CITY OF PORTLAND, MAINE
PLANNING BOARD



Brandon Mazer, Chair
Maggie Stanley, Vice Chair
Marpheen Chann
Sean Dundon
Bob Dunfey
David Silk
Austin Smith

AGENDA
PORTLAND PLANNING BOARD MEETING

The Planning Board will hold a remote meeting on Tuesday, January 11, 2022, 4:00 p.m. Due to the existence of an emergency or urgent issue, the Planning Board will conduct this meeting by remote methods/technology at the Zoom link provided below in accordance with the requirements of 1 M.R.S. section 403-B and the City Council's Remote Participation Policy.

Public comments will be taken for each item on the agenda during the allotted time and written comments should be submitted to planningboard@portlandmaine.gov. Please note that the placement of this item on the agenda is subject to change. Please check the Agenda & Minutes Center prior to the meeting for the item's approximate start time.

When participating via Zoom, allow your computer to install the free Zoom app to get the best meeting experience. For public comment, you will need to use the "raise your hand" feature. To raise your hand via the telephone, please hit *9. You will be un-muted by the moderator when it is time for public comment. For more information on how to use Zoom, please go to: https://www.portlandmaine.gov/remotePUD

ZOOM MEETING INSTRUCTIONS
You are invited to a Zoom webinar.
When: Jan 11, 2022 04:00 PM Eastern Time (US and Canada)
Topic: Planning Board Workshop and Public Hearing 1/11/2022

Please click the link below to join the webinar:
https://us02web.zoom.us/j/89857442845
Or One tap mobile: US: +19292056099,,89857442845# or +13017158592,,89857442845#
Or Telephone: Dial(for higher quality, dial a number based on your current location):
US: +1 929 205 6099 or +1 301 715 8592 or +1 312 626 6799 or +1 669 900 6833 or +1 253 215 8782 or +1 346 248 7799

Webinar ID: 898 5744 2845
International numbers available: https://us02web.zoom.us/u/kc3La1FCZm

WORKSHOP - 4:00 PM

i. ReCode Update (estimated time 4:00 – 6:00 p.m.) The Planning Board will hold a workshop to review work completed to date on ReCode Phase II, with a particular focus on the recently released Land Use Code Evaluation. The Code Evaluation is an assessment of the existing Land Use Code through the lens of *Portland's Plan 2030,* the City's comprehensive plan, and includes recommendations for potential amendments to the Land Use Code and zoning map under future stages of the ReCode process.

PUBLIC HEARING - 6:00 PM

1. ROLL CALL AND DECLARATION OF QUORUM

2. COMMUNICATION AND REPORTS

3. REPORT OF ATTENDANCE AT THE MEETING HELD ON DECEMBER 14, 2021

Afternoon Workshop
35 Commercial Street: Dundon, Dunfey, Silk, and Stanley present; Chann and Mazer absent; Smith recused.
50 Bedford Street: Dundon, Dunfey, Silk, and Stanley present; Chann and Mazer absent; Smith absent.

Evening Hearing
30-32 Atlantic Street: Chann, Dundon, Dunfey, Mazer, Silk, and Stanley present; Smith absent.
19 Willis Street: Chann, Dundon, Dunfey, Mazer, Silk, and Stanley present; Smith absent.

4. REPORTS OF DECISIONS AT THE MEETING HELD ON DECEMBER 14, 2021

i. Major Site Plan; 30-32 Atlantic Street; Kestrel, LLC., Applicant. Stanley moved and Dunfey seconded a motion to waive Land Use Code Section 14.6.2.B.4 & 5, Landscape Preservation, which requires preservation of a minimum of 30% of existing trees 10-inch DBH or greater within the required setback area, in order to allow substitution of landscape in other areas of the site. Vote 6-0, Smith absent. Stanley moved and Dunfey seconded a motion to approve the site plan with two conditions of approval. Vote 6-0, Smith absent.

ii. Level III Site Plan and Subdivision; 19 Willis Street (formerly 33-37 Montreal Street); 37 Montreal Street, LLC., Applicant. Stanley moved and Dunfey seconded a motion to find the Conditional Use for Workforce Housing to meet the standards Land Use Code Sections 14-484 and 14-487 with three conditions of approval. Vote 6-0, Smith absent. Stanley moved and Dunfey seconded a motion to approve the subdivision with two standards of approval. Vote 6-0, Smith absent. Stanley moved and Dunfey seconded a motion to approve the site plan with two conditions of approval. Vote 6-0, Smith absent.

5. NEW BUSINESS

i. Planning Board Officer Elections (estimated time 6:00 – 6:15 p.m.)

ii. Subdivision; 33 McAlister Farm Road; PK Real Estate, LLC., Applicant. ***ITEM TO BE POSTPONED TO A FUTURE DATE*** The Planning Board will hold a remote public hearing to consider the division of 33 McAlister Farm Road into three parcels. The subject property is 10.12 acres in size and is zoned I-M Moderate Impact Industrial. The new parcels to be created through this subdivision are to be 2.06 acres (Lot A), 6.05 acres (Lot B) and 2.01 acres (Lot C).

iii. Major Site Plan; 50 (44) Bedford Street; University of Southern Maine, Applicant. (estimated time 6:15 – 7:15 p.m.) The Planning Board will hold a remote public hearing to consider a proposal for the development of a four-level, 504 space parking garage with a footprint of 45,100 square feet, along with associated site improvements, at 50 (44) Bedford Street. The subject property is 8.1 acres in size and is located in the R-5 Residential and B-2 Community Business zones as well as in the USM Overlay Zone.

iv. Zoning Text Amendment; 35 Commercial Street; Maine Public Broadcasting Corporation, Applicant. (estimated time 7:15 p.m.) The Planning Board will hold a remote public hearing to consider a zoning text amendment by Maine Public Broadcasting Corporation to facilitate changes to the Land Use Code to allow height bonuses along Commercial Street, specifically within the Urban Active Subdistrict of the India Street Form Based Code Zone.

Memorandum
Planning and Urban Development Department

To:	Chair Mazer & Members of the Planning Board
From:	Christine Grimando, Director
	Nell Donaldson, Director of Special Projects
Date:	January 7, 2022
Re:	ReCode Phase II – Land Use Code Evaluation
Meeting Date:	January 11, 2022

I. INTRODUCTION

On January 11, 2022, staff from the Department of Planning & Urban Development and Camiros, the City's ReCode consultant, will hold a workshop with the Planning Board on ReCode Portland, the city's multi-phased rewriting of Portland's land use code. The workshop will include an update on work to date in Phase II of ReCode, with a focus on the first major work product of Phase II, the land use code evaluation. The workshop is meant to give the Planning Board and the public an opportunity to ask questions and provide feedback on the recommendations contained within the code evaluation.

II. THE FOUNDATION: *PORTLAND'S PLAN* & RECODE



Figure 1: Portland's Plan vision

In 2017, the City Council adopted *Portland's Plan 2030* (*https://view.publitas.com/city-of-portland/portlands-plan-2030/page/1*), the comprehensive plan for the City of Portland. *Portland's Plan* was developed with the input of thousands of Portland residents, workers, students, and visitors, and reflects a 21st century vision for the city, focusing the City's aspirations around six key themes: Equitable, Sustainable, Connected, Authentic, Dynamic, and Secure *(Figure 1)*. The plan includes a series of policy guides derived from the vision and related to key topic areas, from transportation to housing, public facilities, historic resources, waterfront, open space, and the economy.

One of the first recommendations of *Portland's Plan* was to "create a new unified development code…that incorporates zoning, the historic preservation ordinance, housing policies, and other aspects of the development review process into a more readable and useful document" (p. 90). At the time of the plan's adoption, the land use code and corresponding zoning map contained content which had been amended by the City Council over decades. Much of this policy reflected current best practice; however, the code had not been holistically reviewed or reworked in half a century. It had ballooned in length to nearly 1,000 pages, contained significant redundancy, and could be cumbersome and confusing to navigate. In making this recommendation, *Portland's Plan* recognized that the City needed to revise the land use code on a functional level to improve legibility, clarity, and consistency for users. Simultaneously, the recommendation also reflected a deeper understanding that fundamentally, as one of the principal tools for implementation of *Portland's Plan,* the land use code would need to be updated to align with the City's new vision and goals. This imperative reflects state statute; in Maine, 30-A MRS Section 4352(2) requires explicitly that a "zoning ordinance must be pursuant to and consistent with a comprehensive plan adopted by the municipal legislative body."

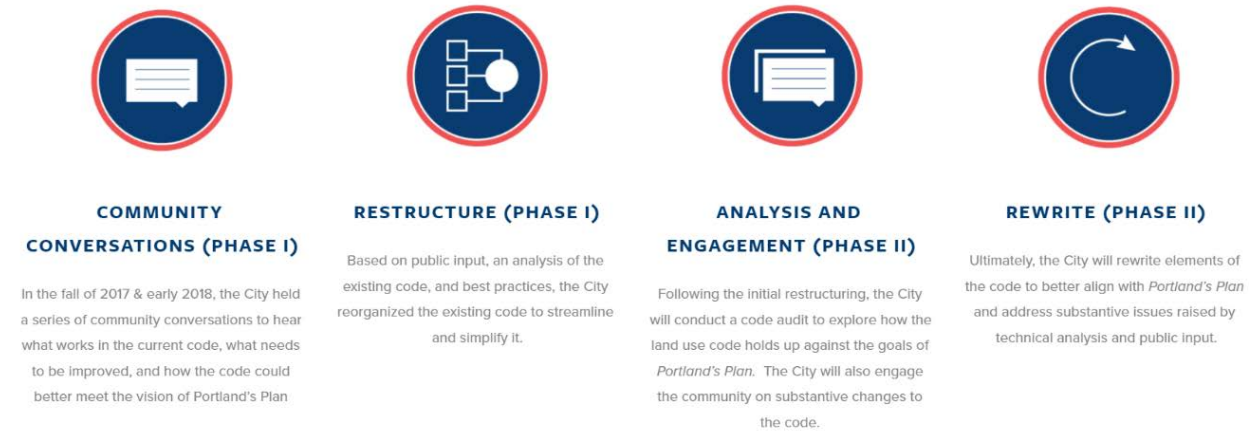

Figure 2. Overview of the ReCode process

In direct response to the *Portland's Plan* recommendation and shortly following the plan's adoption, the City began ReCode Portland (www.recodeportland.me), its first comprehensive effort to rewrite its land use code in over fifty years. From the outset, the effort was designed to advance in two consecutive phases; Phase I would focus on improving the code's functionality, and Phase II would focus on the more policy-oriented work of ensuring that the code aligns with *Portland's Plan (Figure 2).*

III. LOOKING BACK: RECODE PHASE I

Phase I of the ReCode process was organized around the first major objective for the code: reformatting, restructuring, and streamlining the code into a cleaner, more user-friendly document that provides an improved framework for incorporating new policies and addressing evolving planning needs in the future. It is important to note that Phase I also included substantial policy changes which generally aligned with the goal of providing more clear and consistent land use regulation. In this vein, it incorporated updates to the City's off-street parking standards (simplifying regulations and adding exemptions city-wide), accessory dwelling unit (ADU) provisions (creating a simpler, city-wide ADU framework that encourages additional incremental housing creation on all residential properties in the city), and a new, improved, and more visually engaging sign ordinance. (Early in the ReCode Phase I process, prior to the new code being adopted, an impact fee ordinance was also adopted by the Council, which created a systematic and predictable impact fee system to help support new infrastructure that in turn helps sustain city growth.)

After a long review period, including numerous Planning Board workshops, Council workshops, and months in which portions of the draft code were open for public comment, the City Council adopted the new land use code in November of 2020. Staff and the public have worked with the revised code ever since, greatly benefitting from improved navigation, the use of tables and charts, and more clearly organized regulations and standards. As one point of reference, the prior document, at nearly 1,000 pages, was reduced to under 400 pages with the adoption of the new code. Though the page count alone does not reveal the complexity of the changes that comprised Phase I, or the new code's value as a vehicle for the City's land use policies, the reduced size is one indicator of the extent of the restructuring and of the new document's usability.

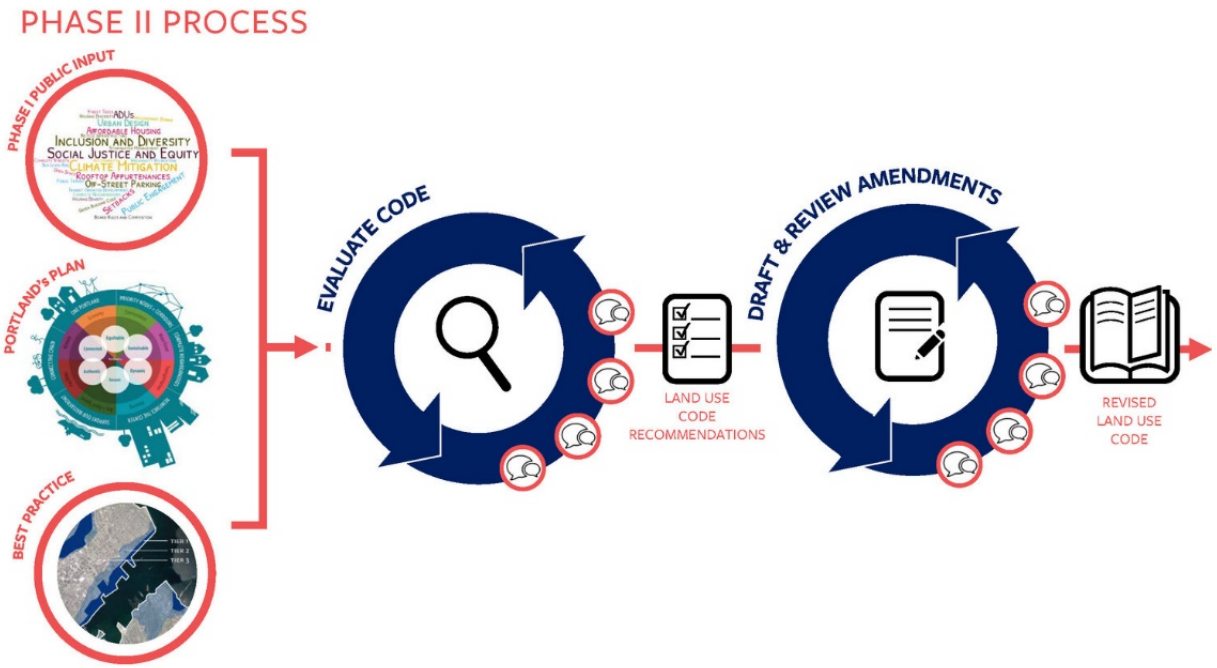

Figure 3: Phase II process

IV. WHERE WE ARE NOW: RECODE PHASE II

Where Phase I of ReCode prioritized a greatly improved structure for the code and greater consistency in how certain key policies are applied, Phase II is focused on examining the land use code in light of goals expressed through *Portland's Plan* and rewriting the code to better align with that vision. For instance, *Portland's Plan* foregrounds issues of sustainability, equity, and housing, among others; Phase II will result in recommended land use code and zoning map amendments that help to address these issues. The evaluation of Portland's zoning districts has been central to the Phase II workplan since the beginning of ReCode, including an assessment of existing zoning districts for how well they align with *Portland's Plan 2030* goals.

A. Phase II process

Phase II began promptly after the conclusion of Phase I with the release of an RFP for consultant services. As of the spring of 2021, Camiros, a consultant with national experience in writing and updating land use codes, was hired to lead the ReCode Phase II effort. Camiros's scope includes two major elements, both of which build off the significant public engagement and policy work of the comprehensive plan *(Figure 3)*:

- *Code evaluation.* The first part of Phase II focuses on a comprehensive evaluation of the existing land use code with respect to the goals from *Portland's Plan.* The code evaluation is designed to provide a set of recommendations for possible code amendments to follow. Camiros's scope includes public engagement around the code evaluation to ensure that the document adequately addresses comprehensive plan goals.
- *Drafting & review of amendments.* Following public input on the code evaluation, the consultant will begin the work of drafting potential amendments to the land use code and zoning map to respond to the evaluation and feedback. As with the code evaluation, this work will involve broad public engagement. Ultimately, amendments will progress through formal review channels with the Planning Board toward Council adoption.

B. Phase II work to date

The Phase II work builds on the extensive community visioning that went into the comprehensive plan, and seeks to assess how the city's goals for housing, land use, transportation, open space, and the environment can best be translated into the technical and regulatory details of the code. Initial work to date has included:

- *Early interviews with stakeholders.* In the spring of 2021, the consultant interviewed 15 individuals representing a diverse array of perspectives on issues relevant to ReCode. The purpose of these interviews was not to engage a large quantity of people; instead the interviews focused on breadth, gathering a preliminary snapshot of some of the challenges and opportunities related to the code in practice in Portland today. Interviewees ranged from those in the development community to affordable housing advocates, neighborhood residents, and representatives of civic and cultural organizations.
- *Update to the ReCode website.* Simultaneously, City staff developed a content series for the ReCode website organized around the vision statement from *Portland's Plan*, presenting perspectives on the relationships between the six elements of the vision and the City's land use code. This work is intended to help viewers connect with the vision, become familiar with *Portland's Plan*, and learn about how the plan intersects with the code. Some of the content included at www.recodeportland.me/explore includes:
  - A chronological overview of past zoning maps and their relation to city planning;
  - an interactive map analyzing complete neighborhoods in the city; and
  - an analysis of recent housing trends by housing type, neighborhood, and zone.
- *Engagement w/ community organizations.* Building off the outreach from Phase I, since the beginning of Phase II, staff has continued to attend meetings with stakeholder groups upon request (in addition to regularly scheduled public meetings). These have included, for instance, meetings with and through the Portland Association of Neighborhoods (PAN), Portland Society of Architects (PSA), Maine Conservation Voters Lunch & Learn, and the Office of Sustainability's Climate and Coffee series. More of these meetings are currently being scheduled.
- *Engagement with Council committees.* In October, staff attended a workshop with the City Council's Housing & Economic Development Committee on the issue of housing policy. In this workshop, staff provided an overview of the foundation for housing policy in *Portland's Plan*, the city's existing land use code-related housing policy, and some initial considerations around future housing policy that have arisen through the early work of ReCode Phase II. The staff memo for this workshop is included here as *Attachment 5.*
- *Development of the code evaluation.* Lastly, staff and the consultant have been focused on review and analysis of the existing land use code as part of the land use code evaluation. The evaluation has been shared internally across Planning, Corporation Counsel, the Office of Sustainability, and Permitting & Inspections. As of late December 2021, it has also been released for public review and comment at https://www.recodeportland.me/code-evaluation.



Figure 4: Land Use Code Evaluation

V. LAND USE CODE EVALUATION

The land use code evaluation *(Attachment 1)* responds to the six themes of the *Portland's Plan* vision, making a clear and intentional connection between the vision established within the City's plan(s) and potential revisions to the land use code. The code evaluation includes recommendations related to basic use regulations, dimensional standards, and the City's existing zones. The evaluation also makes structural recommendations and suggests various updates to continue the organizational work of Phase I. Altogether, the recommendations within the code evaluation provide the City with a "road map" of possible strategies for revising the land use code to bring the City closer to *Portland's Plan.*

A. Summary of Code Evaluation Recommendations

- Use & Use Standards - The land use code evaluation identifies opportunities to revise permitted use regulations within the code to better support the creation of middle-density housing, the creative economy, and urban agriculture. The evaluation also highlights the potential for additions or refinements to the City's range of social service and housing-related uses, and the need to review use regulations through the lens of Portland's climate resiliency goals.
- Dimensional & Design - The code evaluation recommends adjusting dimensional standards in part to help achieve climate goals. Recommendations include the establishment of more consistent regulation for impervious surfaces, further evaluation of height and setbacks in the context of resiliency, and consideration of dimensional bonuses (e.g. additional height or density) in cases where climate goals are furthered. The evaluation also recommends potential revisions to dimensional and design standards to support housing creation and transit-oriented, walkable, urban development.
- Zones - The code evaluation explores opportunities to refine, revise, and reorient the City's palette of zones to better align with the goals of *Portland's Plan.* It takes perhaps the most critical look at the city's residential zones, with an eye toward implementing the City's goal of encouraging new housing production and creating opportunities for a more diverse array of housing types across the city's neighborhoods. The evaluation also recommends adjustments to the City's mixed-use, industrial, and open space zones, identifying where zones may need to be revised to ensure they are achieving their purpose, or where they might be consolidated with other zones.
- General Development Standards – The code evaluation recommends a series of changes that provide greater flexibility for new development, notably through targeted exceptions and rules for architectural elements and accessory structures and uses. Additionally, the evaluation addresses issues of natural resource protections, green building, and green infrastructure, identifying where regulations could be expanded, or new approaches considered to further these aims.
- Parking, Loading & Access – The code evaluation builds upon recent changes to off-street parking regulations with recommendations that encourage mode shift away from single occupancy vehicles and that improve the design and functionality of new off-street parking and loading areas. Recommendations also acknowledge the emergence of new technologies, and consider ways to encourage new development to accommodate advances in electric and autonomous vehicles. Finally, the evaluation recommends refinements to the City's bicycle

parking standards, to ensure they continue to meet both the physical and functional needs of bicyclists in the city.

- Landscape - The code evaluation recommends that a new unified landscape chapter be introduced into the land use code, that would apply to all new development, and be augmented to overtly prioritize and facilitate landscaping and landscape alternatives that further City goals around climate resilience, equity, and ecology.
- Nonconformities - The land use code evaluation recommends modest changes to the City's allowance for nonconformities, to account for individual non-conforming characteristics of a site, provide additional flexibility for enlarging non-conforming structures, and encourage change over time by not allowing one non-conforming use to be replaced by another non-conforming use.
- Code Structure - While the efforts of ReCode Phase I resulted in a code that is considerably more user friendly, it was always understood that additional restructuring would occur as part of Phase II, as content changes are expected to result in a more streamlined regulatory framework. The code evaluation acknowledges this and cites additional opportunities to make use of illustrations and matrices to depict regulations related to design standards, rules of measurement, dimensional requirements, and accessory site elements and structures.

B. Code Evaluation Outreach & Engagement

It is important to note that the code evaluation is not a vision document or a long-range plan such as *Portland's Plan 2030* or *One Climate Future*, but rather a set of technical recommendations on how the code can best further the city's aspirations around housing, climate, and equity, among others. ReCode Phase II is not seeking to recreate those aspirations, but to consider their implementation in terms of changes to such things as setbacks, height, types of housing, residential density allowances, and permitted uses, among others. The cumulative effect of numerous potential amendments to the code, small and large, can result in immediately recognizable changes to the city, or changes that are gradual and incremental but no less profound in their effect. Particularly because of this - the technical yet impactful nature of this document - staff recognizes the need to promote it widely and provide numerous ways for the public to access the information within it.

To this end, as of late December 2021 the code evaluation has been released to the public via the ReCode website, where viewers can read or download the entire document. In addition, the public can access a shorter summary companion piece *(Attachment 2)* on the ReCode website, or watch a video which highlights key findings of the evaluation. With respect to feedback, viewers can comment directly on the code evaluation on the ReCode website. This comment function will be available to the public throughout the coming month at https://www.recodeportland. me/code-evaluation.

The code evaluation and companion materials are being promoted in various ways:

- *Direct outreach.* Staff has publicized the code evaluation directly through the City's Friday news round-up, Planning Department, Planning Board, and ReCode mailing lists. Direct emails were also distributed to leaders of community organizations and to contacts from recent land use applications. Altogether, this direct engagement reached approximately 6,000 email addresses. Direct outreach through www.recodeportland.me included translated promotional materials meant to provide information to a broader, multilingual audience including Arabic, French, Spanish, and Portuguese speakers.

- *Social media.* In conjunction with direct emails, the release of the code evaluation was promoted through the City's and the Planning Department's various social media accounts, including through Instagram, Twitter, and Facebook.
- *Website* – Staff completed a series of website updates to correspond with the release of the code evaluation.
- *City of Portland Civil Space.* Staff built out a landing page on Civil Space, in keeping with the City's broader effort around promotion of large initiatives. This landing page (https://portland.civilspace.io/en) provides an overview of the project and direct links to the ReCode website and the code evaluation. The Civil Space landing page is translatable through Google translate.
- *Council communication.* On Monday, December 20, staff appeared before the City Council with a communication about ReCode Phase II and the land use code evaluation. This meeting was noticed as all Council meetings are.

Staff is also working with Camiros to plan a public engagement event in early 2022, with the goal of providing more and more varied opportunities for the public to interact with the recommendations of the code evaluation. As the plan for this event solidifies, staff will provide updates on the ReCode website and promote the event through outreach similar to that already used to promote the evaluation itself. In addition, in early February, staff and Camiros will appear before the City Council for a workshop on ReCode Phase II. This meeting will include a reporting of feedback on the code evaluation to date.

It is important to note that the code evaluation is intended to stimulate discussion and help build consensus around specific recommendations for the City's code; it is not – itself – the product. The evaluation does not require revisions or action on the part of the Planning Board or the City Council. Rather, feedback from public and the City's formal review bodies will provide important direction as staff and the consultant begin the next stage of work.

VI. PUBLIC COMMENT

As of this writing, the City has received over 100 individual comments on the land use code evaluation through the document comment function on the ReCode Portland website. A summary of these comments is included as *Attachment 3*. While the City is promoting the use of the comment feature available on the ReCode Portland website, members of the public are also welcome to submit written public comment to recode@portlandmaine.gov or planning@portlandmaine.gov.

Since the adoption of ReCode Phase I, the City has also received ten public comments through www.recodeportland.me, with recommendations pertaining to dimensional and design standards so as to allow for more extensive development, further loosening of ADU requirements, and simplification of the City's street extension requirements. More recent comments have focused on the approach and substance of the code evaluation. These comments are included in *Attachment 4*.

VII. NEXT STEPS

Following the public engagement, Planning Board workshop, and Council workshop on the land use code evaluation, staff and Camiros will begin to lay out a strategy for the still more technical work of drafting and reviewing code and zoning map amendments. In addition to broader public engagement around this process, additional workshops with the Planning Board will be scheduled as amendments are developed.

ATTACHMENTS

1. *Land Use Code Evaluation,* Camiros for the City of Portland, ME
2. *Land Use Code Evaluation Companion Piece,* Camiros for the City of Portland, ME
3. Summary of comments on the *Land Use Code Evaluation* to date
4. Public comment received by email
5. *Housing policy & ReCode Portland*, Staff memo to HEDC, 10/1/21

RECODE PORTLAND PHASE II

LAND USE CODE EVALUATION



DECEMBER 2021



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Preface

WELCOME TO PHASE II OF RECODE PORTLAND!

This land use code evaluation represents the first major work product of Phase II of ReCode Portland, the process of updating the City of Portland's Land Use Code to align with our comprehensive plan, *Portland's Plan 2030*.

The work of Phase II will build upon the foundation established during Phase I of the Recode effort, expanding into significant substantive revisions to the content of the Code. In short, whereas Phase I of the process was predominantly focused on **reformatting and restructuring** the City's Land use Code to ensure internal consistency and improve the document's legibility, organization, and accessibility, Phase II will focus on **reorienting and revising** the Code to better align with the vision, goals, and objectives of *Portland's Plan 2030*.

Phase I of the ReCode process, as stated, was centered around an effort to reorganize the Code into a modern, rational, user-friendly format. However, there were a few revisions to the Code focused on implementing new City policy, including provisions for accessory dwelling units, off-street parking flexibilities, and sign standards. Phase II of ReCode – in contrast to Phase I – will be focused on policy implementation rather than restructuring with the goal of bringing Portland's land use regulations into greater alignment with the City's priorities, including **mitigating the impacts of climate change, addressing sea level rise, addressing racial and social equity, and supporting a diverse and affordable supply of housing,** among others. This effort will result in a Code that is responsive to critical and emerging land use issues, reflective of the values of city residents, and respectful of the features that make Portland a unique and thriving coastal city.

PURPOSE OF THE LAND USE CODE EVALUATION.

The Land Use Code Evaluation presents the findings of a detailed review and assessment of the City of Portland's current Land Use Code (adopted in November of 2020), as it relates to the goals and policies of the City articulated within numerous recent policy documents including *Portland's Plan* (2017), and *One Climate Future* (2020), among others. The purpose of this evaluation is manifold; it allows for an in-depth understanding of the City's current regulations and their impacts on key policy directives, and for the development of concepts and approaches for potential revisions to be included in an updated code. It also allows for the identification of areas where more work will be required to develop thoughtful and informed approaches to critical issues, and correspondingly suggests avenues for future study.

For the purposes of this evaluation, regulatory concepts have been organized corresponding to the six themes established within *Portland's Plan*: Equitable, Sustainable, Dynamic, Secure, Authentic, and Connected. This organization provides a clear



and intentional connection between the policies established within the City's plan(s) and revisions to the Land Use Code that can help to implement those policies. An additional series of potential revisions and best practices have been included – with respect to the goals of Phase I of ReCode – to further clarify or simplify the organizational structure of the code. These items will appear as "structural" considerations within the concepts and approaches included in the evaluation.

Readers should note that many of the regulatory concepts discussed within this report are unavoidably technical in nature. Further, some revisions recommended for the City's Land Use Code may appear to be relatively minor, or may – in some cases – simply manifest as what appears to be modest differences in dimensional requirements, ratios, or permitted uses within a zone. However, both individually and as a suite of revisions, these items are all intended to advance the City's goals concerning climate resiliency, housing diversity and affordability, and high-quality development, among others. With the incorporation of the revisions included in this evaluation, Portland's Land Use Code will more accurately reflect and reinforce the City's priorities, goals, and aspirations.

The Land Use Code & *Portland's Plan*

The City's Land Use Code is a key implementation tool for City policy. Concepts, approaches, and recommendations within this evaluation have been targeted at ensuring that the work of Phase II significantly advances the goals of *Portland's Plan* and other City policy documents. Specifically, revisions recommended for Phase II will move Portland closer to its vision of an equitable, sustainable, dynamic, secure, authentic, and connected community.



Equitable

Sustainable

Dynamic

Secure

Authentic

Connected

FOCUS ON: PORTLAND'S PLAN

Portland's Plan, adopted by the City Council in 2017, is the City's comprehensive plan. The plan involved the input of thousands of stakeholders - Portland residents, workers, students, business owners - who helped to shape the plan's ten-year vision. By state law, that vision, and the policy recommendations that flow from it, lay a foundation for all land use regulation in the city. ***Among many areas of focus, the plan supports the land use principles of:***

- **One Portland**, where no one area of the city carries all expectations for accommodating growth and all areas can expect appropriate City services and amenities
- **Complete neighborhoods**, where all residents can access the basic necessities of daily life within walkable, bike-able distance
- **A strong downtown** as the center of the region's arts, cultural, economic, and civic health
- **A thriving working waterfront** where iconic and emerging industries can flourish
- **Priority nodes and corridors** aligned with our multimodal transportation network
- **Connected transportation, open spaces, and infrastructur**e as the backbone for future growth.



THINKING HOLISTICALLY TO MAKE PORTLAND A MORE EQUITABLE CITY.

Equity is a key theme of *Portland's Plan*. A major component of the City's vision for the future is a commitment to incorporating the needs of - and providing opportunities for - all residents. Portland will also continue to celebrate the diversity of its people and places into the future, and will work to remain a welcoming and safe place for residents and visitors alike. The Land Use Code revision presents a valuable opportunity to advance these goals, and to promote an equitable approach to Portland's future development.

Revisions to the City's Land Use Code can work to further equity goals by ensuring that all of the City's neighborhoods can become "complete neighborhoods:" those places where residents have access to stable housing, transportation opportunities, and the services and amenities necessary to meet their daily needs within a close distance. This type of complete neighborhood development also promotes healthy lifestyles, reduces automobile dependence, and encourages the kind of casual neighbor-to-neighbor encounters that result in a stronger sense of community.

Supporting additional neighborhood-scale business through zoning within walking distance of residents' homes can help to achieve complete neighborhoods objectives. Expanding the definition of "agriculture" and providing new opportunities to grow food throughout the city can help to provide access to fresh, healthy foods for all residents. Additionally, clarifying and diversifying the range of dwelling types within the code, and allowing a diverse range of types across the city's neighborhoods, can serve to expand housing choice in new areas of the city, directly addressing issues of equity.

The City can also pursue new tools to incentivize or encourage the creation of affordable housing in Portland. The City can consider an expansion of tools already in place (density/height/setback bonuses, fee reductions, etc.), as well as revisions to these tools, to support additional affordable housing production across the city. Further, thinking holistically, as Portland responds to challenges such as climate

FOCUS ON: EQUITY

Equity is a major theme of *Portland's Plan*, which commits the City to incorporating "the needs of all of our residents in planning for our future." Historically, the planning field hasn't always achieved this lofty goal, and communities across the country are working now to acknowledge and proactively address years of inequitable land use policy. In line with this work, and building off the analysis of the Racial Equity Steering Committee and the City's concurrent Affirmatively Furthering Fair Housing (AFFH) efforts, ReCode Phase II is exploring how our land use code intersects with issues of racial and social equity – how our code has contributed to patterns of economic and racial segregation, where our code may limit access to resources for historically marginalized communities, and where there may be opportunities to affirmatively address existing inequities within the code. The goal is to revise the land use policy in a way that better creates opportunities and promotes access to resources for all citizens, particularly those who most need them.



change and sea level rise, there is a growing need to conceptualize the city not only as a series of unique places, but as one complex whole. As such, there will be opportunities to ensure that both the responsibilities and the opportunities to accommodate new growth and development are shared equally across the city, particularly important in the context of mitigating risk and building resiliency.

Revisions to the Code can also ensure that new development takes an equitable approach to maintaining access to the city's recreational and scenic resources – including the city's waterfront – providing both physical and visual access where appropriate (and in ways that are compatible with water-dependent uses) to provide all communities with the benefit of the city's wealth of amenities. Additionally, landscape requirements can be strengthened for all areas of the city to ensure that the whole of Portland is better equipped to both manage environmental impacts such as heat island and stormwater runoff, and to reap the benefits of green infrastructure – both ecological and psychological.

Finally, the Code can encourage continued investment in established communities by increasing flexibility for the maintenance and improvement of structures and site elements (like landscape or lighting) that may not meet the requirements of the Code. Allowing for reasonable maintenance and improvements to non-conforming structures, without making property owners jump through complex, costly, or time-consuming hoops, can often promote reinvestment in neighborhoods, as opposed to disinvestment.

DEVELOPING NEW APPROACHES TO ALLOW PORTLAND TO FURTHER THE GOALS OF A FISCALLY, SOCIALLY, AND ENVIRONMENTALLY SUSTAINABLE CITY.

The term sustainability is often used in reference to environmental factors like solar and wind energy, cool roofs, and lighting standards. And all of these should be part of the City's development regulations. Yet, community sustainability, the ability for City investments and private development to provide a high quality of life for residents now and into the future is much more than narrowly an environmental issue. *Portland's Plan* takes a comprehensive look at community sustainability, acknowledging the need for growth to sustain the community, infrastructure, and economy, while committing to ensuring that growth is environmentally, socially, and fiscally responsible. Further, *One Climate Future* provides clear guidance for a series of steps the City can take to both reduce its contributions to global climate change, and prepare the city for the impacts associated with it.

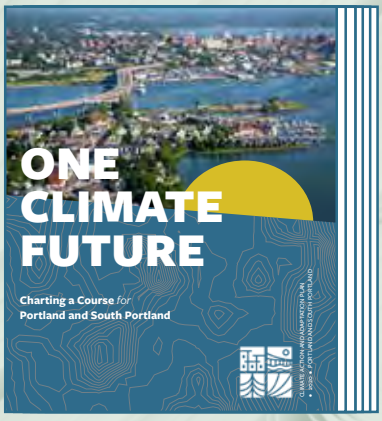
Regarding the Land Use Code, sustainability should be a thread that knits together all sections of the document. At the neighborhood scale, new opportunities for live/work spaces and corner stores can be included alongside a range of housing types to encourage the creation of complete neighborhoods that can reduce the need for vehicle trips and thus the city's carbon footprint. At the city scale, new uses, dwelling types and permitted densities can be a tool to encourage development in those areas of Portland that are low-risk, ensuring that new investment and development

is responsibly located. Resiliency overlays can be developed – through future study – as a key tool to evaluate the potential for risk, and focus growth within those areas of the city that are least likely to experience the negative impacts of climate change and sea level rise.

Barriers to sustainable infrastructure such as solar installations can be identified and removed, balancing the potential impacts of such uses with their environmental and economic benefits. Further, permissions for individual property owners can be expanded through a comprehensive look at accessory structures, including where and how they can be constructed. This can ease the process for property owners installing sustainable infrastructure such as solar panels, small-scale wind turbines, and greenhouses. In addition to removing barriers, revisions to the Code can help to encourage or incentivize sustainable technology such as microgrids and renewable energy systems, further building resiliency into the fabric of the city.

Within the Code, specific zone standards can be included or modified to promote the City's sustainability goals. For instance, dimensional standards within the Land Use Code, such as impervious surface maximums, can be modified to provide a balance between neighborhood character and pattern and site design that prioritizes sustainability and neighborhood resilience. The City can consider new or revised regulations where appropriate, such as landscaping standards, and requirements or incentives for other on-site water quality improvements, such as expansion of green roofs and greater incorporation of Low

FOCUS ON: ONE CLIMATE FUTURE



In 2020, the City of Portland published *One Climate Future*, a plan that identifies clear pathways for reducing our contribution to global climate change while also preparing the city for the impacts of sea level rise, increased precipitation, and hotter air temperatures. *One Climate Future* highlights the importance of land use principles and practices that codify the City's commitment to a smaller carbon footprint, smart growth, and resiliency.

On the mitigation side, *One Climate Future* provides a road map for meeting our city-wide goal of reducing greenhouse gas emissions 80% from 2017 levels by 2050. The plan's greenhouse gas inventory shows that buildings and transportation represent the city's two largest contributors to greenhouse gas emissions. While building emissions are largely regulated by the building code, transportation emissions, which are fundamentally about where people live, work, and meet their daily needs, are integrally tied to the Land Use Code. Recognizing this transportation-land use connection, *One Climate Future* includes recommendations to support transit, walking, and bicycling as alternatives



to single-occupancy vehicles, encourage the co-location of housing, jobs, and services, and facilitate a transition to electric vehicles.

One Climate Future also establishes an adaptation goal, stating that the city will build the resilience of its neighborhoods, infrastructure, and ecosystems to prepare for the impacts of climate change. As with issues of mitigation, adaptation is closely tied to land use - how and where people build homes, workplaces, institutions, and green spaces. The plan's adaptation recommendations include a wide variety of strategies to build strong social networks and a resilient local economy, as well as land use strategies to ensure that our built environment reflects the vulnerabilities posed by sea level rise and increased weather events.

As Phase II of ReCode gets underway, this Code Evaluation explores ways in which the current code is addressing these issues and ways that policy could be modified to ensure that *One Climate Future* is fully reflected in the City's Land Use Code.

Impact Development (LID) strategies. Zone standards can also be revised to promote coordination between land use and transportation investments, allowing for increased density proximate to transit that can improve affordability, reduce vehicle miles traveled (VMT) and encourage the growth of local businesses. Additionally, revisions to specific types of zones, such as the city's industrial zones, can help to both mitigate any potential impacts of this type of development, and ensure that the needs of businesses and the nature of modern industrial operations is acknowledged within the Code, setting the stage for new avenues of economic opportunity.

New and/or revised standards can also help to strengthen protections for the city's abundant natural resources, encourage green infrastructure solutions, and expand access to opportunities for local food production. Landscape regulations can augment this approach by requiring the use of native species and incorporating principles such as habitat preservation and restoration, and planting for pollinators.

Finally, the Land Use Code revision provides another important opportunity to re-evaluate Portland's relationship to the automobile, both now and into the future. Flexibilities and exemptions from parking standards can be reviewed to ensure they are clear, and in alignment with the City's sustainability and economic development goals. Though Portland's standards currently allow for a number of parking exemptions and flexibility in ways to meet parking standards, more can still be done. Following upon the recommendations within One Climate Future, parking maximums can be evaluated for appropriate areas of the city to prevent over-parking and mitigate stormwater runoff and heat-island impacts. Bicycle parking requirements can also be expanded to promote the creation of a more cohesive multi-modal network throughout the city.



EXPANDING OPTIONS AND THINKING BOTH LOCALLY AND GLOBALLY TO MAKE PORTLAND A MORE DYNAMIC CITY.

A dynamic city is one that contains a multitude of options and opportunities that support a variety of lifestyle choices for its residents. It contains lively business districts, thriving residential neighborhoods of multiple scales and intensities, and mixed-use nodes where residents can find opportunities to shop, eat, and be entertained, often within proximity to transit. Dynamic cities embrace diversity, innovation, and change; deftly merging the needs and desires of a modern citizenry with an authentic cultural identity and the "genius loci," or the "spirit of the place."

Portland is already a dynamic city. Moving forward, the Land Use Code revision provides an opportunity to help the City embody its goals as stated in *Portland's Plan*, fully supporting a range of arts and cultural opportunities, innovation, diversity, and a built environment that supports and encourages an active citizenry. New and emerging uses can be woven into the Code in various ways to encourage the creation of dynamic, mixed-use walkable neighborhoods; neighborhood retail, live/work spaces, local food production opportunities, and a diverse range of housing types that can accommodate a broad range of needs, preferences, and incomes.

Standards can be refined to ensure that Portland's neighborhood patterns are acknowledged within the Code, while allowing for an expanded palette of residential dwelling types that can encourage affordability and provide options for upsizing, downsizing, and aging-in-place. As a dynamic city, Portland must also acknowledge the need to respond to the challenges of a changing future. The Land Use Code revision can provide direction for the city to accommodate growth responsibly, encouraging dynamic growth in those areas that are at lowest risk of inundation due to climate change and sea level rise. Further, it can remove barriers to uses and technologies such as solar and wind installations.

The Land Use Code revision can also re-think the City's approach to its built form where appropriate, allowing for new, taller buildings where it makes sense – accommodating greater densities and diversifying the urban character of the city. As Portland continues to grow, the peninsula remains the same size; new densities, a new approach to height, and responsive design controls should be considered to ensure that growth can be absorbed intentionally, contributing to the dynamic character of the city, and reinforcing Portland's sense of place rather than detracting from it.

In addition to the new, a dynamic city provides opportunities for the reuse or conversion of



older, character-giving structures that may have outlived their intended purposes, but are ready to be given new life. The Land Use Code revision can provide standards that accommodate the reuse or conversion of structures in response to changing markets and dynamics within the city. Finally, the Land Use Code revision can support a dynamic multi-modal transportation system within the city by addressing items like parking standards, required EV charging facilities, public realm elements, bicycle accommodations, and allowances for transit-supportive densities where appropriate.

FOCUS ON: PARKING POLICY

As in many American communities, off-street parking requirements commonly arise as one of the most often discussed aspects of the City's land use code. Over the past several decades, the City has worked to calibrate the off-street parking ordinance to best practice, local conditions, and the city's vision, adding bicycle parking standards in 2008, parking study-based standards in 2010, a fee-in-lieu provision in 2010, and exemptions for certain residential development in 2016. Transportation Demand Management requirements, designed to minimize the need for off-street parking, have existed in the code since the mid-2000s.

Under ReCode Phase I, parking policy in the city evolved several steps further. Phase I streamlined and expanded existing off-street parking regulations, such as shared vehicle provisions, shared parking provisions, fee-in-lieu provisions, and residential off-street parking requirements. Even more significantly, ReCode Phase I resulted in the creation of an off-street parking exemption for all uses within 1/4 mile of fixed route transit, effectively eliminating parking requirements for 2/3 of the city. These changes, in total, were designed with the goal of reducing the effect of off-street parking as a barrier to housing development, encouraging a more walkable pedestrian environment, driving the use of transit, and supporting the City's broader climate-related goals.



STRATEGIZING TO ENSURE THAT THE HEALTH AND WELL-BEING OF ALL RESIDENTS IS PARAMOUNT, MAKING PORTLAND A MORE SECURE CITY.

The City is committed to ensuring that all Portlanders have access to housing, healthy food, and economic opportunity. Moreover, Portland is committed to proactively preparing to address the economic and environmental challenges presented by climate change, enhancing the long-term security of the city itself. In the context of the Land Use Code revision, the concept of security is multifaceted.

The Land Use Code revision can clarify and expand the range of dwelling types allowed within the city, diversifying and expanding access to housing options. Additionally, the City's regulatory tools can be evaluated in the context of housing affordability, allowing for the exploration of new tools, techniques, and incentives that can contribute to the creation of new housing, and new affordable housing, within Portland. Food security can also be addressed through allowances for new uses within the city's neighborhoods and allowances for multiple forms of food production and urban agriculture, working to expand access to fresh, healthy food.

FOCUS ON: COMPLETE NEIGHBORHOODS

Portland's Plan prioritizes the concept of complete neighborhoods, where all residents have access to the basic necessities of daily life - high quality and affordable housing, schools and other civic functions, food, open space, other amenities and services - within a walkable or bike-able distance. The city already has examples of these neighborhoods, each with its own social networks, physical form and scale, and distinct sense of identity. Supporting these neighborhoods, and fostering others, is fundamental to the growth of a dynamic city as envisioned in *Portland's Plan*.

As part of ReCode Portland, the City has conducted a complete neighborhoods analysis - a geospatial analysis to determine levels of access to a variety of important resources and amenities by residents city-wide. A critical next step is to understand how the existing code - whether in the mix and form of allowed uses, in residential densities, or in public infrastructure - is facilitating complete neighborhoods. This work involves many questions. Are certain types of uses prohibited in residential areas where they may be appropriate, or are neighborhood-scale businesses allowed in too few locations? Aside from uses and scale, are there other factors that limit complete neighborhoods, such as uncomfortable streetscapes or inadequate pedestrian and bicycle infrastructure? These questions will help to ensure that ReCode helps build an environment where all households have convenient access to the basic necessities of daily life.



The needs of all residents can be addressed through the consideration, and in some instances clarification, of a full range of social service uses within the City's Land Use Code. Standards can be included to ensure that potential impacts are balanced with the need to accommodate the city's most vulnerable populations. The security of Portland's housing stock can also be prioritized through regulations that link key opportunities for investment in new housing to those areas at lowest risk from the impacts of climate change and sea level rise, taking a holistic look to encourage concentrations of new housing to locate responsibly in low-risk areas.

RESPONDING TO AND REFLECTING THE CITY'S UNIQUE CULTURE, CHARACTER, AND COMMUNITIES TO MAINTAIN AN AUTHENTIC PORTLAND.

For centuries, Portland has been a place where people have lived. The mixture of a storied history, unique and intact neighborhood patterns, a strong preservation ethic, and an identity still rooted in Portland's working waterfront and industry combine to create a unique and richly layered urban context. This presents both a challenge and an opportunity for the Land Use Code revision; to provide the City the tools and techniques to accommodate new growth and development in a manner that respects and reinforces Portland's authentic sense of place.

The Land Use Code revision can help maintain and enhance the patterns of development that make Portland special. This can include thinking about the traditional mix of uses that might have occurred within the city's neighborhoods and reincorporating things like the neighborhood corner store or other smaller scale commercial uses, something that was historically found in many Portland neighborhoods. It can also include examining the patterns of neighborhood development within the city and reincorporating permissions for a range of dwelling types, from single-family to "missing middle" style triplex and quadraplex dwellings to multi-family development where appropriate. Further, it can include thinking carefully about the design and context of development in Portland, helping to ensure that the essential historic fabric of the city remains



intact and that – though architectural styles may vary – new development remains authentic to the local character and complementary to the Portland vernacular. This also means that considerations should be made to examine the character of, and concerns related to, development on Portland's islands, to ensure that their unique identities continue to be respected in an updated Code.

As the city has grown over time, its form has naturally responded to the social, geographic, and economic pressures exerted upon it. As new pressures begin to impact the city's development, such as a shortage of affordable housing and the threat of climate change and sea level rise, the City must continue to adapt and respond – as it always has – to the challenges and opportunities of the day. This can mean thinking critically about how to provide opportunities for new housing within the city – the form that such housing might take, as well as where it is most appropriate to incentivize new development given the data regarding high-risk versus low-risk areas of the city. Complementary to this, it can involve considerations for ensuring that new development respects the city's rich history and that, in the face of new development, essential elements of the city's history are preserved. Likewise, it can mean prioritizing access, whether visual or physical, to the city's key natural amenities and public spaces, including its waterfront areas where appropriate.

The Land Use Code revision can also be an opportunity for Portland to address issues of building form and permitted height in a way that feels authentic to the places of Portland. The current paradigm in downtown, for instance - organizing height primarily around the Congress Street commercial spine – may need to be reevaluated to ensure it is still the best approach given the growth of the city and changes over time. The City's numerous height maps can be evaluated, looking at the city holistically to make sure it's prepared to respond to growth and development in a way that is authentic and rational. Finally, authenticity can be built into the City's Land Use Code by ensuring that maritime and industrial uses and districts are maintained and oriented such that these economies can continue to thrive in Portland.



FOCUS ON: HOUSING

Housing in Portland, as in many communities, is a complex issue. In response to the need for new, diverse and affordable housing, the City has created numerous tools to encourage the creation, preservation, and replacement of housing units. For instance, the current Land Use Code includes a variety of "Big A" affordable housing tools: dimensional bonuses, fee reductions, and expedited review for the creation of affordable housing units, and inclusionary zoning requirements. Additionally, there are a number of "Little A" strategies at work in the City code to preserve and create new housing more broadly, including housing replacement provisions, standards addressing residential conversions, tools to address relocation of displaced residents, flexible dimensional zone standards related to use, bulk, and area, streamlined provisions for accessory dwelling units, and progressive, transit-oriented parking policy. These strategies, working together, represent a diverse toolkit for addressing the issue of housing in the city. As a result, housing is being built in Portland - almost 1,500 units over the last four years. However, there is no question that there is more that the Code could do to address issues of housing supply, diversity, and affordability.

Diverse Housing

As the city continues to grow and attract new residents, considerations should be made in the Code to allow for expanded housing options that appeal to a broad range of demographics, incomes, needs, and preferences. Expansion of housing options should occur across the city's neighborhoods, but be tailored to ensure that growth is accommodated in a purposeful and contextual way. The City's zones and their permitted uses should accommodate a diversity of dwelling types and densities such that all residents have options and choice, whether their preference is a traditional single-family neighborhood, a mixed-dwelling neighborhood incorporating single-family, two-family and a variety of middle-density dwellings, or a predominantly multi-family environment of townhomes and larger structures in a denser development pattern. Similarly, residents should have options that allow them to remain in their homes or neighborhoods of choice, aging in place and maintaining affordability through the ability to downsize to a smaller unit or to add an accessory dwelling on their property.

There are a variety of strategies that the City can pursue within its Land Use Code to expand housing diversity in Portland.

Think Bigger

Allowing for more density and more height in critical areas can be a powerful tool to create new housing in the community. While Portland's mixed-use zones currently allow for significant height and density,



FOCUS ON: HOUSING (Continued...)

there may be opportunities to modify base zoning requirements to encourage more housing in appropriate areas, such as in proximity to downtown or along major transit corridors.

Think Smaller

Conversely, going smaller can also provide more affordable housing options. In some city neighborhoods, new development forms should be considered to allow for creativity and flexibility in the development of new housing types that meet a variety of needs and preferences. As an example, these might include standards for compact residential development forms that can be built into existing neighborhood fabric. Urban development patterns can be acknowledged and reinforced through provisions that allow for and encourage the creation of smaller units on smaller lots, where contextually appropriate.

Think About the Middle

While the City's existing regulations encourage the development of "middle density" housing– those forms of housing falling between traditional detached single-family and more intense multi-family or mixed-use development - in some areas of the city (within the R-6, for example), they could go further in supporting this housing type in other contexts.

These forms of housing are a critical tool in providing expanded housing options in a manner that respects established neighborhood context. Moving forward, the City's palette of zones and their allowed uses can help to clarify what these forms are, how they are permitted, and what might be the best and most contextually respectful way to expand these possibilities into neighborhoods where medium density housing is not currently permitted or easily achievable.

The Big Picture

Phase II of ReCode will take a comprehensive look at the suite of housing tools currently used, seeing where they may overlap, conflict, or create unintended consequences. The goal is to get a clear picture of how the City's variety of tools is working systematically to address the creation of new, diverse, and affordable housing within Portland. This holistic look may reveal opportunities to amend, edit, or add new tools to further the City's goals related to diverse and affordable housing.



COORDINATING STANDARDS TO ENSURE PORTLAND RESIDENTS ARE CONNECTED TO THE CITY'S WEALTH OF AMENITIES, NATURAL RESOURCES, AND ECONOMIC OPPORTUNITIES.

The concept of connectedness is key within *Portland's Plan*. Coordination between land use and transportation can be an important component in enhancing quality of life for Portland residents, enabling easy access to employment, housing, and a range of goods and services targeted toward their daily needs.

Within the Land Use Code revision, this can mean expanding the range of allowed uses in neighborhoods, enabling residents the ability to meet their daily needs within walking distance of their homes or offices. It can mean further targeting density and development for transit-rich areas, augmenting the affordability of housing by providing access to goods, services, and employment without the need for an automobile. And it can mean expanding the availability of things like EV charging and bicycle parking to support emerging transportation technologies and enrich the multi-modal network within Portland.

Connectedness can also manifest as prioritizing both physical and visual access to key natural resources and amenities such as parks, open space, and the city's waterfront resources, allowing Portlanders to keep connected to the wealth of health and recreational opportunities the city has to offer. Finally, as the concept of connectedness is prioritized, the Land Use Code revision can provide guidance through standards that address the public realm, the organization of space, and the interface between private structures and the public realm.

Intentionally Blank

Technical Evaluation, Concepts, & Approaches

An effective Code combines rational substantive controls with innovative approaches and fair procedures, which – when applied – work to assure a pattern of development and redevelopment that respects existing character, facilitates change where needed and desired, and affirmatively furthers a City's adopted policies. Additionally, regulations must be well organized, illustrative, and easy to use. Standards and procedures should be clearly stated and administered in a straightforward, transparent manner.

Portland has already made significant progress during Phase I of the ReCode process. With the goal of augmenting and furthering the work of Phase I, this evaluation has focused on a number of specific objectives:

- A revised Land Use Code should implement the key policies of *Portland's Plan*.
- A revised Land Use Code should address key issues identified by staff and stakeholders, including housing diversity and affordability and the impacts of climate change, among others.
- A revised Land Use Code should integrate land use controls and urban design considerations to create a series of regulatory controls that respond to the needs of the city and its unique character.
- A revised Land Use Code should be forward-thinking in nature, flexible, and responsive to both market demands and public expectations for future development.

This evaluation focuses on regulatory issues and potential revisions identified during a comprehensive review of the City's Code. It is not the intent of this evaluation to identify every needed change; many changes will be of a minor, technical nature intended to further "clean-up" the Code and enhance its user-friendliness. Further, some suggestions within this evaluation will require further study and testing, and will likely need to be implemented in subsequent city efforts. The intent of this evaluation is to highlight issues, discuss potential revisions, and explore concepts and approaches that would constitute substantive changes to the City's current regulations.

ORGANIZATION

This evaluation is organized in response to the technical nature and construction of the City's Land Use Code. As such, concepts, approaches, and recommendations are grouped according to the relevant topics within the Code. These include the following:

- Uses and Use Standards
- Dimensional Standards & Design
- Zones
- General Development Standards
- Parking, Loading, and Access
- Landscape
- Nonconformities
- Code Structure

Within each topic, specific recommendations and approaches are identified by the *Portland's Plan*



key themes they work to implement: **equitable, sustainable, dynamic, secure, authentic, and connected.** The intent of this organization is to help readers in understanding connections between the technical recommendations and approaches within this evaluation, and the larger policy goals of the City.

Where a recommendation within this evaluation pertains to the Land Use Code structure more generally, it is identified not by a key theme, but as a "Structural" recommendation. Such recommendations are intended to complement the "clean-up" and reorganization that occurred during Phase I of ReCode. As a component of Phase II, these structural recommendations should be read as a lower priority than their more substantive counterparts.

Uses & Use Standards



1.A. The Code should address additional neighborhood uses and leverage neighborhood mixed-use zoning to encourage development of complete neighborhoods.

Equitable Sustainable Connected Authentic Dynamic

Codes need to be continually refined to address various uses that may be issues for a city, or new uses that have emerged in today's planning and development environment. The City's Phase I update to the use structure - using the generic use approach - has created significant flexibilities to allow for desired new uses. However, the Code could be further updated to address specific uses that correspond to City goals.

For instance, older residential neighborhoods were often developed with pockets of limited commercial services. These are what we might typically refer to as the "corner store," (though other small scale commercial establishments could be accommodated by this model). These structures can be part of the residential fabric of a neighborhood and are critical to the concept of complete neighborhoods. Currently, the code supports neighborhood-scale retail with a small, neighborhood mixed-use zone, the B-1, while residential zones generally prohibit new retail.

To encourage more neighborhood-scale retail in a corner store pattern, the City could map the B-1 Zone onto parcels that have historically provided space for neighborhood-scale commercial uses, as well as consider opportunities to map B-1 to locations that might be conducive to neighborhood retail/ corner store uses in the future. Such locations could include Stevens Avenue/Brighton Avenue, which is in residential zoning but has historically supported small, commercial uses, and locations along outer Auburn Street and/or Allen Avenue. Simultaneously, the City may wish to consider the range of non-residential uses that are permitted within residential zones, to see if there are opportunities to expand options for low-impact uses appropriate for a neighborhood context.

1.B. The Code should address additional creative uses not currently listed.

Equitable Sustainable Connected Authentic Dynamic

As indicated above, codes should be continually evaluated and refined to ensure that they address new and emerging uses. One area of emerging uses particularly relevant to Portland's economy is creative uses. A number of these types of uses are currently being allowed under the City's definition for "low-impact industrial," which is permitted broadly within the industrial and mixed-use zones.

While *Portland's Plan* provides a strong basis for supporting the creative economy, commercial encroachment on industrially-zoned land has long been an area of concern, particularly on the peninsula, and as a result, there is also a strong policy foundation around retaining industrial space for industrial uses. For this reason, a broadening of the "low-impact industrial" use category to span both industrial and mixed-use contexts and support more creative uses carries both some benefits and some potential hazards.



Adding specificity around some creative uses could allow for additional control over where such uses occur across the city and how impacts are managed, while ensuring that the "low-impact industrial" category can remain truly industrial in nature. For instance, by differentiating some small-scale creative, industrial uses, such as micro-production of alcohol or specialty food service (e.g., candy makers, bakeries, caterers, or coffee makers), the City could allow for the inclusion of these uses in zones where they are currently not permitted, with tailored standards appropriate for the context. In the mixed-use context, these uses could be augmented by a requirement for ancillary retail sales (currently required for low-impact industrial uses in several mixed-use zones) and/or restaurant component that sells or serves the products produced on site. Other, more typical industrial uses, including those that would clearly fall within the 'creative' context, could be more explicitly reserved for industrial zoning.

1.C. The Code could address several specific new social service uses.



A range of social service uses could be addressed within the Code to add clarity, avoid ambiguity, and enable tailoring of use permissions and standards related to specific operations and impacts where necessary. For instance, the City could consider including social service center as a specific use. This use would encompass service establishments that aid those recovering from chemical or alcohol dependency; survivors of abuse seeking support; those transitioning from homelessness or prior incarceration; and those with health and disability concerns. It would not include in-patient, overnight, or living quarters for recipients of the service or for the staff, and would not include medical examinations or procedures, or medical detoxification, dispensing of drugs or medications, or other treatments normally conducted in a medical office. References to state licenses would be added as a standard tied to such a use.

1.D. Consider revising the definition of "agriculture" to include modern agricultural activities. *As recommended within the City's Community Agriculture Plan.*



The City's current definition of agriculture is rather broad, and not inclusive of some more modern modes of urban food production. To add clarity, the City could consider expanding the definition of agriculture to capture modern, urban agriculture activities and permitting it in more zones (it is currently only allowed in R-1, R-2, and IR-1), or refining a set of agricultural uses that addresses the varied forms and their impacts. These may include "Agriculture, Animal Husbandry," "Agriculture, Cultivation," "Agriculture, Intensive." Such refinements could expand how and where food production, including small-scale distribution or sales of food, is allowed within the city.



1.E. Expand and clarify the range of dwelling types allowed in the city.

Equitable Sustainable Connected Authentic Dynamic Secure

The current range of dwelling types should be modified to provide clarity and consistency within the Code. Currently, the residential uses within the Code's use table may be both too vague (concerning dwelling types) and too specific (concerning individual unit types). This is particularly striking in the progression of residential uses, which moves from single-family dwellings to two-family dwellings, and then jumps right to multi-family and multiplex dwellings. This means that middle-density housing – particularly three-unit and four-unit dwellings - falls within the multi-family use category, which is permitted very selectively within the city's residential zones.

The range of housing types allowed within the Code could be expanded through the incorporation of specific definitions for three-family and four-family dwellings. These are typically defined outside of a "multi-family" dwelling definition, as the impacts of these uses are often more limited, and they may be a better fit as a potential infill dwelling type in established residential areas. In fact, looking at the City's land use data, these types of dwellings already exist in most of the established residential zones including the R-3 and R-4, where they are currently – under the definition of multi-family - either prohibited or allowed only as a conditional use.

Further, there is an opportunity to clarify the definitions of "multiplex," and "multi-family." The current definitions establish a threshold of three or more units for both of these uses, with significant ambiguity around any distinction between the two. Moving forward, a simpler approach may be to incorporate definitions for three-family and four-family units, convert the "multiplex" to address the townhouse/attached development form, and address five or more units within a structure through the definition of multi-family.

1.F. Add clarity around specific housing-related uses (e.g., lodging houses, SNIDUs, congregate care, etc.).

Equitable Sustainable Connected Authentic Dynamic Secure

The existing Land Use Code includes several related, potentially overlapping categories of specific residential uses, including sheltered care group homes, lodging houses, congregate care, intermediate care, and long-term and extended care. In addition, the Code allows for dwelling units targeted towards populations with special needs, including special needs independent dwelling units and handicapped family units. While some of these variations are important within the code, ambiguity between classifications has the potential to cause confusion. Phase II provides an opportunity to add clarity around these uses.

1.G. A comprehensive set of temporary uses should be addressed in the Code.

Equitable Sustainable Authentic Dynamic

The current Land Use Code does not comprehensively address temporary uses. Currently it seems that the primary temporary uses regulated in the Code include "maker's markets" in the IL-b Zone, "temporary sales" which appear related only to sales of personal items, and "temporary [produce] stands," while other temporary uses, such as farmers' markets, festivals, and food trucks, are addressed under other chapters of the code and/or other regulations entirely.

A more comprehensive approach to temporary uses through the Land Use Code could be beneficial – identifying in which zones they are allowed, timeframes, siting, and requirements for operational plans. The following temporary uses, some of which are currently addressed in other chapters of the City's code of ordinances or in separate regulations, could be considered:

- Farm stands
- Temporary outdoor entertainment events
- Temporary retail sales events
- Temporary sales events of personal items
- Temporary storage pods
- Construction-related temporary uses: storage yards, on-site offices

The City may wish to pursue a temporary use permit model, which would enable the City to regulate these uses to control any potential impacts, and to ensure that a temporary use is not functioning, in fact, as a permanent use. This would also allow for easier enforcement.

1.H. Consider adjusting the City's use regulations to ensure they support a circular and sharing economy; identify and eliminate barriers to businesses that reuse or repair consumer goods. *As recommended within One Climate Future.*

Equitable Sustainable Authentic Dynamic

The City has been allowing these types of uses under the "low-impact industrial" use without issue. However, there may be a desire to consider adding specific uses to support a circular and sharing economy within the city. The creation of specific uses like "Maker Space," or "Artisan Industrial," can allow the City to tailor where such uses may locate, and what standards are in place to control any potential impacts. These types of uses can also often serve as a community gathering space, or a type of small-scale business incubator that may not be adequately captured by the definition of "low-impact industrial." As such, if the desire is to continue allowing them under the definition of "low-impact industrial," consideration should be given to amending the definition to clarify that they are included within such use.

1.I. Evaluate and revise as needed to ensure that solar installations can be maximized and streamlined. *As recommended within One Climate Future.*

Sustainable Dynamic Secure

The Land Use Code currently allows for multiple forms of solar energy systems, including those integrated into and mounted on structures, as well as stand-alone solar installations as a principal use of land, splitting such systems into "solar energy system (minor)" and "solar energy system (major)" based upon a threshold of 9,999 square feet. In sum, it appears that the current Code is quite permissive of these types of systems. Moving through the Code revision process, however, opportunities to expand access to renewable energy systems should be evaluated and carefully considered, either through substantive changes to the standards or by streamlining them. Further, once the MUBEC stretch code is finalized and adopted, the City's regulations should be re-examined to ensure there are no conflicts. Lastly, there may be opportunities to revisit the treatment of solar installations within historic districts with the aim of better balancing the City's historic preservation and climate goals.

1.J. Consider some potential updates to the Code's use structure.

Structural

Consider ways to structure uses within waterfront and other zones that provide consistency with Article 6.

Currently, all uses are not fully consolidated within Article 6, which may create some difficulties. Potential issues we have identified include:

- The India Street Form-Based Code lists prohibited uses. While this is a common approach to form-based coding, it does leave open the possibility for undesirable uses because "no one thought of that." Because the current use approach is so flexible, the City may want to consider bringing the form-based code into a global use matrix to avoid any potential inconsistencies.
- Additional zones, such as the waterfront zones, have another set of permitted uses. The relationship between these uses and Article 6 needs to be defined to keep the user aware and to prevent any interpretation conflicts. Additionally, there may be opportunities to structure use and dimensional standards in the waterfront zones in a way that mirrors Article 6, simply for ease of use.



Consider a reorganization of the use standards within the Land Use Code.

Currently, there are two sections of Article 6 that contain use standards. Section 6.4 contains supplemental use standards that apply to permitted or conditional uses. Then, Section 6.5 contains the conditional use process and conditional use standards for select conditional uses. This can be confusing to users, as they may not be aware that certain uses may be subject to standards. More typically, a Code will contain one set of use standards, like that currently found in Section 6.4, that apply to permitted or conditional uses. If certain standards only apply in the case of a conditional use, those can be delineated as such.

Dimensional & Design



2.A. Consider developing bonus provisions within the residential and mixed-use zones to encourage sustainable construction and/or a walkable, urban environment. *Expansion of a recommendation from One Climate Future.*

Equitable Sustainable Connected Authentic Dynamic Secure

The Code currently contains a targeted series of bonus provisions. These include a height bonus within the IS-FBC for the provision of additional density, green roofs, and workforce and/or low-income housing. They also include a series of bonuses for the provision of workforce or low-income housing in eligible projects as defined within Article 18 of the Code. These bonuses can confer additional height, additional density, reduced setbacks, and reduced fees for eligible projects.

The Code revision process should evaluate opportunities to expand the current bonus provisions to encourage sustainable construction. Bonuses, in the form of height, additional density, reduced setbacks, etc. may be considered for new development that achieves high-performance construction, such as net-zero, passive house, or LEED certification. Bonuses could also be considered for projects that contain active ground floor uses that support a more walkable, urban environment. In either case, the utility of bonuses versus base standards should be considered, as well as the potential effect of new bonuses on the city's existing bonus provisions.

2.B. Evaluate dimensional standards and uses permitted throughout the city in the context of risk and resilience. *As recommended within One Climate Future.*

Equitable Sustainable Connected Authentic Dynamic Secure

In the future, Portland will experience the impacts of higher sea levels, hotter temperatures, and likely more powerful and frequent storms that may damage the city's buildings and infrastructure. These are the realities of climate change. The ReCode process provides the City of Portland with an opportunity to take a holistic, long-range look at patterns of growth and development within the city, and to determine whether those patterns – if continued – contribute to the resiliency of the city.

As stated in *Portland's Plan*, regulations governing development within the city should not be static. Phase II of the ReCode process is one opportunity to evaluate patterns of land use and make strategic changes where appropriate. However, in the future, additional strategies should be pursued, such as the development of resilience zoning overlays that can incentivize higher density construction in areas with no or low flood risk while setting higher standards for resiliency and/or preventing development of hazardous, vulnerable, or incompatible uses in areas determined to be at high flood risk. The concept of resiliency zoning is introduced within *One Climate Future*, in which Portland commits to evaluating a number of scenarios and approaches to resilience overlays.

Development of such overlays will require significant additional study, gathering and synthesis of data and modeling to classify land within the city based upon flood risk, public engagement, and determination of an overall approach to implement such a tool. This study, while beyond the scope of the work of Phase II, should be carried forward in a subsequent City effort.

2.C. Consider development of zone dimensional and design standards that encourage visual and physical access to the city's waterfront areas.
Expansion of a recommendation from Portland's Plan.



Portland's Plan acknowledges the paramount importance of the city's waterfront areas as environmental, economic, and recreational assets. The plan indicates that though change will occur within the city's waterfront areas, land use policies should continue to support a strong base of marine-dependent uses while allowing for economic growth and investment on the waterfront and preserving key public recreational access. One approach to preserving access might be to develop a set of standards for development along the waterfront that prioritizes maintaining public access, whether visual or physical. Standards can reference the City's designated view corridors, and can also encourage building forms that preserve access through passages, breaks in massing, and other design strategies. These strategies can be included for new development not just within the waterfront zones, but for all waterfront areas along Casco Bay, and the Stroudwater, Presumpscot, and Fore Rivers. In the waterfront zones, careful consideration of the operational needs of water-dependent uses as priorities in the zone will need to be considered when evaluating new public access possibilities.

2.D. Refine regulations pertaining to the bulk and placement of structures in the Land Use Code.



Across the spectrum of zones within the Code, there may be opportunities to simplify the way that the bulk and placement of structures is addressed.

Residential Zones. Within the residential zones in particular, bulk and placement of structures is addressed at a granular level, with varying standards based upon groups or categories of uses. A simpler, more modern approach is to provide bulk regulations for two categories: residential uses and nonresidential uses. These can be further refined to address specific dwelling types, such as two-family, etc. as needed, however standards for schools, places of assembly, etc. would be removed from the table and addressed through a series of use standards that address impacts or concerns related to these uses within the residential zones.

Further, the Code revision should explore opportunities to simplify the treatment of setbacks in the residential zones. Currently, setbacks are linked to the height of structures, which may be creating



some unnecessary confusion – as the setback requirements reference building height in stories, while building height regulations are measured simply in feet. Coupled with the current approach to allowing reductions to side setbacks within residential zones, these regulations become quite confusing. Moving forward, a simpler approach might be to create a single setback that applies regardless of height, tailored to the character of the zones to ensure compatibility between adjacent structures.

Accessory Structures. The City should consider removing regulations for the placement and bulk of accessory structures from the dimensional standards, and instead regulate these through a comprehensive set of accessory structure regulations, allowing them to be tailored to individual types of structures as may be needed.

Measurement Methodologies. Currently, the dimensional standards for the residential zones allow for the front setback to be established at the "average depth of adjacent front yards." There is, however, no methodology for how this average should be taken, and what counts as an adjacent front yard – something that should be clarified. Further, there may be an opportunity to refine specific dimensional standards to better address current conditions, such as through a discrete "corner side setback," and "reverse corner side setback," which may both be addressed through the current side setback requirements, but could benefit from additional clarity.

2.E. Consolidate and refine basic design standards in keeping with the work on the design manual.

Sustainable Authentic

The Code currently contains design regulations within the site plan ordinance, as well as within various other areas of the code, including the historic preservation ordinance, the R-7 Compact Urban Residential Overlay, performance standards, and even in use standards.

In keeping with the concurrent design manual work, and with the exception of the historic preservation design standards, general design standards should be consolidated within the site plan ordinance of the code. Further, they should be made simpler, more objective, and more consistent (currently, the first three standards for the R-7 Zone move from standards that specify "should," to those that "must," to those that "shall" be met). A basic set of standards that address the fundamental elements of good design can be an effective means of ensuring a solid design foundation from which to review more detailed design considerations.



2.F. The Code should regulate impervious surface maximums in all residential zones. *Expansion of a recommendation from One Climate Future.*

Equitable Sustainable Authentic Secure

One Climate Future recommends encouraging the conversion of impervious surfaces and the integration of green infrastructure through educational tools, resources, programs and incentives. A simple way to address impervious surface for new development is to include a maximum coverage within the residential zones. Currently, the Land Use Code controls for lot coverage, and contains a control that is essentially the inverse of an impervious surface maximum – requiring a ratio of "landscaped open space," but this is only applicable within the R-6 and R-6a Zone. A more cohesive approach to regulating impervious surfaces would benefit the code, giving the city the ability to ensure that new development does not dramatically increase stormwater runoff, erosion, and sedimentation within residential areas. A control would more clearly define what constitutes impervious surface, limit the total impervious surface on a site, including structures and surfaces such as driveways and non-permeable paths and patios. In zones that encourage higher lot coverage to allow for greater densities and new development, consideration of alternate tools such as green roofs and low impact development requirements may be appropriate.

2.G. Explore opportunities to encourage transit-oriented development within appropriate areas of the city, in coordination with regional transit planning. *As recommended within Portland's Plan and One Climate Future.*

Equitable Sustainable Connected Authentic Dynamic Secure

Portland has recently moved to adopt one of the key basics of a transit-oriented development approach through a categorical exception that exempts uses within ¼ mile of a fixed-route transit service from parking requirements. To further develop this approach, and to encourage the creation of true mixed-use transit-oriented development, the city should refine its regulations to ensure that the zoning supports the co-location of transportation infrastructure and density. For instance, the city should consider ways to adjust allowed densities to achieve transit-supportive levels proximate to transit nodes and corridors – generally considered to be over 8 units per acre, though One Climate Future suggests that such nodes in Portland should aim for 10 to 20 residential units per acre. These permitted densities (or higher immediately adjacent to transit nodes) should be targeted and coordinated with regional transit planning to ensure that land use and transportation complement each other and create the dense, nodal development necessary to support robust transit.

While existing transit corridors are generally well-established, moving forward, further coordination between the City and the regional transit agencies will be necessary to determine the most appropriate



locations for targeted, transit-oriented land use policy, particularly as a rapid transit strategy for the region is developed. Once locations have been identified, specific standards can be created to ensure development in line with the City's vision, including additional density, additional height, and pedestrian-oriented design standards. Such standards may be pulled together in a number of ways, including within a base zone or zones, or as an overlay.

2.H. Consider opportunities to refine height controls within the Land Use Code's mixed-use zones.

Sustainable Authentic Secure

The mixed-use zones address height in a fine-grained manner through specific, granular controls such as those of the Downtown and Bayside height maps, and various footnotes indicating specific height permissions and restrictions, such as those that apply along sections of Commercial Street. The zones also address height through a straightforward series of permissions for certain zones, such as the B-1 and the B-1b. Understanding that allowed heights are a sensitive issue throughout the city, we recommend maintaining the granular level of control that has been established.

There may be opportunities to refine permitted heights that correspond with the city's broader goals, however. For instance, the City could consider small increments of height adjustment at corners as a means of bookending blocks within nodes or along corridors.

There may also be opportunities to refine heights in some select zones, such as the B-2 zones. Currently, the B-2 zones allow a range of heights, from 45' as a base standard, to 50' if the ground floor is in commercial use, to 65' in the B-2 and B-2c zones on large lots with increased setbacks. Given the mapped location of the B-2b zone and its stated objective of encouraging "moderate to high density housing in urban neighborhoods along arterials," there may be a desire to consider increasing the allowed heights in the zone to more closely align with those of the B-2 and B-2c.

Further, as heights are being reconsidered, opportunities to consolidate and align the City's overall approach to height should be considered. The numerous existing height maps in place present a challenge to review and interpretation, and were created at different times, with different stakeholders, interests, and objectives.

To accommodate growth and modern development in a coordinated and intentional way, the City should consider taking a holistic look at where in Portland greater heights may be appropriate. The Land Use Code revision is a good opportunity to begin a conversation about how heights are handled within the city, both on and off-peninsula. While opportunities to align and consolidate controls will be explored during the Phase II process, further study and specific, targeted outreach are likely needed to conceptualize and gain support for a new approach.

Intentionally Blank

Zones



3.A. Identify barriers, and explore options and implications related to allowing for a greater diversity of housing types within the City's residential zones. *Expansion of a recommendation from Portland's Plan and One Climate Future.*



The City's eight residential zones have been reviewed and evaluated relative to their dimensional standards and allowed uses. While this evaluation shows that many of the city's existing residential zones are currently achieving their stated purposes and helping the city to meet its comprehensive plan objectives, there are also areas where uses, dimensional standards, and boundaries could be modified to better meet existing goals, particularly around housing creation.

The following pages contain an overview of the evaluation, and a series of recommendations for each zone, oriented toward exploring potential changes while ensuring that existing patterns are respected. The quantitative figures referenced below have been derived from GIS (Geographic Information Systems) data provided by the City of Portland, and are calculated based upon development information available for "tax parcels" within the city. The data has not been audited or updated as a component of this process, therefore any recent changes may not be reflected. As such, these figures should be viewed as illustrative of the overall patterns of development.



R-1 Residential Zone

Overview

- Single-family orientation
- 15,000sf minimum lot area
- 35' maximum height

Analysis

- Mapped to 42 tax parcels, all in Stroudwater
- Median Yr. Built: 1950
- Typical # of Units: 1
- Typical # Stories: 1
- Median Tax Parcel: 20,471sf
- Single-Family: 74%
  conforming to current lot area standard

Recommendation / Discussion

The R-1 Zone seems to fulfill its low-density single-family orientation. However, it is mapped to a relatively small number of parcels. There may be an opportunity to consolidate the R-1 with the R-2 Zone to bring existing nonconforming lots into conformity and allow for additional low-density development at the western edge of the city.



R-2 Residential Zone

Overview

- Single-family orientation, very limited two-family presence as-built
- 10,000sf minimum lot area
- 35' maximum height

Analysis

- Mapped to 1,626 tax parcels, all off-peninsula
- Median Yr. Built: 1979
- Typical # of Units: 1
- Typical # of Stories: 2
- Median Tax Parcel: 12,979sf
- Single-Family: 85% conforming to current lot area standard

Recommendation / Discussion

The R-2 Zone seems to fulfill its low-density single-family orientation. However, evaluation of both the R-1 and R-2 should consider which areas benefit most from this low-density zoning, due to environmental sensitivity or a wish to retain greater open space, for instance, and which areas might potentially be suitable for a different R-zone designation. In addition, the City could consider reductions in minimum lot size to encourage a more efficient pattern of single-family development.



R-3 Residential Zone

Overview

- Single-family orientation, allows multi-family dwellings (adaptive reuse only) by conditional use approval
- Allows PRUD
- 6,500sf minimum lot area
- (3 ac. for PRUD)
- 35' maximum height

Analysis

- Mapped to 8,124 tax parcels, exclusively off-peninsula
- Median Yr. Built: 1954
- Typical # of Units: 1
- Typical # of Stories: 1
- Median Tax Parcel: 8,750sf
- Single-Family: 76% conforming to current lot area standard

Recommendation / Discussion

The R-3 Zone does not appear to acknowledge current two- and three-family dwellings through its zone standards. The median year built for these uses is 1916, compared to 1954 for all structures in the zone. They would not be allowed to be built under the current code, however. The City may wish to explore a greater diversity of dwelling types within the R-3 zone to acknowledge its historic patterns.

Additionally, nearly one quarter of the R-3's tax parcels do not meet the lot area minimum for a single-family dwelling. These substandard lots are spread throughout the extent of the zone, indicating that this is less an issue of hyperlocal form, and more an issue of a need to reorient the zone standards to better acknowledge the existing lot pattern. Likewise, initial analysis shows that there are significant instances of nonconformities with front and side setbacks within the zone as well. In order to allow for more consistent, traditional neighborhood development patterns, the City may wish to consider context-based solutions to front and side setbacks (e.g., sliding side setbacks to allow for additional setback on one side (e.g., for driveway) in compensation for less on the other side (similar to the R-6)).

Last, an analysis of historic zoning maps reveals that a number of areas of R-3 zoning were previously zoned identically to present-day R-5 zones; in these areas, the parcel pattern and building form more closely resemble R-5 neighborhoods. Here, rezoning could be considered as a way of achieving not only a simpler and more consistent code and zoning map, but also opening up opportunities for additional housing types.



R-4 Residential Zone

Overview

- Single-family and two-family dwellings allowed; multiplex allowed through conditional use approval
- 6,000sf minimum lot area, 3,000sf/du
- 35' maximum height

Analysis

- Mapped to 306 tax parcels, all in the West End
- Median Yr. Built: 1900
- Typical # of Units: 1
- Typical # of Stories: 2
- Median Tax Parcel: 10,156sf
- Single-Family: 86% conforming to current lot area standard
- Two-Family (23): 82% conforming to current lot area standard
- Three-Family (6): 33% conforming to current lot area standard

Recommendation / Discussion

The R-4 Zone appears entirely within the West End and Western Promenade, which has existed under its own residential zoning classification since the 1940s. While most of the lots conform to the current lot area standard, the standard is high for an urban residential zone. Additionally, there may be opportunities to revisit permitted uses and density within this zone, which is proximate to downtown and major employment centers and houses a number of large, historic structures that could support additional housing.



R-5 Residential Zone

Overview

- Single-family, two-family, multi-family (adaptive reuse only - conditional use) and multiplex dwellings allowed
- Allows PRUD
- 6,000sf minimum lot area (may be reduced to 5,000 via small residential lot option), 3,000sf/du
- (2 ac. for PRUD)
- 35' maximum height

Analysis

- Mapped to 4,388 tax parcels, nearly exclusively off-peninsula
- Median Yr. Built: 1920
- Typical # of Units: 1
- Typical # of Stories: 2
- Median Tax Parcel: 6,871sf
- Single-Family: 55% conforming to current lot area standard (80% conforming to small residential lot option standard)
- Two-Family (868): 63% conforming to current lot area standard
- Three-Family (309): 31% conforming to current lot area standard
- Four-Family (70): 31% conforming to current lot area standard

Recommendation / Discussion

The R-5 Zone does not appear to acknowledge the current built form where it is mapped within the City of Portland. The small residential lot option brings the zone's standards closer to the historic form of these neighborhoods, but is subject to additional standards related to the creation/current use of the lot. Simplification or even elimination of the small residential lot option, perhaps by bringing the base zone dimensional standards closer in alignment to the small lot provision, warrants evaluation.

Along these lines, there are multiple ways to refine the standards of the R-5, including reducing lot area requirements and revising setback standards (see R-3 discussion above) to allow for a continuation of the historic form of these neighborhoods. Additional standards may be explored to ensure that infill development respects the established context of these areas.

Revisions to the R-5 to support missing-middle housing should also be considered. While three- and four-families are not the predominant housing type, and in fact they are generally prohibited under the current zoning, many successful instances of small scale multi-family buildings exist in the zone.



R-5a Residential Zone

Overview

- Single-family, two-family, multi-family (4 or more units subject to PRUD standards)
- Allows PRUD
- 6,000sf minimum lot area, 2 ac. maximum, 1,600sf/du
- (2 ac. minimum for PRUD)
- 35' maximum height

Analysis

- Mapped to four tax parcels within the City, comprising two large senior living developments (Stevens Square and Ashton Gardens).

Recommendation / Discussion

The R-5a appears, currently, to be used exclusively for senior living and PRUD development, which does not align with the zone's purpose statement within the ordinance.

The City may wish to explore refinements to this zone to more closely align its developed character with its stated purpose. As an alternative, the purpose of the zone could be reconsidered entirely. For example, the R-5a may provide an opportunity to create a mid-density off-peninsula residential zone that is currently lacking in the city's zone structure. This zone could be used to support transit-oriented nodes in off-peninsula areas with transit-supportive densities and additional missing-middle housing types. This idea should be balanced against the need for greater simplicity in the code and the value of other mechanisms, such as a transit-oriented overlay, that may achieve the same ends.



R-6 Residential Zone

Overview

- Single-family, two-family, multi-family dwellings allowed
- B&Bs allowed
- 2,000sf minimum lot area, 725sf/du
- 45' maximum height

Analysis

- Mapped to 3,856 tax parcels on-peninsula and Back Cove
- Median Yr. Built: 1900
- Typical # of Units: 1
- Typical # of Stories: 2
- Median Tax Parcel: 4,393sf
- Single-Family: 76% conforming to current lot area standard
- Two-Family (428): 89% conforming to current lot area standard
- Three-Family (470): 91% conforming to current lot area standard
- Four-Family (166): 84% conforming to current lot area standard
- Not possible to calculate 5+ units' conformity reliably

Recommendation / Discussion

The R-6 Zone appears to be achieving its stated purpose and accommodating on-peninsula residential development well, with relatively high levels of conformance with current standards. However, there may be opportunities for adjustments to the existing dimensional standards to better address issues around the compatibility of infill development, particularly as it relates to scale and massing.



R-6a Residential Zone

Overview

- Single-family, two-family, multi-family dwellings allowed
- B&Bs allowed (conditional)
- 4 ac. minimum lot area, 725sf/du
- 65' maximum height

Analysis

- Mapped to two tax parcels within the City, comprising two large senior living developments (Park Danforth and Deering Pavilion).

Recommendation / Discussion

The R-6a appears, currently, to be used exclusively for senior living development of significant height, which does not align with the zone's purpose statement within the ordinance. The City may wish to explore refinements to this zone to more closely align its developed character with its stated purpose.



3.B. Further study the City's island zones to ensure they adequately acknowledge and support these unique areas within the city.

Sustainable Authentic Dynamic Secure

The City's four island zones regulate residential and commercial development on the city's islands, including Peaks Island, Cushings Island, Great Diamond Island, Little Diamond Island, and Cliff Island. The dimensional standards of these zones, appropriately, reflect a more rural orientation than those of the mainland residential zones, and function much like traditional rural zones in their acknowledgment of infrastructural limitations and the need to focus development inward to prioritize adequate public services and preservation of the rural island character. However, in some of the island zones there is a clear pattern of non-conforming lots, and there may be an opportunity to consider changes to the pattern of permitted uses as well. Furthermore, the City should look for opportunities to adapt island zoning as the needs of island communities evolve. For instance, Peaks Island is the island with the most potential to accommodate some additional housing and other development, and its zoning warrants consideration for tools to create new housing opportunities that also recognize the unique and sensitive island context.

Moving forward, we would recommend a closer examination of the full range of regulations in place for the city's islands. There may be a need to adjust use permissions, dimensional and/or design controls to address new or emerging issues. It is understood that the city's islands are unique and well-loved among residents; any recommended revisions should be grounded in further detailed study specific to the islands and their issues and concerns.

3.C. Evaluate and refine the City's mixed-use zones to ensure they support the city's thriving mixed-use areas, and continue to enable modern, sustainable, walkable development in line with the City's vision for the future.

Equitable Sustainable Connected Authentic Dynamic Secure

The Land Use Code currently contains 13 mixed-use zones. Generally, these zones appear to be functioning well to accommodate the varying intensities of mixed-use development that the City wishes to see. Even so, there may be ways to modify existing policy within these zones and explore their application as a means of furthering Portland's policy goals. Each zone has been reviewed and evaluated on the following pages.



B-1 & B-1b Mixed Use Zones

Overview

B-1 is a neighborhood commercial zone that allows a mixture of low intensity commercial uses (live/work spaces, bed and breakfasts) designed to ensure that adequate transitions are maintained between commercial uses and adjacent established neighborhoods. Also allows residential units (435sf/du on-peninsula, 1,000sf/du off-peninsula).

B-1b is a narrowly mapped zone (19 tax parcels) that maintains all the dimensional and use standards of the B-1 zone, but restricts the location of certain commercial uses (restaurants, small retail establishments) to the ground floor of structures only.

Recommendation / Discussion

The B-1 is mapped in a nodal fashion that could likely support an expanded palette of uses, provided that the scale remains tailored to a neighborhood context. Currently the uses allowed are very limited, even for a neighborhood commercial zone. Typically, these zones permit a series of uses that can both exist harmoniously with their surrounding neighborhood contexts, and fulfill some of the basic needs of residents within proximity to their homes. There may also be an opportunity to allow some flexibility around creative, incubator space within the B-1 context.

The City may also want to explore the possibility of consolidating the B-1 and B-1b into a single zone. Use standards can be tailored to maintain requirements for some of these uses to locate on the ground floor only or to better incentivize ground floor retail with residential above.

Lastly, to encourage additional housing development, the city could explore the idea of eliminating the off-peninsula/on-peninsula distinction within the zone's density and height standards in favor of consistent dimensional requirements across the zone.



B-2, B-2b, & B-2c Mixed Use Zones

Overview

B-2 is a community mixed-use center that allows a broad range of commercial uses that serve the needs of both the adjoining neighborhoods and the larger community. It also allows for residential units at significant density (435sf/du on-peninsula, 1,000sf/du off-peninsula, 435sf/du off-peninsula with an active street frontage).

B-2b is a slightly modified variant of the B-2 Zone that refines some sign controls from the B-2, makes certain uses conditional (auto service, marijuana dispensary, etc.), and modifies a limited number of dimensional standards including allowed height and impervious surface maximums.

B-2c is a narrowly mapped zone (17 tax parcels) intended to serve as a transitional zone, further modifying the standards of the B-2 and B-2b to prohibit bars.

Recommendation / Discussion

The B-2/b/c Zones appear to be functioning well, although they generally do not see the levels of redevelopment or investment their dimensional standards would seem to imply. The dimensional distinctions between each of these zones are relatively minor, except for permitted heights on large lots. There may be an opportunity to increase the allowed height across these zones in keeping with the permitted heights on large lots in the B-2 and B-2c Zones as a means of encouraging housing and density. The "gradients" in use between the B-2 zones appear to primarily address levels of commercial intensity and transitions to adjoining neighborhoods. As such, there is likely a need to maintain them.

As with the B-1 Zones, the density in B-2 varies between on- and off-peninsula locations. In addition to exploring a more consistent approach to density, there may also be value in more broadly reconsidering residential density within the B-2 zones, which serve as major sources of off-peninsula housing opportunity and are often found in transit nodes and along transit corridors. In tandem, a relaxing of height and density requirements could help to open up areas of B-2 to mixed-use redevelopment that could provide the backbone for improved transit service.



B-3, B-3b, & B-3c Mixed Use Zones

Overview

The B-3 Zone acknowledges the role of downtown as the active, mixed-use heart of the City and the region. It provides the greatest flexibility in relation to dimensional standards, and allows for some of the greatest achievable heights within the City.

B-3b does not currently appear on the zoning map. Further, our evaluation could not identify anywhere in the Code where B-3b is differentiated from the B-3 Zone; regulations seem to always address them as a pair. Resultingly, we cannot identify a functional purpose for this zone.

B-3c is a very narrowly mapped zone (10 tax parcels) that is intended to serve as a transition to "protect and enhance the quiet enjoyment of adjoining residential neighborhoods." It modifies the standards of the B-3 and B-3b to prohibit bars.

Recommendation / Discussion

Evaluation of the B-3/b/c zones indicates that they are performing adequately to address the needs of Downtown. There may be a need to reevaluate the permitted heights within these areas to ensure they reflect the goals of the comprehensive plan and the City's current regulatory stance on downtown height. This could be in the form of greater by-right heights in some areas, new or different rationales for height bonuses, greater heights for particular uses, or other approaches to height maximums.



B-4 Mixed Use Zone

Overview

The B-4 Zone acknowledges those areas of the community that are primarily auto-oriented and that require a different approach and set of standards. Uses such as auto dealerships, auto service stations, and other large-scale uses are generally permitted within this zone.

Recommendation / Discussion

The B-4 Zone is primarily mapped along the Warren Avenue corridor on the west side of the city. Given that it is acknowledging a built form and a set of uses that are distinct, in many ways it is serving the mix of larger scale commercial and industrial uses in this area well. However, there are opportunities to support the functional needs of these uses while encouraging a better relationship of buildings to the street, as well as opportunities to permit housing - which is currently prohibited. While the form and the prospect of integrating residential into this corridor will require careful consideration, as a B zone (rather than industrial or waterfront zone, for instance) there is no reason to preclude the possibility for new housing creation here.

B-5 & B-5b Mixed Use Zones

Overview

The B-5 and B-5b Zones both allow for a broad mix of uses including commercial, residential, and low impact industrial uses. These zones address locations on peninsula and on Thompson's Point where a dense, urban mixed-use development pattern is envisioned, mixing reuse of existing structures and new development of significant size.

Recommendation / Discussion

These zones appear to be working; this evaluation has not flagged any items for revision. However, given that the use and dimensional distinctions between the two zones are relatively minor – largely in the form of the requirement for a 10-foot maximum setback in the B-5b (B-5 requires no setback) and some tailored height limitations along Commercial Street – there may be an opportunity to consolidate the zones and address these variations in form through locational criteria (as is currently the case for the height restrictions).



B-6 Mixed Use Zone

Overview

The B-6 Zone is a geographically specific zone that allows for a broad, urban mix of uses including residential, commercial, and low impact industrial uses, and is intended to achieve the vision of a 24-hour mixed-use zone as articulated within the City's Eastern Waterfront Master Plan. Urban standards such as minimum heights and minimum building wall requirements are included in the B-6 Zone.

Recommendation / Discussion

The B-6 Zone appears to be aligned with its intent statement. However, the regulations of the zone are quite complex, with numerous footnotes and exceptions within the dimensional standards, in addition to the B-6 height map. Opportunities for simplification should be explored during drafting.

B-7 Mixed Use Zone

Overview

The B-7 Zone is a geographically specific zone intended to establish a high-quality, pedestrian oriented mixed-use environment in areas at the periphery of downtown, "including but not limited to Bayside." Like the B-6 Zone, the B-7 Zone is regulated via a height map, and contains standards to encourage an urban orientation, addressing building wall requirements, parking location and design, etc.

Recommendation / Discussion

The B-7 Zone appears to align with its stated intent. Like the B-6 Zone, opportunities should be explored for potential to simplify the regulations and maintain the intent of the zone, if possible. In addition, given the B-7's location in a low-lying area of the city, there may be opportunities to explore flood resilience strategies within this zone.



3.D. Consider some revisions to the O-P and R-P Zones.

Sustainable Authentic Dynamic

The City maintains two office zones, the O-P Office Park Zone, and the R-P Residence Professional Zone. These each serve specific purposes, regulating large, coordinated office developments (O-P), and addressing the unique needs of smaller office and professional uses within proximity to residential neighborhoods (R-P). Moving forward, the City should consider some modifications to make these zones work more effectively.

Currently, the R-P Zone contains only a very limited set of standards, which generally mirror those of a residential zone, and in fact refer to the "nearest residential zone" in the case of residential uses. The intent of this zone seems to be to allow for low-intensity office use while maintaining a residential character, either through the conversion of existing residential structures or new construction which mimics it. In practice, this zone has allowed for residential-to-office conversions, but also new office and even multi-family affordable housing development (which is eligible for affordable housing bonuses). The zone would benefit from some additional clarity around purpose, form, and use. There may also be some opportunity for rezoning to B-1 in areas where mixed-use would better serve surrounding neighborhoods and existing office employees.

The O-P Zone contains a series of use standards designed to accommodate what appears to be a rather broad definition of an office park as "separate office buildings planned, constructed, or managed on an integrated coordinated basis." "Office Park" also appears in the use standards, but not in the use table for the O-P Zone, which may be an issue. Moving forward, this zone should be further evaluated to ensure it contains clear standards that work to create the type of development the City envisions within the O-P Zone.

3.E. Explore opportunities for refinement and/or consolidation of the City's industrial zones.

Sustainable Authentic Dynamic

The Code currently categorizes industrial zones into four groups: Low-Impact (I-L, I-Lb), Moderate Impact (I-M, I-Ma, I-Mb), High Impact (I-H, I-Hb), and Airport Business (A-B). On the following pages, each of these zones has been evaluated, and specific recommendations or discussion points are presented.

As discussed within the evaluations, there may be opportunities to refine the uses allowed within some of these zones, adjust their dimensional standards to improve their function, or to consolidate or eliminate specific zones that may no longer be needed. In so doing, the City must carefully consider the balance between preserving industrially-zoned land and allowing for the evolution of these spaces.



I-L & I-Lb Industrial Zones

Overview

I-L and I-Lb address low-impact industrial areas within the City. They both allow a maximum height of 45 feet, but other dimensional standards are varied between the two zones, with I-Lb taking on a more intense building form through reduction of required setbacks and a greater allowance for impervious surface coverage.

Uses allowed within these zones include a fairly broad range of typically low-impact uses such as warehousing, storage, and distribution, and marijuana testing facilities.

Recommendation / Discussion

The City may want to explore opportunities to refine the uses allowed within its I-L and I-Lb Zones. Currently, the mix of uses allowed within these zones includes some industrial uses that are more typically considered moderate- to high-impact, such as printing and publishing. Additionally, the zones allow some non-industrial uses including recreation and amusement centers and preschool facilities. While it is common to allow some non-industrial uses within a low-impact environment, such uses are more typically oriented toward serving the daily needs of employees and visitors. Given the proximity of the I-L and I-Lb to commercial areas and the premium of industrial space within the city, drastic expansions of non-industrial uses are not recommended. Further, any consideration of even minor expansions of existing non-industrial uses must be balanced with the pressure that such changes can exert on the viability of industrial uses. Any use expansion should include standards, such as requirements that these uses be located on upper floors, that ensure that such uses support or do no harm to the functional needs of industrial uses within the zone.

A 45' height maximum may be low for some more modern forms of light-industrial construction. Efficiencies are often established for these uses through techniques such as cross-docked layouts and high-bay interiors that require clear-heights that approach the current structure height maximum.



I-M, I-Ma, & I-Mb Industrial Zones

Overview

The I-M, I-Ma, and I-Mb Zones address areas of moderate-impact industrial development within the City. They allow for maximum heights of 75 feet (I-M, I-Mb) or 45 feet (I-Ma), and a mixture of uses that builds in intensity and impact from those permitted within the I-L zones, including uses such as recycling and solid waste disposal, tow lots, and marijuana cultivation facilities between 2,000sf and 7,000sf in plant canopy.

Recommendation / Discussion

Like the I-L Zones, there may be opportunities to refine the uses that are allowed within these zones to better reflect a moderate impact industrial environment.

It is somewhat uncommon for industrial zones to employ a sliding-scale approach to setbacks, such as that seen in the dimensional standards for the I-M and I-Ma zones. This approach is typically used to mitigate the impacts of height on adjacent residential uses, but it appears that the presence of residential uses abutting these zones overrides the sliding scale and requires a greater setback. A more common approach, like that in the I-L Zones, is to establish a broadly applicable minimum setback.

The I-Ma Zone is not currently mapped. The zone seems to be differentiated only in that it does not allow correctional pre-release facilities, and reduces the maximum height to 45 feet. Given that this zone is not mapped, we would recommend considering elimination of the I-Ma.



I-H & I-Hb Industrial Zones

Overview

The I-H and I-Hb Zones accommodate areas of high-impact industrial development within the City. They provide a high level of flexibility in their dimensional standards (particularly I-Hb), and allow maximum heights up to 75 feet.

Uses allowed within the I-H and I-Hb Zones include a range of general and heavy industrial uses that may cause impacts to surrounding land uses.

Recommendation / Discussion

The I-H and I-Hb Zones appear to be well-oriented to meet the intent articulated within the Code, as they allow a broad range of uses and flexibility in form. Currently, the I-H zone is very selectively mapped to areas off Riverside Street and Bishop Street.

The I-Hb zone does not currently appear on the map, which may indicate an opportunity to look at consolidation or elimination.



3.F. Consider some strategic revisions to the current R-OS (Recreation Open Space) Zone.

Sustainable Authentic

The R-OS Zone allows for the preservation and protection of parks and open spaces within Portland, as well as the establishment of large-scale regional sports and athletic facilities. Revisions the City should consider include the removal of the zone's floor-area ratio (FAR) control and the adjustment of the zone's impervious surface ratio.

FAR is typically better suited to dense urban development where a city wants to deal strategically with issues of height, building massing, and land area. As a control within an open space zone, it is quite uncommon. There are likely better approaches to limiting the size of structures within the R-OS Zone considering a maximum gross floor area, or adjusting setbacks and impervious surface controls (currently 75% for sports complexes) to better hem in the large structures that are also allowed within the zone. Both of these controls, as they stand, could allow for buildings that are quite large and potentially out of sync with the City's vision for this zone. During the revision process, controls can be calibrated and tested to ensure they meet the intent of the zone and the uses that it permits.

3.G. Ensure that the City's waterfront zones continue to function effectively. *As recommended within Portland's Plan.*

Equitable Sustainable Authentic Dynamic Secure

The City's waterfront is a critical economic and cultural resource. As such, it is important to maintain the unique characteristics of this area, which comprises a mixture of marine and non-marine uses. The code's treatment of the waterfront divides it into three distinct zones, acknowledging the potential for varied forms and use mixes in strategic locations while prioritizing the health and operational needs of the working waterfront as its most vital component. Specifically, these zones include:

EWPZ Eastern Waterfront Port Zone. The EWPZ places a high priority on the protection and functional needs of deepwater-dependent uses (those requiring a minimum of 15 feet of depth). The zone specifies a set of standards to ensure adverse impacts on marine uses are avoided, and only allows for a very limited set of commercial uses (offices) within the upper floors of existing structures. Additional limited uses are allowed through conditional use approval, including passenger-support services associated with a marine passenger use, limited industrial uses, and public uses such as maritime museums.

WCZ Waterfront Central Zone. The WCZ is intended to nurture an environment along the waterfront that prioritizes the protection of existing and potential water-dependent uses to ensure the long-term economic viability of the City's waterfront,



while encouraging a mixture of uses that can create vitality and an additional source of fiscal stability to the area's marine infrastructure. The CSOZ Commercial Street Overlay Zone acknowledges the unique position of Commercial Street as an interface between the City's active downtown pedestrian environment and the City's active working waterfront, and allows for a mixture of uses that includes retail, service, restaurants, and office uses in addition to the base uses of the WCZ. The CSOZ also includes unique provisions, such as a requirement for investment in marine infrastructure, to maintain the City's focus on the health of the working waterfront.

WPDZ Waterfront Port Development Zone. The WPDZ focuses on ensuring the continued viability of the Port of Portland as a critical resource within both the city and the region. The zone includes a set of tailored dimensional standards to address the port, as well as performance standards addressing outdoor storage, lighting, etc.

Each of these zones has been refined over time to address the unique needs of the city's waterfront, and we anticipate that all will remain. The Code revision process should maintain the unique orientation and provisions of each of these zones, while recognizing the potential for emerging industries that can be compatible within the waterfront context. Where any changes may be recommended, they should be focused on attempting to align, clarify, and modernize the language while preserving the function and intent of these established zones.

3.H. Consider the continued applicability of the Land Use Code's overlay zones.

Sustainable Authentic Dynamic Secure

The City's 11 overlay zones have been reviewed as a component of this evaluation. These are targeted regulations that address specific issues throughout the community and as such it is generally recommended that they remain. However, there may be opportunities to refine some of the overlay zones to better implement the policies of the City moving forward. Those overlays for which recommendations have been developed are discussed below:

R-7 Compact Urban Residential Overlay Zone. This zone currently allows high-density housing, on par with the city's smaller mixed-use zones, subject to dimensional and design standards. It may be valuable to explore converting a version of the R-7 to a simpler base zone instead of this complex overlay. This approach could result in a higher density residential zone that bridges existing R-zone and B-zone densities in appropriate areas of the city, such as along transit corridors. Other tools/approaches to permit higher densities in such areas are also discussed elsewhere in the code evaluation.

Downtown Entertainment Overlay Zone. The DEOZ is established to address nuisance impacts of downtown entertainment uses. Currently, applicability of the zone is established by a reference to the boundaries of the B-3, B-3c, and WCZ zones as well as the DEOZ Map. This should be simplified/clarified to avoid potential conflicts that may arise from a



change to the referenced zones, or a change to the DEOZ map. In addition, a review of standards may be necessary to ensure that sound mitigation is being adequately addressed.

Helistop Overlay. The Helistop Overlay addresses helicopter landing areas on individual sites. Typically, as this is one use, these impacts are handled through a series of use standards as opposed to a specific overlay zone. There may be an opportunity to eliminate this zone through the inclusion of use standards addressing the criteria within the overlay.

Island Transfer Station Overlay. The ITS Overlay establishes a location for transfer stations for solid waste and Public Works activities. This zone might be considered for conversion into a base zone, or for integration into existing base zoning, moving forward.

Munjoy Hill Neighborhood Conservation Overlay Zone. This overlay zone was established to alleviate development pressure regarding rate of demolitions and design outcomes of new construction within the Munjoy Hill neighborhood on Portland's peninsula. As there have been recent changes within this area, including the adoption of a local historic district, this overlay may no longer be applicable in its current form. Further study is recommended to evaluate the continued utility of the Munjoy Hill Neighborhood Conservation Overlay Zone.

Pedestrian Activities District Overlay. The PAD Overlay establishes an active use requirement for frontages as specified on the PAD Overlay map, focused over the city's downtown area. The map itself is quite granular in its approach to requiring active uses, with certain frontages requiring active uses and others "encouraging" active uses. There may be an opportunity to explore integration of the principles within the PAD into the base B-3/b/c standards and consider the PAD for other nodal, mixed-use zones. Further, there may also be an opportunity to strengthen the PAD requirements themselves.

3.I. Refine the India Street Form-Based Code Zone to provide consistency and make improvements as needed.

Structural

The India Street Form-Based Code is a unique district within the city, addressing the India Street area through an approach that focuses on built form, the relationship of structures to one another and the street, and the creation of a vibrant, active pedestrian environment. This is a relatively new district within the City's Code. As part of an audit process, the City may want to consider opportunities for simplification and alignment with the overall code structure, including both in format and in substance (e.g., definitions), and refine use and dimensional provisions where needed.



3.J. Consider a refinement to clarify the sequential ordering of the City's zones.

Structural

The manner in which zones are currently named in sequence is somewhat inconsistent and counterintuitive, which may lead to confusion regarding the logical progression of the zones within the Code. For example, within the mixed-use zones, progression from B-3 to B-3b to B-3c represents a decrease in the intensity of the zone, whereas in the industrial zones the progression from I-M to I-Ma to I-Mb represents an increase in intensity. This prevents an easy mental mapping of the zone structure, because the naming convention or sequence between each set of zones is inconsistent; in some cases, "higher" zones represent higher intensity, while in other cases they represent the opposite.

Moving forward, it is recommended that the City should consider refining the naming convention and sequencing of the zones to be more intuitive and consistent across the categories of zones, to add to the Code's ease of use.

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General Development Standards

4.A. The Code should expand and clarify what is allowed to project into a setback, such as architectural features and accessory structures.

Sustainable Authentic Dynamic

The Code currently contains a set of limited permissions for allowed projections into setbacks - found in Section 7.5.5 (for setbacks) and 7.5.6 (for stepbacks). A full range of common projections should be addressed in the Code – ranging from architectural features (sills, belt courses, cornices, buttresses, ornamental features, bay windows, eaves, etc.) to accessory structures (decks, porches, pergolas, etc.). Including a table that details specific features that can project could serve to encourage the design of façades with greater architectural interest. Without such allowances for projections, structures would have to sit back further into the lot to accommodate them, which would decrease the building area and discourage their inclusion. The Code should also address instances of encroachment within the right-of-way.

4.B. A comprehensive set of accessory structures and uses should be clearly defined within the Code.

Sustainable Authentic Dynamic

Currently, regulations for accessory structures and uses are addressed in various locations throughout the Code, including:

- General standards for location and bulk in the dimensional tables
- Section 6.6 (Accessory Uses)
- Section 7.4 9 (Supplemental Dimensional Standards) - standards for pools and fences

An accessory structures and uses section should be created that – first – contains a set of general standards for accessory structures, drawing from what is found within the dimensional tables. Second, a full range of common accessory structures and uses should be included, enabling the City to address the specific impacts of structures or uses. Each accessory structure and use should be defined, and regulations should be clearly articulated for each, including zones where they are allowed, minimum lot sizes (if needed), maximum sizes and heights, permitted locations on a lot, and any required impact controls, such as screening.

Based upon an evaluation of the current accessory structures and uses addressed within the Code, some revisions to consider are as follows:

- Drive-through facilities are currently considered an accessory use. Whether drive-throughs are permitted is a function of both principal use and zone, creating some complexity that is challenging in the current format. Revisions could include tables that help to simplify permissions. Consistent development standards should also be considered.
- Outdoor storage standards in Table 6-H should include more specific screening requirements, tailored to the zone.
- Private solar and wind energy systems refer to principal use standards, which may be too restrictive or inappropriate for a small system installed at a residential property. Typically, when these are an accessory use, specific regulations are created to address them.
- The home occupation use should be modernized to be more flexible. This can be achieved, for example, by eliminating the list of specific businesses allowed as a home occupation, while still controlling any potential negative impacts or nuisances. In particular, the ongoing COVID-19 pandemic has led to many communities relaxing home occupation standards, an acknowledgment that the nature of many uses has changed.

4.C. Performance standards should be consolidated (where possible) and updated to facilitate easier enforcement.



Section 6.8 contains the Code's performance standards, but an additional set is found in the waterfront zones. We understand that the unique environmental sensitivities of the waterfront, as well as the nature of the activity within the working waterfront, create the need for specific standards. It should be clear, however, how both sets of standards interact. Structural changes could help to accomplish this.

Further, many of the standards are very technical, which can lead to difficulty in their administration, particularly those related to noise, odor, and smoke. Simplified standards should be considered.

4.D. A suite of targeted revisions could strengthen the City's natural resource protections, incentivize green building and the development of green infrastructure, and provide flexibility for eco-innovation. *As recommended within Portland's Plan and One Climate Future*



Portland's Plan, along with *One Climate Future* present a series of key avenues for the City to explore from both a policy and regulatory perspective, aimed at strengthening Portland's commitment to the protection of its abundant natural resources, its unique character, and its quality of life. Numerous recommendations within these plans are worthy of consideration during the ReCode process, and as already discussed, sustainability and resiliency are a thread that run through the entirety of the Phase II ReCode effort.

Though the nature of some of the recommendations listed below may vary, they are being presented as a suite within the recommendations for General Development Standards, as the intent is for these types of standards to be as broadly applicable as possible. Some of these suggestions may in fact be implemented in part or in whole within other recommendations presented in this evaluation. Others may require both revisions to the City's Land Use Code and Technical Manual. Further, some may require significant additional study – beyond the scope of Phase II - to be fully implemented.

- Strengthen Portland's wetland protections where possible.
- Integrate low-impact development standards and impervious surface standards, along with expanded flexibilities or requirements or green infrastructure and open space to help capture and retain stormwater and to mitigate heat.
- Preserve existing opportunities and increase opportunities to use open space for food production, including community gardens, urban agriculture, food forests, and other forms.
- Maintain and enhance stream and shore buffers and protections for critical ecosystems.
- Consider the development of an incentive system to encourage the preservation of open space, integration of green infrastructure, planting of trees, and use of other technologies such as microgrids and renewable thermal energy systems.
- Create standards and flexibilities for the integration of features such as shading structures, green roofs, green walls, solar canopies, permeable paving, and high-albedo paving within new developments.
- Update the shoreland zoning to reflect state statute and ensure the protection of critical coastal resources as appropriate.

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Parking, Loading & Access

5.A. The Code should comprehensively and consistently address the design of all off-street parking, both surface and structured.

Sustainable Connected Authentic

Within Section 6.5 of the Code there are a series of conditional use standards that address the design of off-street surface lots and parking structures as principal uses, both by use and by zone. These standards should be revised to ensure regulations apply to all off-street facilities throughout the Code. Standards should be evaluated to ensure that they coordinate with all parking and access specifications within the City's Technical Manual. Items that may be addressed include:

- Basic design elements such as required setbacks, etc.
- Requirements for location of facilities on the site
- Off-site parking permissions

Regulations should include design standards for parking structure facades facing a street, such as façade articulation, screening of the ground floor and rooftop parking, and maintenance of a vehicular clear sight zone at any entry/exit points to prevent conflicts with any other vehicles and pedestrians.

The current structured parking requirements for the B-6 and B-7 Zones require active space along the ground floor along all frontages, with exemptions available due to challenging topography or based upon Planning Board review. The City may want to consider creating more options for first floor design if the requirement that all ground floors should be active has proven too onerous for current development. It may be that select street frontages require active ground floors, while other – or secondary – frontages can choose from a variety of options that remain geared toward higher levels of screening and design, but do not require active uses. Additionally, if a series of options are developed, additional zones can be considered for these higher levels of design.

5.B. Consider further detailing electric vehicle charging requirements as referenced within the City's Code. *As recommended within One Climate Future*

Sustainable Connected Dynamic Secure

The Code currently references the City's Technical Manual, which specifies a requirement for new structured and surface parking lots of five or more spaces to "include energized electrical outlets or installed chargers capable of providing Level 2 EV charging or higher to 20% of parking spaces." Further, the manual requires that the remaining spaces be served by sufficient facilities to allow for future installation of EV charging equipment.

This requirement is generally in line with the recommended actions in *One Climate Future*. However, moving into the revision, the City may want to explore opportunities to further refine the current requirements as referenced into the Technical Manual

based on practice and the evolving landscape around EV charging.

5.C. Consider enhancing the Transportation Demand Management (TDM) Plan requirements to incorporate recommendations within One Climate Future. *As recommended within One Climate Future*



The Code currently references the TDM requirements within the City's Technical Manual. These current TDM standards are quite robust, however there may be an opportunity to enhance and align them with the recommendations included within One Climate Future by modifying applicability or by amending the requirements themselves.

5.D. Address autonomous vehicles through considerations related to drop-off/pick-up zones, flexibilities related to parking space and structure design, and new uses such as AV staging, support, and recharging.



With autonomous vehicles on the horizon (and increasingly on Portland's roadways), the City should consider including provisions that will allow for ease of adaptation to the impacts that increasing numbers of AVs can have on the urban fabric. Specifically, some considerations may include:

- **Parking flexibilities.** Portland is already a step ahead here, as much of the city currently requires no minimum parking due to a series of exemptions that are available. With the advent of autonomous vehicles, the number of people who are simply dropped off at their destination will increase and the need for additional parking spaces will decrease.
- **Design of parking spaces and parking structures.** The City may want to consider requirements or flexibilities to address the impacts of autonomous vehicles on the design of parking spaces and structures. Many communities are moving toward specific design requirements that anticipate the reuse or conversion of parking structures that may be unnecessary in the future. Further, facilities for storage of AVs may not require a typical parking space, but can effectively store vehicles within a smaller footprint.
- **Drop-off and pick-up zones.** In addition to the impacts already felt due to the increase in ride-sharing services, autonomous vehicles will only increase the importance of ensuring effective design relative to parking location, drop-off and pick-up locations, and their impact on building design and the public realm.
- **New uses to support AVs.** With more autonomous vehicles on the roads, the need for service, storage and recharging of these vehicles will become important. These uses may generate

unique impacts that a typical service station or parking garage may not, and therefore the City should consider options for regulating these uses, as well as where they should be located.

5.E. Re-evaluate current parking flexibilities and exemptions to ensure clarity and alignment with the City's goals, and consider establishment of parking maximums in locations proximate to public transit. *As recommended within One Climate Future*



Portland has made great strides toward adjusting its parking requirements to prioritize multi-modality and the creation of walkable, active and pedestrian-oriented nodes and neighborhoods. The City has reduced minimums and created exemptions and incentives to reduce the amount of off-street parking required within Portland. As a suite of tools, however, these should all be evaluated to ensure they are coordinated and working together. The categorical exemption for development within ¼ mile of transit may overlap with other exemptions, creating confusion as to what applies and what is needed within the Code. The revision process should organize and evaluate the various flexibilities and exemptions to determine their utility and streamline what is included within the Code.

A further step, as recommended within *One Climate Future*, is to consider the establishment of parking maximums in specific transit-served areas of the community. This potential revision should be supported by continued evaluation of the City's 2017 Peninsula Parking Study and its recommendations. In addition, further study may be needed to better understand the locations where such a change might be best targeted, and to ensure that the maximums established are reasonable and effective in achieving the City's goals.

5.F. Consider refinements to the City's bicycle parking requirements.



The City's current bicycle parking requirements are fairly strong, requiring two spaces for every five units for residential uses, and two spaces for every ten vehicular spaces (up to 100, and then one space per 20 vehicular spaces thereafter) for nonresidential uses. Further, the City's Technical Manual provides significant detail related to the required location and design of these spaces to ensure that they are adequately located and functional.

Given recent changes to off-street parking requirements, the City should consider a new approach to nonresidential bicycle parking requirements, basing them on square footage rather than a ratio linked to the number of vehicular parking spaces provided. An additional refinement that the City should consider is specifying how many short-term and long-term bicycle spaces are needed. The Technical Manual addresses the design of bicycle parking for long-term use – such as in residential



uses, but there are no requirements, such as a ratio of long-term vs. short-term spaces required. In particular, long-term bicycle spaces for multi-family developments are especially important, as this is the primary way residents store their bikes.

5.G. Consider updates to the Code's loading standards, and addressing the storage of recreational and commercial vehicles.

Structural

1. Loading standards should be updated to be more flexible.

Loading is an important element of new development and should be better tailored to uses and/or zones. The B-6, B-7 or WCZ zones are exempt from loading requirements but all other zones require a loading bay even at 5,000sf of gross floor area, even for retail. The concern is that these requirements may sacrifice a more urban form to accommodate a loading bay.

One option is to allow the market to decide how many loading spaces are needed, and only dictate the location and design of loading. The other is to significantly increase the minimum square footage for the larger use categories before requiring loading and to cap out the minimum required loading at 3 spaces; the nature of the business will determine the amount of loading required. Existing structures should also be exempted from these minimums, requiring only maintenance of any existing bays even with expansions (this would require elimination of Section 19.2.4. Nonconformity as to off-street loading). This also encourages the reuse of existing buildings.

2. The Code should address recreational vehicle and commercial vehicle storage.

Recreational Vehicles. Recreational vehicles should be limited to outdoor storage areas located in select areas of a site, such as within the interior side yard behind the front building line or in the rear yard. When stored in the interior side or rear yard, the recreational vehicle should be located a certain distance from any lot line and screened from view from any public right-of-way.

Commercial Vehicles. Commercial vehicles parked within a residential zone should allow for standard size vehicles owned and used for commercial purposes by the occupant of a dwelling or guest including, but not limited to, vans, sports utility vehicles (SUVs), standard passenger size livery vehicles, and pick-up trucks, provided that the vehicle is stored or parked in a permitted parking area. Commercial vehicle storage for nonresidential zones should be limited to commercial vehicles that are being operated and stored in the normal course of business. They should be required to be stored on the lot in areas related to their use as vehicles, provided that the primary purpose of such vehicles is not the display of signs.

Landscape



6.A. Landscape requirements should address all aspects of site development, from preservation to screening and buffering.

Sustainable Authentic Dynamic

The contribution of landscape to the visual quality of the built environment cannot be overemphasized. In addition to its visual and aesthetic benefits, landscape can provide valuable ecological and climate resilience benefits to the city.

Landscape requirements should be consistent across the Code. Currently, they are contained in multiple areas, including the performance standards for uses (Section 6.8.8), and with those developments that require site plan review (in Article 14). The performance standards of Section 6.8.8 are rather vague regarding what is required for the O-P, R-P, A-B, I-H, and I-Hb Zones, and do not include references to the City's Technical Manual, which may be helpful. Comparatively, the site plan review standards are more specific. Moving forward, one approach is to develop a new, unified set of landscape standards, varied by zone as appropriate, with references to specific standards in the Technical Manual. The site plan ordinance could augment these standards as necessary.

Similar to off-street parking and loading, a new, unified landscape section could contain all the Code requirements related to landscape, and should align with and clearly reference back to the detailed standards of the Technical Manual wherever applicable. A new landscape section could include standards for:

- **Landscape preservation** (based on Section 14.6.2.B) This section could be evaluated and revised as needed to ensure standards related to preservation, removal, and replacement of existing vegetation are adequate and aligned with the City's goals.
- **Site landscaping** (based on Section 14.6.2.C.1). This section could also be revised to include more flexibilities in the requirements within setbacks to ensure compatibility with the building frontage where it is located.
- **Buffer yards** (based on Section 14.6.2.C.2). This section can build upon the existing site plan standards but include different widths and planting requirements to allow for a more tailored approach in transitions between uses and zones.
- **Parking lot landscaping** (based on Section 14.6.2.C.3). This section includes requirements for the interior of parking lots but does not speak to screening along the street. Where a parking lot abuts the street (excluding alleys), specific requirements – such as for low fencing, walls, or shrubs, can help to effectively screen cars from the right-of-way.
- **Street tree requirements** (based on Section 14.6.2.C.4). This section refers to the Technical Manual. If this has been achieving the desired tree canopy along streets, it should be maintained as-is.



6.B. Landscape requirements could be updated to consider flexibilities or allowances for techniques and technologies, other than vegetation, that can contribute to rainwater management and heat island mitigation. Requirements should also support the city's ecological systems through prioritization of native species and planting for pollinators. *As recommended within One Climate Future*

Sustainable Authentic Dynamic Secure

While the contributions of landscape to the built environment – and to the mitigation of rainwater runoff and heat island among other urban issues – is clear, the City may want to consider building flexibilities into the Code to allow for other types of site elements to enhance or augment these contributions. Such flexibilities may include allowances for solar shades or other shading structures within parking areas, allowances for green roofs, and considerations for materials such as high-albedo paving to contribute to the City's goals of managing rainwater, mitigating heat, and providing shade and beautification for residents.

Additionally, the plant selection requirements within the City's Technical Manual do a good job of prioritizing the use of native species and preventing the spread of invasives. These standards could be enhanced, however, to include acknowledgment of additional considerations such as planting for pollinators or the creation of critical habitat.

Nonconformities



7.A. The City may wish to consider no longer allowing a change from one nonconforming use to another nonconforming use.

Authentic

The current Code allows the following: "A lawful nonconforming use shall not be changed to any use other than a use permitted in the zone in which the use is located or to any use other than a nonconforming use of a more restricted zone, as set forth in the following schedule..."

The intent of any code revision is to reduce the number of nonconformities within the city, by ensuring that desirable patterns and development character are acknowledged and protected within the Code. For those nonconformities that remain, the intent is for their gradual elimination over time. It is unclear why the current Code allows for a change from one nonconforming use to another nonconforming use, as this essentially works to negate the achievement of the City's long-term vision. As such, it is recommended to eliminate this permission. If Portland wished to have fewer use nonconformities or grant more flexibility for existing nonconformities, one solution would be to expand the allowable uses and therefore reduce total nonconformities overall rather than unnecessarily complex mechanisms that undermine the intent of categorizing a use as nonconforming.

7.B. New regulations for nonconforming site characteristics should be added to the Code.

Equitable Sustainable Authentic Dynamic Secure

The City could address sites that do not comply with general development standards, such as performance standards or standards around accessory uses or structures, by creating a separate nonconformity category for elements such as landscape, fences or walls, lighting, or parking.

Much like the City's existing sign regulations, these regulations would allow normal maintenance and incidental repair to a nonconforming site element, but prohibit repairs or reconstruction that would create any new nonconformity or increase the degree of the previously existing nonconformity. The regulation would also spell out when nonconforming site elements must be brought into conformance (e.g., when a new principal structure is constructed on a site, an existing principal structure is increased in floor area by a certain amount, an existing parking lot is fully reconstructed or expanded, or, in specific circumstances, when 50% or more of the length of a nonconforming fence is reconstructed).

7.C. Flexibilities for additions and enlargements can be added to the nonconforming regulations.



Building off existing provisions that allow for vertical expansions in Section 4.4.3, the Code could contain new allowances related to additions and extensions that enable nonconforming walls, such as those which may be too close to a side or rear lot line (with some limitations), to be extended horizontally.

This type of provision is very useful, as it can encourage continued investment and upkeep of homes in existing older neighborhoods, helping to preserve the (often "naturally-occurring" affordable) housing stock, and easing the process for property owners who want to continue to invest in their homes, particularly older homes.

Such a provision, crafted to refer to both vertical and horizontal expansions, may appear as: "Where a dwelling is deemed nonconforming because of encroachment into the required interior side or rear yard, the structure may be enlarged or extended vertically or horizontally along the same plane as defined by its existing perimeter walls, so long as the resulting structure does not increase the degree of the existing nonconformity or otherwise violate this Code."

Code Structure



8.A. The Code would benefit from greater use of illustrations and matrices.

Structural

Illustrations, matrices, and flowcharts are an effective way for regulations to communicate information to users, clarifying requirements and aiding consistency in application of standards. All standards that can be illustrated should be. Codes can also benefit from the use of matrices, which can easily summarize and clearly present information regarding uses, dimensional requirements, and other provisions.

Currently most illustrations within the Land Use Code are found within the form-based code (India Street Form-Based Zone) and sign sections. The revised Code should illustrate a greater variety of regulations, which will more effectively communicate information to users. Numerous additional regulations and terms would benefit from graphics including, but not limited to:

- Measurement rules (Section 7.2)
- Design standards
- Lot types and dimensions
- Parking, landscape, and sign regulations
- Accessory structure regulations, such as fences, detached garages, etc.

8.B. The Code could be refined to explain the rules of measurement more clearly, as well as any exceptions to those rules.

Structural

Currently, rules of measurement are found within multiple sections of the Code, including the dimensional standards article, the form-based code, and the sign article. Bringing measurement methodologies together into one Article (Section 7.2) could add significant clarity and benefit ease of use.

One issue with the rules of measurement is that there is an extensive set of exceptions to these rules, found in Section 7.5. The inclusion of this section, as well as rules of measurement and modifications within the footnotes of the zone dimensional standards, creates three levels of regulation that must be found and interpreted to clearly determine what applies in each situation. There are several ways that this can be improved to make things clearer:

- Based upon a closer evaluation of the zones, some of the exceptions (footnotes and Section 7.5) may be able to be integrated directly into the zone standards in the tables.
- Certain exceptions can be considered part of the rules of measurement. For example, appurtenances that do not count toward building height can be part of the rules for calculating height.

- Some exceptions can be handled as "general development standards," such as projections into setbacks.
- A more significant revision can be to then divide the dimensional article into "parts" so that each section can have a main body of text that lists specific modifications/exceptions (rather than footnotes or cross-references).

8.C. All terms used in the Code should be clearly defined.

Structural

Within the Code's current structure, definitions are found in multiple locations, including Article 3, the India Street Form-Based Code, signs, waterfront zones, etc. Moving forward, it may be beneficial to reorganize all definitions within the Code into a single location in Article 3. All existing definitions should also be evaluated, updated for clarity, and checked for any internal conflicts. There may also be undefined terms to be added, upon further review.

One exception to this approach are the definitions associated with floodplain regulations to the floodplain article (Article 12). These are specifically tied to the administration and interpretation of floodplain regulations, many of which are established by other agencies like FEMA and therefore may differ in definition from the same term used in the larger Code.



Other Recommendations

9.A. Augmenting ReCode Phase I work

Structural

Lastly, there are a number of small vestigial Code edits from Phase I, including minor updates to reflect changing state statute, edits for clarity or consistency (e.g., definitions of new terms, clarification of thresholds, updates to text to reflect the results of recent referenda), and minor edits to address practical issues that arise in the interpretation of the ordinance. These edits, which range from updating the shoreland zoning to clarifying the ADU regulations that apply in non-conforming structures, further the City's efforts to ensure the Code's long-term legibility.

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Recommendation Matrix

Recommendations presented within this Land Use Code Evaluation have been organized within the matrix below, sorted by their likely impact toward achieving the goals of Phase II as determined by the number of key themes they touch upon. Additionally, any items cited as including a component of further study are indicated with an asterisk in the matrix.

Items requiring further study have been included here, as progress can be made on many of these during Phase II.

#	Recommendation	Equitable	Sustainable	Connected	Authentic	Dynamic	Secure	Structural
Recommendations Addressing All Themes from *Portland's Plan*								
1D	Consider revising the definition of "agriculture" to include modern agricultural activities.	●	●	●	●	●	●	
1E	Expand and clarify the range of dwelling types allowed in the city.	●	●	●	●	●	●	
1F	Add clarity around specific housing-related uses (e.g., lodging houses, SNIDUs, congregate care, etc.).	●	●	●	●	●	●	
2A	Consider developing bonus provisions within the residential and mixed-use zones to encourage sustainable construction and/or a walkable, urban environment.*	●	●	●	●	●	●	
2B	Evaluate densities and uses permitted throughout the city in the context of risk and resilience.*	●	●	●	●	●	●	
2G	Explore opportunities to encourage transit-oriented development within appropriate areas of the city, in coordination with regional transit planning.*	●	●	●	●	●	●	

#	Recommendation	Equitable	Sustainable	Connected	Authentic	Dynamic	Secure	Structural
3C	Evaluate and refine the City's mixed-use zones to ensure they support the city's thriving mixed-use areas, and continue to enable modern, sustainable, walkable development in line with the City's vision for the future.	●	●	●	●	●	●	
Recommendations Addressing Five Themes from *Portland's Plan*								
1A	The Code should address additional neighborhood uses and leverage neighborhood mixed-use zoning to encourage development of complete neighborhoods.	●	●	●	●	●		
1B	The Code should address additional creative uses not currently listed.	●	●	●	●	●		
2C	Consider development of zone dimensional and design standards that encourage visual and physical access to the city's waterfront areas.	●	●	●	●	●		
3A	Identify barriers, and explore options and implications related to allowing for a greater diversity of housing types within the City's residential zones.	●	●		●	●	●	
3G	Ensure that the City's waterfront zones continue to function effectively.	●	●		●	●	●	
7B	New regulations for nonconforming site characteristics should be added to the Code.	●	●		●	●	●	
7C	Flexibilities for additions and enlargements can be added to the nonconforming regulations.	●	●		●	●	●	

#	Recommendation	Equitable	Sustainable	Connected	Authentic	Dynamic	Secure	Structural
Recommendations Addressing Four Themes from *Portland's Plan*								
1G	A comprehensive set of temporary uses should be addressed in the Code.	●	●		●	●		
1H	Consider adjusting the City's use regulations to ensure they support a circular and sharing economy; identify and eliminate barriers to businesses that reuse or repair consumer goods. As recommended within *One Climate Future*.	●	●		●	●		
2D	Refine regulations pertaining to the bulk and placement of structures in the Land Use Code.	●	●		●		●	
2F	The Code should regulate impervious surface maximums in all residential zones.	●	●		●		●	
3B	Consider further study of the City's island zones to ensure they adequately acknowledge and support these unique areas within the city.*		●		●	●	●	
3H	Consider the continued applicability of the Land Use Code's overlay zones.*		●		●	●	●	
4D	A suite of targeted revisions could strengthen the City's natural resource protections, incentivize green building and the development of green infrastructure, and provide flexibility for eco-innovation.*		●		●	●	●	
5B	Consider further detailing electric vehicle charging requirements as referenced within the City's Code.		●	●		●	●	
5C	Consider enhancing the Transportation Demand Management (TDM) Plan requirements to incorporate recommendations within One Climate Future.		●	●		●	●	

#	Recommendation	Equitable	Sustainable	Connected	Authentic	Dynamic	Secure	Structural
5D	Address autonomous vehicles through considerations related to drop-off/pick-up zones, flexibilities related to parking space and structure design, and new uses such as AV staging, support, and recharging.		●	●		●	●	
5E	Re-evaluate current parking flexibilities and exemptions to ensure clarity and alignment with the City's goals, and consider establishment of parking maximums in locations proximate to public transit.*		●	●		●	●	
5F	Consider refinements to the City's bicycle parking requirements.		●	●		●	●	
6B	Landscape requirements could be updated to consider flexibilities or allowances for techniques and technologies, other than vegetation, that can contribute to rainwater management and heat island mitigation. Requirements should also support the city's ecological systems through prioritization of native species and planting for pollinators.		●		●	●	●	
Recommendations Addressing Three Themes from *Portland's Plan*								
1C	The Code should address several specific new social service uses.	●		●			●	
1I	Evaluate and revise as needed to ensure that solar installations can be maximized and streamlined.*		●			●	●	
2H	Consider opportunities to refine height controls within the Land Use Code's mixed-use zones.*		●		●		●	
3D	Consider some revisions to the O-P and R-P Zones.		●		●	●		

#	Recommendation	Equitable	Sustainable	Connected	Authentic	Dynamic	Secure	Structural
3E	Explore opportunities for refinement and/or consolidation of the City's industrial zones.		●		●	●		
4A	The Code should expand and clarify what is allowed to project into a setback, such as architectural features and accessory structures.		●		●	●		
4B	A comprehensive set of accessory structures and uses should be clearly defined within the Code.		●		●	●		
4C	Performance standards should be consolidated (where possible) and updated to facilitate easier enforcement.	●	●				●	
5A	The Code should comprehensively and consistently address the design of all off-street parking, both surface and structured.		●	●		●		
6A	Landscape requirements should address all aspects of site development, from preservation to screening and buffering.		●		●	●		
Recommendations Addressing Two Themes from *Portland's Plan*								
2E	Consolidate and refine basic design standards in keeping with the work on the design manual.		●		●			
3F	Consider some strategic revisions to the current R-OS (Recreation Open Space) Zone		●		●			
Recommendations Addressing One Theme from *Portland's Plan*								
7A	The City may wish to consider no longer allowing a change from one nonconforming use to another nonconforming use.				●			

#	Recommendation	Equitable	Sustainable	Connected	Authentic	Dynamic	Secure	Structural
Structural Recommendations								
1J	Consider some potential updates to the Code's use structure.							●
3I	Refine the India Street Form-Based Code Zone to provide consistency and make improvements as needed.							●
3J	Consider a refinement to clarify the sequential ordering of the City's zones.							●
5G	Consider updates to the Code's loading standards, and addressing the storage of recreational and commercial vehicles.							●
8A	The Code would benefit from greater use of illustrations and matrices.							●
8B	The Code could be refined to explain the rules of measurement more clearly, as well as any exceptions to those rules.							●
8C	All terms used in the Code should be clearly defined.							●
9A	Augmenting ReCode Phase I Work							●

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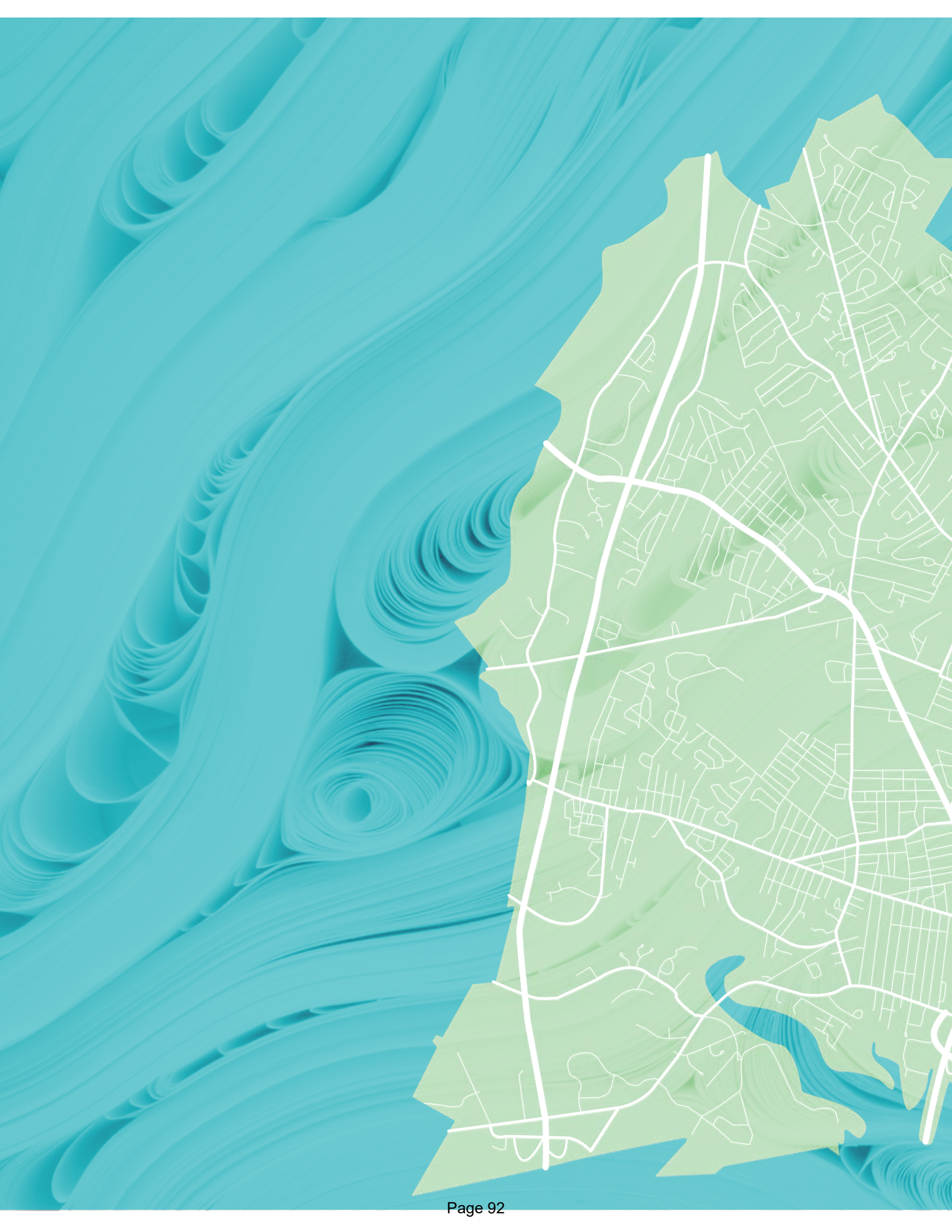


Let's Talk About the City of Portland's

Land Use Code Evaluation

***ReCode Portland** is a multi-phased process focused on rewriting the City's Land Use Code for the first time in more than 50 years.*

The overarching goals of the ReCode process are to create a new code that is user-friendly, advances the goals of Portland's Plan, and enables the City to effectively address issues related to housing, design, preservation, conservation, the working waterfront, energy, and transportation. Phase I of the ReCode process was centered around an effort to reorganize the Code into a modern, rational, user-friendly format and to implement some key policies from Portland's Plan, including provisions for accessory dwelling units, off-street parking flexibilities, and sign standards.Phase I of the process concluded in November of 2020 with the adoption of a reformatted, restructured, and updated Land Use Code.

The Land Use Code Evaluation represents the first major work product of Phase II of ReCode Portland. The work of Phase II will build upon the foundation established during Phase I of the ReCode effort, expanding into significant substantive revisions to the content of the Code. In short, whereas Phase I of the process was predominantly focused on reformatting and restructuring the City's Land use Code, Phase II will focus on reorienting and revising the Code to bring it into alignment with the City's priorities, including confronting the impacts of climate change, mitigating sea level rise, addressing issues of racial and social equity, and supporting a diverse and affordable supply of housing, among others.

The evaluation explores the impacts of the City's current regulations on these key policy areas, and presents a series of concepts, approaches, and recommendations targeted to ensure that the work of Phase II significantly advances the goals of Portland's Plan and other City policy documents. Within the evaluation, regulatory concepts are classified based upon their relationship with six key themes of Portland's vision for the future: that of an equitable, sustainable, dynamic, secure, authentic, and connected community. Where a specific recommendation addresses one or more of these themes, it is indicated as such within the document.

Updating Portland's Land Use Code is an unavoidably technical process, by nature. Though the Evaluation seeks to be intentional in connecting suggested concepts, approaches, and recommendations to established policies, the revisions themselves must respond to the nature and organization of the Code as a regulatory document. As such, the Evaluation structures its recommendations not by policy area, but by type of regulatory control:

- *Uses & Use Standards*
- *Dimensional & Design Standards*
- *Zones*
- *General Development Standards*
- *Parking, Loading & Access*
- *Landscape*
- *Nonconformities*
- *Updates to Code Structure*

The types of controls addressed within the Evaluation are presented below, with a brief description of what they are, how they relate to Portland's Plan and other City policy documents, and what they can do to reflect and reinforce the City's priorities, goals, and aspirations.

So, what's in the Land Use Code Evaluation?

Find out

Uses & Use Standards

Uses and use standards directly address the types of 'land uses' that are allowed on property across the City. For instance, use standards define what kinds of residential uses are allowed on a property, whether restaurants or retail are permitted in certain areas, and where other types of uses, like auto service stations, bed and breakfasts, and preschools are allowed to operate. Allowed uses vary by zoning district, meaning that certain land uses might be allowed in one area of the City, but not in another.

How do these relate to Portland's Plan?

Uses and use standards are central to achieving the goals of Portland's Plan. Rethinking which types of uses are allowed where – and under what conditions - can help to match opportunities for certain types of housing, institutional, commercial, or industrial uses to the areas of the City where they are most needed, or to limit certain uses where they might create conflicts. For example, expanding the types of housing allowed within certain residential districts could allow for the creation of additional housing units – a major goal of Portland's Plan. Similarly, creating opportunities for new small-scale neighborhood retail establishments could help to move the City closer to its complete neighborhood goals.

What does the Evaluation recommend?

The Land Use Code Evaluation identifies opportunities to revise use regulations within the Code to better support the creation of middle-density housing, the creative economy, and urban agriculture. The Evaluation also highlights the potential for additions or refinements to the City's range of social service and housing-related uses, and the need to review use regulations through the lens of Portland's climate resiliency goals.

Dimensional & Design Standards

At their most basic level, dimensional standards establish where on a property buildings may be located, and how big they can be. For instance, dimensional standards may define how close to a property line a building can sit, how tall that building can be, and how much of the lot it is allowed to cover. Dimensional standards also establish minimum lot sizes for certain uses, which impact – for instance – how many residential units can be built on a particular site. Design standards work to augment dimensional standards by further defining how a building should relate to the public realm around it. For instance, design standards might require that a certain percentage of a building contain doors or windows that face the street.

How do these relate to Portland's Plan?

Dimensional and design standards, like use standards, are key to meeting the goals of Portland's Plan. Where the plan foregrounds concepts such as promoting transit-oriented development and housing production, updates to the Land Use Code's dimensional standards (like minimum lot sizes, height limits, required setbacks, and residential density limits) can fundamentally affect whether these concepts can become a reality in Portland. For instance, does the current Code allow sufficient height to build units along transit corridors at actual transit-supportive densities? Are current minimum lot area regulations making it harder to build housing in the City?

What does the Evaluation recommend?

The Evaluation recommends adjusting dimensional standards to help achieve climate goals - like regulating impervious surface maximums more consistently, considering height and setbacks in the context of resiliency, and considering dimensional bonuses (e.g., additional height or density) in cases where climate goals are met. The Evaluation also recommends potential revisions to dimensional and design standards that can help to support housing creation and transit-oriented, walkable, urban development.



Zones

Zones are the basic building blocks of the Land Use Code, and the fundamental organizing element for how its regulations are applied. Each zone within the Land Use Code is created with a specific purpose, and contains a set of regulations that address uses, dimensional standards, and other development standards to achieve that purpose. For instance, Portland's Code includes a series of residential zones, mixed-use zones (i.e. zones where residential uses and other uses might be "mixed" on a property), island zones, industrial zones, and open space zones, among others. The City's zoning map identifies the specific geographic areas that are within each zone, effectively applying the regulations of the zone to real property in Portland.

How do these relate to Portland's Plan?

As one of the foundational aspects of the City's Land Use Code, zones and zone-based regulations will play a critical role in achieving the goals of Portland's Plan. For instance, basic revisions to the City's residential zones could open opportunities for additional (and more diverse) housing creation across the City, moving Portland closer to its goals related to equity, security, and sustainability. Further, modifications to mixed-use zoning could help support transportation goals and encourage the creation of complete neighborhoods.

What does the Evaluation recommend?

The Land Use Code Evaluation explores opportunities to refine, revise, and reorient the City's palette of zones to better align with the goals of Portland's Plan. It takes perhaps the most critical look at the residential zones, with an eye toward implementing the City's goal of creating opportunities for a diverse range of housing options across the City's neighborhoods. The Evaluation also recommends adjustments to the City's mixed-use, industrial, and open space zones, identifying where zones may need to be revised to ensure they are achieving their purpose, where they might be consolidated with other zones, or where their elimination may be the best course of action.



General Development Standards

Certain rules and regulations within the Land Use Code apply to all development, regardless of use type or zone. For example, numerous performance standards, dimensional standards, and otherrequirements are includedto help protect of the City's natural resources, incentivize green building techniques, and ensure compatibility between different uses and structures.

How do these relate to Portland's Plan?

Portland's Plan, (and One Climate Future) encourage the City to look for opportunities where natural resource protections might be strengthened or expanded, low-impact development might be encouraged, and flexibilities for green building techniques and technologies might be incorporated into the Land Use Code. The comprehensive plan additionally emphasizes the City's authenticity as a key strength; general development standards can address things like the projection of architectural features into setbacks or the right-of-way, or where and how certain accessory structures can be located, allowing the things that make the City unique to continue.

What does the Evaluation recommend?

The Land Use Code Evaluation recommends a series of revisions that can provide greater flexibility for new development while maintaining the City's authenticity, notably through targeted exceptions and rules for architectural elements and accessory structures and uses. Additionally, the Evaluation addresses issues of natural resource protections, green building, and green infrastructure, identifiying where regulations could be expanded, or new approaches considered.

Parking, Loading & Access

The off-street parking and loading requirements of the Land Use Code determine how much and where off-street parking and loading must be provided in association with any given land use within the City.

How do these relate to Portland's Plan?

Portland's Plan (and *One Climate Future*) place a premium on moving away from auto-oriented development, and reimagining our built environment to support access to housing, employment, goods and services without the need for an automobile. The Code's off-street parking and loading regulations are central to this vision, as they directly relate to how much of our built environment is devoted to automobiles and their storage. Quite often, the need to accommodate off-street parking can be the primary "driver" of site designs, rather than other factors like walkability or the creation or preservation of open space. As such, modifying these regulations can have a profound impact on site development by providing the flexibility to use land for other purposes that address City goals, such as green infrastructure, public space, or additional housing.

What does the Evaluation recommend?

The Evaluation builds upon recent changes to off-street parking regulations with recommendations that encourage mode shift, and improve the design and functionality of new off-street parking and loading areas where they are constructed. Recommendations also acknowledge the emergence of new technologies, and encourage new development to accommodate the supportive infrastructure for advancements in electric and autonomous vehicles. Finally, the Evaluation recommends refinements to the City's bicycle parking standards, to ensure they continue to meet both the physical and functional needs of bicyclists in the City.

Landscape

Landscape provisions of the Land Use Code require that all new development preserve or provide landscaped elements. These standards prevent the removal of certain trees and require that certain site features, such as mechanical equipment and off-street parking, be screened from public view. Requirements also require that certain incompatible land uses be buffered from residential areas, and that new street trees be planted as new development occurs.

How do these relate to Portland's Plan?

Existing landscape standards tend to focus predominantly on the aesthetics of the built environment and the softening of transitions between land uses. Both Portland's Plan and One Climate Future emphasize the need to think more holistically about the benefits of natural areas and landscaping as they relate to the City's goals around climate, equity, and ecology.

What does the Evaluation recommend?

The Evaluation recommends that a new unified landscape chapter be introduced into the Land Use Code, that would apply to all new development, and be augmented to overtly prioritize and facilitate landscaping and landscape alternatives that further the City's goals.

Nonconformities

The City's Land Use Code establishes rules that govern how nonconforming lots, structures, and uses (i.e. those that do not comply with the current Land Use Code) may be developed, occupied or operated while remaining nonconforming. Under these rules, nonconformities may continue so long as the nonconformity is not exacerbated, with the eventual goal of achieving compliance with the Land Use Code.

How do these relate to Portland's Plan?

While Portland's Plan provides no specific direction on changes to nonconformities, it does encourage creative thinking around how existing development may be repurposed to account for changes in land use. Likewise, Portland's Plan identifies that zoning in many locations across the City is incongruous with the built form, and may need to be revised to achieve broader compliance.

What does the Evaluation recommend?

The Evaluation recommends modest changes to the City's allowance for nonconformities, to account for individual non-conforming characteristics of a site, provide additional flexibility for enlarging nonconforming structures, and encourage change over time by not allowing one non-conforming use to be replaced by another nonconforming use.

Updates to Code Structure

Prior to the adoption of ReCode Phase I, Portland's Land Use Code was lengthy, challenging to navigate, and redundant. This was largely due toits structure, which was organized primarily around individual zoning districts. Phase I of ReCode addressed many of these issues, restructuring the Code thematically, (ex. Zones, Use, Dimensional, etc..) and through the introduction of simple graphics and tables.

What does the Evaluation recommend?

While the efforts of ReCode Phase I resulted in a code that is considerably more user friendly, it was always understood that additional restructuring would occur as part of Phase II, as content changes are expected to result in a more streamlined regulatory framework. The code evaluation acknowledges this and cites additional opportunities to make use of illustrations and matrices to depict regulations related to design standards, rules of measurement, dimensional requirements, and accessory site elements and structures.

For more information about ReCode Portland, and to read and comment on the full Land Use Code Evaluation, please visit us at:

www.recodeportland.me

Name	Code Evaluation Section	Comment	Topic	Zone (If Applicable)	Commenters Who Agree	Commenters Who Disagree
Nathan Miller	Table of Contents	This is not user friendly	Process		2	0
Karen Snyder	Preface	It needs to be very clear in this document that just adding housing is NOT the goal but the correct housing mix to ensure long term residency. Affordable needs to be spelled out. For example, AMI% levels < 45AMI% (40k/yr), >45% and < 120AMI% (40-75K/yr), and > 120AMI% (>80k/yr)/yr. As we saw in 2015, R6 Zoning changes to promote affordable housing. The EXACT opposite happened, and Portland's population continues to decline even with increased housing units while rents increase and push out more long term residents to be replace wealthy out of state people living part-time here.	Housing	R-6	0	0
Karen Snyder	Preface	As I am trained in Industrial Engineering, I applaud the standardization, use of matrices, graphics and illustrations to make the language more consistent and transparent to the people of Portland. However, the devil is in the detail to ensure that Portland City Hall puts long term residence, affordability and environment as top priorities with accountable goals because what happened in the last 5 years for housing costs to double and triple is not sustainable and promoted commodization of housing in which only the wealthy can live in Portland. Please stop using Boston, SF, NYC as models to copy. These cities have the highest cost of living and are unsustainable cities.	Structure		0	0
Kierston Van Soest	The Land Use Code and Portland's Plan	I think it is unrealistic to assume that residents don't need/want cars. As much as we would like people to use public transit, it is not desirable, slow and routes are not easy to use to go to the mall, food store or Home Depot (for example). By eliminating parking requirements you will create more parking issues and drive people away. I would also just note that my teenaged daughter sometimes takes the bus to go to high school. She avoids it after a few unwelcome encounters with "rough looking" men on the bus. Some routes are not welcoming.	Transportation		1	3
Mike Tremblay	The Land Use Code and Portland's Plan	Eliminating parking requirements simply means developers won't need to spend more money and real estate on building parking spaces it doesn't think it needs. Build as much parking as what's needed, and no more.	Transportation		4	0
Mako Bates	The Land Use Code and Portland's Plan	If public transit is unappealing for various reasons (and I agree it can be), then that's a real problem. But private automobiles are a second-rate solution; just make the public transit better.	Transportation		2	0
Winston Lumpkins	The Land Use Code and Portland's Plan	Eliminating parking requirements just means that new construction won't HAVE to include it. You should be able to choose if you want to pay for a parking space. I don't have a car, so, a developer might be able to sell or rent a cheaper new construction apartment to me if they where not arbitrarily required to provide parking that I don't want, wasting valuable real estate in the process. Some people are prepared to pay for the waste of space that is automobile storage- certainly, as the market demands, some will always be built. We absolutely must improve the city bus service. All of the transit talk is just that if we don't. It won't really be a viable alternative unless it's easier to use than a car. You don't have to park them, or pay for storage & upkeep, so if it was every 10 or 15 minutes & you didn't have to plan your life around it, it would be a better choice for some people. That's a work in progress, and I invite you to ask your councilor to advocate upping the frequency of the bus so that it could be really useful.	Transportation		0	0
Craig Bramley	The Land Use Code and Portland's Plan	I agree with this comment. Other cities have made stunning transformations in a short time with increased bus frequency, dedicated bus lanes, and increasing cycling. The City should recognize that prioritizing cars makes the city less livable and desirable. Related - the Turnpike Authority is looking to build a westward extension that is designed to funnel many more cars into Portland. The City should actively oppose this measure.	Transportation		0	0
Winston Lumpkins	The Land Use Code and Portland's Plan	Seems very simple.	Complete neighborhoods		1	0
Karen Snyder	The Land Use Code and Portland's Plan	In theory, I agree with comments but provide the examples and sources where these "stunning" transformations are made to be used as benchmarking because if using Boston, SF, NYC as examples then that is a no-go... When I use to fly from Portland (yes, I know carbon emissions are bad) and get into office in Manhattan in far less time than commuters from New Jersey, that is not sustainable and so bad for environment.	Transportation		0	0

Comment Thread

	Liz Trice	The Land Use Code and Portland's Plan	We need to hit all the aspects at once - reducing parking requirements; allowing small retail and commercial in neighborhoods; vastly increasing quality and quantity of transit; slowing traffic on arterials to 20 MPH; increase quality and pleasantness of walking and biking along arterials.	Transportation		1	0
	Eliav Bitan	The Land Use Code and Portland's Plan	I agree with the general theme of creating more housing, but I think this report is minimizing the opportunity here. We have incredibly high demand for people to come live here-- which is great! We should rapidly build new construction and upzone current construction to enable more people to live in it. Portland could easily have 50-100% more residential housing, which would lower rents and housing costs, reducing homelessness, increasing the size of the tax base, increasing markets for local items, enabling young Mainers to stay/return to Portland. Private markets have shown that they can be very effective at generating rapid growth-- I would encourage the city to use the power of the private market to achieve these goals by dramatically reducing the regulatory burden faced by those who want to build residential housing or add residential units to their existing buildings. The alternative to doing this will be continued raising housing costs, continued homelessness, reduced equity, continued aging population--- which no one wants.	Housing		5	0
	Mike Tremblay	The Land Use Code and Portland's Plan	Access to transit	Complete neighborhoods		1	0
	Mike Tremblay	The Land Use Code and Portland's Plan	"Nodes" feels jargony. Use public-friendly words like "intersections", "Squares", or "neighborhoods"	Text edit		1	1
	Mike Tremblay	The Land Use Code and Portland's Plan	"e" not bolded	Text edit		0	0
	Mako Bates	The Land Use Code and Portland's Plan	Focus on walking distance. Not everyone can ride a bike, and nobody can ride a bike every day.	Complete neighborhoods		2	0
	Mako Bates	The Land Use Code and Portland's Plan	Someplace in here it would be good to be clear that we want people moving to Portland. This isn't a greedy sense where some abstract entity of "Portland" desires to be larger; I mean that there are people who want to live here and we should help them do that. I have friends and family who have had to move outside the city because they couldn't afford the rents. I have also had a lot of co-workers who drove their cars into the city every day instead of simply living close by. When we talk about "residents", be clear that we're including people who don't currently live here, but who, hypothetically, will in the future we are planning.	Housing		3	0
	Eamonn Dundon	The Land Use Code and Portland's Plan	IZ needs to be examined in this context. The current 25% is killing housing production. While the Council can't directly fix that in ReCode II alone, they can send an amendment back out to the voters as part of action on ReCode II. Expecting dense affordable housing production with the 25% in place will not get us where we go and will exacerbate equity concerns as cheaper housing production gets pushed to the suburbs (increasing the need for personal vehicles), while the only projects built in Portland are <9 unit high-end condos.	Housing		0	0
	Eamonn Dundon	The Land Use Code and Portland's Plan	"Neighborhood character" has long been a NIMBY/racist dog whistle. I would suggest going with a different term such a contextually appropriate.	Text edit		0	0
Comment Thread	Eamonn Dundon	The Land Use Code and Portland's Plan	This is a place to go big and seriously consider eliminating parking minimums for most residential development.	Sustainability		1	0
Comment Thread	Winston Lumpkins	The Land Use Code and Portland's Plan	I think this is key. Parking costs money- those who want cars can certainly pay to store them, but we need to allow the construction of apartments/housing which don't have parking, so that those of us who don't need it don't have to pay for it anyway.	Housing		1	0
	Eamonn Dundon	The Land Use Code and Portland's Plan	We need to be honest about the cliff in housing production following the increase to the IZ %. This should be front and center for all discussions on housing production. In general, I think it would be helpful for the Planning Board and City Council to get an in depth briefing on the finances of housing production. Elected and appointed officials should be walked through various development pro formas by developers and underwriters to enhance appreciation for how difficult financing can be and to identify bottlenecks and what the city can do to reduce those. We have have the most ambitious zoning code in the world, but if one or two provisions preclude reasonable financing arrangements we will not see the housing production we desire.	Housing		1	0
	Liz Trice	The Land Use Code and Portland's Plan	There might need to be a new type of B zone that allows for very small retail - like allowing one house in a single family neighborhood to be converted (or provide a few rooms) to be a cafe or bookstore. Right now it feels like "all or nothing" - if you allow any business uses at all, it allows all sorts of things that people might not want in their neighborhood.	Complete neighborhoods		1	0

Liz Trice	The Land Use Code and Portland's Plan	I would like to see a policy goal to reduce the overall pavement and exposed pavement in the city. Some of the arterials have a 120' Right of Way, mostly pavement that is mostly vacant. Reducing overall lane and arterial widths, requiring parking to be allowed to used night and day, and implementing a forest canopy street trees along arterials would help with this.	Sustainability		0	0
Liz Trice	The Land Use Code and Portland's Plan	We should have a serious inventory of green spaces and publicly support efforts to connect them, making sure every resident is within an easy .25 mile walk of the green network.	Parks		0	0
Cal	The Land Use Code and Portland's Plan	"All residents" needs to have some demographic and data-based correlation to support the various suggested updates.	Equity		0	0
Karen Snyder	The Land Use Code and Portland's Plan	I can't help but thinking that this is a great sounding document but who will be held accountable to ensure these aspirations actually transpire and NOT allow the continued commodization of housing and unsustainable housing prices?	Housing		0	0
Karen Snyder	The Land Use Code and Portland's Plan	Complete neighborhoods needs to ensure long term housing and only allow very limited short term rental Airbnbs. Airbnbs destabilizes neighborhoods, reduces quality of life of abutters who are long term residents and goes against Comprehensive Plan. How will this be addressed?	Complete neighborhoods		0	0
Karen Snyder	The Land Use Code and Portland's Plan	What is the definition of a working waterfront? How to protect from sea level rise? How are the climate one goals protect watefronts?	Sustainability		0	0
Karen Snyder	The Land Use Code and Portland's Plan	All residents term is too generic. It needs to be spelled out what type of residents. Is it long term residents or short term residents. Is it focused on demographic and/or socio-economic? For example, socio-economic levels from the following 3 levels MUST be equally provided long term housing be created for: AMI% levels < 45AMI% (40k/yr), >45% and < 120AMI% (40-75K/yr), and > 120AMI% (>80k/yr)/yr.	Equity		0	0
Karen Snyder	The Land Use Code and Portland's Plan	It needs to be very clear in this document that just adding housing is NOT the goal but the correct housing mix to ensure long term residency. Affordable needs to be spelled out. For example, AMI% levels < 45AMI% (40k/yr), >45% and < 120AMI% (40-75K/yr), and > 120AMI% (>80k/yr)/yr. As we saw in 2015, R6 Zoning changes to promote affordable housing. The EXACT opposite happened, and Portland's population continues to decline even with increased housing units while rents increase and push out more long term residents to be replace wealthy out of state people living part-time here. This current situation is unsustainable.	Housing		0	0
Karen Snyder	The Land Use Code and Portland's Plan	Ripping up the pavers and putting down asphalt was one of the worse things the City of Portland could do to exacerbate storm water runoff. If City goes back to pavers, it would do several positive things. 1. The surface would be more permeable and would reduce storm water runoff. 2. It would deter vehicles because who wants to be on a bumpy road? 3. The storm water runoff will reduce considerable and will cause less vehicular toxins going into Casco Bay. 4. By having pavers, the tress will begin growing a stronger root system which will provide greater canopies which will absorb greater carbon emissions.	Sustainability		0	0
Karen Snyder	The Land Use Code and Portland's Plan	I don't agree with Eammon's dog whistle input. Every neighborhood has character. Just please stop with this overused term.	Urban Design		0	0
Karen Snyder	The Land Use Code and Portland's Plan	Transportation carbon emissions can ONLY be reduced if the working class and middle class live closer to their work. Therefore, it is just not housing being built but the right housing mix. Only long term housing should be built in 3 distinct socio-economic levels. For example, AMI% levels < 45AMI% (40k/yr), >45% and < 120AMI% (40-75K/yr), and > 120AMI% (>80k/yr)/yr. Any other housing should be banned and any existing housing NOT used as long term should require to pay a vacancy fee.	Transportation		0	0
Karen Snyder	The Land Use Code and Portland's Plan	Shouldn't airflight carbon emissions also be curbed? This is a transportation mode has a large carbon footprint as well.	Sustainability		0	0
Karen Snyder	The Land Use Code and Portland's Plan	How "authentic" is Portland really when the long-term residents who lived here are currently being pushed out by the increased rents and unsustainable property evaluations? This sounds like a marketing tool with no substantial accountability but a nice to have. just like the Comprehensive Plan.	Other		0	0
Jason	The Land Use Code and Portland's Plan	One Portland - Except the half of Portland that is cut off in the above graphics.	Process		0	0
Teresa Valliere	The Land Use Code and Portland's Plan	Incentive and support Neighborhood commercial hubs, not one Downtown	Complete neighborhoods		1	0
Eliav Bitan	Uses & Use Standards	I agree with the sentiment of of expanding housing types. I would encourage the group to use the power of freedom and choice to enable citizens to make these decisions ourselves. Rather than regulate many details, we could empower our citizens to make decisions that create more housing. This kind of citizen empowerment and freedom will enable innovation and creativity while over regulation will stifle people's ability to solve problems.	Housing		1	0

	Ben McCall	Uses & Use Standards	Doing this is imperative, but should also be coupled with specifically allowing these lower-density developments in residential districts where multi-family developments currently aren't allowed, like R-1, R-2, and R-4.	Housing	R-Zones	1	0
	Ben McCall	Uses & Use Standards	From experience, the lack of clarity in these use categories has caused confusion in applications to the ZBA for conditional use approval on multiple occasions.	Housing		0	0
Comment Thread	Mako Bates	Uses & Use Standards	Why not just allow a certain density of retail in all residential zones? e.g. "retail under x-sqft is allowed on the first floor of lots at the intersections of streets in these zones".	Complete neighborhoods	R-Zones	3	0
	Liz Trice	Uses & Use Standards	Agreed. Really, any intersection in a neighborhood more than two blocks away from a B zone may be appropriate for a corner store or neighborhood cafe with limited hours. We may need to create a more narrow list of allowed businesses than B1 currently does.	Complete neighborhoods		0	0
	Craig Bramley	Uses & Use Standards	I agree. If you do this corner by corner, we will end up with a few loud voices opposing any change as already happens with any effort to build on the peninsula.	Complete neighborhoods		0	0
Comment Thread	Mako Bates	Uses & Use Standards	Do you really need a whole schema of "housing types"? If you've defined a building, and you've explained what it means for multiple "families" to live in a building (and under what regulations it's allowed), then why do you need separate definitions for each number of families that might live in a building? This whole paradigm seems designed to reduce flexibility.	Housing		1	0
	Nathan Miller	Uses & Use Standards	I think I agree with this sentiment, why create more splintered definitions of housing and specific regulations of where they can be built? Just relax existing regulations to allow small-scale multifamily in ALL residential zones.	Housing	R-Zones	0	0
	Eamonn Dundon	Uses & Use Standards	Four units should be legalized in all residential zones in the city.	Housing	R-Zones	2	0
	Winston Lumpkins	Uses & Use Standards	Single family zoning must be eliminated. All residential areas should allow multi unit, triple or quadruple Decker style construction. Doing anything else is violence against the working class & specifically stops a "certain" type of person from living in a neighborhood.	Housing		1	0
Comment Thread	Winston Lumpkins	Uses & Use Standards	I have heard that 3-4 unit buildings, while nice to look at, are a little bit wasteful compared to 10-20 unit buildings. Not entirely sure if that's correct, but, perhaps 3-4 unit buildings are not the ideal size?	Housing		0	0
	Liz Trice	Uses & Use Standards	Larger buildings are more efficient, but 3-4 unit buildings are typically of a size that feels compatible with existing single family neighborhoods. In addition, a normal homeowner can purchase and finance a 3-4 unit building with FHA and other consumer home loan products, meaning that if the building next to your house is a 3-4 unit building, it's more likely to feel like a single family home and be managed by a peer homeowner rather than a large landlord.	Housing		0	0
	Winston Lumpkins	Uses & Use Standards	We shouldn't allow the construction of further single family homes. We have far too many already. They take up too much space.	Housing	R-Zones	0	0
	Liz Trice	Uses & Use Standards	How cool would it be to have a small candy maker in a garage that sells candy a few afternoons a week - sort of like a tasting room - in a neighborhood? It shouldn't have to be a whole zone.	Complete neighborhoods		0	0
	Nathan Miller	Uses & Use Standards	Allow these small-scale "corner stores" to be integrated into residential neighborhoods with VERY minimal parking requirements (if any). Should be targeting mostly a walk up crowd, such as the Rosemont Market on Brighton or the Vientiane Market on Noyes.	Complete neighborhoods		0	0
	Nathan Miller	Uses & Use Standards	Not sure if this would really be addressed by the recode initiative, but in line with the temporary uses options, why not allow multi-day, informal neighborhood street closures for community building and breaks from traffic for fun, recreation, and conversation. Like a rotating "calmed neighborhood" street closure program in the summer. Make this an easy process for a neighborhood to initiate.	Other		0	0
	Nathan Miller	Uses & Use Standards	I was told that because of city-required setbacks from the roof-edges my home was not a good candidate for a solar PV system. Would these regulations still be in place, and do they provide any tangible benefit relative to the restrictions they confer?	Sustainability		0	0
	Eliav Bitan	Dimensional & Design	I love the direction towards making these regulations more usable by citizens. I would suggest simply removing many of them to enable citizens freedom to use their property as they best see fit, as long as it aligns with the city's goals--- increasing housing, improving sustainability.	Structure		4	0
	Barbara A. Vestal	Dimensional & Design	Highest priority should be for active water-dependent uses like berthing for commercial harvesters and support services needed by them. Public access for others, whether physical or visual, should be of second priority and should not substitute for keeping the real working waterfront.	Waterfront		1	0

	Barbara A. Vestal	Dimensional & Design	The very basic way height is measured needs to be overhauled, not just in mixed use zones. It should be measured from existing topography (or grade as of 2010 or similar) and NOT from post-development grade. Developers should not be allowed to fill first and then use that as the new elevation. They should not be allowed to manipulate height through the use of "plinths" or similar structures. Pre-development grade should be the baseline. Additional provisions are needed for measuring height on sloping lots, imposing a maximum height increase that can be obtained from averaging over a slope.	Height		3	1
	Barbara A. Vestal	Dimensional & Design	The City has over-used height bonuses as a way to incentivize "workforce housing." On Munjoy Hill it has resulted in a net loss of affordable housing. Multiple affordable units may be demolished for a large luxury condo development, out of scale for the neighborhood due to a 10 foot height bonus, in exchange for one workforce housing unit (that doesn't even replace those that were demolished to clear the construction site). Much better for affordable housing and the neighborhood to have three stories of smaller, less expensive units. Incentives should be devised for reduced minimum lot area per unit (increased density) for multiple workforce housing units. Limits on consolidation of lots should be considered as well.	Housing	R-6	1	0
	Mako Bates	Dimensional & Design	If we need/want buildings to he "high-performance", accessible, etc (and we certainly do), then just require that. If we accept buildings being taller, denser, and closer together (and we certainly do), then please allow that without strings attached. I see no reason to use a system of bonuses to tie the one to the other. Cash offsets, like our system where a developer can buy an exemption to affordable-housing requirements, may be fine for certain purposes.	Sustainability		2	0
	Mako Bates	Dimensional & Design	Agree that 10-20 units/acre is a better concept for "transit-supportive" density.	Housing		1	0
	Mushreq Alsamraee	Dimensional & Design	I'm hoping that you can waive some of the requirements to add an accessory unit and allowing us to build on a paper street	Housing		0	0
Comment Thread	Liz Trice	Dimensional & Design	There are whole streets in R3 where every single house is still not considered to be conforming. I'd like to see front setbacks drastically reduced. Most front yards are unused, and this prohibits porches and other uses that would increase the utility of property and sociability of neighborhoods.	Housing	R-3	1	0
	Liz Trice	Dimensional & Design	One of the nicest neighborhoods in the city is Deering Center, where the front porch stoops land at the front property line /sidewalk. Zero setback! Setbacks seem to me to be a useless anachronism - does anyone know a positive purpose they play?	Housing	R-5	1	0
	Liz Trice	Dimensional & Design	agree. Would like to see average street widths narrow as well, and increase canopy coverage of all streets, including arterials.	Sustainability		0	0
	Craig Bramley	Dimensional & Design	As I understand it, the current setbacks apply equally to both the main and accessory structures on a lot. The code should recognize that in many instances it would be appropriate for a small accessory structure to be closer to the property line than a house or other large building - for example a small shed near a property line.	Housing		0	0
	Nathan Miller	Dimensional & Design	The LEED program has introduced significant industry-wide sustainability shifts, but at this point it is no where as significant an undertaking as Passive House or net-zero designs, and the level of reward/incentive should be relative to rigor.	Sustainability		0	0
Comment Thread	Jeff Levine	Zones	There should be some consideration of whether a city the size of Portland really needs seven different residential zones (in addition to zones like B-1 and B-2 that allow residential.) It seems reasonable to consider combining, for example, R-4 and R-5. Similarly, R-1 and R-2; and R-6 and R-7. If there is a need for dimensional differences, have subzones where all the uses and requirements are the same except for the dimensional table. That would streamline the code and make it more equitable.	Structure	R-Zones	3	1
	Liz Trice	Zones	agreed. Combine R1-3 (and allow up to 4 units/lot, or duplex + 2 ADUs), combine R4-5, and R6-7.	Structure	R-Zones	0	0
	Cal	Zones	Modification to zoning needs to recognize the exiting, current pattern of development as to density, size and scale in keeping with the city's Comprehensive Plan to ensure the valued recognition of our neighborhoods to the city's viability and livability. Portland must remain competitive with surrounding areas in providing a diversity of housing including home ownership options.	Housing	R-Zones	0	0
	Winston Lumpkins	Zones	Single family zoning must be eliminated from all areas in the city. It serves to limit the overall supply of housing & exclude the working class.	Housing	R-Zones	0	0
	Winston Lumpkins	Zones	We have enough single family housing. Eliminate single family zoning.	Housing	R-Zones	0	0
	Nathan Miller	Zones	I can't see any scenario where a minimum lot size should be this large in a city, even at the periphery. We're the state's only significant urban area and we should start acting like it.	Housing	R-1	0	0

Comment Thread	Eliav Bitan	Zones	have multiple families living in it. This will improve efficiency of resource use and enable more housing creation, lowering housing costs and improving equity for lower income people. This zone is antiquated and should be changed.	Housing	R-1	4	1
	Winston Lumpkins	Zones	YES.	Housing	R-1	0	0
Comment Thread	Ben McCall	Zones	Portland is at a point where allowing "low-density" development to remain, even on the western edge of town, is counterproductive. At a minimum, every lot within a zone that allows for residential uses, should allow a duplex or triplex to be built.	Housing	R-1	6	1
	Eamonn Dundon	Zones	Agreed, there should be no mention of encouraging "low-density" development anywhere in the city.	Housing	R-1	1	0
	Mako Bates	Zones	I agree: Scrap this whole zone; roll those parcels into R-2. (And within R2, allow multi-family dwellings and reduce the minimum lot size, as discussed below.)	Structure	R-1	1	1
	Craig Bramley	Zones	Yes to consideration of reducing minimum lot size. The prior sentences are somewhat confusing. A goal of maximizing open space is not inconsistent with higher density. In fact, increasing density along with preservation of open space is more aligned with this goal than the post WWII acceptance of large minimum lot sizes.	Housing	R-2	0	0
	Nathan Miller	Zones	Similar to R-1, this is a ridiculously large min lot size in a city,	Housing	R-2	0	0
	Mako Bates	Zones	Allow multi-family dwellings, of the same kind as R-3 (but for new buildings as well as existing buildings, and without special approval).	Housing	R-2	2	1
	Cal	Zones	While I agree there may be some opportunities to allow greater density in R-3 zones, it must be done very carefully to protect the integrity of established neighborhoods.	Housing	R-3	0	0
	Leslie Sanford	Zones	I think it would be beneficial to most of R3 if the restrictions on distance between property lines for two story houses was eased. Right now for 1-1.5 stories it's 8ft on either side but for 2 stories it's 14. There is minimal difference between a 1.5 and 2 story house in terms of obstructing view or being overbearing to your neighbor. Changing the distance required between 2 story homes would allow property owners who need a little more space to stay in their current homes. It would also ease the pressure on the real estate market, I'd think.	Housing	R-3	1	0
	Mako Bates	Zones	Where prevalent non-compliance with a regulation is not causing problems, that suggests that the regulation should be relaxed to accommodate the existing uses/practices. This section suggests such common-sense adjustments, including re-zoning various areas to higher (historic) densities.		R-3	3	0
	Mako Bates	Zones	Because the area covered by R-3 is so large, small details should be considered carefully. For example, multi-family dwellings are allowed only with conditional use approval, and only under adaptive re-use. Given the intention of allowing small, attached, "in-laws" style units, just codify and allow small, attached, "in-laws" style units, without additional approval steps and regardless of the age of the building.	Housing	R-3	1	0
	Eamonn Dundon	Zones	This zone should be overhauled to allow up to 4 units. Could also look at reducing the acreage min. for PRUDs.	Housing	R-3	2	0
	Winston Lumpkins	Zones	It feels like in many neighborhoods multi family homes where once allowed, and now are not. That needs to be reversed as soon as possible.	Housing	R-3	0	0
	Nathan Miller	Zones	For this zone it appears that there are only ~10% multifamily developments, which is ridiculous given the density on the rest of the peninsula. Open up the west end for more multifamily, even if it will take a significant amount of time for properties to actually be redeveloped.	Housing	R-4	0	0
Comment Thread	Mako Bates	Zones	It's unclear what would be lost by scrapping this zone and rolling these parcels into R-5.	Structure	R-4	2	0
	Eamonn Dundon	Zones	Agreed that these should be rolled into the R-5. We cannot allow the West End and the Hill to continue to carve out exceptions from the rest of the peninsula if we truly want to encourage TOD and 15 minute neighborhoods.	Structure	R-4	2	0
	Liz Trice	Zones	It would be appropriate to allow at least R4-5 (maybe even R6-7) densities all along the arterials, which is mostly where the transit lines run.	Housing	R-4	0	0
	Cal	Zones	Eliminating smaller lot options opens up the possibility of single-family homes with abutting smaller lots to be purchased and the house being demolished to allow for larger scale development in low to moderate, highly residential areas, leading to an "urbanization" of these neighborhoods.	Housing	R-5	0	0

	Cal	Zones	Evidence of historic form of R-5 neighborhoods needs to be documented with inventory/ evaluation of current housing types.	Housing	R-5	0	0
	Mako Bates	Zones	I agree: Scrap the small-lot option and reduce the minimum lot size to 5k or lower. These are large, important residential areas; please allow for higher density here!	Housing	R-5	1	0
	Cal	Zones	PRUD's have worked well in the R-5 to allow for increased density with design requirements that are compatible for a low to moderate residential neighborhood zone with the 3 ac. requirement. Any reduction would have to be thoroughly vetted as to potential impact.	Housing	R-5	0	0
	Nathan Miller	Zones	Could not agree more. I live in an R-5 zone that has many multifamily units mixed into the neighborhood, and they fit right in. I can't understand why you shouldn't be able to build more units like those that already exist and work just fine.	Housing	R-5	0	0
	Cal	Zones	Patterns of development in neighborhoods needs to be considered for conformity to existing pattern of development to protect established character of the R-3 and R-5 neighborhoods especially when considering reduction in current requirements for lot size and setbacks.	Housing	R-3, R-5	0	0
	Cal	Zones	Mid-level density??? Cautious approach as to definition of such a proposal and its impact on potential areas of this zone. Additional "missing-middle housing types" ??? Define what is meant by this statement.	Housing	R-5a	0	0
	Barbara A. Vestal	Zones	The maximum height is 35", with a "height bonus" for up to 45' if it meets certain conditions, including the provision of a workforce housing unit.	Housing	R-6	0	0
	Barbara A. Vestal	Zones	I agree with the need to revisit in-fill development and the need to look at the negative impact of the 2015 rezoning which first allowed the demolition of existing housing to create new buildable lots. Prior to that in-fill development was only allowed on lots in non-residential use or vacant.	Housing	R-6	0	0
Comment Thread	Barbara A. Vestal	Zones	Getting rid of the height bonus (35 to 45 feet) and substituting new incentives that will actually produce more affordable housing should be evaluated. Smaller, less luxurious units, more likely to be inhabited year round, would go farther toward meeting the goals of Plan 2030 than the current crop of luxury condos.	Housing	R-6	1	1
	Mako Bates	Zones	I don't like the "bonus" system either. Let the max height be 45'.	Housing	R-6	4	0
	Eamonn Dundon	Zones	For this zone to work correctly the onerous and complicated MH conservation overlay needs to be removed. Neighborhoods must be integrated into the full context of the city, and neighborhood specific carveouts like this make the code difficult to use while undermining the goals of this zone.	Housing	R-6	1	0
	Liz Trice	Zones	B1 may need to be much more "neighborhoody" - ie preventing larger businesses, to be accepted by neighborhoods. Then we could have it used much more broadly. And somehow there should be a way to convert just a single home into a small business that serves the neighborhood. I've seen this done in lovely ways in single family neighborhoods.	Complete neighborhoods	B-1	0	0
	Mako Bates	Zones	These are good recommendations. Taking for granted that the existing division between "residential" and "mixed use" zones is important, I think there's room for a lot more B-1 style zones throughout the city's residential areas. And I agree that there's no need for a higher sf/du off-peninsula.	Complete neighborhoods	B-1	1	0
	Liz Trice	Zones	B2b is a useful zone and should be applied more widely; most B1s in the city would be better as a B2b. Maybe just extend to 100' of all arterials.	Corridors	B-2	0	0
	Mako Bates	Zones	This covers the lots adjacent to Forest Ave, from 295 to Morrill's Corner. Obviously it's important, and it's dear to me personally. It's totally fine that existing use isn't hitting the limits of what's allowed; we should move the whole zone to the "on-peninsula" density anyway. Increasing the allowed height to allow 4-story buildings would probably be good too.	Corridors	B-2	3	0
	Eamonn Dundon	Zones	Increasing the heights allowed in this zone along arterials and collectors would be a good idea.	Height	B-2	2	0
Comment Thread	Eamonn Dundon	Zones	At least allowing PRUDs in the B-4 would be a good start.	Housing	B-4	0	0
	Nathan Miller	Zones	Would it be reasonable to open up housing in a zone that doesn't currently allow it, but ONLY allow multifamily development? Unclear if that is what is being suggested. I don't see much point to adding single-family lots.	Housing	B-4	0	0
	Eamonn Dundon	Zones	In this zone and others it might be helpful context to understand how many city owned parcels and/or vacant/underutilized parcels there are that could be eligible for some housing development if uses were more permissive.	Process	B-4	1	0

	Liz Trice	Zones	Do we really need a zone that deliberately is auto-only? People still need to work there, an often these areas are impossible to walk to from any residential areas, and don't have any housing. Riverside doesn't even have a bus line. People have to get in their car just to go a few hundred feet. I know we will have grocery stores and auto supply stores, but there's a way to allow for that without creating entire areas that are hostile to anyone on foot.	Transportation	B-4	0	0
	Cal	Zones	What happened to B-5 zone??		B-5	0	0
	Liz Trice	Zones	six business zones seems like a lot. Could we allow B1 businesses in most r zones, and combine a few of these?	Structure	B-6	0	0
	Liz Trice	Zones	In the spirit of "mixed use", walkable neighborhoods, it doesn't seem right to have a zone devoted to Office Zones, where people won't be able to walk, and it won't be mixed use. Just allow these uses in the B 1-2 zones and apply more liberally. Really, we should have housing almost everywhere that's not conservation or heavy industrial.	Mixed Use	O-P, R-P	0	0
	Nathan Miller	Zones	I think we should retain significant flexibility in how our existing athletic structures, (Hadlock, Fitzpatrick, Memorial, Troubh, Expo) can be reconfigured so as to allow for future, undetermined professional and recreations uses. Example- introducing the futsal court on the Fox St fields because that's what was demanded by the local park users.		R-OS	0	0
	Eamonn Dundon	Zones	I think we need to better define and justify "specific issues" in relation to overlay zones. If they were put in place to achieve an enduring and well thought out policy goal they should remain, but if they were put in place as reactionary responses to small concentrated lobbying efforts from incumbent homeowners they should be eliminated. MHNCO was certainly the latter and should be eliminated. It sets a bad precedent for future overlays where incumbent homeowners respond to new development (good) with NIMBY overlays (bad). Design guidelines should largely be removed from overlays and instead contained in the design manual and HP guidelines.	Structure	MHNCO	0	0
	Liz Trice	Zones	Not sure if this should be necessary; if we're doing a good job, the default is that all zones are pedestrian zones, not the other way around.	Urban design	PAD	0	0
	Cal	Zones	Yes, to importance of recognizing current pattern of development - - important to attracting young families. We are losing our middle class and young people to outlying communities. They desire neighborhoods that afford them the experience of suburbia, but with the availability of all the amenities Portland offers.	Housing		0	0
	Eamonn Dundon	General Development Standards	If I remember correctly there was some recent action on drive-thrus. I think we should be doing everything we can in the new code to eliminate the ability to build new drive-thrus to parcels on the far edge of the city in proximity to interstates. They do not fit with OCF or the comp plan.			1	0
	Liz Trice	General Development Standards	We should also have a set of policy taking into account bird-friendly policies, which includes brid-friendly building design, and use of native plantings which provide native bugs. . Seattle has done a good job with this. Birds are a big bonus to livability, resident happiness, and mental health.	Sustainability		0	0
	Mako Bates	Parking, Loading & Access	These are good suggestions. There's no discussion of _on-street_ parking. Remember that we want people using fewer cars in general (even if they're autonomous), so in general we should be allocating less space for cars.	Transportation		1	0
	Eamonn Dundon	Parking, Loading & Access	Even before AVs go mainstream we should be moving more of our curb space to drop off or pick up only. Rideshare alone demands this change and it will also further reduce on-street parking in the most pedestrian friendly areas, causing people to think twice before driving downtown, etc.	Transportation		2	0
Comment Thread	Eamonn Dundon	Parking, Loading & Access	I don't think parking maximums should be restricted to locations in proximity to transit. We can have parking maximums around the city, that while higher in places with less transit and bike/ped access, are still there to avoid over-parking and increased impervious surface areas. These maximums can be adjusted down over time as personal vehicle dependency decreases.	Transportation		1	0
	Liz trice	Parking, Loading & Access	Parking maximums may be a good idea, but I'm inclined to let a business decide what they need. I'm more concerned with making sure there is tree canopy over parking to prevent heat islands, making stores accessible to pedestrians in safe comfortable ways, reducing run-off, and ensuring that what parking is there is allowed to be used by other uses during off hours. The West End faces a large challenge due to the fact that the only business and only parking there is Maine Med, which doesn't then allow other residents or businesses to use it during off hours.	Transportation		0	0
	Liz Trice	Parking, Loading & Access	love the idea of requiring structured parking to be built in a way that could be repurposed for housing etc.			1	0

	Nathan Miller	Parking, Loading & Access	I don't think the current TDM standards are all that robust. I've only got to read through a couple of submitted TDMs, and the goals for reducing single-occ-vehicle trips can be quite modest, with minimal actionable items.	Transportation		0	0
	Nathan Miller	Parking, Loading & Access	Very much agree. When I lived in apartment buildings it was always a hassle to find a secure, dry location to store my bike. Obviously there may be some opportunities for bike-share to reduce the need for individual bike ownership, so perhaps that could be an alternate if our pilot project turns out well.	Transportation		0	0
	Liz trice	Landscape	again, parking should be built in ways that do not impede pedestrian access to buildings, and should be covered with tree canopy to prevent heat islands, and designed for environmentally sound runoff.	Transportation		0	0
	Liz trice	Landscape	Often it seems that tree plantings are required on both public and private land, but that trees never reach the height that would actually provide canopy shade and prevent heat islands. What are the best strategies to ensure actual mature trees that provide shade and enjoyment? I suspect that the arborist's office may need a larger budget to ensure the success of these trees.	Sustainability		0	0
Comment Thread	Jeff Levine	Nonconformities	Unless the zoning map gets everything perfect- including allowing for small commercial nodes to be legalized through new zoning districts - this escape valve is very helpful in practice. For example, there is a small commercial use near the Reiche School that was formerly a convenience store, zoned residential. Unless the new zoning map categorized that kind of spot as allowing retail that use should be allowed to go to another non-residential use as it serves the purpose of a 15-minute city to have it there.	Nonconformities		3	0
	Mako Bates	Nonconformities	I think this is an important point, but I'm also pretty sure we could design a less-janky "escape valve".	Nonconformities		0	0
	Eamonn Dundon	Code Structure	"+1" to more illustrations. It really improves the usability of the code for non-technical people and lets people more easily imagine what is possible on their parcel or in their neighborhood. It would also increase the public's understanding of standards.	Structure		3	0
	Liz trice	Code Structure	It's nice when all uses and zones can fit on one page. That would be a good goal. Exceptions and rules for specific zones should be kept to a minimum.	Structure		0	0
	Jeff Levine	Other Recommendations	The site plan ordinance needs to be revised to make the process less onerous for small changes - more should be done administratively and more should be able to be done without site plan review at all. The ordinance should also finalize removing subdivision requirements from multifamily housing if that hasn't happened yet. Finally, the requirements to put up letters of credit for public improvements as part of the site plan review process should be relaxed or eliminated for below-market affordable housing, as that has been identified in the State Commission on Housing & Zoning as an impediment to housing production (and is a somewhat unnecessary cost as MaineHousing already requires these developers to build to plan.)	Structure		0	0



Squarespace
Feb 9, 2021, 7:23:42 PM
to recodep...@portlandmaine.gov

Sent via form submission from *ReCode Portland*

Name: Winston Lumpkins IV

Email Address: winston.lumpkins@gmail.com

Subject: support Multi unit buildings

Message: It is my firmly held belief that there should be absolutely no development of single unit buildings allowed, we have far too many.
3 units should be the minimum that are allowed on a single foundation. Mulit unit buildings are green, they are more affordable to rent, they look nicer. Bring back the triple Decker's! They are selling for like 500,000, there is no way they wouldn't build lots if they where allowed to.

It's [-----] disgusting all the little single unit buildings all over the place wasting perfectly good land that could house 3-4 families.

Squarespace
Apr 18, 2021, 7:49:34 AM
to recodep...@portlandmaine.gov

Sent via form submission from *ReCode Portland*

Name: Mary Morse

Email Address: mrsm1359@outlook.com

Subject: Noise

Message: When looking at zoning and land use please considered impacts on existing neighborhoods with regard to noise pollution. We are overwhelmed with the noise (especially the bass) from music venues on the East side. These venues often go to 1 AM! It is seriously impacting the livability of our neighborhoods.

Portland Maine Yes. Google's good here.

Helen Donaldson <hcd@portlandmaine.gov>

Re: Form Submission - Contact us Re:Code - recode II suggestion

G Bahlkow <gbahlkow@gmail.com> Wed, Jul 14, 2021 at 10:28 AM
To: Helen Donaldson <hcd@portlandmaine.gov>

Hi Nell,

Thank you for your prompt reply!

Any help understanding "where" in the RECODE II process things stand will be appreciated.

Many thanks, Gary

PS Pasted below is a copy of email sent to Director and Deputy Director of Planning about a specific (to me) anomaly which seems easy to address - note there are two attached files that support the dialogue :

Good afternoon,

I am contacting you at the suggestion of Caitlin Cameron. Please let me know if this is, in fact, directed to the right people!

I have been renovating a residential property in the R6 with Munjoy Hill overlay. It is located in the newly approved Munjoy Hill Historic District. 42 Lafayette Street.

After completing renovations to the main house, I met with Caitlin, Deb Andrews and Ann Machado in January of 2019 about the possibility of replacing the existing garage (circa 1948) with a new one. My concept was to use a slightly larger footprint and have a small dwelling unit above.

I ran into a conflict with the current regs that Caitlin, Deb and Ann seemed to think was an unintended consequence of a new overlay reg - 8.7.4.A.2. (At least that was my impression of their comments at the meeting - I don't mean to put any words in their mouth).

I believe it was Caitlin who said the intent of 8.7.4.A.2. was to get more living space onto the ground floor in larger condo type projects (or avoid the sterility of nothing but garage on ground floors in condo projects). In my case, I am really just replacing a functionally obsolete accessory building with a new one. And adding a single, small dwelling unit above.

If you look at the Dimensional Table 7A for R6 you will find that I could build a 20x30 garage with 8 foot door (40%) and put the dwelling unit on top. Unfortunately, the Overlay reg in 8.7.4.A.2. currently takes that 7A allowable garage away.

If, in fact, this is an unintended consequence of the overlay I will appreciate you considering a modification in the RECODE II process.

Currently I have a permit pending for a new single family (as advised by Ann). The permit number is BLDR 2019 01144. If you look at the original submittals (with a new garage) vs the revised submittals I just uploaded today (without the garage) you might conclude, as I have, that a single bay garage/workshop on the first floor with a small dwelling unit above looks like a thoughtful accessory building (where a little house next to the big house looks, well, odd. At least to me.).

As a personal note - to give you some context on why I am pushing for this, my hobby is tinkering on old cars. I REALLY would like to replace the tiny garage there now with a slightly larger one that could accommodate a workshop on the ground level. I'd also like to add a small dwelling unit above to the housing pool on Munjoy Hill.

If this is a lost cause I will go ahead and replace the old garage with a new house with no garage/workshop but I am hoping you folks might see a path forward for me to do what I hope to do.

I know this is a long and potentially confusing email. I'd be glad to elaborate in person or by phone if that might be useful. 207-650-1551

In the meantime, I am attaching a couple items that might help you visualize the foregoing. You might have to be patient waiting for the Site Plan to load. It is a pretty big file that takes a minute or two to draw.

Thank you for your consideration.

Gary Bahlkow

[Quoted text hidden]

> [Quoted text hidden]
> Notice: Under Maine law, documents - including e-mails - in the possession of public officials or city employees about government business may be classified as public records. There are very few exceptions. As a result, please be advised that what is written in an e-mail could be released to the public and/or the media if requested.

2 attachments



42LAFA~1.JPG
4229K

Bahlkow Site Plan_3B-11 x 17 (7) (1) June 25, 2019.pdf
757K

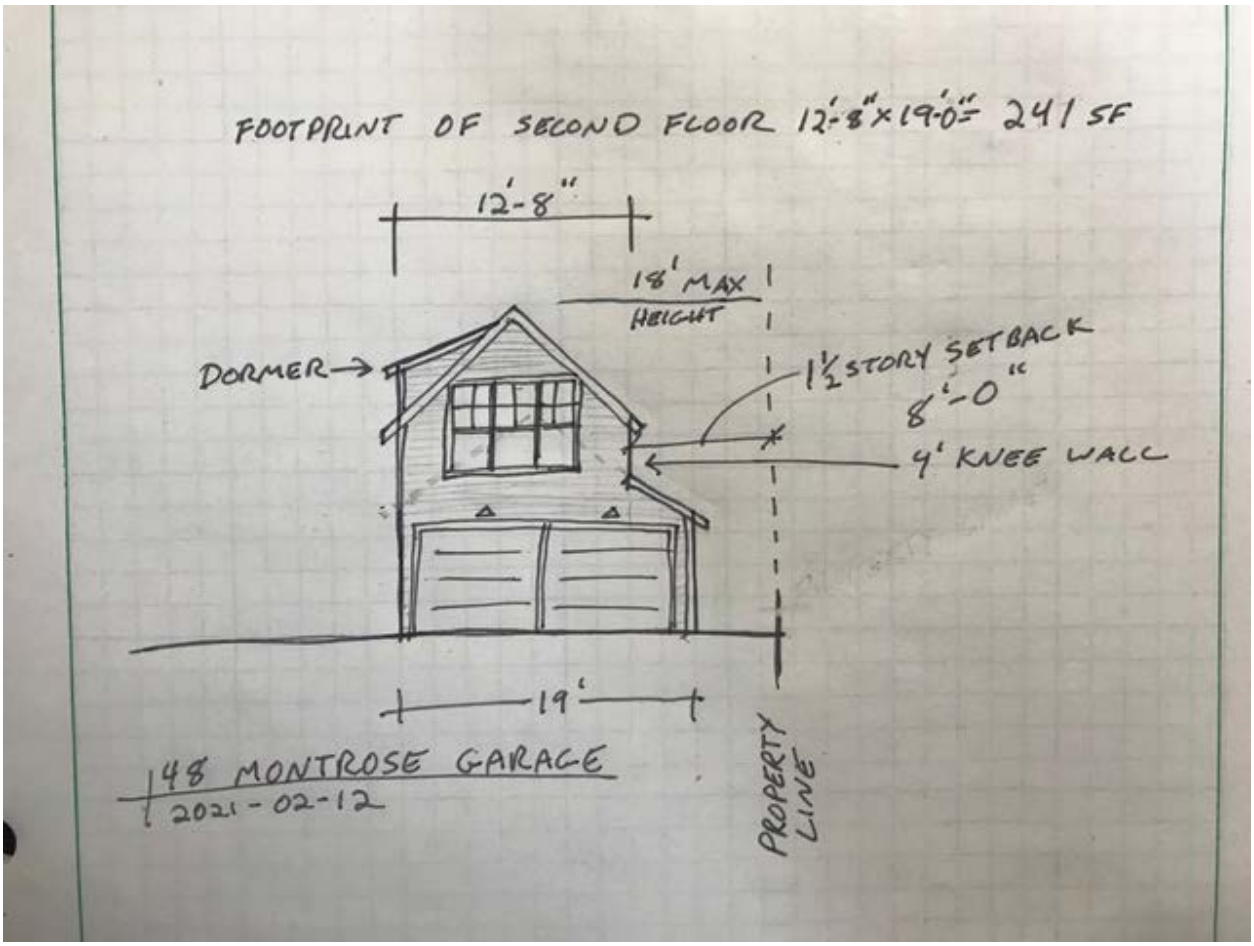
Chris Herlihy
Jul 26, 2021, 3:47:13 PM
to recodep...@portlandmaine.gov

Hello,

I am working with a clients who owns 48 Montrose Ave. We are interested in knowing if the recoding would have impact on the setback limitations of using their accessory structure (garage) for an ADU. The house is in Zone R5 and I have sketched the current limitations below, but they would like to use the whole 2nd floor, or more then I currently have allotted if they are able to.

Best Regards,

Chris Herlihy
Architectural Designer
Polestar Design
70 Center St. 2nd Floor
Portland, Maine 04101
O: 207.405.1815
M: 406.600.5069



Portland Maine Yes. Google's good here.

Helen Donaldson <hcd@portlandmaine.gov>

Fwd: Form Submission - Contact us Re:Code - ADU's in R-5 and setbacks

Helen Donaldson <hcd@portlandmaine.gov> Mon, Jul 27, 2020 at 9:06 AM
To: Jennifer Munson <jmy@portlandmaine.gov>

Name: Nick Aceto

Email Address: n...@acetola.com

Subject: ADU's in R-5 and setbacks

Message: Hello,

I am excited to see the city has recently published the first phase of the revised land use code. I am also very pleased to see more language included in this phase regarding ADU's in residential zones, particularly R-5. Thanks to everyone for all the hard work!

Reading through the dimensional standards I was a bit confused by a few items:

1. Rear Setbacks: It appears the rear setback for R-5 has remained the same, 20'. It also appears this requirement stands for accessory structures (ADU's). If this is the case I would strongly suggest reconsidering a more progressive standard which can allow for greater flexibility in design and more efficient use of yard space. By reducing the rear yard setback to 5' for detached ADU's you would allow what is often underutilized yard space to be repurposed as living space/floor area. For the average two car garage carriage house this represents an additional +/- 300 sf(or one additional bedroom). In the case of some smaller lots this could mean the difference between building the ADU or not. In a time when Portland so desperately needs affordable housing, I urge you to consider drastically relaxing setback standards, particularly for ADU's.

2. Detached ADU Height Limits: It appears ADU's are proposed to carry a max height limit of 18' while their counterpart principal structures are nearly double at 35'. It seems unnecessarily restrictive to set a lower height limit than the principal structure. In a time where affordable housing is needed, the height limit seems it could restrict some property owners from providing additional living space or even make the ADU project unfeasible. I would suggest making the height limit the same as the principal structure. There is already language in the code requiring accessory structures to be 'subordinate' to the principal buildings in terms of placement and bulk (2/3rds floor area limitation).

As a resident in the R-5 zone my partner and I would very much like to develop our own ADU. We think the ADU could be a very valuable tool in helping combat the lack of affordable housing, organically, within existing neighborhoods. However I would urge staff to consider relaxing dimensional standards so as to allow maximum design flexibility early in order to promote efficacy of this new strategy.

Thank you!

NIck Aceto

(Sent via *ReCode Portland*)

Squarespace
Dec 16, 2021, 2:21:16 PM (5 days ago)

to recodep...@portlandmaine.gov

Sent via form submission from ReCode Portland

Name: Daniel Higgins

Email Address: dannyhiggins207@gmail.com

Subject: R2 Zoning Questions

Message: I live on 106 Caron St. with a lot size of approx. 17,800 sq.ft. A number of years ago I contacted Marge Schmucal (spelling?) in city hall and was informed that , to sub-divide my lot for 2 lots R2 zoning requires 10, 000 sq. Ft. Per lot.. Now I see Brandi Lane sub-division approx. 50 yards away from my house, being started with many lots below the 10,000 sq.ft.. This was zoned C40. Is the ReCode Portland addressing issues like this?

Does this submission look like spam? Report it here.



Mush J
unread,

Dec 21, 2021, 5:31:08 PM (17 hours ago)

to recodep...@portlandmaine.gov

Hello,
I own a land in Hemingway Street and I'm looking to build a house there and my neighbors too, that's in my opinion is going to help with the housing needs and the economic too so I was hoping that the city is looking at this issue and waive the requirements of paving the street or helping us pave it or even split the cost,
Thank you,
Mushreq J Alsamraee
35 Hemingway street
Portland, ME
2076329523



Squarespace
unread,

9:06 AM (2 hours ago)

to recodep...@portlandmaine.gov

Sent via form submission from ReCode Portland

Name: Elizabeth C Parsons

Email Address: ecparsons33@hotmail.com

Subject: Recode Portland format

Message: Have received the email about reading and commenting on the current Recode process. Would very much like to do this and find that the format is tedious and off-putting. The document appears in a small window and navigating around it is tricky. Is it possible to receive a PDF of the document?

If this is the only way that you solicit feedback, what you are going to get are responses only from people who are already in the know and not just ordinary citizens--who may have perspectives that need to be heard. Please make a concerted effort to expand the ways of access to this important document and process.

Does this submission look like spam? Report it here.

PC-9

Portland Maine Yes. Google's good here.

Matthew Grooms <mgrooms@portlandmaine.gov>

Comments

'Dennis Martin' via ReCode Portland <recodeportland@portlandmaine.gov> Wed, Dec 22, 2021 at 10:41 AM
Reply-To: Dennis Martin <dennyjrdaddy@yahoo.com>
To: recodeportland@portlandmaine.gov

Hello- We are in a historic district. We would install solar panels on our large southeast facing roof except it is also street side for the historical district. It's probably time to limit the historical districts' reach when it comes to homeowner's mitigating their carbon footprint. Wasn't sure how to comment on the document. Thanks Dennis Martin 217 Brackett St.

Portland Maine Yes. Google's good here.

Helen Donaldson <hcd@portlandmaine.gov>

Recode Phase II Land Use Code Evaluation

Barbara Vestal <vestal@chesterandvestal.com> Thu, Jan 6, 2022 at 12:56 PM
To: planningboard@portlandmaine.gov, Christine Grimando <CDG@portlandmaine.gov>, Helen Donaldson <HCD@portlandmaine.gov>

Chair Mazer and Planning Board Members:

These comments are submitted for consideration as part of your workshop on the Land Use Code Evaluation (Evaluation) on January 11th. For the most part, I am submitting comments on the document in this letter format rather than using the awkward online "bubble" format.

While I think the Evaluation contains many useful observations and may trigger important discussions, I found it to be very uneven and incomplete in how substantive topics are addressed. I was hoping the document would contain a detailed assessment of the ways in which the current land use ordinance fails to implement the major principles of Portland's Plan 2030. (Those major principles are adequately summarized in the Evaluation as: One Portland, complete neighborhoods, strong downtown, thriving working waterfront, priority nodes and corridors, and connected transportation, open spaces and infrastructure, p. 7). Further, I was hoping the Evaluation would contain a comprehensive set of recommendations for amendments (or at least a list of very specific topics for further analysis) which would detail **how to move the City toward implementation of the major principles of Plan 2030**.

Instead, the Evaluation is organized around those six generic themes from Plan 2030 (equitable, sustainable, dynamic, secure, authentic, connected) which are so amorphous that they are not equal to the task of moving the discussion forward. The Evaluation is further divided into technical sections organized by seven components of any Land Use Code. There are approximately 40 substantive recommendations gathered in the "recommendation matrix" but they seem scattershot. The document does not clearly identify the fundamental choices that need to be made if the City is to move toward those major policy principles of the comprehensive plan, Plan 2030, nor does the Evaluation seem to propose a comprehensive suite of recommendations (or focused topics for further analysis) which are strategically selected to further those principles.

Figuring out how to amend the Land Use Code to actually further those substantive principles is the work that needs to be undertaken now. To be successful, it needs to be intensive and laser focused on those principles. The choices among alternative land use patterns and opportunity costs of those choices need to be clearly laid out so that appropriate decisions can be made. If true to Plan 2030 principles, some fundamental changes need to be made in the pattern of uses allowed by zoning and supported by the Land Use Code, particularly off-peninsula. Instead of confronting those decisions head on, this Evaluation seems to have gotten sidetracked on a quest to generate recommendations that will tick as many boxes as possible based on claims that they have some vague relationship to the six generic themes. To my mind, this is an unhelpful elevation of form over substance.

The chapter entitled "The Land Use Code & Portland's Plan" (pp. 7 - 19) is a bit of a puzzle. It asserts over and over and over again that revisions to a land use code **CAN** produce x, y or z (e.g. achieve complete neighborhoods, further equity goals, incentivize affordable housing, etc.). Is the word **CAN** intended to be read as **SHOULD** in relation to Portland? Are these intended as substantive recommendations? Or is this chapter just meant to educate the reader as to the theoretical power of a generic land use code? It would be a more useful document if it helped the City identify **how** to move toward plan implementation by focusing on the specific decisions that need to be made in amendments to the Land Use Code, organized by the topics called out in this chapter (equity, environmental sustainability, parking, complete neighborhoods, housing) and additional major principles goals from Plan 2030 which are not specifically highlighted in this chapter (one Portland, strong downtown, thriving working waterfront, and land use patterns related to priority nodes and corridors and connected transportation, open spaces and infrastructure).

Turing to substance, I would like to share four general observations:

AFFORDABLE HOUSING: The Evaluation seems to emphasize new housing production. (p. 8, 17-18), identifying what could be included in the toolkit to incentivize new construction to produce expanded housing opportunities. The elephants in the room, not discussed in the Evaluation, are the disincentives imposed by referenda in November 2020, specifically including rent control, which are highly likely to discourage the construction of virtually any **newly constructed rental housing.** The exception may be 1-4 unit structures intended to have an owner occupant, accessory dwelling units, government-subsidized units, or units owned by Portland Housing Authority, which are exempt from rent control. Unlike most other rent control ordinances, there is no exemption for rental units constructed after the date of enactment. Any "holistic look" at land use housing tools is a wasted effort unless it expands its focus enough to appreciate the current broader regulatory framework. Rather than focusing on new construction incentives, I believe the land use toolkit for affordable housing is going to need to focus on how Portland can adjust its provisions on nonconformities to **retain existing housing** and to encourage investment in existing affordable housing. This is mentioned very briefly on page 9 but not fleshed out.

In addition, the new construction incentives need to be adjusted so they are not counterproductive. For example, on Munjoy Hill, the height bonus for one “workforce” housing unit has actually incentivized demolition of multiple existing units, to be replaced by expensive condominium units, resulting in a **net loss** of affordable housing. A different set of incentives need to be developed (e.g. allow different types of units or smaller units, reduced minimum lot size per unit for affordable units, etc.) to replace the counterproductive height bonus.

HEIGHT: Recommendation 2.H. states: "Consider opportunities to refine height controls within the Land Use Code's ***mixed use zones***" (emphasis added). This recommendation should not be limited to mixed use zones. Height provisions need to be comprehensively reviewed throughout the City. Currently measurement methodologies are very sparsely detailed and are particularly inadequate for retaining an acceptable scale on a sloped site. Architects have developed "work arounds" that evade the intent and letter of the ordinance. Except on the islands, the current language is being interpreted, unlike almost every other jurisdiction, to allow

a developer to fill first (or resort to other artificial means) and then calculate height from a newly created grade.

The methodology to calculate height needs to be fixed. It needs to specify: 1) where measurements are to be taken on the surface of the earth relative to the footprint of the structure (what defines the corners or the location of the perimeter – the weight-bearing foundation? Incorporated retaining walls? Other?); 2) where measurements are to be taken relative to the vertical location/elevation of the corner points or perimeter (e.g. where the weight-bearing foundation pierces the ground or some other point?); 3) stipulate that calculations are to be based on pre-development grade (or natural grade as of a past date like the year 2000) so that use of fill or other artificial ground-raising techniques to increase allowable height are not permitted; and 4) as many of the remaining undeveloped sites in Portland involve steep slopes, establish standards to address height calculations for sloped lots so that the resulting structures are not out of character with their surroundings, such as a cap on the number of feet of additional height allowed as a result of averaging the grade. Ideally this height methodology fix, which has been discussed for years, should be expedited and not wait for completion of the entire Recode II process.

WATERFRONT ZONES: The Evaluation recommends that "the Code revision process should maintain the unique orientation and provisions of each of these [3 waterfront] zones, while recognizing the potential for emerging industries that can be compatible within the waterfront context." (p. 54). If the emerging industries are meant to be **water-dependent industries** (not intended to include the “hospitality industry” or similar “industries”), that is a reasonable recommendation. As these waterfront zones are so complex and have been intensely negotiated, from time to time, over the last 30 years, I strongly believe it is best for the Recode II process to leave them as they are and not undertake to "align, clarify, [or] modernize the language" even if the recommended intent would be to preserve the function and intent of these established zones. Trying to consolidate definitions into one place or tweaking performance standards so they are consistent with the language used in another zone may inadvertently upset a delicate balance.

LAND USE PATTERN: The Plan 2030 calls for off-peninsula areas to carry more of the burden of accommodating future growth, and advances priority nodes and corridors as the way to do this while supporting sustainability goals for public transportation. The zone analysis in the Evaluation contains only a very cursory analysis of the existing zones, and fails to address how these zones could and should be amended to further these important major principles. Does the City need one or more overlay zones for the priority nodes and corridors? Where would the overlay zone(s) apply? How much density would be allowed? How would they be structured to support affordable housing goals? These issues are the heart of making the Land Use Code consistent with and supportive of Plan 2030. It is unfortunate that the Evaluation does not include more helpful analysis of these issues.

Best wishes as you try to cull what is useful out of this Evaluation and come up with a plan for how to move forward with the Recode II process.

Regards,

Barbara Vestal

--
Barbara A. Vestal, Esq.
Chester & Vestal, PA
107 Congress Street
Portland, Maine 04101
(207) 772-7426 - phone
(207) 761-5822 - facsimile

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PC 11

Comments on Proposed Recode

0 views

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Cheryl Ann Leeman <cal4161@yahoo.com> 12:00 PM (4 hours ago)

to planning@portlandmaine.gov

First and foremost, there has to be a recognition for the city's neighborhoods and their value to the overall quality of life in Portland especially established neighborhoods with patterns of developments attractive to young families who want a more suburban feel similar to outlaying communities - - as stated in the city's comprehensive plan that "uniqueness and integrity of our neighborhood will be maintained and enhanced" and "compatible with current development patterns and contextually appropriate ".

1. *Urbanization* of neighborhoods will be in direct conflict with what the Comp Plan and the homeowners who purchased their homes in areas of the city where the established patterns of housing development were an indication of a desirable, well-defined and livable neighborhoods to raise one's family.
2. Until there is an actual inventory of housing stock in the R-3 and R-5, it is somewhat inaccurate to say that these zones "do not appear to acknowledge the current built forms" mapped within the city. AS stated, three and four family dwellings are not predominant housing types in these zones.
3. Greater density requires data-based documentation as to the appropriateness of where this might be applicable.
4. To suggest "context-based" solution to front and side setbacks has potential for unintended consequences of urban application with buildings closer to street and abutting properties in neighborhoods that historically have front and side yards.
5. Possible elimination of small lot residential lot option could lead to the purchasing of a house with small lot next to it, demolitioning the house and combining lots for a massive scale development, and so much more.
6. Changing R-3 zones to R-5 would affect almost every neighborhood off peninsula to higher density impacts for unwelcome multi-family buildings in well established neighborhoods like Back Cove, Deering Center, North Deering, East Deering and Riverton, etc.
7. Infill development, if carefully done, with specific standards within established context of R-3 and R-5 zones is certainly an option. However, to date, what we have experienced is amendment changes to zoning to accommodate a proposal even though it may not fit within neighborhood context.
8. Where is the neighborhood planning tool kit to enrich community input?
9. There is a need of defined process for improved neighborhood involvement prior to the finalization of projects instead of being put in a position of reacting to proposal, setting up adversial situation.

Finally, the document sent out for folks to use for evaluating the Recode was difficult to navigate. I believe the public will be hard pressed to response using this method.

Thank you, Cheryl Leeman

CITY OF PORTLAND
Planning & Urban Development
Christine Grimando, AICP, Acting Director

To: Housing & Economic Development Committee

From: Christine Grimando, Director, Planning & Urban Development
Nell Donaldson, Director of Special Projects, Planning & Urban Development

Date: October 1, 2021

RE: Housing policy & ReCode Portland

I. INTRODUCTION

Over the past several months, the Housing & Economic Development Committee has focused on the issue of "missing middle" housing. The Committee's work has led to conversations that range from the definition of "missing middle" housing to the regulatory and funding barriers that inhibit its production. In support of further discussion, Planning staff has prepared this memo to provide background on policy that relates to "missing middle" housing, particularly from a land use perspective. The memo describes the foundation for housing policy in the city's comprehensive plan, the city's existing land use-related housing policy that furthers this vision, and some initial considerations around future housing policy that have arisen through ReCode Portland and dovetail with the Committee's work.

II. "MISSING MIDDLE" THROUGH A PLANNING LENS

To date, the Committee's work on "missing middle" housing has generally focused on terms of income and affordability. Through this lens, "missing middle" is housing for populations that fall between 1) the target market for what is deed restricted or otherwise legally binding affordable housing, assisted by state, federal, and sometimes local funding, and 2) market rate housing. Though the former is critically important to ensuring that a portion of the city's housing is guaranteed as affordable, it comprises a relatively small share of the city's overall housing stock. What comprises market rate housing is every other unit of housing, regardless of price or scale, that is not legally bound to remain affordable.

Notably, as used in most planning literature and practice, "missing middle" more commonly refers to a housing typology, rather than an income range; from this perspective, "missing middle" is a form of low-rise multi-unit or small lot housing that is generally compatible with lower-density neighborhoods *(Figure 1)*. This type of housing, including rowhouses, duplexes, triplexes, and four-plexes, was once more common in cities across the country, and is still of value as a means of diversifying the housing stock and, importantly, supporting affordability. "Missing middle" forms can serve as a means of increasing a city's housing supply across different neighborhoods, which has benefits for the overall housing supply and diversity of housing choices. In terms of affordability, income- and form-based definitions of "missing middle" can overlap, as "missing middle" forms can

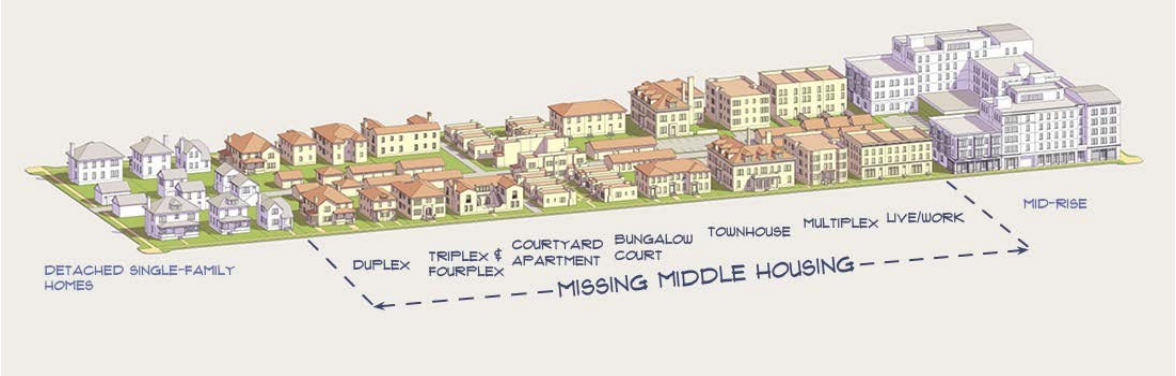

Figure 1: Missing middle housing through a planning lens. (Source: Opticos Design)

provide what is sometimes referred to as "naturally-occurring" affordable housing, or housing at a price point that is attainable to middle-income households.

While the city's existing land use code includes affordable housing policies targeted directly at housing for populations with incomes up to 100% of AMI (as described below), the land use code has historically served as a tool used largely to regulate use, density, and form, and continues to be a powerful way of shaping the outcomes of the majority of the housing built in Portland. For this reason, in addition to considering ways to support more affordable housing as defined within the code, this memo includes a discussion of opportunities to encourage additional housing more broadly, across typologies and environments, as a means of increasing supply to all households, including those of "missing middle" incomes. It also considers opportunities to create "missing middle" housing *forms* as a means of producing "missing middle" *income* housing.

III. HOUSING POLICY FOUNDATION

Portland's Plan 2030, the City of Portland's comprehensive plan and the foundation for land use and other policy goals in the city, squarely foregrounds housing as one of the city's most pressing issues, and one connected to all facets of the city's vision - equity, sustainability, and security among them. Recognizing that increasing housing supply is fundamental to issues of affordability, the plan sets a housing production target and prioritizes the creation of policies and programs to encourage housing that meets the needs, preferences, and financial capabilities of all Portland households. The plan supports an incremental increase in housing supply across all neighborhoods, encourages more significant increases in housing within major transportation nodes and corridors *(Figure 2)*, and emphasizes the need for additional dedicated affordable housing.

IV. EXISTING HOUSING-RELATED LAND USE POLICY

The City of Portland's existing land use code includes a number of provisions that align with the recommendations from *Portland's Plan.* These provisions encompass policy meant to support an increase in the supply of housing for a full range of housing types and sizes, and policy meant to encourage or require the creation of what is legally binding affordable and workforce housing, targeted specifically for residents of low or moderate incomes. Land use regulations that allow a range of housing types and sizes and encourage housing creation may not result in each unit of new housing being affordable to all, but the aggregate impact of increasing the available supply creates

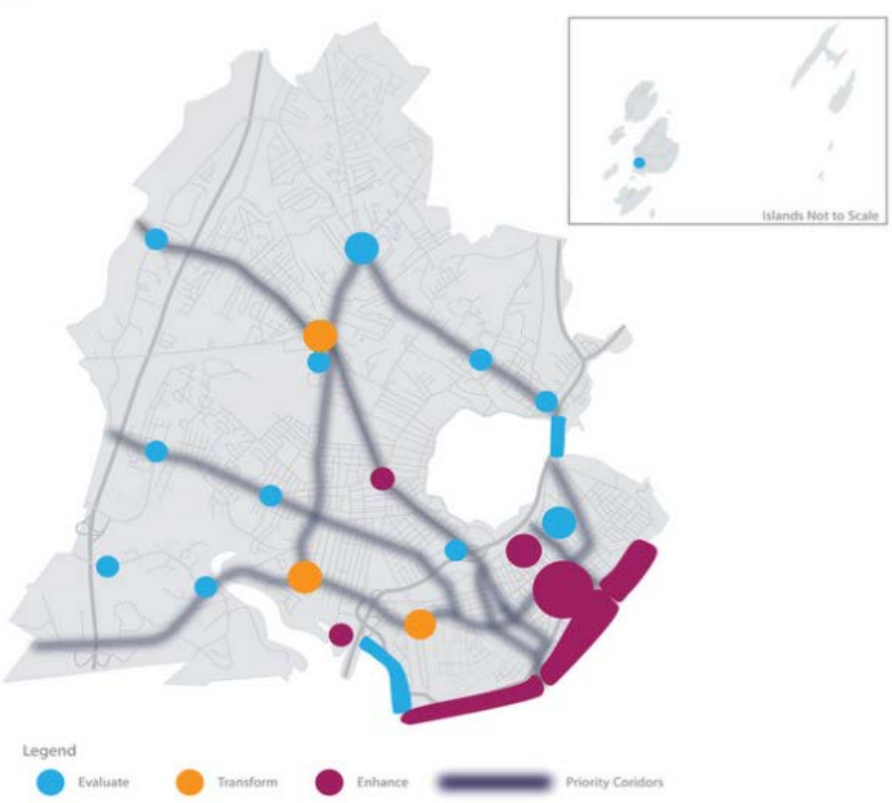

Figure 2: Priority nodes and corridors from Portland's Plan.

new housing opportunities for all, including more 'naturally occurring affordable' market rate housing.

A. Policies to encourage housing supply and 'naturally-occurring' affordable housing

1. *Housing replacement ordinance.* The city's land use code has included provisions since the early 2000s that require that any development proposals that would remove existing housing replace those units, either within the same geographic area or by contributing to the city's Housing Trust Fund. These provisions help to counter any potential net losses in housing supply associated with private development.
2. *Base zoning adjustments to encourage housing creation.* In the past decade, the city has adjusted base zoning in several districts, including the B-1, B-2, and R-6, to support greater housing creation, modifying dimensional standards to allow for higher densities and smaller lots. These provisions have generally been targeted towards higher density residential zones and mixed-use zones well-served by transit, on the grounds that they create opportunities for housing development in areas of the city that are particularly well-prepared for them.
3. *Accessory Dwelling Units (ADUs).* As of December 2020, the land use code includes revised Accessory Dwelling Unit (ADU) standards. The 2020 revisions eliminated restrictive dimensional and parking requirements and removed procedural hurdles to ADUs, making it significantly easier to build an ADU within the city. Further, the 2020 amendments permit significantly more ADUs - in total number that can be built per lot, and in total number that might be built city-wide - than the prior regulations, paving the way for smaller, naturally affordable units across the city.

4. *Parking exemptions.* Off-street parking requirements are often cited as a barrier to housing production, forcing developers to devote valuable land area and/or building envelope to vehicles, rather than housing units. The city's land use code has long included a great deal of flexibility to developers when it comes to parking, including exemptions in certain zones, shared parking provisions, and off-site parking allowances. As of December 2020, the city's land use code offers an off-street parking exemption to any use within a ¼ mile of a transit, essentially freeing much of the city from parking requirements. Additional parking flexibility and lowering/standardizing residential parking requirements was also implemented in December 2020.

B. Policies to support affordable housing

1. *Affordable housing bonuses.* As of the mid-2000s and as refined in the late 2010s, the city's land use code has included dimensional bonuses for affordable and workforce housing in many of the city's mixed-use zones and for PRUDs in residential zones, scaled to the level of affordability provided. These bonuses allow increased height, increased density, and reduced setbacks for affordable housing projects.
2. *Expedited permitting for affordable housing.* In addition, affordable housing applications have been eligible for a reduction in fees and priority review since the mid-2000s. With the passage of the impact fee ordinance, the affordable housing fee reductions were extended to include these fees.
3. *Inclusionary zoning.* As of 2015, the city adopted inclusionary zoning, which requires that projects of 10 or more dwelling units provide a share of workforce housing either on-site or as a contribution to the City's Housing Trust Fund. A second inclusionary zoning policy was adopted in 2019 for hotels. These policies are intended to ensure that affordable housing is constructed in tandem with market rate housing, and to support the creation of this housing in a mixed-income setting. The inclusionary zoning policy was modified by referendum in 2020 to increase the affordable housing share and to target lower median incomes.

V. HOUSING TRENDS TODAY

While the city's land use code includes a number of progressive provisions designed to support housing production, and affordable housing production in particular, it is also clear that these provisions have not sufficiently counter-balanced trends, shared by many cities across the country and many communities across the state, towards rising housing costs and continued affordability gaps. Recent building permit data *(Figures 3 and 4)* shows that while the city is on track to produce the number of dwelling units called for in *Portland's Plan*, just over 27% of those new multi-family units developed in the last five years are categorically affordable units, with rents or purchase prices limited to households earning below 120% of the area median income. Additionally, in regard to new multi-family developments, there are disproportionate numbers of smaller studio and one-bedroom units, which constitute more than 70% of all new multi-family units created in the past five years. New housing is more common in on-peninsula neighborhoods, and affordable housing is not equitably distributed across the city, with certain neighborhoods seeing significant levels of new affordable housing development and other neighborhoods virtually none at all.

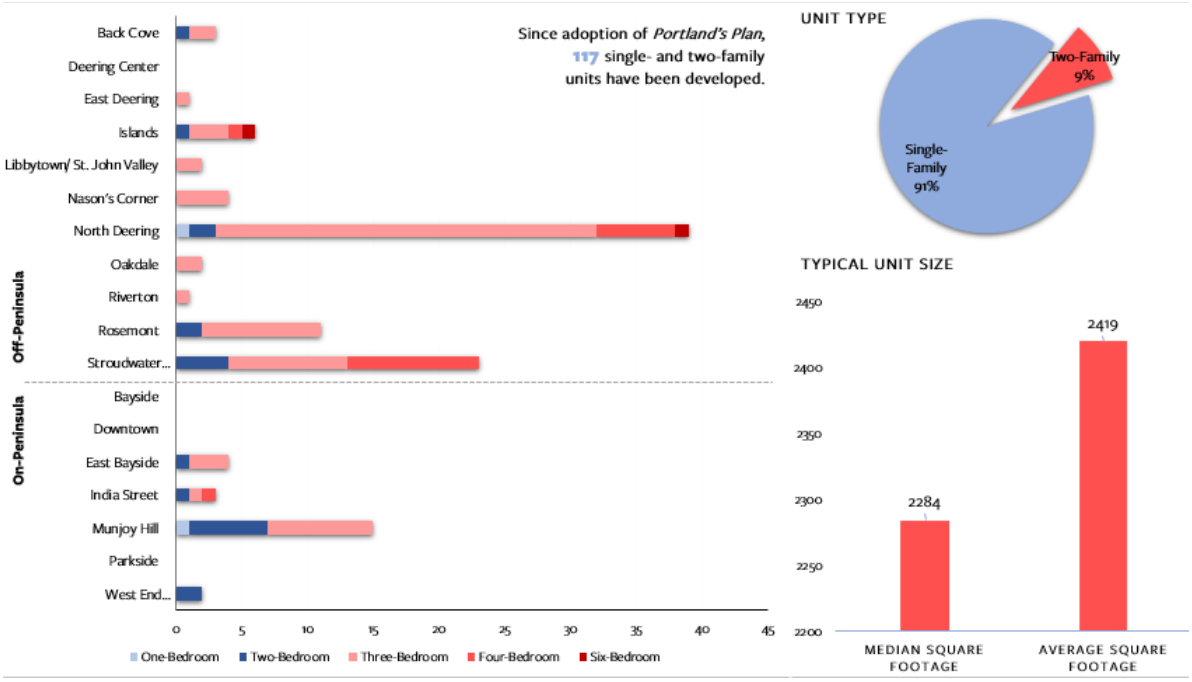

Figure 3: Single and two-family housing trends (2017-2021) (Source: City of Portland permit data)

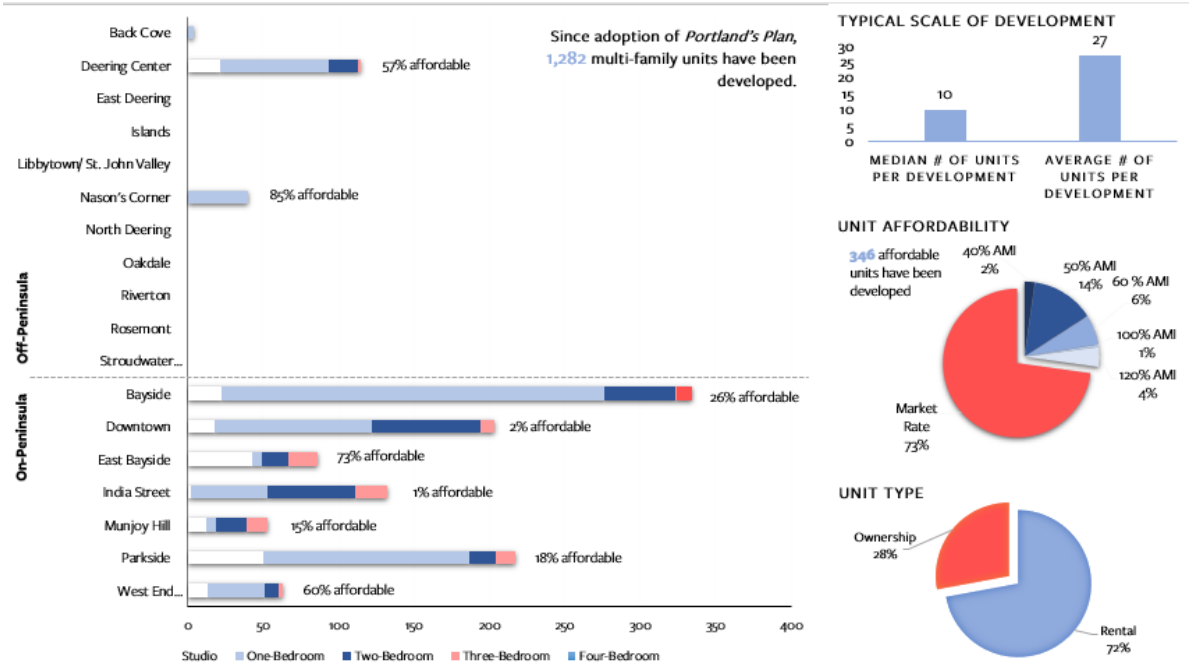

Figure 4: Multi-family housing trends (2017-2021) (Source: City of Portland permit data)

VI. RECODE PHASE II

Given these trends, we know that there is additional work that must be done around housing creation, diversity and affordability city-wide. As part of ReCode, the city's multi-year initiative to rewrite its land use code, staff has been working with a consultant, Camiros, to evaluate the existing code for ways to more effectively address the goals of *Portland's Plan.* An early step of the second phase of ReCode is analyzing the current land use code for consistency with the comprehensive pan. This evaluation, which is still being finalized, includes a broad focus on housing. Central to the evaluation are the concepts of:

- Encouraging housing creation and diversity of housing types as an essential means of ensuring the overall health and accessibility of our housing supply.
- Proposing new housing policy that reflects the city's wide variety of neighborhoods, scales, and infrastructure contexts, while allowing for all neighborhoods in the city to provide opportunities for new housing creation.
- Crafting a housing strategy that builds opportunities where it can have the greatest effect on efforts to meet Portland's equity and climate goals.
- Recognizing that affordable housing development is not keeping pace with demand, is geographically uneven, and additional tools may be necessary to enable housing creation to be more equitably distributed across the city.
- Recognizing that mixing both requirements and incentives is central to a balanced housing strategy.

Initial policy concepts from the evaluation include:

A. Potential strategies to encourage housing supply and 'naturally-occurring' affordable housing

1. *Modifying minimum lot sizes (and corresponding densities) in residential zones to more accurately reflect the existing parcel pattern and open opportunities for additional housing creation.* Initial analysis shows that, in several of the city's residential zones, minimum lot size regulations result in a significant number of non-conforming lots (meaning lots that are undersized given existing regulations). While the existing code provides fairly generous allowances for legally non-conforming lots, revising minimum lot area standards, particularly where there are opportunities for lot divisions, could create new opportunities for housing.
2. *Creating new categories of housing types, particularly in the "missing middle" mid-density range (e.g. three- and four-units), and permitting these housing types as of right in appropriate residential zones, with corresponding changes to density requirements.* The existing land use code includes a fairly narrow range of traditional housing types, permitting single-family dwellings, two-family dwellings, and multi-family dwellings (defined as three or more units). The existing zoning is permissive about where single-family occurs, but is much more restrictive when it comes to multi-family dwellings *(Figure 5)*. Broadening the range of housing types to differentiate between small, mid-density housing (e.g. three-family and four-family) and larger-scaled housing could provide opportunities to allow more of these middle-sized housing types across the residential zoning spectrum.

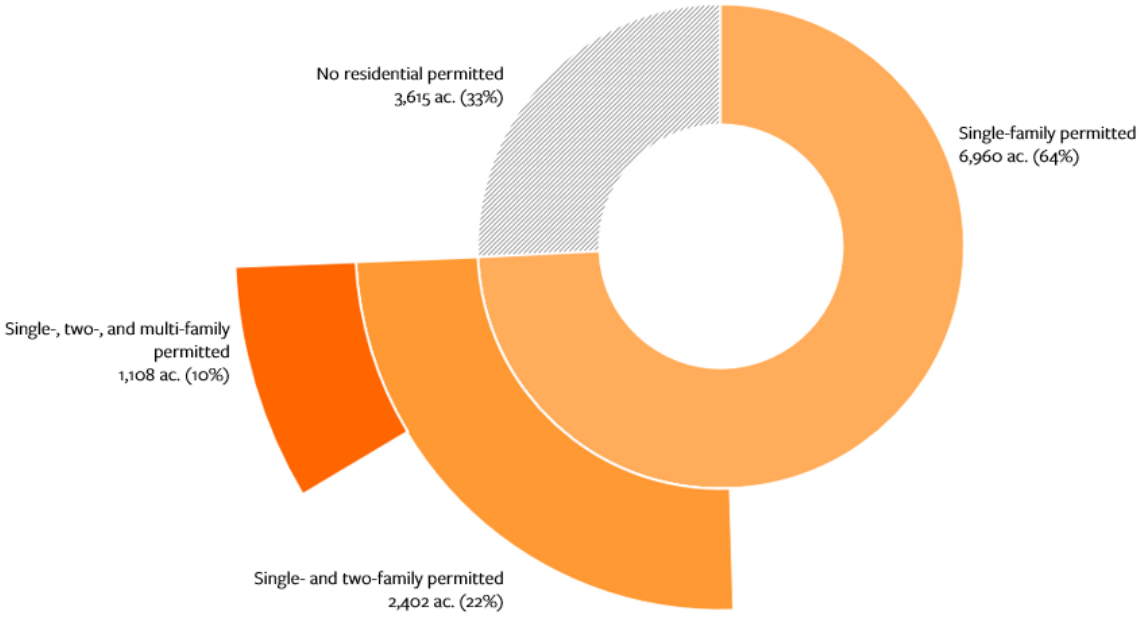

Figure 5: City land area by type of housing allowed as permitted use (Source: City of Portland Assessor parcel data) (Note: Represents permitted uses only. Does not reflect areas where multi-family may be permitted as a conditional use.)

3. *Modifying setback requirements in residential zones to more accurately reflect the existing built form and support more opportunities for ADU creation, as well as to add flexibility for additions and redevelopment.* There is evidence to suggest that space and bulk regulations, including setbacks, diverge from the existing built form in some of the city's most successful walkable neighborhoods. Modifying setbacks to reflect the existing building pattern could help to open up opportunities for additional square footage on residential lots in a way that encourages contextual development. Furthermore, reviewing setbacks for accessory structures, particularly accessory dwelling units, could pave the way for more ADU creation.
4. *Exploring creative opportunities to allow relatively higher residential density off-peninsula.* Zoning for off-peninsula neighborhoods contains certain tools to allow for variations from single-family housing, but currently they are limited. There is an opportunity in many neighborhoods of the city to introduce new tools or standards to bridge the medium-to-higher residential zone densities of the peninsula and the considerably lower densities of residential neighborhoods off-peninsula in ways that are sensitive to Portland's distinct neighborhoods.
5. *Expanding more 'productive' residential zoning where the existing form supports it.* Data from the last five years shows that particular zones of the city have supported more housing production than others *(Figure 6)*. Not surprisingly, these zones tend to be higher density residential or mixed-use. Given this data, there is an opportunity to expand more 'productive' zones geographically to potentially stimulate additional housing production. Any consideration of this strategy would have to take into account existing built pattern and form as well as the city's long-term goals. For instance, there are off-peninsula areas of the city that were developed prior to zoning according to similar conventions around height,

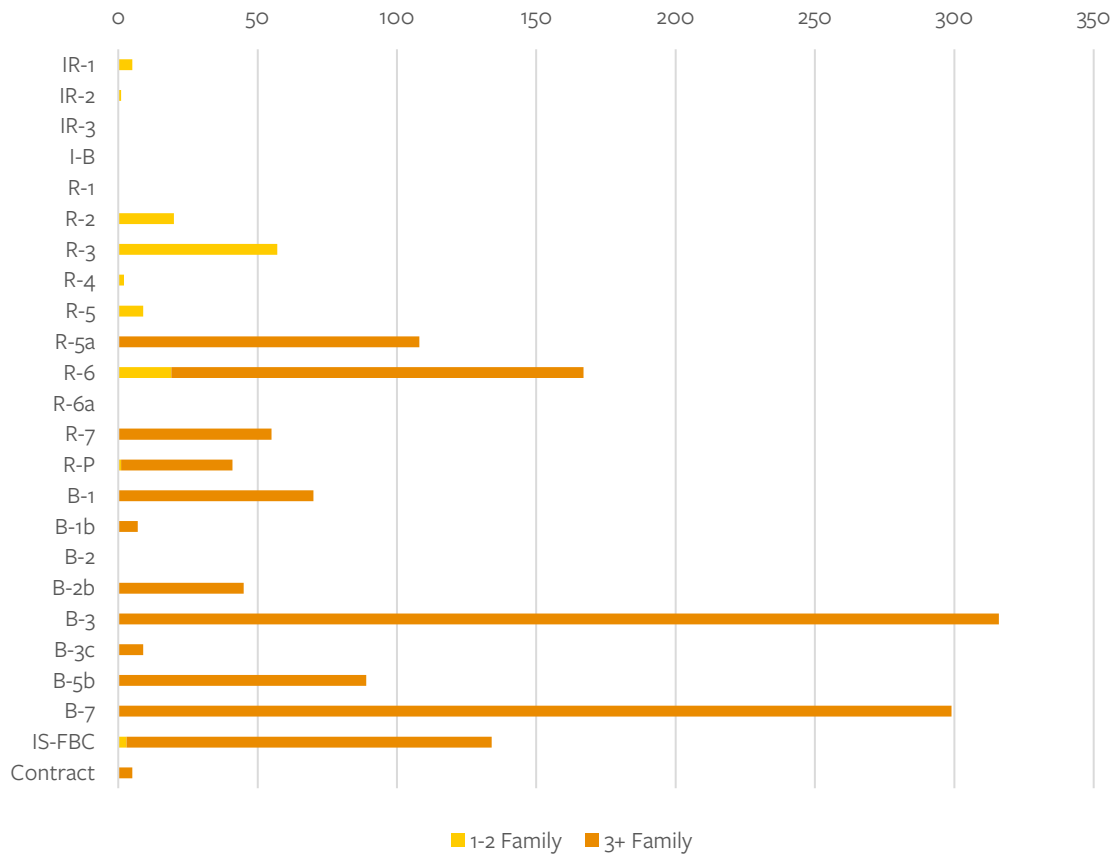

Figure 6: Housing production by zone (in units) (2017-2021) (Source: City of Portland permit data)

scale, and building placement, but are currently zoned inconsistently; there may be opportunities to rezone some of these areas to more closely align the zoning with the existing built form. This could take the form of changes to existing zone boundaries, modification to existing zone standards, or consolidation of zones.

6. *Modifying densities and height in zones along transit corridors and in transit nodes to support additional housing opportunities.* Portland has recently adopted one of the basic elements of a transit-oriented development approach through a categorical exception that exempts uses within ¼ mile of a fixed-route transit service from parking requirements. To further develop this approach, the City could consider adjusting allowed densities within the existing zoning along transit corridors and in transit nodes. This change, coupled with changes in height regulations, could help the city advance both housing and transportation goals with more transit-supportive zoning.
7. *Adjusting mixed-use zoning around nodes where appropriate.* While most of the city's transit corridors include at least some transit-supportive zoning, such as the B-3 or the B-2, there are areas where a map amendment to expand the use of this zoning (potentially as modified above) could help to create new opportunities for transit-supportive housing across the city.
8. *Permitting housing in mixed-use zones across the board.* Last, all but one of the city's existing mixed-use zones include housing as a permitted use. This zone, the B-4, which is clustered predominantly along Warren Avenue and Riverside Street, has a decidedly more

industrial, large-lot character than many of the city's other mixed-use zones. However, the zone is also proximate to public school and park facilities, one of the city's higher education institutions, and major development sites in Westbrook. Allowing housing as a permitted use would unlock a significant opportunity for housing development.

B. Affordable housing

1. *Expanding dimensional bonuses for affordable housing bonuses to additional zones.* As described above, the City's existing land use code includes provisions designed to give affordable housing projects advantages in the form of density, height, and setback bonuses. This increase in affordable housing potential in the land use code is contextual in that these bonuses are restricted to certain, mostly mixed-use zones, and largely consistent with the nodes and corridors identified as suitable for more intensive growth in *Portland's Plan 2030*. In order to further incentivize affordable housing, these bonuses could be expanded, for instance to all zones in which multi-family is permitted. Any consideration of this policy change would need to take a graduated approach to the intensity and scale of residential neighborhoods; there may be areas where a density bonus is appropriate, for example, but not height increases or setback reductions.

It should be noted that these concepts are still very much in draft form; pursuing any or all of these changes would require additional analysis, drafting, and public review and comment. Following the release of the full code evaluation (which will also address a variety of other issues that are central to *Portland's Plan),* the work plan for ReCode will involve significant public engagement to test concepts, gather feedback, and establish priorities for potential amendments moving forward.

Finally, the Planning & Urban Development Department and the Housing & Economic Development Department are exploring ways to strengthen the alignment between the City's Housing Trust investment strategy with the City's priority growth areas, with particular attention to those areas that have been identified as suitable for growth but have yet to see significant housing investments.

VII. CONCLUSION

Securing and expanding Portland's legally-binding affordable housing supply is a central part of Portland's housing strategy, and the City's land use tools correspondingly reflect this importance. The land use code also defines the parameters of where, how much, and in what form all housing occurs in the city, including market rate housing, which is and will continue to be the majority of the community's housing stock. The code does not determine all aspects of housing affordability or development outcomes, but it provides a powerful framework that enables a resilient mixture of housing to be created. Though Portland's land use code currently reflects housing creation as a priority, the Committee's work, and the work of ReCode, provide valuable opportunities to evaluate the code for additional tools and changes to provide for a more equitable and accessible housing landscape city-wide.

PLANNING BOARD REPORT
PORTLAND, MAINE

USM Parking Garage
50 Bedford Street
Major Site Plan Application
PL-001729-2021
University of Southern Maine (USM), Applicant

Submitted to:	Portland Planning Board	**Prepared By:**	Jimmy Dealaman
Public Hearing Date:	January 11th, 2022	**Date:**	January 7th, 2022

I. INTRODUCTION

The University of Southern Maine (USM) is seeking a Major Site Plan approval to facilitate the construction of a four-level, 171,850 square foot structured parking garage with 504 parking spaces at 50 Bedford Street. The site is located in the Oakdale neighborhood and within the R-5 Residential and B-2 Community Business zones, and the USM overlay zone.



Figure 1 – Aerial View of Subject Parcel

This application is being referred to the Planning Board for compliance with the City of Portland's Land Use Code Site Plan Standards, Section 14.6, along with delegated review of an amendment to a previous Maine Site Location of Development Act (SLODA) approval. The Planning Board previously held a workshop on September 28, 2021 and a second workshop on December 14, 2021, (See Section VII below for summary).

The Planning and Urban Development Department mailed 56 notices advertising this meeting to interested parties and property owners within 500 feet of the site. A legal advertisement ran in the December 30th 2021 and January 1st, 2022 editions of the *Portland Press Herald*.

Applicant: The University of Southern Maine
Applicant Representatives: Woodard & Curran; Winton Scott Architects; VHB

II. REQUIRED REVIEWS

Review	*Applicable Standards*
Site Plan	Section 14.6
Design Review	City of Portland Design Manual Section (e) University of Southern Maine Overlay Zone, Appendix 3 Principles and Standards
Traffic Movement Permit (TMP) Amendment	Delegated Review from Maine DOT, Technical Manual, Section 1.1 – Traffic Studies
Maine Site Location of Development (SLODA) Amendment	Delegated Review from Maine DEP, Technical Manual Section 14

Waiver Requests	*Applicable Standards*
To waive the required installation of EV chargers for 20% of parking spaces and provide EV charging for 12% of spaces.	Technical Manual, Section 1.17 Electric Vehicle Infrastructure: New structured and surface parking lots of five or more spaces shall include energized electrical outlets or installed chargers capable of providing Level 2 EV charging or higher to 20% of parking spaces
To allow 4,000K CCT fixtures versus 3,000K CCT fixtures.	Technical Manual, Section 12.3.5 Luminaire Types: All fixtures must be LED and shall not exceed 3000K Correlated Color Temperature (CCT). Screw in light fixtures must have LED lamps specified to be maximum of 3000K CCT.

III. PROJECT DATA

Existing Zoning	R-5 Residential Zone, B-2 Community Business Zone, USM Overlay Zone
Property Size	353,446 square feet (8.1 acres)
Existing Use	Post-Secondary School (University)
Proposed Use	No Change
Proposed Development Program	Structured Parking Garage (Accessory to University)

	Existing	*Proposed*	*Net Change*
Building Footprint	0	44,266 SF	+44,266 SF
Building Floor Area	0	171,850 SF	+171,850 SF
Impervious Surface Area	63,162 SF	87,942 SF	+21,780 SF
Parking Spaces	1,247 spaces	1,659 spaces	+412 spaces
Bicycle Parking Spaces	84 spaces	334 spaces	+250 spaces
EV Charging Stations	0	58	+58



Figure 2 – Aerial View of USM Portland Campus and Surrounding Neighborhood Facing Southwest

IV. BACKGROUND

On November 10, 2020 the Planning Board Approved a Level III Site Plan application (PL-001040-2020) to facilitate construction of a student center, dorms, and associated open spaces at 25 Bedford Street. As a condition of approval the applicant is required to provide proof of parking commitments sufficient to provide the 396 parking spaces required by the proposed development, or shall submit a site plan application for a parking garage providing these spaces. The subject application would satisfy this condition.

On May 26, 2020, the subject parcel previously received Planning Board approvals for a 214-space surface parking lot. However, the applicant no longer intends to move forward with that approval and intends for the subject development to supplant that project.

V. EXISTING CONDITIONS AND SURROUNDING AREA

The University of Southern Maine occupies an approximately 29-acres campus just north of Portland's peninsula and situated in the Oakdale neighborhood. The campus is bounded by Forest Avenue and Durham Street to the East, Falmouth Street to the North, Exeter Street to the West and I-295 and Chamberlain Street to the South. The campus operates in conjunction with USM's two other campuses located in Gorham and Lewiston, and at present, largely serves a commuter student population, with residence halls housed on the university's Gorham campus. The campus consists of buildings ranging from repurposed single-family homes to large academic buildings, surface parking lots, and one parking garage. An approximately 42,000 square foot student center and approximately 580 bed dormitory and new quad approved by the Planning Board in 2020 are currently under construction.



Figure 3 – View of Proposed Development Site Facing East

The proposed development is planned for an 8.1-acre parcel located at 44 Bedford Street known informally as the Wishcamper Lot, which is currently utilized as surface parking totaling 92 spaces (See Figure 3). As mentioned in the background section this parcel previously received Planning Board approvals for a 214-space surface parking lot at its May 26, 2020 meeting. Currently, this site is occupied by several existing uses: i) the Glickman Family Library, a seven story structure, originally built as a commercial bakery in 1911, and was acquired in 1993 by USM; ii) the Abromson Community Education Center which includes classrooms, a 500-seat lecture hall/auditorium and 1,155 space parking garage and; iii) the Wishcamper Center, which hosts the schools Osher Lifelong Learning Institute, Cutler Institute, and Muskie School of Public Service.

The parcel is intersected by the R-5 Residential zone on the lower portion of the lot which continues to the south and west, and the B-2 Community Business zone on the upper portion of the lot which continues to the north and east of the site. The site also falls within the USM Overlay Zone which supersedes any requirements of the underlying zoning districts.

The site is proximate to public transit with METRO routes including local service route 4 to Westbrook, the Huskie Line which connects to the Gorham Campus, Westbrook, and Downtown Portland, as well as the Zoom Turnpike Express which connects the campus to Biddeford and Saco.

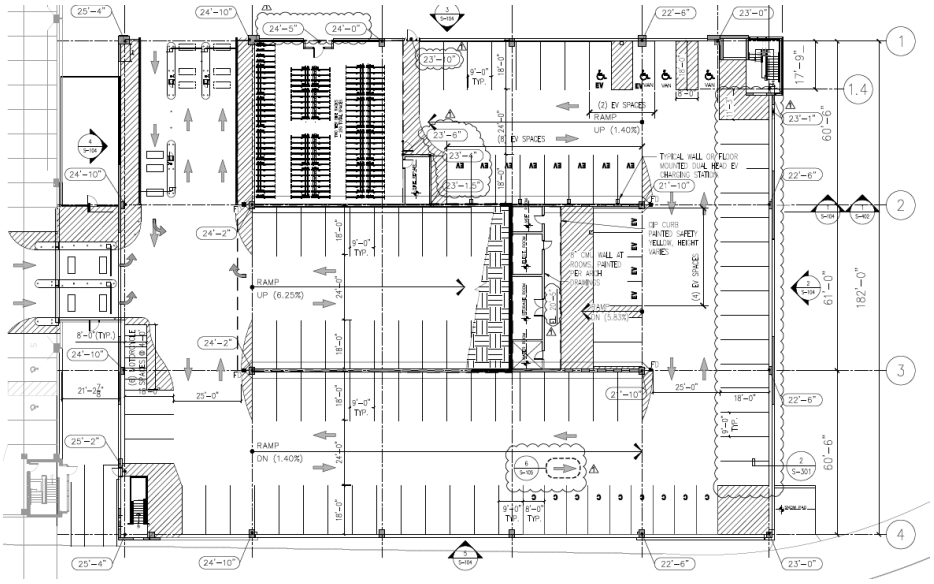

Figure 4 – Ground Level Striping Plan

VI. PROPOSED DEVELOPMENT

The applicant proposes to construct a four-level 504 space parking garage (127 space reduction from the original application submission). 58 of the total parking spaces in the proposed garage would be served by EV charging stations. The project includes a vehicle turnaround drive, two drop-off spaces accessing Glickman Library, a reconfigured library plaza space, new landscaping, lighting, extended fire access drive, pedestrian walkways and other associated site improvements. The proposed garage also includes a bicycle repair room with capacity for storing approximately 250 bikes. The applicant proposes making traffic and pedestrian site improvements along Bedford and Surrenden streets, as well as other streets and intersections in the project vicinity (See Section XIII for more information).

The proposed development would have a height of approximately 59 feet, approximately one level lower than the existing/adjacent parking garage. The proposed garage would be set apart approximately 21 feet from the existing parking garage, and connected via a one-way vehicle access route. The proposed circulation to both garages has been revised to keep primary traffic entering the existing garage entrance at Surrenden Street and directing all egress traffic through the proposed garage and exiting at the access drive (referred to as Winslow Street) to the east. The only exceptions are one resident only entrance (bypass) lane into the proposed garage, and a reversible garage gate at the existing garage entrance to accommodate PM peak hour load when more users are leaving campus.

The proposed parking garage is intended to accommodate the additional long-term parking needs associated with the development of a new Residence Hall (Portland Commons), which is currently under construction and expected to open in early summer of 2023.

VII. PREVIOUS WORKSHOPS

WORKSHOP #1 – SEPTEMBER 28, 2021

The project was introduced to the Planning Board by the applicant and staff at a workshop held on September 28, 2021. The Board provided initial feedback about the design, the requested EV charging station waiver, and the parking requirement, which is as follows:

Design – The Board expressed support of the proposed design providing minimal comments. One Board member suggested making the brick anchor pavilions on either end of the building a different color brick, and consider using grey brick so that the facility could be more compatible with the pre-cast panels and complement the Wishcamper

complex. Additional Board feedback asked about lighting and whether there could be more opportunity for planting between the buildings instead of gravel. (See Section XI.4.I below for Applicant's Response)

EV Charging Waiver – The Board expressed support for EV charging being primarily utilized by overnight parkers. Board members expressed interest in obtaining more information about the costs of the charging stations, and costs associated with providing EV charging to the remaining required spaces. Some Board members suggested the project consider applying the cost savings of waived EV charging stations into rooftop solar power. While not a requirement, during the pre-app stage, Staff encouraged the applicant to consider rooftop solar installation. The applicant stated they had looked into providing solar but the cost to support that infrastructure was too great. (See Attachment U for Additional Information Provided by Applicant).

Some Board members expressed concern with the precedent that would be set by waiving the EV charging requirement. Other Board comments described that if considering a waiver, it would need to be narrowly tailored and justified for the precedent being set. The Board also requested an updated TDM plan be submitted which should speak to EV charging monitoring. (See Section XI.1.D. for Additional Information Provided by Applicant).

Parking Requirement – Some Board members were supportive of 631 parking spaces proposed for the site if there will be increased demand from future campus growth, or if the garage is used as a centralized place for commuters taking a shuttle on peninsula. Board members were also interested if a future addition could be added to accommodate future demand. Other Board members were not supportive of the proposed five-levels of parking totaling 631 spaces, given the TDM includes a parking demand reduction goal and more information was requested about the parking program and justifying the need for 631 spaces. It was suggested by one Board member to remove a story off the building or provide no more than 396 spaces to meet the previous condition of approval. Another board member was supportive of the parking moving away from the residential neighborhood and having excess capacity to serve future growth. (See Section XI.1.D for Additional Information Provided by the Applicant).

WORKSHOP #2 – DECEMBER 14, 2021

Staff and the applicant both presented a summary of the updated proposal. Staff provided highlights from the review including Traffic Movement Permit (TMP) recommendations, more information on lighting and EV waivers, and the applicant's revised parking amount of 504 parking spaces. The Board provided the following feedback:

Lighting Fixture Color Temperature Waiver –The Board raised no concerns regarding the waiver request.

EV Charging Waiver –The Board noted that the proposed parking garage would include EV charging stations serving 58 parking spaces, a sufficient amount to accommodate current and projected future demand. The applicant also proposed incorporating sufficient infrastructure into the garage to accommodate future installation of EV supply equipment, as well as incorporating additional measures into the TDM Plan for monitoring and increasing EV supply based on future demand. Therefore, the Board believed that the applicant's waiver request to provide EV charging stations to serve 12 percent of parking spaces, an eight percent reduction from the minimum 20 percent EV requirement, is appropriate.

Parking Requirement – The Board unanimously supported the applicant's revised proposal to reduce the amount of parking provided that the project would be reducing dependency on single occupancy vehicles in general, as well as being more aligned with the University's TDM Plan goal for reducing the amount of parking. Also, some of the Board expressed support for 504 parking spaces due to the fact that the structure was designed in a way so that parking could always be expanded if future demand necessitates higher parking levels.

VIII. RIGHT, TITLE, & INTEREST

The owner of the property is the University of Maine System. The applicant has provided a copy of quitclaim and governor's deed, recorded at the Cumberland County Registry of Deeds (Book 29219 Page 218 and Book 24387 Page 258, respectively), which demonstrates their right, title and interest in the property (Attachment E).

IX. FINANCIAL & TECHNICAL CAPACITY

The applicant has submitted a Statement of Financial Capacity letter from their Chief Operations Officer as demonstration of their financial capacity (Attachment J).

The applicant has submitted a Technical Capability narrative summary explaining the development teams relevant experience to complete the proposed development (Attachment J).

X. ZONING ANALYSIS

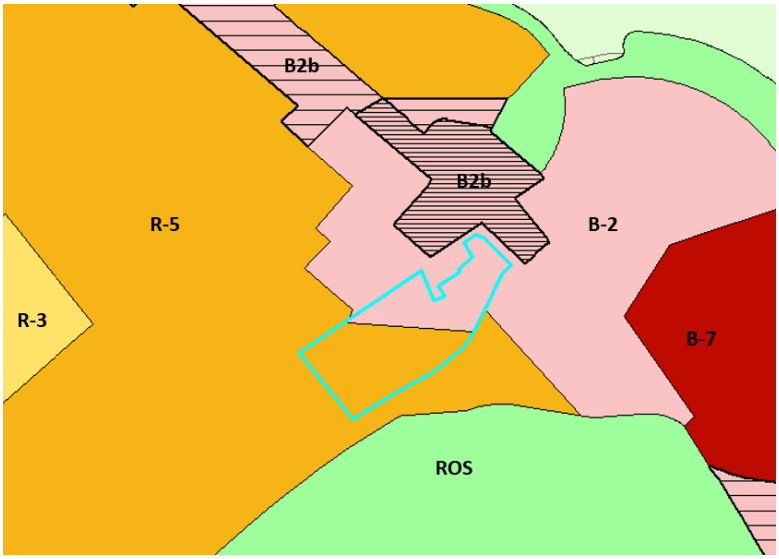

Figure 5 – Zoning Map with Subject Parcel Outlined in Blue

The parcel is located in the R-5 Residential and B-2 Community Business zones, and is also within the USM Overlay Zone which supersedes any of the specific requirements of the underlying zoning districts. In parcels with a split zone condition, the zoning requirements consider the more restrictive dimensional standard unless modified by an overlay zone or other Land Use Code provisions.

The proposed use of parking garage is listed as a permitted use in the USM Overlay Zone (Section 8.10.3.A.12).

Staff analyzed the proposal and found that the project complies with all dimensional requirements. The applicable dimensional standards under the USM Overlay Zone (Section 8.10.5) and underlying zones (Section 7.3) which are summarized below. The University Campus Overlay Setback and Height Map is attached to this report as additional reference (Attachment 1).

USM Overlay Zone	***Permitted***	***Proposed***
Minimum Setback	10 feet	30.5 feet
Maximum Building Height	85 feet	59 feet
Minimum Building Height	35 feet	73 feet
Maximum Impervious Surface Ratio (of USM overlay zone)	66%	55%
Maximum Coverage by Buildings (of USM overlay zone)	40%	30%

R-5 Residential Zone	*Permitted*	*Proposed*
Minimum Lot Area (Post-secondary school)	2 acres	8.1 acres
Minimum Street Frontage	50 feet	>50 feet
Minimum Lot Width	60 feet	>60 feet

XI. SITE PLAN STANDARDS (Section 14.6)

The proposed development has been reviewed by staff for conformance with the relevant review standards of the City of Portland's Site Plan Ordinance, Section 14.6. Staff comments are below.

1. Transportation Standards (Section 14.6.1)

A. Impact on surrounding street systems

The proposed project is expected to increase the traffic and circulation for access and egress to the existing and proposed parking garages and surrounding street systems. Due to the volume of passenger car equivalents exceeding 100 peak hour trips, a Traffic Movement Permit (TMP) was required. Due to the overlap between the review of the Site Plan standards staff have included the review of the Impact of surrounding street systems standard as part of the TMP review section (See Section XIII below).

Staff find that requiring the project to follow the final recommendations of the TMP review process will result in providing adequate traffic safety measures and mitigation of congestion in proportion to the level of impact on the surrounding street systems.

B. Access and circulation

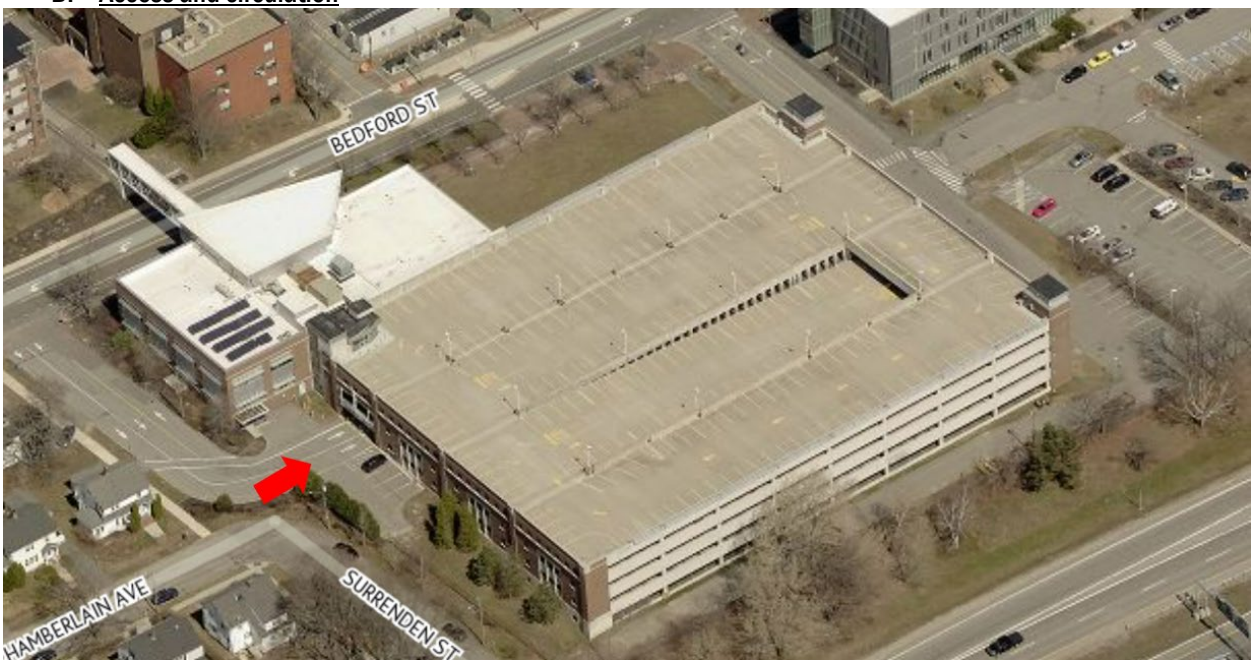

Figure 6 – Entrance to Existing Parking Garage on Surrenden Street

The existing site is accessed via a two-way access drive (referred to in the proposal as 'Winslow Street'). Additional vehicle traffic to the site occurs from Bedford Street to Surrenden Street (See Figure 6) which circulates through the existing parking garage and empties as exit-only to Winslow Street. The existing parking garage also includes an emergency vehicle access drive with gated/restricted access off of Winslow Street. The main access drive provides a loop for vehicles to access surface parking areas which serve the Wishcamper Center and Glickman Library. There are existing asphalt walkways and sidewalks connecting buildings and the brick sidewalk on the main Bedford Street frontage.

The current application is proposing to continue traffic circulation through the existing garage and provide a one-way route of egress via the proposed parking garage leading to Winslow Street, as well as providing a reversible entry/exit lane at the garage on Surrenden Street. The reversible lane would allow for vehicles exiting via Surrenden Street between 3 – 11 PM to manage higher peak hour PM traffic volumes (See Figure 9). All lanes will utilize active/LED signage and the reversible lane will include LED signage inside and outside the garage indicating traffic flow direction at each lane (Attachment V).

The Winslow Street access drive is reconfigured to provide a much narrower loop road which extends to a two-vehicle loading/unloading space in front of the Glickman library as well as an emergency access road to the rear of the parking garage (See Figure 7). The applicant has submitted vehicle turning templates to demonstrate sufficient turning radius of emergency vehicles (Plan 35). The emergency access drive will extend behind the existing and proposed garage and will continue to be gated to restrict unauthorized access.

The proposal (Plan 15) shows a new concrete pedestrian walkway running along the front of the new garage which connects via two crosswalks across the access drive to repaved asphalt walkways and an updated plaza area fronting Glickman library. The applicant has submitted a plan showing pedestrian routes between the three buildings (Plan 36). Pedestrian access to the bicycle repair/storage room will be from the front of the parking garage within a recessed alcove.

City staff have reviewed the access and circulation standards in conjunction with the submitted TMP application (See Section XIII) and Impact on Surrounding Street System (See Section XI.1.A.) standards and find that requiring the project to follow the final recommendations of the TMP review process will result in providing safe and reasonable access and internal circulation for users of the site and comply with applicable site plan standards of this section.

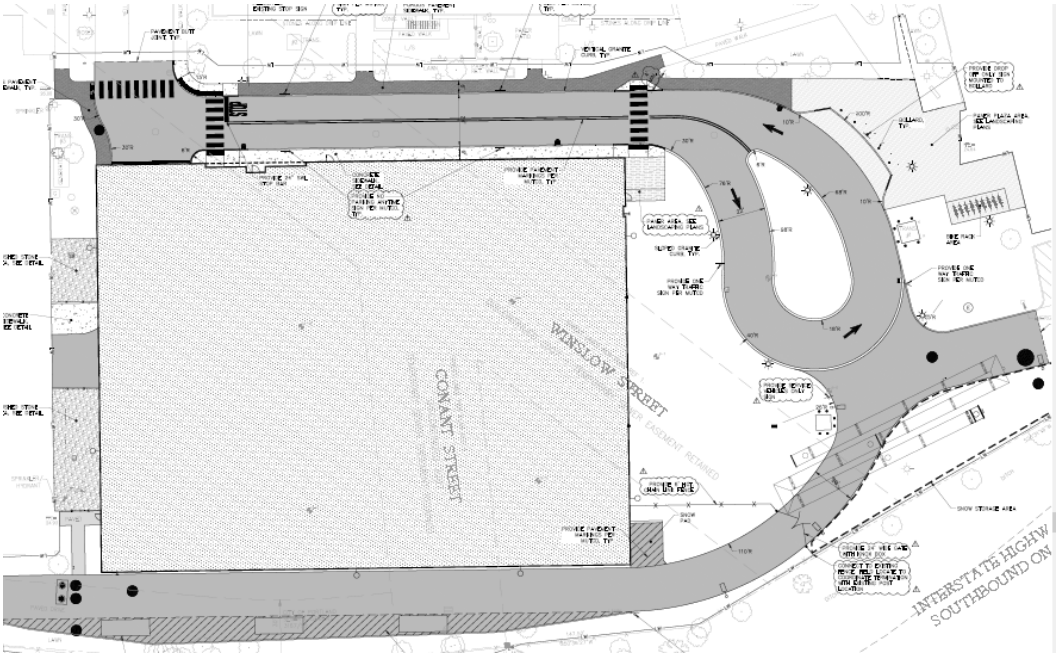

Figure 7 – Site Layout and Materials Plan

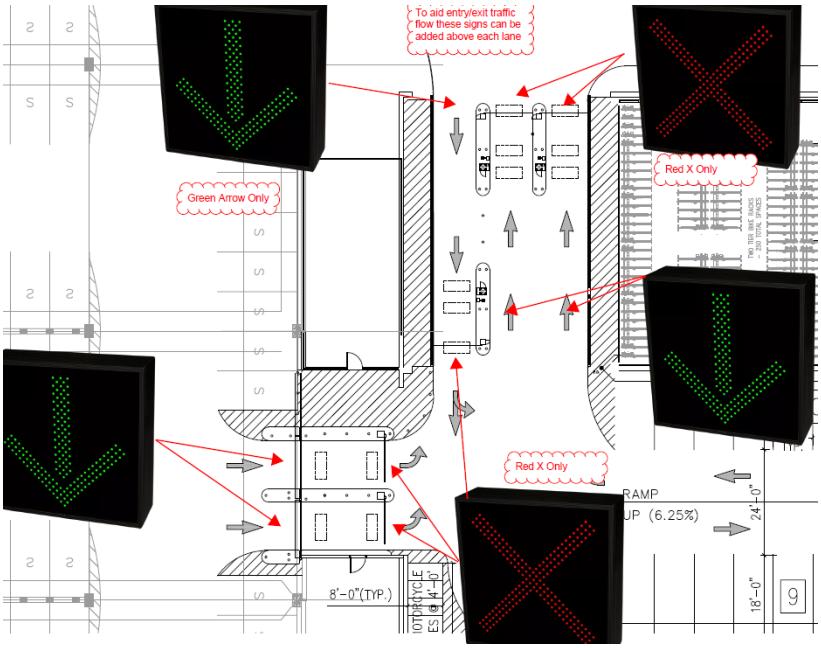

Figure 8 – Circulation Route to Proposed Garage

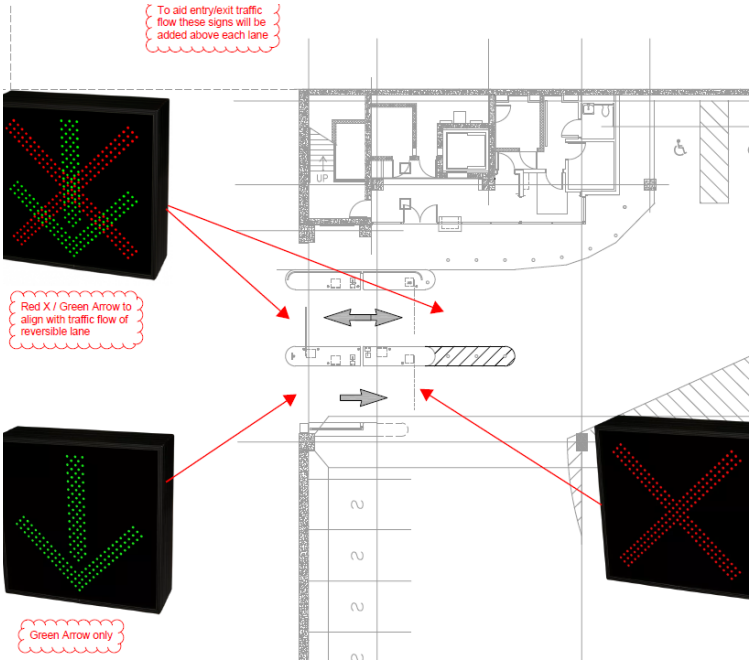

Figure 9 – Primary Entrance to Garages and Reversible Lane during Peak PM Egress

C. Public transit access

The University is located along the 2, 4, and Husky METRO lines which connects to the Westbrook and Gorham Campus and Downtown Portland. No changes to public transit access are proposed as part of this project. An existing bus shelter is located on Bedford Street.

D. Parking

Vehicular Parking: Based on the requirements in the USM Overlay Zone (Land Use Code Section 8.10.6), the parking requirement/amount for any university buildings must be determined by the Planning Board during site plan review.

The current proposal is intended to satisfy the amount of parking required as part of a condition of approval required by the Planning Board in 2020 under a separate approval (PL-001040-2020) for USM's student center, dorm, & quad (Attachment 5) to provide **396 parking spaces.** This parking requirement was based on a parking study (Attachment Y) which looked at the campus supply changes and demand projections. Some of the key highlights from the 2020 parking study include:

- **130 parking spaces** lost at the Woodbury parking lot permanently due to the student center, dorm & quad project
- 122 new parking spaces would be added at the Wishcamper surface parking lot which has 92 parking spaces (PL-000974-2020) for a total of **214 parking spaces**
- A new 425 space parking garage which would be situated at the Sullivan Recreation parking lot (**net gain of 364 spaces**)

Since the 2020 approval requiring 396 parking spaces, the location of the proposed new parking garage has moved to Bedford Street with the current plan submission. As a result, the Wishcamper surface parking expansion (214 spaces), which was intended to replace parking displaced by the University's future developments and to satisfy the University's existing parking demands, is not being pursued and the proposed garage is providing parking to accommodate both the previously planned parking at the Wishcamper site and the Planning Board's prior condition of approval to provide 396 parking spaces.

Since the first Planning Board workshop the applicant has reduced the amount of proposed parking from 631 to 504 vehicle parking spaces. This amount is intended to a) meet the 396 parking spaces needed for the student center, dorm and quad project and loss of parking supply at the Woodbury lot, as well as b) proposing 108 additional spaces to accommodate displaced parking and loss of existing and planned parking supply at the Wishcamper lot. Adjusting for the number of existing parking spaces present at the Wishcamper site, the net increase in parking at the Wishcamper site is **412 spaces**, or 16 spaces more than required 396 parking spaces.

When determining the parking requirement for university buildings, the Planning Board is asked to take factors into consideration such as:

Land Use Code Section 8.10.6 Parking:
"A. The availability of off-campus parking and shuttle transportation to and from such off campus facilities.
B. The ratio of commuter students to resident students.
C. The use of centrally located on-campus parking facilities so situated that students, faculty, staff and visitors arriving on campus can reasonably be expected to park in the central facilities and walk to their various on-campus destinations during the course of a school day.
D. Shared use of a single parking facility by two or more buildings when the peak parking demand period for such buildings do not overlap.
E. Development and implementation of a parking management plan which discourages on-street parking. On-street parking shall not be used to satisfy the university's parking demand.
F. Development and implementation of programs designed to reduce the number of automobiles parking on campus, such as ride share programs and incentives for use of bicycles and public transportation."

Staff have reviewed the application and believe that the proposed 504 parking spaces is an appropriate amount based upon previous Planning Board approvals for parking associated with USM, displaced parking, and the 2020 USM campus parking study.

Bicycle Parking: The proposal includes a covered and secured bicycle repair and storage room with a capacity for 250 bikes as well as the storage needs of the new dormitory.

Additional bicycle parking includes 84 existing outdoor spaces. Staff find the proposed bicycle parking to meet the required standards.

Snow Storage: The applicant is proposing snow storage areas to occur primarily on landscaped areas. The submitted drawings show the location of a snow pad off of the landscaped area (Plan 30). The applicant has indicated that if snow exceeds the available space on-site it will be hauled off-site.

Electric Vehicle (EV) charging: Section 1.17 of the Technical Manual requires that new structured parking lots of five or more spaces shall include energized electrical outlets or installed chargers capable of providing Level 2 EV charging or higher to 20% or parking spaces. Remaining spaces must be served by sufficient conduit, wiring, and electrical service to allow for future installation of electric vehicle supply equipment.

The proposed 504 parking space garage necessitates the applicant provide 100 EV charging stations or energized electrical outlets to meet *Technical Manual Standard Section 1.17 Electrical Vehicle Infrastructure.* The applicant requests a waiver (Attachment I) to the EV standard and is proposing to install 58 EV chargers (12 percent). The applicant noted that the number of charging stations proposed with construction of the garage is based upon an analysis of the current and future demand for EV charging stations by the targeted users of the garage and that 58 stations will meet their 2023 forecasted demand for campus commuters and residents. Additionally, the applicant has stated that they are prepared to increase the supply of EV charging stations to meet future demand and intend to monitor the EV demand by utilizing charging stations usage data as well as collecting data during parking pass registration.

Described as a note on the Utility and Grading Plan (Sheet C-104) the proposed parking garage will be constructed to accommodate future electric vehicle supply equipment with electrical circuits designed to be expandable as new equipment is added. The proposed project includes the following EV features:

- Installation of a transformer sized to accommodate a 20% EV buildout.
- Installation of conduit from the electric room to the future transformer pad site to accommodate the remaining 80% EV spaces.
- Ensure there is sufficient room for future panels in the electric room and the satellite electric rooms on the various floors.
- Design pathways for future conduit (and wiring) to satellite electric rooms.
- Future conduit from the satellite electric rooms will be overhead and utilize the blockouts that will be provided in the double tees. According to the applicant this will allow for additional conduit to be ceiling mounted and enable routing to all parking spaces if/when needed.

The applicant believes that the proposed measures will limit the amount of unused materials from being installed and subject to deterioration and/or damage; Ensures that capability to expand, as needed is in place now; and limits spending for elements that might never be necessary as technology continues to change.

In response to the Planning Board's questions during the last workshop, the applicant has provided more information regarding the costs of EV charging stations and supporting infrastructure, anticipated rate for premium overnight parking available, and the number of EV vehicle users on campus (Attachment U). Additionally, in response to staff questions asking if electrical outlets were considered as an alternative to smart stations, the applicant has responded that while uncontrolled outlets are cheaper, they do not allow the University to track and charge a fee for users, which presents a significant risk to the University's ability to control demand charges and recover the electrical cost. Also that a charging fee is a means to encourage turnover at charging stations when not in use and increase availability.

To demonstrate its commitment to monitoring EV charging demand and provide future EV charging stations, the applicant has proposed an addendum to their TDM plan (see Section E below) which describes installing additional EV Charging Stations in the parking garage in response to future demand until the number of Charging Stations equals 20% of parking spaces in the garage as well as a providing an EV Use and Forecast Report to the City each year starting in 2024.

Staff notes that the applicants requested reduction is reasonable given that the applicant proposes to install EV chargers to serve 12 percent of parking spaces, 58 total spaces, which is a sufficient number of spaces for the current and expected demand as demonstrated by the applicant's analysis. Staff also notes that the applicant will also install a transformer sized to accommodate a 20 percent EV buildout for a large 504 parking space garage and install conduit from the electric room to the transformer pad site to accommodate full build out of the garage space. The applicants have also proposed an addendum to their TDM Plan describing installing additional EV charging stations in response to future demand and providing an EV use and Forecast Report to the City each year starting in 2024.

Given that the applicant is providing a substantial number of EV chargers capable of handling current and future demand and proposes to install sufficient capacity for expansion and also proposes data collection and an addendum to their TDM plan staff believes the waiver request is appropriate.

E. Transportation demand management (TDM)

The Planning Board previously approved a Transportation Demand Management (TDM) plan (Attachment CC) for the student center, dormitory, quad project (PL-001040-2020) that included a trip reduction goal of between 3% and 6%, and a parking reduction of between 10% and 14 % by the year 2025. Due to the current proposal's reliance on trip generation and parking data analyzed under a prior site plan approval a new TDM was not required for this project. However, due to the applicant's desire to install future EV charging based on future demand as well as to implement an annual monitoring plan based on supply and demand statistics, at the request of staff, the applicant has proposed an addendum (Attachment X) to incorporate this language to the Strategies and Reporting sections of their current TDM plan. The City's Transportation Program Manager has reviewed the addendum and finds all comments are sufficiently met (Attachment 11), and the addendum is acceptable to append the respective sections of the current TDM plan.

2. Environmental Quality Standards (Section 14.6.2)

A. Preservation of significant natural features

The applicant reports that the site is currently developed with no known areas of significant natural features. While US Fish and Wildlife has identified the northern long-eared bat as a federally threatened species that may live within the project area, the applicant states that *"tree-clearing for this project will be minimal; it is not anticipated that this project will have an impact on the northern long-eared bat species."*

B. Landscape preservation

The Wishcamper site includes a majority of trees planted along the Bedford Street Frontage. Additional trees and landscaping are scattered throughout the site with a row of trees at the rear of the Wishcamper Center and along Surrenden Street. These trees will be preserved and protected during construction. Staff finds the project meets the landscape preservation standards by preserving more than the required 30 percent of existing trees within the setbacks.

The applicant is currently proposing an erosion control berm around the southwest property line as well as noting that existing trees along the Wishcamper Center will be protected (Plan 14).

C. Site landscaping and buffers

The Applicant has submitted a Planting Plan (Plan 32) proposing 23 Princeton Elm Trees which will create a vibrant tree canopy within the open space at the end of the Winslow Street access loop. Five additional bayberry shrubs are

also proposed to screen the transformer and generator at the entrance to the new parking garage. This standard is sufficiently met. However, feedback provided by the City Arborist (Attachment 7), encourages the applicant to diversify the plantings with a few other tree types to improve chances of survival and to consider breaking up the large planting area. Although not required, staff recommend that the applicant diversify the planting with one or two other trees to ensure the health of the elm trees proposed.

D. Water quality/storm water management/erosion control

The proposed development provides a stormwater management system comprised of a series of catch basins, a subsurface detention system, and proprietary treatment unit. Once stormwater flows are treated, the site runoff will be piped and discharged to the City's separated stormwater system on Forest Avenue.

The City's consulting stormwater engineer has reviewed the applicant's grading plan (Plan 16) Stormwater Management Report and Plans (Attachment O) for water quality and erosion control and finds the project complies with MaineDEP Chapter 500 Stormwater Standards, Section 5 of the City Technical Manual as well as the Site Location of Development Act Permit requirements (Attachment 4).

3. Public Infrastructure and Community Safety Standards (Section 14.6.3)

A. Consistency with City Master Plans

The applicant has analyzed the City's comprehensive plan, Portland's Plan 2030, and finds that the project is aligned with the document given the project will help support the growth of the University of Southern Maine's student body, a vital resource for the economic development of the City of Portland. Furthermore, the proposed project is consistent with objectives outlined under the transportation policy guide. By providing sufficient parking on campus the proposal is in alignment with the goal of "*supporting livability by improving the quality of life in neighborhoods and improving the public health of residents*,". By providing 58 new EV charging stations, and over 200 bicycle parking spaces and repair room the proposed project aligns with the goal of "*Supporting sustainability by reducing energy consumption, greenhouse gas emissions, and stormwater impacts*."

Portland's Plan also emphasizes "*supporting sustainable growth in our educational institutions,"* and *"promoting the orderly expansion of institutional uses, including educational campuses, which are central to workforce development, employment, and the health of the local and regional economies*." While this application is focused on a new parking garage, the proposed project should be viewed in the lens of USM's overall campus development which includes the construction of a new student center and introduction of on-campus housing. In combination, the current application and previous approvals align with the City's goal to ensure that the growth of Portland's educational institutions are integrated into Portland's urban fabric. Furthermore, the introduction of student housing and additional support services on-campus will further support sustainability goals and reduction of greenhouse gas emissions by reducing vehicles mile traveled from students that may live in the new housing.

B. Public safety and fire prevention

In order to demonstrate how public safety CPTED principles are incorporated into the site's design, the applicant has provided an analysis highlighting how the design promotes natural surveillance conditions and manages access to the site (Attachment K). The applicant explains that the program of the outdoor space will include clusters of picnic tables to encourage small group use in dedicated spaces. The site also provides walkways which are open and readily connected to plazas and destination uses. Additionally, the applicant is proposing site lighting to provide uniform coverage of entrances, exits and pathways. Due to the garage's 24-hours a day accessibility, it includes a surveillance system, monitored in the parking office, that will allow for viewing areas not easily observed within the garage.

The City's Fire Marshal finds that all site plan review comments are satisfactorily addressed with the new FDC locations, and finds the amended site plan is acceptable.

C. Availability and capacity of public utilities

The applicant has submitted a Utility Plan (Plan 16). The proposed parking garage does not propose any new water services with the exception of the dry stand pipe and sprinkler system with a Fire Department Connection (FDC). The applicant has provided documentation from the Portland Water District showing a capacity to serve demonstrating that public infrastructure can accommodate the development (Attachment BB)

Due to the project not producing any dry weather wastewater flow, a capacity authorization is not required by the Public Works Department.

4. Site Design Standards (Section 14.6.4)

A. Massing, ventilation, and wind impact

The massing of the proposed structured garage is approximately one level lower than the existing garage. The applicant states that the garage was designed within the context of the surrounding scaled buildings. The development is not anticipated to have adverse impacts related to ventilation and wind.

B. Shadows

The applicant has described that the new structure was designed to minimize impacts of shadows on open space and public areas that would affect the viability of the public use and existing vegetation. The landscaped space is situated to the north of the site and trees are spaced approximately 20 feet apart to minimize the effects of building shadows on open space. The development is not anticipated to have adverse impacts related to shadows.

C. Snow and ice loading

The applicant shows a snow dump gate from the rooftop (Plan 7) as well as a snow pad to dispose of snow. The applicant states that the structure is designed to prevent snow and ice from accumulating and falling onto abutting properties and public ways. Additionally, the applicant has indicated that snow that exceeds the available space on-site will be hauled off-site. The development is not anticipated to have adverse impacts related to snow and ice loading.

D. View corridor

There are no designated view corridors within the project vicinity.

E. Historic resources

The proposed development is not located in or within a 100 feet of a historic district or historic landmark.

F. Exterior lighting

Staff have reviewed the submitted photometric plans (Plan 34) and associated catalog cut sheets (Attachment K) and find the application sufficiently meets the site lighting requirements of the City's Technical Manual with one exception. The applicant has requested a waiver to Section 12.3.5 of the Technical Manual for color temperature exceeding 3,000K CCT. The applicant has stated that 4,000K color temperature fixtures were selected to match the existing fixtures immediately adjacent to the scope of work area. Given the fixtures proposed that exceed the allowable color temperature currently exist on site and do no create a nuisance to abutting properties and users, staff support a waiver to the standard.

G. Noise and vibration

No adverse impacts related to noise and vibration are anticipated as mechanical equipment is located away from residential properties. In addition, the site abuts Interstate 295 to the east and additional campus buildings and Forest Avenue to the north and west.

H. Signage and wayfinding

Existing signage is proposed to be maintained, and new traffic signage will be provided as shown on the drawings.

I. Zoning-related design standards

The proposed garage is subject to meeting all applicable USM Overlay Zone design standards under Section e and Appendix 3 of the design manual (Attachment 8). As part of the original application, the applicant submitted a narrative about the project's consistency with the USM Design Principles (Attachment L), as well as perspective views (9, 10, 33) and elevations (Plans 7, 8) which have been updated in response to staff comment.



Figure 10 – Perspective View of Proposed 4 Level Garage (Building Front)

The project was reviewed by a design review team made up of three Planning staff which found the project met the goals to minimize the impact on the street and to create an attractive façade to neighboring uses (Principle C). To better clarify the pedestrian environment and experience (Standard A-3) the applicant has provided a circulation plan (Plan 36).



Figure 11 – Perspective View of Bicycle Storage and Vehicle Entrances

The applicant has provided five Bayberry shrubs near at the north elevation of the proposed garage to screen the existing transformer and generator. No other HVAC systems are planned or will be visible on the building's exterior. Staff find that HVAC is sufficiently unobtrusive and screened by the proposed landscaping (Standard C-6).

Since the last workshop and in response to staff comment, the applicant has added a schedule of materials indicating type and color to the elevations (Plans 7, 8). In response to the Board's questions about consideration of a different brick type/color, the applicant has responded (Attachment S) that several products were explored further but due to an inability to incorporate such products into precast concrete units as well as the potential of an undesired contrast with the middle portion of the building, the red-orange thin brick was retained to follow the initial staff commendation to provide a red-bronze blend consistent with the rest of campus. While the waterstruck (lightly textured) brick is not an exact match to brick found on campus, the applicant believes the proposed brick has a similar variety of colors and blend of tones and avoids a thin appearance. Staff find the proposed material is compatible with adjacent uses and architecture (Standard C-1).

In response to the Board's recommendation to consider additional plantings in the space between the two garages, the applicant has responded (Attachment S) that due to the many utilities and the need to maintain access to them, as well as a number of other factors such as visibility/security concerns, no additional plantings are provided.

Staff believe the proposal has complied with all applicable design standards related to the USM Overlay Zone design standards (Attachment 8).

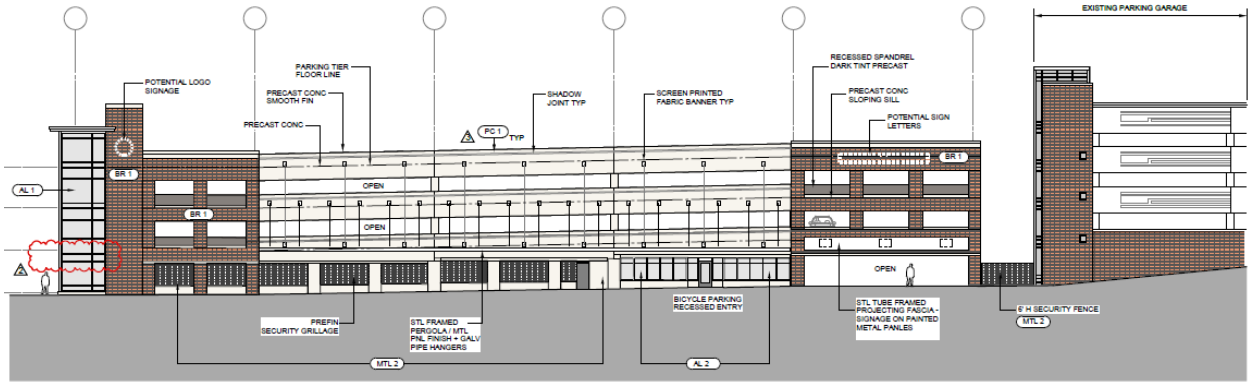

Figure 12 – North Elevation

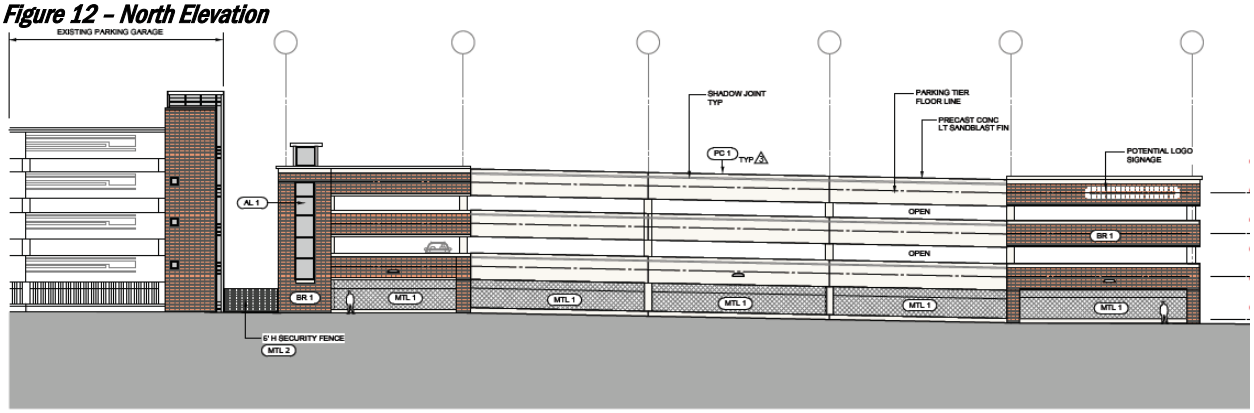

Figure 13 – South Elevation

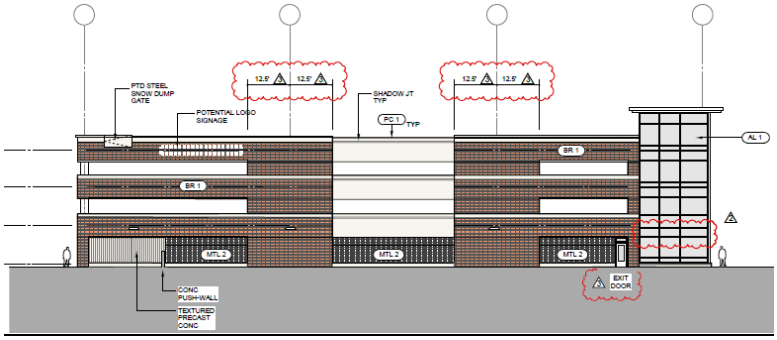

Figure 14 – East Elevation

XII. SITE LOCATION OF DEVELOPMENT ACT (SLODA) AMENDMENT

As part of the Major Site Plan application the applicant also prepared a SLODA Amendment which Planning Staff have submitted to MaineDEP (Attachment 2) in accordance with the Chapter 500 Rules.

The City of Portland has delegated review authority from the MaineDEP for large projects that trigger Site Location of Development Act (SLODA) review. According to the standards for this review listed under Section 14 of the City's Technical Manual, sections are responded to below which overlap with a number of site plan standards:

- Financial & Technical Capacity: see Section VIII above.
- Traffic Movement: see site plan standards, X.1.A., above, and Traffic Movement Permit, below.

- No Adverse Effect on the Natural Environment, Ground Water, Flooding, Storm Water Management & Erosion and Sedimentation Control: see site plan standards, X.2.D., above. The development is not located within a flood hazard zone, as shown on the FEMA Flood Insurance Rate Map provided in this application. The proposed development is not anticipated to cause or increase flooding or cause an unreasonable hazard to any adjacent structures (Attachments 2, O).
- Soil Types: The applicant provided a soil survey, the applicant is also participating in a VRAP for the site. A soil management plan will be developed for the site (Attachment 2).
- Infrastructure: see site plan standards, X.3.C., above.

XIII. TRAFFIC MOVEMENT PERMIT (TMP) REVIEW

For projects generating more than 100 passenger car equivalents (PCEs) during its peak hour of traffic generation, a Traffic Movement Permit (TMP) is required under Maine state statute 704—A. Any project surpassing this threshold is required to make adequate provision for traffic movement of all types into and out of the project area such that any traffic increase that is attributable to the project will not result in unreasonable congestion or unsafe conditions within the vicinity of the development. TMPs are a requirement of the Maine Department of Transportation (DOT), but the City of Portland has delegated review of them from the DOT, requiring all TMP applications to be approved or denied by the Planning Board.

On November 10, 2020, the Planning Board approved USM's TMP application (PL-001040-2020) for a new Student Center, Dormitory, & Quad which was estimated to generate 160 AM peak hour and 160 PM peak hour trips. This estimate was based on the forecasted enrollment to 2028 and the TMP review and approval assumed that a future parking garage would be built with access on Falmouth Street.

The applicant has submitted a TMP Modification Application (Attachment P) to amend the previously approved TMP for a new parking garage location accessible from Bedford Street. The applicant's required scoping meeting was conducted on September 27th, 2021, and the applicant has since updated their TMP amendment application materials by providing additional documentation (Attachments T,U,V,W) in response to reviewer comments.

A representative of Oakhurst Dairy provided written and verbal testimony on the proposed project during the second workshop. He expressed concerns regarding parking, queuing, and traffic impacts in the vicinity and at their site located at 364 Forest Avenue. He also requested clarification on the parking numbers provided and ensuring that they align with the assumptions modeled by the sim traffic tools. He also expressed concerns about pedestrian safety and the effectiveness of striping and signage proposed to prevent cars from blocking the Oakhurst entrance.

The applicant's traffic consultant (VHB) explained the methodologies used and staff concurred with the approach used for parking calculations. VHB explained that the simulation assumed pedestrian actuations based on field observations. In addition, the application does include overriding signal timings over a certain percentage of the time to allow pedestrian to cross. Further to minimize queuing at intersections the applicant intends to shorten the crossing distances to reduce pedestrian crossing times.

DPW, City staff, and the city's traffic consultant have reviewed the applicant's methodologies and find them appropriate.

The number of new peak hour trips anticipated with enrollment growth is 160 trips (125 in and 35 out) in the highest AM peak hour and 160 trips (51 and 109 out) in the highest PM peak hour. To promote pedestrian and traffic safety the applicant has proposed making improvements to Bedford Street (Plan 37) which include but are not limited to: a new dedicated left turn lane for vehicles entering Winslow Street, replacing the raised median island and relocating the crosswalk, and extending a painted median to separate vehicle and bicycle traffic in each direction. To address concerns of queuing and circulation, access to the site will continue via Surrenden Street for commuter traffic, while a resident only entrance lane will be maintained via the Winslow access drive. Surrenden Street will be reconfigured to include two exiting lanes at Bedford Street that taper back to a single lane in each direction at the crosswalk and

widen at the garage entrance to accommodate two lanes of traffic for at least three vehicles (including the vehicle at the gate) (See Figure 15). To manage higher peak hour PM trips exiting the garage volumes, the applicant has proposed a reversible entry/exit lane using an active/LED signage inside and outside the garage indicating traffic flow direction at each lane (Attachment V).

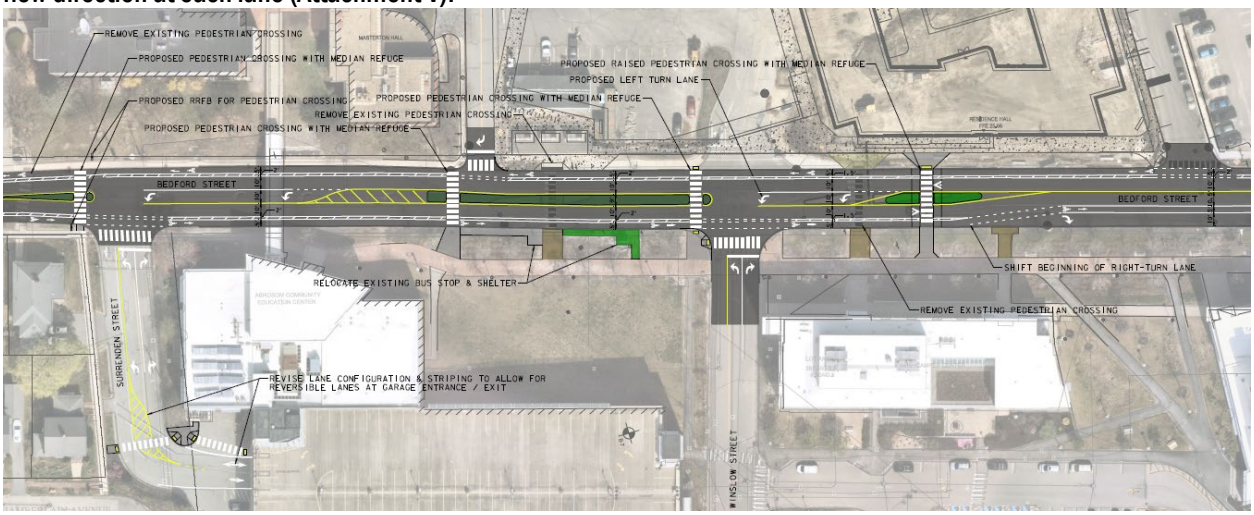

Figure 15 – Proposed Conceptual Plan for USM Intersection Improvements for Parking Garage Circulation

USM is currently subject to meeting the TMP conditions of approval set by the Planning Board dated November 10, 2020 (Attachment 5) for the USM student center/dormitory (PL-001040-2020) which are relevant mitigation requirements to the current TMP application and included the following:

- **Providing conceptual design plans, preliminary and final plans and specifications and constructing Traffic calming / pedestrian improvements at the Falmouth Street / Oakdale Street**
  The improvement on Falmouth Street/Oakdale Street intersection is required to address safety concerns as it relates to vehicle speeds and general neighborhood impacts on Falmouth Street. [Note: the mitigation requirement determined for the current application is adequately addressed by meeting this condition]

- **Contributing $10,000 to the City towards Forest Avenue traffic signal optimization at the Forest Avenue / Bedford Street / Baxter Boulevard and Forest Avenue / Falmouth Street / Preble Street Extension intersections with the intent of improving mobility efficiencies.**

- **Providing conceptual design plans, preliminary and final plans and specifications for improvements at the Forest Avenue/Bedford Street/Baxter Boulevard intersection based on the Smart Corridor Study recommendations**
  This improvement addresses pedestrian safety concerns at the subject intersection and includes making geometric modifications to the corners on the Baxter Boulevard approach and upgrades to pedestrian traffic signal equipment. [Note: the mitigation requirement determined for the current application is adequately addressed by meeting this condition]

- **Providing conceptual design plans, preliminary and final plans and specifications for improvements at the Forest Avenue/Falmouth Street/Preble Street Extension intersection based on the Smart Corridor Study recommendations**
  This improvement includes making geometric modifications to the southeast corner of the subject intersection, a crosswalk on the southerly Forest Avenue approach, and upgraded pedestrian traffic signal equipment. It should be noted that the new crosswalk will require installation of a new sidewalk ramp on the westerly side of Forest Avenue. Thus, improvements are proposed on the southeast and southwest corners of the intersection as a part of this condition.

The City's traffic engineering consultant reviewed the TMP amendment application in conjunction with staff and has provided final comments (Attachment 3). Upon final review of the application, a list of mitigation requirements are recommended as conditions of approval (See Section XVI.C. below).

Staff recommend that TMP approval be contingent upon conditions of approval, which are summarized as follows:

Mitigation Requirements:

- **Provide updated construction management plan and final design plan of raised crosswalk**
  Specifications of the raised crosswalk must be submitted for additional review, as well as an updated construction management plan which includes roadway improvements

- **Provide preliminary/final plans and specifications and construct improvements on Bedford Street (Plan 37)**
  The improvements are required to facilitate access and egress movements to the garage and providing safe pedestrian and bicycle movements.

- **Implementation of do not block driveway pavement markings and signage on the southbound side of Forest Avenue at the Oakhurst driveway located at 364 Forest Avenue.**
  This improvement is required due to vehicle blockage and impacts at Oakhurst's driveway as traffic queues extend from the Bedford/Baxter intersection.

- **Implementing traffic signal equipment improvement on the I-295 Southbound Off-Ramp**
  This improvement is being required to address long vehicle queues on the ramp with the goal of avoiding any backups onto I-295.

- **Monitor and conduct a review of operations of the traffic signal equipment improvements at the Forest Avenue/Bedford Street intersection as well as improvements on the I-295 Southbound Off-Ramp.**
  To address congestion issues documented at the Forest Avenue/Bedford Street intersection the applicant has recently made traffic signal improvements which include replacing the detection system and troubleshooting issues at the site. Staff have confirmed the improvement is functioning and recommend a condition for monitoring to ensure the improvements, including the detection and communication system, will confirm outcomes and maximize operational efficiencies or make adjustments to the satisfaction of Public Works.

  Similarly, once traffic signal equipment is installed on the I-295 Southbound Off-Ramp, staff are recommending the same condition for monitoring that equipment as well.

XIV. NEIGHBORHOOD MEETING & PUBLIC COMMENT

The applicant's neighborhood meeting was held on September 22nd, 2021 and the required neighborhood meeting documentation has been submitted (Attachment Z). The neighborhood meeting included eight members of the public that met with the project team. Feedback provided at this meeting was supportive about the new location but concerns were voiced about the traffic on Forest Ave, bus traffic contributing to congestion, questioning the extent that upgrades to the intersection will improve conditions, as well as seeking traffic calming measures to slow vehicles and improve pedestrian safety.

At the time of writing this report one written public comment has been received for this project (PC1).

XV. STAFF RECOMMENDATION

Subject to the proposed motions and conditions of approval listed below, Planning Department staff recommends that the Planning Board approve application #PL-001729-2021 to construct a new 504 parking space structured parking garage at 50 Bedford Street which meets the applicable standards of Portland's Land Use Code.

XVI. PROPOSED MOTIONS

A. WAIVERS

On the basis of the application, plans, reports and other information submitted by the applicant, findings and recommendations contained in the Planning Board Report for the public hearing January 11, 2022 for application #PL-001729-2021 at 50 Bedford Street relevant to the Site Plan Standards of the Land Use Code and Portland's Technical and Design Standards, and other regulations, and testimony presented at the Planning Board public hearing:

1. Luminaire Types
   The Planning Board [**finds/does not find**] based upon the submitted materials, that extraordinary conditions exist or undue hardship may result from strict compliance with the Technical Manual standard (Section 12.3.5) which requires, all fixtures must not exceed 3000K Correlated Color Temperature, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [**waives/does not waive**] the Technical Manual standard Section 12.3.5 to allow fixtures with 4,000K Correlated Color Temperature.

2. Electric Vehicle Infrastructure
   The Planning Board **[finds/does not find]** based upon the submitted materials, that extraordinary conditions exist or undue hardship may result from strict compliance with the Technical Manual standard (Section 1.17) which requires, electrical outlets or installed chargers capable of providing Level 2 EV charging or higher to 20% of parking spaces, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board **[waives/does not waive]** the Technical Manual standard Section 1.17 to allow EV charging stations be provided to serve 12% of parking spaces.

B. SITE PLAN REVIEW & SITE LOCATION OF DEVELOPMENT

On the basis of the application, plans, reports and other information submitted by the applicant; findings and recommendations contained in the Planning Board Report for the public hearing on January 11, 2022 for application #PL-001729-2021 and 50 Bedford Street relevant to the site plan and Site Location of Development Act regulations; and the testimony presented at the Planning Board hearing, the Planning Board [**finds/does not find**] that the plan is in conformance with the site plan standards of the Land Use Code and the Site Location of Development Act standards, subject to the following conditions of approval:

C. TRAFFIC MOVEMENT PERMIT

On the basis of the application, plans, reports and other information submitted by the applicant; findings and recommendations contained in the Planning Board Report for the public hearing on January 11, 2022 for application #PL-001729-2021 and 50 Bedford Street relevant to Portland's technical and design standards and other regulations; and the testimony presented at the Planning Board hearing, the Planning Board **[finds/does not find]** that the plan is in conformance with 23 MRSA 704-A and Chapter 305 Rules and Regulations pertaining to Traffic Movement Permits, subject to the following conditions of approval:

PRIOR TO ISSUANCE OF BUILDING PERMIT

1. The applicant shall resubmit for review and approval by the Planning Authority and Public Works an updated construction management plan which includes all improvements being made to Bedford Street and Falmouth Street.

2. The applicant shall submit updated plans with the final design of the raised crosswalks on Bedford Street and Falmouth Street to the Planning Authority for review and approval.

PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY

3. The applicant shall provide final design plans and specifications for Bedford Street Improvements as detailed in the concept plan prepared by VHB dated 12/22/2021, which was reviewed and approved by the Planning Authority and Public Works. Final design plans shall be stamped by a professional engineer and such improvements shall be constructed by the applicant prior to completion of a parking garage structure.

4. The applicant shall be responsible for the implementation of do not block driveway pavement markings and signage on the southbound side of Forest Avenue at the Oakhurst driveway located at 364 Forest Avenue. The applicant shall provide conceptual design plans, preliminary and final plans and specifications to the Planning Authority for review and approval. Final design plans must be stamped by a professional engineer and implemented prior to completion of a parking garage structure.

5. The applicant shall be responsible for implementing traffic signal equipment improvements on the I-295 Southbound Off-Ramp. The improvements shall include all equipment necessary for installing a vehicle queue detection system that is compatible with the RapidFlow signal system at Forest/Bedford/Baxter intersection. The proposed system type and equipment shall be reviewed and approved by Public Works before being installed and shall be field tested and verified before being accepted by the City. Said improvements shall be constructed by the applicant prior to completion of a parking garage structure.

ONGOING/MONITORING

6. Within six months after completion of the garage and full occupancy of the USM dormitory, the applicant shall monitor and conduct a review of operations of the traffic signal equipment improvements at the Forest Avenue/Bedford Street intersection as well as improvements on the I-295 Southbound Off-Ramp. The improvements including the detection and communication system must confirm outcomes and maximize operational efficiencies or the applicant must make adjustments to the satisfaction of Public Works.

XVII. ATTACHMENTS

PLANNING BOARD REPORT ATTACHMENTS

1. University Campus Overlay Setback and Height Map
2. SLOD Application
3. Traffic Engineer Comments (dated 1.6.2022)
4. Stormwater Consultant Comments (dated 9.24.2021)
5. Planning Board Approval Letter for 25 Bedford Street (dated 11.10.2020)
6. Planning Board Approval Letter for 44 Bedford Street (dated 5.26.2020)
7. City Arborist Comments (dated 9.13.2021)
8. Design Manual, Appendix 3
9. Parking Director Comments (dated 12.1.2021)
10. Fire Department Comments (dated 12.2.2021)
11. Transportation Manager Comments (dated 12.3.2021)

APPLICANT'S SUBMITTAL

A. Cover Letter & Table of Contents
B. Application Checklist
C. Application Fees
D. Project Description
E. Right, Title & Interest
F. Evidence of State and Federal Approvals
G. Zoning Assessment

H. Easements & Other Burdens
I. Waiver Requests
J. Financial & Technical Capability
K. Compliance with Site Plan Standards
L. Consistency with USM Design Principles
M. Construction Management Plan
N. Boundary Survey
O. Stormwater Management Report
P. TMP Modification Application (dated 9.10.2021)
Q. Response to Staff Comments (dated 9.13.2021)
R. Response to Staff Comments (dated 9.17.2021)
S. Response to Staff Comments (dated 10.25.2021)
T. Response to Staff Comments (dated 11.09.2021
U. Response to Staff Comments (dated 11.23.2021)
V. Response to Staff Comments (dated 12.03.2021)
W. USM Garage Updated TMP Section 7 (dated 12.07.2021)
X. TDM Addendum
Y. 2020 Parking Analysis
Z. Neighborhood Meeting Certification
AA. Construction Management Plan
BB. Ability to Serve from Portland Water District
CC. TDM Plan (approved 11.10.2020)
DD. Response to Staff Comments (dated 12.23.2021)

PLANS

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Plan 2	A-101 GROUND LEVEL STRIPING PLAN
Plan 3	A-102 FIRST LEVEL STRIPING PLAN
Plan 4	A-103 SECOND LEVEL STRIPING PLAN
Plan 5	A-104 THIRD LEVEL STRIPING PLAN
Plan 6	A-105 ROOF LEVEL STRIPING PLAN
Plan 7	A200 Elevations
Plan 8	A201 Elevations
Plan 9	A202 Views
Plan 10	A203 Views
Plan 11	C-000 General Notes & Legend
Plan 12	C-100 Existing Conditions Survey - 1
Plan 13	C-101 Existing Conditions Survey -2
Plan 14	C-102 Demolition & Erosion & Sediment Control Plan
Plan 15	C-103 Site Layout & Materials Plan
Plan 16	C-104 Utility & Grading Plan
Plan 17	D-200 Civil Details – 1
Plan 18	D-201 Civil Details – 2
Plan 19	D-202 Civil Details – 3
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Plan 22	E-000 - ELECTRICAL LEGEND AND ABBREVIATIONS
Plan 23	E-500 - ELECTRICAL DETAILS
Plan 24	E-501 - ELECTRICAL DETAILS
Plan 25	E-600 - ELECTRICAL SCHEDULES
Plan 26	ES-000 - ELECTRICAL SITE LEGEND, DETAILS, AND NOTES

Plan 27 ES-100 - ELECTRICAL SITE PLAN AND NOTES
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Plan 29 G100 Context Plan
Plan 30 G101 Ground Level Code Information Plan
Plan 31 G102 Upper Levels Code Information Plan
Plan 32 L-100 Planting Plan
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Plan 34 SL-100 - SITE PHOTOMETRIC PLAN AND SCHEDULES
Plan 35 Turning Templates
Plan 36 Pedestrian Routes
Plan 37 Bedford Street Improvement Concept Plan

PUBLIC COMMENT

PC1. Oakhurst Daily 12-14-2021

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

July 26, 2021

James Rather
City of Portland Development Review Services Manager
389 Congress Street
Portland, ME 04101

Re: University of Southern Maine Structured Parking Garage
Major Site Plan Application & Site Location of Development Amendment

Dear James:

On behalf of the University of Southern Maine, Woodard & Curran is pleased to submit applications for a Major Site Plan Review and a Site Location of Development (SLOD) Amendment for a structured parking garage located at 44 Bedford Street. The proposed development includes a five-level structured parking garage, vehicle turnaround and drop-off area, fire access drive, pedestrian walkways, site landscaping, exterior lighting, and associated site improvements. The proposed parking garage will be approximately 45,100 square-feet in size and will create a total of 632 parking spaces, which includes 13 ADA accessible parking stalls, for a net increase in 425 additional off-street parking spaces for the University. The proposed garage will provide parking for the Portland Commons Residence Hall, which is currently under construction, and enable future developments at the University by replacing some of the parking that will be displaced by future developments (to be submitted under separate cover at a later date). The proposed stormwater management plan will consist of a subsurface detention and proprietary treatment device.

This application has been prepared in accordance with the City of Portland's Land Use Code of Ordinances and the applicable sections of the City of Portland Design and Technical Manuals. The SLOD Amendment has been prepared in accordance with Maine Department of Environmental Protection Chapter 500 Rules. It is our understanding that the City will be reviewing the SLOD Amendment under their Delegated Review Authority.

The application materials, supporting documents, and design drawings will be uploaded into the Eplan folder when it is available for the project. Thank you for coordinating the review of this project. If you have any questions regarding this application, please feel free to contact me at (207) 558-3665 or by email at aefletcher@woodardcurran.com.

Sincerely,

WOODARD & CURRAN INC.

Ashley Fletcher, PE
Technical Manager

cc: Ann Vashon, University of Southern Maine
Wes Wilson, Desman Design Management, Inc.

USM Structured Parking Garage

44 Bedford Street

Major Site Plan Application

41 Hutchins Drive
Portland, ME 04102
800-426-4262

0233035.00
University of Southern Maine
July 2021

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

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1. APPLICATION CHECKLIST

CITY OF PORTLAND
Planning & Urban Development Department

MAJOR SITE PLAN
GENERAL DOCUMENT AND DRAWINGS CHECKLIST
Please submit each document as a separate PDF file.
Please confirm by electronically checking the boxes in the left-hand column.

** PLEASE FILL OUT AND UPLOAD THE ZONING ASSESSMENT TABLE AND WAIVER TABLE SEPARATELY AS NOTED BELOW **

At the time of application submission, please contact the Department of Public Works regarding E-911 addressing for your project.

GENERAL APPLICATION DOCUMENTS		
Yes X	NA	**Project Description** ● Cover letter with detailed project description
Yes X	NA	**Completed Checklist** (this document)
Yes X	NA	**Evidence of Right, Title, and Interest** ● Deeds, leases, or purchase and sales agreements
Yes	NA X	**Evidence of State or Federal Approvals** ● Permits or letters of non-jurisdiction, if applicable
Yes X	NA	**Zoning Assessment** (see Zoning Assessment Table) Summary of compliance with use and dimensional standards of the land use code
Yes X	NA	**Site Plan Standards Assessment** (see Section 14.6 of the land use code) • Summary of project compliance with site plan standards of the land use code
Yes X	NA	**Summary of Existing and/or Proposed Easements or Covenants, applicable.** ● Evidence of existing easements and any proposed easements, covenants, public or private rights-of-way
Yes X	NA	**Waiver Requests** (see Waiver Table) ● Written request for waiver describing request and compliance with applicable waiver standards
Yes X	NA	**Financial Capability** ● Letter or evidence from a financial institution or third party verifying financial capacity to undertake project
Yes X	NA	**Technical Capability** ● Evidence of technical capability of applicant and consultants – resumes and/or examples of past projects

MAJOR SITE PLAN
STANDARDS AND SUBMISSION CHECKLIST

Provide assessment of compliance with standards and include supplemental documentation, as applicable.
Please submit each document as a separate PDF file.

TRANSPORTATION		
Yes X	NA	**Impact on Surrounding Street Systems (14-14.6.1(A))** ● Describe incremental volume of traffic impacts and mitigation measures. If needed
Yes X	NA	**Access and Circulation (14-14.6.1(B))** Identify and describe the following: ● Site access and internal circulation, including ADA access ● Drive-up features, if applicable ● Loading and servicing needs, routes, and geometry, providing turning templates for delivery vehicles, if applicable ● Sidewalks and condition along street frontages and internal walkways ● Engineered details for ADA ramps and public sidewalks, meeting sidewalk material policy and construction requirements (Technical Manual, Section 1)
Yes X	NA	**Public Transit (14-14.6.1(C)), if applicable** Identify and describe the following: ● Existing available transit service and proposed transit improvements, including design details, such as easement, pad base, and shelter
Yes X	NA	**Off-Street Parking (14-14.6.1(D)), if applicable** Identify and describe the following: ● Proposed vehicular and bicycle parking supply (including ADA-compliant parking) in relation to applicable parking requirements in Article 19 of the land use code ● Curb cut separation and parking layout (Technical Manual, Section 1) ● Construction details for bicycle racks ● Management plan for snow storage and removal
Yes X	NA	**Transportation Demand Management (TDM) (14-14.6.1(E)), if applicable** ● Provide TDM plan drafted in accordance with Technical Manual Section 1 requirements

ENVIRONMENTAL	
Yes NA X	**Preservation of Significant Natural Features (14-14.6.2(A)), if applicable** Identify and describe the following: ● High and moderate value waterfowl and wading habitat ● Aquifers (for Casco Bay Islands) ● Waterbodies (including wetlands, watercourses, significant vernal pools and floodplains) ● Proposed preservation areas and protection measures ● Documentation from environmental compliance consultants and determinations from applicable state and federal agencies
Yes NA X	**Landscape Preservation (14-14.6.2(B))** Identify and describe the following: ● Measures to preserve trees, including within required zoning setbacks (Technical Manual, Section 4) ● Measures to protect existing vegetation during construction
Yes NA X	**Site Landscaping and Buffers (14-14.6.2(C))** Identify and describe the following: ● Overall landscaping approach and consistency with standards ● The use of screening and buffering of service areas and between non-residential and residential uses ● Existing Heritage or Feature Trees on site and measures to preserve ● Compliance with street tree requirements
Yes NA X	**Water Quality, Stormwater Management, and Erosion Control (14-14.6.2(D))** Identify and describe the following: ● Erosion and sedimentation control plan and measures ● Evidence of compliance with Urban Impaired Stream Standards pursuant to DEP Chapter 500 stormwater law, as applicable ● Subsurface sanitary sewage disposal and groundwater protection measures

PUBLIC INFRASTRUCTURE AND COMMUNITY SAFETY	
Yes NA X	**Consistency with City Master Plans (14-14.6.3(A))** ● Describe proposed easements, rights and improvements to connect or continue off-premises public infrastructure, as applicable
Yes NA X	**Public Safety and Fire Prevention (14-14.6.3(B))** Identify and describe the following: ● Compliance with Crime Prevention through Environmental Design (CPTED) requirements (Technical Manual, Section 3) ● Emergency vehicle access ● Consistency with public safety standards (Technical Manual, Section 3)
Yes NA X	**Availability and Adequacy of Public Utilities (14-14.6.3(C)) (Technical Manual, Sections 2 & 9)** Identify and describe the following: ● Electrical services, including providing underground services ● Existing and proposed connections for public utilities and required public utility upgrades ● Sewer line connections
SITE DESIGN	
Yes NA X	**Massing, Ventilations and Wind Impact (14-14.6.4(A))** Identify and describe the following: ● Wind and ventilation impacts on adjoining structures and/or adjacent public spaces, including wind study, if applicable ● Bulk, location, or height impacts on adjoining structures
Yes NA X	**Shadows (14-14.6.4(B)), if applicable** ● Provide shadow analysis of impacts on publicly accessible open space (Technical Manual, Section 11)
Yes NA X	**Snow and Ice Loading (14-14.6.4(C))** ● Describe building design measures to prevent snow and ice from loading or falling onto adjacent properties or public ways
Yes NA X	**View Corridors (14-14.6.4(D)), if applicable** ● Describe any protection of designated view corridors (Portland Design Manual, Appendix. 1)
Yes NA X	**Historic Resources (14-14.6.4(E)), if applicable** Identify and describe the following: ● The site's status as a designated landmark, within a historic district or historic landscape district, or within 100 feet of any designated landmark, historic district, or historic landscape district ● Compliance with standards for preservation and documentation of archaeological resources

Yes NA X	Exterior Lighting (14-14.6.4(F)) ● Describe how the proposed site lighting will adhere to photometrics requirements as it relates to light trespass and full cutoff fixture design, pursuant to Technical Manual Section 12
Yes NA X	Noise and Vibration (14-14.6.4(G)) ● Provide data on noise levels for HVAC and other mechanical equipment, such as design specifications, to demonstrate consistency with state and federal noise emissions requirements as well as City code
Yes NA X	Signage and Wayfinding (14-14.6.4(H)), if applicable ● Provide signage plan showing the location, dimensions, height and setback of all existing and proposed signs ● Provide drawings of all commercial and directional signage on site
Yes NA X	Zone-Related Design Standards (14-14.6.4(I)) ● Address any applicable design review standards by zone, including compliance with Design Manual

MAJOR SITE PLAN
DRAWINGS CHECKLIST

Please upload the following DRAWINGS with the listed details into e-Plan as separate pdfs.

All drawings must be submitted in a 24 x 36 sheet size.

BOUNDARY SURVEY (stamped by a Maine Licensed Surveyor and drawn as per Technical Manual Sec. 13)

SITE PLAN(s) (stamped by a Maine Licensed Professional Engineer) including:

All sheets – Include a title block with project title and the following information:

- Project street address
- Name and address of property owner & applicant
- Licensed design professional, incl firm that produced plans
- North arrow
- Date of preparation and revision history block
- Tax parcel (chart, block, and lot) number

Existing Conditions Plan with the following:

- Existing structures, with distance from primary building façade(s) to the property line
- Approximate location of structures on abutting properties
- All streets and intersections adjacent to the site
- Existing driveways, pedestrian ways, and bicycle infrastructure, including dimensions and materials
- Existing public transit infrastructure
- Existing vehicle & bicycle parking areas
- Existing utilities on site and within adjacent rights-of-way
- Existing grades (two-foot contours preferred)
- Location of water courses, wetlands, and vegetation, or other significant natural features
- Existing soil conditions and location of test pits and borings
- Zoning boundary lines, including overlays
- Location of all existing easements and rights-of-way

Proposed Site Plan with the following:

- Proposed structures, including distance from primary building façade(s) to property lines
- Ground floor area, and finished floor elevations for all buildings
- Any proposed geometric modifications to streets and intersections adjacent to site
- Location, dimensions and materials of all proposed driveways, vehicle, bicycle, & pedestrian access ways with corresponding curb lines
- Engineered specifications/ cross-sections for proposed driveways, sidewalks & paved areas
- Location and dimensions of proposed loading areas, including turning templates
- Proposed transit infrastructure with dimensions/ engineering specifications
- Location of vehicle and bicycle parking with dimensions and engineering specifications
- Location of all snow storage areas
- Exterior lighting (please see Technical Manual Sec. 12 for photometrics requirements)
- Location of fire hydrants

- Location of solid waste management receptacles
- Location of all proposed HVAC and mechanical equipment, including proposed screening, where applicable
- Location of proposed easements and rights-of-way, including dimensions
- Please utilize color-coding and/or hatches and shading to delineate changes between the pre and post development condition as needed

UTILITY PLAN including:

- Proposed electrical infrastructure
- Location, sizing and directional flows of all proposed sewer and stormwater infrastructure
- Location and dimensions of off-premises public or publicly accessible infrastructure adjacent to site
- Electric utility infrastructure

GRADING AND DRAINAGE PLAN including:

- Proposed grades
- Proposed stormwater management measures meeting Technical Manual (Section 5) standards
- Any proposed alteration of a watercourse or wetlands
- Any groundwater protection measures
- Proposed buffers and preservation measures for wetlands or significant natural features

LANDSCAPE PLAN including:

- Existing vegetation to be preserved and preservation measures
- Proposed landscaping, screening, and street trees, including caliper widths for trees
- Planting schedule, including street trees

ARCHITECTURAL PLANS AND RENDERINGS including:

- Exterior building elevations, color renderings, illustrations of all sides
- Axonometric and street-level views for structures greater than three stories in height
- Provide context drawings, if applicable (Design Manual, page 1)
- Floor plans

CONSTRUCTION MANAGEMENT PLAN including:

- Specifics on traffic control, sidewalk sheds, and pedestrian rerouting
- Include a drawing and written narrative

OTHER

- Details and cross-sections, as necessary

2. APPLICATION FEES

A check for the required application fee will be provided to the Planning Department. It is our understanding that the application fee includes:

- Major Site Plan – 200,000 to 300,000 sq. ft.: $5,000
- SLOD Review: $3,500
- Traffic Movement Permit Amendment: $1,500

3. PROJECT DESCRIPTION

On behalf of the University of Southern Maine (Applicant), Woodard & Curran is pleased to submit this application for Major Site Plan Review for a new parking garage. This project represents another significant step in the growth of the campus and will specifically support the Portland Commons Residence Hall currently under construction.

This application has been prepared in accordance with the City of Portland's Chapter 14, Land Use Code of Ordinances and the applicable sections of the City of Portland Design and Technical Manuals. It is submitted by Woodard & Curran under authority to act as agent on behalf of the University of Southern Maine (USM) granted in the attached Agent Authorization Letter.

3.1 PROJECT SITE & BACKGROUND

The project site is located at 44 Bedford Street (Tax Map/Lot No. 114 A001001), in the area south of the Wishcamper Center and north of the I-295 corridor. A Site Location Map is attached to this Section for your reference. The subject property is in the R-5 Residential, B-2 Community Business, and University of Southern Maine Overlay Zones. The purpose of the USM Overlay zone is to allow the University to continue and reasonably expand within defined boundaries; and to recognize the unique qualities of a university campus, while at the same time protecting the value and integrity of established neighborhoods. This project is in alignment with that purpose. University buildings and structures are subject to the requirements of the underlying zoning districts, except as modified by the USM Overlay Zone.

The project is not located in a flood hazard zone, as shown on the FEMA FIRM Map attached to this Section.

3.2 PROJECT PURPOSE AND NEED

The University of Southern Maine is comprised of three campus locations in central and southern Maine, a region that is viewed nationally as among the most livable and desirable in the country. The three campuses, located in Portland, Gorham, and Lewiston, have different physical features and dynamics, and each offers a variety of educational, cultural, and recreational opportunities to USM students.

USM completed a Facilities Master Plan in January 2019, which was approved by the Board of Trustees for the University of Maine System. The Facilities Master Plan included a new residence hall (Portland Commons) and Career and Student Success Center (CSSC) on the Portland campus, which are currently under construction and scheduled to be open in the early summer of 2023. Those projects support USM's goals and objectives with respect to advancing student development, providing needed space for student activities, and strengthening of the USM community of residential and commuter students.

The development of the Residence Hall results in additional parking needs for the campus, which will be accommodated with the new structured parking. The additional parking need was determined during the Site Plan approval process for the CSSC and Residence Hall in November of 2020 (Portland File No. PL-001040-2020). The calculation included: projected parking rates for the new residents; displaced parking from the construction of the Residence Hall and new Campus Quad; planned parking to be provided by a surface lot to be developed at the Wishcamper site; and reductions for Transportation Demand Management (TDM). The projected total need was determined to be 396 spaces.

Upon completion of a site study for location of the new structured parking, the Wishcamper site was selected for the new garage. In addition to the 396 spaces required to meet the residence hall needs, the new garage will accommodate the 207 surface parking spaces that were planned for this location under a separate site plan approval. That previous approval, the Wishcamper Parking Lot (PL-974-2020, approved May 26,2020), will not be constructed.

3.3 PROPOSED PROJECT

The proposed development includes a five-level structured parking garage, vehicle turnaround and drop-off area, fire access drive, pedestrian walkways, and associated site improvements, including landscaping and exterior lighting. The proposed parking garage will provide 632 parking spaces for a net increase in 425 parking spaces for the University (632 minus the 207 surface parking spaces on the Wishcamper lot). The proposed garage includes the required ADA accessible parking. A 250-space bike storage room and bike repair room will be included on the interior of the garage. A small plaza and drop-off area will be developed in front of the Osher/Glickman Library entrance. Traffic and pedestrian improvements are also proposed along Bedford and Surrenden Streets in conjunction with the development of the garage and as part of the Traffic Movement Permit (TMP) prepared by others.

3.3.1 Civil Engineering Approach

The site has been designed to provide safe access and circulation for pedestrians, bicyclists, passenger vehicles, delivery vehicles, fire trucks and other emergency vehicles and buses. The site design includes a vehicle turnaround with a two-space drop-off area. Delivery vehicle access to the back of the library and fire truck access through the site and south of the garage will be maintained. The proposed stormwater management system will collect and convey surface runoff to a subsurface detention and treatment system that ultimately discharges to the separated storm sewer on Forest Avenue. Design drawings for the proposed project are included with this application.

3.3.2 Architectural Approach

3.3.2.1 Site Location Criteria

Following an analysis of four portions of the campus, the current development site was selected by USM. There are many benefits of locating the new garage near the existing one. The site is an existing surface parking lot and is adjacent to the nearby uses which will use the garage. Circulation of vehicles and pedestrians is arranged without conflicts and is achieved by extending existing patterns and not by introducing new conflicting ones. One factor in particular is the proximity to the new dormitory, and the garage will readily accommodate long term parking. Since the area is already an open parking lot, the construction of the new garage will not require demolition of existing buildings, either new or historic.

This new location is a part of USM with newer vintage buildings, forming a context which lends itself to a distinct cohesive “neighborhood” within the larger campus. The massing of the new structure will be consistent with its neighbors, the existing garage, and the Wishcamper Center classroom building. Although a building height of 85 feet is allowed at this location in the overlay zone, the new garage will be 50 feet tall, making it similar in size to the existing garage and approximately one story lower than Wishcamper. This design strategy will also keep the library, a taller facility, as the appropriately dominant feature of the southeast part of the campus.

3.3.2.2 Overlay Zone Design Guidelines

The proposed garage will be a significant structure, and as such has been approached with context relationships as a primary design consideration. The concept of best uses of campus edges has featured in the site selection, with the garage located on a campus edge where its use will not provide an inappropriate adjacency. It has both connections to the pedestrian environment as well as having no impact on the Bedford Street view corridor. It is, in fact, located on the campus at the furthest spot possible from the nearby residential neighborhoods.

Given its location in the campus context of the University, the design of the structure as well as its uses has been a driver of the resulting design. The garage itself consists of a central portion of gently sloped tiers, of an understated nature, largely unseen from Bedford Street, which have been developed as a secondary zone in relationship to more detailed end bays. These end bays provide an articulated massing response to the need for a contextual relationship

to the surrounding structures. This intent has been carried into the materials and elevation layouts. Materials in general will be high quality, long lasting, and weather resistant.

- Structural Elements Precast reinforced concrete
- Exposed Spandrels Colored and textured precast concrete or brick-faced precast panels
- Window Framing Clear anodized aluminum
- Window Glass Clear insulating units

3.3.2.3 Crime Prevention Through Environmental Design

Parking garages in particular benefit from inclusion of CPTED features in their design. At many times of the day, users may be alone in the structure while walking to their cars. A sense of community ownership within the garage has been established in the new garage by its inclusion of bicycle storage and designated long term parking spaces. Over time, this will help users be able to differentiate those who are users and those who have no business in the facility.

The structure itself will also contribute to the safety and security of the facility. It is primarily an open structure, with ample views both within the parking tiers and views from the garage of the nearby roads and sidewalks on all sides. Stairways feature large, glazed walls, so that a sense of what lies outside them can be seen. Security call stations will be provided, and will be readily accessed, their blue beacons easily visible in the garage.

3.3.3 Landscaping Approach

The landscape plan for the new parking garage at USM accommodates new vehicular and pedestrian patterns, while prioritizing the campus pedestrian experience through the creation of a new plaza at the Glickman/Osher entrance, and by maintaining access to existing campus nodes.

Vehicular access to the site for pedestrian drop-offs, school buses, and book pickups/drop-offs have been accommodated with a vehicular loop integrated into a large grove of trees. Safe pedestrian drop-offs are accommodated with 2 pullout drop off spaces, continuous with plaza paving, proximal to the Glickman/Osher entrance and accessible to Wishcamper entrances. This paved plaza at the entrance of Glickman/Osher creates a new campus node for pedestrian and school group drop-offs, book pickup, access to an existing book drop slot, expanded bike parking, and a central meeting and gathering spot for students, faculty, or staff- at a scale that complements the buildings and the increasing use of the outdoor space between Glickman/Osher and Wishcamper. Cyclists are accommodated at the plaza as well, the bike racks at the Glickman entrance are expanded from existing capacity of 8 bikes to a new capacity of 18 bikes, honoring the 10 additional short-term bike parking spaces USM said it would include in the original Wishcamper surface lot proposed expansion. An existing nearby rack accommodating 32 bikes will remain.

Service and emergency access are newly separated from pedestrian activity, further enhancing the campus experience and pedestrian safety; only service vehicles and emergency vehicles will travel beyond the drop off loop to access the Glickman loading dock and the fire lane along the south façade of both parking garages.

The grove of native deciduous trees from the City of Portland's Recommended Tree list expands upon the existing planted zones from Bedford Street through the space between Wishcamper and Glickman/Osher. Turf lawn is indicated to the east of the garage beneath and beyond the grove, welcoming students to gather on the grass. Native groundcover is planned for the sculpted mound in the middle of the loop, and for the zone between the loading dock and pedestrian plaza at the Glickman/Osher entry vestibule. All plantings are low maintenance, and deciduous native canopy trees and low native groundcover allow for visibility beneath tree canopies to enhance campus safety.

3.4 ATTACHMENTS

- Agent Authorization Letter
- Site Location Map
- FEMA FIRMette
- Design Drawings (Bound Separately)

University Services
Facilities Management

University of Southern Maine

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

University of Southern Maine
Facilities Management Department (CPPM)
96 Falmouth St
Portland, ME 04103
Tel: 207-780-4655
Fax: 207-780-4538
umaine.edu

July 28, 2021

To: Local, State, and Federal Review Officials

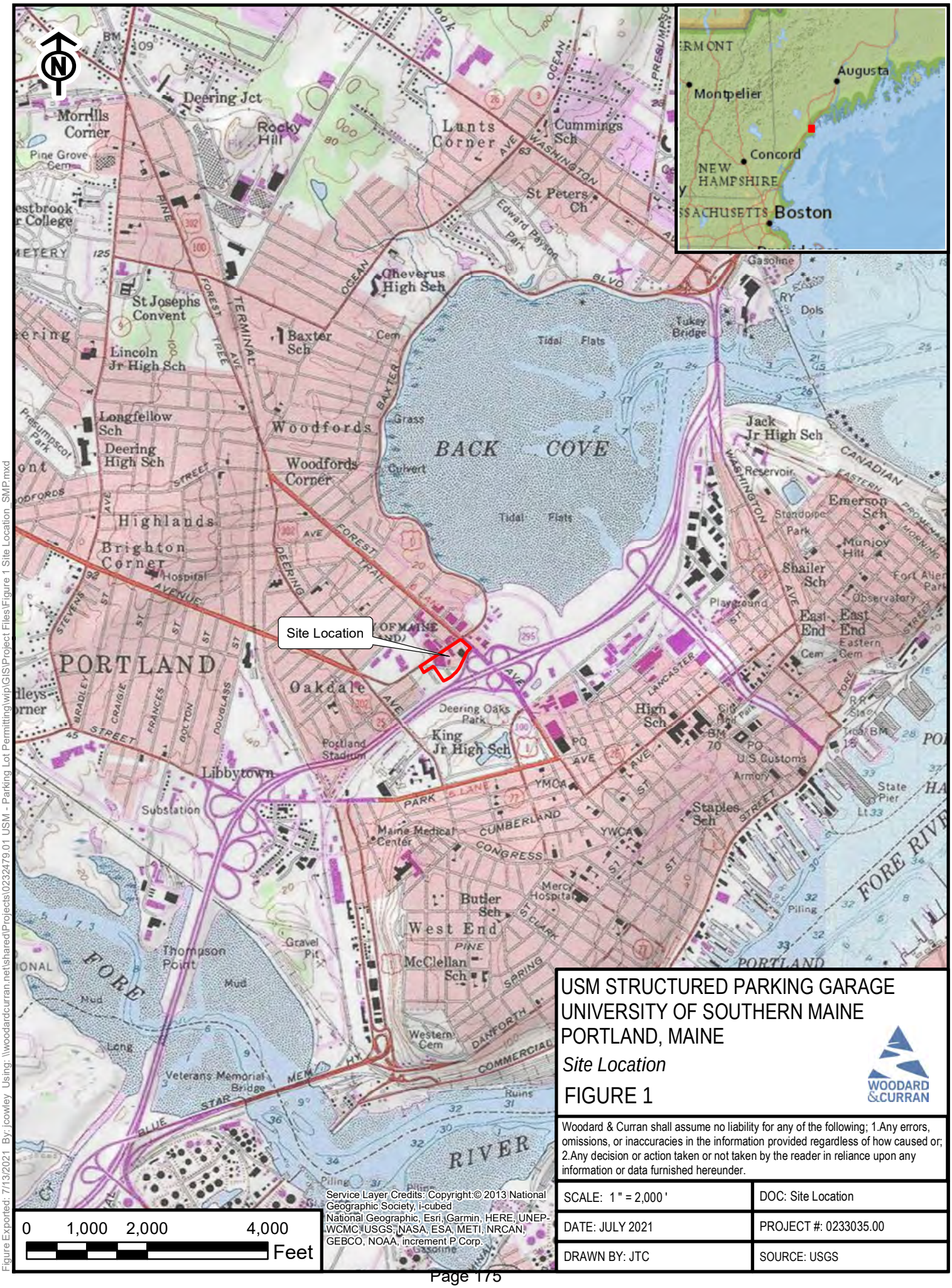
RE: AUTHORIZED REPRESENTATIVE – USM Structured Parking Garage

The University of Southern Maine, a member of the University of Maine System, is preparing plans for the new USM Structured Parking Garage located on the University of Southern Maine, Portland Campus. The University has retained Woodard & Curran, Inc., via Desman Design Management Inc., as our garage consultant, to assist in the preparation of the applications associated with permitting approvals for this project. When necessary, Woodard & Curran, Inc., is authorized as its agent to represent the University in addressing questions on the plans, or applicable applications, for this project.

Sincerely,

John M. Souther,
Executive Director of Facilities Management,
University of Southern Maine for the
University of Maine System

cc: to file.



Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

USM STRUCTURED PARKING GARAGE
UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

Site Location

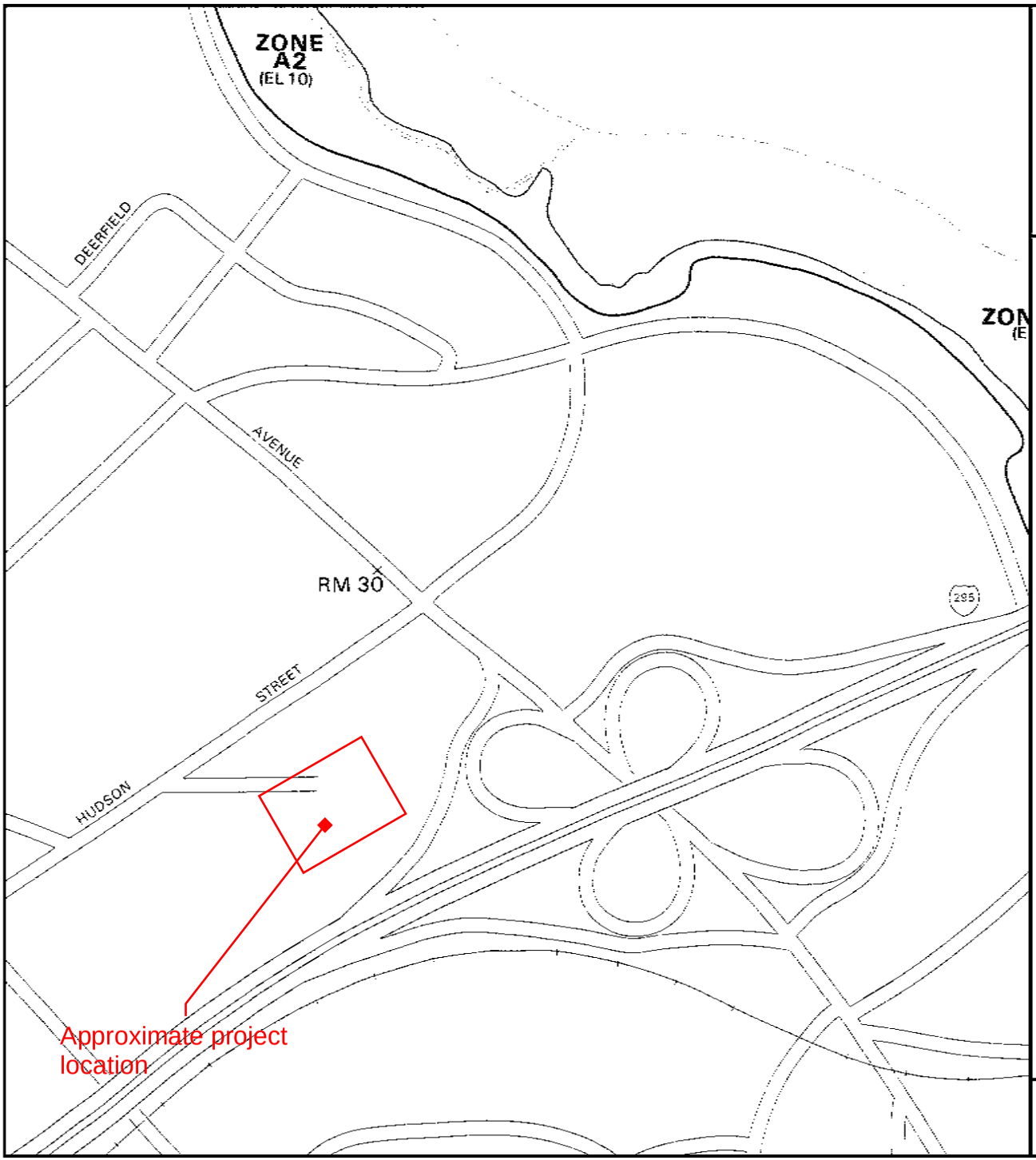
FIGURE 1

WOODARD &CURRAN

Woodard & Curran shall assume no liability for any of the following; 1.Any errors, omissions, or inaccuracies in the information provided regardless of how caused or; 2.Any decision or action taken or not taken by the reader in reliance upon any information or data furnished hereunder.

SCALE: 1 " = 2,000 '	DOC: Site Location
DATE: JULY 2021	PROJECT #: 0233035.00
DRAWN BY: JTC	SOURCE: USGS

Figure Exported: 7/13/2021 By: jcowley Using: \\woodardcurran.net\shared\Projects\0232479.01 USM - Parking Lot Permitting\wip\GIS\Project Files\Figure 1 Site Location_SMP.mxd



APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CITY OF
PORTLAND, MAINE
CUMBERLAND COUNTY

PANEL 13 OF 17
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230051 0013 B

EFFECTIVE DATE:
JULY 17, 1986

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

4. RIGHT, TITLE, & INTEREST

The proposed project is located on property owned by the Applicant and identified as Tax Map 114, Lot A001001. Attached is a copy of the deeds associated with this property.

4.1 ATTACHMENTS

- Deeds

GOVERNOR'S DEED
(with Reverter)

KNOW ALL PERSONS BY THESE PRESENTS, that the STATE OF MAINE, acting by and through its Governor, on recommendation of the Commissioner of its DEPARTMENT OF TRANSPORTATION, under and pursuant to the provisions of 23 M.R.S.A., Section 61, for consideration, the sufficiency of which is hereby acknowledged, RELEASES to THE UNIVERSITY OF MAINE SYSTEM, organized as a non-profit corporation of the State of Maine, with offices at 16 Central Street in Bangor, Maine, its successors and assigns forever, all its right, title and interest in and to a certain lot or parcel of land situated on the southerly side of Winslow Street, so-called, at its intersection with the westerly sideline of the right-of-way of State Highway "295", also known as Interstate 295, in Portland, County of Cumberland and State of Maine, and being as shown on a Right-of-way Map for State Highway "295" Portland, Cumberland County, Federal Aid Project Number I-295-3(28), dated January 1967, File Number 3-185, sheet 57 of 73, on file at the offices of the Maine Department of Transportation in Augusta, bounded and described as follows:

BEGINNING at a point on the southerly sideline of Winslow Street at its intersection with the westerly sideline of the right-of-way of Route 295;

THENCE S 26° 51' 18" W along said westerly sideline of Route 295, a distance of 34.00 feet;

THENCE S 51° 22' 05" W continuing along said westerly sideline of Route 295, a distance of 23.93 feet to land now or formerly of the University Of Southern Maine Foundation;

THENCE N 38° 37' 55" W along said University Of Southern Maine Foundation land 20.00 feet;

THENCE N 6° 51' 23" E continuing along said University Of Southern Maine Foundation land, 33.28 feet to the southerly sideline of said Winslow Street;

THENCE S 85° 26' 46" E along said southerly sideline of Winslow Street, 42.70 feet, more or less to the aforementioned westerly sideline of the right-of-way of Route 295 and the POINT OF BEGINNING, and containing one thousand four hundred twenty-seven square feet, more or less (1,427 sq. ft. ±).

EXCEPTING AND RESERVING from this conveyance any and all rights of access from the herein described parcel of land to State Highway "295", also known as Interstate 295, all of which rights of access are expressly reserved to, and retained by, the State of Maine.

ALSO RESERVING to the State of Maine the perpetual right to enter upon said parcel to maintain any highway slopes and drainage facilities or installations that may exist.

SUBJECT TO all utility easements and installations located on the above described premises, including those shown on the herein referred to Right-of-way Map, and to those rights which any utility enjoys over the subject premises for maintenance, location or relocation of poles and other installations.

NOTWITHSTANDING the foregoing, Grantor gives this deed, and Grantee accepts the same, upon the express CONDITION that the property hereby conveyed is to be retained by the University of Maine system and used for

public purposes only; and if said property or any interest in it, or any portion of it, is transferred, or if it is used for any commercial or other non-public purposes, said property shall at once REVERT to, and re-vest in, the Grantor, its successors or assigns; and that such reversion, should it occur, shall be automatic and require no further act of conveyance or documentation in order to be effective.

BEING a portion of premises acquired by the State of Maine from Charles T. Hayes, Jr. and Beatrice Hayes by warranty deed dated July 19, 1968 and recorded at the Cumberland County Registry of Deeds on July 23, 1968 in Volume 3049 at Page 553; and a portion of premises acquired from Reuben Katz by warranty deed dated January 10, 1969 and recorded at said Registry Of Deeds on January 15, 1969 in Volume 3072 at Page 435.

THE STATE OF MAINE makes no representations or warranties with respect to the premises hereby conveyed. The representations and warranties so excluded encompass, but are not limited to, those pertaining to: land use and environmental matters; fitness of the premises or any portion thereof for any particular purposes; water quality or quantity; the condition or quality of the soil; inchoate or unrecorded liens; status of title to or rights within that area lying between the high and low water marks; or the existence, status, or condition of access to, or public utilities serving the premises. Any subsequent use of, improvement to, or construction on the parcel shall be subject to all applicable laws, regulations, ordinances, and permitting requirements.

IN WITNESS WHEREOF, I, John E. Baldacci, Governor of the State of Maine, have caused the name and Great Seal of the State of Maine to be hereunto affixed this 11th day of Sept. in the year two thousand six.

STATE OF MAINE

By: _____, Governor
John E. Baldacci

Received
Recorded Register of Deeds
Sep 20,2006 02:29:02P
Cumberland County
John B OBrien

Affixed by: _____
Secretary of State

STATE OF MAINE
Kennebec, *ss.*

Sept. 11th, 2006

Personally appeared the above-named, John E. Baldacci, Governor of the State of Maine and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of the State of Maine.

Before me, _____
Notary Public/~~Attorney at Law~~

Print Name: _____

My commission expires: _____

ROSEMARIE D. SMITH
Notary Public, Maine
My Commission Expires January 6, 2009

SEAL

SHORT FORM QUITCLAIM DEED WITH COVENANT

MAINE REAL ESTATE TAX PAID

THE UNIVERSITY OF SOUTHERN MAINE FOUNDATION, a Maine nonprofit corporation with a mailing address of 96 Falmouth Street, Portland, Maine 04104, FOR CONSIDERATION PAID, grants to UNIVERSITY OF MAINE SYSTEM, a body politic and instrumentality of the State of Maine, with a mailing address of 16 Central Street, Bangor, Maine 04401, with QUITCLAIM COVENANT, certain real property, together with any improvements thereon, located in the City of Portland, Cumberland County, Maine and more particularly described on Exhibit A attached hereto and made a part hereof.

Being the same premises conveyed to the grantor herein by a Short Form Quitclaim Deed With Covenant from Frederick J. Olsen dated April 27, 2005 and recorded at the Cumberland County Registry of Deeds in Book 22577, Page 79.

IN WITNESS WHEREOF, The University of Southern Maine Foundation, has caused this instrument to be executed and delivered as of the 20th day of December, 2011.

The University of Southern Maine Foundation

Witness

By: Margaret A. Weston
Name: Margaret A. Weston
Its: President

State of Maine
County of Cumberland, ss. December 16, 2011

Personally appeared the above-named Margaret A. Weston, President of The University of Southern Maine Foundation, and acknowledged the foregoing instrument to be her free act and deed in her said capacity and the free act and deed of The University of Southern Maine Foundation.

Before me,

Amy Blaisdell
Notary Public/Attorney at Law
Name: Amy Blaisdell
Commission Expires: 10/16/2015

Amy Blaisdell
NOTARY PUBLIC
Lisbon Falls, ME
Commission expires on
October 16, 2015

Exhibit A

Formerly Tax Map 114, Block D, Lot 21:

Three (3) certain lots or parcels of land, with the buildings thereon, situated on the northerly side of Winslow Street in the City of Portland, County of Cumberland, State of Maine, being lots numbered 1, 2 and 3 on an unrecorded plan of the Heater piece at and adjoining the junction of said Winslow Street and Bedford Street made by E.C. Jordan & Co., Civ. Eng., in January 1918, and on file in the office of said E.C. Jordan & Co., said three lots taken together, being bounded and described as follows:

Beginning at a point on said northerly line of Winslow Street at the southwest corner of land now or formerly of John W. Lovely heirs and thence running, with an included angle of 88° 43' and by the westerly line of said Lovely land eighty-six (86) feet to a post and land now or formerly of the T.A. Huston & Co.; thence northwesterly and along said Huston land, forty-nine (49) feet to a post; thence northwesterly and along said Huston land thirty-two and three tenths (32.3) feet to an iron post; thence westerly and along said Huston land twenty-two and thirty-five hundredths (22.35) feet to an iron post; thence westerly and along said Huston land nineteen and eighty-four hundredths (19.84) feet to a post; said post being the southeasterly corner of lot numbered 11 on said plan; thence westerly and along the rear or southerly line of said lot numbered 11, fifty-nine and thirty-seven hundredths (59.37) feet to the southwesterly corner of lot numbered 11; thence southwesterly at right angles to said Winslow Street one hundred (100) feet to said northerly line of Winslow Street; thence easterly and along said northerly line of Winslow Street one hundred fifty-nine (159) feet to the point or place of beginning; said three lots having together an area of 18,027 square feet, be the same more or less.

EXCEPTING AND RESERVING from the above-described premises that portion thereof which was conveyed by Ellestad Hansen, Warren K. Webber and Mary E. Hansen to Charles A. Adams by deed dated April 8, 1924 and recorded in the Cumberland County Registry of Deeds in Book 1165, Page 79, and such portion thereof as may have been conveyed by Mary E. Hansen to the State of Maine by deed dated January 7, 1970 and recorded in the said Registry of Deeds in Book 3114, Page 724.

Formerly Tax Map 114, Block D, Lot 22:

ALSO a certain lot or parcel of land situated on the northerly side of Winslow Street in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows, to wit:

Beginning at an iron hub at the southwest corner of a lot of land conveyed by Edward D. Noyes, et al. to Ellestad Hansen and Warren K. Webber by deed dated November 14, 1923 and recorded in the Cumberland County Registry of Deeds in Book 1153, Page 280; thence easterly along the northerly side line of Winslow Street forty-seven (47) feet to a stake; thence northerly at right angles to said Winslow Street one hundred sixteen and thirty-three hundredths (116.33) feet to an iron hub in the northerly line of the lot above mentioned; thence westerly with an included angle of seventy (70) degrees and thirty-six (36) minutes to the right, forty-nine and seventy-six hundredths (49.76) feet to a stake at the northwest corner of the lot above mentioned; thence southerly on a line at right angles to said Winslow Street one hundred (100) feet to the point of beginning.

Formerly Tax Map 114, Block C, Lot 1:

ALSO a certain lot or parcel of land in the City of Portland, County of Cumberland and State of Maine, described as follows: Beginning at a stake on the southerly side of Winslow Street at the intersection with the easterly side of Conant Street; thence 25° E by Conant Street one hundred ten (110) feet; thence easterly at right angles with Conant Street forty-six and thirty-one hundredths (46.31) feet to a stake; thence northerly to a point in the southerly side of Winslow Street distant easterly sixty-three and seventy-two hundredths (63.72) feet from the point of beginning; thence N 71° 37' W by said Winslow Street sixty-three and seventy-two hundredths (63.72) feet to the point of beginning.

Formerly Tax Map 114, Block C, Lot 2:

ALSO a certain lot or parcel of land situated in the City of Portland, County of Cumberland and State of Maine bounded and described as follows, to wit:

Beginning at a point on the present southerly boundary line of Winslow Street at the northeasterly line of land now or formerly of Frederick J. Olsen; thence southeasterly along the northeasterly line of land now or formerly of said Olsen, about sixty-six (66) feet to a corner; thence southwesterly along the southeasterly line of land now or formerly of said Olsen, about forty-six and three tenths (46.3) feet to the northeasterly boundary line of Conant Street; thence southeasterly along the northeasterly boundary line of Conant Street about eighteen (18) feet to a monument located about seventy-one (71) feet northwesterly from and as measured along a line normal to the Ramp F.A. 6 Base Line at about Sta. 5+50; thence northeasterly about sixty-six (66) feet to a point on a line, said line being a projected line between the beforementioned monument and a monument located fifty (50) feet northwesterly from and as measured along a line normal to the Ramp F.A. 6 Base Line at Sta. 4+50, said point being twenty-five (25) feet southwesterly of and as measured along said projected line from said monument located

northwesterly of Sta. 4+50; thence northwesterly at right angles to said projected line twenty (20) feet to a point; thence northerly by a direct course to a point on the present southerly boundary line of Winslow Street; thence westerly along the present southerly boundary line of Winslow Street sixty (60) feet to the point of beginning. Said lot or parcel of land contains about 2,867 square feet and is a portion of that land as acquired from Charles T. Hayes, Jr. and Beatrice Hayes, pursuant to a Notice of Layout and Taking dated March 8, 1973 and recorded at the Cumberland County Registry of Deeds in Book 3367, Page 58. Said parcel is shown on a certain Maine Department of Transportation Right-of-way Map entitled "State Highway '295', Portland, Cumberland County, Federal Aid Project No. 1-295-3(28)" dated January 1967, on file in Augusta, File No. 3-185.

The premises herein conveyed is SUBJECT to a State of Maine Notice of Layout and Taking dated February 28, 1973 and recorded in said Cumberland County Registry of Deeds in Book 3367, Page 58.

Received
Recorded Register of Deeds
Dec 21,2011 12:40:48P
Cumberland County
Pamela E. Lovley

5. EVIDENCE OF STATE AND/OR FEDERAL APPROVALS

The following state and federal permits will be required for the proposed work:

- Maine Department of Environmental Protection Site Location of Development Act Permit Amendment (reviewed by City of Portland under Delegated Review Authority); and
- Maine Construction General Permit Notice of Intent.

Copies of permits can be provided to the City under separate cover as they become available.

6. ZONING ASSESSMENT

The project is located within the City of Portland R-5 and B-2 Zones, as well as the University of Southern Maine Overlay Zone. The entirety of the project is in the USM Overlay Zone, which is governed by Section 8.10 of the Land Use Code. The purpose of the USM Overlay zone is to allow the University to continue and reasonably expand within defined boundaries, and to recognize the unique qualities of a university campus while at the same time protecting the value and integrity of established neighborhoods. University buildings and structures are subject to the requirements of the underlying zoning districts, except as modified by the USM Overlay Zone. Parking Garages are listed as a permitted use in the Overlay Zone. The Overlay Zone provides for an 85-foot building height in the portion of the campus where the new parking garage will be located, and yard setbacks of 10 feet from Bedford Street; 0 feet from Forest Avenue; and 10 feet from the I-295 right-of-way.

The existing grassed area interior to the site that will be converted to parking is not considered open space used for recreation; it is currently used for overflow parking and storage and consists largely of a weedy overgrowth and dirt. It should be noted that the University's plans for development of the CSSC and Portland Commons includes creating an open space that will be central to the campus, which will provide a better opportunity for recreational use than the area that will be replaced by the proposed parking garage.

According to the City's Land Use Ordinance, Chapter 14 of the Code of Ordinances, the proposed work is subject to a maximum impervious surface ratio of 66% of the total land area within the University of Southern Maine overlay zone exclusive of public streets. Based on available data from the City of Portland's Online Stormwater Fee Lookup service, the University currently has an impervious surface ratio of approximately 54%; the proposed parking garage will result in an impervious surface ratio of approximately 56%.

The attached Zoning Assessment Table summarizes how the proposed project will comply with the dimensional requirements specified in the City's Land Use Ordinance.

6.1 ATTACHMENTS

- Zoning Assessment Table

ZONING ANALYSIS Relevant Zone(s) R-5, B-2 & USM Overlay

All Projects:

	Required	Proposed
Lot Size	N/A	N/A
Area Per Dwelling Unit	N/A	N/A
Minimum Street Frontage	N/A	N/A
Front Yard Minimum	10'	>10'
Front Yard Maximum	N/A	N/A
Rear Yard	10'	>10'
Yard Right	10'	>10'
Yard Left	10'	>10'
Side Street Setback	N/A	N/A
Step Back	N/A	N/A
Maximum Lot Coverage	40%	30%
Minimum Lot Coverage	N/A	N/A
Maximum Height	85'	<85'
Open Space	N/A	N/A
Maximum Impervious Area	66%	55%
Pavement Setback	N/A	N/A
Floor Area Ratio	N/A	N/A
Off Street Parking Spaces	N/A	632
Loading Bays	N/A	N/A
Other 1		
Other 2		
Other 3		

N/A

Planned Residential Unit Developments (PRUD) Requirements

	Required	Proposed
Minimum Lot Size		
Minimum Lot Area per Dwelling		
Maximum # Units per Building		
Maximum Building Length		
Maximum Accessory Building Length		
Minimum Setbacks		
Minimum Building Separation		
Minimum Open Space		

N/A

Affordable Housing Density Bonuses (if applicable)

	Bonus Increase or Decrease	Maximum Allowable With Bonus	Proposed
Density			
Height			
Setback Reduction			
Recreation Space			
Maximum Accessory Building Length			
Minimum Setbacks			
Minimum Building Separation			
Minimum Open Space			
Explanatory Text 1 (optional):			
Explanatory Text 2 (optional):			
Explanatory Text 3 (optional):			

7. EASEMENTS & OTHER BURDENS

Existing easements associated with the Site are shown on the enclosed drawings; no new easements will be created as part of the proposed project.

Standard to be Waived: Cite Ordinance or Technical Manual Standard	**Cite Standard Language:** Cite specific language of applicable Ordinance or Technical Manual Standard	**Waiver Being Sought:** Describe waiver being sought. Ex. – We are requesting a two-way parking lot drive aisle width of 20' feet.	**Justification for Waiver:** Address specific waiver criteria, if applicable, and document reasons for the waiver request.
City of Portland Technical Manual Section 1 - Transportation Systems - Subsection 1.17 Electric Vehicle Infrastructure	New structured garages shall provide EV charging to 20% of parking spaces. Remaining spaces must be served by sufficient conduit, wiring, and electrical service to allow for future installation of electric vehicle supply equipment.	58 Charging Stations (9% of garage spaces), tracking usage and forecasting demand, commitment to meet EV charging demand in future and sizing electrical infrastructure to accommodate growth as described in attached narrative.	See Section 8.1 of the Site Plan Narrative for waiver justification.
Technical Manual Section 12.3.5: Luminaire Types	All fixtures must be LED and shall not exceed 3000K Correlated Color Temperature (CCT). Screw in light fixtures must have LED lamps specified to be maximum of 3000K CCT.	Applicant requests a waiver to allow 4,000K CCT fixtures versus 3,000K CCT fixtures.	4,000K color temperature fixtures were selected to match the existing fixtures immediately adjacent to the scope of work area.

9. FINANCIAL & TECHNICAL CAPABILITY

9.1 FINANCIAL CAPABILITY

Attached is evidence of the University's financial capability to complete the proposed project.

9.2 TECHNICAL CAPABILITY

The University of Southern Maine (USM) is a public university with over 8,000 undergraduate and graduate students taking courses online and at campuses in Portland, Gorham, and Lewiston. Known for its academic excellence, student focus and engagement with the community, USM provides students with hands-on experience that complements classroom learning and leads to employment opportunities in one of the nation's most desirable places to live. USM is a member of the University of Maine System (UMS), the State's largest educational enterprise that includes seven universities and an annual enrollment of nearly 30,000 students.

Desman, Inc. is recognized as one of the nation's leading consulting architectural and engineering firms specializing in the planning, design and restoration of structured parking facilities, transportation improvements and other parking related consulting services. Desman offers a complete scope of services in the parking industry including planning, design, restoration, construction administration, financing methods, parking access/revenue control, operational and management techniques. In brief, its core business is parking planning, design, and all other parking related consulting services. Desman has over 45 years of experience in providing these services for parking structures and parking related projects.

Woodard & Curran (W&C), a 1,000-person Portland-based firm, has provided engineering services to the public and private sector for over 40 years, including permitting, civil/site engineering, stormwater, and construction management services. W&C has completed projects for colleges, universities, and healthcare institutions that build strong, sustainable infrastructure and environmental programs serving both their business needs and the communities that make them so vibrant. With extensive experience in design and permitting for site development projects, W&C has completed many projects within the City of Portland and for the University of Maine System.

Winston Scott Architects is a small, design-oriented architectural practice established in 1975 and located in Portland, Maine. Their work encompasses a diverse array of project types and scales ranging from multi-block urban developments to historic renovations, commercial and institutional buildings, and multifamily and single-family residences. The firm has been recognized numerous times for design excellence by the Maine and New England Chapters of the American Institute of Architects, as well as the United States Green Building Council; and their work has been profiled in national trade journals, local publications, and several books focused on design and architecture.

Michael Boucher Landscape Architecture (MBLA) is a professional landscape design firm located in southern Maine. MBLA, founded in 1994, is engaged in ongoing collaborations with many acclaimed architecture firms. The office is currently involved in a variety of projects nationally and internationally, connecting them to many landscape typologies, cultural viewpoints, and methods of building. This experience benefits their clients and projects in providing a sense of objectivity that we fold into each new undertaking. MBLA offers a full scope of landscape architecture services tailored to assist clients in developing clear visions for their properties.

9.3 ATTACHMENTS

- Evidence of Financial Capability

DocuSign Envelope ID: 78157A2A-6DE5-4E27-B7A8-4B2065B0545F

UNIVERSITY OF
SOUTHERN MAINE
Finance and Administration

July 27, 2021

Mr. Darrin Stairs
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

Dear Mr. Stairs:

The University of Southern Maine expects the Structured Parking project to cost approximately $22 million.

To fund the project, the University would utilize bond anticipation notes and revenue bonding pursuant to approval by the University of Maine System Board of Trustees.

Thank you for your consideration.

Sincerely,

DocuSigned by:
Alexander E. Porteous
73AFFEE3455845F...

Alexander E. Porteous
Chief Operating Officer & Chief Business Officer

P.O. Box 9300, Portland, ME 04104-9300
(207) 780-4484 TTY (207) 780-5646, FAX (207) 780-4549
www.usm.maine.edu
A member of the University of Maine System

10. COMPLIANCE WITH SITE PLAN STANDARDS

Article 14 of the City of Portland's Land Use Code outlines the site plan standards that must be met by Major Site Plan projects. The proposed project will comply with the City's design standards as described in the following sections:

10.1 TRANSPORTATION

The proposed project will not increase traffic or parking demand. The proposed parking lot will enable future developments (the Portland Commons residential hall and CSSC) at the University by replacing a portion of the parking that will be displaced by these planned developments. By constructing the proposed parking lot in advance of future developments, the University's existing parking demands will be satisfied for future construction. It should be noted that the University has developed a campus-wide Transportation Demand Management (TDM) Plan that comprehensively addresses the University's long-term goals for future developments. This TDM Plan was presented as part of the CSSC and Portland Residence Hall Site Plan and Traffic Movement Plan applications.

10.1.1 Traffic Impact

VHB has conducted a technical analysis in support of a modification of the Traffic Movement Permit (TMP) previously approved for the development of a new residence hall and Student Center on the University of Southern Maine (USM) campus. Although in the approved TMP for Project ID PL-001040-2020, a parking garage was not the primary subject of the permit application, for the purposes of the traffic analysis, the proposed parking garage location was situated off Falmouth Street. Anticipated new trips to and from the campus were assumed to utilize the new parking garage structure.

The proposed location of the parking garage has since been relocated as a response to neighborhood feedback and a site evaluation process. The locations of the 580-bed residence hall and Student Center that were previously permitted have not changed. The new parking garage will now be located adjacent to the existing parking structure on campus with joint access to and from Bedford Street. As a result, the traffic that had previously been assigned to the garage on Falmouth Street will instead access the proposed parking structure location. This traffic was redistributed across the adjacent street network and reevaluated to assess the resulting traffic impacts.

The shift to add these trips to the roadway network at the new proposed parking garage location along Bedford Street results in some delay increases at the intersection of Forest Avenue with Bedford Street and Baxter Boulevard as compared to the garage location along Falmouth Street. Advance queue detection should be considered in order to ensure that the addition of this traffic to intersection of Forest Avenue with Bedford Street does not cause an impact beyond the available queue storage and impact the operation of the I-295 off ramp. Overall, this proposed location for the parking garage is not anticipated to adversely affect traffic operations in the vicinity of the USM campus.

Updated traffic circulation for access and egress to the existing and proposed parking garages will compel updates to the Bedford Street corridor. It is proposed that vehicles will enter the parking garages via Winslow Street and exit the parking garages via Surrenden Street, as previously discussed and depicted in Figure 1 below. A dedicated left turn lane will be provided for vehicles traveling westbound on Bedford Street and entering the parking garages via Winslow Street, replacing the raised median island and crosswalk currently set back from the intersection on the east leg. This crosswalk will be replaced by a crossing on the west leg of the intersection to limit the number of vehicular lanes pedestrians will need to cross to two. A painted median will be extended beyond the existing raised median island between Bedford Street and Winslow Street, separating the single vehicular through lanes and painted bike lanes in each direction. The need for a single departure lane from the intersection on Winslow Street will allow for a pedestrian bumpout to be implemented. The bumpout will effectively shorten the crossing distance for pedestrians across the Winslow Street leg of the intersection and widen back to two lanes to maximize the queuing space for vehicles entering

the parking garages. An amendment to USM's Traffic Movement Permit (TMP) describing the proposed improvements in more detail and supplemental design drawings will be submitted to the City under separate cover.

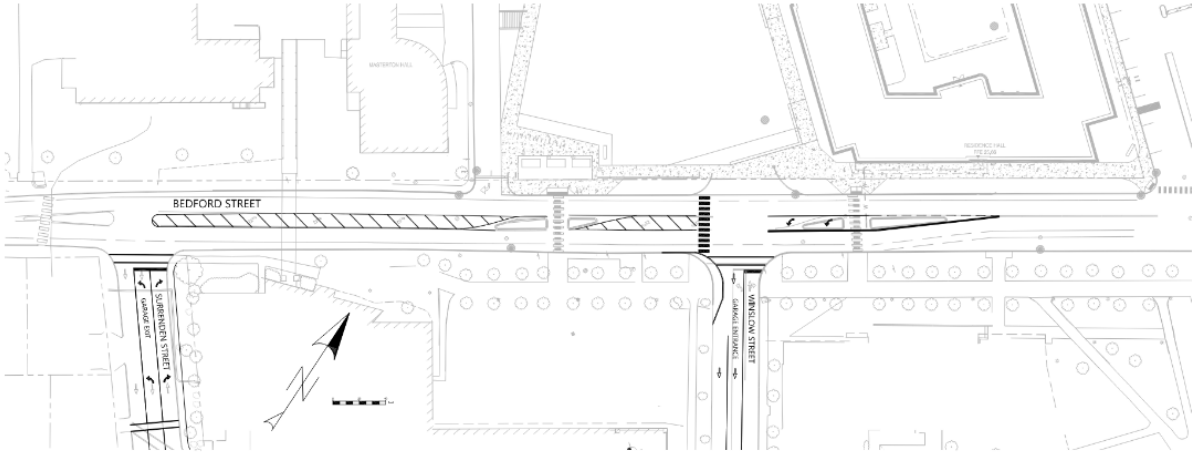


Figure 1. Conceptual Plan for Bedford Street and Parking Garage Circulation

10.1.2 Access & Circulation

The proposed parking garage will include ADA accessible parking spaces at ground-level and accessible pedestrian walkways. Traffic signage, pavement markings and various paving materials/patterns will be provided to circulate pedestrian and vehicular traffic throughout the Site. A loop road has been provided to the drop off area in front of the Osher/Glickman library, as well as maintenance of an emergency access road to the rear of the parking garages.

10.1.3 Loading & Servicing

The proposed project will not include any changes to the Site's loading or servicing needs. modification to the loop road will continue to service the loading and service areas behind the Osher/Glickman Library, as well as drop offs to the library and Wishcamper.

10.1.4 Sidewalks

Internal sidewalks and ADA ramps will be provided, as shown, and detailed on the design drawings.

10.1.5 Public Transit

No changes to public transit access are proposed as part of this project.

10.1.6 Parking

As previously described, the purpose of the proposed parking garage is to replace parking that will be displaced by the residence hall and CSSC project and to meet demand for residential parking. The proposed parking garage will provide 632 parking spaces for a net increase in 425 parking spaces for the University, including required ADA parking; a parking summary is provided on the Plans. The proposed parking garage has been designed in accordance with the dimensional standards of Section 1 of the City's Technical Design Manual, as shown on the design drawings.

10.1.7 Bicycle Parking

The proposed parking garage will include a covered and secured bicycle storage area capable of holding 250 bikes. This storage will serve commuter students who ride bicycles to campus as well as bicycle storage needs for the new dormitory, Portland Commons. Additional bicycle parking is provided along the sidewalk and building entrances elsewhere on the site.

10.1.8 Snow Storage

Proposed snow storage areas are indicated on the drawings. The proposed landscaped areas will be the primary source for snow storage. Snow that exceeds the available space on-site will be hauled off-site. A snow dump area is provided from the roof deck of the new garage in the southeast corner.

10.1.9 Traffic Demand Management

USM has a robust Traffic Demand Management (TDM) plan in place. This was provided as part of the CSSC and Residence Hall project, and copies can be provided upon request

10.2 ENVIRONMENTAL & LANDSCAPE FEATURES

10.2.1 Preservation of Significant Natural Features

The Site has been previously developed and there are no known areas of significant natural features, including rare or endangered botanical features, significant wildlife habitats, or wetland areas. The attached Official Species List identifies the northern long-eared bat, which has been listed as a Federally Threatened Species, in association with the project area (a common designation across the state); however, there are no critical habitat areas located within the project area. Based on US Fish & Wildlife information, the northern long-eared bat typically lives in caves during the winter months, and in trees larger than three inches in diameter during the summer, with migration between these two habitats in the spring in the fall. Tree-clearing for this project will be minimal; it is not anticipated that this project will have an impact on the northern long-eared bat species.

10.2.2 Landscape Preservation

A Tree Preservation & Removals Plan is included in the design drawings; this Plan shows what existing trees will be preserved and specifies protection measures.

10.2.3 Site Landscaping

Landscaping Plans are included in the drawings referenced in Section 3 of this Report. These Plans show proposed landscaping and screening of the Site; plant sizes are specified in the planting schedule provided on the Plans.

10.3 ENVIRONMENTAL & STORMWATER

10.3.1 Water Quality, Stormwater Management, & Erosion Control

The project must comply with the water quality, stormwater management, and erosion control standards identified by the City of Portland in the Land Use Chapter of the Code of Ordinances and Section 5 of the City's Technical Manual, as well as the MaineDEP Chapter 500 Stormwater Standards associated with Site Location of Development Act Permit requirements. The stormwater management system is comprised of a series of catch basins, a subsurface detention system, and proprietary treatment unit. The subsurface detention and treatment system will consist of large metal pipe and a StormFilter unit, which will provide storage and treatment for site runoff prior to discharging to the City's separated stormwater system in Forest Avenue. The Stormwater Management Plan included with this application demonstrates

that the proposed development meets the applicable standards. The project will not result in the flooding of adjacent lots or City property.

Erosion and sediment control measures are shown and detailed on the drawings. The project is not located within the watershed of an Urban Impaired Stream and is not anticipated to pose a risk of groundwater contamination during or after construction; the project does not include subsurface sanitary sewage disposal.

10.4 PUBLIC INFRASTRUCTURE & SAFETY

10.4.1 Consistency with City Master Plans

The proposed project is consistent with the City of Portland Comprehensive Plan, Portland's Plan 2030, developed in 2017. The proposed project will help support the growth of the University of Southern Maine's student body, a vital resource for the economic development of the City of Portland.

10.4.2 Public Safety & Fire Prevention

10.4.2.1 Natural Surveillance

The layout of the site and the features of the garage have been designed to create formal and informal natural surveillance conditions. These conditions of "see and be seen" will enhance the safety of legitimate users and deter potential offenders. The site layout will include zones of use which will be readily identifiable to users:

Private: Areas within the garage will be screened from the public areas.

Semi-Private: Clusters of picnic tables will encourage small group use in dedicated spaces.

Public: Open walkways will interconnect with plazas and destination uses.

Lighting of the site and garage will meet the City's standards and will also provide uniform coverage of the entrances, exits and pathways to create a saft people-oriented environment. Clear observation conditions will create the feeling of safety and belonging which will foster active use without concerns of areas which need to be avoided.

The garage will also include a surveillance system that will allow viewing of areas not easily observed within the garage. This system will be an extension of the security system in the existing garage, and will be monitored in the existing parking office. It will provide general viewing of all areas of the garage. In addition, the system will also provide close views of key points – entries, elevator lobbies and stairs.

10.4.2.2 Access Management

The site has been designed with a hierarchy of pathways, plazas, and vehicular routes which are coordinated and serve to reinforce guidance place-making for the USM community. Emergency use areas will be gated so that while that while still readily usable by staff, fire and security forces, they will be off-limits for others.

10.4.2.3 Territorial Reinforcement

The site has been designed with a hierarchy of pathways, plazas, and vehicular routes which are coordinated and serve to reinforce guidance place-making for the USM community.

10.4.2.4 Fire Department Access and Operations

The garage has been designed to the applicable requirements of NFPA standards outlined in the Technical Standards. It will include a dry standpipe system, with interconnected risers, available to be fed from a fire hydrant near the garage.

The site layout for the garage will extend the existing 20' at the south side of the existing garage for the full length of the new facility. This will provide full access for operations on three sides of the garage. Stair towers in the garage will exit directly to exterior walks, and the stair exits in the existing garage will be maintained. An emergency access road will be maintained to the south of the two garages.

10.4.3 Availability & Adequacy of Public Utilities

Portions of the existing water, sewer, and stormwater utility infrastructure on-site will be displaced to accommodate construction of the garage and its foundation, including a fire hydrant and Vortechnics unit. Locations of relocated utilities are shown on the Utility Plan in the design drawings attached to Section 3 of this Report. No water services are proposed to the new garage. The garage design includes a dry stand pipe and sprinkler system with a Fire Department Connection (FDC) in the northeast corner stairwell. Woodard & Curran will coordinate with the Portland Water District to approval for the proposed design; documentation of Portland Water District approval can be provided upon receipt.

A new sewer service and oil/water separator will be provided along the southern edge of the garage for the floor drains in the lower levels of the garage. The sewer service and oil/water separator will discharge to the combined sewer interior to the site. Runoff from the rooftop level of the garage will be conveyed to the separated storm sewer system, as shown on the design drawings, and described in the Stormwater Management Report (submitted under separate cover). The attached letter was provided to the Portland Department of Public Works to request confirmation of ability to serve the proposed development; the Wastewater Capacity Application was submitted with this letter. A copy of the City's determination will be provided upon receipt.

As described in the Stormwater Management Report, the stormwater management system for the site will be comprised of a series of catch basins, a subsurface detention system, and proprietary treatment unit that discharge to the City's separated stormwater system in Forest Avenue. As requested by the City, site drainage patterns will be modified to direct stormwater runoff from the proposed development to the City's separated stormwater system in Forest Avenue instead of the combined sewer; the City has indicated that the stormwater system on Forest Avenue has capacity to convey additional stormwater flow from the site.

The proposed project will also generate construction waste and demolition debris (CDD). The Contractor will be responsible for hauling the CDD or contracting with a waste management service to haul the CDD, from the project site. The Contractor will be fully responsible for handling, managing, and disposing of all waste generated by construction in accordance with Maine Solid Waste Management Regulations – 06-096 CMR 400-409 and all other applicable local, state, and federal regulations.

The proposed development is not anticipated to produce any hazardous waste. Environmental assessments of the Site have been conducted and the Owner is a participant in the Maine Department of Environmental Protection Voluntary Response Action Program (VRAP). A soil management plan will be developed for the Site.

The proposed project will not result in any additional solid waste after construction has been completed.

10.5 SITE DESIGN

10.5.1 Massing, Ventilation, & Wind Impact

The parking structure has been designed within the context of the surrounding similarly scaled buildings.

10.5.2 Shadows

The parking structure has been designed to minimize impacts of shadows on open space and public areas that would affect the viability of the public use and existing vegetation.

10.5.3 Snow & Ice Loading

The parking structure has been designed to prevent snow and ice from accumulating and falling onto abutting properties and public ways.

10.5.4 View Corridors

The parking structure will not obstruct public view corridors identified in the City's Downtown Vision View Corridor Protection Plan.

10.5.5 Historic Resources

The proposed development is not located in or adjacent to a historic district or historic landmark.

10.5.6 Exterior Lighting

Proposed exterior lighting is shown on the drawings. A Photometric Plan and details for the proposed lighting fixtures are included in the drawings; cut sheets of the proposed lighting fixtures are also attached to this Section for your reference. It should be noted that the project abuts the I-295 corridor; according to Section 12 of the Technical Manual, public rights-of-way is considered a non-sensitive use and, as such, illumination at the property boundary must not exceed 1.0 foot-candles; the lighting plan has been designed in accordance with these standards. Existing light poles in the surface parking lot will be demolished as shown on the Demolition plan in the design drawings.

10.5.7 Noise & Vibration

The proposed project will not result in any increase in noise or vibration on the Site.

10.5.8 Signage & Wayfinding

Existing signage will be maintained, and new traffic signage will be provided as shown on the drawings.

10.5.9 Zoning Related Design Standards

A summary of the project's compliance with zoning related design standards is provided in Section 6 of this Report.

10.6 ATTACHMENTS

- Traffic Movement Permit Amendment Application (submitted under separate cover)
- Official Species List
- Stormwater Management Plan (submitted under separate cover)
- Wastewater Ability-to-Serve Letter & Application
- Photometric Plan
- Light Fixture Cut Sheets

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588
http://www.fws.gov/mainefieldoffice/index.html

In Reply Refer To: April 01, 2021
Consultation Code: 05E1ME00-2021-SLI-0915
Event Code: 05E1ME00-2021-E-02772
Project Name: USM Garage

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies the threatened, endangered, candidate, and proposed species and designated or proposed critical habitat that may occur within the boundary of your proposed project or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC Web site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the Endangered Species Consultation Handbook at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

This species list also identifies candidate species under review for listing and those species that the Service considers species of concern. Candidate species have no protection under the Act but are included for consideration because they could be listed prior to completion of your project. Species of concern are those taxa whose conservation status is of concern to the Service (i.e., species previously known as Category 2 candidates), but for which further information is needed.

If a proposed project may affect only candidate species or species of concern, you are not required to prepare a Biological Assessment or biological evaluation or to consult with the Service. However, the Service recommends minimizing effects to these species to prevent future conflicts. Therefore, if early evaluation indicates that a project will affect a candidate species or species of concern, you may wish to request technical assistance from this office to identify appropriate minimization measures.

Please be aware that bald and golden eagles are not protected under the Endangered Species Act but are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). Projects affecting these species may require development of an eagle conservation plan: http://www.fws.gov/windenergy/eagle_guidance.html Information on the location of bald eagle nests in Maine can be found on the Maine Field Office Web site: http://www.fws.gov/mainefieldoffice/Project%20review4.html

Additionally, wind energy projects should follow the wind energy guidelines: http://www.fws.gov/windenergy/ for minimizing impacts to migratory birds and bats. Projects may require development of an avian and bat protection plan.

Migratory birds are also a Service trust resource. Under the Migratory Bird Treaty Act, construction activities in grassland, wetland, stream, woodland, and other habitats that would result in the take of migratory birds, eggs, young, or active nests should be avoided. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm and at:

http://www.towerkill.com; and at:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
(207) 469-7300

Project Summary

Consultation Code: 05E1ME00-2021-SLI-0915
Event Code: 05E1ME00-2021-E-02772
Project Name: USM Garage
Project Type: DEVELOPMENT
Project Description: An addition to the existing USM Surrenden Street Parking Garage on the University of Southern Maine's campus.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.66203135,-70.27331546908917,14z



Counties: Cumberland County, Maine

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9045

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

July 30, 2021

ATTN: Bradley Roland, P.E.
Department of Public Works
212 Canco Road
Portland, ME 04103

Re: USM Structured Parking Garage – Request for Evidence of Ability to Serve

Dear Mr. Roland:

The University of Southern Maine Portland Campus is proposing to construct a structured parking garage adjacent to the existing garage located at 44 Bedford Street in Portland, Maine. The proposed project will include the construction of a structured parking garage with associated site improvements including lighting, landscaping, utilities, and stormwater management infrastructure. Please refer to the enclosed Utility Plan for locations and sizes of proposed service connection and associated oil/water separator for the proposed parking garage floor drain. Upon completion of development, the proposed project is anticipated to discharge approximately 20 gallons per minute to the site's combined sewer system; the proposed project will not generate any wastewater flow. We have submitted a Major Site Plan Application for the proposed project to the City of Portland Planning Department and would appreciate documentation regarding the City's ability to accommodate the proposed flows.

Please let us know if any additional information is required to facilitate your review. We appreciate your assistance. If you have any questions or require any additional information, please do not hesitate to contact me at (207) 558-3665 or aefletcher@woodardcurran.com.

Sincerely,

WOODARD & CURRAN INC.

Ashley Fletcher, PE
Technical Manager

Enclosures: Utility Plan
City of Portland Wastewater Capacity Application Form

cc:

PN: 0233035.00

CITY OF PORTLAND WASTEWATER CAPACITY APPLICATION

Portland Dept. of Public Works -
Water Resources
55 Portland Street,
Portland, Maine 04101-2991

Bradley Roland, P.E.
Water Resources Division
Department of Public Works
55 Portland Street
Portland, ME 04103

Date: **July 30, 2021**

1. Please, Submit Utility, Site, and Locus Plans.

Site Address: **44 Bedford Street**

Chart Block Lot Number: **114 A001001**

Proposed Use: **Parking Garage**
Previous Use: **Surface Parking**
Existing Sanitary Flows: **0** GPD
Existing Process Flows: **0** GPD
Description and location of City sewer that is to receive the proposed building sewer lateral.

21" combined sewer between Bedford Street & I295.

Site Category		
	Commercial *(see part 4 below)*	X
	Industrial *(complete part 5 below)*	
	Governmental	
	Residential	
	Other *(specify)*	

Clearly, indicate the proposed connections, on the submitted plans.

2. Please, Submit Contact Information.

City Planner's Name: **James Rather** Phone: **207-874-8699**
Owner/Developer Name: **University of Southern Maine, c/o Ann Vashon**
Owner/Developer Address: **25 Bedford Street, Portland, ME 04104**
Phone: **(207) 780-4177** Fax: **N/A** E-mail: **ann.vashon@maine.edu**
Engineering Consultant Name: **Woodard & Curran, c/o Ashley Fletcher, PE**
Engineering Consultant Address: **41 Hutchins Drive, Portland, ME 04101**
Phone: **(207) 558-3665** Fax: **N/A** E-mail: **aefletcher@woodardcurran.com**

Note: Consultants and Developers should allow +/- 15 days, for capacity status, prior to Planning Board Review.

3. Please, Submit Domestic Wastewater Design Flow Calculations.

Estimated Domestic Wastewater Flow Generated: **0 gpd**
Peaking Factor/ Peak Times: **Peak flow = 20 gpm (rainy days)**
Specify the source of design guidelines: *(i.e.* "*Handbook of Subsurface Wastewater Disposal in Maine,*" "*Plumbers and Pipe Fitters Calculation Manual,*" *Portland Water District Records, Other (specify)*

Note: Please submit calculations showing the derivation of your design flows, either on the following page, in the space provided, or attached, as a separate sheet.

4. Please, Submit External Grease Interceptor Calculations.

Total Drainage Fixture Unit (DFU) Values: **N/A**

Size of External Grease Interceptor: _____

Retention Time: _____

Peaking Factor/ Peak Times: _____

Note: In determining your restaurant process water flows, and the size of your external grease interceptor, please use The Uniform Plumbing Code. Note: In determining the retention time, sixty (60) minutes is the minimum retention time. Note: Please submit detailed calculations showing the derivation of your restaurant process water design flows, and please submit detailed calculations showing the derivation of the size of your external grease interceptor, either in the space provided below, or attached, as a separate sheet.

5. Please, Submit Industrial Process Wastewater Flow Calculations

Estimated Industrial Process Wastewater Flows Generated: **N/A** GPD

Do you currently hold Federal or State discharge permits? Yes ____ No ____

Is the process wastewater termed categorical under CFR 40? Yes ____ No ____

OSHA Standard Industrial Code (SIC): *(http://www.osha.gov/oshstats/sicser.html)*

Peaking Factor/Peak Process Times: _____

Note: On the submitted plans, please show where the building's domestic sanitary sewer laterals, as well as the building's industrial-commercial process wastewater sewer laterals exits the facility. Also, show where these building sewer laterals enter the city's sewer. Finally, show the location of the wet wells, control manholes, or other access points; and, the locations of filters, strainers, or grease traps.

Note: Please submit detailed calculations showing the derivation of your design flows, either in the space provided, or attached, as a separate sheet.

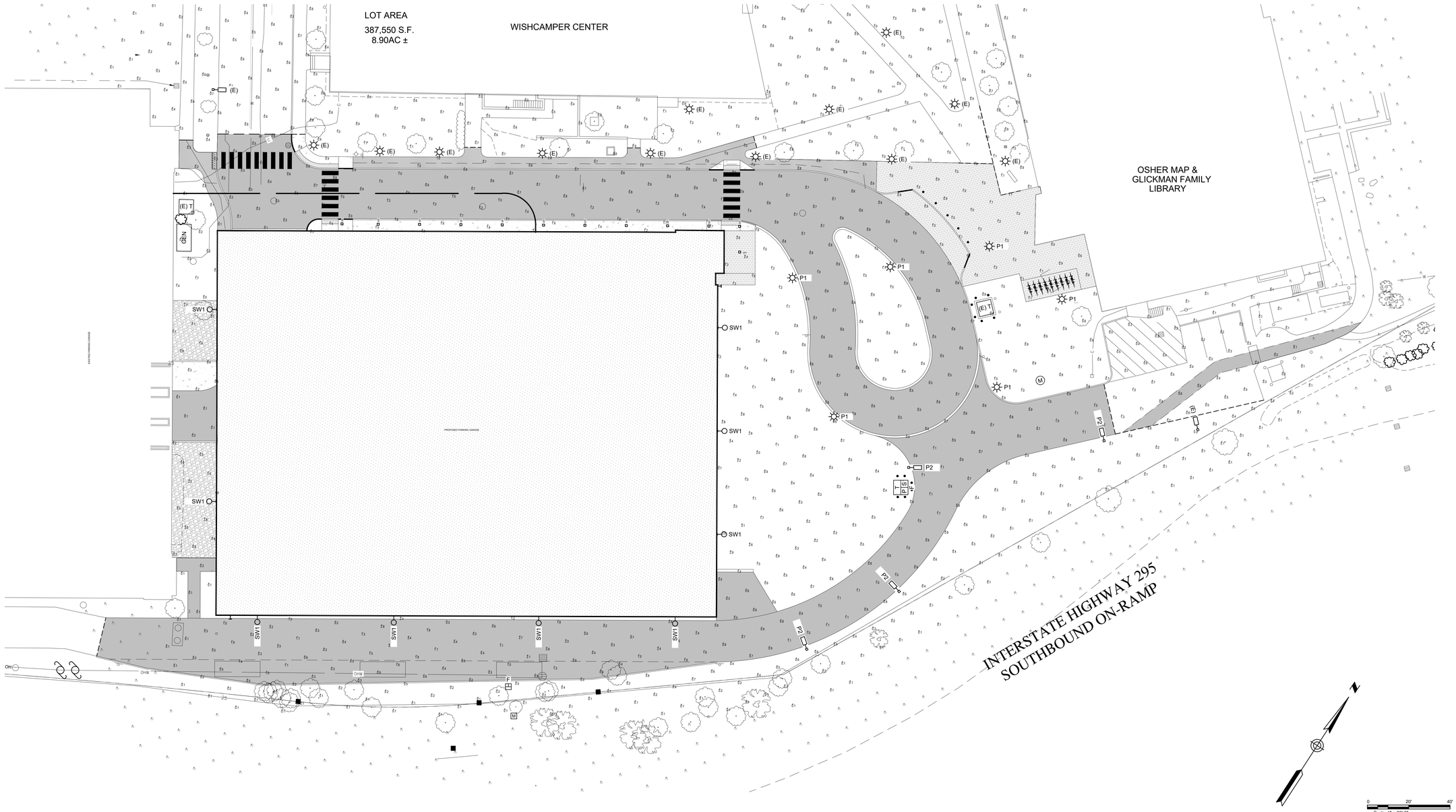
LUMINAIRE SCHEDULE ~ SITE

TYPE	DESCRIPTION	MFR	CATALOG SERIES NUMBER SEE NOTE 1	MOUNTING, U.N.O.	VOLTS	LAMP				KEY NOTES
						QTY PER FIXTURE	WATTS	LUMENS	TYPE	
P1	SITE LIGHT AND POLE, "ICE CREAM CONE" SHAPE	SEE NOTE 8		14' POLE	277	1	24	3,330	LED ARRAY ~ 4000K	8,9
P2	SITE LIGHT AND POLE, "SHOEBOX" SHAPE	SEE NOTE 8		14' POLE	277	1	18	2,160	LED ARRAY ~ 4000K	8,10
SW1	WALL MOUNTED EXTERIOR LIGHT	LITHONIA	KAXW-LED-P1-40K-R4-MVOLT	KEYNOTE 5	UNV	1	29	3,643	LED ARRAY ~ 4000K	5
SR1	RECESSED CANOPY LIGHT	LITHONIA	LDN4SQ-40-07-LS4-AR-LSS-MVOLT	RECESSED CANOPY	UNV	1	8.6	620	LED ARRAY ~ 4000K	

	NOTES
1	**NOTE THAT THESE NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. PROVIDE ALL REQUIREMENTS ON SCHEDULE, NOTES, SPECS, AND DRAWINGS COMBINED.**
2	**CATALOG SERIES NUMBERS ARE USED TO ESTABLISH A LEVEL OF QUALITY AND NOT INTENDED TO LIMIT COMPETITION. SERIES NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. COMPLY WITH ADDITIONAL REQUIREMENTS IN SPECIFICATIONS AND DRAWINGS.**
3	PROVIDE WALL,CEILING, OR PENDANT MOUNTING AS INDICATED ON PLANS. PROVIDE NUMBER OF FACES AND ARROWS AS INDICATED.
4	VERIFY CEILING STRUCTURE AND MOUNTING HEIGHT PRIOR TO ORDERING ANY LIGHT FIXTURES.
5	COORDINATE MOUNTING HEIGHT WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
6	PROVIDE COLD WEATHER OPTION.
7	CONFIRM EXACT FIXTURE CONFIGURATION AND OPTIONS WITH MUNICIPALITY PRIOR TO ORDERING FIXTURE.
8	FIXTURE AND POLE SHALL BE PROVIDED BY OWNER FROM EXISTING OWNER'S STOCK.
9	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8029E345-A.
10	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8039E40-A.

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
DRIVES	Illuminance	Fc	0.99	3.5	0.2	4.95	17.50
WALKWAY- GLICKMAN	Illuminance	Fc	1.00	1.3	0.5	2.00	2.60
WALKWAY- NEW GARAGE	Illuminance	Fc	1.46	1.7	1.2	1.22	1.42



A1	PHOTOMETRIC SITE PLAN
SCALE: 1"=20'-0"	

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT
& STRUCTURAL ENGINEER
DESMAN Design Management
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Boston, MA 02108

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PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN
41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING
160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

© DESMAN, Inc.
2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

SITE PHOTOMETRIC PLAN AND SCHEDULES

SL-100

ORDERING INFORMATION

Sample Number: MSA-400-MH-MT-3S-FG-BK-L

MSA	100	MH	VOLT	5S	FG	DP		

Product Family [1]
MSA=MESA

Lamp Wattage [2]
HID
50=50W
70=70W
100=100W
150=150W
175=175W
250=250W
320=320W [3]
350=350W [3]
400=400W [4]
Compact Fluorescent
42=42W [5]
57=57W [5,6]
114=(2) 57W [7]
140=(2) 70W [7]
Electrodeless Fluorescent
85=85W [8]

Lamp Type
MH=Metal Halide
MP=Pulse Start Metal Halide
HPS=High Pressure Sodium
CF=Compact Fluorescent [9]
QL=Electrodeless Fluorescent

Voltage [10]
120=120V
208=208V
240=240V
277=277V
347=347V
480=480V
DT=Dual-Tap Wired 277V [11]
MT=Multi-Tap Wired 277V [11]
TT=Triple-Tap Wired 347V [11]

Distribution
2S=Type II
3S=Type III
4S=Type IV
5S=Type V
SL=Forward Throw Spill Light Eliminator

Lens Type
FG=Flat Glass
FR=Frosted Flat Glass
SG=Sag Glass
FRS=Frosted Sag Glass
VS=Polycarbonate Vandal Shield [12]

Colors (add as suffix/must specify) [13]
BK=Black
AP=Grey
BZ=Bronze
WH=White
DP=Dark Platinum
GM=Graphite Metallic
GN=Hartford Green

Options (add as suffix)
F=Single Fuse (120, 277, or 347V / Specify Voltage)
FF=Double Fuse (208, 240 or 480V / Specify Voltage)
Q=Quartz Restrike [14]
EM=Quartz Restrike with Delay (Also Strikes at Cold Start) [14]
EM/SC=Quartz Emergency Separate Circuit [14]
42CF/EM=Emergency Battery Backup [15]
R=NEMA Twistlock Photocontrol Receptacle
PC=Button Photocontrol
DS=Dual Fluorescent Switching Control [16]
HS=House Side Shield [17]
L=Lamp Included

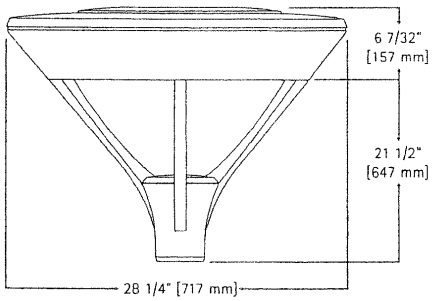
Accessories (order separately/ replace XX with color suffix)
VA6028-XX=Dual Mount Arm
VA6029-XX=Wall Mount Arm
OA/RA1016=Photocontrol-Multi-tap
OA/RA1027=Photocontrol-480V
OA/RA1201=Photocontrol-Multi-tap 347V

DL1

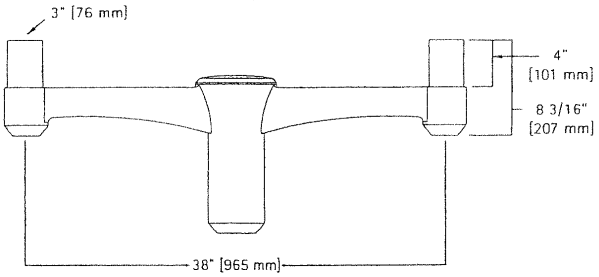
NOTES: 1 Slipfits over 3" O.D. tenon. 2 50-175W HID lamps use medium-base lampholders. 250-400W HID lamps use mogul-base lampholders. 3 320 and 350W Pulse Start Metal Halide only. 4 400W Metal Halide requires reduced envelope ED-28 lamps. 5 Compact Fluorescent lamp only. Available in Type 3S, 4S and 5S distributions only. 6 Nominal M.O.L. lamp length of 57W CFL not to exceed 7". 7 Dual 57 and 70W Compact Fluorescent lamp available in Type 4S distribution only. 8 Electrodeless Fluorescent lamp option available in Type 3S and 5S distributions only. 120V only. 9 Compact Fluorescent ballasts contain internal fusing. No supplemental fusing is necessary. CF ballasts are 120 through 277V. 10 Products also available in non-US voltages and 50Hz for international markets. Consult factory for availability and ordering information. 11 Dual-Tap is 120/277V wired 277V. Multi-Tap is 120/208/240/277V wired 277V. Triple-Tap ballast is 120/277/347V wired 347V. 12 Maximum wattage of 250W HID. 13 RAL and custom color matches available. Consult your INVUE Lighting Systems Representative. 14 Quartz options not available with SL optic. 15 Battery backup provides 90 minutes of supplemental light at 60% of initial rated lamp lumens. Type 3S, 4S, 5S optics only. Must specify 42W Compact Fluorescent lamp. 16 Dual switching requires dual 57W or dual 70W Compact Fluorescent lamps, and allows independent switching control of each lamp through use of two (2) electronic ballasts. Allows 50% power reduction. 17 House side shield not available on 5S or SL optics.

DIMENSIONS

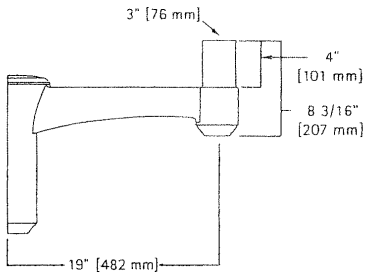
MESA [EPA 1.1]



Dual Mount Arm [EPA 1.36]



Wall Mount Arm



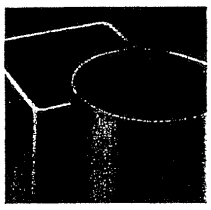
WATTAGE TABLE

	MSA
Metal Halide	50, 70, 100, 175, 250, 400W
Pulse Start Metal Halide	250, 320, 350, 400W
High Pressure Sodium	50, 70, 100, 150, 250, 400W
Compact Fluorescent	42, 57, (2) 57, (2) 70W
Electrodeless Fluorescent	85W

SHIPPING DATA

	MSA
Net. Weight (lbs.)	50
E.P.A.	1.1

NOTE: The above are approximate weights and volumes.



POLES

INVUE Lighting Systems offers a comprehensive package of steel, aluminum and decorative poles to suit any site lighting application. Consult the INVUE Poles brochure for ordering information and product specifications.

STANDARD COLORS

BK Black
AP Grey
BZ Bronze
WH White
DP Dark Platinum
GM Graphite Metallic
GN Hartford Green



APPLICATIONS DEPARTMENT

Let the application experts at Cooper Lighting design your next lighting layout. Aided by the latest computer simulation software and a comprehensive lighting background, our Application Engineers can design, analyze, and provide statistical layouts for any lighting application. Whether the design criteria calls for Illuminance, Luminance, or Small Target Visibility (STV) compliance, Cooper Lighting can provide the fixture layout and supporting documentation necessary to help secure your next project.



INVUE WEBSITE

Visit invuelighting.com for the latest product information from INVUE Lighting Systems. With instant access to IES photometric files, PDF product specification sheets, new product announcements, and other helpful specification tools, the INVUE Lighting website is an invaluable resource for getting information to customers-quickly.

ARX=ORDERING INFORMATION

The following information illustrates the correct way to enter an order for ARS4T08NGMA1V. The ordering designation is detailed as follows.

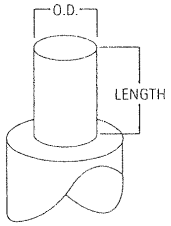
Aluminum	Round	Straight	Shaft Dia. (at base)	Wall Thickness	Mounting Height (ft.)	Base Type	Colors	Fixture Mounting + Type	No. + Location of Arms	Accessories (Vibration Damper)
A	R	X	4	T	08	N	GM	A	1	V

Mtg. Height (Ft.) MH	Catalog Number[3]	Wall Thickness (In.)	Shaft Dia. (In.) B	Bolt Proj. (In.) BP	Bolt Circle Dia. (In.) BC	Anchor Bolt D x AB x H (In.) AB	Net. Wt. (Lbs.)	EPA (Sq. Ft.)[2,4] At Pole Top 70	80	90	100	EPA (Sq. Ft.)[2,4] 18" Above Pole Top 70	80	90	100	Max. Fixture Load—Include Bracket (Lbs.)
8	ARX4T08NBZ	.125	4	1 7/8	6 3/4	3/4 x 17 x 3	20	18.9	14.2	10.9	8.6	15.6	11.7	9.0	7.1	100
10	ARX4T10NBZ	.125	4	1 7/8	6 3/4	3/4 x 17 x 3	24	14.0	10.3	7.8	6.0	11.9	8.8	6.6	5.1	100
12	ARX4T12NBZ	.125	4	1 7/8	6 3/4	3/4 x 17 x 3	27	10.6	7.6	5.6	4.2	9.2	6.6	4.9	3.7	100
12	ARX5T12NBZ	.125	5	1 7/8	7 3/4	3/4 x 17 x 3	33	17.9	13.2	10.2	8.2	15.6	11.5	9.0	7.1	100
15	ARX4T15NBZ	.125	4	1 7/8	6 3/4	3/4 x 17 x 3	33	7.0	4.8	3.2	2.3	6.3	4.3	2.9	2.0	100
15	ARX5T15NBZ	.125	5	1 7/8	7 3/4	3/4 x 17 x 3	40	12.5	9.0	6.9	5.4	11.2	8.0	6.1	4.8	100
18	ARX4M18NBZ[1]	.188	4	1 7/8	6 3/4	3/4 x 17 x 3	54	8.1	5.5	3.7	2.5	7.3	5.0	3.3	2.3	100
18	ARX5M18NBZ	.188	5	1 7/8	7 3/4	3/4 x 17 x 3	66	14.4	10.3	7.9	6.2	13.1	9.4	7.2	5.6	150
20	ARX5M20NBZ	.188	5	1 7/8	7 3/4	3/4 x 17 x 3	73	11.7	8.2	6.2	4.8	10.8	7.5	5.7	4.4	150

NOTES: 1 Factory installed vibration dampeners.
2 The above is our standard offering. Where higher EPA/wind speed capability or mounting height is required, other shaft dimensions and/or wall thickness are available. Consult INVUE Lighting Representative for pricing and lead times. The above E.P.A. capacities are based on loading from (1994) and pole drag coefficients from (2001) American Association of State Highway and Transportation Officials Specification.
3 Catalog item includes one set of anchor bolts, single nuts and (2) leveling shims.
4 EPAs based on shaft properties with wind normal to flat. EPAs calculated using base wind velocity as indicated plus 30% gust factor.

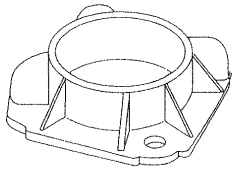
MOUNTING OPTIONS=FIXED TENON [add as suffix]

Designation Number	O.D. (in.)	Length (in.)
1	2 3/8"	3 1/2"
2	2 3/8"	4"
5	3"	4"
4	4"	6"

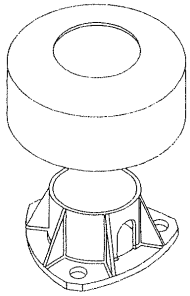


ACCESSORIES
C=Convenience Outlet
E=GFI Convenience Outlet
F=Vibration Pad
G=Ground Lug
V=Vibration Damper
D=Base Cover ("A" Base Only)

STANDARD BASE [Round Aluminum Pole only]
Type A=6", 7", 8" or 10"



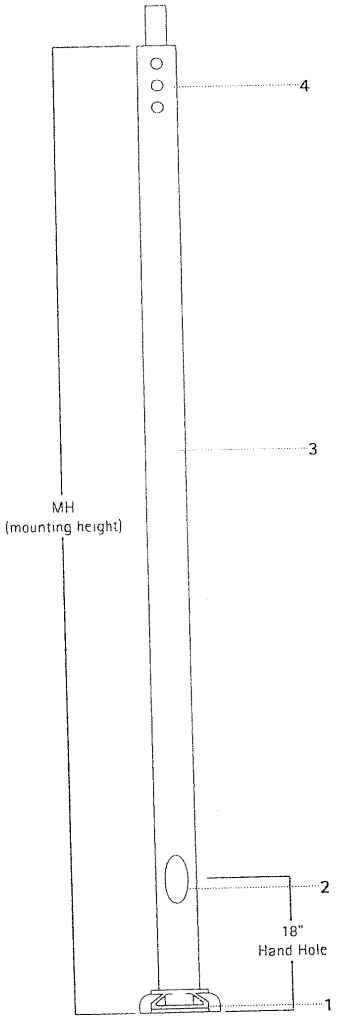
STANDARD BASE [Round Aluminum Pole only]
Type N=4", 5", or 6" (Standard with Base Cover)



ARX=ALUMINUM ROUND STRAIGHT

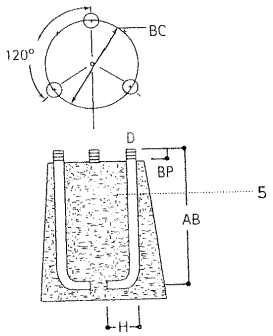
8'–20' Mounting Height

PL1





Base View



SPECIFICATION FEATURES

1 356-T6 cast aluminum alloy shoe base with aluminum alloy bolt covers or base cover dependent upon base type.

2 Flush hand hole assembly 2 3/8" x 4 1/2" for 4" and 3" x 5" for 5" shafts with ground lug located opposite opening drilled and tapped. Ground lug located opposite hand hole opening drilled and tapped for 3/8" 16NC-2 grounding screw.

3 Straight round shaft 6063-T6 aluminum alloy finished in premium TGIC polyester powder coat.

4 Drilled or Tenon (specify).

5 Anchor bolt per ASTM A576 with (1) nut, (1) flat washer, and (2) shims. Nuts, washers and threaded portion of bolt are hot dip galvanized.

POLE COMPATIBILITY MATRIX	DRILL	EPA + MOUNTING CONFIGURATIONS					
	PATTERN	Single w/Arm	2 @ 180°	2 @ 90°	3 @ 90°	3 @ 120°	4 @ 90°
PRODUCT	TENON	[1]	[2]	[5]	[3]	[6]	[4]
ICON SMALL	A	0.69	1.38	1.38	1.84	1.84	2.07
ICON MEDIUM	C	1.09	2.18	2.18	2.86	2.86	3.20
ICON SMALL STRUCTURAL MOUNT	J	0.71	1.42	1.42	1.90	1.90	2.14
ICON MEDIUM STRUCTURAL MOUNT	K	1.11	2.22	2.22	2.92	2.92	3.27
SLIDE	4*	2.97	--	--	--	--	--
FLITE	4*	1.56	--	--	--	--	--
VISION SMALL	E	1.27	2.54	2.54	3.60	3.60	4.13
VISION MEDIUM	M	1.6	3.20	3.20	4.50	4.50	5.55
VISION SMALL STRUCTURAL MOUNT	F	1.28	2.56	2.56	3.63	3.63	4.17
VISION MEDIUM STRUCTURAL MOUNT	G	1.82	3.64	3.64	4.96	4.96	5.62
ASCENT SMALL	A	0.85	1.70	1.70	2.35	2.35	2.68
ASCENT MEDIUM	C	1.35	2.70	2.70	3.83	3.83	4.56
STRUT SMALL	A	1.03	2.06	2.06	2.89	2.89	3.49
STRUT MEDIUM	C	1.64	3.28	3.28	4.70	4.70	5.77
X-FORM SMALL	E	1.15	2.30	2.30	3.20	3.20	3.81
X-FORM MEDIUM	M	2.1	4.20	4.20	6.00	6.00	7.50
MESA	5**	1.1	3.56	--	--	--	--
EPIC MEDIUM	4*	Consult EPIC brochure for system EPA data					
EPIC LARGE	4*	Consult EPIC brochure for system EPA data					

* Fits 4" O.D. by 6" long tenon or slipfits over 4" ARX or SRX pole. ** Fits 3" O.D. by 4" long tenon.

THREE BOLT ANCHORAGE [see ordering information]

BC=Bolt Circle
PB=Bolt Projection
AB=Bolt Dimensions
D=Bolt Diameter
H=Bolt Dimensions

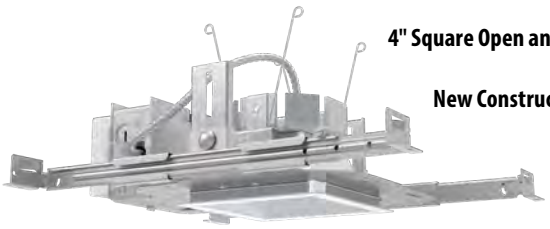
NOTE: Specifications and dimensions subject to change without notice.

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

LDN4SQ

4" Square Open and WallWash LED
Non-IC
New Construction Downlight



FEATURES & SPECIFICATIONS

INTENDED USE — Typical applications include corridors, lobbies, conference rooms and private offices.

CONSTRUCTION — Durable square metal reflectors retained by torsion springs.

Galvanized steel mounting/plaster frame; galvanized steel junction box with bottom-hinged access covers and spring latches.

Vertically adjustable mounting brackets with commercial bar hangers provide 3-3/4" total adjustment.

Two combination 1/2"-3/4" and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out). No. 12 AWG conductors, rated for 90°C.

Accommodates 12"-24" joist spacing.

Passive cooling thermal management for 25°C standard; high ambient (40°C) option available. Light engine and drivers are accessible from above or below ceiling.

Max ceiling thickness 1-1/2".

OPTICS — LEDs are binned to a 3-step SDCM; 80 CRI minimum. 90 CRI optional.

LED light source concealed with diffusing optical lens.

General illumination lighting with 1.0 S/MH and 55° cutoff to source and source image.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes. Also available in white and black painted reflectors.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes.

ELECTRICAL — Multi-volt (120-277V, 50/60Hz) 0-10V dimming drivers mounted to junction box, 10% or 1% minimum dimming level available.

0-10V dimming fixture requires two (2) additional low-voltage wires to be pulled.

70% lumen maintenance at 60,000 hours.

LISTINGS — Certified to US and Canadian safety standards. Wet location standard (covered ceiling). IP55 rated. ENERGY STAR® certified product.

BUY AMERICAN — Product with the BAA option is assembled in the USA and meets the Buy America(n) government procurement requirements under FAR, DFARS and DOT.

Please refer to www.acuitybrands.com/buy-american for additional information.

WARRANTY — 5-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/support/warranty/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

Buy American

battery pack

A+ Capable options indicated by this color background.

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: LDN4SQ 35/15 LS4AR LSS MVOLT EZ1

LDN4SQ															
Series		**Color temperature**		**Lumens**[1]				**Aperture/Trim Color**				**Finish**		**Voltage**	
LDN4SQ	4" square	27/	2700K	05	500 lumens	20	2000 lumens	LS4	Downlight	AR	Clear	LSS	Semi-specular	MVOLT	Multi-volt
		30/	3000K	07	750 lumens	25	2500 lumens	LSW4	Wallwash	WR[2]	White	LD	Matte diffuse	120	120V
		35/	3500K	10	1000 lumens	30	3000 lumens			BR[2]	Black	LS	Specular	277	277V
		40/	4000K	15	1500 lumens	40	4000 lumens							347[3]	347V
		50/	5000K												

Driver		**Options**			
GZ10	0-10V driver dims to 10%	SF[4]	Single fuse	NPS80EZ[7]	nLight® dimming pack controls 0-10V eldoLED drivers (EZ10, EZ1).
GZ1	0-10V driver dims to 1%	TRW[5]	White painted flange	NPS80EZER[7]	nLight® dimming pack controls 0-10V eldoLED drivers (EZ10, EZ1). ER controls fixtures on emergency circuit.
D10	Minimum dimming 10% driver for use with JOT	TRBL[5]	Black painted flange	NLTAIR2[8,10]	nLight® Air enabled
D1	Minimum dimming 1% driver for use with JOT	EL[6]	Emergency battery pack with integral test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS	NLTAIRER2[8,10]	nLight® AIR Dimming Pack Wireless Controls. Controls fixtures on emergency circuit, not available with battery pack options
EZ10	0-10V eldoLED driver with smooth and flicker-free deep dimming performance down to 10%	ELR[6]	Emergency battery pack with remote test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS	NLTAIREM2[8,10]	nLight® AIR Dimming Pack Wireless Controls. UL924 Emergency Operation, via power interrupt detection. Available with battery pack options.
EZ1	0-10V eldoLED driver with smooth and flicker-free deep dimming performance down to 1%	ELSD[6]	Emergency battery pack with self-diagnostics, 10W Constant Power, integral test switch. Not Certified in CA Title 20 MAEDBS	N80[9]	nLight™ Lumen Compensation
EDAB	eldoLED DALI SOLDRIVE dim to dark	ELRSD[6]	Emergency battery pack with self-diagnostics, 10W Constant Power, remote test switch. Not Certified in CA Title 20 MAEDBS	JOT[13]	Wireless room control with "Just One Touch" pairing
		E10WCP[6]	Emergency battery pack, 10W Constant Power with integral test switch. Certified in CA Title 20 MAEDB	HAO[11]	High ambient option (40°C)
		E10WCPR[6]	Emergency battery pack, 10W Constant Power with remote test switch. Certified in CA Title 20 MAEDB	CP[12]	Chicago Plenum
		NPP16D[7]	nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1).	RRL___	RELOC®-ready luminaire connectors enable a simple and consistent factory installed option across all ABL luminaire brands. Refer to RRL for complete nomenclature. Available only in RRLA, RRLB, RRLAE, and RRLC12S.
		NPP16DER[7]	nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1). ER controls fixtures on emergency circuit.	BAA	Buy America(n) Act Compliant
				90CRI	High CRI (90+)

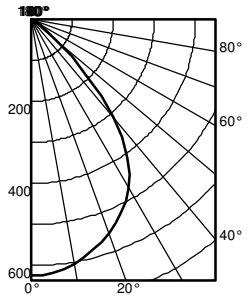
Notes

1. Overall height varies based on lumen package; refer to dimensional chart on page 3.
2. Not available with finishes.
3. Not available with emergency options.
4. Must specify voltage 120V or 277V.
5. Available with clear (AR) reflector only.
6. 12.5" of plenum depth or top access required for battery pack maintenance.
7. Specify voltage. ER for use with generator supply EM power. Will require an emergency hot feed and normal hot feed.
8. NLTAIR2, NLTAIRER2 and NLTAIREM2 not recommended for metal ceiling installations.
9. Fixture begins at 80% light level. Must be specified with NPS80EZ or NPS80EZ ER. Only available with EZ10 and EZ1 drivers.
10. Not available with CP, NPS80EZ, NPS80EZER, NPP16D, NPP16DER or N80 options.
11. Fixture height is 5-11/16" for all lumen packages with HAO.
12. Must specify voltage for 3000lm. Not available with emergency battery pack option.
13. Must specify D10 or D1 driver. Not available with nLight options. Not available with CP. Not recommended for metal ceiling installation. Not for use with emergency backup power systems other than battery packs.

PHOTOMETRY

Distribution Curve | **Distribution Data** | **Output Data** | **Coefficient of Utilization** | **Illuminance Data at 30" Above Floor for a Single Luminaire**

LDN4SQ 35/10 LS4AR, input watts: 10.58, delivered lumens: 908.4, LM/W = 85.86, spacing criterion at 0= 1.15, test no. ISF 35250P109



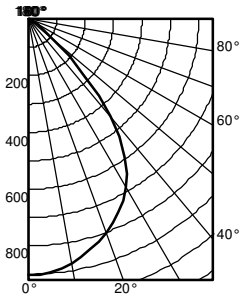
	Ave	Lumens
0	625	
5	621	59
15	580	163
25	519	238
35	409	251
45	192	148
55	37	38
65	7	8
75	2	2
85	0	0
90	0	

Zone	Lumens	% Lamp
0° - 30°	460.2	50.7
0° - 40°	710.8	78.2
0° - 60°	897.5	98.8
0° - 90°	908.1	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.1	0.0
90° - 180°	0.3	0.0
0° - 180°	908.4	*100.0
*Efficiency		

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	119	119	119	116	116	116	111	111	111
1	109	107	104	107	105	102	103	101	99
2	100	96	92	99	94	91	95	92	89
3	92	86	82	90	85	81	88	83	80
4	84	78	73	83	77	73	81	76	72
5	78	71	66	77	70	66	75	69	65
6	72	65	60	71	64	60	69	63	59
7	66	59	54	66	59	54	64	58	54
8	62	55	50	61	54	50	60	54	50
9	57	50	46	57	50	46	56	50	46
10	53	47	42	53	47	42	52	46	42

		50% beam - 59.5°		10% beam - 90.9°	
Mounting Height	Inital FC Center Beam	Diameter	FC	Diameter	FC
8.0	20.6	6.3	10.3	11.2	2.1
10.0	11.1	8.6	5.5	15.2	1.1
12.0	6.9	10.9	3.5	19.3	0.7
14.0	4.7	13.1	2.4	23.4	0.5
16.0	3.4	15.4	1.7	27.4	0.3

LDN4SQ 35/15 LS4AR, input watts: 17.5, delivered lumens: 1314.4, LM/W = 75.10, spacing criterion at 0= 1.15, test no. ISF 35250P114.



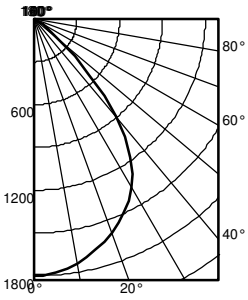
	Ave	Lumens
0	904	
5	898	85
15	840	237
25	751	344
35	592	363
45	277	214
55	54	56
65	11	12
75	2	3
85	1	1
90	0	

Zone	Lumens	% Lamp
0° - 30°	665.9	50.7
0° - 40°	1028.5	78.2
0° - 60°	1298.6	98.8
0° - 90°	1314.0	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.1	0.0
90° - 180°	0.4	0.0
0° - 180°	1314.4	*100.0
*Efficiency		

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	119	119	119	116	116	116	111	111	111
1	109	107	104	107	105	102	103	101	99
2	100	96	92	99	94	91	95	92	89
3	92	86	82	90	85	81	88	83	80
4	84	78	73	83	77	73	81	76	72
5	78	71	66	77	70	66	75	69	65
6	72	65	60	71	64	60	69	63	59
7	66	59	54	66	59	54	64	58	54
8	62	55	50	61	54	50	60	54	50
9	57	50	46	57	50	46	56	50	46
10	53	47	42	53	47	42	52	46	42

		50% beam - 59.5°		10% beam - 90.9°	
Mounting Height	Inital FC Center Beam	Diameter	FC	Diameter	FC
8.0	29.9	6.3	14.9	11.2	3.0
10.0	16.1	8.6	8.0	15.2	1.6
12.0	10.0	10.9	5.0	19.3	1.0
14.0	6.8	13.1	3.4	23.4	0.7
16.0	5.0	15.4	2.5	27.4	0.5

LDN4SQ 35/30 LS4AR, input watts: 32.1, delivered lumens: 2614.1, LM/W = 83.78, spacing criterion at 0= 1.15, test no. ISF 31036P129.



	Ave	Lumens
0	1797	
5	1786	169
15	1670	470
25	1493	685
35	1178	721
45	551	426
55	107	111
65	21	24
75	5	6
85	1	1
90	0	

Zone	Lumens	% Lamp
0° - 30°	1324.3	50.7
0° - 40°	2045.4	78.2
0° - 60°	2582.5	98.8
0° - 90°	2613.2	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.2	0.0
90° - 180°	0.8	0.0
0° - 180°	2614.0	*100.0
*Efficiency		

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	119	119	119	116	116	116	111	111	111
1	109	107	104	107	105	102	103	101	99
2	100	96	92	99	94	91	95	92	89
3	92	86	82	90	85	81	88	83	80
4	84	78	73	83	77	73	81	76	72
5	78	71	66	77	70	66	75	69	65
6	72	65	60	71	64	60	69	63	59
7	66	59	54	66	59	54	64	58	54
8	62	55	50	61	54	50	60	54	50
9	57	50	46	57	50	46	56	50	46
10	53	47	42	53	47	42	52	46	42

		50% beam - 59.5°		10% beam - 90.9°	
Mounting Height	Inital FC Center Beam	Diameter	FC	Diameter	FC
8.0	59.4	6.3	29.7	11.2	5.9
10.0	32.0	8.6	16.0	15.2	3.2
12.0	19.9	10.9	10.0	19.3	2.0
14.0	13.6	13.1	6.8	23.4	1.4
16.0	9.9	15.4	4.9	27.4	1.0

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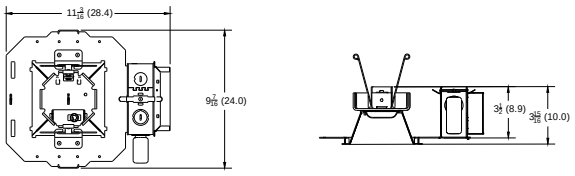
LDN4SQ

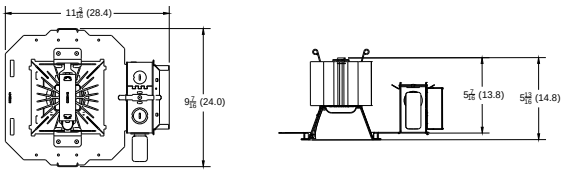
* All dimensions are inches (centimeters) unless otherwise noted.

LDN4 500 - 1500 LUMENS



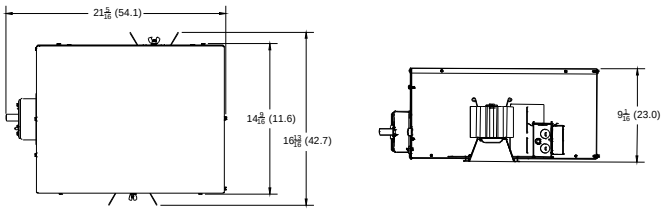
Aperture: 4-5/16" (11)
Ceiling Opening: 5-1/8" (13)
Overlap Trim: 5-7/16" (13.8)

LDN4 2000 - 3000 LUMENS



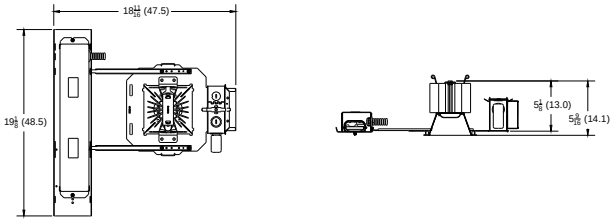
Aperture: 4-5/16" (11)
Ceiling Opening: 5-1/8" (13)
Overlap Trim: 5-7/16" (13.8)

LDN4 CP



Aperture: 4-5/16" (11)
Ceiling Opening: 5-1/8" (13)
Overlap Trim: 5-7/16" (13.8)

LDN4 EL



Aperture: 4-5/16" (11)
Ceiling Opening: 5-1/8" (13)
Overlap Trim: 5-7/16" (13.8)

LDN4SQ			
Nominal	**Lumens**	**Wattage**	**Lm/W**
500	432.5	5.7	75.3
750	620	8.6	72.1
1000	863	10.6	81.6
1500	1249	17.5	71.4
2000	1657	22.1	74.9
2500	2218	26.1	85.0
3000	2483	32.1	77.4
4000	3479	43.0	80.9

LUMEN OUTPUT MULTIPLIERS ☒FINISH			
	Clear (AR)	**White (WR)**	**Black (BR)**
Specular (LS)	1.0	N/A	N/A
Semi-specular (LSS)	0.950	N/A	N/A
Matte di☒use (LD)	0.85	N/A	N/A
Painted	N/A	0.87	0.73

HOW TO ESTIMATE DELIVERED LUMENS IN EMERGENCY MODE

Use the formula below to estimate the delivered lumens in emergency mode

Delivered Lumens = 1.25 x P x LPW

P = Ouput power of emergency driver. P = 10W for PS1055CP

LPW = Lumen per watt rating of the luminaire. This information is available on the ABL luminaire spec sheet.
The LPW rating is also available at Designlight Consortium.

LUMEN OUTPUT MULTIPLIERS ☒CCT					
	2700K	**3000K**	**3500K**	**4000K**	**5000K**
80CRI	0.950	0.966	1.000	1.025	1.101

Notes

- Tested in accordance with IESNA LM-79-08.
- Tested to current IES and NEMA standards under stabilized laboratory conditions.
- CRI: 80 typical.

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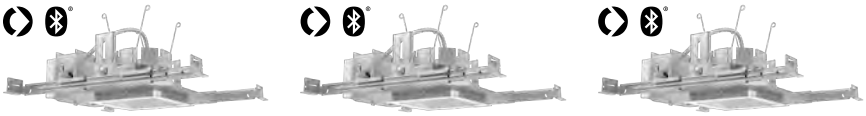
ADDITIONAL DATA

JOT
JUST ONE TOUCH

The Sensor Switch JOT enabled solution offers a wireless, app-free approach to single room lighting control. JOT enabled products use Bluetooth® Low Energy (BLE) technology to enable wireless dimming and switching.

Diagram



LDN4SQ Series



Sensor Switch
WSXA JOT

1. **Power:** Install JOT enabled fixtures and controls as instructed.
2. **Pair:** Insert the pairing tool into the pinhole on the wall switch; press and hold any button for 6 seconds.
3. **Play:** Once paired, each fixture will individually dim down to 10% brightness. All products will be fully functional.

COMPATIBLE 0-10V WALL-MOUNT DIMMERS		
MANUFACTURER	PART NO.	POWER BOOSTER AVAILABLE
Lutron®	Diva® DVTV	
	Diva® DVSCTV	
	Nova T® NTFTV	
	Nova® NFTV	
Leviton®	AWSMT-7DW	CN100
	AWSMG-7DW	PE300
	AMRMG-7DW	
	Leviton Centura Fluorescent Control System	
	IllumaTech® IP7 Series	
Synergy®	ISD BC	RDMFC
	SLD LPCS	
	Digital Equinox (DEQ BC)	
Douglas Lighting Controls	WPC-5721	
Entertainment Technology	Tap Glide TG600FAM120 (120V)	
	Tap Glide Heatsink TGH1500FAM120 (120V)	
	Oasis OA2000FAMU	
Honeywell	EL7315A1019	EL7305A1010 (optional)
	EL7315A1009	
HUNT Dimming	Preset slide: PS-010-IV and PS-010-WH	
	Preset slide: PS-010-3W-IV and PS-010-3W-WH	
	Preset slide, controls FD-010: PS-IFC-010-IV and PS-IFC-010-WH-120/277V	
	Preset slide, controls FD-010: PS-IFC-010-3W-IV and PS-IFC-010-3W-WH-120/277V	
	Remote mounted unit: FD-010	
Lehigh Electronic Products	Solitaire	PBX
PDM Electrical Products	WPC-5721	
Starfield Controls	TR61 with DALI interface port	RT03 DALInet Router
WattStopper®	LS-4 used with LCD-101 and LCD-103	

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded background*
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

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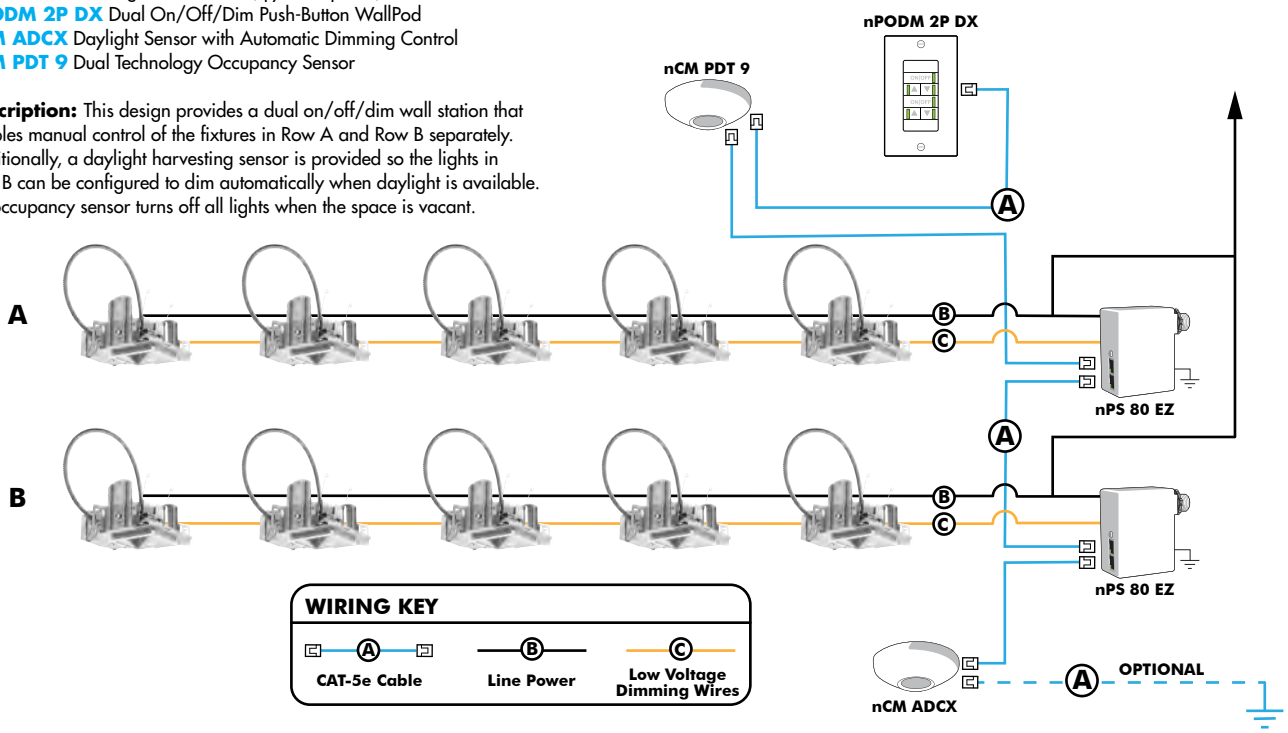
LDN4SQ

EXAMPLE
Group Fixture Control*
*Appiication diagram applies for fixtures with eldoLED drivers only.

nPS 80 EZ Dimming/Control Pack (qty: 2 required)
nPODM 2P DX Dual On/Off/Dim Push-Button WallPod
nCM ADCX Daylight Sensor with Automatic Dimming Control
nCM PDT 9 Dual Technology Occupancy Sensor

Description: This design provides a dual on/off/dim wall station that enables manual control of the fixtures in Row A and Row B separately. Additionally, a daylight harvesting sensor is provided so the lights in Row B can be configured to dim automatically when daylight is available. An occupancy sensor turns off all lights when the space is vacant.



Choose Wall Controls

nLight offers multiple styles of wall controls - each with varying features and user experience.



Push-Button Wallpod
Traditional tactile buttons and LED user feedback



Graphic Wallpod
Full color touch screen provides a sophisticated look and feel

nLight® Wired Controls Accessories:			
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlight for complete listing of nLight controls.			
WallPod Stations	**Model number**	**Occupancy sensors**	**Model Number**
On/Off	nPODM (Color)	Small motion 360°, ceiling (PIR/dual Tech)	nCM 9 / nCM PDT 9
On/Off & Raise/Lower	nPOD DX (Color)	Large motion 360°, ceiling (PIR/dual tech)	nCM 10 / nCM PDT 10
Graphic Touchscreen	nPOD GFX (Color)	Wide View (PIR/dual tech)	nWV 16 / nWV PDT 16
Photocell controls	**Model Number**	Wall Switch w/ Raise/Lower (PIR/dual tech)	nWSX LV DX / nWSX PDT LV DX
Dimming	nCM ADCX	**Cat-5 cables (plenum rated)**	**Model Number**
		10', CAT5 10FT	CAT5 10FT J1
		15, CAT5 15FT	CAT5 15FT J1

nLight® AIR Control Accessories: *Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlightair.*	
Wall switches	**Model number**
On/Off single pole	rPODB [color]
On/Off two pole	rPODB 2P [color]
On/Off & raise/lower single pole	rPODB DX [color]
On/Off & raise/lower two pole	rPODB 2P DX [color]
On/Off & raise/lower single pole	rPODBZ DX WH[1]

Notes
1 Can only be ordered with the RES7Z zone control sensor version.

nLight AIR

nLight AIR is the ideal solution for retrofit or new construction spaces where adding communication is cost prohibitive. The integrated nLight AIR rPP20 Power Pack is part of each Lithonia LDN Luminaire. These individually addressable controls offer the ultimate in flexibility during initial setup and for space repurposing.



Simple as 1,2,3

1. Install the nLight® AIR fixtures with embedded smart sensor
2. Install the wireless battery-powered wall switch
3. With CLAIRITY app, pair the fixtures with the wall switch and if desired, customize the sensor settings for the desired outcome



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KAXW
LED Wall Luminaire

Catalog Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements.

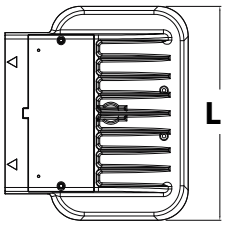
Specifications

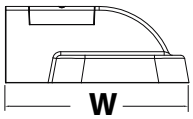
Length: 14" (35.6 cm)

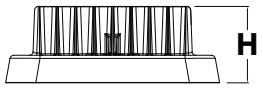
Width: 12" (35.6 cm)

Height: 5" (12.7 cm)

Weight (max): 19.7 lbs (8.9 kg)







A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and system-level interoperability.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is A+ Certified when ordered with DTL® controls marked by a shaded background. DTL DLL equipped luminaires meet the A+ specification for luminaire to photocontrol interoperability1
- This luminaire is part of an A+ Certified solution for ROAM® or XPoint™ Wireless control networks, providing out-of-the-box control compatibility with simple commissioning, when ordered with drivers and control options marked by a shaded background[1]

To learn more about A+, visit www.acuitybrands.com/aplus.

1. See ordering tree for details.

A+ Capable options indicated by this color background.

Ordering Information

EXAMPLE: KAXW LED P3 40K R3 MVOLT DDBXD

KAXW LED

Series	Performance package	Color temperature	Distribution	Voltage	Mounting	Control options	Other options	Finish *(required)*
KAXW LED	P1 P2 P3	30K 3000 K 40K 4000 K 50K 5000 K	R3 Type 3 R4 Type 4	MVOLT [1] 120 [1] 208 [1] 240 [1] 277 [1] 347 [2] 480 [2]	**Shipped included** (blank) Surface mounting bracket	**Shipped installed** PER NEMA twist-lock receptacle only (controls ordered separate)[3,4] PER5 Five-wire receptacle only (controls ordered separate)[4,5] PER7 Seven-wire receptacle only (controls ordered separate)[4,5] PIR 180° motion/ambient light sensor, <15' mtg ht [6] FAO Field adjustable output[7] PIRH Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc [6] PIR1FC3V Bi-level, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc [6] PIRH1FC3V Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc [6]	**Shipped installed** SF Single fuse (120, 277 or 347V)[8] DF Double fuse (208, 240 or 480V)[9] HS House-side shield [10] LCE Left Conduit Entry [11] RCE Right Conduit Entry [11] **Shipped separately** BSW Bird-deterrent spikes[10] EGS External glare shield[10]	DDBXD Dark bronze DBLXD Black DNAXD Natural aluminum DWHXD White DSSXD Sandstone DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white DSSTXD Textured sandstone

NOTES

1 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
2 Not available in the P1 performance package.
3 Not available with ROAM®. See PER5 or PER7 option.
4 Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See Accessories information.
5 If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls.
6 Specifies the Sensor Switch MSOD-7-ODP control; see Outdoor Control Technical Guide for details. Dimming driver standard. Not available with PER5 or PER7. Must specify 120V or 277V. Requires PER or separate on/off.
7 Not available with PER5 or PER7 options.
8 Must specify 120, 277, or 347V option.
9 Must specify 208, 240, or 480V option.
10 Also available as a separate accessory; see Accessories information.
11 Requires a contractor supplied ½" EMT raintight fitting.
12 Requires luminaire to be specified with PER, PER5 or PER7 option. Ordered and shipped as a separate line item from Acuity Brands Controls.

Accessories

Ordered and shipped separately.

DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) [12]
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) [12]
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) [12]
DSHORT SBK U	Shorting cap
KAXWHS U	House-side shield
KAXWBSW U	Bird-deterrent spikes
KAXWEGS U	External glare shield

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Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Performance Package	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)				
			Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
P1	29W	R3	3,322	1	0	1	115	3,545	1	0	1	122	3,607	1	0	1	124
		R4	3,415	1	0	1	118	3,643	1	0	1	126	3,707	1	0	1	128
P2	49W	R3	5,731	1	0	1	117	6,115	1	0	1	125	6,222	1	0	1	127
		R4	5,891	1	0	1	120	6,285	1	0	1	128	6,396	1	0	1	131
P3	79W	R3	8,852	1	0	1	112	9,445	2	0	2	120	9,611	2	0	2	122
		R4	9,099	2	0	2	115	9,708	2	0	2	123	9,879	2	0	2	125

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-50°C (32-122°F).
* Shaded cells include active dynamic temperature sensing.

Ambient	Lumen Multiplier		
	P1	P2	P3
0°C	1.05	1.05	1.05
10°C	1.03	1.03	1.03
20°C	1.01	1.01	1.01
25°C	1	1	1
30°C	0.99	0.99	0.99
40°C	0.97	0.97	0.93
45°C	0.96	0.96	0.84
50°C	0.95	0.95	0.74

Electrical Load

Package		120V	208V	240V	277V	347V	480V
P1	Current (A)	0.24A	0.14A	0.13A	0.11A		
	System Watts	29W	29W	29W	29W		
P2	Current (A)	0.41A	0.24A	0.21A	0.18A	0.14A	0.11A
	System Watts	49W	48W	48W	48W	47W	47W
P3	Current (A)	0.66A	0.38A	0.33A	0.29A	0.23A	0.17A
	System Watts	79W	78W	78W	78W	77W	76W

Projected LED Lumen Maintenance

Operating Hours	25,000	50,000	100,000
Lumen Maintenance Factor	>0.94	>0.89	>0.80

Values calculated according to IESNA TM-21-11 methodology and valid up to 40°C.

PER Table						
Control	PER (3 wire)	PER5 (5 wire)		PER7 (7 wire)		
			Wire 4/Wire5		Wire 4/Wire5	Wire 6/Wire7
Photocontrol Only (On/Off)	✔	⚠	Wired to dimming leads on driver	⚠	Wired to dimming leads on driver	Wires Capped inside fixture
ROAM	⃠	✔	Wired to dimming leads on driver	⚠	Wired to dimming leads on driver	Wires Capped inside fixture
ROAM with Motion (ROAM on/off only)	⃠	⚠	Wires Capped inside fixture	⚠	Wires Capped inside fixture	Wires Capped inside fixture
Future-proof*	⃠	⚠	Wired to dimming leads on driver	✔	Wired to dimming leads on driver	Wires Capped inside fixture
Future-proof* with Motion	⃠	⚠	Wires Capped inside fixture	✔	Wires Capped inside fixture	Wires Capped inside fixture

✔ Recommended
⃠ Will not work
⚠ Alternate

*Future-proof means: Ability to change controls in the future.

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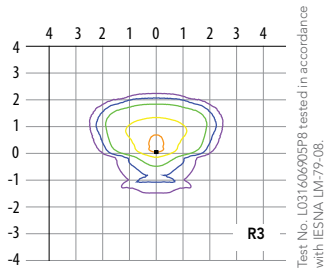
Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's KAXW homepage.

Isofootcandle plots for the KAXW LED P3 40K. Distances are in units of mounting height (20').

LEGEND

0.1 fc
0.5 fc
1.0 fc
2.0 fc
5.0 fc



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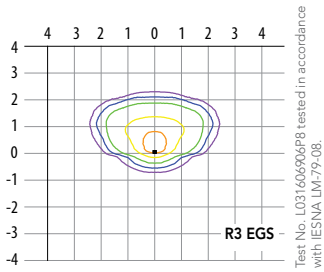

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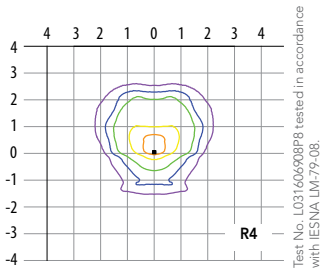
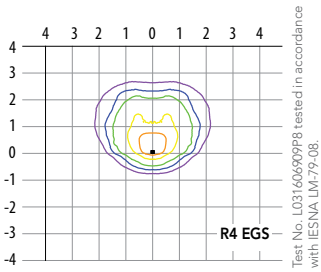


Test No. L031606908P8 tested in accordance with IESNA LM-79-08.



Test No. L031606909P8 tested in accordance with IESNA LM-79-08.

FEATURES & SPECIFICATIONS

INTENDED USE
This feature-rich luminaire embodies the highest level of functionality with extraordinary efficacy which maximizes your application efficiency providing high levels of light for minimal cost specifically for building-mounted doorway and pathway illumination on nearly any type of facility.

CONSTRUCTION
The die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. This modular design allows for ease of maintenance and future light engine upgrades. The LED driver is installed in a separate compartment to thermally isolate it from the light engines for low operating temperature and long life. The housing is completely sealed against moisture and environmental contaminants (IP65).

FINISH
Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in both textured and non-textured finishes.

OPTICS
Individually formed acrylic lenses are engineered for superior application efficiency which maximizes the light in the areas where it is most needed. Light engines are available in 3000 K, 4000 K or 5000 K (minimum 70 CRI) configurations. The KAXW has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

ELECTRICAL
Light engine(s) configurations consist of high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to >L80/100,000 hours). Class 1 electronic drivers are designed to have a power factor >90%, THD <20%, and an expected life of 100,000 hours.

INSTALLATION
Included wall mount plate facilitates a quick and easy installation. Mounting bolts feature a 1000-hour salt fog finish. Optional bi-level motion sensor and NEMA 3, 5 or 7 pin twist lock photocontrol receptacle are also available.

LISTINGS
CSA Listed for wet locations. Light engines and electrical compartment are IP66 rated. Rated for temperatures as low as -40°C minimum ambient.

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

WARRANTY
5-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx.

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

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11. CONSISTENCY WITH USM DESIGN PRINCIPLES AND STANDARDS

The *University of Southern Maine Campus and Design Principles and Standards* were created in recognition of the need of the university to grow in a vibrant, aesthetic, and sustainable manner that provides a strong sense of place and conveys an identity as a high-quality institution of learning.

All new buildings shall be designed to create a visual connection with existing campus buildings with a goal of achieving a cohesive campus appearance. New development shall be characterized by excellence in architectural design, craftsmanship, materials, streetscape and landscape improvements, signage, and lighting appropriate for a university in an urban setting in the Northeast.

These principles and standards were intended to regulate the future build out of the institution while ensuring that new development is sensitive to adjacent residential neighborhoods and commercial areas and is successfully integrated with the City as a whole.

11.1 APPLICABILITY

The principles and standards apply to all development on the University of Southern Maine Portland campus. The following summarizes how the proposed project addresses each of the principles and standards found in the USM Campus and Design Principles and Standards.

11.2 PRINCIPLES AND STANDARDS

Principle A Campus Design

Standard A-1: Campus Edges.

Following an extensive evaluation of available sites on the campus, the proposed parking garage has been located on the campus edge bordering Route 295. This site replaces an existing surface lot with a higher density structure, which is remotely located with respect to other campus edges abutting residential neighborhoods.

Standard A-2: Building Orientation

The new parking garage is oriented so that its users easily connect to existing major pedestrian routes between the garage and university destination activities. The massing of the garage reinforces an existing open space which affords access to the Glickman Library, and effectively creates a new courtyard which further highlights the library entrance.

Standard A-3: Pedestrian Environment

The main pedestrian exit of the new parking garage at the northeast stair tower features a canopy overhead, and opens to a large, paved landing to accommodate larger numbers of pedestrians for events. The secondary pedestrian entrance/exit at the northwest, shared with the vehicular entrance, is continuous with an existing sidewalk along the access road leading to Bedford Street, and is within view of the stair tower exit at the existing parking garage. A 6' concrete sidewalk and lighted canopy is planned along the north façade of the new garage as refuge for pedestrians as well. All exits lead to existing campus paths and sidewalks adjacent to vehicle ways or planted zones of lawn and trees. Three crosswalks safely guide pedestrians from the parking garage to important campus destinations.

Standard A-4: Gateways

This standard is not applicable.

Standard A-5: Views and Landmarks

Neither the Bedford Street View Corridor nor the views of the Glickman Library entrance have been impacted by the new garage.

Principle B Access and Circulation

Standard B-1: Connectivity

The new parking garage, located between Wishcamper Center, Glickman/Osher Libraries, and the existing parking garage, provides new pedestrian connections for users of the garage to Wishcamper and Glickman/Osher, as well as connections to existing north south routes to the campus center.

Standard B-2: Circulation

The main pedestrian exit opens to a large, paved landing leading pedestrians to a crosswalk strategically placed at a node to the north of the access road at the closest point to serve Wishcamper, Glickman/Osher, and an existing path to Bedford Street and campus center. The secondary exit, to the northwest, is adjacent to the stair tower exit of the existing garage and leads pedestrians to an existing sidewalk along the access road to Bedford Street, or, to a crosswalk to access the sidewalk along the south of Wishcamper. At the Glickman/Osher library entrance a new paved plaza with a pullout drop off space allows for safe vehicular, and bus drop off of pedestrians, bike parking near the entrance of Glickman, and book drop off. Service and emergency access are newly separated from pedestrian activity; only service vehicles and emergency vehicles will travel beyond the drop off loop and grove to access the Glickman loading dock and the fire lane along the south façade of both parking garages.

Standard B-3: Multi-modality

The proposed site layout will provide clear, safe, and convenient multi-modal circulation paths on-site. A bus and vehicle turnaround and drop-off area is provided by the library entrance. Fire and emergency vehicle access is provided along the southern edge of the building. Measures have been taken to clarify and minimize pedestrian and vehicular crossings. Convenient and accessible routes are provided from the parking garage pedestrian entrances to the adjacent buildings.

The proposed parking garage will include a covered and secured bicycle storage area with capacity to serve bicycle commuters and bicycles owned by residents of new dormitory, Portland Commons. A separate entrance is provided for the bicycle storage area to provide separation from traffic in the garage. Additional bicycle parking is provided along the sidewalk and at building entrances for convenience.

Standard B-4: Traffic Calming

The pedestrian environment is the focus of this design and measures have been taken to enhance this and create a higher level of safety for pedestrians by limiting pedestrian and vehicular interaction.

Standard B-5: Sidewalks

As previously described in Section 10.1 of this Report, several improvements associated with the project are proposed along Bedford Street. This standard will be addressed as part of the TMP Amendment application submitted under separate cover. Private sidewalk layout and materials are shown on the design drawings.

Standard B-6: Street Lights

No work is proposed along public streets; this standard is not applicable.

Principle C Parking, Loading and Service Areas

Standard C-1: Parking Structures - Structure

The proposed parking garage will be a structure which is compatible with its adjacent uses. Its apparent size will match that of the existing garage, and its combination of materials will be compatible also. Thin brick, permanently bonded to precast panels will give the new facility a relationship to other buildings on the campus including the existing garage. This brick, due to the manufacturing standards for precast panels, must be more dimensionally uniform than waterstruck brick, but will have a variegated mixture of tones and will match or complement nearby brickwork. Thin brick that has a uniform sheen or a lack of texture will not be used. Precast concrete spandrels will be a buff color similar to the existing garage and will feature a sandblasted texture with slightly exposed aggregate. Each panel will have a smooth finish top, similar in concept to a coping stone, which will be separated from the face of the panel by a simple shadow joint.

Standard C-2: Parking Structures – Active Uses

This standard is not applicable; the new garage is set back approximately 185 feet from Bedford Street.

Standard C-3: Parking Structures – Decks and Ramps

Because of space limitations on the chosen site, sloping decks will be needed for all parking tiers. A sloping deck of 5% to 6% will be used in the middle bay of the structure, but its length will not be adequate to rise a full story. Sloping decks of 1.9% will be utilized at center portions of the north and south sides of the garage to make up the difference. Only a portion of the center of the north side will be visible from Bedford Street due to its 185-foot setback and its location behind the Wishcamper Center. The visual focus of the views from Bedford Street will be the emphasized pavilions of the north and south ends of the garage.

Standard C-4: Surface Lots

The existing surface parking lot will be replaced by the parking garage; this standard is not applicable.

Standard C-5: Loading and Service Areas

Service areas are consolidated along the southern edge of the garage to conceal them from public view.

Standard C-6: Utility Services

All utilities are located adjacent to the proposed garage out of public view and access.

Principle D Architectural Design

Standard D1: Height

The proposed garage is 50' high, very slightly higher than the existing garage. This is lower than the height allowed by the overlay zone criteria which allows 85'. The height is approximately one story lower than the Wishcamper Center and four stories lower than the Glickman Library. This maintains the precedence of the nearby destination uses and continues their landmark status on the Campus.

Standard D-2: Setbacks

This standard is not applicable.

Standard D-3: Stepbacks

This standard is not applicable.

Standard D-4: Massing

This standard is not applicable.

Standard D-5: Entrances

The primary entrance to the parking garage is located adjacent to a pedestrian route between the Glickman Library and the Wishcamper Center and has been emphasized by a glass-enclosed stair. The secondary entrance which is combined with the vehicles entrance is also adjacent to major pedestrian routes to the campus at the north end of Wishcamper. This location also includes a major bicycle storage facility for 250 bicycles, secured within the new garage.

Standard D-6: Windows

Although the garage will be open to the weather without windows, the concept of transparency at the ground level will be utilized. Instead of walls, this level will be enclosed by metal security gratings, which easily allow views into and out of the garage. A dark color will be used to avoid veiling. This will enhance security and the awareness of activity.

Standard D-7: Materials

The new garage will be constructed of 100-year materials including precast concrete, prefinished metal trim, clear anodized aluminum curtainwall with clear glass.

Standard D-8: Signage

Wayfinding to the new garage will be denoted to the public with a new monument sign at the corner of the garage access drive and Bedford Street.

Wayfinding within the garage will begin with a signboard over the vehicle entrance and will continue within the garage using overhead signage.

Standard D-9: Historic Structures

This standard is not applicable.

Standard D-10 Original Residential Structures

This standard is not applicable.

12. CONSTRUCTION MANAGEMENT PLAN

A Construction Management Plan has been prepared for the proposed project per the City of Portland guidelines. The Contractor will be required to provide adequate safety fencing and signage directing pedestrians safely around the construction area. The Construction Management Plan is attached to this Section for your reference.

12.1 ATTACHMENTS

- Construction Management Plan

Construction Management Plan

Project: University of Southern Maine - Structured Parking Garage

The University of Southern Maine - Structured Parking Garage Construction Management Plan depicts the overall planning, coordination, and control of the proposed construction site, including sequential phasing, from beginning to completion.

The following construction management plan has been developed by the University's Design Team Members based on the components of the project and the City's goal for a plan is to support a safe construction site and protect the public safety, accessibility (including preserving accessible pedestrian, bicycle, and vehicular modes of transport throughout the city), and welfare during construction. This plan minimizes construction impacts in their duration and magnitude to the surrounding area and provides a visual framework to convey and communication the process for addressing site logistics, minimizing conflicts and addressing access for university, construction and emergency vehicles and pedestrians.

Presently the University is soliciting proposals from qualified Construction Managers. It is the intent of the University to allocate the management of the Construction Management Plan to the selected Construction Manager.

The following construction management plan for the USM - Structured Parking Garage may be subject to adjustments based on coordination with the Construction Manager following selection. The Construction Management Plan shall include the following submissions:

1) a construction management site plan;
2) a construction schedule (time frame); and
3) a written narrative addressing the categories below.

A. Construction Management Principles

The purpose of this Construction Management Plan is to maintain a safe construction site and minimize impacts to adjacent buildings, university operations and surrounding neighborhood. The selected Construction Manager shall maintain open lines of communication between the University, City, Public and Consultants to mitigate concerns in the most effective manner during construction. This goal is to be attained by continued planning, review, update, communication and execution with all parties. The following sections further define this approach for the successful application of the Construction Management Plan.

B. Development Review of Construction Management Plan

The Construction Manager will continually maintain and update the Construction Management Plan for the duration of the project to augment and improve site safety measures. This is intended to be a live document that is updated as the project progresses

and site conditions change. The focus of each update will be to ensure the safety of the public, pro-active elimination of adverse situations and maintenance of accessibility for necessary services in and around the construction site. As a part of this plan development the initial Construction Management Phasing and Logistics Plans are included at the end of this document.

C. Performance Guarantees, Inspection Fees, Preconstruction Meeting, and Permits

Prior to scheduling a preconstruction meeting and the issuance of any city required permits, the University of Southern Maine and their selected Construction Manager shall meet all of the requirements contained in Section 14-530. Development review fees and post approval requirements and 14-532. General requirements and enforcement of Portland's Land Use Code.

Anticipated permits, (if applicable) include:

1. **Street Opening and Street Occupancy Permits:** Construction activity in the public right-of-way shall be in accordance with Chapter 25. Sewer and stormwater system connections shall be in accordance with Chapters 24 and 32 of the Land Use Code. All required permits shall be obtained through the Department of Public Works and the requests shall conform with the approved construction management plan.

2. **Blasting:** Blasting, if required, shall conform with Article VIII. Regulation of Explosives in the Land Use Code and Section 3.7 Standards for Blasting and Regulation of Explosives in Portland's Technical Manual.

   Based on preliminary geotechnical findings and information it is not anticipated that blasting will be required.

3. **Building Code:** Employ the best practices, as applicable, of Chapter 33 Safeguards During Construction, from the 2015 International Building Code.

Vehicular access will be maintained around the construction site for the entirety of the project for emergency fire access to the rear of the existing parking garage and access to the Glickman Loading dock. Pedestrian access will remain to the Glickman and Wishcamper buildings. Work within Bedford Street may require the temporary closure of lanes.

D. Construction Administration and Communication

USM and the Construction Manager will work diligently to implement a communication strategy that is agreed upon by the City, Stakeholders and Neighbors. The communication strategy is intended to ensure that all construction operations are performed in accordance with all agreements, ordinances and special permits applicable to this project. The Construction Manager will work closely with adjacent abutters, businesses, nearby

construction sites, and all parties informed, as far in advance as possible, of scheduled work, particularly work anticipated to cause significant noise, vibrations, or dust. The final construction management plan shall provide for the following:

1. Contact Person and contact information for USM staff and Construction Manager personnel that is available 24 hours.
2. Construction Signage posted on the site with Contact Information for Construction Manager.
3. Describe any additional communication strategies.
4. All construction and temporary site signage, including signage at cross walks, existing garage and main streets, shall be updated, adjusted and removed as project progresses through each construction phase and at project completion.

E. Construction Schedule

Construction of the garage is anticipated to commence in the winter/spring of 2022 and be substantially complete in April 2023. The initial phase of construction will include alterations to the parking access control equipment within the existing garage and closure of the east entry/exit. This schedule is in line with, and is in support of, the nearby construction of the Portland Commons & Student Success Center buildings.

Work hours to follow City of Portland regulations during the daytime hours as defined in Section 17-18 “Construction Activities for Building permit” and Section 25-129 “Noise, dust and debris” of the City’s Code of Ordinances. Any required off-hour work will be coordinated directly with the City.

Material Deliveries will be coordinated within normal work hours and be stored on-site as shown in the site logistics plans. Construction deliveries are expected to travel from 295 to Forrest Avenue to Bedford Street and then onto the project site.

F. Security & Public Safety

The construction site will be enclosed by temporary chain link fencing during construction. The fencing will be moved in a phased approach in coordination with the site logistics plan. Primary site access will be from Bedford Street to the garage access road and then into the construction site via a swinging site gate. Secondary gates will be provided for emergency access to the rear of the existing garage and the roadway will be maintained and open at all times for access. Gates will be locked during non-work hours and equipped with knox box for emergency access. Emergency Access and deliveries around the project site to the existing USM parking structure, Wishcamper building and Glickman will be maintained at all times. The construction site will follow all requirements of IBC Chapter 33 “Safeguards during Construction” and NFPA 241 “Standard for Safeguarding Construction, Alteration, and Demolition Operations" including construction and placement of necessary separation and safety barriers between the existing garage and construction site.

Structures undergoing construction, alteration, or demolition operations, including those in underground locations, shall comply with NFPA 1 Chapter 16. A complete fire safety and access plan will be developed in coordination with the City of Portland prior to project commencement.

G. Construction Permitting and Traffic Control Plans

Construction Activity in Public Streets: Construction activity in the public right-of- way is controlled by Chapter 25 Article VII of the City Code of Ordinances. The contractor will work to minimize impacts from construction and provide safe access around the site. The project shall follow City of Portland requirements for traffic control throughout the duration of the project. Construction activities and deliveries will not impact public access or streets unless directly coordinated and notified prior.

Sewer and Stormwater: Sewer and stormwater water system connections are controlled by Chapters 24 and 32 of the City Code of Ordinance. Tie-ins of the new connections will occur within the existing surface parking lot. All tie-in connections will obtain the appropriate permits and be coordinated with the DPW.

Traffic Control Plans: Construction activity that impacts the existing public street system will (where applicable) be controlled to protect the safety of the construction workers and all modes of the traveling public. Phased construction of the proposed ring road will include traffic control and safety measures. Traffic controls will include temporary signage and barriers where necessary to manage all modes of travel including, vehicle, pedestrian, and bicycle traffic. ADA compliance for affected public pathways will be maintained for the duration of the project.

H. Site Management and Controls

The Construction Manager will address maintaining the site in a safe condition and will include the following:

1. Regular trash and debris removal including the recycling of materials to meet USM's adopted ParkSmart Certification criteria. Trash dumpsters and areas around the dumpsters will be maintained in a clean and orderly manner.
2. Dust controls- The construction shall comply with Portland's requirements under Section 25-129 on Noise, dust and debris (below). Dust control will include street sweeping, water trucks, truck pads and similar measures to minimize dust from construction activities.

Sec. 25-129. Noise, dust and debris.

Each permittee shall conduct and carry out excavation work in such manner as to avoid unnecessary inconvenience and annoyance to the general public and occupants of neighboring property. To the fullest extent practicable, the permittee shall take appropriate measures to reduce noise, dust and unsightly debris in the performance of the excavation work. Excavation work, including the use of any tool, appliance, or equipment, shall be performed between the hours of 7:00 a.m. and 10;00 p.m. only, exclusive of emergency work. Time waiver requests may be submitted to the public works authority for work outside of this time period and will be subject to neighborhood concerns. Excavation work shall not occur on Sundays, holidays or on major holiday weekends, unless expressly authorized by the public works authority or as a result of emergency need.

3. Noise: The construction shall comply with the University's and Portland's requirements as defined under Section 17- 18 of the City Code (below) and Section 25-129 on Noise, dust and debris

Sec. 17-18. Construction activities.

(a) Within the R-zones, from September 1st to May 31st, no person shall engage in construction activities generating noise exceeding fifty (50) decibels, between the hours of 7:00 p.m. and 7:00 a.m., of the following day within five hundred (500) feet of any building used for residential, hospital or nursing home purposes. From June 1st to August 31st construction activity may continue until 8:00 p.m. Any other language notwithstanding, no construction activity shall begin before 8:00 a.m. on a Saturday, Sunday or legal holiday.

(b) Construction activities shall include, but not be limited to, the following:

(1) The use or operation of power or heavy equipment in connection with road, street, or bridge construction, reconstruction or repair;

(2) The use or operation of power or heavy equipment in connection with the installation or repair of utility lines, pipes, wires or cables;

(3) The use or operation of power or heavy equipment in connection with the construction of buildings, including specifically excavation for foundations or landscaping work of any kind;

(4) The renovation, repair, remodeling or demolition of the exterior or foundation of any building or structure.

(c) This section shall not apply in the following situations:

(1) Emergency repair work on any utility line, pipe, wire or cable required to restore normal utility service;

(2) Situations where the public works authority or the office of building inspections determines that the construction activity is of a unique character which cannot reasonably be completed or performed during the permitted hours and which is not of a recurring nature, provided that prior to engaging in such activity the contractor or his representatives gives notice of the time and scope of such proposed activity, the notice to be given in a manner approved by the public works authority.

4. Rodent Control will be provided, if applicable, by a professional exterminator and

consistent with Chapter 22 of the City Code.

5. Snow Removal: Pursuant to Section 25-173 Contractors to ensure a safe means of travel within and areas affected by the work zone including:
    1) Snow/ice removal or commence automatically from (1" of snow and up) or Ice
    2) Remove snow as needed within the work zone, including parking spaces & not to block any driveways or sight lines with the piles of snow.
    3) Clear all walks & ramps with the work zone
    4) Sand or Salt as needed
    5) Clear all basin or drainage to help snow melt
    6) This would include Monday-Friday Sat/Sunday/Holidays
6. The construction manager shall ensure the site follows all requirements of IBC Chapter 33 “Safeguards during Construction” and NFPA 241 “Standard for Safeguarding Construction, Alteration, and Demolition Operations"

I. Erosion Control and Preservation of Trees

Prior to construction, erosion and sediment controls with be installed as shown on the design drawings. These shall be regularly inspected and maintained for the duration of the project. The preservation of trees and landscaping shall be as shown on the landscaping plans. Care will be taken to avoid damage to the trees and landscaping that is to remain. Landscape, soils and plantings damage during construction activities will be restored, replaced and re-planted to assimilate pre-existing conditions as cataloged by pre-construction photographic documentation, surveys and similar records.

J. Construction Staging Area

The site logistics plan shows planned locations for staging and laydown areas, onsite truck washing stations, materials storage and construction trailers.

Standard deliveries will be coordinated with the effort to minimize disruption to both the surrounding public spaces and the construction site as much as possible. Precast concrete piece deliveries will be continuous throughout the day during the superstructure erection. An off-site queuing yard will be coordinated to optimize deliveries in coordination with on-going erection activities and avoid queuing of vehicles.

K. Parking During Construction

For portions of the project, minimal on-site parking will be available for construction workers. It is anticipated during these times, that parking will be required off-site with transportation to the site. Parking for workers will be prohibited along nearby public roads.

Closure of a limited number of spaces within the existing garage will be required during construction. The CM will provide phasing documents showing the timeframe and quantity of required parking closures within the existing garage. Garage patrons will be provided advance

notification of proposed modifications to create awareness prior to application.

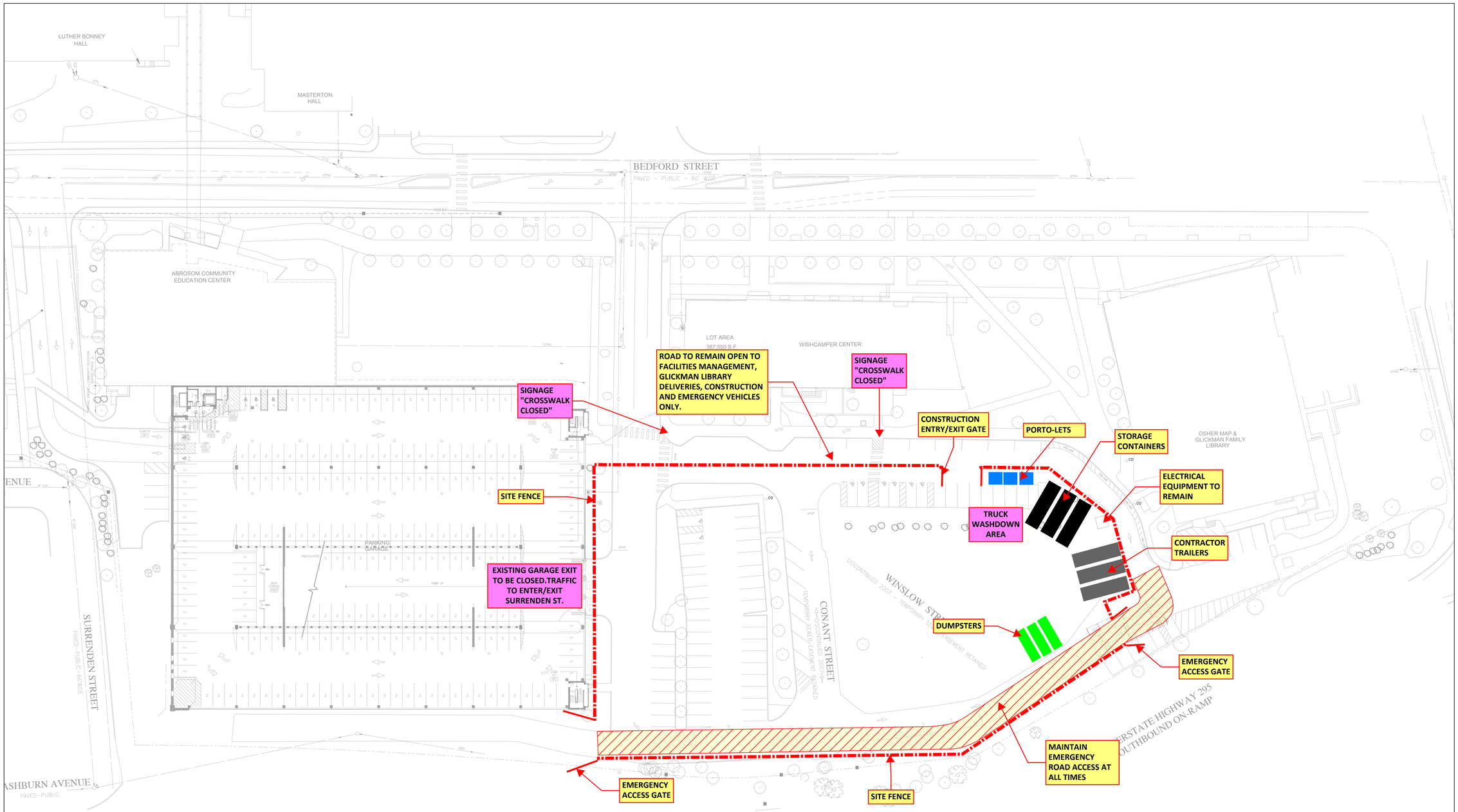
L. Dewatering Plans

A dewatering plan and recommendations will be developed as recommended by the geotechnical report prepared by S.W. Cole. The dewater plan will be submitted and coordinated with the City of Portland. Based on the preliminary geotechnical report it is anticipated that sumping and pumping of shallow excavation will be sufficient to control groundwater.

M. Special Measures as Necessary

The project is proposed to include deep pile-foundations which generally require pile-driving equipment. This technique typically results in ground vibrations in and around the immediate vicinity. To pro-actively mitigate the effects of this construction technique, pre-construction surveys and photographic documentation will be conducted on the surrounding facilities and buildings and, were necessary, vibration monitors installed to document the intensity of the vibrations. An action and monitoring plan along with a photographic catalog of surrounding structures will be will developed and shared with the City and USM in advance of this construction activity.

While is expected that this Construction Management Plan will be updated by the selected Construction Manager, the logistics, staging and control measures presented in this plan are expected in large part, to remain as presented herein. Any modifications, updates or changes in the plan will be submitted to the City of Portland for approval in advance of preceding with any work or portions of work affected by such updates.



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USM - Structured Parking Garage Phasing Plan

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

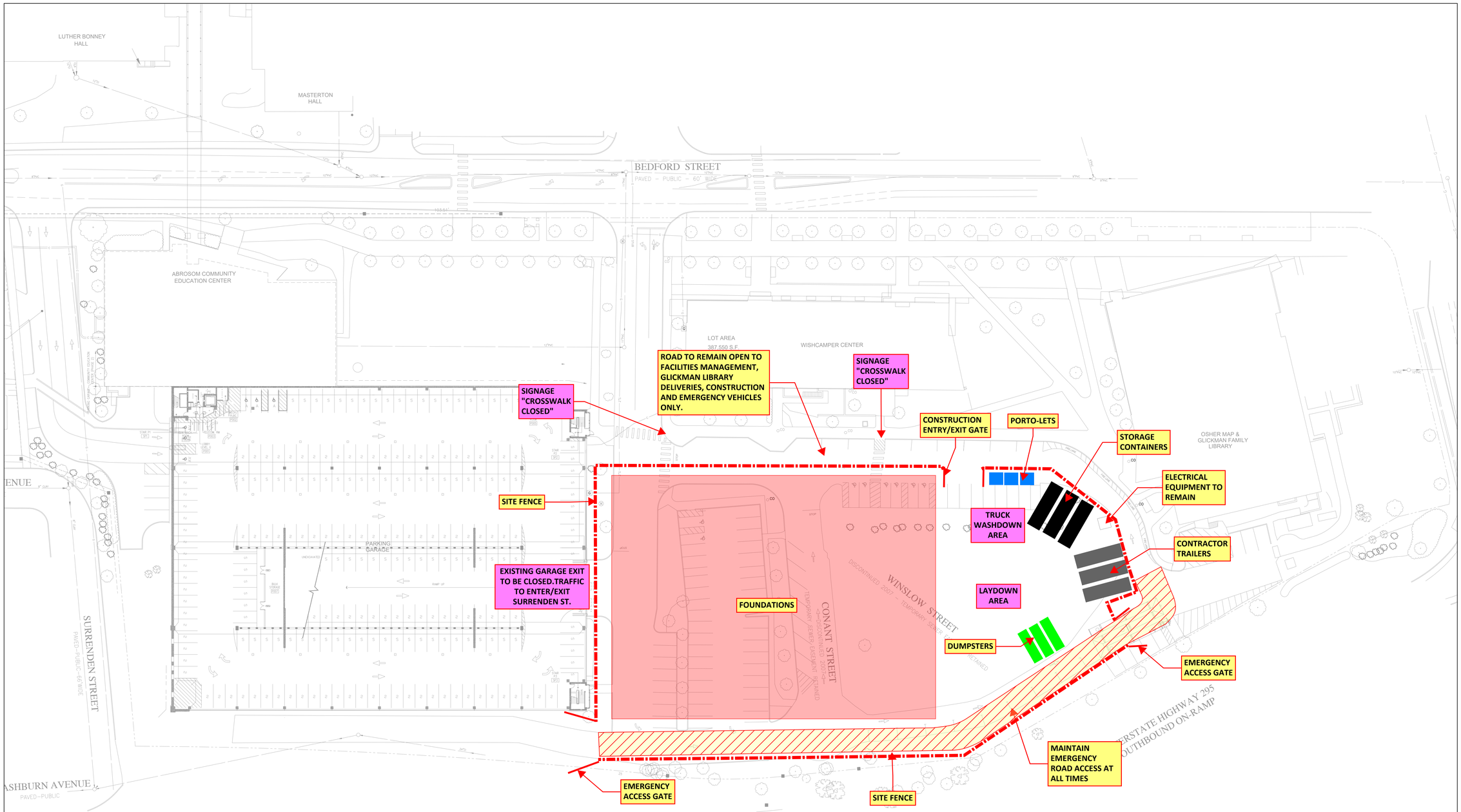
SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**07/12/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

PHASE 1 - SITE PREPARATION



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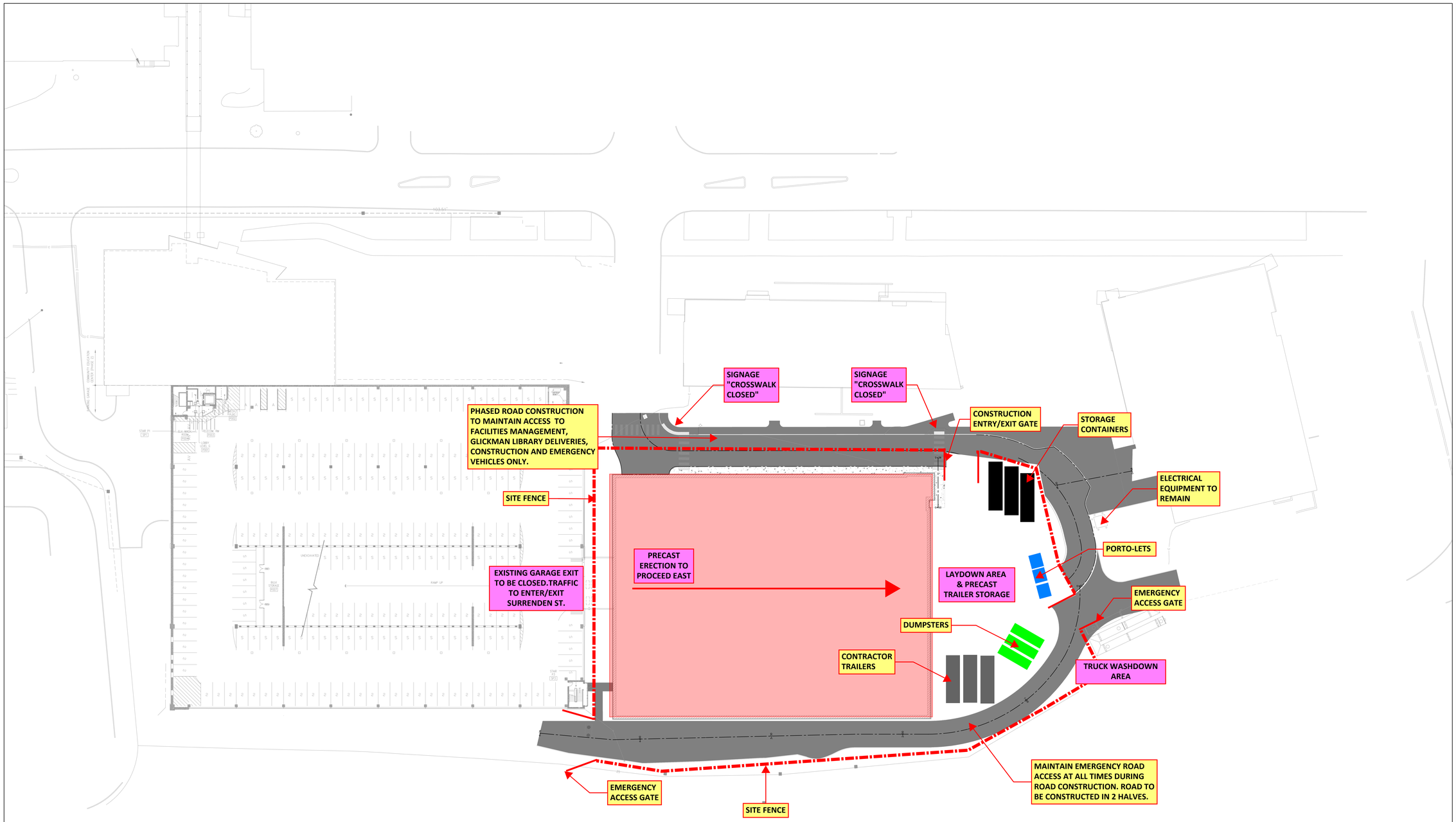
PHASE 2 - FOUNDATIONS



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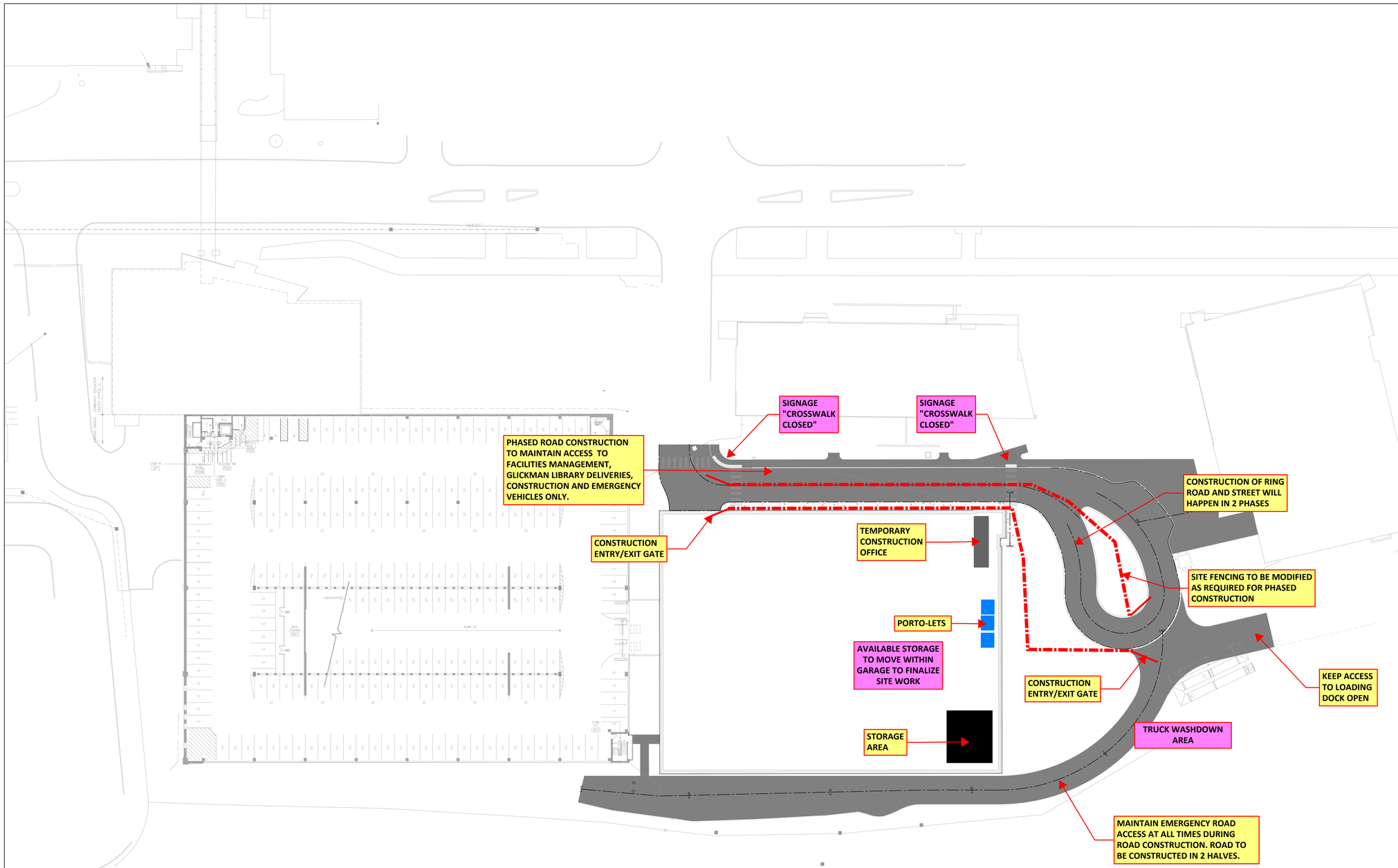
PHASE 3 - STRUCTURE ERECTION



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CHECKED BY	**B.F.**

SHEET TITLE:

PHASE 4 -RING ROAD & LANDSCAPE

13. BOUNDARY SURVEY

A boundary and topographic survey of the Site was completed by Owen Haskell, Inc. Professional Land Surveyors. The survey is included with the drawings referenced in Section 3 of this Report.

STORMWATER MANAGEMENT PLAN

USM Structured Parking Garage



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University of Southern Maine
July 2021

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APPENDICES

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Appendix B: Stormwater Quality Calculations
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1. STORMWATER MANAGEMENT PLAN

This Stormwater Management Plan (SWMP) describes existing site conditions, the proposed development, inspection and maintenance requirements for the proposed stormwater system, and compliance with applicable stormwater standards for the proposed structured parking garage located on the University of Southern Maine campus at 44 Bedford Street in Portland, Maine.

1.1 Existing Conditions

The project site is a portion of an approximately 29-acre University campus, south of the Wishcamper Center and north of the I-295 corridor. The project area has been previously developed and is currently utilized for surface parking. Existing conditions consist primarily of impervious paved area and vegetated area utilized for overflow parking and storage. This vegetated parking area consists of a weedy overgrowth and patches of dirt. The project site is not located in a FEMA flood hazard zone. Stormwater runoff from the Site is collected in catch basins and discharged to the City of Portland combined sewer interior to the Site. A small portion of the project area currently drains towards the separated stormwater system in Forest Avenue.

1.2 Proposed Development

The proposed development consists of a structured parking garage, access drive, pedestrian walkways, and associated site improvements. The project will result in approximately 2.4-acres of disturbance. The stormwater management system is comprised of a series of catch basins, a subsurface detention system, and proprietary treatment unit. The subsurface detention and treatment system will consist of large metal pipe and a StormFilter unit, which will provide storage and treatment for site runoff prior to discharging to the City's separated stormwater system in Forest Avenue. As requested by the City, site drainage patterns will be modified to direct stormwater runoff from the proposed development to the City's separated stormwater system in Forest Avenue; the City has indicated that the stormwater system on Forest Avenue has capacity to convey additional stormwater flow from the site.

1.3 Inspection & Maintenance Requirements

General inspection and maintenance of stormwater systems will take place during and after construction. During construction, the Contractor will be responsible for inspecting and maintaining the Site, as described in Section 1.4.1 of this Report. Upon completion of construction, the property owner will be responsible for implementing the Inspection and Maintenance Plan for the proposed stormwater system, which is provided in Appendix A of this Report.

1.4 Stormwater Standards

The project is subject to the MaineDEP Chapter 500 Stormwater Standards. The project is not located within the watershed of an Urban Impaired Stream and is therefore not subject to the Urban Impaired Stream Standard. The following sections describe the project's compliance with the applicable stormwater standards.

1.4.1 Basic Standard (Soil Erosion & Sediment Control)

A variety of erosion and sediment control measures will be utilized during construction, including but not limited to the following:

- Stabilized construction entrances;
- Up-gradient runoff diversion barriers;
- Downgradient sediment barriers;
- Catch basin inlet protection devices;

- Preservation and maintenance of vegetated areas to the maximum extent possible;
- Temporary stabilization of disturbed areas to be exposed for more than seven days;
- Permanent stabilization of final graded areas;
- Controls for fugitive dust, debris, and other materials; and
- Inspection of all measures until the Site is permanently stabilized.

Structural measures will be installed as shown on the design drawings. Details and specifications for these measures are included on the drawings. All measures will be implemented in accordance with the "Maine Erosion and Sedimentation Handbook for Construction: Best Management Practices". All temporary measures will be installed prior to any earth-disturbing activities and will be removed upon permanent stabilization of the Site. The Contractor will be responsible for implementing and maintaining all erosion and sediment control measures in an effective operating condition during construction. Permanent erosion control measures will include vegetation and pavement. After construction, the Owner will be responsible for inspecting and maintaining the Site as described in Section 1.3 of this Report.

1.4.2 General Standard (Stormwater Quality)

The proposed project is considered redevelopment and is therefore subject to Section 4.C(2)(d) of the MaineDEP Chapter 500 Stormwater Standards. As demonstrated by the calculations provided in Appendix B of this Report, the proposed project is required to provide treatment for 60% of the redeveloped area and the proposed StormFilter treatment unit will provide the required treatment. The StormFilter treatment system has been designed in accordance with the MaineDEP proprietary BMP approval letter to Contech dated March 13, 2015. Larger storm events will bypass the StormFilter unit via a weir in the upstream corrugated metal pipe (CMP) system. A letter prepared by Contech describing the design of the StormFilter treatment system is also provided in Appendix B of this Report.

1.4.3 Flooding Standard (Stormwater Quantity)

The project is required to comply with the flooding standard, as the project requires review pursuant to MaineDEP Site Law. Chapter 500 Stormwater Rules require that the stormwater management system detain, retain, or result in the infiltration of the stormwater flows from the 24-hour storm of the 2-year, 10-year, and 25-year frequencies, such that peak flows from the post-development Site do not exceed those from the pre-development Site. Stormwater models were developed for the pre-development and post-development site conditions. Adequate provisions have been made to collect and control stormwater via the proposed stormwater detention system. The following sections describe the stormwater modeling methodology and the results of the HydroCAD analysis.

1.4.3.1 Stormwater Modeling Methodology

Stormwater modeling was completed using the HydroCAD 10.00 Stormwater Modeling System by Applied Microcomputer Systems, which uses TR-20 runoff calculation methodology. The HydroCAD output for both the pre- and post-development models are provided in Appendix C. A 24-hour duration and Type III rainfall distribution was applied to the rainfall depths for the 2-year, 10-year, and 25-year storm events from Appendix H of the DEPs Chapter 500 Rules.

HydroCAD provides a lookup table for curve number (CN), which is a measure of the retention and runoff properties of various surfaces based on the Hydrological Soil Group (HSG) and land cover type using TR-55 methodology. The Site contains Hydrologic Soil Group A soils. The area of each land cover type was delineated utilizing topographical survey information and HydroCAD computed the final CN for each subcatchment based on an area-weighted average. It should be noted that the curve number utilized for the proposed porous pavement is based upon data from the Rhode Island Stormwater Design and Installation Standards Manual.

The Time of Concentration (Tc) is the time required for runoff to travel from the most hydrologically distant point of a watershed to the point of discharge. The longest hydraulic flow path is partitioned into segments based on flow types, land cover, and slopes. The Tc for each watershed is computed within HydroCAD as the sum of the travel times for each consecutive flow segment along the longest hydraulic flow path. The primary types of flow consist of sheet flow, shallow concentrated flow, and channel flows; sheet flow typically occurs within the first 100-feet of runoff. A minimum Tc of six minutes was utilized for all watershed areas.

The HydroCAD model has been prepared utilizing conservative assumptions about the proposed porous pavement walkways. While we anticipate that the proposed walkways will provide some detention and infiltration, this has not been included in the HydroCAD model for the purposes of this stormwater analysis. As previously described, the project area ultimately discharges runoff in two locations; these two discharge points have been utilized as the Study Points for the stormwater analysis:

- Study Point 1: Forest Avenue Storm Drain System; and
- Study Point 2: Combined Sewer System interior to the Site.

Existing and proposed drainage patterns and features are shown on the figures provided in Appendix D.

1.4.3.2 Pre- and Post-Development Peak Runoff Rate Results

The table below provides a summary of the peak runoff rates for the 24-hour, 2-, 10-, and 25-year Type III storm events:

Study Point		Peak Runoff Rate (cfs)		
		2-Year Storm	10-Year Storm	25-Year Storm
#1 (Separated Stormwater System)	Pre-Development	0.9	1.9	2.7
	Post-Development	1.7	3.9	8.4
#2 (Combined Sewer System)	Pre-Development	2.6	5.2	7.6
	Post-Development	0.5	1.0	1.5
Net Change	Pre-Development	3.5	7.1	10.3
	Post-Development	2.2	4.9	9.9

The proposed stormwater management system has been designed to improve and maintain current runoff conditions to the maximum extent possible. As previously noted, the City of Portland has requested that the site drainage patterns be modified to direct stormwater runoff from the proposed development to the City's separated stormwater system in Forest Avenue; as demonstrated by the table above, the result is a reduction in peak runoff rates to the combined sewer system (Study Point #2), an increase in peak runoff rates to the separated stormwater system (Study Point #1), but an overall reduction in the net peak runoff rates from the site during the 2-, 10- and 25-year storm events.

The City of Portland has indicated that the Forest Avenue separated stormwater system has capacity for additional stormwater flow. Additionally, the proposed stormwater management system has been adequately sized to safely convey runoff from the proposed site. Therefore, we do not anticipate that the proposed development will result in any adverse effects, including flooding and erosion, to abutting properties as a result of the project. We respectfully request approval for the proposed increase in the peak rate of runoff to the Forest Avenue stormwater system in order to satisfy the City's desire to separate the runoff from the proposed development from the combined sewer.

APPENDIX A: STORMWATER INSPECTION & MAINTENANCE PLAN

STORMWATER INSPECTION & MAINTENANCE PLAN

USM Structured Parking Garage, Portland, Maine

General inspection and maintenance during and after construction must take place in accordance with the requirements outlined in Appendix B of the Maine Department of Environmental Protection (MaineDEP) Chapter 500 Rules. Upon completion of the project, the Owner will assume responsibility for overseeing the property, including the inspection and maintenance of the Site's stormwater drainage system and treatment measures outlined herein. A person with knowledge of stormwater management and erosion and sediment control, including the standards and conditions in the permit, shall conduct the inspections and perform maintenance of the facilities.

Inspection and maintenance activities will be performed per the attached checklist, schedule, StormFilter guidelines; an example page of the BMP Maintenance Log that shall be kept on-site is also attached.

Storm Drain System

Trash, debris, and sediment shall be removed from storm drain pipes and catch basins as needed on a semi-annual basis. In addition to the inspection and maintenance of stormwater systems, paved areas will be inspected annually each spring. Visual inspections will enable parking areas to be kept clean and clear through periodic sweeping and winter plowing as required. The inspections will also ensure pavement markings are repainted as needed to maintain proper traffic circulation and parking space delineation. Paved areas will be plowed and sanded as often as necessary to maintain public safety. Periodic sweeping of pavement will keep the parking areas clean and will reduce the amount of sediment available to enter the stormwater systems, in turn reducing the need to clean the stormwater systems.

Porous Pavement

Winter maintenance procedures may be problematic (e.g., scraping by plows, clogging by sand, clogging by or inability to treat de-icing chemicals). Snow removal and deicing activities should be done carefully to avoid disturbance to the pavement structure. The plow blade should be raised 1" above the surface or outfitted with a flexible rubber bottom piece. Porous pavement has the potential to become impervious if not properly maintained. Proper maintenance should consist of the following:

- Frequent inspections should be performed during the first few months following construction; the system should inspected routinely on an annual basis thereafter. Inspections should be made after significant storm events to check for surface ponding that could indicate failure due to clogging. Non-routine maintenance may require reconstruction of the surface treatment, and possibly the filter and reservoir layers, to relieve major clogging.
- Prevent sedimentation due to the erosion of areas upgradient of the porous pavement.
- Prevent vehicles with muddy wheels from accessing the porous pavement.
- Sweep, vacuum and/or pressure wash pavement twice annually at a minimum.
- Limit salt use for deicing and do not use sand.
- Remove leaves and organic debris in the fall.
- Measures should be taken to ensure that an area designed to be porous does not receive a future overlay of conventional non-porous paving.

StormFilter System

The StormFilter system must be inspected at least once every six months, and the filters maintained annually per the manufacturer's guidelines, which are outlined in the attached guidance document.

STORMWATER INSPECTION CHECKLIST

Inspection by: _____ Date: _____

Stormwater Management Feature	Condition						Comments
Subsurface Detention System	no siltation		some siltation		heavily silted in		
Subsurface Detention System	no clogging/flooding		some clogging/flooding		heavy clogging/flooding		
Subsurface Detention System	outlet free of erosion		some erosion at outlet		outlet heavily eroded		
Subsurface Detention System	inlet/outlet clear		some debris		completely blocked		
StormFilter System*	Cartridges are in good condition		Cartridges in need of cleaning		Cartridges in need of replacement		
StormFilter System*	no clogging/flooding		some clogging/flooding		heavy clogging/flooding		
Porous Pavement	No sediment or debris accumulation		Some sediment or debris accumulation		Excessive sediment or debris accumulation		
Porous Pavement	Structure is in good condition.		Structure has small visible wear.		Structure has excessive visible wear.		

**See attached manufacturer's guidelines for StormFilter System maintenance and inspection.*

Recommended Actions: _____

_____

Actions Completed: _____ Date: _____

STORMWATER MAINTENANCE TASKS & RECOMMENDED SCHEDULE

TASKS	DETENTION AND STORMFILTER SYSTEM	POROUS PAVEMENT	STORM DRAIN PIPES	SCHEDULE
Inspect for sediment & debris accumulation	X	X	X	Spring and Fall
Remove sediment & Debris accumulation	X	X	X	As needed
Inspect for erosion				As needed
Reestablish vegetation in erosion areas				Early spring
Inspect structural elements during wet weather and compare to as-built plans	X	X	X	Annually
Make adjustments or replacements as determined by wet weather observations	X	X	X	As needed
Keep records of all inspections and maintenance activities	X	X	X	Annually
Have a professional engineer perform emergency inspections upon identification of severe problems	X	X	X	As needed

CONTECH®
ENGINEERED SOLUTIONS

StormFilter Inspection and Maintenance Procedures



The Stormwater Management StormFilter®

Maintenance Guidelines

The primary purpose of the Stormwater Management StormFilter® is to filter and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is a good practice to inspect the system after major storm events.

Maintenance Procedures

Although there are many effective maintenance options, we believe the following procedure to be efficient, using common equipment and existing maintenance protocols. The following two-step procedure is recommended::

1. **Inspection**
   - Inspection of the vault interior to determine the need for maintenance.
2. **Maintenance**
   - Cartridge replacement
   - Sediment removal

Inspection and Maintenance Timing

At least one scheduled inspection should take place per year with maintenance following as warranted.

First, an inspection should be done before the winter season. During the inspection the need for maintenance should be determined and, if disposal during maintenance will be required, samples of the accumulated sediments and media should be obtained.

Second, if warranted, a maintenance (replacement of the filter cartridges and removal of accumulated sediments) should be performed during periods of dry weather.



In addition to these two activities, it is important to check the condition of the StormFilter unit after major storms for potential damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the inspection/ maintenance schedule depending on the actual operating conditions encountered by the system. In general, inspection activities can be conducted at any time, and maintenance should occur, if warranted, during dryer months in late summer to early fall.

Maintenance Frequency

The primary factor for determining frequency of maintenance for the StormFilter is sediment loading.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media inside the cartridges. The flow through the system will naturally decrease as more and more particulates are trapped. Eventually the flow through the cartridges will be low enough to require replacement. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on a routine as-needed basis, in order to prevent material from being re-suspended and discharged to the StormFilter treatment system.

The average maintenance lifecycle is approximately 1-5 years. Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction may need to be inspected and maintained more often than those with fully stabilized surface conditions.

Regulatory requirements or a chemical spill can shift maintenance timing as well. The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after major storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system or site. It is recommended that the site owner develop a database to properly manage StormFilter inspection and maintenance programs..



Inspection Procedures

The primary goal of an inspection is to assess the condition of the cartridges relative to the level of visual sediment loading as it relates to decreased treatment capacity. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, then typically large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, then maintenance is warranted and the cartridges need to be replaced.

Warning: In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct an inspection:

Important: Inspection should be performed by a person who is familiar with the operation and configuration of the StormFilter treatment unit.

1. If applicable, set up safety equipment to protect and notify surrounding vehicle and pedestrian traffic.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the access portals to the vault and allow the system vent.
4. Without entering the vault, visually inspect the inside of the unit, and note accumulations of liquids and solids.
5. Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the flow of water per drainage pipe. Record all observations. Digital pictures are valuable for historical documentation.
6. Close and fasten the access portals.
7. Remove safety equipment.
8. If appropriate, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
9. Discuss conditions that suggest maintenance and make decision as to weather or not maintenance is needed.

Maintenance Decision Tree

The need for maintenance is typically based on results of the inspection. The following Maintenance Decision Tree should be used as a general guide. (Other factors, such as Regulatory Requirements, may need to be considered)

1. Sediment loading on the vault floor.
   a. If >4" of accumulated sediment, maintenance is required.
2. Sediment loading on top of the cartridge.
   a. If >1/4" of accumulation, maintenance is required.
3. Submerged cartridges.
   a. If >4" of static water above cartridge bottom for more than 24 hours after end of rain event, maintenance is required. (Catch basins have standing water in the cartridge bay.)
4. Plugged media.
   a. If pore space between media granules is absent, maintenance is required.
5. Bypass condition.
   a. If inspection is conducted during an average rain fall event and StormFilter remains in bypass condition (water over the internal outlet baffle wall or submerged cartridges), maintenance is required.
6. Hazardous material release.
   a. If hazardous material release (automotive fluids or other) is reported, maintenance is required.
7. Pronounced scum line.
   a. If pronounced scum line (say ≥ 1/4" thick) is present above top cap, maintenance is required.



Maintenance

Depending on the configuration of the particular system, maintenance personnel will be required to enter the vault to perform the maintenance.

Important: If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flows is occurring.

Replacement cartridges can be delivered to the site or customers facility. Information concerning how to obtain the replacement cartridges is available from Contech Engineered Solutions.

Warning: In the case of a spill, the maintenance personnel should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

1. If applicable, set up safety equipment to protect maintenance personnel and pedestrians from site hazards.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the doors (access portals) to the vault and allow the system to vent.
4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
5. Make notes about the external and internal condition of the vault. Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.
6. Using appropriate equipment offload the replacement cartridges (up to 150 lbs. each) and set aside.
7. Remove used cartridges from the vault using one of the following methods:

Method 1:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

   Using appropriate hoisting equipment, attach a cable from the boom, crane, or tripod to the loose cartridge. Contact Contech Engineered Solutions for suggested attachment devices.

B. Remove the used cartridges (up to 250 lbs. each) from the vault.



Important: Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner.

C. Set the used cartridge aside or load onto the hauling truck.

D. Continue steps a through c until all cartridges have been removed.

Method 2:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

B. Unscrew the cartridge cap.

C. Remove the cartridge hood and float.

D. At location under structure access, tip the cartridge on its side.

E. Empty the cartridge onto the vault floor. Reassemble the empty cartridge.

F. Set the empty, used cartridge aside or load onto the hauling truck.

G. Continue steps a through e until all cartridges have been removed.

8. Remove accumulated sediment from the floor of the vault and from the forebay. This can most effectively be accomplished by use of a vacuum truck.
9. Once the sediments are removed, assess the condition of the vault and the condition of the connectors.
10. Using the vacuum truck boom, crane, or tripod, lower and install the new cartridges. Once again, take care not to damage connections.
11. Close and fasten the door.
12. Remove safety equipment.
13. Finally, dispose of the accumulated materials in accordance with applicable regulations. Make arrangements to return the used **empty** cartridges to Contech Engineered Solutions.

Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Related Maintenance Activities - Performed on an as-needed basis

StormFilter units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.







Inspection Report

Date: Personnel:

Location: System Size:

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other ☐

Sediment Thickness in Forebay: Date:

Sediment Depth on Vault Floor:

Structural Damage:

Estimated Flow from Drainage Pipes (if available):

Cartridges Submerged: Yes ☐ No ☐ Depth of Standing Water:

StormFilter Maintenance Activities (check off if done and give description)

☐ Trash and Debris Removal:

☐ Minor Structural Repairs:

☐ Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source:

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source:

Erosion of Landscaped Areas: Yes ☐ No ☐ Source:

Items Needing Further Work:

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals.

Other Comments:

Review the condition reports from the previous inspection visits.

StormFilter Maintenance Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other ☐

List Safety Procedures and Equipment Used: _____

_____

_____

System Observations

Months in Service:

Oil in Forebay (if present): Yes ☐ No ☐

Sediment Depth in Forebay (if present): _____

Sediment Depth on Vault Floor: _____

Structural Damage: _____

Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: Yes ☐ No ☐ Details: _____

Replace Cartridges: Yes ☐ No ☐ Details: _____

Sediment Removed: Yes ☐ No ☐ Details: _____

Quantity of Sediment Removed (estimate?):

Minor Structural Repairs: Yes ☐ No ☐ Details: _____

Residuals (debris, sediment) Disposal Methods: _____

Notes:

_____

_____

_____

_____

_____

_____

_____

RECYCLED PAPER

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- Drawings and specifications are available at www.conteches.com.
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Stormwater BMP Maintenance Log

BMP Structure	Inspector (Name)	Work Performed	Date Performed	Comments
Pavement Sweeping				
Porous Pavement				
Catch Basins				
CMP System				
StormFilter System				
Other				
Additional Comments:				

APPENDIX B: STORMWATER QUALITY CALCULATIONS

WOODARD &CURRAN COMMITMENT & INTEGRITY DRIVE RESULTS
41 HUTCHINS DRIVE
PORTLAND, MAINE 04102

CLIENT: USM
PROJECT: Structured Parking Garage
CALCS BY: JTC/AEF
DATE: 7/12/2021
PROJECT NO.: 233035.00

Redevelopment Treatment Calculations - Per Section 4.C.2.d of the MaineDEP Chapter 500 Rules

Area of Redevelopment (acres) = 2.37

a. Existing Pollutant Impact

Land Use	Pollutant Ranking	Land Area (Ac.)	Impact
High Use Roads	5	0.00	0.00
Medium Use Roads/Parking Lot	4	1.29	5.15
Other Parking Lots/Flat Asphalt Roofs/Industrial Roofs	3	0.00	0.00
Other Roofs/Landscaped Area/Paved Walkway	2	1.07	2.13
Non-grass Landscaping/Stormwater	1	0.02	0.02
Forest/Meadow	0	0.00	0.00
	Sum:	2.37	7.30

b. Proposed Pollutant Impact

Land Use	Pollutant Ranking	Land Area (Ac.)	Impact
High Use Roads	5	0.00	0.00
Medium Use Roads/Parking Lot	4	1.72	6.88
Other Parking Lots/Flat Asphalt Roofs/Industrial Roofs	3	0.00	0.00
Other Roofs/Landscaped Area/Paved Walkway	2	0.65	1.29
Non-grass Landscaping/Stormwater	1	0.00	0.00
Forest/Meadow	0	0.00	0.00
	Sum:	2.37	8.17

c. Existing Impact/Total Redevelopment Acres

3.1

d. Proposed Impact/Total Redevelopment Acres

3.4

e. Item D Minus Item C

0.4

Treatment Requirements - Per Table 3 of the MaineDEP Chapter 500 Rules

Treatment Required (%) = 60%
Treatment Area Required (SF) = 61,940

Treatment Design Calculations

StormFilter System:

Treated Area = 61940 SF
WQV (required) = 1" x Treatment Area Required = 5162 CF

*Refer to Contech Design Review Letter for information on the sizing and design of the StormFilter Treatment System.

Contech Engineered Solutions LLC
71 US Rte 1, Suite F
Scarborough, ME 04074
Phone: (207) 885-6191
www.ContechES.com

Amy Lebel
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

July 28, 2021

RE: University of Southern Maine Structured Parking Garage (Contech Reference No. 635857)
Review of StormFilter Design

To whom it may concern,

The purpose of this letter is to document Contech Engineered Solutions review of the plans and the proposed application of the StormFilter Media Filtration System water quality unit for the USM Structured Parking Garage site in Portland, ME.

Contech Engineered Solutions (Contech) has reviewed the StormFilter (SF) design for this project. We believe the SF configuration to be an appropriate water quality solution for this site.

The SF system with Zeolite-Phosphosorb (Zeo-Psorb) cartridges is approved for use by MEDEP meeting the General Standard of the Stormwater rules (Chapter 500) if designed, installed, and maintained in accordance with the provisions noted in the March 13, 2015 approval letter from the MEDEP.

The SF system is designed in accordance with the maximum drain down rate of 0.27 gallons per minute per square foot of filter surface area (3 gpm per 27" cartridge). Additionally, the SF is designed with an upstream sumped water quality volume (WQv) detention system to retain, route and treat the entire WQ event flow from the contributing drainage area to the treatment unit. The resultant volume from the WQ event storm is detained in the upstream detention to an elevation below any bypass flow paths resulting in a routed storm event volume through the SF cartridges with a required emptying time of 24 to 48 hours. Due to the extended detention time upstream of the SF in the sumped WQv detention system, Contech assumes sedimentation of the larger solids at an estimated 50 percent reduction of the total suspended solids prior to the treatment by the SF.

The engineer of record provided a WQv of 5,162 cf and a drainage area of 2.02 ac, of which 1.54 ac is impervious. In order to adequately treat the runoff from this area, Contech recommends a SF manhole SFMH72 with seven (7) – 27" Zeo-Psorb cartridges.

The SF system requires a hydraulic headwater condition to fully immerse the media and activate the cartridge float valve. For 27" SF cartridges, this headwater condition is 3.05 ft above SF outlet invert. This is achieved by the either physical inlet to outlet pipe elevation drop or an upstream WQ detention filling during the WQ storm flow to the required SF float valve activation elevation.

The site detention system storage is designed to store the WQv and flood control volume separately. The two parts of the detention system are separated by a weir to ensure that the WQv is captured for treatment prior to overflowing into the flood control detention. The WQv shall be stored in a 66" diameter corrugated metal pipe (CMP) with a 6" sump depth. The treatment flow outlet pipe stub is positioned 6" above the 66" CMP WQv detention invert.

The WQv is routed through the SF vault with a drain down flow rate of 0.047 cfs (3 gpm per cartridge x 7 cartridges / 448.83 gpm/cfs) and is estimated to drain down in 30.5 hours. The resulting cumulative treated volume for this design is 5,185 cf.

Contech Engineered Solutions LLC
71 US Rte 1, Suite F
Scarborough, ME 04074
Phone: (207) 885-6191
www.ContechES.com

The weir plate between the WQv and the Flood Control Detention CMP with high overflow weir is positioned to allow storms larger than the WQ storm to overflow into the flood control detention. The flood control detention is a 72" diameter CMP system with an internal flow control wall to control outlet flows to a downstream structure.

Our systems require periodic maintenance to continue operating properly. Given typical runoff pollutant loading rates, Contech recommends maintenance inspections on an annual basis.

This system is expected to operate in accordance with Contech's design intent. Please feel free to contact me if you have any questions or concerns.

Sincerely,

David Adams, PE
Contech Engineered Solutions, LLC.
(207) 885-6191
dave.adams@ContechES.com

Determining Number of Cartridges for Systems Downstream of Detention

CONTECH Engineered Solutions Engineer:	DRA
Date Prepared:	7/22/2021

Site Information

Project Name	USM Structured Parking Garage
Project State	Maine
Project Location	Portland
Drainage Area, Ad	2.02 ac
Impervious Area, Ai	1.54 ac
Pervious Area, Ap	0.48
% Impervious	76.09%
Runoff Coefficient, Rc	0.73

Upstream Detention System

Water Quality Volume	5,162 cf
	(provided by Woodard and Curran)
24-hr release rate	27 gpm
48-hr release rate	13 gpm
Detention pretreatment credit	50%

Mass loading calculations

Mean Annual Rainfall, P	47.33 in
Agency required % removal	85%
Percent Runoff Capture	85%
MEDEP Mean Annual Runoff, Vt	252,674 ft^3
Event Mean Concentration of Pollutant, EMC	68 mg/l

Filter System

Filtration brand	StormFilter
Cartridge height	27 in
Specific Flow Rate per MEDEP authorization	3.00 gpm/cart

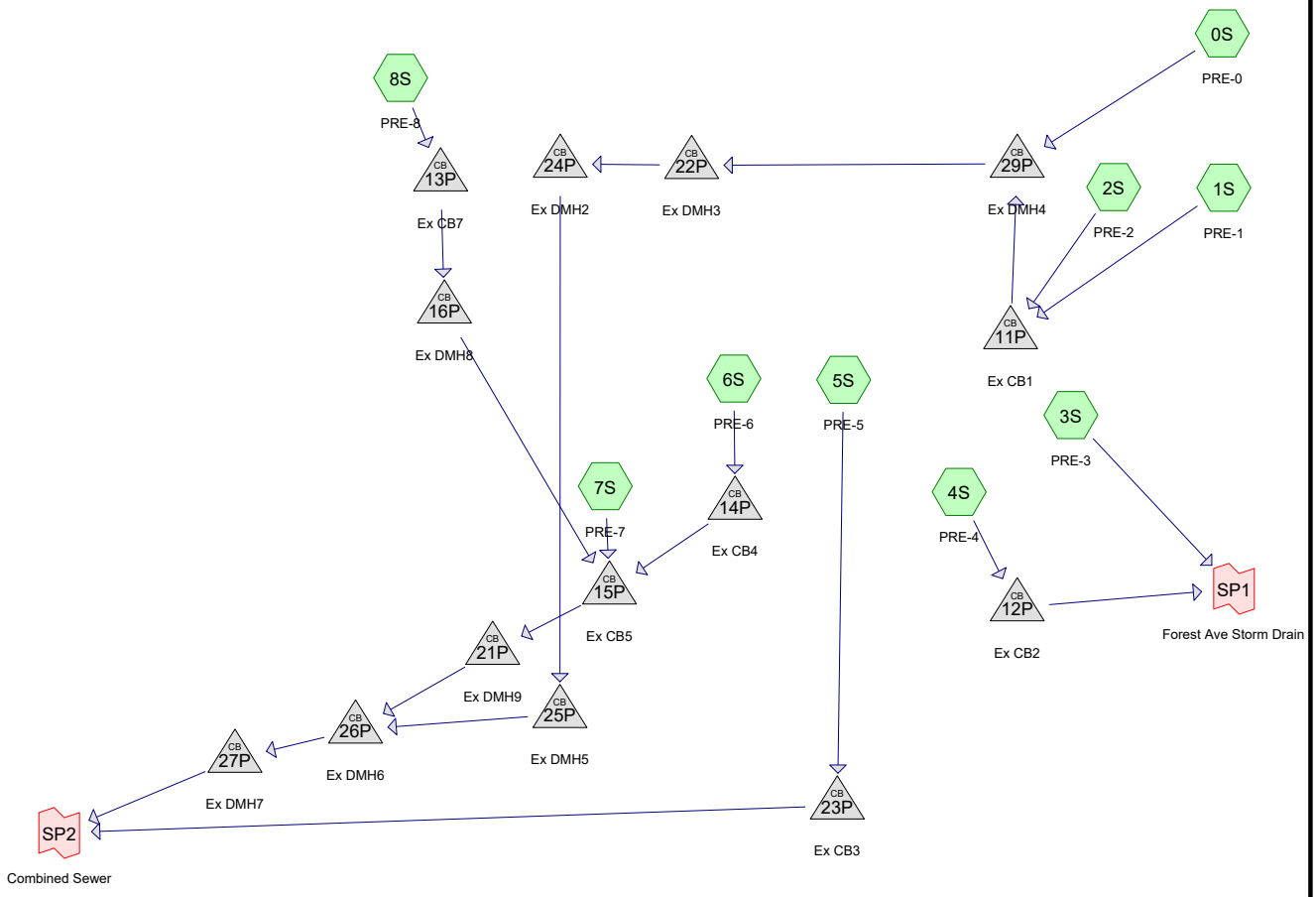
Number of cartridges - mass loading

Mass removed by pretreatment system, M_{pre}	536 lbs
Mass load to filters after pretreatment, M_{pass1}	536 lbs
Estimate the required filter efficiency, E_{filter}	0.70
Mass to be captured by filters, M_{filter}	375 lbs
Allowable Cartridge Flow rate, Q_{cart}	22.50 gpm
Mass load per cartridge, M_{cart} (lbs)	54 lbs
Number of Cartridges required, N_{mass}	7 ea
Treatment Capacity	21 gpm

Determine Critical Sizing Value

SUMMARY	
Mass Loading	
Treatment Mass (lbs)	375
Cartridge Mass Capacity (lbs)	54
Number of Cartridges	7

APPENDIX C: HYDROCAD REPORTS



Subcat Reach Pond Link

Routing Diagram for C1. Pre
Prepared by Woodard Curran, Printed 7/28/2021
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.60	68	Grass cover (parking area), HSG A (1S, 2S, 3S, 4S, 5S)
0.60	39	Grass cover, Good, HSG A (0S, 1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S)
1.45	98	Paved parking, HSG A (0S, 1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S)
0.15	40	Porous Pavement (0S, 1S, 2S, 3S, 5S, 6S, 8S)
2.79	**76**	**TOTAL AREA**

Summary for Subcatchment 0S: PRE-0

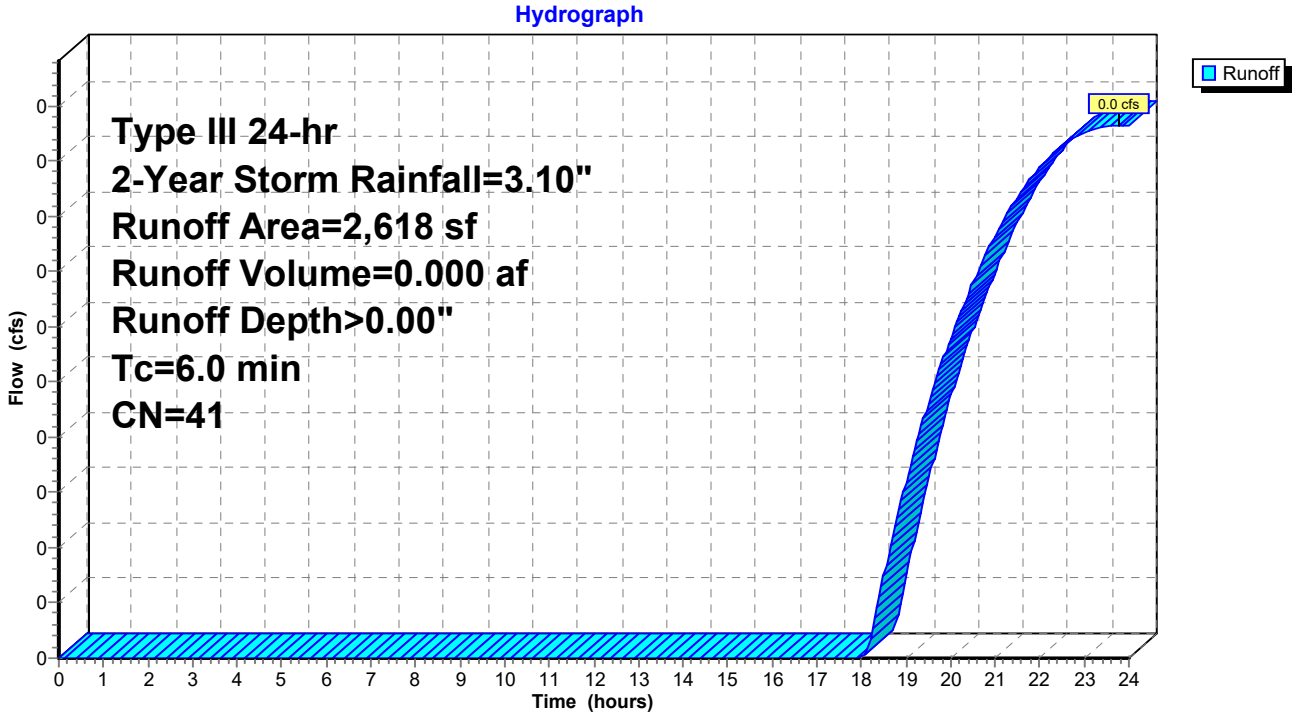
Runoff = 0.0 cfs @ 23.77 hrs, Volume= 0.000 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
	70	98	Paved parking, HSG A
	1,403	39	Grass cover, Good, HSG A
*	1,145	40	Porous Pavement
	2,618	41	Weighted Average
	2,548		97.33% Pervious Area
	70		2.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 0S: PRE-0



Summary for Subcatchment 1S: PRE-1

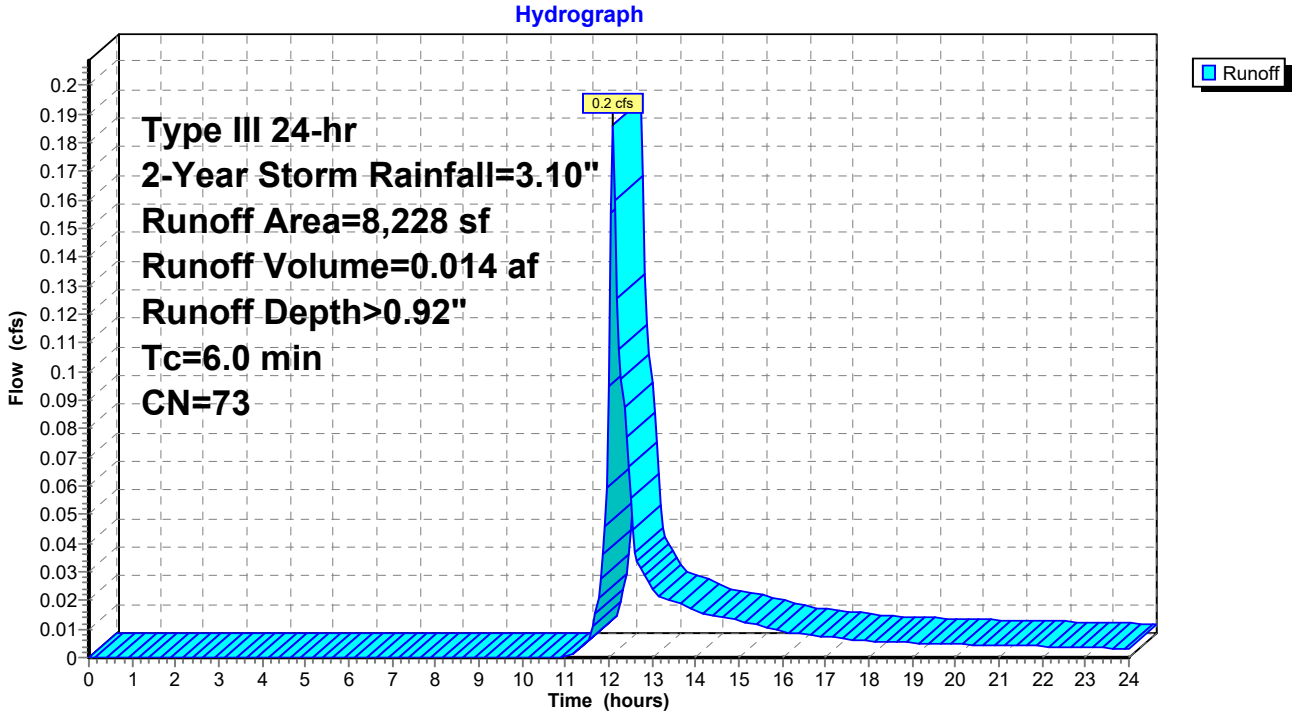
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.014 af, Depth> 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
	4,083	98	Paved parking, HSG A
	1,673	39	Grass cover, Good, HSG A
*	1,374	68	Grass cover (parking area), HSG A
*	1,098	40	Porous Pavement
	8,228	73	Weighted Average
	4,145		50.38% Pervious Area
	4,083		49.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PRE-1



Summary for Subcatchment 2S: PRE-2

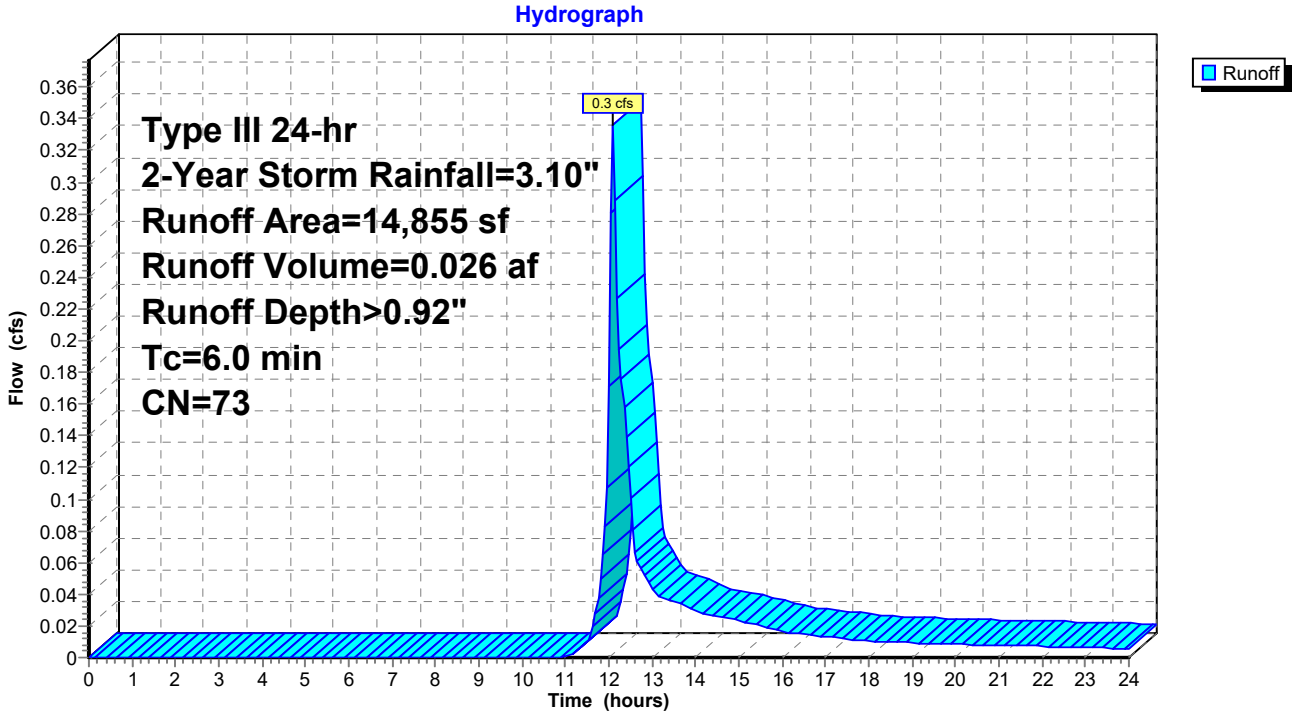
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.026 af, Depth> 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
	6,344	98	Paved parking, HSG A
	2,948	39	Grass cover, Good, HSG A
	4,408	68	Grass cover (parking area), HSG A
*	1,155	40	Porous Pavement
	14,855	73	Weighted Average
	8,511		57.29% Pervious Area
	6,344		42.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PRE-2



Summary for Subcatchment 3S: PRE-3

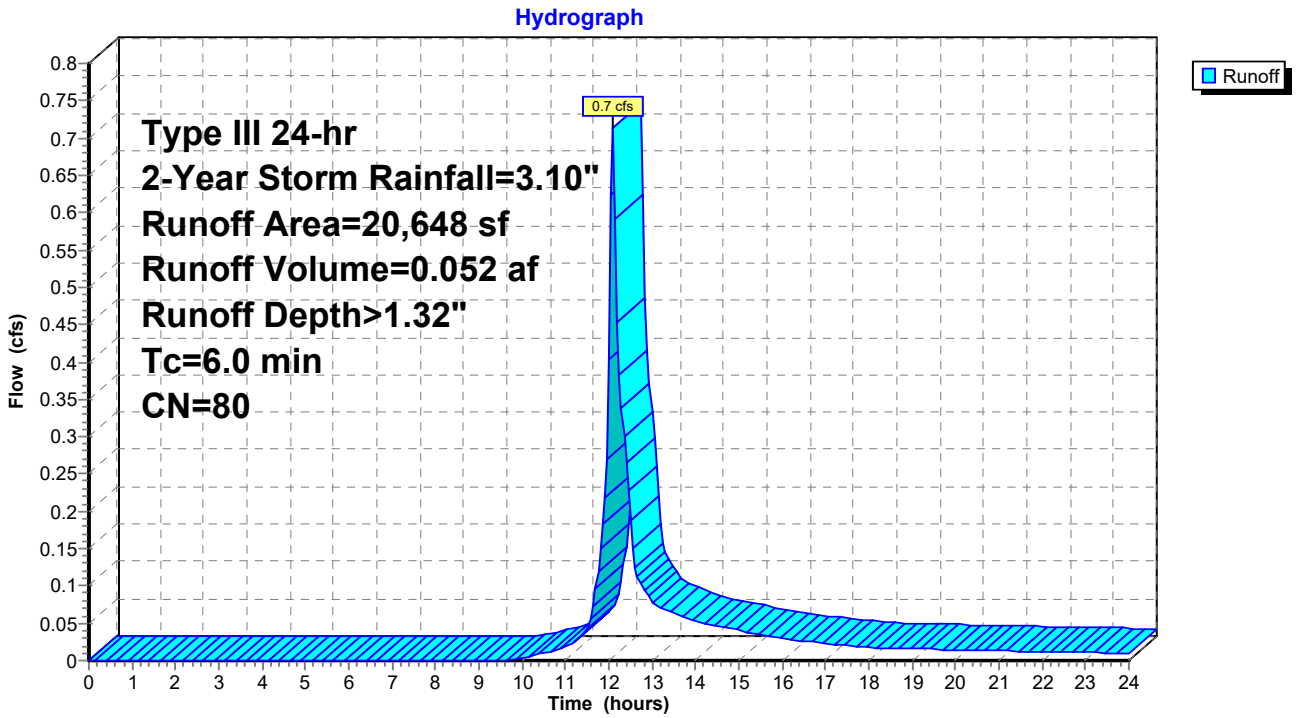
Runoff = 0.7 cfs @ 12.10 hrs, Volume= 0.052 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
	10,577	98	Paved parking, HSG A
	1,903	39	Grass cover, Good, HSG A
	7,715	68	Grass cover (parking area), HSG A
*	453	40	Porous Pavement
	20,648	80	Weighted Average
	10,071		48.77% Pervious Area
	10,577		51.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PRE-3



Summary for Subcatchment 4S: PRE-4

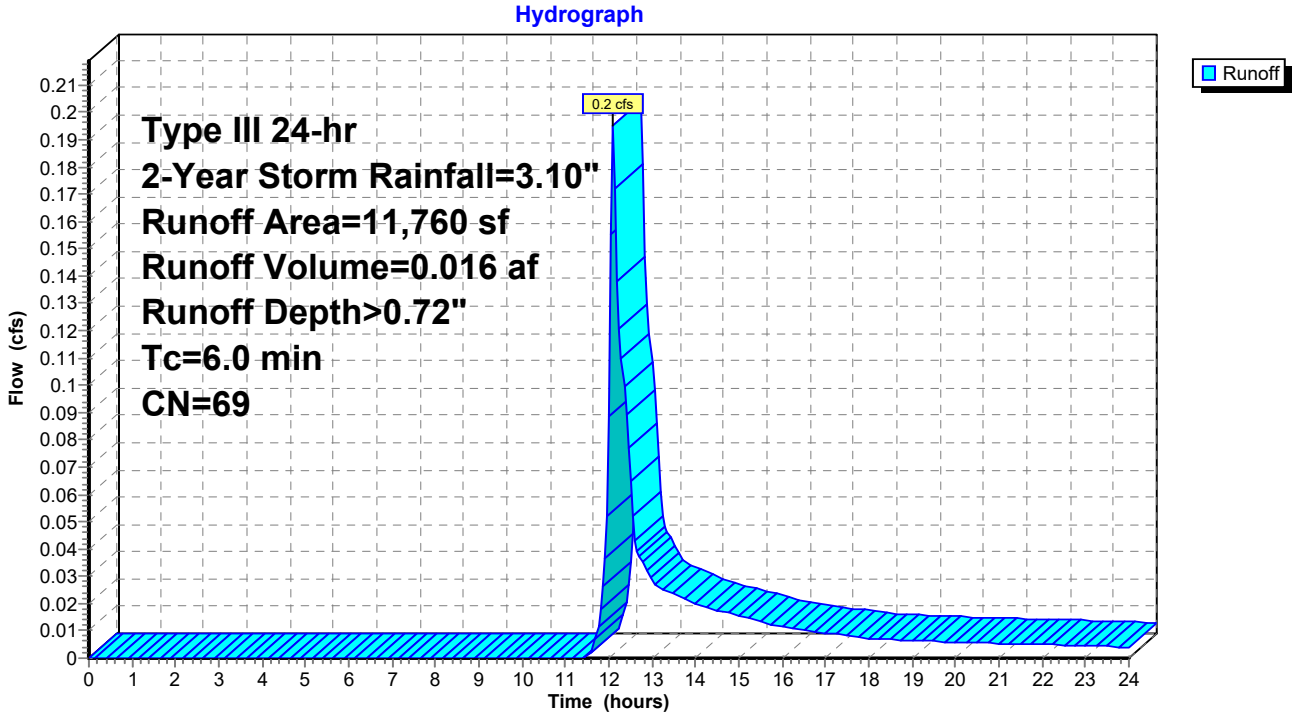
Runoff = 0.2 cfs @ 12.11 hrs, Volume= 0.016 af, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

Area (sf)	CN	Description
2,321	98	Paved parking, HSG A
1,957	39	Grass cover, Good, HSG A
7,482	68	Grass cover (parking area), HSG A
11,760	69	Weighted Average
9,439		80.26% Pervious Area
2,321		19.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PRE-4



Summary for Subcatchment 5S: PRE-5

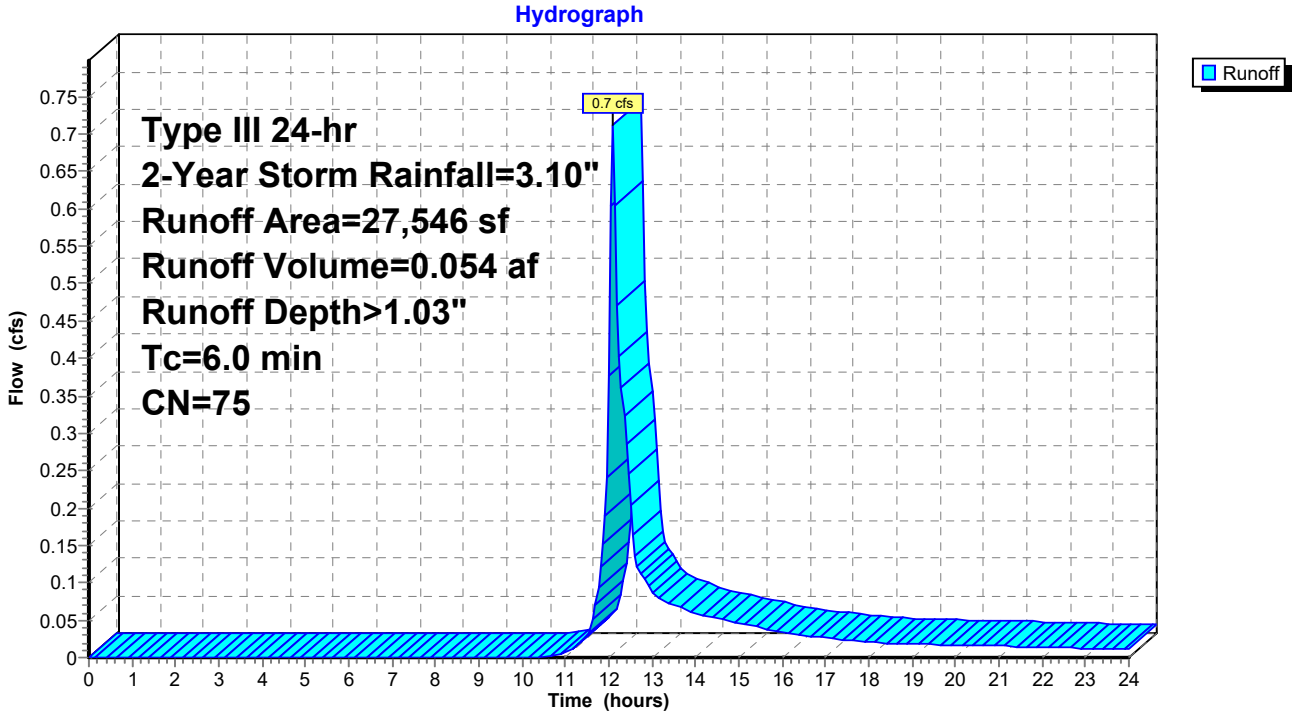
Runoff = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
	14,114	98	Paved parking, HSG A
	6,700	39	Grass cover, Good, HSG A
	5,072	68	Grass cover (parking area), HSG A
*	1,660	40	Porous Pavement
	27,546	75	Weighted Average
	13,432		48.76% Pervious Area
	14,114		51.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S: PRE-5



Summary for Subcatchment 6S: PRE-6

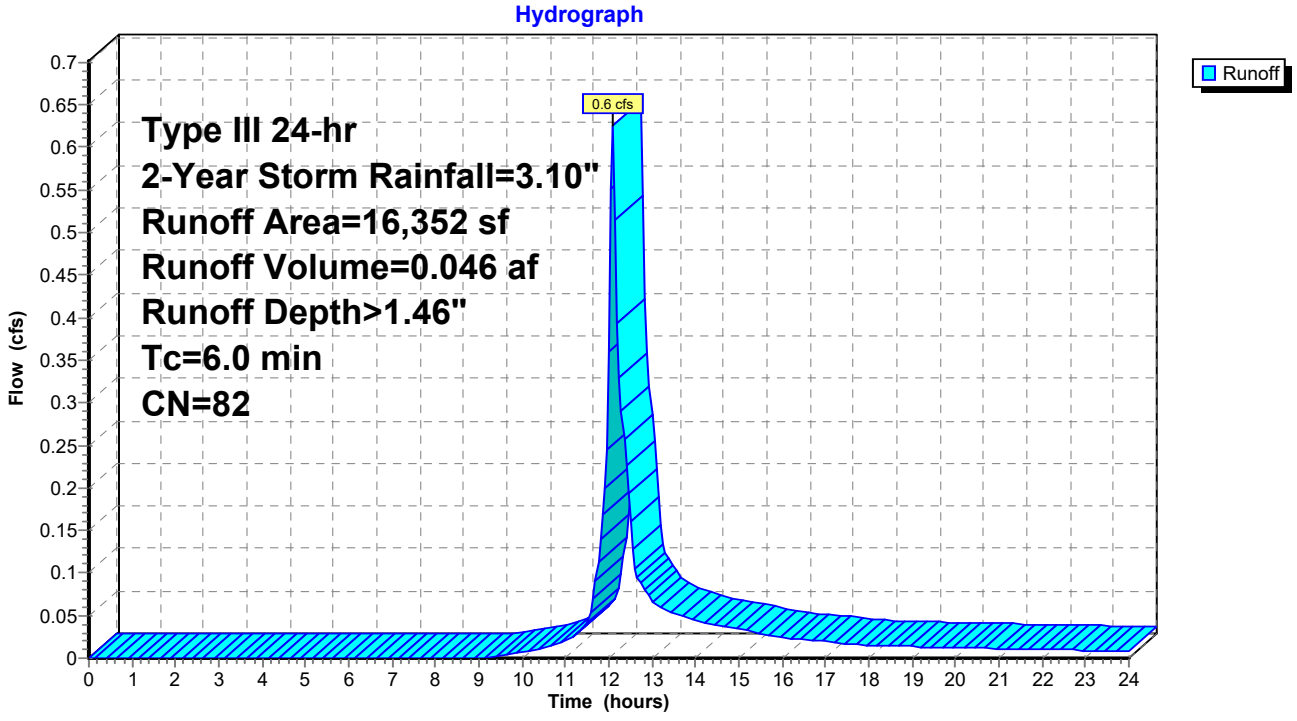
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 0.046 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
	11,768	98	Paved parking, HSG A
	3,865	39	Grass cover, Good, HSG A
*	719	40	Porous Pavement
	16,352	82	Weighted Average
	4,584		28.03% Pervious Area
	11,768		71.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S: PRE-6



Summary for Subcatchment 7S: PRE-7

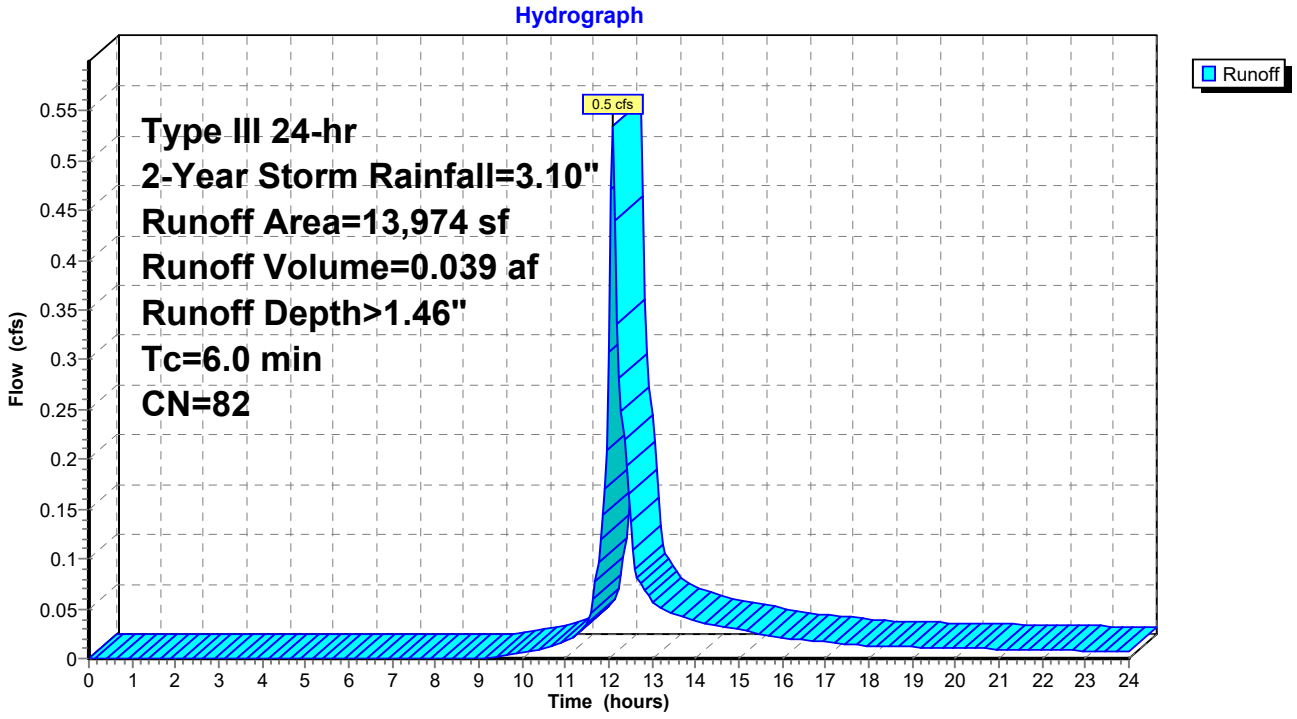
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.039 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

Area (sf)	CN	Description
10,235	98	Paved parking, HSG A
3,739	39	Grass cover, Good, HSG A
13,974	82	Weighted Average
3,739		26.76% Pervious Area
10,235		73.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: PRE-7



Summary for Subcatchment 8S: PRE-8

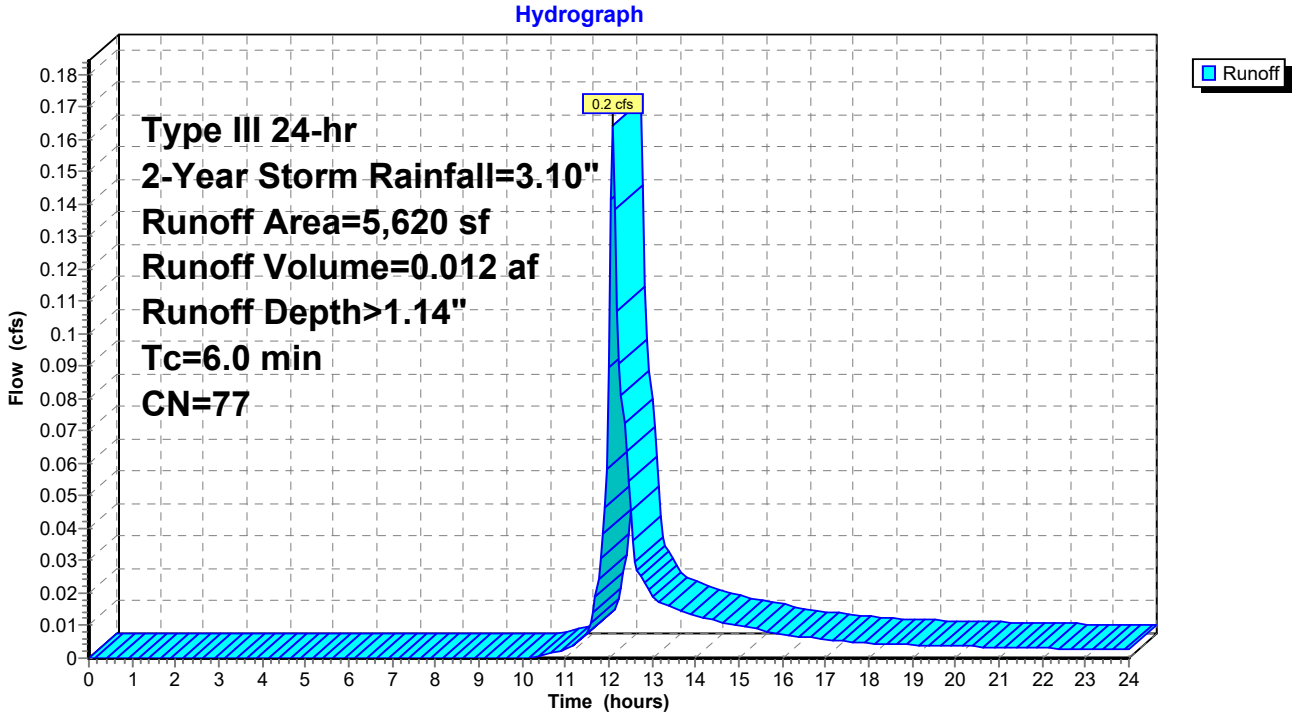
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
	3,664	98	Paved parking, HSG A
	1,857	39	Grass cover, Good, HSG A
*	99	40	Porous Pavement
	5,620	77	Weighted Average
	1,956		34.80% Pervious Area
	3,664		65.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S: PRE-8



Summary for Pond 11P: Ex CB1

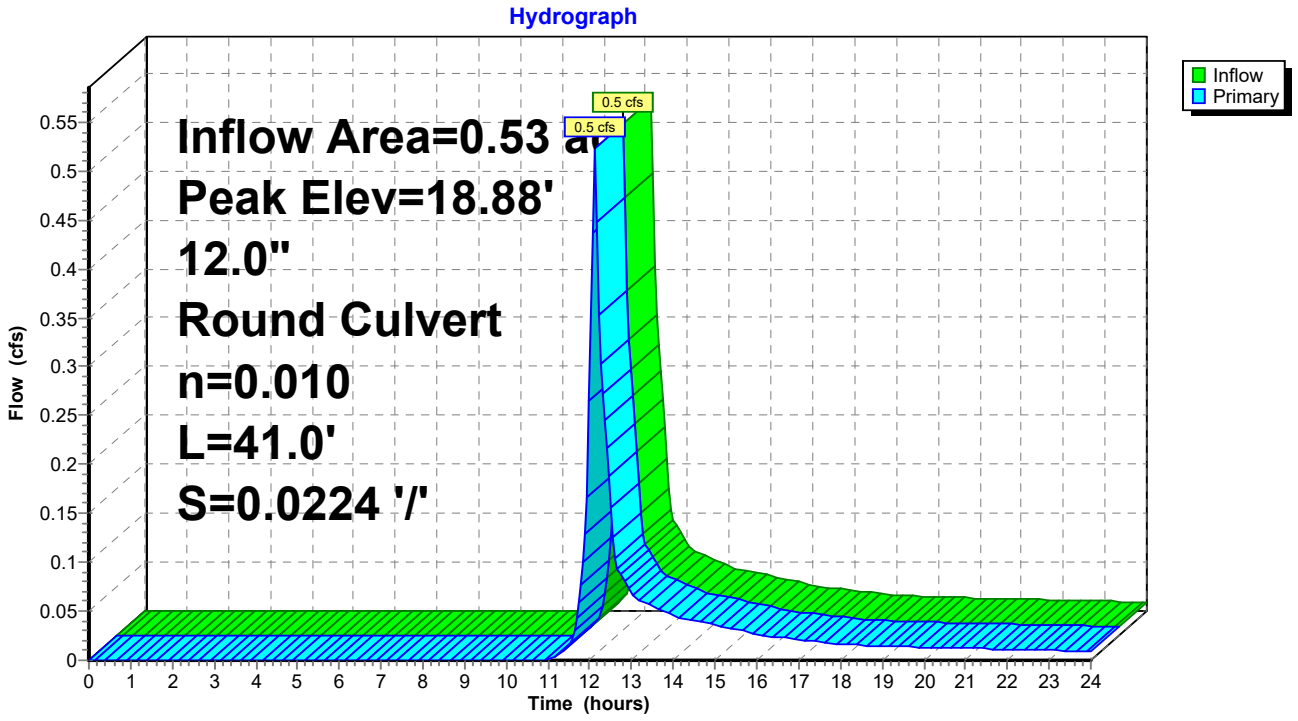
Inflow Area = 0.53 ac, 45.17% Impervious, Inflow Depth > 0.92" for 2-Year Storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.88' @ 12.10 hrs
Flood Elev= 22.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.47'	**12.0" Round Culvert** L= 41.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.47' / 17.55' S= 0.0224 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=18.88' TW=17.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.5 cfs @ 1.72 fps)

Pond 11P: Ex CB1



Summary for Pond 12P: Ex CB2

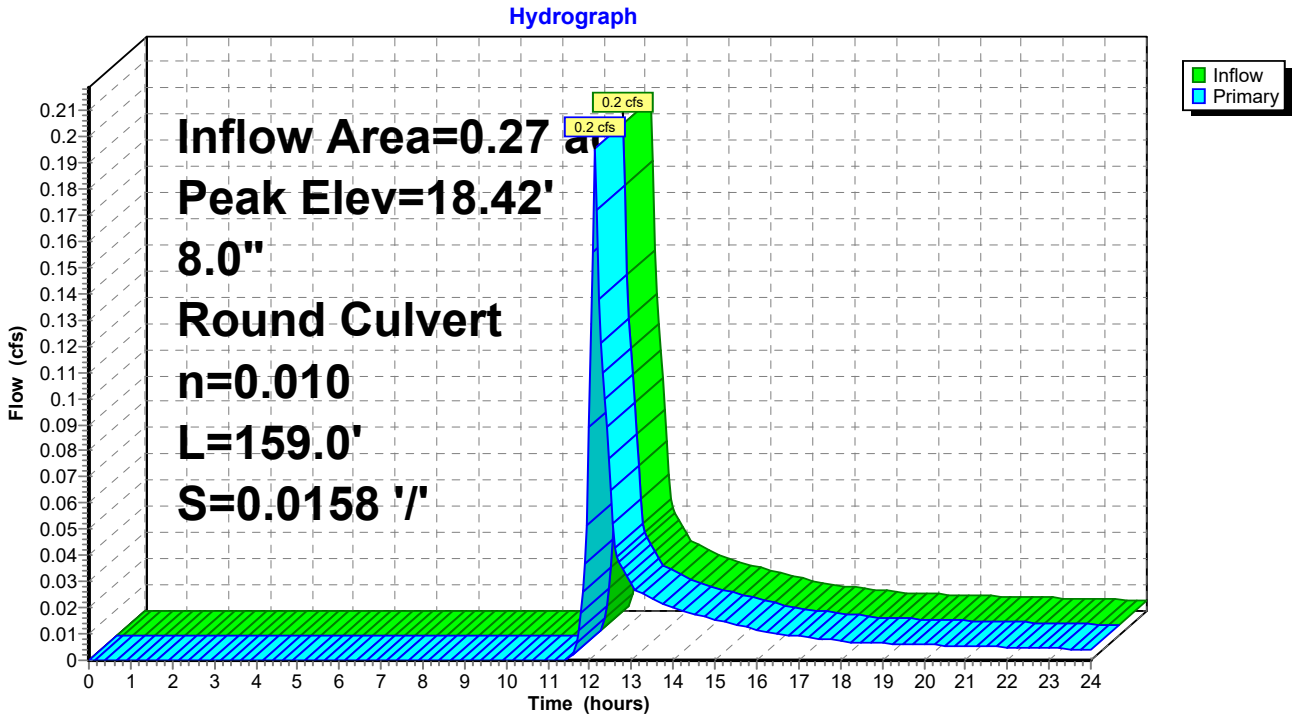
Inflow Area = 0.27 ac, 19.74% Impervious, Inflow Depth > 0.72" for 2-Year Storm event
Inflow = 0.2 cfs @ 12.11 hrs, Volume= 0.016 af
Outflow = 0.2 cfs @ 12.11 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.11 hrs, Volume= 0.016 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.42' @ 12.11 hrs
Flood Elev= 22.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.14'	**8.0" Round Culvert** L= 159.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.14' / 15.62' S= 0.0158 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.2 cfs @ 12.11 hrs HW=18.42' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.2 cfs @ 1.41 fps)

Pond 12P: Ex CB2



Summary for Pond 13P: Ex CB7

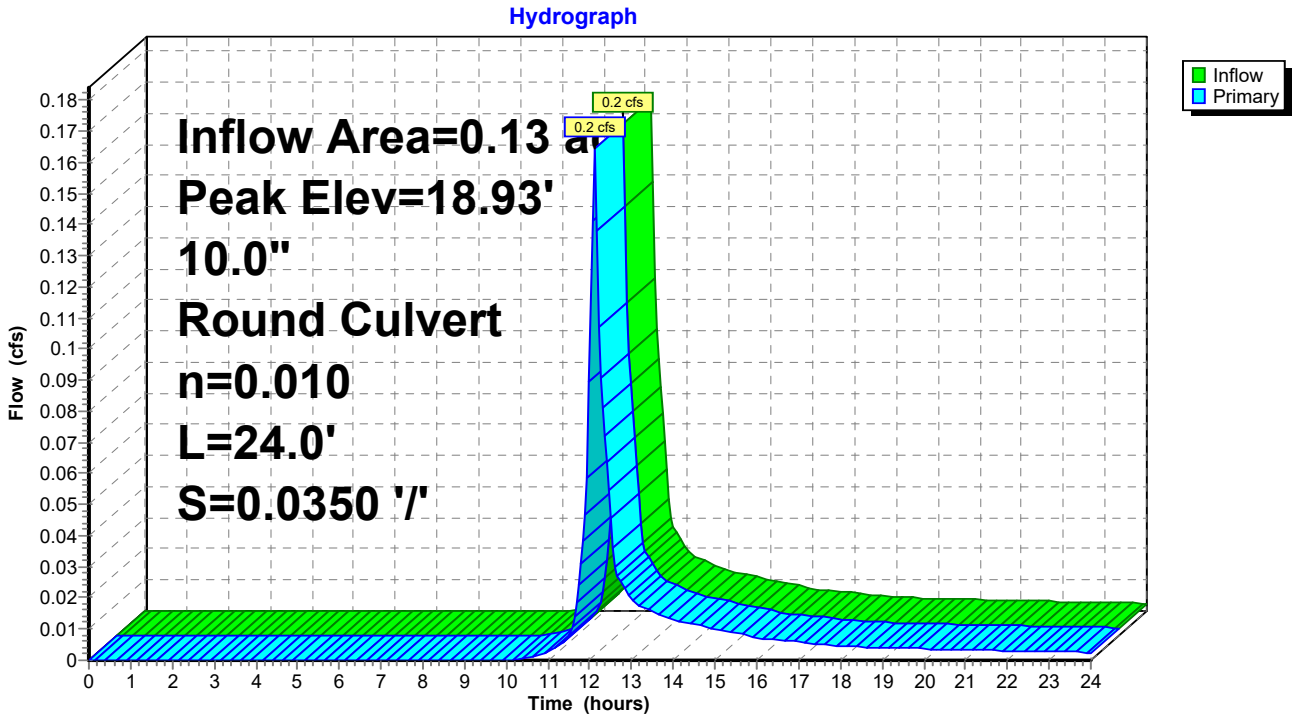
Inflow Area = 0.13 ac, 65.20% Impervious, Inflow Depth > 1.14" for 2-Year Storm event
Inflow = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af
Outflow = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.93' @ 12.10 hrs
Flood Elev= 24.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.70' / 17.86' S= 0.0350 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.2 cfs @ 12.10 hrs HW=18.93' TW=15.45' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.2 cfs @ 1.30 fps)

Pond 13P: Ex CB7



Summary for Pond 14P: Ex CB4

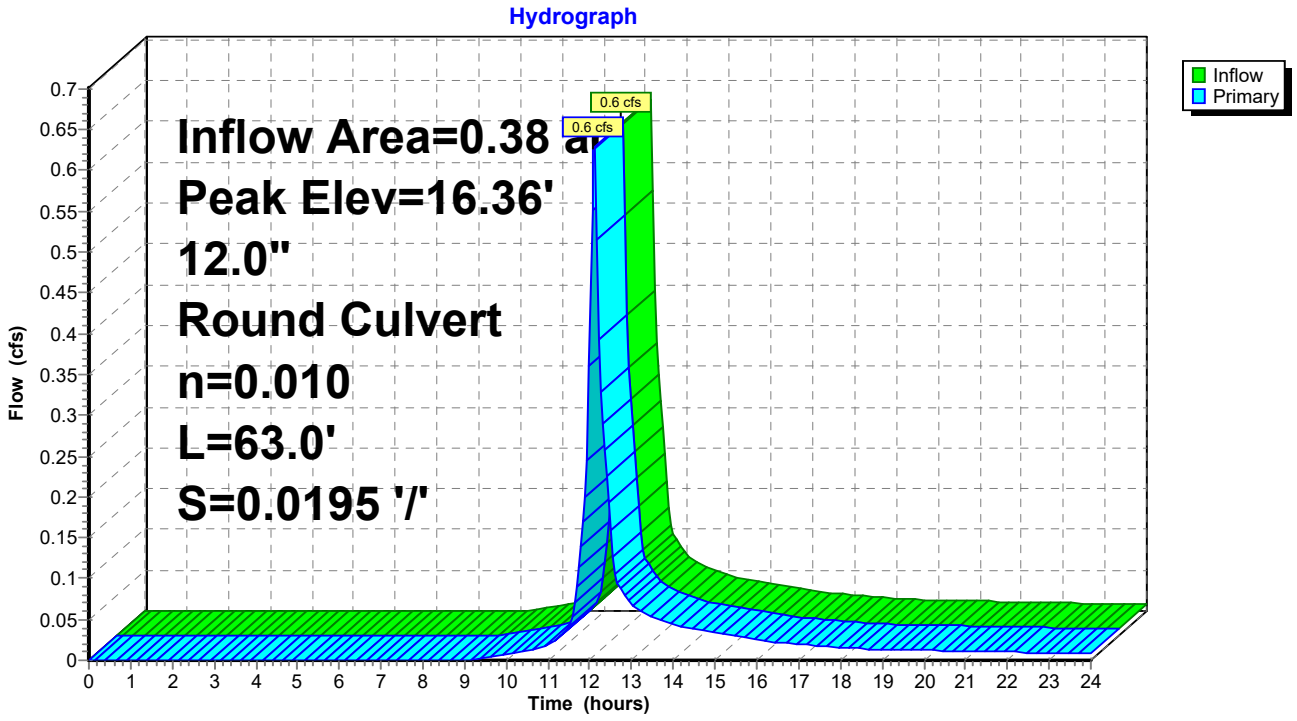
Inflow Area = 0.38 ac, 71.97% Impervious, Inflow Depth > 1.46" for 2-Year Storm event
Inflow = 0.6 cfs @ 12.09 hrs, Volume= 0.046 af
Outflow = 0.6 cfs @ 12.09 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.09 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.36' @ 12.09 hrs
Flood Elev= 21.96'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.91'	**12.0" Round Culvert** L= 63.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.91' / 14.68' S= 0.0195 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.6 cfs @ 12.09 hrs HW=16.36' TW=15.44' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.6 cfs @ 1.80 fps)

Pond 14P: Ex CB4



Summary for Pond 15P: Ex CB5

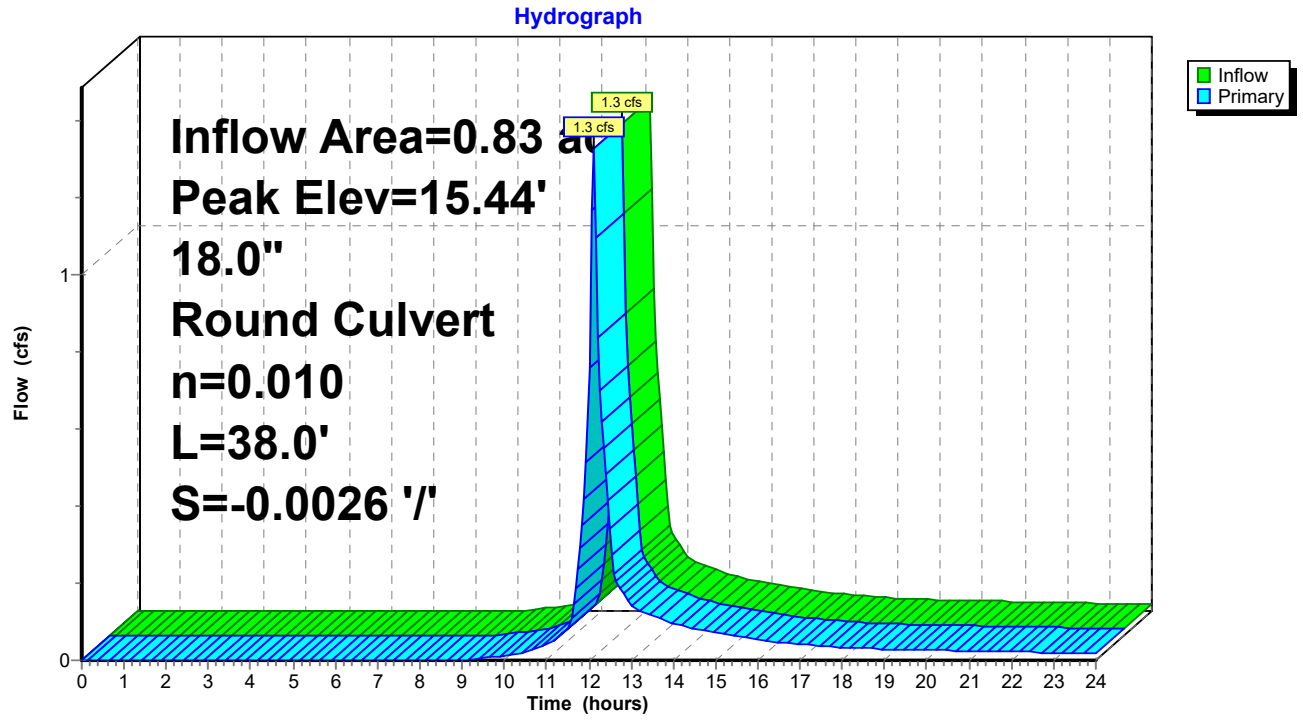
Inflow Area = 0.83 ac, 71.40% Impervious, Inflow Depth > 1.41" for 2-Year Storm event
Inflow = 1.3 cfs @ 12.10 hrs, Volume= 0.097 af
Outflow = 1.3 cfs @ 12.10 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.10 hrs, Volume= 0.097 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.44' @ 12.10 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.80'	**18.0" Round Culvert** L= 38.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 14.80' S= -0.0026 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.3 cfs @ 12.10 hrs HW=15.44' TW=15.22' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.3 cfs @ 1.76 fps)

Pond 15P: Ex CB5



Summary for Pond 16P: Ex DMH8

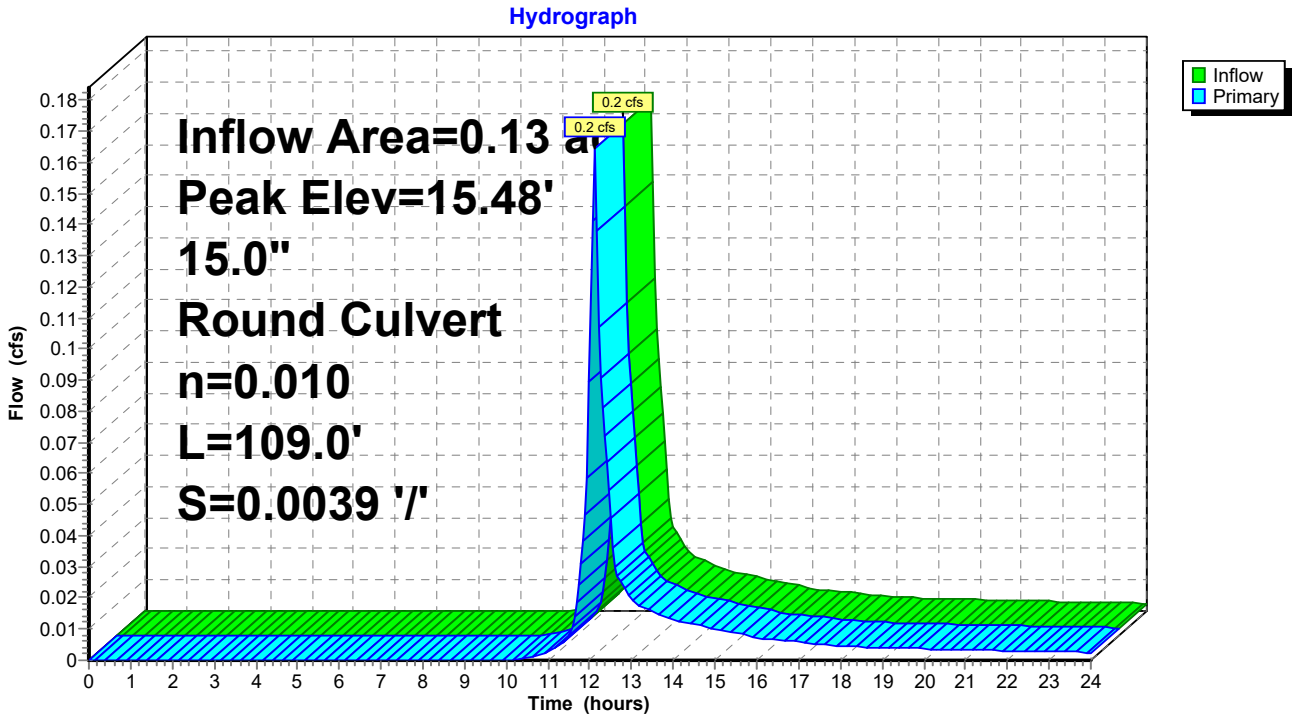
Inflow Area = 0.13 ac, 65.20% Impervious, Inflow Depth > 1.14" for 2-Year Storm event
Inflow = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af
Outflow = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.10 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.48' @ 12.14 hrs
Flood Elev= 24.67'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.08'	**15.0" Round Culvert** L= 109.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.08' / 14.65' S= 0.0039 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.1 cfs @ 12.10 hrs HW=15.45' TW=15.44' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.1 cfs @ 0.28 fps)

Pond 16P: Ex DMH8



Summary for Pond 21P: Ex DMH9

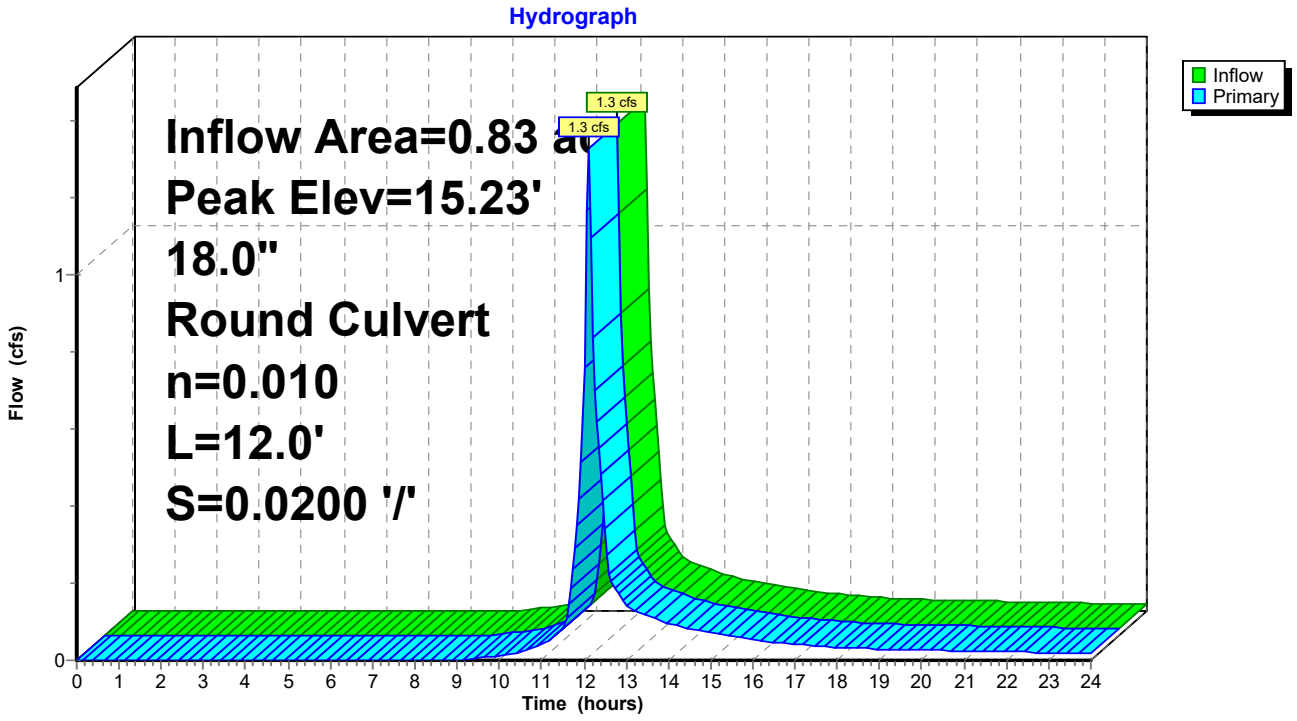
Inflow Area = 0.83 ac, 71.40% Impervious, Inflow Depth > 1.41" for 2-Year Storm event
Inflow = 1.3 cfs @ 12.10 hrs, Volume= 0.097 af
Outflow = 1.3 cfs @ 12.10 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.10 hrs, Volume= 0.097 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.23' @ 12.11 hrs
Flood Elev= 23.72'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.62'	**18.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.62' / 14.38' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.2 cfs @ 12.10 hrs HW=15.22' TW=15.00' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.2 cfs @ 2.61 fps)

Pond 21P: Ex DMH9



Summary for Pond 22P: Ex DMH3

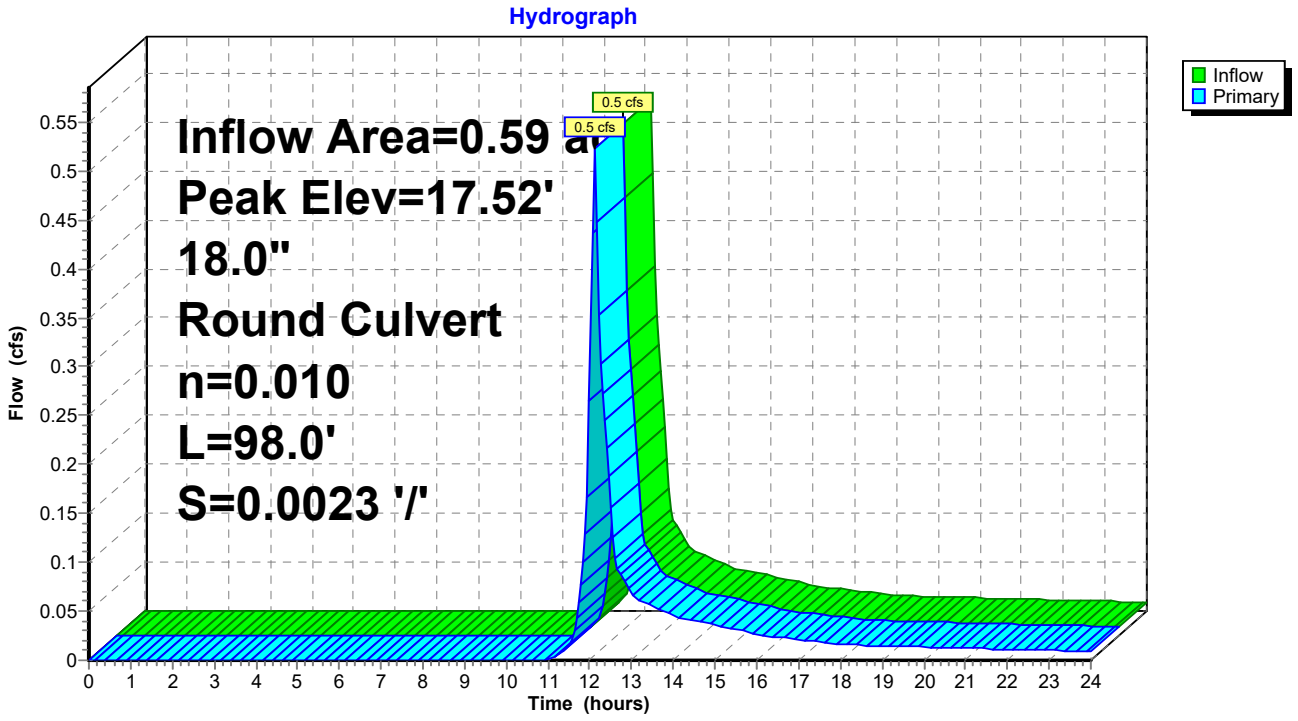
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 0.83" for 2-Year Storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.52' @ 12.10 hrs
Flood Elev= 24.92'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.12'	**18.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.12' / 16.89' S= 0.0023 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=17.51' TW=17.16' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.5 cfs @ 2.11 fps)

Pond 22P: Ex DMH3



Summary for Pond 23P: Ex CB3

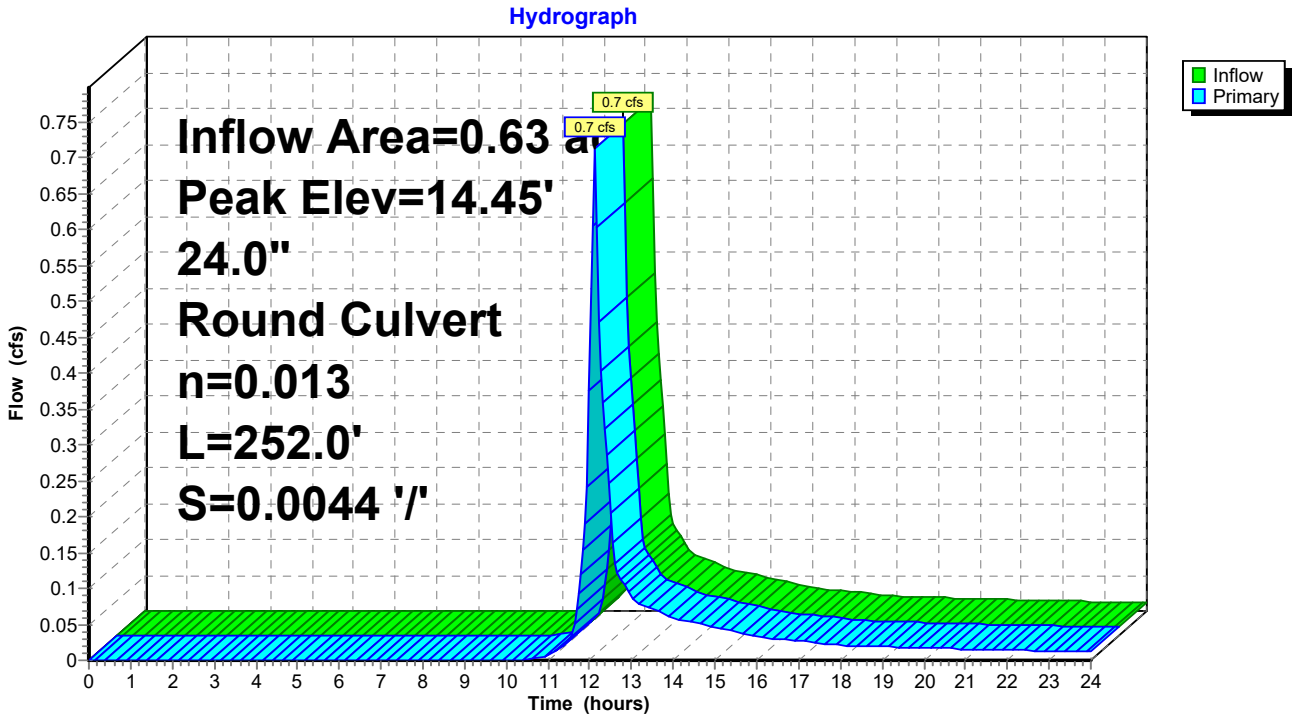
Inflow Area = 0.63 ac, 51.24% Impervious, Inflow Depth > 1.03" for 2-Year Storm event
Inflow = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af
Outflow = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.10 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.45' @ 12.10 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.05'	**24.0" Round Culvert** L= 252.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.05' / 12.94' S= 0.0044 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=0.7 cfs @ 12.10 hrs HW=14.45' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.7 cfs @ 2.40 fps)

Pond 23P: Ex CB3



Summary for Pond 24P: Ex DMH2

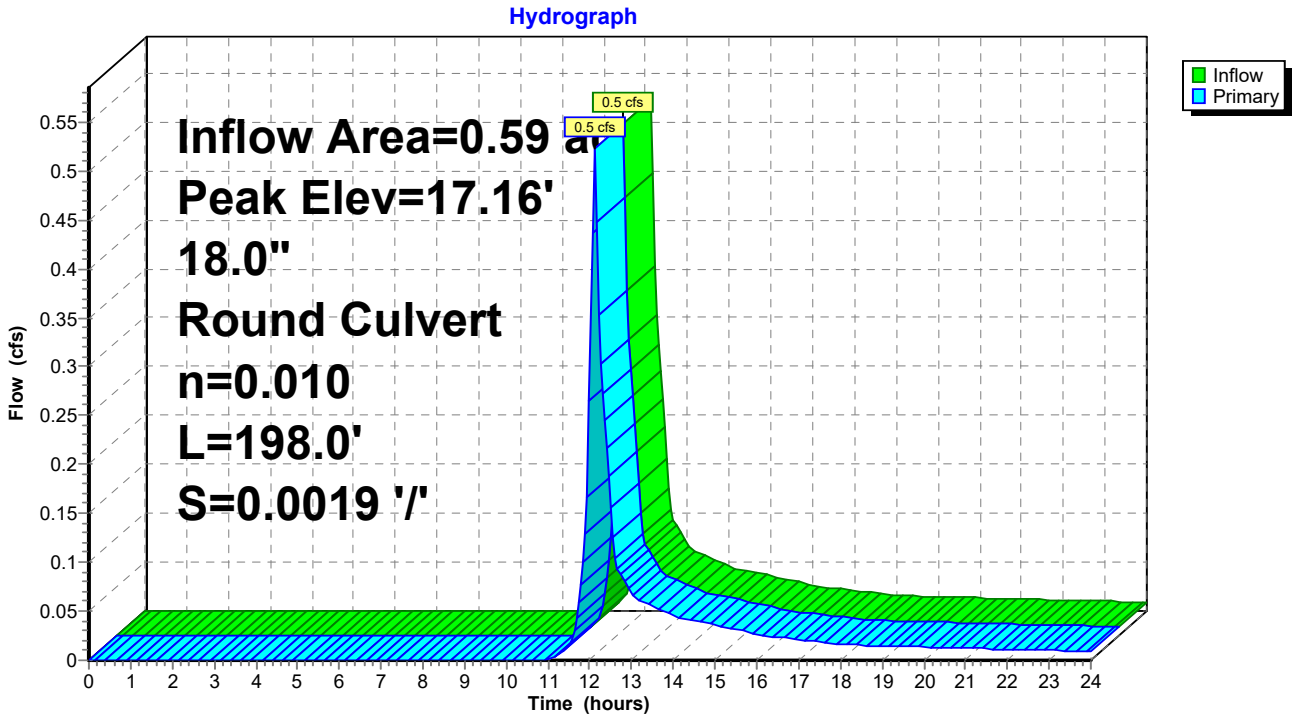
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 0.83" for 2-Year Storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.16' @ 12.10 hrs
Flood Elev= 25.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.75'	**18.0" Round Culvert** L= 198.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.75' / 16.38' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=17.16' TW=15.80' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.5 cfs @ 2.02 fps)

Pond 24P: Ex DMH2



Summary for Pond 25P: Ex DMH5

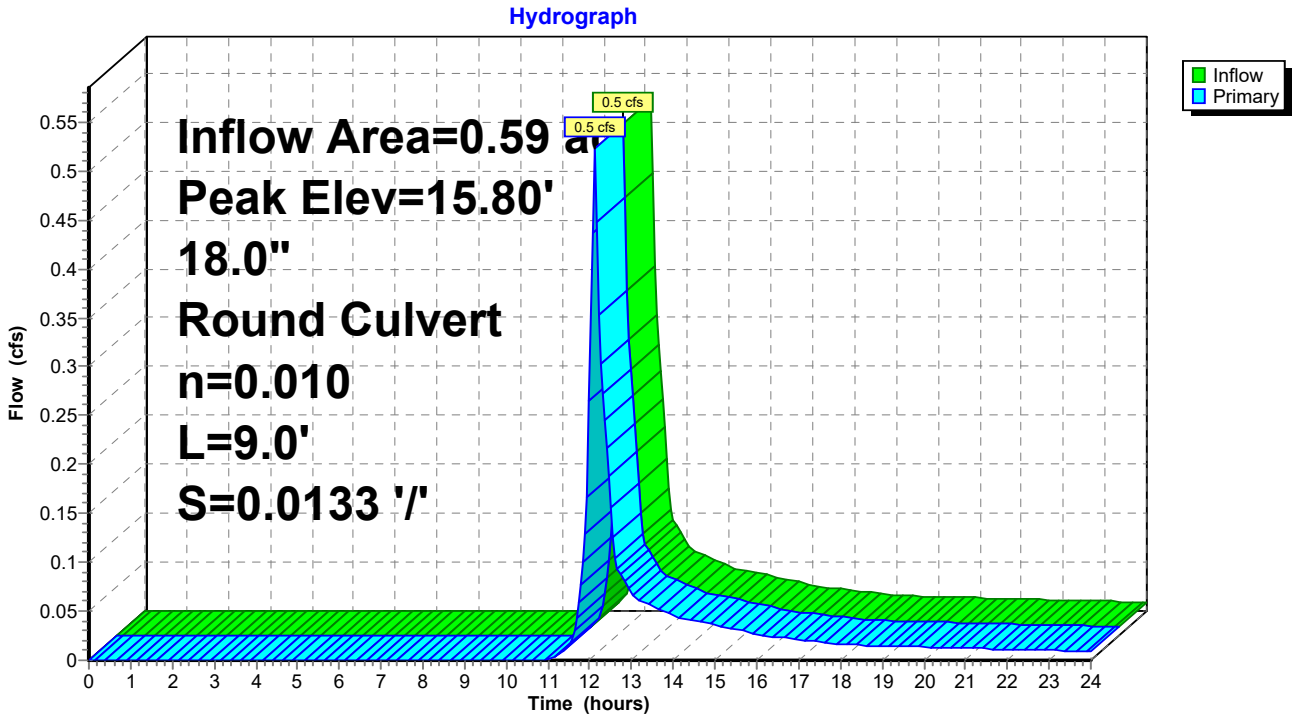
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 0.83" for 2-Year Storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.80' @ 12.10 hrs
Flood Elev= 23.84'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.44'	**18.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.44' / 15.32' S= 0.0133 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=15.80' TW=15.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.5 cfs @ 1.61 fps)

Pond 25P: Ex DMH5



Summary for Pond 26P: Ex DMH6

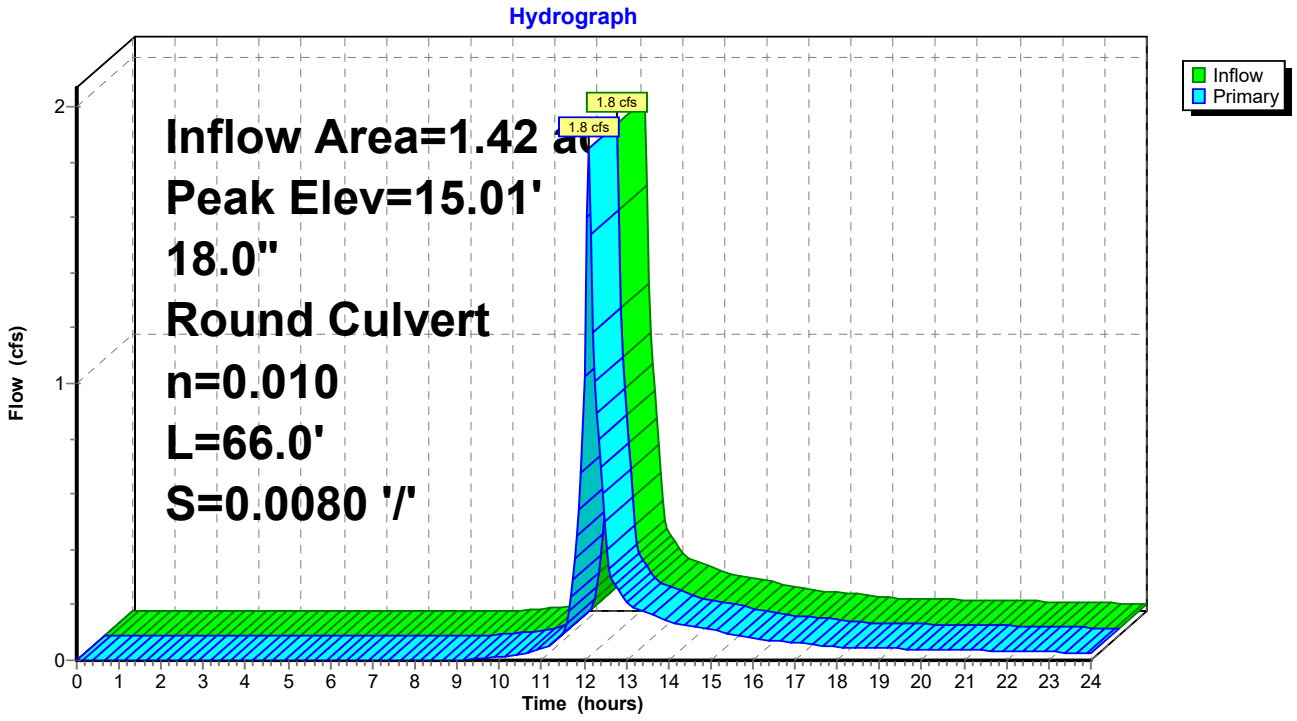
Inflow Area = 1.42 ac, 58.66% Impervious, Inflow Depth > 1.16" for 2-Year Storm event
Inflow = 1.8 cfs @ 12.10 hrs, Volume= 0.137 af
Outflow = 1.8 cfs @ 12.10 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.10 hrs, Volume= 0.137 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.01' @ 12.10 hrs
Flood Elev= 23.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.30'	**18.0" Round Culvert** L= 66.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.30' / 13.77' S= 0.0080 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.8 cfs @ 12.10 hrs HW=15.00' TW=14.53' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.8 cfs @ 3.25 fps)

Pond 26P: Ex DMH6



Summary for Pond 27P: Ex DMH7

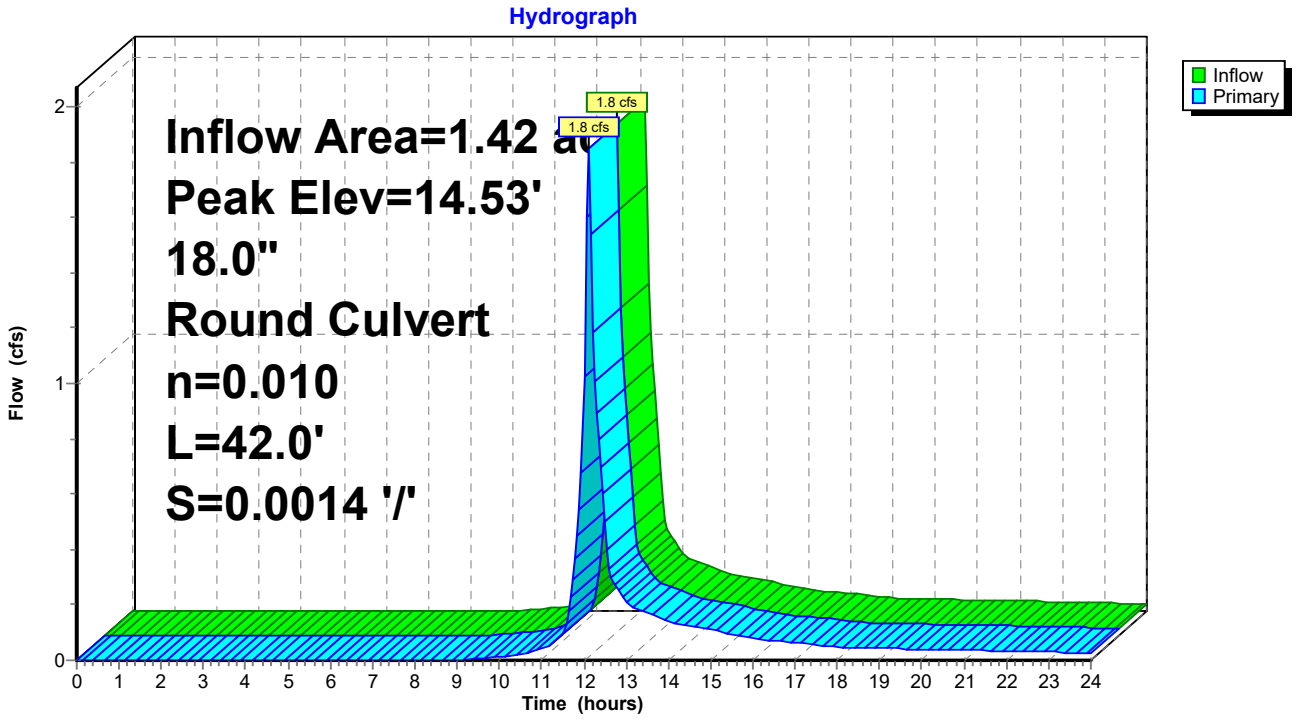
Inflow Area = 1.42 ac, 58.66% Impervious, Inflow Depth > 1.16" for 2-Year Storm event
Inflow = 1.8 cfs @ 12.10 hrs, Volume= 0.137 af
Outflow = 1.8 cfs @ 12.10 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.10 hrs, Volume= 0.137 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.53' @ 12.10 hrs
Flood Elev= 24.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.70'	**18.0" Round Culvert** L= 42.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 13.70' / 13.64' S= 0.0014 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.8 cfs @ 12.10 hrs HW=14.53' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.8 cfs @ 2.65 fps)

Pond 27P: Ex DMH7



Summary for Pond 29P: Ex DMH4

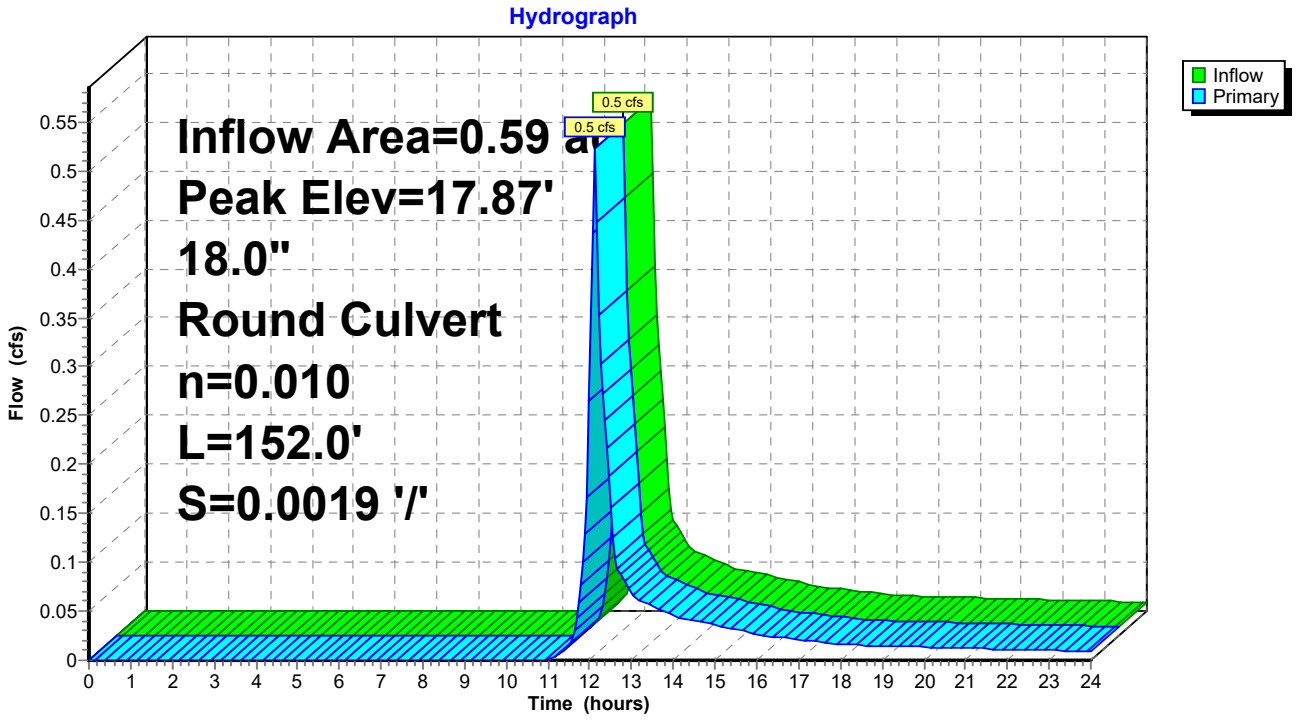
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 0.83" for 2-Year Storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.87' @ 12.11 hrs
Flood Elev= 23.44'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.46'	**18.0" Round Culvert** L= 152.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.46' / 17.17' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=17.87' TW=17.51' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.5 cfs @ 1.92 fps)

Pond 29P: Ex DMH4

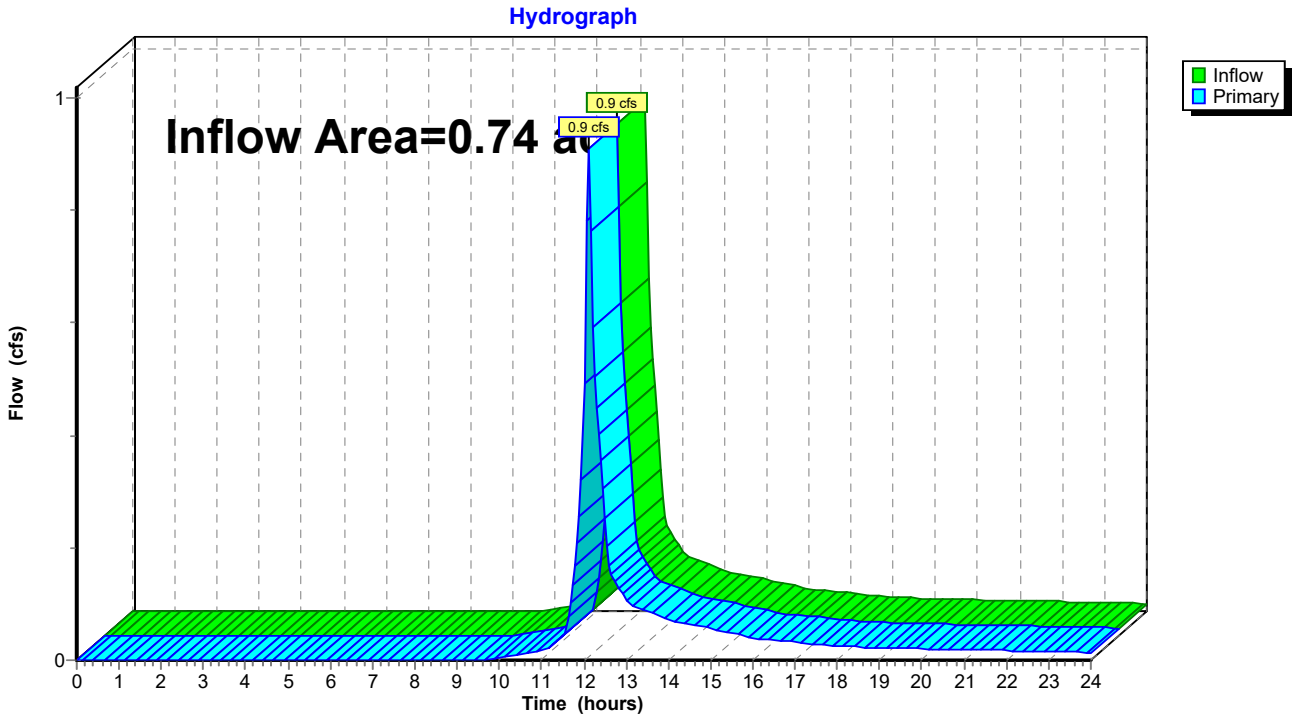


Summary for Link SP1: Forest Ave Storm Drain

Inflow Area = 0.74 ac, 39.80% Impervious, Inflow Depth > 1.11" for 2-Year Storm event
Inflow = 0.9 cfs @ 12.10 hrs, Volume= 0.069 af
Primary = 0.9 cfs @ 12.10 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Forest Ave Storm Drain

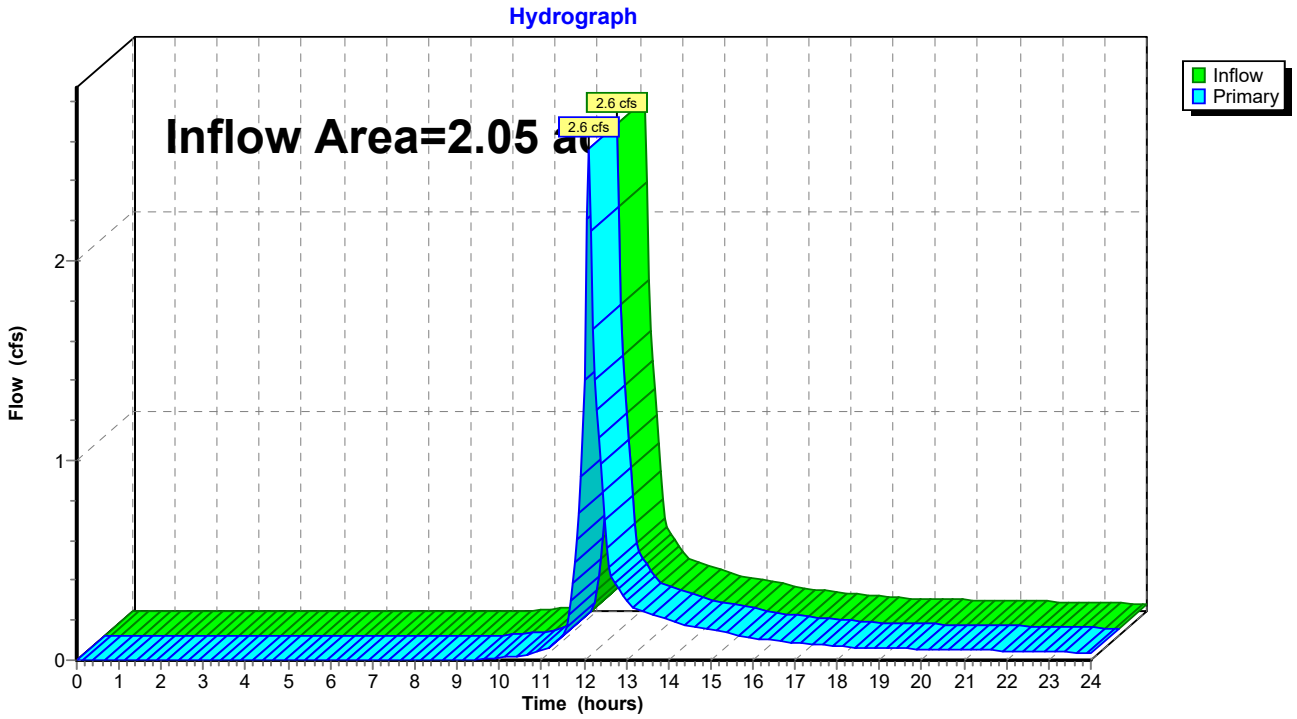


Summary for Link SP2: Combined Sewer

Inflow Area = 2.05 ac, 56.37% Impervious, Inflow Depth > 1.12" for 2-Year Storm event
Inflow = 2.6 cfs @ 12.10 hrs, Volume= 0.191 af
Primary = 2.6 cfs @ 12.10 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Combined Sewer



Summary for Subcatchment 0S: PRE-0

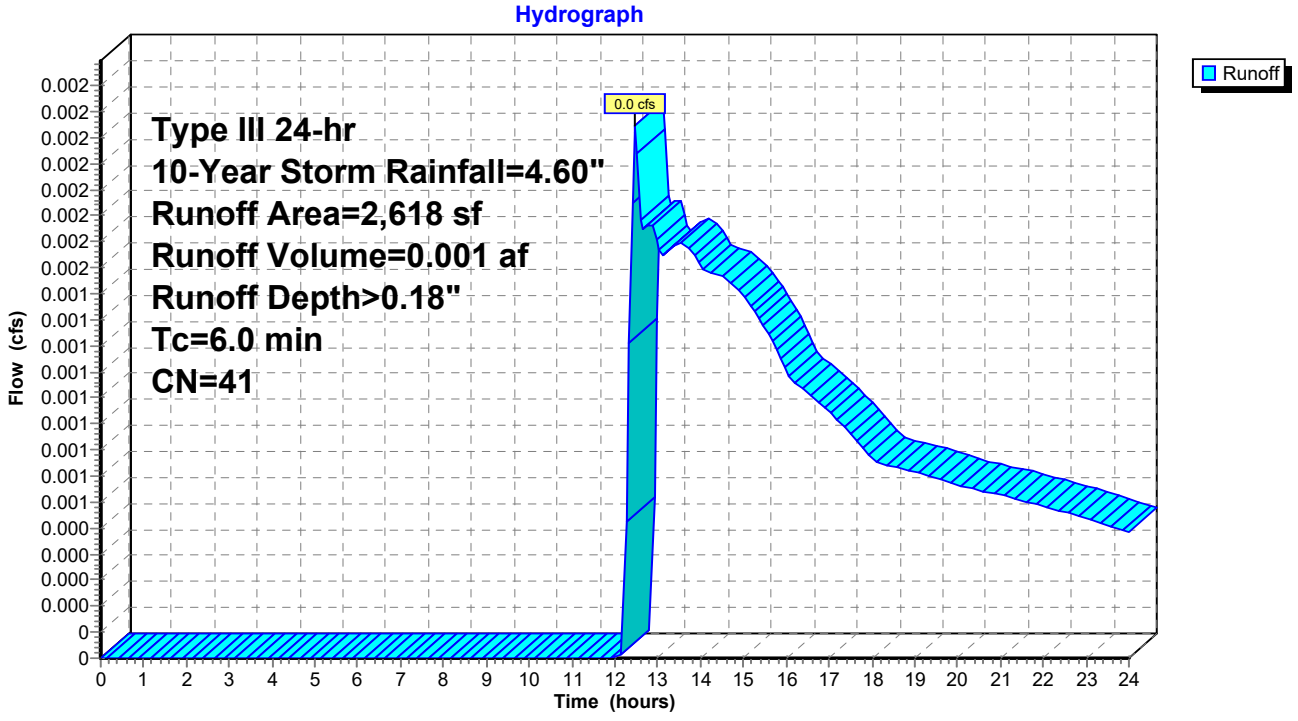
Runoff = 0.0 cfs @ 12.48 hrs, Volume= 0.001 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
	70	98	Paved parking, HSG A
	1,403	39	Grass cover, Good, HSG A
*	1,145	40	Porous Pavement
	2,618	41	Weighted Average
	2,548		97.33% Pervious Area
	70		2.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 0S: PRE-0



Summary for Subcatchment 1S: PRE-1

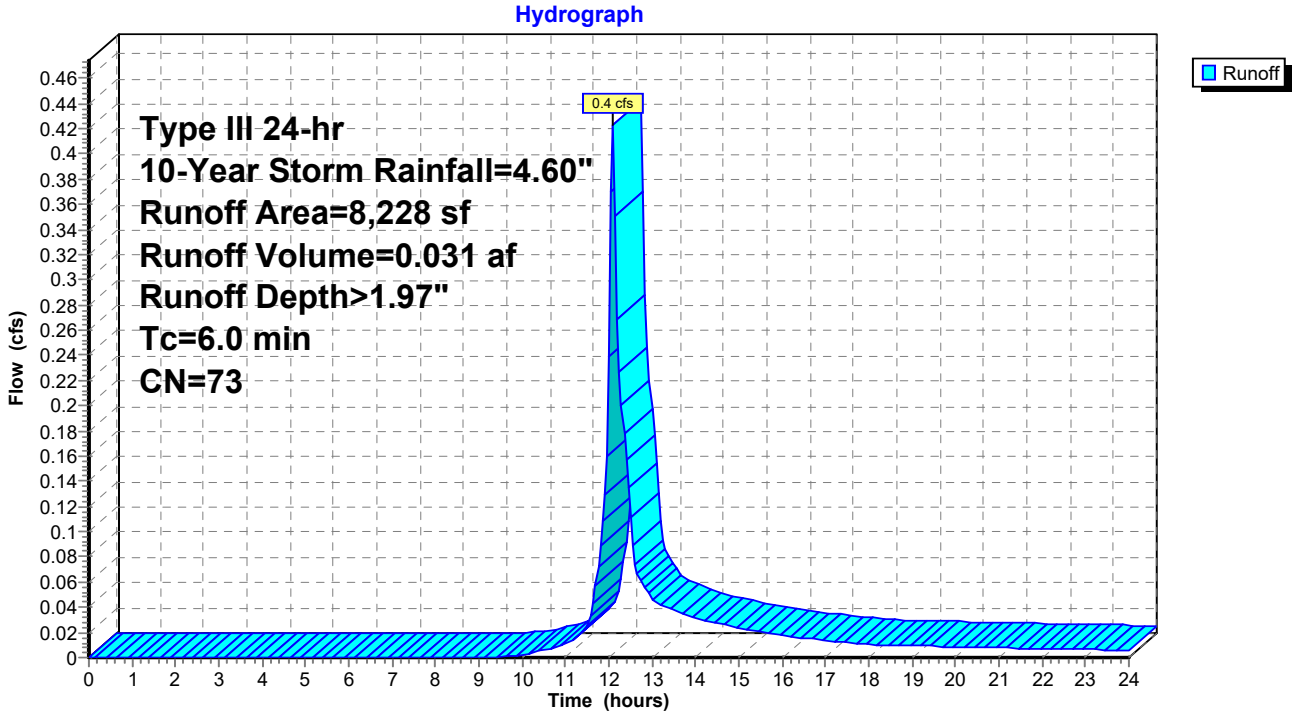
Runoff = 0.4 cfs @ 12.10 hrs, Volume= 0.031 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
	4,083	98	Paved parking, HSG A
	1,673	39	Grass cover, Good, HSG A
*	1,374	68	Grass cover (parking area), HSG A
*	1,098	40	Porous Pavement
	8,228	73	Weighted Average
	4,145		50.38% Pervious Area
	4,083		49.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PRE-1



Summary for Subcatchment 2S: PRE-2

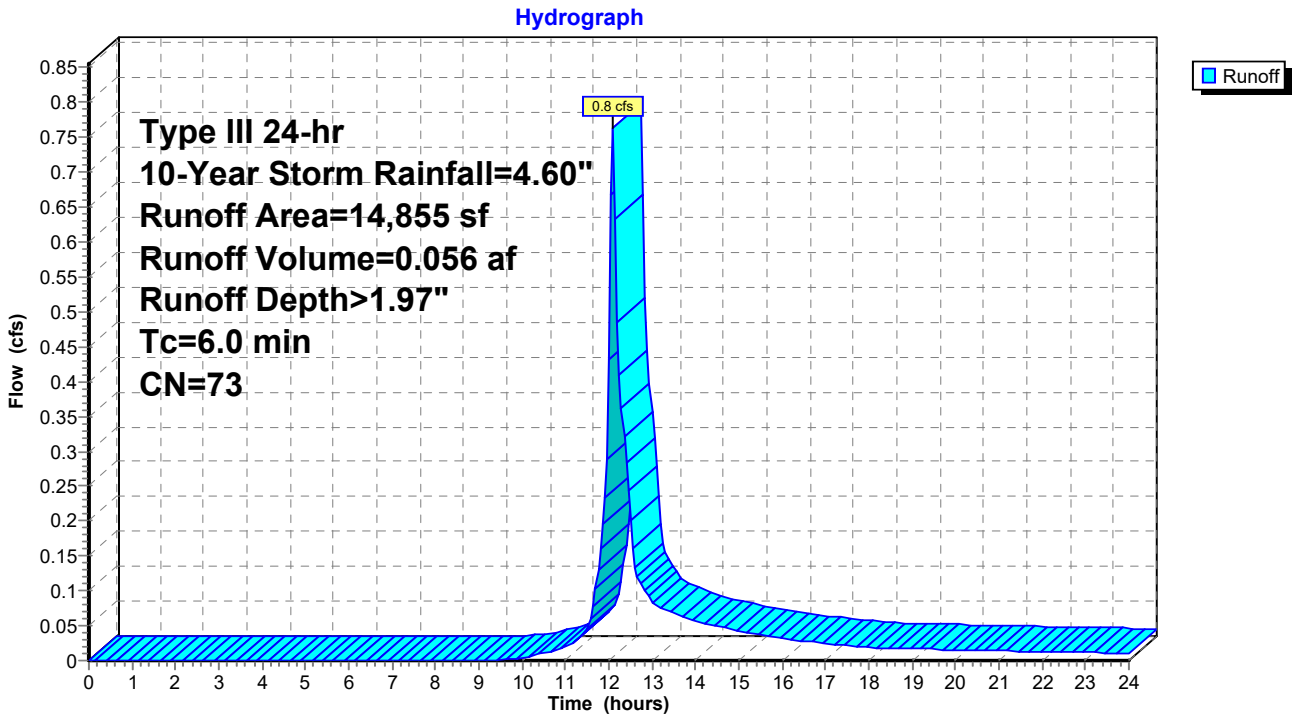
Runoff = 0.8 cfs @ 12.10 hrs, Volume= 0.056 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
	6,344	98	Paved parking, HSG A
	2,948	39	Grass cover, Good, HSG A
	4,408	68	Grass cover (parking area), HSG A
*	1,155	40	Porous Pavement
	14,855	73	Weighted Average
	8,511		57.29% Pervious Area
	6,344		42.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PRE-2



Summary for Subcatchment 3S: PRE-3

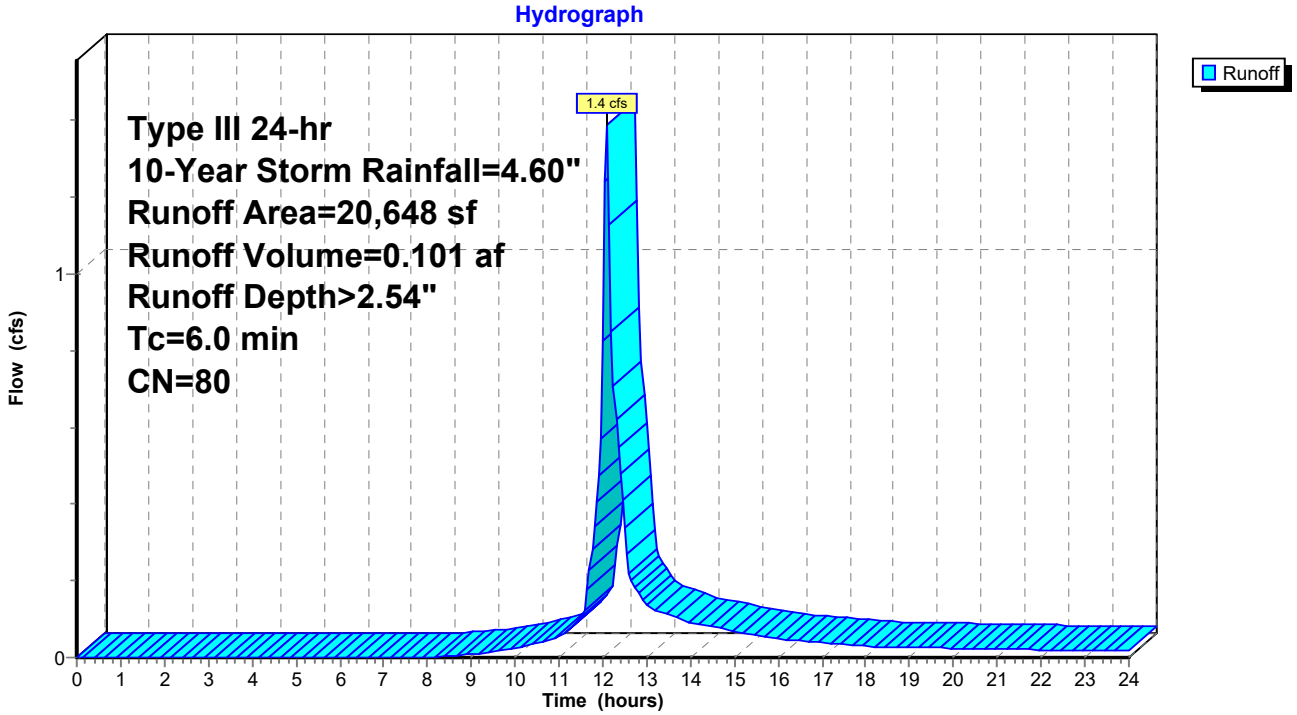
Runoff = 1.4 cfs @ 12.09 hrs, Volume= 0.101 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
	10,577	98	Paved parking, HSG A
	1,903	39	Grass cover, Good, HSG A
	7,715	68	Grass cover (parking area), HSG A
*	453	40	Porous Pavement
	20,648	80	Weighted Average
	10,071		48.77% Pervious Area
	10,577		51.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PRE-3



Summary for Subcatchment 4S: PRE-4

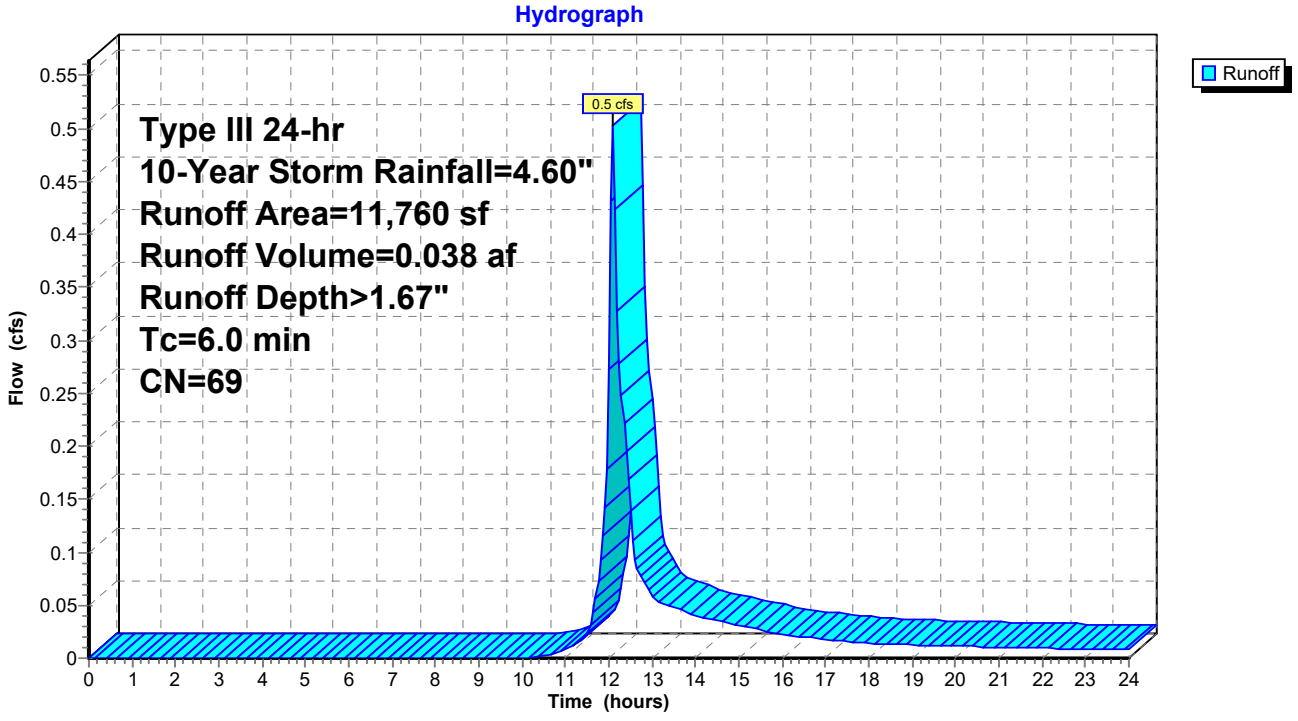
Runoff = 0.5 cfs @ 12.10 hrs, Volume= 0.038 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

Area (sf)	CN	Description
2,321	98	Paved parking, HSG A
1,957	39	Grass cover, Good, HSG A
7,482	68	Grass cover (parking area), HSG A
11,760	69	Weighted Average
9,439		80.26% Pervious Area
2,321		19.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PRE-4



Summary for Subcatchment 5S: PRE-5

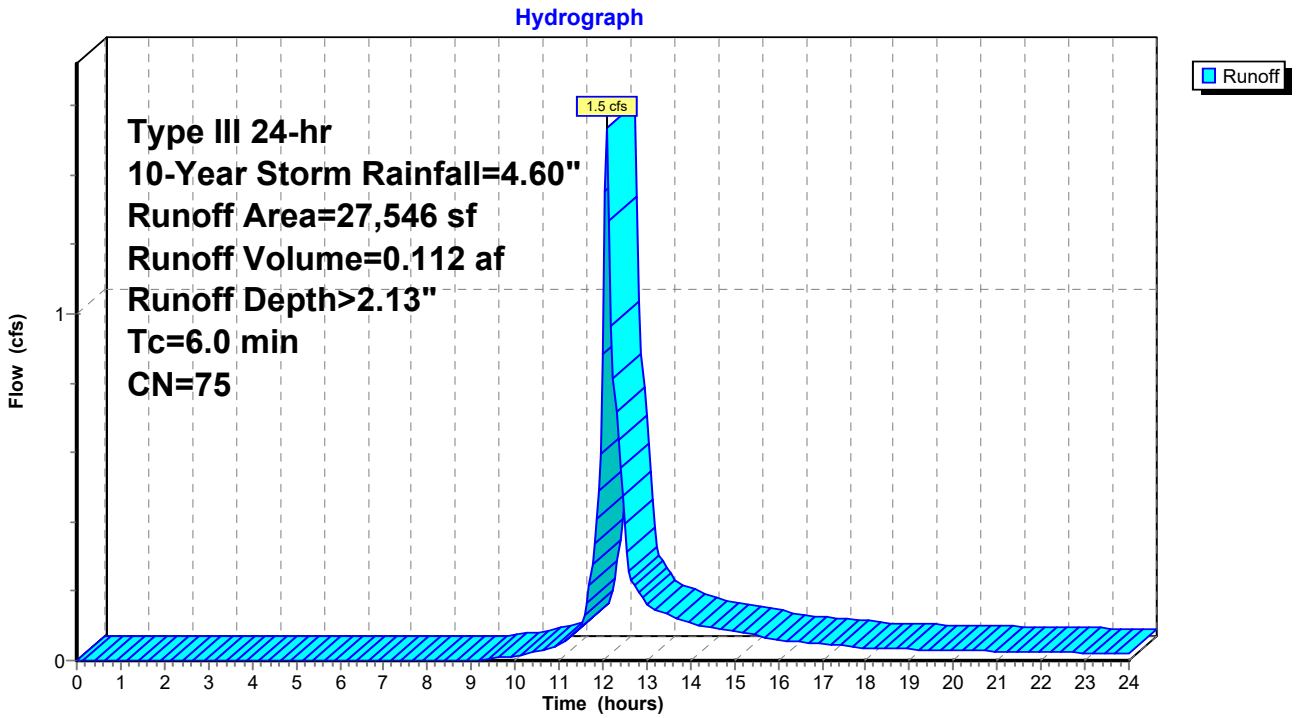
Runoff = 1.5 cfs @ 12.10 hrs, Volume= 0.112 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
	14,114	98	Paved parking, HSG A
	6,700	39	Grass cover, Good, HSG A
	5,072	68	Grass cover (parking area), HSG A
*	1,660	40	Porous Pavement
	27,546	75	Weighted Average
	13,432		48.76% Pervious Area
	14,114		51.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S: PRE-5



Summary for Subcatchment 6S: PRE-6

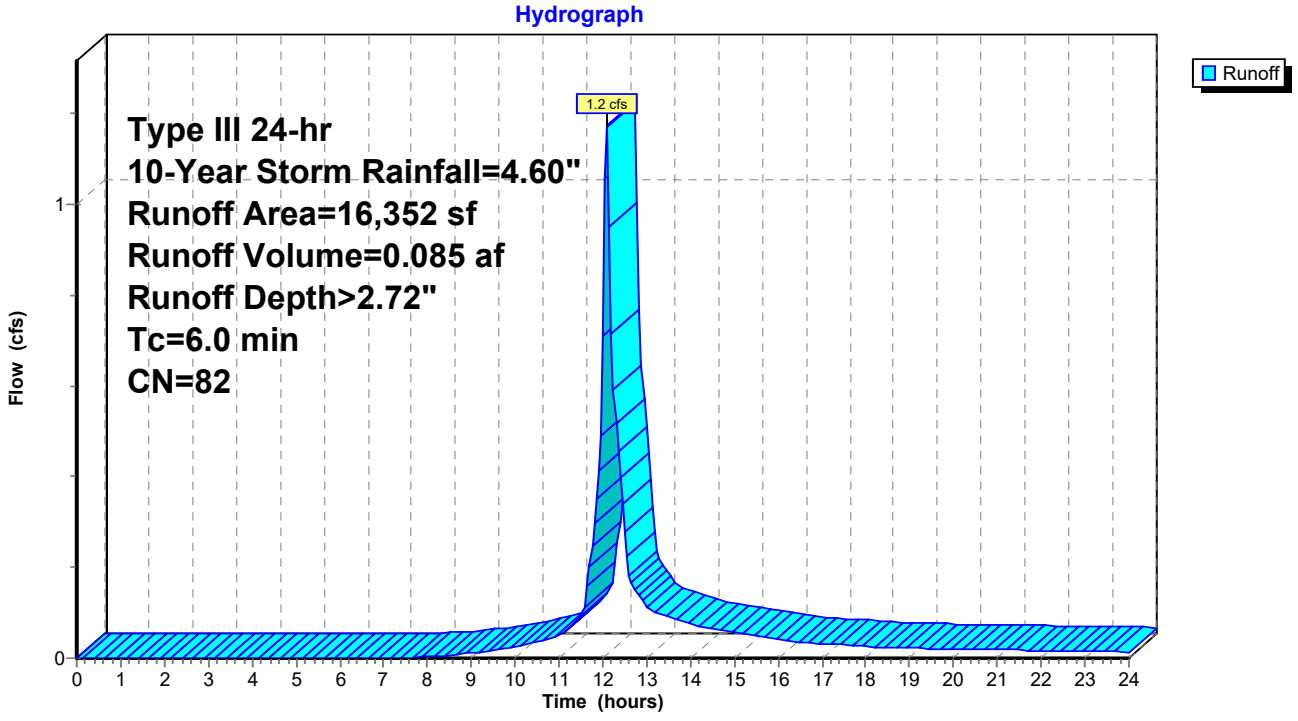
Runoff = 1.2 cfs @ 12.09 hrs, Volume= 0.085 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
	11,768	98	Paved parking, HSG A
	3,865	39	Grass cover, Good, HSG A
*	719	40	Porous Pavement
	16,352	82	Weighted Average
	4,584		28.03% Pervious Area
	11,768		71.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S: PRE-6



Summary for Subcatchment 7S: PRE-7

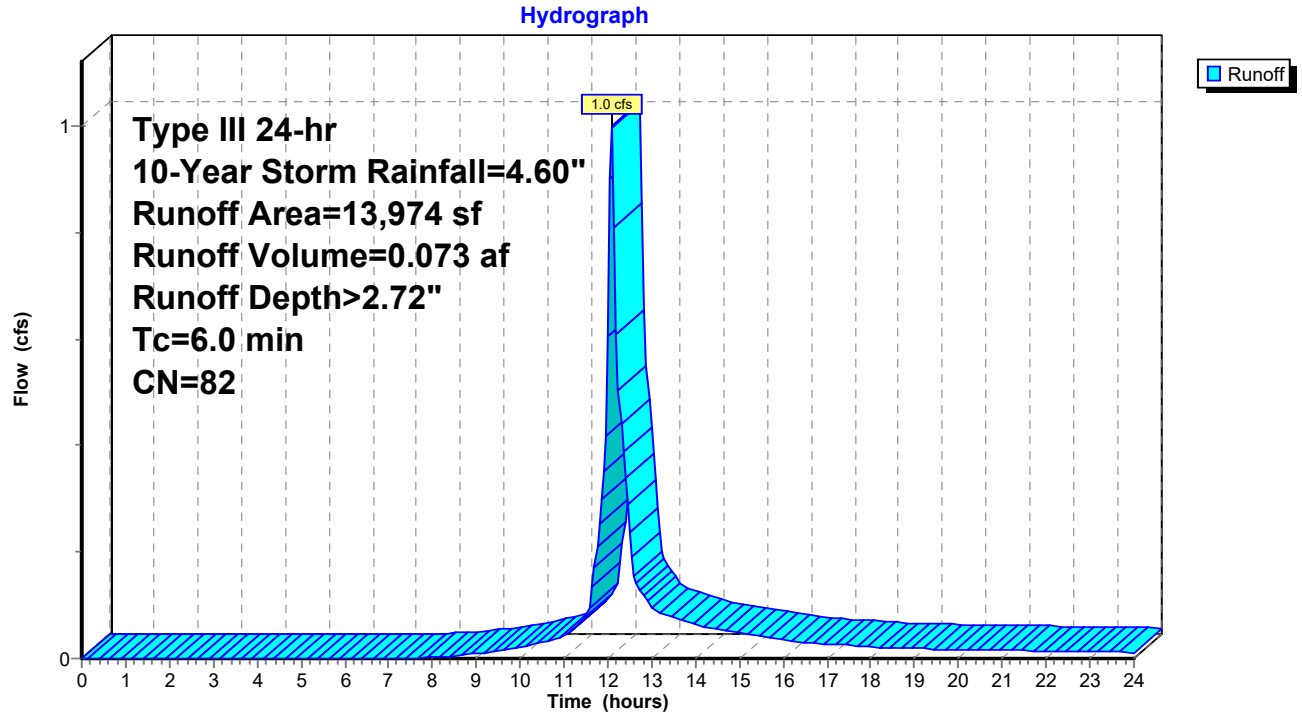
Runoff = 1.0 cfs @ 12.09 hrs, Volume= 0.073 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

Area (sf)	CN	Description
10,235	98	Paved parking, HSG A
3,739	39	Grass cover, Good, HSG A
13,974	82	Weighted Average
3,739		26.76% Pervious Area
10,235		73.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: PRE-7



Summary for Subcatchment 8S: PRE-8

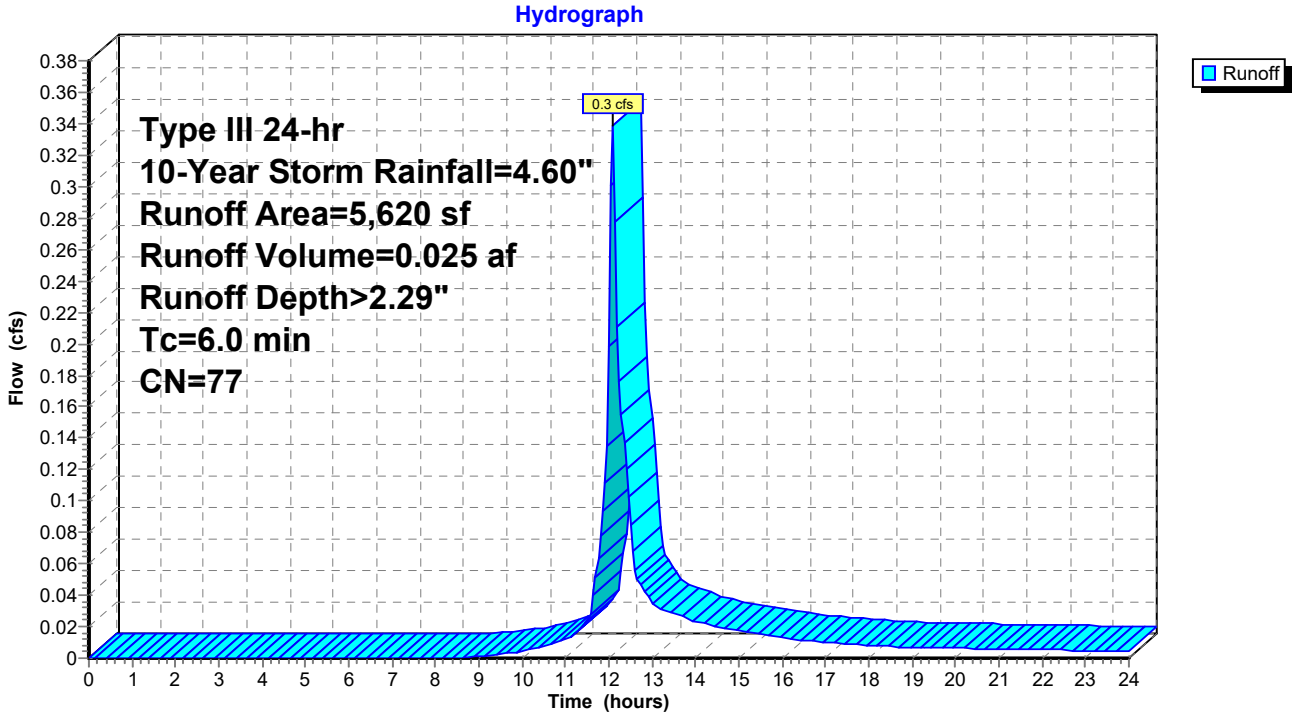
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
	3,664	98	Paved parking, HSG A
	1,857	39	Grass cover, Good, HSG A
*	99	40	Porous Pavement
	5,620	77	Weighted Average
	1,956		34.80% Pervious Area
	3,664		65.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S: PRE-8



Summary for Pond 11P: Ex CB1

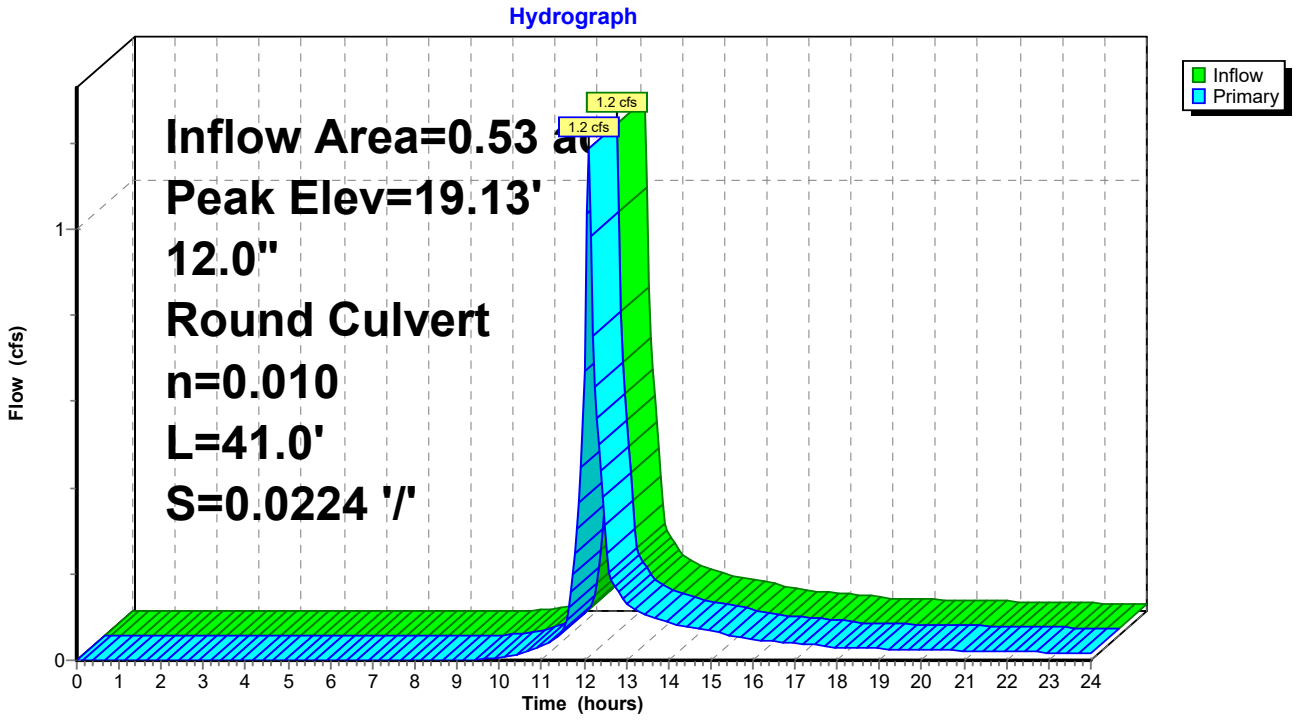
Inflow Area = 0.53 ac, 45.17% Impervious, Inflow Depth > 1.97" for 10-Year Storm event
Inflow = 1.2 cfs @ 12.10 hrs, Volume= 0.087 af
Outflow = 1.2 cfs @ 12.10 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.10 hrs, Volume= 0.087 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.13' @ 12.10 hrs
Flood Elev= 22.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.47'	**12.0" Round Culvert** L= 41.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.47' / 17.55' S= 0.0224 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.2 cfs @ 12.10 hrs HW=19.12' TW=18.09' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.2 cfs @ 2.17 fps)

Pond 11P: Ex CB1



Summary for Pond 12P: Ex CB2

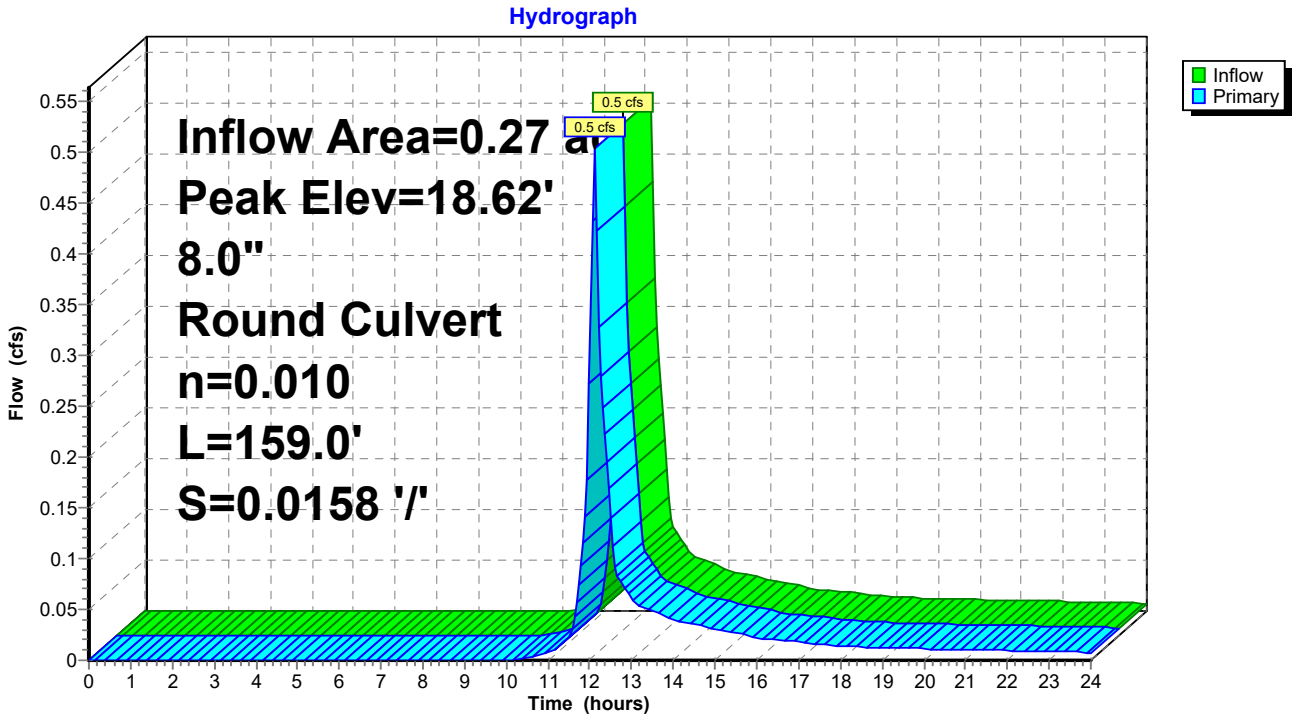
Inflow Area = 0.27 ac, 19.74% Impervious, Inflow Depth > 1.67" for 10-Year Storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.038 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.62' @ 12.10 hrs
Flood Elev= 22.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.14'	**8.0" Round Culvert** L= 159.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.14' / 15.62' S= 0.0158 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=18.62' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.5 cfs @ 1.86 fps)

Pond 12P: Ex CB2



Summary for Pond 13P: Ex CB7

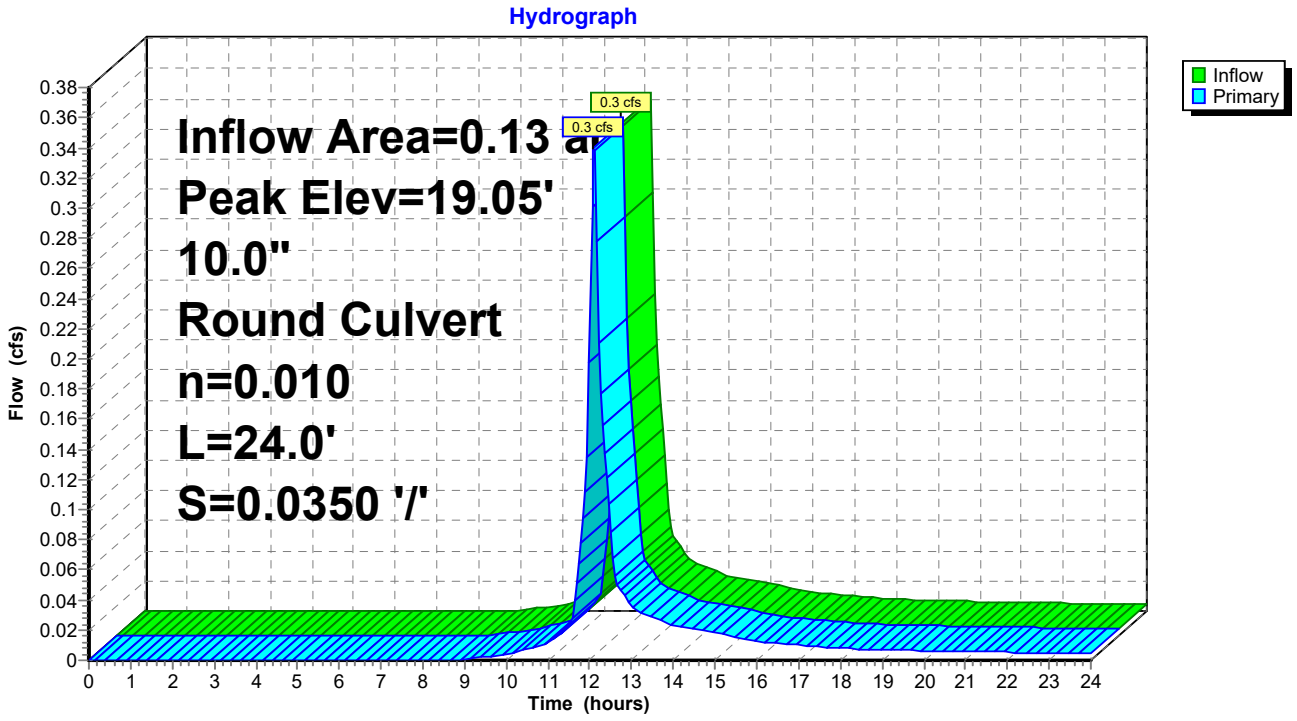
Inflow Area = 0.13 ac, 65.20% Impervious, Inflow Depth > 2.29" for 10-Year Storm event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 0.025 af
Outflow = 0.3 cfs @ 12.09 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.09 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.05' @ 12.09 hrs
Flood Elev= 24.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.70' / 17.86' S= 0.0350 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.3 cfs @ 12.09 hrs HW=19.04' TW=15.70' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.3 cfs @ 1.58 fps)

Pond 13P: Ex CB7



Summary for Pond 14P: Ex CB4

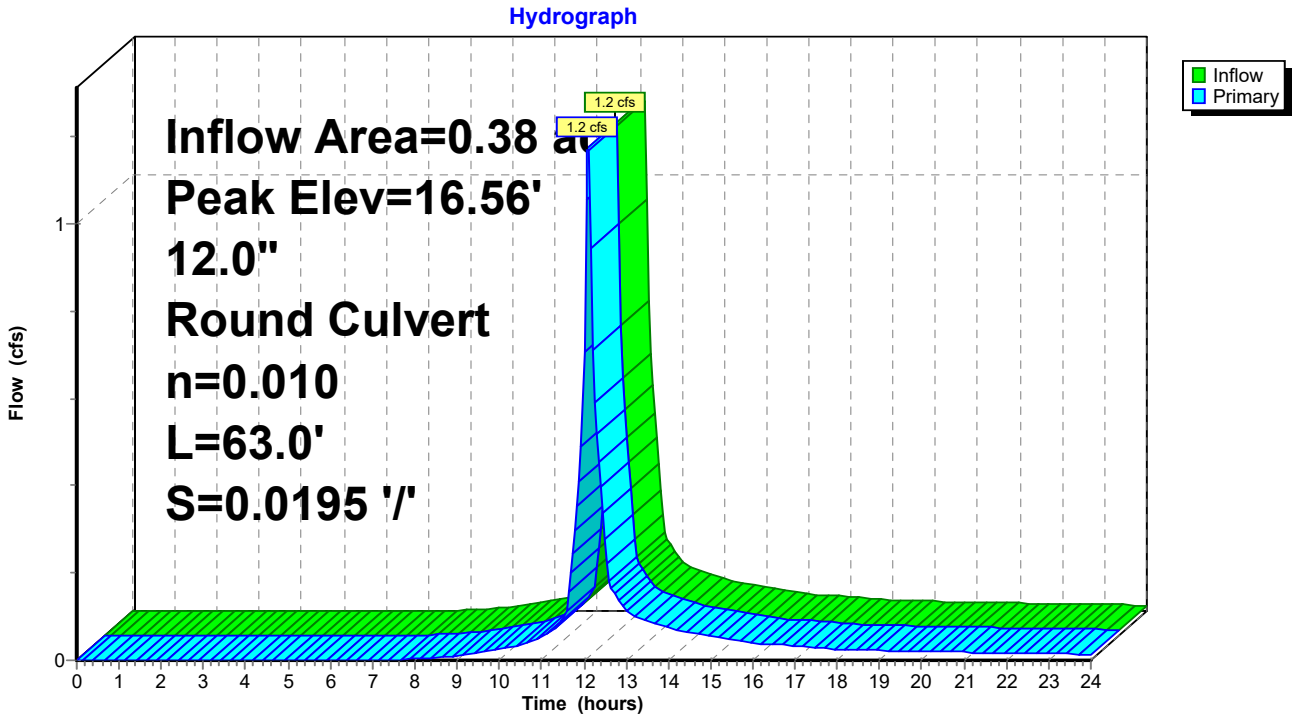
Inflow Area = 0.38 ac, 71.97% Impervious, Inflow Depth > 2.72" for 10-Year Storm event
Inflow = 1.2 cfs @ 12.09 hrs, Volume= 0.085 af
Outflow = 1.2 cfs @ 12.09 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.09 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.56' @ 12.09 hrs
Flood Elev= 21.96'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.91'	**12.0" Round Culvert** L= 63.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.91' / 14.68' S= 0.0195 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.2 cfs @ 12.09 hrs HW=16.55' TW=15.74' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.2 cfs @ 2.16 fps)

Pond 14P: Ex CB4



Summary for Pond 15P: Ex CB5

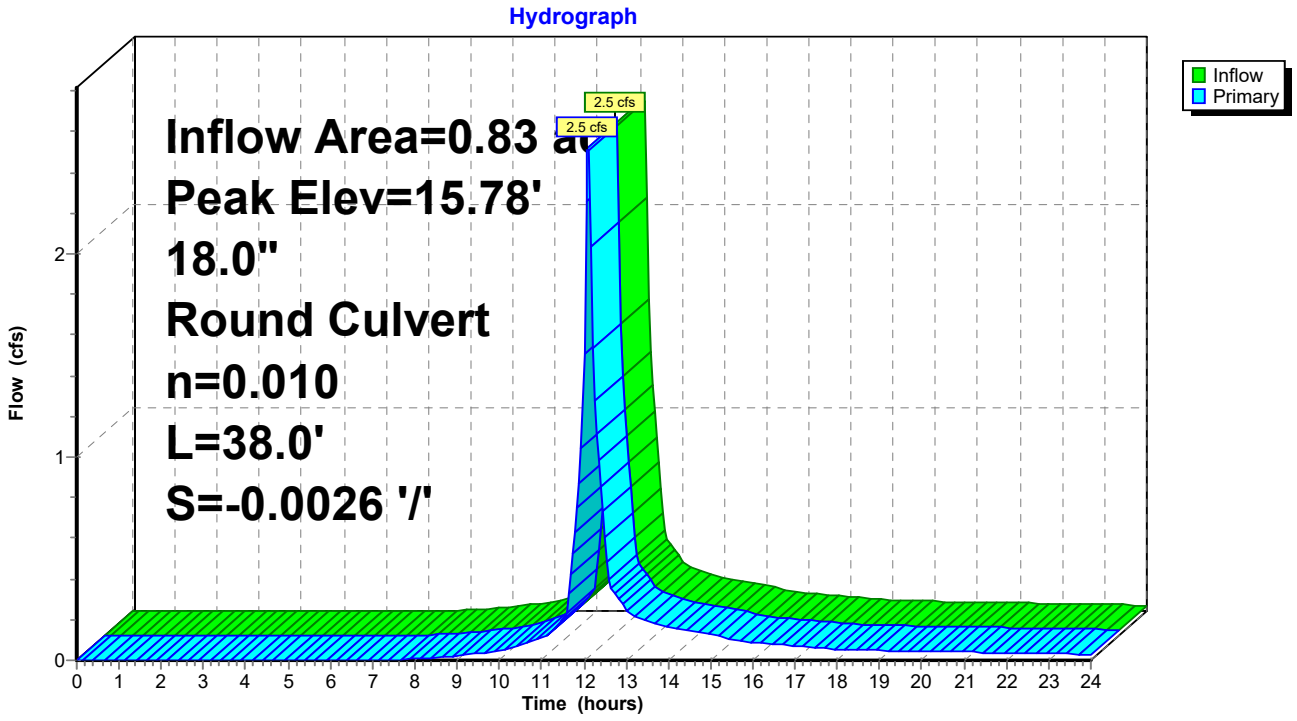
Inflow Area = 0.83 ac, 71.40% Impervious, Inflow Depth > 2.65" for 10-Year Storm event
Inflow = 2.5 cfs @ 12.09 hrs, Volume= 0.183 af
Outflow = 2.5 cfs @ 12.09 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.09 hrs, Volume= 0.183 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.78' @ 12.14 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.80'	**18.0" Round Culvert** L= 38.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 14.80' S= -0.0026 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.9 cfs @ 12.09 hrs HW=15.74' TW=15.56' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.9 cfs @ 1.59 fps)

Pond 15P: Ex CB5



Summary for Pond 16P: Ex DMH8

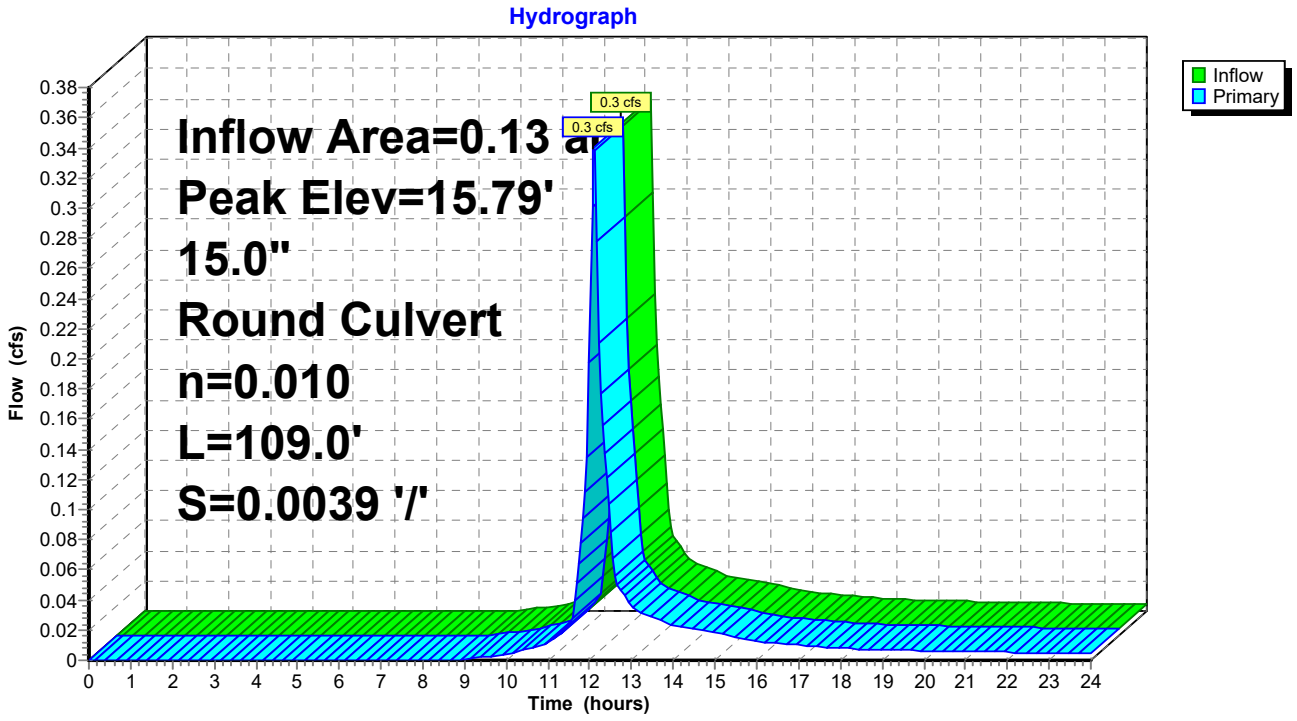
Inflow Area = 0.13 ac, 65.20% Impervious, Inflow Depth > 2.29" for 10-Year Storm event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 0.025 af
Outflow = 0.3 cfs @ 12.09 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.09 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.79' @ 12.19 hrs
Flood Elev= 24.67'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.08'	**15.0" Round Culvert** L= 109.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.08' / 14.65' S= 0.0039 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=15.70' TW=15.74' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.0 cfs)

Pond 16P: Ex DMH8



Summary for Pond 21P: Ex DMH9

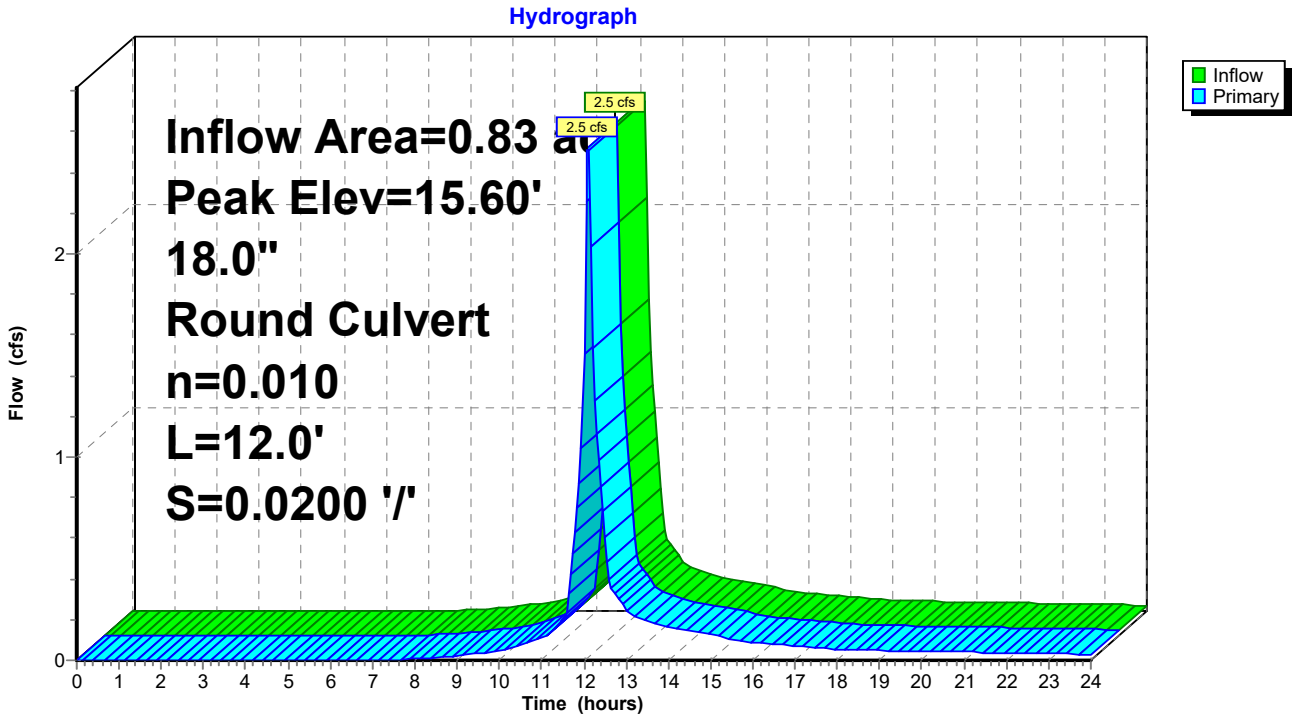
Inflow Area = 0.83 ac, 71.40% Impervious, Inflow Depth > 2.65" for 10-Year Storm event
Inflow = 2.5 cfs @ 12.09 hrs, Volume= 0.183 af
Outflow = 2.5 cfs @ 12.09 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.09 hrs, Volume= 0.183 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.60' @ 12.13 hrs
Flood Elev= 23.72'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.62'	**18.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.62' / 14.38' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.9 cfs @ 12.09 hrs HW=15.56' TW=15.38' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.9 cfs @ 1.62 fps)

Pond 21P: Ex DMH9



Summary for Pond 22P: Ex DMH3

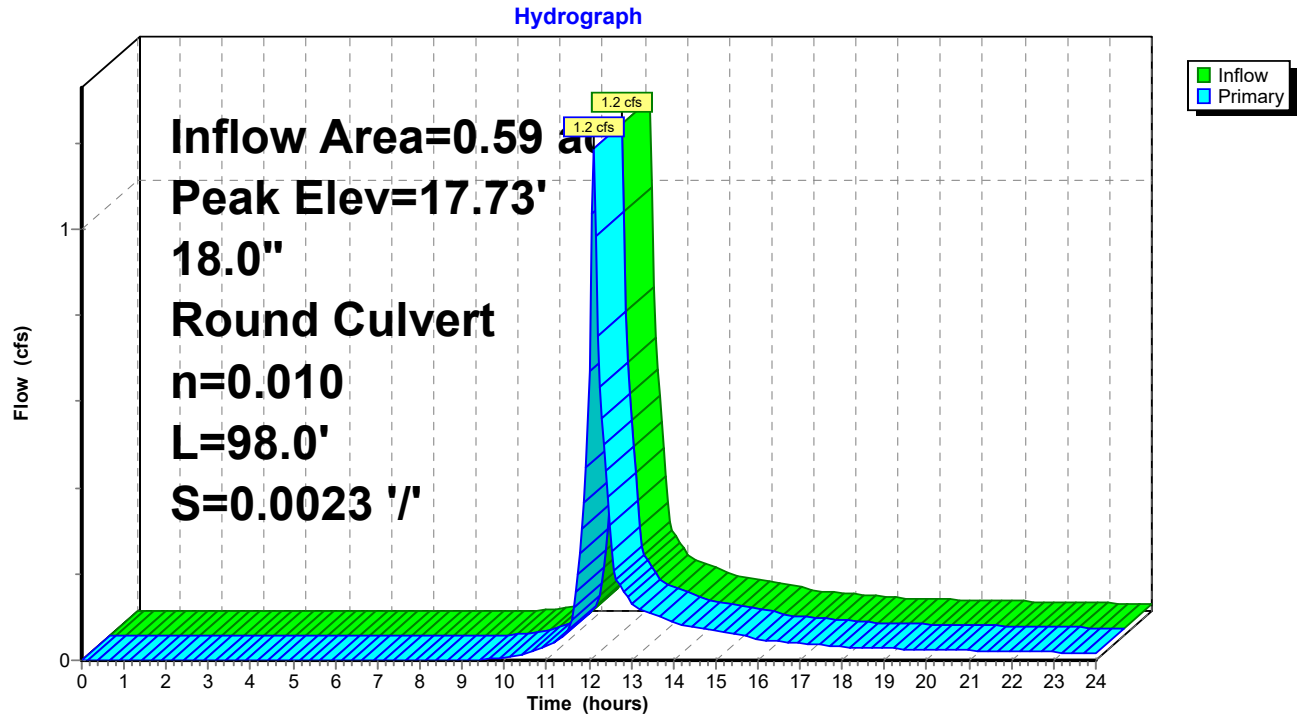
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 1.79" for 10-Year Storm event
Inflow = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af
Outflow = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.73' @ 12.10 hrs
Flood Elev= 24.92'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.12'	**18.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.12' / 16.89' S= 0.0023 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.1 cfs @ 12.10 hrs HW=17.73' TW=17.37' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.1 cfs @ 2.51 fps)

Pond 22P: Ex DMH3



Summary for Pond 23P: Ex CB3

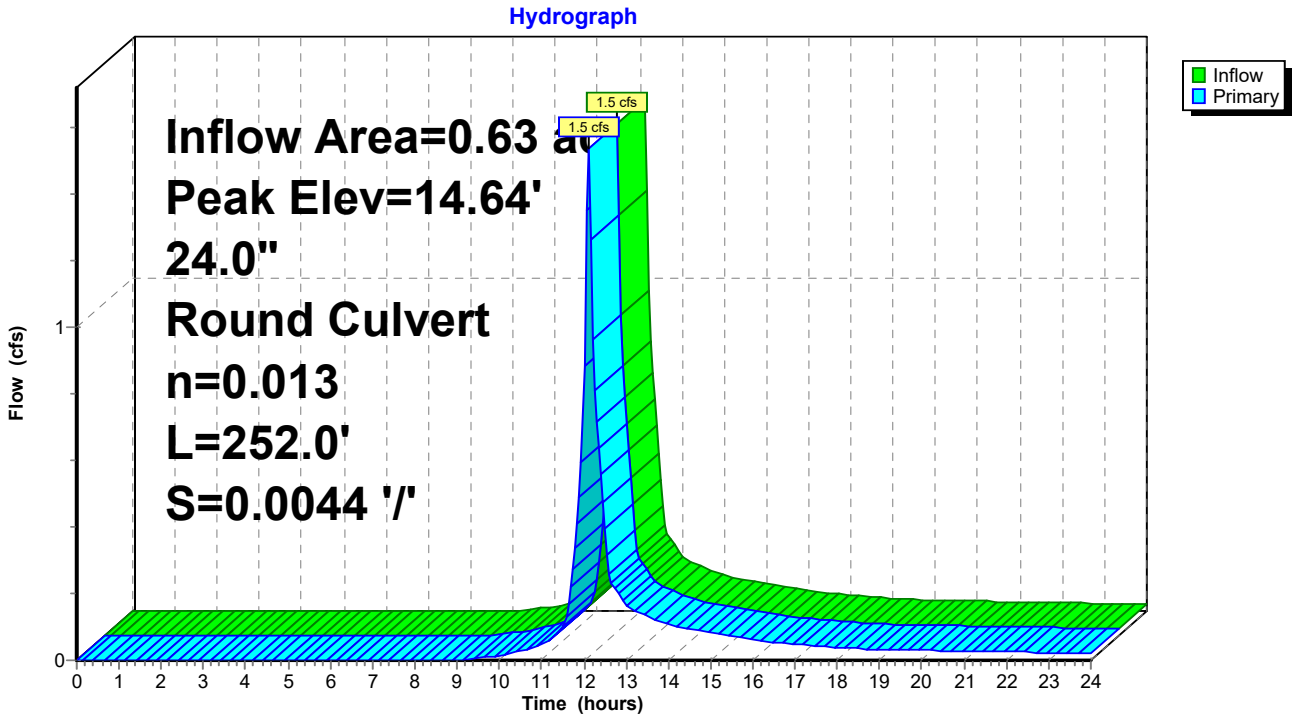
Inflow Area = 0.63 ac, 51.24% Impervious, Inflow Depth > 2.13" for 10-Year Storm event
Inflow = 1.5 cfs @ 12.10 hrs, Volume= 0.112 af
Outflow = 1.5 cfs @ 12.10 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.10 hrs, Volume= 0.112 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.64' @ 12.09 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.05'	**24.0" Round Culvert** L= 252.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.05' / 12.94' S= 0.0044 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=1.5 cfs @ 12.10 hrs HW=14.64' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.5 cfs @ 2.95 fps)

Pond 23P: Ex CB3



Summary for Pond 24P: Ex DMH2

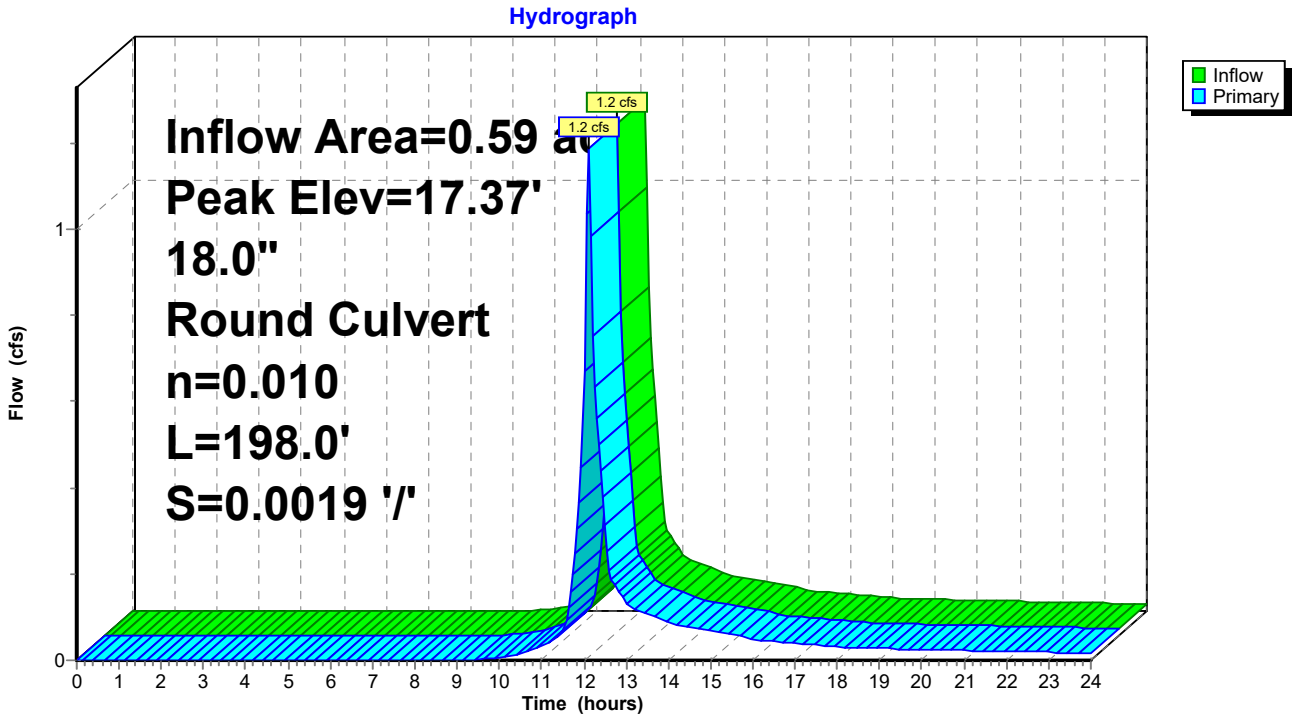
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 1.79" for 10-Year Storm event
Inflow = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af
Outflow = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.37' @ 12.10 hrs
Flood Elev= 25.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.75'	**18.0" Round Culvert** L= 198.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.75' / 16.38' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.2 cfs @ 12.10 hrs HW=17.37' TW=16.01' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.2 cfs @ 2.52 fps)

Pond 24P: Ex DMH2



Summary for Pond 25P: Ex DMH5

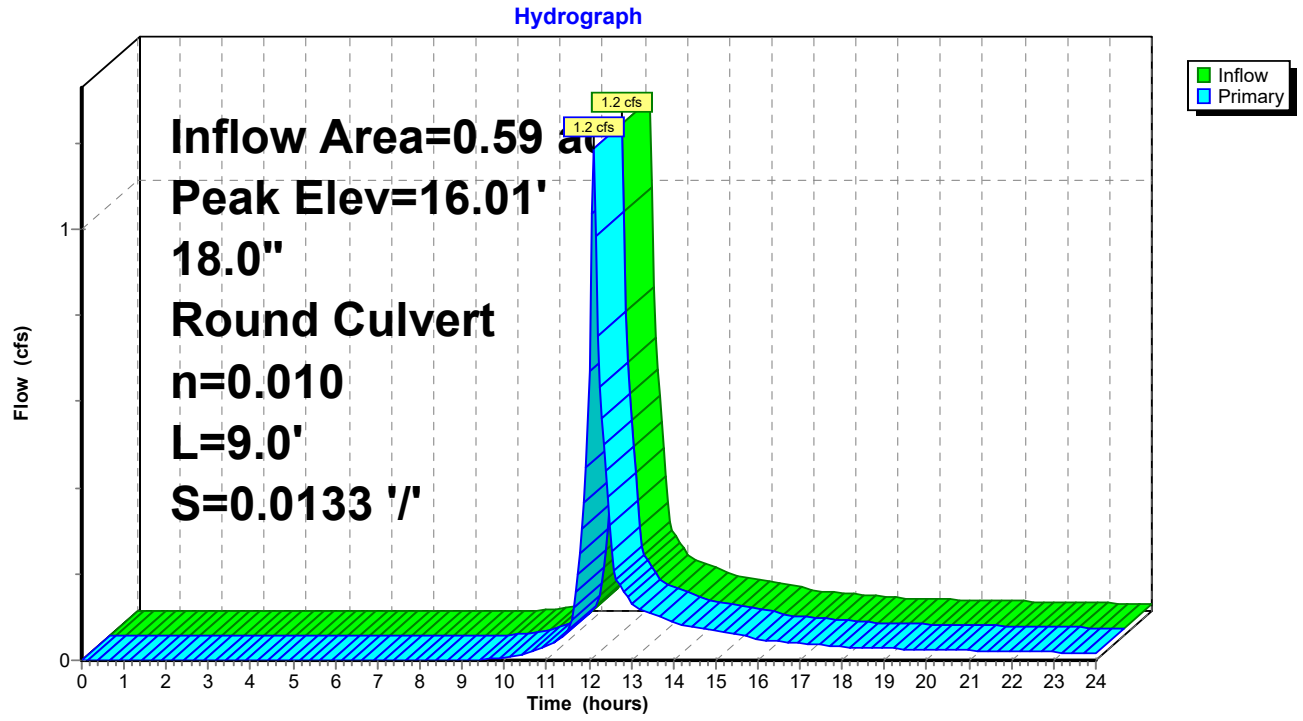
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 1.79" for 10-Year Storm event
Inflow = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af
Outflow = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.01' @ 12.10 hrs
Flood Elev= 23.84'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.44'	**18.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.44' / 15.32' S= 0.0133 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.2 cfs @ 12.10 hrs HW=16.01' TW=15.39' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.2 cfs @ 2.85 fps)

Pond 25P: Ex DMH5



Summary for Pond 26P: Ex DMH6

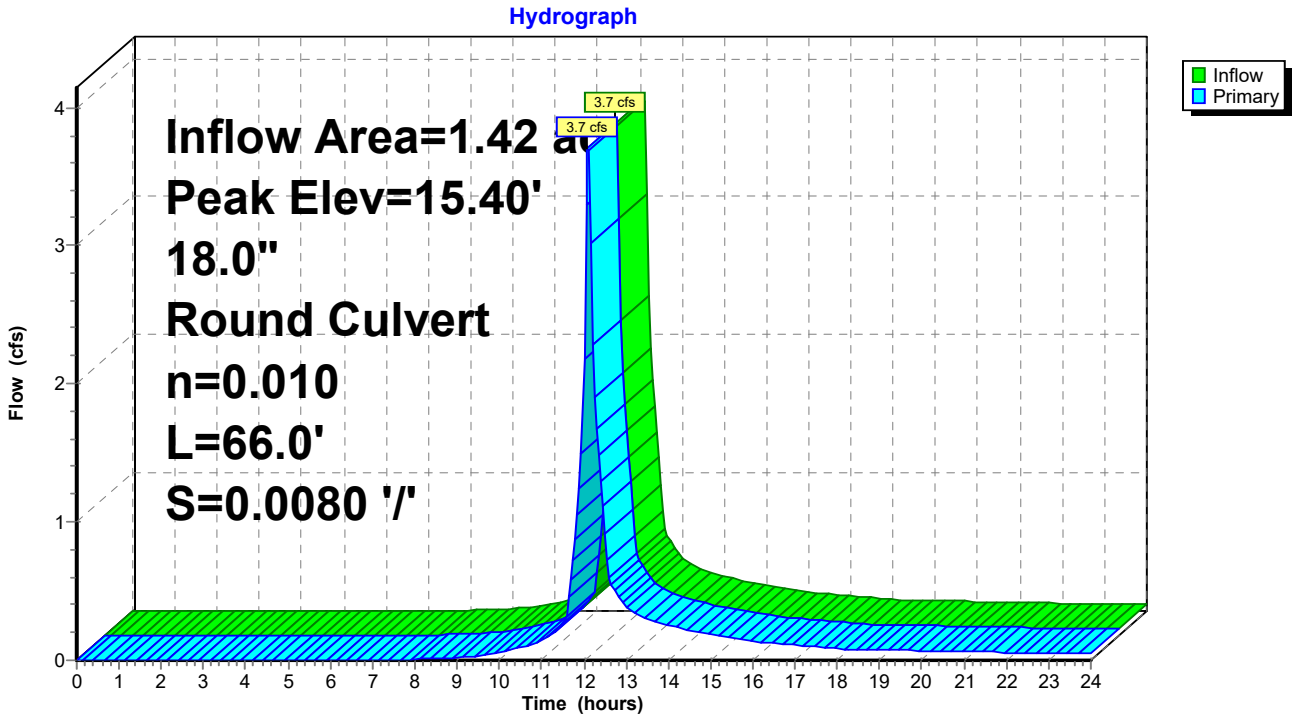
Inflow Area = 1.42 ac, 58.66% Impervious, Inflow Depth > 2.29" for 10-Year Storm event
Inflow = 3.7 cfs @ 12.09 hrs, Volume= 0.270 af
Outflow = 3.7 cfs @ 12.09 hrs, Volume= 0.270 af, Atten= 0%, Lag= 0.0 min
Primary = 3.7 cfs @ 12.09 hrs, Volume= 0.270 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.40' @ 12.11 hrs
Flood Elev= 23.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.30'	**18.0" Round Culvert** L= 66.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.30' / 13.77' S= 0.0080 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.3 cfs @ 12.09 hrs HW=15.39' TW=14.93' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.3 cfs @ 3.40 fps)

Pond 26P: Ex DMH6



Summary for Pond 27P: Ex DMH7

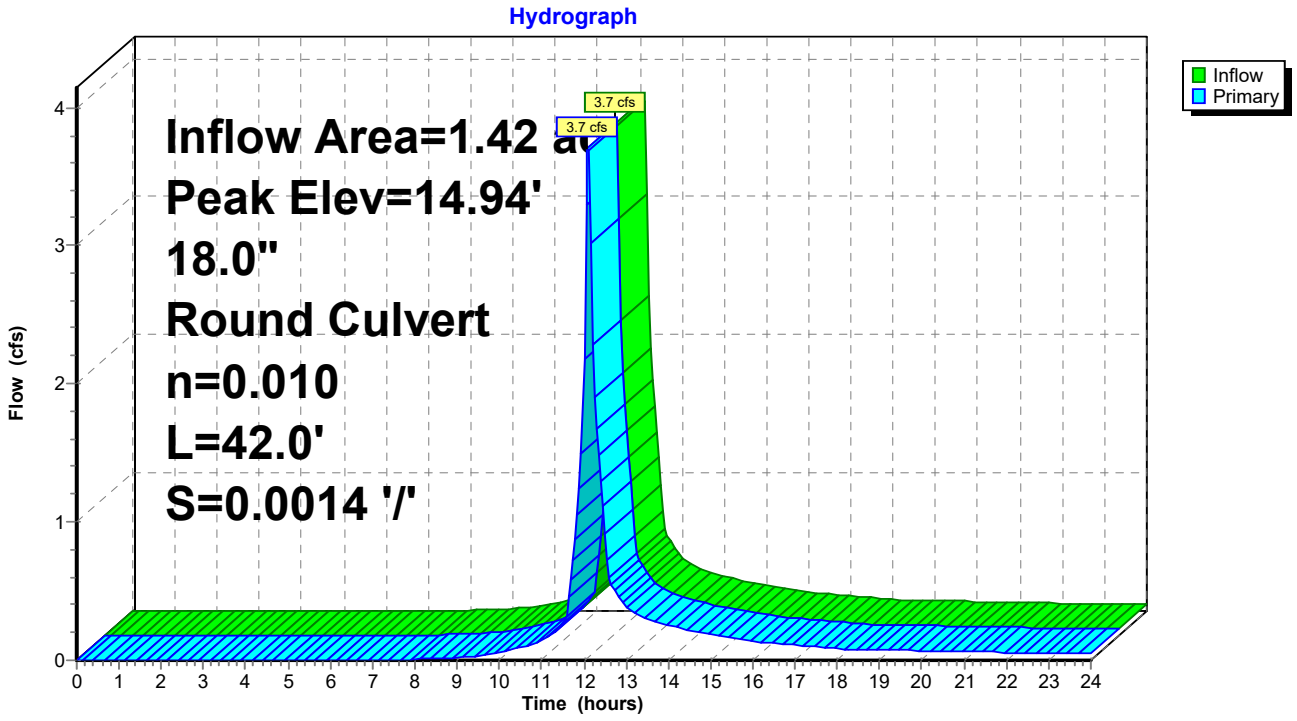
Inflow Area = 1.42 ac, 58.66% Impervious, Inflow Depth > 2.29" for 10-Year Storm event
Inflow = 3.7 cfs @ 12.09 hrs, Volume= 0.270 af
Outflow = 3.7 cfs @ 12.09 hrs, Volume= 0.270 af, Atten= 0%, Lag= 0.0 min
Primary = 3.7 cfs @ 12.09 hrs, Volume= 0.270 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.94' @ 12.09 hrs
Flood Elev= 24.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.70'	**18.0" Round Culvert** L= 42.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 13.70' / 13.64' S= 0.0014 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.6 cfs @ 12.09 hrs HW=14.93' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.6 cfs @ 3.21 fps)

Pond 27P: Ex DMH7



Summary for Pond 29P: Ex DMH4

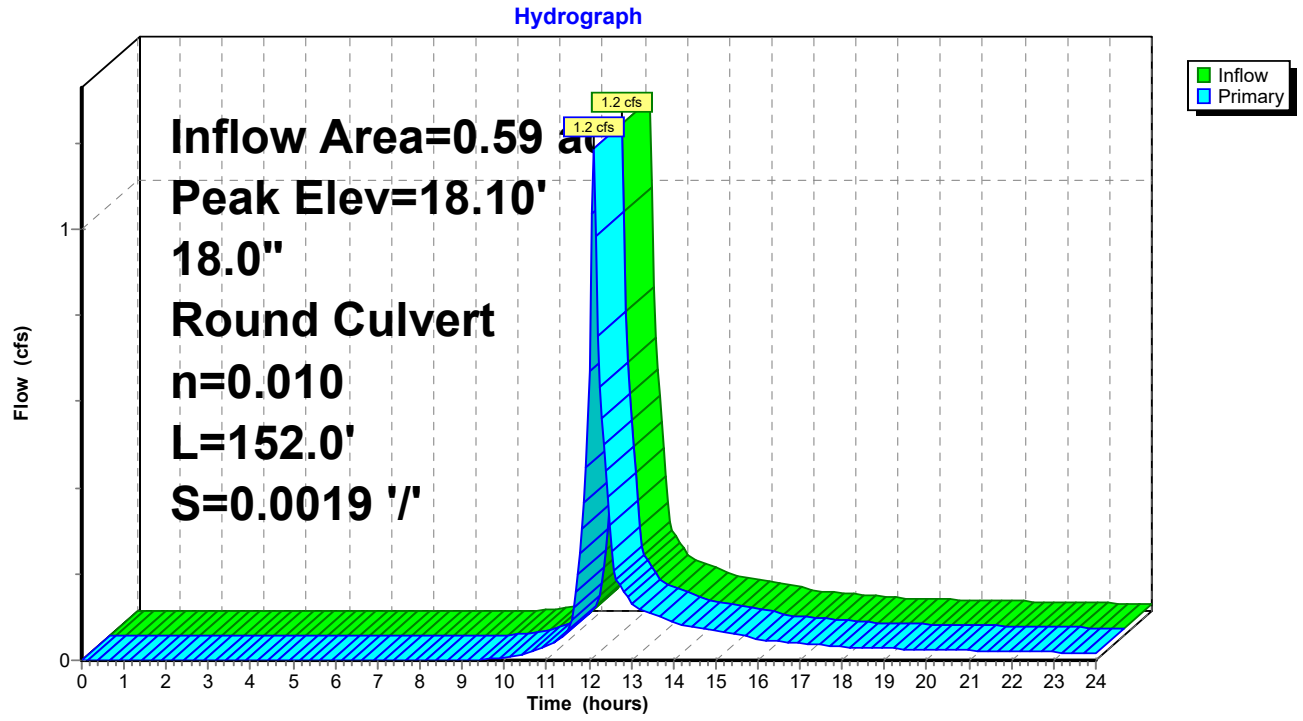
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 1.79" for 10-Year Storm event
Inflow = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af
Outflow = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.10 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.10' @ 12.11 hrs
Flood Elev= 23.44'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.46'	**18.0" Round Culvert** L= 152.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.46' / 17.17' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.1 cfs @ 12.10 hrs HW=18.09' TW=17.73' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.1 cfs @ 2.30 fps)

Pond 29P: Ex DMH4

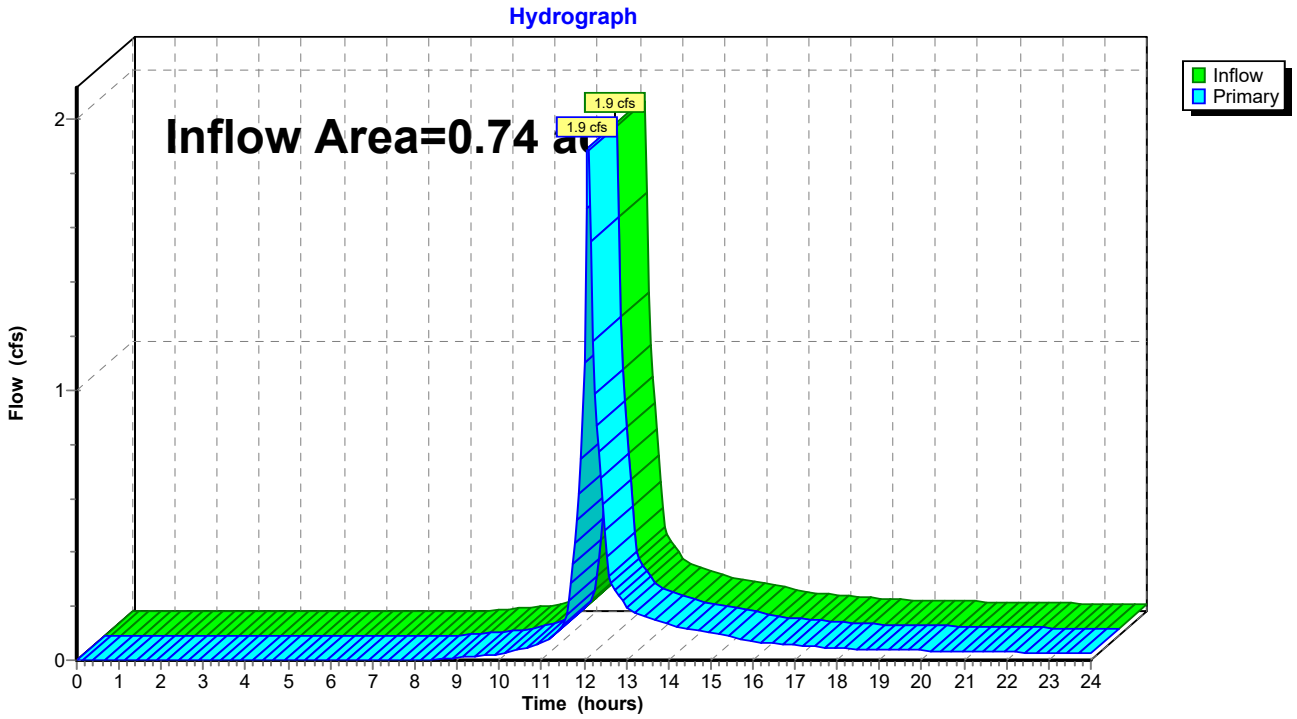


Summary for Link SP1: Forest Ave Storm Drain

Inflow Area = 0.74 ac, 39.80% Impervious, Inflow Depth > 2.23" for 10-Year Storm event
Inflow = 1.9 cfs @ 12.09 hrs, Volume= 0.138 af
Primary = 1.9 cfs @ 12.09 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Forest Ave Storm Drain

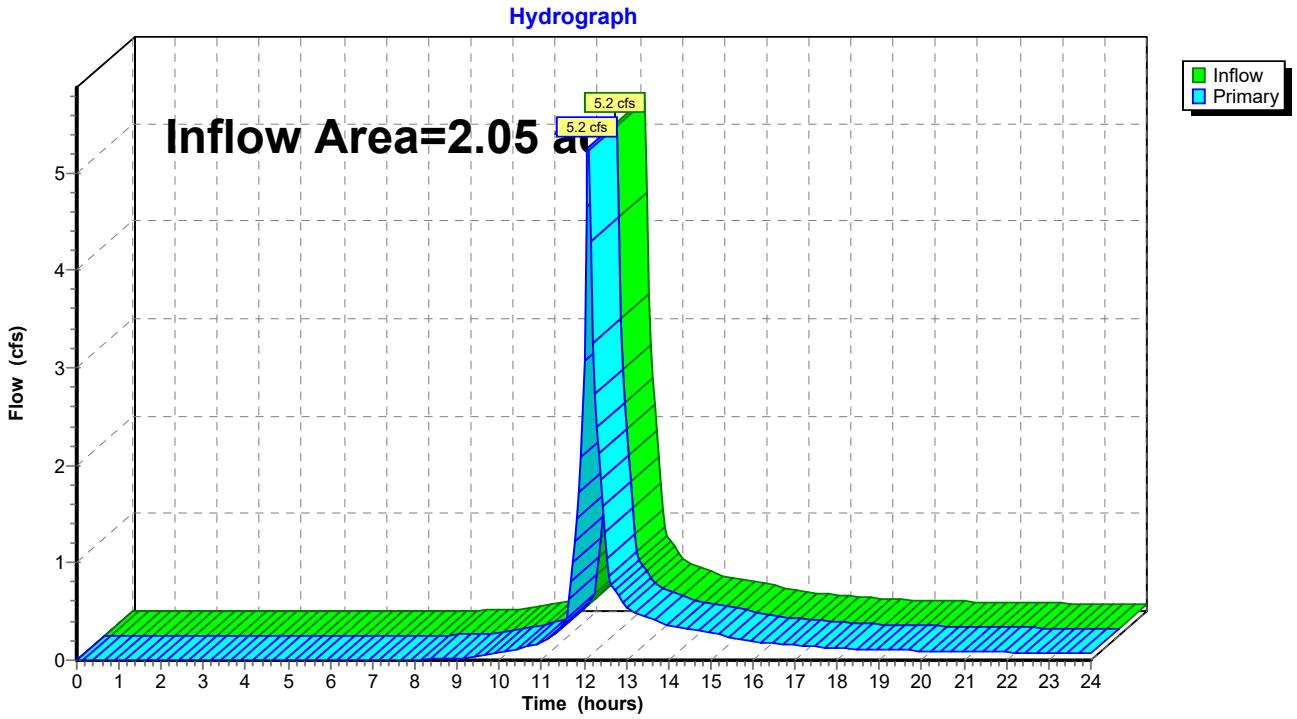


Summary for Link SP2: Combined Sewer

Inflow Area = 2.05 ac, 56.37% Impervious, Inflow Depth > 2.24" for 10-Year Storm event
Inflow = 5.2 cfs @ 12.09 hrs, Volume= 0.382 af
Primary = 5.2 cfs @ 12.09 hrs, Volume= 0.382 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Combined Sewer



Summary for Subcatchment 0S: PRE-0

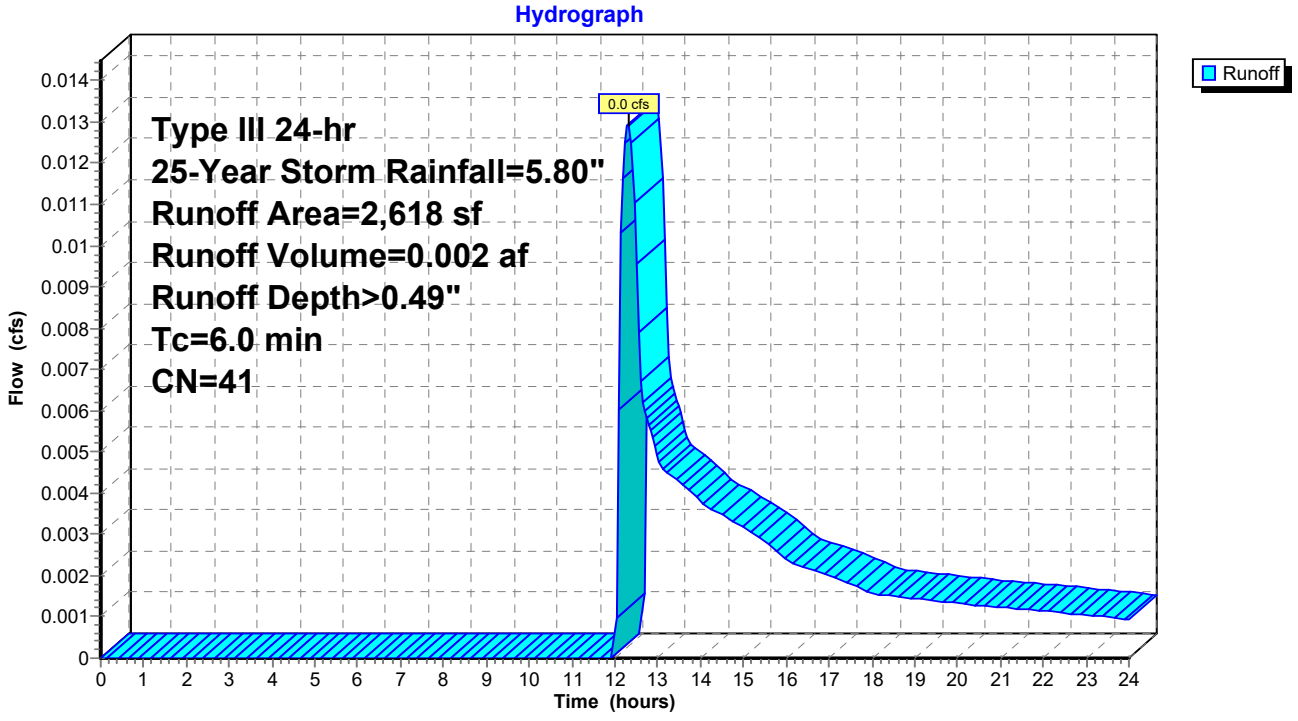
Runoff = 0.0 cfs @ 12.31 hrs, Volume= 0.002 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	70	98	Paved parking, HSG A
	1,403	39	Grass cover, Good, HSG A
*	1,145	40	Porous Pavement
	2,618	41	Weighted Average
	2,548		97.33% Pervious Area
	70		2.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 0S: PRE-0



Summary for Subcatchment 1S: PRE-1

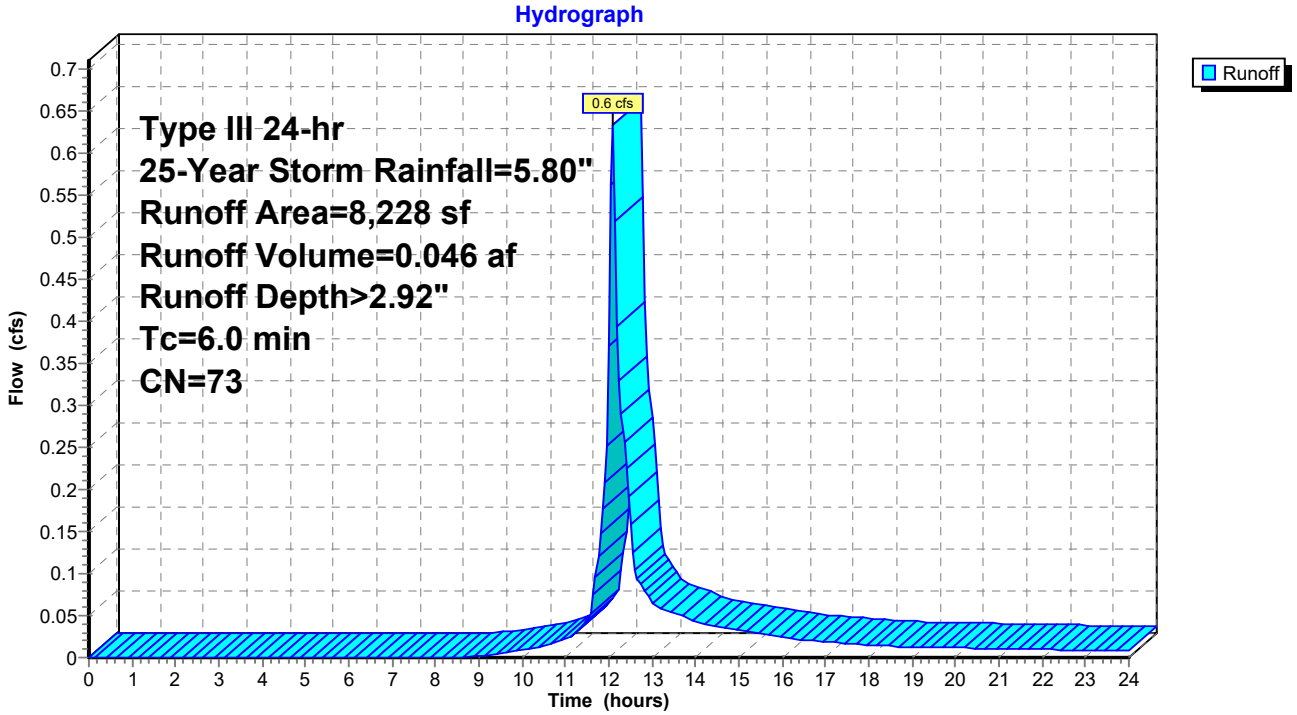
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 0.046 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	4,083	98	Paved parking, HSG A
	1,673	39	Grass cover, Good, HSG A
*	1,374	68	Grass cover (parking area), HSG A
*	1,098	40	Porous Pavement
	8,228	73	Weighted Average
	4,145		50.38% Pervious Area
	4,083		49.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S: PRE-1



Summary for Subcatchment 2S: PRE-2

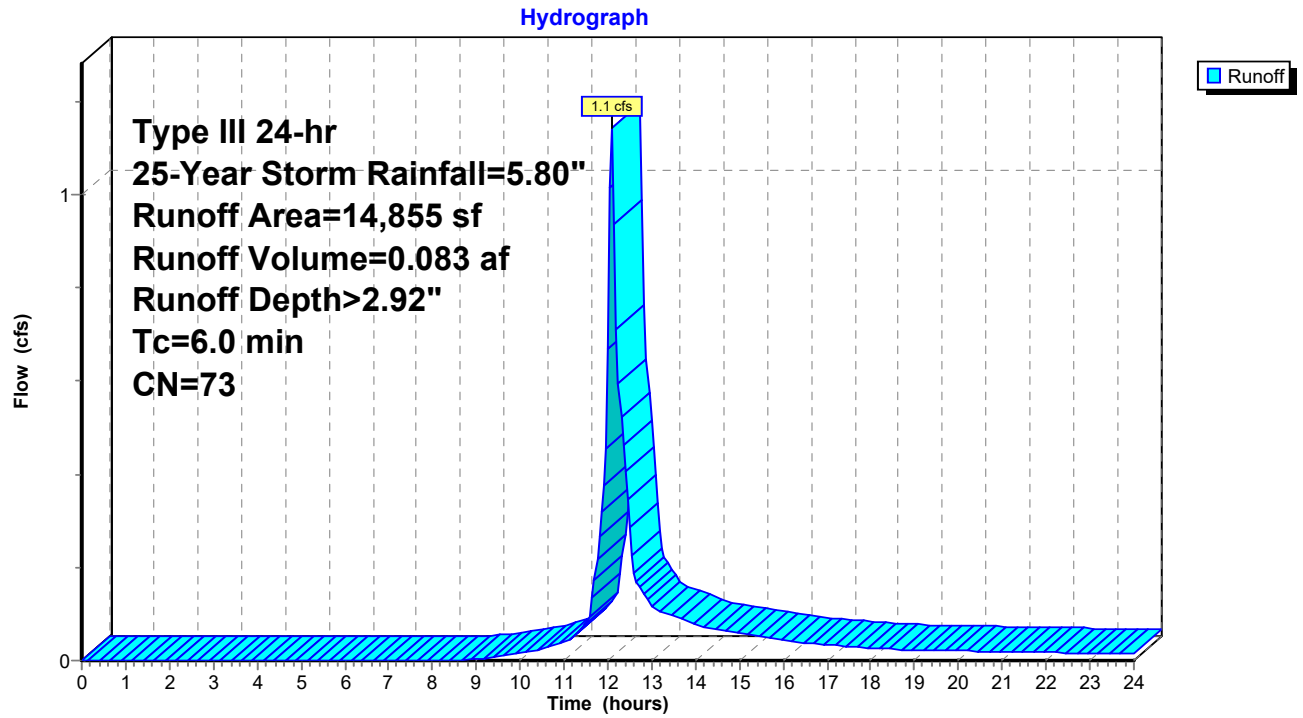
Runoff = 1.1 cfs @ 12.09 hrs, Volume= 0.083 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	6,344	98	Paved parking, HSG A
	2,948	39	Grass cover, Good, HSG A
	4,408	68	Grass cover (parking area), HSG A
*	1,155	40	Porous Pavement
	14,855	73	Weighted Average
	8,511		57.29% Pervious Area
	6,344		42.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S: PRE-2



Summary for Subcatchment 3S: PRE-3

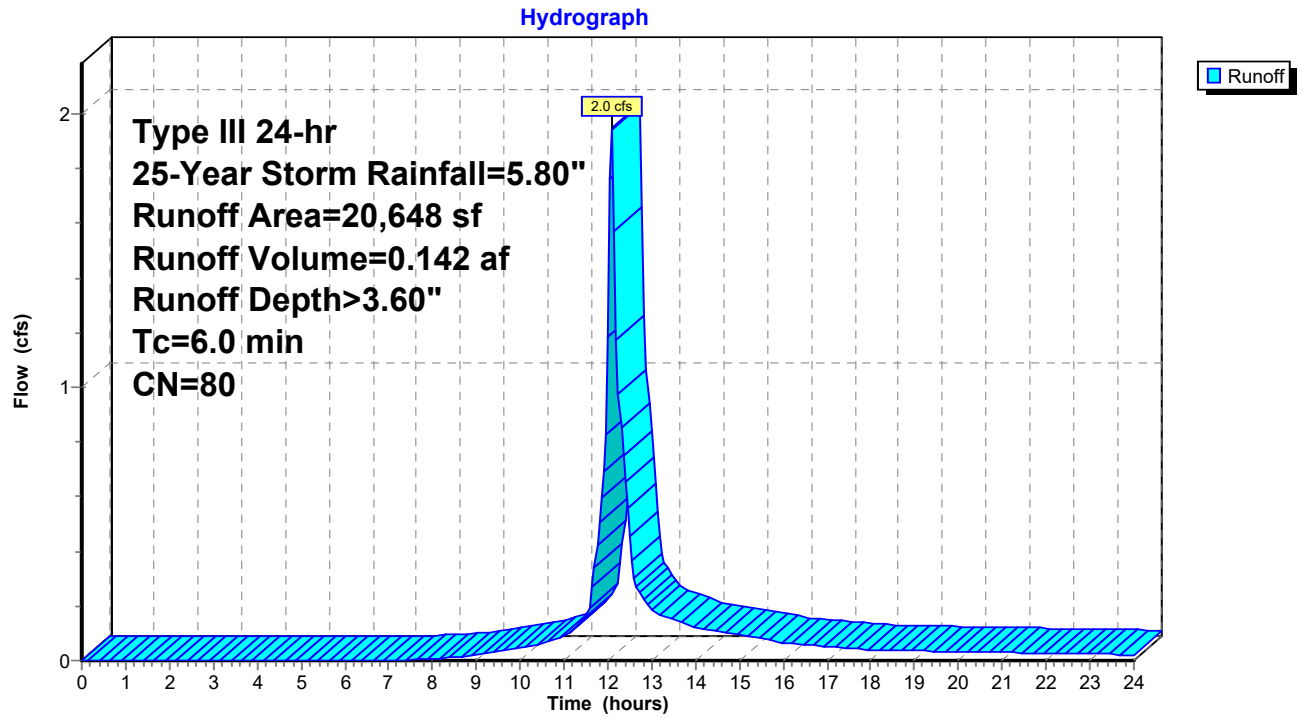
Runoff = 2.0 cfs @ 12.09 hrs, Volume= 0.142 af, Depth> 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	10,577	98	Paved parking, HSG A
	1,903	39	Grass cover, Good, HSG A
	7,715	68	Grass cover (parking area), HSG A
*	453	40	Porous Pavement
	20,648	80	Weighted Average
	10,071		48.77% Pervious Area
	10,577		51.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: PRE-3



Summary for Subcatchment 4S: PRE-4

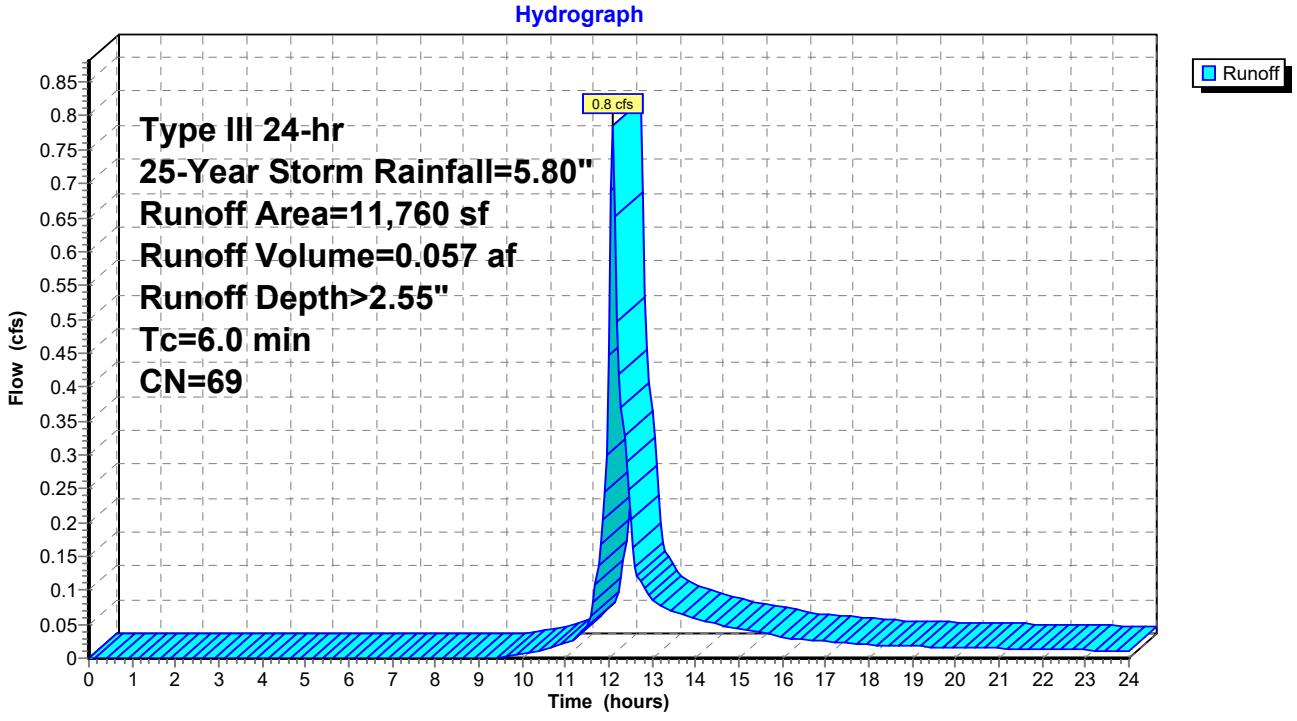
Runoff = 0.8 cfs @ 12.10 hrs, Volume= 0.057 af, Depth> 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,321	98	Paved parking, HSG A
1,957	39	Grass cover, Good, HSG A
7,482	68	Grass cover (parking area), HSG A
11,760	69	Weighted Average
9,439		80.26% Pervious Area
2,321		19.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: PRE-4



Summary for Subcatchment 5S: PRE-5

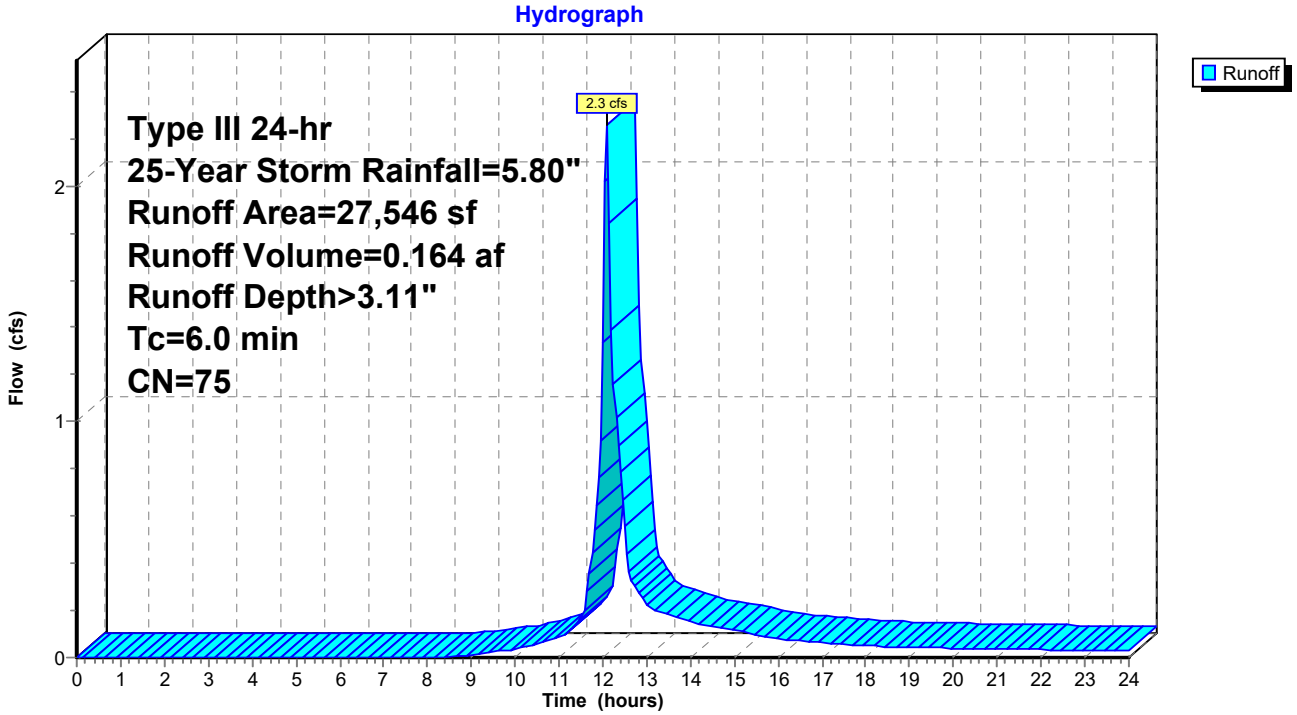
Runoff = 2.3 cfs @ 12.09 hrs, Volume= 0.164 af, Depth> 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	14,114	98	Paved parking, HSG A
	6,700	39	Grass cover, Good, HSG A
	5,072	68	Grass cover (parking area), HSG A
*	1,660	40	Porous Pavement
	27,546	75	Weighted Average
	13,432		48.76% Pervious Area
	14,114		51.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S: PRE-5



Summary for Subcatchment 6S: PRE-6

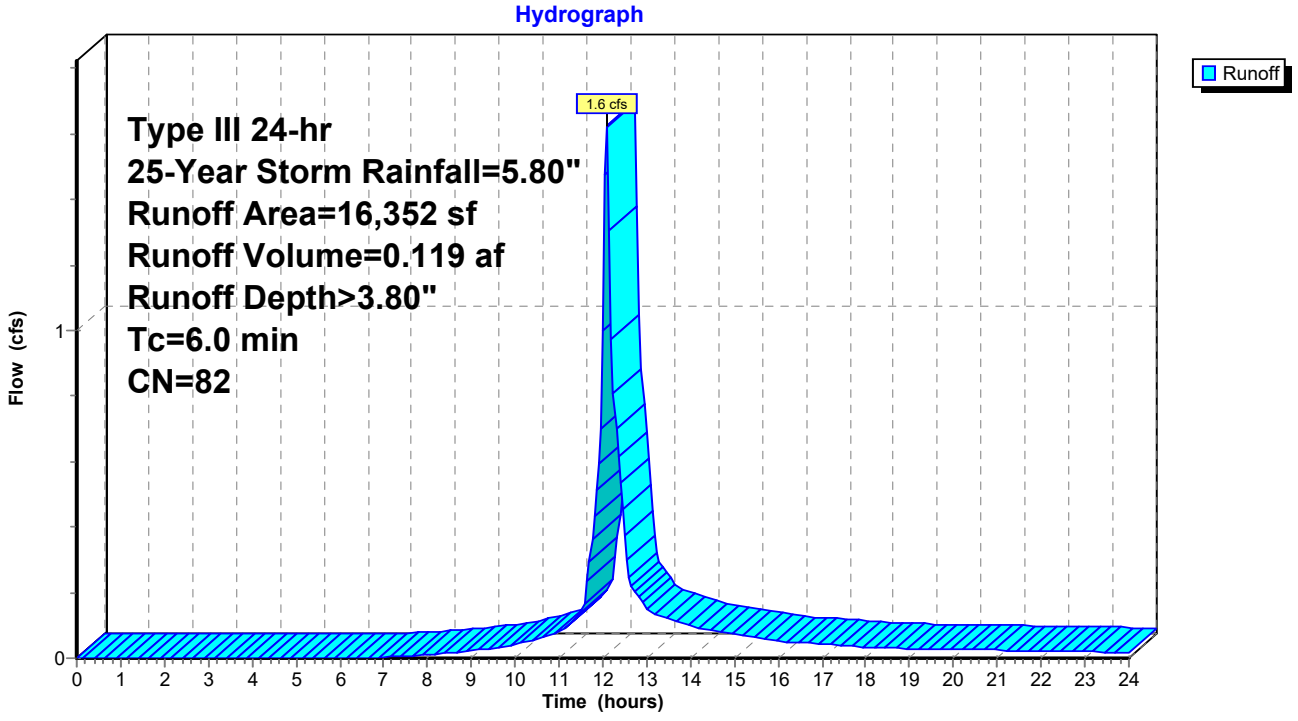
Runoff = 1.6 cfs @ 12.09 hrs, Volume= 0.119 af, Depth> 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	11,768	98	Paved parking, HSG A
	3,865	39	Grass cover, Good, HSG A
*	719	40	Porous Pavement
	16,352	82	Weighted Average
	4,584		28.03% Pervious Area
	11,768		71.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S: PRE-6



Summary for Subcatchment 7S: PRE-7

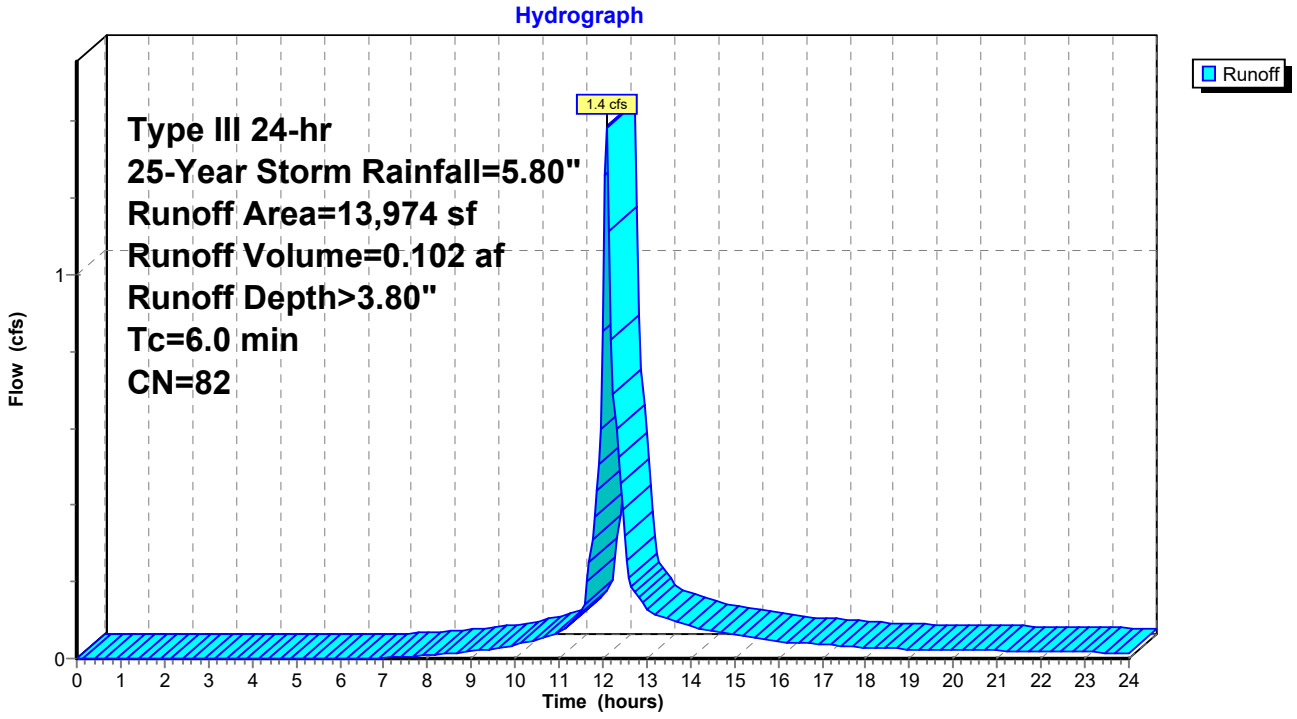
Runoff = 1.4 cfs @ 12.09 hrs, Volume= 0.102 af, Depth> 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

Area (sf)	CN	Description
10,235	98	Paved parking, HSG A
3,739	39	Grass cover, Good, HSG A
13,974	82	Weighted Average
3,739		26.76% Pervious Area
10,235		73.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: PRE-7



Summary for Subcatchment 8S: PRE-8

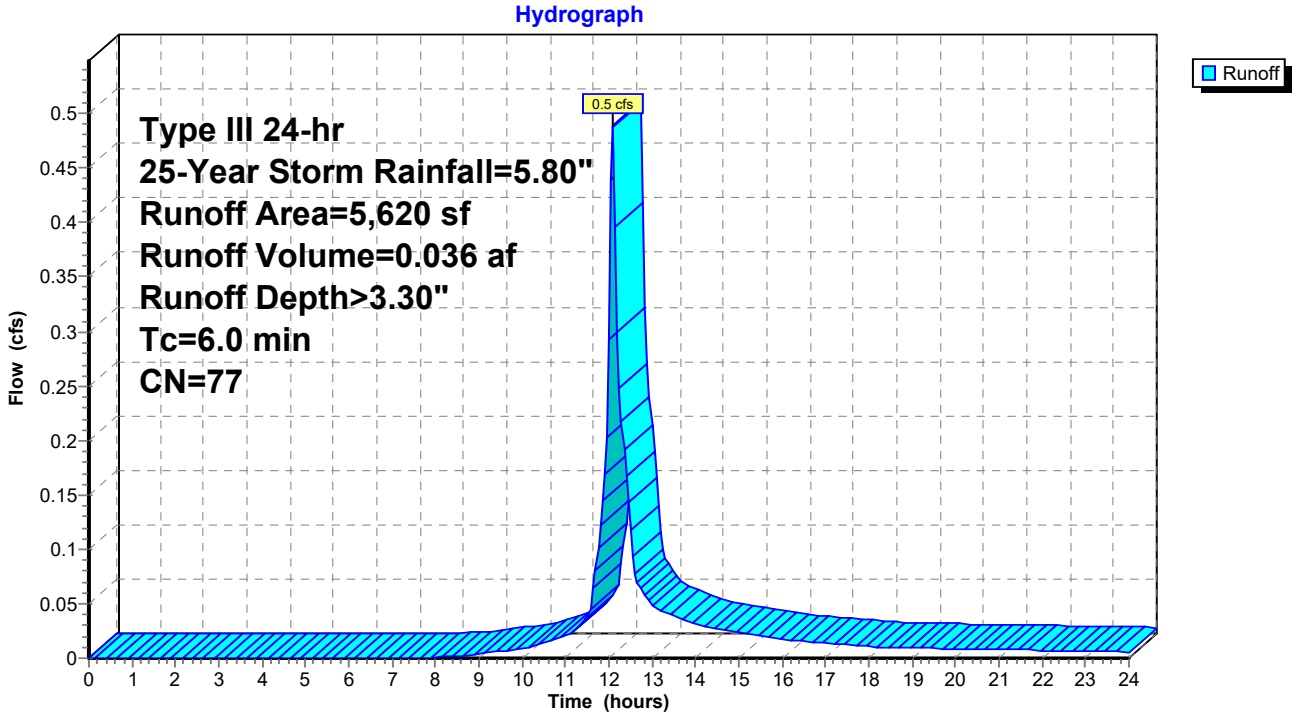
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.036 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	3,664	98	Paved parking, HSG A
	1,857	39	Grass cover, Good, HSG A
*	99	40	Porous Pavement
	5,620	77	Weighted Average
	1,956		34.80% Pervious Area
	3,664		65.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S: PRE-8



Summary for Pond 11P: Ex CB1

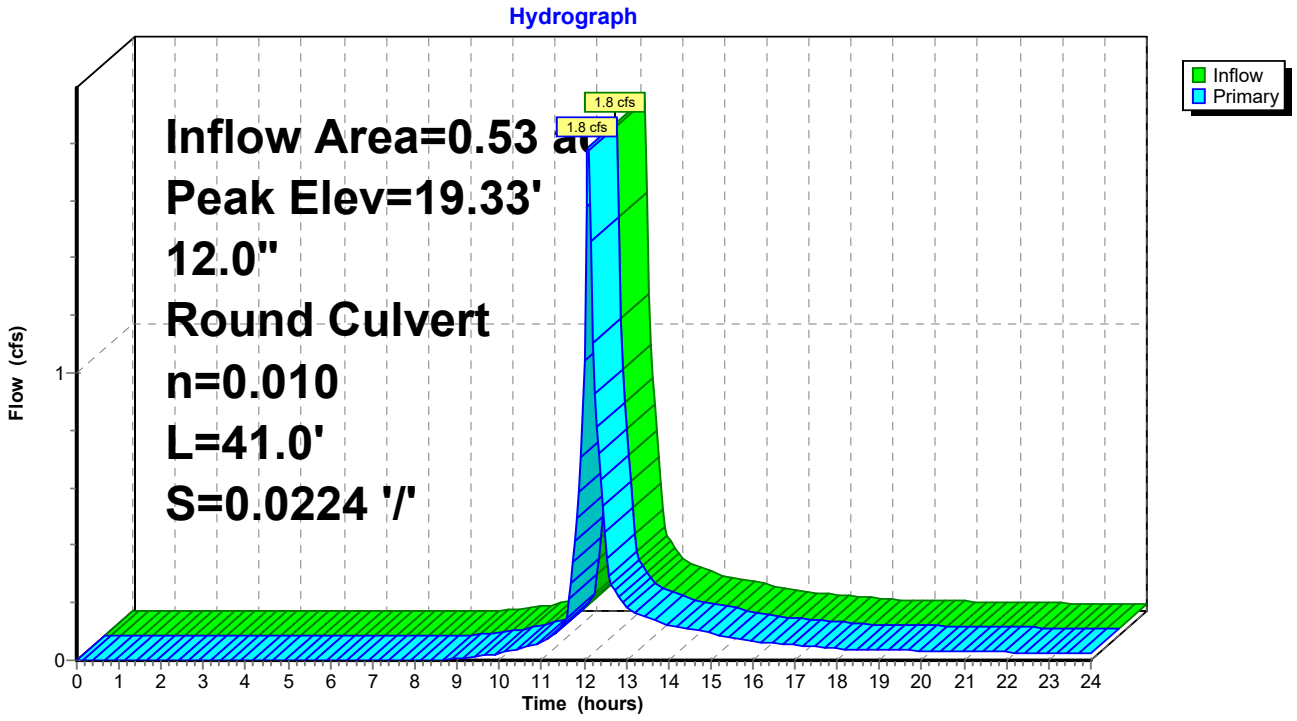
Inflow Area = 0.53 ac, 45.17% Impervious, Inflow Depth > 2.92" for 25-Year Storm event
Inflow = 1.8 cfs @ 12.09 hrs, Volume= 0.129 af
Outflow = 1.8 cfs @ 12.09 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.09 hrs, Volume= 0.129 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.33' @ 12.09 hrs
Flood Elev= 22.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.47'	**12.0" Round Culvert** L= 41.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.47' / 17.55' S= 0.0224 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.8 cfs @ 12.09 hrs HW=19.32' TW=18.26' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.8 cfs @ 2.47 fps)

Pond 11P: Ex CB1



Summary for Pond 12P: Ex CB2

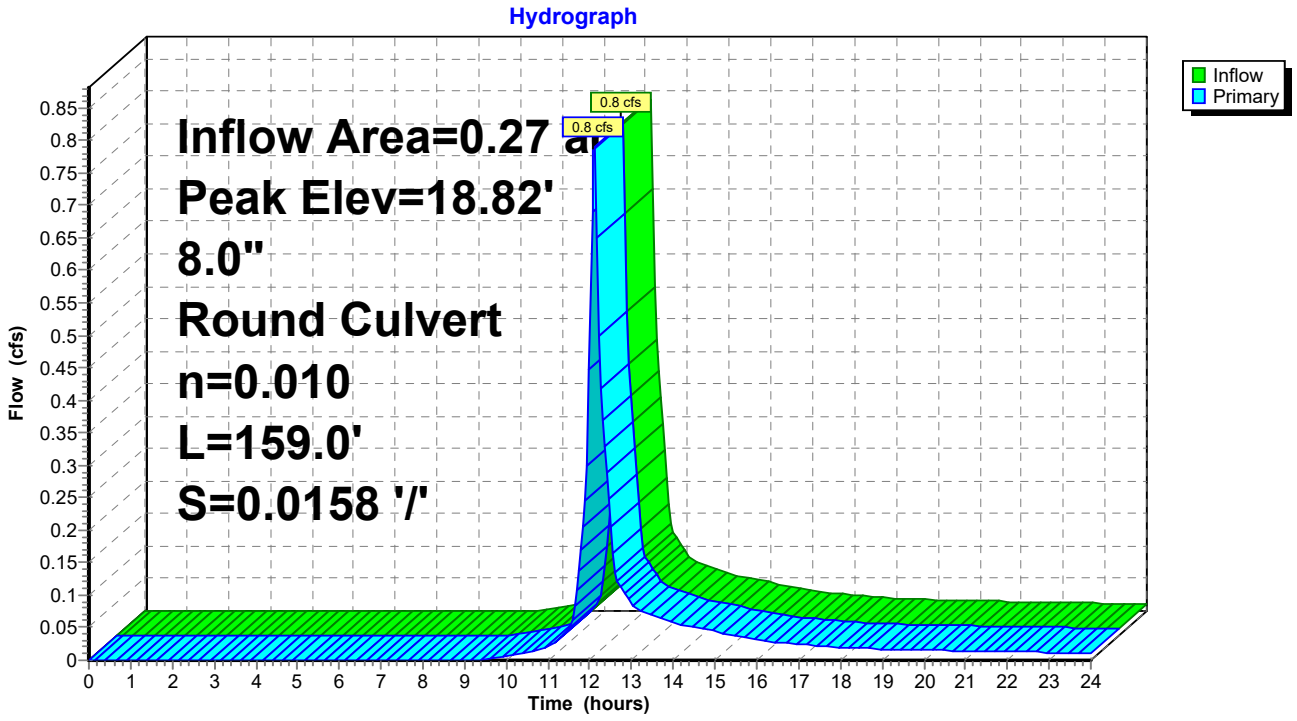
Inflow Area = 0.27 ac, 19.74% Impervious, Inflow Depth > 2.55" for 25-Year Storm event
Inflow = 0.8 cfs @ 12.10 hrs, Volume= 0.057 af
Outflow = 0.8 cfs @ 12.10 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.10 hrs, Volume= 0.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.82' @ 12.10 hrs
Flood Elev= 22.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.14'	**8.0" Round Culvert** L= 159.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.14' / 15.62' S= 0.0158 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.8 cfs @ 12.10 hrs HW=18.82' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.8 cfs @ 2.23 fps)

Pond 12P: Ex CB2



Summary for Pond 13P: Ex CB7

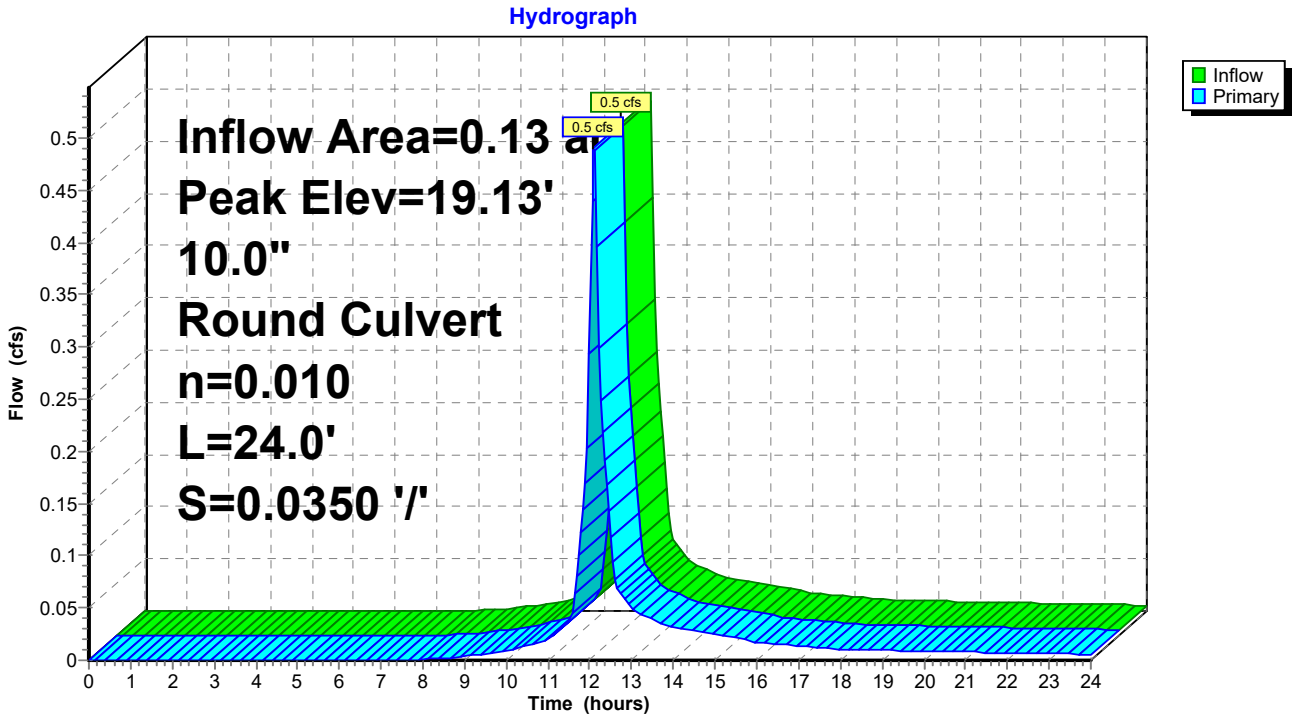
Inflow Area = 0.13 ac, 65.20% Impervious, Inflow Depth > 3.30" for 25-Year Storm event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 0.036 af
Outflow = 0.5 cfs @ 12.09 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.13' @ 12.09 hrs
Flood Elev= 24.51'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.70'	**10.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.70' / 17.86' S= 0.0350 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.5 cfs @ 12.09 hrs HW=19.12' TW=15.89' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.5 cfs @ 1.74 fps)

Pond 13P: Ex CB7



Summary for Pond 14P: Ex CB4

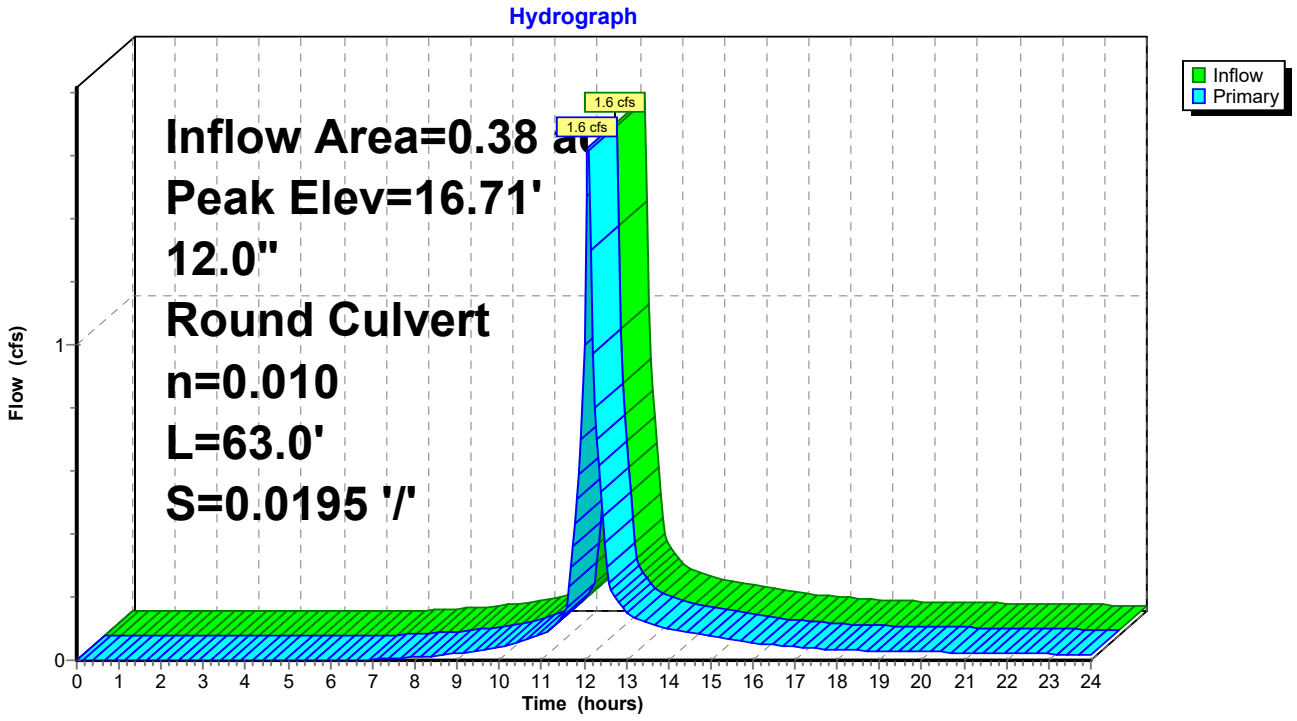
Inflow Area = 0.38 ac, 71.97% Impervious, Inflow Depth > 3.80" for 25-Year Storm event
Inflow = 1.6 cfs @ 12.09 hrs, Volume= 0.119 af
Outflow = 1.6 cfs @ 12.09 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min
Primary = 1.6 cfs @ 12.09 hrs, Volume= 0.119 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.71' @ 12.09 hrs
Flood Elev= 21.96'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.91'	**12.0" Round Culvert** L= 63.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.91' / 14.68' S= 0.0195 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.6 cfs @ 12.09 hrs HW=16.70' TW=16.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.6 cfs @ 2.39 fps)

Pond 14P: Ex CB4



Summary for Pond 15P: Ex CB5

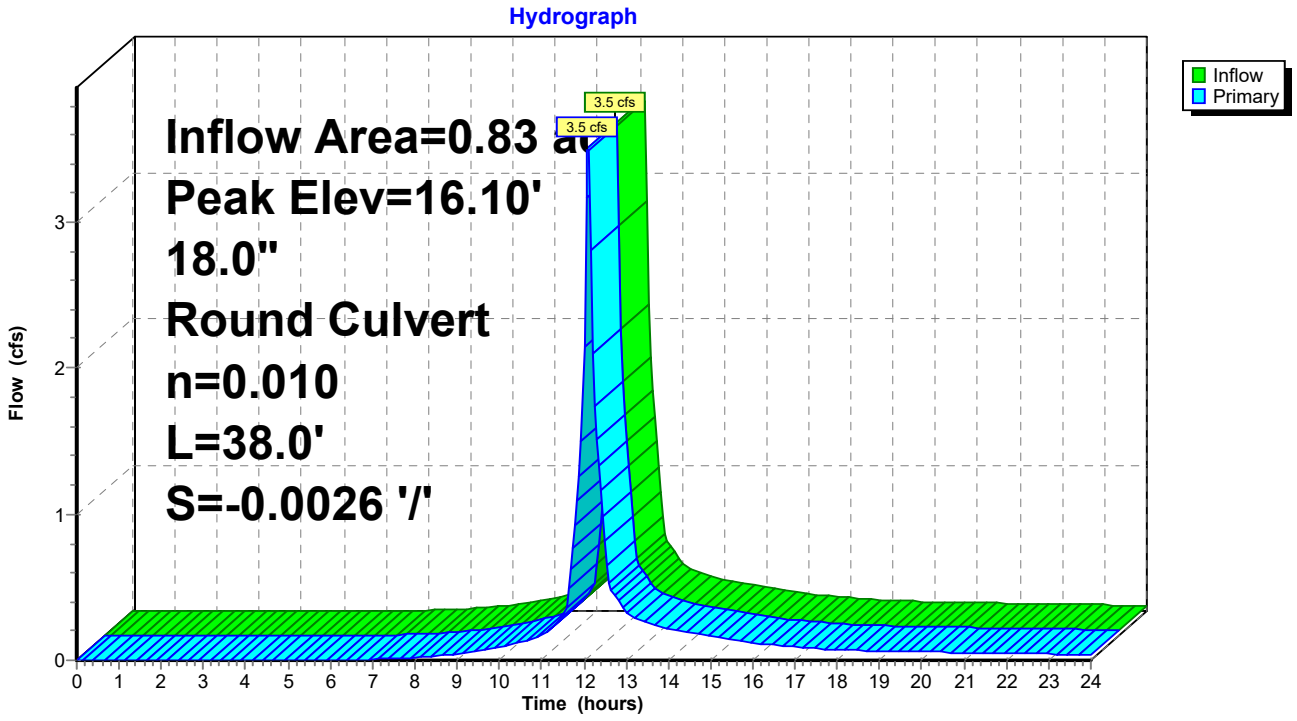
Inflow Area = 0.83 ac, 71.40% Impervious, Inflow Depth > 3.72" for 25-Year Storm event
Inflow = 3.5 cfs @ 12.09 hrs, Volume= 0.256 af
Outflow = 3.5 cfs @ 12.09 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.0 min
Primary = 3.5 cfs @ 12.09 hrs, Volume= 0.256 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.10' @ 12.17 hrs
Flood Elev= 22.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.80'	**18.0" Round Culvert** L= 38.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.70' / 14.80' S= -0.0026 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.2 cfs @ 12.09 hrs HW=16.00' TW=15.85' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.2 cfs @ 1.48 fps)

Pond 15P: Ex CB5



Summary for Pond 16P: Ex DMH8

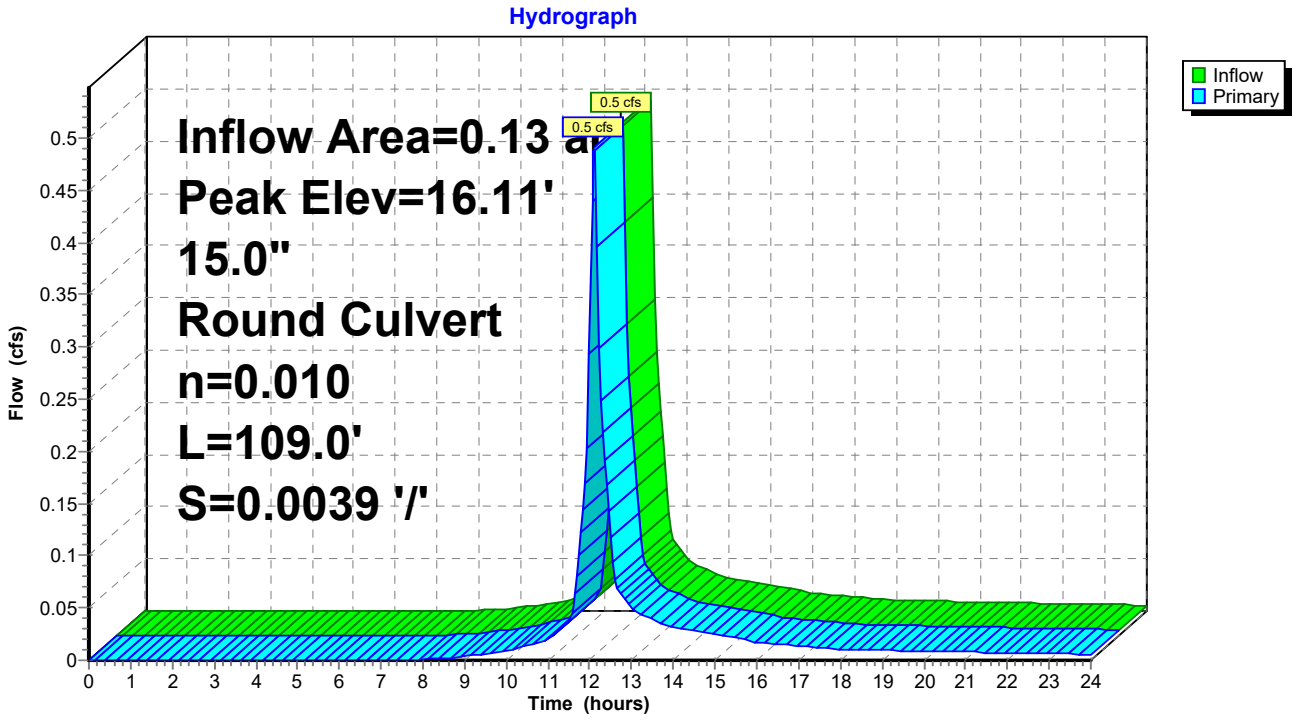
Inflow Area = 0.13 ac, 65.20% Impervious, Inflow Depth > 3.30" for 25-Year Storm event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 0.036 af
Outflow = 0.5 cfs @ 12.09 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.11' @ 12.22 hrs
Flood Elev= 24.67'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.08'	**15.0" Round Culvert** L= 109.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.08' / 14.65' S= 0.0039 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=15.89' TW=16.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.0 cfs)

Pond 16P: Ex DMH8



Summary for Pond 21P: Ex DMH9

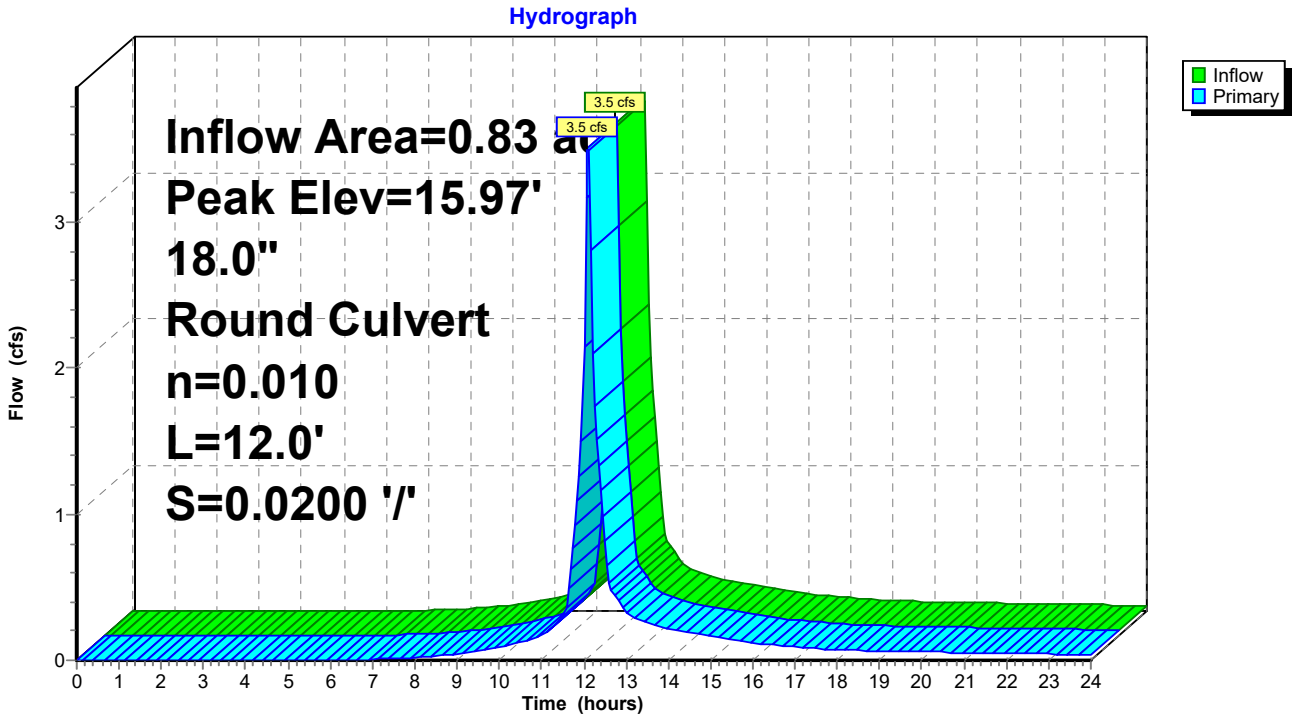
Inflow Area = 0.83 ac, 71.40% Impervious, Inflow Depth > 3.72" for 25-Year Storm event
Inflow = 3.5 cfs @ 12.09 hrs, Volume= 0.256 af
Outflow = 3.5 cfs @ 12.09 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.0 min
Primary = 3.5 cfs @ 12.09 hrs, Volume= 0.256 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.97' @ 12.14 hrs
Flood Elev= 23.72'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.62'	**18.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.62' / 14.38' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.0 cfs @ 12.09 hrs HW=15.85' TW=15.73' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.0 cfs @ 1.30 fps)

Pond 21P: Ex DMH9



Summary for Pond 22P: Ex DMH3

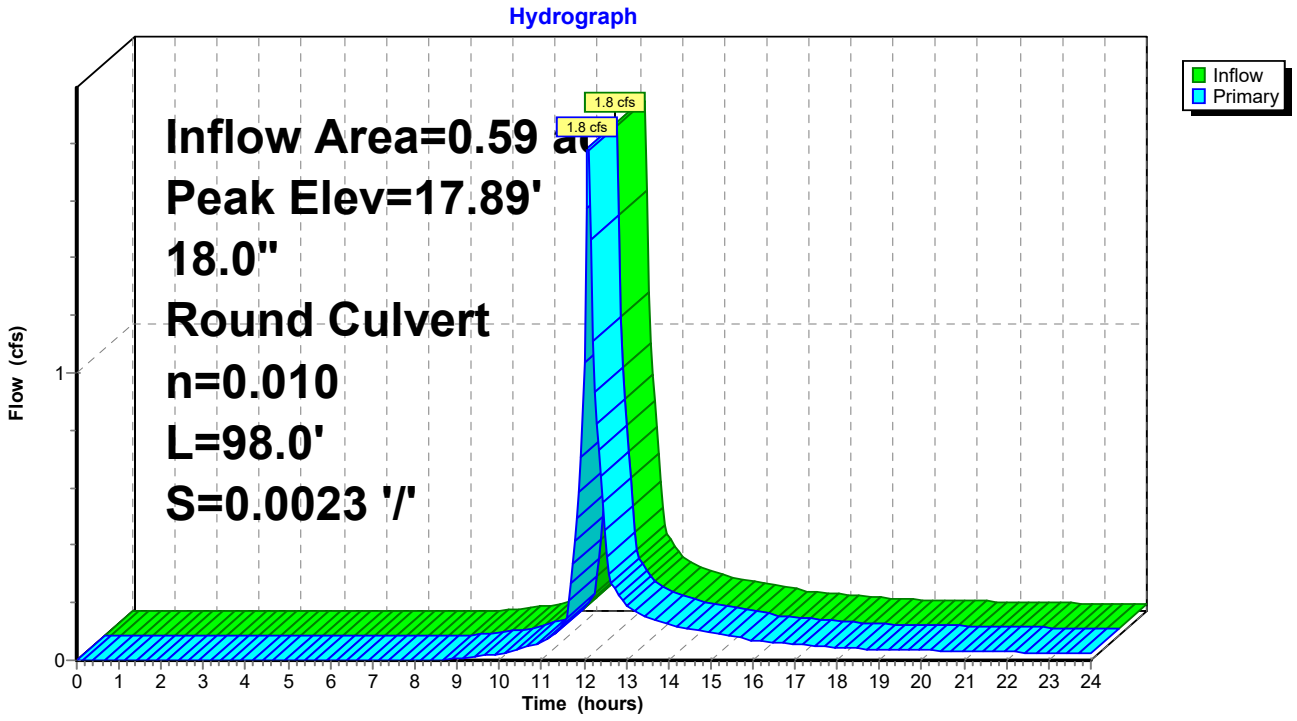
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 2.67" for 25-Year Storm event
Inflow = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af
Outflow = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.89' @ 12.10 hrs
Flood Elev= 24.92'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.12'	**18.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.12' / 16.89' S= 0.0023 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.6 cfs @ 12.09 hrs HW=17.88' TW=17.52' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.6 cfs @ 2.67 fps)

Pond 22P: Ex DMH3



Summary for Pond 23P: Ex CB3

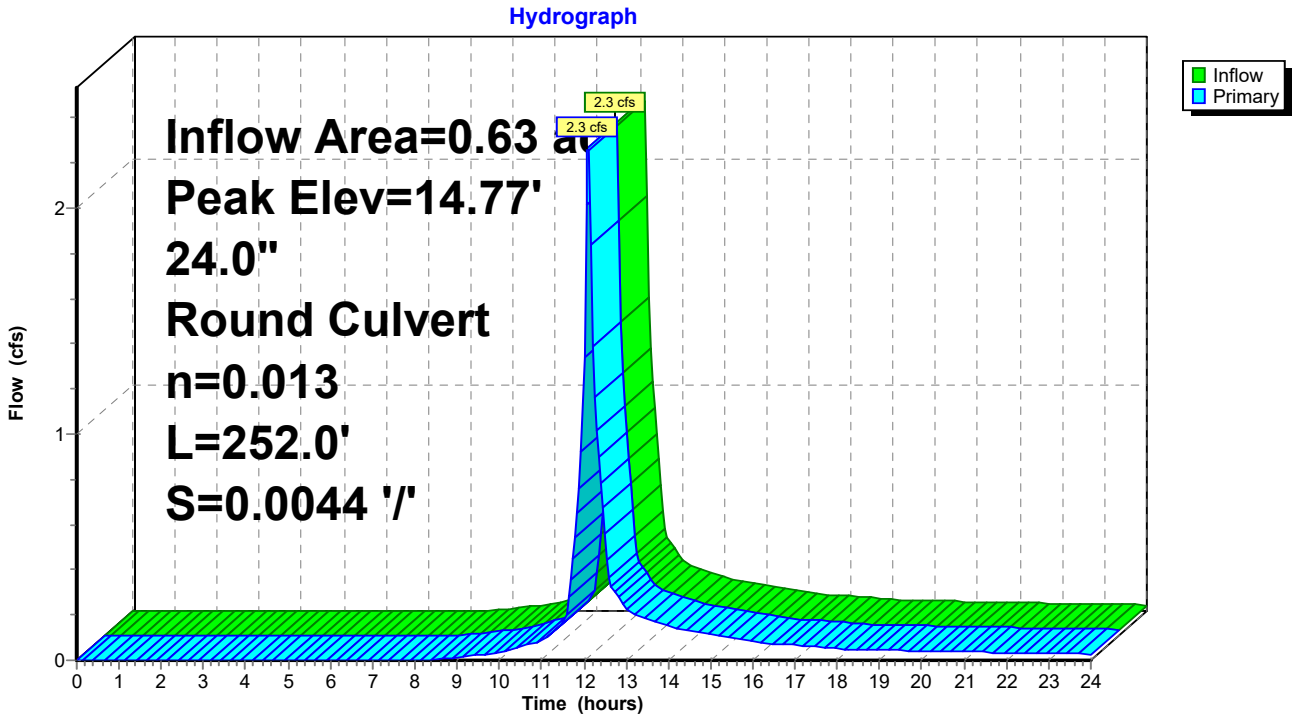
Inflow Area = 0.63 ac, 51.24% Impervious, Inflow Depth > 3.11" for 25-Year Storm event
Inflow = 2.3 cfs @ 12.09 hrs, Volume= 0.164 af
Outflow = 2.3 cfs @ 12.09 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.0 min
Primary = 2.3 cfs @ 12.09 hrs, Volume= 0.164 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.77' @ 12.09 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.05'	**24.0" Round Culvert** L= 252.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.05' / 12.94' S= 0.0044 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=2.2 cfs @ 12.09 hrs HW=14.77' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.2 cfs @ 3.27 fps)

Pond 23P: Ex CB3



Summary for Pond 24P: Ex DMH2

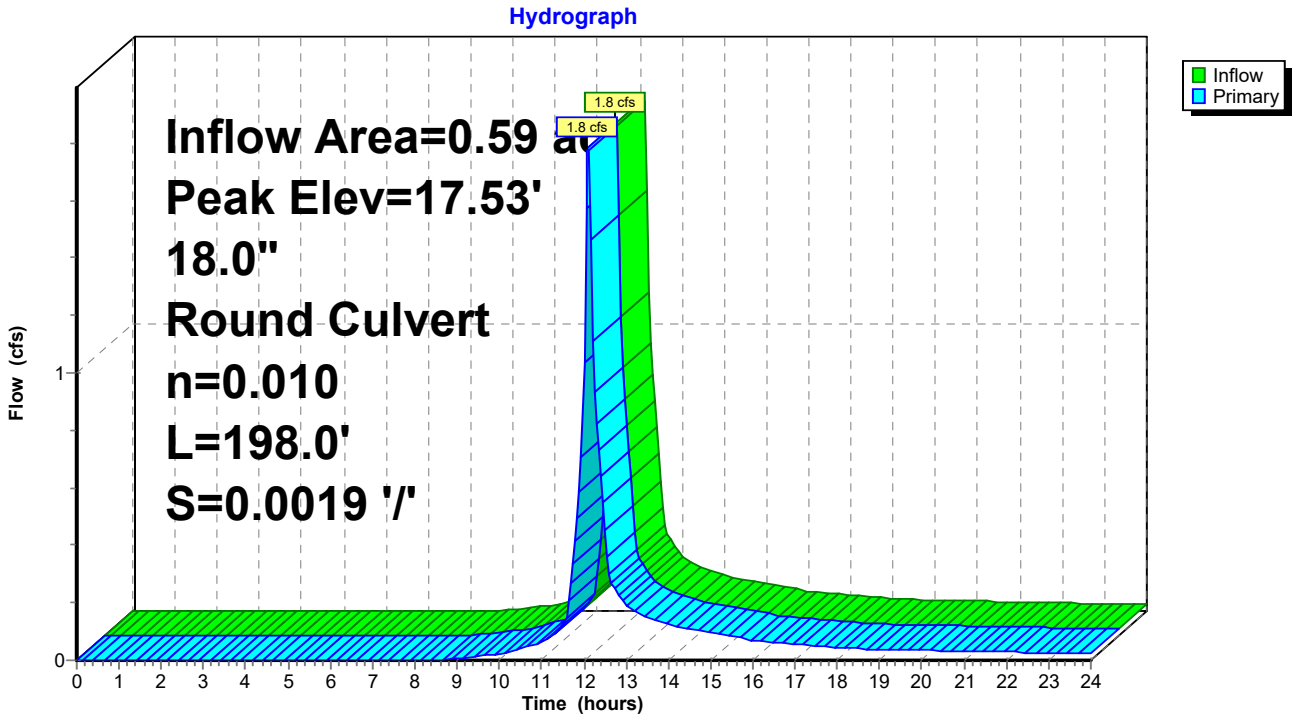
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 2.67" for 25-Year Storm event
Inflow = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af
Outflow = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.53' @ 12.09 hrs
Flood Elev= 25.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.75'	**18.0" Round Culvert** L= 198.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.75' / 16.38' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.8 cfs @ 12.09 hrs HW=17.52' TW=16.16' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.8 cfs @ 2.80 fps)

Pond 24P: Ex DMH2



Summary for Pond 25P: Ex DMH5

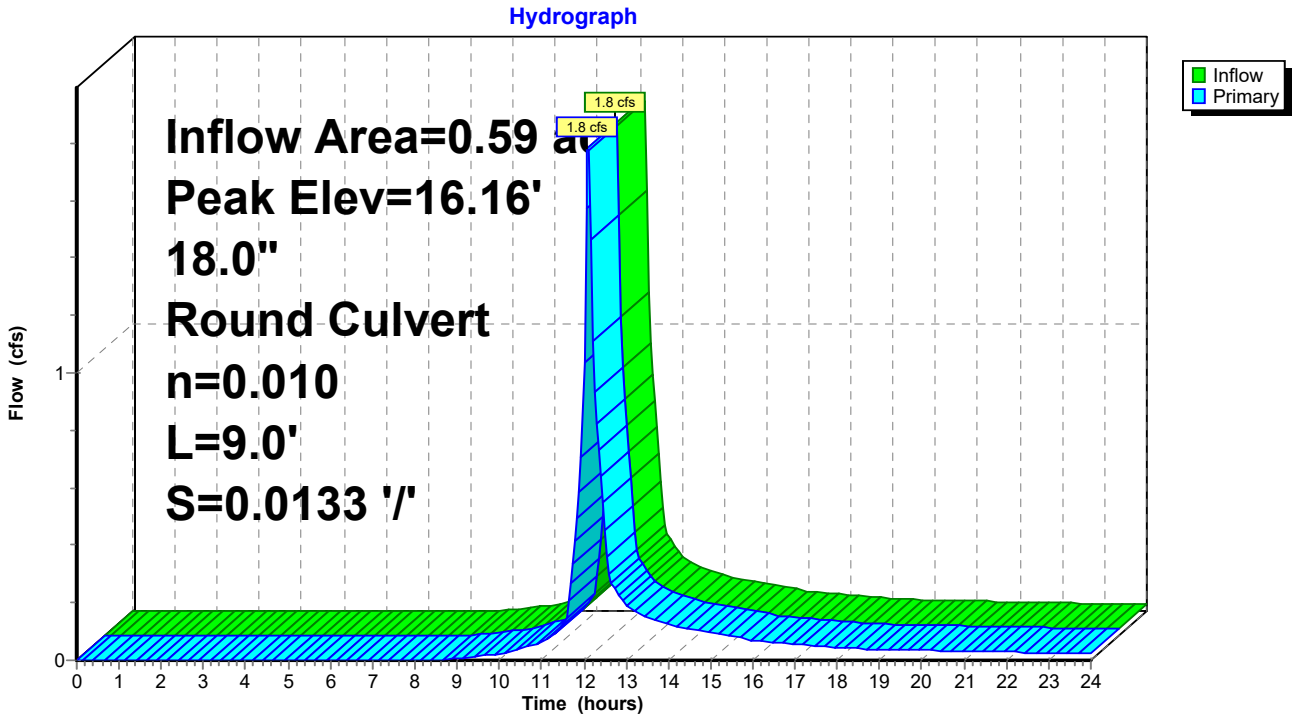
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 2.67" for 25-Year Storm event
Inflow = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af
Outflow = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.16' @ 12.09 hrs
Flood Elev= 23.84'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.44'	**18.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.44' / 15.32' S= 0.0133 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.8 cfs @ 12.09 hrs HW=16.16' TW=15.75' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.8 cfs @ 3.08 fps)

Pond 25P: Ex DMH5



Summary for Pond 26P: Ex DMH6

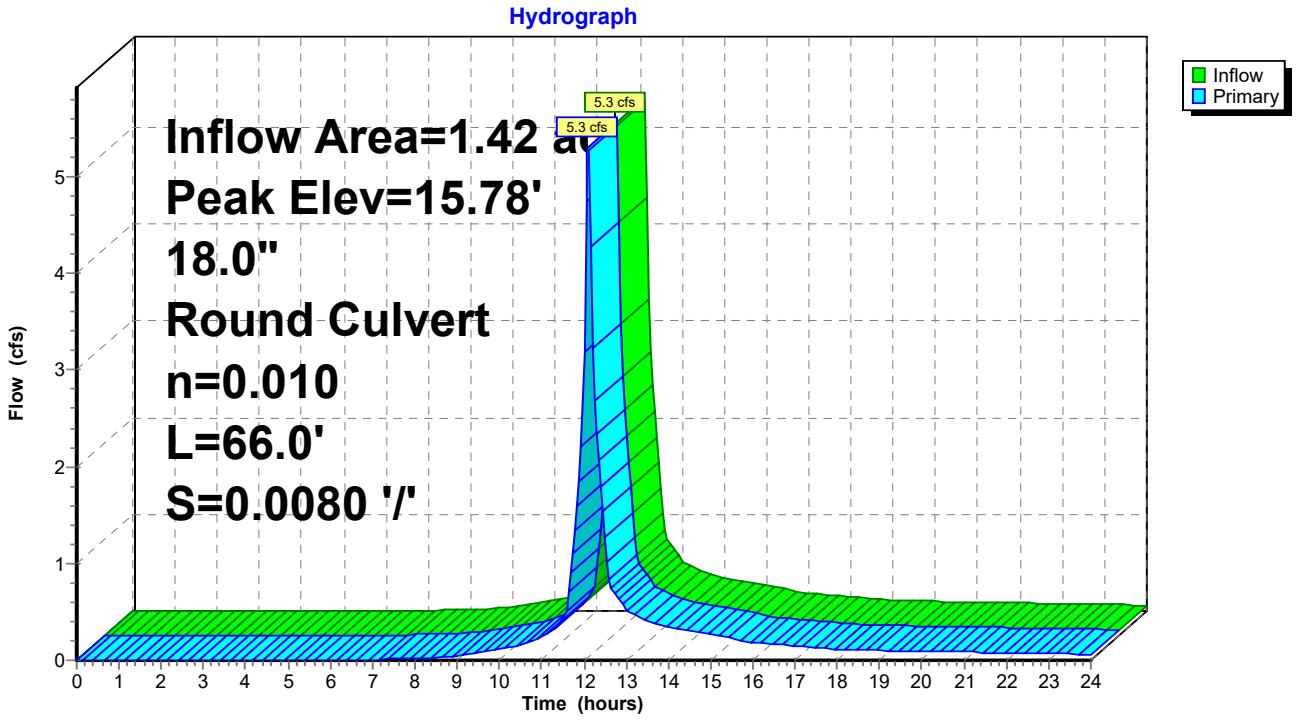
Inflow Area = 1.42 ac, 58.66% Impervious, Inflow Depth > 3.29" for 25-Year Storm event
Inflow = 5.3 cfs @ 12.09 hrs, Volume= 0.387 af
Outflow = 5.3 cfs @ 12.09 hrs, Volume= 0.387 af, Atten= 0%, Lag= 0.0 min
Primary = 5.3 cfs @ 12.09 hrs, Volume= 0.387 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.78' @ 12.11 hrs
Flood Elev= 23.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.30'	**18.0" Round Culvert** L= 66.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.30' / 13.77' S= 0.0080 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.7 cfs @ 12.09 hrs HW=15.74' TW=15.24' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.7 cfs @ 2.69 fps)

Pond 26P: Ex DMH6



Summary for Pond 27P: Ex DMH7

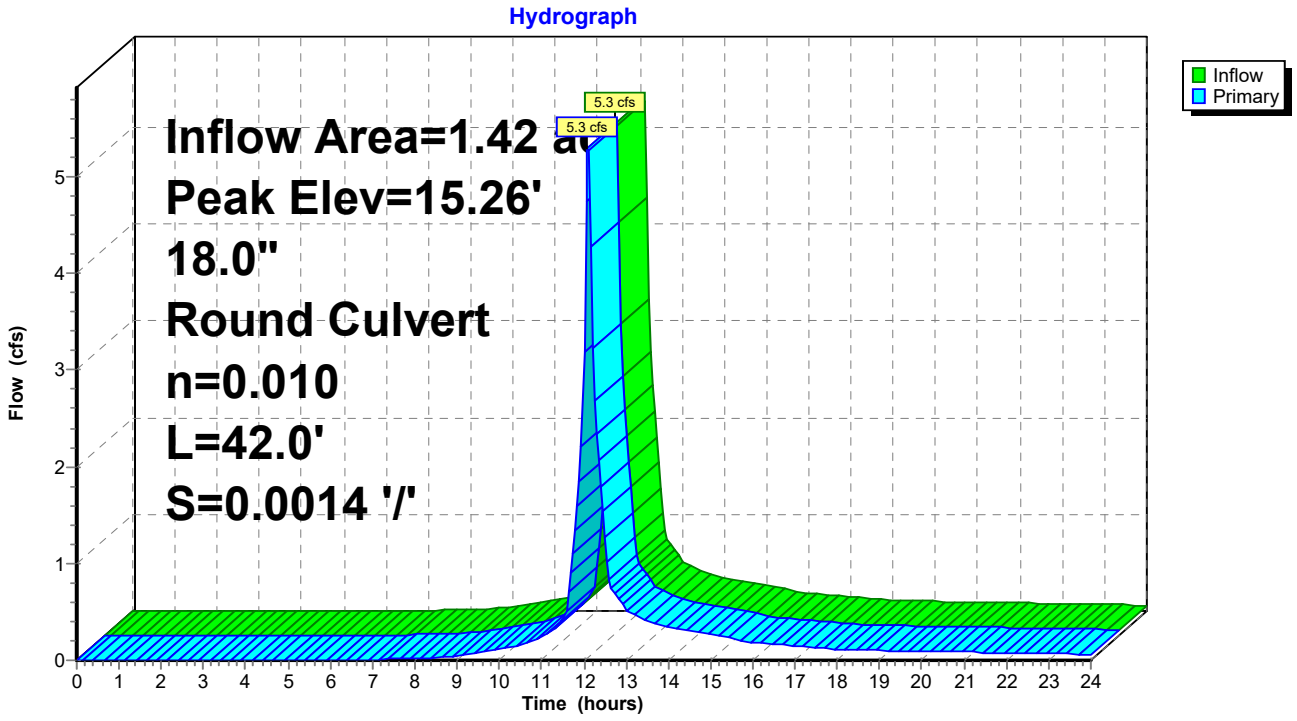
Inflow Area = 1.42 ac, 58.66% Impervious, Inflow Depth > 3.29" for 25-Year Storm event
Inflow = 5.3 cfs @ 12.09 hrs, Volume= 0.387 af
Outflow = 5.3 cfs @ 12.09 hrs, Volume= 0.387 af, Atten= 0%, Lag= 0.0 min
Primary = 5.3 cfs @ 12.09 hrs, Volume= 0.387 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.26' @ 12.09 hrs
Flood Elev= 24.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.70'	**18.0" Round Culvert** L= 42.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 13.70' / 13.64' S= 0.0014 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.2 cfs @ 12.09 hrs HW=15.24' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 5.2 cfs @ 3.56 fps)

Pond 27P: Ex DMH7



Summary for Pond 29P: Ex DMH4

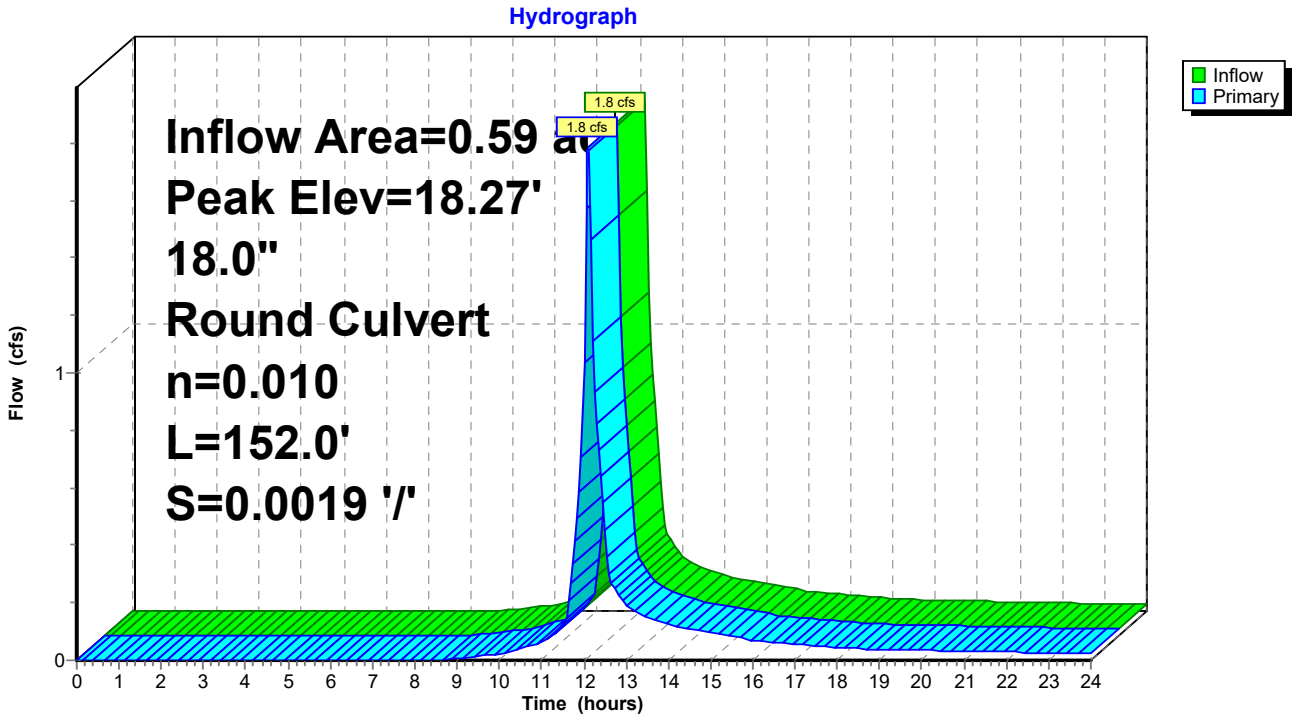
Inflow Area = 0.59 ac, 40.84% Impervious, Inflow Depth > 2.67" for 25-Year Storm event
Inflow = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af
Outflow = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.09 hrs, Volume= 0.131 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.27' @ 12.11 hrs
Flood Elev= 23.44'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.46'	**18.0" Round Culvert** L= 152.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.46' / 17.17' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.6 cfs @ 12.09 hrs HW=18.26' TW=17.88' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.6 cfs @ 2.48 fps)

Pond 29P: Ex DMH4

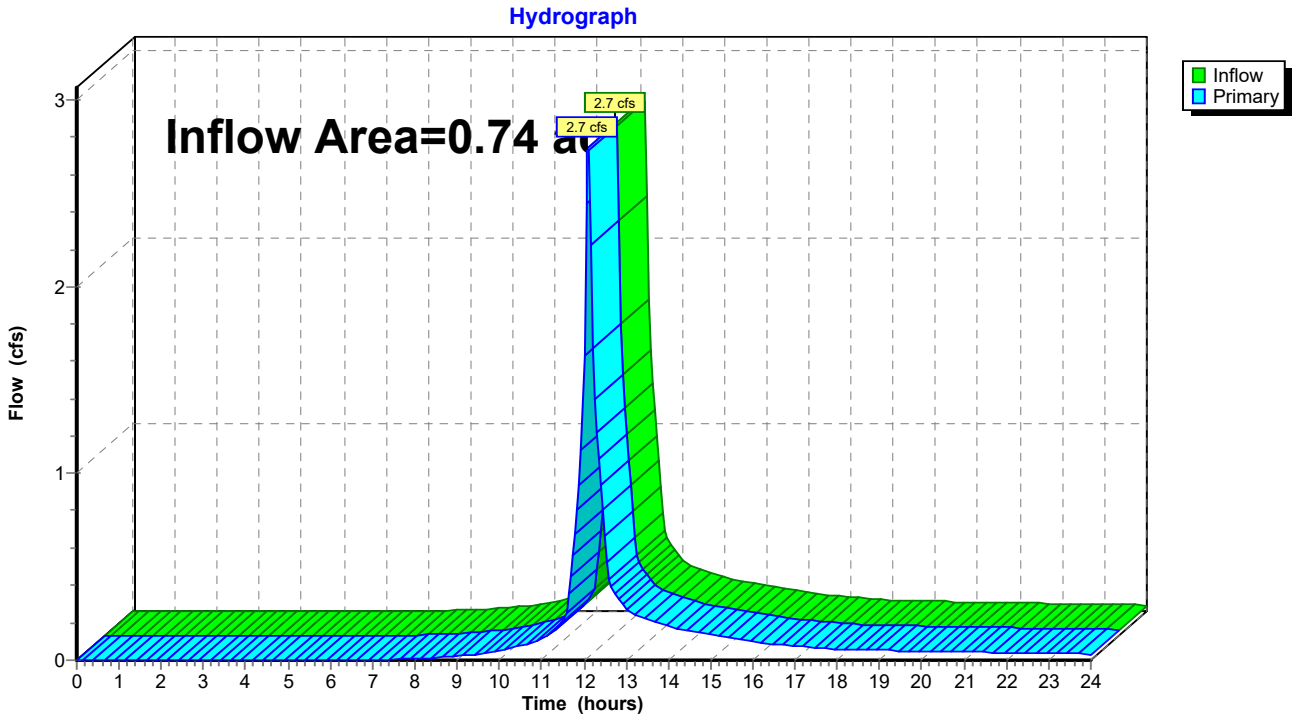


Summary for Link SP1: Forest Ave Storm Drain

Inflow Area = 0.74 ac, 39.80% Impervious, Inflow Depth > 3.22" for 25-Year Storm event
Inflow = 2.7 cfs @ 12.09 hrs, Volume= 0.200 af
Primary = 2.7 cfs @ 12.09 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Forest Ave Storm Drain

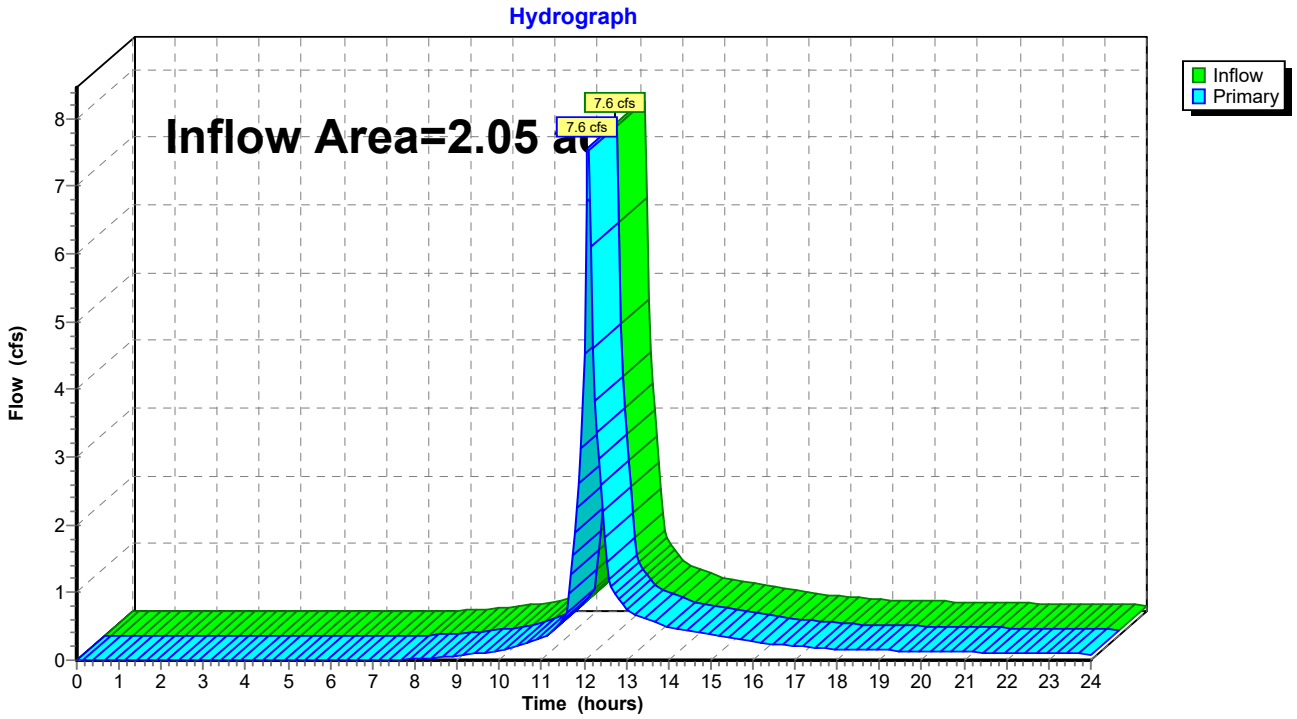


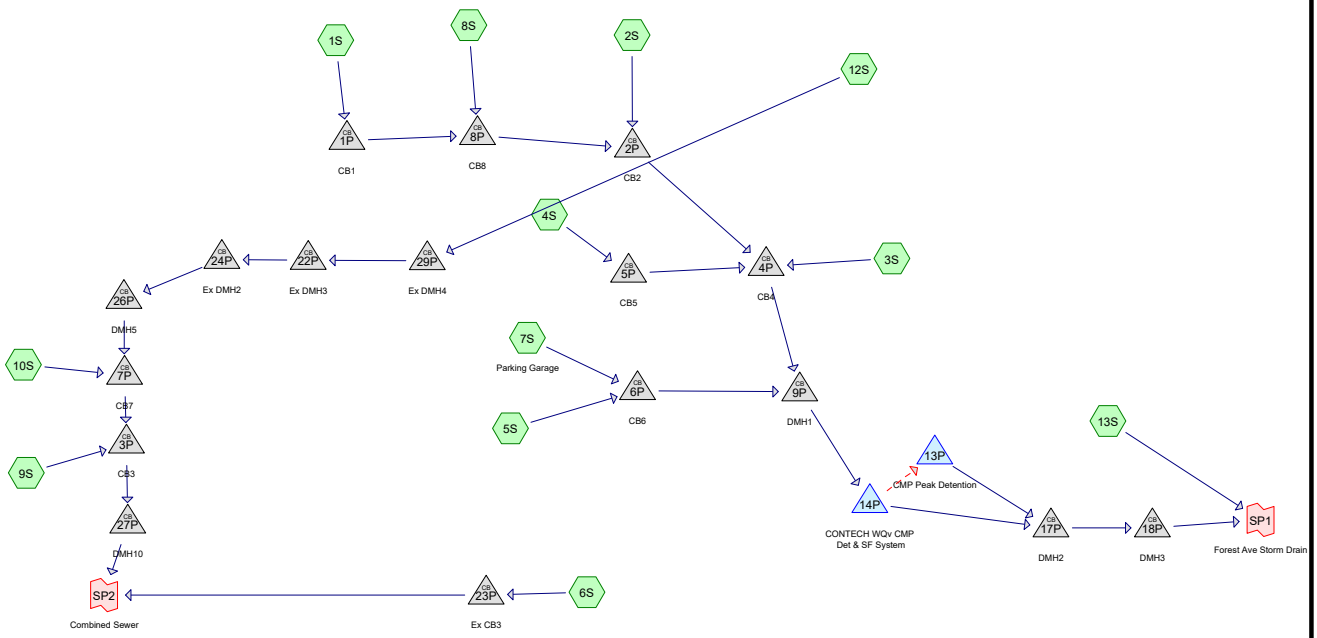
Summary for Link SP2: Combined Sewer

Inflow Area = 2.05 ac, 56.37% Impervious, Inflow Depth > 3.23" for 25-Year Storm event
Inflow = 7.6 cfs @ 12.09 hrs, Volume= 0.551 af
Primary = 7.6 cfs @ 12.09 hrs, Volume= 0.551 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Combined Sewer





Subcat Reach Pond Link

Routing Diagram for C2. Post
Prepared by Woodard Curran, Printed 7/28/2021
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.76	39	Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 8S, 9S, 10S, 12S, 13S)
1.95	98	Impervious (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 12S, 13S)
0.08	40	Porous Pavement (1S, 2S, 8S, 12S)
2.79	**80**	**TOTAL AREA**

Summary for Subcatchment 1S:

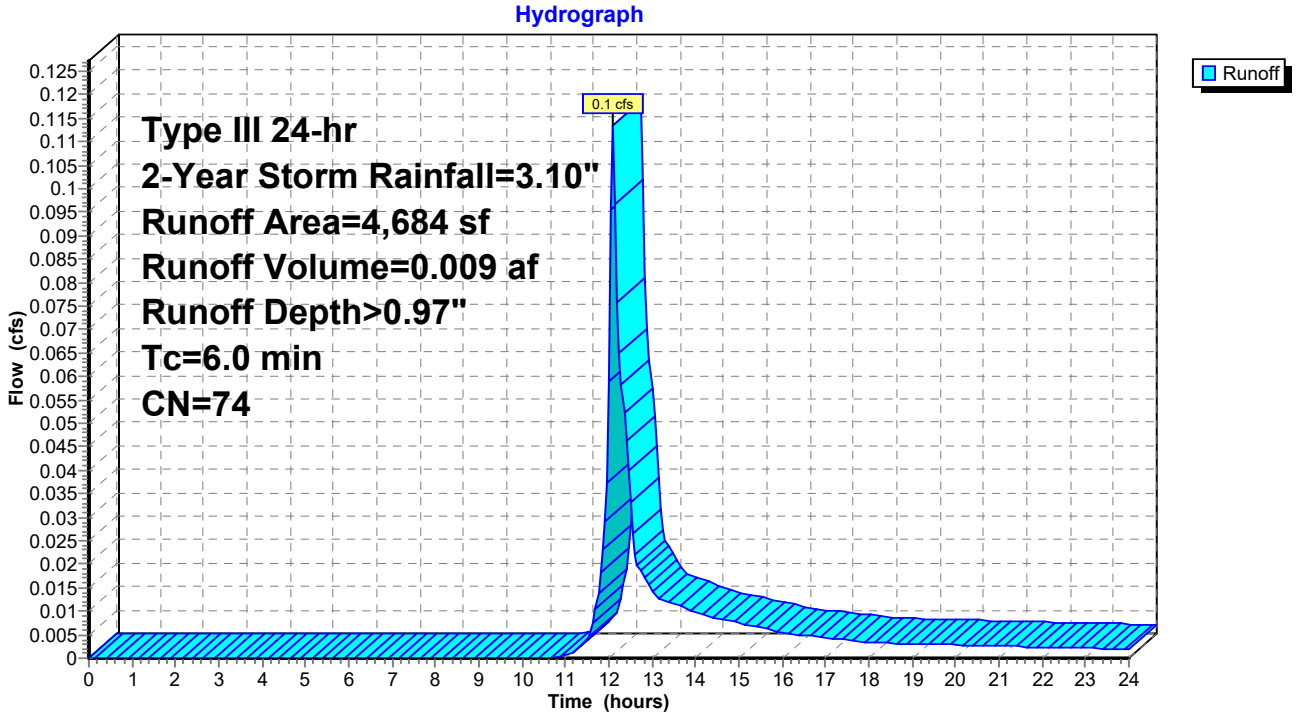
Runoff = 0.1 cfs @ 12.10 hrs, Volume= 0.009 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	2,770	98	Impervious
	1,237	39	Grass cover, Good, HSG A
*	677	40	Porous Pavement
	4,684	74	Weighted Average
	1,914		40.86% Pervious Area
	2,770		59.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S:



Summary for Subcatchment 2S:

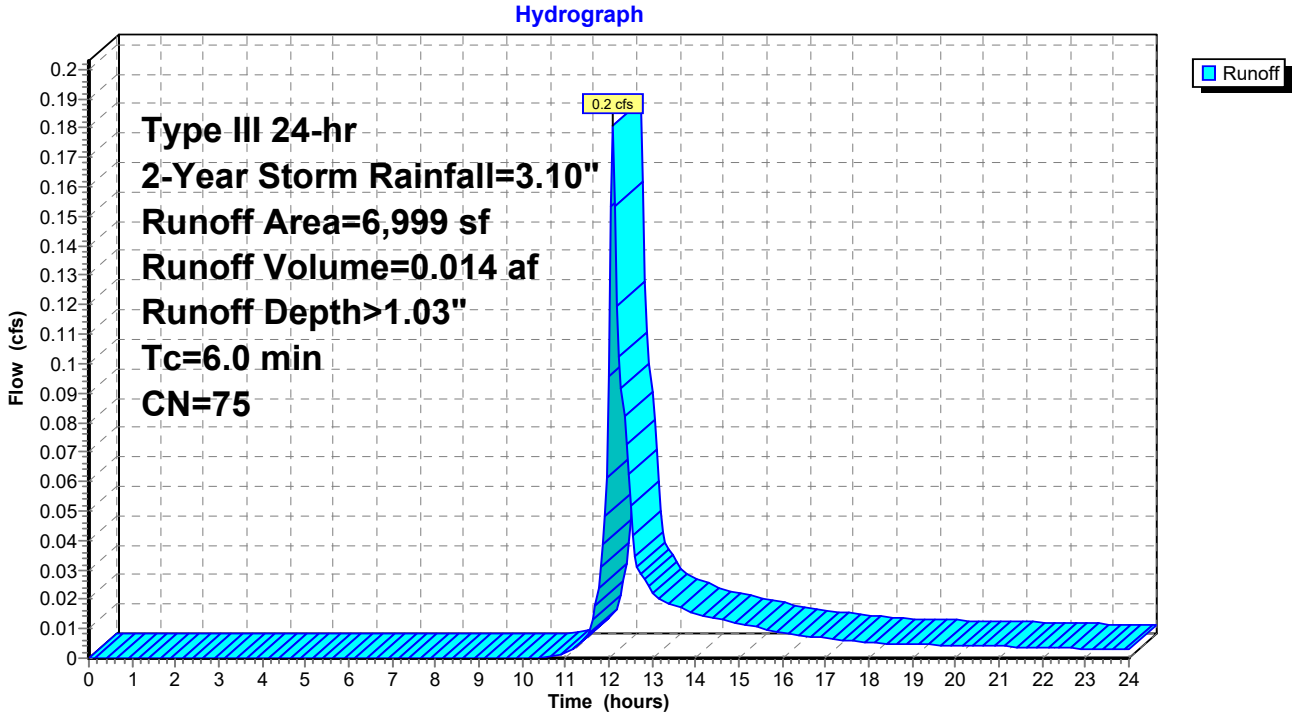
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.014 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	4,238	98	Impervious
	1,996	39	Grass cover, Good, HSG A
*	765	40	Porous Pavement
	6,999	75	Weighted Average
	2,761		39.45% Pervious Area
	4,238		60.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S:



Summary for Subcatchment 3S:

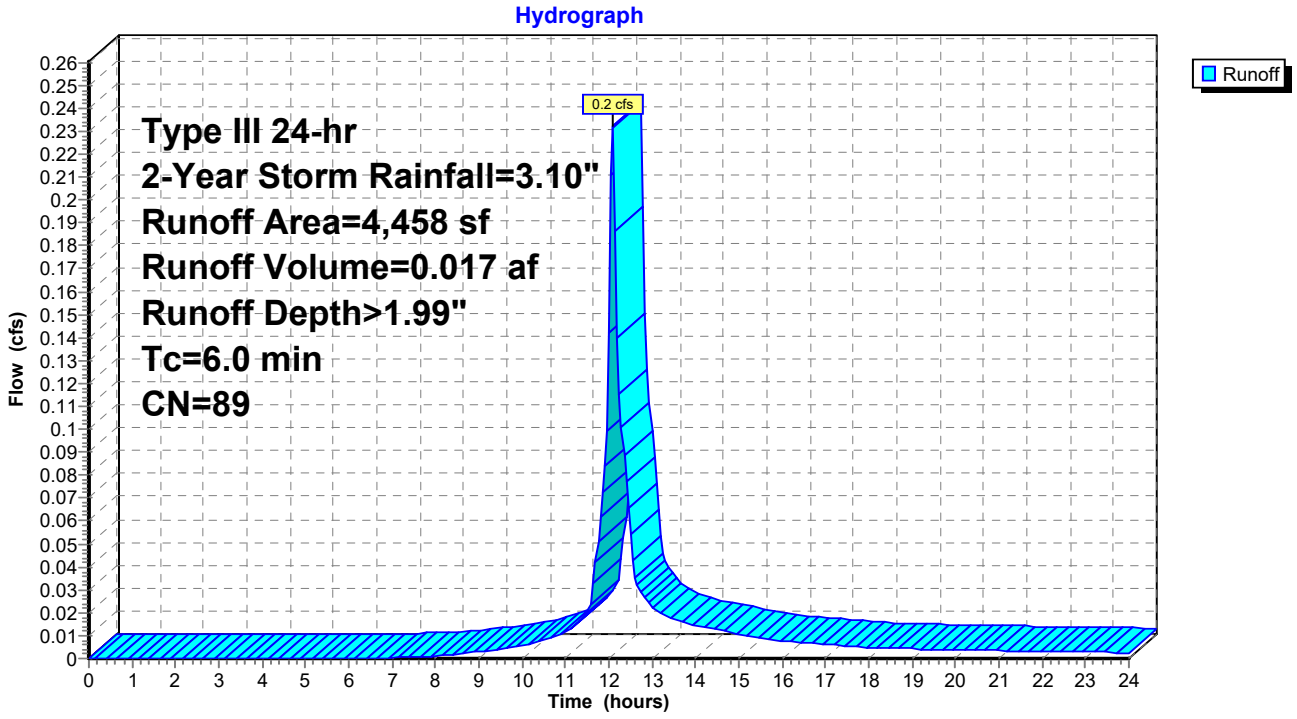
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	3,789	98	Impervious
	669	39	Grass cover, Good, HSG A
	4,458	89	Weighted Average
	669		15.01% Pervious Area
	3,789		84.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S:



Summary for Subcatchment 4S:

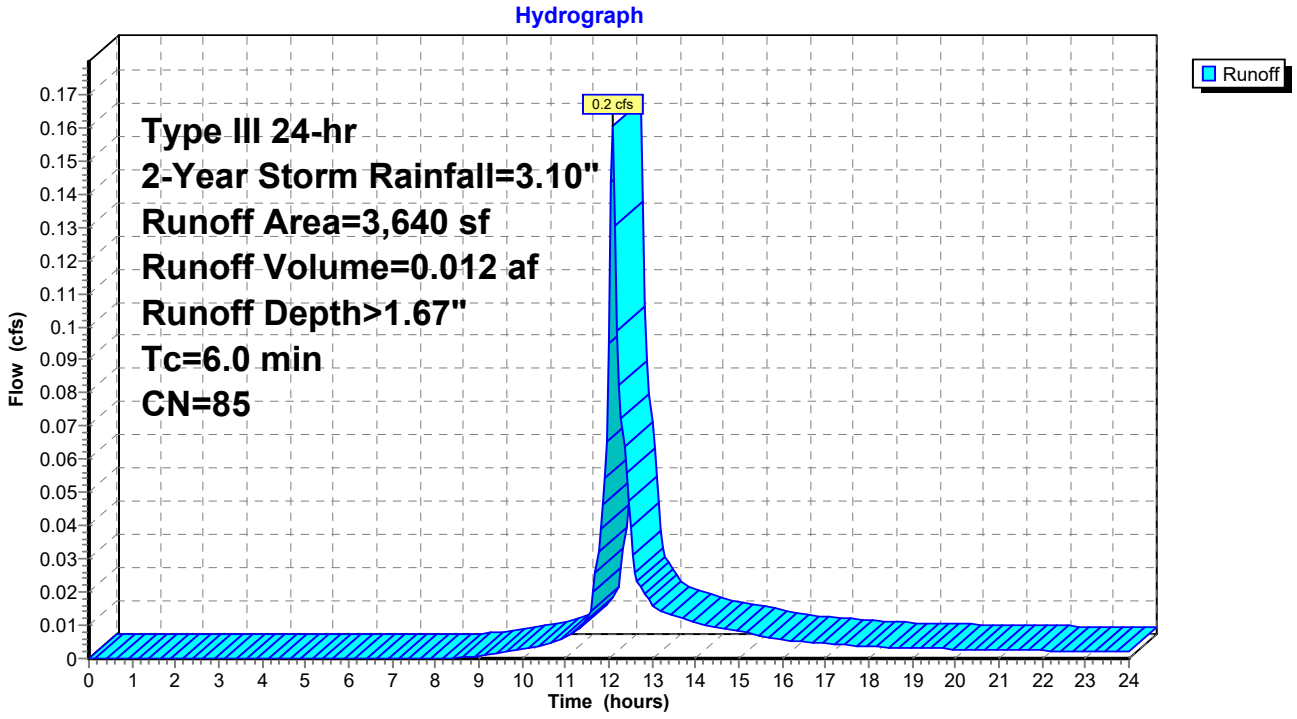
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	2,814	98	Impervious
	826	39	Grass cover, Good, HSG A
	3,640	85	Weighted Average
	826		22.69% Pervious Area
	2,814		77.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S:



Summary for Subcatchment 5S:

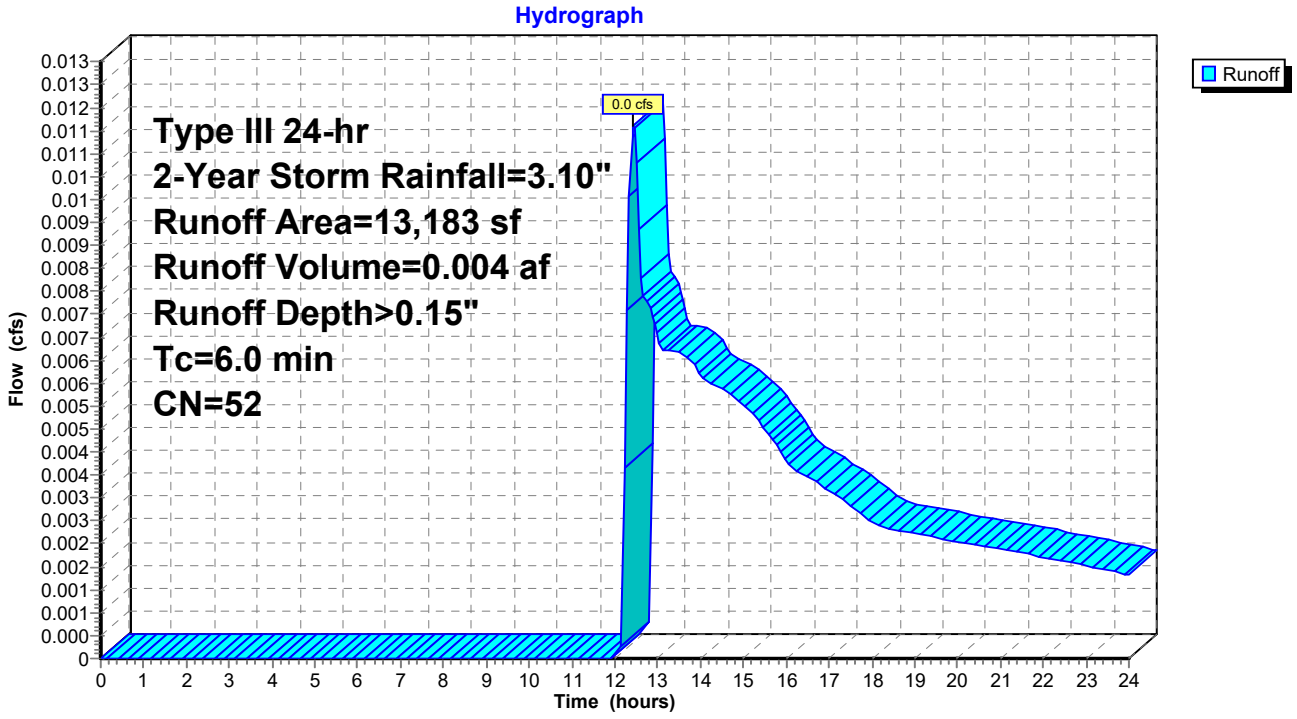
Runoff = 0.0 cfs @ 12.43 hrs, Volume= 0.004 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	2,965	98	Impervious
	10,218	39	Grass cover, Good, HSG A
	13,183	52	Weighted Average
	10,218		77.51% Pervious Area
	2,965		22.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S:



Summary for Subcatchment 6S:

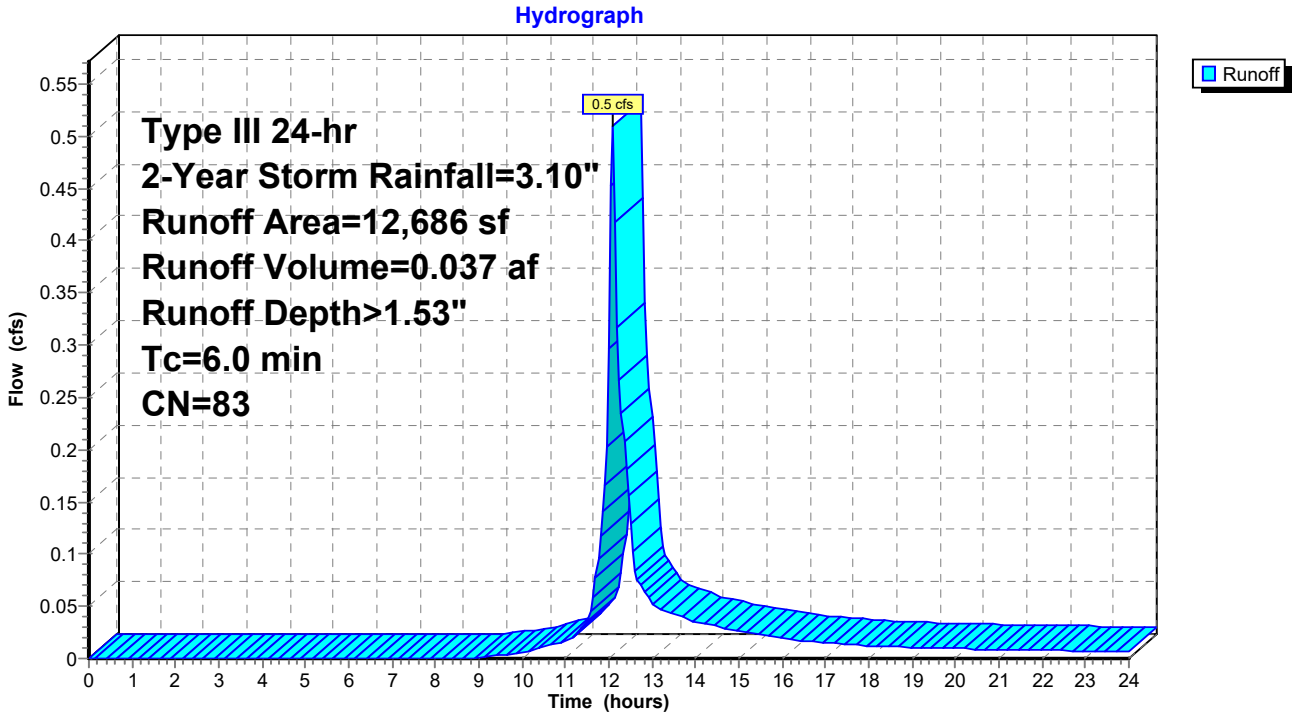
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.037 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	9,384	98	Impervious
	3,302	39	Grass cover, Good, HSG A
	12,686	83	Weighted Average
	3,302		26.03% Pervious Area
	9,384		73.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S:



Summary for Subcatchment 7S: Parking Garage

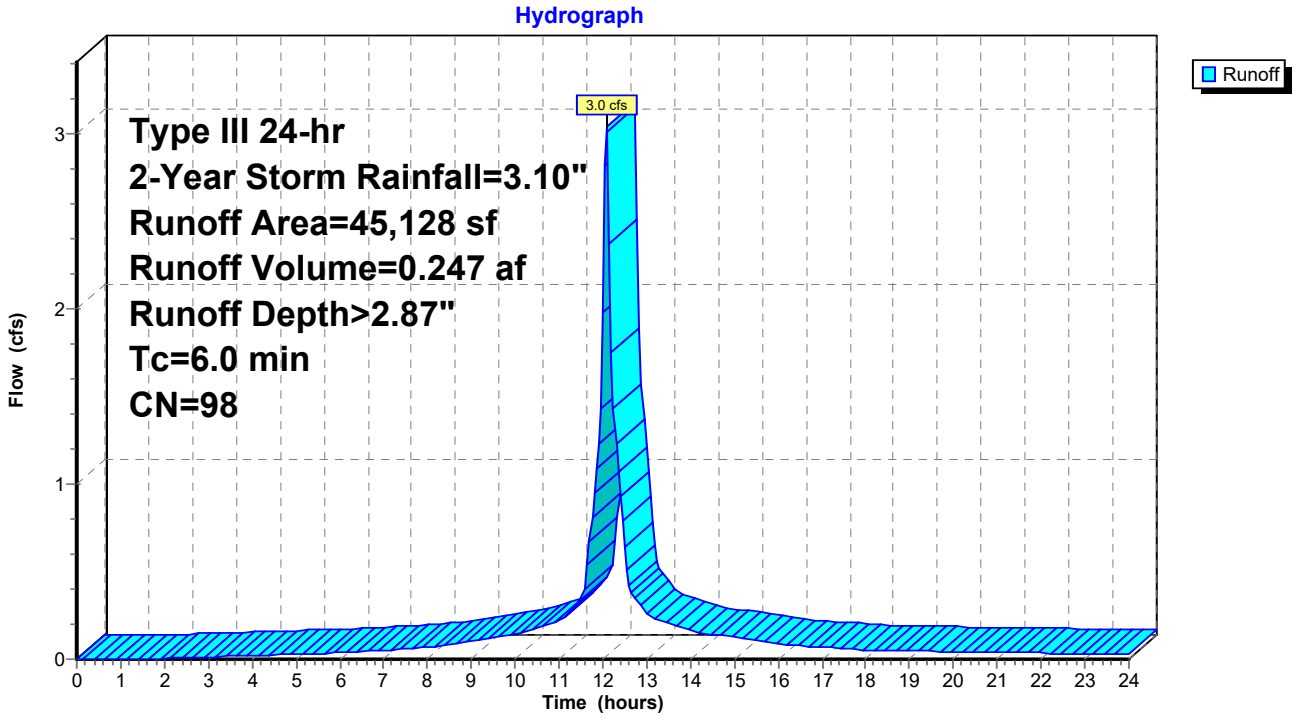
Runoff = 3.0 cfs @ 12.09 hrs, Volume= 0.247 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	45,128	98	Impervious
	45,128		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: Parking Garage



Summary for Subcatchment 8S:

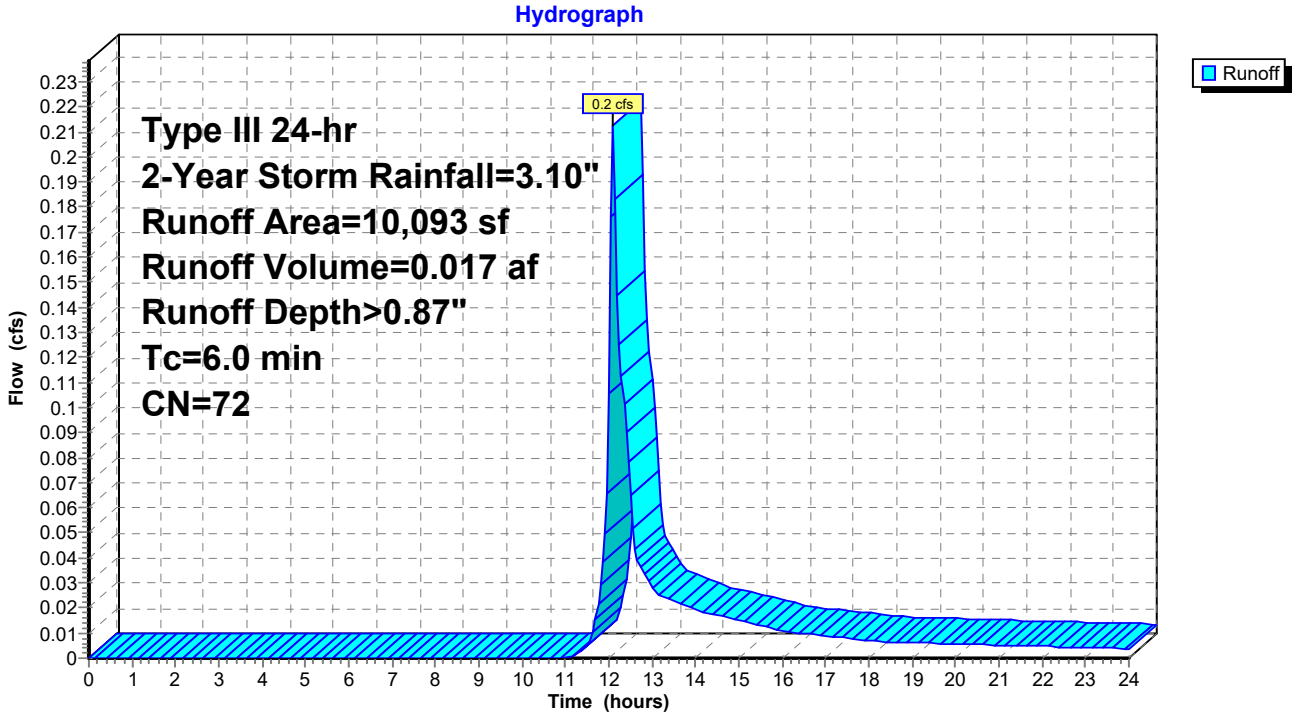
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.017 af, Depth> 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	5,667	98	Impervious
	3,193	39	Grass cover, Good, HSG A
*	1,233	40	Porous Pavement
	10,093	72	Weighted Average
	4,426		43.85% Pervious Area
	5,667		56.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S:



Summary for Subcatchment 9S:

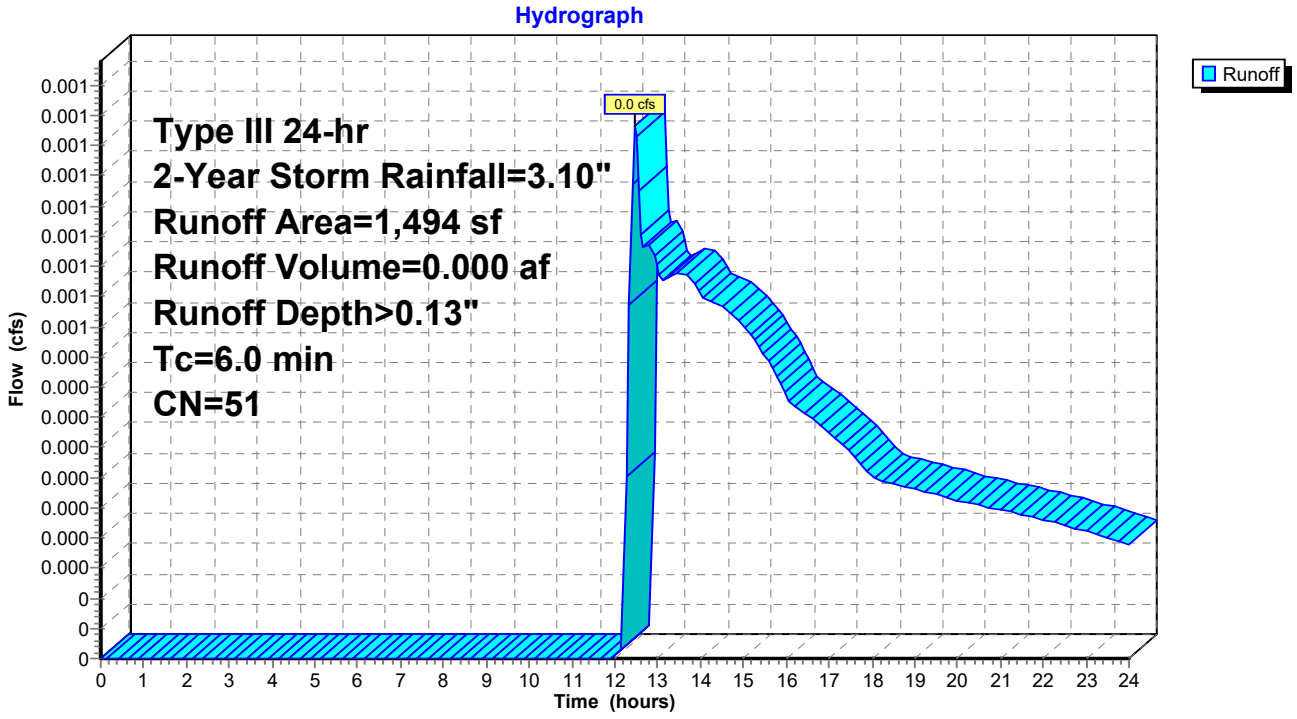
Runoff = 0.0 cfs @ 12.47 hrs, Volume= 0.000 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	302	98	Impervious
	1,192	39	Grass cover, Good, HSG A
	1,494	51	Weighted Average
	1,192		79.79% Pervious Area
	302		20.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S:



Summary for Subcatchment 10S:

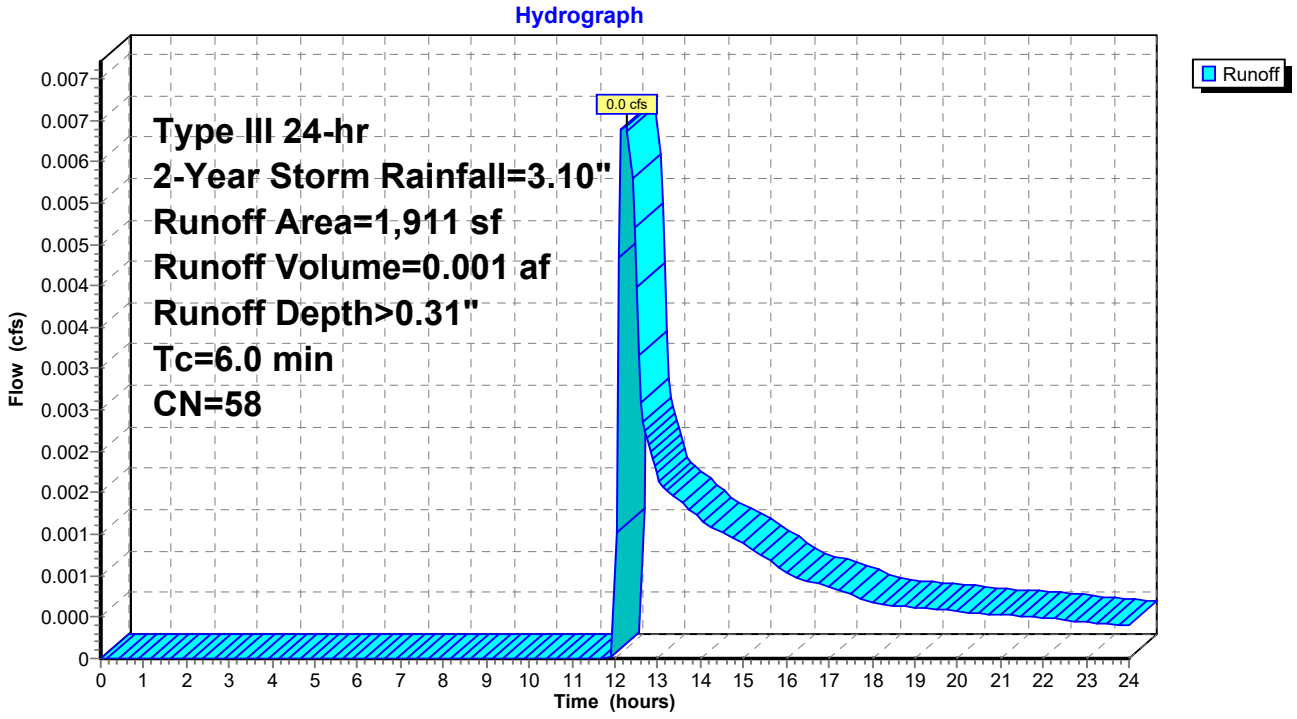
Runoff = 0.0 cfs @ 12.26 hrs, Volume= 0.001 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	617	98	Impervious
	1,294	39	Grass cover, Good, HSG A
	1,911	58	Weighted Average
	1,294		67.71% Pervious Area
	617		32.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S:



Summary for Subcatchment 12S:

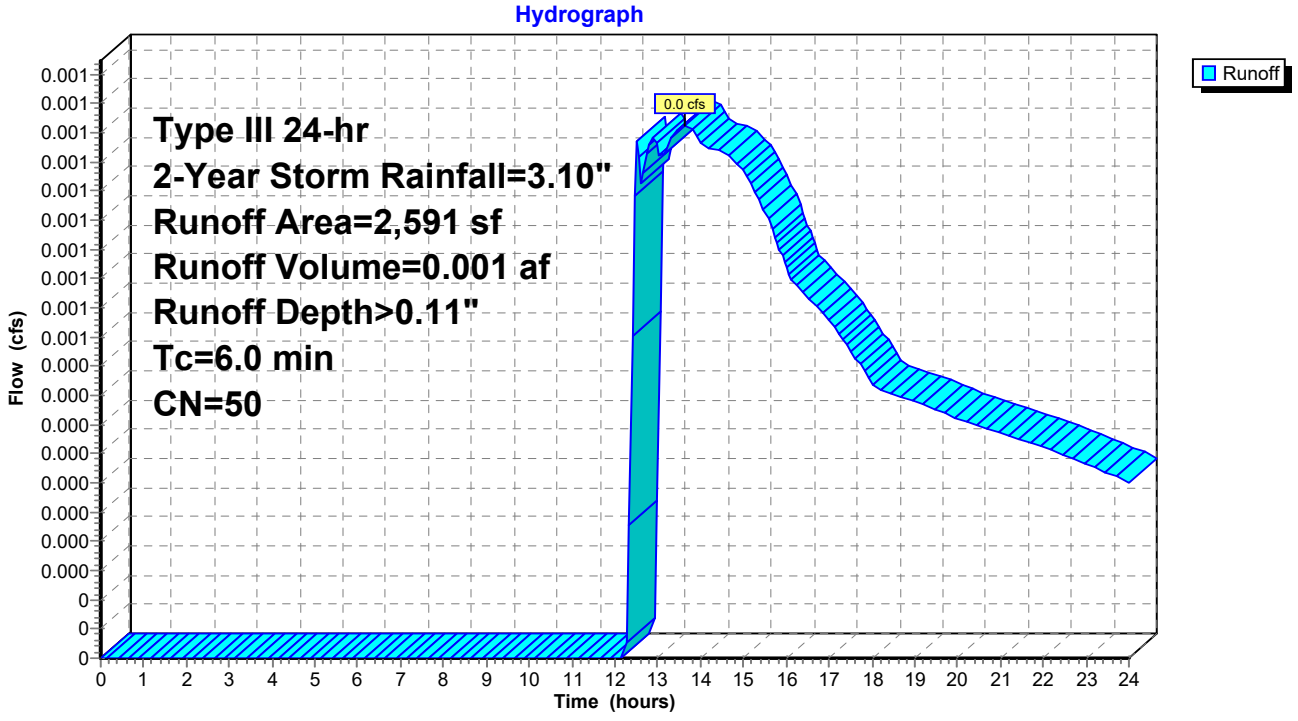
Runoff = 0.0 cfs @ 13.63 hrs, Volume= 0.001 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	466	98	Impervious
	1,499	39	Grass cover, Good, HSG A
*	626	40	Porous Pavement
	2,591	50	Weighted Average
	2,125		82.01% Pervious Area
	466		17.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S:



Summary for Subcatchment 13S:

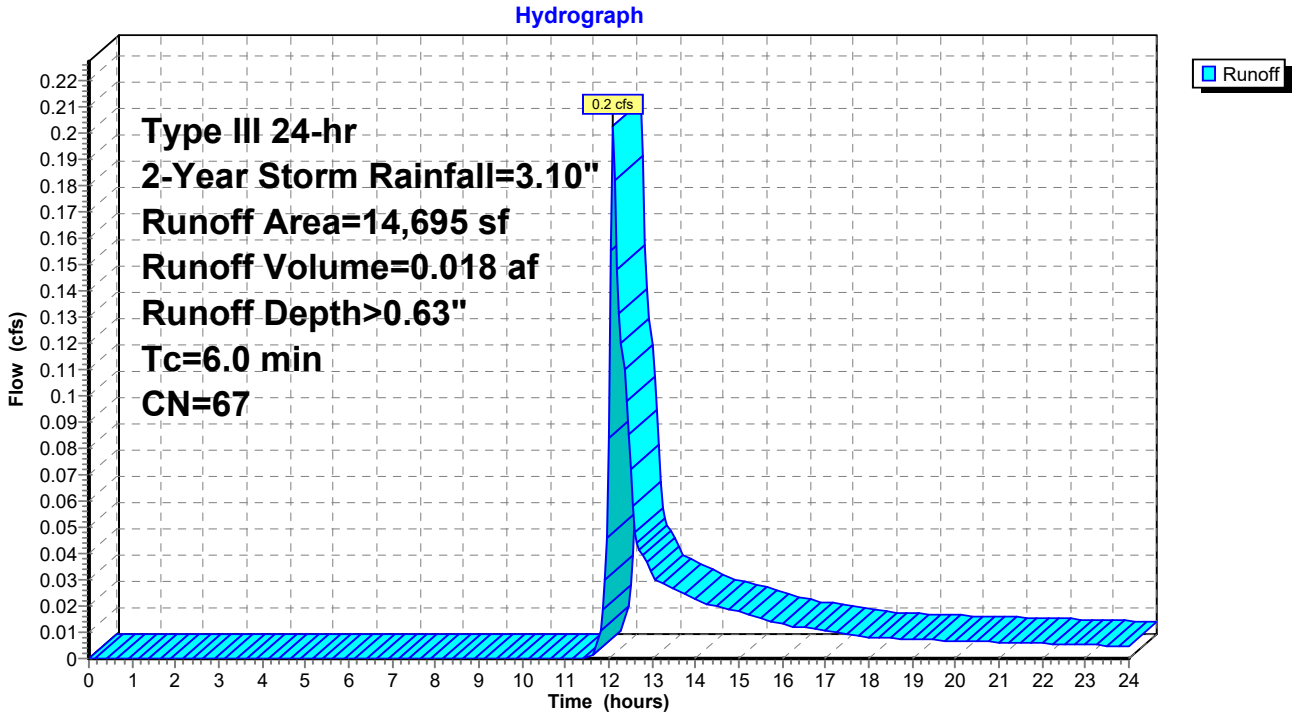
Runoff = 0.2 cfs @ 12.11 hrs, Volume= 0.018 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Storm Rainfall=3.10"

	Area (sf)	CN	Description
*	7,017	98	Impervious
	7,678	39	Grass cover, Good, HSG A
	14,695	67	Weighted Average
	7,678		52.25% Pervious Area
	7,017		47.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S:



Summary for Pond 1P: CB1

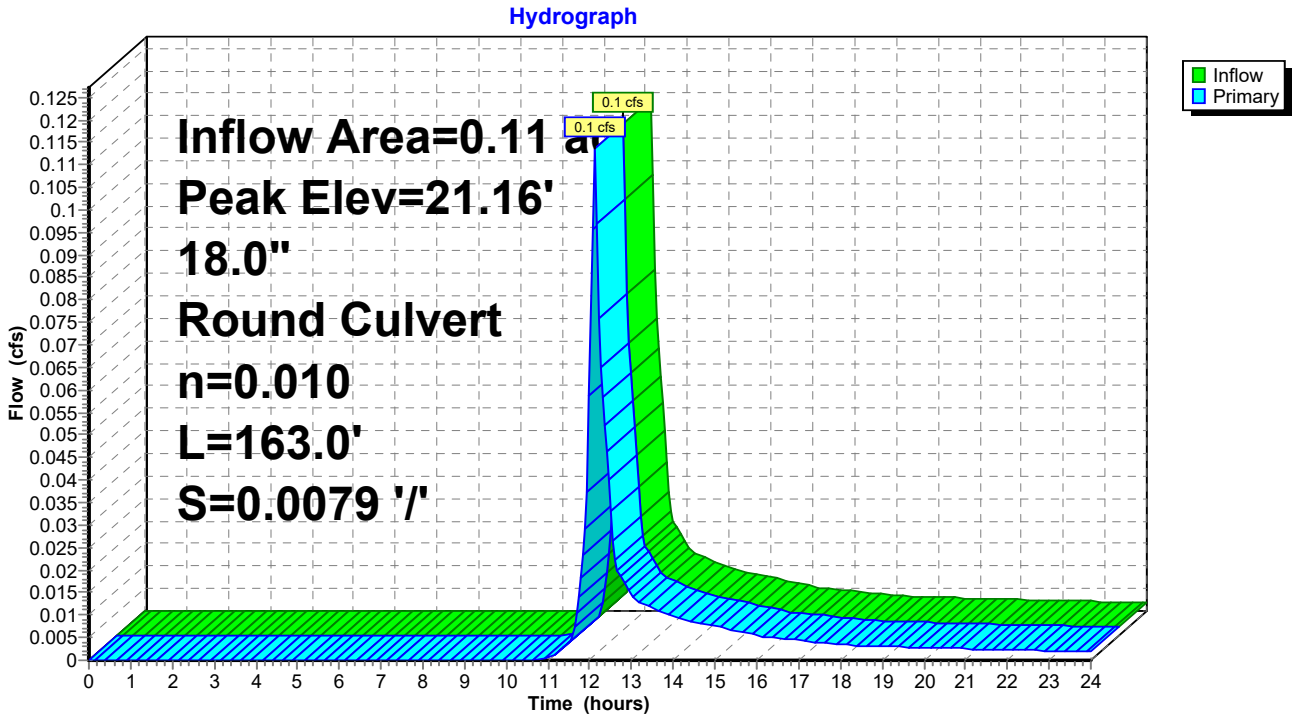
Inflow Area = 0.11 ac, 59.14% Impervious, Inflow Depth > 0.97" for 2-Year Storm event
Inflow = 0.1 cfs @ 12.10 hrs, Volume= 0.009 af
Outflow = 0.1 cfs @ 12.10 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.10 hrs, Volume= 0.009 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 21.16' @ 12.10 hrs
Flood Elev= 25.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**18.0" Round Culvert** L= 163.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 21.00' / 19.71' S= 0.0079 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.10 hrs HW=21.16' TW=19.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.1 cfs @ 1.09 fps)

Pond 1P: CB1



Summary for Pond 2P: CB2

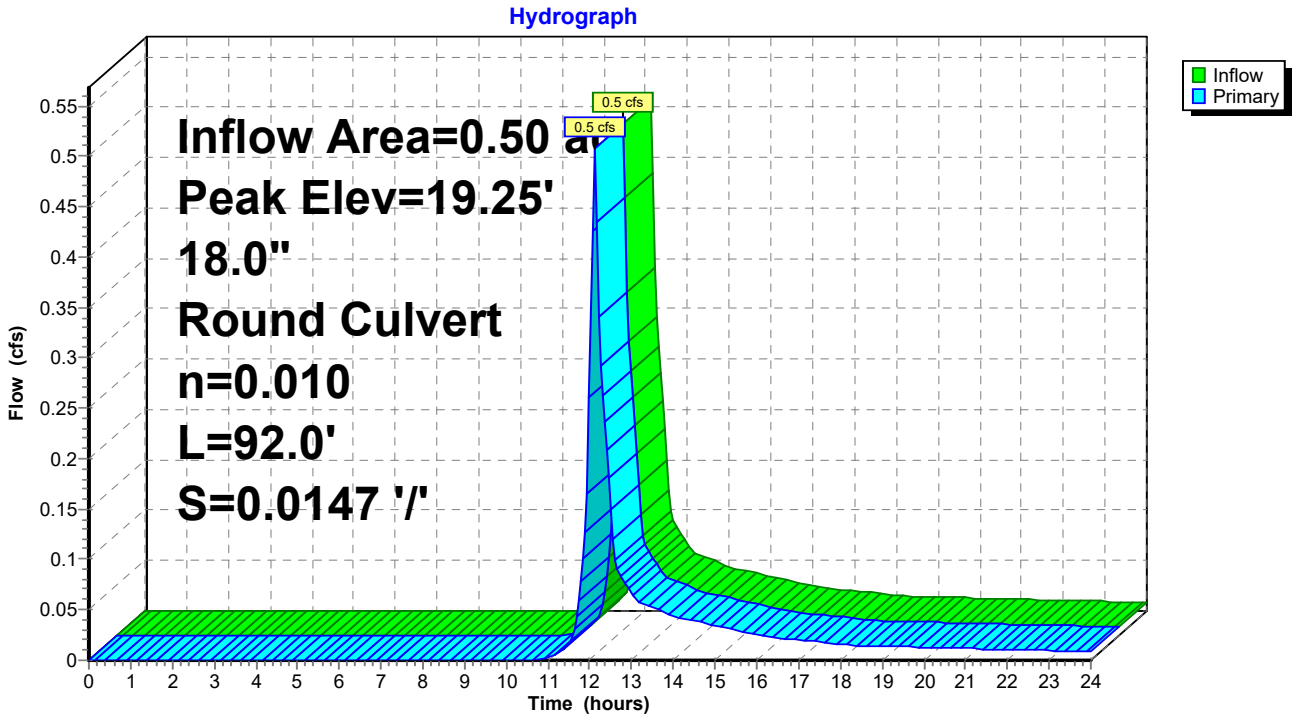
Inflow Area = 0.50 ac, 58.21% Impervious, Inflow Depth > 0.94" for 2-Year Storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.039 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.25' @ 12.10 hrs
Flood Elev= 22.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.90'	**18.0" Round Culvert** L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.90' / 17.55' S= 0.0147 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=19.25' TW=18.31' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.5 cfs @ 1.60 fps)

Pond 2P: CB2



Summary for Pond 3P: CB3

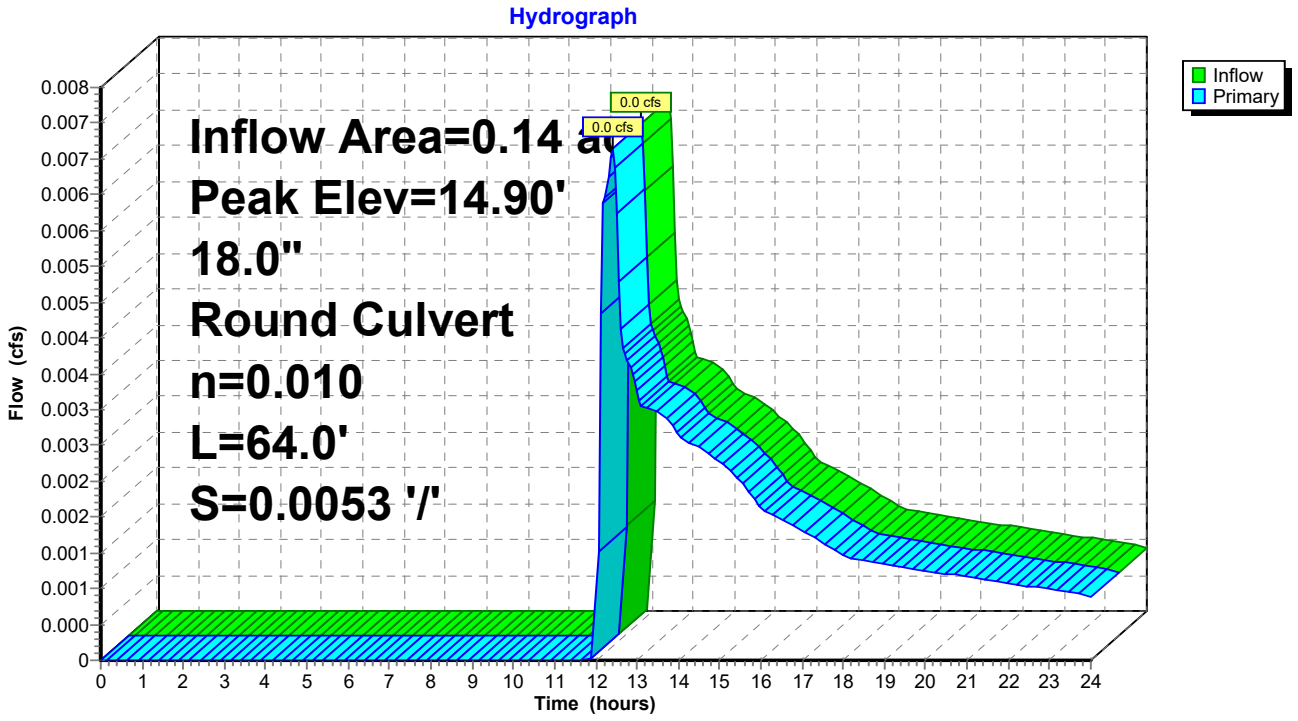
Inflow Area = 0.14 ac, 23.10% Impervious, Inflow Depth > 0.18" for 2-Year Storm event
Inflow = 0.0 cfs @ 12.39 hrs, Volume= 0.002 af
Outflow = 0.0 cfs @ 12.39 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.39 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.90' @ 12.39 hrs
Flood Elev= 23.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.86'	**18.0" Round Culvert** L= 64.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.86' / 14.52' S= 0.0053 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.39 hrs HW=14.90' TW=14.14' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.0 cfs @ 0.80 fps)

Pond 3P: CB3



Summary for Pond 4P: CB4

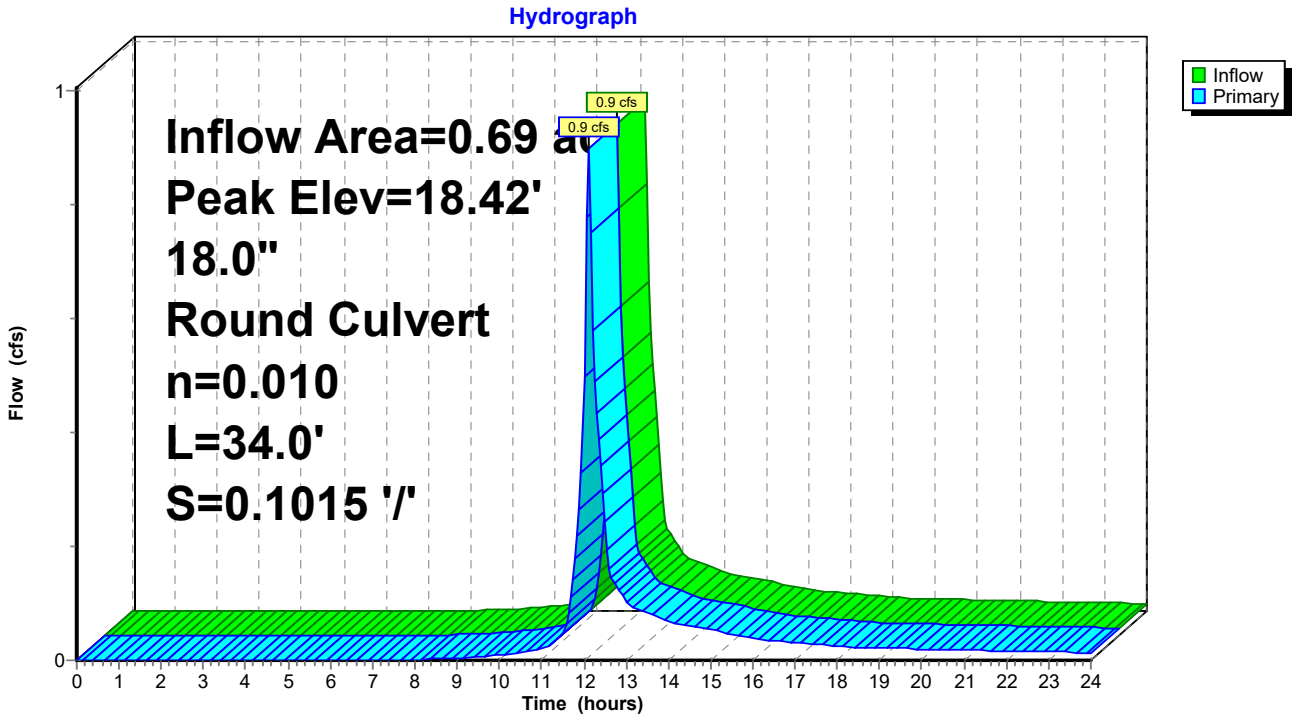
Inflow Area = 0.69 ac, 64.53% Impervious, Inflow Depth > 1.19" for 2-Year Storm event
Inflow = 0.9 cfs @ 12.10 hrs, Volume= 0.068 af
Outflow = 0.9 cfs @ 12.10 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.10 hrs, Volume= 0.068 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.42' @ 12.16 hrs
Flood Elev= 22.87'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.45'	**18.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.45' / 14.00' S= 0.1015 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.10 hrs HW=18.29' TW=18.38' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.0 cfs)

Pond 4P: CB4



Summary for Pond 5P: CB5

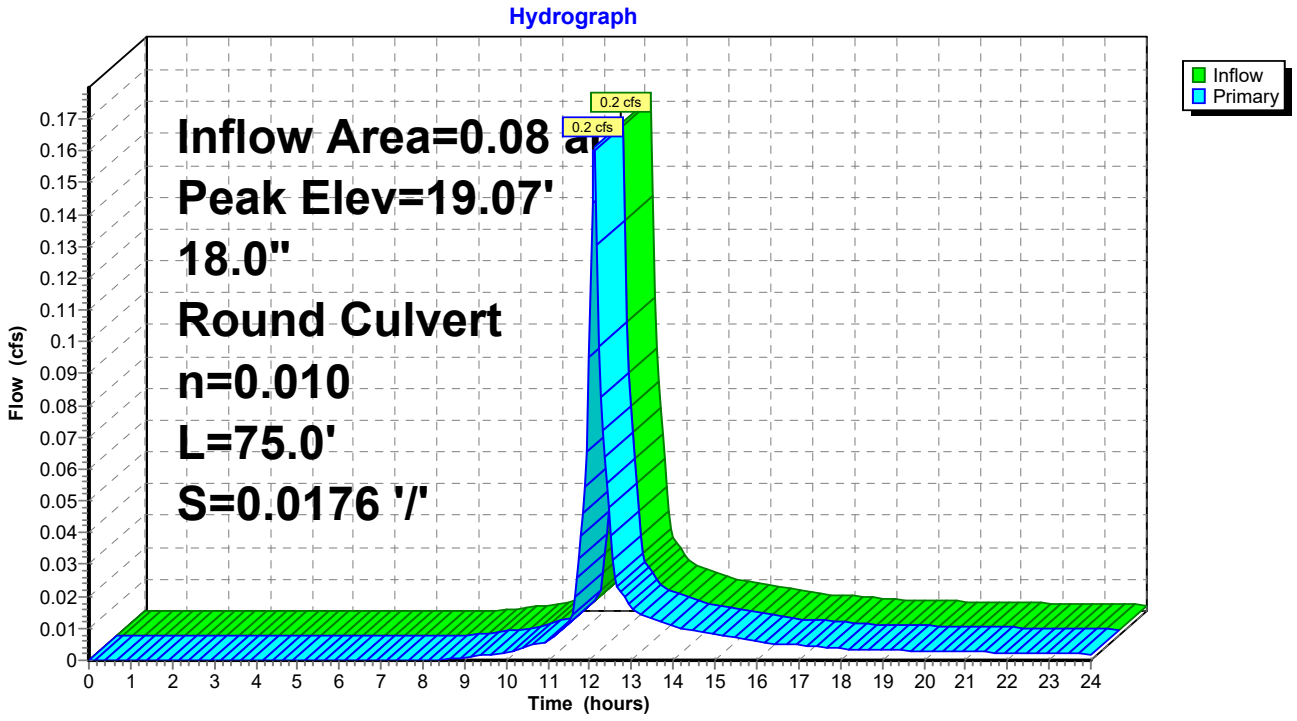
Inflow Area = 0.08 ac, 77.31% Impervious, Inflow Depth > 1.67" for 2-Year Storm event
Inflow = 0.2 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.2 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.09 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.07' @ 12.09 hrs
Flood Elev= 22.83'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.87'	**18.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.87' / 17.55' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.2 cfs @ 12.09 hrs HW=19.06' TW=18.27' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.2 cfs @ 1.18 fps)

Pond 5P: CB5



Summary for Pond 6P: CB6

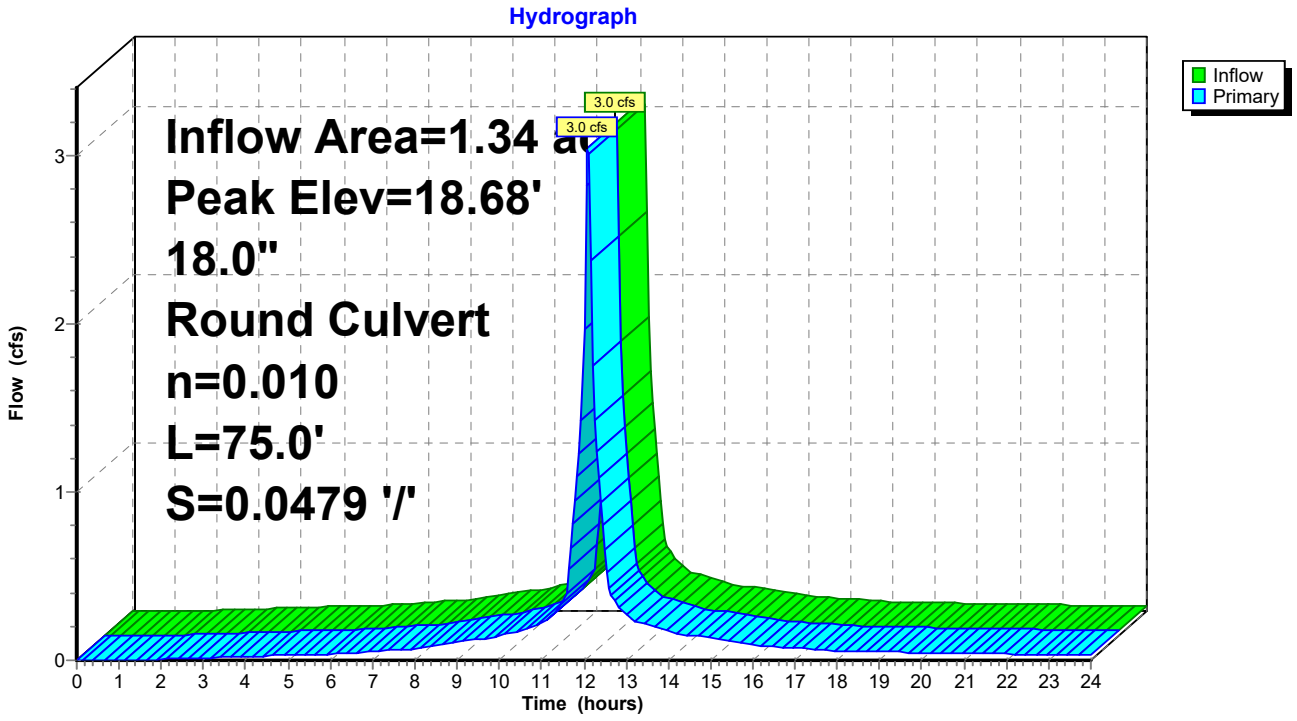
Inflow Area = 1.34 ac, 82.48% Impervious, Inflow Depth > 2.25" for 2-Year Storm event
Inflow = 3.0 cfs @ 12.09 hrs, Volume= 0.251 af
Outflow = 3.0 cfs @ 12.09 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min
Primary = 3.0 cfs @ 12.09 hrs, Volume= 0.251 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.68' @ 12.12 hrs
Flood Elev= 22.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.59'	**18.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.59' / 14.00' S= 0.0479 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.3 cfs @ 12.09 hrs HW=18.61' TW=18.35' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.3 cfs @ 2.49 fps)

Pond 6P: CB6



Summary for Pond 7P: CB7

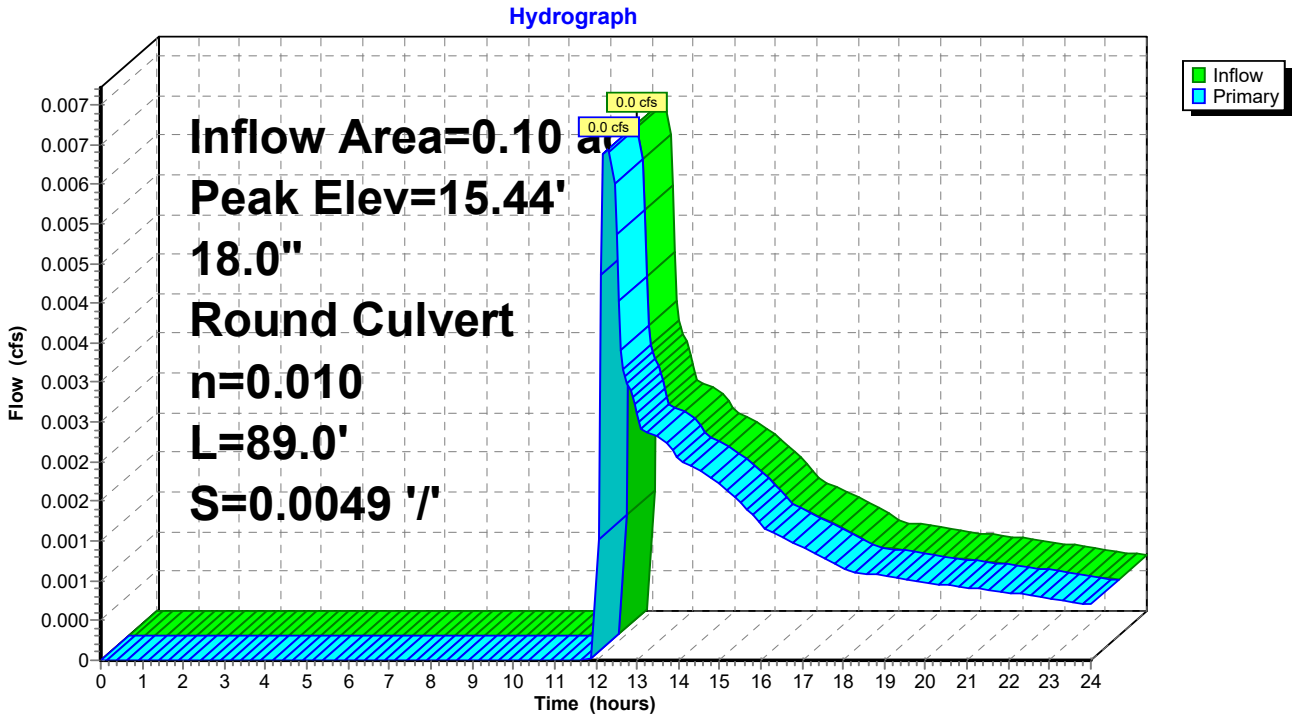
Inflow Area = 0.10 ac, 24.06% Impervious, Inflow Depth > 0.19" for 2-Year Storm event
Inflow = 0.0 cfs @ 12.30 hrs, Volume= 0.002 af
Outflow = 0.0 cfs @ 12.30 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.30 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.44' @ 12.30 hrs
Flood Elev= 24.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.40'	**18.0" Round Culvert** L= 89.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.40' / 14.96' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.30 hrs HW=15.44' TW=14.90' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.0 cfs @ 0.76 fps)

Pond 7P: CB7



Summary for Pond 8P: CB8

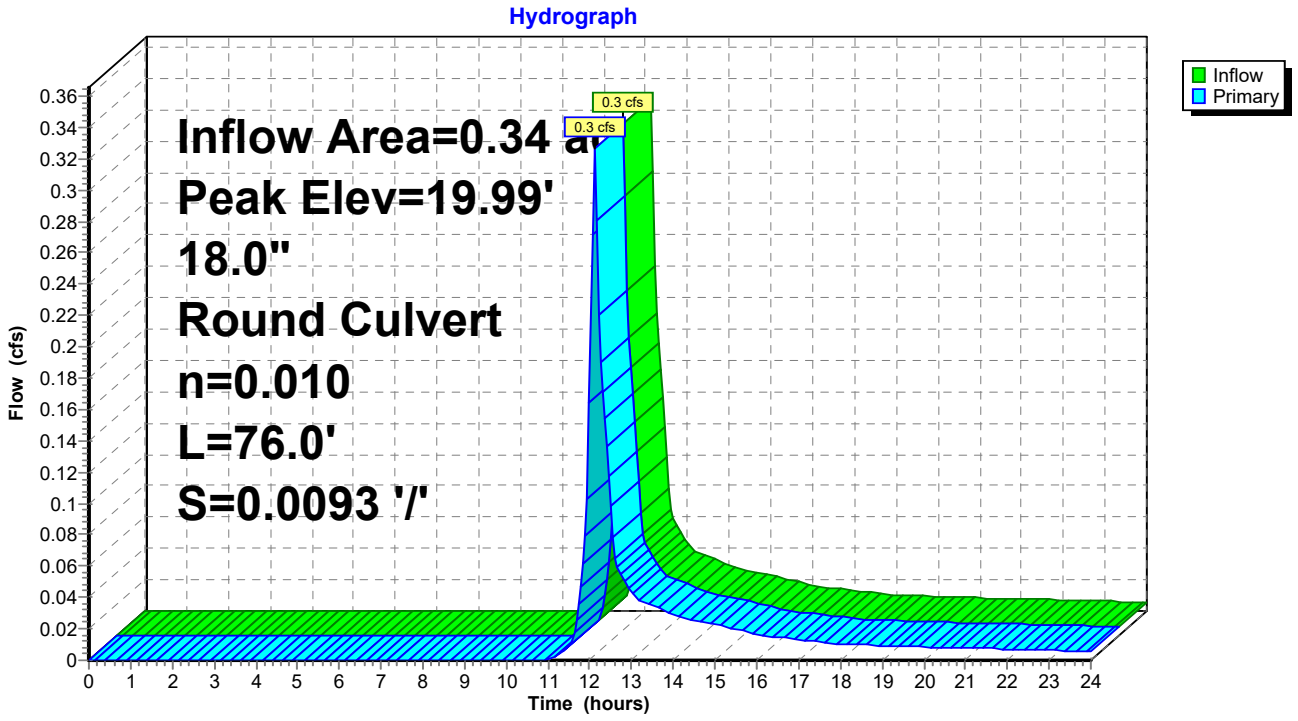
Inflow Area = 0.34 ac, 57.10% Impervious, Inflow Depth > 0.90" for 2-Year Storm event
Inflow = 0.3 cfs @ 12.10 hrs, Volume= 0.025 af
Outflow = 0.3 cfs @ 12.10 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.10 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.99' @ 12.10 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.71'	**18.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.71' / 19.00' S= 0.0093 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.3 cfs @ 12.10 hrs HW=19.99' TW=19.25' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.3 cfs @ 1.42 fps)

Pond 8P: CB8



Summary for Pond 9P: DMH1

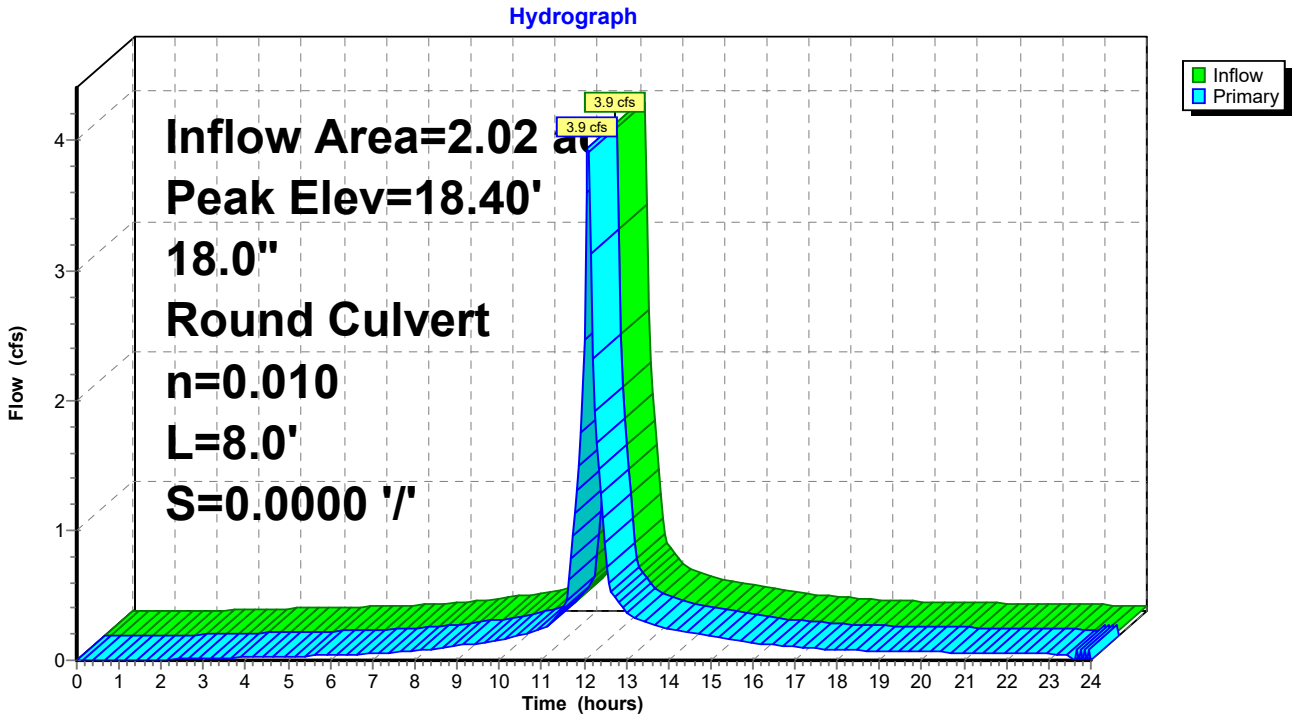
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 1.89" for 2-Year Storm event
Inflow = 3.9 cfs @ 12.09 hrs, Volume= 0.319 af
Outflow = 3.9 cfs @ 12.09 hrs, Volume= 0.319 af, Atten= 0%, Lag= 0.0 min
Primary = 3.9 cfs @ 12.09 hrs, Volume= 0.319 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.40' @ 12.11 hrs
Flood Elev= 22.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.58'	**18.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 13.58' / 13.58' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.4 cfs @ 12.09 hrs HW=18.36' TW=18.10' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.4 cfs @ 1.94 fps)

Pond 9P: DMH1



Summary for Pond 13P: CMP Peak Detention

Inflow	=	3.9 cfs @	12.10 hrs, Volume=	0.178 af
Outflow	=	1.5 cfs @	12.34 hrs, Volume=	0.178 af, Atten= 60%, Lag= 14.2 min
Primary	=	1.5 cfs @	12.34 hrs, Volume=	0.178 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.33' @ 12.34 hrs Surf.Area= 1,224 sf Storage= 1,904 cf
Flood Elev= 20.87' Surf.Area= 1,224 sf Storage= 4,269 cf

Plug-Flow detention time= 12.7 min calculated for 0.178 af (100% of inflow)
Center-of-Mass det. time= 12.7 min (809.1 - 796.4)

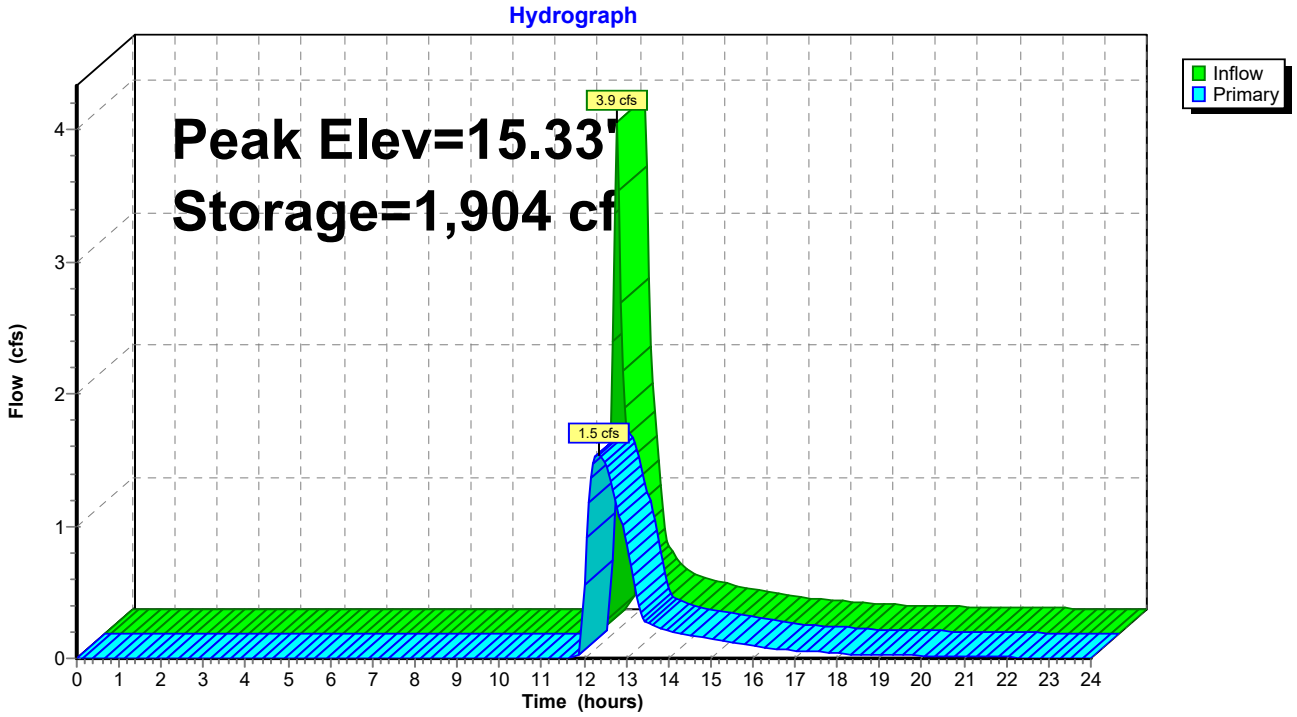
Volume	Invert	Avail.Storage	Storage Description
#1A	12.58'	0 cf	**8.00'W x 153.00'L x 6.00'H Field A** 7,344 cf Overall - 4,268 cf Embedded = 3,076 cf x 0.0% Voids
#2A	12.58'	4,268 cf	**CMP Round 72** x 7 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.26 sf x 20.00'L = 565.2 cf Overall Size= 72.0"W x 72.0"H x 20.00'L Row Length Adjustment= +11.00' x 28.26 sf x 1 rows
		4,268 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	12.58'	**18.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.58' / 12.20' S= 0.0190 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	12.58'	**6.1" Vert. Orifice/Grate** C= 0.600
#3	Device 1	15.58'	**5.7" Vert. Orifice/Grate** C= 0.600
#4	Device 1	16.66'	**4.8" Vert. Orifice/Grate** C= 0.600
#5	Device 1	17.92'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 3.21 3.27 3.33 3.39 3.45 3.51 3.57 3.63 3.69 3.75 3.81 3.87 Width (feet) 3.75 3.60 3.43 3.26 3.06 2.85 2.62 2.35 2.05 1.68 1.19 0.00

Primary OutFlow Max=1.5 cfs @ 12.34 hrs HW=15.32' TW=12.66' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.5 cfs of 12.0 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 1.5 cfs @ 7.59 fps)
  - **3=Orifice/Grate** (Controls 0.0 cfs)
  - **4=Orifice/Grate** (Controls 0.0 cfs)
  - **5=Custom Weir/Orifice** (Controls 0.0 cfs)

Pond 13P: CMP Peak Detention



Summary for Pond 14P: CONTECH WQv CMP Det & SF System

Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 1.89" for 2-Year Storm event
Inflow = 3.9 cfs @ 12.09 hrs, Volume= 0.319 af
Outflow = 3.9 cfs @ 12.10 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.9 min
Primary = 0.0 cfs @ 12.10 hrs, Volume= 0.061 af
Secondary = 3.9 cfs @ 12.10 hrs, Volume= 0.178 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 13.58' Surf.Area= 1,313 sf Storage= 186 cf
Peak Elev= 18.11' @ 12.10 hrs Surf.Area= 1,313 sf Storage= 3,942 cf (3,756 cf above start)
Flood Elev= 20.87' Surf.Area= 1,313 sf Storage= 4,110 cf (3,924 cf above start)

Plug-Flow detention time= 157.5 min calculated for 0.235 af (74% of inflow)
Center-of-Mass det. time= 55.9 min (833.8 - 777.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	13.08'	0 cf	**7.50'W x 175.00'L x 5.50'H Field A** 7,219 cf Overall - 4,108 cf Embedded = 3,110 cf x 0.0% Voids
#2A	13.08'	4,108 cf	**CMP Round 66** x 8 Inside #1 Effective Size= 66.0"W x 66.0"H => 23.75 sf x 20.00'L = 475.0 cf Overall Size= 66.0"W x 66.0"H x 20.00'L Row Length Adjustment= +13.00' x 23.75 sf x 1 rows
		4,108 cf	Total Available Storage

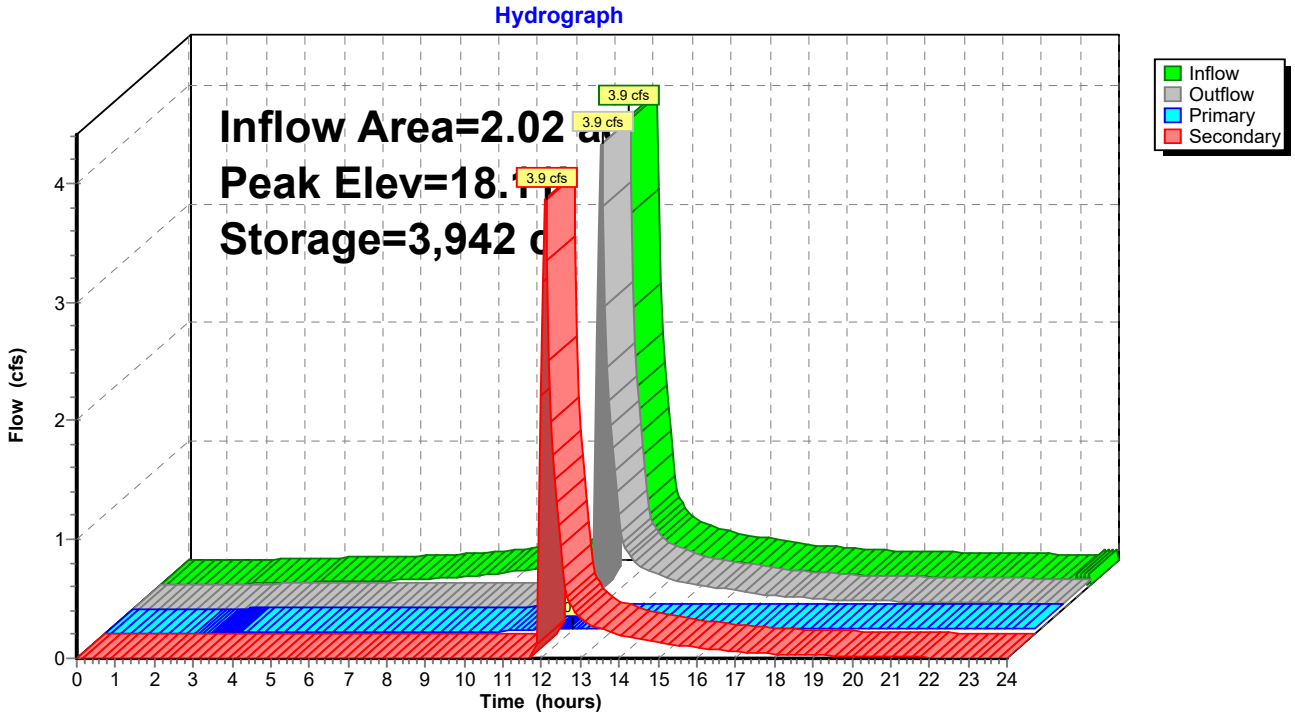
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	13.58'	**12.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.58' / 13.56' S= 0.0067 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	12.58'	**Tube/Siphon/Float Valve X 7.00** Starts@15.33' Breaks@13.25' 0.336" Diameter, C= 0.600, 0.263" Trickle Diameter
#3	Secondary	17.65'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 2.44 2.49 2.54 2.60 2.66 2.71 2.76 2.82 2.87 2.93 2.99 3.04 3.09 3.15 3.20 3.26 3.32 3.37 Width (feet) 4.13 4.03 3.93 3.82 3.70 3.57 3.44 3.30 3.15 2.98 2.81 2.61 2.40 2.16 1.88 1.54 1.09 0.00

Primary OutFlow Max=0.0 cfs @ 12.10 hrs HW=18.11' TW=12.59' (Dynamic Tailwater)
└─**2=Tube/Siphon/Float Valve** (Orifice Controls 0.0 cfs @ 11.32 fps)
└─**1=Culvert** (Passes 0.0 cfs of 7.6 cfs potential flow)

Secondary OutFlow Max=3.8 cfs @ 12.10 hrs HW=18.11' TW=14.33' (Dynamic Tailwater)
└─**3=Custom Weir/Orifice** (Weir Controls 3.8 cfs @ 2.29 fps)

Pond 14P: CONTECH WQv CMP Det & SF System



Summary for Pond 17P: DMH2

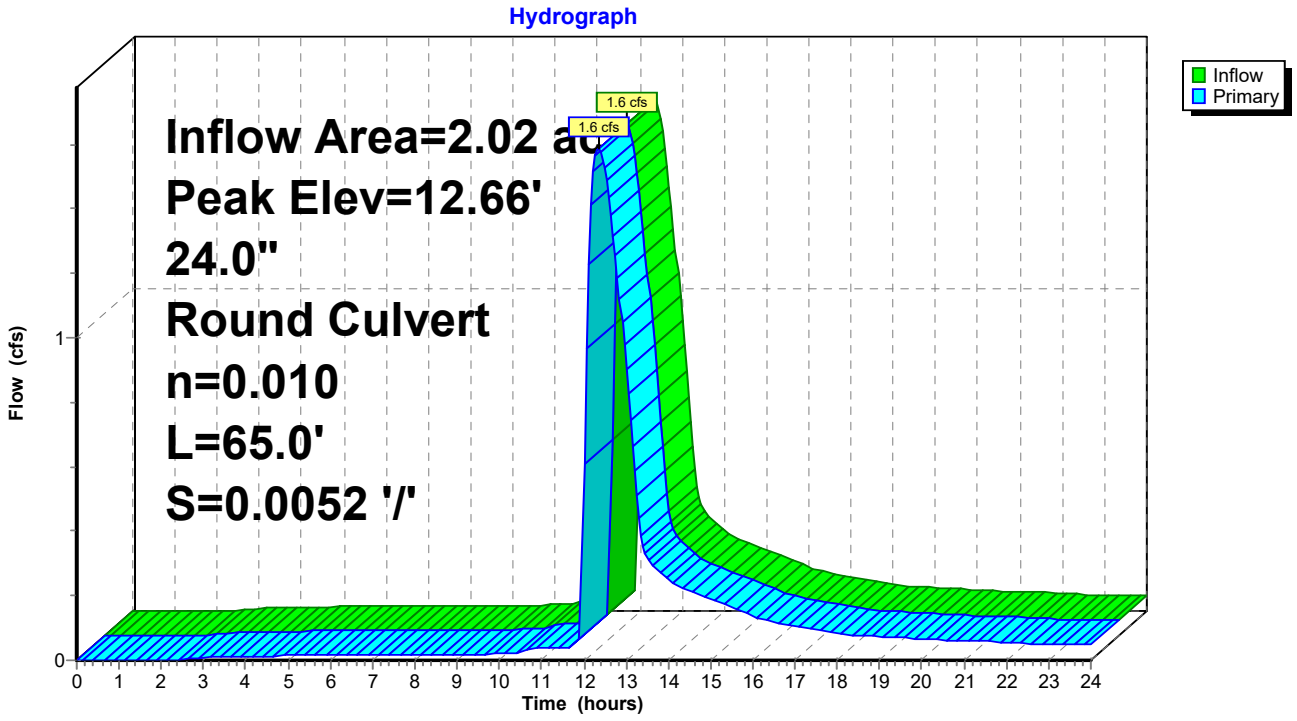
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 1.42" for 2-Year Storm event
Inflow = 1.6 cfs @ 12.34 hrs, Volume= 0.240 af
Outflow = 1.6 cfs @ 12.34 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.0 min
Primary = 1.6 cfs @ 12.34 hrs, Volume= 0.240 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 12.66' @ 12.35 hrs
Flood Elev= 21.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.07'	**24.0" Round Culvert** L= 65.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 12.07' / 11.73' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.6 cfs @ 12.34 hrs HW=12.66' TW=12.22' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.6 cfs @ 3.07 fps)

Pond 17P: DMH2



Summary for Pond 18P: DMH3

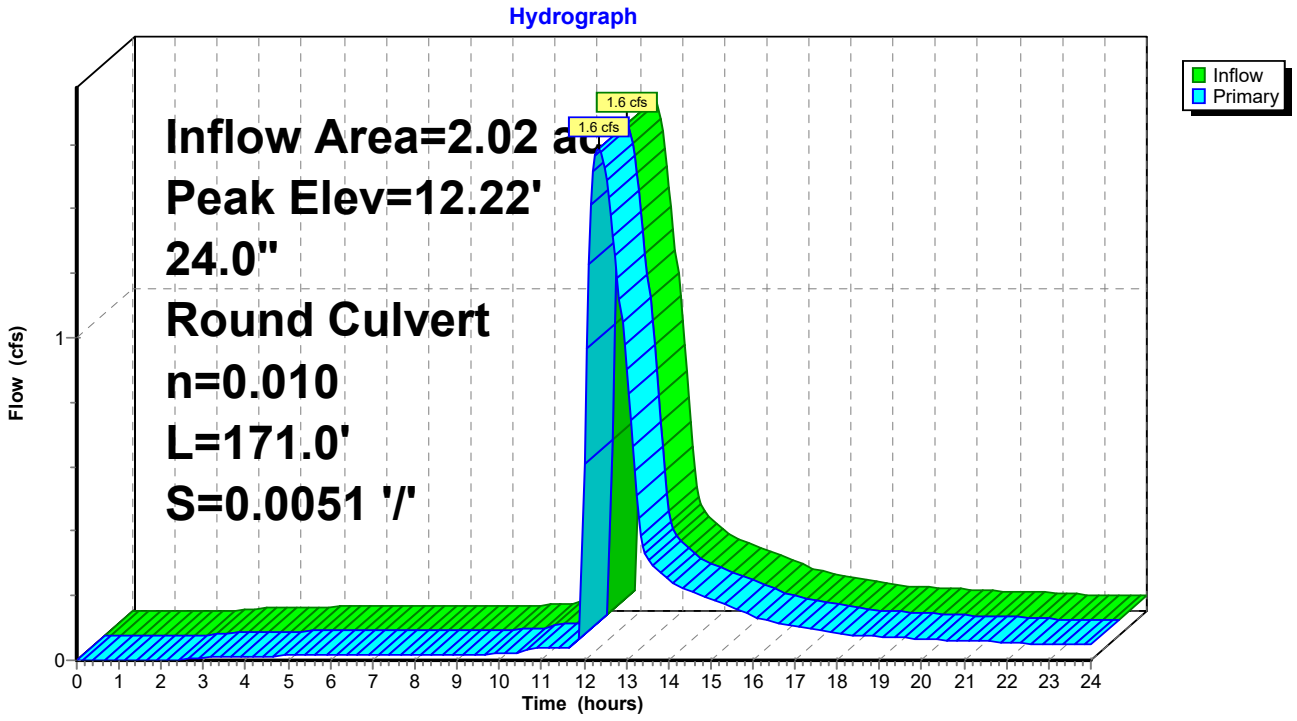
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 1.42" for 2-Year Storm event
Inflow = 1.6 cfs @ 12.34 hrs, Volume= 0.240 af
Outflow = 1.6 cfs @ 12.34 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.0 min
Primary = 1.6 cfs @ 12.34 hrs, Volume= 0.240 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 12.22' @ 12.34 hrs
Flood Elev= 20.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	**24.0" Round Culvert** L= 171.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 11.63' / 10.75' S= 0.0051 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.6 cfs @ 12.34 hrs HW=12.22' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.6 cfs @ 2.06 fps)

Pond 18P: DMH3



Summary for Pond 22P: Ex DMH3

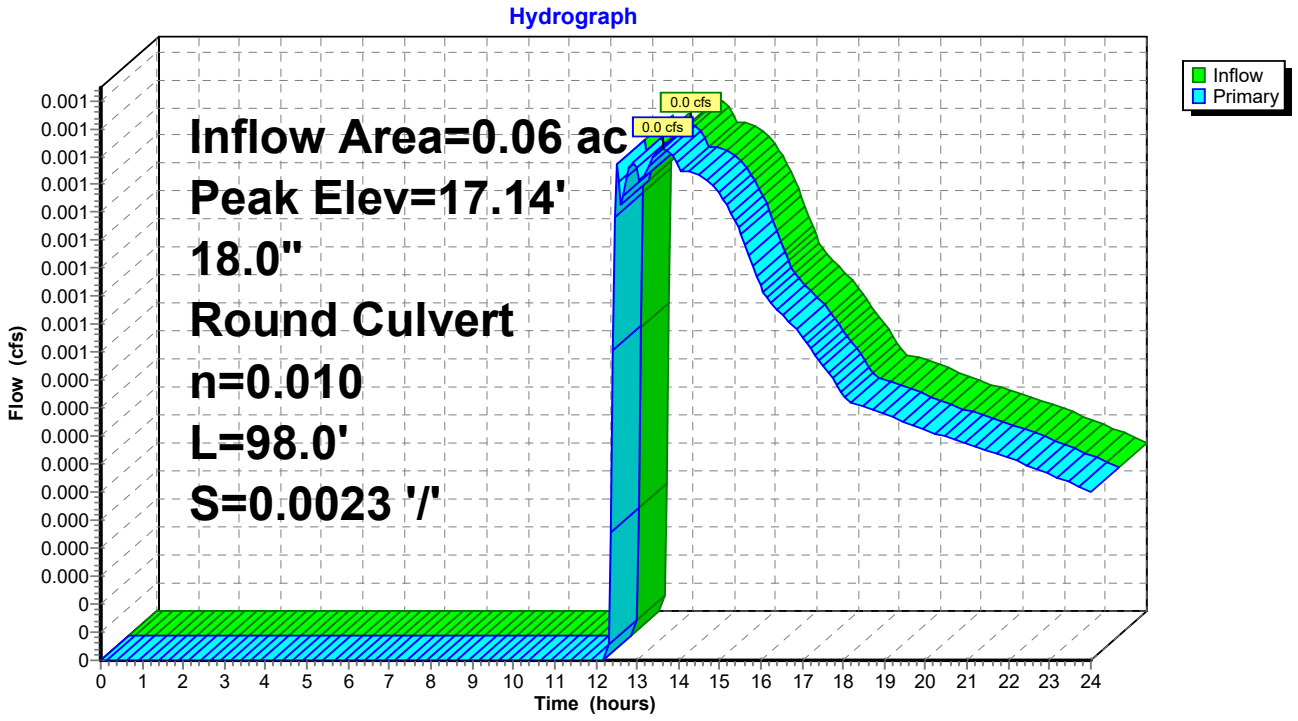
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 0.11" for 2-Year Storm event
Inflow = 0.0 cfs @ 13.61 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 13.61 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 13.61 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.14' @ 13.61 hrs
Flood Elev= 24.92'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.12'	**18.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.12' / 16.89' S= 0.0023 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 13.61 hrs HW=17.14' TW=16.77' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.0 cfs @ 0.32 fps)

Pond 22P: Ex DMH3



Summary for Pond 23P: Ex CB3

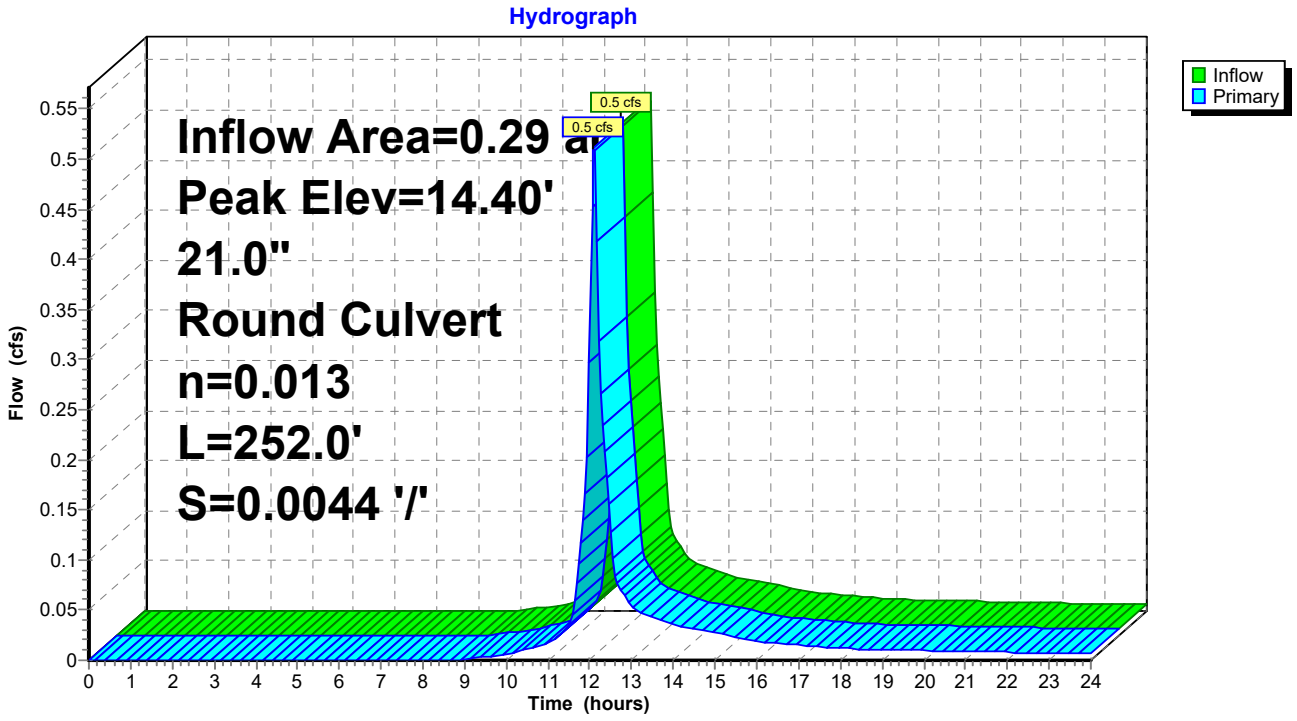
Inflow Area = 0.29 ac, 73.97% Impervious, Inflow Depth > 1.53" for 2-Year Storm event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 0.037 af
Outflow = 0.5 cfs @ 12.09 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 0.037 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.40' @ 12.09 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.05'	**21.0" Round Culvert** L= 252.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.05' / 12.94' S= 0.0044 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 2.41 sf

Primary OutFlow Max=0.5 cfs @ 12.09 hrs HW=14.40' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.5 cfs @ 2.21 fps)

Pond 23P: Ex CB3



Summary for Pond 24P: Ex DMH2

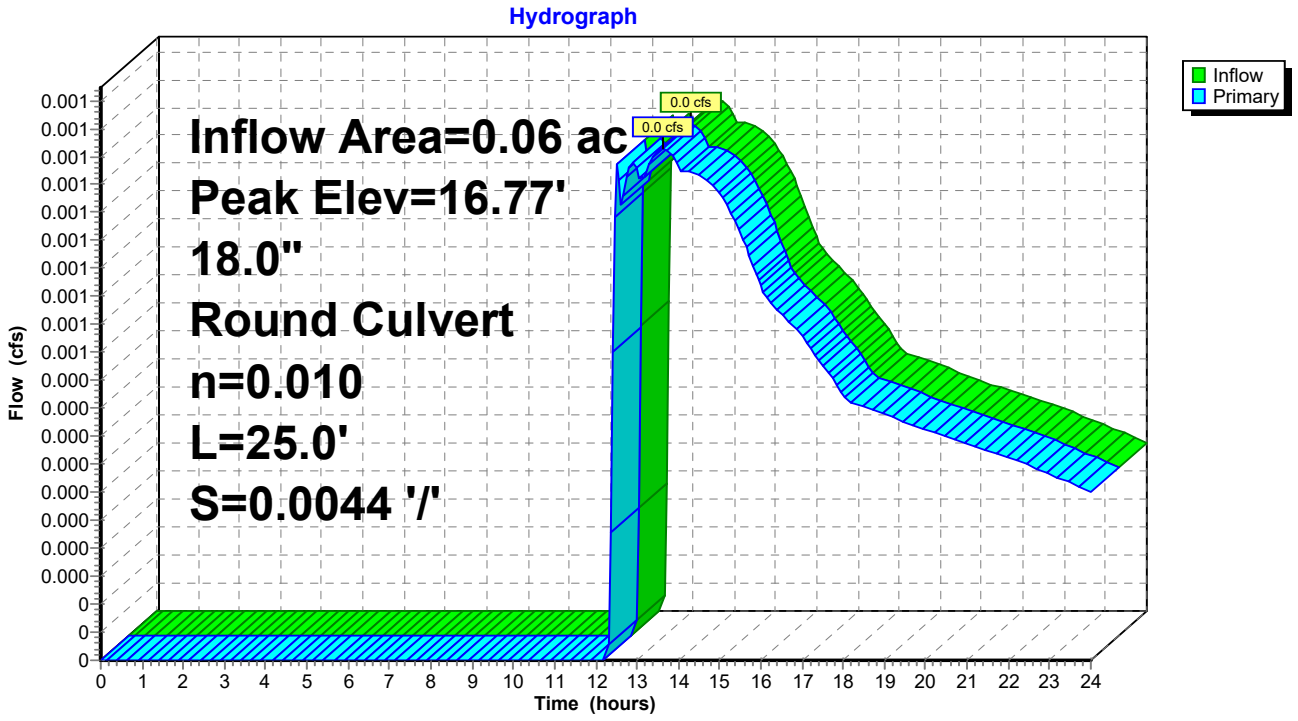
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 0.11" for 2-Year Storm event
Inflow = 0.0 cfs @ 13.61 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 13.62 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.3 min
Primary = 0.0 cfs @ 13.62 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.77' @ 13.62 hrs
Flood Elev= 25.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.75'	**18.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.75' / 16.64' S= 0.0044 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 13.62 hrs HW=16.77' TW=16.55' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.0 cfs @ 0.40 fps)

Pond 24P: Ex DMH2



Summary for Pond 26P: DMH5

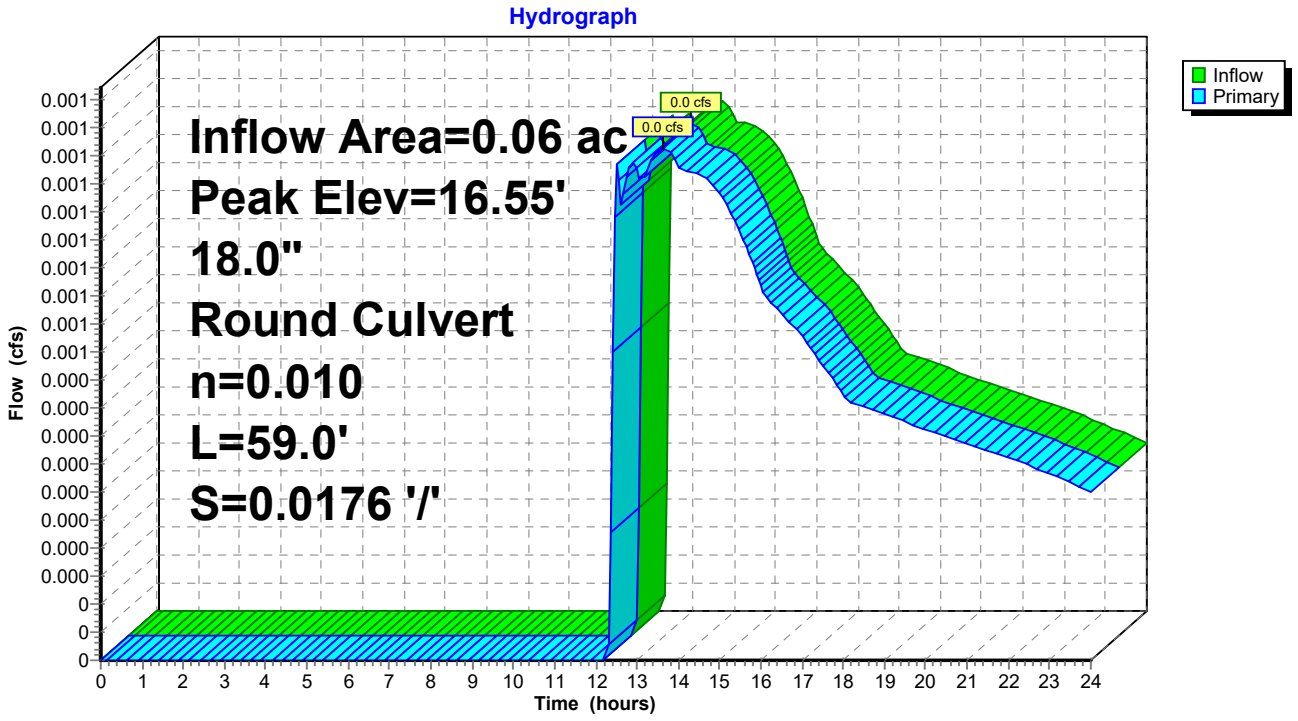
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 0.11" for 2-Year Storm event
Inflow = 0.0 cfs @ 13.62 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 13.62 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.5 min
Primary = 0.0 cfs @ 13.62 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.55' @ 13.62 hrs
Flood Elev= 25.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.54'	**18.0" Round Culvert** L= 59.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.54' / 15.50' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 13.62 hrs HW=16.55' TW=15.43' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.0 cfs @ 0.32 fps)

Pond 26P: DMH5



Summary for Pond 27P: DMH10

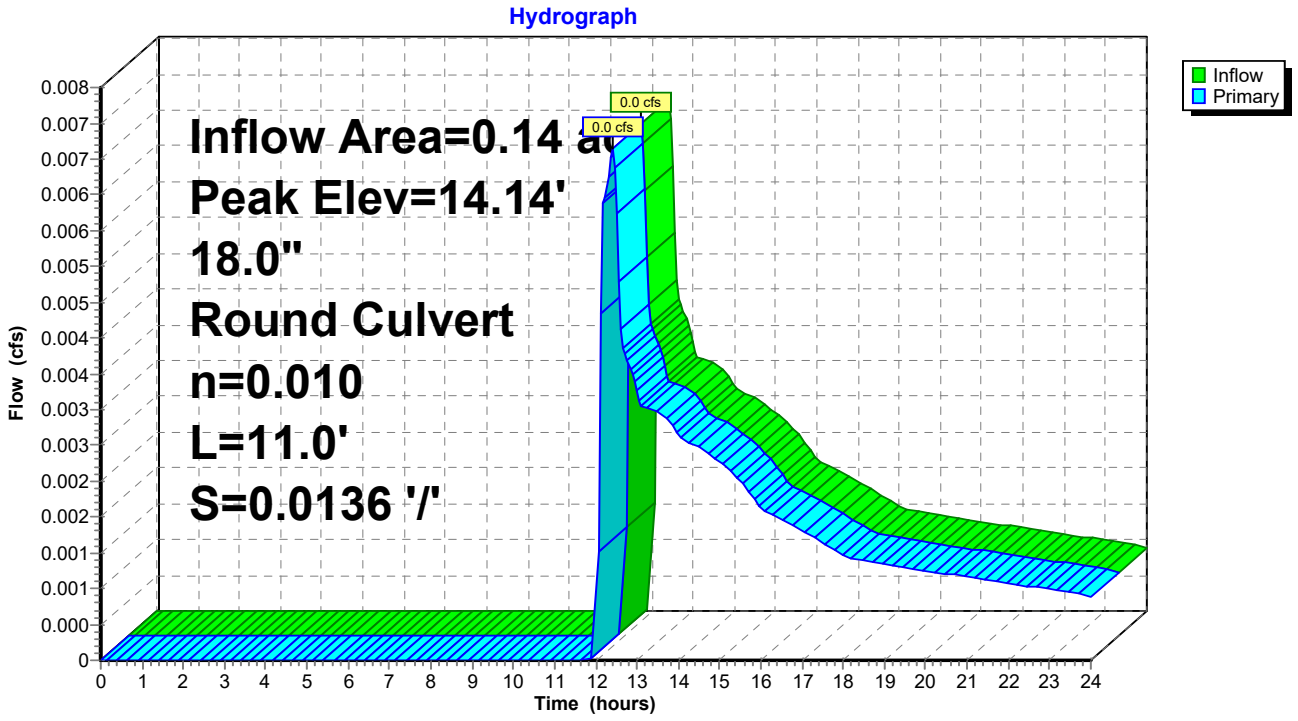
Inflow Area = 0.14 ac, 23.10% Impervious, Inflow Depth > 0.18" for 2-Year Storm event
Inflow = 0.0 cfs @ 12.39 hrs, Volume= 0.002 af
Outflow = 0.0 cfs @ 12.39 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.39 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.14' @ 12.39 hrs
Flood Elev= 24.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.10'	**18.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.10' / 13.95' S= 0.0136 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.39 hrs HW=14.14' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.0 cfs @ 0.54 fps)

Pond 27P: DMH10



Summary for Pond 29P: Ex DMH4

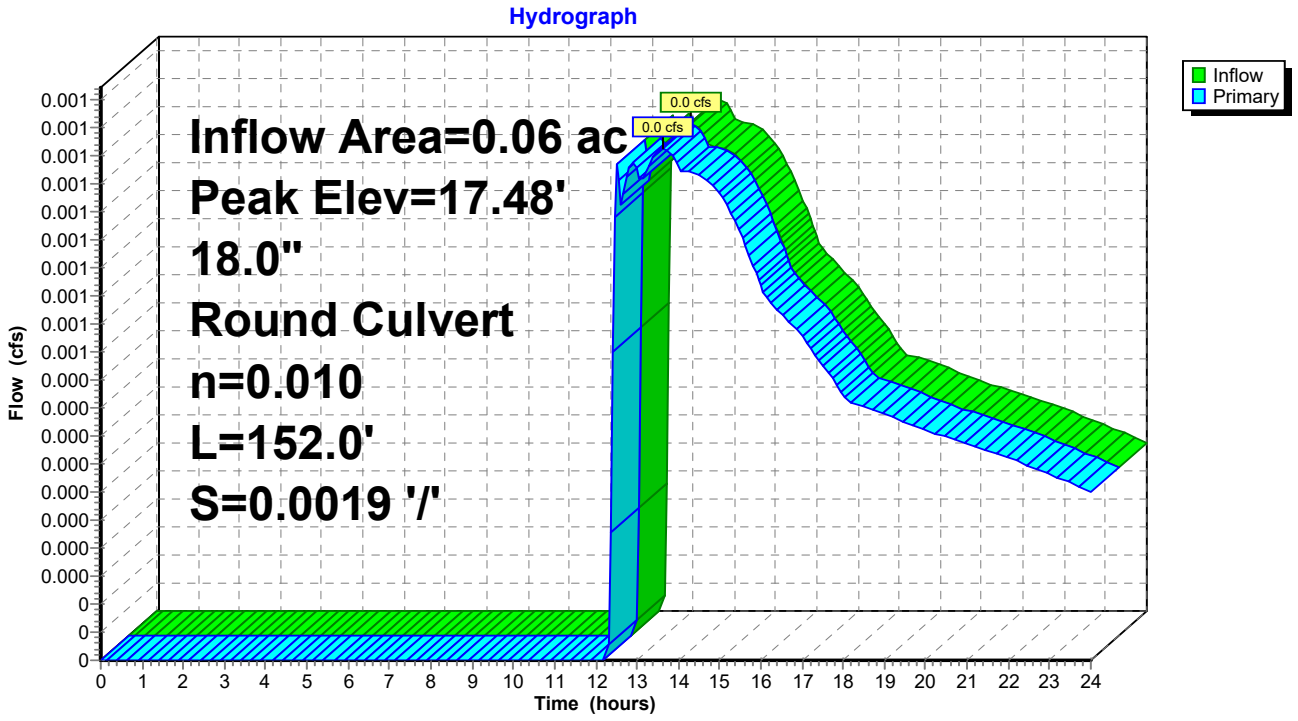
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 0.11" for 2-Year Storm event
Inflow = 0.0 cfs @ 13.63 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 13.61 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 13.61 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.48' @ 13.61 hrs
Flood Elev= 23.44'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.46'	**18.0" Round Culvert** L= 152.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.46' / 17.17' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 13.61 hrs HW=17.48' TW=17.14' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.0 cfs @ 0.30 fps)

Pond 29P: Ex DMH4

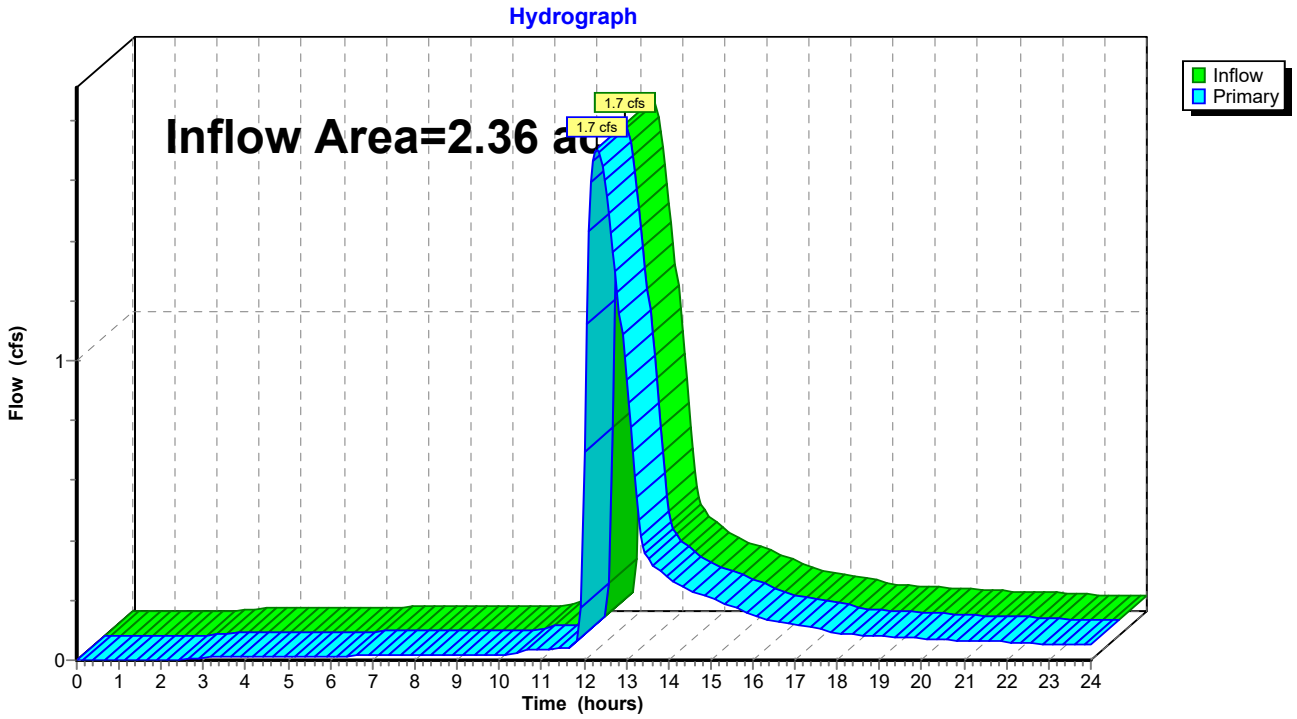


Summary for Link SP1: Forest Ave Storm Drain

Inflow Area = 2.36 ac, 72.31% Impervious, Inflow Depth > 1.31" for 2-Year Storm event
Inflow = 1.7 cfs @ 12.30 hrs, Volume= 0.257 af
Primary = 1.7 cfs @ 12.30 hrs, Volume= 0.257 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Forest Ave Storm Drain

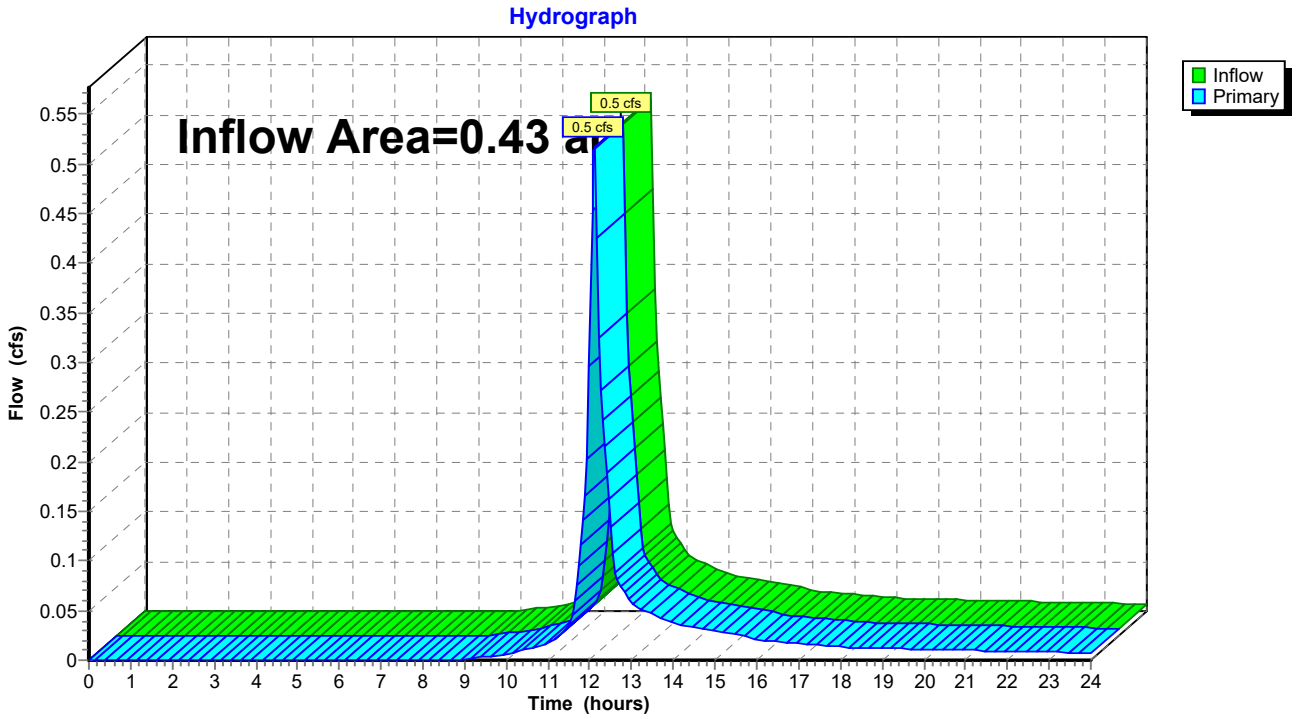


Summary for Link SP2: Combined Sewer

Inflow Area = 0.43 ac, 57.64% Impervious, Inflow Depth > 1.09" for 2-Year Storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.039 af
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Combined Sewer



Summary for Subcatchment 1S:

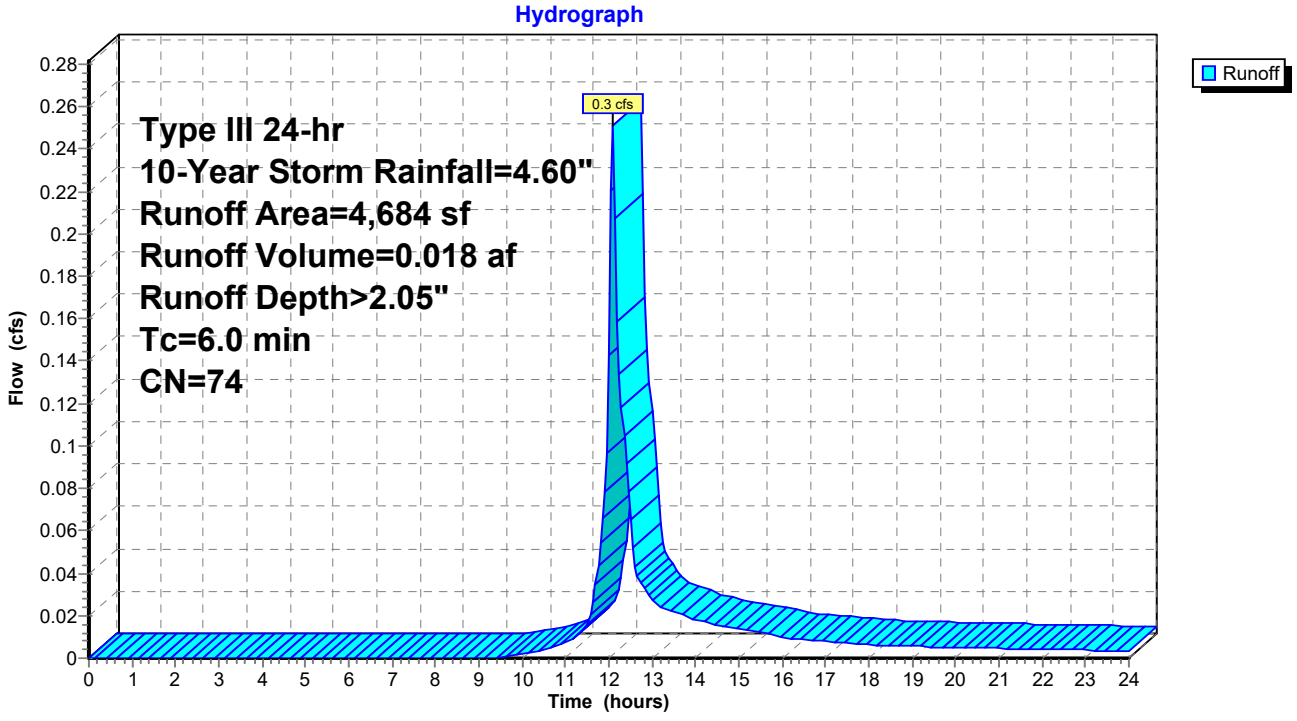
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.018 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	2,770	98	Impervious
	1,237	39	Grass cover, Good, HSG A
*	677	40	Porous Pavement
	4,684	74	Weighted Average
	1,914		40.86% Pervious Area
	2,770		59.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S:



Summary for Subcatchment 2S:

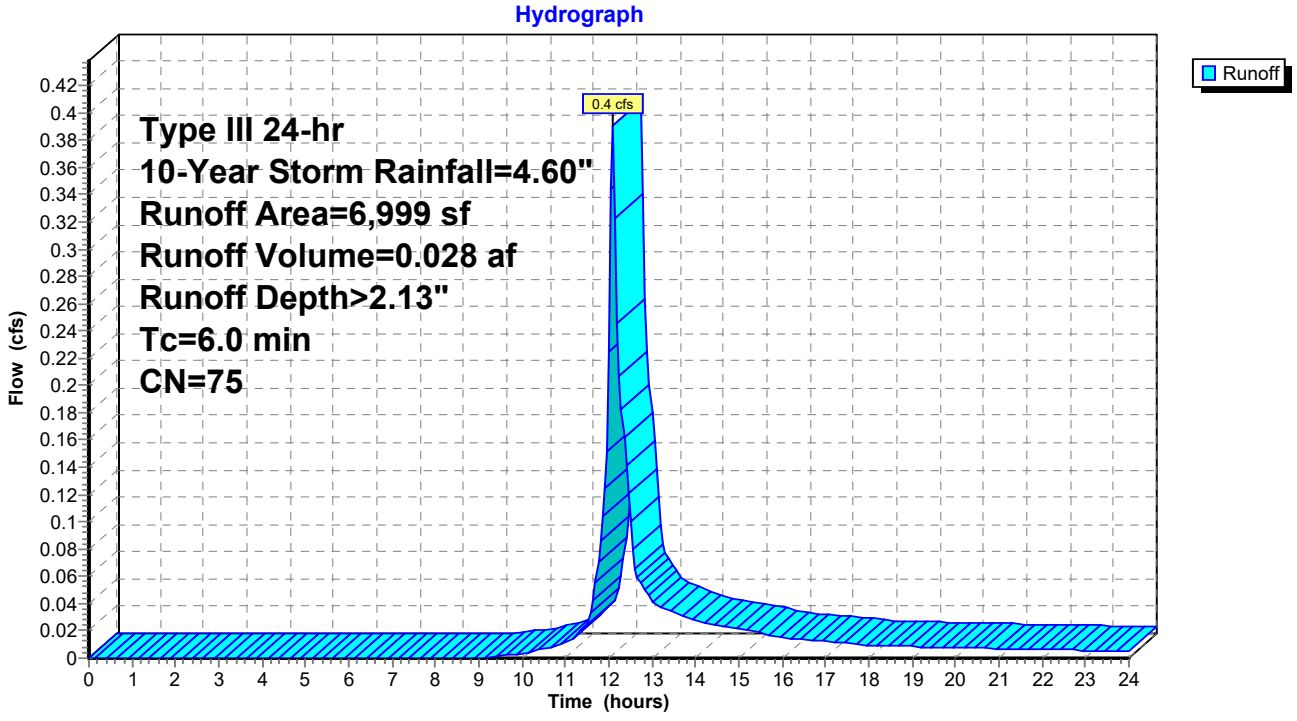
Runoff = 0.4 cfs @ 12.10 hrs, Volume= 0.028 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	4,238	98	Impervious
	1,996	39	Grass cover, Good, HSG A
*	765	40	Porous Pavement
	6,999	75	Weighted Average
	2,761		39.45% Pervious Area
	4,238		60.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S:



Summary for Subcatchment 3S:

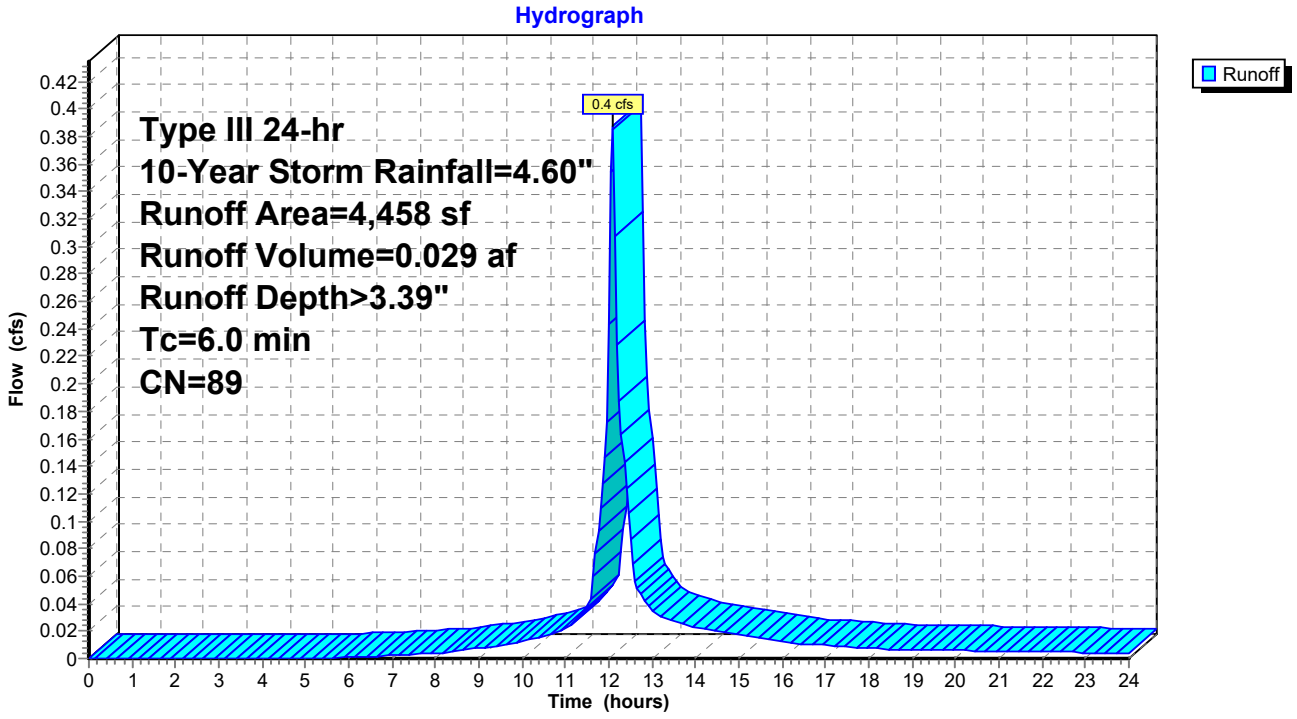
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	3,789	98	Impervious
	669	39	Grass cover, Good, HSG A
	4,458	89	Weighted Average
	669		15.01% Pervious Area
	3,789		84.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S:



Summary for Subcatchment 4S:

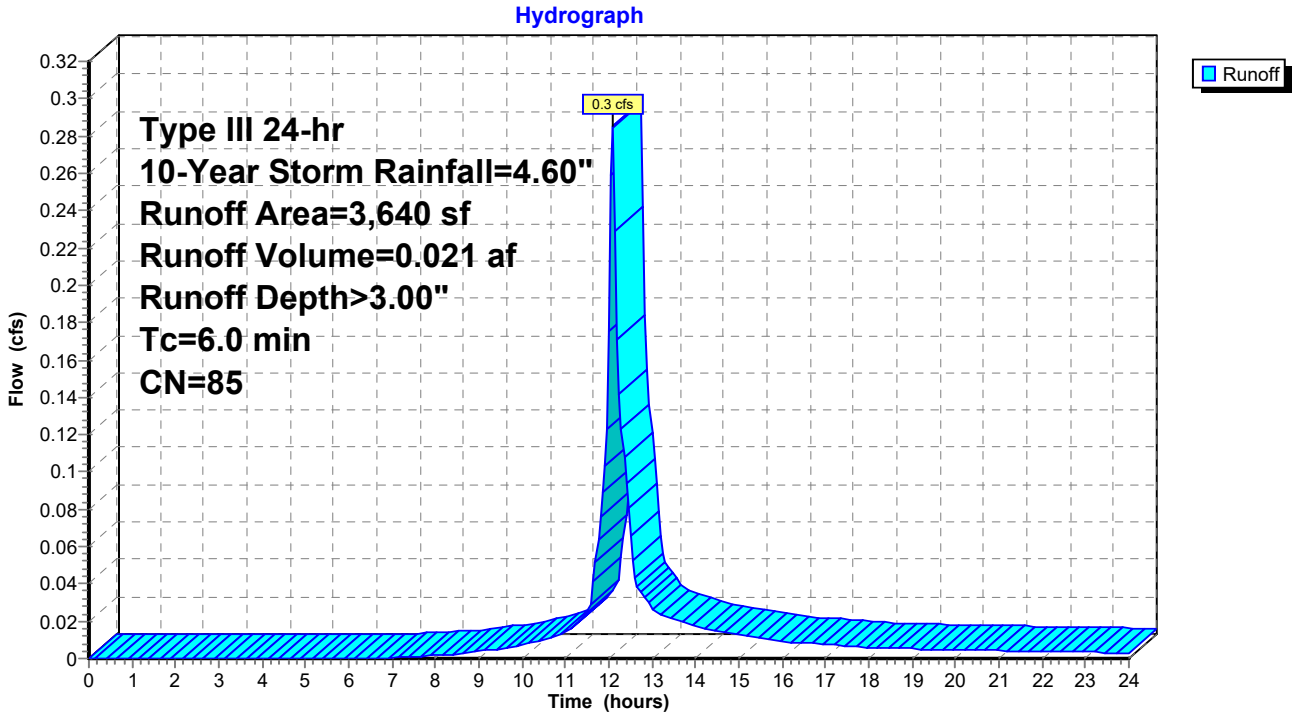
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 0.021 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	2,814	98	Impervious
	826	39	Grass cover, Good, HSG A
	3,640	85	Weighted Average
	826		22.69% Pervious Area
	2,814		77.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S:



Summary for Subcatchment 5S:

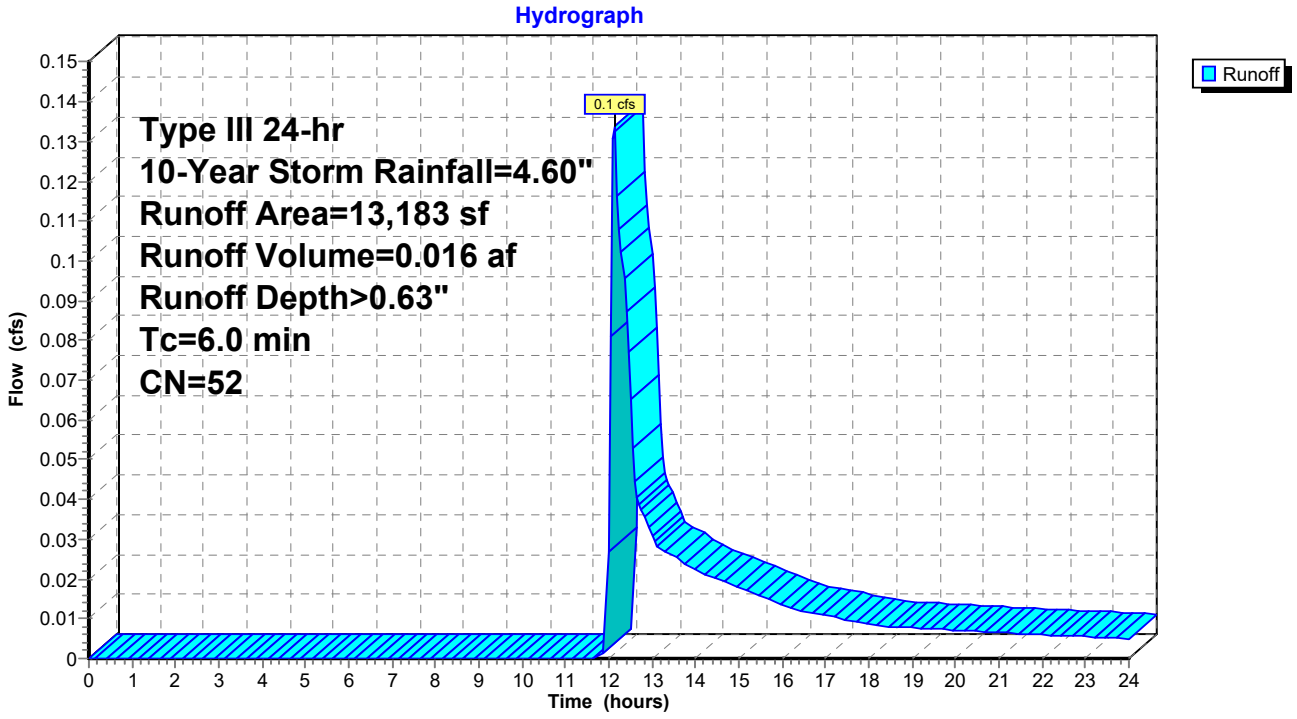
Runoff = 0.1 cfs @ 12.13 hrs, Volume= 0.016 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	2,965	98	Impervious
	10,218	39	Grass cover, Good, HSG A
	13,183	52	Weighted Average
	10,218		77.51% Pervious Area
	2,965		22.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S:



Summary for Subcatchment 6S:

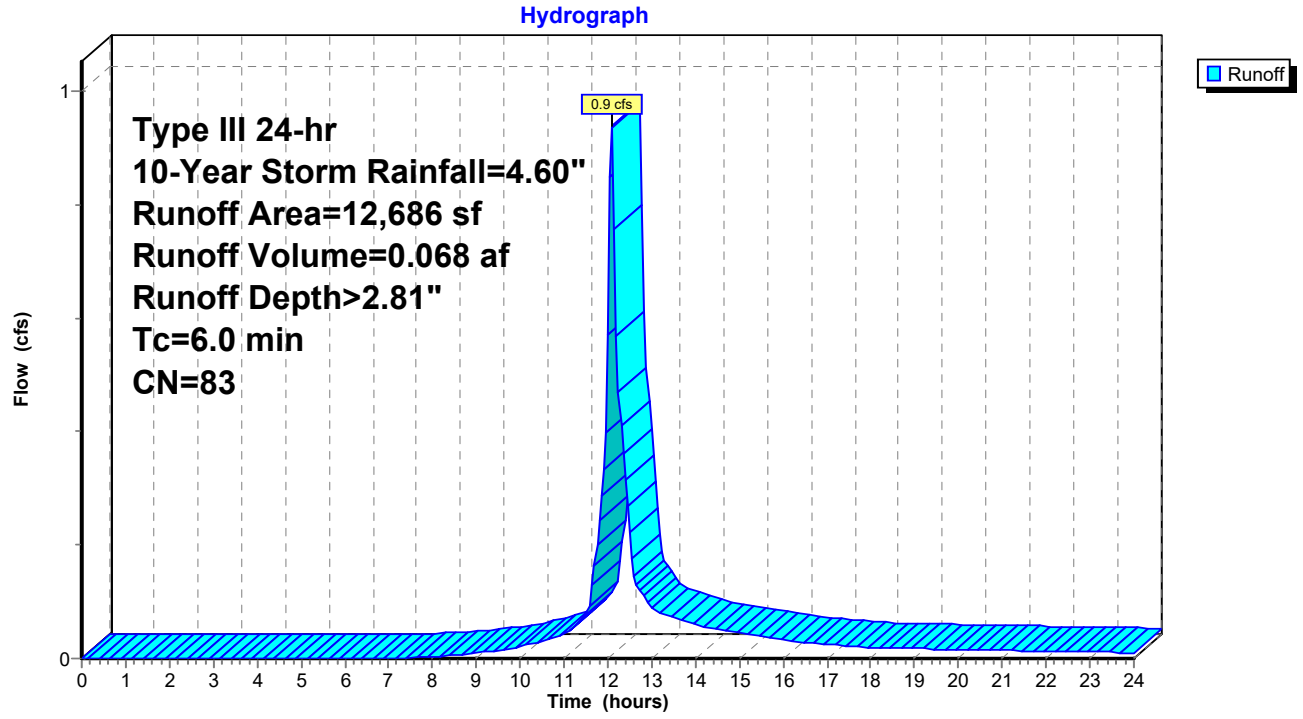
Runoff = 0.9 cfs @ 12.09 hrs, Volume= 0.068 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	9,384	98	Impervious
	3,302	39	Grass cover, Good, HSG A
	12,686	83	Weighted Average
	3,302		26.03% Pervious Area
	9,384		73.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S:



Summary for Subcatchment 7S: Parking Garage

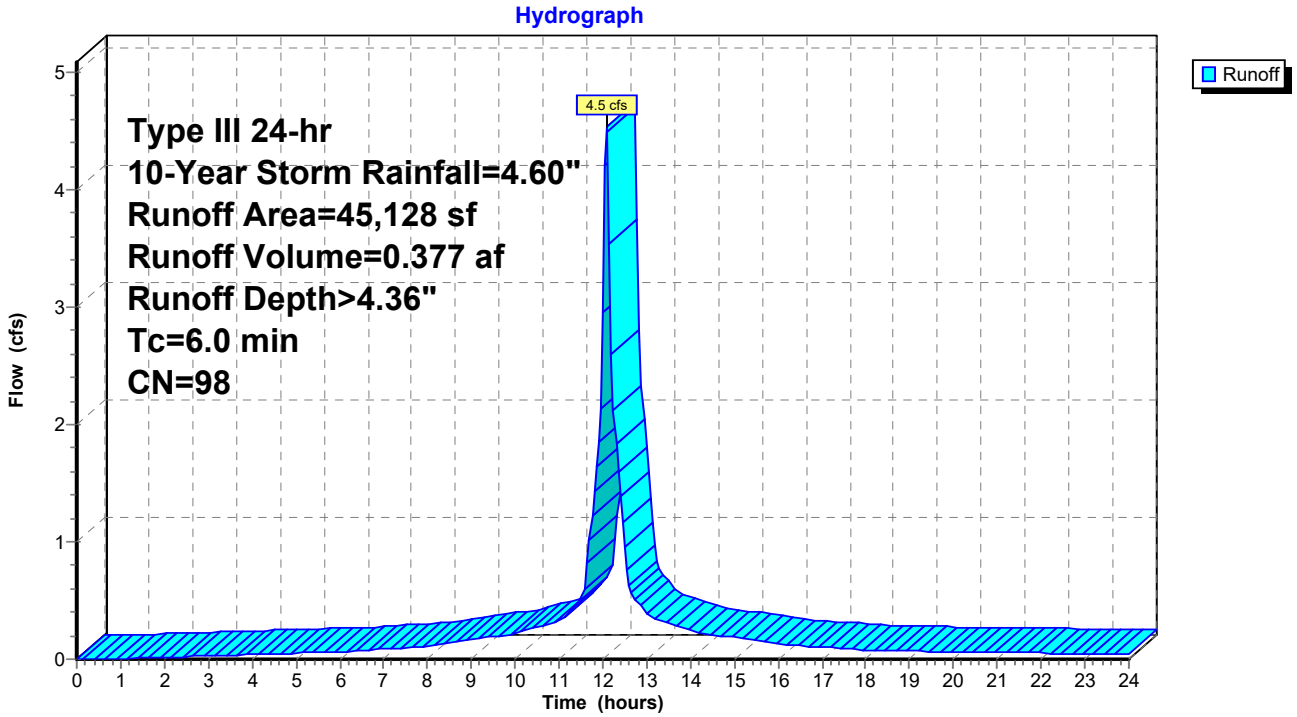
Runoff = 4.5 cfs @ 12.09 hrs, Volume= 0.377 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	45,128	98	Impervious
	45,128		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: Parking Garage



Summary for Subcatchment 8S:

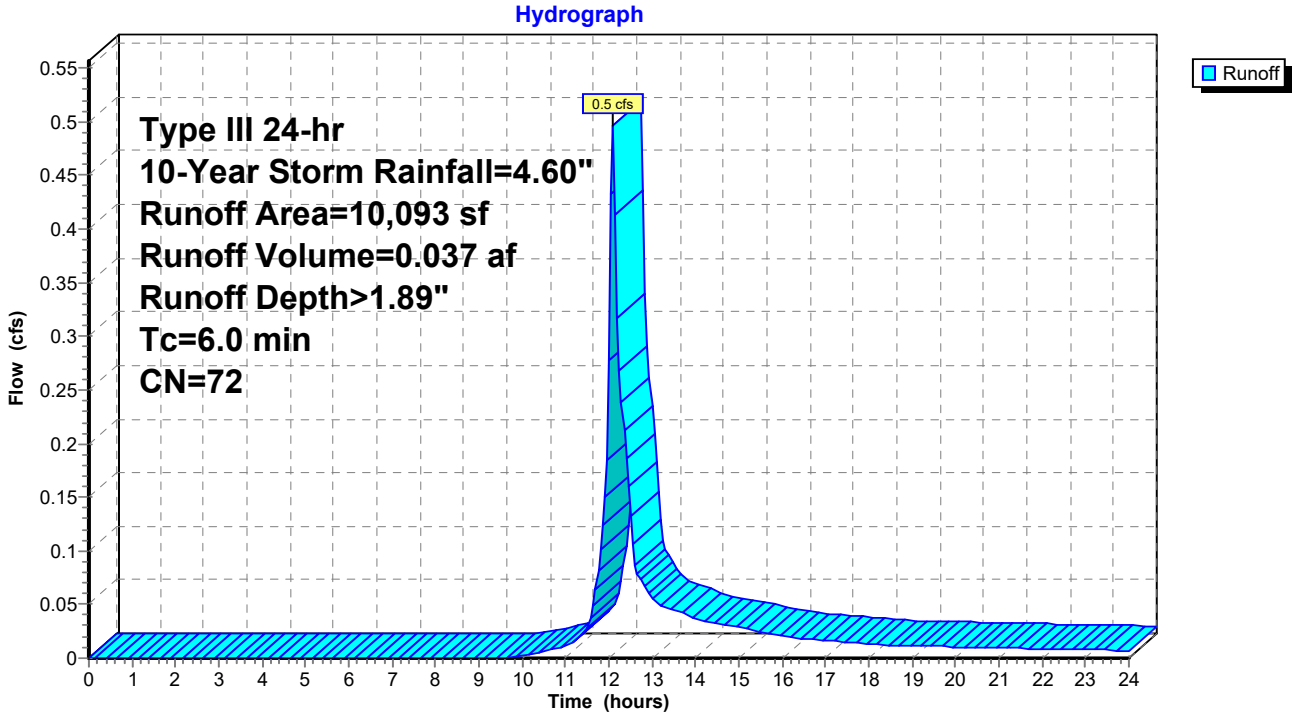
Runoff = 0.5 cfs @ 12.10 hrs, Volume= 0.037 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	5,667	98	Impervious
	3,193	39	Grass cover, Good, HSG A
*	1,233	40	Porous Pavement
	10,093	72	Weighted Average
	4,426		43.85% Pervious Area
	5,667		56.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S:



Summary for Subcatchment 9S:

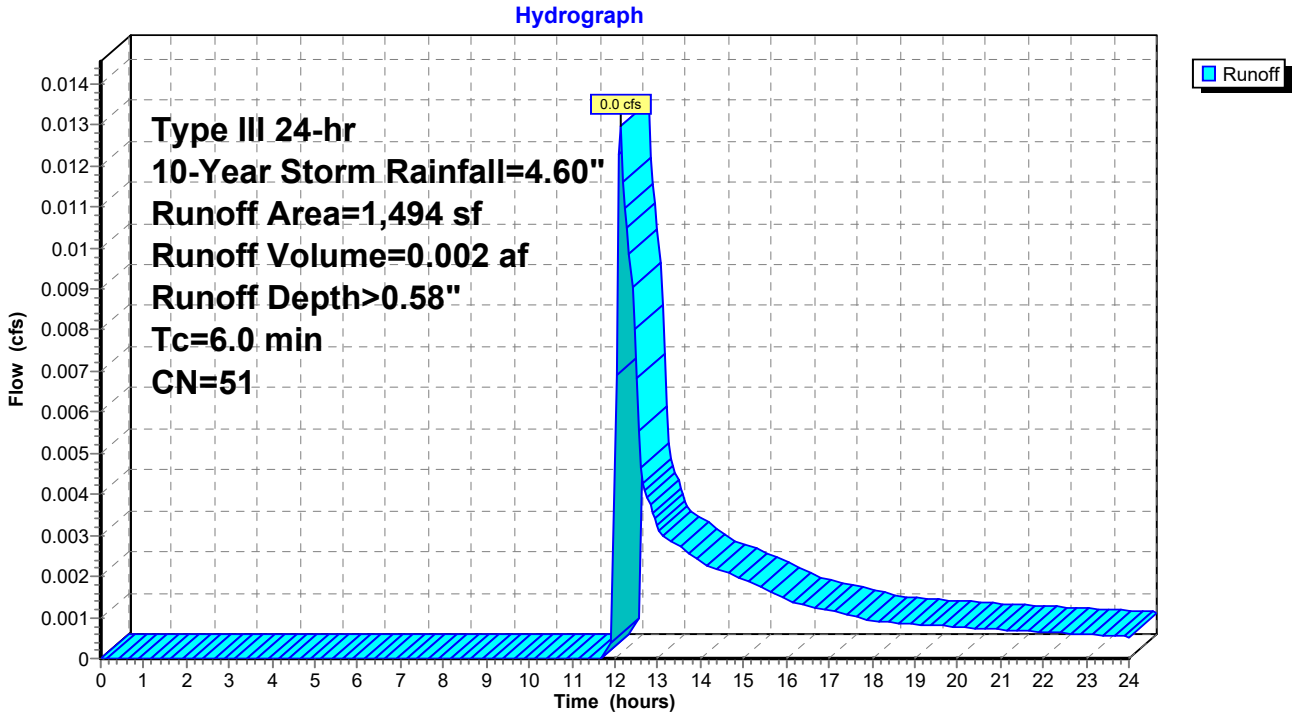
Runoff = 0.0 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	302	98	Impervious
	1,192	39	Grass cover, Good, HSG A
	1,494	51	Weighted Average
	1,192		79.79% Pervious Area
	302		20.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S:



Summary for Subcatchment 10S:

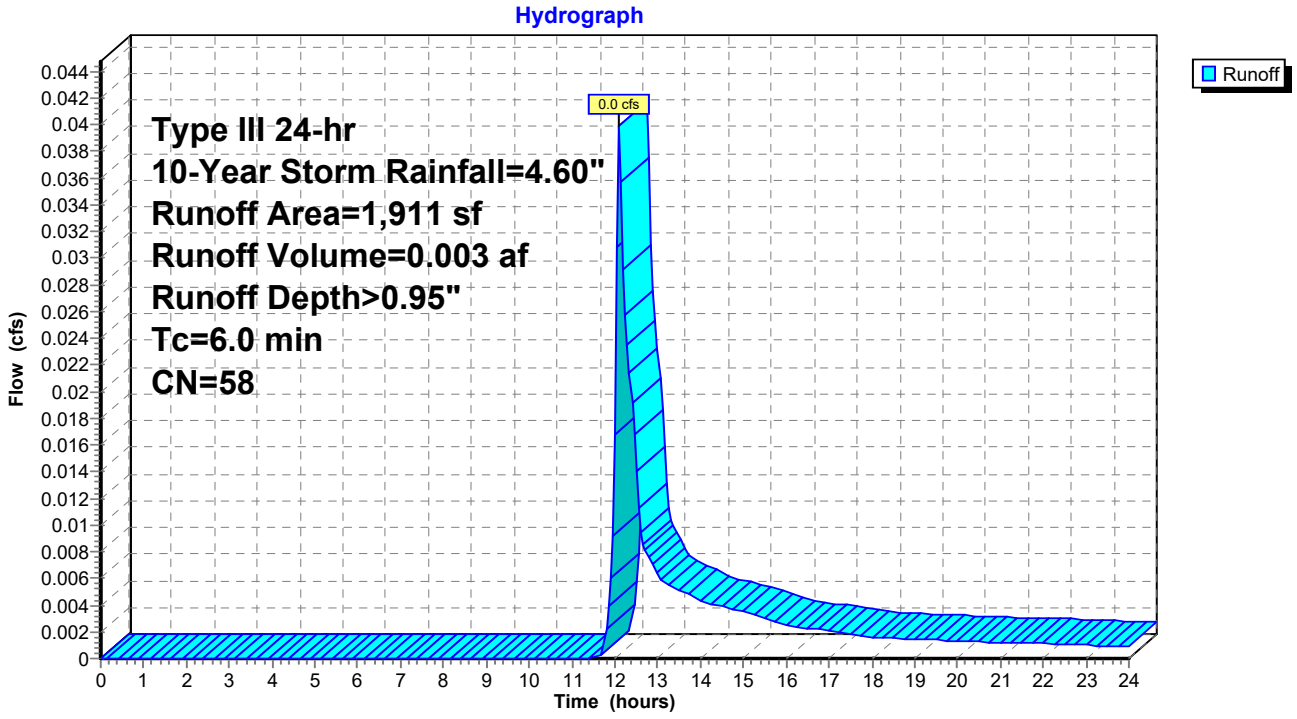
Runoff = 0.0 cfs @ 12.11 hrs, Volume= 0.003 af, Depth> 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	617	98	Impervious
	1,294	39	Grass cover, Good, HSG A
	1,911	58	Weighted Average
	1,294		67.71% Pervious Area
	617		32.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S:



Summary for Subcatchment 12S:

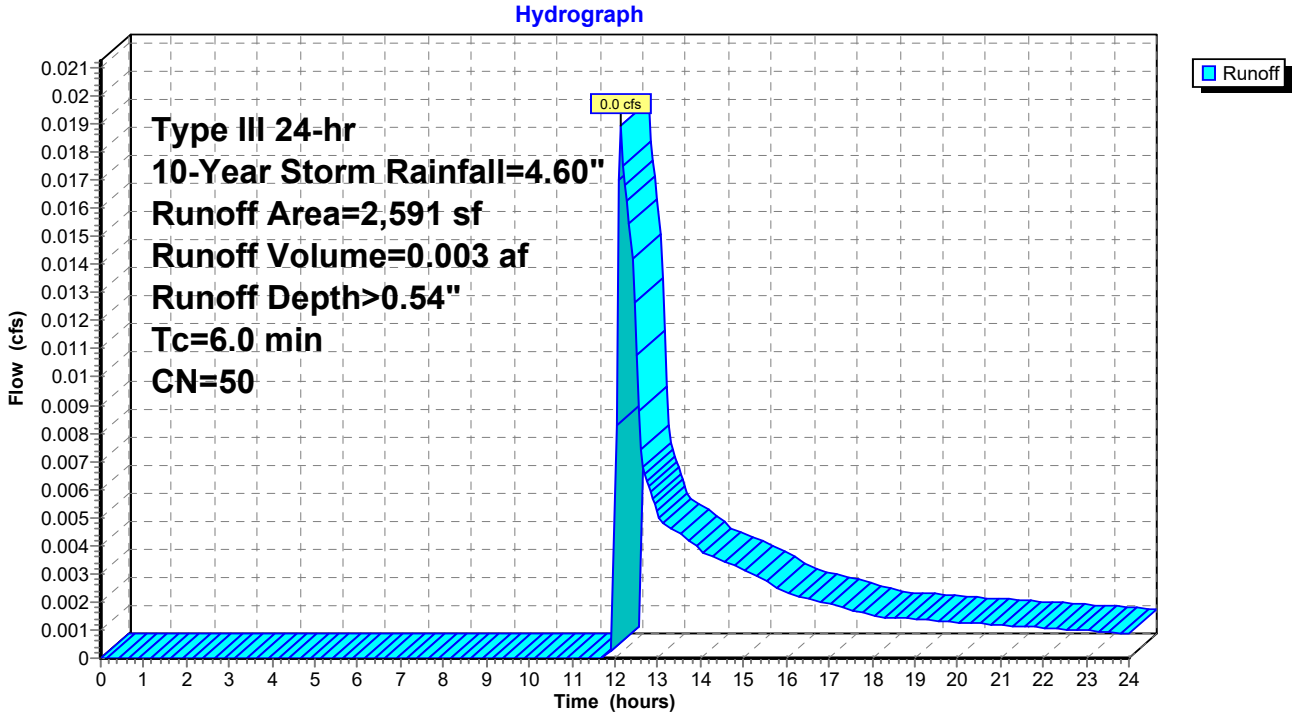
Runoff = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af, Depth> 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	466	98	Impervious
	1,499	39	Grass cover, Good, HSG A
*	626	40	Porous Pavement
	2,591	50	Weighted Average
	2,125		82.01% Pervious Area
	466		17.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S:



Summary for Subcatchment 13S:

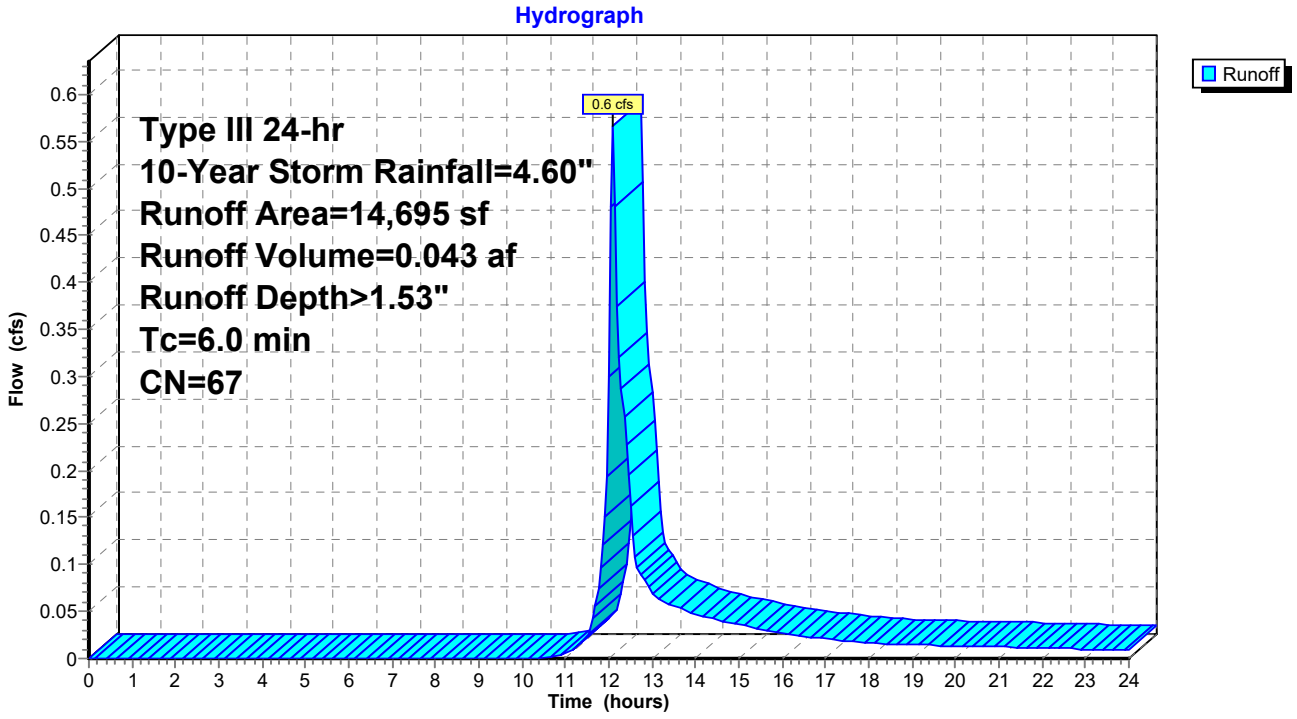
Runoff = 0.6 cfs @ 12.10 hrs, Volume= 0.043 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.60"

	Area (sf)	CN	Description
*	7,017	98	Impervious
	7,678	39	Grass cover, Good, HSG A
	14,695	67	Weighted Average
	7,678		52.25% Pervious Area
	7,017		47.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S:



Summary for Pond 1P: CB1

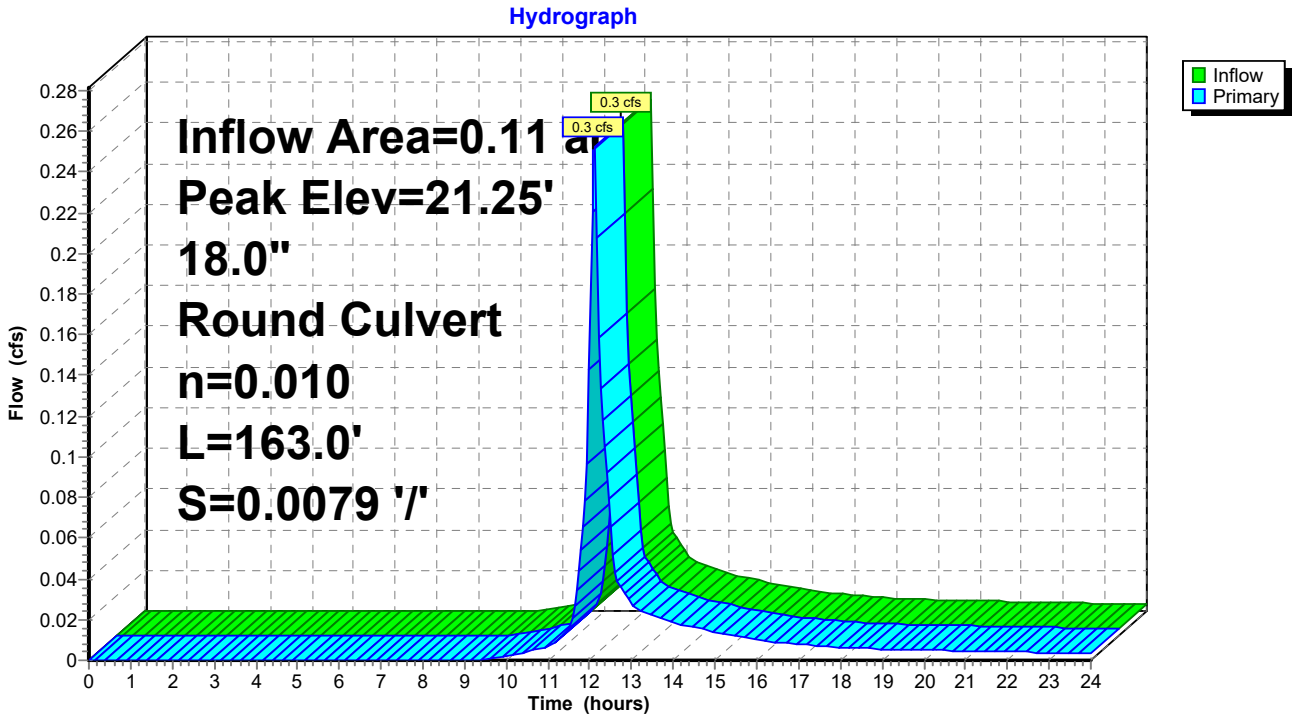
Inflow Area = 0.11 ac, 59.14% Impervious, Inflow Depth > 2.05" for 10-Year Storm event
Inflow = 0.3 cfs @ 12.10 hrs, Volume= 0.018 af
Outflow = 0.3 cfs @ 12.10 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.10 hrs, Volume= 0.018 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 21.25' @ 12.10 hrs
Flood Elev= 25.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**18.0" Round Culvert** L= 163.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 21.00' / 19.71' S= 0.0079 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.2 cfs @ 12.10 hrs HW=21.24' TW=20.14' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.2 cfs @ 1.33 fps)

Pond 1P: CB1



Summary for Pond 2P: CB2

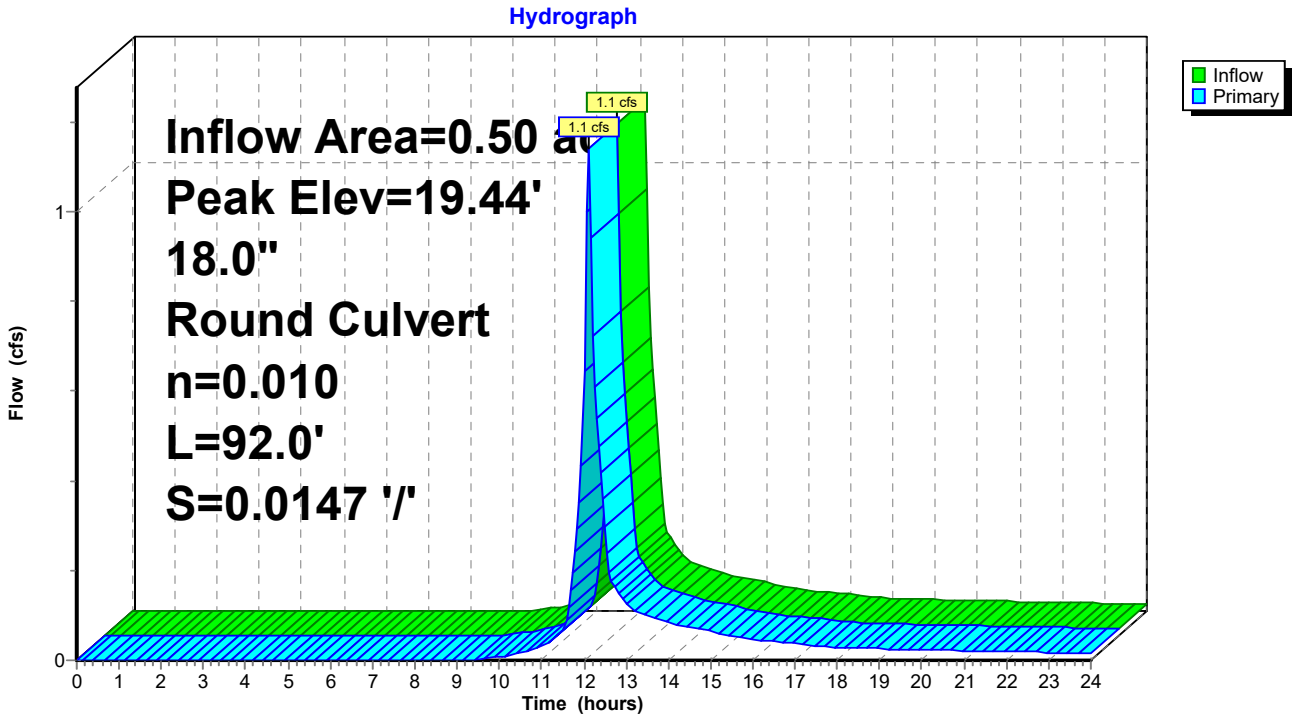
Inflow Area = 0.50 ac, 58.21% Impervious, Inflow Depth > 2.00" for 10-Year Storm event
Inflow = 1.1 cfs @ 12.10 hrs, Volume= 0.083 af
Outflow = 1.1 cfs @ 12.10 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min
Primary = 1.1 cfs @ 12.10 hrs, Volume= 0.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.44' @ 12.10 hrs
Flood Elev= 22.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.90'	**18.0" Round Culvert** L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.90' / 17.55' S= 0.0147 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.1 cfs @ 12.10 hrs HW=19.44' TW=18.90' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.1 cfs @ 1.97 fps)

Pond 2P: CB2



Summary for Pond 3P: CB3

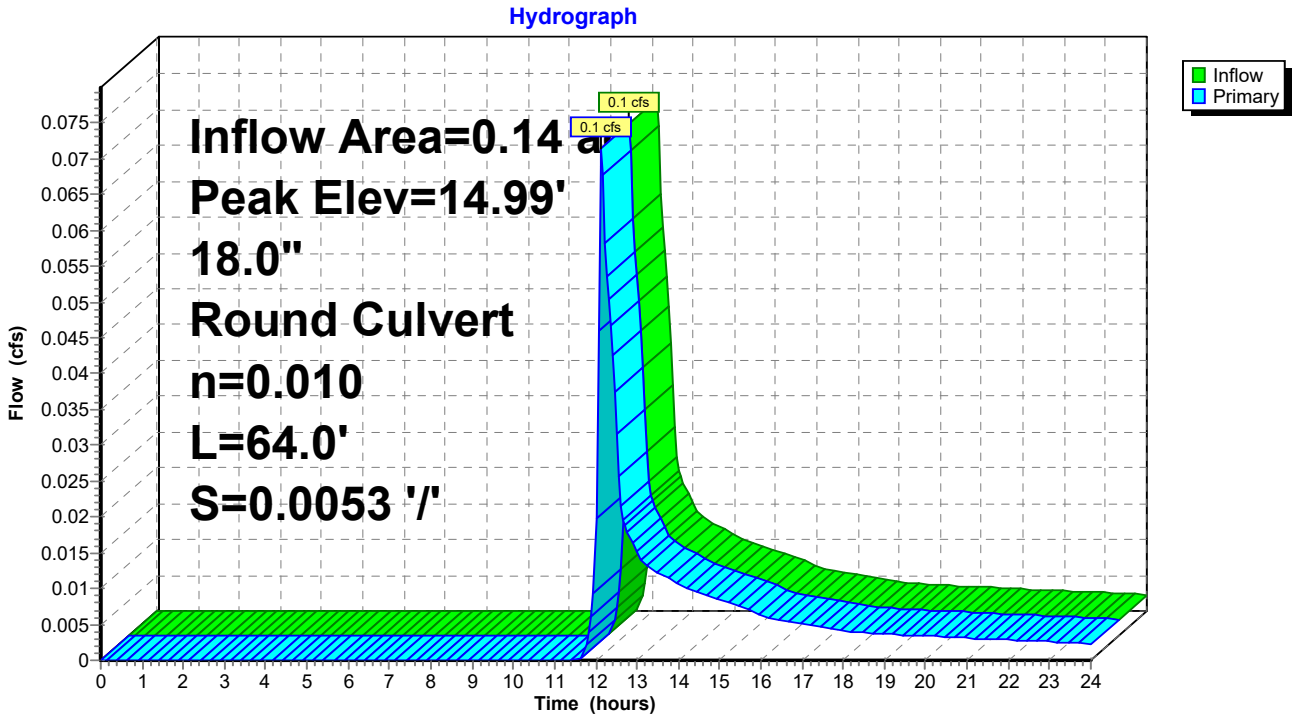
Inflow Area = 0.14 ac, 23.10% Impervious, Inflow Depth > 0.68" for 10-Year Storm event
Inflow = 0.1 cfs @ 12.12 hrs, Volume= 0.008 af
Outflow = 0.1 cfs @ 12.12 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.12 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.99' @ 12.12 hrs
Flood Elev= 23.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.86'	**18.0" Round Culvert** L= 64.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.86' / 14.52' S= 0.0053 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.12 hrs HW=14.99' TW=14.23' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.1 cfs @ 0.96 fps)

Pond 3P: CB3



Summary for Pond 4P: CB4

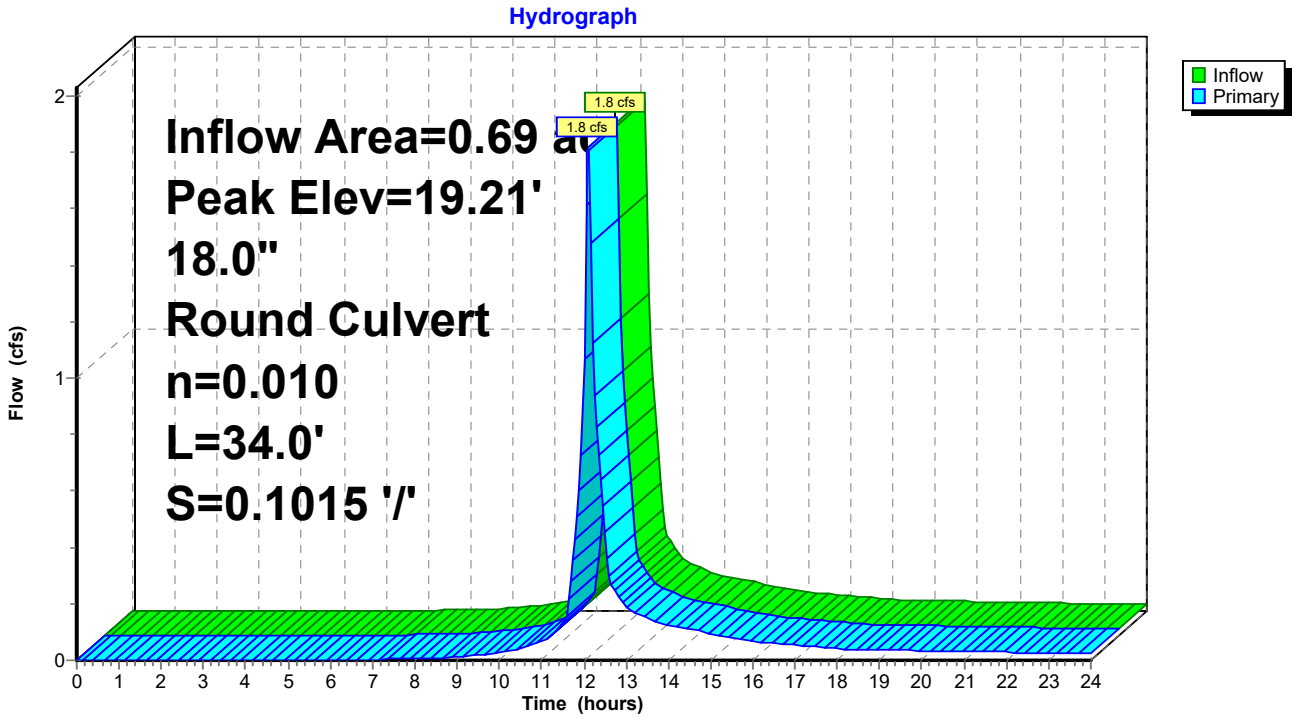
Inflow Area = 0.69 ac, 64.53% Impervious, Inflow Depth > 2.33" for 10-Year Storm event
Inflow = 1.8 cfs @ 12.09 hrs, Volume= 0.133 af
Outflow = 1.8 cfs @ 12.09 hrs, Volume= 0.133 af, Atten= 0%, Lag= 0.0 min
Primary = 1.8 cfs @ 12.09 hrs, Volume= 0.133 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.21' @ 12.15 hrs
Flood Elev= 22.87'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.45'	**18.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.45' / 14.00' S= 0.1015 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=18.88' TW=19.13' (Dynamic Tailwater)
1=Culvert (Controls 0.0 cfs)

Pond 4P: CB4



Summary for Pond 5P: CB5

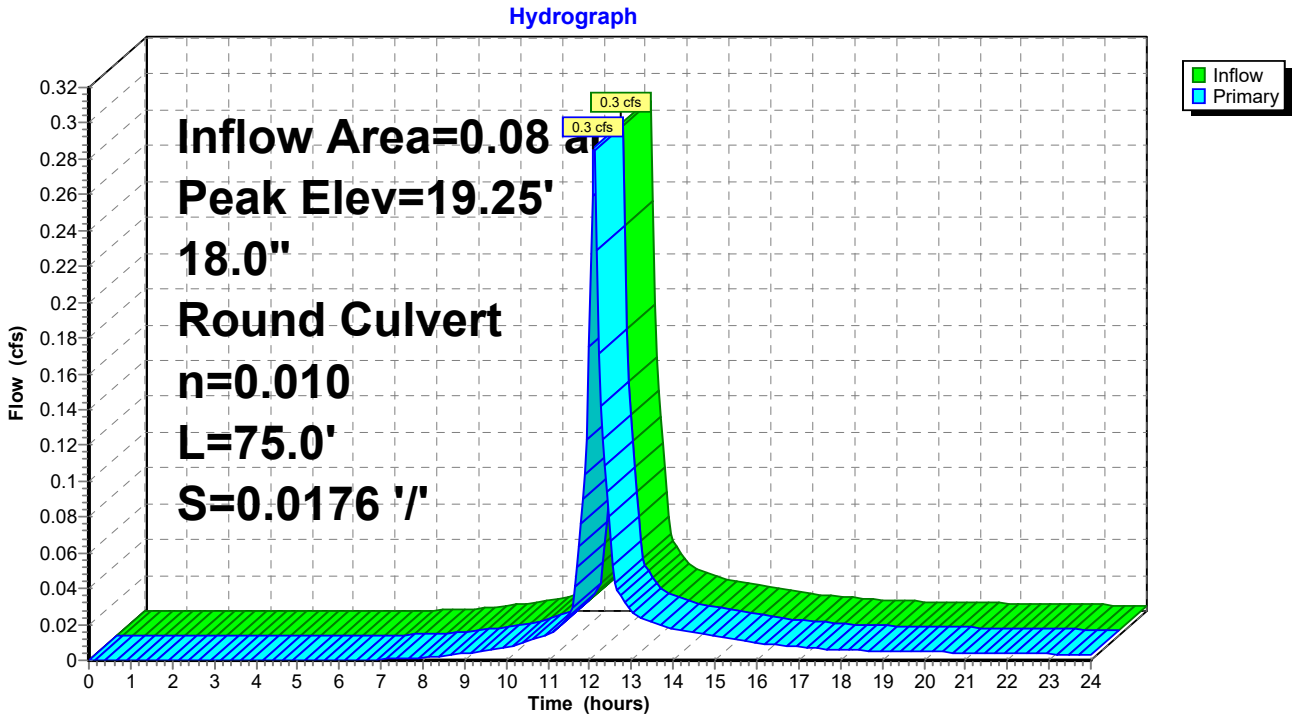
Inflow Area = 0.08 ac, 77.31% Impervious, Inflow Depth > 3.00" for 10-Year Storm event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.3 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.09 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.25' @ 12.20 hrs
Flood Elev= 22.83'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.87'	**18.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.87' / 17.55' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.2 cfs @ 12.09 hrs HW=19.13' TW=18.85' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.2 cfs @ 1.79 fps)

Pond 5P: CB5



Summary for Pond 6P: CB6

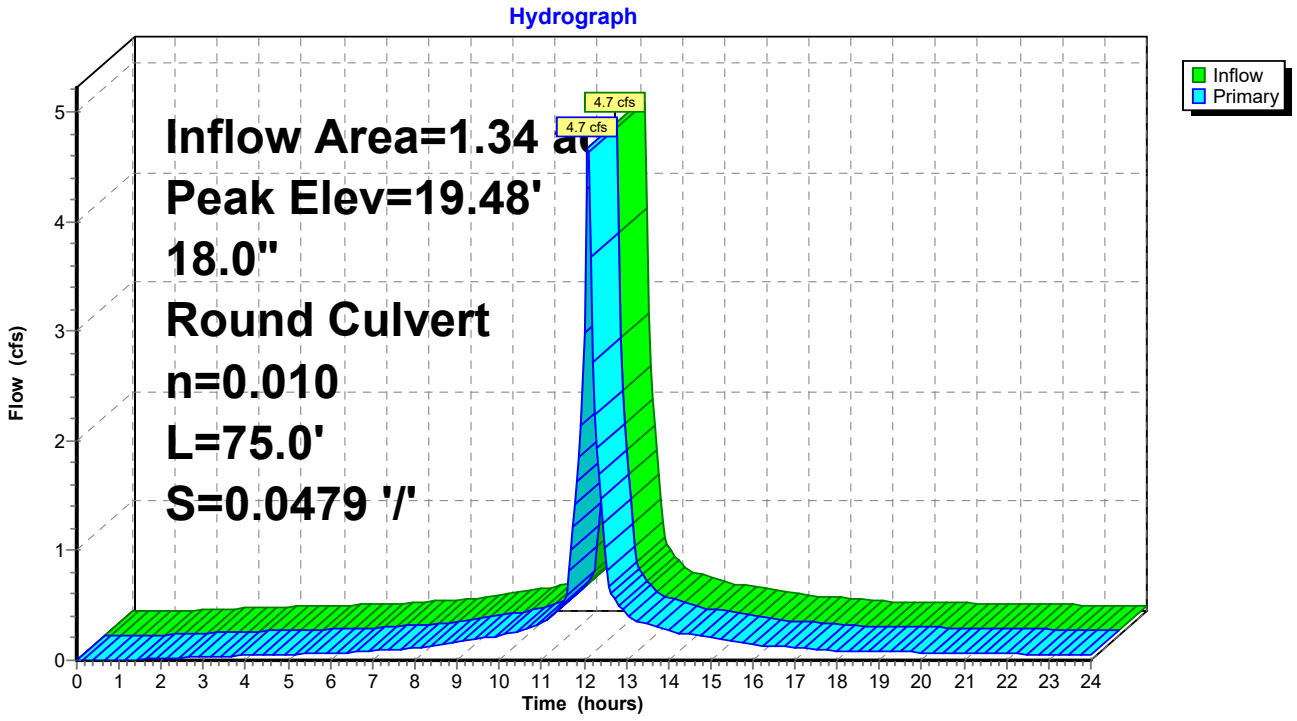
Inflow Area = 1.34 ac, 82.48% Impervious, Inflow Depth > 3.52" for 10-Year Storm event
Inflow = 4.7 cfs @ 12.09 hrs, Volume= 0.392 af
Outflow = 4.7 cfs @ 12.09 hrs, Volume= 0.392 af, Atten= 0%, Lag= 0.0 min
Primary = 4.7 cfs @ 12.09 hrs, Volume= 0.392 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.48' @ 12.14 hrs
Flood Elev= 22.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.59'	**18.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.59' / 14.00' S= 0.0479 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.5 cfs @ 12.09 hrs HW=19.23' TW=19.09' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.5 cfs @ 1.42 fps)

Pond 6P: CB6



Summary for Pond 7P: CB7

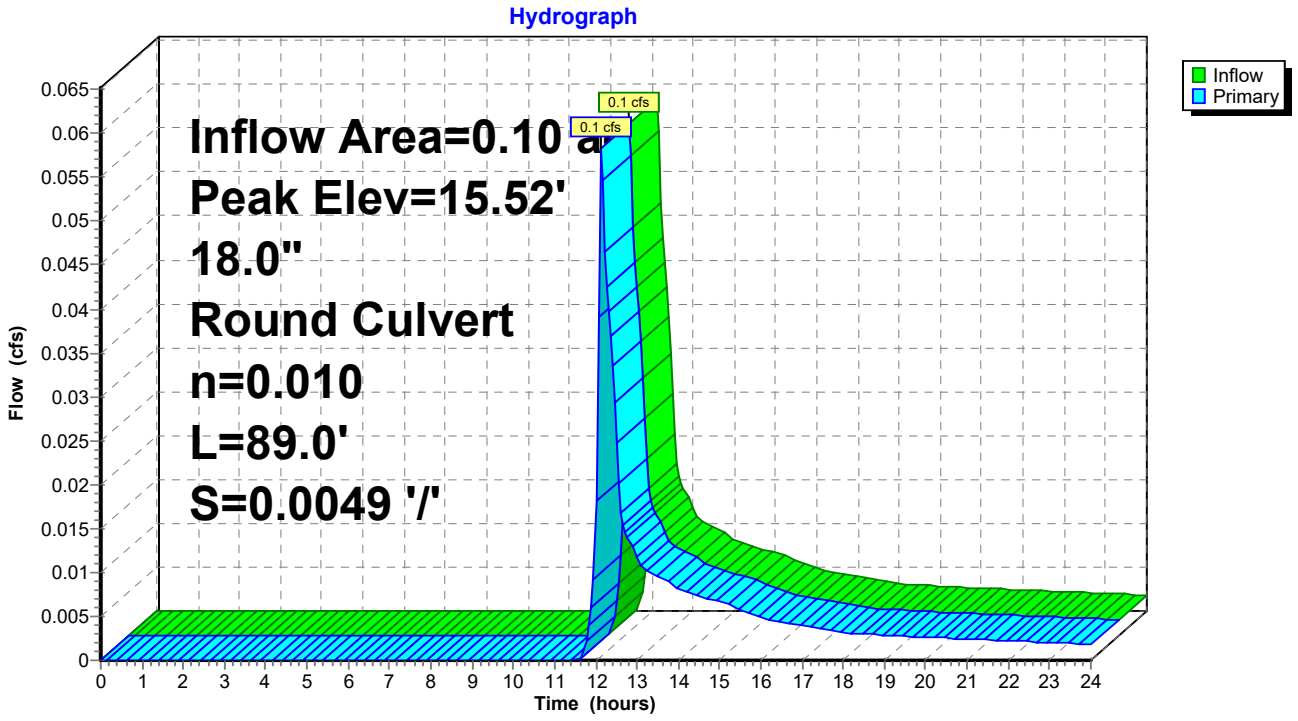
Inflow Area = 0.10 ac, 24.06% Impervious, Inflow Depth > 0.71" for 10-Year Storm event
Inflow = 0.1 cfs @ 12.12 hrs, Volume= 0.006 af
Outflow = 0.1 cfs @ 12.12 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.12 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.52' @ 12.12 hrs
Flood Elev= 24.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.40'	**18.0" Round Culvert** L= 89.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.40' / 14.96' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.12 hrs HW=15.51' TW=14.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.1 cfs @ 0.91 fps)

Pond 7P: CB7



Summary for Pond 8P: CB8

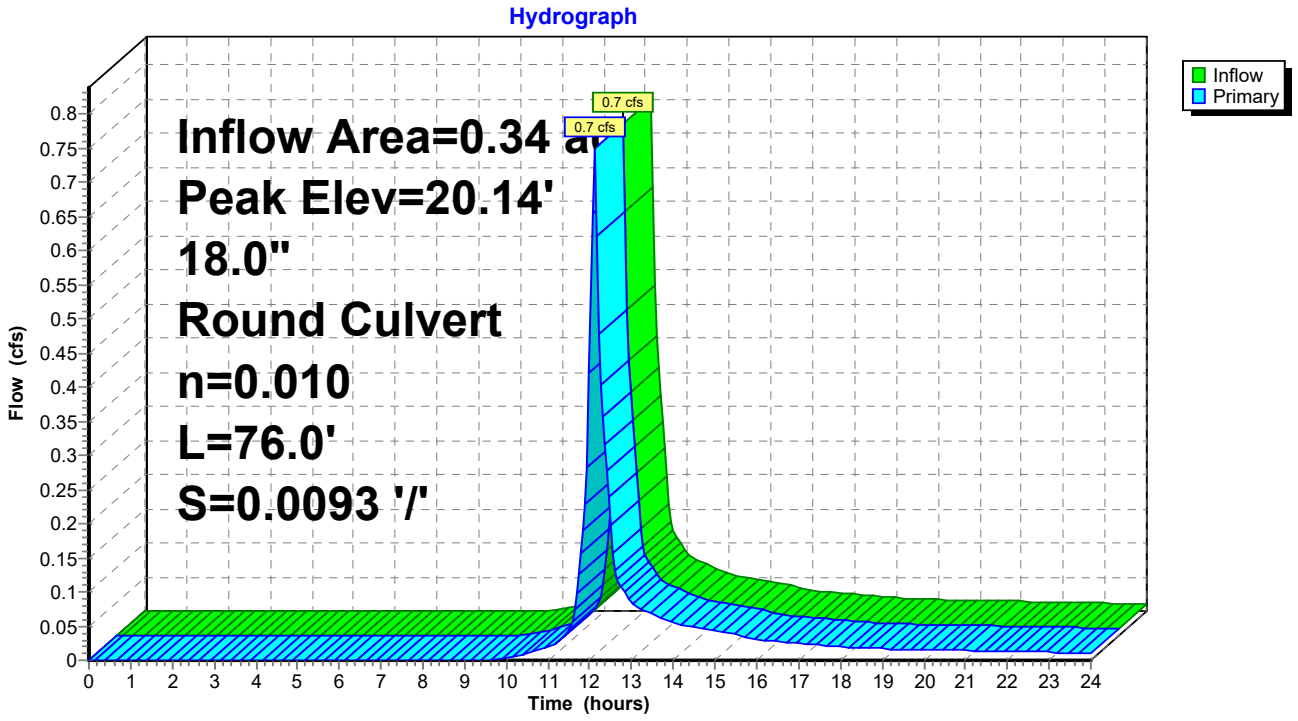
Inflow Area = 0.34 ac, 57.10% Impervious, Inflow Depth > 1.94" for 10-Year Storm event
Inflow = 0.7 cfs @ 12.10 hrs, Volume= 0.055 af
Outflow = 0.7 cfs @ 12.10 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.10 hrs, Volume= 0.055 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 20.14' @ 12.10 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.71'	**18.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.71' / 19.00' S= 0.0093 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.7 cfs @ 12.10 hrs HW=20.14' TW=19.44' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.7 cfs @ 1.76 fps)

Pond 8P: CB8



Summary for Pond 9P: DMH1

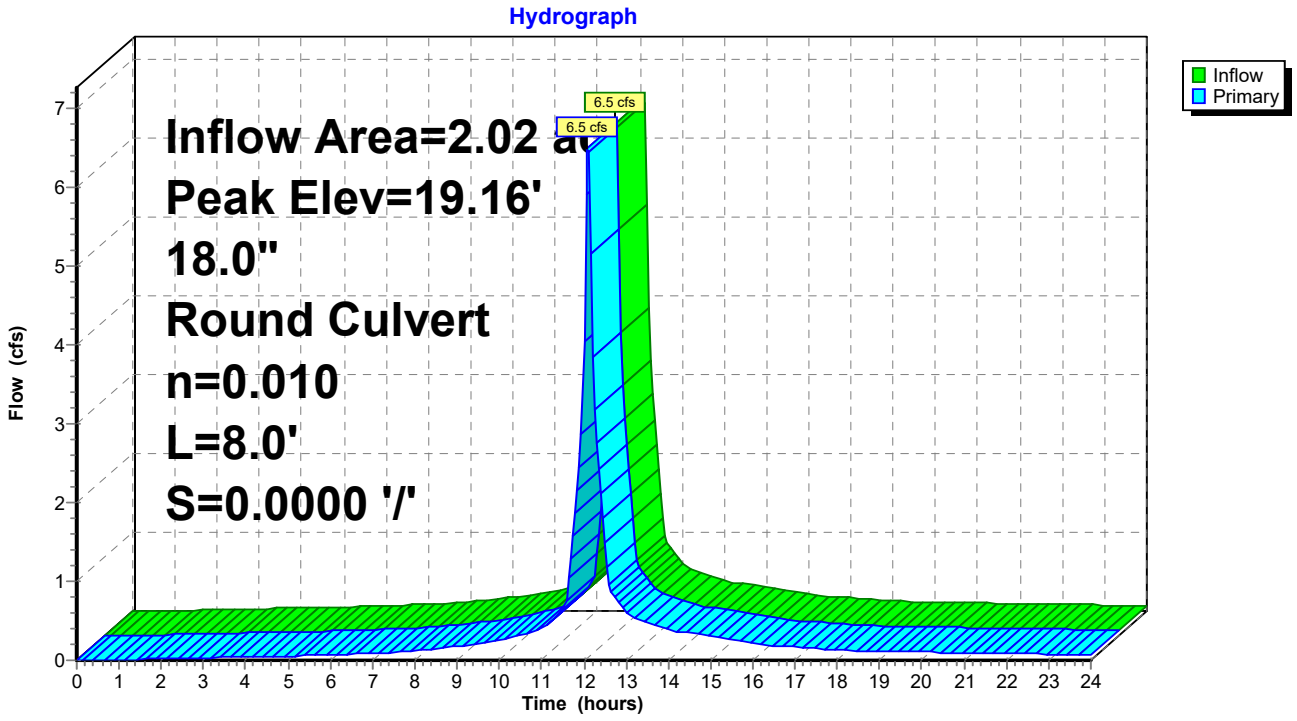
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 3.12" for 10-Year Storm event
Inflow = 6.5 cfs @ 12.09 hrs, Volume= 0.526 af
Outflow = 6.5 cfs @ 12.09 hrs, Volume= 0.526 af, Atten= 0%, Lag= 0.0 min
Primary = 6.5 cfs @ 12.09 hrs, Volume= 0.526 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 19.16' @ 12.10 hrs
Flood Elev= 22.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.58'	**18.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 13.58' / 13.58' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.0 cfs @ 12.09 hrs HW=19.10' TW=18.31' (Dynamic Tailwater)
1=Culvert (Inlet Controls 6.0 cfs @ 3.38 fps)

Pond 9P: DMH1



Summary for Pond 13P: CMP Peak Detention

Inflow	=	6.4 cfs @	12.10 hrs, Volume=	0.380 af
Outflow	=	3.5 cfs @	12.24 hrs, Volume=	0.379 af, Atten= 46%, Lag= 8.2 min
Primary	=	3.5 cfs @	12.24 hrs, Volume=	0.379 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.32' @ 12.24 hrs Surf.Area= 1,224 sf Storage= 3,616 cf
Flood Elev= 20.87' Surf.Area= 1,224 sf Storage= 4,269 cf

Plug-Flow detention time= 13.7 min calculated for 0.378 af (100% of inflow)
Center-of-Mass det. time= 13.2 min (815.4 - 802.2)

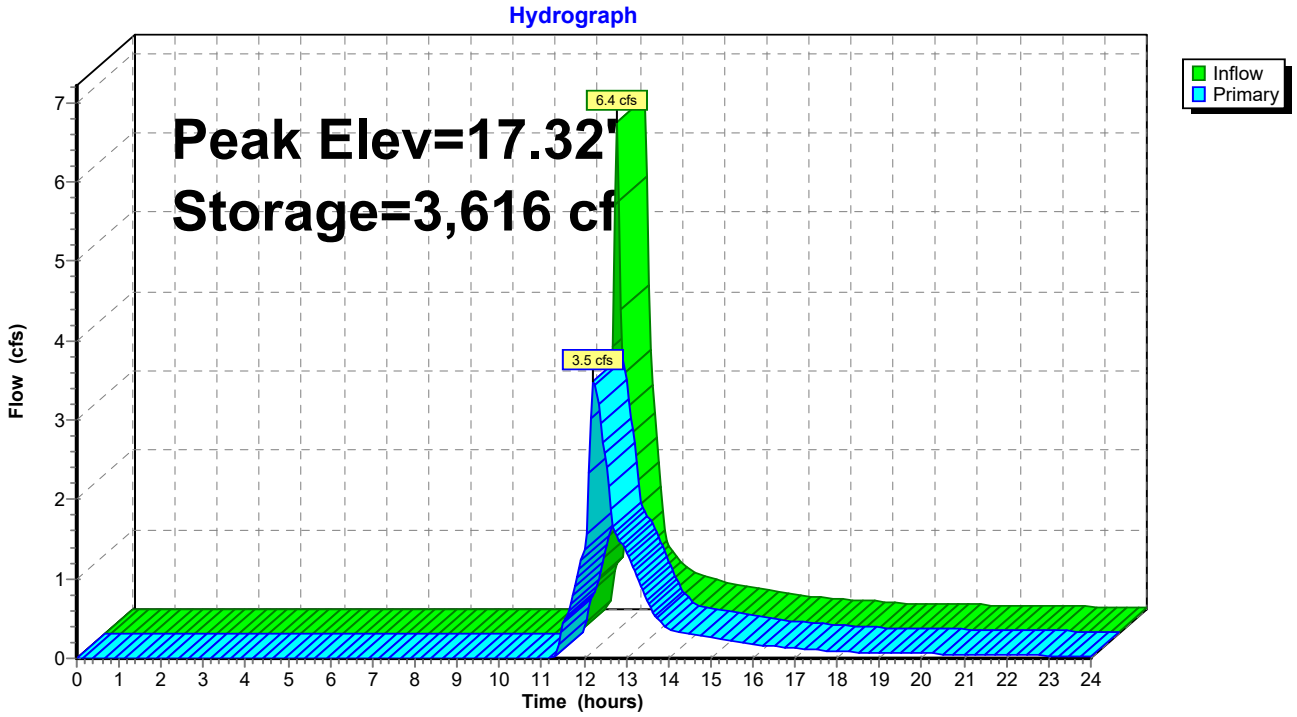
Volume	Invert	Avail.Storage	Storage Description
#1A	12.58'	0 cf	**8.00'W x 153.00'L x 6.00'H Field A** 7,344 cf Overall - 4,268 cf Embedded = 3,076 cf x 0.0% Voids
#2A	12.58'	4,268 cf	**CMP Round 72** x 7 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.26 sf x 20.00'L = 565.2 cf Overall Size= 72.0"W x 72.0"H x 20.00'L Row Length Adjustment= +11.00' x 28.26 sf x 1 rows
		4,268 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	12.58'	**18.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.58' / 12.20' S= 0.0190 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	12.58'	**6.1" Vert. Orifice/Grate** C= 0.600
#3	Device 1	15.58'	**5.7" Vert. Orifice/Grate** C= 0.600
#4	Device 1	16.66'	**4.8" Vert. Orifice/Grate** C= 0.600
#5	Device 1	17.92'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 3.21 3.27 3.33 3.39 3.45 3.51 3.57 3.63 3.69 3.75 3.81 3.87 Width (feet) 3.75 3.60 3.43 3.26 3.06 2.85 2.62 2.35 2.05 1.68 1.19 0.00

Primary OutFlow Max=3.5 cfs @ 12.24 hrs HW=17.30' TW=13.01' (Dynamic Tailwater)
- **1=Culvert** (Passes 3.5 cfs of 17.0 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 2.0 cfs @ 9.97 fps)
  - **3=Orifice/Grate** (Orifice Controls 1.0 cfs @ 5.87 fps)
  - **4=Orifice/Grate** (Orifice Controls 0.4 cfs @ 3.20 fps)
  - **5=Custom Weir/Orifice** (Controls 0.0 cfs)

Pond 13P: CMP Peak Detention



Summary for Pond 14P: CONTECH WQv CMP Det & SF System

Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 3.12" for 10-Year Storm event
Inflow = 6.5 cfs @ 12.09 hrs, Volume= 0.526 af
Outflow = 6.5 cfs @ 12.10 hrs, Volume= 0.446 af, Atten= 0%, Lag= 0.7 min
Primary = 0.0 cfs @ 12.08 hrs, Volume= 0.066 af
Secondary = 6.4 cfs @ 12.10 hrs, Volume= 0.380 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 13.58' Surf.Area= 1,313 sf Storage= 186 cf
Peak Elev= 18.33' @ 12.10 hrs Surf.Area= 1,313 sf Storage= 4,043 cf (3,857 cf above start)
Flood Elev= 20.87' Surf.Area= 1,313 sf Storage= 4,110 cf (3,924 cf above start)

Plug-Flow detention time= 118.8 min calculated for 0.442 af (84% of inflow)
Center-of-Mass det. time= 44.0 min (817.9 - 773.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	13.08'	0 cf	**7.50'W x 175.00'L x 5.50'H Field A** 7,219 cf Overall - 4,108 cf Embedded = 3,110 cf x 0.0% Voids
#2A	13.08'	4,108 cf	**CMP Round 66** x 8 Inside #1 Effective Size= 66.0"W x 66.0"H => 23.75 sf x 20.00'L = 475.0 cf Overall Size= 66.0"W x 66.0"H x 20.00'L Row Length Adjustment= +13.00' x 23.75 sf x 1 rows
		4,108 cf	Total Available Storage

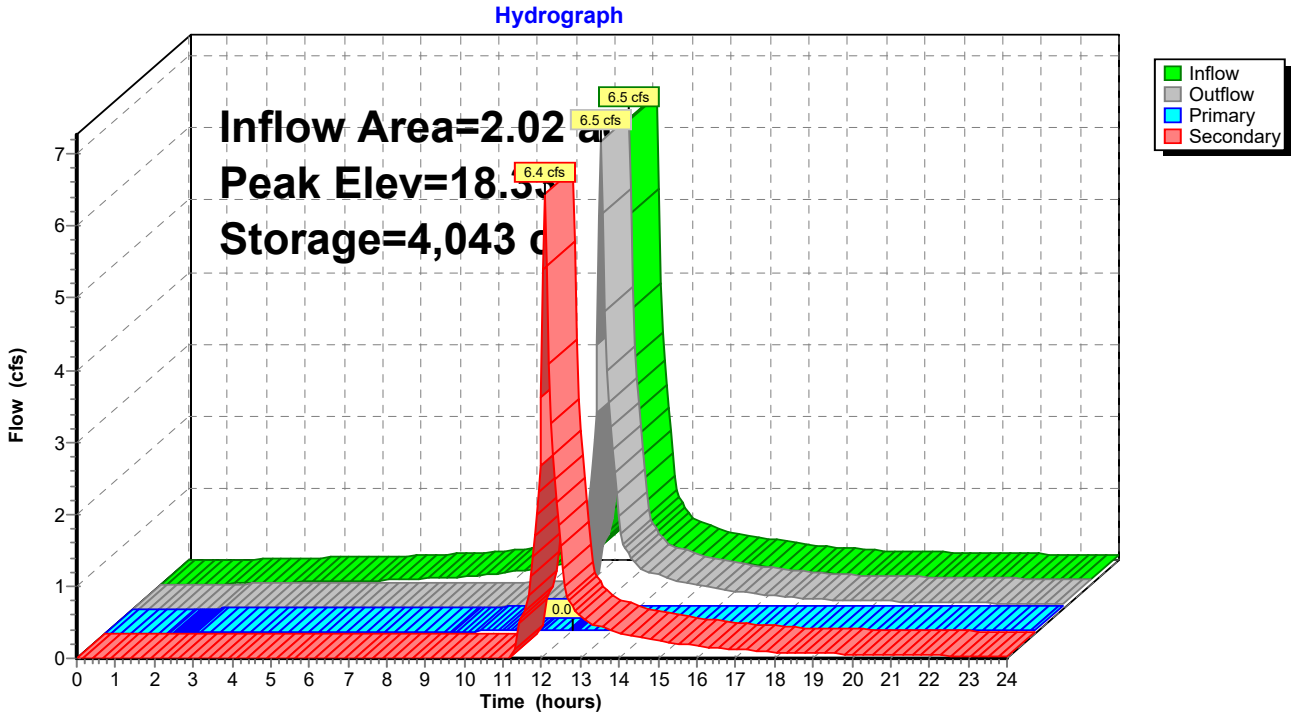
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	13.58'	**12.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.58' / 13.56' S= 0.0067 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	12.58'	**Tube/Siphon/Float Valve X 7.00** Starts@15.33' Breaks@13.25' 0.336" Diameter, C= 0.600, 0.263" Trickle Diameter
#3	Secondary	17.65'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 2.44 2.49 2.54 2.60 2.66 2.71 2.76 2.82 2.87 2.93 2.99 3.04 3.09 3.15 3.20 3.26 3.32 3.37 Width (feet) 4.13 4.03 3.93 3.82 3.70 3.57 3.44 3.30 3.15 2.98 2.81 2.61 2.40 2.16 1.88 1.54 1.09 0.00

Primary OutFlow Max=0.0 cfs @ 12.08 hrs HW=18.30' TW=12.76' (Dynamic Tailwater)
└─**2=Tube/Siphon/Float Valve** (Orifice Controls 0.0 cfs @ 11.34 fps)
└─**1=Culvert** (Passes 0.0 cfs of 7.8 cfs potential flow)

Secondary OutFlow Max=6.4 cfs @ 12.10 hrs HW=18.33' TW=16.23' (Dynamic Tailwater)
└─**3=Custom Weir/Orifice** (Weir Controls 6.4 cfs @ 2.84 fps)

Pond 14P: CONTECH WQv CMP Det & SF System



Summary for Pond 17P: DMH2

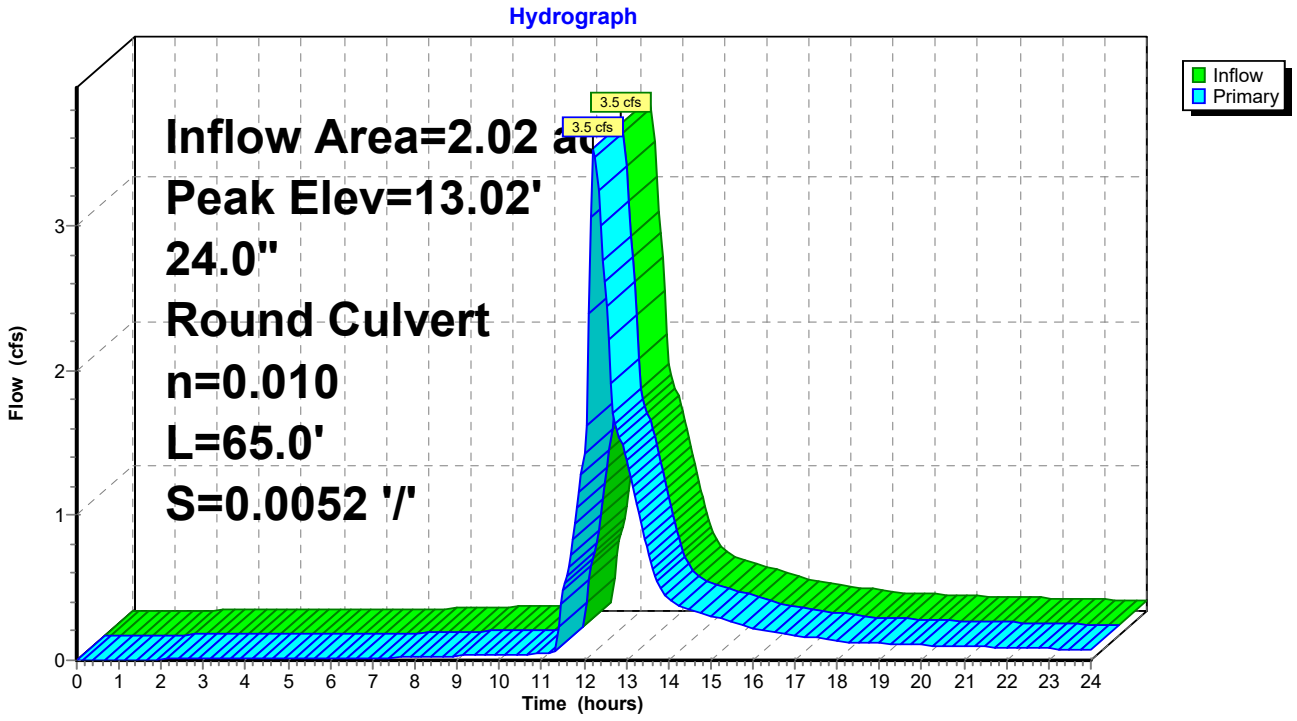
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 2.64" for 10-Year Storm event
Inflow = 3.5 cfs @ 12.24 hrs, Volume= 0.446 af
Outflow = 3.5 cfs @ 12.24 hrs, Volume= 0.446 af, Atten= 0%, Lag= 0.0 min
Primary = 3.5 cfs @ 12.24 hrs, Volume= 0.446 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 13.02' @ 12.26 hrs
Flood Elev= 21.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.07'	**24.0" Round Culvert** L= 65.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 12.07' / 11.73' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.5 cfs @ 12.24 hrs HW=13.01' TW=12.53' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.5 cfs @ 3.47 fps)

Pond 17P: DMH2



Summary for Pond 18P: DMH3

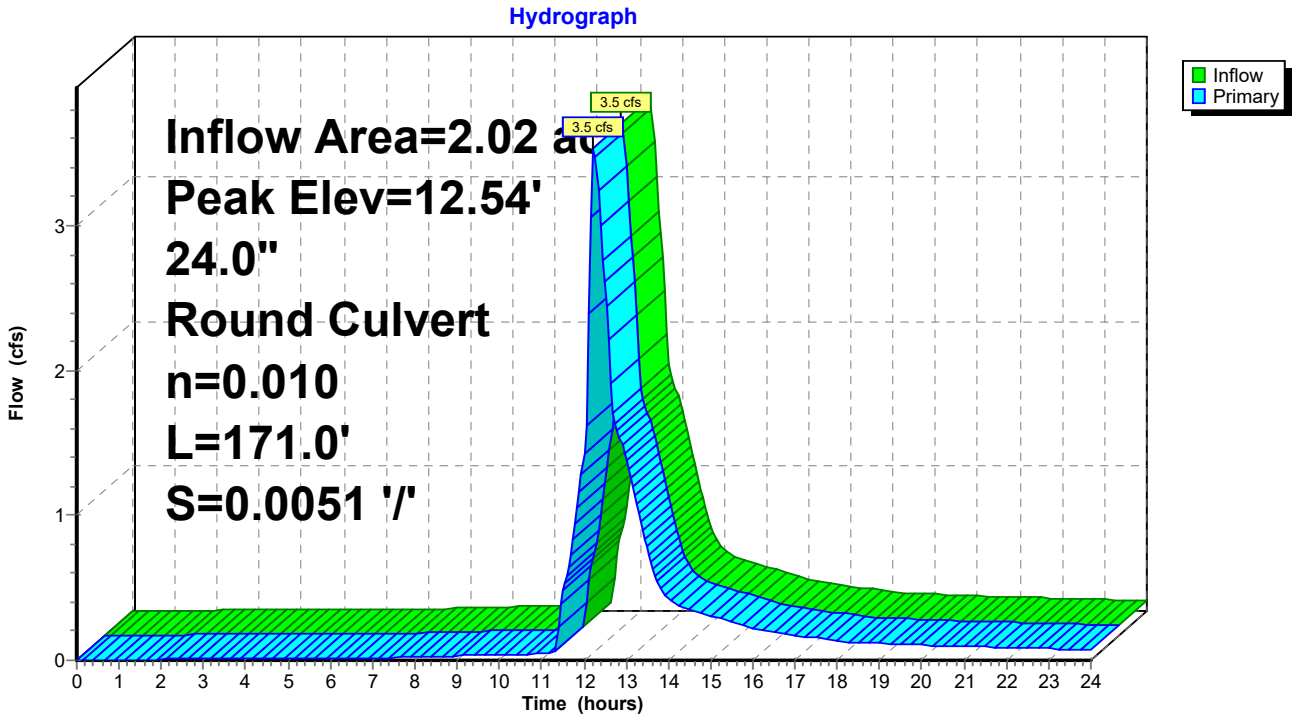
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 2.64" for 10-Year Storm event
Inflow = 3.5 cfs @ 12.24 hrs, Volume= 0.446 af
Outflow = 3.5 cfs @ 12.24 hrs, Volume= 0.446 af, Atten= 0%, Lag= 0.0 min
Primary = 3.5 cfs @ 12.24 hrs, Volume= 0.446 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 12.54' @ 12.24 hrs
Flood Elev= 20.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	**24.0" Round Culvert** L= 171.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 11.63' / 10.75' S= 0.0051 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.5 cfs @ 12.24 hrs HW=12.53' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.5 cfs @ 2.56 fps)

Pond 18P: DMH3



Summary for Pond 22P: Ex DMH3

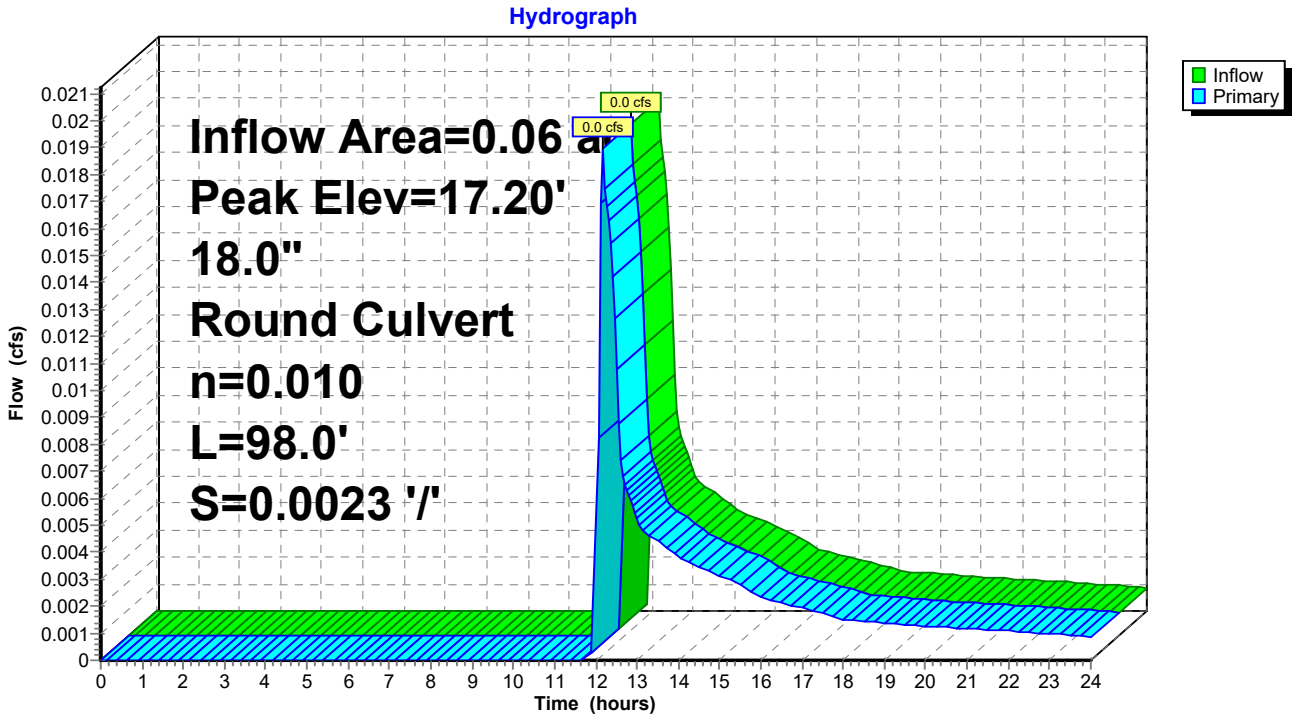
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 0.54" for 10-Year Storm event
Inflow = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af
Outflow = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.20' @ 12.15 hrs
Flood Elev= 24.92'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.12'	**18.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.12' / 16.89' S= 0.0023 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.15 hrs HW=17.20' TW=16.82' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.0 cfs @ 0.82 fps)

Pond 22P: Ex DMH3



Summary for Pond 23P: Ex CB3

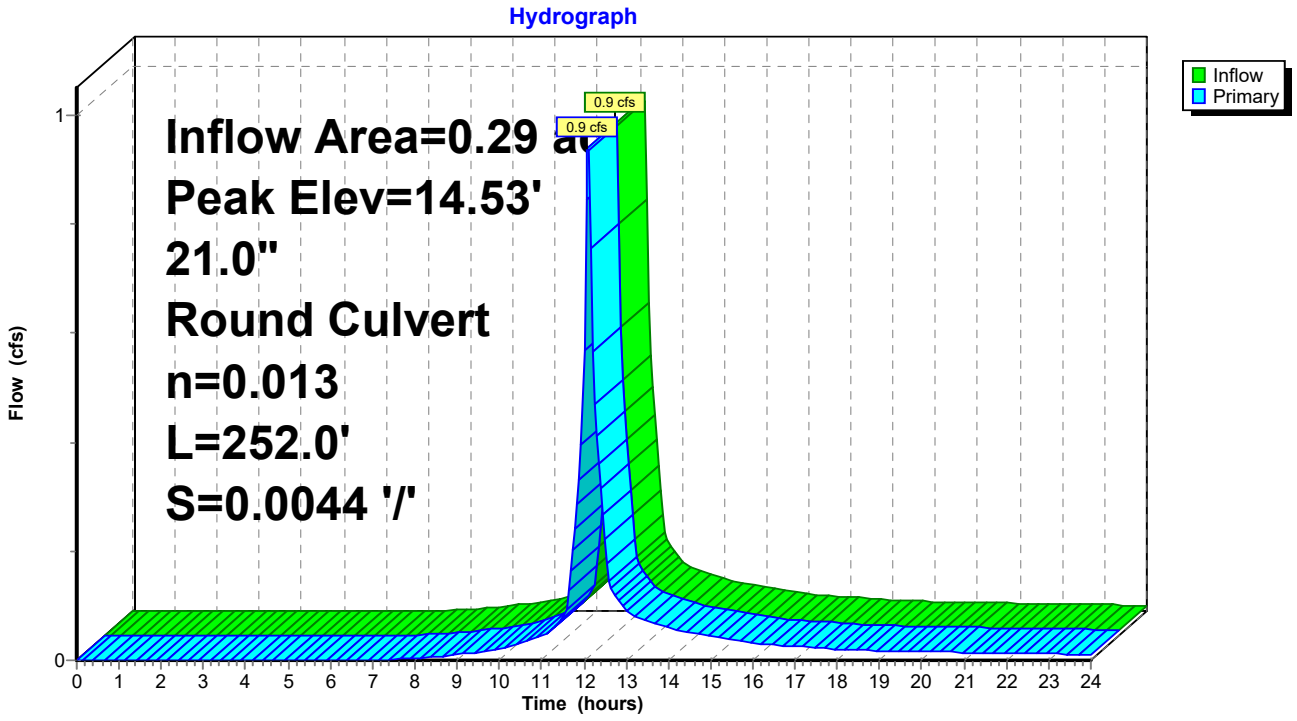
Inflow Area = 0.29 ac, 73.97% Impervious, Inflow Depth > 2.81" for 10-Year Storm event
Inflow = 0.9 cfs @ 12.09 hrs, Volume= 0.068 af
Outflow = 0.9 cfs @ 12.09 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.09 hrs, Volume= 0.068 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.53' @ 12.09 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.05'	**21.0" Round Culvert** L= 252.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.05' / 12.94' S= 0.0044 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 2.41 sf

Primary OutFlow Max=0.9 cfs @ 12.09 hrs HW=14.53' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.9 cfs @ 2.61 fps)

Pond 23P: Ex CB3



Summary for Pond 24P: Ex DMH2

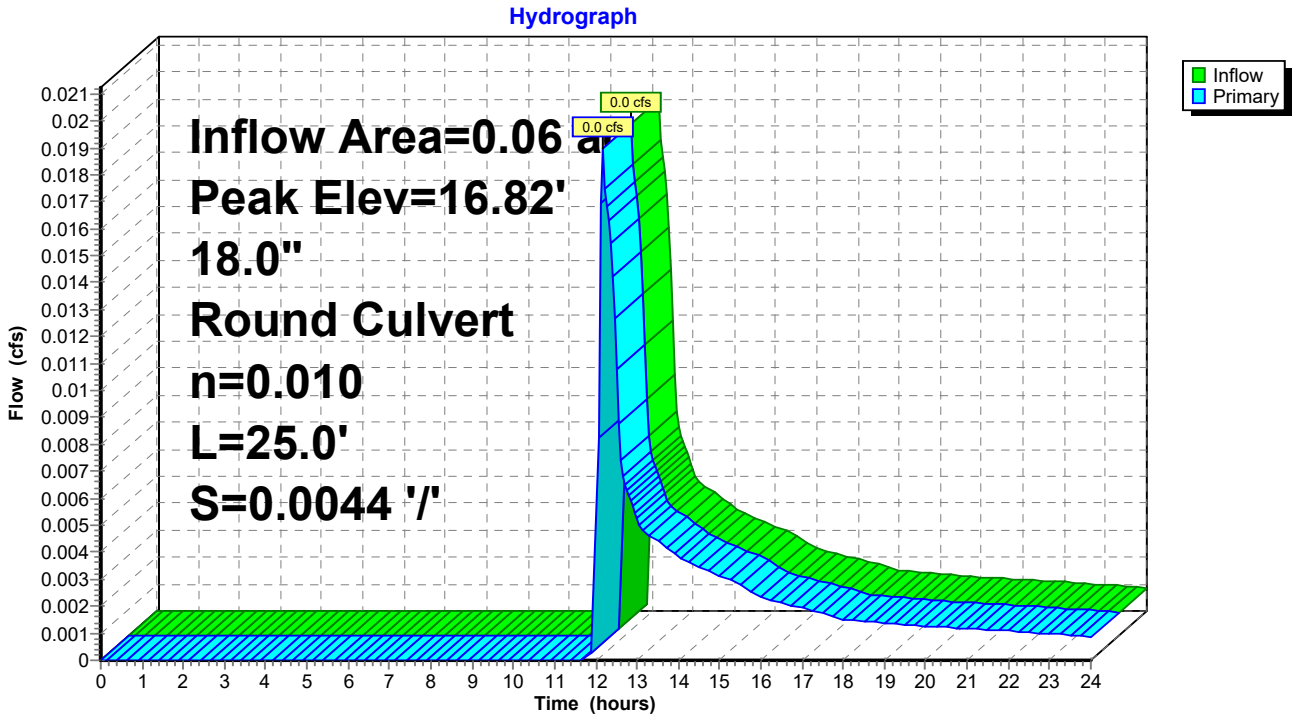
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 0.54" for 10-Year Storm event
Inflow = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af
Outflow = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.82' @ 12.15 hrs
Flood Elev= 25.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.75'	**18.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.75' / 16.64' S= 0.0044 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.15 hrs HW=16.82' TW=16.61' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.0 cfs @ 0.98 fps)

Pond 24P: Ex DMH2



Summary for Pond 26P: DMH5

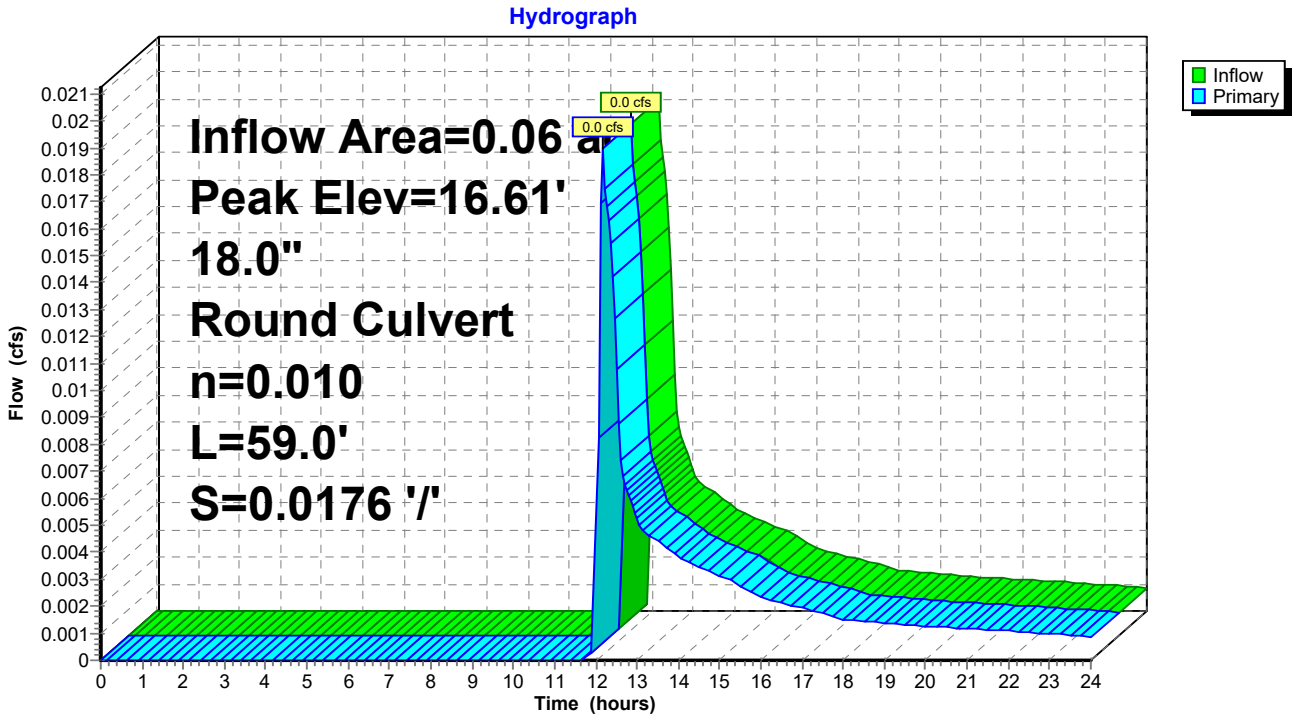
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 0.54" for 10-Year Storm event
Inflow = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af
Outflow = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.61' @ 12.15 hrs
Flood Elev= 25.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.54'	**18.0" Round Culvert** L= 59.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.54' / 15.50' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.15 hrs HW=16.61' TW=15.51' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.0 cfs @ 0.69 fps)

Pond 26P: DMH5



Summary for Pond 27P: DMH10

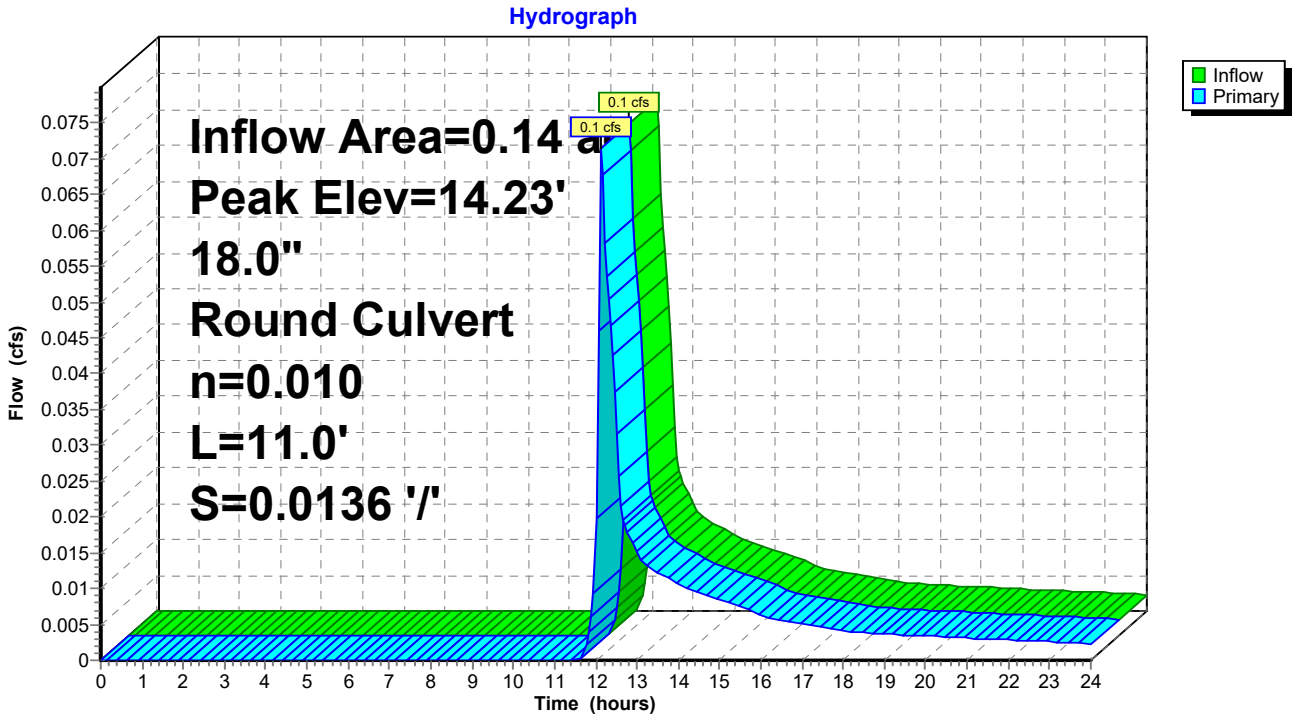
Inflow Area = 0.14 ac, 23.10% Impervious, Inflow Depth > 0.68" for 10-Year Storm event
Inflow = 0.1 cfs @ 12.12 hrs, Volume= 0.008 af
Outflow = 0.1 cfs @ 12.12 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.12 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.23' @ 12.12 hrs
Flood Elev= 24.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.10'	**18.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.10' / 13.95' S= 0.0136 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.12 hrs HW=14.23' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.1 cfs @ 0.96 fps)

Pond 27P: DMH10



Summary for Pond 29P: Ex DMH4

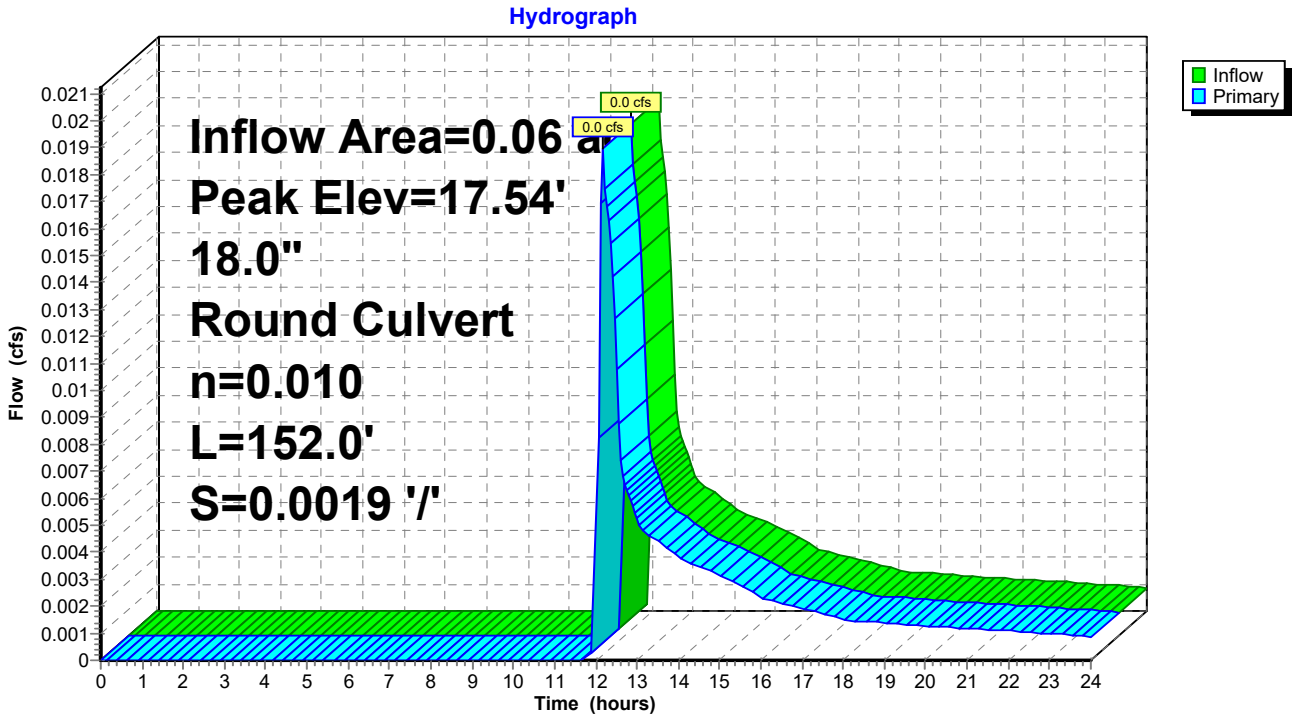
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 0.54" for 10-Year Storm event
Inflow = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af
Outflow = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.15 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.54' @ 12.15 hrs
Flood Elev= 23.44'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.46'	**18.0" Round Culvert** L= 152.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.46' / 17.17' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.15 hrs HW=17.54' TW=17.20' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.0 cfs @ 0.77 fps)

Pond 29P: Ex DMH4

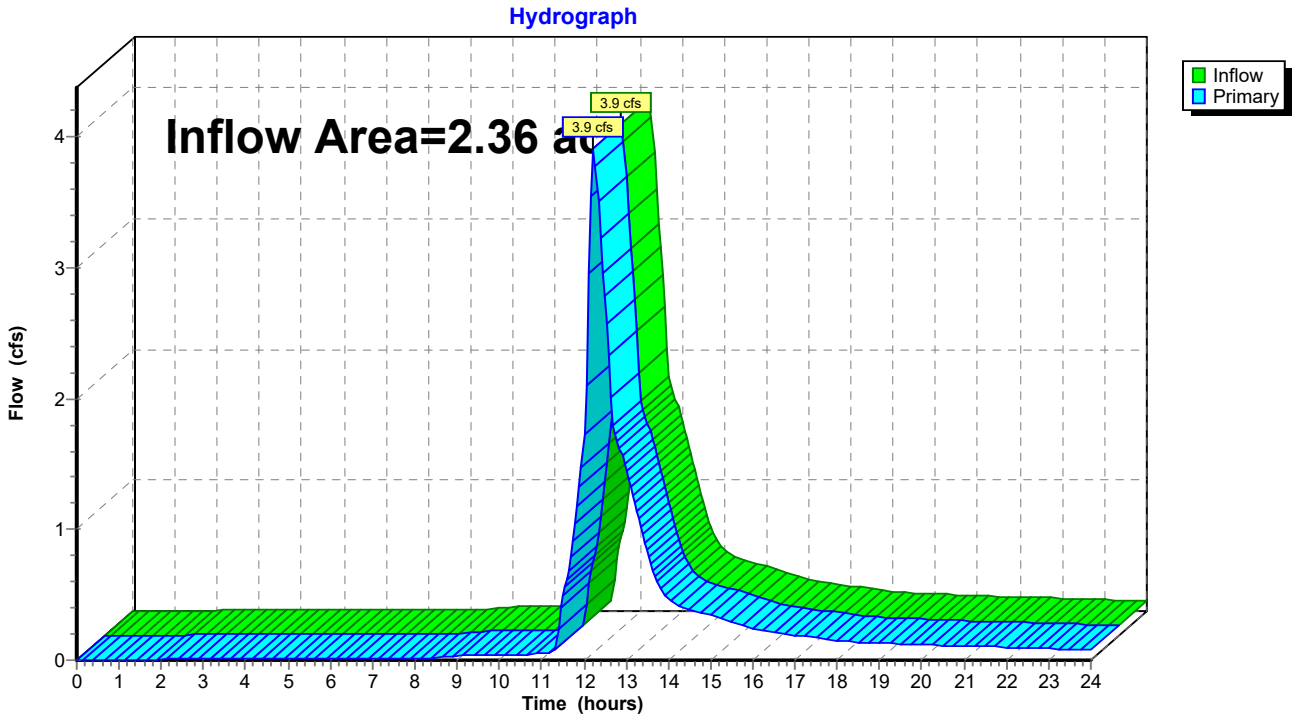


Summary for Link SP1: Forest Ave Storm Drain

Inflow Area = 2.36 ac, 72.31% Impervious, Inflow Depth > 2.48" for 10-Year Storm event
Inflow = 3.9 cfs @ 12.22 hrs, Volume= 0.489 af
Primary = 3.9 cfs @ 12.22 hrs, Volume= 0.489 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Forest Ave Storm Drain

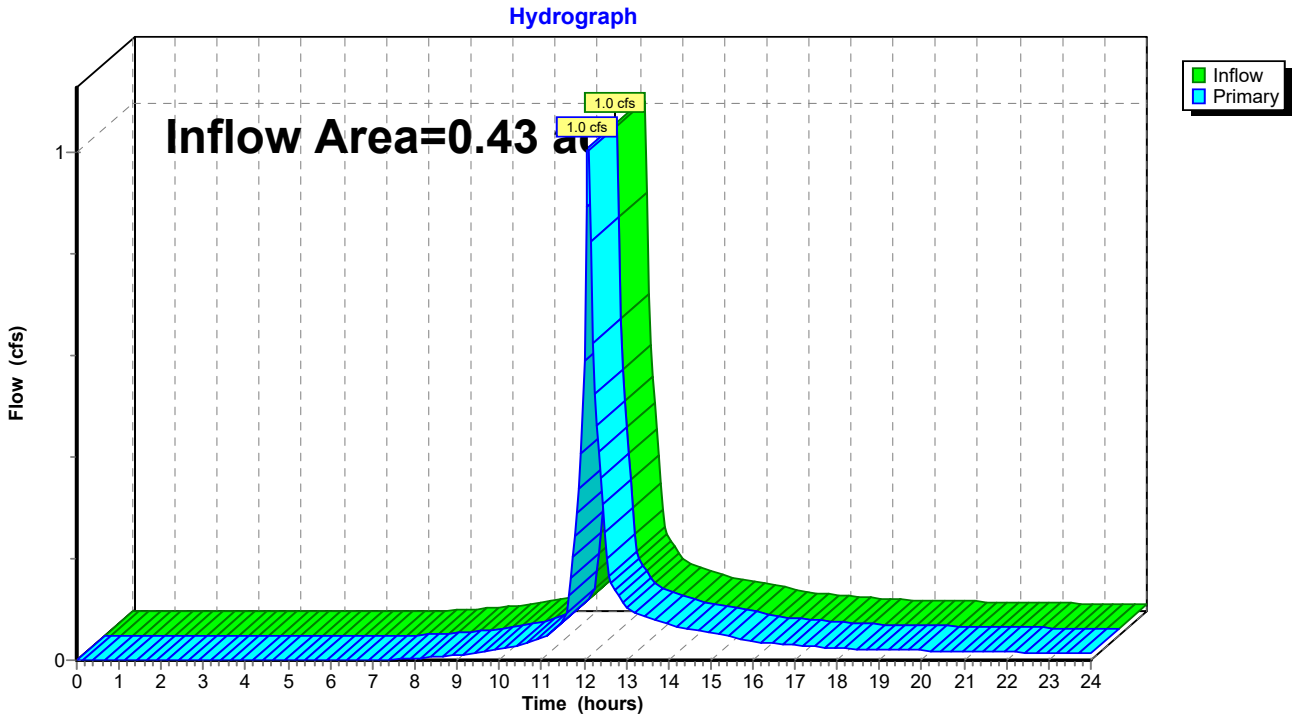


Summary for Link SP2: Combined Sewer

Inflow Area = 0.43 ac, 57.64% Impervious, Inflow Depth > 2.13" for 10-Year Storm event
Inflow = 1.0 cfs @ 12.09 hrs, Volume= 0.076 af
Primary = 1.0 cfs @ 12.09 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Combined Sewer



Summary for Subcatchment 1S:

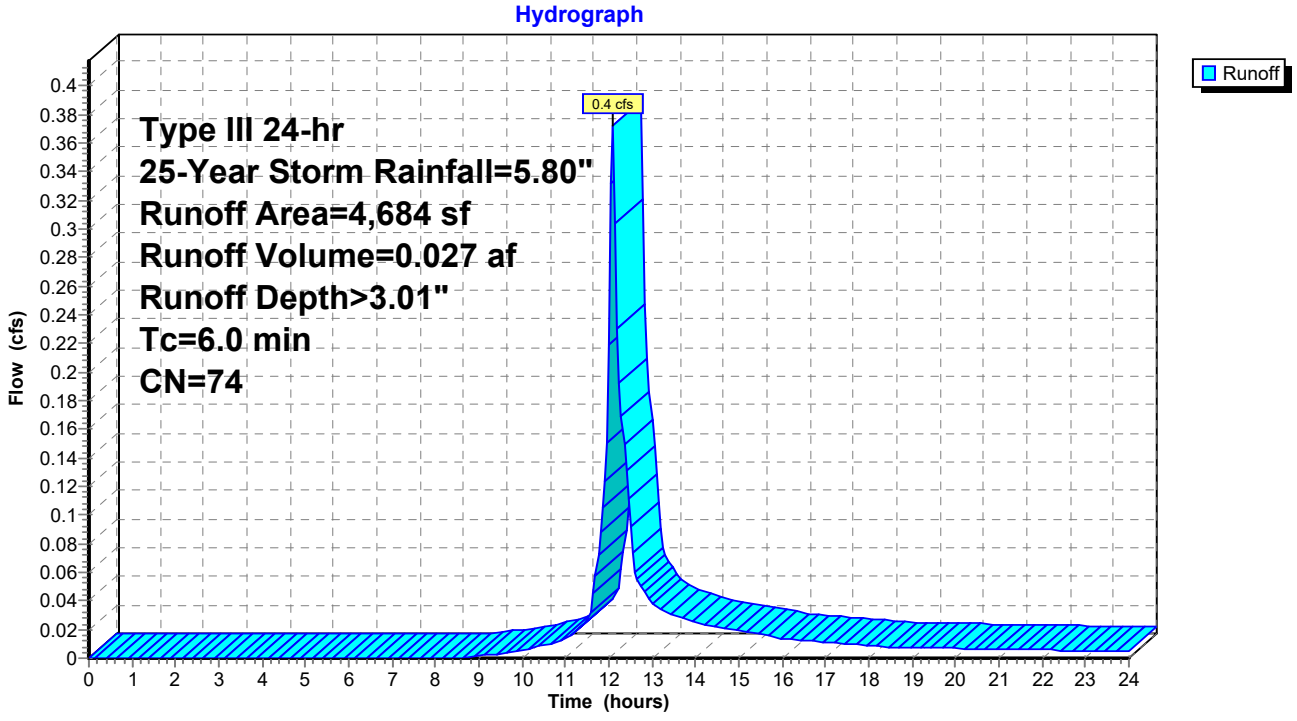
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.027 af, Depth> 3.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	2,770	98	Impervious
	1,237	39	Grass cover, Good, HSG A
*	677	40	Porous Pavement
	4,684	74	Weighted Average
	1,914		40.86% Pervious Area
	2,770		59.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1S:



Summary for Subcatchment 2S:

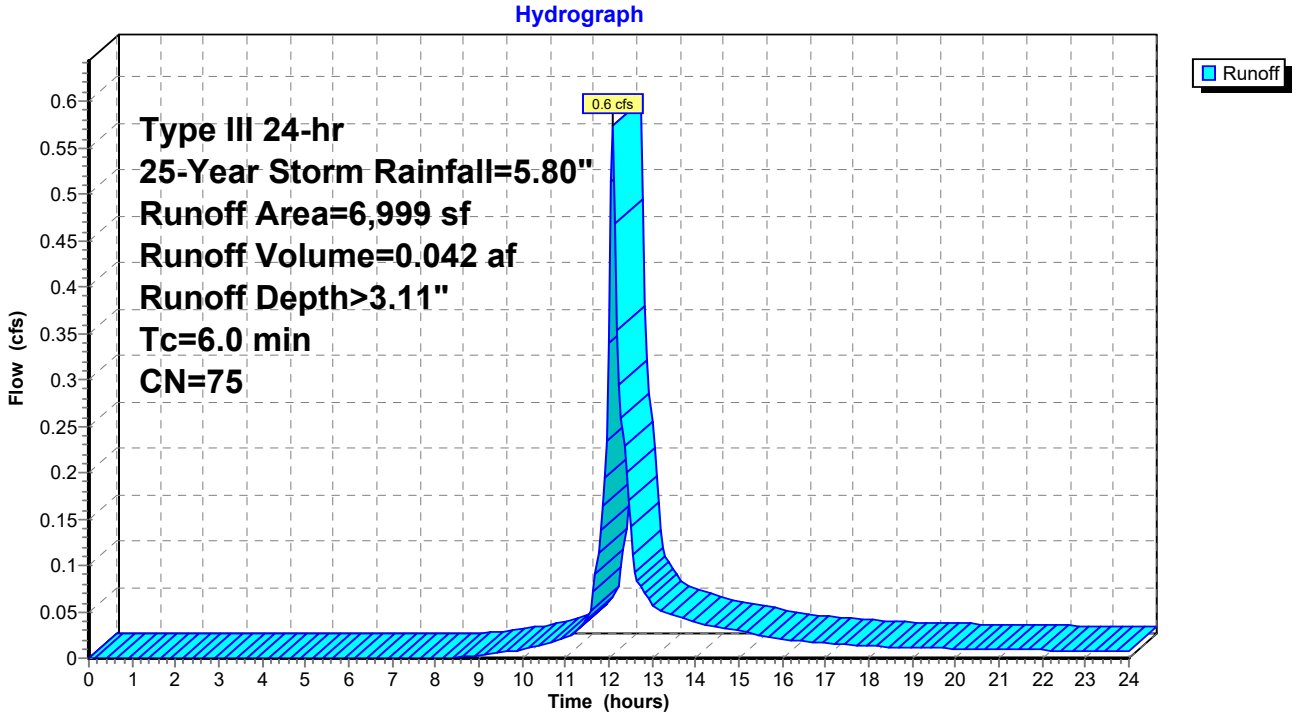
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 0.042 af, Depth> 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	4,238	98	Impervious
	1,996	39	Grass cover, Good, HSG A
*	765	40	Porous Pavement
	6,999	75	Weighted Average
	2,761		39.45% Pervious Area
	4,238		60.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2S:



Summary for Subcatchment 3S:

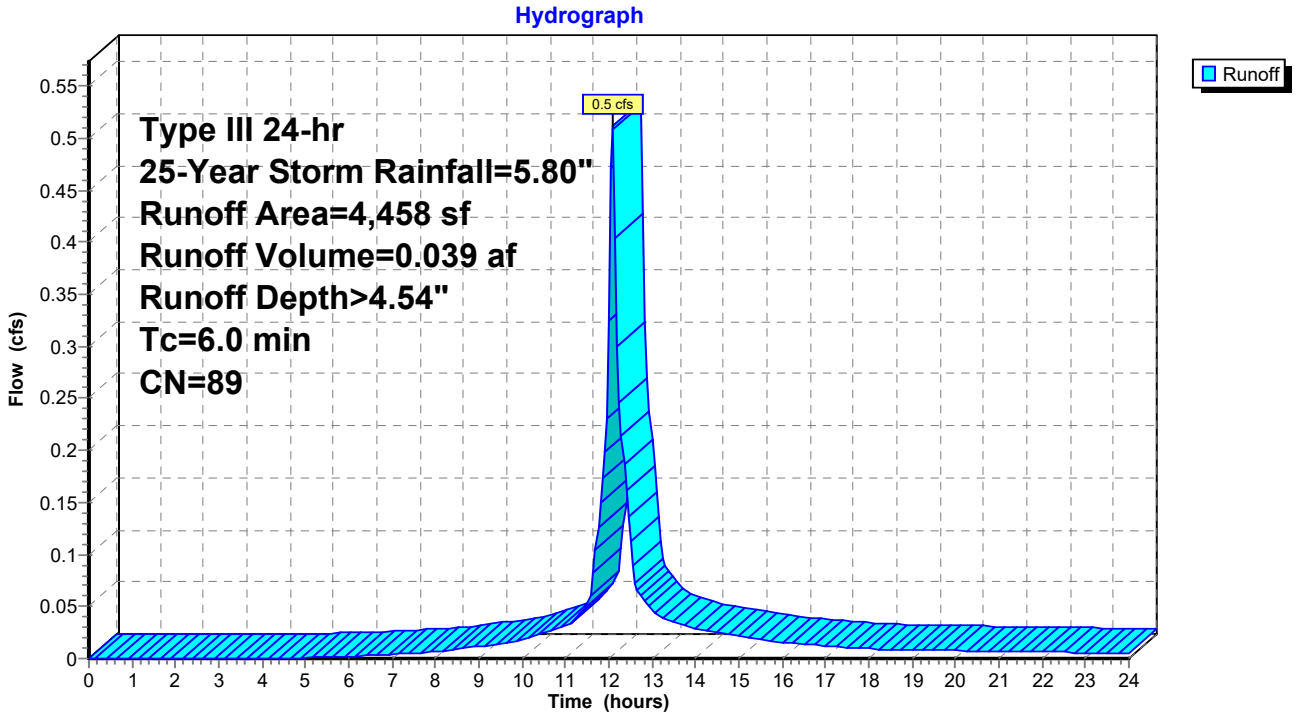
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.039 af, Depth> 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	3,789	98	Impervious
	669	39	Grass cover, Good, HSG A
	4,458	89	Weighted Average
	669		15.01% Pervious Area
	3,789		84.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S:



Summary for Subcatchment 4S:

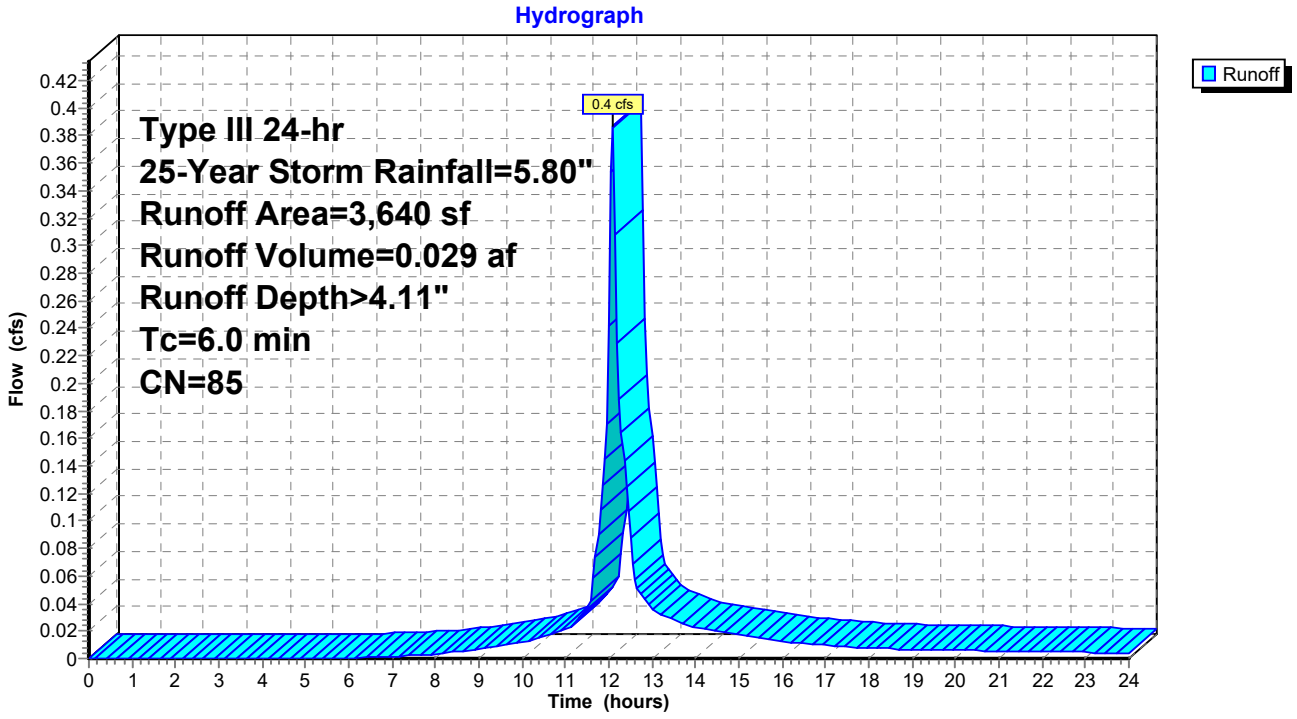
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	2,814	98	Impervious
	826	39	Grass cover, Good, HSG A
	3,640	85	Weighted Average
	826		22.69% Pervious Area
	2,814		77.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S:



Summary for Subcatchment 5S:

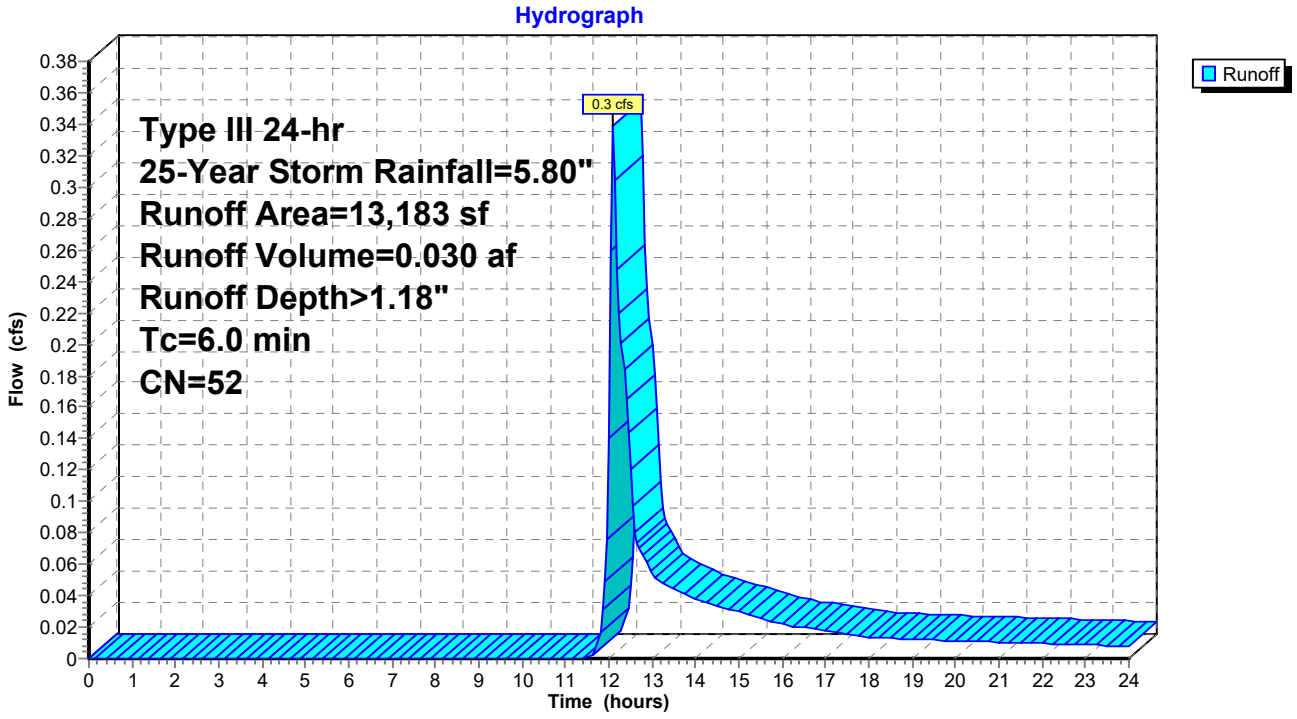
Runoff = 0.3 cfs @ 12.11 hrs, Volume= 0.030 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	2,965	98	Impervious
	10,218	39	Grass cover, Good, HSG A
	13,183	52	Weighted Average
	10,218		77.51% Pervious Area
	2,965		22.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 5S:



Summary for Subcatchment 6S:

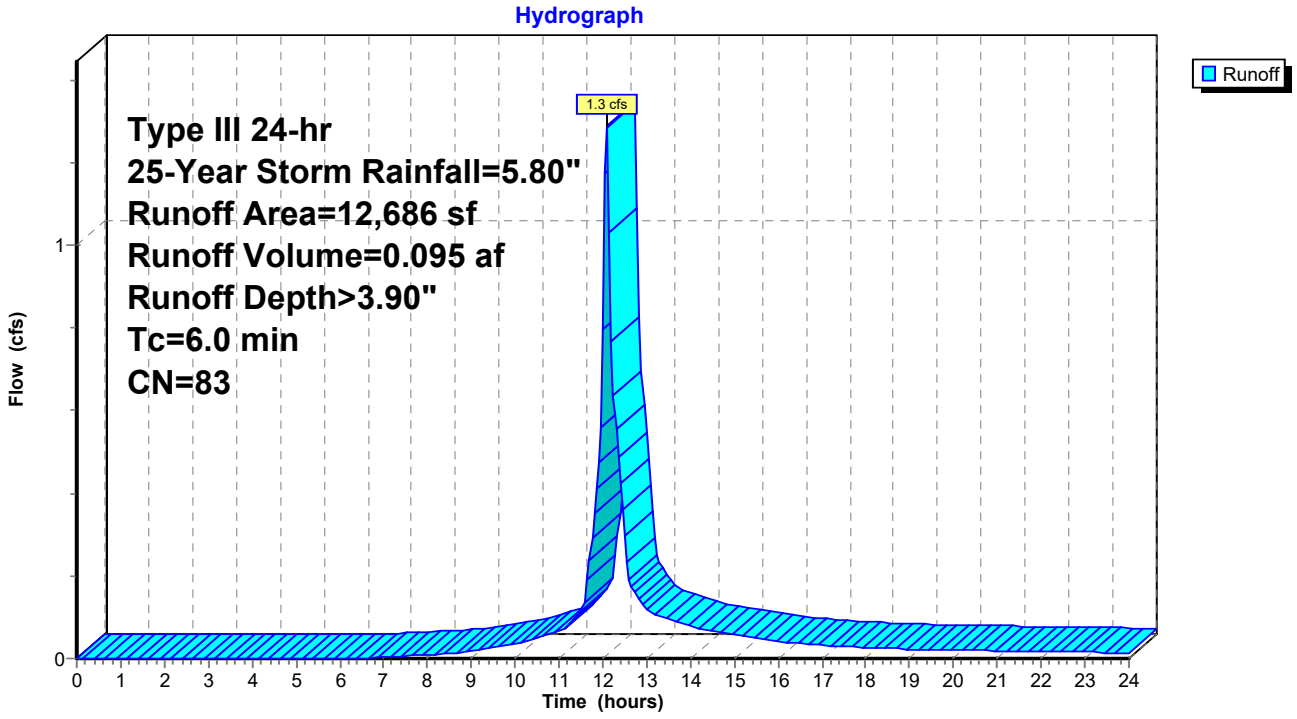
Runoff = 1.3 cfs @ 12.09 hrs, Volume= 0.095 af, Depth> 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	9,384	98	Impervious
	3,302	39	Grass cover, Good, HSG A
	12,686	83	Weighted Average
	3,302		26.03% Pervious Area
	9,384		73.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 6S:



Summary for Subcatchment 7S: Parking Garage

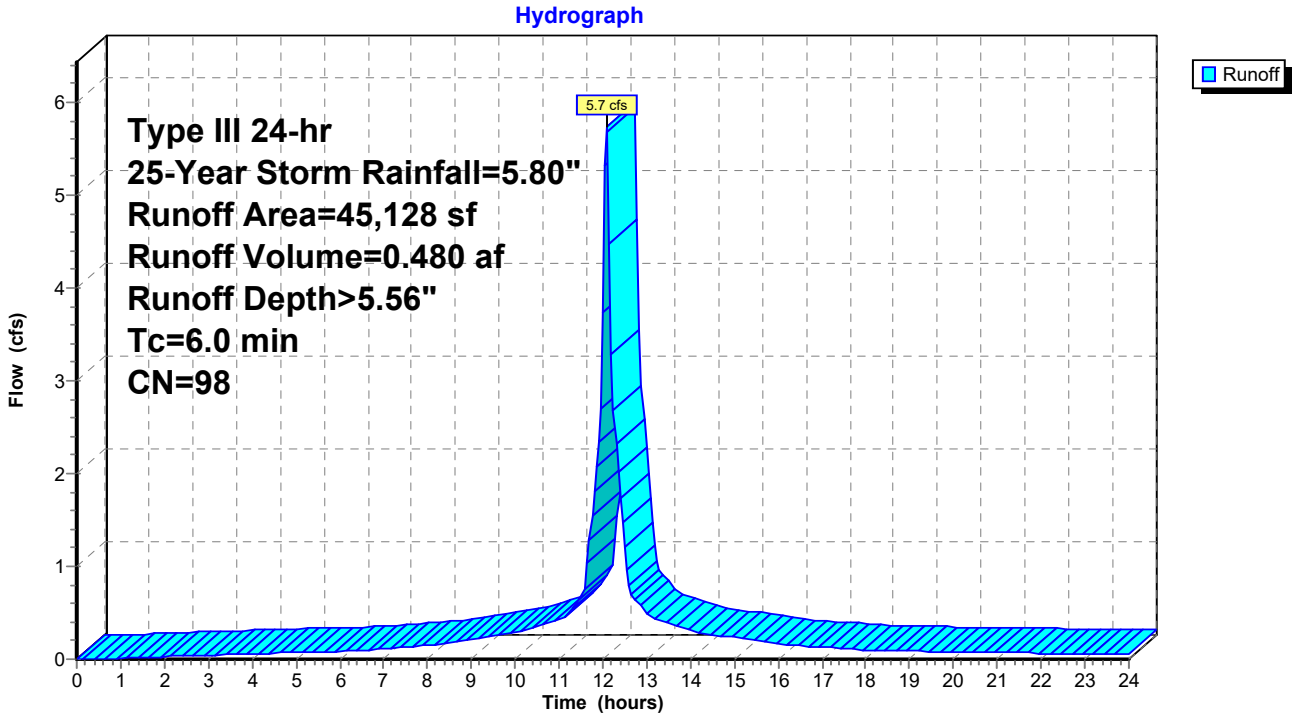
Runoff = 5.7 cfs @ 12.09 hrs, Volume= 0.480 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	45,128	98	Impervious
	45,128		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 7S: Parking Garage



Summary for Subcatchment 8S:

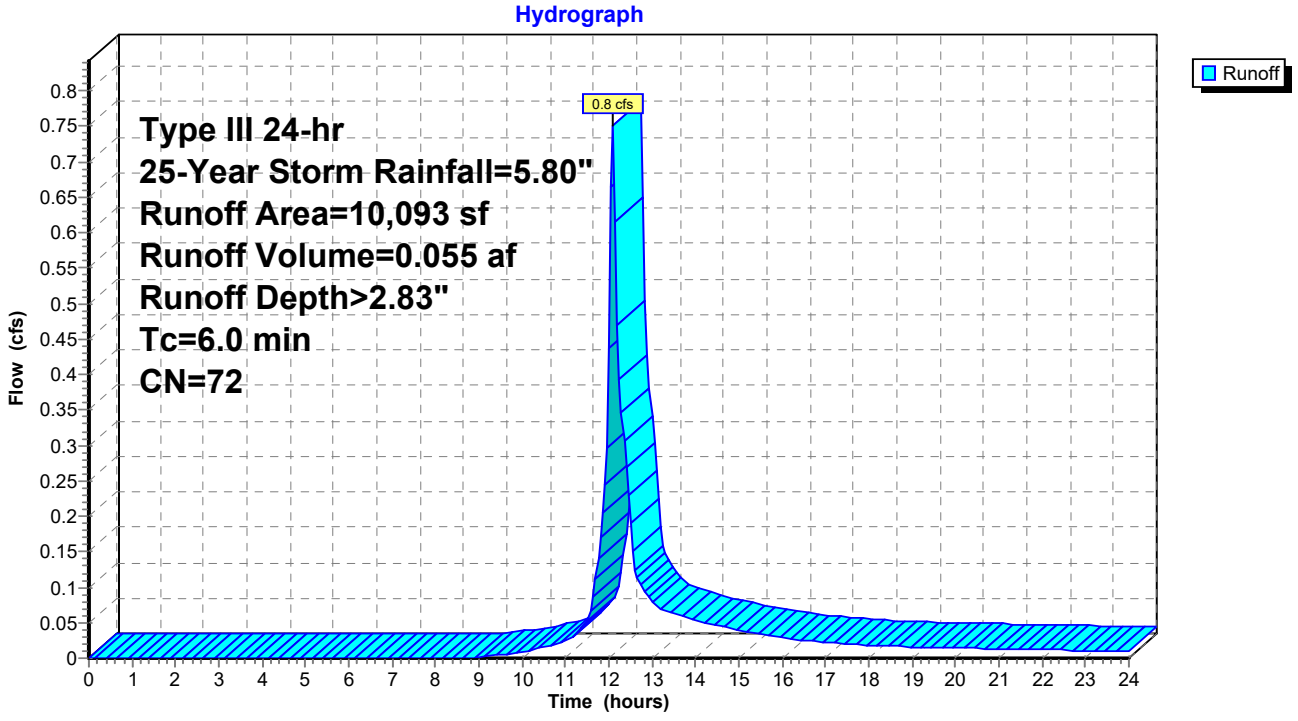
Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.055 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	5,667	98	Impervious
	3,193	39	Grass cover, Good, HSG A
*	1,233	40	Porous Pavement
	10,093	72	Weighted Average
	4,426		43.85% Pervious Area
	5,667		56.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 8S:



Summary for Subcatchment 9S:

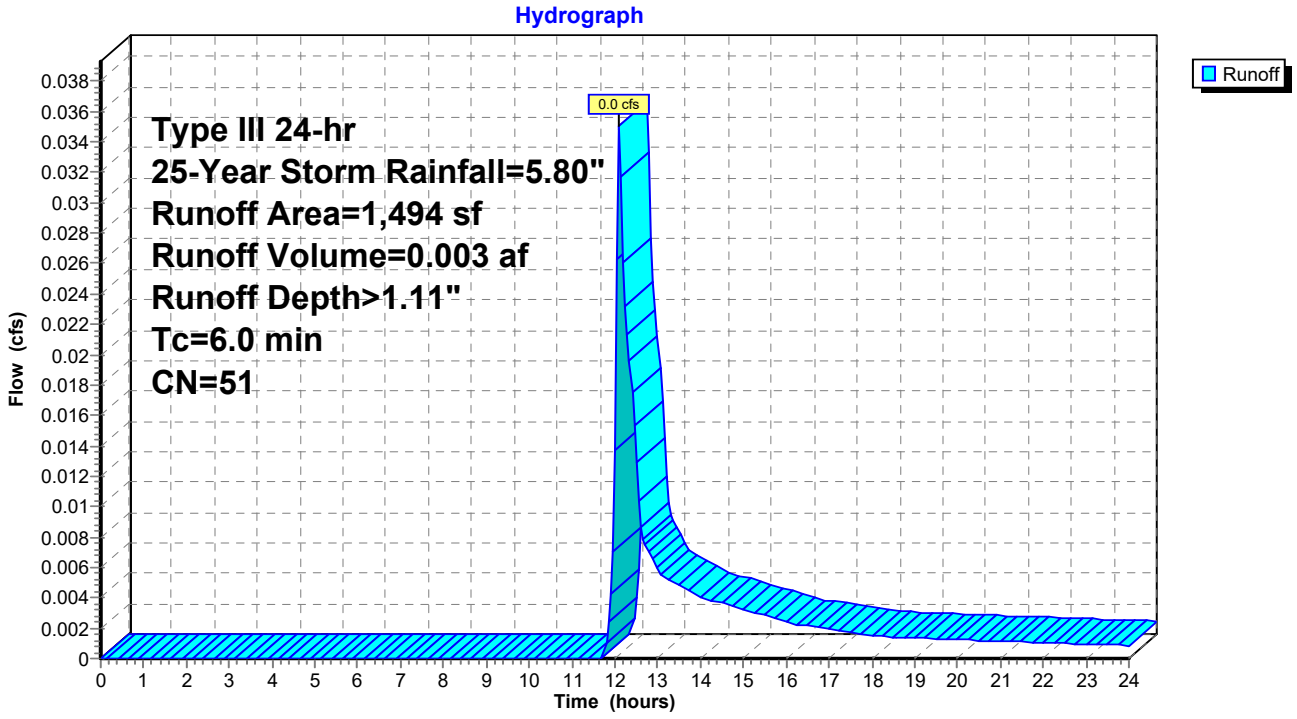
Runoff = 0.0 cfs @ 12.11 hrs, Volume= 0.003 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	302	98	Impervious
	1,192	39	Grass cover, Good, HSG A
	1,494	51	Weighted Average
	1,192		79.79% Pervious Area
	302		20.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 9S:



Summary for Subcatchment 10S:

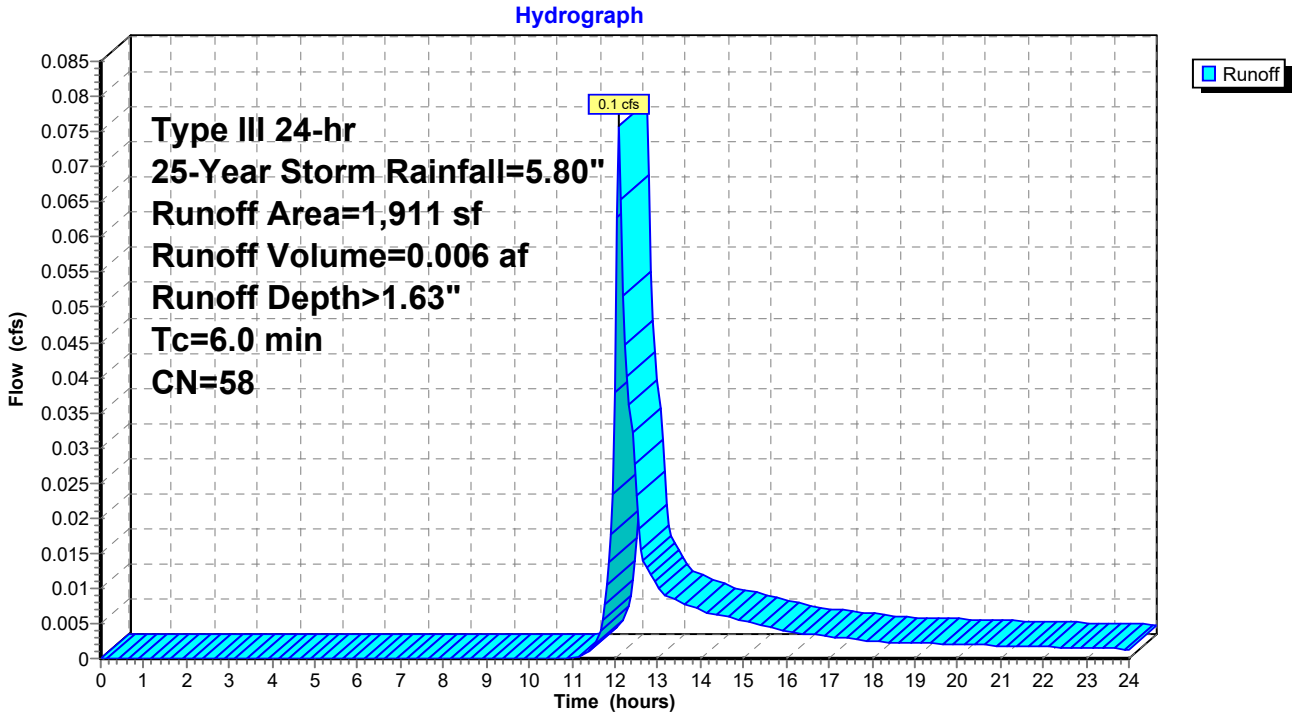
Runoff = 0.1 cfs @ 12.10 hrs, Volume= 0.006 af, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	617	98	Impervious
	1,294	39	Grass cover, Good, HSG A
	1,911	58	Weighted Average
	1,294		67.71% Pervious Area
	617		32.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 10S:



Summary for Subcatchment 12S:

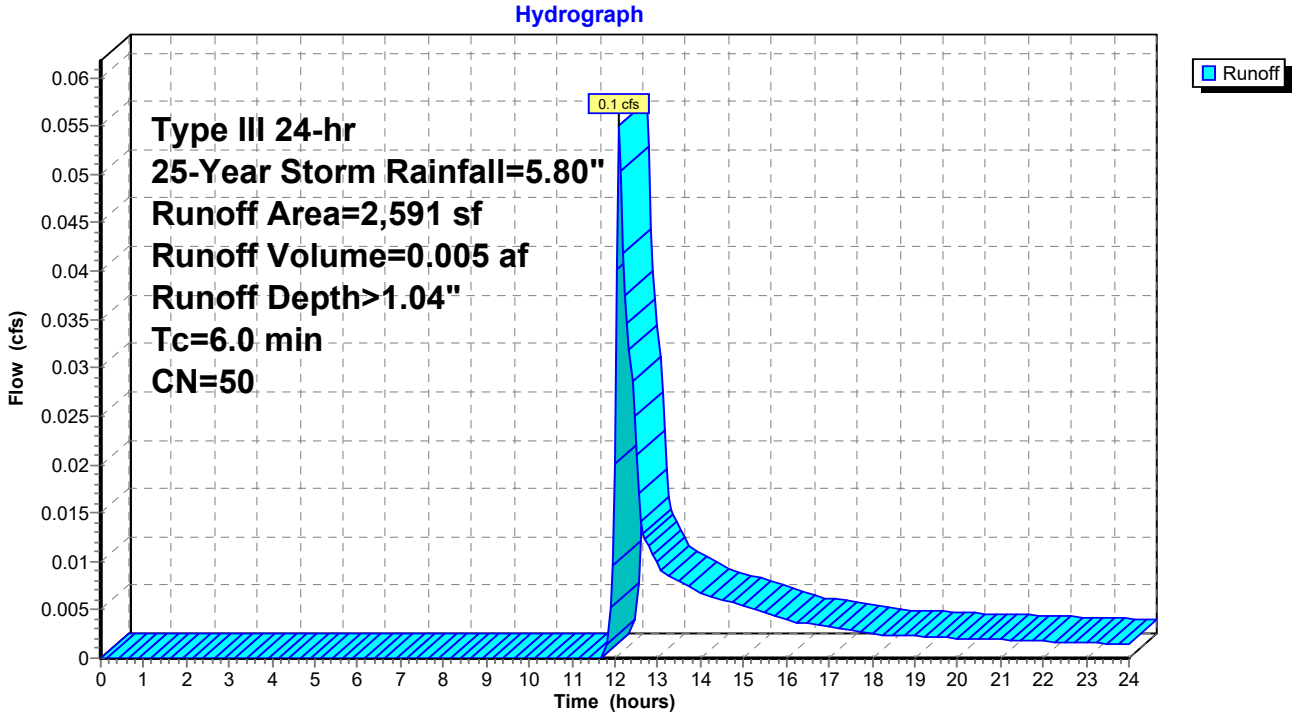
Runoff = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	466	98	Impervious
	1,499	39	Grass cover, Good, HSG A
*	626	40	Porous Pavement
	2,591	50	Weighted Average
	2,125		82.01% Pervious Area
	466		17.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 12S:



Summary for Subcatchment 13S:

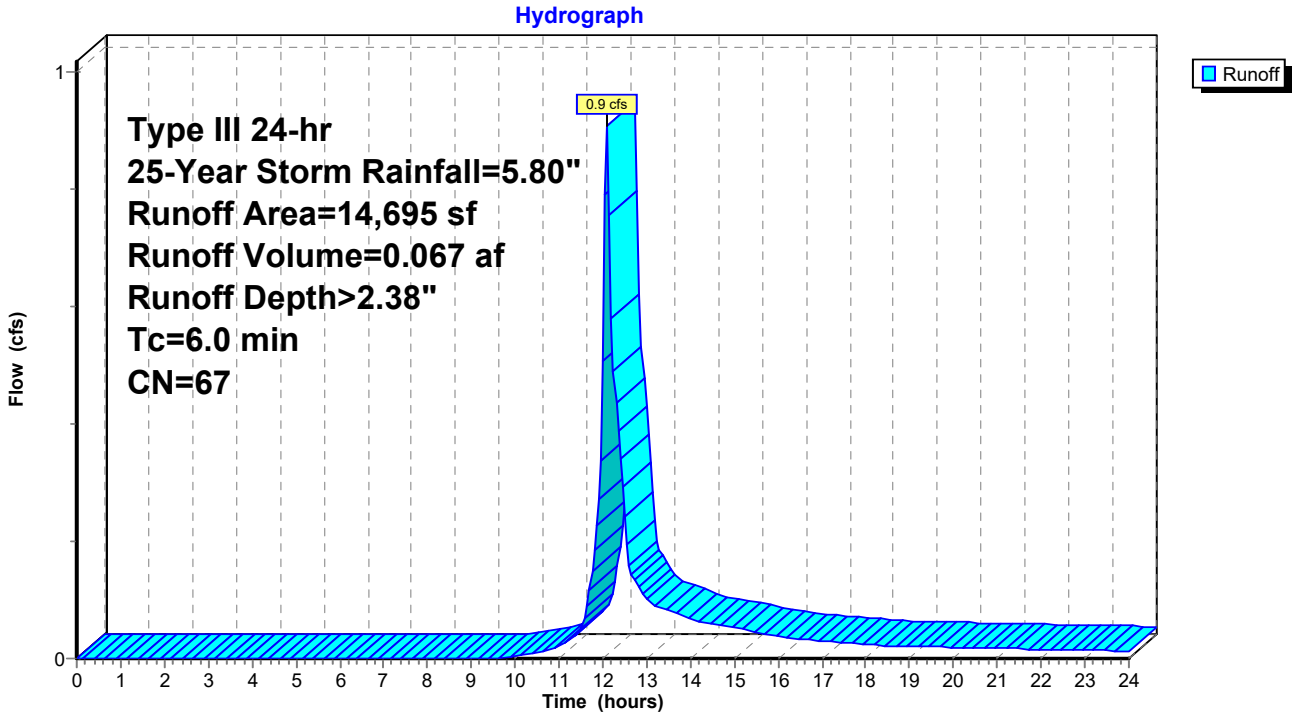
Runoff = 0.9 cfs @ 12.10 hrs, Volume= 0.067 af, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	7,017	98	Impervious
	7,678	39	Grass cover, Good, HSG A
	14,695	67	Weighted Average
	7,678		52.25% Pervious Area
	7,017		47.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 13S:



Summary for Pond 1P: CB1

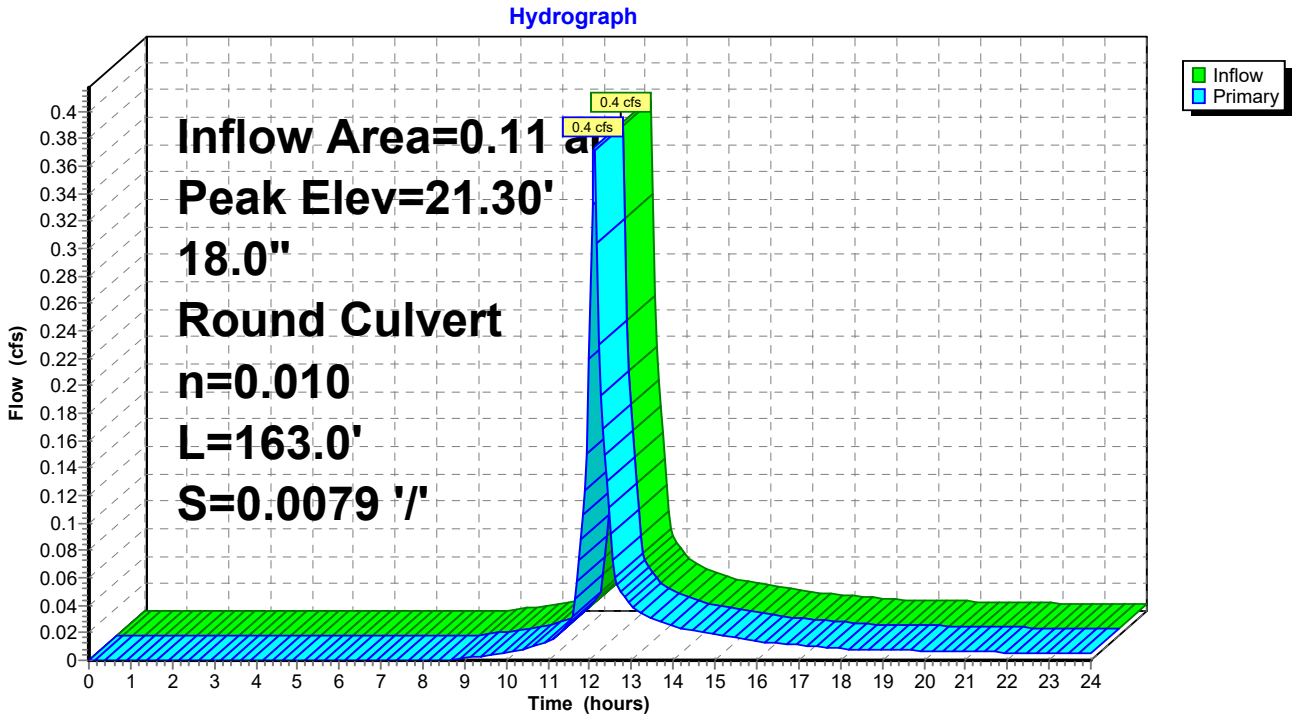
Inflow Area = 0.11 ac, 59.14% Impervious, Inflow Depth > 3.01" for 25-Year Storm event
Inflow = 0.4 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.4 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 12.09 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 21.30' @ 12.09 hrs
Flood Elev= 25.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**18.0" Round Culvert** L= 163.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 21.00' / 19.71' S= 0.0079 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.4 cfs @ 12.09 hrs HW=21.30' TW=20.24' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.4 cfs @ 1.47 fps)

Pond 1P: CB1



Summary for Pond 2P: CB2

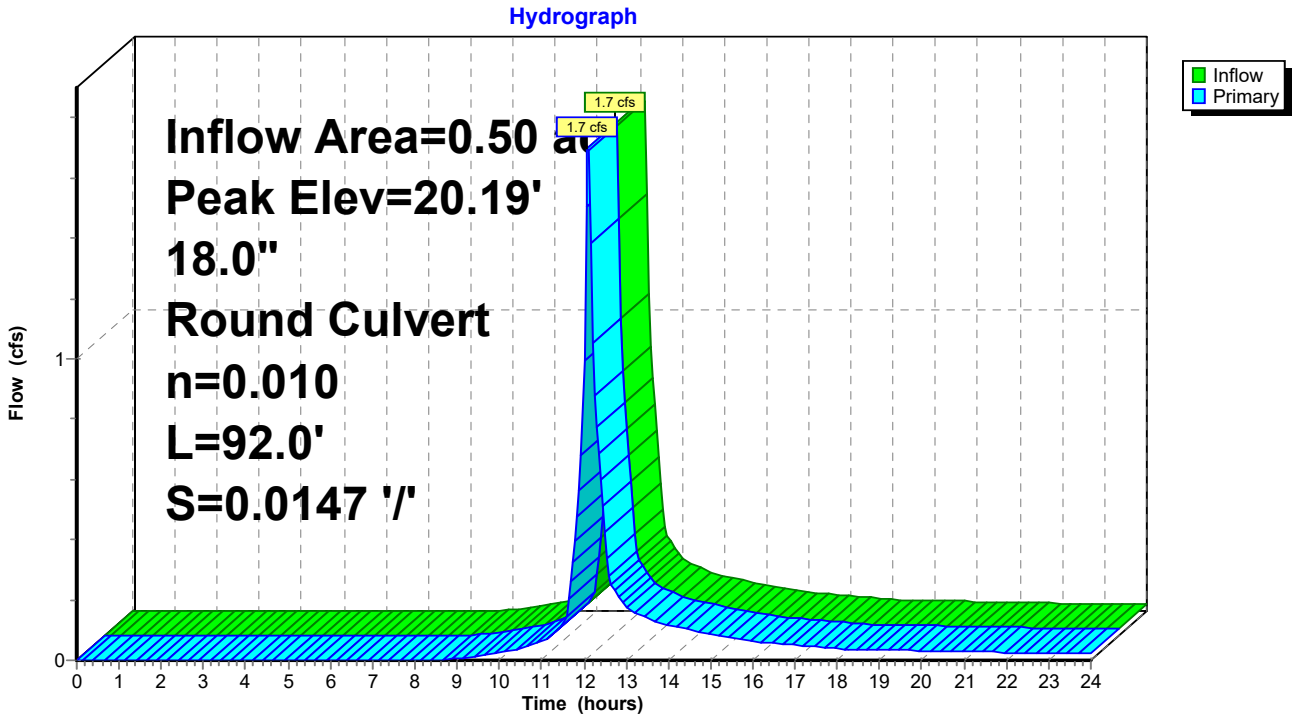
Inflow Area = 0.50 ac, 58.21% Impervious, Inflow Depth > 2.96" for 25-Year Storm event
Inflow = 1.7 cfs @ 12.09 hrs, Volume= 0.123 af
Outflow = 1.7 cfs @ 12.09 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min
Primary = 1.7 cfs @ 12.09 hrs, Volume= 0.123 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 20.19' @ 12.19 hrs
Flood Elev= 22.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.90'	**18.0" Round Culvert** L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.90' / 17.55' S= 0.0147 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=19.57' TW=19.64' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.0 cfs)

Pond 2P: CB2



Summary for Pond 3P: CB3

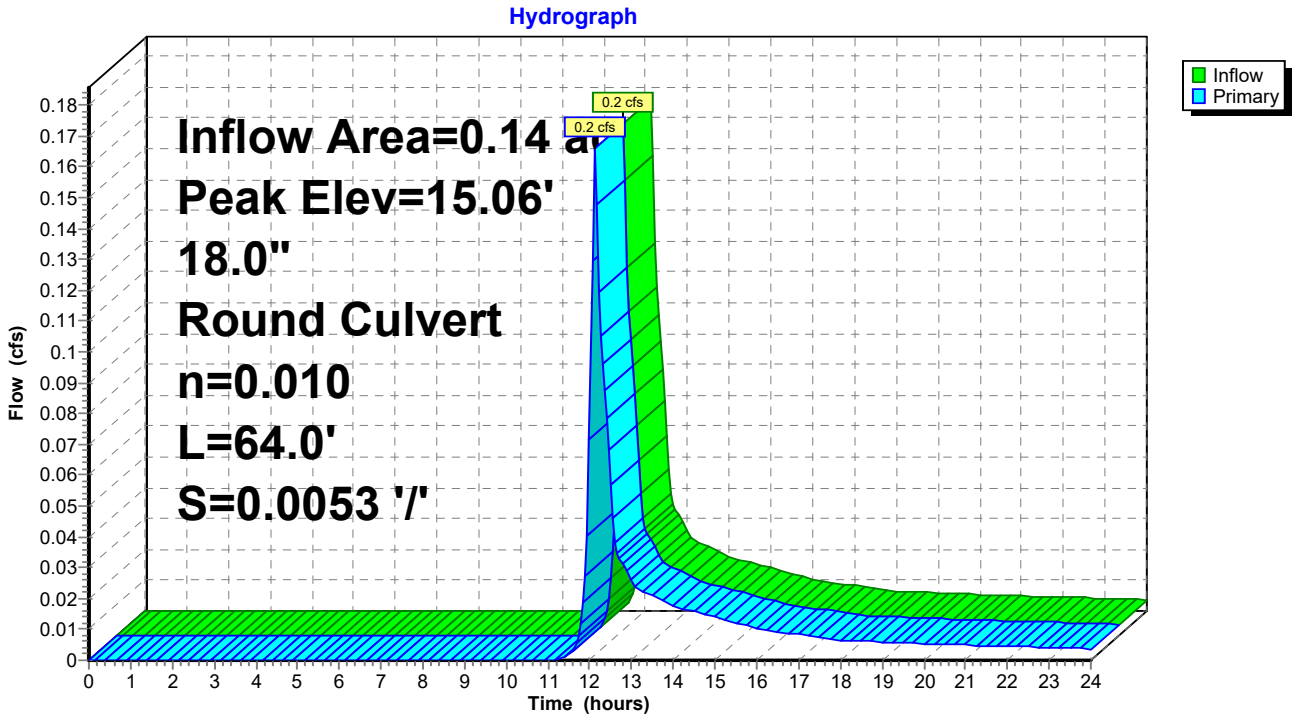
Inflow Area = 0.14 ac, 23.10% Impervious, Inflow Depth > 1.25" for 25-Year Storm event
Inflow = 0.2 cfs @ 12.11 hrs, Volume= 0.014 af
Outflow = 0.2 cfs @ 12.11 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.11 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.06' @ 12.11 hrs
Flood Elev= 23.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.86'	**18.0" Round Culvert** L= 64.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.86' / 14.52' S= 0.0053 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.2 cfs @ 12.11 hrs HW=15.06' TW=14.30' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.2 cfs @ 1.19 fps)

Pond 3P: CB3



Summary for Pond 4P: CB4

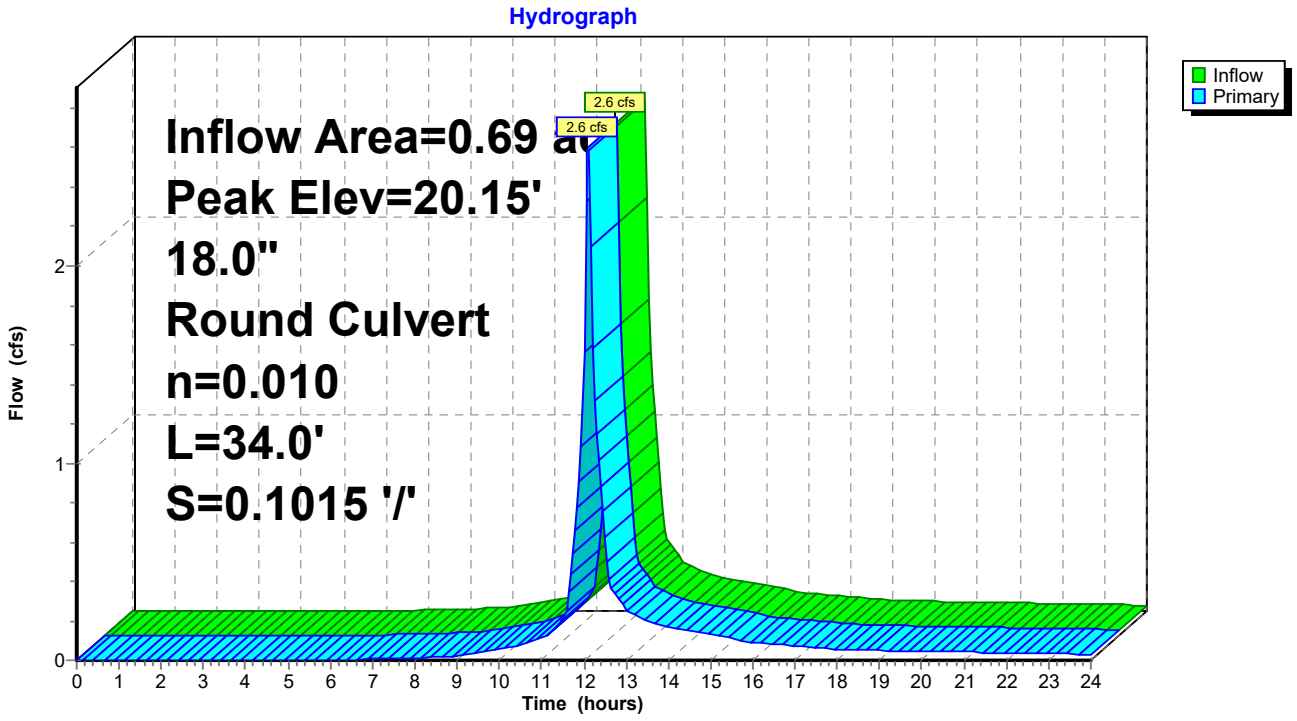
Inflow Area = 0.69 ac, 64.53% Impervious, Inflow Depth > 3.33" for 25-Year Storm event
Inflow = 2.6 cfs @ 12.09 hrs, Volume= 0.191 af
Outflow = 2.6 cfs @ 12.09 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min
Primary = 2.6 cfs @ 12.09 hrs, Volume= 0.191 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 20.15' @ 12.15 hrs
Flood Elev= 22.87'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.45'	**18.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.45' / 14.00' S= 0.1015 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=19.61' TW=19.98' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.0 cfs)

Pond 4P: CB4



Summary for Pond 5P: CB5

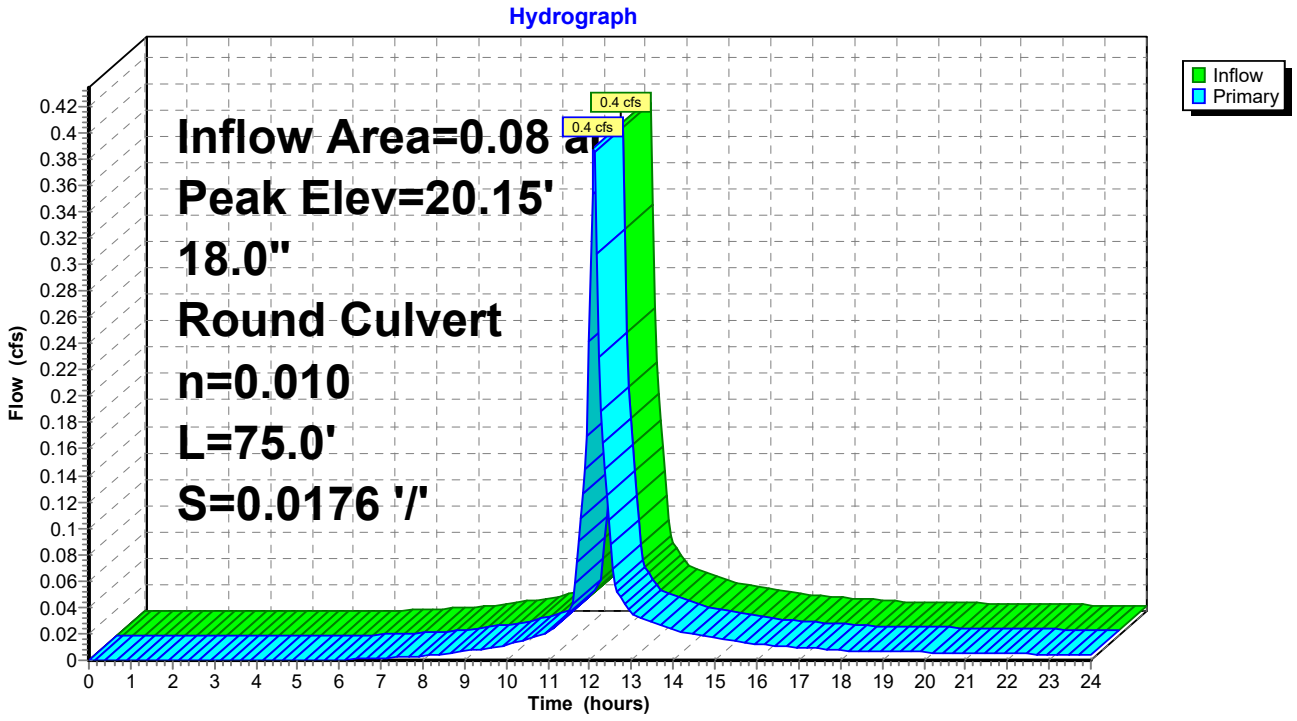
Inflow Area = 0.08 ac, 77.31% Impervious, Inflow Depth > 4.11" for 25-Year Storm event
Inflow = 0.4 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.4 cfs @ 12.09 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 12.09 hrs, Volume= 0.029 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 20.15' @ 12.20 hrs
Flood Elev= 22.83'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.87'	**18.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 18.87' / 17.55' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=19.19' TW=19.56' (Dynamic Tailwater)
1=Culvert (Controls 0.0 cfs)

Pond 5P: CB5



Summary for Pond 6P: CB6

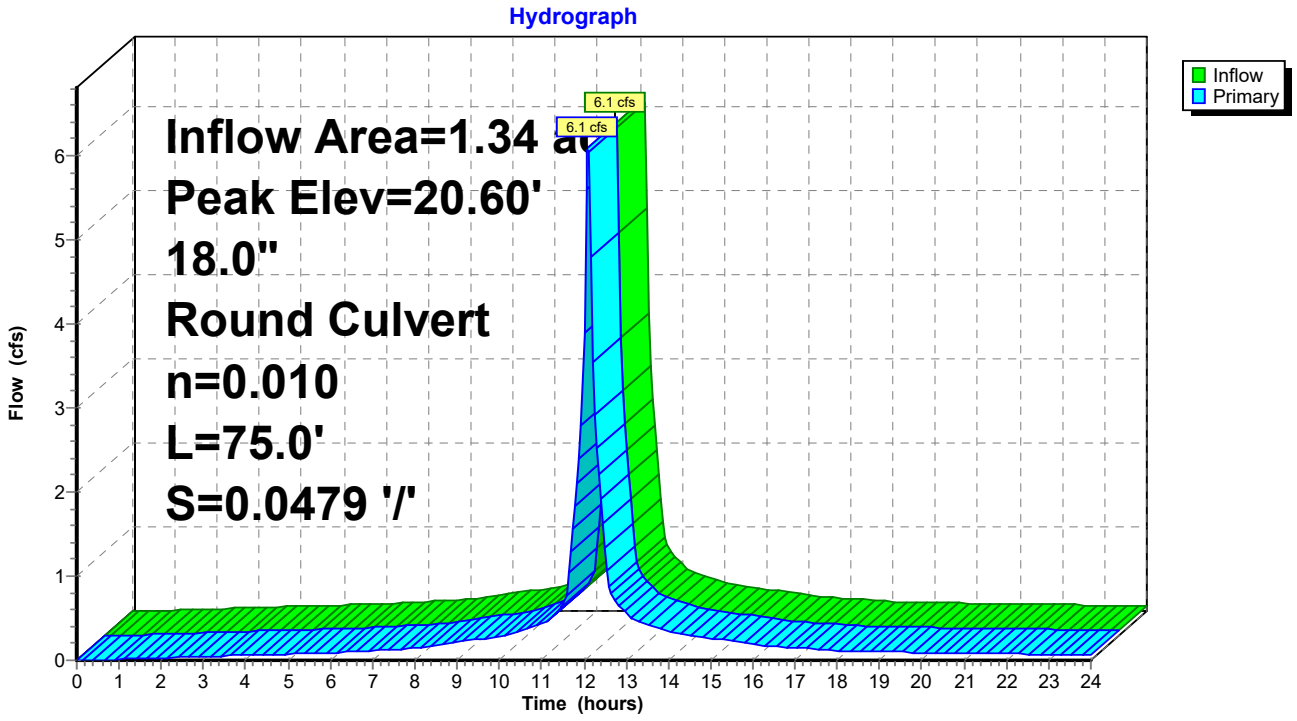
Inflow Area = 1.34 ac, 82.48% Impervious, Inflow Depth > 4.57" for 25-Year Storm event
Inflow = 6.1 cfs @ 12.09 hrs, Volume= 0.510 af
Outflow = 6.1 cfs @ 12.09 hrs, Volume= 0.510 af, Atten= 0%, Lag= 0.0 min
Primary = 6.1 cfs @ 12.09 hrs, Volume= 0.510 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 20.60' @ 12.13 hrs
Flood Elev= 22.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.59'	**18.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.59' / 14.00' S= 0.0479 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.2 cfs @ 12.09 hrs HW=20.17' TW=19.94' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.2 cfs @ 1.81 fps)

Pond 6P: CB6



Summary for Pond 7P: CB7

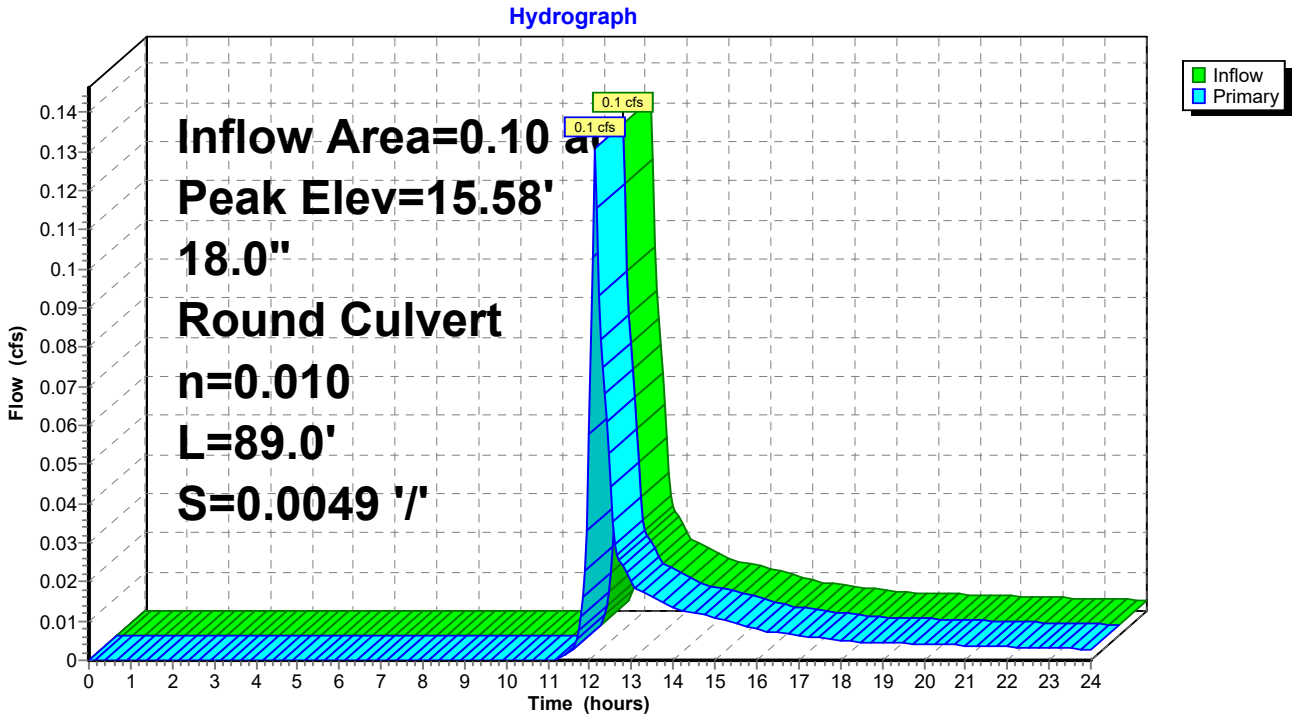
Inflow Area = 0.10 ac, 24.06% Impervious, Inflow Depth > 1.29" for 25-Year Storm event
Inflow = 0.1 cfs @ 12.11 hrs, Volume= 0.011 af
Outflow = 0.1 cfs @ 12.11 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.11 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 15.58' @ 12.11 hrs
Flood Elev= 24.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	15.40'	**18.0" Round Culvert** L= 89.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 15.40' / 14.96' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.11 hrs HW=15.57' TW=15.06' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.1 cfs @ 1.12 fps)

Pond 7P: CB7



Summary for Pond 8P: CB8

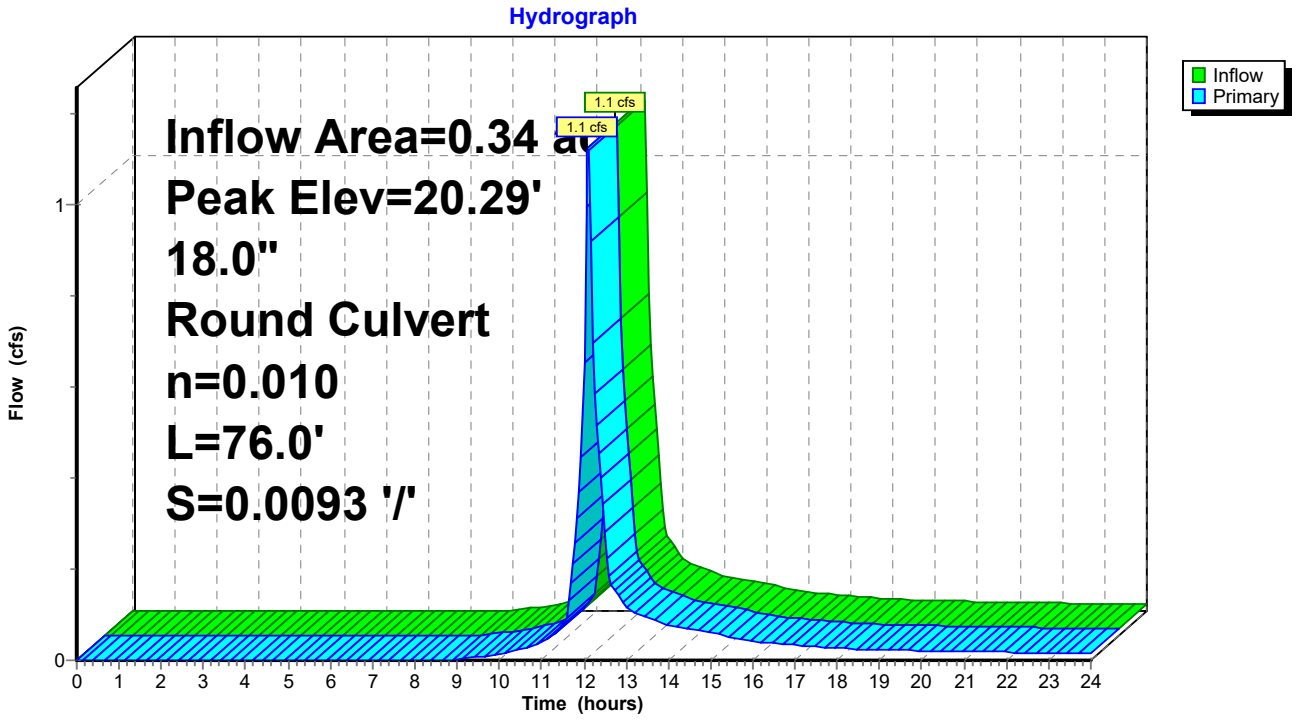
Inflow Area = 0.34 ac, 57.10% Impervious, Inflow Depth > 2.89" for 25-Year Storm event
Inflow = 1.1 cfs @ 12.09 hrs, Volume= 0.082 af
Outflow = 1.1 cfs @ 12.09 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min
Primary = 1.1 cfs @ 12.09 hrs, Volume= 0.082 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 20.29' @ 12.24 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.71'	**18.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.71' / 19.00' S= 0.0093 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.1 cfs @ 12.09 hrs HW=20.24' TW=19.57' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.1 cfs @ 1.96 fps)

Pond 8P: CB8



Summary for Pond 9P: DMH1

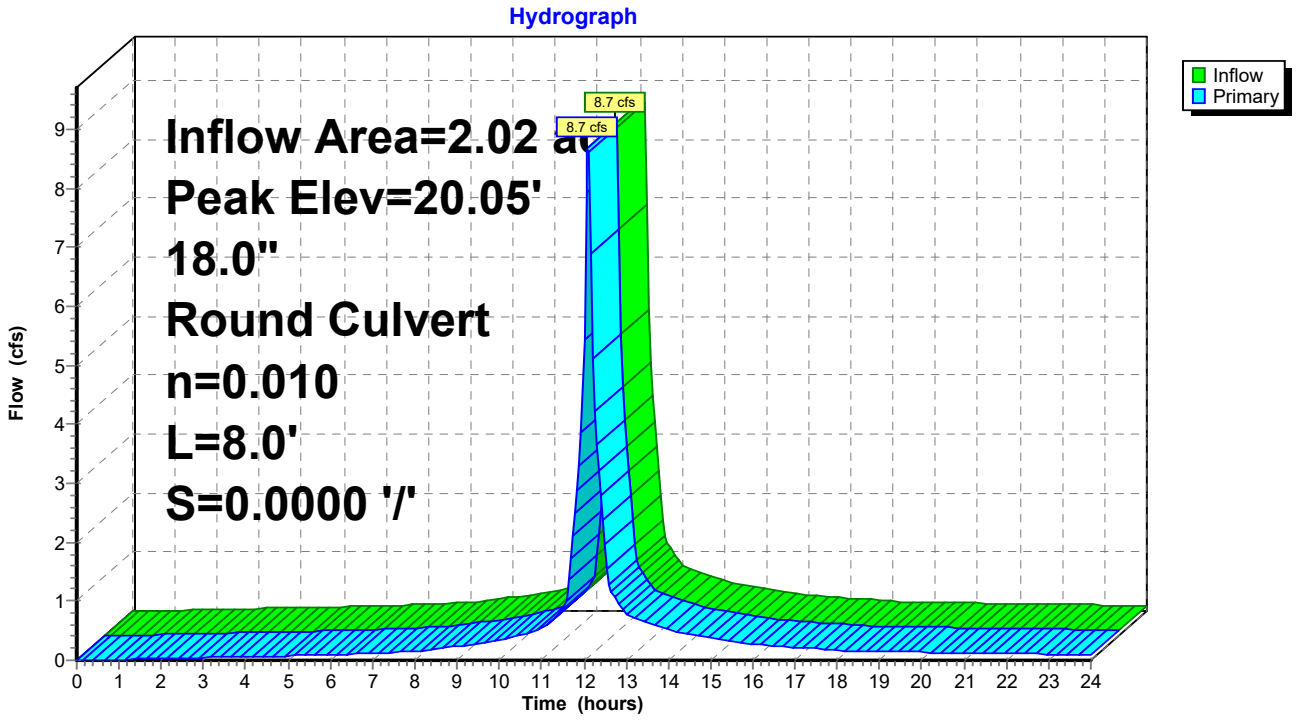
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 4.15" for 25-Year Storm event
Inflow = 8.7 cfs @ 12.09 hrs, Volume= 0.700 af
Outflow = 8.7 cfs @ 12.09 hrs, Volume= 0.700 af, Atten= 0%, Lag= 0.0 min
Primary = 8.7 cfs @ 12.09 hrs, Volume= 0.700 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 20.05' @ 12.10 hrs
Flood Elev= 22.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	13.58'	**18.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 13.58' / 13.58' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=8.1 cfs @ 12.09 hrs HW=19.95' TW=18.49' (Dynamic Tailwater)
1=Culvert (Inlet Controls 8.1 cfs @ 4.59 fps)

Pond 9P: DMH1



Summary for Pond 13P: CMP Peak Detention

Inflow	=	8.7 cfs @	12.10 hrs, Volume=	0.551 af
Outflow	=	7.6 cfs @	12.16 hrs, Volume=	0.551 af, Atten= 12%, Lag= 3.5 min
Primary	=	7.6 cfs @	12.16 hrs, Volume=	0.551 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.41' @ 12.16 hrs Surf.Area= 1,224 sf Storage= 4,234 cf
Flood Elev= 20.87' Surf.Area= 1,224 sf Storage= 4,269 cf

Plug-Flow detention time= 12.7 min calculated for 0.549 af (100% of inflow)
Center-of-Mass det. time= 12.1 min (812.4 - 800.3)

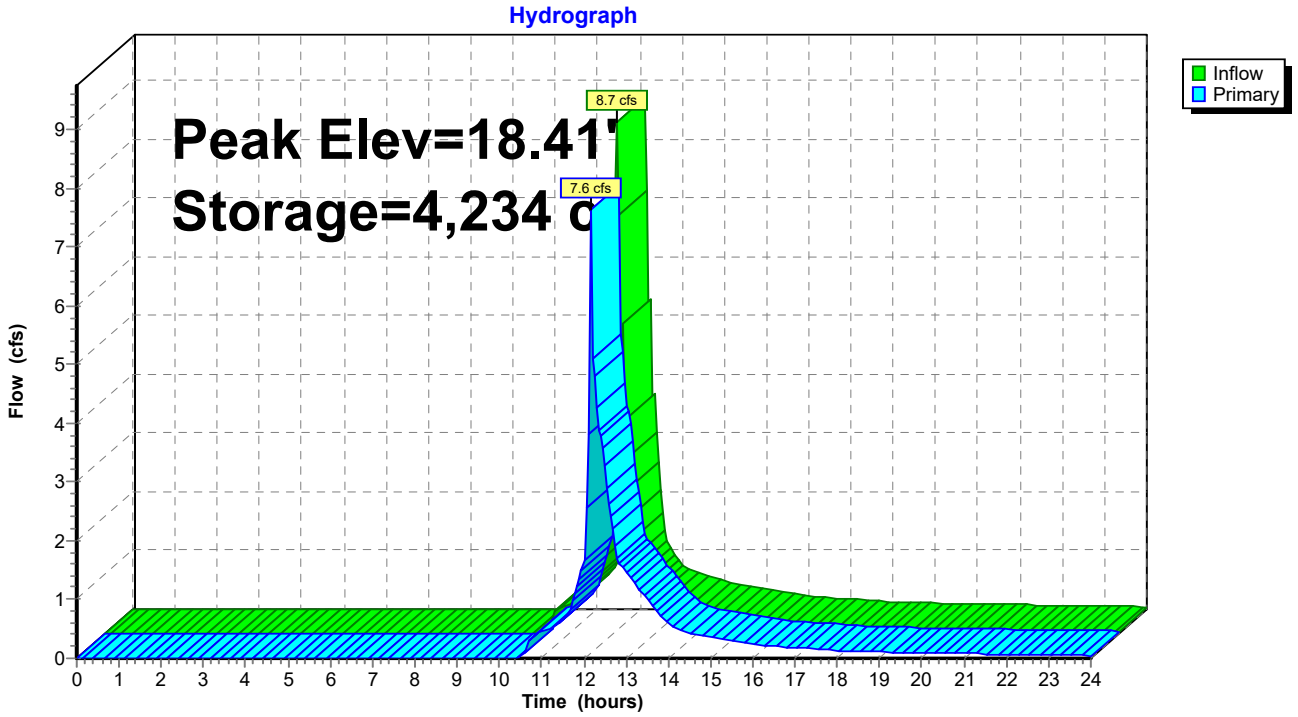
Volume	Invert	Avail.Storage	Storage Description
#1A	12.58'	0 cf	**8.00'W x 153.00'L x 6.00'H Field A** 7,344 cf Overall - 4,268 cf Embedded = 3,076 cf x 0.0% Voids
#2A	12.58'	4,268 cf	**CMP Round 72** x 7 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.26 sf x 20.00'L = 565.2 cf Overall Size= 72.0"W x 72.0"H x 20.00'L Row Length Adjustment= +11.00' x 28.26 sf x 1 rows
		4,268 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	12.58'	**18.0" Round Culvert** L= 20.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.58' / 12.20' S= 0.0190 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	12.58'	**6.1" Vert. Orifice/Grate** C= 0.600
#3	Device 1	15.58'	**5.7" Vert. Orifice/Grate** C= 0.600
#4	Device 1	16.66'	**4.8" Vert. Orifice/Grate** C= 0.600
#5	Device 1	17.92'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 3.21 3.27 3.33 3.39 3.45 3.51 3.57 3.63 3.69 3.75 3.81 3.87 Width (feet) 3.75 3.60 3.43 3.26 3.06 2.85 2.62 2.35 2.05 1.68 1.19 0.00

Primary OutFlow Max=7.2 cfs @ 12.16 hrs HW=18.35' TW=13.51' (Dynamic Tailwater)
- **1=Culvert** (Passes 7.2 cfs of 18.7 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 2.1 cfs @ 10.59 fps)
  - **3=Orifice/Grate** (Orifice Controls 1.4 cfs @ 7.66 fps)
  - **4=Orifice/Grate** (Orifice Controls 0.7 cfs @ 5.88 fps)
  - **5=Custom Weir/Orifice** (Weir Controls 3.0 cfs @ 2.25 fps)

Pond 13P: CMP Peak Detention



Summary for Pond 14P: CONTECH WQv CMP Det & SF System

Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 4.15" for 25-Year Storm event
Inflow = 8.7 cfs @ 12.09 hrs, Volume= 0.700 af
Outflow = 8.8 cfs @ 12.10 hrs, Volume= 0.620 af, Atten= 0%, Lag= 0.5 min
Primary = 0.0 cfs @ 12.06 hrs, Volume= 0.069 af
Secondary = 8.7 cfs @ 12.10 hrs, Volume= 0.551 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 13.58' Surf.Area= 1,313 sf Storage= 186 cf
Peak Elev= 18.52' @ 12.10 hrs Surf.Area= 1,313 sf Storage= 4,102 cf (3,916 cf above start)
Flood Elev= 20.87' Surf.Area= 1,313 sf Storage= 4,110 cf (3,924 cf above start)

Plug-Flow detention time= 100.2 min calculated for 0.616 af (88% of inflow)
Center-of-Mass det. time= 38.8 min (810.0 - 771.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	13.08'	0 cf	**7.50'W x 175.00'L x 5.50'H Field A** 7,219 cf Overall - 4,108 cf Embedded = 3,110 cf x 0.0% Voids
#2A	13.08'	4,108 cf	**CMP Round 66** x 8 Inside #1 Effective Size= 66.0"W x 66.0"H => 23.75 sf x 20.00'L = 475.0 cf Overall Size= 66.0"W x 66.0"H x 20.00'L Row Length Adjustment= +13.00' x 23.75 sf x 1 rows
		4,108 cf	Total Available Storage

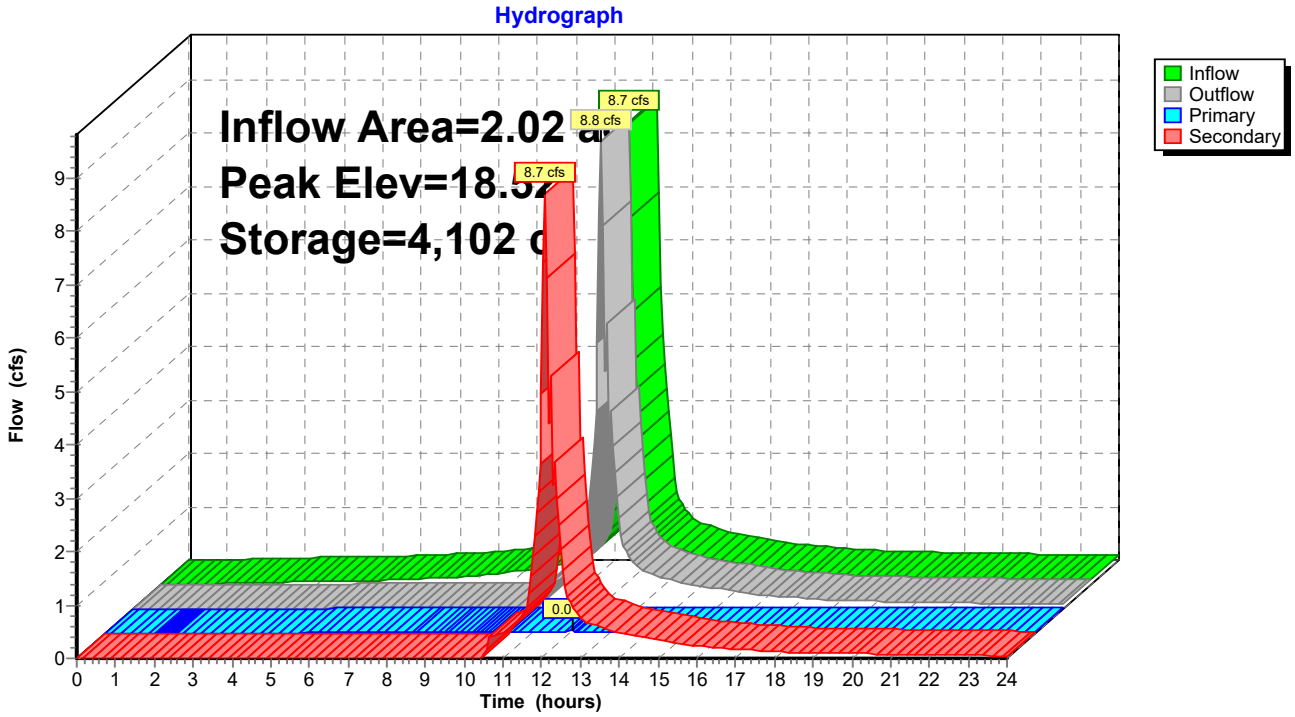
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	13.58'	**12.0" Round Culvert** L= 3.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.58' / 13.56' S= 0.0067 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	12.58'	**Tube/Siphon/Float Valve X 7.00** Starts@15.33' Breaks@13.25' 0.336" Diameter, C= 0.600, 0.263" Trickle Diameter
#3	Secondary	17.65'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 2.44 2.49 2.54 2.60 2.66 2.71 2.76 2.82 2.87 2.93 2.99 3.04 3.09 3.15 3.20 3.26 3.32 3.37 Width (feet) 4.13 4.03 3.93 3.82 3.70 3.57 3.44 3.30 3.15 2.98 2.81 2.61 2.40 2.16 1.88 1.54 1.09 0.00

Primary OutFlow Max=0.0 cfs @ 12.06 hrs HW=18.44' TW=12.89' (Dynamic Tailwater)
└─**2=Tube/Siphon/Float Valve** (Orifice Controls 0.0 cfs @ 11.34 fps)
└─**1=Culvert** (Passes 0.0 cfs of 7.9 cfs potential flow)

Secondary OutFlow Max=8.6 cfs @ 12.10 hrs HW=18.51' TW=17.56' (Dynamic Tailwater)
└─**3=Custom Weir/Orifice** (Weir Controls 8.6 cfs @ 3.32 fps)

Pond 14P: CONTECH WQv CMP Det & SF System



Summary for Pond 17P: DMH2

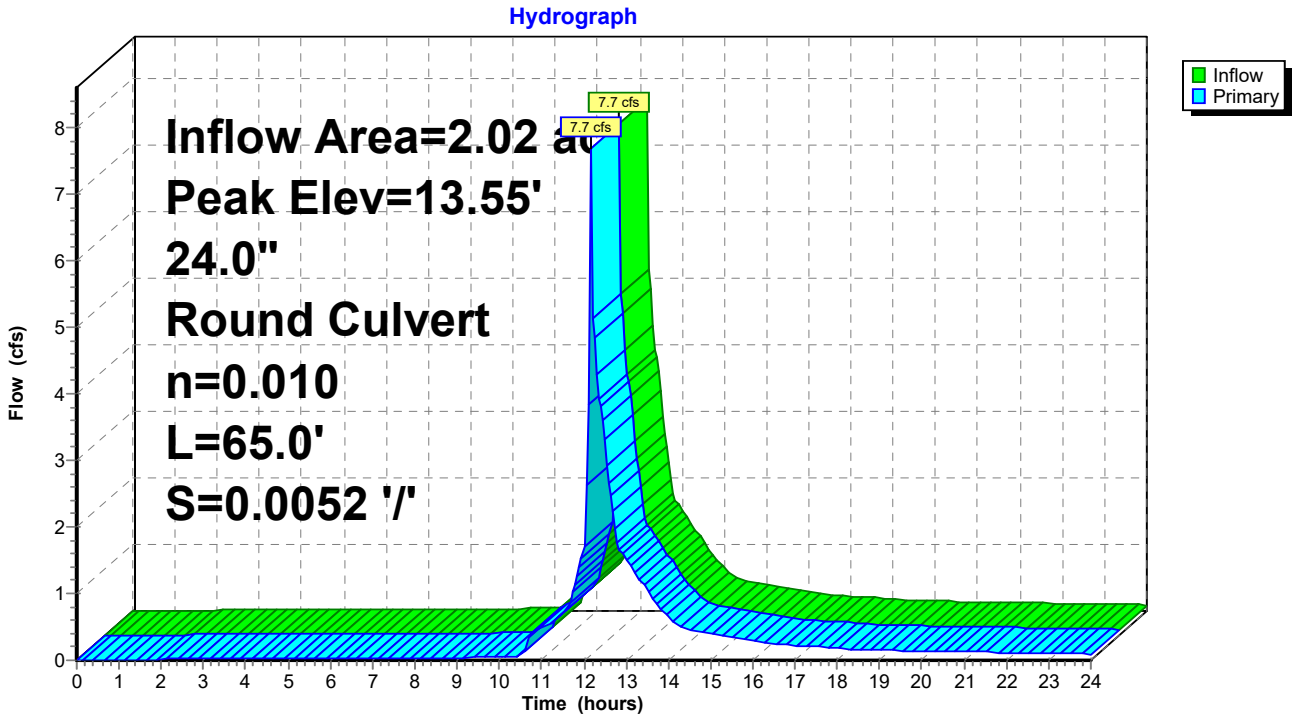
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 3.67" for 25-Year Storm event
Inflow = 7.7 cfs @ 12.16 hrs, Volume= 0.620 af
Outflow = 7.7 cfs @ 12.16 hrs, Volume= 0.620 af, Atten= 0%, Lag= 0.0 min
Primary = 7.7 cfs @ 12.16 hrs, Volume= 0.620 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 13.55' @ 12.17 hrs
Flood Elev= 21.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	12.07'	**24.0" Round Culvert** L= 65.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 12.07' / 11.73' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.3 cfs @ 12.16 hrs HW=13.51' TW=13.02' (Dynamic Tailwater)
1=Culvert (Outlet Controls 6.3 cfs @ 3.66 fps)

Pond 17P: DMH2



Summary for Pond 18P: DMH3

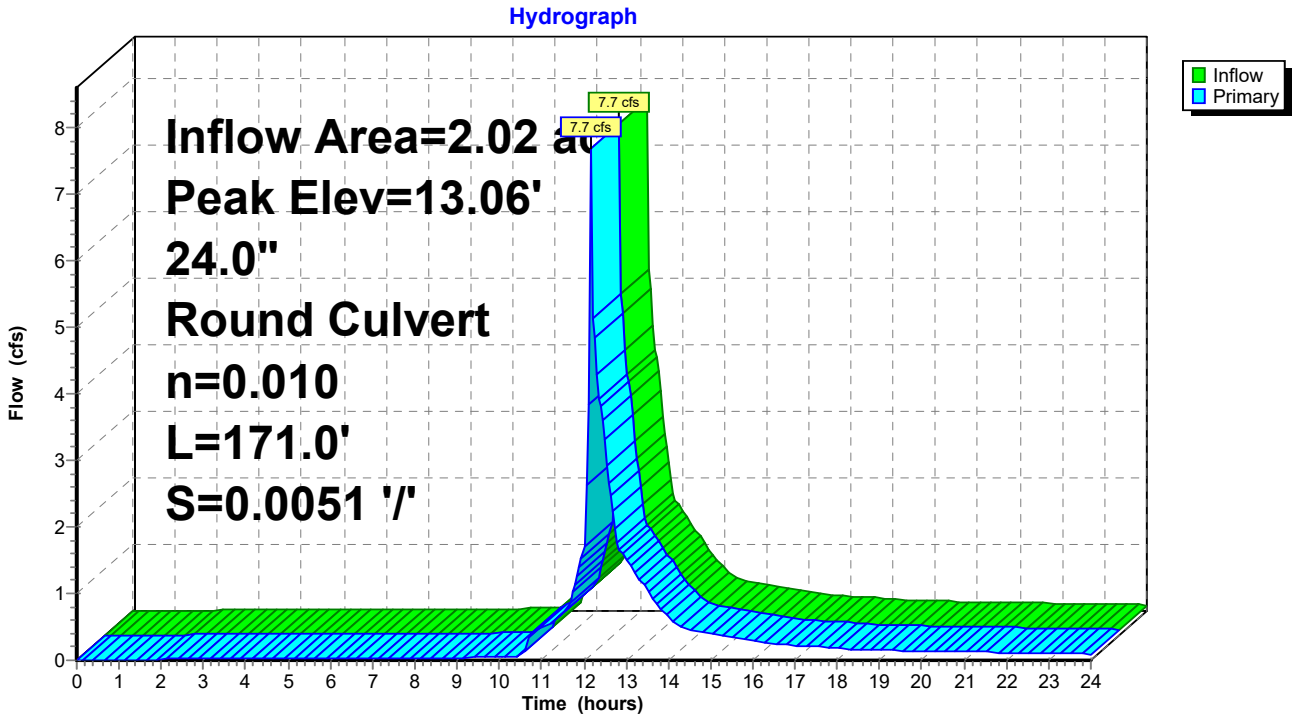
Inflow Area = 2.02 ac, 76.40% Impervious, Inflow Depth > 3.67" for 25-Year Storm event
Inflow = 7.7 cfs @ 12.16 hrs, Volume= 0.620 af
Outflow = 7.7 cfs @ 12.16 hrs, Volume= 0.620 af, Atten= 0%, Lag= 0.0 min
Primary = 7.7 cfs @ 12.16 hrs, Volume= 0.620 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 13.06' @ 12.16 hrs
Flood Elev= 20.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	11.63'	**24.0" Round Culvert** L= 171.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 11.63' / 10.75' S= 0.0051 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.4 cfs @ 12.16 hrs HW=13.02' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 7.4 cfs @ 3.17 fps)

Pond 18P: DMH3



Summary for Pond 22P: Ex DMH3

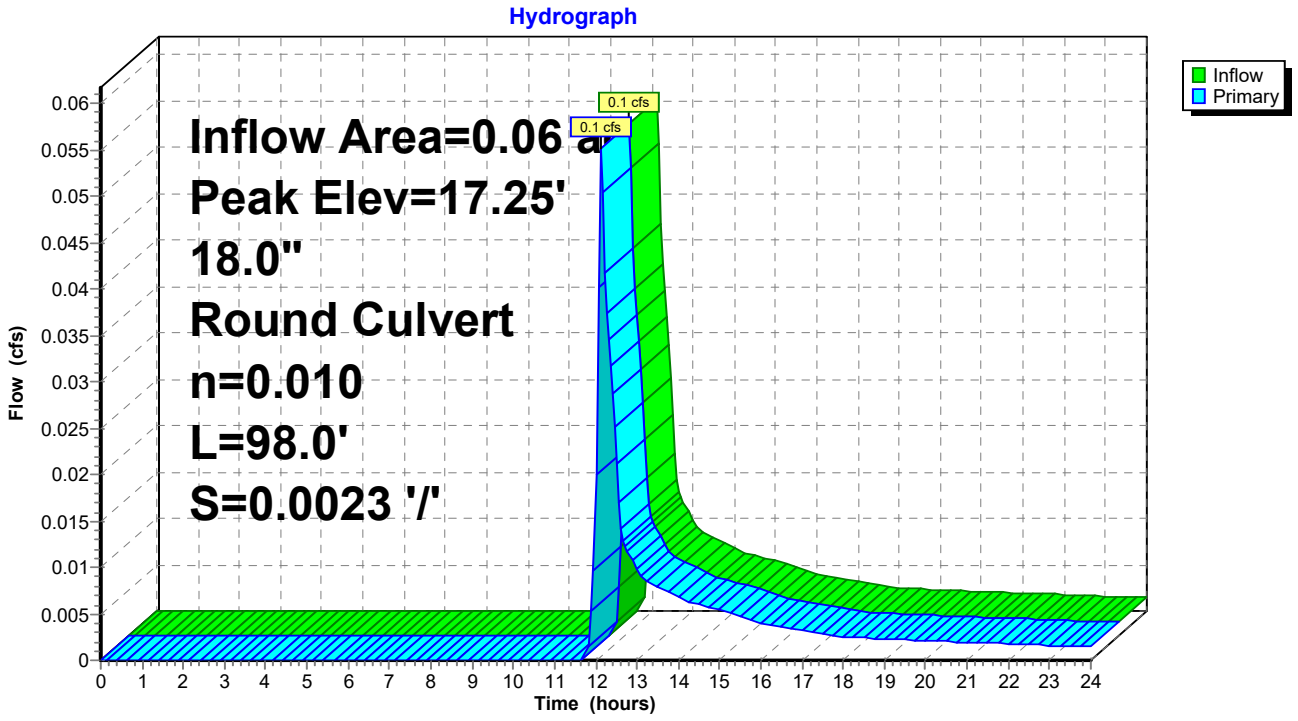
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 1.04" for 25-Year Storm event
Inflow = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af
Outflow = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.25' @ 12.11 hrs
Flood Elev= 24.92'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.12'	**18.0" Round Culvert** L= 98.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.12' / 16.89' S= 0.0023 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.11 hrs HW=17.25' TW=16.87' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.1 cfs @ 1.12 fps)

Pond 22P: Ex DMH3



Summary for Pond 23P: Ex CB3

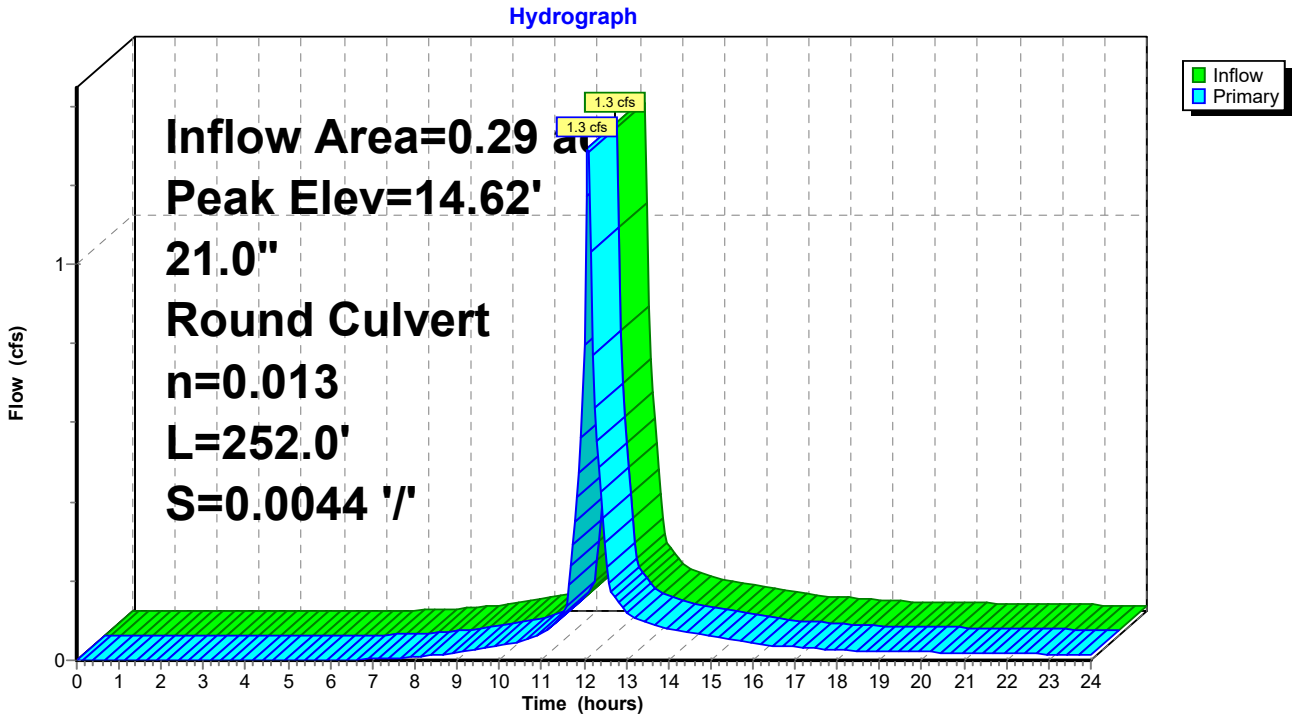
Inflow Area = 0.29 ac, 73.97% Impervious, Inflow Depth > 3.90" for 25-Year Storm event
Inflow = 1.3 cfs @ 12.09 hrs, Volume= 0.095 af
Outflow = 1.3 cfs @ 12.09 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.09 hrs, Volume= 0.095 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.62' @ 12.09 hrs
Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.05'	**21.0" Round Culvert** L= 252.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.05' / 12.94' S= 0.0044 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 2.41 sf

Primary OutFlow Max=1.3 cfs @ 12.09 hrs HW=14.61' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.3 cfs @ 2.85 fps)

Pond 23P: Ex CB3



Summary for Pond 24P: Ex DMH2

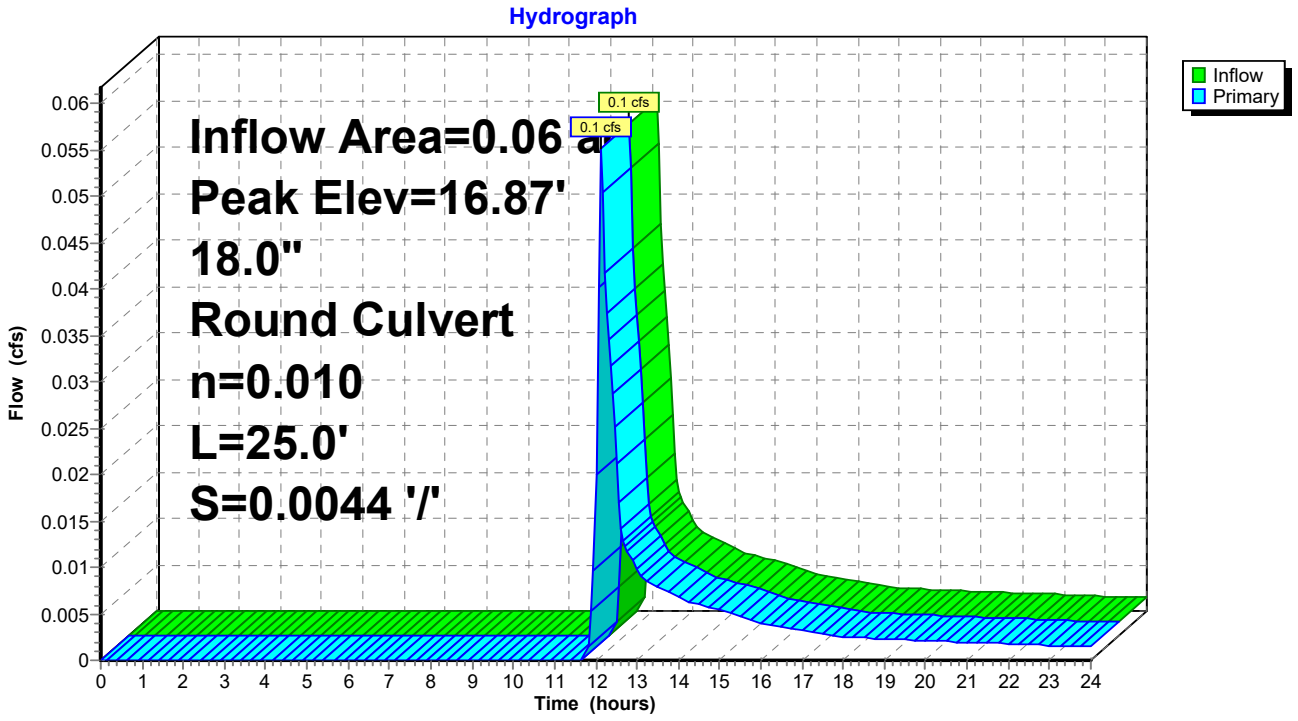
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 1.04" for 25-Year Storm event
Inflow = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af
Outflow = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.87' @ 12.11 hrs
Flood Elev= 25.38'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.75'	**18.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.75' / 16.64' S= 0.0044 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.11 hrs HW=16.87' TW=16.65' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.1 cfs @ 1.30 fps)

Pond 24P: Ex DMH2



Summary for Pond 26P: DMH5

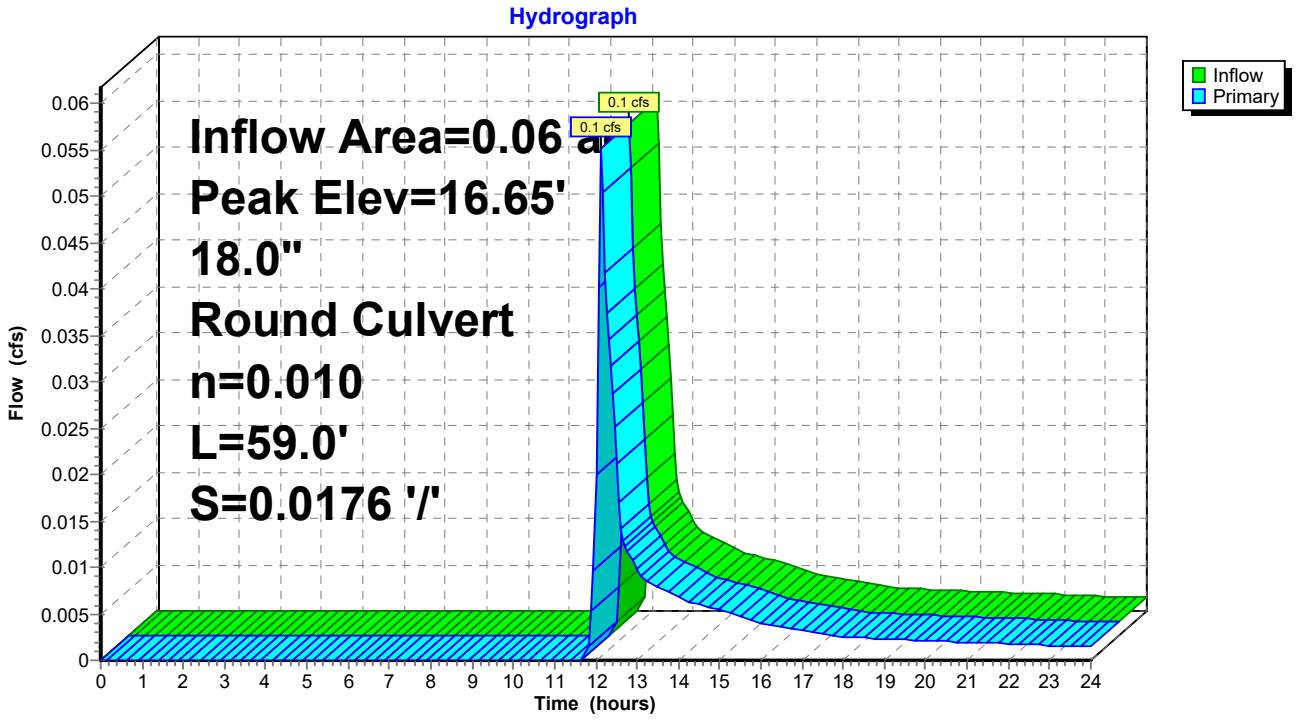
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 1.04" for 25-Year Storm event
Inflow = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af
Outflow = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 16.65' @ 12.11 hrs
Flood Elev= 25.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.54'	**18.0" Round Culvert** L= 59.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 16.54' / 15.50' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.11 hrs HW=16.65' TW=15.57' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.1 cfs @ 0.90 fps)

Pond 26P: DMH5



Summary for Pond 27P: DMH10

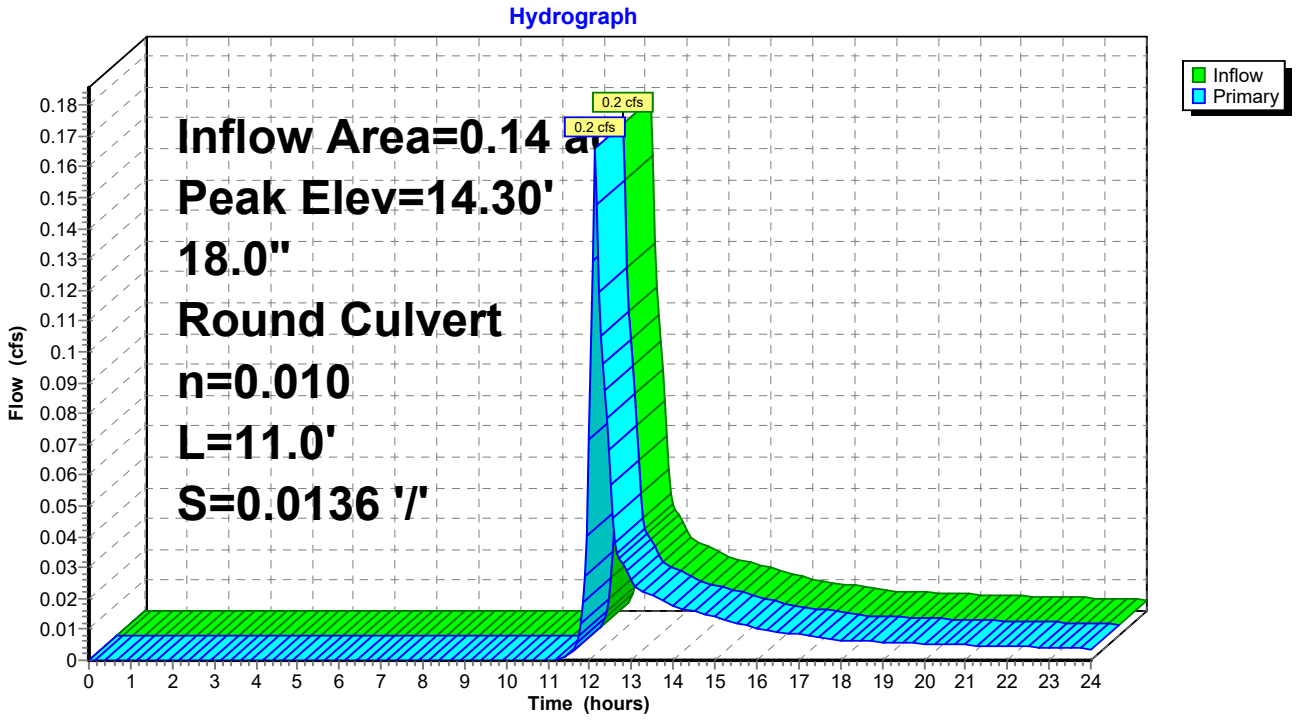
Inflow Area = 0.14 ac, 23.10% Impervious, Inflow Depth > 1.25" for 25-Year Storm event
Inflow = 0.2 cfs @ 12.11 hrs, Volume= 0.014 af
Outflow = 0.2 cfs @ 12.11 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.11 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 14.30' @ 12.11 hrs
Flood Elev= 24.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	14.10'	**18.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 14.10' / 13.95' S= 0.0136 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.2 cfs @ 12.11 hrs HW=14.30' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.2 cfs @ 1.19 fps)

Pond 27P: DMH10



Summary for Pond 29P: Ex DMH4

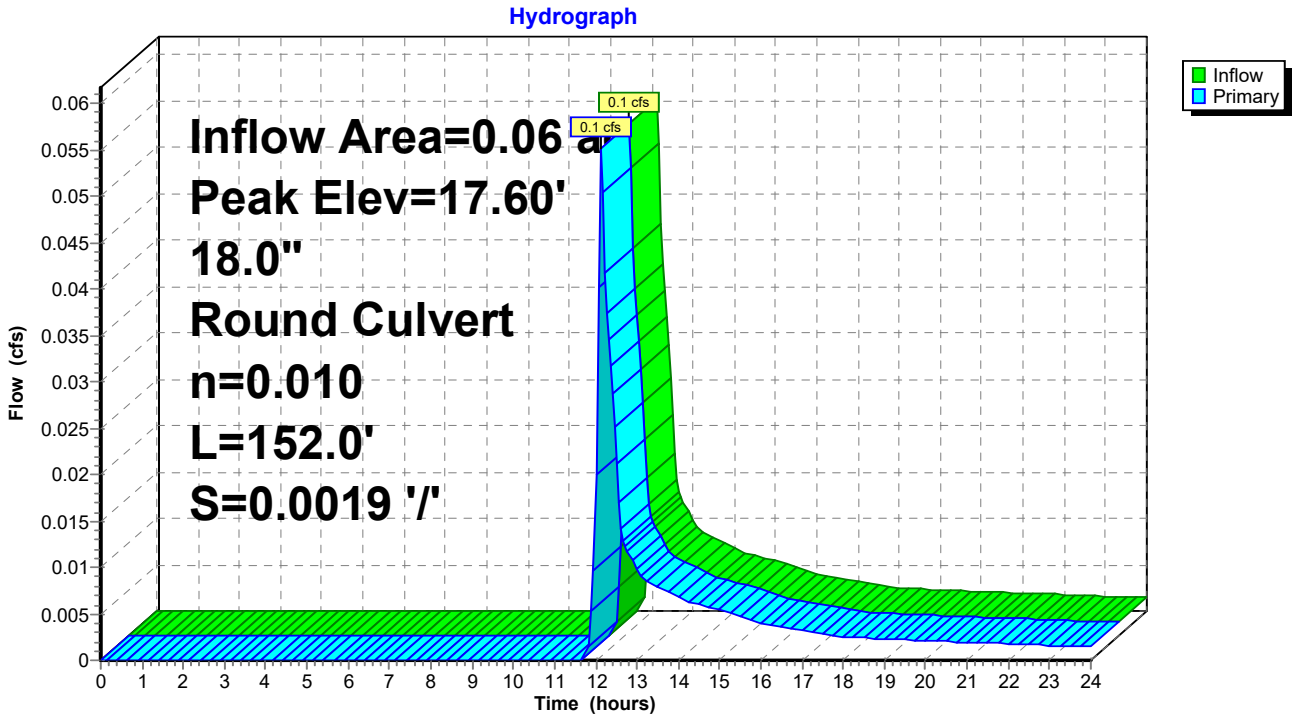
Inflow Area = 0.06 ac, 17.99% Impervious, Inflow Depth > 1.04" for 25-Year Storm event
Inflow = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af
Outflow = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.11 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 17.60' @ 12.11 hrs
Flood Elev= 23.44'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.46'	**18.0" Round Culvert** L= 152.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 17.46' / 17.17' S= 0.0019 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.11 hrs HW=17.59' TW=17.25' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.1 cfs @ 1.05 fps)

Pond 29P: Ex DMH4

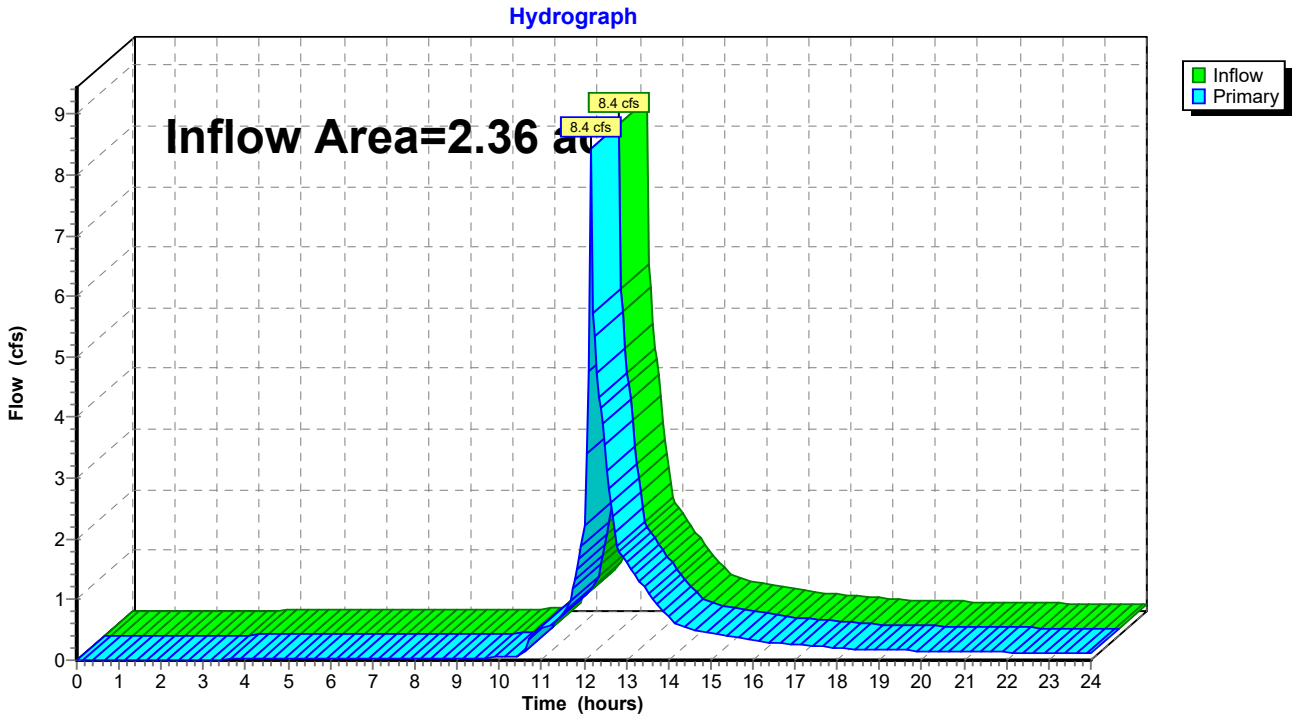


Summary for Link SP1: Forest Ave Storm Drain

Inflow Area = 2.36 ac, 72.31% Impervious, Inflow Depth > 3.49" for 25-Year Storm event
Inflow = 8.4 cfs @ 12.15 hrs, Volume= 0.687 af
Primary = 8.4 cfs @ 12.15 hrs, Volume= 0.687 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Forest Ave Storm Drain

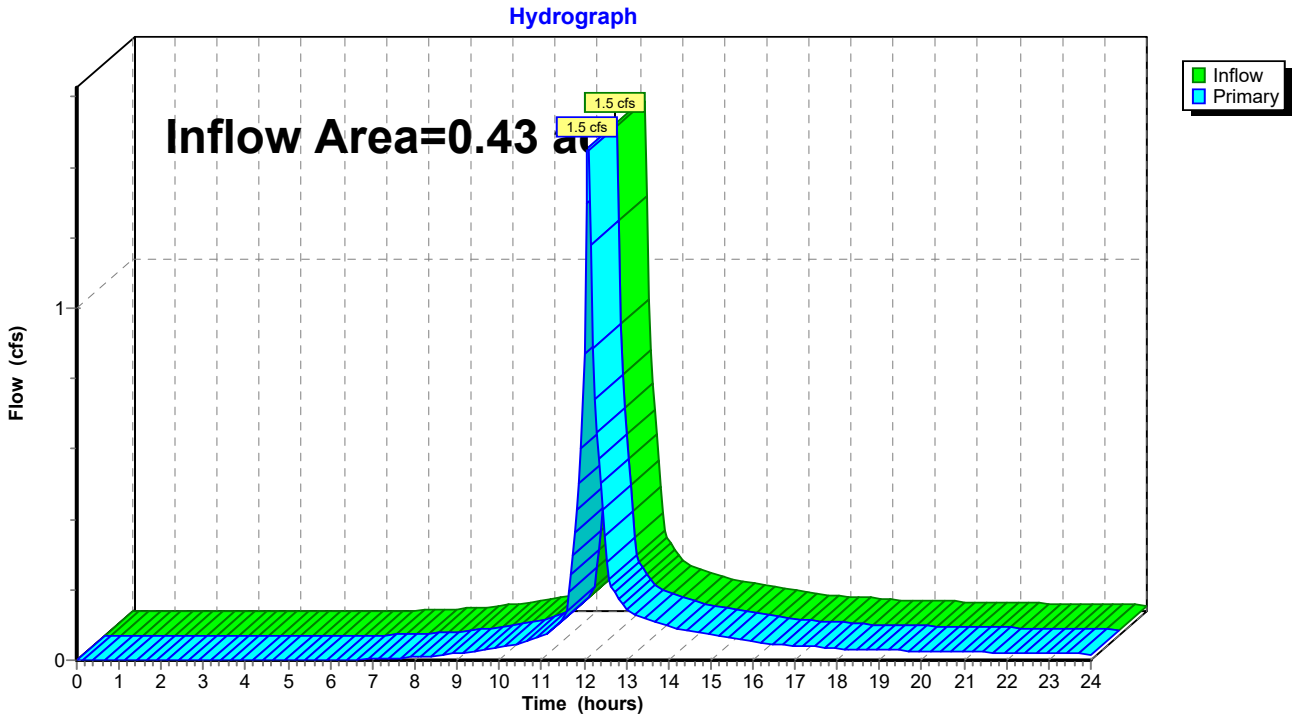


Summary for Link SP2: Combined Sewer

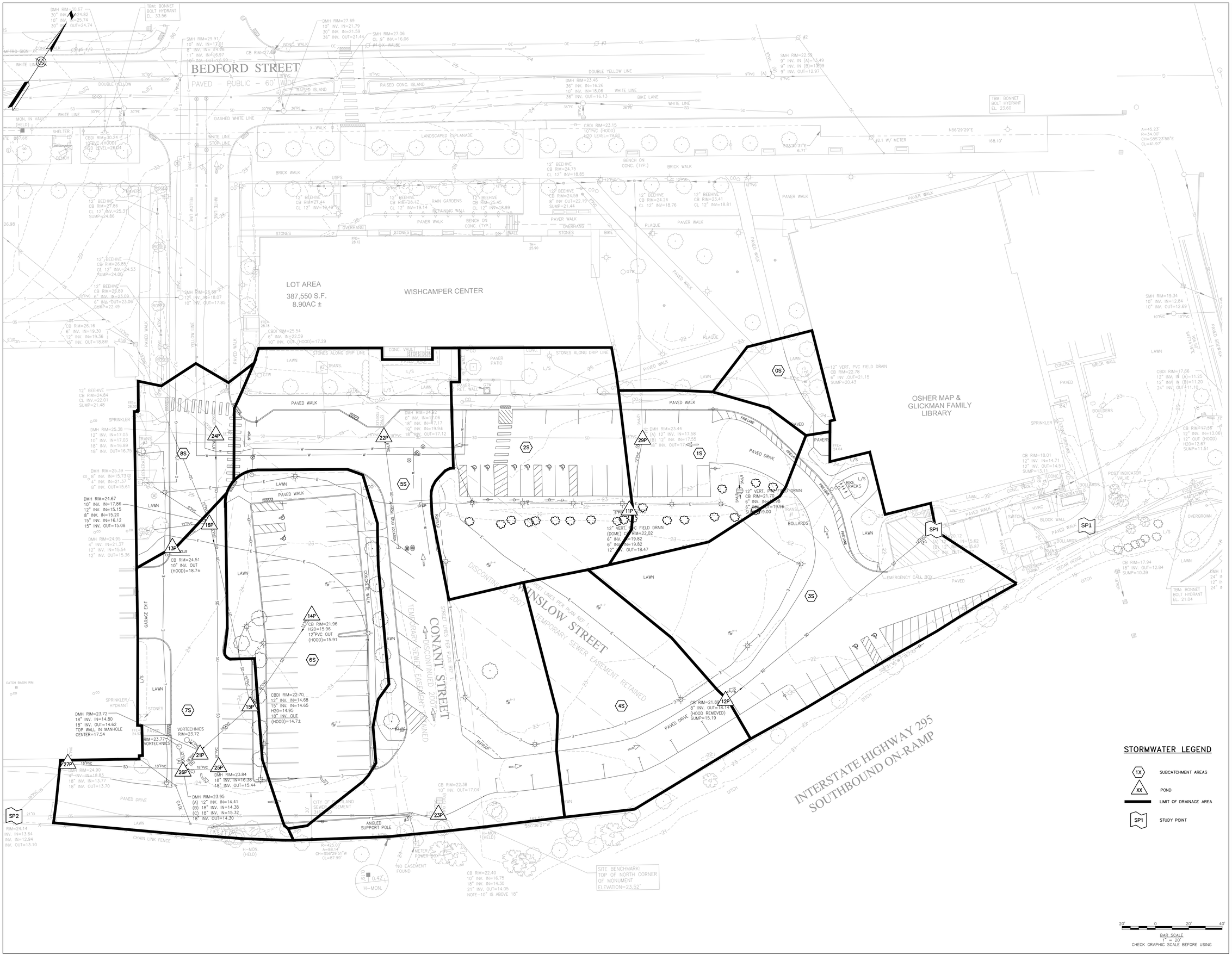
Inflow Area = 0.43 ac, 57.64% Impervious, Inflow Depth > 3.05" for 25-Year Storm event
Inflow = 1.5 cfs @ 12.09 hrs, Volume= 0.109 af
Primary = 1.5 cfs @ 12.09 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Combined Sewer



APPENDIX D: FIGURES



UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT
& STRUCTURAL ENGINEER

DESMAN Design Management

18 Tremont Street #300
Boston, MA 02108

ARCHITECT
WINTON-SCOTT ARCHITECTS

5 MILK STREET
PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN

41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE

457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING

160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE

286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC

40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT

94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

© DESMAN, Inc.
2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/12/21	Schematic Design Progress Set

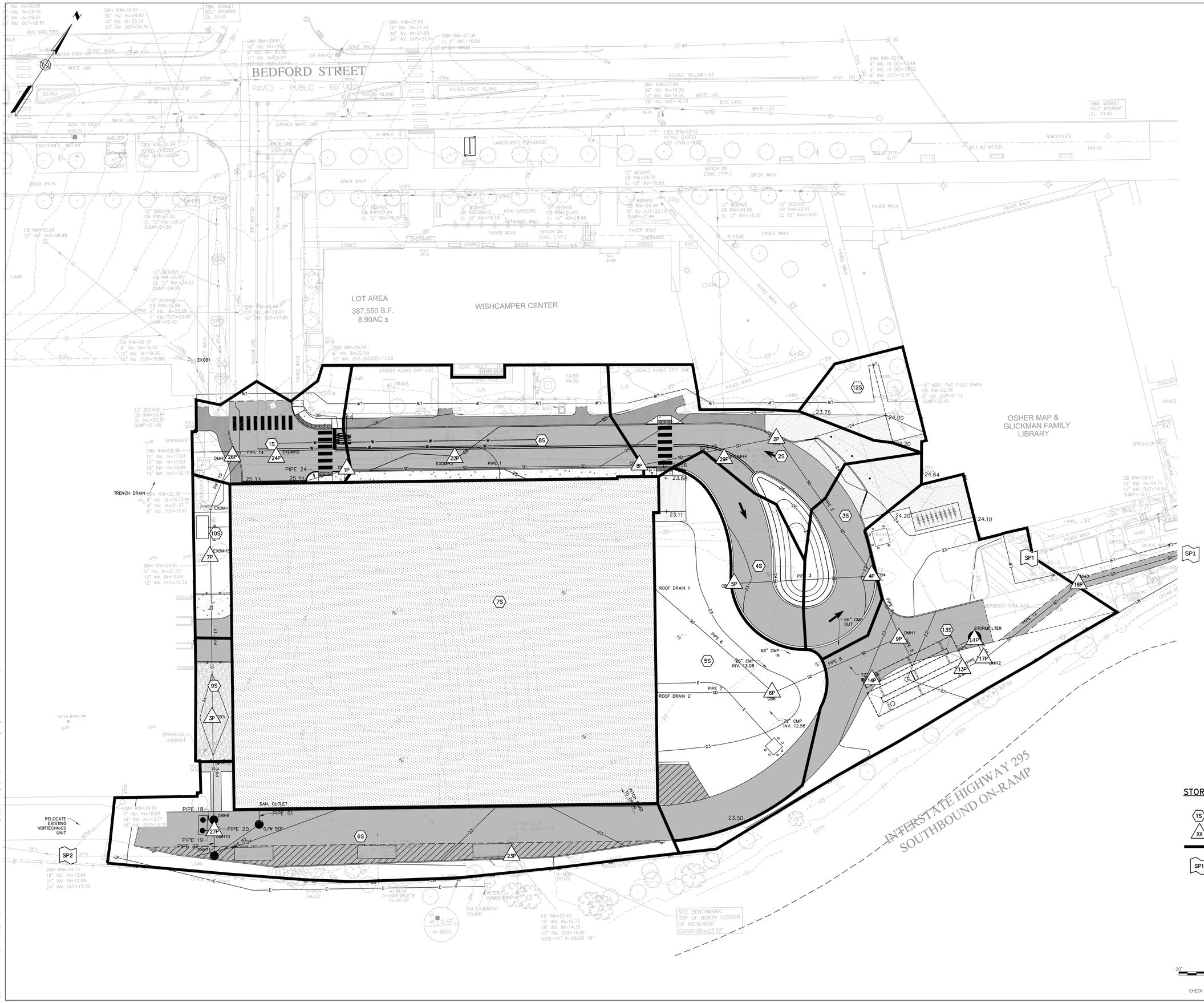
SCALE	**1"=20'**
DATE ISSUED	**JULY 2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

PRE DEVELOPMENT

PRE

\\vessbsdcurran.net\Shared\Projects\20230535.00 USM - Falmouth Street Garage\wip\Drawings\Civil\20230535.00 SW Figs.dwg, Jul 16, 2021 - 3:25pm JCOWLEY



STORMWATER LEGEND

- 1S — SUBCATCHMENT AREAS
- XX — POND
- LIMIT OF DRAINAGE AREA
- SP1 — STUDY POINT

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

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COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/12/21	Schematic Design Progress Set

SCALE	**1"=20'**
DATE ISSUED	**JULY 2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

POST DEVELOPMENT

POST

\\woodardcurran.net\Shared\Projects\20233035.00 USM - Falmouth Street Garage\wip\Drawings\Civil\233035.00 SW Flat.dwg, Jul 16, 2021 - 3:24pm, JCONLEY

[redacted]

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September 10, 2021

Mr. Matthew Grooms
City of Portland
389 Congress Street, 4th floor
Portland, Maine 04101

Re: Application for Traffic Movement Permit Modification
University of Southern Maine
Portland, Maine

Dear Matthew,

On behalf of University of Southern Maine (applicant), VHB is pleased to submit this Traffic Movement Permit Modification Application detailing the relocation of the parking garage that was previously permitted as part of Project ID PL-001040-2020. The previous approval for a student center and residential hall included a parking garage with access on Falmouth Street. In response to feedback from the surrounding neighborhood and a parking garage site selection process, this modification application seeks approval for relocation of the parking garage south of Bedford Street in Portland.

We have attached the following information in support of this application:

- Updates to Sections 1-7
- Signed Modification Application Form
- Notice of Intent to File
- List of Abutters

As the $500 application fee will be sent to you separately, please advise an appropriate address. We look forward to scheduling a meeting in the near future.

Very truly yours,

Jennifer Conley, PE, PTOE
Director, Transportation Systems
Jconley@vhb.com

Engineers | Scientists | Planners | Designers

500 Southborough Drive
Suite 105B
South Portland, Maine 04106
P 207.889.3150
F 207.253.5596

DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING DIVISION

ID#:_____
Fees Paid:_____
Date Received:_____

APPLICATION FOR TRAFFIC MOVEMENT PERMIT MODIFICATION

This form shall be used to request approval of minor changes to: (a) project design or operation; or (b) the conditions of a permit as previously approved by the Department of Transportation or the Department of Environmental Protection.

A processing fee of $500.00 (check payable to Treasurer, State of Maine) is required at the time of application submittal.

If significant changes are proposed, then a complete new or amendment application may be required by the Department.

(Please type or print)

Name of Applicant: University of Southern Maine

Address: 37 College Avenue, Gorham, ME 04038

Telephone Number: (207) 780-4585

Name of Contact or Agent: Aaron Witham

Telephone Number: (207) 780-5947

LOCATION OF ACTIVITY

Name of Project: University of Southern Maine Residence Hall, Student Center and Parking Garage

Municipality or Township: Portland County: Cumberland

REQUIRED INFORMATION

1. Existing DOT or DEP Permit Number: PL-001040-2020

2. DOT or DEP Project Manager for previous application (if known): Matthew Grooms

3. Description of Proposed Change: Prior approval of a Residential Hall and Student Center included a location for a parking garage with access and egress to Falmouth Street. In response to feedback from the community and a site selection process, the parking garage site was relocated to a site with access and egress to Bedford Street.

(Attach additional sheet(s), if necessary)

4. Provide all documentation necessary to support the proposed change. This documentation shall include, as appropriate, revised site plans, construction drawings and technical data. (If you are unsure of what information to include, please contact the original DOT or DEP project manager, or the Traffic Engineering Division.

5. Does your proposal involve a significant expansion of the project, change the nature of the project, or modify any Department findings with respect to any licensing criteria? no (if you are unsure how to answer this or if your answer is "yes", please contact the original DOT or DEP project manager, or the Division of Land Resource Regulation in either Portland, Augusta, or Bangor for assistance).

If yes, you must provide public notice (see attached form). By signing this application, you certify that the completed notice has been sent by certified mail to abutters and municipal officials; and has been published once in a newspaper circulated in the area where the project is located.

NOTE: All supporting documents summarized above must be attached to this form and sent to the nearest appropriate DOT Office located below: File the modification "Attention Division Traffic Engineer" in the appropriate Division office.

MDOT Division P.O. Box 1178 41 Rice Street Presque Isle, ME 04769 Tel: (207) 764-2060	MDOT Division 2 P.O. Box 539 High Street Ellsworth, ME 04605 Tel: (207) 667-5556	MDOT Division 3 P.O. Box 1208 219 Hogan Road Bangor, ME 04402-1208 Tel: (207) 941-4500
MDOT Division 4 Route 201 10 Mountain Ave. Fairfield, ME 04937 Tel: (207) 453-7377	MDOT Division 5 143 Rankin St. P.O. Box 566 Rockland, ME 04841 Tel: (207) 596-2230	MDOT Division 6 P.O. Box 1940 Portland, ME 04104 Tel: (207) 883-5546
MDOT Division 7 P.O. Box 817 Dixfield, ME 04224-0683 Tel: (207) 562-4228		

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment".

Aaron Witham _____.....DATE: 09-09-2021

SIGNATURE OF APPLICANT

Aaron Witham

PRINT OR TYPED NAME

Director of Sustainability, USM

TITLE

THE APPLICATION FEE IS DUE AT THE TIME OF APPLICATION SUBMITTAL. THE APPLICATION WILL NOT BE PROCESSED UNTIL THIS FEE IS PAID.

1/2000

CERTIFICATION

The traffic engineer responsible for preparing this application and/or attaching pertinent site and traffic information hereto, by signing below, certifies that the application for traffic approval is complete and accurate to the best of his/her knowledge.

Signature: Jennifer Conley Re/Cert/Lic No.: 15652

Name (print): Jennifer Conley

Date: September 3, 2021

If the signature below is not the applicant's signature, attach letter of agent authorization signed by applicant.

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Aaron Witham — 09-09-2021

Signature of applicant — Date

FORM C 7/97

NOTICE OF INTENT TO FILE

Please take notice that

University of Southern Maine
96 Falmouth St
Portland, ME 04103

is intending to file a Traffic Movement Permit application with the Maine Department of Transportation pursuant to the provisions of 23 M.R.S.A. § 704 - A on or about September 7, 2021.

The application is for the relocation of a parking garage previously approved as part of the development of a residential hall and student center on the University of Southern Maine campus in Portland. In response to feedback from the neighboring community and a parking garage site evaluation, the originally proposed parking garage located adjacent to the Sullivan Gymnasium Complex was shifted to a site adjacent to the existing parking garage south of Wishcamper Center. Construction of the parking garage, residential hall, and student center is anticipated to be completed and occupied in 2023. The project, as was previously approved, is anticipated to generate up to 160 AM peak hour and 160 PM peak hour trips based on ITE Trip Generation, 10th Edition, estimates for the forecasted enrollment out to 2028. The project site is adjacent to the Wishcamper Center, Glickman Family and Osher Map Libraries, and existing parking garage on Bedford Street at the following location:

Tax Map/Lot No. 114 A001
44 Bedford Street
Portland, ME 04101

A request for a public hearing must be received by the Department, in writing, no later than 20 days after the application is found by the Department to be complete and is accepted for processing. Public comment on the application will be accepted throughout the processing of the application.

The application will be filed for public inspection at the Department of Transportation Division office (Presque Isle, Ellsworth, Bangor, Fairfield, Rockland, Scarborough or Dixfield) during normal working hours. A copy of the application may also be seen at the City of Portland offices in Portland, Maine.

Written public comments may be sent to the following address: Attention Matthew Grooms, Planning Department, City of Portland, 289 Congress Street, Portland, ME 04101.

Abutters List

Name	Address			
15 BAXTER BOULEVARD LLC	PO BOX 255	BRUNSWICK	ME	04011
343 LLC	PO BOX 66749	FALMOUTH	ME	04105
BAXTER 43 HOLDINGS LLC	712 MAIN ST	RICHMOND	ME	04357
BAYVIEW COURT LLC	ONE CITY CENTER 4TH FL	PORTLAND	ME	04101
MAUREEN BYRNE	11 GLENN LN	YORK	ME	03909
PETER CALLNAN	25 WASHBURN ST	PORTLAND	ME	04101
HAROLD COZENS	16 CHAMBERLAIN AVE	PORTLAND	ME	04101
CPORT CREDIT UNION	PO BOX 777	PORTLAND	ME	04104
SEAN DOWLING	1209 N TAFT ST # C	ARLINGTON	VA	22201
MICHAEL ELING	23 CHAMBERLAIN AVE	PORTLAND	ME	04101
DANIEL FINK	35 WASHBURN AVE	PORTLAND	ME	04101
DAWN GAY	8 CHAMBERLAIN AVE	PORTLAND	ME	04101
HANNAFORD BROS CO #351C	PO BOX 1000	PORTLAND	ME	04104
ANNE HEELAN	7 WASHBURN AVE	PORTLAND	ME	04101
ADAM MOSES	24 CHAMBERLAIN AVE	PORTLAND	ME	04101
OAKHURST DAIRY	364 FOREST AVE	PORTLAND	ME	04101
JOHN OGOREK	20 CHAMBERLAIN AVE	PORTLAND	ME	04101
PALMER SPRING CO	PO BOX 8009	PORTLAND	ME	04104
GEORGIA PORTER	29 WASHBURN AVE	PORTLAND	ME	04101
PORTLAND HOUSING AUTHORITY	14 BAXTER BLVD	PORTLAND	ME	04101
AMANDA POWELL	4 CHAMBERLAIN AVE	PORTLAND	ME	04101
DEBRA SMITH	3 WASHBURN AVE	PORTLAND	ME	04101
JOHN STEVENS	29 CHAMBERLAIN AVE	PORTLAND	ME	04101
EVAN THOMAS	34 CHAMBERLAIN AVE	PORTLAND	ME	04101
LISA TUPPER	30 CHAMBERLAIN AVE	PORTLAND	ME	04101
UNIVERSITY OF MAINE	107 MAINE AVE	BANGOR	ME	04401
UNIVERSITY OF MAINE SYSTEM	96 FALMOUTH ST	PORTLAND	ME	04103
UNIVERSITY OF MAINE SYSTEM	5703 ALUMNI HALL	ORONO	ME	04469
UNIVERSITY OF MAINE SYSTEM	107 MAINE AVE	BANGOR	ME	04401

Abutters List

Name	Address			
UNIVERSITY OF MAINE SYSTEM CHIEF FINANCIAL OFFICER	PO BOX 9300	PORTLAND	ME	04104
UNIVERSITY OF MAINE THE	107 MAINE AVE	BANGOR	ME	04401
KATHERINE URBANEK	PO BOX 66749	FALMOUTH	ME	04105
LUCAS WALKER	21 WASHBURN AVE	PORTLAND	ME	04101
PETER WEED	33 CHAMBERLAIN AVE	PORTLAND	ME	04101
TROY WILKINS	PO BOX 3891	PORTLAND	ME	04104
WILLIAM C ROWELL FAMILY LIMITED PARTNERSHIP	PO BOX 3615	PORTLAND	ME	04104

Section 1

Site and Traffic Information

1.A. Site Description and Site Plan

A modification to the original Traffic Movement Permit (TMP) for Project ID PL-001040-2020 is being pursued based on change to the proposed location of the multi-level parking garage intended to provide parking for the residence hall and student center that were permitted originally. The sites for the residence hall and student center remain as described in the original permit, located on the block between Bedford Street, Brighton Avenue, Falmouth Street, and Durham Street (Tax Map/Lot No. 114A).

The project site for the proposed parking garage is located at 44 Bedford Street (Tax Map/Lot No. 114 A001), in the area south of the Wishcamper Center and north of the I-295 corridor. The site is owned by the University of Southern Maine and is proposed to provide parking for the residence hall and student center permitted in the original TMP. The site and boundary surveys, as well as the proposed site plan are included in Attachment 1A. The garage site that was described in the original TMP is no longer applicable.

1.B. Existing and Proposed Site Uses

The existing and proposed uses for the residence hall and student center sites remain the same as previously permitted. The existing use of the proposed parking garage site is surface parking adjacent to the Wishcamper Center, Glickman Family and Osher Map Libraries, and the existing parking garage. The proposed multi-level parking facility will provide up to 650 parking spaces. Proposed garage access will be from Bedford Street with traffic entering via Winslow Street and exiting through the existing garage to Surrenden Street.

1.C. Regional Mapping

No Change

1.D. Proposed Uses in the Vicinity of the Proposed Development

No Change

1.E. Trip Generation

The trip generation remained consistent with the previously approved TMP and was calculated based on the Institute of Transportation Engineers (ITE) publication, Trip Generation, 10th edition.

		Trip Generation - Proposed Site[1]
Weekday AM Peak Hour	Enter	125
	Exit	35
	Total	160
Weekday PM Peak Hour	Enter	51
	Exit	109
	Total	160

1 Trip Generation based on ITE 10th Edition, LUC 550, University/College (1,066 Students).

1.F. Trip Distribution

The regional trip distribution patterns remained consistent with the previously approved TMP, as outlined below. The distribution of the site related traffic was based on USM Portland student zip code information assuming the University will continue to draw from similar geographic areas.

Most site trips are anticipated to be generated to and from the south on Forest Avenue with 46 percent of traffic oriented to and from I-295 and an additional seven percent oriented to and from downtown Portland and parts of South Portland. The next sources of trips are 30 percent to and from Brighton Avenue and 14 percent to and from points north via Forest Avenue. Minor percentages access USM from Preble Street (two percent) and Deering Avenue points south (one percent).

1.G. Trip Assignment

The trips associated with increased enrollment and previously oriented to and from the garage site on Falmouth Street are now anticipated to derive to and from the proposed multi-level parking garage off Bedford Street. As such, the trips previously assigned to the driveway on Falmouth Street were redistributed to the Winslow Street entrance and from the Surrenden Street exit of the proposed garage site. The trips are now assigned to and from the proposed garage site following the likely path to and from the respective student zip codes. The resulting site trip reassignment is depicted in Attachment 1B.

Attachments

Attachment 1A – Site survey, Proposed site plans

Attachment 1B –Trip generation calculations, site trip diagrams

Section 2

Traffic Crashes

No changes

Section 3

Development Entrances and Exits

3.A Entrance and Exit Locations

The sites for the residence hall and student center previously approved remain unchanged. As such, the driveway locations and anticipated entering and exiting travel patterns to and from these facilities remain largely the same as previously outlined in the approved TMP. Any anticipated shift in travel patterns surrounding the residence hall and student center will result from the relocation of the parking garage from the site adjacent to Sullivan Gymnasium Complex to the site adjacent to the existing parking garage. It is anticipated that access between the residence hall or student center and the proposed garage will concentrate non-motorized travel to Bedford Street.

The proposed multi-level parking garage site is located off Bedford Street between Wishcamper Center, Glickman Family and Osher Map Libraries, and the existing parking garage. The current access to the garage site is provided via Winslow Street. Winslow Street facilitates vehicles entering and exiting the current surface parking areas and drop off locations behind Wishcamper and the libraries, as well as vehicles exiting the existing parking garage. It is proposed that the access to the garage site along Bedford Street will shift to circulate vehicles entering the parking garages via Winslow Street and vehicles exiting the parking garages via Surrenden Street. Both Winslow Street and Surrenden Street will remain two-way facilities to provide access to local driveways, parking, and drop-off locations.

The change in circulation for access and egress to the proposed and existing parking garages, as well as the anticipated concentration of non-motorized activity along and across Bedford Street, will compel improvements to the Bedford Street corridor in the vicinity of the Surrenden Street and Winslow Street intersections. The proposed improvements for vehicular traffic include the addition of a westbound left turn lane on Bedford Street to process vehicles entering the parking garages at Winslow Street, reconfiguration of Winslow Street to two lanes southbound to process the queues entering the garages, reconfiguration of Surrenden Street to two lanes northbound with dedicated left and right turn lanes to process vehicles exiting the garages, and raised median islands along the corridor to channelize traffic and encourage slower speeds. From a non-vehicular standpoint, improvements along Bedford Street include maintenance of full width bike lanes in both directions, a pedestrian bump-out to narrow the pedestrian crossing at Winslow Street, relocation and improvement of the three existing crosswalks to locations with new raised median islands for mid-crossing pedestrian refuge and enhancement such as raised crosswalks and rectangular rapid flashing beacons(RRFBs), the addition of a new crosswalk, and compliant ramps and connections to the new crossing locations.

Attachment 3 provides a conceptual plan for the proposed improvements on Bedford Street, Winslow Street, and Surrenden Street.

3.B Plan View

Attachment 1A of Section 1 shows the proposed site plan. As shown, the site fronts onto Winslow Street with access via Bedford Street. Attachment 3 shows all intersection roads, speed limits, and sight distances for each entrance/exit.

3.C Stopping Sight Distances

The access points to and from the garage are located on minor roadways with low traffic volumes and traveling speeds. In both cases (entry and exit), the proposed garage is sharing an access with the existing garage with a configuration that the garage access is a continuation of the main roadway and not intersecting with it.

3.D Entrance/Exit Compliance with Design Requirements

As indicated above, the entrances and exits are designed as continuations of through roadways and not as driveway entrances. As such, the criteria specified in the MaineDOT's Chapter 299 Highway Driveway and Entrance Rules is not applicable.

Section 4

Title, Right, or Interest

4.A Evidence of Title, Right, or Interest

The proposed development is located on property owned by the Applicant and identified as Tax Map 114A Lot A-1. Attached are copies of the deeds associated with this property.

- Deed, dated September 11, 2006, Cumberland County Registry of Deeds, Book 24387, Pg 261.
- Deed, dated December 16, 2011, Cumberland County Registry of Deeds, Book 29219, Pg 218.

Section 5

Public or Private Right-of-Way

5.A Public or Private Rights-of-Way

The site is proposed to be accessed as described in Section 3. No additional public or private rights of way are proposed.

Section 6

Schedule

6.A Schedule

Construction of the residence hall and student center is underway with anticipated opening in Summer 2023. The proposed parking garage project is planned to be constructed in coordination with the ongoing projects, with anticipated construction beginning in 2022 and completed in 2023.

LUTHER BONNEY HALL

BASEMENT ENTRANCE

MASTERTON HALL

ABROSOM COMMUNITY EDUCATION CENTER

BEDFORD STREET
PAVED – PUBLIC – 60' WIDE

WISHCAMPER CENTER

LOT AREA
387,550 S.F.
8.90AC ±

TAX MAP 114-A-2

OSHER MAP & GLICKMAN FAMILY LIBRARY

MATCH LINE SHEET 2

CHAMBERLAIN AVENUE
PAVED–PUBLIC–50'WIDE

SURRENDEN STREET
PAVED–PUBLIC–66'WIDE

WASHBURN AVENUE
PAVED–PUBLIC

PARKING GARAGE

WINSLOW STREET
DISCONTINUED 2007 – TEMPORARY SEWER EASEMENT RETAINED

CONANT STREET
TEMPORARY SEWER EASEMENT DISCONTINUED 2007 – RETAINED

INTERSTATE HIGHWAY 295
SOUTHBOUND ON-RAMP

NOTE: THIS PORTION OF SURRENDEN STREET DISCONTINUED FEB 27, 2003

CITY OF PORTLAND UTILITY EASEMENT – SEE 19739/130
PORTLAND WATER DISTRICT EASMENT – SEE 19364/95
NORTHERN UTILITIES NATURAL GAS EASEMENT – SEE 20781/344

UTILITY NOTE

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEY HAS NOT PHYSICALLY LOCATION THE UNDERGROUND UTILITIES. CALL 1–888–DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

SCALE : 1" = 30'
0' 15' 30' 60'

PLAN REFERENCES

1. "BOUNDARY & TOPOGRAPHIC PLAN ON BEDFORD STREET, USM CAMPUS, PORTLAND, MAINE MADE FOR WOODARD & CURRAN, INC." SEPTEMBER 08, 2005 REV. 5 11–02–06 BY OWEN HASKELL, INC.

2. MAINE STATE HIGHWAY COMMISSION RIGHT OF WAY MAP, STATE HIGHWAY '295', PORTLAND, CUMBERLAND COUNTY, S.H.C. FILE NO. 3–185. SHEETS 57 REVISED AND 61

3. "BOUNDAY & TOPOGRAPHIC SURVEY, USM PORTLAND CAMPUS, 96 FALMOUTH STREET, PORTLAND, MAINE MADE FOR OAK POINT ASSOCIATES," NOV. 12, 2019 BY OWEN HASKELL, INC., OHI JOB# 2019–244 P.

GENERAL NOTES

1. OWNER OF RECORD: UNIVERSITY OF MAINE
TAX MAP 114 BLOCK A LOT 1 and LOT 2
BOOK 29219 PAGE 218
BOOK 24387 PAGE 258
BOOK 34066 PAGE 29

2. BEARINGS ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD 83 PER COORDINATE DATA PROVIDED BY THE CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS.

3. ELEVATIONS ARE BASED ON CITY OF PORTLAND DATUM, NGVD 29. BENCHMARK UTILIZED IS A COPPER BOLT IN 3 FOOT OFFSET MONUMENT LOCATED AT THE SOUTHWEST CORNER OF THE BRIGHTON AVENUE AND FALMOUTH STREET INTERSECTION.

SAMUEL D. GLIDDEN, PLS #2520

REV. 1	4-30-2021	SURVEYED ADDITIONAL AREAS

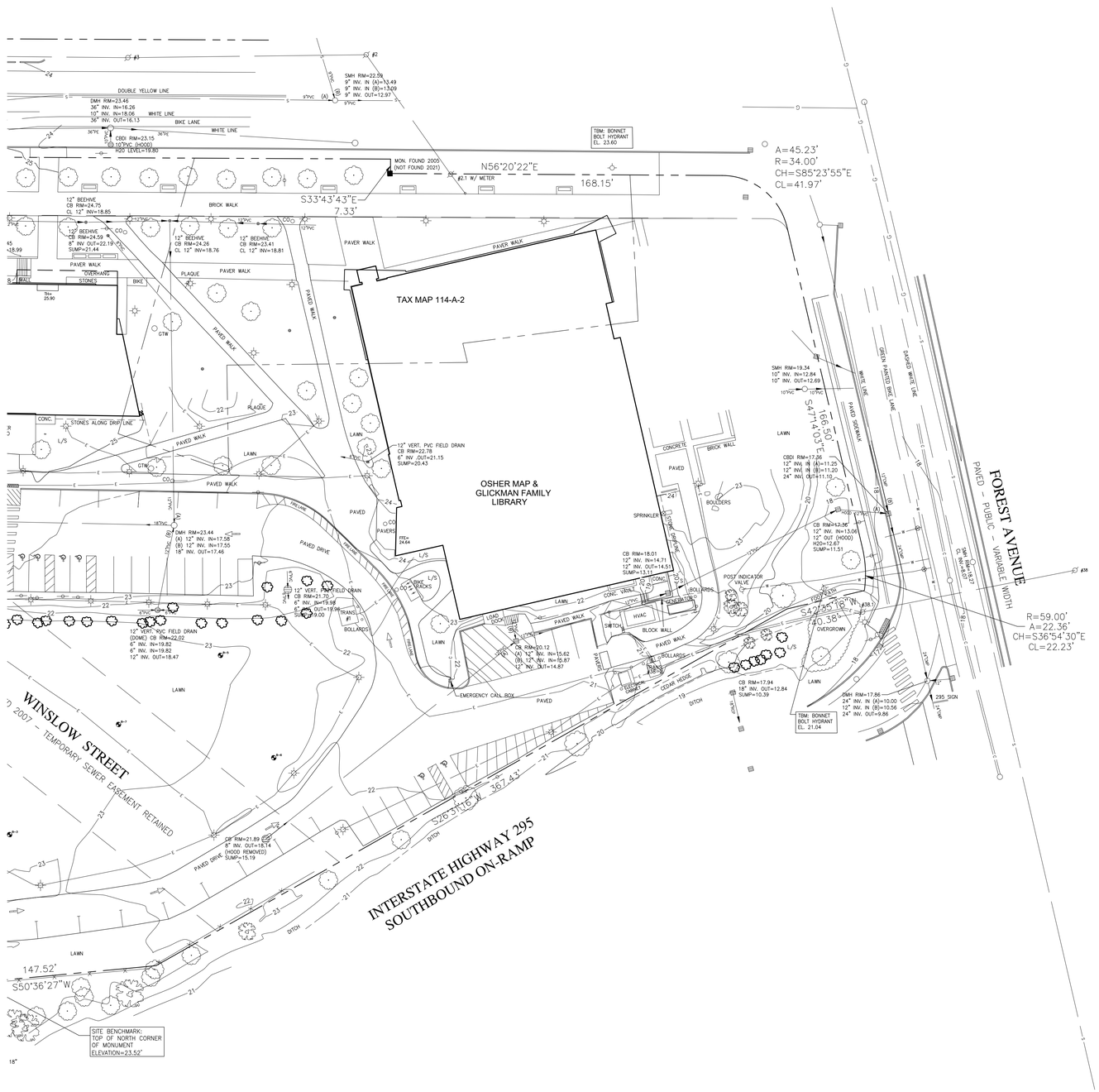
Existing Conditions Survey

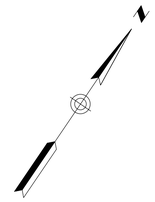
USM Portland - Wishcamper Lot
Portland, Maine
Made for
Woodard & Curran
41 Hutchins Drive, Portland, Maine

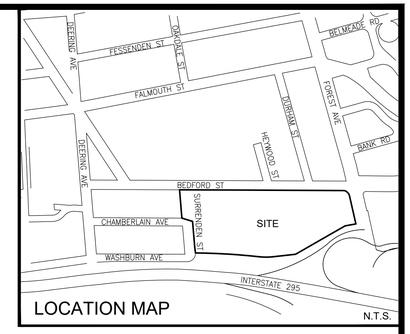
OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 US ROUTE 1, UNIT 10, FALMOUTH, ME 04105 TEL. 207-774-0424

DRAWN BY:	SDG / JLW	DATE:	JAN. 27, 2019	JOB NO.	2019-267 P
CHECKED BY:	SDG	SCALE:	1" = 30'	DRWG. NO.	1 OF 2

MATCH LINE SHEET 1







LEGEND

●	IRON PIPE OR ROD FOUND	-X-X-	FENCE
■	MONUMENT FOUND	═══	CURB
	UTILITY POLE	- - -	OVERHEAD WIRES
	MANHOLE	E	UNDERGROUND POWER
E G	ELECTRIC/GAS METER	C	COMMUNICATION
	SIGN	W	WATER LINE
	CATCH BASIN	G	GAS LINE
	HYDRANT	T	TELEPHONE
	WATER VALVE OR SHUTOFF	SD	STORM DRAIN
	GAS VALVE	SS	SANITARY SEWER
	LIGHT POLE	STM	STEAM LINE
	DECIDUOUS TREE	IPF/IRF	IRON PIPE OR ROD FOUND
	CONIFEROUS TREE	L/S	LANDSCAPED AREA
	SHRUB / BUSH	CONC.	CONCRETE
GTW	GEOTHERMAL WELL	FFE	FINISHED FLOOR ELEVATION
	ELECTRICAL JUNCT. BOX	THRES.	THRESHOLD
		N/F	NOW OR FORMERLY
		000/000	DEED BOOK / PAGE

SCALE : 1" = 30'

0' 15' 30' 60'

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SAMUEL D. GLIDDEN, PLS #2520

STATE OF MAINE · SAMUEL D GLIDDEN · 2520 · PROFESSIONAL · LAND SURVEYOR

REV.	DATE	DESCRIPTION
1	4-30-2021	SURVEYED ADDITIONAL AREAS

Existing Conditions Survey

USM Portland - Wishcamper Lot
Portland, Maine
Made for
Woodard & Curran
41 Hutchins Drive, Portland, Maine

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 US ROUTE 1, UNIT 10, FALMOUTH, ME 04105 TEL. 207-774-0424

DRAWN BY: SDG / JLW	DATE: JAN 27, 2019	JOB NO.	2019-267 P
CHECKED BY: SDG	SCALE: 1" = 30'	DRWG. NO.	2 OF 2

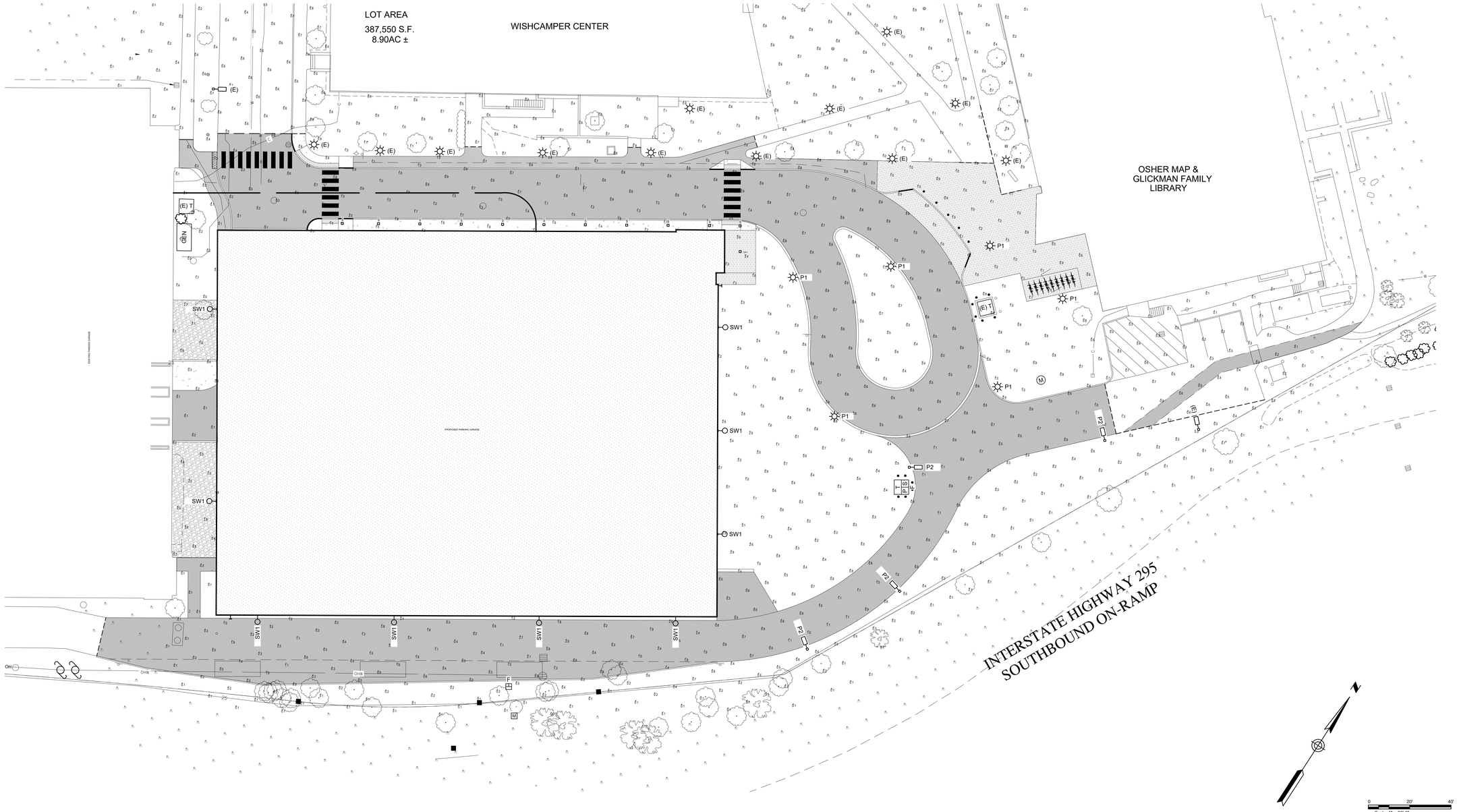
LUMINAIRE SCHEDULE ~ SITE

TYPE	DESCRIPTION	MFR	CATALOG SERIES NUMBER SEE NOTE 1	MOUNTING, U.N.O.	VOLTS	LAMP				KEY NOTES
						QTY PER FIXTURE	WATTS	LUMENS	TYPE	
P1	SITE LIGHT AND POLE, "ICE CREAM CONE" SHAPE	SEE NOTE 8		14' POLE	277	1	24	3,330	LED ARRAY ~ 4000K	8,9
P2	SITE LIGHT AND POLE, "SHOEBOX" SHAPE	SEE NOTE 8		14' POLE	277	1	18	2,160	LED ARRAY ~ 4000K	8,10
SW1	WALL MOUNTED EXTERIOR LIGHT	LITHONIA	KAXW-LED-P1-40K-R4-MVOLT	KEYNOTE 5	UNV	1	29	3,643	LED ARRAY ~ 4000K	5
SR1	RECESSED CANOPY LIGHT	LITHONIA	LDN4SQ-40-07-LS4-AR-LSS-MVOLT	RECESSED CANOPY	UNV	1	8.6	620	LED ARRAY ~ 4000K	

	NOTES
1	**NOTE THAT THESE NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. PROVIDE ALL REQUIREMENTS ON SCHEDULE, NOTES, SPECS, AND DRAWINGS COMBINED.**
2	**CATALOG SERIES NUMBERS ARE USED TO ESTABLISH A LEVEL OF QUALITY AND NOT INTENDED TO LIMIT COMPETITION. SERIES NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. COMPLY WITH ADDITIONAL REQUIREMENTS IN SPECIFICATIONS AND DRAWINGS.**
3	PROVIDE WALL,CEILING, OR PENDANT MOUNTING AS INDICATED ON PLANS. PROVIDE NUMBER OF FACES AND ARROWS AS INDICATED.
4	VERIFY CEILING STRUCTURE AND MOUNTING HEIGHT PRIOR TO ORDERING ANY LIGHT FIXTURES.
5	COORDINATE MOUNTING HEIGHT WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
6	PROVIDE COLD WEATHER OPTION.
7	CONFIRM EXACT FIXTURE CONFIGURATION AND OPTIONS WITH MUNICIPALITY PRIOR TO ORDERING FIXTURE.
8	FIXTURE AND POLE SHALL BE PROVIDED BY OWNER FROM EXISTING OWNER'S STOCK.
9	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8029E345-A.
10	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8039E40-A.

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
DRIVES	Illuminance	Fc	0.99	3.5	0.2	4.95	17.50
WALKWAY- GLICKMAN	Illuminance	Fc	1.00	1.3	0.5	2.00	2.60
WALKWAY- NEW GARAGE	Illuminance	Fc	1.46	1.7	1.2	1.22	1.42



A1	PHOTOMETRIC SITE PLAN
SCALE: 1"=20'-0"	

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT
& STRUCTURAL ENGINEER
DESMAN Design Management
18 Tremont Street #300
Boston, MA 02108

ARCHITECT
WINTON-SCOTT ARCHITECTS
5 MILK STREET
PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN
41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING
160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

© DESMAN, Inc.
2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

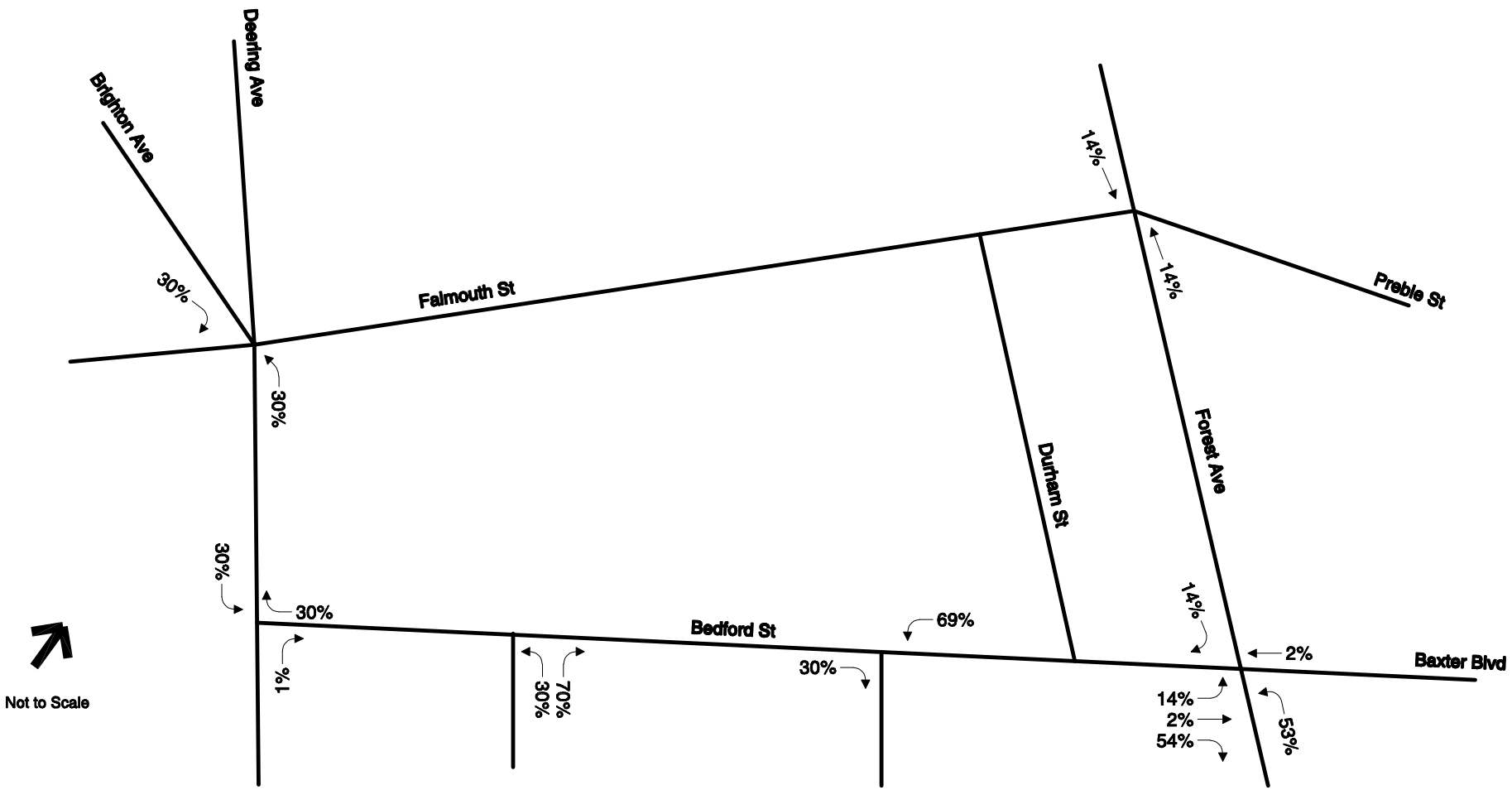
SITE PHOTOMETRIC PLAN AND SCHEDULES

SL-100

Trip Generation

Total Site generated trips (not accounting for internal, pass-by, or diverted trips)

	Site Land Uses and Descriptions				AM PK HR OF GENERATOR										PM PK HR OF GENERATOR									
					directional dist.		average				# trips				directional dist.		average				# trips			
	Code	Land Use	Size	Unit	% enter	% exit	# studies	Avg Rate	Std Dev.	Total by Avg	Method Chosen	Total Trips	Entering	Exiting	% enter	% exit	# studies	Avg Rate	Std Dev.	Total by Avg	Method Chosen	Total Trips	Entering	Exiting
	1	2	3	4	16	17	18	19	20	21	24	25			26	27	28	29	30	31	34	35		
10th	550	University / College	1066	students	78%	20%	7.00	0.15	0.05	160	average	**160**	**125**	**35**	32%	68%	9.00	0.15	0.05	160	average	**160**	**51**	**109**



Trip Distribution Percentages

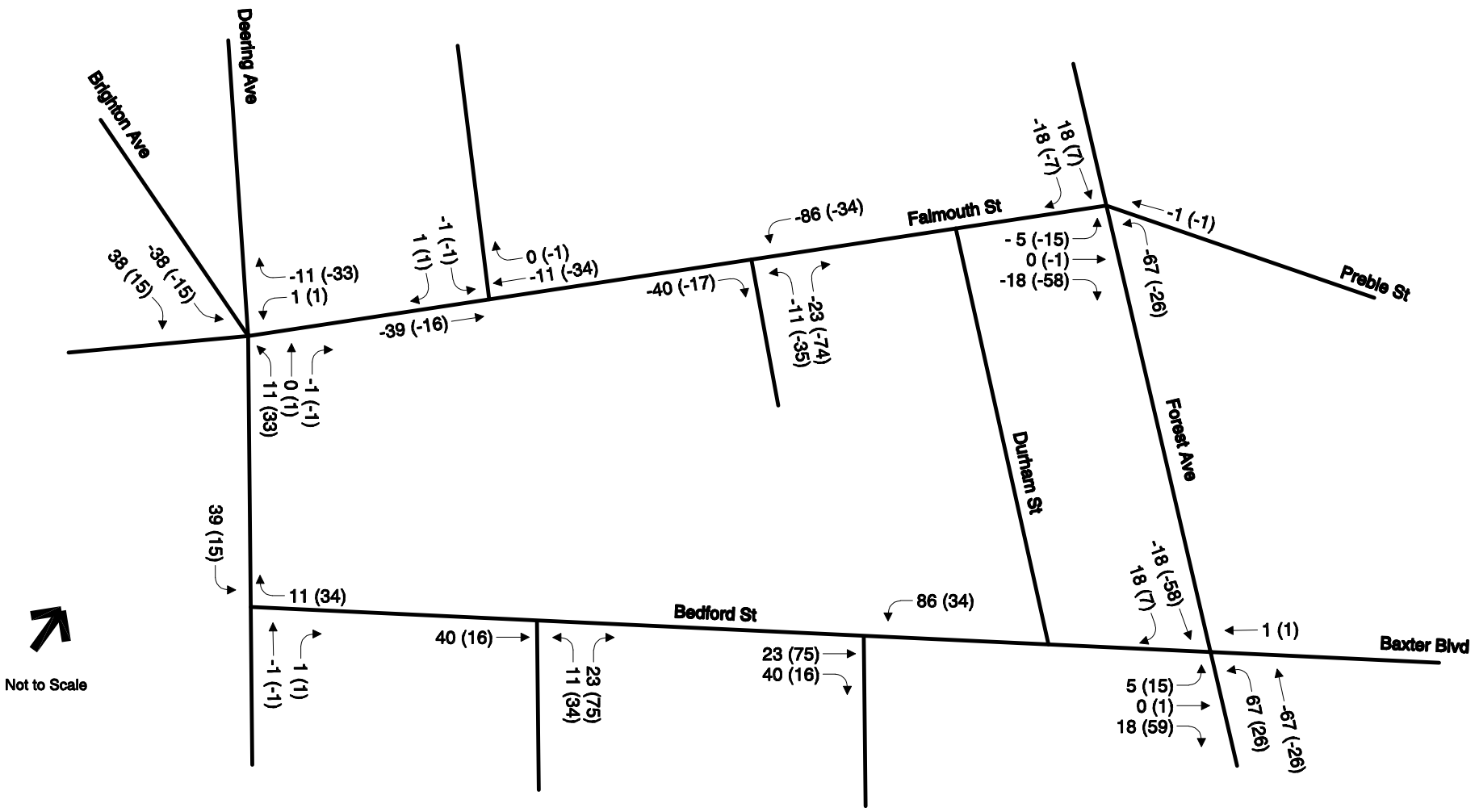
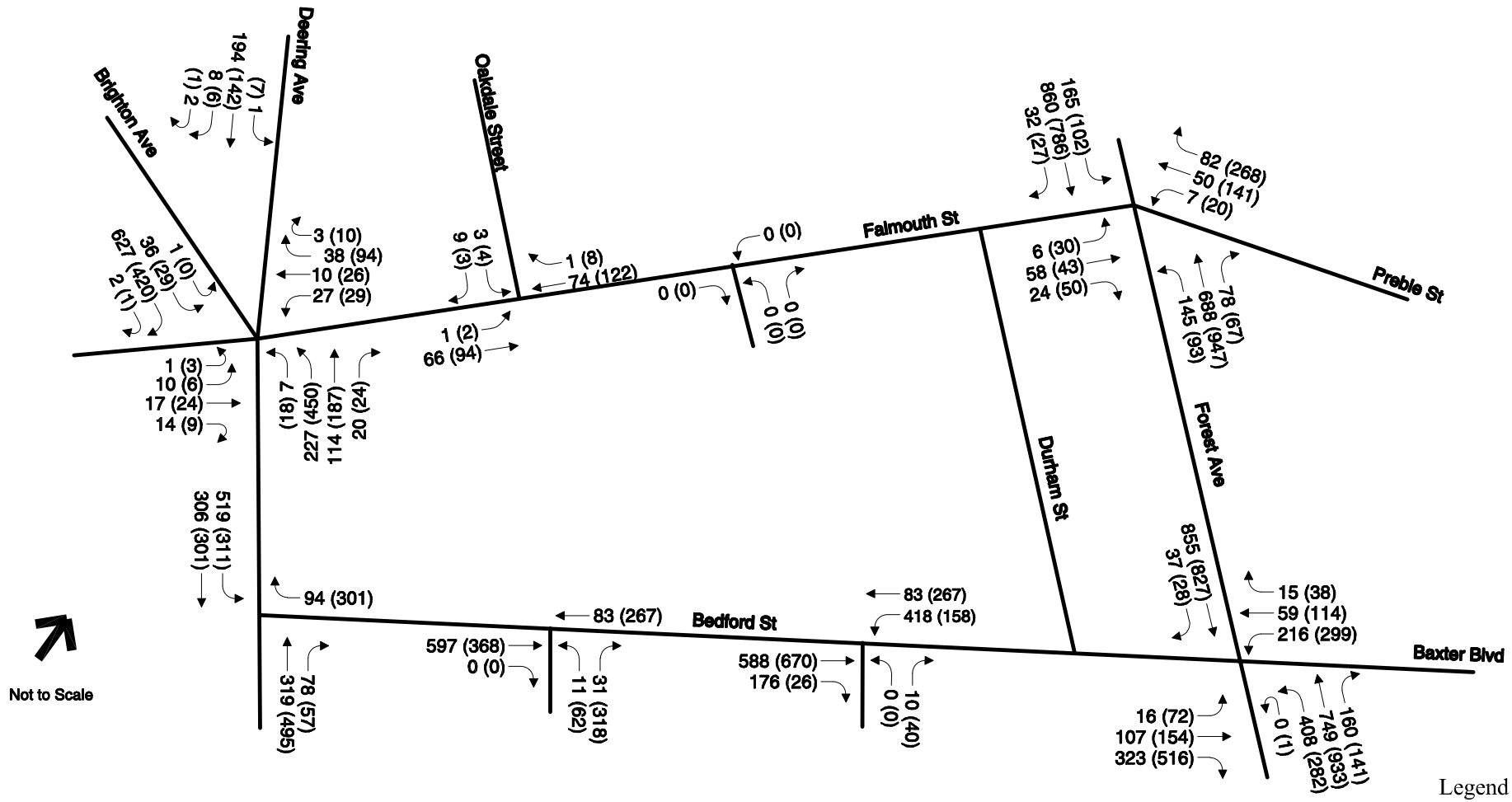


Figure 5: Trip Generation for the Proposed Site

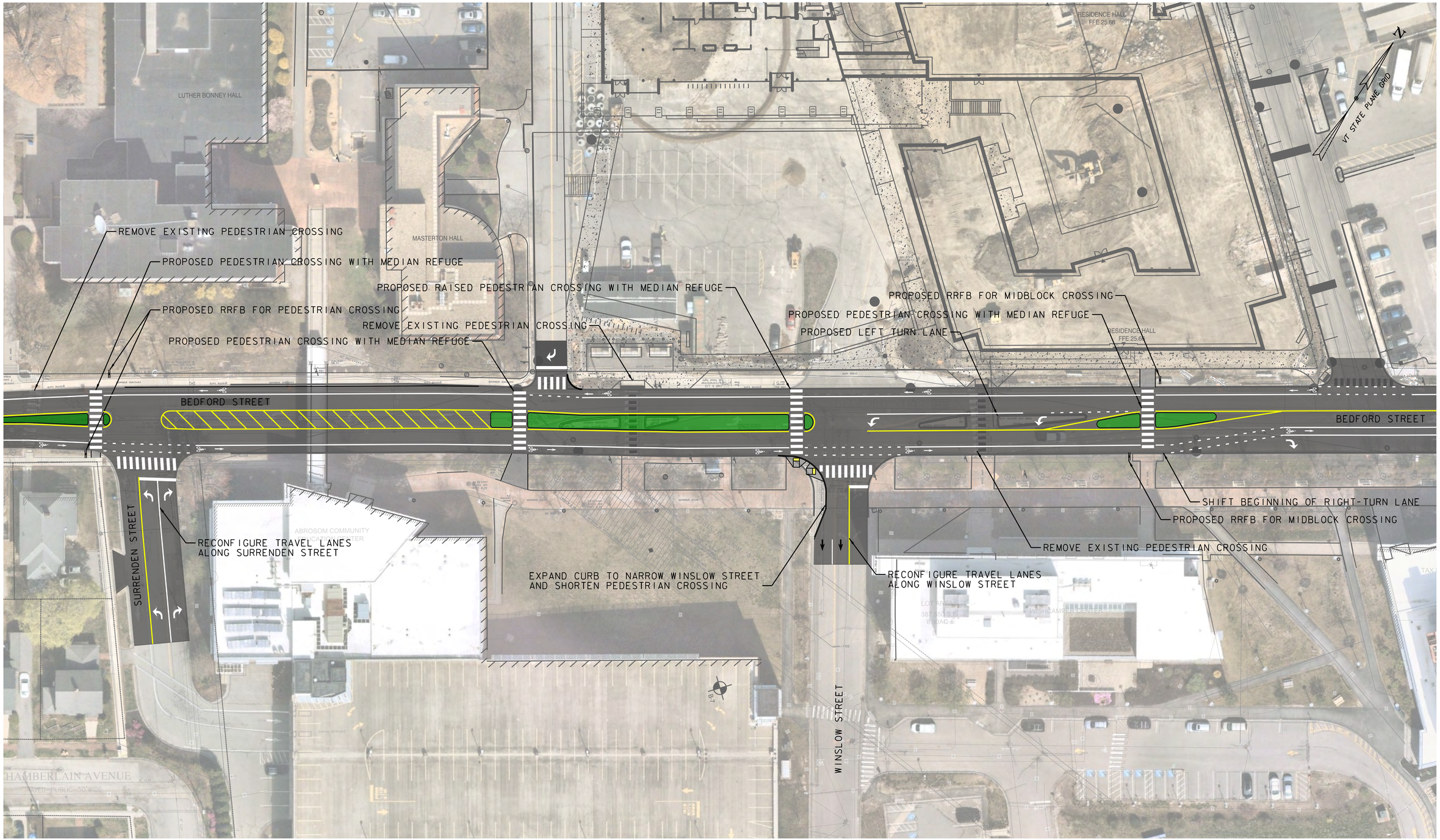
2028 TMP Modification Traffic Volumes



Legend

AM Peak Hour
(PM Peak Hour)

2028 Build Traffic Volumes
(TMP Modification)



PROJECT NAME:	USM INTERSECTION IMPROVEMENTS
PROJECT NUMBER:	52718.01

FILE NAME: bdr_concepts.dgn	PLOT DATE: 09/03/21
PROJECT LEADER: J.A. CONLEY	DRAWN BY: D.A. GINGRAS
DESIGNED BY: D.A. GINGRAS	CHECKED BY: J.A. CONLEY
BEDFORD STREET CONCEPT	SHEET 3 OF 4

GOVERNOR'S DEED
(with Reverter)

KNOW ALL PERSONS BY THESE PRESENTS, that the STATE OF MAINE, acting by and through its Governor, on recommendation of the Commissioner of its DEPARTMENT OF TRANSPORTATION, under and pursuant to the provisions of 23 M.R.S.A., Section 61, for consideration, the sufficiency of which is hereby acknowledged, RELEASES to THE UNIVERSITY OF MAINE SYSTEM, organized as a non-profit corporation of the State of Maine, with offices at 16 Central Street in Bangor, Maine, its successors and assigns forever, all its right, title and interest in and to a certain lot or parcel of land situated on the southerly side of Winslow Street, so-called, at its intersection with the westerly sideline of the right-of-way of State Highway "295", also known as Interstate 295, in Portland, County of Cumberland and State of Maine, and being as shown on a Right-of-way Map for State Highway "295" Portland, Cumberland County, Federal Aid Project Number I-295-3(28), dated January 1967, File Number 3-185, sheet 57 of 73, on file at the offices of the Maine Department of Transportation in Augusta, bounded and described as follows:

BEGINNING at a point on the southerly sideline of Winslow Street at its intersection with the westerly sideline of the right-of-way of Route 295;

THENCE S 26° 51' 18" W along said westerly sideline of Route 295, a distance of 34.00 feet;

THENCE S 51° 22' 05" W continuing along said westerly sideline of Route 295, a distance of 23.93 feet to land now or formerly of the University Of Southern Maine Foundation;

THENCE N 38° 37' 55" W along said University Of Southern Maine Foundation land 20.00 feet;

THENCE N 6° 51' 23" E continuing along said University Of Southern Maine Foundation land, 33.28 feet to the southerly sideline of said Winslow Street;

THENCE S 85° 26' 46" E along said southerly sideline of Winslow Street, 42.70 feet, more or less to the aforementioned westerly sideline of the right-of-way of Route 295 and the POINT OF BEGINNING, and containing one thousand four hundred twenty-seven square feet, more or less (1,427 sq. ft. ±).

EXCEPTING AND RESERVING from this conveyance any and all rights of access from the herein described parcel of land to State Highway "295", also known as Interstate 295, all of which rights of access are expressly reserved to, and retained by, the State of Maine.

ALSO RESERVING to the State of Maine the perpetual right to enter upon said parcel to maintain any highway slopes and drainage facilities or installations that may exist.

SUBJECT TO all utility easements and installations located on the above described premises, including those shown on the herein referred to Right-of-way Map, and to those rights which any utility enjoys over the subject premises for maintenance, location or relocation of poles and other installations.

NOTWITHSTANDING the foregoing, Grantor gives this deed, and Grantee accepts the same, upon the express CONDITION that the property hereby conveyed is to be retained by the University of Maine system and used for

public purposes only; and if said property or any interest in it, or any portion of it, is transferred, or if it is used for any commercial or other non-public purposes, said property shall at once REVERT to, and re-vest in, the Grantor, its successors or assigns; and that such reversion, should it occur, shall be automatic and require no further act of conveyance or documentation in order to be effective.

BEING a portion of premises acquired by the State of Maine from Charles T. Hayes, Jr. and Beatrice Hayes by warranty deed dated July 19, 1968 and recorded at the Cumberland County Registry of Deeds on July 23, 1968 in Volume 3049 at Page 553; and a portion of premises acquired from Reuben Katz by warranty deed dated January 10, 1969 and recorded at said Registry Of Deeds on January 15, 1969 in Volume 3072 at Page 435.

THE STATE OF MAINE makes no representations or warranties with respect to the premises hereby conveyed. The representations and warranties so excluded encompass, but are not limited to, those pertaining to: land use and environmental matters; fitness of the premises or any portion thereof for any particular purposes; water quality or quantity; the condition or quality of the soil; inchoate or unrecorded liens; status of title to or rights within that area lying between the high and low water marks; or the existence, status, or condition of access to, or public utilities serving the premises. Any subsequent use of, improvement to, or construction on the parcel shall be subject to all applicable laws, regulations, ordinances, and permitting requirements.

IN WITNESS WHEREOF, I, John E. Baldacci, Governor of the State of Maine, have caused the name and Great Seal of the State of Maine to be hereunto affixed this 11th day of Sept. in the year two thousand six.

STATE OF MAINE

By: _____, Governor
John E. Baldacci

Received
Recorded Register of Deeds
Sep 20,2006 02:29:02P
Cumberland County
John B OBrien

Affixed by: _____
Secretary of State

STATE OF MAINE
Kennebec, *ss.*

Sept. 11th, 2006

Personally appeared the above-named, John E. Baldacci, Governor of the State of Maine and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of the State of Maine.

Before me, _____
Notary Public/~~Attorney at Law~~

Print Name: _____

My commission expires: _____

ROSEMARIE D. SMITH
Notary Public, Maine
My Commission Expires January 6, 2009

SEAL

SHORT FORM QUITCLAIM DEED WITH COVENANT

MAINE REAL ESTATE TAX PAID

THE UNIVERSITY OF SOUTHERN MAINE FOUNDATION, a Maine nonprofit corporation with a mailing address of 96 Falmouth Street, Portland, Maine 04104, FOR CONSIDERATION PAID, grants to UNIVERSITY OF MAINE SYSTEM, a body politic and instrumentality of the State of Maine, with a mailing address of 16 Central Street, Bangor, Maine 04401, with QUITCLAIM COVENANT, certain real property, together with any improvements thereon, located in the City of Portland, Cumberland County, Maine and more particularly described on Exhibit A attached hereto and made a part hereof.

Being the same premises conveyed to the grantor herein by a Short Form Quitclaim Deed With Covenant from Frederick J. Olsen dated April 27, 2005 and recorded at the Cumberland County Registry of Deeds in Book 22577, Page 79.

IN WITNESS WHEREOF, The University of Southern Maine Foundation, has caused this instrument to be executed and delivered as of the 20th day of December, 2011.

The University of Southern Maine Foundation

Witness

By: Margaret A. Weston
Name: Margaret A. Weston
Its: President

State of Maine
County of Cumberland, ss. December 16, 2011

Personally appeared the above-named Margaret A. Weston, President of The University of Southern Maine Foundation, and acknowledged the foregoing instrument to be her free act and deed in her said capacity and the free act and deed of The University of Southern Maine Foundation.

Before me,

Amy Blaisdell
Notary Public/Attorney at Law
Name: Amy Blaisdell
Commission Expires: 10/16/2015

Amy Blaisdell
NOTARY PUBLIC
Lisbon Falls, ME
Commission expires on
October 16, 2015

Exhibit A

Formerly Tax Map 114, Block D, Lot 21:

Three (3) certain lots or parcels of land, with the buildings thereon, situated on the northerly side of Winslow Street in the City of Portland, County of Cumberland, State of Maine, being lots numbered 1, 2 and 3 on an unrecorded plan of the Heater piece at and adjoining the junction of said Winslow Street and Bedford Street made by E.C. Jordan & Co., Civ. Eng., in January 1918, and on file in the office of said E.C. Jordan & Co., said three lots taken together, being bounded and described as follows:

Beginning at a point on said northerly line of Winslow Street at the southwest corner of land now or formerly of John W. Lovely heirs and thence running, with an included angle of 88° 43' and by the westerly line of said Lovely land eighty-six (86) feet to a post and land now or formerly of the T.A. Huston & Co.; thence northwesterly and along said Huston land, forty-nine (49) feet to a post; thence northwesterly and along said Huston land thirty-two and three tenths (32.3) feet to an iron post; thence westerly and along said Huston land twenty-two and thirty-five hundredths (22.35) feet to an iron post; thence westerly and along said Huston land nineteen and eighty-four hundredths (19.84) feet to a post; said post being the southeasterly corner of lot numbered 11 on said plan; thence westerly and along the rear or southerly line of said lot numbered 11, fifty-nine and thirty-seven hundredths (59.37) feet to the southwesterly corner of lot numbered 11; thence southwesterly at right angles to said Winslow Street one hundred (100) feet to said northerly line of Winslow Street; thence easterly and along said northerly line of Winslow Street one hundred fifty-nine (159) feet to the point or place of beginning; said three lots having together an area of 18,027 square feet, be the same more or less.

EXCEPTING AND RESERVING from the above-described premises that portion thereof which was conveyed by Ellestad Hansen, Warren K. Webber and Mary E. Hansen to Charles A. Adams by deed dated April 8, 1924 and recorded in the Cumberland County Registry of Deeds in Book 1165, Page 79, and such portion thereof as may have been conveyed by Mary E. Hansen to the State of Maine by deed dated January 7, 1970 and recorded in the said Registry of Deeds in Book 3114, Page 724.

Formerly Tax Map 114, Block D, Lot 22:

ALSO a certain lot or parcel of land situated on the northerly side of Winslow Street in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows, to wit:

Beginning at an iron hub at the southwest corner of a lot of land conveyed by Edward D. Noyes, et al. to Ellestad Hansen and Warren K. Webber by deed dated November 14, 1923 and recorded in the Cumberland County Registry of Deeds in Book 1153, Page 280; thence easterly along the northerly side line of Winslow Street forty-seven (47) feet to a stake; thence northerly at right angles to said Winslow Street one hundred sixteen and thirty-three hundredths (116.33) feet to an iron hub in the northerly line of the lot above mentioned; thence westerly with an included angle of seventy (70) degrees and thirty-six (36) minutes to the right, forty-nine and seventy-six hundredths (49.76) feet to a stake at the northwest corner of the lot above mentioned; thence southerly on a line at right angles to said Winslow Street one hundred (100) feet to the point of beginning.

Formerly Tax Map 114, Block C, Lot 1:

ALSO a certain lot or parcel of land in the City of Portland, County of Cumberland and State of Maine, described as follows: Beginning at a stake on the southerly side of Winslow Street at the intersection with the easterly side of Conant Street; thence 25° E by Conant Street one hundred ten (110) feet; thence easterly at right angles with Conant Street forty-six and thirty-one hundredths (46.31) feet to a stake; thence northerly to a point in the southerly side of Winslow Street distant easterly sixty-three and seventy-two hundredths (63.72) feet from the point of beginning; thence N 71° 37' W by said Winslow Street sixty-three and seventy-two hundredths (63.72) feet to the point of beginning.

Formerly Tax Map 114, Block C, Lot 2:

ALSO a certain lot or parcel of land situated in the City of Portland, County of Cumberland and State of Maine bounded and described as follows, to wit:

Beginning at a point on the present southerly boundary line of Winslow Street at the northeasterly line of land now or formerly of Frederick J. Olsen; thence southeasterly along the northeasterly line of land now or formerly of said Olsen, about sixty-six (66) feet to a corner; thence southwesterly along the southeasterly line of land now or formerly of said Olsen, about forty-six and three tenths (46.3) feet to the northeasterly boundary line of Conant Street; thence southeasterly along the northeasterly boundary line of Conant Street about eighteen (18) feet to a monument located about seventy-one (71) feet northwesterly from and as measured along a line normal to the Ramp F.A. 6 Base Line at about Sta. 5+50; thence northeasterly about sixty-six (66) feet to a point on a line, said line being a projected line between the beforementioned monument and a monument located fifty (50) feet northwesterly from and as measured along a line normal to the Ramp F.A. 6 Base Line at Sta. 4+50, said point being twenty-five (25) feet southwesterly of and as measured along said projected line from said monument located

northwesterly of Sta. 4+50; thence northwesterly at right angles to said projected line twenty (20) feet to a point; thence northerly by a direct course to a point on the present southerly boundary line of Winslow Street; thence westerly along the present southerly boundary line of Winslow Street sixty (60) feet to the point of beginning. Said lot or parcel of land contains about 2,867 square feet and is a portion of that land as acquired from Charles T. Hayes, Jr. and Beatrice Hayes, pursuant to a Notice of Layout and Taking dated March 8, 1973 and recorded at the Cumberland County Registry of Deeds in Book 3367, Page 58. Said parcel is shown on a certain Maine Department of Transportation Right-of-way Map entitled "State Highway '295', Portland, Cumberland County, Federal Aid Project No. 1-295-3(28)" dated January 1967, on file in Augusta, File No. 3-185.

The premises herein conveyed is SUBJECT to a State of Maine Notice of Layout and Taking dated February 28, 1973 and recorded in said Cumberland County Registry of Deeds in Book 3367, Page 58.

Received
Recorded Register of Deeds
Dec 21,2011 12:40:48P
Cumberland County
Pamela E. Lovley

University of Southern Maine

Traffic Movement Permit - Section 7

Proposed Residence Hall, Student Center, and Parking Garage

August 2021

Introduction

VHB has conducted a technical analysis in support of a Traffic Movement Permit (TMP) modification for development of a new residence hall and Student Center on the University of Southern Maine (USM) campus. Although in the approved TMP for Project ID PL-001040-2020, a parking garage was not the primary subject of the permit application, for the purposes of the traffic analysis, the proposed parking garage location was situated off of Falmouth Street. Anticipated new trips to and from the campus were assumed to utilize the new parking garage structure.

The proposed location of the parking garage has since been relocated as a response to neighborhood feedback and a site evaluation process. The locations of the 580-bed residence hall and Student Center that were previously permitted have not changed. The new parking garage will now be located adjacent to the existing parking structure on campus with joint access to and from Bedford Street. As a result, the traffic that had previously been assigned to the garage on Falmouth Street will instead access the proposed parking structure location on Bedford Street. This traffic was redistributed across the adjacent street network and reevaluated to assess the resulting traffic impacts.

Future Conditions

The future traffic conditions in the study area were analyzed with the proposed project in place and compared to the conditions outlined in the TMP traffic analysis. The TMP future traffic volumes and intersection operations for the future horizon year of 2028 were analyzed for the Build condition, with the parking garage located off of Bedford Street. The results for the Base condition, with the parking garage located off of Falmouth Street, were included as previous permitted.

Infrastructure Improvements

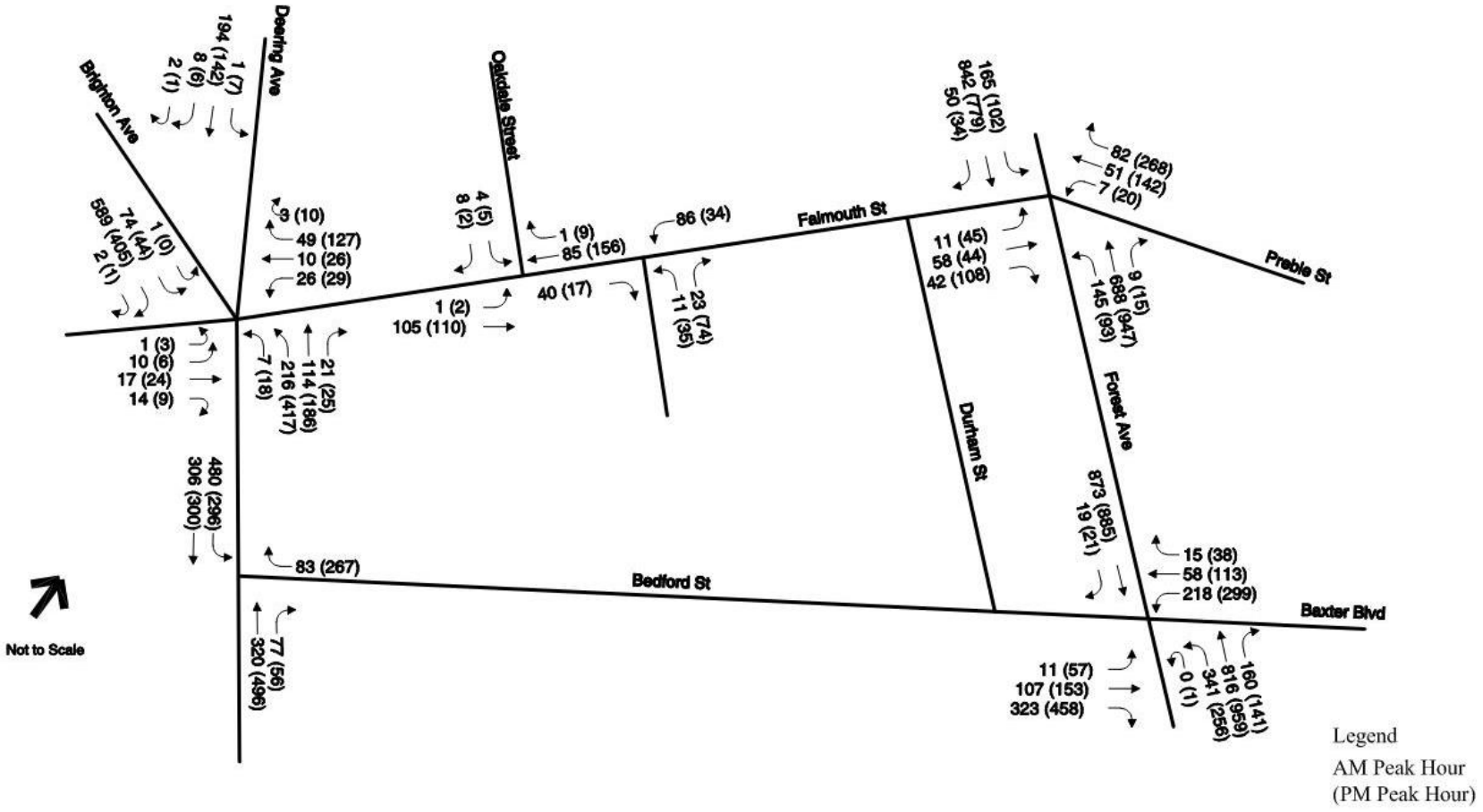
Construction of a roundabout at the intersection of Falmouth Street, Brighton Avenue and Deering Avenue is currently being completed. As such, the TMP permit traffic analysis as well as the traffic analysis for the current garage location on Bedford Street both include a completed roundabout at this location.

The traffic volume data collected at the intersection of Falmouth Street, Brighton Avenue and Deering Avenue was redistributed to represent the volumes that will exist at the five-leg roundabout in the future, rather than the current six-leg condition.

Baseline Traffic Conditions

The TMP traffic analysis included a one percent per year background traffic growth rate, the traffic associated with identified projects in the area, and the trip generation associated with the growth anticipated on campus assigned to a parking garage on Falmouth Street. The resulting traffic networks from the 2028 TMP Build conditions serve as the baseline condition for this analysis, as illustrated in Figure 1.

Figure 1. 2028 Base Network (TMP Condition with garage on Falmouth Street)



Trip Generation Reassignment

To determine the impact of the proposed garage location, VHB reassigned the trips destined for the proposed parking garage from the location on Falmouth Street to the location on Bedford Street. As a reminder, based on industry standards and MaineDOT guidance, the number of new peak hour trips anticipated with the growth in enrollment is 160 trips (125 in and 35 out) in the highest AM peak hour and 160 trips (51 and 109 out) in the highest PM peak hour with no adjustments for the high portion of transit trips to and from the campus. It is important to note that existing campus mode shares are already high and with additional Transportation Demand Management initiatives, the number of students and employees walking, biking, riding transit, or carpooling is expected to rise. To remain conservative, the trip generation for this analysis was not reduced to reflect the existing or anticipated mode split based on TDM measures.

The proposed garage circulation will involve an entrance at Winslow Street and an exit at Surrenden Street via the existing garage. The trips to and from the existing garage will also follow the new entry and exit pattern and were redistributed accordingly. The trips to and from the existing Bedford Street garage were added to that network based on garage entry and exit data from October 2019 (determined to represent a typical school year condition).

The new garage trips were assigned to local roadways based on campus user zip code data. The redistributed trips were added to the 2028 baseline networks to determine the 2028 Build networks. The trip reassignment based on the new proposed garage location is shown in Figure 2.

The resulting 2028 Build networks for the TMP Modification are shown in Figure 3.

Figure 2. Redistribution of Trip Generation based on Proposed Parking Relocation

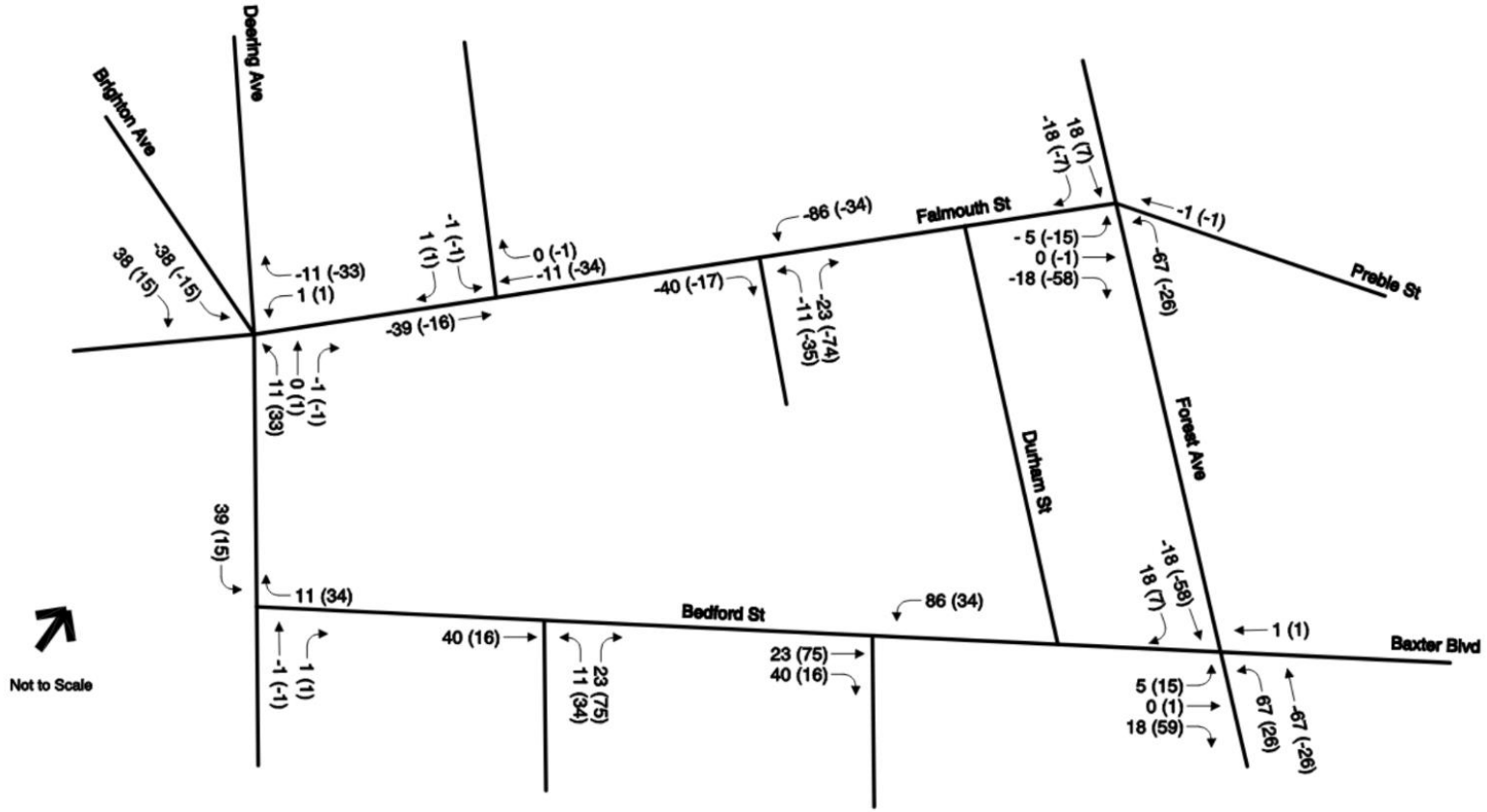
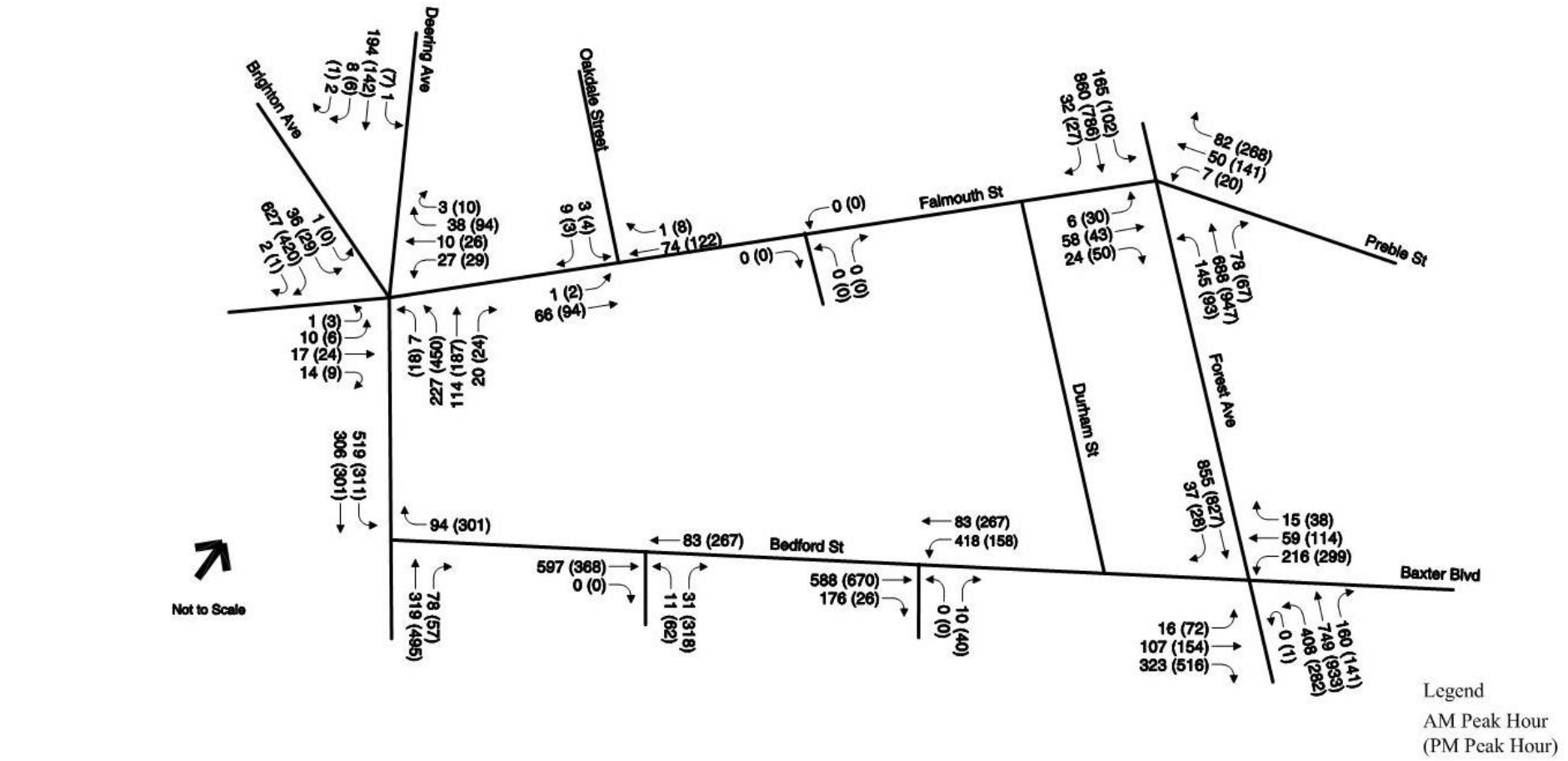


Figure 3. 2028 TMP Modification Build Condition Traffic Volumes



TRAFFIC ANALYSES

Intersection Capacity Analyses

Intersection capacity analyses were performed for the study area intersections consistent with the traffic analysis provided in the TMP traffic analysis. Levels of service (LOS) were calculated based on the criteria published in the *2000 Highway Capacity Manual*.[1] Level of service is the term that defines the conditions that may occur on a given roadway or at an intersection when accommodating various traffic volume loads. Levels of service range from A to F with LOS A representing generally free flowing operating conditions and LOS F representing generally congested conditions. Synchro 10 was used to determine the LOS at signalized intersections and Sidra Intersection 8 was used to determine the LOS at the proposed roundabout. Copies of the LOS calculations are provided in the Appendix.

Table 1 summarizes the operational analysis at the signalized study area intersections during the 2028 weekday AM and PM peak hours under Base (Falmouth Street garage) and Build (Bedford Street garage) conditions. As shown, the intersection of Forest Avenue at Falmouth Street is expected to operate at LOS B/C in 2028. The redistribution of some trips away from this intersection was anticipated to reduce the overall delay at the intersection by just over two seconds in the AM peak hour and by less than a second in the PM peak hour compared to the already permitted Base condition.

The signalized intersection of Forest Avenue at Bedford Street is expected to operate at LOS D in 2028 both in the Base condition and the Build condition. With the relocation of the parking garage to the Bedford Street site, it is anticipated that the overall delay at the intersection will increase by approximately seven seconds in the AM peak hour and only about 2 seconds in the PM peak hour. Even in the No Build condition, without project traffic, a number of movements at this intersection are currently operating at LOS E. The installation of adaptive signal control would ensure that the intersection operates at optimal conditions throughout the day.

Table 1. 2028 Signalized Intersection Operation

Intersection	2028 Baseline			2028 Build		
Peak Hour	**v/c+**	**Delay***	**LOS****	**v/c+**	**Delay***	**LOS****
Forest Avenue at Falmouth Street/Preble Street						
AM Peak Hour	0.53	19.6	B	0.49	17.4	B
PM Peak Hour	0.54	20.6	C	0.54	20.1	C
Forest Avenue at Bedford Street/Baxter Blvd						
AM Peak Hour	0.80	38.4	D	0.84	45.8	D
PM Peak Hour	0.93	49.7	D	0.96	51.9	D

+ Volume to capacity ratio
* Delay expressed in seconds per vehicles
** Level of Service

Based on the impact associated with the new garage location trips at the intersection of Forest Avenue at Bedford Avenue and Baxter Street, potential improvements were investigated. Pedestrian accommodations are being improved at this location by USM as a part of the permit condition for the residence hall and student center. However,

[1] Highway Capacity Manual, Federal Highway Administration, Transportation Research Board, 2000.

vehicular delays will also be impacted. In particular, the northbound left turn movement from Forest Avenue onto Bedford Street is anticipated to operate at LOS E in the AM and LOS F in the PM. Queues for the northbound left movement were reported to be 565' and 445' in the AM and PM, respectively.

To better understand the queuing, simulations were observed that produced queues with spill back past the I-295 off-ramp of 3 to 5 vehicles. A queue of 375 feet will block vehicles from exiting the ramp from I-295 Southbound. It was observed however, that queues forming on the ramp of 424' in the AM and 341' in the PM dissipated quickly when the northbound movements of the Forest / Baxter / Bedford intersection were served. Advanced detection would ensure the northbound lanes get cleared and alleviate potential queuing on the exit ramp. As with the no build condition evaluated in the original analysis, the westbound left and southbound through movements are anticipated to have queues that exceed storage in the AM and PM peak hours. Additionally, in the PM peak hour the eastbound lanes at the intersection are anticipated to have queues that exceed storage, however, it was observed in the simulation that these queues clear with the help of an overlap phase.

Table 2 summarizes the operational analysis at the Brighton Avenue, Deering Avenue and Falmouth Street roundabout during the 2028 weekday AM and PM peak hours under Base and Build conditions. As shown, even with anticipated growth, project related traffic, and relocation of the parking garage, the proposed infrastructure will result in a LOS B or better condition for all approaches during the peak hours.

Table 2. Roundabout Levels of Service

Peak Hour		2028 Base (Falmouth Site)				2028 Build (Bedford Site)			
Movement	**SL^**	**v/c+**	**Delay***	**LOS****	**Queue**	**v/c+**	**Delay***	**LOS****	**Queue**
Falmouth Street at Deering Street and Brighton Avenue									
AM Peak Hour									
Deering Ave, SE	200	0.401	4.4	A	6	0.379	4.0	A	6
Falmouth St, NE	290	0.146	5.4	A	2	0.128	5.7	A	1
Deering Ave, NW	420	0.39	5.0	A	5	0.388	5.0	A	5
Brighton Ave, E	165	0.838	12.1	B	33	0.839	11.9	B	33
Falmouth St, SW	625	0.166	12.5	B	2	0.167	12.5	B	2
Overall		**0.838**	**8.4**	**A**		**0.839**	**8.3**	**A**	
PM Peak Hour									
Deering Ave, SE	200	0.663	4.8	A	15	0.675	4.7	A	16
Falmouth St, NE	290	0.467	11.3	B	8	0.407	11	B	6
Deering Ave, NW	420	0.431	11.1	B	6	0.435	11.1	B	6
Brighton Ave, E	165	0.566	4.7	A	11	0.567	4.6	A	11
Falmouth St, SW	625	0.101	7.5	A	1	0.102	7.5	A	1
Overall		**0.663**	**6.4**	**A**		**0.675**	**6.1**	**A**	

^ Storage length measured in feet, distance to adjacent intersection
+ Volume to capacity ratio
* Delay expressed in seconds per vehicles
** Level of Service
Queue measured in feet

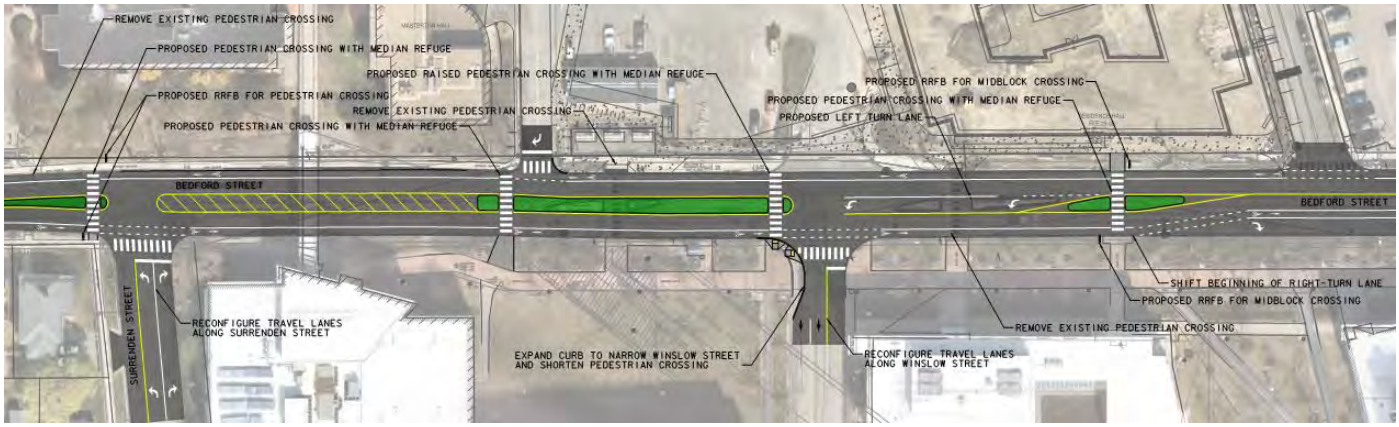
The approaches of the driveway exiting the joint garage proposed on Bedford Street at Surrenden Street is anticipated to operate at LOS B/C with 13 to 17 seconds of delay during both the AM and PM peak hours, the highest delay occurring for the PM peak hour left hand turn lane. The entering driveway proposed for the joint garage on Bedford Street at Winslow Street is anticipated to have a 10 to 15 second delay when making the left hand turning movement to enter from Bedford Street. It is anticipated that this movement will be accommodated in a separate left turn lane.

Bedford Street Concept

Updated traffic circulation for access and egress to the existing and proposed parking garages will compel updates to the Bedford Street corridor. It is proposed that vehicles will enter the parking garages via Winslow Street and exit the parking garages via Surrenden Street, as previously discussed and depicted in Figure 3 below. A dedicated left turn lane will be provided for vehicles traveling westbound on Bedford Street and entering the parking garages via Winslow Street, replacing the raised median island and crosswalk currently set back from the intersection on the east leg. This crosswalk will be replaced by a raised crossing on the west leg of the intersection to limit the number of vehicular lanes pedestrians will need to cross to two with a raised pedestrian refuge island between the lanes. The raised island will extend to the west to discourage vehicles from passing busses in the bus stop and keep vehicular speeds low. The need for a single departure lane from the intersection on Winslow Street will allow for a pedestrian bumpout to be implemented. The bumpout will effectively shorten the crossing distance for pedestrians across the Winslow Street leg of the intersection and widen back to two lanes to maximize the queuing space for vehicles entering the parking garages.

Additional crossing improvements have also been proposed. Crosswalks with rectangular rapid flashing beacons (RRFBs) are proposed to the west of Surrenden Street and midblock between Winslow Street and Durham Street as there is anticipated to be a desire line in that vicinity between the residence hall and student center to the north and the library and parking garage to the south.

Figure 3. Conceptual Plan for Bedford Street and Parking Garage Circulation



Transportation Demand Management (TDM)

The University of Southern Maine (USM) has recently developed a Transportation Demand Management (TDM) plan that provides a cohesive strategy for establishing and implementing a successful TDM program for the Portland campus. The TDM plan seeks to enhance multimodal accessibility, ensure the use of non-vehicular modes, and discourage the use of driving through parking management, to achieve and build upon the university's parking demand reduction goals for the campus. The TDM Plan presents a suite of strategies and timeframe for when USM intends to implement the various strategies. The strategies aim at promoting walking and bicycling, improving transit service to promote ridership, promoting carpooling, changing time-of-day travel demands to eliminate or reduce

vehicle trips, and managing parking demand via changes to USM's pricing and permit policies. The implementation of TDM will reduce the vehicle trips to the site and reduce delays at area intersections.

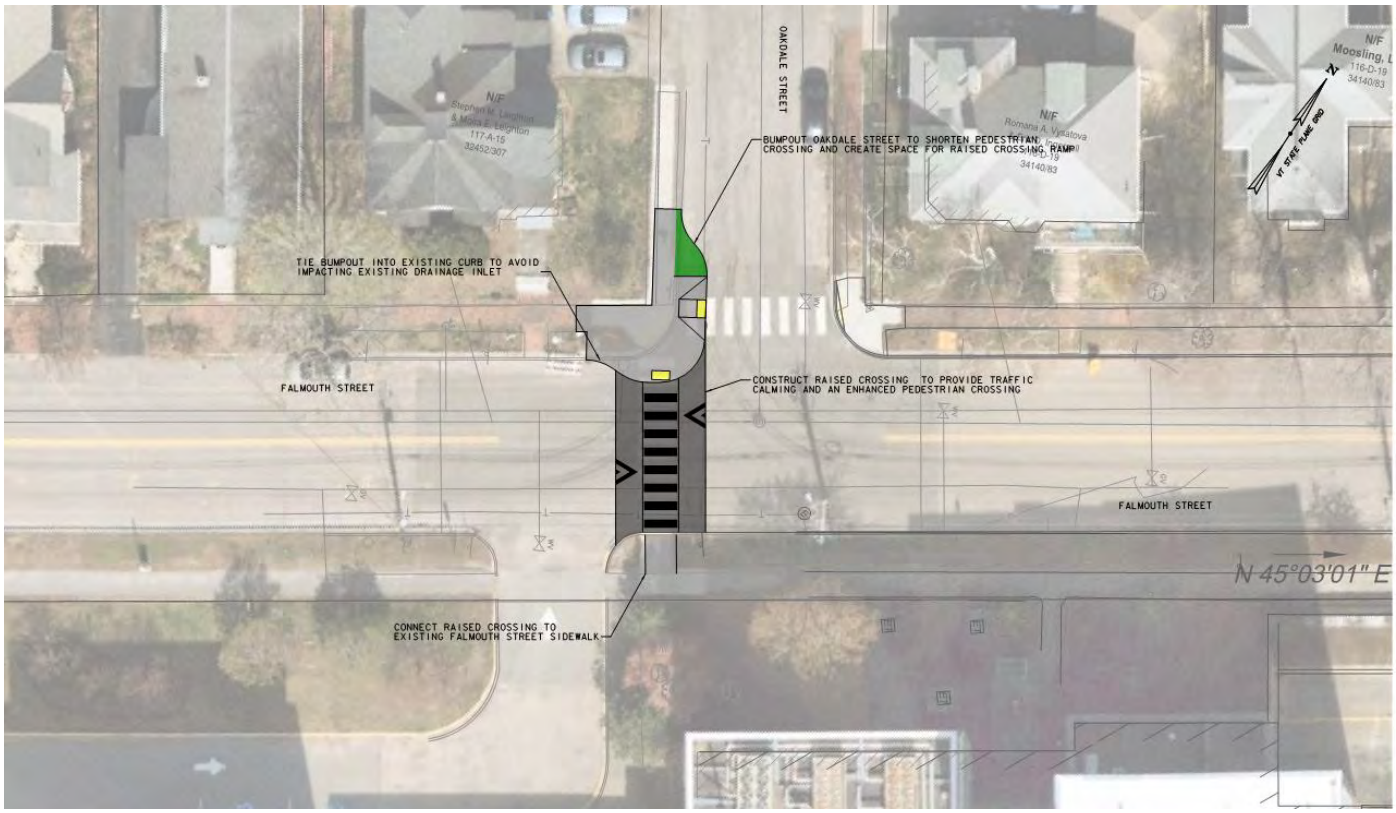
Neighbor Concern – Oakhurst Dairy

USM has worked with Oakhurst Dairy to understand their concerns associated with the proposed project. One concern raised by Oakhurst Dairy is the length of queue on Forest Avenue northbound and that it causes a backup on the I-295 off ramp. As indicated above, USM is committed to addressing this concern. Oakhurst is even more concerned with queues blocking the Oakhurst driveway on Forest Avenue. Although this has been a longstanding concern, recently, traffic signal operation at Forest Avenue at Bedford Street and Baxter Boulevard has resulted in longer queues. A discussion with the City Traffic Engineer reveals that the City has had an issue with vehicle detection at this location and as a result the signal is not operating optimally. A representative from Oakhurst has shared video that documents these queuing concerns. In order to address the issues with the operation at this intersection so that the impacts to our neighbor are reduced, we have engaged a traffic signal technician to work with the City to troubleshoot and determine a plan for remedying this issue. Because Oakhurst remains concerned about the operation at their driveway and the queues on Forest Avenue that block that driveway, USM is committed to work with Oakhurst and the City to develop a plan to discourage vehicles from blocking the driveway. Preliminary discussions indicate that the City could be agreeable to signage and/or striping to not "Block the Box". USM plans to continue to work with Oakhurst on this issue.

Neighbor Concern – Falmouth Street/Oakdale Street and Bedford Street

USM has worked with neighborhood since the previous permitting process to ensure that their concerns are being addressed. USM held an open meeting with residential neighbors on August 26th to discuss traffic impacts and proposed mitigation measures. The neighborhood had previously expressed concern with traffic speed and volumes on Falmouth Street, and as such an undefined traffic calming measure was written into a condition of approval on the residence hall & student center project. The University shared a conceptual draft of the Falmouth Street traffic calming measure at the meeting with the neighborhood (see Figure 4 below). The neighborhood's reception of the drawing seemed favorable. However, the neighborhood expressed some concerns about traffic along Bedford Street and that traffic would be made worse by pedestrian safety measures such as pedestrian island improvements and by higher volumes of vehicles entering/exiting the South side of Bedford. Several items were brought up from individuals along the lines of wanting traffic to flow efficiently, but one specific item brought up by multiple residents was concern that USM was not proposing bus pull-outs for the METRO, and that this could lead to traffic backing up behind stopped buses. USM explored this issue at length internally, and also had two meetings with METRO to discuss it. Ultimately, USM decided that pedestrian safety should outweigh vehicular traffic efficiency when the two are opposed as an in-line bus stop would minimize the ability of vehicles to drive past buses that are offloading people. USM feels that the suite of measures currently proposed offers the best trade-off between efficiency and safety given the siting of the garage on Bedford Street. Bedford Street was the location the neighborhood favored over Falmouth Street and Deering Avenue, and this was one of the most important factors in deciding on the garage's location.

Figure 4. Conceptual Plan for Pedestrian Improvements at Falmouth Street at Oakdale Street



Conclusions

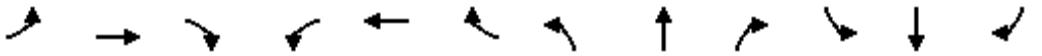
The proposal to relocate the parking garage to Bedford Street is positive for a number of reasons. However, adding these trips to the roadway network at the new proposed parking garage location along Bedford Street results in some delay increases at the intersection of Forest Avenue with Bedford Street and Baxter Boulevard as compared to the garage location along Falmouth Street. Advance queue detection should be considered in order to ensure that the addition of this traffic to the intersection of Forest Avenue with Bedford Street and Baxter Boulevard does not cause an impact beyond the available queue storage or impact the operation of the I-295 off ramp. In addition, USM is committed to creating a Bedford Street that is hospitable to pedestrians, transit and bicyclists. Finally, USM is working to improve the operations at Forest Street at Bedford Street and Baxter Boulevard in the short term to ensure that the traffic signal is operating as it was intended. Overall, this proposed location for the parking garage is not anticipated to adversely affect traffic operations in the vicinity of the USM campus.

Memorandum

Technical Appendix

Synchro Intersection Capacity Analysis

SIDRA Roundabout Capacity Analysis

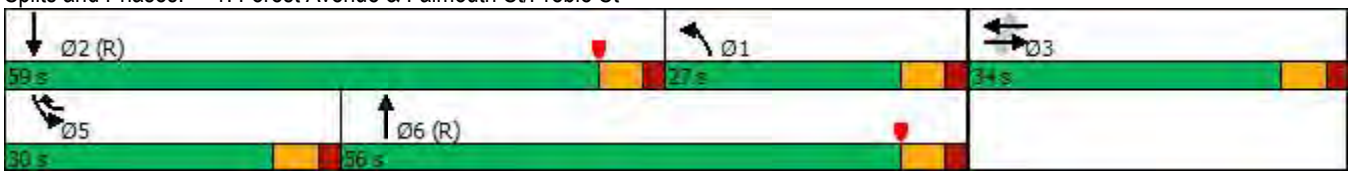


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	58	24	7	50	82	78	688	9	165	860	32
Future Volume (vph)	6	58	24	7	50	82	78	688	9	165	860	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	200		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00	0.99	1.00	1.00		1.00	1.00	
Frt			0.850			0.850		0.998			0.995	
Flt Protected		0.995			0.994		0.950			0.950		
Satd. Flow (prot)	0	1890	1615	0	1811	1583	1703	3499	0	1719	3486	0
Flt Permitted		0.970			0.958		0.950			0.950		
Satd. Flow (perm)	0	1843	1593	0	1746	1560	1697	3499	0	1718	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			88		1			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		771			1265			804			1168	
Travel Time (s)		17.5			28.8			18.3			26.5	
Confl. Peds. (#/hr)	2		1	1		2	5		1	1		5
Peak Hour Factor	0.77	0.77	0.77	0.93	0.93	0.93	0.91	0.91	0.91	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	33%	0%	2%	6%	3%	0%	5%	3%	0%
Adj. Flow (vph)	8	75	31	8	54	88	86	756	10	201	1049	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	31	0	62	88	86	766	0	201	1088	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			10			18			16	
Link Offset(ft)		0			-6			0			-2	
Crosswalk Width(ft)		16			16			30			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		3			3	5	1	6		5	2	
Permitted Phases	3		3	3		3						
Detector Phase	3	3	3	3	3	5	1	6		5	2	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	16.0	16.0	37.0		16.0	25.0	
Total Split (s)	34.0	34.0	34.0	34.0	34.0	30.0	27.0	56.0		30.0	59.0	
Total Split (%)	28.3%	28.3%	28.3%	28.3%	28.3%	25.0%	22.5%	46.7%		25.0%	49.2%	
Maximum Green (s)	28.0	28.0	28.0	28.0	28.0	24.0	21.0	50.0		24.0	53.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0			26.0			14.0	
Pedestrian Calls (#/hr)	4	4	4	4	4			7			4	
Act Effct Green (s)		14.4	14.4		14.4	34.7	16.3	73.3		20.3	79.7	
Actuated g/C Ratio		0.12	0.12		0.12	0.29	0.14	0.61		0.17	0.66	
v/c Ratio		0.38	0.10		0.30	0.17	0.37	0.36		0.69	0.47	
Control Delay		51.4	0.6		49.3	4.9	36.1	7.5		58.9	12.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		51.4	0.6		49.3	4.9	36.1	7.5		58.9	12.8	
LOS		D	A		D	A	D	A		E	B	
Approach Delay		37.6			23.2			10.4			19.9	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 17.6		Intersection LOS: B	
Intersection Capacity Utilization 53.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Forest Avenue & Falmouth St/Preble St





Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	83	31	62	88	86	766	201	1088
v/c Ratio	0.38	0.10	0.30	0.17	0.37	0.36	0.69	0.47
Control Delay	51.4	0.6	49.3	4.9	36.1	7.5	58.9	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	0.6	49.3	4.9	36.1	7.5	58.9	12.8
Queue Length 50th (ft)	61	0	45	0	61	70	148	213
Queue Length 95th (ft)	82	0	78	28	114	141	193	306
Internal Link Dist (ft)	691		1185			724		1088
Turn Bay Length (ft)		150			200		150	
Base Capacity (vph)	460	500	436	590	326	2138	375	2317
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.06	0.14	0.15	0.26	0.36	0.54	0.47

Intersection Summary

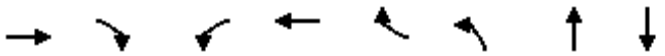
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	107	323	218	59	15	408	749	160	0	855	37
Future Volume (vph)	16	107	323	218	59	15	408	749	160	0	855	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		375	140		75	0		0	0		0
Storage Lanes	0		1	1		1	1		0	0		0
Taper Length (ft)	100			75			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00		0.99		0.98		1.00			1.00	
Frt			0.850			0.850		0.974			0.994	
Flt Protected		0.994		0.950			0.950					
Satd. Flow (prot)	0	1656	1439	1608	1676	1454	1608	3068	0	0	3156	0
Flt Permitted		0.963		0.950			0.950					
Satd. Flow (perm)	0	1603	1439	1593	1676	1424	1608	3068	0	0	3156	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			82		34			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			1168			275			804	
Travel Time (s)		13.8			26.5			6.3			18.3	
Confl. Peds. (#/hr)	5		7	7		5			5			5
Peak Hour Factor	0.83	0.83	0.83	0.92	0.92	0.92	0.97	0.97	0.97	0.96	0.96	0.96
Heavy Vehicles (%)	7%	2%	1%	1%	2%	0%	1%	3%	2%	0%	2%	7%
Adj. Flow (vph)	19	129	389	237	64	16	421	772	165	0	891	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	148	389	237	64	16	421	937	0	0	930	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			18			4	
Link Offset(ft)		0			3			0			0	
Crosswalk Width(ft)		20			10			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		15	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1			1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50			50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50			50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Turn Type	Perm	NA	pt+ov	Prot	NA	Perm	Prot	NA			NA	
Protected Phases		4	4 5	3	8		5	2			6	
Permitted Phases	4					8						
Detector Phase	4	4	4 5	3	8	8	5	2			6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		5.0	5.0	5.0	5.0	10.0			10.0	
Minimum Split (s)	29.0	29.0		16.0	29.0	29.0	16.0	34.0			34.0	
Total Split (s)	29.0	29.0		23.0	52.0	52.0	31.0	68.0			37.0	
Total Split (%)	24.2%	24.2%		19.2%	43.3%	43.3%	25.8%	56.7%			30.8%	
Maximum Green (s)	23.0	23.0		17.0	46.0	46.0	25.0	62.0			31.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0			4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lost Time Adjust (s)		-4.0		-4.0	-4.0	-4.0	-4.0	-4.0			-4.0	
Total Lost Time (s)		2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lead/Lag	Lag	Lag		Lead			Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	3.5	3.0			3.0	
Recall Mode	None	None		None	None	None	None	C-Min			C-Min	
Walk Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Flash Dont Walk (s)	18.0	18.0			18.0	18.0		23.0			23.0	
Pedestrian Calls (#/hr)	10	10			1	1		1			1	
Act Effct Green (s)		24.0	58.3	20.7	46.7	46.7	32.3	69.3			35.0	
Actuated g/C Ratio		0.20	0.49	0.17	0.39	0.39	0.27	0.58			0.29	
v/c Ratio		0.46	0.53	0.86	0.10	0.03	0.97	0.53			1.01	
Control Delay		46.5	19.5	76.0	22.4	0.1	82.4	16.7			67.1	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay		46.5	19.5	76.0	22.4	0.1	82.4	16.7			67.1	
LOS		D	B	E	C	A	F	B			E	
Approach Delay		26.9			61.3			37.0			67.1	
Approach LOS		C			E			D			E	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 46.7		Intersection LOS: D	
Intersection Capacity Utilization 82.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Forest Avenue & Bedford St/Baxter Blvd





Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	148	389	237	64	16	421	937	930
v/c Ratio	0.46	0.53	0.86	0.10	0.03	0.97	0.53	1.01
Control Delay	46.5	19.5	76.0	22.4	0.1	82.4	16.7	67.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	19.5	76.0	22.4	0.1	82.4	16.7	67.1
Queue Length 50th (ft)	99	159	180	30	0	~361	225	~409
Queue Length 95th (ft)	149	220	#318	58	0	#565	287	#530
Internal Link Dist (ft)	529			1088			195	724
Turn Bay Length (ft)		375	140		75			
Base Capacity (vph)	360	737	281	698	641	432	1784	923
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.53	0.84	0.09	0.02	0.97	0.53	1.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	69	0	0	75	0	0
Future Volume (vph)	69	0	0	75	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	198			771	187	
Travel Time (s)	4.5			17.5	4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	0	0	82	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	75	0	0	82	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 7.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	69	0	0	75	0	0
Future Volume (Veh/h)	69	0	0	75	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	75	0	0	82	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				771		
pX, platoon unblocked						
vC, conflicting volume			75		157	75
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			75		157	75
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1524		834	986

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	75	82	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1524	1700
Volume to Capacity	0.04	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	7.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	3	9	1	66	74	1
Future Volume (vph)	3	9	1	66	74	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.896				0.998	
Flt Protected	0.989			0.999		
Satd. Flow (prot)	1651	0	0	1861	1859	0
Flt Permitted	0.989			0.999		
Satd. Flow (perm)	1651	0	0	1861	1859	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	291			602	198	
Travel Time (s)	6.6			13.7	4.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	10	1	72	80	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	0	73	81	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	14.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	3	9	1	66	74	1
Future Volume (Veh/h)	3	9	1	66	74	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	10	1	72	80	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					969	
pX, platoon unblocked						
vC, conflicting volume	154	80	81			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	154	80	81			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	836	980	1517			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	13	73	81
Volume Left	3	1	0
Volume Right	10	0	1
cSH	942	1517	1700
Volume to Capacity	0.01	0.00	0.05
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.9	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	14.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	11	31	597	0	0	83
Future Volume (vph)	11	31	597	0	0	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1770	1583	1863	0	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1583	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	225		566			440
Travel Time (s)	5.1		12.9			10.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	34	649	0	0	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	34	649	0	0	90
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	11	31	597	0	0	83
Future Volume (Veh/h)	11	31	597	0	0	83
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	34	649	0	0	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1049
pX, platoon unblocked						
vC, conflicting volume	739	649			649	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	739	649			649	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	93			100	
cM capacity (veh/h)	385	470			937	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	12	34	649	90
Volume Left	12	0	0	0
Volume Right	0	34	0	0
cSH	385	470	1700	937
Volume to Capacity	0.03	0.07	0.38	0.00
Queue Length 95th (ft)	2	6	0	0
Control Delay (s)	14.7	13.3	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.6		0.0	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	0	10	588	176	418	83
Future Volume (vph)	0	10	588	176	418	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.969			
Flt Protected					0.950	
Satd. Flow (prot)	1611	0	1805	0	1770	1863
Flt Permitted					0.950	
Satd. Flow (perm)	1611	0	1805	0	1770	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	239		440			609
Travel Time (s)	5.4		10.0			13.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	11	639	191	454	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	830	0	454	90
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	10	588	176	418	83
Future Volume (Veh/h)	0	10	588	176	418	83
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	639	191	454	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						609
pX, platoon unblocked						
vC, conflicting volume	1732	734			830	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1732	734			830	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			43	
cM capacity (veh/h)	42	420			802	

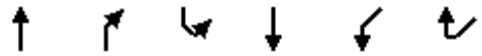
Direction, Lane #	NW 1	NE 1	SW 1	SW 2
Volume Total	11	830	454	90
Volume Left	0	0	454	0
Volume Right	11	191	0	0
cSH	420	1700	802	1700
Volume to Capacity	0.03	0.49	0.57	0.05
Queue Length 95th (ft)	2	0	90	0
Control Delay (s)	13.8	0.0	15.2	0.0
Lane LOS	B		C	
Approach Delay (s)	13.8	0.0	12.7	
Approach LOS	B			

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	319	78	519	306	0	94
Future Volume (vph)	319	78	519	306	0	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.973					0.865
Flt Protected				0.970		
Satd. Flow (prot)	1812	0	0	1807	0	1611
Flt Permitted				0.970		
Satd. Flow (perm)	1812	0	0	1807	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	205			164	566	
Travel Time (s)	4.7			3.7	12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	347	85	564	333	0	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	432	0	0	897	0	102
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

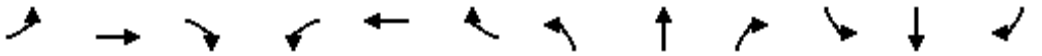
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 73.0%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	319	78	519	306	0	94
Future Volume (Veh/h)	319	78	519	306	0	94
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	347	85	564	333	0	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			432		1850	390
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			432		1850	390
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			50		100	85
cM capacity (veh/h)			1128		41	659

Direction, Lane #	NB 1	SB 1	SW 1
Volume Total	432	897	102
Volume Left	0	564	0
Volume Right	85	0	102
cSH	1700	1128	659
Volume to Capacity	0.25	0.50	0.15
Queue Length 95th (ft)	0	72	14
Control Delay (s)	0.0	9.8	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	9.8	11.5
Approach LOS			B

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

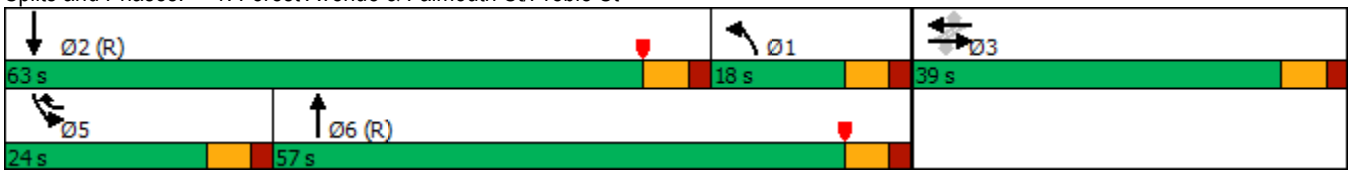


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	44	108	20	142	268	93	947	15	102	779	34
Future Volume (vph)	45	44	108	20	142	268	93	947	15	102	779	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	200		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.994	
Flt Protected		0.975			0.994		0.950			0.950		
Satd. Flow (prot)	0	1852	1615	0	1858	1599	1805	3466	0	1805	3554	0
Flt Permitted		0.482			0.950		0.950			0.950		
Satd. Flow (perm)	0	916	1615	0	1776	1599	1805	3466	0	1805	3554	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140			82		2			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		675			1256			804			1168	
Travel Time (s)		15.3			28.5			18.3			26.5	
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.96	0.96	0.96	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	6%	1%	1%	0%	4%	1%	0%	1%	0%
Adj. Flow (vph)	58	57	140	25	175	331	97	986	16	107	820	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	140	0	200	331	97	1002	0	107	856	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			10			18			16	
Link Offset(ft)		0			-6			0			-2	
Crosswalk Width(ft)		16			16			30			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		3			3	5	1	6		5	2	
Permitted Phases	3		3	3		3						
Detector Phase	3	3	3	3	3	5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	16.0	16.0	37.0		16.0	25.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	24.0	18.0	57.0		24.0	63.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	20.0%	15.0%	47.5%		20.0%	52.5%	
Maximum Green (s)	33.0	33.0	33.0	33.0	33.0	18.0	12.0	51.0		18.0	57.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0			26.0			14.0	
Pedestrian Calls (#/hr)	4	4	4	4	4			7			4	
Act Effct Green (s)		20.4	20.4		20.4	37.8	21.1	74.2		13.3	66.5	
Actuated g/C Ratio		0.17	0.17		0.17	0.32	0.18	0.62		0.11	0.55	
v/c Ratio		0.74	0.36		0.66	0.59	0.31	0.47		0.54	0.43	
Control Delay		73.4	9.0		56.6	28.8	25.3	4.5		74.7	10.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		73.4	9.0		56.6	28.8	25.3	4.5		74.7	10.9	
LOS		E	A		E	C	C	A		E	B	
Approach Delay		38.0			39.3			6.4			18.0	
Approach LOS		D			D			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 21 (18%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 19.3		Intersection LOS: B	
Intersection Capacity Utilization 59.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Forest Avenue & Falmouth St/Preble St

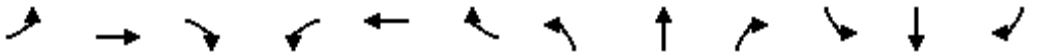




Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	115	140	200	331	97	1002	107	856
v/c Ratio	0.74	0.36	0.66	0.59	0.31	0.47	0.54	0.43
Control Delay	73.4	9.0	56.6	28.8	25.3	4.5	74.7	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.4	9.0	56.6	28.8	25.3	4.5	74.7	10.9
Queue Length 50th (ft)	86	0	147	162	58	56	89	93
Queue Length 95th (ft)	119	31	187	186	m87	41	m119	126
Internal Link Dist (ft)	595		1176			724		1088
Turn Bay Length (ft)		150			200		150	
Base Capacity (vph)	267	570	518	643	317	2144	300	1976
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.25	0.39	0.51	0.31	0.47	0.36	0.43

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	44	108	20	142	268	93	947	15	102	779	34
Future Volume (vph)	45	44	108	20	142	268	93	947	15	102	779	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.98	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1853	1615		1858	1599	1805	3464		1805	3553	
Flt Permitted		0.48	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		917	1615		1775	1599	1805	3464		1805	3553	
Peak-hour factor, PHF	0.77	0.77	0.77	0.81	0.81	0.81	0.96	0.96	0.96	0.95	0.95	0.95
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	58	57	140	25	175	331	97	986	16	107	820	36
RTOR Reduction (vph)	0	0	116	0	0	59	0	1	0	0	2	0
Lane Group Flow (vph)	0	115	24	0	200	272	97	1001	0	107	854	0
Heavy Vehicles (%)	0%	0%	0%	6%	1%	1%	0%	4%	1%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		3			3	5	1	6		5	2	
Permitted Phases	3		3	3		3						
Actuated Green, G (s)		18.4	18.4		18.4	29.7	19.1	72.3		11.3	64.5	
Effective Green, g (s)		20.4	20.4		20.4	33.7	21.1	74.3		13.3	66.5	
Actuated g/C Ratio		0.17	0.17		0.17	0.28	0.18	0.62		0.11	0.55	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.0	2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		155	274		301	502	317	2144		200	1968	
v/s Ratio Prot						c0.06	0.05	c0.29		0.06	0.24	
v/s Ratio Perm		c0.13	0.01		0.11	0.11						
v/c Ratio		0.74	0.09		0.66	0.54	0.31	0.47		0.54	0.43	
Uniform Delay, d1		47.3	42.0		46.6	36.6	43.1	12.2		50.4	15.7	
Progression Factor		1.00	1.00		1.00	1.00	0.54	0.29		1.35	0.63	
Incremental Delay, d2		16.5	0.1		4.9	0.6	0.1	0.5		1.0	0.5	
Delay (s)		63.8	42.1		51.5	37.2	23.6	4.1		69.3	10.4	
Level of Service		E	D		D	D	C	A		E	B	
Approach Delay (s)		51.9			42.6			5.8			16.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

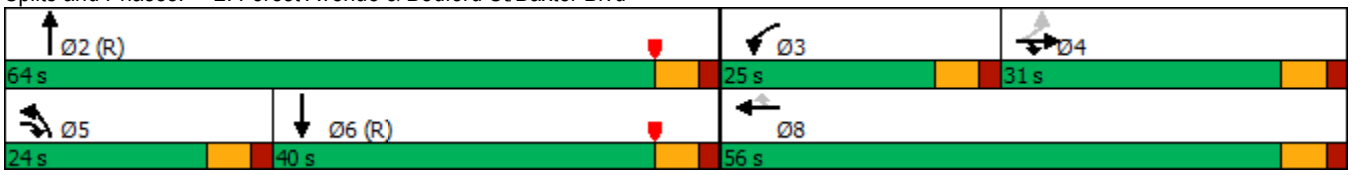
c Critical Lane Group

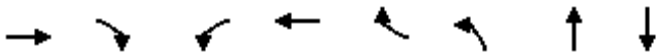
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	153	458	299	113	38	256	959	141	0	885	21
Future Volume (vph)	57	153	458	299	113	38	256	959	141	0	885	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		375	140		75	0		0	0		0
Storage Lanes	0		1	1		1	1		0	0		0
Taper Length (ft)	100			75			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.981			0.996	
Flt Protected		0.987		0.950			0.950					
Satd. Flow (prot)	0	1655	1425	1608	1693	1439	1593	3125	0	0	3173	0
Flt Permitted		0.882		0.950			0.950					
Satd. Flow (perm)	0	1479	1425	1608	1693	1439	1593	3125	0	0	3173	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			82		20			2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			1329			253			804	
Travel Time (s)		13.8			30.2			5.8			18.3	
Peak Hour Factor	0.87	0.87	0.87	0.85	0.85	0.85	0.91	0.91	0.91	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	66	176	526	352	133	45	281	1054	155	0	962	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	242	526	352	133	45	281	1209	0	0	985	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			18			4	
Link Offset(ft)		0			3			0			0	
Crosswalk Width(ft)		20			10			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		15	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1			1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50			50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50			50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Turn Type	Perm	NA	pt+ov	Prot	NA	Perm	Prot	NA			NA	
Protected Phases		4	4 5	3	8		5	2			6	
Permitted Phases	4					8						
Detector Phase	4	4	4 5	3	8	8	5	2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0	5.0	5.0	10.0			10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	29.0	29.0		16.0	29.0	29.0	16.0	34.0			34.0	
Total Split (s)	31.0	31.0		25.0	56.0	56.0	24.0	64.0			40.0	
Total Split (%)	25.8%	25.8%		20.8%	46.7%	46.7%	20.0%	53.3%			33.3%	
Maximum Green (s)	25.0	25.0		19.0	50.0	50.0	18.0	58.0			34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0			4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lost Time Adjust (s)		-4.0		-4.0	-4.0	-4.0	-4.0	-4.0			-4.0	
Total Lost Time (s)		2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lead/Lag	Lag	Lag		Lead			Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	3.5	3.0			3.0	
Recall Mode	None	None		None	None	None	None	C-Min			C-Min	
Walk Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Flash Dont Walk (s)	18.0	18.0			18.0	18.0		23.0			23.0	
Pedestrian Calls (#/hr)	10	10			1	1		1			1	
Act Effct Green (s)		28.5	53.0	23.0	53.5	53.5	22.5	62.5			38.0	
Actuated g/C Ratio		0.24	0.44	0.19	0.45	0.45	0.19	0.52			0.32	
v/c Ratio		0.69	0.78	1.14	0.18	0.07	0.94	0.74			0.98	
Control Delay		52.9	33.3	139.5	20.6	1.0	88.3	25.6			52.0	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay		52.9	33.3	139.5	20.6	1.0	88.3	25.6			52.0	
LOS		D	C	F	C	A	F	C			D	
Approach Delay		39.5			97.9			37.4			52.0	
Approach LOS		D			F			D			D	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 50.1		Intersection LOS: D	
Intersection Capacity Utilization 87.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Forest Avenue & Bedford St/Baxter Blvd



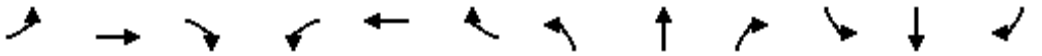


Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	242	526	352	133	45	281	1209	985
v/c Ratio	0.69	0.78	1.14	0.18	0.07	0.94	0.74	0.98
Control Delay	52.9	33.3	139.5	20.6	1.0	88.3	25.6	52.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	33.3	139.5	20.6	1.0	88.3	25.6	52.0
Queue Length 50th (ft)	171	293	~319	60	0	218	367	407
Queue Length 95th (ft)	253	421	#466	95	3	#392	456	#534
Internal Link Dist (ft)	529			1249			173	724
Turn Bay Length (ft)		375	140		75			
Base Capacity (vph)	357	675	308	761	692	298	1636	1006
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.78	1.14	0.17	0.07	0.94	0.74	0.98

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	153	458	299	113	38	256	959	141	0	885	21
Future Volume (vph)	57	153	458	299	113	38	256	959	141	0	885	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95			0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.98			1.00	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1654	1425	1608	1693	1439	1593	3124			3174	
Flt Permitted		0.88	1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		1478	1425	1608	1693	1439	1593	3124			3174	
Peak-hour factor, PHF	0.87	0.87	0.87	0.85	0.85	0.85	0.91	0.91	0.91	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	66	176	526	352	133	45	281	1054	155	0	962	23
RTOR Reduction (vph)	0	0	46	0	0	25	0	10	0	0	1	0
Lane Group Flow (vph)	0	242	480	352	133	20	281	1199	0	0	984	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	Prot	NA	Perm	Prot	NA			NA	
Protected Phases		4	4 5	3	8		5	2			6	
Permitted Phases	4					8						
Actuated Green, G (s)		24.5	49.0	19.0	49.5	49.5	18.5	58.5			34.0	
Effective Green, g (s)		28.5	53.0	23.0	53.5	53.5	22.5	62.5			38.0	
Actuated g/C Ratio		0.24	0.44	0.19	0.45	0.45	0.19	0.52			0.32	
Clearance Time (s)		6.0		6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)		2.0		2.0	2.0	2.0	3.5	3.0			3.0	
Lane Grp Cap (vph)		351	629	308	754	641	298	1627			1005	
v/s Ratio Prot			c0.34	c0.22	0.08		c0.18	0.38			c0.31	
v/s Ratio Perm		0.16				0.01						
v/c Ratio		0.69	0.76	1.14	0.18	0.03	0.94	0.74			0.98	
Uniform Delay, d1		41.7	28.2	48.5	20.0	18.7	48.1	22.4			40.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.69	
Incremental Delay, d2		4.5	4.9	95.7	0.0	0.0	37.3	3.0			22.7	
Delay (s)		46.2	33.2	144.2	20.0	18.7	85.4	25.4			50.8	
Level of Service		D	C	F	C	B	F	C			D	
Approach Delay (s)		37.3			102.4			36.7			50.8	
Approach LOS		D			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	49.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

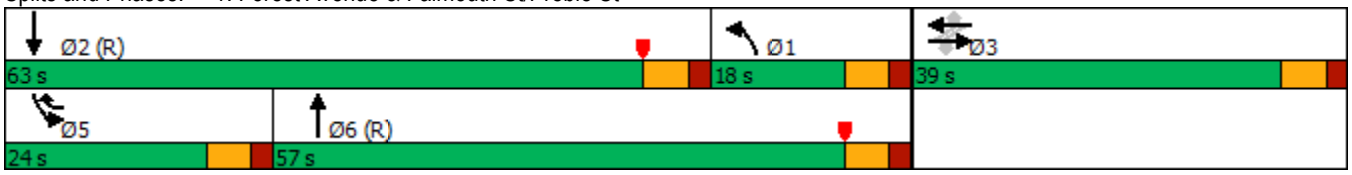
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	44	108	20	141	268	67	947	15	102	786	27
Future Volume (vph)	45	44	108	20	141	268	67	947	15	102	786	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	200		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.995	
Flt Protected		0.975			0.994		0.950			0.950		
Satd. Flow (prot)	0	1852	1615	0	1858	1599	1805	3466	0	1805	3558	0
Flt Permitted		0.485			0.949		0.950			0.950		
Satd. Flow (perm)	0	922	1615	0	1774	1599	1805	3466	0	1805	3558	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140			82		2			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		675			1256			804			1168	
Travel Time (s)		15.3			28.5			18.3			26.5	
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.96	0.96	0.96	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	6%	1%	1%	0%	4%	1%	0%	1%	0%
Adj. Flow (vph)	58	57	140	25	174	331	70	986	16	107	827	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	140	0	199	331	70	1002	0	107	855	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			10			18			16	
Link Offset(ft)		0			-6			0			-2	
Crosswalk Width(ft)		16			16			30			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		3			3	5	1	6		5	2	
Permitted Phases	3		3	3		3						
Detector Phase	3	3	3	3	3	5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	16.0	16.0	37.0		16.0	25.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	24.0	18.0	57.0		24.0	63.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	20.0%	15.0%	47.5%		20.0%	52.5%	
Maximum Green (s)	33.0	33.0	33.0	33.0	33.0	18.0	12.0	51.0		18.0	57.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0			26.0			14.0	
Pedestrian Calls (#/hr)	4	4	4	4	4			7			4	
Act Effct Green (s)		20.4	20.4		20.4	37.7	18.6	74.3		13.3	71.3	
Actuated g/C Ratio		0.17	0.17		0.17	0.31	0.16	0.62		0.11	0.59	
v/c Ratio		0.74	0.36		0.66	0.59	0.25	0.47		0.54	0.40	
Control Delay		73.0	9.0		56.6	28.8	25.6	4.7		74.7	9.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		73.0	9.0		56.6	28.8	25.6	4.7		74.7	9.9	
LOS		E	A		E	C	C	A		E	A	
Approach Delay		37.9			39.3			6.0			17.1	
Approach LOS		D			D			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 21 (18%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 18.9		Intersection LOS: B	
Intersection Capacity Utilization 59.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Forest Avenue & Falmouth St/Preble St





Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	115	140	199	331	70	1002	107	855
v/c Ratio	0.74	0.36	0.66	0.59	0.25	0.47	0.54	0.40
Control Delay	73.0	9.0	56.6	28.8	25.6	4.7	74.7	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	9.0	56.6	28.8	25.6	4.7	74.7	9.9
Queue Length 50th (ft)	86	0	146	162	41	57	89	93
Queue Length 95th (ft)	119	31	186	186	m62	49	m119	126
Internal Link Dist (ft)	595		1176			724		1088
Turn Bay Length (ft)		150			200		150	
Base Capacity (vph)	268	570	517	643	300	2146	300	2120
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.25	0.38	0.51	0.23	0.47	0.36	0.40

Intersection Summary

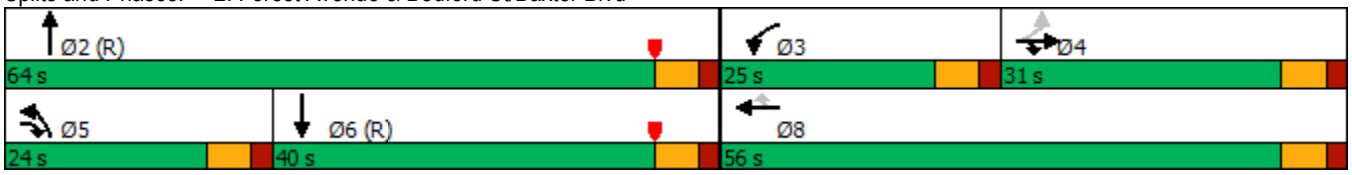
m Volume for 95th percentile queue is metered by upstream signal.

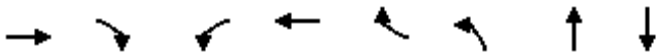
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	154	516	299	114	38	282	933	141	0	827	28
Future Volume (vph)	72	154	516	299	114	38	282	933	141	0	827	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		375	140		75	0		0	0		0
Storage Lanes	0		1	1		1	1		0	0		0
Taper Length (ft)	100			75			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.980			0.995	
Flt Protected		0.984		0.950			0.950					
Satd. Flow (prot)	0	1650	1425	1608	1693	1439	1593	3122	0	0	3169	0
Flt Permitted		0.858		0.950			0.950					
Satd. Flow (perm)	0	1438	1425	1608	1693	1439	1593	3122	0	0	3169	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			82		21			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			1329			253			804	
Travel Time (s)		13.8			30.2			5.8			18.3	
Peak Hour Factor	0.87	0.87	0.87	0.85	0.85	0.85	0.91	0.91	0.91	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	83	177	593	352	134	45	310	1025	155	0	899	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	260	593	352	134	45	310	1180	0	0	929	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			18			4	
Link Offset(ft)		0			3			0			0	
Crosswalk Width(ft)		20			10			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		15	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1			1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50			50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50			50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Turn Type	Perm	NA	pt+ov	Prot	NA	Perm	Prot	NA			NA	
Protected Phases		4	4 5	3	8		5	2			6	
Permitted Phases	4					8						
Detector Phase	4	4	4 5	3	8	8	5	2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0	5.0	5.0	10.0			10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	29.0	29.0		16.0	29.0	29.0	16.0	34.0			34.0	
Total Split (s)	31.0	31.0		25.0	56.0	56.0	24.0	64.0			40.0	
Total Split (%)	25.8%	25.8%		20.8%	46.7%	46.7%	20.0%	53.3%			33.3%	
Maximum Green (s)	25.0	25.0		19.0	50.0	50.0	18.0	58.0			34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0			4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lost Time Adjust (s)		-4.0		-4.0	-4.0	-4.0	-4.0	-4.0			-4.0	
Total Lost Time (s)		2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lead/Lag	Lag	Lag		Lead			Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	3.5	3.0			3.0	
Recall Mode	None	None		None	None	None	None	C-Min			C-Min	
Walk Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Flash Dont Walk (s)	18.0	18.0			18.0	18.0		23.0			23.0	
Pedestrian Calls (#/hr)	10	10			1	1		1			1	
Act Effct Green (s)		29.0	53.0	23.0	54.0	54.0	22.0	62.0			38.0	
Actuated g/C Ratio		0.24	0.44	0.19	0.45	0.45	0.18	0.52			0.32	
v/c Ratio		0.75	0.88	1.14	0.18	0.07	1.06	0.73			0.92	
Control Delay		56.9	42.3	139.5	20.5	1.0	116.9	25.3			42.3	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay		56.9	42.3	139.5	20.5	1.0	116.9	25.3			42.3	
LOS		E	D	F	C	A	F	C			D	
Approach Delay		46.7			97.8			44.4			42.3	
Approach LOS		D			F			D			D	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 51.8		Intersection LOS: D	
Intersection Capacity Utilization 90.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Forest Avenue & Bedford St/Baxter Blvd





Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	260	593	352	134	45	310	1180	929
v/c Ratio	0.75	0.88	1.14	0.18	0.07	1.06	0.73	0.92
Control Delay	56.9	42.3	139.5	20.5	1.0	116.9	25.3	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	42.3	139.5	20.5	1.0	116.9	25.3	42.3
Queue Length 50th (ft)	187	365	~319	61	0	~264	353	377
Queue Length 95th (ft)	#280	#557	#466	96	3	#445	438	#484
Internal Link Dist (ft)	529			1249			173	724
Turn Bay Length (ft)		375	140		75			
Base Capacity (vph)	347	675	308	761	692	292	1623	1005
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.88	1.14	0.18	0.07	1.06	0.73	0.92

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	98	0	0	130	0	0
Future Volume (vph)	98	0	0	130	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	136			675	183	
Travel Time (s)	3.1			15.3	4.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	107	0	0	141	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	0	0	141	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

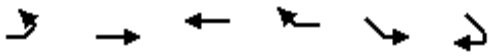
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	10.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	98	0	0	130	0	0
Future Volume (Veh/h)	98	0	0	130	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	107	0	0	141	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				675		
pX, platoon unblocked						
vC, conflicting volume			107		248	107
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			107		248	107
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1484		740	947

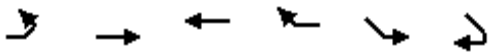
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	107	141	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1484	1700
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	10.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	2	94	122	8	4	3
Future Volume (vph)	2	94	122	8	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.991		0.942	
Flt Protected		0.999			0.972	
Satd. Flow (prot)	0	1861	1846	0	1706	0
Flt Permitted		0.999			0.972	
Satd. Flow (perm)	0	1861	1846	0	1706	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		733	136		287	
Travel Time (s)		16.7	3.1		6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	2	102	133	9	4	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	104	142	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 16.9%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	2	94	122	8	4	3
Future Volume (Veh/h)	2	94	122	8	4	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	102	133	9	4	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			811			
pX, platoon unblocked						
vC, conflicting volume	142				244	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	142				244	138
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1441				744	911

Direction, Lane #	EB 1	WB 1	SE 1
Volume Total	104	142	7
Volume Left	2	0	4
Volume Right	0	9	3
cSH	1441	1700	807
Volume to Capacity	0.00	0.08	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.2	0.0	9.5
Lane LOS	A		A
Approach Delay (s)	0.2	0.0	9.5
Approach LOS			A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	16.9%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	62	318	368	0	0	267
Future Volume (vph)	62	318	368	0	0	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1770	1583	1863	0	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1583	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	218		550			444
Travel Time (s)	5.0		12.5			10.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	67	346	400	0	0	290
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	346	400	0	0	290
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	62	318	368	0	0	267
Future Volume (Veh/h)	62	318	368	0	0	267
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	346	400	0	0	290
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1053
pX, platoon unblocked						
vC, conflicting volume	690	400			400	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	690	400			400	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	47			100	
cM capacity (veh/h)	411	650			1159	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	67	346	400	290
Volume Left	67	0	0	0
Volume Right	0	346	0	0
cSH	411	650	1700	1159
Volume to Capacity	0.16	0.53	0.24	0.00
Queue Length 95th (ft)	14	79	0	0
Control Delay (s)	15.5	16.7	0.0	0.0
Lane LOS	C	C		
Approach Delay (s)	16.5		0.0	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	0	40	670	26	158	267
Future Volume (vph)	0	40	670	26	158	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.995			
Flt Protected					0.950	
Satd. Flow (prot)	1611	0	1853	0	1770	1863
Flt Permitted					0.950	
Satd. Flow (perm)	1611	0	1853	0	1770	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	212		444			609
Travel Time (s)	4.8		10.1			13.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	0	43	728	28	172	290
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	756	0	172	290
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 58.9%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	40	670	26	158	267
Future Volume (Veh/h)	0	40	670	26	158	267
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	43	728	28	172	290
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						609
pX, platoon unblocked						
vC, conflicting volume	1376	742			756	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1376	742			756	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	90			80	
cM capacity (veh/h)	128	416			855	

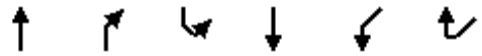
Direction, Lane #	NB 1	NE 1	SW 1	SW 2
Volume Total	43	756	172	290
Volume Left	0	0	172	0
Volume Right	43	28	0	0
cSH	416	1700	855	1700
Volume to Capacity	0.10	0.44	0.20	0.17
Queue Length 95th (ft)	9	0	19	0
Control Delay (s)	14.7	0.0	10.3	0.0
Lane LOS	B		B	
Approach Delay (s)	14.7	0.0	3.8	
Approach LOS	B			

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	495	57	311	301	0	301
Future Volume (vph)	495	57	311	301	0	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986					0.865
Flt Protected				0.975		
Satd. Flow (prot)	1837	0	0	1816	0	1611
Flt Permitted				0.975		
Satd. Flow (perm)	1837	0	0	1816	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	214			201	550	
Travel Time (s)	4.9			4.6	12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	538	62	338	327	0	327
Shared Lane Traffic (%)						
Lane Group Flow (vph)	600	0	0	665	0	327
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	495	57	311	301	0	301
Future Volume (Veh/h)	495	57	311	301	0	301
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	538	62	338	327	0	327
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			600		1572	569
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			600		1572	569
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			65		100	37
cM capacity (veh/h)			977		79	522

Direction, Lane #	NB 1	SB 1	SW 1
Volume Total	600	665	327
Volume Left	0	338	0
Volume Right	62	0	327
cSH	1700	977	522
Volume to Capacity	0.35	0.35	0.63
Queue Length 95th (ft)	0	39	107
Control Delay (s)	0.0	7.6	22.8
Lane LOS		A	C
Approach Delay (s)	0.0	7.6	22.8
Approach LOS			C

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: 101 [AM Peak Hour - 2028 Build - Bedford Garage]

Deering Ave / Brighton Ave / Falmouth St
Portland, ME
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Deering Ave											
21	L2	9	0.0	0.379	6.1	LOS A	2.7	19.3	0.33	0.44	39.5
21a	L1	284	2.4	0.379	5.3	LOS A	2.7	19.3	0.33	0.44	39.1
22	T1	143	1.0	0.379	1.6	LOS A	2.7	19.3	0.33	0.44	39.1
23	R2	25	0.0	0.379	2.2	LOS A	2.7	19.3	0.33	0.44	38.3
Approach		460	1.8	0.379	4.0	LOS A	2.7	19.3	0.33	0.44	39.0
NorthEast: Falmouth St											
24	L2	34	0.0	0.128	8.6	LOS A	0.7	4.8	0.59	0.61	39.1
25	T1	13	0.0	0.128	4.2	LOS A	0.7	4.8	0.59	0.61	38.7
26a	R1	48	0.0	0.128	4.1	LOS A	0.7	4.8	0.59	0.61	38.4
26	R2	4	0.0	0.128	4.7	LOS A	0.7	4.8	0.59	0.61	38.0
Approach		98	0.0	0.128	5.7	LOS A	0.7	4.8	0.59	0.61	38.7
NorthWest: Deering Ave											
27	L2	1	0.0	0.388	9.2	LOS A	2.1	15.3	0.63	0.64	39.4
28	T1	240	5.4	0.388	5.0	LOS A	2.1	15.3	0.63	0.64	39.0
29	R2	10	0.0	0.388	5.4	LOS A	2.1	15.3	0.63	0.64	38.2
29b	R3	2	0.0	0.388	5.8	LOS A	2.1	15.3	0.63	0.64	38.0
Approach		253	5.1	0.388	5.0	LOS A	2.1	15.3	0.63	0.64	39.0
West: Brighton Ave											
10b	L3	1	0.0	0.839	16.9	LOS B	15.0	107.1	1.00	1.13	37.0
10a	L1	40	0.0	0.839	15.4	LOS B	15.0	107.1	1.00	1.13	36.4
12a	R1	704	2.7	0.839	11.7	LOS B	15.0	107.1	1.00	1.13	36.1
12b	R3	2	0.0	0.839	12.7	LOS B	15.0	107.1	1.00	1.13	35.5
Approach		748	2.5	0.839	11.9	LOS B	15.0	107.1	1.00	1.13	36.1
SouthWest: Falmouth St											
30b	L3	1	0.0	0.167	16.1	LOS B	1.1	7.9	0.92	0.90	36.8
30	L2	14	0.0	0.167	15.4	LOS B	1.1	7.9	0.92	0.90	36.5
31	T1	24	0.0	0.167	11.0	LOS B	1.1	7.9	0.92	0.90	36.1
32	R2	20	8.0	0.167	12.1	LOS B	1.1	7.9	0.92	0.90	35.5
Approach		59	2.7	0.167	12.5	LOS B	1.1	7.9	0.92	0.90	36.0
All Vehicles		1618	2.6	0.839	8.3	LOS A	15.0	107.1	0.72	0.81	37.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM Peak Hour - 2028 Build - Bedford Garage]

Deering Ave / Brighton Ave / Falmouth St
Portland, ME
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Deering Ave											
21	L2	23	0.0	0.675	6.5	LOS A	7.4	52.6	0.52	0.48	39.1
21a	L1	563	1.7	0.675	5.8	LOS A	7.4	52.6	0.52	0.48	38.7
22	T1	234	0.7	0.675	2.1	LOS A	7.4	52.6	0.52	0.48	38.7
23	R2	30	0.0	0.675	2.6	LOS A	7.4	52.6	0.52	0.48	37.9
Approach		849	1.3	0.675	4.7	LOS A	7.4	52.6	0.52	0.48	38.7
NorthEast: Falmouth St											
24	L2	36	0.0	0.407	14.6	LOS B	2.8	19.8	0.88	0.96	37.1
25	T1	33	0.0	0.407	10.2	LOS B	2.8	19.8	0.88	0.96	36.7
26a	R1	118	0.0	0.407	10.1	LOS B	2.8	19.8	0.88	0.96	36.5
26	R2	13	0.0	0.407	10.7	LOS B	2.8	19.8	0.88	0.96	36.0
Approach		199	0.0	0.407	11.0	LOS B	2.8	19.8	0.88	0.96	36.6
NorthWest: Deering Ave											
27	L2	9	16.7	0.435	16.5	LOS B	2.7	19.0	0.82	0.92	37.0
28	T1	175	0.0	0.435	10.9	LOS B	2.7	19.0	0.82	0.92	36.7
29	R2	7	0.0	0.435	11.4	LOS B	2.7	19.0	0.82	0.92	36.0
29b	R3	1	0.0	0.435	11.9	LOS B	2.7	19.0	0.82	0.92	35.8
Approach		193	0.7	0.435	11.1	LOS B	2.7	19.0	0.82	0.92	36.6
West: Brighton Ave											
10b	L3	1	0.0	0.567	9.5	LOS A	4.9	34.8	0.72	0.66	39.9
10a	L1	33	0.0	0.567	8.0	LOS A	4.9	34.8	0.72	0.66	39.1
12a	R1	472	3.0	0.567	4.3	LOS A	4.9	34.8	0.72	0.66	38.8
12b	R3	1	0.0	0.567	5.3	LOS A	4.9	34.8	0.72	0.66	38.1
Approach		507	2.8	0.567	4.6	LOS A	4.9	34.8	0.72	0.66	38.8
SouthWest: Falmouth St											
30b	L3	4	0.0	0.102	11.4	LOS B	0.6	4.2	0.75	0.71	38.8
30	L2	8	20.0	0.102	11.6	LOS B	0.6	4.2	0.75	0.71	38.4
31	T1	34	0.0	0.102	6.3	LOS A	0.6	4.2	0.75	0.71	38.0
32	R2	13	0.0	0.102	6.8	LOS A	0.6	4.2	0.75	0.71	37.3
Approach		59	2.9	0.102	7.5	LOS A	0.6	4.2	0.75	0.71	38.0
All Vehicles		1806	1.6	0.675	6.1	LOS A	7.4	52.6	0.65	0.63	38.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

COMMITMENT & INTEGRITY
DRIVE RESULTS

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Via Electronic Mail

September 13, 2021

Jimmy Dealaman, Planner
Planning and Urban Development Department
City Hall, 389 Congress Street, 4th Floor
Portland, Maine 04101

Re: 50 Bedford Street – Response to Site Plan Application Review Comments

Dear Jimmy:

The following are responses to comments received from the City of Portland in an email dated August 29, 2021; the comments received are provided below for your reference, followed by our response in italics:

Preliminary Site Plan Review Comments

Zoning

According to Land Use Code Section 8.10.5 the University of Southern Maine Overlay Zone (exclusive of public streets), is subject to a maximum lot coverage of 40% for building footprints and the maximum impervious area of 66%. Staff request an estimate of where the USM campus is at with each of these metrics in order to confirm the maximum is not exceeded.

RESPONSE: As noted in the Zoning Analysis Table attached to Section 6 of our application, the proposed building lot coverage is 30%, and the proposed impervious area coverage is 55%.

Impact on Surrounding Street Systems

The City's consulting traffic engineer has determined that modification to the TMP application is acceptable. Staff request that the applicant's traffic engineer (VHB) submit appropriate materials to amend the TMP application. Once the amended TMP application is submitted for review, please email Tom Errico thomas.errico@tylin.com to schedule the required scoping with between the applicant team and City staff.

RESPONSE: The TMP Amendment Application is in progress; the traffic engineer will reach out to Tom Errico to schedule the scoping meeting.

Are any additional street improvements at the entrance to the driveway on Bedford Street proposed or anticipated that might impact circulation into the access drive to the site?

RESPONSE: A figure depicting the conceptual-level plan for Bedford Street improvements and supporting narrative description was provided in Section 10.1.1 of the Site Plan

Narrative. The design is still in progress; design drawings and supplemental narrative for these improvements will be provided under separate cover as part of the TMP Amendment Application.

Access and Circulation

The width of the door to the bicycle storage space appears to be narrow which may discourage access to this area. Please revisit the entrance to this location.

RESPONSE: The bicycle storage entrance has been re-worked to provide a larger door with recessed alcove to better define and provide access to the bicycle entrance/storage area. Please see the revised Drawing A101.

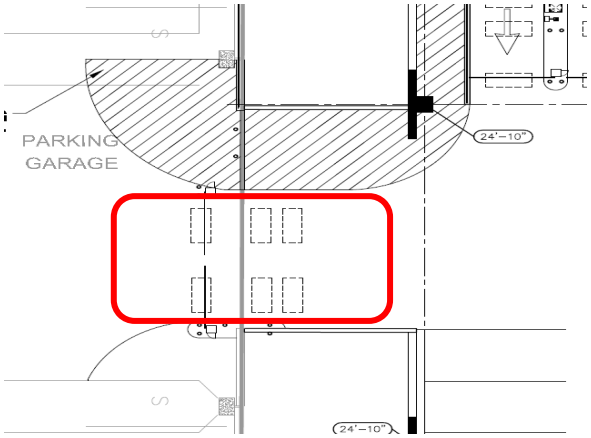
Referencing the State of Maine's guide on ADA design standards, the size of the garage appears to necessitate adding more accessible spaces. Please revisit the minimum # of required handicap accessible parking spaces, or provide staff with more information showing how the requirement for accessible spaces is being met for the project.

RESPONSE: The car count table on sheet A101 has been updated to show the number of accessible parking spaces provided with a note identifying the ADA Criteria.

Please clarify the interaction between the two garages. Please show any directional striping to clarify vehicle circulation between the two garages (i.e. is there two way traffic between the garages, any special signage for directing vehicles to the exit?)

RESPONSE: Two-way traffic will not be permitted between garages; this will be controlled by "Free-in" gates that allow entry-only into the existing garage, except for limited USM facility vehicles. Directional arrows have been added along with planned active and static signage to the Striping Plans (Sheets A-101 through A-105).

Please label for clarification what is proposed in the area shown below (see image) between the two garages on the ground level striping plan. (i.e. gate, speed bump, etc.)



RESPONSE: The Ground-Level Striping Plan (Sheet A-101) has been revised to include directional arrows to aid with patron wayfinding (see previous response).

Please provide additional narrative about how the south drive behind the garage will be utilized? It appears to be used as a fire lane to access the building as well as for trash pick-up. How do trash trucks access the dumpsters in that vicinity and how regularly? Also, please explain what generates the trash that the dumpsters will be accommodating, and where are these operations located? What restricts movement of unauthorized vehicles from using this lane (gate, signage, etc.) The narrative suggests gated emergency access. Please show any features related to vehicle circulation on the plan. Also please clarify if restricted access continues behind the existing garage. Please note whether this is a one-way drive? If so, please show any proposed signage.

RESPONSE: Similar to existing conditions, the area south of the garage will be fenced and gated to restrict unauthorized access. The fire access drive is a 20-foot wide, two-way drive with limited and restricted use. Emergency vehicle access will be provided via a Knox box at the gate. The Site Layout & Materials Plan (Drawing Sheet C-103) has been updated to depict fence, gate, and Knox box locations.

Three open-top, roll-off container dumpsters are proposed to manage bulky waste generated by the USM Portland campus that cannot fit into regular municipal solid waste dumpsters or compactors. Each container will store a different type of bulky waste: yard waste (grass clippings and leaves); construction and demolition (C&D) debris (branches cut from trees, broken wooden furniture, lumber, and carpet from renovations, etc.); and metal (scrap metal from various projects, metal desks, filing cabinets, metal pieces of chairs, etc.). Apart from emergency vehicle access, only ground, waste, and custodial Facilities supervisors will be allowed keyed entry into the gated area to access the dumpsters. Two pulls are expected each month, which means two of the three dumpsters will be pulled each month and returned. The dumpsters will be removed from campus for the winter months, so as not to impede snow removal. During the warmer months, the yard waste and C&D dumpsters will remain, while the waste dumpster will be on-site intermittently (only around about 25% of the time). The dumpsters will not be used for liquid material, food, hazardous waste, or regular municipal solid waste.

It appears a waiver will be needed to the City's Technical Manual Section 1.14.5. for drive aisles being under 24 feet wide (shown in I-27 of Section 1 of the Technical Manual). If a waiver is being sought, please provide a written request explaining the basis for justifying a waiver.

RESPONSE: The proposed drive aisle into the site and up to the turnaround is 24-feet wide to accommodate two-way traffic in accordance with the City's Technical Manual. The turnaround lanes are 22-feet and will be one-way as indicated by the signage specified on the Site Layout & Materials Plan (Drawing Sheet C-103); in accordance with Section 1.7.2.2 of the City's Technical Manual, the minimum width for one-way traffic is 12-feet. The proposed emergency access drive along the south side of the site is 20-feet wide and is not

intended for general traffic. Furthermore, in accordance with Section 1.7.2.3 of the Technical Manual, it is our understanding that the minimum two-way drive aisle width is 20-feet, with a preferred width of 24-feet. Section 1.14.5 and Figure I-27 of the Technical Manual apply to parking lot and parking space design; the proposed drive aisle is not associated with a parking lot. We do not believe a waiver is needed for the proposed drive aisles but will complete one if the City determines one is necessary.

Please show all dimensions within the garage parking areas. Also please add a scale for staff to reference on the floor/striping plan sheets. In particular please be sure to show the dimension aisle width behind the handicap accessible spaces. Staff are also wondering if the EV charging stations will occupy any space and if so, accounting for those dimensions in the parking layout design accordingly.

RESPONSE: Dimensions identifying drive aisle widths, stall depths, stall widths, and dual-head EV charging station locations (between stalls so as not to interfere with the parking spaces) have been added to the floor/striping plan sheets.

Please label any compact parking spaces that are being proposed so staff can differentiate these.

RESPONSE: Presently there are no compact parking spaces planned.

Staff are wondering how traffic and parking to the garage is being regulated (how do students know which garage to enter, and what type of device is used to allow entry to the garage)

RESPONSE: Active signage will be included above the main entrance directing visitors, monthly permit holders, and students to the appropriate entry lane. Internal to the garage signage, floor striping will further direct patrons to the appropriate zone of parking.

What are the hours of the garage?

RESPONSE: The new garage will be open 24 hours/day, 7days/week.

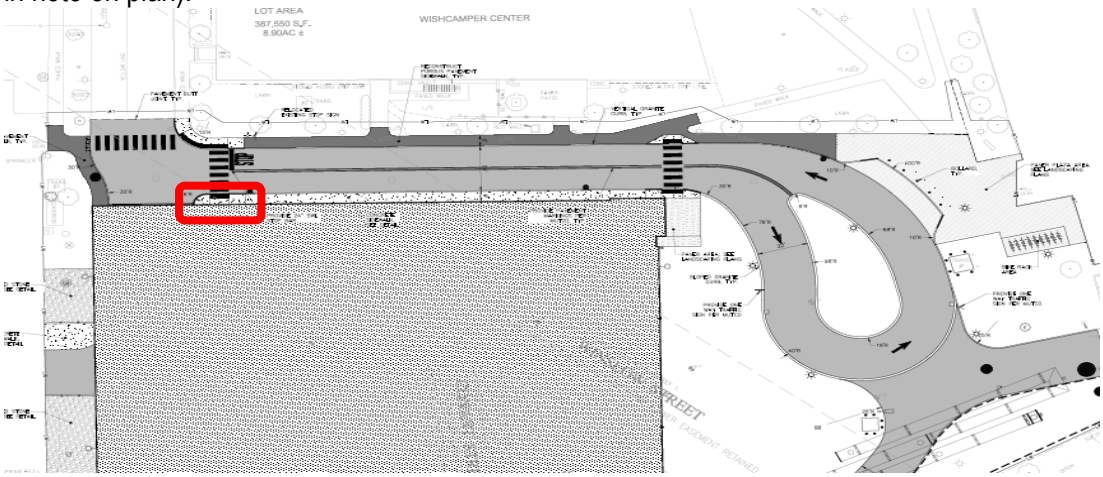
Will there be a maximum duration for vehicles charging at EV stations? What will deter parking at EV charging stations longer than required to charge vehicle?

RESPONSE: EV charging stations will be specified to have a user interface application that will prompt users when their car is charged (and to move it to a non-EV stall). Potential monetary fines for not moving a charged vehicle will be considered.

Is the extent of impervious surface area in the vicinity of the vehicle turnaround (towards the Forest Avenue side of site) necessary? Staff wonder if any unnecessary paving not needed for turning could be reduced. Staff recommend seeing a better outcome for this space if possible (e.g. increasing green space, etc.)

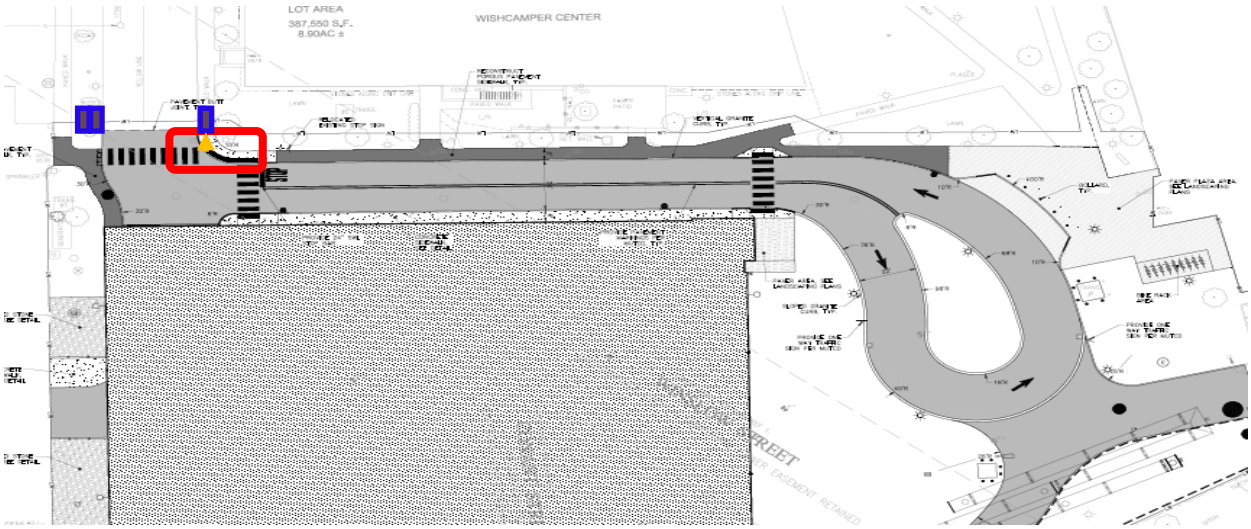
RESPONSE: As shown by the enclosed turning template showing fire truck access route, the extent of impervious surface area in the vicinity of the vehicle turnaround is necessary for fire truck access and maneuvering.

Please revisit the design of the ramps and landing at the location shown below. Pedestrian routes should be accessible (not exceeding 2% max slope) The interior hallway should also be revisited for its interface/relationship with the sidewalk. Please label slope or provide detail (citing detail in note on plan).



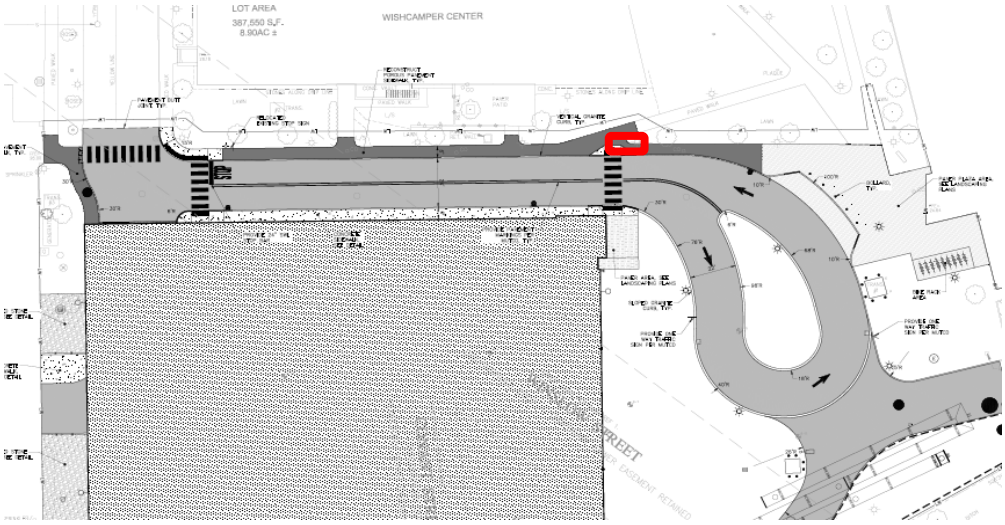
RESPONSE: Details specifying maximum slopes for all pedestrian ramps are cited on the Grading Plan (Drawing Sheet C-104); all pedestrian routes are ADA accessible.

The entirely of the detectable warning panel location (see image below) should be within the crosswalk. Please revisit this location. The panel could potentially be shifted slightly (see blue locations) and the ramps could be separated to meet each crosswalk.



RESPONSE: As specified on the Grading Plan (Drawing Sheet C-104), the proposed ramp has been designed to be a "Blended Transition Ramp"; this is a Maine Department of Transportation (MaineDOT) Standard Detail for Pedestrian Ramps (per MaineDOT Standard Details 801(26)) and an ADA acceptable configuration. All other options for ramp configurations have been deemed infeasible given the site's tight constraints. The ramp cannot be relocated further north as sketched above as it would conflict with existing stormwater features located along the west side of the driveway entrance into the site.

Please revisit the path at the location below (see image). It appears to be 3 feet from the top of the ramp, so this path should likely be extended to provide sufficient access and turning.



RESPONSE: The sidewalk width was increased in this area to provide a minimum 4-foot landing at the top of the ADA ramp; this change is reflected on the Site Layout & Materials Plan (Drawing Sheet C-103).

Parking

Please label any parking spaces that are expected along the access drive (if any are expected), also show any signage for loading or no parking areas.

RESPONSE: "No Parking" signs will be provided along the access drive loop. Two vehicle loading/unloading spaces are provided proximal to the Glickman/Osher entrance for safe pedestrian drop-offs. Proposed signage is depicted on the Site Layout & Materials Plan (Drawing Sheet C-103).

Based on the waiver documentation submitted, staff are open to supporting a partial waiver for the electric vehicle charging station requirement. Please provide a note on the utility plans that remaining spaces will be served by sufficient conduit, wiring, and electrical service to allow for future installation of electric vehicle supply equipment.

RESPONSE: A note has been added to the Utility & Grading Plan (Sheet C-104) regarding the accommodation of future electric vehicle supply equipment. Electrical conduit in the garage is surface mounted and easily expandable. Electrical circuits will also be designed to be expandable as new equipment is added.

To be clear, the applicant is proposing the following:

1. *Size the transformer now to accommodate a 20% EV buildout (install the 29 dual head units (58 spaces) or 9.4% of the current 618 spaces at this time, as indicated in the waiver request.*
2. *Install the conduit from the electric room to the future transformer pad site to accommodate the remaining 80% EV spaces.*
3. *Ensure there is sufficient room for future panels in the electric room and the satellite electric rooms on the various floors.*
4. *Design pathways for future conduit (and wiring) to those satellite electric rooms.*
5. *Future conduit from the satellite electric rooms will be overhead and utilize the blockouts that will be provided in the double tees. This will allow for additional conduit to be ceiling mounted and enable routing to all parking spaces if/when needed.*

This approach:

1. *Limits unused materials from being installed and subject to deterioration and/or damage;*
2. *Ensures that capability to expand, as needed, is in place now; and*
3. *Limits spending for elements that might never be necessary.*

Also, please clarify what parking areas might be reserved or intended for students/guests/faculty/etc.

RESPONSE: The parking program will include the nesting of daily credentialed patrons to park in the existing garage and utilize the Surrenden Street Exit. Long-term resident, visitor, and off-peak patrons will utilize the new garage.

Will any special signage be shown to inform visitors if parking lot is full or which garage has capacity? Will this be monitored?

RESPONSE: Active signage will be provided above the main entrance and a monument sign off of Bedford Street will direct garage patrons to the garage entrance (off of Winslow Street).

Is there any demand or parking areas that will be set aside for motorcycle, etc. If so, where will this be located and how will it be reserved for these vehicles?

RESPONSE: Motorcycle parking has been added on the ground-level of the garage as shown on Sheet A-101.

Public Safety and Fire Prevention

Please provide a turning template showing fire truck access route, also showing how vehicle is expected to turn around.

RESPONSE: Fire truck access and turnaround turning templates are enclosed.

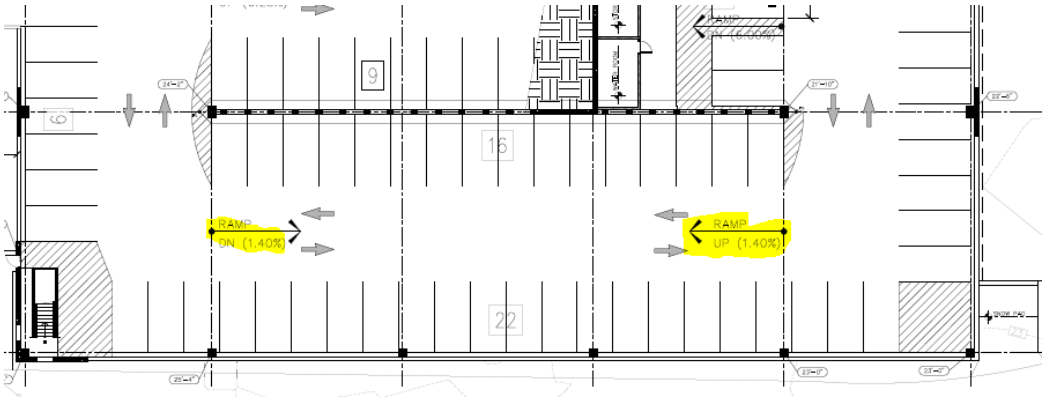
Site Design Standards

Also included as part of these preliminary comments, staff are providing design review comments (please see separate attachment).

RESPONSE: Noted. Responses to preliminary design review comments are provided in the following sections.

General

Please verify that the slopes provided on the ground level striping plan are correct (see image below). These appear to be possibly unintended so staff want confirm this is accurate.



RESPONSE: The Striping Plans (Sheets A101 through A105) have been revised to clarify ramp slope.

Preliminary Design Review Comments

Provide additional information on landscape/screening of hvac systems.
See attached rendering with notes (dated 8/27/21 by ccameron).

RESPONSE: There are no HVAC systems in the landscape to be screened.

A-3 Pedestrian Environment

The bike/ped circulation routes do not seem to be indicated or thought through. The pedestrian and bike entrances to the building are not legible or clear from either direction.

RESPONSE: Pedestrian routes have been considered and accommodated in the site design as shown on the enclosed Pedestrian Routes diagram. Building façade changes have also been proposed. Please see updated renderings, architectural elevations, and narrative responses below.

In addition, the interstitial space between the two garages has the potential to become dark, inhospitable spaces. To make this space feel secure and comfortable consider how visual interest or screening will be accommodated either in the design of the fencing, with lighting, or other amenities to indicate what is safe, habitable space.

RESPONSE: The space between the buildings is not intended to be a habitable space; however, it will be well lit and easy to maintain, with crushed stone at the ground-plane. There will be 36" concrete knee walls between the parking garage interior and these spaces, and 6' fencing between these spaces and the exterior. See drawings A200 and A201 for fencing, see drawing A201 for light fixtures. View A202 shows the perspective from the driveway entrance.

C-1 Structures

Scale, Massing, and material selection are compatible with adjacent, existing garage structure. Building is setback with minimal visual impact on Bedford Street. Front facade treated with material changes that correspond to entry points/building corners, scaling elements such as canopy and banners. The pedestrian/bike experience does not seem fully functional or adequately accommodated. Pedestrian entrances should emphasized and made more legible from the circulation routes - especially from adjacent building entrances. Bike room entrances are not directly accessible, functional. What is circulation pattern for peds/bikes? Staff recommend that the ground floor bay for bikes be differentiated with material and set back from the building face to accommodate maneuvering - a visible and wide/accessible entrance to the bike storage should be placed on the front facade. The remaining two car bays might carry the brick cladding to help the differentiation.

RESPONSE. Please see updated renderings and architectural elevations, showing building façade changes. A new recessed entry for the bicycle storage room has been added to provide more maneuvering space for cyclists apart from car traffic. The existing pedestrian stair tower has been emphasized as an entrance by removing the wrap-around canopy and extending the mass of glass to grade. A sunscreen of smaller scale has been added to draw interest around to the east side entry door location. The ground level of the east side of the garage in general has had piers added within each structural bay which creates a storefront expression for both the car and bike parking zones.

Principle C

Overall the project meets the goals to minimize the impact on the street and to create an attractive facade to neighboring uses.

RESPONSE: Acknowledged.

C-2 Active Uses

The building is setback at least 35' from Bedford Street and is placed behind the more active Wishcamper Center.

RESPONSE: Acknowledged.

C-3 Decks and Ramps

Ramps throughout the building including where visible from public rights of way. However, building is setback from all rights of way and ramps are screened so as to appear mostly horizontal floors from exterior.

RESPONSE: Acknowledged.

C-6 Utility Services

Provide screening for existing equipment visible from driveway. Where, if any, will additional hvac units be located?

RESPONSE: The existing transformer and existing generator near vehicular entry are being screened from entry driveway by five bayberry shrubs. These woody shrubs are semi evergreen, very hardy, and grow to about 8' tall. All transformers must have clear access 10' from front of unit and cannot be screened between front of unit and vehicular way. Any additional HVAC units will be integrated into the design of the garage.

In addition to changes made to the plans in response to the above comments, a 1.5" domestic water service connection to the proposed garage has been added to the Utility & Grading Plan (Sheet C-104). While daily use of domestic water in the garage is not expected, occasional use via hose hookups is anticipated to facilitate occasional garage maintenance. An ability to serve request letter has been prepared and sent to Portland Water District; a copy of this letter is enclosed. An ability to serve determination will be provided upon receipt.

Thank you for your feedback and comments as we continue to move forward with this project. Please contact me should you have any questions.

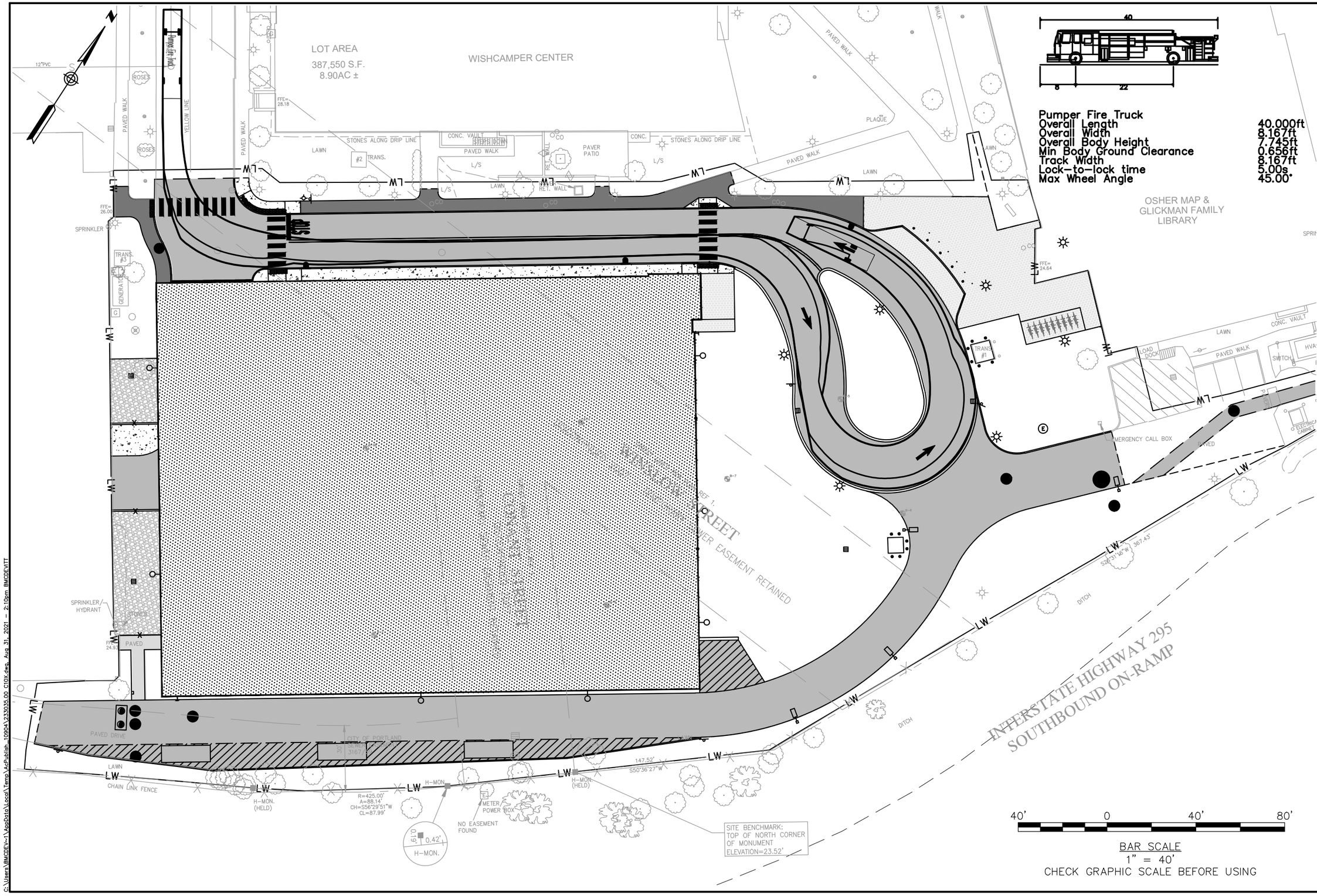
Sincerely,

WOODARD & CURRAN, INC.

Darrin Stairs, PE
Project Manager

Enclosure(s): Fire Truck Vehicle Movement Figures 1-3
Pedestrian Routes Diagram
Water Ability to Serve Request Letter
Revised Plans (uploaded under separate cover to Eplan)
- A-100 Site Plan
- A-101 Ground Level Striping Plan
- A-102 First Level Striping Plan
- A-103 Second Level Striping Plan
- A-104 Third Level Striping Plan
- A-105 Roof Level Striping Plan
- A-200 Building Elevations
- A-201 Building Elevations
- A-202 Building Views
- A-203 Building Views
- C-103 Site Layout & Materials Plan
- C-104 Utility & Grading Plan
- D-201 Civil Details – 2
- L-100 Planting Plan

cc: Wes Wilson, Desman Design Management
Ann Vashon, USM



41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS
WOODARD &CURRAN

VEHICLE MOVEMENT FIGURE – 1

DESIGNED BY: ANL
DRAWN BY: BCM
CHECKED BY: DBS
233035.00 C10X.dwg

UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

USM – STRUCTURED PARKING GARAGE
50 BEDFORD ST. PORTLAND, ME 04104

JOB NO: 233035.00
DATE: SEPTEMBER 2021
SCALE: 1"=40'

VEH. 1

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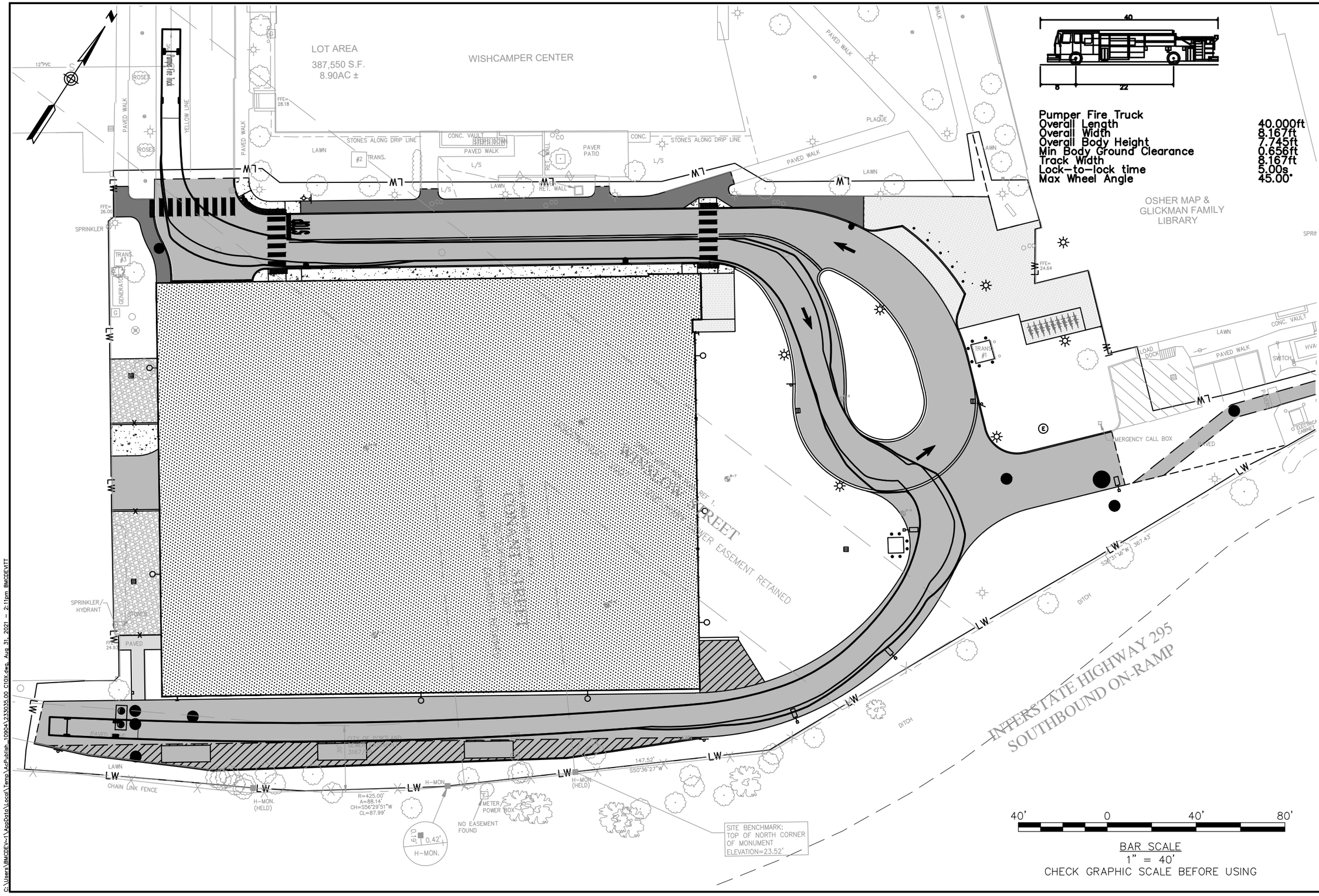

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COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

VEHICLE MOVEMENT FIGURE – 2

DESIGNED BY: ANL
DRAWN BY: BCM
CHECKED BY: DBS
233035.00 C10X.dwg

UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

USM – STRUCTURED PARKING GARAGE
50 BEDFORD ST. PORTLAND, ME 04104

JOB NO: 233035.00
DATE: SEPTEMBER 2021
SCALE: 1"=40'

VEH. 2

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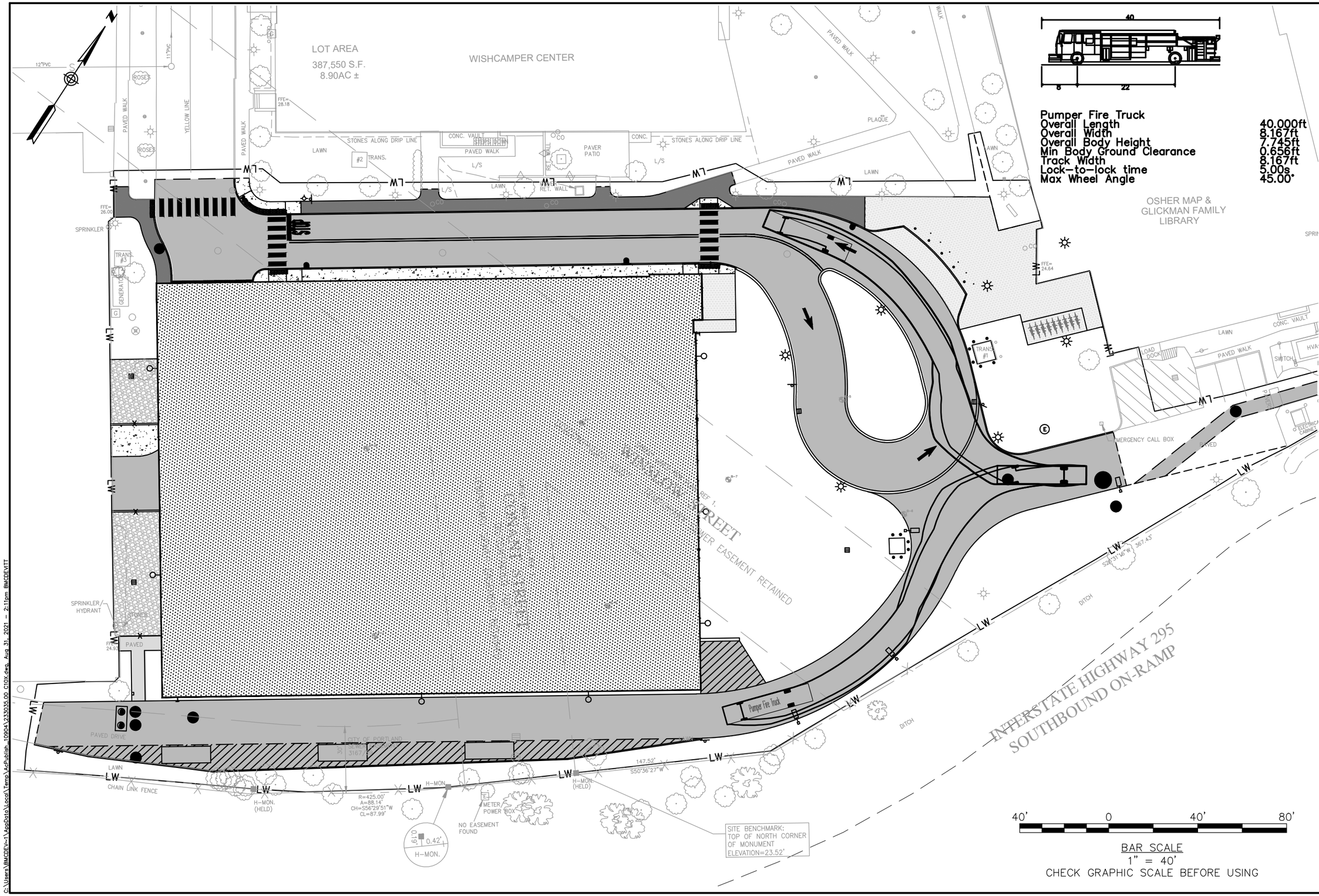

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COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

VEHICLE MOVEMENT FIGURE – 3

DESIGNED BY:	ANL
DRAWN BY:	BCM
CHECKED BY:	DBS
233035.00 C10X.dwg	

UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

USM – STRUCTURED PARKING GARAGE
50 BEDFORD ST. PORTLAND, ME 04104

JOB NO: 233035.00
DATE: SEPTEMBER 2021
SCALE: 1"=40'

VEH. 3

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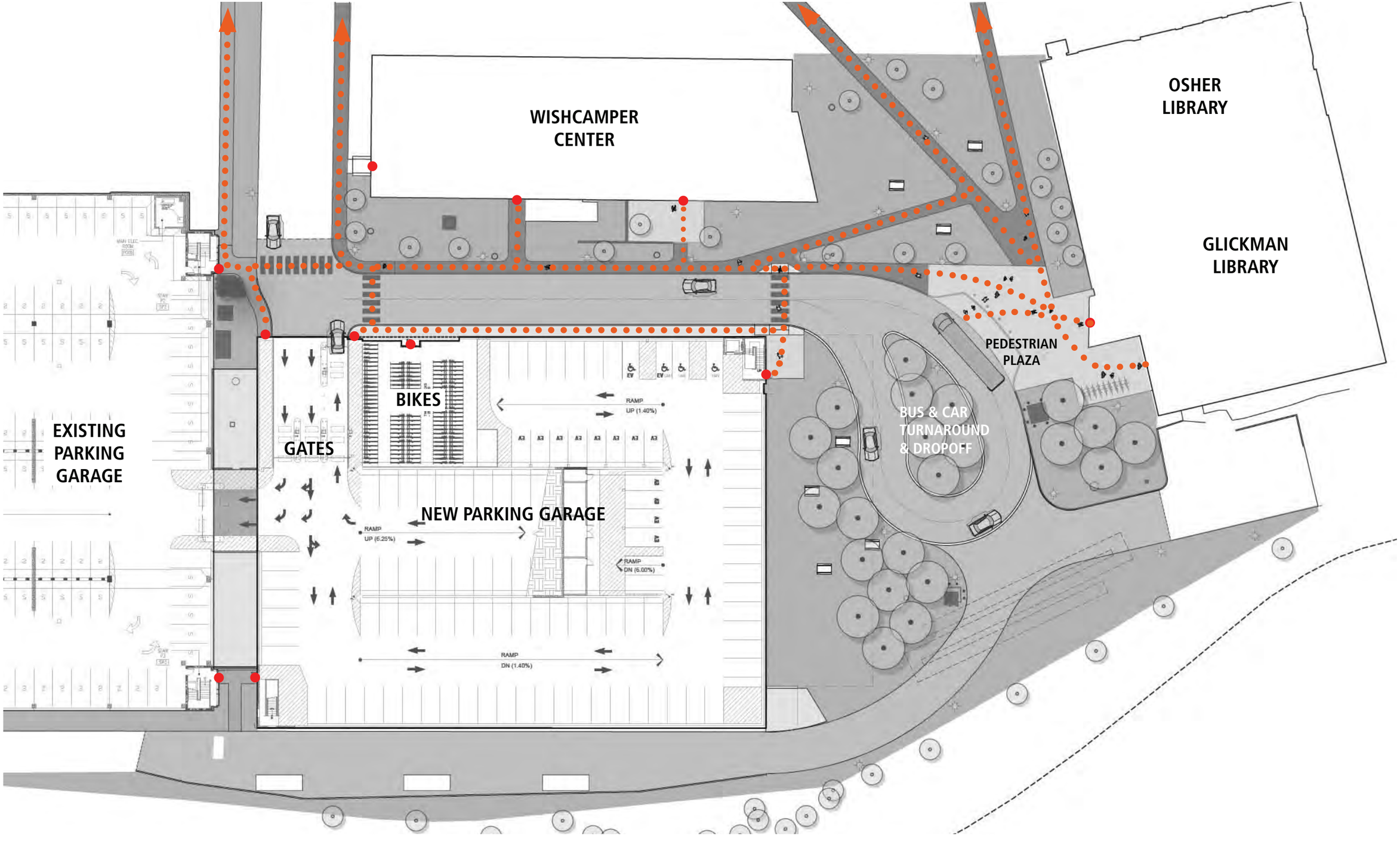

USM PARKING GARAGE: **WISHCAMPER SITE**
Portland, Maine

PEDESTRIAN ROUTES
1 SEPTEMBER 2021
mbla | inc

COMMITMENT & INTEGRITY
DRIVE RESULTS

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WOODARD &CURRAN

September 2, 2021

MEANS Group
Portland Water District
225 Douglass Street
Portland, ME 04104

Re: USM Structured Parking Garage – Request for Evidence of Ability to Serve

To Whom It May Concern:

The University of Southern Maine Portland Campus is proposing to construct a structured parking garage adjacent to the existing garage located at 44 Bedford Street in Portland, Maine. The proposed project will include the construction of a five-level structured parking garage with associated site improvements including lighting, landscaping, utilities, and stormwater management infrastructure. Portions of the existing water services on-site will be displaced to accommodate construction of the garage and its foundation, including a fire hydrant. The garage design includes a 1.5" domestic water service and a dry standpipe and sprinkler system with a Fire Department Connection (FDC) in the northeast corner stairwell. Locations and sizes of proposed water services, hydrant, valves, and service connection are shown on the enclosed Utility Plan. A fixture count spreadsheet is also enclosed to assist in determining peak flow for the site.

Daily use of domestic water is not anticipated for the proposed development. Hose hookups in the garage will facilitate occasional and infrequent garage maintenance. This estimate is based on the preliminary design of the interior layout. We do not anticipate changes that would result in significant water usage increases but will notify the Water District if design development results in any major changes. We have submitted a Major Site Plan Application for the proposed project to the City of Portland Planning Department and would appreciate documentation regarding Portland Water District's ability to serve the proposed development with potable water.

Please let us know if any additional information is required to facilitate your review. We appreciate your assistance and look forward to working with you further. Please do not hesitate to contact me at (207)558-3662 or dstairs@woodardcurran.com.

Sincerely,

WOODARD & CURRAN

Darrin Stairs, P.E.
Project Manager

Enclosure(s) Utility Plan
Fixture Count Spreadsheet

PN: 0233035.00

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Att. R

Via Electronic Mail

September 17, 2021

Jimmy Dealaman, Planner
Planning and Urban Development Department
City Hall, 389 Congress Street, 4th Floor
Portland, Maine 04101

Re: 50 Bedford Street – Response to Wright-Pierce Stormwater Review Comments

Dear Jimmy:

Thank you for coordinating the review of the proposed parking garage located at 50 (44) Bedford Street. We received the September 3, 2021 memo from Wright-Pierce (3rd party peer reviewer); the comments provided by Wright-Pierce are provided below for your reference and our response follows each comment in italics:

September 3, 2021 Memo from Wright-Pierce

Basic Standard

- Erosion and Sedimentation Control best management practices were observed on the Erosion and Sediment Control Plan and associated Details. An Inspection, Maintenance, and Housekeeping Plan has been provided with the erosion details and notes. In general, application of erosion and sedimentation control devices is appropriate. The following items are in need of clarification:
    - Inspection and Maintenance Log should include Oil/Water Separator inspection requirements.
    - Inspection and Maintenance Log should reference the inspector to MaineDEP Stormwater BMP Handbook for engineers and designers (current edition) for a full list of required inspection items.

  RESPONSE: Only flows captured by the garage's interior floor drains will discharge to the proposed oil/water separator; these flows are considered wastewater and will discharge to the combined sewer. Since the oil/water separator will not be treating stormwater, it is not included in the Stormwater Inspection and Maintenance Plan. The proposed oil/water separator will be maintained by USM similar to other oil/water separators on campus. The reference to the MaineDEP Stormwater BMP Handbook has been added to the Inspection and Maintenance Plan and BMP Log.

General Standard

- The applicant has provided an impact analysis to compare pre-development and post-development land use pollutant rankings under MaineDEP redevelopment guidelines. The written analysis indicated that the proposed development had a higher pollutant ranking than the existing site by a magnitude between 0 and 1, and is therefore required to treat 60% of the proposed site's disturbed surface area. A summary of pollutant rankings was provided by the applicant, reviewed, and it is generally agreed that the site required surface runoff treatment for 60% of the disturbed surface area for the proposed project. To help confirm the approach, please provide a brief discussion confirming the specific use of different paved surfaces and the roof area. Please confirm how those values relates to the indicated pollutant rankings for the existing and proposed parking lots and roof areas.

RESPONSE: All impervious areas with uncovered vehicular traffic, including paved parking lot area, drive aisles, fire access road, and driveways were considered Pollutant Ranking 4 – Medium Use Roads/Parking lot in both the pre- and post-development pollutant impact analysis. For the post-development analysis, the garage roof, which consists of uncovered parking spaces, and the drop off pull-out spaces off the loop driveway were also assigned Pollutant Ranking 4 – Medium Use Roads/Parking. Paved and concrete walkways, paver plaza area, pervious pavement, and grassed landscaped areas were considered Pollutant Ranking 2 – Landscaped Area/Paved Walkway.

- High-pollutant surface areas should be prioritized to a practicable extent for stormwater treatment under the redevelopment standard. Please provide a calculation of what percentage of surfaces with a pollutant ranking of 4 are being treated. If there are limitations to treating high-ranked surface areas, please indicate what site limitations would drive this design need.

  RESPONSE: High-pollutant surface areas were prioritized for treatment during design of the stormwater system. Of the 2.37-acre redevelopment area, Pollutant Ranking 4 encompasses 1.72 acres in the post-development condition. Approximately 1.44 acres or 83.5% of Pollutant Ranking 4 area is treated by the proposed subsurface stormwater treatment system. The remaining area is located over the treatment system (4.5% of Pollutant Ranking 4 area), at ground-level between the garages (1%) and along the portion of the fire-access road south of the proposed garage where existing stormwater infrastructure will be preserved (11%).

- An executed maintenance contract for the BMP systems is required. Maintenance agreements may be provided as a condition of approval.

  RESPONSE: Acknowledged.

Porous Pavement, Stormfilter, and Subsurface Storage Design

- Porous pavement design is included within the proposed project. However, the applicant has indicated proprietary devices are being used to meet the Water Quality Design standards, and porous pavement has not been included in the calculations for Treatment Design Calculations section of Appendix B. Please confirm intent of porous pavement on this project.

  RESPONSE: Existing porous pavement sidewalk will be impacted to construct the proposed improvements. Porous pavement was not allocated treatment credit in the Design Calculations because the proposed work will be maintenance and repair of existing porous pavement.

- A letter from the manufacturer is provided stating the StormFilter and storage conduit meets their approval for the specific project. The subsurface alignment is provided to remove a portion of granular solids prior to entering the treatment system.

  RESPONSE: Acknowledged.

- The information provided has indicated the project meets the minimum treatment requirements under Chapter 500. Further review of HydroCAD files will be provided once Department of Public Works clarifies intent and allowable activities for connections to the existing combined sewer system.

  RESPONSE: Acknowledged.

Flooding Standard

- It is understood that these two study points are located in separate watersheds for the proposed project, with one study point leading towards a combined sewer system, and the other conveying flows towards a separated sewer system. As such, the reviewer does not necessarily agree with the statement that the proposed flow rates have the represented net change in the Peak Runoff Rates table as these flow rates are not necessarily additive. The City of Portland Department of Public Works is responsible for issuing certification of any connection to Existing Stormwater Systems. E-mail, or otherwise written, confirmation from the Department of Public Works accepting this connection is requested to confirm that this connection is appropriate under Land Use section (prior number) 14-526 (b) 3 a. (iv); and 14-526 (c) 3 a., as well as adherence to MaineDEP Chapter 500.
    - It is understood the connection to the combined sewer system has not been approved by Public Works at this time.
    - It is appreciated there are two competing design requirements; to both remove stormwater flows to the combined sewer system, and to also meet the requirement to reduce flow rates to each study point. In many ways, these requirements work in opposition to achieve a common goal.
    - There is a potential ability to waive the requirements of the Flooding Standard, governing flow rates to each study point, within the existing codes. This would require the following information:
        - The applicant indicating the storm drainage system ultimately discharges to tidal waterways;
        - The applicant indicating through calculations, or receiving confirmation from the Department of Public Works, to allow an increase for surface water flows to the drainage system in interval rain events as noted in the Land Use Code;
        - The applicant requesting this waiver to discharge to tidal waterways, and having such waiver approved by the City Planning authority.
    - Connection to the existing combined sewer must be coordinated with the Department of Public Works.

  RESPONSE: The design, as proposed, is the result of a specific request of City DPW staff to direct stormwater flows, to the maximum extent possible, to the separated sewer located in Forest Avenue. It is the applicant's understanding that the Forest Avenue storm system has adequate capacity to handle the flows. A revised ability to serve request has been submitted to DPW for review, clarifying the separation of building sewer flows (building floor drains) to the combined sewer system as required by the City of Portland Technical Standards.

Grading and Drainage

- The applicant has indicated Maine Construction General Permit will likely be required for the project due to the extent of disturbed surface area. No further action necessary.

  RESPONSE: Acknowledged.

- Typical details should show a maximum 2% cross-slope for sidewalks, crosswalks, and crosswalk portions of driveways and maintenance entrances. No further action necessary.

  RESPONSE: Acknowledged.

- Further review of grading and drainage, in particular reviewing pipe information for positive flows, will be provided once the City Department of Public Works confirms the approved path forward for the flow rates as mentioned in Section 4 of these comments.

  RESPONSE: Acknowledged.

Utility Connections

- Ability to serve letters have not been provided for utilities impacted by the proposed project, but have been requested by the applicant for applicable utilities. Please confirm these letters will be provided to the Planning Department when received.

  RESPONSE: Water and sewer ability to serve determinations will be submitted to Planning upon receipt.

- Standard design for the electrical utility has been provided. Please confirm intent of infrastructure on the roadway side of fencing. While no work appears to be occurring outside of the property limits, temporary removal of the existing fence may be considered a safety concern to vehicles on the interstate, particularly if new above-ground electrical systems are placed near the property line.

  RESPONSE: The proposed electrical service will be underground from Forest Avenue. Please see sheet ES-100 Electrical Site Plan previously provided.

  The electrical work shown near the property line (adjacent to the I-295 corridor) is a relocated secondary electrical service to the interstate lighting circuit. This work is being coordinated directly with Maine DOT and Central Maine Power.

If you have any questions or require additional information, please do not hesitate to contact me at (207) 558-3662 or by email at dstairs@woodardcurran.com.

Sincerely,

WOODARD & CURRAN INC.

Darrin Stairs, PE
Project Manager

cc: University of Southern Maine

Enclosures:
1. Revised Stormwater Inspection & Maintenance Plan and Inspection Checklist
2. Stormwater BMP Maintenance Log

STORMWATER INSPECTION & MAINTENANCE PLAN

USM Structured Parking Garage, Portland, Maine

General inspection and maintenance during and after construction must take place in accordance with the requirements outlined in Appendix B of the Maine Department of Environmental Protection (MaineDEP) Chapter 500 Rules. Upon completion of the project, the Owner will assume responsibility for overseeing the property, including the inspection and maintenance of the Site's stormwater drainage system and treatment measures outlined herein. A person with knowledge of stormwater management and erosion and sediment control, including the standards and conditions in the permit, shall conduct the inspections and perform maintenance of the facilities. The inspector should refer to the MaineDEP Stormwater BMP Handbook for engineers and designers (current edition) for a full list of required inspection items.

Inspection and maintenance activities will be performed per the attached checklist, schedule, StormFilter guidelines; an example page of the BMP Maintenance Log that shall be kept on-site is also attached.

Storm Drain System

Trash, debris, and sediment shall be removed from storm drain pipes and catch basins as needed on a semi-annual basis. In addition to the inspection and maintenance of stormwater systems, paved areas will be inspected annually each spring. Visual inspections will enable parking areas to be kept clean and clear through periodic sweeping and winter plowing as required. The inspections will also ensure pavement markings are repainted as needed to maintain proper traffic circulation and parking space delineation. Paved areas will be plowed and sanded as often as necessary to maintain public safety. Periodic sweeping of pavement will keep the parking areas clean and will reduce the amount of sediment available to enter the stormwater systems, in turn reducing the need to clean the stormwater systems.

Porous Pavement

Winter maintenance procedures may be problematic (e.g., scraping by plows, clogging by sand, clogging by or inability to treat de-icing chemicals). Snow removal and deicing activities should be done carefully to avoid disturbance to the pavement structure. The plow blade should be raised 1" above the surface or outfitted with a flexible rubber bottom piece. Porous pavement has the potential to become impervious if not properly maintained. Proper maintenance should consist of the following:

- Frequent inspections should be performed during the first few months following construction; the system should inspected routinely on an annual basis thereafter. Inspections should be made after significant storm events to check for surface ponding that could indicate failure due to clogging. Non-routine maintenance may require reconstruction of the surface treatment, and possibly the filter and reservoir layers, to relieve major clogging.
- Prevent sedimentation due to the erosion of areas upgradient of the porous pavement.
- Prevent vehicles with muddy wheels from accessing the porous pavement.
- Sweep, vacuum and/or pressure wash pavement twice annually at a minimum.
- Limit salt use for deicing and do not use sand.
- Remove leaves and organic debris in the fall.
- Measures should be taken to ensure that an area designed to be porous does not receive a future overlay of conventional non-porous paving.

StormFilter System

The StormFilter system must be inspected at least once every six months, and the filters maintained annually per the manufacturer's guidelines, which are outlined in the attached guidance document.

STORMWATER INSPECTION CHECKLIST

Inspection by: _____ Date: _____

Stormwater Management Feature	Condition						Comments
Subsurface Detention System	no siltation		some siltation		heavily silted in		
Subsurface Detention System	no clogging/flooding		some clogging/flooding		heavy clogging/flooding		
Subsurface Detention System	outlet free of erosion		some erosion at outlet		outlet heavily eroded		
Subsurface Detention System	inlet/outlet clear		some debris		completely blocked		
StormFilter System*	Cartridges are in good condition		Cartridges in need of cleaning		Cartridges in need of replacement		
StormFilter System*	no clogging/flooding		some clogging/flooding		heavy clogging/flooding		
Porous Pavement	No sediment or debris accumulation		Some sediment or debris accumulation		Excessive sediment or debris accumulation		
Porous Pavement	Structure is in good condition.		Structure has small visible wear.		Structure has excessive visible wear.		

**See attached manufacturer's guidelines for StormFilter System maintenance and inspection.*
***Refer to the MaineDEP Stormwater BMP Handbook for Engineers and Designers (current edition) for a full list of required inspection items.*

Recommended Actions: _____

_____

Actions Completed: _____ Date: _____

STORMWATER MAINTENANCE TASKS & RECOMMENDED SCHEDULE

TASKS	DETENTION AND STORMFILTER SYSTEM	POROUS PAVEMENT	STORM DRAIN PIPES	SCHEDULE
Inspect for sediment & debris accumulation	X	X	X	Spring and Fall
Remove sediment & Debris accumulation	X	X	X	As needed
Inspect for erosion				As needed
Reestablish vegetation in erosion areas				Early spring
Inspect structural elements during wet weather and compare to as-built plans	X	X	X	Annually
Make adjustments or replacements as determined by wet weather observations	X	X	X	As needed
Keep records of all inspections and maintenance activities	X	X	X	Annually
Have a professional engineer perform emergency inspections upon identification of severe problems	X	X	X	As needed

Stormwater BMP Maintenance Log

BMP Structure	Inspector (Name)	Work Performed	Date Performed	Comments
Pavement Sweeping				
Porous Pavement				
Catch Basins				
CMP System				
StormFilter System				
Other				
Additional Comments:				

The Inspector should refer to the MaineDEP Stormwater BMP Handbook for Engineers and Designers (current edition) for a full list of required inspection items.

COMMITMENT & INTEGRITY
DRIVE RESULTS

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Via Electronic Mail

October 25, 2021

Jimmy Dealaman, Planner
Planning & Urban Development Department
City of Portland
389 Congress Street, 4th Floor
Portland, ME 04101

Re: USM Parking Garage – 50 Bedford Street
Major Site Plan Review (PL-001729-2021) – Supplemental Materials

Jimmy:

Thank you for continuing to coordinate the review of the Site Plan application for the proposed USM Parking Garage located at 50 Bedford Street.

On behalf of the applicant, we are submitting revised materials to the site plan application (PL-001729-2021) as follows:

- Revised Parking Garage size

In addition, we are providing supplemental materials for the following items:

- Proposed TDM Revisions to support the EV Charging Station waiver request
- Response to Planning Board question on landscape plantings between the two garages
- Response to Planning Board question on brick types and colors.
- Ability to Serve Confirmation from Portland Water District

Each of these items is described in more detail below.

1. Revised Parking Garage Size

As discussed in a phone call with planning staff last week, the applicant is reducing the size of the garage, from 631 passenger car spaces to 504 passenger car spaces. This will be accomplished by removing one level. Additionally, a number of compact spaces have been added. The summary of the parking provided in this revised submittal is summarized in the table below:

PARKING SUMMARY – **CURRENT SUBMITTAL**						
LEVEL	STANDARD SPACES 9' x 18'	COMPACT SPACES 8' x 18'	EV SPACES 9'x18'	ADA SPACES	TOTALS (CARS ONLY)	MOTOR-CYCLE SPACES
GRADE	76	9	12	4	101	6
FIRST	96	25	16	3	140	0
SECOND	96	25	16	3	140	0
THIRD (ROOF)	83	25	14	1	123	0
TOTAL	**351**	**84**	**58**	**11**	**504**	**6**

As discussed with planning staff, this reduction in the proposed size of the garage is being made due to new (real-time) information for both parking demand, and supply, on the campus. This is primarily due to the Law School moving off the USM Campus. It remains the intent of the new garage to provide the 396 parking spaces required to meet the Condition of Approval (COA) for Portland Commons (PL-1040-2020). The additional spaces beyond those required to meet the COA, and Campus Parking Inventory changes are explained in the table below:

Proposed Parking Garage and Portland Commons Condition of Approval	
Proposed New Parking Garage	504 spaces[1]
Required to meet the Condition of Approval (Portland Commons)	(396) spaces
Additional Spaces in New Garage After meeting Condition of Approval	**108 spaces**

Campus Parking Inventory Changes	
Additional Spaces in New Garage after meeting COA for Portland Commons (from above)	108 spaces
Displacement due to Siting New Garage on Wishcamper Lot	(207) spaces
Peak Demand Gain in Available Spaces by Law School Move Offsite	152 spaces
Total Net Surplus on Campus	**53**[2]

[1]Six Motorcycle Spaces Planned for New Garage are Additional to the Above Automobile Spaces

[2]Subject to design completion, two additional spaces may be lost in the existing garage adjacent to the proposed exit modifications

The removal of one level of the proposed garage results in new building elevations and floor plans, but all other aspects of the project (building materials, site access and layout, utilities, and stormwater management) remain the same. The attached revised plans (Striping Plans, Building Elevations and Views) depict those changes.

2. Proposed TDM Revisions to support the EV Charging Station waiver request

In order to provide additional assurance that the University will report on EVs and build supply to match demand, the applicant proposes the following revisions to the Transportation Demand Management (TDM) Plan:

In Section 6 "Trip, Parking, Mode Split & GHG Reduction Strategies, p. 39, the narrative under initiative "Build Additional EV Charging Stations" should be replaced with the following: "The University will install additional EV Charging Stations in the parking garage in response to demand until the number of Charging Stations equals 20% of parking spaces in the garage as required by the City of Portland's Technical Manual. The University will endeavor to continue to match demonstrated demand with supply of electric vehicle charging stations, so that demand would not exceed supply."

In Section 7, "Monitoring and Reporting Plan", p. 43, the inclusion of EV ownership would stay in the annual transportation survey, as it is important for GHG calculations, but we would add a new, additional requirement to our annual reporting portfolio to read: "The University will provide an EV Use and Forecast Report to the City on or before June 1st of each year beginning in 2024, summarizing EV ownership and EV charging station use statistics. The Report will also include a proposal regarding the number of EV charging stations for the coming school year, based upon the supply and demand statistics from the previous year. In alignment with the other reporting activities outlined in the TDM plan, the University commits to annual reporting through 2030, the horizon of the Facilities Master Plan, after which a new TDM plan may be proposed."

3. Response to Planning Board question on landscape plantings between the two garages:

At the first Planning Board Workshop, there were questions regarding the consideration of plantings in the space between the two garages. This idea was considered, but USM prefers not to introduce plants/trees to the zone between the two garages for the following reasons:

- There are many utilities in this zone that require access and preclude planting in their footprints
- The zones are surrounded by 36" high concrete barriers to enhance vehicular and pedestrian safety, along with 6' fences at either end. Users will not occupy this space nor have many opportunities to experience the space.
- This narrow gap between two tall buildings experiences limited direct light and is thus a challenging growing situation.
- Maintaining plantings in this zone, which is awkward to access, creates an unnecessary burden for USM facilities department.
- USM security prefers no plantings in this zone for visibility reasons. Evergreen trees would not be a viable option due to security concerns, and deciduous trees, although better, still obscure views and create a maintenance issue.
- USM prefers to maintain this interstitial space as an open ventilated lightwell, with low maintenance inert stone at the ground plane.

4. Response to Planning Board question on brick types and colors.

In response to the questions at the Planning Board Workshop regarding brick types and colors, the applicant offers the following:

Brick selection began with inquiries to Morin LaChance since their products are locally made and of highest quality. They also do not require shipping over long distances and have historically contributed

to the Maine economy and environment. Unfortunately, they do not have any products which meet the dimensional uniformity requirements for being incorporated into precast concrete units.

We subsequently researched available products which meet these criteria and looked closely at a gray brick offered by Glen-Gery. Closer examination showed that brick did not have a desired contrast to the middle portion of the building and gave an impression of a mesh net of an under-scaled texture. In addition, the gray bricks in this manufacturer's offerings are produced at a plant in West Germany.

A red-orange thin brick was included in initial views submitted for City urban design comments. In response, a red-bronze blend was strongly recommended, since most brickwork on campus has this coloration. The brick submitted in the final application has a similar variety of colors, even if the dimensional restrictions for the brick mean that it is not an exact match for the waterstruck brick found on campus and at existing adjacent parking garage. Its most important characteristic, however, is that its blend of tones avoids a "thin" appearance.

5. Ability to Serve Confirmation from Portland Water District

The Portland Water District has acknowledged it ability to serve the project in the enclosed email.

We look forward to moving forward on this matter, and trust that City Staff has the additional information to move forward with a second Planning Board workshop.

If you have any questions or require additional information, please do not hesitate to contact me at 207-558-3662 or email me at dstairs@woodardcurran.com.

Sincerely,

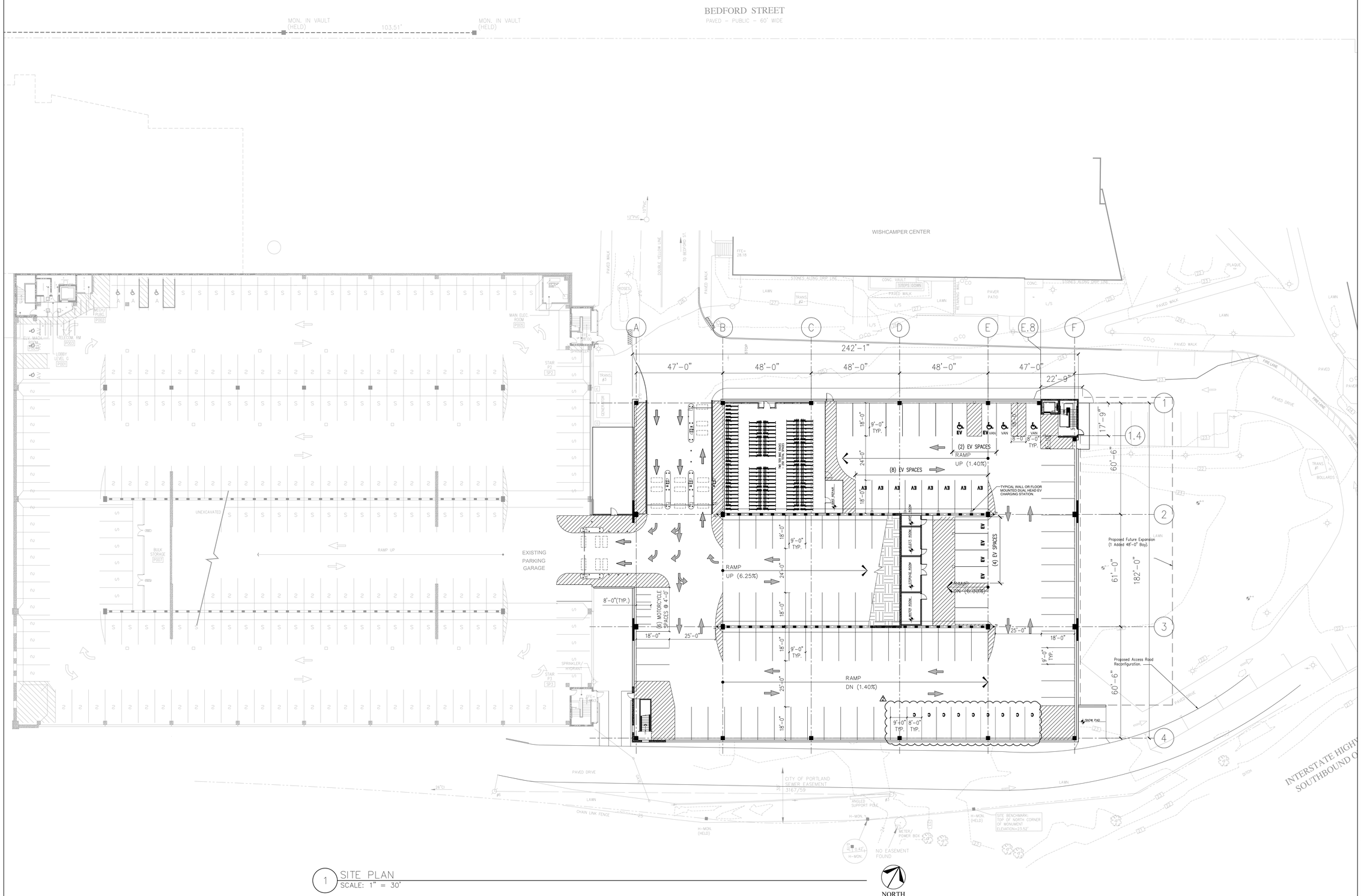
WOODARD & CURRAN, INC.

Darrin Stairs, PE
Project Manager

cc: Ann Witham, USM
Wes Wilson, Desman Design Group

Attachments:
- Plans (uploaded separately to EPlan)
  - Revised Building Striping Plans
  - Revised Building Elevations
  - Revised Building Views
- Ability to Serve email from Portland Water District

PN: 233035.00



1 SITE PLAN
SCALE: 1" = 30'

NORTH

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
1	9/1/21	Response to City Comments
2	10/25/21	Plng Brd W.S. #2 Updates

SUBMISSIONS:

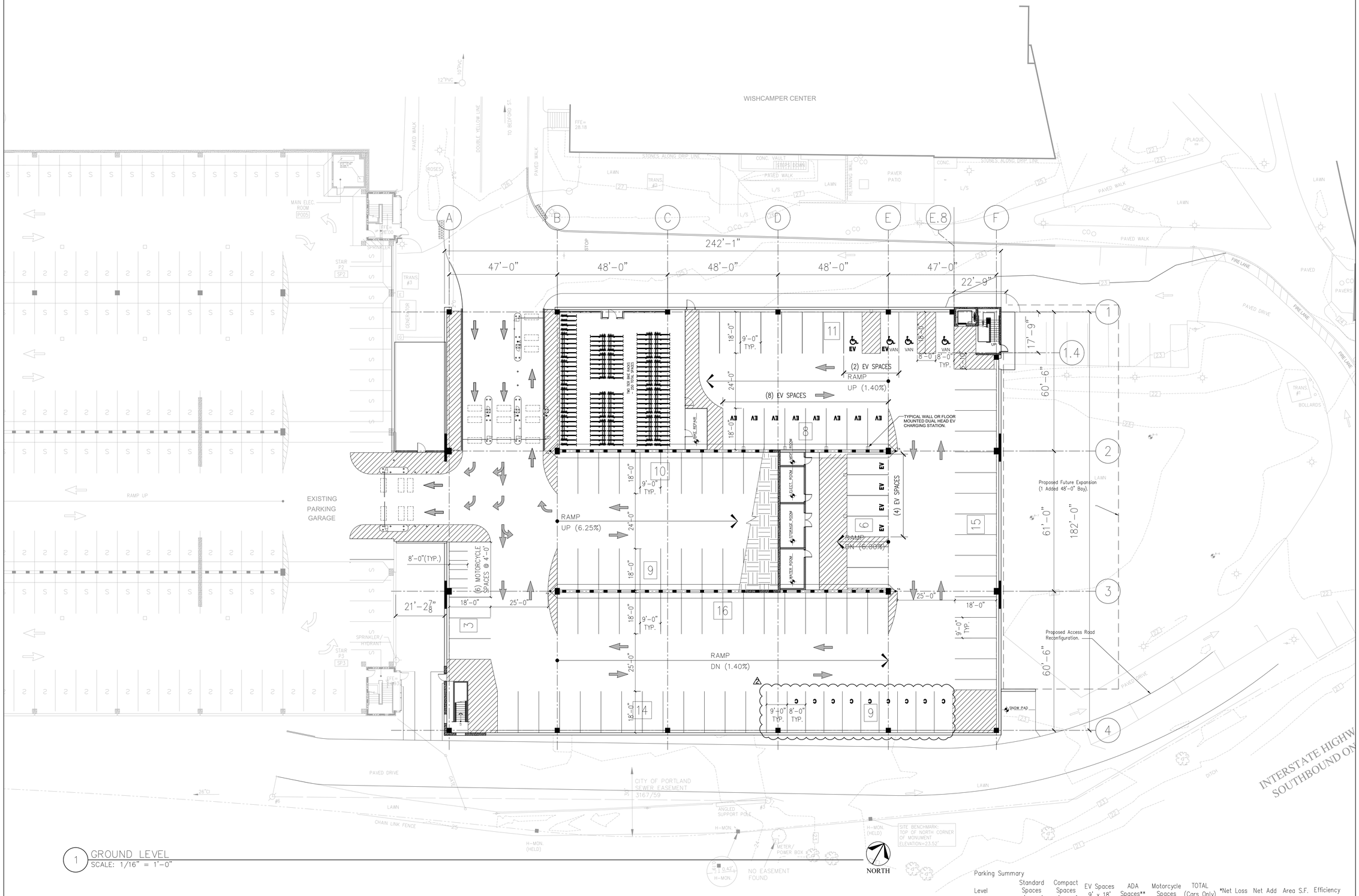
Date	Issued For:
08/09/21	Schematic Design

SCALE	**1" = 20'-0"**
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

SITE PLAN

A-100



1 GROUND LEVEL
SCALE: 1/16" = 1'-0"

Parking Summary

Level	Standard Spaces 9' x 18'	Compact Spaces 8' x 18'	EV Spaces 9' x 18'	ADA Spaces**	Motorcycle Spaces	TOTAL (Cars Only)	*Net Loss	Net Add	Area S.F.	Efficiency
Ground Level (Grade)	76	9	12	4	6	101	−207	−106	45,960	455.0
First Level	96	25	16	3	0	140	0	140	45,090	322.1
Second Level	96	25	16	3	0	140	0	140	45,090	322.1
Third Level (Roof)	83	25	14	1	0	123	0	123	35,710	290.3
Total	351	84	58	11	6	504	−207	297	171,850	341

*Includes loss of stalls in the adjacent parking garage and off-site parking
** ADA Parking Stalls = 2% of 512 Total Spaces = 10.24 = 11

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PROJECT:

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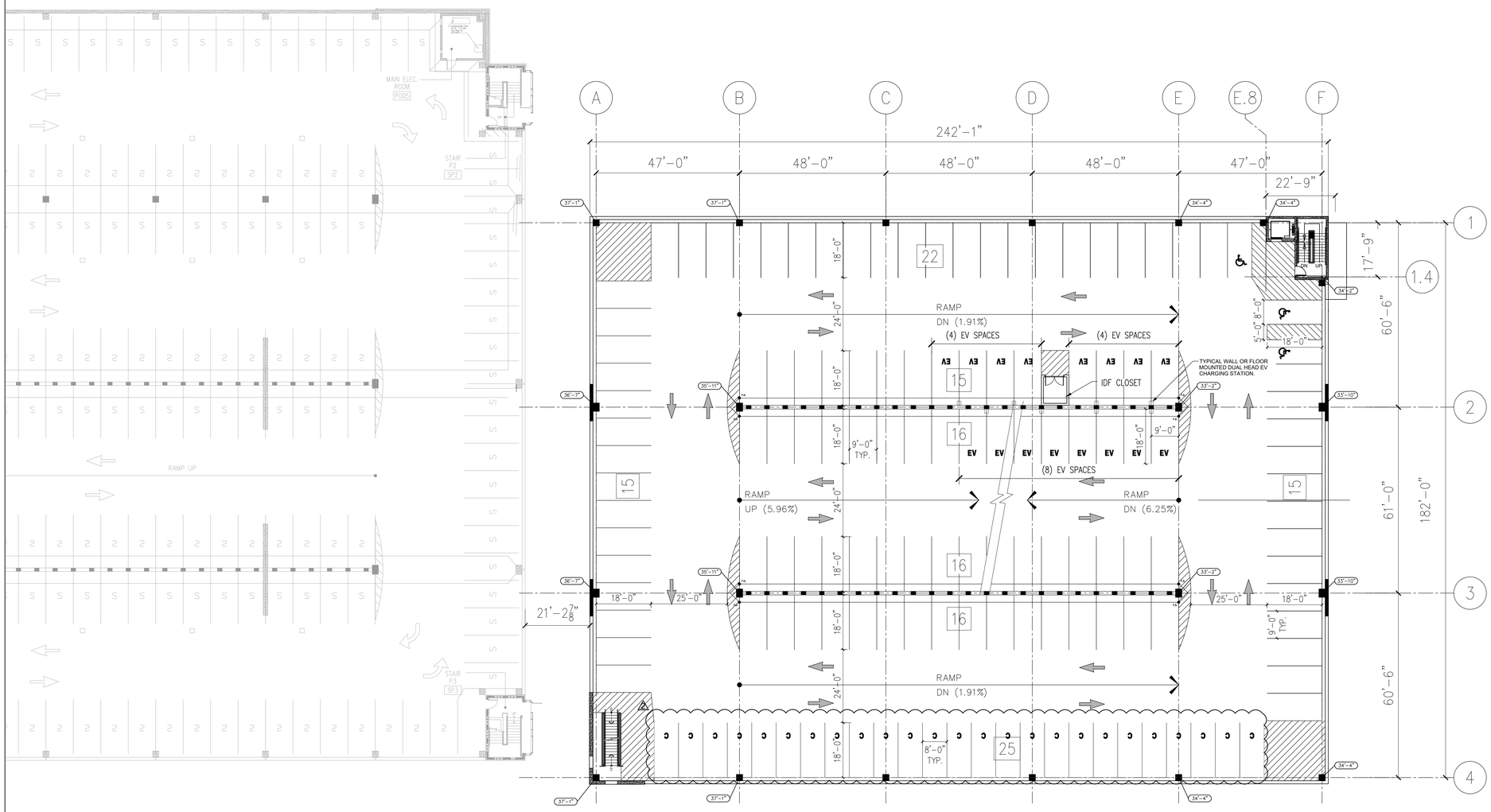
08/09/21	Schematic Design

SCALE **1/16" = 1'-0"**
DATE ISSUED **08/31/2021**
PROJECT NO **20-20145.00-1**
DRAWN BY **C.M.**
CHECKED BY **B.F.**

SHEET TITLE:

GROUND LEVEL STRIPING PLAN

A-101



1 FIRST LEVEL
SCALE: 1/16" = 1'-0"

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08/09/21	Schematic Design

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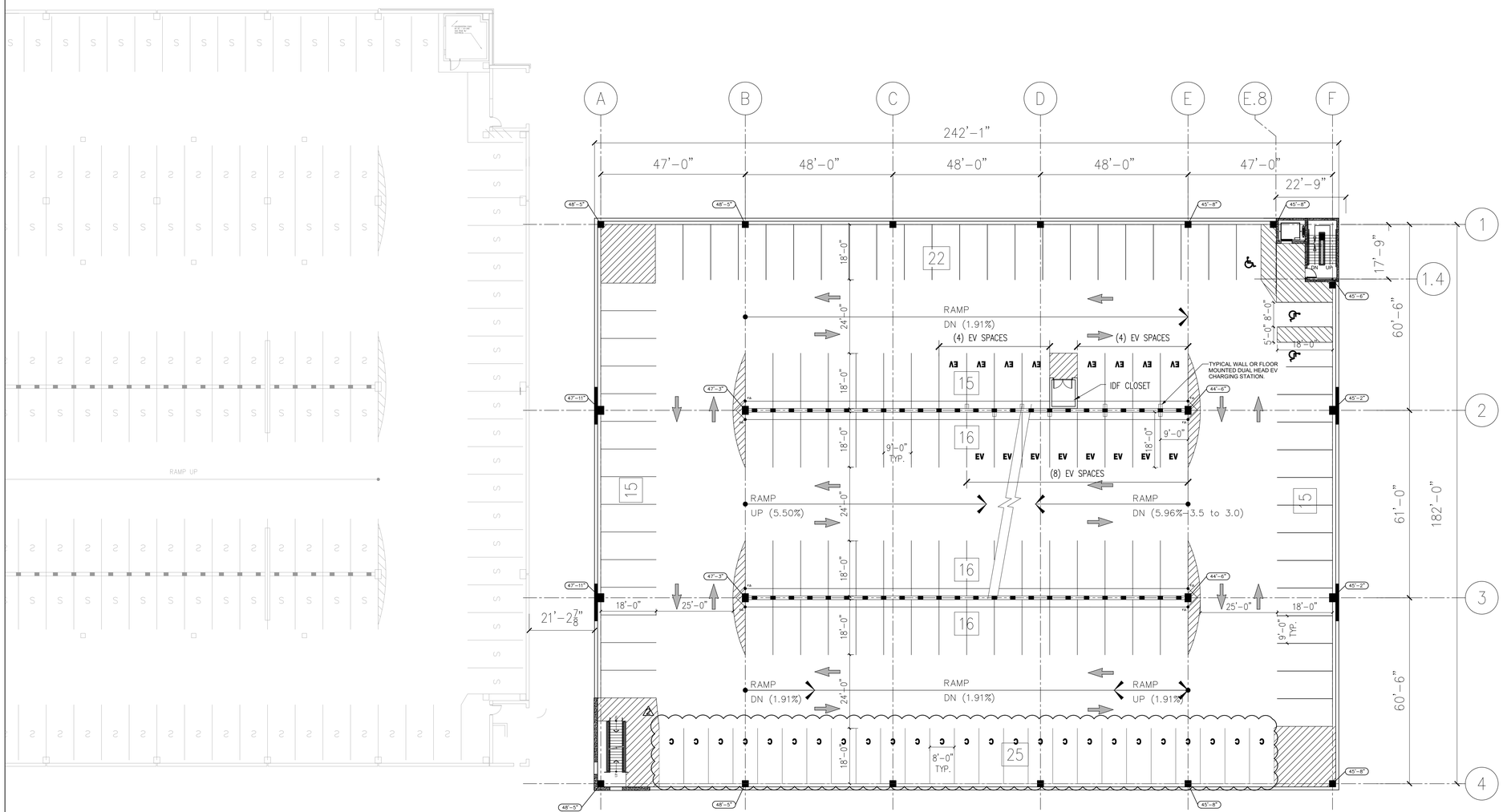
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

FIRST LEVEL STRIPING PLAN

A-102



1 SECOND LEVEL
SCALE: 1/16" = 1'–0"

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SUBMISSIONS:

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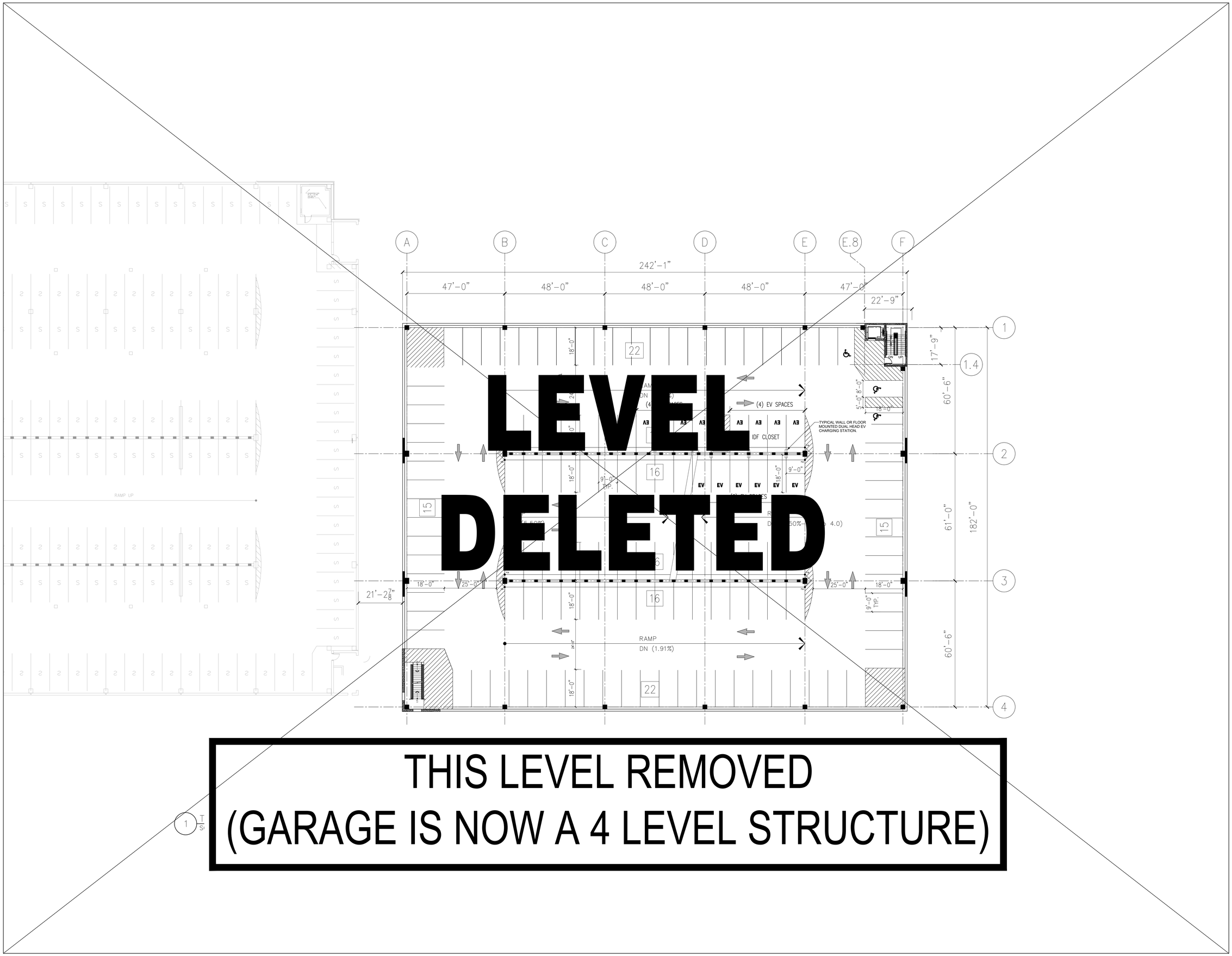
08/09/21	Schematic Design

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

SECOND LEVEL STRIPING PLAN

A-103



THIS LEVEL REMOVED
(GARAGE IS NOW A 4 LEVEL STRUCTURE)

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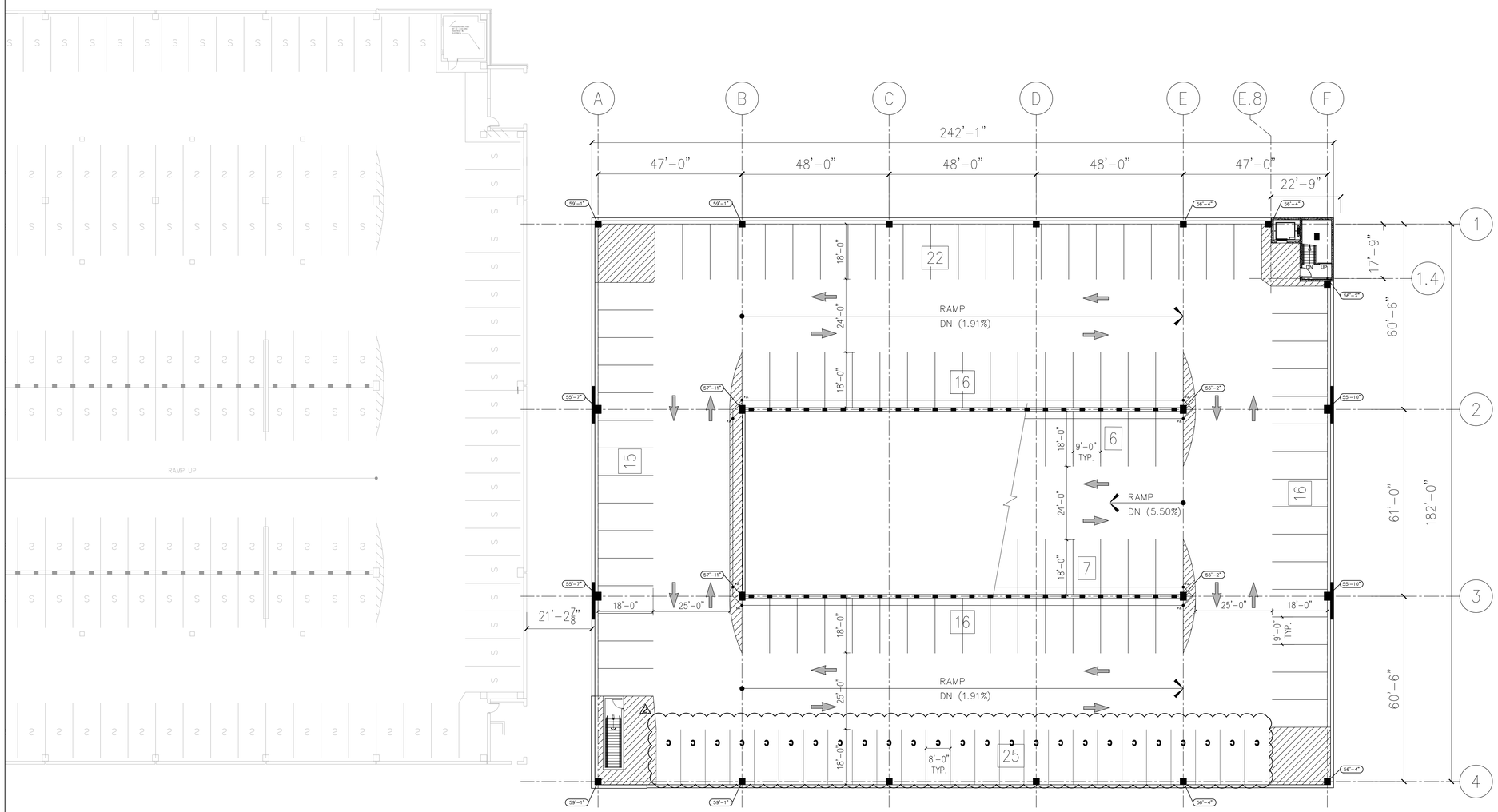
08/09/21	Schematic Design

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

THIRD LEVEL STRIPING PLAN

A-104



1 ROOF LEVEL
SCALE: 1/16" = 1'-0"

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BURLINGTON, VT 05403

COST ESTIMATOR
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94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
1	9/1/21	Response to City Comments
2	10/25/21	Ping Brd W.S. #2 Updates

SUBMISSIONS:

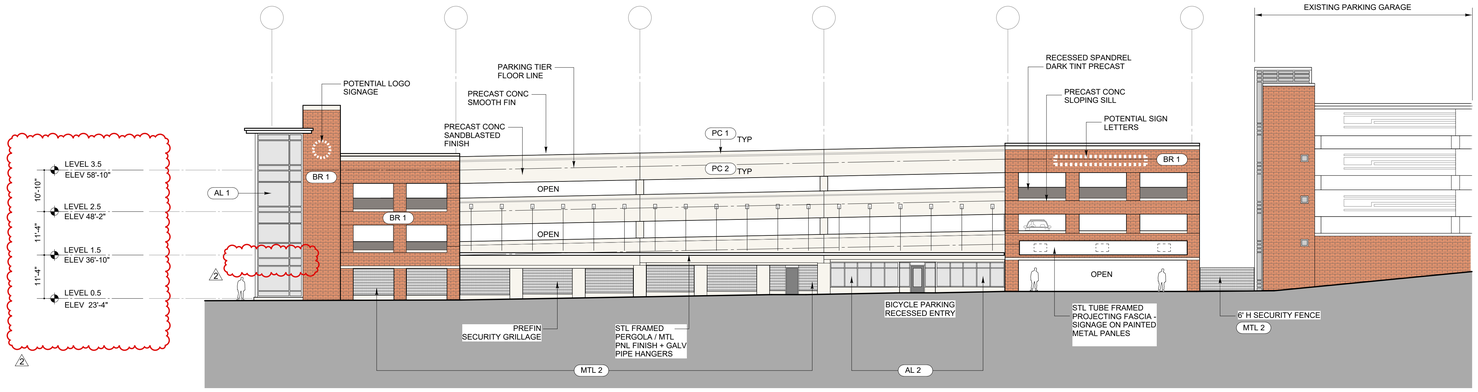
Date	Issued For:
08/09/21	Schematic Design

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

ROOF LEVEL STRIPING PLAN

A-105

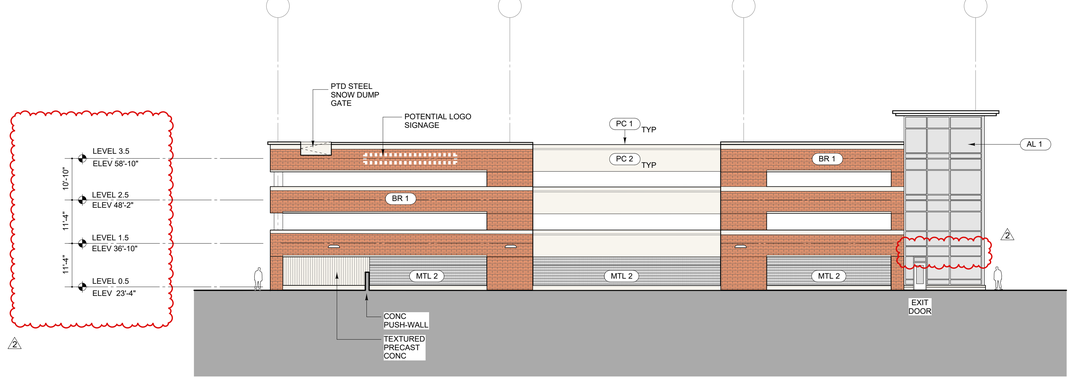


NORTH ELEVATION

1/16" = 1' - 0"

1 ADDED:
- SECURITY FENCE BETWEEN EXISTING AND NEW GARAGE
- RECESSED ENTRY TO BIKE STORAGE
- GLAZED ALUM STOREFRONT AT BIKE STORAGE
- PIERS TO SUBDIVIDE BAYS AT GROUND LEVEL
- STEEL PERGOLA IN LIEU OF FULL CANOPY
- EXTENDED GLASS AT EAST STAIR TO GRADE LEVEL
- ALUM SUNSCREEN FEATURE AT EAST STAIR

2 DELETED:
- ONE PARKING TIER
- ALUM SUNSCREEN FEATURE AT EAST STAIR



EAST ELEVATION

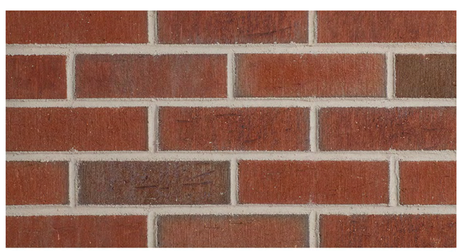
1/16" = 1' - 0"

1 • DELETED CANOPY
* ADDED ALUM SUNSHADE FEATURE

2 • DELETED ONE TIER AND ALUM SUNSHADE



SECURITY BAR GRATING - MTL 2



BRICK - BR 1
GLEN-GERY 387 RUSTIC RED

MATERIALS LEGEND

KEY	MATERIAL	NOTES
AL 1	ALUMINUM CURTAINWALL	CLEAR ANODIZED / UN-TINTED GLASS
BR 1	BRICK	THIN BRICK INTEGRAL TO PRECAST
MTL 1	SECURITY FENCING	BLACK VINYL-COATED CHAIN LINK
MTL 2	SECURITY BAR GRATING	2" x 5" OPENING / BLACK PREFINISH
MTL 3	PAINTED STEEL	FLUSH PANEL
PC 1	PRECAST CONCRETE	SMOOTH FINISH
PC 2	PRECAST CONCRETE	MEDIUM SANDBLASTED FINISH

2 REVISED MATERIAL

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

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LANDSCAPE ARCHITECT
MICHAEL BOUCHER
LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
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MEP/FP ENGINEER
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PROJECT:

USM - Structured Parking Garage

Address
44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
1	09/07/21	Response to City Comments
2	10/25/21	Plng Brd W.S. #2 Updates

SUBMISSIONS:

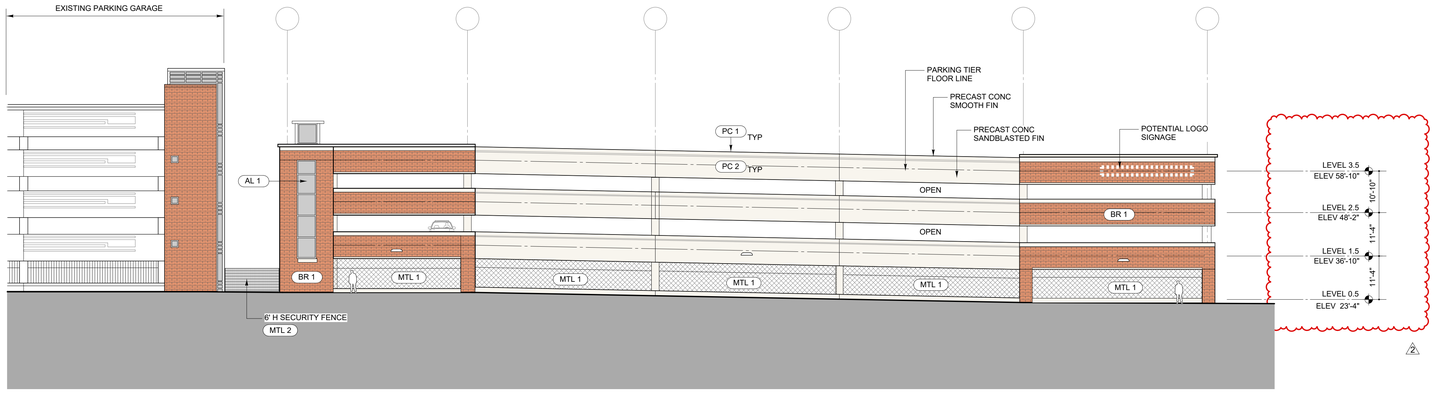
Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

SHEET TITLE:

Building Elevations

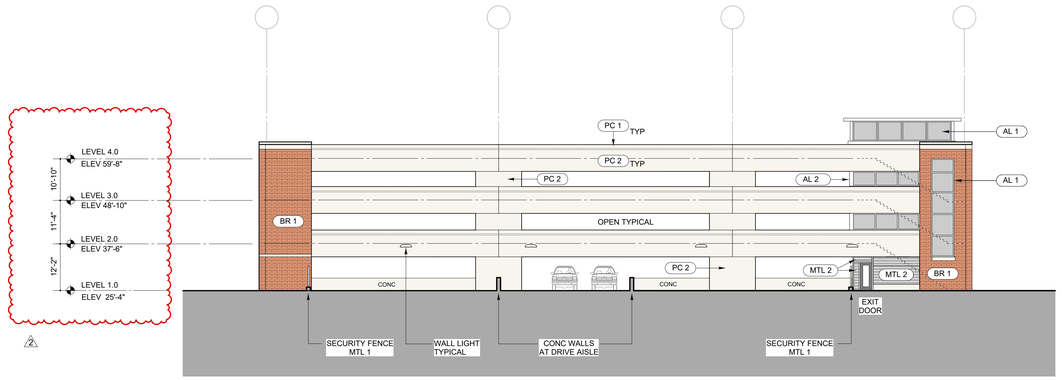
A - 200



SOUTH ELEVATION

1/16" = 1' - 0"

2 DELETED ONE PARKING TIER
VINYL COATED CHAIN LINK FOR OPENINGS INFILL



WEST ELEVATION

1/16" = 1' - 0"

1 • WALL LIGHTS CALLED OUT
• CONCRETE KNEEWALLS ADDED
• SOUTHWEST STAIR ENCLOSURE MODIFIED
• PIERS TO SUBDIVIDE BAYS AT GROUND LEVEL
• STEEL PERGOLA IN LIEU OF FULL CANOPY
• EXTENDED GLASS AT EAST STAIR TO GRADE LEVEL
• ALUM SUNSCREEN FEATURE AT EAST STAIR

2 DELETED ONE PARKING TIER

MATERIALS LEGEND

KEY	MATERIAL	NOTES
AL 1	ALUMINUM CURTAINWALL	CLEAR ANODIZED / UN-TINTED GLASS
BR 1	BRICK	THIN BRICK INTEGRAL TO PRECAST
MTL 1	SECURITY FENCING	BLACK VINYL-COATED CHAIN LINK
MTL 2	SECURITY BAR GRATING	2" x 5" OPENING / BLACK PREFINISH
MTL 3	PAINTED STEEL	FLUSH PANEL
PC 1	PRECAST CONCRETE	SMOOTH FINISH
PC 2	PRECAST CONCRETE	MEDIUM SANDBLASTED FINISH

2 REVISED MATERIAL

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

7/2/2021 3:16:33 PM

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CIVIL ENGINEER
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PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER
LANDSCAPE ARCHITECTURE

457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING

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2021

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SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

SHEET TITLE:

Building Elevations

A - 501



OVERVIEW

2 ONE TIER DELETED



BEDFORD STREET VIEW

2 ONE TIER DELETED



GARAGE ENTRANCE

1 DESIGN REVISIONS

2 ONE TIER DELETED

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SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE
DATE ISSUED 07/30/2021
PROJECT NO 20-20145.00-1
DRAWN BY
CHECKED BY

SHEET TITLE:

Building Views

A - 202

7/2/2021 3:16:33 PM



STAIRWAY ENTRANCE

1 DESIGN REVISIONS
2 ONE TIER DELETED



BICYCLE ROOM ENTRANCE

1 DESIGN REVISIONS
2 ONE TIER DELETED

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
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PROJECT TEAM:

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2021

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Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

SHEET TITLE:

Building Views

A - 203

From: Robert Bartels <rbartels@pwd.org> on behalf of AMaP MEANS <means@pwd.org>
Sent: Friday, October 8, 2021 1:57 PM
To: Darrin Stairs
Cc: Amy LeBel; Adam Sellick
Subject: RE: 509089-44 Bedford Street, PO

Hello Darrin,

Based on the information provided, the existing **6-inch domestic service** with **2-inch meter** should be able to handle the water demand at the site. As part of this approval, and in accordance with PWD's Cross Connection Control Program, an approved **Reduced Pressure Zone Assembly (RPZ) backflow prevention device** must be installed on the new domestic service branch to the proposed parking garage directly after the service entrance prior to service activation. Please refer to the PWD website for more information on cross-connection control policies.

PLEASE NOTE: The following conditions apply to your project:

- One (1) private fire hydrant may be installed on the fire service on this site. Please refer to the PWD website for more information regarding private hydrant inspection policies. A service application will be required to take a deposit for the inspection of the private hydrant. PWD is currently only processing service applications via email, and accepting completed applications with payment by the drop box at our main office or through the mail at PO Box 3553, Portland, ME 04104-3553. To begin the service application process, please contact the MEANS department at MEANS@pwd.org or by phone at (207)774-5961 Ext. 3199.

Please feel free to reach out if you have any questions.

Thanks,

From: Darrin Stairs <DStairs@woodardcurran.com>
Sent: Wednesday, October 06, 2021 9:27 AM
To: Robert Bartels <rbartels@pwd.org>
Cc: Amy LeBel <alebel@woodardcurran.com>
Subject: RE: 509089-44 Bedford Street, PO

ATTENTION: This email did NOT originate from Portland Water District. This email is from an external source outside of the District. Exercise EXTREME caution when opening external attachments or links from unknown senders.

Robert – Here is the corrected plan. Thank you for pointing that out.

Thank you,

Darrin
Darrin B. Stairs, PE
Project Manager
Woodard & Curran
Direct: 207.558.3662
Cell: 207.405.4805

From: Robert Bartels <rbartels@pwd.org>
Sent: Thursday, September 23, 2021 4:09 PM
To: Darrin Stairs <DStairs@woodardcurran.com>
Cc: Amy LeBel <alebel@woodardcurran.com>
Subject: RE: 509089-44 Bedford Street, PO
Darrin,
You are showing the domestic service coming off the fire line and not the domestic service line. I know this is a small error but it should be shown accurately. Please revise and resubmit.
Thanks,

From: Darrin Stairs <DStairs@woodardcurran.com>
Sent: Wednesday, September 22, 2021 3:31 PM
To: Robert Bartels <rbartels@pwd.org>
Cc: Amy LeBel <alebel@woodardcurran.com>
Subject: RE: 509089-44 Bedford Street, PO
ATTENTION: This email did NOT originate from Portland Water District. This email is from an external source outside of the District. Exercise EXTREME caution when opening external attachments or links from unknown senders.
Robert – we have revised the plan to include the notes below. Please see attached.
Thank you and please let me know if you need anything futher.
--Darrin
Darrin B. Stairs, PE
Project Manager
Woodard & Curran
Direct: 207.558.3662
Cell: 207.405.4805

From: Robert Bartels <rbartels@pwd.org>
Sent: Thursday, September 9, 2021 2:08 PM
To: Darrin Stairs <DStairs@woodardcurran.com>
Subject: 509089-44 Bedford Street, PO [Filed 13 Sep 2021 12:39]
Darrin,
A couple things for you. There is a meter pit on the domestic service line. It is located about 6' from the street line gate valve (between the arrows and the gas line on your plan). You can see the meter pit in Google street view.
The hydrant will be private. Please indicate the hydrant is a private hydrant on the plans.
The garage service will require an RPZ backflow preventer at the service entrance (no meter is required on this service). Please add a callout on the plans for an RPZ backflow preventer.
Thanks,
Robert Bartels, PE

Robert Bartels

Senior Project Engineer

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

Via Electronic Mail

November 9, 2021

Jimmy Dealaman, Planner
Planning & Urban Development Department
City of Portland
389 Congress Street, 4th Floor
Portland, ME 04101

Re: USM Parking Garage – 50 Bedford Street
Major Site Plan Review (PL-001729-2021) – Supplemental Materials

Jimmy:

On behalf of the applicant, we are providing the following supplemental materials in support of this application:

- Proposed Addendum to the Transportation Demand Management (TDM) plan
- Updated USM Section 7 document
- Updated Section 7 Appendices

We look forward to moving forward on this matter, and trust that City Staff has the additional information to move forward with a second Planning Board workshop on November 23rd.

If you have any questions or require additional information, please do not hesitate to contact me at 207-558-3662 or email me at dstairs@woodardcurran.com.

Sincerely,

WOODARD & CURRAN, INC.

Darrin Stairs, PE
Project Manager

cc: Ann Witham, USM
Wes Wilson, Desman Design Group

Attachments:
- Proposed Addendum to the Transportation Demand Management (TDM) plan
- Updated USM Section 7 document
- Updated Section 7 Appendices

PN: 233035.00

Addendum to University of Southern Maine Portland Campus Transportation Demand Management (TDM) Plan

11-9-2021

The changes below represent modifications to the plan due to changes in the University's structured garage proposal and other dynamic changes (internal & external to USM) that have occurred over the last 12 months. These include:

- The University siting the proposed structured parking on the Wishcamper lot
- Maine Law School moving off campus
- The University downsizing the proposed size of the structured parking, as a result of the Maine Law School move and feedback received from the Planning Board
- The City of Portland adding a requirement for electric vehicle charging stations to its Technical Manual

Mobility Context, Section 2-

The following updates are made to the parking lots represented in Figure 7 on page 16. The figure represented the lots on November 11th, 2021. These updated figures are current as of November 9th, 2021:

- The Woodbury lot - 130 spaces were displaced due to construction of the residence hall and Career & Student Success Center ("CSSC")
- The Facilities lot - 41 spaces were displaced due to construction of the residence hall and CSSC
- The Heat Plant lot - 21 spaces will be reduced to 15 spaces due to construction of the residence hall and CSSC
- The Brighton Ave lot- 26 spaces were displaced from the City roundabout project
- The Wishcamper lot -91 spaces are proposed to be displaced from the new parking garage at this location

TDM Coordinator, Section 4-

The roles of the two point people from the University have been changed, in part to help support the TDM effort:

- The University's TDM Coordinator will still be Aaron Witham, whose new title is Director of Sustainability. The inclusion of TDM duties into his new job description demonstrate the University's commitment to TDM success.
- The supporting role will now be an Associate Vice President of Administration position, rather than Director of Auxiliary Services. This change also represents an increase in focus and attention to transportation matters.

Transportation Demand Reduction Goals, Section 5-

Trip Reduction Goal- This goal stays the same because even though the structured parking will be located in a different area, the trips are not created by the garage, and thus don't change

as a result of location. Even though trips from the Law School won't happen anymore, VHB thought it would be best to be conservative and not deduct those trips from our analysis, so that we can ensure that the traffic mitigation measures proposed are overly sufficient.

Parking Demand Reduction Goal-
The goal remains a 10-14% reduction at the hour of peak demand. The gross number translation, however, changes from the published 159-222 vehicles to 144-201, to reflect a loss of Maine Law School demand in the campus-wide base demand number.

GHG Reduction Goal-

The goal of 20% reduction in GHG emissions from transportation remains the same, as it is a per capita goal, not impacted by the size of the population. How the University plans to achieve this goal is constantly evolving based on the proportion of electric vehicle commuters and based on fuel economy standards, both of which are impacted as much or more by evolving national forces, as they are by University policies.

Summary of Targets-

TDM Plan: Baseline Data, Targets & Monitoring/Reporting

Date of TDM Plan: 11-3-2020				11-4-2021 Addendum
Provide Data in Percentages and Absolute Numbers, where applicable		*Baseline Data (at time of TDM plan adoption*	*TDM Plan Reduction Target (if applicable)*	*Current Reporting Period Data*
Vehicular Trips	*Off-Peak*	N/A	N/A	Report forthcoming in 2024
	AM Peak Hr	581	3-6% (17-35 trips)	Report forthcoming in 2024
	PM Peak Hr	381	3-6% (12-23 trips)	Report forthcoming in 2024
Mode Split (future data may be reported as	*Single-Occupancy Vehicle*	75%	70%	Report forthcoming in 2024

SOV & Non-SOV)	*Non-SOV*	25%	30%	Report forthcoming in 2024
	Carpool	8%	Not specific	Report forthcoming in 2024
	Bicycle	*11% (shared with walk)	Not specific	Report forthcoming in 2024
	Walk	*11% (shared with bike)	Not specific	Report forthcoming in 2024
	Transit	6%	Not specific	Report forthcoming in 2024
On-site Parking (Peak)		Was 1,587 (adjusted to 1,435)	10-14% (144-201)	Report forthcoming in 2024
GHG Emissions Targets		2 MT of CO2e per capita	20% (or .4 MT of CO2e per capita)	Report forthcoming in 2024
Other:_____				

*Adjusted On-site parking number is due to deducting Maine Law School from total demand in the baseline, so that the TDM reduction target accounts for the change in actual conditions on the ground

Trip, Parking, Mode Split & GHG Reduction Strategies, Section 6-

The existing strategy, "Build Additional EV Charging Stations" is clarified to mean the University will endeavor to match demonstrated demand with supply of electric vehicle charging stations, so that demand would not exceed supply.

A year into strategizing implementation of our TDM plan, we have adjusted some launch dates. Some have adjusted to earlier and some later. Please see new launch dates written in red in the table below.

Table 3: Overview of TDM Initiatives for USM

STRATEGY	LAUNCH DATE	INFRASTRUCTURE	INCENTIVES	EDUCATION
Walking				
Create Walk Spot Maps	Fall 2023			X
Publicize the "Complete City Project"	Spring 2022			X
Hold Fitness Challenges	Spring 2022		X	
Biking				
*Co-launch City Bikeshare	Spring 2023	X		
Build Bicycle Repair Station	Spring 2023	X		X
Promote Local Bike Activities	Spring 2022		X	X
Offer Discounted Bike Supplies	Fall 2022		X	
*Improve Bike Infrastructure	Spring 2023	X		
Apply for Bike Friendly University Certification	Fall 2022	X	X	X
Transit				
*Continue METRO Pass Program	Ongoing	X	X	
Propose Husky Line Improvements	Fall 2023	X		
Propose Transit Service Expansion Beyond Husky Line	Spring 2022	X		
Install Transit Screen	Spring 2023	X		
****Carpooling, Telecommuting & Time-of-Day***				
Establish Vanpool Vehicles	Fall 2022	X	X	
Designate Carpool/Vanpool Spaces	Fall 2022	X	X	

Develop Rideshare Matching Platform	Fall 2022	X		
Promote Telework & Flexwork	Ongoing		X	X
Restructure Course Schedule	Ongoing	X		
Parking Pricing				
Establish Commuter Parking Buyout Program	Fall 2022		X	
*Establish Residential Parking Buyout Program	Fall 2023		X	
Host Carshare Program to Support Buyouts	Spring 2023	X	X	
*Unbundle Student Parking Fees	Fall 2022		X	X
Build Additional EV Charging Stations	Spring 2023	X		
Review Parking Price Levels	Fall 2022		X	
Communications & Marketing				
*Hold New Student & Employee Orientations for Transportation	Spring 2022		X	X
*Revise Transportation Website	Fall 2021			X
*Publish Access Guide	Fall 2021			X
Offer Guaranteed Ride Home Service	Spring 2023		X	

*Core strategies that the University is committing to are indicated by *. In the case of the Carpooling, Telecommuting & Time-of-Day category, the category itself is considered core, but the University will maintain flexibility in which of these strategies it implements, depending on future conditions

Monitoring and Reporting Plan, Section 7-

Inclusion of EV ownership would stay in the annual transportation survey, as outlined on page 43. This is important for GHG calculations.

In addition to the survey data, the University will provide an EV Use and Forecast Report to the City on or before June 1st of each year beginning in calendar year 2024, summarizing EV ownership and EV charging station use statistics. The Report will also include a proposal regarding the number of EV charging stations for the coming school year, based upon the supply and demand statistics from the previous year. In alignment with the other reporting activities outlined in the TDM plan, the University commits to annual reporting through 2030, the horizon of the Facilities Master Plan, after which a new TDM plan may be proposed.

University of Southern Maine

Traffic Movement Permit

Revised Section 7

Proposed Residence Hall, Student Center, and Parking Garage

November 2021

Introduction

VHB has conducted a technical analysis in support of a Traffic Movement Permit (TMP) modification for development of a new residence hall and Student Center on the University of Southern Maine (USM) campus. Although in the approved TMP for Project ID PL-001040-2020, a parking garage was not the primary subject of the permit application, for the purposes of the traffic analysis, the proposed parking garage location was situated off of Falmouth Street. Anticipated new trips to and from the campus were assumed to utilize the new parking garage structure.

The proposed location of the parking garage has since been relocated as a response to neighborhood feedback and a site evaluation process. The locations of the 580-bed residence hall and Student Center that were previously permitted have not changed. The new parking garage will now be located adjacent to the existing parking structure on campus with joint access to and from Bedford Street. As a result, the traffic that had previously been assigned to the garage on Falmouth Street will instead access the proposed parking structure location on Bedford Street. This traffic was redistributed across the adjacent street network and reevaluated to assess the resulting traffic impacts.

Future Conditions

The future traffic conditions in the study area were analyzed with the proposed project in place and compared to the conditions outlined in the TMP traffic analysis. The TMP future traffic volumes and intersection operations for the future horizon year of 2028 were analyzed for the Build condition, with the parking garage located off of Bedford Street. The results for the Base condition, with the parking garage located off of Falmouth Street, were included as previous permitted.

Infrastructure Improvements

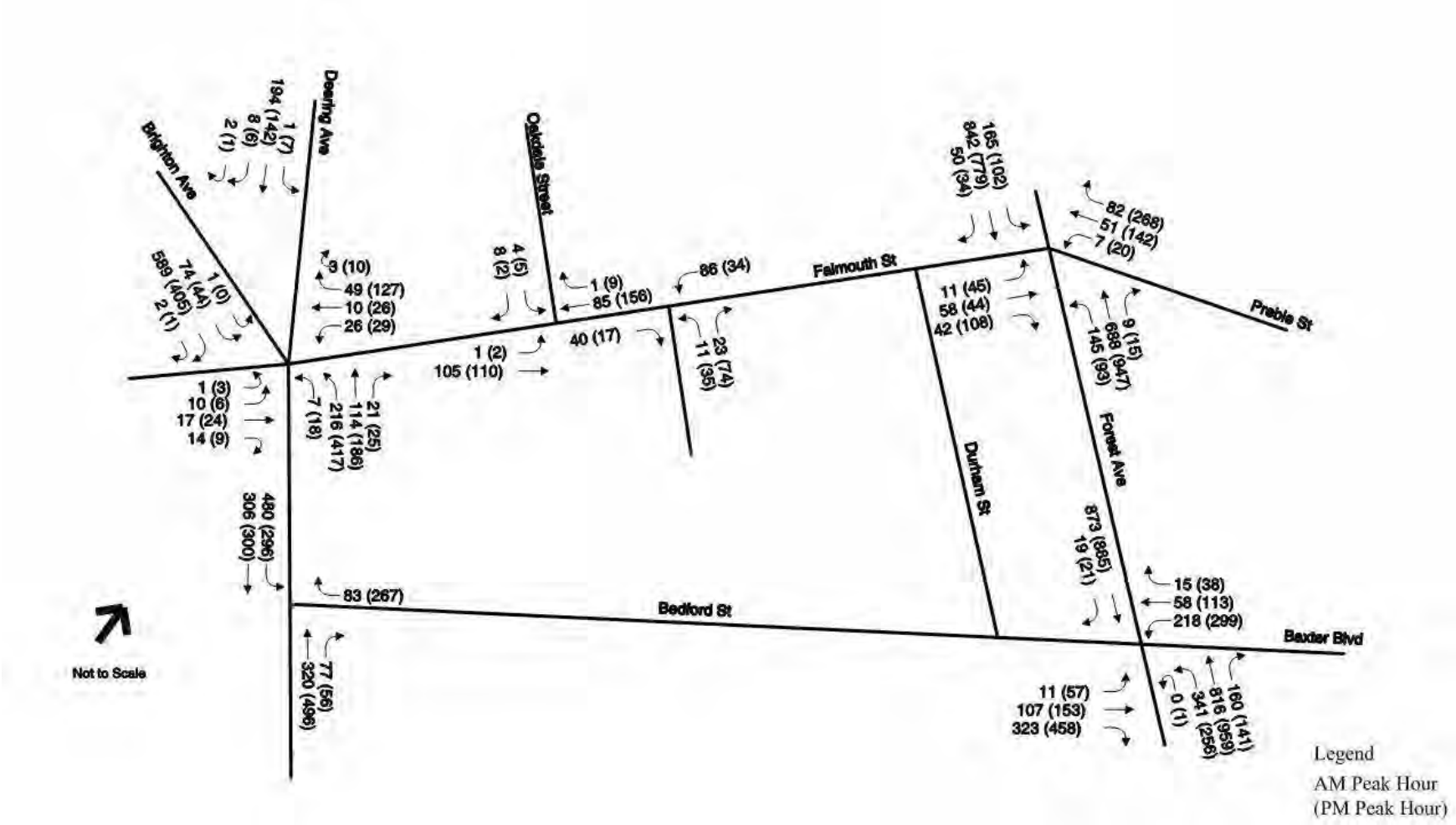
Construction of a roundabout at the intersection of Falmouth Street, Brighton Avenue and Deering Avenue is currently being completed. As such, the TMP permit traffic analysis as well as the traffic analysis for the current garage location on Bedford Street both include a completed roundabout at this location.

The traffic volume data collected at the intersection of Falmouth Street, Brighton Avenue and Deering Avenue was redistributed to represent the volumes that will exist at the five-leg roundabout in the future, rather than the current six-leg condition.

Baseline Traffic Conditions

The TMP traffic analysis included a one percent per year background traffic growth rate, the traffic associated with identified projects in the area, and the trip generation associated with the growth anticipated on campus assigned to a parking garage on Falmouth Street. The resulting traffic networks from the 2028 TMP Build conditions serve as the baseline condition for this analysis, as illustrated in Figure 1.

Figure 1. 2028 Base Network (TMP Condition with garage on Falmouth Street)



In anticipation of the proposed garage location on Bedford Street with access to and from the parking garage via Surrenden Street and Winslow Street, baseline data for the intersections would be necessary. The existing parking garage is the primary purpose for trips into or out of either Surrenden Street or Winslow Street. Therefore, data from the existing garage was representative of the entering and exiting movements at these two intersections with Bedford Street. As such, the peak AM and peak PM enters and exits to the existing garage were used as the basis for the baseline turning movements at the intersections.

The peak periods of the adjacent roadway network were reviewed for a three-day garage activity report counted from October 21, 2019 through October 23, 2019 to identify the peak AM and peak PM garage enters and exits. The time period was consistent with the campus-wide parking study which noted 90% occupancy of the parking garage. The AM peak hour had 474 enters and 9 exits and the PM peak hour had 70 enters and 309 exits. These data were distributed on to the network on Bedford Street based on the distributions for the study and adjusted to reflect the directional distribution noted in Bedford Street counts. Additional volumes were added at the intersection of Bedford Street and Winslow Street to address imbalances in the network and the drop off and pick up trips associated with the Wishcamper Center and Glickman Library. The figure outlining the raw garage count data and the adjustments the data for the intersections of Bedford Street with Surrenden Street and Winslow Street is included in the appendix.

Trip Generation Reassignment

To determine the impact of the proposed garage location, VHB reassigned the trips destined for the proposed parking garage from the location on Falmouth Street to the location on Bedford Street. As a reminder, based on industry standards and MaineDOT guidance, the number of new peak hour trips anticipated with the growth in enrollment is 160 trips (125 in and 35 out) in the highest AM peak hour and 160 trips (51 and 109 out) in the highest PM peak hour with no adjustments for the high portion of transit trips to and from the campus. It is important to note that existing campus mode shares are already high and with additional Transportation Demand Management initiatives, the number of students and employees walking, biking, riding transit, or carpooling is expected to rise. To remain conservative, the trip generation for this analysis was not reduced to reflect the existing or anticipated mode split based on TDM measures.

In order to confirm that the trips estimated based on the anticipated growth in enrollment represents the anticipated trips at a garage on this campus, an addition analysis was conducted. At the completion of this Section 7, the proposed garage was anticipated to accommodate approximately 631 parking spaces which would have consisted of 396 parking spaces associated with the residence hall and an additional 325 spaces that will accommodate parking spaces relocated from elsewhere on campus (ie. lots closed for development of campus center and residence hall as well as parking at Wishcamper center). Although it is likely that many of the trips relocating from Wishcamper parking are accounted for in the 2019 adjusted volumes, in the event that these are new commuter trips, the anticipated impact was calculated.

The 2019 trip rate at the existing garage was 0.42 trips per parking space during the AM peak hour and 0.33 trips per parking space during the PM peak hour. As the proposed non-residential spaces will likely follow the commuter student pattern of the existing garage, these rates were applied to the 236 non-residential spaces in the proposed garage resulting in 99 AM peak hour trips and 78 PM peak hour trips. Subtracting these commuter trips from the proposed total proposed garage trip generation of 160 trips during each the AM and PM peak hour results in the residential portion of the garage generating 61 AM peak hour trips and 79 PM peak hour trips. The trip rate associated with these residential spaces is 0.15 trips per parking space during the AM peak hour and 0.20 trips per parking space during the PM peak hour. It is reasonable that the residential spaces would result in only 35% of the

trips a commuter space would generate during the AM peak hour. The PM peak hour rate for the residential spaces would calculate to 60% of the trips associated with a commuter space. These ratios reflect what is likely an overestimate of the trips that will be generated by a residential student. Therefore the trip generation calculated by ITE appears to be conservative when compared to the trip patterns of the existing garage. With the reduction in parking spaces associated with the removal of a garage level, the ITE trip generation based on enrollment is a highly conservative estimate of the likely trips to the proposed garage.

The proposed trips to and from the existing Bedford Street garage were added to the 2028 baseline networks to determine the 2028 Build networks. The trip reassignment based on the new proposed garage location is shown in Figure 2. The resulting 2028 Build networks for the TMP Modification are shown in Figure 3.

Figure 2. Redistribution of Trip Generation based on Proposed Parking Relocation

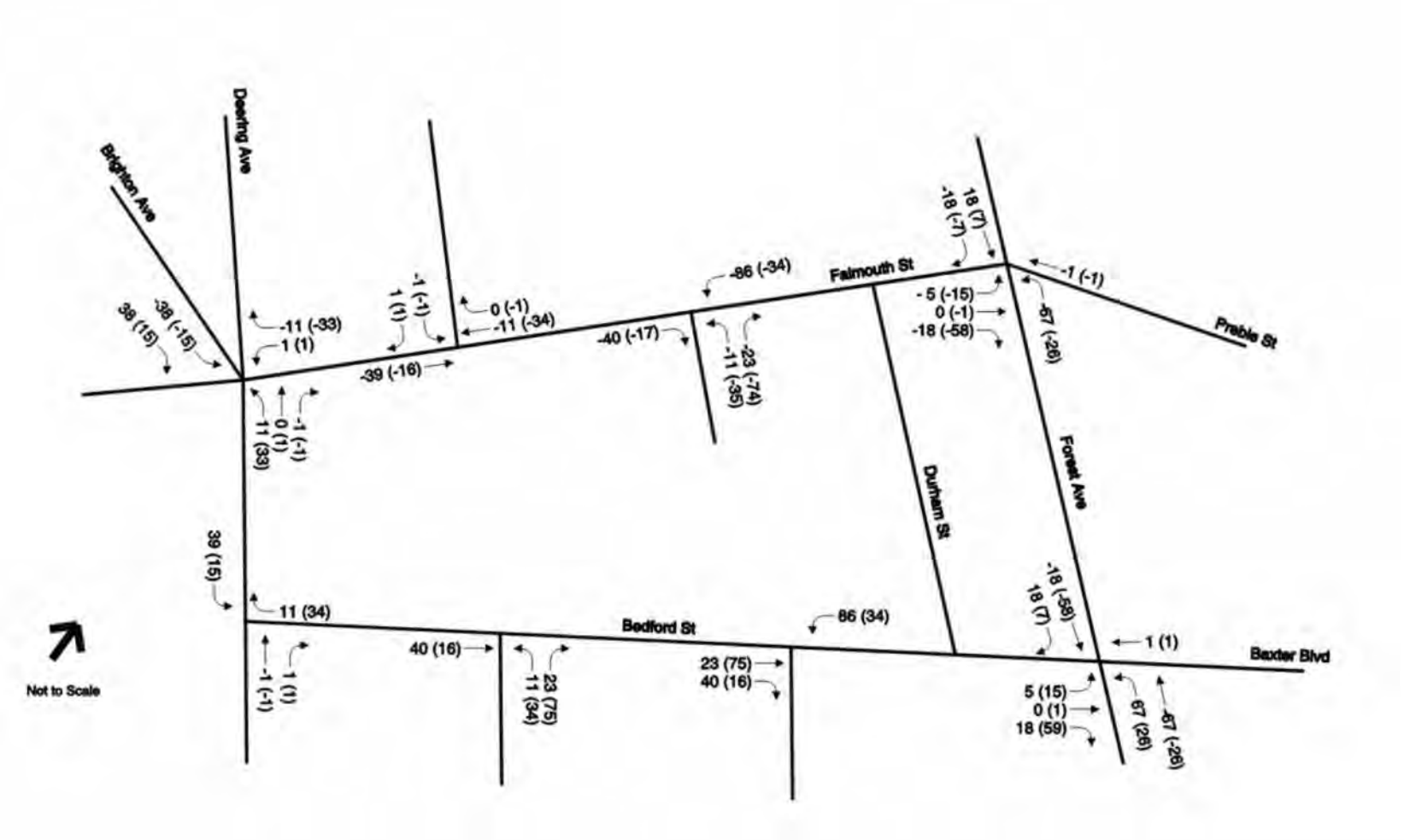
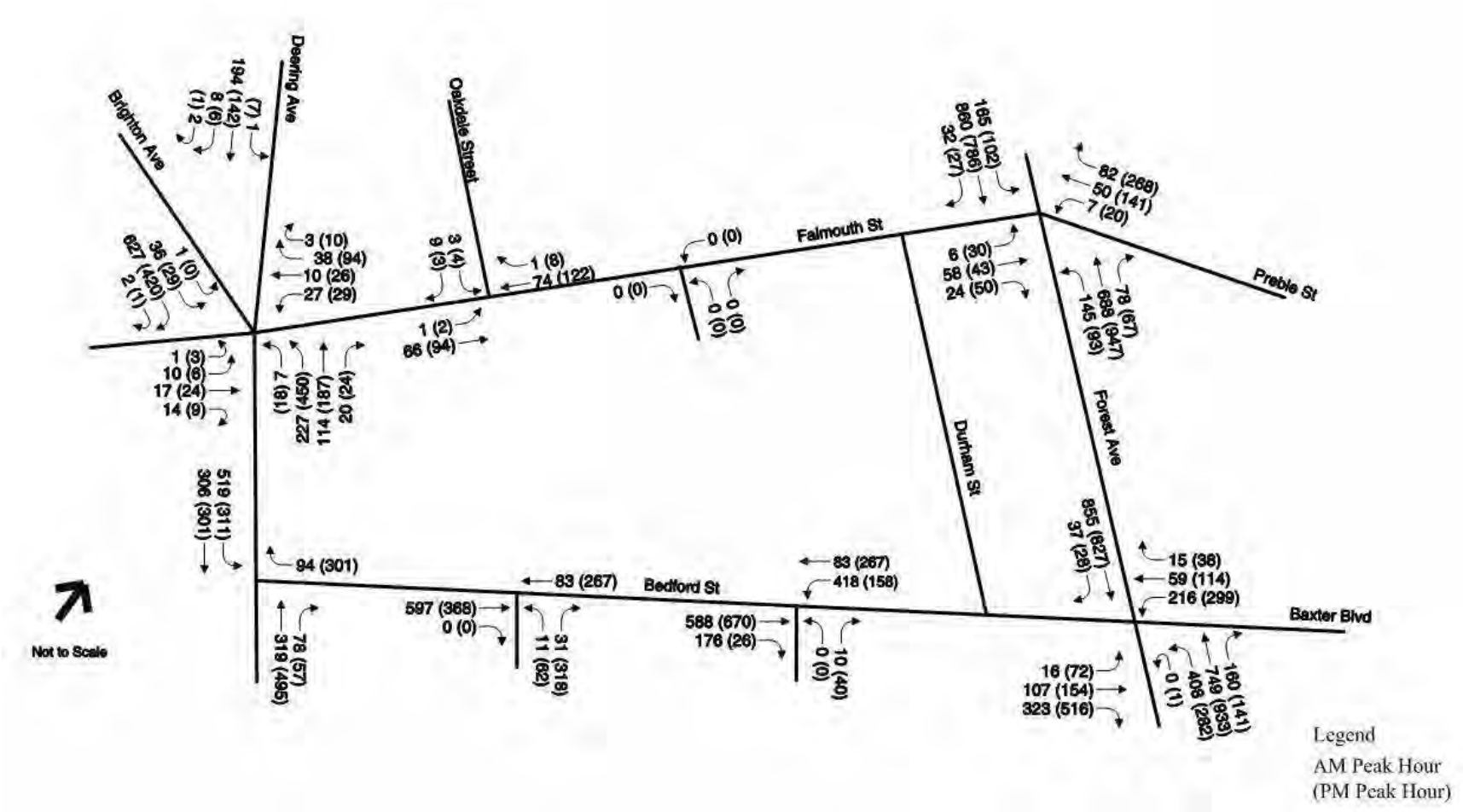


Figure 3. 2028 TMP Modification Build Condition Traffic Volumes



TRAFFIC ANALYSES

Intersection Capacity Analyses

Intersection capacity analyses were performed for the study area intersections consistent with the traffic analysis provided in the TMP traffic analysis. Levels of service (LOS) were calculated based on the criteria published in the *2000 Highway Capacity Manual*.[1] Level of service is the term that defines the conditions that may occur on a given roadway or at an intersection when accommodating various traffic volume loads. Levels of service range from A to F with LOS A representing generally free flowing operating conditions and LOS F representing generally congested conditions. Synchro 10 was used to determine the LOS at signalized intersections and Sidra Intersection 8 was used to determine the LOS at the proposed roundabout. Copies of the LOS calculations are provided in the Appendix.

Synchro Analysis

Table 1 summarizes the operational analysis at the signalized study area intersections during the 2028 weekday AM and PM peak hours under Base (Falmouth Street garage) and Build (Bedford Street garage) conditions. As shown, the intersection of Forest Avenue at Falmouth Street is expected to operate at LOS B/C in 2028. The redistribution of some trips away from this intersection was anticipated to reduce the overall delay at the intersection by just over two seconds in the AM peak hour and by less than a second in the PM peak hour compared to the already permitted Base condition. It is noted that based on each movement at the intersection, there are three movements that consistently operate at LOS E regardless of the garage site. This includes the southbound left movement in the AM and PM peak hour, which consistently experiences delay at LOS E including in the existing condition. In the PM peak hour, the eastbound and westbound left movements additionally operate consistently at a LOS E including in the existing condition. Ensuring that the adaptive signal control at this intersection is operating properly will help to optimize the conditions throughout the day and likely result in improved service and reduced delay for the legs of the intersection experiencing delays at LOS E.

The signalized intersection of Forest Avenue at Bedford Street is expected to operate at LOS D in 2028 both in the Base condition and the Build condition. With the relocation of the parking garage to the Bedford Street site, it is anticipated that the overall delay at the intersection will increase by approximately seven seconds in the AM peak hour and only about 2 seconds in the PM peak hour. Even in the No Build condition, without project traffic, two of the left turning movements at this intersection are currently operating at LOS E/F. A closer look at the movements at the intersection reveal that the westbound left and northbound left will continue to operate at LOS E/F in the 2028 Build condition regardless of the garage site, with the exception of the AM peak hour condition where the northbound left and southbound through will tip just past the threshold delays to LOS F and LOS E, respectively. The optimization possible through the adaptive signal control system in place at the intersection will help to ensure that these movements, serving two of the three heaviest volume movements at the intersection, are served optimally throughout the day.

Based on the impact associated with the new garage location trips at the intersection of Forest Avenue at Bedford Street and Baxter Boulevard, potential improvements were investigated. Pedestrian accommodations are being improved at this location by USM as a part of the permit condition for the residence hall and student center. However, vehicular delays will also be impacted. As such, it will be imperative that the adaptive signal control system is

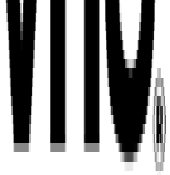
[1] Highway Capacity Manual, Federal Highway Administration, Transportation Research Board, 2000.

operating optimally. Adjustments to the detection and parameters of the system as these changes are adopted will ensure that the adaptive signal system is capturing all of the information it needs to optimize service to each movement at the intersection.

Table 1. Signalized Intersection Operation Summary

Intersection		2028 Base (Falmouth Site)				2028 Build (Bedford Site)			
Peak Hour	**SL^**	**v/c+**	**Delay***	**LOS****	**Queue**	**v/c+**	**Delay***	**LOS****	**Queue**
Forest Avenue at Falmouth Street/Preble Street									
AM Peak Hour									
Falmouth Avenue, EBLT	210	0.40	52.0	D	87	0.38	51.4	D	82
Falmouth Avenue, EBR	150	0.18	1.2	A	0	0.10	0.6	A	0
Preble Street, WBLT	630	0.29	48.9	D	79	0.3	49.3	D	78
Preble Street, WBR	630	0.17	4.8	A	28	0.17	4.9	A	28
Forest Avenue, NBL	200	0.57	39.8	D	190	0.37	36.1	D	114
Forest Avenue, NBT/TR	700	0.36	8.0	A	292	0.36	7.5	A	141
Forest Avenue, SBL	150	0.69	58.9	E	193	0.69	58.9	E	193
Forest Avenue, SBT/TR	250	0.51	15.5	B	347	0.47	12.8	B	306
Overall		**0.69**	**19.7**	**B**		**0.69**	**17.6**	**B**	
PM Peak Hour									
Falmouth Avenue, EBLT	210	0.74	73.4	E	119	0.74	73.0	E	119
Falmouth Avenue, EBR	150	0.36	9.0	A	31	0.36	9.0	A	31
Preble Street, WBLT	630	0.66	56.6	E	187	0.66	56.6	E	186
Preble Street, WBR	630	0.59	28.8	C	186	0.59	28.8	C	186
Forest Avenue, NBL	200	0.31	25.3	C	m87	0.25	25.6	C	m62
Forest Avenue, NBT/TR	700	0.47	4.5	A	41	0.47	4.7	A	49
Forest Avenue, SBL	150	0.54	74.7	E	m119	0.54	74.7	E	m119
Forest Avenue, SBT/TR	250	0.43	10.9	B	126	0.4	9.9	A	126
Overall		**0.74**	**19.3**	**B**		**0.74**	**18.9**	**B**	
Forest Avenue at Bedford Street/Baxter Blvd									
AM Peak Hour									
Bedford Street, EBLT	530	0.43	45.4	D	143	0.46	46.5	D	149
Bedford Street, EBR	375	0.54	20.3	C	220	0.53	19.5	B	220
Baxter Blvd, WBL	140	0.86	76.0	E	#318	0.86	76.0	E	318
Baxter Blvd, WBT	690	0.10	22.3	C	58	0.10	22.4	C	58
Baxter Blvd, WBR	75	0.03	0.1	A	0	0.03	0.1	A	0
Forest Avenue, NBL	1000+	0.88	67.2	E	#443	0.97	82.4	F	565
Forest Avenue, NBT/TR	1000+	0.57	17.6	B	318	0.53	16.7	B	287
Forest Avenue, SBT/TR	700	0.95	52.4	D	#529	1.01	67.1	E	530
Overall		**0.95**	**39.5**	**D**		**1.01**	**45.8**	**D**	
PM Peak Hour									
Bedford Street, EBLT	530	0.69	52.9	D	253	0.75	56.9	E	#280
Bedford Street, EBR	375	0.78	33.3	C	421	0.88	42.3	D	#557
Baxter Blvd, WBL	140	1.14	139.5	F	#466	1.14	139.5	F	#466
Baxter Blvd, WBT	690	0.18	20.6	C	95	0.18	20.5	C	96
Baxter Blvd, WBR	75	0.07	1.0	A	3	0.07	1.0	A	3
Forest Avenue, NBL	1000+	0.94	88.3	F	#392	1.06	116.9	F	#445
Forest Avenue, NBT/TR	1000+	0.74	25.6	C	456	0.73	25.3	C	438
Forest Avenue, SBT/TR	700	0.98	52	D	#534	0.92	42.3	D	#484
Overall		**1.14**	**50.1**	**D**		**1.14**	**51.9**	**D**	

^ Storage length measured in feet, length of turning lane or distance to adjacent intersection
+ Volume to capacity ratio
* Delay expressed in seconds per vehicles
** Level of Service
Queue measured in feet
95th percentile volume exceeds capacity, queue may be longer
m 95th percentile queue is metered by an upstream signal



SimTraffic Analysis

In addition to the Synchro Analysis, the City of Portland has requested the analysis results calculated by the simulations of the network. The simulations were observed and modified to reflect the operation of the Forest Avenue corridor with the Adaptive Traffic Signal system in place. Table provides the delays and queues reported from the simulation for the signalized intersections. As shown, the delays at the Forest Avenue intersections fall into range associated with poor levels of service but some of this is due to the simulation requiring vehicles to move into a lane early in anticipation of the ramp downstream. The delays reported are significantly longer than observed in the simulation.

Table 2. Signalized Intersection Operation Summary – SimTraffic Analysis

Intersection		2028 Build (Falmouth Site)			2028 Build (Bedford Site)		
Peak Hour	SL^	Delay (sec/veh)	LOS	95th Percentile Queue (ft)	Delay (sec/veh)	LOS	95th Percentile Queue (ft)
Forest Avenue at Falmouth Street/Preble Street							
AM Peak Hour							
Falmouth Avenue, EBLT	210	52.0	D	119	48.1	D	92
Falmouth Avenue, EBR	150	31.3	C	71	19.6	B	46
Preble Street, WBLT	630	50.6	D	70	51.4	D	78
Preble Street, WBR	630	6.8	A	32	5.5	A	37
Forest Avenue, NBL	200	35.7	D	193	40.2	D	102
Forest Avenue, NBT/TR	700	4.1	A	101	9.9	A	163
Forest Avenue, SBL	150	251.9	F	288	62.2	E	214
Forest Avenue, SBT/TR	250	360.1	F	1559	47.1	D	656
Overall		**135.2**	**F**		**29.6**	**C**	
PM Peak Hour							
Falmouth Avenue, EBLT	210	50.2	D	141	48.2	D	135
Falmouth Avenue, EBR	150	33.8	C	122	23.3	C	122
Preble Street, WBLT	630	61.8	E	218	47.4	D	192
Preble Street, WBR	630	52.9	D	148	12.6	B	139
Forest Avenue, NBL	200	43.6	D	126	43.9	D	96
Forest Avenue, NBT/TR	700	7.1	A	174	10.7	B	192
Forest Avenue, SBL	150	244.6	F	291	74.4	E	218
Forest Avenue, SBT/TR	250	506.6	F	1540	83.8	F	755
Overall		**119**	**F**		**36.8**	**D**	
Forest Avenue at Bedford Street/Baxter Blvd							
AM Peak Hour							
Bedford Street, EBLT	530	42.0	D	178	128.1	F	531
Bedford Street, EBR	375	25.3	C	253	69.0	E	454
Baxter Blvd, WBL	140	36.7	D	194	325.2	F	252
Baxter Blvd, WBT	690	21.8	C	125	231.8	F	1247
Baxter Blvd, WBR	75	8.9	A	22	195.2	F	34
Forest Avenue, NBL	1000+	53.8	D	225	70.7	E	210
Forest Avenue, NBT/TR	1000+	14.8	B	230	7.3	A	187
Forest Avenue, SBT/TR	700	215	F	836	82.7	F	794
Overall		**69.3**	**E**		**77.3**	**E**	
PM Peak Hour							
Bedford Street, EBLT	530	49.7	D	314	141.5	F	660
Bedford Street, EBR	375	38.1	D	374	84.5	F	448
Baxter Blvd, WBL	140	44.7	D	231	372	F	231
Baxter Blvd, WBT	690	22.1	C	258	280.4	F	1627
Baxter Blvd, WBR	75	8.8	A	27	259.2	F	29
Forest Avenue, NBL	1000+	71.1	E	204	62.5	E	198
Forest Avenue, NBT/TR	1000+	18.2	B	208	12	B	214
Forest Avenue, SBT/TR	700	205	F	681	116	F	877
Overall		**65.5**	**E**		**96.8**	**F**	

^ Storage length measured in feet, length of turning lane or distance to adjacent intersection
+ Volume to capacity ratio
* Delay expressed in seconds per vehicles
** Level of Service
Queue measured in feet
s Queue lengths determined from SimTraffic simulation

Table 3. Unsignalized Intersection Operation Summary – SimTraffic Analysis

Intersection	2028 Build (Falmouth Site)			2028 Build (Bedford Site)		
Peak Hour	Delay (sec/veh)	LOS	95th Percentile Queue (ft)	Delay (sec/veh)	LOS	95th Percentile Queue (ft)
Bedford St & Surrenden St						
AM Peak Hour						
Surrenden St, NWLR	2.1	A	0	8.6	A	51
Bedford St, NETR	1.3	A	30	0.8	A	0
Bedford St, SWTL	15.6	C	260	0.1	A	0
Overall	**7.6**	**A**		**1.1**	**A**	
PM Peak Hour						
Surrenden St, NWLR	0.0	A	0	19.1	B	183
Bedford St, NETR	0.8	A	0	2.6	A	68
Bedford St, SWTL	3.8	A	69	0.3	A	0
Overall	**8**	**A**		**8**	**A**	
Bedford St & Winslow St						
AM Peak Hour						
Winslow St, NWLR	9.6	A	25	11.9	B	27
Bedford St, NETR	4.4	A	0	3.6	A	136
Bedford St, SWL	0.6	A	0	40.1	E	143
Bedford St, SWT	1.6	A	0	17.0	C	507
Overall	**1.2**	**A**		**15.3**	**C**	
PM Peak Hour						
Winslow St, NWLR	13.1	B	152	155.9	F	159
Bedford St, NETR	0.7	A	4	16.5	B	392
Bedford St, SWL	0	A	0	17	B	114
Bedford St, SWT	1.5	A	0	2.2	A	80
Overall	**18.3**	**B**		**18.3**	**B**	
Forest Avenue at I-295						
AM Peak Hour						
I-295, EBR	7.6	A	232	16.5	B	414
I-295, WBR	13.6	B	180	400.9	F	1173
Forest Avenue, SET	0.4	A	35	0.5	A	16
Forest Ave, NWT	1.5	A	114	10.1	B	156
Overall	**3.7**	**A**		**33.1**	**C**	
PM Peak Hour						
I-295, EBR	11.2	B	242	15.4	B	301
I-295, WBR	138.0	F	848	77.6	E	525
Forest Avenue, SET	0.6	A	27	0.6	A	40
Forest Ave, NWT	3.9	A	118	2.7	A	115
Overall	**14.6**	**B**		**9.7**	**A**	

^ Storage length measured in feet, length of turning lane or distance to adjacent intersection
+ Volume to capacity ratio
* Delay expressed in seconds per vehicles
** Level of Service
Queue measured in feet
s Queue lengths determined from SimTraffic simulation

Roundabout Analysis

Table 4 summarizes the operational analysis at the Brighton Avenue, Deering Avenue and Falmouth Street roundabout during the 2028 weekday AM and PM peak hours under Base and Build conditions. As shown, even with anticipated growth, project related traffic, and relocation of the parking garage, the proposed infrastructure will result in a LOS B or better condition for all approaches during the peak hours.

Table 4. Roundabout Levels of Service

Peak Hour		2028 Base (Falmouth Site)				2028 Build (Bedford Site)			
Movement	**SL^**	**v/c+**	**Delay***	**LOS****	**Queue**	**v/c+**	**Delay***	**LOS****	**Queue**
Falmouth Street at Deering Street and Brighton Avenue									
AM Peak Hour									
Deering Ave, SE	200	0.401	4.4	A	6	0.379	4.0	A	6
Falmouth St, NE	290	0.146	5.4	A	2	0.128	5.7	A	1
Deering Ave, NW	420	0.39	5.0	A	5	0.388	5.0	A	5
Brighton Ave, E	165	0.838	12.1	B	33	0.839	11.9	B	33
Falmouth St, SW	625	0.166	12.5	B	2	0.167	12.5	B	2
Overall		**0.838**	**8.4**	**A**		**0.839**	**8.3**	**A**	
PM Peak Hour									
Deering Ave, SE	200	0.663	4.8	A	15	0.675	4.7	A	16
Falmouth St, NE	290	0.467	11.3	B	8	0.407	11	B	6
Deering Ave, NW	420	0.431	11.1	B	6	0.435	11.1	B	6
Brighton Ave, E	165	0.566	4.7	A	11	0.567	4.6	A	11
Falmouth St, SW	625	0.101	7.5	A	1	0.102	7.5	A	1
Overall		**0.663**	**6.4**	**A**		**0.675**	**6.1**	**A**	

^ Storage length measured in feet, distance to adjacent intersection
+ Volume to capacity ratio
* Delay expressed in seconds per vehicles
** Level of Service
Queue measured in feet

The approaches of the driveway exiting the joint garage proposed on Bedford Street at Surrenden Street is anticipated to operate at LOS B/C with 13 to 17 seconds of delay during both the AM and PM peak hours, the highest delay occurring for the PM peak hour left hand turn lane. The entering driveway proposed for the joint garage on Bedford Street at Winslow Street is anticipated to have a 10 to 15 second delay when making the left hand turning movement to enter from Bedford Street. It is anticipated that this movement will be accommodated in a separate left turn lane.

Bedford Street Concept

Updated traffic circulation for access and egress to the existing and proposed parking garages will compel updates to the Bedford Street corridor. It is proposed that vehicles will enter the parking garages via Winslow Street and exit the parking garages via Surrenden Street, as previously discussed and depicted in

Figure ***4*** below.

For entering vehicles, a dedicated left turn lane will be provided for vehicles traveling westbound on Bedford Street and entering the parking garages via Winslow Street. The left turn lane will require replacement of the raised median island and crosswalk currently set back from the intersection on the east leg. This crosswalk will be replaced by a raised crossing on the west leg of the intersection, limiting the number of vehicular lanes pedestrians will need to

cross to two with a pedestrian refuge island between the lanes. The need for a single departure lane from the intersection on Winslow Street will allow for a pedestrian bumpout to be implemented. The bumpout will effectively shorten the crossing distance for pedestrians across the Winslow Street leg of the intersection and widen back to two lanes to maximize the queuing space for vehicles entering the parking garages. Although Winslow Street will predominantly serve traffic entering the garage facilities, an exit lane will be maintained to allow for drop-offs.

The proposed circulation will provide egress for both garages through the existing garage and out to Surrenden Street. As such, a concept reconfiguring the lanes to accommodate the exiting movements is included in Figure 5 below. Although the predominant traffic flow on Surrenden Street will traffic exiting onto Bedford Street, a single lane will be maintained to accommodate vehicles entering to access the driveway, loading area, and few surface parking spaces along Surrenden Street.

Along the length of Bedford Street, other multimodal improvements are proposed. Crosswalks with rectangular rapid flashing beacons (RRFBs) are proposed to the west of Surrenden Street and midblock between Winslow Street and Durham Street. The latter is anticipated to serve a desire line between the residence hall and student center to the north and the library and parking garage to the south. A crossing is proposed midblock between Winslow Street and Surrenden Street, shifting the existing crossing approximately 70' west. The raised island separating opposing traffic on Bedford Street is proposed to extend from the raised crossing at Winslow Street through the midblock crossing between Winslow Street and Surrenden Street, creating a protected, mid-crossing pedestrian refuge. Buffered bike lanes are proposed to flank the eastbound and westbound travel lanes, providing 1 ½ to 2 feet of striped buffer width between vehicular and bicycle modes. The buffered bike lanes and median treatments will narrow the travel lanes to approximately 10'. These features will help to discourage vehicles from passing busses at the bus stops on the north and south sides of Bedford Street and help to reduce vehicular speeds through this critical multimodal area.

Figure 4. Conceptual Plan for Bedford Street and Parking Garage Circulation

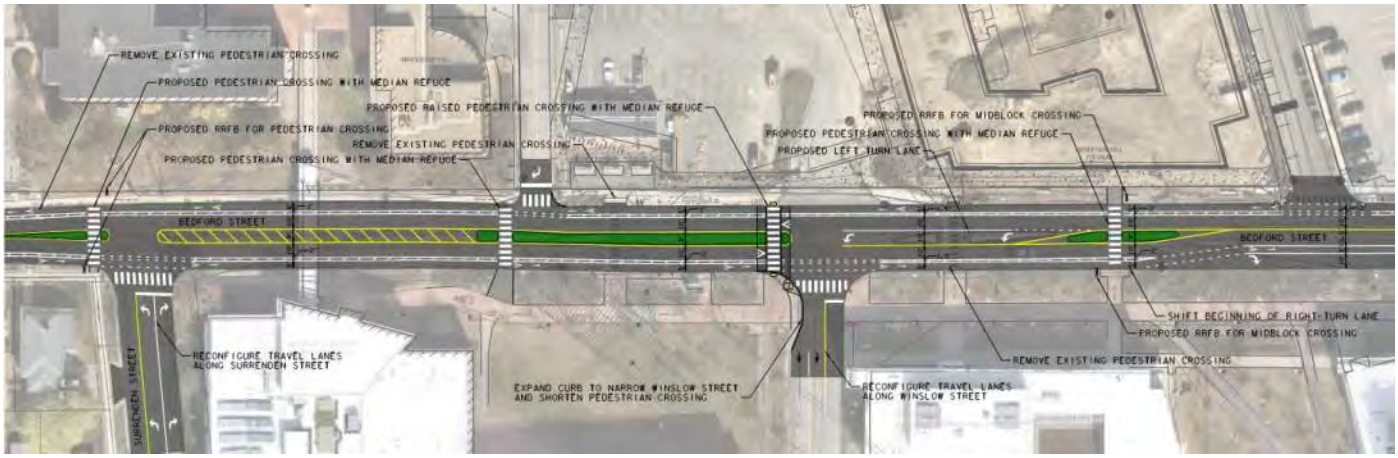


Figure 5. Conceptual Plan for Surrenden Street Garage Exit



Garage Queuing

In order to understand the queuing anticipated at the entry and exit points of the garage facilities, a queuing analysis was conducted for during and post construction scenarios. For analysis purposes, it was assumed that 1148 spaces are served during construction and 1780 spaces are served during post construction, and that the per space trip rate will be the same for the new garage as observed for the existing garage in October 2019. Further, observations from the existing garage on transaction times for permit parkers, transient parkers using pay-on-foot, and transient parkers using pay-at-exit were all factored into the analysis. Based on the analysis, during construction the garage entrance and exit would each require a minimum of 2 lanes with an anticipated design queue of 3 cars per entrance lane and 1 car per exit lane. Following construction, with both garages operational, it is anticipated that 3 entrance and 2 exit lanes will be required for peak operation. Given that the analysis evaluated more spaces than are now anticipated in the new garage and that the predominant use of the new garage is expected to be residential users with less per space trip making than the existing garage serving commuters, the analysis was conservative. The details of the analysis are outlined in the memorandum and supporting calculations included in the appendices.

Transportation Demand Management (TDM)

The University of Southern Maine (USM) has recently developed a Transportation Demand Management (TDM) plan that provides a cohesive strategy for establishing and implementing a successful TDM program for the Portland campus. The TDM plan seeks to enhance multimodal accessibility, ensure the use of non-vehicular modes, and discourage the use of driving through parking management, to achieve and build upon the university's parking demand reduction goals for the campus. The TDM Plan presents a suite of strategies and timeframe for when USM

intends to implement the various strategies. The strategies aim at promoting walking and bicycling, improving transit service to promote ridership, promoting carpooling, changing time-of-day travel demands to eliminate or reduce vehicle trips, and managing parking demand via changes to USM's pricing and permit policies. The implementation of TDM will reduce the vehicle trips to the site and reduce delays at area intersections.

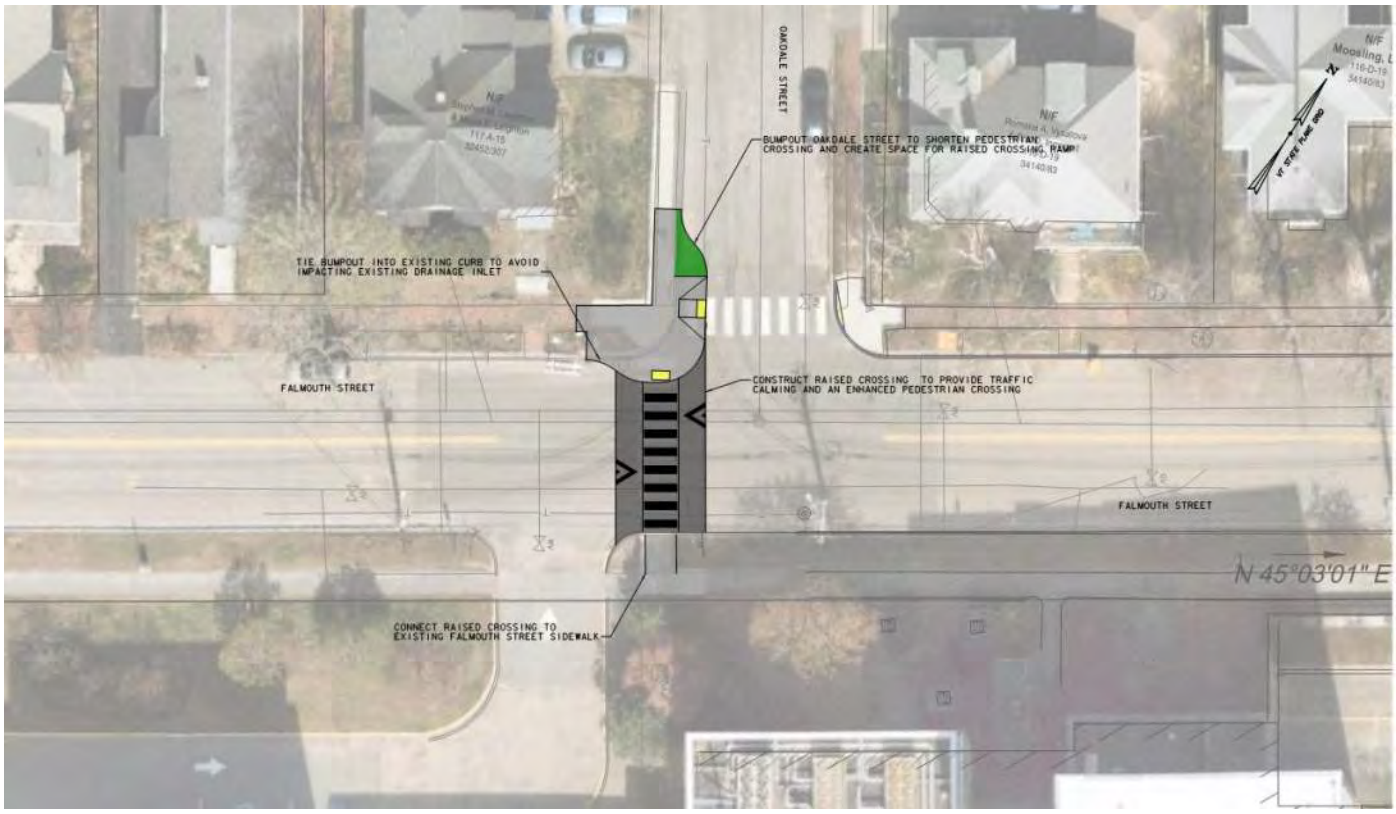
Neighbor Concern – Oakhurst Dairy

USM has worked with Oakhurst Dairy to understand their concerns associated with the proposed project. Oakhurst Dairy has raised a number of concerns with the queuing along Forest Avenue and the operation of the signals at the intersections of Bedford Street / Baxter Boulevard and Falmouth Street / Preble Street. One concern raised by Oakhurst Dairy is the length of queue on Forest Avenue northbound and that it causes a backup on the I-295 off ramp. As indicated above, USM is committed to addressing this concern. Oakhurst is even more concerned with queues blocking the Oakhurst driveway on Forest Avenue. Although the Bedford Street garage site reduces the anticipated additional volume along the Oakhurst block of Forest Avenue compared to the Falmouth garage site, queuing through this area remains a concern. Further, recent traffic signal operation at Forest Avenue at Bedford Street and Baxter Boulevard has resulted in longer queues. A discussion with the City Traffic Engineer revealed that the City has had an issue with vehicle detection at this location and as a result the signal is not operating optimally. A representative from Oakhurst shared video that documents these queuing concerns. As such, USM is committed to working with the City to replace the camera causing the detection issue at the intersection. Because Oakhurst remains concerned about the operation at their driveway and the queues on Forest Avenue that block that driveway, USM is committed to work with Oakhurst and the City to develop a plan to discourage vehicles from blocking the driveway, including signage and/or striping to not "Block the Box".

Neighbor Concern – Falmouth Street/Oakdale Street and Bedford Street

USM has worked with neighborhood since the previous permitting process to ensure that their concerns are being addressed. USM held an open meeting with residential neighbors on August 26th to discuss traffic impacts and proposed mitigation measures. The neighborhood had previously expressed concern with traffic speed and volumes on Falmouth Street, and as such an undefined traffic calming measure was written into a condition of approval on the residence hall & student center project. The University shared a conceptual draft of the Falmouth Street traffic calming measure at the meeting with the neighborhood (see Figure 6 below). The neighborhood's reception of the drawing seemed favorable. However, the neighborhood expressed some concerns about traffic along Bedford Street and that traffic would be made worse by pedestrian safety measures such as pedestrian island improvements and by higher volumes of vehicles entering/exiting the South side of Bedford. Several items were brought up from individuals along the lines of wanting traffic to flow efficiently, but one specific item brought up by multiple residents was concern that USM was not proposing bus pull-outs for the METRO, and that this could lead to traffic backing up behind stopped buses. USM explored this issue at length internally, and also had two meetings with METRO to discuss it. Ultimately, USM decided that pedestrian safety should outweigh vehicular traffic efficiency when the two are opposed as an in-line bus stop would minimize the ability of vehicles to drive past buses that are offloading people. USM feels that the suite of measures currently proposed offers the best trade-off between efficiency and safety given the siting of the garage on Bedford Street. Bedford Street was the location the neighborhood favored over Falmouth Street and Deering Avenue, and this was one of the most important factors in deciding on the garage's location.

Figure 6. Conceptual Plan for Pedestrian Improvements at Falmouth Street at Oakdale Street



Conclusions and Recommendations

The proposal to relocate the parking garage to Bedford Street is positive for a number of reasons. However, adding these trips to the roadway network at the new proposed parking garage location along Bedford Street results in some delay increases at the intersection of Forest Avenue with Bedford Street and Baxter Boulevard as compared to the garage location along Falmouth Street. Advance queue detection should be considered in order to ensure that the addition of this traffic to the intersection of Forest Avenue with Bedford Street and Baxter Boulevard does not cause an impact beyond the available queue storage and impact the operation of the I-295 off ramp. In addition, USM is committed to creating a Bedford Street that is hospitable to pedestrians, transit and bicyclists. To assist our neighbor Oakhurst, we proposed to create signage and striping to reduce incidents when traffic blocks that driveway. Finally, USM is working to improve the operations at Forest Street at Bedford Street and Baxter Boulevard in the short term to ensure that the traffic signal is operating as it was intended with the replacement of the detection camera. Overall, this proposed location for the parking garage is not anticipated to adversely affect traffic operations in the vicinity of the USM campus.

Technical Appendix

Existing USM Parking Garage Activity Report

Time		October 21, 2019							October 22, 2019							October 23, 2019						
		Entry			Exit			Entry/Exit	Entry			Exit			Entry/Exit	Entry			Exit			Entry/Exit
		Credential	Transient	Total	Credential	Transient	Total	Total	Credential	Transient	Total	Credential	Transient	Total	Total	Credential	Transient	Total	Credential	Transient	Total	Total
								0							0							0
0:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 -		2	0	2	1	0	1	3	2	0	2	1	0	1	3	1	0	1	0	1	1	2
6:00 -		10	0	10	6	0	6	16	8	0	8	3	0	3	11	15	0	15	0	6	6	21
7:00 -		79	4	83	6	0	6	89	68	0	68	8	0	8	76	71	4	75	10	0	10	85
8:00 -		433	41	**474**	5	4	**9**	483	410	13	423	9	1	10	433	401	16	417	5	1	6	423
9:00 -		317	14	331	26	4	30	361	384	23	407	11	6	17	424	317	12	329	28	3	31	360
10:00 -		174	8	182	103	13	116	298	204	13	217	124	5	129	346	202	21	223	116	6	122	345
11:00 -		221	5	226	241	5	246	472	228	19	247	291	20	311	558	184	45	229	217	9	226	455
12:00 -		223	15	238	128	6	134	372	252	11	263	119	6	125	388	221	55	276	149	8	157	433
13:00 -		117	8	125	198	5	203	328	115	8	123	174	6	180	303	116	11	127	149	5	154	281
14:00 -		134	9	143	286	7	293	436	139	12	151	283	10	293	444	153	12	165	259	12	271	436
15:00 -		144	11	155	195	21	216	371	187	22	209	221	11	232	441	151	13	164	189	18	207	371
16:00 -		61	3	64	255	20	275	339	73	75	148	224	6	230	378	58	12	**70**	260	49	**309**	379
17:00 -		40	16	56	164	3	167	223	78	48	126	99	144	243	369	40	18	58	241	44	285	343
18:00 -		5	6	11	179	12	191	202	14	5	19	0	301	301	320	13	5	18	169	10	179	197
19:00 -		3	3	6	91	10	101	107	4	1	5	0	171	171	176	5	3	8	75	8	83	91
20:00 -		2	0	2	49	16	65	67	0	1	1	0	84	84	85	3	0	3	45	8	53	56
21:00 -		2	0	2	12	1	13	15	0	0	0	0	24	24	24	1	0	1	19	5	24	25
22:00 -		1	0	1	3	0	3	4	1	0	1	0	6	6	7	1	0	1	6	1	7	8
23:00 -		0	0	0	1	0	1	1	0	0	0	0	2	2	2	0	0	0	2	1	3	3
Total		1,968	143	2,111	1949	127	2076	2203	2167	251	2418	1567	803	2370	3173	1953	227	2180	1939	195	2134	2329

To: University of Southern Maine

Date: August 20, 2021

Memorandum

Project #: 52718.01

From: Jennifer Conley, PE, PTOE
Bill Cranshaw

Re: **DRAFT** Garage Queuing Analysis

VHB has reviewed the operations of the existing and proposed USM parking garages and analyzed the queues that are expected to occur under both the construction (existing) and final (existing and proposed) conditions.

Key assumptions

1. The existing parking garage has 1,148 spaces. The new garage will add 632 spaces.
2. The two garages will use the same entry and exit lanes.
    a. The entry lanes will be located between the two garages. The current concept is for there to be three entry lanes, one of which is reversable as a additional exit lane.
    b. The primary exit will be at the southwest corner of the existing garage, where the entrance to that garage is currently.
3. The garages will be used by a mix of permit holders and transient parkers.
    a. Permit holders have RFID hangtags
    a. Transient parkers pull a ticket at the entry and either pre-pay before exiting or pay at the exit. Based on information from the existing garage, ten percent of transient parkers are expected to pay at the exit.
4. Hourly volumes for October 21-23, 2019 show the following:
    a. The busiest hour for entries was consistently from 8-9 am. The highest single-day hourly entry volume was 474, with 433 permit holders and 43 transients entering.
    b. The busiest hour for exit varied each day – from late morning, to mid-afternoon, to late afternoon. The highest single-day hour exit volume was 311, with 291 permit holders and 20 transients exiting.
    c. The daily percentage of transient parkers ranged from 6 to 10 percent.
    d. The garage was never full during the three days. Peak occupancy ranged from 1,027 to 1,060 cars, approximately 90 to 92 percent of capacity.
5. **The analysis of future volumes, with both garages in operation, assume the same per-space trip rate as the existing garage (conservatively high assumption).** Those rates, calculated from the peak hourly volumes of the 2019 data, are listed below. Two sets of "per-space" rates are calculated, one based on the full garage capacity and one based on the maximum number of spaces used. The higher rates are used in the analysis.
    a. Entering volume = 0.41 cars per space (based on garage capacity)
    b. Exiting volume -= 0.27 cars per space (based on garage capacity)
    c. Entering volume = 0.46 cars per occupied space
    d. Exiting volume = 0.30 cars per occupied space
6. Transaction times are based on information provided by USM.
    a. Permit parkers: 10 seconds at the entrance and 10 seconds at the exit
    b. Transient parkers using pay-on-foot: 15 seconds at the entrance and 17 seconds at the exit

   a. Transient parkers paying at the exit: 15 seconds at the entrance and 120 seconds at the exit.
7. The service rate, i.e., the maximum number of cars per hour that can be accommodated in a lane, is calculated from the transaction times, weighted to reflect the mix of permit and transient cars in the peak hour.
   a. The service rate for entry lanes is 350 cars per hour
   b. The service rate for exit lanes is 335 cars per hour.

Number of Lanes

The determination of the number of lanes required is a two-step process.

1. The first is a simple check on the number of entry/exit lanes by comparing the anticipated hourly volumes with the service capacity of the lanes to ensure that the arriving volumes are not higher than the maximum processing capacity through the lanes.
2. The second next step is to evaluate the anticipate queuing based on the minimum number of lanes, to determine if there may be operational problems related to queuing or excessive delays for drivers

Table 1 presents the results of the calculations.

- The results show that during construction, with the existing garage fully used, two entry and two exit lanes are needed, and that the design queues are 3 and 1 car, respectively.
- Post construction, with the two garages fully used and sharing entry and exit plazas, the minimum number of lanes is 3 for the entry and 2 for the exit. At about 80% lane utilization, both the entry and exit plaza would require queuing space for 4 cars at each lane.

Table 1: Garage Entry/Exit Lane Calculations

	During Construction		Post Construction	
	Entrance	Exit	Entrance	Exit
Spaces	1148	1148	1780	1780
Hourly Rate/Space	0.46	0.30	0.46	0.3
Hourly Volume (V)	528	344	819	534
Max. Service Rate (SR)	350	335	350	335
V/SR	1.5	>1.0	2.3	1.6
Minimum # of Lanes	2	2	3	2
Lane Utilization (SR/V)	75%	51%	78%	80%
Average Queue	2	1	3	2
Design Queue	3	1	4	4

Notes: Average Queue and Design Queue are the number of cars per lane, including the car at the gate.
Queuing calculations assume multichannel queuing, where entry or exit lanes are in the same location and equally accessible to approaching drivers.

Lane Configuration During Construction

There are many factors affecting the proper design and layout of entry and exit plazas. One of the more important is how the service rate throughput of the lanes night be affected the ease for drivers to approach the lane and the ticket/car readers. If drivers need to make a turn as they approach the gate some may have trouble positioning themselves and accessing, say, a payment machine at the exit. This would reduce the effective service rate and thus increase queuing and might increase the number of required lanes.

The service rate used in the Table 1 calculations reflects field measurements made at the existing equipment. However, the proposed temporary lane configuration for the entrance involves a sharp turn towards the entrance plaza immediately after entering the garage.

Such a sharp turn to position a car in the entry lane can reduce the service rate by 25 percent or more, however, in this case the potential reduction is likely relatively small and any adverse impacts can likely be mitigated.
The reason that the potential reduction is relatively small is that the vast majority (90% or more) of parkers use RFID hangtags and an RFID system does not require as precise a vehicle alignment at the gate as would a swipe-card or ticket issuance system. Nonetheless, care should be taken to ensure that the entry lanes are effectively positioned. This could be done by moving the proposed gate location slightly farther into the garage, or by having the entry plaza located outside of the garage.

Garage Queuing Calculations

ENTRY	Spaces	Rate per Space	Volume	Max Service Rate	V/S	No. of Lanes
Typical Occupancy	1148	0.41	471	350	1.3	2
Full Occupancy	1148	0.46	528	350	1.5	2

EXIT	Spaces	Rate per Space	Volume	85% of Service Rate	Ratio	No. of Lanes
Typical Occupancy	1148	0.27	310	335	0.9	1
Full Occupancy	1148	0.30	344	335	1.0	1

ENTRY	Spaces	Rate per Space	Volume	85% of Service Rate	Ratio	No. of Lanes
Typical Occupancy	1780	0.41	730	350	2.1	3
Full Occupancy	1780	0.46	819	350	2.3	3

EXIT	Spaces	Rate per Space	Volume	85% of Service Rate	Ratio	No. of Lanes
Typical Occupancy	1780	0.27	481	335	1.4	2
Full Occupancy	1780	0.30	534	335	1.6	2

		350	3	1050	819	0.78
		335	2	670	534	0.797014925

Q =3 cars behind space

Q = 3 cars behind space

	Existing		Proposed	
	Entrance	**Exit**	**Entrance**	**Exit**
Spaces	1148	1148	1780	1780
Hourly Rate/Space	0.46	0.3	0.46	0.3
Hourly Volume	528	344	819	534
Max. Service Rate	350	335	350	335
Volume/Service Rate	1.5	1.0	2.3	1.6
Minimum # of Lanes	2	2.0	3	2
Lane Utiliization (SR/V)	75%	51%	78%	80%
Average Queue	2	1	2	2
Design Queue	3	1	4	4

Departure Rate	180	
Lanes	2	
	360	

		M/D/1		M/M/1	M/M/2
					0.85
Arrivals per minute		3	ʎ	3	3
Transactions per minute		4	u	4	4
Traffic Intensity (P)		75%	p	75%	0.882353
Average Length		1.125	cars	2.25	6.617647
Average time in queue		0.375	min per car	0.750	0.750
Spent in system		0.625	min per car	1.000	1.000

Typical Occupancy

Garage Queuing Calculations

Observations in Existing Garage (by Dewey)

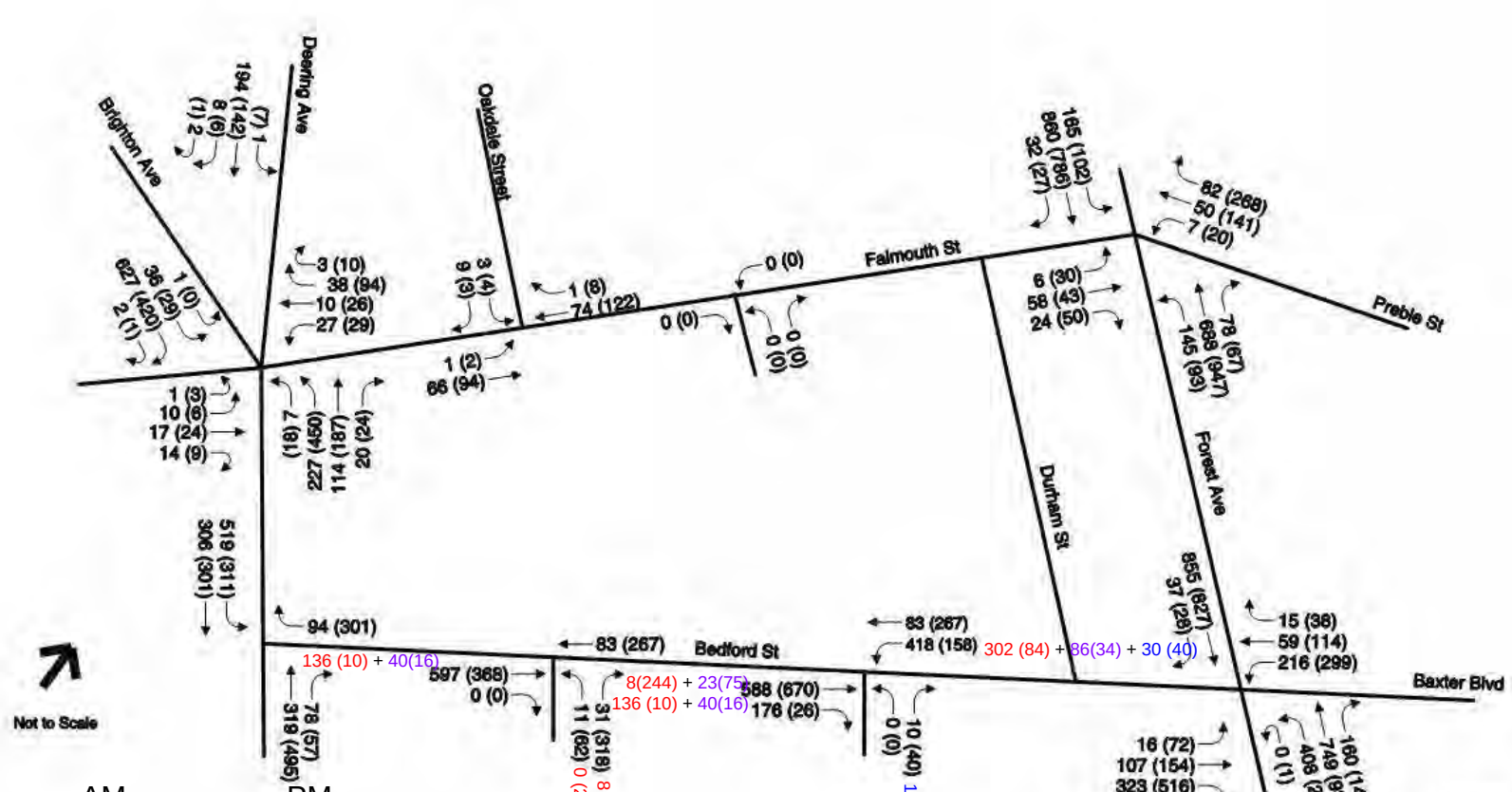
Using hangtag (USM students, staff & faculty):
Entry takes 10 seconds
Exit also takes 10 seconds

Pulling a ticket (visitors & conference goers):
Entry takes 10 seconds if you know exactly what you are doing (we think adding 5 seconds to get to 15 total is more representative of an actual visitor who doesn't know what they are doing and has to read the signs)
Exit takes 12 seconds)+5 for 17 total per logic explained above.
*Additionally, Dewey estimates 10% of this visitor population will try to pay at the exit gate instead of pre-paying (even after accounting for signs and education to deter this behavior). For those 10%, he estimates that exit will take at least 90 seconds, but probably more.

ENTRY	Time (seconds)	Actual Service Rate Per Hour		Hourly Volume			1 Lane	2 Lane	3 Lane					
USM	10	360		443	92%	329.5041					10	443	4430	
Transient				41							15	41	615	
Transient pre-pay	15	240	90%	36	7%	17.85124						484	5045	10.42355 secs per
Transient exit-pay	15	240	10%	5	1%	2.479339								
				484		349.8347	Service Rate	**1.38**	**0.69**	**0.46**	484			

EXIT	Time (seconds)	Actual Service Rate Per Hour		Hourly Volume				1 Lane	2 Lane	3 Lane					
USM	10	360		260	84%	302.9126						10	443	4430	
Transient				49											
Transient pre-pay	17	212	90%	44	14%	30.1542						17	44	748	
Transient exit-pay	120	30	10%	5	2%	0.485437						120	4	480	
													491	5658	11.52342 secs per
				309		333.5523	Service Rate	**1.45**	**0.73**	**0.48**	484				

Figure 3. 2028 TMP Modification Build Condition Traffic Volumes



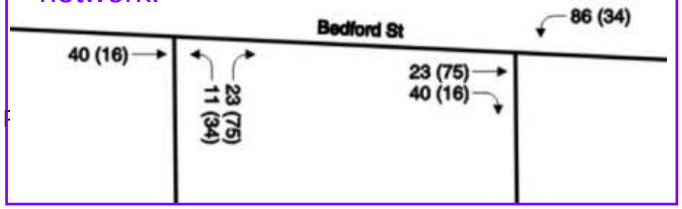
	AM		PM	
garage existing[1]	438 in	8 out	94 in	271 out
trip gen[2] -	126 in	34 out	50 in	109 out
drop-offs	30 in	10 out	40 in	40 out
TOTAL	594 in	52 out	184 in	420 out

[1] based on a peak USM week ins and outs in October 2019 (pre-COVID), average of Tuesday thru Thursday volumes

[2] based on TMP trip generation, conservative estimate of new trips

[3] replaces some existing drop off and parking trips to Wishcamper and Library to better balance network

Trip Generation network:

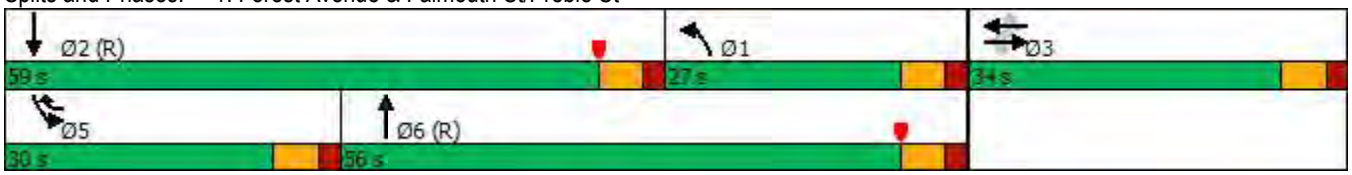


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	58	24	7	50	82	78	688	9	165	860	32
Future Volume (vph)	6	58	24	7	50	82	78	688	9	165	860	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	200		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00	0.99		1.00	0.99	1.00	1.00		1.00	1.00	
Frt			0.850			0.850		0.998			0.995	
Flt Protected		0.995			0.994		0.950			0.950		
Satd. Flow (prot)	0	1890	1615	0	1811	1583	1703	3499	0	1719	3486	0
Flt Permitted		0.970			0.958		0.950			0.950		
Satd. Flow (perm)	0	1843	1593	0	1746	1560	1697	3499	0	1718	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			88		1			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		771			1265			804			1168	
Travel Time (s)		17.5			28.8			18.3			26.5	
Confl. Peds. (#/hr)	2		1	1		2	5		1	1		5
Peak Hour Factor	0.77	0.77	0.77	0.93	0.93	0.93	0.91	0.91	0.91	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	33%	0%	2%	6%	3%	0%	5%	3%	0%
Adj. Flow (vph)	8	75	31	8	54	88	86	756	10	201	1049	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	31	0	62	88	86	766	0	201	1088	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			10			18			16	
Link Offset(ft)		0			-6			0			-2	
Crosswalk Width(ft)		16			16			30			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		3			3	5	1	6		5	2	
Permitted Phases	3		3	3		3						
Detector Phase	3	3	3	3	3	5	1	6		5	2	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	16.0	16.0	37.0		16.0	25.0	
Total Split (s)	34.0	34.0	34.0	34.0	34.0	30.0	27.0	56.0		30.0	59.0	
Total Split (%)	28.3%	28.3%	28.3%	28.3%	28.3%	25.0%	22.5%	46.7%		25.0%	49.2%	
Maximum Green (s)	28.0	28.0	28.0	28.0	28.0	24.0	21.0	50.0		24.0	53.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0			26.0			14.0	
Pedestrian Calls (#/hr)	4	4	4	4	4			7			4	
Act Effct Green (s)		14.4	14.4		14.4	34.7	16.3	73.3		20.3	79.7	
Actuated g/C Ratio		0.12	0.12		0.12	0.29	0.14	0.61		0.17	0.66	
v/c Ratio		0.38	0.10		0.30	0.17	0.37	0.36		0.69	0.47	
Control Delay		51.4	0.6		49.3	4.9	36.1	7.5		58.9	12.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		51.4	0.6		49.3	4.9	36.1	7.5		58.9	12.8	
LOS		D	A		D	A	D	A		E	B	
Approach Delay		37.6			23.2			10.4			19.9	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 17.6		Intersection LOS: B	
Intersection Capacity Utilization 53.5%		ICU Level of Service A	
Analysis Period (min) 15			

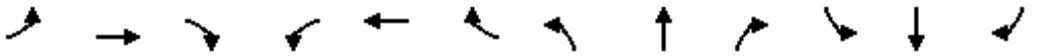
Splits and Phases: 1: Forest Avenue & Falmouth St/Preble St





Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	83	31	62	88	86	766	201	1088
v/c Ratio	0.38	0.10	0.30	0.17	0.37	0.36	0.69	0.47
Control Delay	51.4	0.6	49.3	4.9	36.1	7.5	58.9	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	0.6	49.3	4.9	36.1	7.5	58.9	12.8
Queue Length 50th (ft)	61	0	45	0	61	70	148	213
Queue Length 95th (ft)	82	0	78	28	114	141	193	306
Internal Link Dist (ft)	691		1185			724		1088
Turn Bay Length (ft)		150			200		150	
Base Capacity (vph)	460	500	436	590	326	2138	375	2317
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.06	0.14	0.15	0.26	0.36	0.54	0.47

Intersection Summary



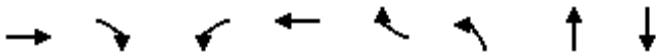
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	107	323	218	59	15	408	749	160	0	855	37
Future Volume (vph)	16	107	323	218	59	15	408	749	160	0	855	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		375	140		75	0		0	0		0
Storage Lanes	0		1	1		1	1		0	0		0
Taper Length (ft)	100			75			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00		0.99		0.98		1.00			1.00	
Frt			0.850			0.850		0.974			0.994	
Flt Protected		0.994		0.950			0.950					
Satd. Flow (prot)	0	1656	1439	1608	1676	1454	1608	3068	0	0	3156	0
Flt Permitted		0.963		0.950			0.950					
Satd. Flow (perm)	0	1603	1439	1593	1676	1424	1608	3068	0	0	3156	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			82		34			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			1168			275			804	
Travel Time (s)		13.8			26.5			6.3			18.3	
Confl. Peds. (#/hr)	5		7	7		5			5			5
Peak Hour Factor	0.83	0.83	0.83	0.92	0.92	0.92	0.97	0.97	0.97	0.96	0.96	0.96
Heavy Vehicles (%)	7%	2%	1%	1%	2%	0%	1%	3%	2%	0%	2%	7%
Adj. Flow (vph)	19	129	389	237	64	16	421	772	165	0	891	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	148	389	237	64	16	421	937	0	0	930	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			18			4	
Link Offset(ft)		0			3			0			0	
Crosswalk Width(ft)		20			10			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		15	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1			1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50			50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50			50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Turn Type	Perm	NA	pt+ov	Prot	NA	Perm	Prot	NA			NA	
Protected Phases		4	4 5	3	8		5	2			6	
Permitted Phases	4					8						
Detector Phase	4	4	4 5	3	8	8	5	2			6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		5.0	5.0	5.0	5.0	10.0			10.0	
Minimum Split (s)	29.0	29.0		16.0	29.0	29.0	16.0	34.0			34.0	
Total Split (s)	29.0	29.0		23.0	52.0	52.0	31.0	68.0			37.0	
Total Split (%)	24.2%	24.2%		19.2%	43.3%	43.3%	25.8%	56.7%			30.8%	
Maximum Green (s)	23.0	23.0		17.0	46.0	46.0	25.0	62.0			31.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0			4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lost Time Adjust (s)		-4.0		-4.0	-4.0	-4.0	-4.0	-4.0			-4.0	
Total Lost Time (s)		2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lead/Lag	Lag	Lag		Lead			Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	3.5	3.0			3.0	
Recall Mode	None	None		None	None	None	None	C-Min			C-Min	
Walk Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Flash Dont Walk (s)	18.0	18.0			18.0	18.0		23.0			23.0	
Pedestrian Calls (#/hr)	10	10			1	1		1			1	
Act Effct Green (s)		24.0	58.3	20.7	46.7	46.7	32.3	69.3			35.0	
Actuated g/C Ratio		0.20	0.49	0.17	0.39	0.39	0.27	0.58			0.29	
v/c Ratio		0.46	0.53	0.86	0.10	0.03	0.97	0.53			1.01	
Control Delay		46.5	19.5	76.0	22.4	0.1	82.4	16.7			67.1	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay		46.5	19.5	76.0	22.4	0.1	82.4	16.7			67.1	
LOS		D	B	E	C	A	F	B			E	
Approach Delay		26.9			61.3			37.0			67.1	
Approach LOS		C			E			D			E	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 46.7		Intersection LOS: D	
Intersection Capacity Utilization 82.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Forest Avenue & Bedford St/Baxter Blvd





Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	148	389	237	64	16	421	937	930
v/c Ratio	0.46	0.53	0.86	0.10	0.03	0.97	0.53	1.01
Control Delay	46.5	19.5	76.0	22.4	0.1	82.4	16.7	67.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	19.5	76.0	22.4	0.1	82.4	16.7	67.1
Queue Length 50th (ft)	99	159	180	30	0	~361	225	~409
Queue Length 95th (ft)	149	220	#318	58	0	#565	287	#530
Internal Link Dist (ft)	529			1088			195	724
Turn Bay Length (ft)		375	140		75			
Base Capacity (vph)	360	737	281	698	641	432	1784	923
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.53	0.84	0.09	0.02	0.97	0.53	1.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	69	0	0	75	0	0
Future Volume (vph)	69	0	0	75	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	198			771	187	
Travel Time (s)	4.5			17.5	4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	0	0	82	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	75	0	0	82	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 7.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	69	0	0	75	0	0
Future Volume (Veh/h)	69	0	0	75	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	75	0	0	82	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				771		
pX, platoon unblocked						
vC, conflicting volume			75		157	75
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			75		157	75
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1524		834	986

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	75	82	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1524	1700
Volume to Capacity	0.04	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	7.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	3	9	1	66	74	1
Future Volume (vph)	3	9	1	66	74	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.896				0.998	
Flt Protected	0.989			0.999		
Satd. Flow (prot)	1651	0	0	1861	1859	0
Flt Permitted	0.989			0.999		
Satd. Flow (perm)	1651	0	0	1861	1859	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	291			602	198	
Travel Time (s)	6.6			13.7	4.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	10	1	72	80	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	0	73	81	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 14.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	3	9	1	66	74	1
Future Volume (Veh/h)	3	9	1	66	74	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	10	1	72	80	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					969	
pX, platoon unblocked						
vC, conflicting volume	154	80	81			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	154	80	81			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	836	980	1517			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	13	73	81
Volume Left	3	1	0
Volume Right	10	0	1
cSH	942	1517	1700
Volume to Capacity	0.01	0.00	0.05
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.9	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	14.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	11	31	597	0	0	83
Future Volume (vph)	11	31	597	0	0	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1770	1583	1863	0	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1583	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	225		566			440
Travel Time (s)	5.1		12.9			10.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	34	649	0	0	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	34	649	0	0	90
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	11	31	597	0	0	83
Future Volume (Veh/h)	11	31	597	0	0	83
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	34	649	0	0	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1049
pX, platoon unblocked						
vC, conflicting volume	739	649			649	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	739	649			649	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	93			100	
cM capacity (veh/h)	385	470			937	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	12	34	649	90
Volume Left	12	0	0	0
Volume Right	0	34	0	0
cSH	385	470	1700	937
Volume to Capacity	0.03	0.07	0.38	0.00
Queue Length 95th (ft)	2	6	0	0
Control Delay (s)	14.7	13.3	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.6		0.0	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	0	10	588	176	418	83
Future Volume (vph)	0	10	588	176	418	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.969			
Flt Protected					0.950	
Satd. Flow (prot)	1611	0	1805	0	1770	1863
Flt Permitted					0.950	
Satd. Flow (perm)	1611	0	1805	0	1770	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	239		440			609
Travel Time (s)	5.4		10.0			13.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	11	639	191	454	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	830	0	454	90
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	10	588	176	418	83
Future Volume (Veh/h)	0	10	588	176	418	83
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	11	639	191	454	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						609
pX, platoon unblocked						
vC, conflicting volume	1732	734			830	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1732	734			830	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			43	
cM capacity (veh/h)	42	420			802	

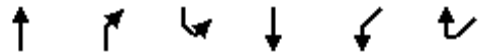
Direction, Lane #	NW 1	NE 1	SW 1	SW 2
Volume Total	11	830	454	90
Volume Left	0	0	454	0
Volume Right	11	191	0	0
cSH	420	1700	802	1700
Volume to Capacity	0.03	0.49	0.57	0.05
Queue Length 95th (ft)	2	0	90	0
Control Delay (s)	13.8	0.0	15.2	0.0
Lane LOS	B		C	
Approach Delay (s)	13.8	0.0	12.7	
Approach LOS	B			

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	319	78	519	306	0	94
Future Volume (vph)	319	78	519	306	0	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.973					0.865
Flt Protected				0.970		
Satd. Flow (prot)	1812	0	0	1807	0	1611
Flt Permitted				0.970		
Satd. Flow (perm)	1812	0	0	1807	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	205			164	566	
Travel Time (s)	4.7			3.7	12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	347	85	564	333	0	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	432	0	0	897	0	102
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

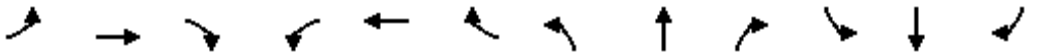
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 73.0%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	319	78	519	306	0	94
Future Volume (Veh/h)	319	78	519	306	0	94
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	347	85	564	333	0	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			432		1850	390
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			432		1850	390
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			50		100	85
cM capacity (veh/h)			1128		41	659

Direction, Lane #	NB 1	SB 1	SW 1
Volume Total	432	897	102
Volume Left	0	564	0
Volume Right	85	0	102
cSH	1700	1128	659
Volume to Capacity	0.25	0.50	0.15
Queue Length 95th (ft)	0	72	14
Control Delay (s)	0.0	9.8	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	9.8	11.5
Approach LOS			B

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

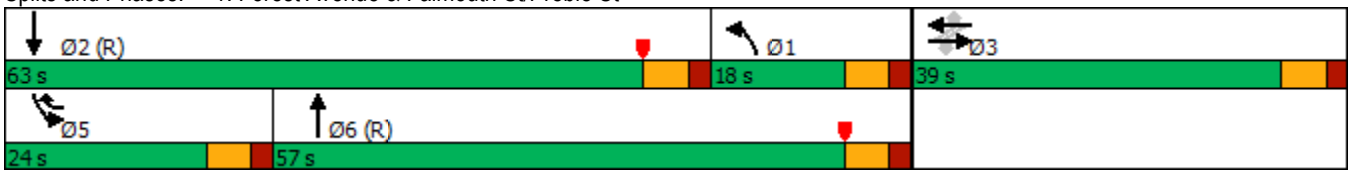


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	44	108	20	142	268	93	947	15	102	779	34
Future Volume (vph)	45	44	108	20	142	268	93	947	15	102	779	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	200		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.994	
Flt Protected		0.975			0.994		0.950			0.950		
Satd. Flow (prot)	0	1852	1615	0	1858	1599	1805	3466	0	1805	3554	0
Flt Permitted		0.482			0.950		0.950			0.950		
Satd. Flow (perm)	0	916	1615	0	1776	1599	1805	3466	0	1805	3554	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140			82		2			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		675			1256			804			1168	
Travel Time (s)		15.3			28.5			18.3			26.5	
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.96	0.96	0.96	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	6%	1%	1%	0%	4%	1%	0%	1%	0%
Adj. Flow (vph)	58	57	140	25	175	331	97	986	16	107	820	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	140	0	200	331	97	1002	0	107	856	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			10			18			16	
Link Offset(ft)		0			-6			0			-2	
Crosswalk Width(ft)		16			16			30			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		3			3	5	1	6		5	2	
Permitted Phases	3		3	3		3						
Detector Phase	3	3	3	3	3	5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	16.0	16.0	37.0		16.0	25.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	24.0	18.0	57.0		24.0	63.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	20.0%	15.0%	47.5%		20.0%	52.5%	
Maximum Green (s)	33.0	33.0	33.0	33.0	33.0	18.0	12.0	51.0		18.0	57.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0			26.0			14.0	
Pedestrian Calls (#/hr)	4	4	4	4	4			7			4	
Act Effct Green (s)		20.4	20.4		20.4	37.8	21.1	74.2		13.3	66.5	
Actuated g/C Ratio		0.17	0.17		0.17	0.32	0.18	0.62		0.11	0.55	
v/c Ratio		0.74	0.36		0.66	0.59	0.31	0.47		0.54	0.43	
Control Delay		73.4	9.0		56.6	28.8	25.3	4.5		74.7	10.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		73.4	9.0		56.6	28.8	25.3	4.5		74.7	10.9	
LOS		E	A		E	C	C	A		E	B	
Approach Delay		38.0			39.3			6.4			18.0	
Approach LOS		D			D			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 21 (18%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 19.3		Intersection LOS: B	
Intersection Capacity Utilization 59.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Forest Avenue & Falmouth St/Preble St

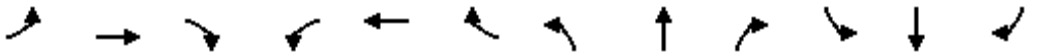




Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	115	140	200	331	97	1002	107	856
v/c Ratio	0.74	0.36	0.66	0.59	0.31	0.47	0.54	0.43
Control Delay	73.4	9.0	56.6	28.8	25.3	4.5	74.7	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.4	9.0	56.6	28.8	25.3	4.5	74.7	10.9
Queue Length 50th (ft)	86	0	147	162	58	56	89	93
Queue Length 95th (ft)	119	31	187	186	m87	41	m119	126
Internal Link Dist (ft)	595		1176			724		1088
Turn Bay Length (ft)		150			200		150	
Base Capacity (vph)	267	570	518	643	317	2144	300	1976
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.25	0.39	0.51	0.31	0.47	0.36	0.43

Intersection Summary

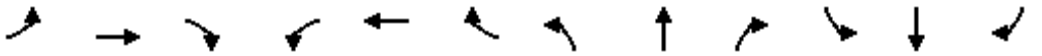
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	44	108	20	142	268	93	947	15	102	779	34
Future Volume (vph)	45	44	108	20	142	268	93	947	15	102	779	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.98	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1853	1615		1858	1599	1805	3464		1805	3553	
Flt Permitted		0.48	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		917	1615		1775	1599	1805	3464		1805	3553	
Peak-hour factor, PHF	0.77	0.77	0.77	0.81	0.81	0.81	0.96	0.96	0.96	0.95	0.95	0.95
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	58	57	140	25	175	331	97	986	16	107	820	36
RTOR Reduction (vph)	0	0	116	0	0	59	0	1	0	0	2	0
Lane Group Flow (vph)	0	115	24	0	200	272	97	1001	0	107	854	0
Heavy Vehicles (%)	0%	0%	0%	6%	1%	1%	0%	4%	1%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		3			3	5	1	6		5	2	
Permitted Phases	3		3	3		3						
Actuated Green, G (s)		18.4	18.4		18.4	29.7	19.1	72.3		11.3	64.5	
Effective Green, g (s)		20.4	20.4		20.4	33.7	21.1	74.3		13.3	66.5	
Actuated g/C Ratio		0.17	0.17		0.17	0.28	0.18	0.62		0.11	0.55	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.5	2.5		2.5	2.0	2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		155	274		301	502	317	2144		200	1968	
v/s Ratio Prot						c0.06	0.05	c0.29		0.06	0.24	
v/s Ratio Perm		c0.13	0.01		0.11	0.11						
v/c Ratio		0.74	0.09		0.66	0.54	0.31	0.47		0.54	0.43	
Uniform Delay, d1		47.3	42.0		46.6	36.6	43.1	12.2		50.4	15.7	
Progression Factor		1.00	1.00		1.00	1.00	0.54	0.29		1.35	0.63	
Incremental Delay, d2		16.5	0.1		4.9	0.6	0.1	0.5		1.0	0.5	
Delay (s)		63.8	42.1		51.5	37.2	23.6	4.1		69.3	10.4	
Level of Service		E	D		D	D	C	A		E	B	
Approach Delay (s)		51.9			42.6			5.8			16.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

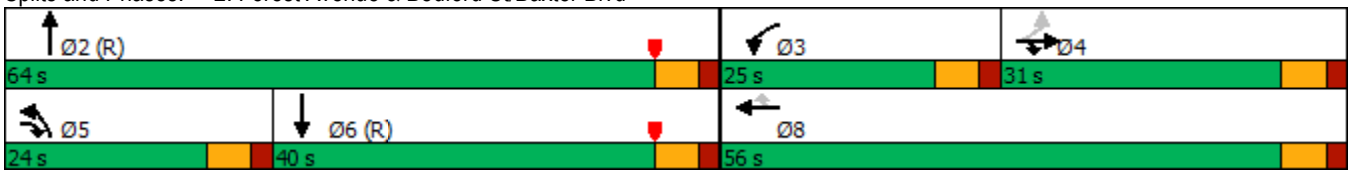


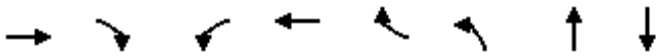
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	153	458	299	113	38	256	959	141	0	885	21
Future Volume (vph)	57	153	458	299	113	38	256	959	141	0	885	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		375	140		75	0		0	0		0
Storage Lanes	0		1	1		1	1		0	0		0
Taper Length (ft)	100			75			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.981			0.996	
Flt Protected		0.987		0.950			0.950					
Satd. Flow (prot)	0	1655	1425	1608	1693	1439	1593	3125	0	0	3173	0
Flt Permitted		0.882		0.950			0.950					
Satd. Flow (perm)	0	1479	1425	1608	1693	1439	1593	3125	0	0	3173	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			82		20			2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			1329			253			804	
Travel Time (s)		13.8			30.2			5.8			18.3	
Peak Hour Factor	0.87	0.87	0.87	0.85	0.85	0.85	0.91	0.91	0.91	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	66	176	526	352	133	45	281	1054	155	0	962	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	242	526	352	133	45	281	1209	0	0	985	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			18			4	
Link Offset(ft)		0			3			0			0	
Crosswalk Width(ft)		20			10			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		15	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1			1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50			50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50			50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Turn Type	Perm	NA	pt+ov	Prot	NA	Perm	Prot	NA			NA	
Protected Phases		4	4 5	3	8		5	2			6	
Permitted Phases	4					8						
Detector Phase	4	4	4 5	3	8	8	5	2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0	5.0	5.0	10.0			10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	29.0	29.0		16.0	29.0	29.0	16.0	34.0			34.0	
Total Split (s)	31.0	31.0		25.0	56.0	56.0	24.0	64.0			40.0	
Total Split (%)	25.8%	25.8%		20.8%	46.7%	46.7%	20.0%	53.3%			33.3%	
Maximum Green (s)	25.0	25.0		19.0	50.0	50.0	18.0	58.0			34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0			4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lost Time Adjust (s)		-4.0		-4.0	-4.0	-4.0	-4.0	-4.0			-4.0	
Total Lost Time (s)		2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lead/Lag	Lag	Lag		Lead			Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	3.5	3.0			3.0	
Recall Mode	None	None		None	None	None	None	C-Min			C-Min	
Walk Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Flash Dont Walk (s)	18.0	18.0			18.0	18.0		23.0			23.0	
Pedestrian Calls (#/hr)	10	10			1	1		1			1	
Act Effct Green (s)		28.5	53.0	23.0	53.5	53.5	22.5	62.5			38.0	
Actuated g/C Ratio		0.24	0.44	0.19	0.45	0.45	0.19	0.52			0.32	
v/c Ratio		0.69	0.78	1.14	0.18	0.07	0.94	0.74			0.98	
Control Delay		52.9	33.3	139.5	20.6	1.0	88.3	25.6			52.0	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay		52.9	33.3	139.5	20.6	1.0	88.3	25.6			52.0	
LOS		D	C	F	C	A	F	C			D	
Approach Delay		39.5			97.9			37.4			52.0	
Approach LOS		D			F			D			D	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 50.1		Intersection LOS: D	
Intersection Capacity Utilization 87.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Forest Avenue & Bedford St/Baxter Blvd



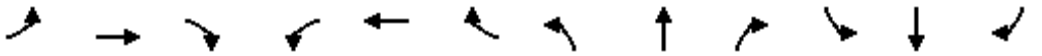


Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	242	526	352	133	45	281	1209	985
v/c Ratio	0.69	0.78	1.14	0.18	0.07	0.94	0.74	0.98
Control Delay	52.9	33.3	139.5	20.6	1.0	88.3	25.6	52.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	33.3	139.5	20.6	1.0	88.3	25.6	52.0
Queue Length 50th (ft)	171	293	~319	60	0	218	367	407
Queue Length 95th (ft)	253	421	#466	95	3	#392	456	#534
Internal Link Dist (ft)	529			1249			173	724
Turn Bay Length (ft)		375	140		75			
Base Capacity (vph)	357	675	308	761	692	298	1636	1006
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.78	1.14	0.17	0.07	0.94	0.74	0.98

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	153	458	299	113	38	256	959	141	0	885	21
Future Volume (vph)	57	153	458	299	113	38	256	959	141	0	885	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95			0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.98			1.00	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1654	1425	1608	1693	1439	1593	3124			3174	
Flt Permitted		0.88	1.00	0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		1478	1425	1608	1693	1439	1593	3124			3174	
Peak-hour factor, PHF	0.87	0.87	0.87	0.85	0.85	0.85	0.91	0.91	0.91	0.92	0.92	0.92
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	66	176	526	352	133	45	281	1054	155	0	962	23
RTOR Reduction (vph)	0	0	46	0	0	25	0	10	0	0	1	0
Lane Group Flow (vph)	0	242	480	352	133	20	281	1199	0	0	984	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pt+ov	Prot	NA	Perm	Prot	NA			NA	
Protected Phases		4	4 5	3	8		5	2			6	
Permitted Phases	4					8						
Actuated Green, G (s)		24.5	49.0	19.0	49.5	49.5	18.5	58.5			34.0	
Effective Green, g (s)		28.5	53.0	23.0	53.5	53.5	22.5	62.5			38.0	
Actuated g/C Ratio		0.24	0.44	0.19	0.45	0.45	0.19	0.52			0.32	
Clearance Time (s)		6.0		6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)		2.0		2.0	2.0	2.0	3.5	3.0			3.0	
Lane Grp Cap (vph)		351	629	308	754	641	298	1627			1005	
v/s Ratio Prot			c0.34	c0.22	0.08		c0.18	0.38			c0.31	
v/s Ratio Perm		0.16				0.01						
v/c Ratio		0.69	0.76	1.14	0.18	0.03	0.94	0.74			0.98	
Uniform Delay, d1		41.7	28.2	48.5	20.0	18.7	48.1	22.4			40.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.69	
Incremental Delay, d2		4.5	4.9	95.7	0.0	0.0	37.3	3.0			22.7	
Delay (s)		46.2	33.2	144.2	20.0	18.7	85.4	25.4			50.8	
Level of Service		D	C	F	C	B	F	C			D	
Approach Delay (s)		37.3			102.4			36.7			50.8	
Approach LOS		D			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	49.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

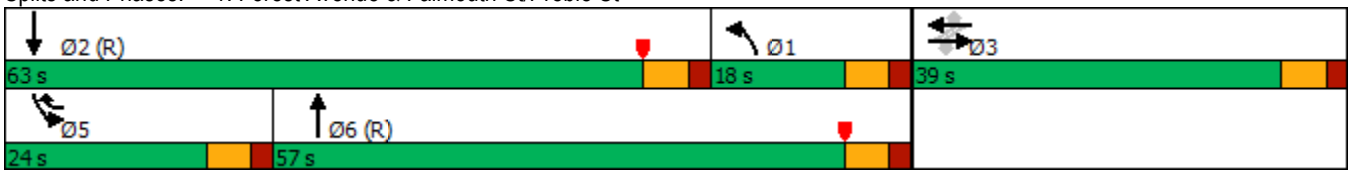
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	44	108	20	141	268	67	947	15	102	786	27
Future Volume (vph)	45	44	108	20	141	268	67	947	15	102	786	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	200		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.995	
Flt Protected		0.975			0.994		0.950			0.950		
Satd. Flow (prot)	0	1852	1615	0	1858	1599	1805	3466	0	1805	3558	0
Flt Permitted		0.485			0.949		0.950			0.950		
Satd. Flow (perm)	0	922	1615	0	1774	1599	1805	3466	0	1805	3558	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140			82		2			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		675			1256			804			1168	
Travel Time (s)		15.3			28.5			18.3			26.5	
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.96	0.96	0.96	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	6%	1%	1%	0%	4%	1%	0%	1%	0%
Adj. Flow (vph)	58	57	140	25	174	331	70	986	16	107	827	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	140	0	199	331	70	1002	0	107	855	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			10			18			16	
Link Offset(ft)		0			-6			0			-2	
Crosswalk Width(ft)		16			16			30			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		3			3	5	1	6		5	2	
Permitted Phases	3		3	3		3						
Detector Phase	3	3	3	3	3	5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	16.0	16.0	37.0		16.0	25.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	24.0	18.0	57.0		24.0	63.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	20.0%	15.0%	47.5%		20.0%	52.5%	
Maximum Green (s)	33.0	33.0	33.0	33.0	33.0	18.0	12.0	51.0		18.0	57.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Flash Dont Walk (s)	21.0	21.0	21.0	21.0	21.0			26.0			14.0	
Pedestrian Calls (#/hr)	4	4	4	4	4			7			4	
Act Effct Green (s)		20.4	20.4		20.4	37.7	18.6	74.3		13.3	71.3	
Actuated g/C Ratio		0.17	0.17		0.17	0.31	0.16	0.62		0.11	0.59	
v/c Ratio		0.74	0.36		0.66	0.59	0.25	0.47		0.54	0.40	
Control Delay		73.0	9.0		56.6	28.8	25.6	4.7		74.7	9.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		73.0	9.0		56.6	28.8	25.6	4.7		74.7	9.9	
LOS		E	A		E	C	C	A		E	A	
Approach Delay		37.9			39.3			6.0			17.1	
Approach LOS		D			D			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 21 (18%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 18.9		Intersection LOS: B	
Intersection Capacity Utilization 59.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Forest Avenue & Falmouth St/Preble St

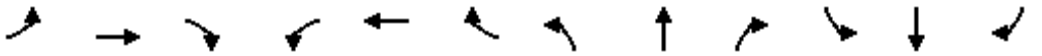




Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	115	140	199	331	70	1002	107	855
v/c Ratio	0.74	0.36	0.66	0.59	0.25	0.47	0.54	0.40
Control Delay	73.0	9.0	56.6	28.8	25.6	4.7	74.7	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	9.0	56.6	28.8	25.6	4.7	74.7	9.9
Queue Length 50th (ft)	86	0	146	162	41	57	89	93
Queue Length 95th (ft)	119	31	186	186	m62	49	m119	126
Internal Link Dist (ft)	595		1176			724		1088
Turn Bay Length (ft)		150			200		150	
Base Capacity (vph)	268	570	517	643	300	2146	300	2120
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.25	0.38	0.51	0.23	0.47	0.36	0.40

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

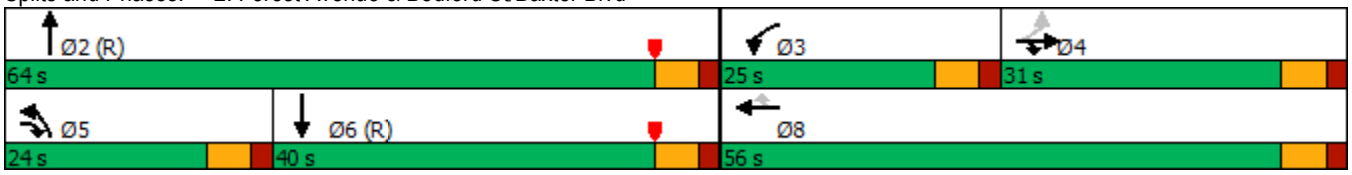


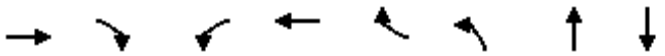
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	154	516	299	114	38	282	933	141	0	827	28
Future Volume (vph)	72	154	516	299	114	38	282	933	141	0	827	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		375	140		75	0		0	0		0
Storage Lanes	0		1	1		1	1		0	0		0
Taper Length (ft)	100			75			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.980			0.995	
Flt Protected		0.984		0.950			0.950					
Satd. Flow (prot)	0	1650	1425	1608	1693	1439	1593	3122	0	0	3169	0
Flt Permitted		0.858		0.950			0.950					
Satd. Flow (perm)	0	1438	1425	1608	1693	1439	1593	3122	0	0	3169	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			82		21			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			1329			253			804	
Travel Time (s)		13.8			30.2			5.8			18.3	
Peak Hour Factor	0.87	0.87	0.87	0.85	0.85	0.85	0.91	0.91	0.91	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	83	177	593	352	134	45	310	1025	155	0	899	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	260	593	352	134	45	310	1180	0	0	929	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			12			18			4	
Link Offset(ft)		0			3			0			0	
Crosswalk Width(ft)		20			10			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		15	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1			1	
Detector Template												
Leading Detector (ft)	50	50	50	50	50	50	50	50			50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0			0	
Detector 1 Size(ft)	50	50	50	50	50	50	50	50			50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Turn Type	Perm	NA	pt+ov	Prot	NA	Perm	Prot	NA			NA	
Protected Phases		4	4 5	3	8		5	2			6	
Permitted Phases	4					8						
Detector Phase	4	4	4 5	3	8	8	5	2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		5.0	5.0	5.0	5.0	10.0			10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	29.0	29.0		16.0	29.0	29.0	16.0	34.0			34.0	
Total Split (s)	31.0	31.0		25.0	56.0	56.0	24.0	64.0			40.0	
Total Split (%)	25.8%	25.8%		20.8%	46.7%	46.7%	20.0%	53.3%			33.3%	
Maximum Green (s)	25.0	25.0		19.0	50.0	50.0	18.0	58.0			34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0			4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lost Time Adjust (s)		-4.0		-4.0	-4.0	-4.0	-4.0	-4.0			-4.0	
Total Lost Time (s)		2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lead/Lag	Lag	Lag		Lead			Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	3.5	3.0			3.0	
Recall Mode	None	None		None	None	None	None	C-Min			C-Min	
Walk Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Flash Dont Walk (s)	18.0	18.0			18.0	18.0		23.0			23.0	
Pedestrian Calls (#/hr)	10	10			1	1		1			1	
Act Effct Green (s)		29.0	53.0	23.0	54.0	54.0	22.0	62.0			38.0	
Actuated g/C Ratio		0.24	0.44	0.19	0.45	0.45	0.18	0.52			0.32	
v/c Ratio		0.75	0.88	1.14	0.18	0.07	1.06	0.73			0.92	
Control Delay		56.9	42.3	139.5	20.5	1.0	116.9	25.3			42.3	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay		56.9	42.3	139.5	20.5	1.0	116.9	25.3			42.3	
LOS		E	D	F	C	A	F	C			D	
Approach Delay		46.7			97.8			44.4			42.3	
Approach LOS		D			F			D			D	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 51.8		Intersection LOS: D	
Intersection Capacity Utilization 90.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Forest Avenue & Bedford St/Baxter Blvd





Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	260	593	352	134	45	310	1180	929
v/c Ratio	0.75	0.88	1.14	0.18	0.07	1.06	0.73	0.92
Control Delay	56.9	42.3	139.5	20.5	1.0	116.9	25.3	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	42.3	139.5	20.5	1.0	116.9	25.3	42.3
Queue Length 50th (ft)	187	365	~319	61	0	~264	353	377
Queue Length 95th (ft)	#280	#557	#466	96	3	#445	438	#484
Internal Link Dist (ft)	529			1249			173	724
Turn Bay Length (ft)		375	140		75			
Base Capacity (vph)	347	675	308	761	692	292	1623	1005
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.88	1.14	0.18	0.07	1.06	0.73	0.92

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	98	0	0	130	0	0
Future Volume (vph)	98	0	0	130	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1863	0	0	1863	1863	0
Flt Permitted						
Satd. Flow (perm)	1863	0	0	1863	1863	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	136			675	183	
Travel Time (s)	3.1			15.3	4.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	107	0	0	141	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	0	0	141	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

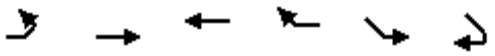
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	10.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	98	0	0	130	0	0
Future Volume (Veh/h)	98	0	0	130	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	107	0	0	141	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				675		
pX, platoon unblocked						
vC, conflicting volume			107		248	107
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			107		248	107
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1484		740	947

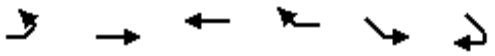
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	107	141	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1484	1700
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	10.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	2	94	122	8	4	3
Future Volume (vph)	2	94	122	8	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.991		0.942	
Flt Protected		0.999			0.972	
Satd. Flow (prot)	0	1861	1846	0	1706	0
Flt Permitted		0.999			0.972	
Satd. Flow (perm)	0	1861	1846	0	1706	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		733	136		287	
Travel Time (s)		16.7	3.1		6.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	2	102	133	9	4	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	104	142	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 16.9%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	2	94	122	8	4	3
Future Volume (Veh/h)	2	94	122	8	4	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	102	133	9	4	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			811			
pX, platoon unblocked						
vC, conflicting volume	142				244	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	142				244	138
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1441				744	911

Direction, Lane #	EB 1	WB 1	SE 1
Volume Total	104	142	7
Volume Left	2	0	4
Volume Right	0	9	3
cSH	1441	1700	807
Volume to Capacity	0.00	0.08	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.2	0.0	9.5
Lane LOS	A		A
Approach Delay (s)	0.2	0.0	9.5
Approach LOS			A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	16.9%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	62	318	368	0	0	267
Future Volume (vph)	62	318	368	0	0	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1770	1583	1863	0	0	1863
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1583	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	218		550			444
Travel Time (s)	5.0		12.5			10.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	67	346	400	0	0	290
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	346	400	0	0	290
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	62	318	368	0	0	267
Future Volume (Veh/h)	62	318	368	0	0	267
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	346	400	0	0	290
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1053
pX, platoon unblocked						
vC, conflicting volume	690	400			400	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	690	400			400	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	47			100	
cM capacity (veh/h)	411	650			1159	

Direction, Lane #	NW 1	NW 2	NE 1	SW 1
Volume Total	67	346	400	290
Volume Left	67	0	0	0
Volume Right	0	346	0	0
cSH	411	650	1700	1159
Volume to Capacity	0.16	0.53	0.24	0.00
Queue Length 95th (ft)	14	79	0	0
Control Delay (s)	15.5	16.7	0.0	0.0
Lane LOS	C	C		
Approach Delay (s)	16.5		0.0	0.0
Approach LOS	C			

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	0	40	670	26	158	267
Future Volume (vph)	0	40	670	26	158	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.995			
Flt Protected					0.950	
Satd. Flow (prot)	1611	0	1853	0	1770	1863
Flt Permitted					0.950	
Satd. Flow (perm)	1611	0	1853	0	1770	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	212		444			609
Travel Time (s)	4.8		10.1			13.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	0	43	728	28	172	290
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	756	0	172	290
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 58.9%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	40	670	26	158	267
Future Volume (Veh/h)	0	40	670	26	158	267
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	43	728	28	172	290
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						609
pX, platoon unblocked						
vC, conflicting volume	1376	742			756	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1376	742			756	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	90			80	
cM capacity (veh/h)	128	416			855	

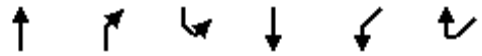
Direction, Lane #	NB 1	NE 1	SW 1	SW 2
Volume Total	43	756	172	290
Volume Left	0	0	172	0
Volume Right	43	28	0	0
cSH	416	1700	855	1700
Volume to Capacity	0.10	0.44	0.20	0.17
Queue Length 95th (ft)	9	0	19	0
Control Delay (s)	14.7	0.0	10.3	0.0
Lane LOS	B		B	
Approach Delay (s)	14.7	0.0	3.8	
Approach LOS	B			

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	495	57	311	301	0	301
Future Volume (vph)	495	57	311	301	0	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986					0.865
Flt Protected				0.975		
Satd. Flow (prot)	1837	0	0	1816	0	1611
Flt Permitted				0.975		
Satd. Flow (perm)	1837	0	0	1816	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	214			201	550	
Travel Time (s)	4.9			4.6	12.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	538	62	338	327	0	327
Shared Lane Traffic (%)						
Lane Group Flow (vph)	600	0	0	665	0	327
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	495	57	311	301	0	301
Future Volume (Veh/h)	495	57	311	301	0	301
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	538	62	338	327	0	327
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			600		1572	569
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			600		1572	569
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			65		100	37
cM capacity (veh/h)			977		79	522

Direction, Lane #	NB 1	SB 1	SW 1
Volume Total	600	665	327
Volume Left	0	338	0
Volume Right	62	0	327
cSH	1700	977	522
Volume to Capacity	0.35	0.35	0.63
Queue Length 95th (ft)	0	39	107
Control Delay (s)	0.0	7.6	22.8
Lane LOS		A	C
Approach Delay (s)	0.0	7.6	22.8
Approach LOS			C

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: 101 [AM Peak Hour - 2028 Build - Bedford Garage]

Deering Ave / Brighton Ave / Falmouth St
Portland, ME
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Deering Ave											
21	L2	9	0.0	0.379	6.1	LOS A	2.7	19.3	0.33	0.44	39.5
21a	L1	284	2.4	0.379	5.3	LOS A	2.7	19.3	0.33	0.44	39.1
22	T1	143	1.0	0.379	1.6	LOS A	2.7	19.3	0.33	0.44	39.1
23	R2	25	0.0	0.379	2.2	LOS A	2.7	19.3	0.33	0.44	38.3
Approach		460	1.8	0.379	4.0	LOS A	2.7	19.3	0.33	0.44	39.0
NorthEast: Falmouth St											
24	L2	34	0.0	0.128	8.6	LOS A	0.7	4.8	0.59	0.61	39.1
25	T1	13	0.0	0.128	4.2	LOS A	0.7	4.8	0.59	0.61	38.7
26a	R1	48	0.0	0.128	4.1	LOS A	0.7	4.8	0.59	0.61	38.4
26	R2	4	0.0	0.128	4.7	LOS A	0.7	4.8	0.59	0.61	38.0
Approach		98	0.0	0.128	5.7	LOS A	0.7	4.8	0.59	0.61	38.7
NorthWest: Deering Ave											
27	L2	1	0.0	0.388	9.2	LOS A	2.1	15.3	0.63	0.64	39.4
28	T1	240	5.4	0.388	5.0	LOS A	2.1	15.3	0.63	0.64	39.0
29	R2	10	0.0	0.388	5.4	LOS A	2.1	15.3	0.63	0.64	38.2
29b	R3	2	0.0	0.388	5.8	LOS A	2.1	15.3	0.63	0.64	38.0
Approach		253	5.1	0.388	5.0	LOS A	2.1	15.3	0.63	0.64	39.0
West: Brighton Ave											
10b	L3	1	0.0	0.839	16.9	LOS B	15.0	107.1	1.00	1.13	37.0
10a	L1	40	0.0	0.839	15.4	LOS B	15.0	107.1	1.00	1.13	36.4
12a	R1	704	2.7	0.839	11.7	LOS B	15.0	107.1	1.00	1.13	36.1
12b	R3	2	0.0	0.839	12.7	LOS B	15.0	107.1	1.00	1.13	35.5
Approach		748	2.5	0.839	11.9	LOS B	15.0	107.1	1.00	1.13	36.1
SouthWest: Falmouth St											
30b	L3	1	0.0	0.167	16.1	LOS B	1.1	7.9	0.92	0.90	36.8
30	L2	14	0.0	0.167	15.4	LOS B	1.1	7.9	0.92	0.90	36.5
31	T1	24	0.0	0.167	11.0	LOS B	1.1	7.9	0.92	0.90	36.1
32	R2	20	8.0	0.167	12.1	LOS B	1.1	7.9	0.92	0.90	35.5
Approach		59	2.7	0.167	12.5	LOS B	1.1	7.9	0.92	0.90	36.0
All Vehicles		1618	2.6	0.839	8.3	LOS A	15.0	107.1	0.72	0.81	37.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM Peak Hour - 2028 Build - Bedford Garage]

Deering Ave / Brighton Ave / Falmouth St
Portland, ME
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Deering Ave											
21	L2	23	0.0	0.675	6.5	LOS A	7.4	52.6	0.52	0.48	39.1
21a	L1	563	1.7	0.675	5.8	LOS A	7.4	52.6	0.52	0.48	38.7
22	T1	234	0.7	0.675	2.1	LOS A	7.4	52.6	0.52	0.48	38.7
23	R2	30	0.0	0.675	2.6	LOS A	7.4	52.6	0.52	0.48	37.9
Approach		849	1.3	0.675	4.7	LOS A	7.4	52.6	0.52	0.48	38.7
NorthEast: Falmouth St											
24	L2	36	0.0	0.407	14.6	LOS B	2.8	19.8	0.88	0.96	37.1
25	T1	33	0.0	0.407	10.2	LOS B	2.8	19.8	0.88	0.96	36.7
26a	R1	118	0.0	0.407	10.1	LOS B	2.8	19.8	0.88	0.96	36.5
26	R2	13	0.0	0.407	10.7	LOS B	2.8	19.8	0.88	0.96	36.0
Approach		199	0.0	0.407	11.0	LOS B	2.8	19.8	0.88	0.96	36.6
NorthWest: Deering Ave											
27	L2	9	16.7	0.435	16.5	LOS B	2.7	19.0	0.82	0.92	37.0
28	T1	175	0.0	0.435	10.9	LOS B	2.7	19.0	0.82	0.92	36.7
29	R2	7	0.0	0.435	11.4	LOS B	2.7	19.0	0.82	0.92	36.0
29b	R3	1	0.0	0.435	11.9	LOS B	2.7	19.0	0.82	0.92	35.8
Approach		193	0.7	0.435	11.1	LOS B	2.7	19.0	0.82	0.92	36.6
West: Brighton Ave											
10b	L3	1	0.0	0.567	9.5	LOS A	4.9	34.8	0.72	0.66	39.9
10a	L1	33	0.0	0.567	8.0	LOS A	4.9	34.8	0.72	0.66	39.1
12a	R1	472	3.0	0.567	4.3	LOS A	4.9	34.8	0.72	0.66	38.8
12b	R3	1	0.0	0.567	5.3	LOS A	4.9	34.8	0.72	0.66	38.1
Approach		507	2.8	0.567	4.6	LOS A	4.9	34.8	0.72	0.66	38.8
SouthWest: Falmouth St											
30b	L3	4	0.0	0.102	11.4	LOS B	0.6	4.2	0.75	0.71	38.8
30	L2	8	20.0	0.102	11.6	LOS B	0.6	4.2	0.75	0.71	38.4
31	T1	34	0.0	0.102	6.3	LOS A	0.6	4.2	0.75	0.71	38.0
32	R2	13	0.0	0.102	6.8	LOS A	0.6	4.2	0.75	0.71	37.3
Approach		59	2.9	0.102	7.5	LOS A	0.6	4.2	0.75	0.71	38.0
All Vehicles		1806	1.6	0.675	6.1	LOS A	7.4	52.6	0.65	0.63	38.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6153	6007	5941	6045	5997	6028
Vehs Exited	6039	5868	5821	5950	5873	5911
Starting Vehs	150	136	152	159	164	151
Ending Vehs	264	275	272	254	288	266
Travel Distance (mi)	2606	2563	2561	2595	2570	2579
Travel Time (hr)	353.7	332.2	450.2	376.6	387.3	380.0
Total Delay (hr)	255.0	235.6	353.4	278.4	290.2	282.5
Total Stops	5096	4881	5040	4951	5263	5042
Fuel Used (gal)	153.3	146.5	172.9	157.1	159.1	157.8

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6153	6007	5941	6045	5997	6028
Vehs Exited	6039	5868	5821	5950	5873	5911
Starting Vehs	150	136	152	159	164	151
Ending Vehs	264	275	272	254	288	266
Travel Distance (mi)	2606	2563	2561	2595	2570	2579
Travel Time (hr)	353.7	332.2	450.2	376.6	387.3	380.0
Total Delay (hr)	255.0	235.6	353.4	278.4	290.2	282.5
Total Stops	5096	4881	5040	4951	5263	5042
Fuel Used (gal)	153.3	146.5	172.9	157.1	159.1	157.8

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	120	67	109	47	146	135	169	225	1190	1188
Average Queue (ft)	54	21	35	12	55	25	37	176	892	909
95th Queue (ft)	101	53	84	34	114	86	114	285	1559	1536
Link Distance (ft)	698		1192	1192		669	669		1136	1136
Upstream Blk Time (%)									56	58
Queuing Penalty (veh)									0	0
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	0					0		9	55	
Queuing Penalty (veh)	0					0		39	90	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	196	316	215	453	82	208	201	210	732	739
Average Queue (ft)	88	155	177	165	7	197	113	129	680	696
95th Queue (ft)	160	258	245	421	38	206	186	202	812	801
Link Distance (ft)	523			1118		192	192	192	669	669
Upstream Blk Time (%)						52	1	2	39	58
Queuing Penalty (veh)						181	2	6	174	259
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)		0	34	1						
Queuing Penalty (veh)		0	26	1						

Intersection: 66: Forest Avenue

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	291	432	8	118	40	44
Average Queue (ft)	108	123	0	63	3	3
95th Queue (ft)	222	342	7	132	18	20
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)			0	6		
Queuing Penalty (veh)			0	16		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 795

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:57	3:57	3:57	3:57	3:57	3:57
End Time	5:00	5:00	5:00	5:00	5:00	5:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8442	8355	8274	8356	8315	8349
Vehs Exited	8136	8046	8007	8007	8053	8054
Starting Vehs	238	195	247	234	227	226
Ending Vehs	544	504	514	583	489	525
Travel Distance (mi)	4083	4033	3997	4040	4018	4034
Travel Time (hr)	533.1	545.8	529.2	497.6	597.7	540.7
Total Delay (hr)	382.5	396.9	381.6	348.6	449.2	391.7
Total Stops	9064	8840	9192	8744	8401	8845
Fuel Used (gal)	233.4	235.2	230.3	223.6	246.3	233.7

Interval #0 Information Seeding

Start Time	3:57
End Time	4:00
Total Time (min)	3

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8442	8355	8274	8356	8315	8349
Vehs Exited	8136	8046	8007	8007	8053	8054
Starting Vehs	238	195	247	234	227	226
Ending Vehs	544	504	514	583	489	525
Travel Distance (mi)	4083	4033	3997	4040	4018	4034
Travel Time (hr)	533.1	545.8	529.2	497.6	597.7	540.7
Total Delay (hr)	382.5	396.9	381.6	348.6	449.2	391.7
Total Stops	9064	8840	9192	8744	8401	8845
Fuel Used (gal)	233.4	235.2	230.3	223.6	246.3	233.7

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	163	153	187	182	112	235	239	225	1162	1172
Average Queue (ft)	71	65	100	80	49	52	59	144	874	893
95th Queue (ft)	128	119	170	146	94	146	160	285	1510	1495
Link Distance (ft)	604		1193	1193		681	681		1137	1137
Upstream Blk Time (%)									52	57
Queuing Penalty (veh)									0	0
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	0	0				0		1	54	
Queuing Penalty (veh)	0	0				0		5	55	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	512	399	215	1080	21	185	189	203	735	738
Average Queue (ft)	243	302	211	714	3	172	161	171	678	696
95th Queue (ft)	507	433	232	1284	15	194	210	220	842	815
Link Distance (ft)	525			1275		165	165	165	681	681
Upstream Blk Time (%)	5			8		60	11	20	24	49
Queuing Penalty (veh)	34			0		315	58	103	108	223
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)	1	12	77	0						
Queuing Penalty (veh)	3	28	118	1						

Intersection: 67: Forest Avenue

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	297	626	62	133	112	125
Average Queue (ft)	113	212	7	71	23	28
95th Queue (ft)	240	539	35	146	80	89
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)		0	0	11	0	1
Queuing Penalty (veh)		0	2	42	1	3
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 1100

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6133	6205	6083	6142	6161	6141
Vehs Exited	6000	6081	5975	5995	6017	6014
Starting Vehs	149	133	181	127	132	139
Ending Vehs	282	257	289	274	276	271
Travel Distance (mi)	2677	2691	2659	2651	2689	2674
Travel Time (hr)	286.5	367.6	356.3	280.2	307.8	319.7
Total Delay (hr)	185.4	266.2	255.9	180.0	206.4	218.8
Total Stops	5079	4791	4821	4914	4906	4905
Fuel Used (gal)	139.5	158.6	154.9	136.8	144.5	146.8

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6133	6205	6083	6142	6161	6141
Vehs Exited	6000	6081	5975	5995	6017	6014
Starting Vehs	149	133	181	127	132	139
Ending Vehs	282	257	289	274	276	271
Travel Distance (mi)	2677	2691	2659	2651	2689	2674
Travel Time (hr)	286.5	367.6	356.3	280.2	307.8	319.7
Total Delay (hr)	185.4	266.2	255.9	180.0	206.4	218.8
Total Stops	5079	4791	4821	4914	4906	4905
Fuel Used (gal)	139.5	158.6	154.9	136.8	144.5	146.8

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.9	0.2	0.1	0.1	0.0	0.0	0.0	241.8	231.4	272.5
Total Del/Veh (s)	52.0	50.6	31.3	43.1	50.6	6.8	35.7	4.1	3.0	251.9	297.5	360.1

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	All
Denied Del/Veh (s)	114.5
Total Del/Veh (s)	135.2

2: Forest Avenue & Bedford St/Baxter Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	3.3	0.7	3.5	15.9	11.7	13.4	8.7	0.0	8.7
Total Del/Veh (s)	42.0	40.3	25.3	36.7	21.8	8.9	53.8	14.8	11.4	207.0	215.9	69.8

3: USM & Falmouth St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.3	0.1	4.0	2.0	5.3	2.7	2.0

6: Falmouth St & Oakdale St Performance by movement

Movement	SEL	SER	NEL	NET	SWT	SWR	All
Denied Del/Veh (s)	0.1	0.1		0.2	0.0	0.0	0.1
Total Del/Veh (s)	4.8	2.5		0.1	0.4	0.2	0.5

14: Forest Avenue Performance by movement

Movement	SET	SER	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.7	0.9	0.4	1.1

17: Bedford St Performance by movement

Movement	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.1	1.3	15.6	13.0	7.6

19: Bedford St Performance by movement

Movement	NWL	NWR	NET	SWT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	9.6	4.4	0.6	1.6	1.2

64: Forest Avenue Performance by movement

Movement	SET	SER	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.1	1.0	1.9	1.3

66: Forest Avenue Performance by movement

Movement	EBR	WBR	SET	NWT	All
Denied Del/Veh (s)	0.6	0.2	0.0	0.0	0.2
Total Del/Veh (s)	7.6	13.6	0.4	1.5	3.7

68: Forest Avenue Performance by movement

Movement	SET	SER	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.7	1.4	2.6	2.1

72: Forest Avenue Performance by movement

Movement	SET	NWT	NWR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.4	0.6	0.5	0.4

74: Forest Avenue Performance by movement

Movement	EBR	SET	All
Denied Del/Veh (s)	0.3	0.0	0.1
Total Del/Veh (s)	4.9	0.4	1.3

75: Forest Avenue Performance by movement

Movement	WBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.2	0.3	0.4	0.4	0.3
Total Del/Veh (s)	2.1	0.8	8.9	9.6	6.0

255: Deering St & Bedford St Performance by movement

Movement	NBT	NBR	SBL	SBT	SWR	All
Denied Del/Veh (s)	0.3	0.4	3.1	3.2	0.1	2.0
Total Del/Veh (s)	1.4	0.5	7.3	6.7	4.4	5.0

Total Network Performance

Denied Del/Veh (s)	43.0
Total Del/Veh (s)	81.8

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	142	95	79	50	223	168	150	225	1182	1181
Average Queue (ft)	62	34	31	11	112	23	27	175	903	914
95th Queue (ft)	119	71	70	32	193	89	101	288	1559	1536
Link Distance (ft)	698		1192	1192		669	669		1136	1136
Upstream Blk Time (%)									55	57
Queuing Penalty (veh)									0	0
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	0	0			1	0		9	59	
Queuing Penalty (veh)	0	0			2	0		36	97	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	255	314	208	218	25	203	202	214	730	734
Average Queue (ft)	88	152	131	44	6	183	142	154	671	689
95th Queue (ft)	178	253	194	125	22	225	213	230	836	812
Link Distance (ft)	523			1118		192	192	192	669	669
Upstream Blk Time (%)	0					26	1	3	35	49
Queuing Penalty (veh)	0					92	5	12	156	218
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)		0	7	1						
Queuing Penalty (veh)		0	5	3						

Intersection: 3: USM & Falmouth St

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	63	50
Average Queue (ft)	11	19
95th Queue (ft)	41	45
Link Distance (ft)	698	158
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Falmouth St & Oakdale St

Movement	SE
Directions Served	LR
Maximum Queue (ft)	35
Average Queue (ft)	12
95th Queue (ft)	37
Link Distance (ft)	262
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: Forest Avenue

Movement	SE	SE
Directions Served	T	TR
Maximum Queue (ft)	18	46
Average Queue (ft)	1	4
95th Queue (ft)	7	24
Link Distance (ft)	308	308
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 17: Bedford St

Movement	NE	SW
Directions Served	TR	LT
Maximum Queue (ft)	42	269
Average Queue (ft)	9	167
95th Queue (ft)	30	260
Link Distance (ft)	505	384
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 19: Bedford St

Movement	NW
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	6
95th Queue (ft)	25
Link Distance (ft)	208
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 64: Forest Avenue

Movement	SE	SE	NW	NW	NW
Directions Served	R	R	T	T	T
Maximum Queue (ft)	25	57	54	62	71
Average Queue (ft)	1	4	12	19	8
95th Queue (ft)	12	28	45	61	39
Link Distance (ft)	59	59	110	110	110
Upstream Blk Time (%)	0	0			0
Queuing Penalty (veh)	0	0			0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 66: Forest Avenue

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	341	180	35	114	27	36
Average Queue (ft)	107	60	1	24	1	3
95th Queue (ft)	232	136	14	84	12	18
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)	0		0	1		
Queuing Penalty (veh)	0		0	3		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 68: Forest Avenue

Movement	SE	NW	NW	NW
Directions Served	T	T	T	T
Maximum Queue (ft)	57	72	40	66
Average Queue (ft)	2	38	3	12
95th Queue (ft)	28	90	23	50
Link Distance (ft)	192	53	53	53
Upstream Blk Time (%)	0	17	0	1
Queuing Penalty (veh)	0	59	1	5
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 72: Forest Avenue

Movement	NW
Directions Served	T
Maximum Queue (ft)	56
Average Queue (ft)	3
95th Queue (ft)	23
Link Distance (ft)	308
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 74: Forest Avenue

Movement	EB	SE	SE
Directions Served	R	T	T
Maximum Queue (ft)	125	15	62
Average Queue (ft)	56	1	12
95th Queue (ft)	94	11	40
Link Distance (ft)	1088	84	84
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 75: Forest Avenue

Movement	SE	NW	NW
Directions Served	T	T	TR
Maximum Queue (ft)	11	144	389
Average Queue (ft)	0	6	25
95th Queue (ft)	5	62	166
Link Distance (ft)	110	1537	1537
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 255: Deering St & Bedford St

Movement	NB	SB	SW
Directions Served	TR	LT	R
Maximum Queue (ft)	36	168	71
Average Queue (ft)	3	128	34
95th Queue (ft)	18	185	57
Link Distance (ft)	177	136	505
Upstream Blk Time (%)		13	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 696

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Phase	1	2	3	5	6
Movement(s) Served	NBL	SBT	EBWB	SBL	NBT
Maximum Green (s)	21.0	53.0	28.0	24.0	50.0
Minimum Green (s)	5.0	10.0	5.0	5.0	10.0
Recall	None	C-Min	None	None	C-Min
Avg. Green (s)	15.0	75.1	13.1	13.1	78.7
g/C Ratio	NA	NA	NA	-0.01	NA
Cycles Skipped (%)	0	0	0	18	0
Cycles @ Minimum (%)	3	0	0	9	0
Cycles Maxed Out (%)	10	100	0	0	100
Cycles with Peds (%)	0	17	10	0	14

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Phase	2	3	4	5	6	8
Movement(s) Served	NBT	WBL	EBTL	NBL	SBT	WBTL
Maximum Green (s)	62.0	17.0	23.0	25.0	31.0	46.0
Minimum Green (s)	10.0	5.0	7.0	5.0	10.0	5.0
Recall	C-Min	None	None	None	C-Min	None
Avg. Green (s)	65.2	14.4	22.9	27.2	32.0	43.7
g/C Ratio	NA	NA	NA	NA	NA	NA
Cycles Skipped (%)	0	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0
Cycles Maxed Out (%)	100	45	57	83	100	59
Cycles with Peds (%)	17	0	30	0	10	14

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8387	8198	8395	8526	8292	8362
Vehs Exited	8073	7915	8171	8247	8065	8092
Starting Vehs	195	223	209	224	211	211
Ending Vehs	509	506	433	503	438	477
Travel Distance (mi)	4021	3990	4094	4136	4009	4050
Travel Time (hr)	566.2	604.9	506.5	497.3	515.5	538.1
Total Delay (hr)	417.9	458.2	355.9	345.1	367.8	389.0
Total Stops	8141	8432	8223	8294	8209	8256
Fuel Used (gal)	238.1	246.9	227.5	226.6	227.0	233.2

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8387	8198	8395	8526	8292	8362
Vehs Exited	8073	7915	8171	8247	8065	8092
Starting Vehs	195	223	209	224	211	211
Ending Vehs	509	506	433	503	438	477
Travel Distance (mi)	4021	3990	4094	4136	4009	4050
Travel Time (hr)	566.2	604.9	506.5	497.3	515.5	538.1
Total Delay (hr)	417.9	458.2	355.9	345.1	367.8	389.0
Total Stops	8141	8432	8223	8294	8209	8256
Fuel Used (gal)	238.1	246.9	227.5	226.6	227.0	233.2

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.6	0.2	0.2	0.2	0.0	0.0	0.0	302.5	287.1	309.3
Total Del/Veh (s)	50.2	43.3	33.8	61.8	52.9	14.4	43.6	6.9	7.1	244.6	346.5	506.6

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	All
Denied Del/Veh (s)	107.7
Total Del/Veh (s)	119.0

2: Forest Avenue & Bedford St/Baxter Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.3	0.5	3.0	0.9	2.9	0.0	0.0	0.0	8.5	0.0	2.2
Total Del/Veh (s)	48.0	49.7	38.1	44.7	22.1	8.8	71.1	18.2	15.5	190.8	205.2	65.5

5: USM & Falmouth St Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Total Del/Veh (s)	0.2	0.0	3.8	2.1	5.6	3.2	2.2

12: Falmouth St & Oakdale St Performance by movement

Movement	EBL	EBT	WBT	WBR	SEL	SER	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	1.7	0.2	0.4	0.2	5.8	3.3	0.4

14: Forest Avenue Performance by movement

Movement	SET	SER	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.9	1.7	0.5	1.2

16: Bedford St Performance by movement

Movement	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.8	0.6	3.8	1.5	1.3

18: Bedford St Performance by movement

Movement	NBL	NBR	NET	SWT	All
Denied Del/Veh (s)	0.4	0.3	0.0	0.0	0.1
Total Del/Veh (s)	13.1	9.4	0.7	1.5	4.3

64: Forest Avenue Performance by movement

Movement	WBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.3	3.8	65.8	63.8	35.8
Total Del/Veh (s)	2.6	1.3	173.4	186.0	93.2

65: Forest Avenue Performance by movement

Movement	SET	SER	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.3	0.9	2.4	1.7

67: Forest Avenue Performance by movement

Movement	EBR	WBR	SET	NWT	All
Denied Del/Veh (s)	0.4	37.5	0.0	0.1	3.1
Total Del/Veh (s)	11.2	138.0	0.6	3.9	14.6

69: Forest Avenue Performance by movement

Movement	SET	SER	NWT	SWR	All
Denied Del/Veh (s)	0.0	0.0	0.1	107.6	6.3
Total Del/Veh (s)	1.6	1.1	5.2	194.8	13.5

73: Forest Avenue Performance by movement

Movement	SET	NWT	NWR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.5	2.4	1.6	1.3

75: Forest Avenue Performance by movement

Movement	EBR	SET	All
Denied Del/Veh (s)	0.3	0.0	0.1
Total Del/Veh (s)	7.5	0.5	2.4

255: Deering St & Bedford St Performance by movement

Movement	NBT	NBR	SBL	SBT	SWT	SWR	All
Denied Del/Veh (s)	0.5	0.4	1.2	1.2	0.0	0.0	0.6
Total Del/Veh (s)	1.3	0.4	8.5	6.1	0.7	9.7	4.8

Total Network Performance

Denied Del/Veh (s)	50.7
Total Del/Veh (s)	111.8

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	182	156	280	183	146	212	238	225	1169	1171
Average Queue (ft)	69	66	116	79	67	59	65	144	902	920
95th Queue (ft)	141	122	218	148	126	156	174	291	1540	1529
Link Distance (ft)	604		1193	1193		681	681		1137	1137
Upstream Blk Time (%)									56	60
Queuing Penalty (veh)									0	0
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	2	0				0		1	59	
Queuing Penalty (veh)	2	0				0		4	60	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	470	398	214	321	40	181	196	202	738	733
Average Queue (ft)	165	240	167	104	9	163	165	174	676	693
95th Queue (ft)	314	374	231	258	27	204	205	208	835	813
Link Distance (ft)	526			1275		165	165	165	681	681
Upstream Blk Time (%)	0					40	13	22	24	46
Queuing Penalty (veh)	1					210	68	114	108	208
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)		2	20	3						
Queuing Penalty (veh)		4	31	9						

Intersection: 5: USM & Falmouth St

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	34	62
Average Queue (ft)	3	35
95th Queue (ft)	21	56
Link Distance (ft)	604	154
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Falmouth St & Oakdale St

Movement	EB	SE
Directions Served	LT	LR
Maximum Queue (ft)	6	36
Average Queue (ft)	0	5
95th Queue (ft)	4	24
Link Distance (ft)	710	258
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 14: Forest Avenue

Movement	SE	SE	NW	NW
Directions Served	T	TR	T	T
Maximum Queue (ft)	17	56	15	9
Average Queue (ft)	1	3	1	0
95th Queue (ft)	12	23	11	7
Link Distance (ft)	308	308	59	59
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 16: Bedford St

Movement	SW
Directions Served	LT
Maximum Queue (ft)	95
Average Queue (ft)	21
95th Queue (ft)	69
Link Distance (ft)	387
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 18: Bedford St

Movement	NB	NE
Directions Served	LR	TR
Maximum Queue (ft)	180	6
Average Queue (ft)	89	0
95th Queue (ft)	152	4
Link Distance (ft)	183	387
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 64: Forest Avenue

Movement	WB	SE	NW	NW
Directions Served	R	T	T	TR
Maximum Queue (ft)	22	21	2452	2448
Average Queue (ft)	1	1	1944	1977
95th Queue (ft)	11	15	3062	3034
Link Distance (ft)	874	110	2402	2402
Upstream Blk Time (%)			39	51
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 65: Forest Avenue

Movement	SE	SE	NW	NW	NW
Directions Served	R	R	T	T	T
Maximum Queue (ft)	32	33	55	102	114
Average Queue (ft)	3	4	12	22	18
95th Queue (ft)	24	26	46	76	70
Link Distance (ft)	59	59	110	110	110
Upstream Blk Time (%)	0	0		0	0
Queuing Penalty (veh)	0	0		1	1
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 67: Forest Avenue

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	331	572	51	120	107	120
Average Queue (ft)	115	264	5	42	24	30
95th Queue (ft)	242	848	27	118	79	90
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)		9	0	9	0	0
Queuing Penalty (veh)		0	1	35	1	2
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 69: Forest Avenue

Movement	SE	NW	NW	NW	SW
Directions Served	T	T	T	T	R
Maximum Queue (ft)	50	75	88	95	465
Average Queue (ft)	3	49	41	58	238
95th Queue (ft)	23	96	92	104	542
Link Distance (ft)	165	53	53	53	565
Upstream Blk Time (%)		30	8	15	15
Queuing Penalty (veh)		141	36	68	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 73: Forest Avenue

Movement	SE	SE	NW	NW	NW
Directions Served	T	T	T	T	TR
Maximum Queue (ft)	13	29	112	23	48
Average Queue (ft)	1	1	17	1	3
95th Queue (ft)	8	15	106	10	27
Link Distance (ft)	111	111	308	308	308
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			0		
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 75: Forest Avenue

Movement	EB	SE
Directions Served	R	T
Maximum Queue (ft)	164	80
Average Queue (ft)	79	17
95th Queue (ft)	134	55
Link Distance (ft)	1088	84
Upstream Blk Time (%)		0
Queuing Penalty (veh)		1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 255: Deering St & Bedford St

Movement	NB	SB	SW
Directions Served	TR	LT	R
Maximum Queue (ft)	34	202	139
Average Queue (ft)	3	108	73
95th Queue (ft)	19	195	118
Link Distance (ft)	185	173	488
Upstream Blk Time (%)		5	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1107

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Phase	1	2	3	5	6
Movement(s) Served	NBL	SBT	EBWB	SBL	NBT
Maximum Green (s)	12.0	57.0	33.0	18.0	51.0
Minimum Green (s)	5.0	10.0	5.0	5.0	10.0
Recall	None	C-Min	None	None	C-Min
Avg. Green (s)	10.7	68.3	25.2	11.2	68.0
g/C Ratio	-0.01	NA	NA	-0.01	NA
Cycles Skipped (%)	7	0	0	21	0
Cycles @ Minimum (%)	11	0	0	9	0
Cycles Maxed Out (%)	21	100	27	3	100
Cycles with Peds (%)	0	10	10	0	14

Controller Summary
Average Cycle Length (s): NA
Number of Complete Cycles : 0

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Phase	2	3	4	5	6	8
Movement(s) Served	NBT	WBL	EBTL	NBL	SBT	WBTL
Maximum Green (s)	58.0	19.0	25.0	18.0	34.0	50.0
Minimum Green (s)	10.0	5.0	7.0	5.0	10.0	5.0
Recall	C-Min	None	None	None	C-Min	None
Avg. Green (s)	58.3	17.8	26.4	18.4	34.0	50.6
g/C Ratio	NA	NA	NA	NA	NA	NA
Cycles Skipped (%)	0	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0
Cycles Maxed Out (%)	100	66	93	97	100	97
Cycles with Peds (%)	0	0	33	0	3	3

Controller Summary
Average Cycle Length (s): NA
Number of Complete Cycles : 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6264	6174	6078	6279	5986	6155
Vehs Exited	6178	6019	5931	6119	5853	6021
Starting Vehs	149	145	115	143	155	138
Ending Vehs	235	300	262	303	288	273
Travel Distance (mi)	2784	2691	2644	2753	2646	2704
Travel Time (hr)	296.8	378.5	287.5	275.4	402.5	328.1
Total Delay (hr)	191.9	277.1	187.8	171.6	303.1	226.3
Total Stops	4948	5531	4877	5042	4746	5027
Fuel Used (gal)	144.8	160.9	138.4	138.3	164.6	149.4

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6264	6174	6078	6279	5986	6155
Vehs Exited	6178	6019	5931	6119	5853	6021
Starting Vehs	149	145	115	143	155	138
Ending Vehs	235	300	262	303	288	273
Travel Distance (mi)	2784	2691	2644	2753	2646	2704
Travel Time (hr)	296.8	378.5	287.5	275.4	402.5	328.1
Total Delay (hr)	191.9	277.1	187.8	171.6	303.1	226.3
Total Stops	4948	5531	4877	5042	4746	5027
Fuel Used (gal)	144.8	160.9	138.4	138.3	164.6	149.4

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	1.1	0.1	0.1	0.1	0.1	0.0	0.0	2.4	0.3	0.4
Total Del/Veh (s)	53.8	45.4	16.2	56.8	46.7	5.6	47.2	9.5	8.3	50.4	22.1	30.4

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	22.3

2: Forest Avenue & Bedford St/Baxter Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	126.7	127.3	104.3	211.1	184.3	174.2	0.3	0.0	90.8
Total Del/Veh (s)	178.7	114.0	87.2	451.9	328.1	255.6	78.1	6.9	5.4	58.7	66.0	89.1

17: Bedford St & Surrenden St Performance by movement

Movement	NWL	NWR	NET	SWT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	11.8	32.1	12.7	0.2	12.3

19: Bedford St & Winslow St Performance by movement

Movement	NWR	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	0.1	24.8	26.7	0.2	0.2	16.4
Total Del/Veh (s)	44.0	22.0	17.4	52.2	25.7	30.5

66: Forest Avenue Performance by movement

Movement	EBR	WBR	SET	NWT	All
Denied Del/Veh (s)	1.1	98.9	0.0	0.0	7.1
Total Del/Veh (s)	16.5	497.8	0.4	11.4	39.1

Total Zone Performance

Denied Del/Veh (s)	110.1
Total Del/Veh (s)	1230.2

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	129	55	108	52	139	197	225	223	544	590
Average Queue (ft)	51	19	33	12	42	59	76	125	165	210
95th Queue (ft)	100	49	79	36	100	135	163	218	411	449
Link Distance (ft)	698		1192	1192		669	669		1136	1136
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	0				0	0		7	7	
Queuing Penalty (veh)	0				0	0		30	12	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	538	400	215	1142	20	208	188	204	699	710
Average Queue (ft)	367	299	201	735	4	195	59	71	411	495
95th Queue (ft)	655	485	246	1442	16	209	152	177	764	744
Link Distance (ft)	523			1118		192	192	192	669	669
Upstream Blk Time (%)	20			34		66	0	1	4	7
Queuing Penalty (veh)	120			0		229	0	2	17	30
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)	23	11	79	1						
Queuing Penalty (veh)	74	13	59	2						

Intersection: 17: Bedford St & Surrenden St

Movement	NW	NW	NE
Directions Served	L	R	TR
Maximum Queue (ft)	30	81	411
Average Queue (ft)	8	26	93
95th Queue (ft)	30	64	369
Link Distance (ft)	195	195	505
Upstream Blk Time (%)			1
Queuing Penalty (veh)			8
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 19: Bedford St & Winslow St

Movement	NW	NE	SW	SW
Directions Served	LR	TR	L	T
Maximum Queue (ft)	47	380	125	502
Average Queue (ft)	11	150	119	325
95th Queue (ft)	35	428	147	563
Link Distance (ft)	203	372		523
Upstream Blk Time (%)		13		1
Queuing Penalty (veh)		80		3
Storage Bay Dist (ft)			100	
Storage Blk Time (%)			40	0
Queuing Penalty (veh)			33	1

Intersection: 66: Forest Avenue

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	488	1056	29	118	34	36
Average Queue (ft)	172	573	2	96	4	2
95th Queue (ft)	415	1209	18	156	22	17
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)	2	18	0	39		
Queuing Penalty (veh)	0	0	1	110		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 827

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Phase	1	2	3	5	6
Movement(s) Served	NBL	SBT	EBWB	SBL	NBT
Maximum Green (s)	11.0	66.0	25.0	33.0	44.0
Minimum Green (s)	5.0	10.0	5.0	5.0	10.0
Recall	None	C-Min	None	None	C-Min
Avg. Green (s)	12.0	68.5	11.9	13.5	56.6
g/C Ratio	-0.01	NA	NA	-0.01	NA
Cycles Skipped (%)	13	0	0	8	0
Cycles @ Minimum (%)	23	0	3	11	3
Cycles Maxed Out (%)	7	100	0	0	100
Cycles with Peds (%)	0	15	13	0	19

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Phase	2	3	4	5	6	8
Movement(s) Served	NBT	WBL	EBTL	NBL	SBT	WBTL
Maximum Green (s)	78.0	7.0	17.0	45.0	27.0	30.0
Minimum Green (s)	10.0	5.0	7.0	5.0	10.0	5.0
Recall	C-Min	None	None	None	C-Min	None
Avg. Green (s)	160.3	11.6	21.1	44.3	110.0	38.4
g/C Ratio	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Cycles Skipped (%)	41	41	41	39	41	41
Cycles @ Minimum (%)	0	0	0	0	0	0
Cycles Maxed Out (%)	59	55	55	54	59	55
Cycles with Peds (%)	14	0	45	0	10	14

Controller Summary

Average Cycle Length (s): NA
Number of Complete Cycles : 0

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:57	3:57	3:57	3:57	3:57	3:57
End Time	5:00	5:00	5:00	5:00	5:00	5:00
Total Time (min)	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8588	8525	8539	8742	8580	8593
Vehs Exited	8369	8215	8252	8443	8288	8316
Starting Vehs	243	249	253	245	238	243
Ending Vehs	462	559	540	544	530	521
Travel Distance (mi)	4240	4170	4158	4277	4164	4202
Travel Time (hr)	425.3	497.7	442.6	434.8	480.7	456.2
Total Delay (hr)	269.3	344.0	289.5	277.5	327.5	301.5
Total Stops	9205	9600	9351	9467	9375	9402
Fuel Used (gal)	212.3	226.6	213.8	215.8	223.2	218.3

Interval #0 Information Seeding

Start Time	3:57
End Time	4:00
Total Time (min)	3

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8588	8525	8539	8742	8580	8593
Vehs Exited	8369	8215	8252	8443	8288	8316
Starting Vehs	243	249	253	245	238	243
Ending Vehs	462	559	540	544	530	521
Travel Distance (mi)	4240	4170	4158	4277	4164	4202
Travel Time (hr)	425.3	497.7	442.6	434.8	480.7	456.2
Total Delay (hr)	269.3	344.0	289.5	277.5	327.5	301.5
Total Stops	9205	9600	9351	9467	9375	9402
Fuel Used (gal)	212.3	226.6	213.8	215.8	223.2	218.3

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.2	2.2	0.1	0.2	0.2	0.0	0.0	0.0	2.5	0.2	0.3
Total Del/Veh (s)	49.0	41.2	29.9	41.7	45.4	14.4	45.0	9.1	8.0	79.9	75.1	108.5

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	39.7

2: Forest Avenue & Bedford St/Baxter Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	1.8	3.3	5.2	111.3	126.9	133.7	0.0	0.0	0.0	1.9	0.5	16.1
Total Del/Veh (s)	135.3	151.8	88.7	373.5	275.5	264.3	68.3	11.7	10.8	121.5	131.3	101.9

16: Bedford St & Surrenden St Performance by movement

Movement	NWL	NWR	NET	SWT	All
Denied Del/Veh (s)	3.7	3.7	0.0	0.0	1.4
Total Del/Veh (s)	11.2	23.6	3.4	0.4	9.6

18: Bedford St & Winslow St Performance by movement

Movement	NBR	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	6.2	0.2	0.0	0.0	0.0	0.4
Total Del/Veh (s)	151.4	24.2	21.6	18.8	2.2	23.5

67: Forest Avenue Performance by movement

Movement	EBR	WBR	SET	NWT	All
Denied Del/Veh (s)	0.5	0.3	0.0	0.0	0.1
Total Del/Veh (s)	15.6	84.8	0.6	3.7	10.4

Total Zone Performance

Denied Del/Veh (s)	18.7
Total Del/Veh (s)	888.2

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	143	143	195	180	110	235	290	224	858	882
Average Queue (ft)	70	70	100	79	45	88	97	114	329	371
95th Queue (ft)	120	129	173	151	93	190	217	230	760	779
Link Distance (ft)	604		1193	1193		681	681		1137	1137
Upstream Blk Time (%)									0	0
Queuing Penalty (veh)									0	0
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	0	0				1		1	28	
Queuing Penalty (veh)	0	0				0		5	29	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	542	400	215	1306	41	182	188	200	737	735
Average Queue (ft)	474	385	212	963	7	170	141	159	626	661
95th Queue (ft)	654	452	229	1644	27	192	208	219	867	847
Link Distance (ft)	525			1275		165	165	165	681	681
Upstream Blk Time (%)	24			47		47	5	10	12	28
Queuing Penalty (veh)	168			0		249	25	53	54	129
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)	11	40	88	4	0					
Queuing Penalty (veh)	57	90	134	12	0					

Intersection: 16: Bedford St & Surrenden St

Movement	NW	NW	NE
Directions Served	L	R	TR
Maximum Queue (ft)	179	212	153
Average Queue (ft)	49	107	23
95th Queue (ft)	146	204	93
Link Distance (ft)	188	188	488
Upstream Blk Time (%)	7	10	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: Bedford St & Winslow St

Movement	NB	NE	SW	SW
Directions Served	LR	TR	L	T
Maximum Queue (ft)	147	385	122	179
Average Queue (ft)	63	201	68	12
95th Queue (ft)	151	475	119	81
Link Distance (ft)	178	375		525
Upstream Blk Time (%)	8	6		
Queuing Penalty (veh)	0	41		
Storage Bay Dist (ft)			100	
Storage Blk Time (%)			6	
Queuing Penalty (veh)			15	

Intersection: 67: Forest Avenue

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	401	450	69	119	101	107
Average Queue (ft)	150	180	6	57	19	14
95th Queue (ft)	311	598	37	134	77	61
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)	0	1	0	8	0	0
Queuing Penalty (veh)	0	0	1	31	1	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 1095

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Phase	1	2	3	5	6
Movement(s) Served	NBL	SBT	EBWB	SBL	NBT
Maximum Green (s)	12.0	57.0	33.0	18.0	51.0
Minimum Green (s)	5.0	10.0	5.0	5.0	10.0
Recall	None	C-Min	None	None	C-Min
Avg. Green (s)	12.0	72.7	22.5	11.5	66.7
g/C Ratio	-0.01	NA	NA	-0.01	NA
Cycles Skipped (%)	21	0	0	14	0
Cycles @ Minimum (%)	18	0	0	9	0
Cycles Maxed Out (%)	4	100	7	0	100
Cycles with Peds (%)	0	13	7	0	20

Controller Summary

Average Cycle Length (s): NA

Number of Complete Cycles : 0

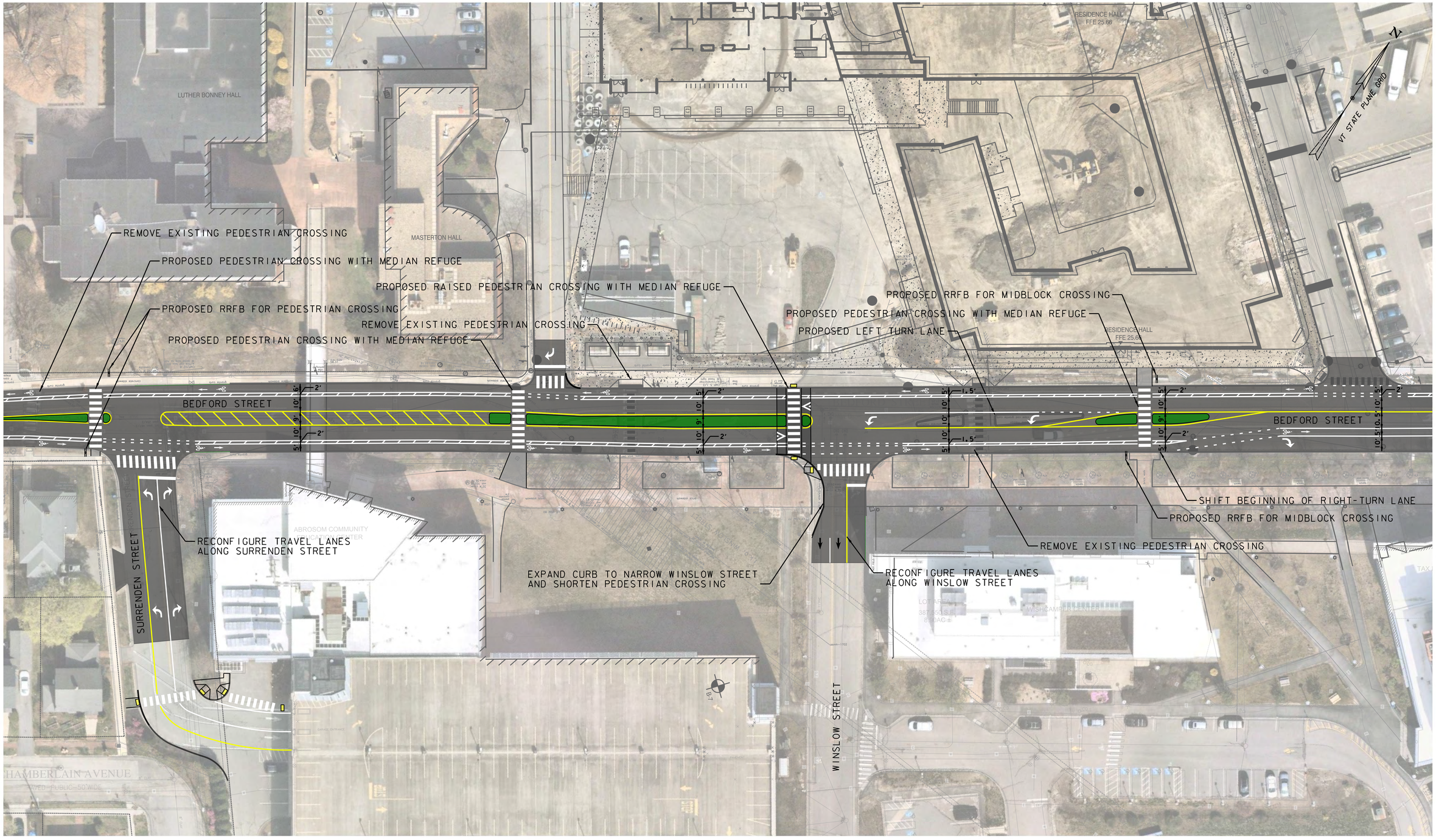
Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Phase	2	3	4	5	6	8
Movement(s) Served	NBT	WBL	EBTL	NBL	SBT	WBTL
Maximum Green (s)	72.0	7.0	23.0	21.0	45.0	36.0
Minimum Green (s)	10.0	5.0	7.0	5.0	10.0	5.0
Recall	C-Min	None	None	None	C-Min	None
Avg. Green (s)	72.0	7.0	23.3	21.0	45.0	36.0
g/C Ratio	NA	NA	NA	NA	NA	NA
Cycles Skipped (%)	0	0	0	0	0	0
Cycles @ Minimum (%)	0	0	0	0	0	0
Cycles Maxed Out (%)	100	100	100	100	100	100
Cycles with Peds (%)	3	0	83	0	0	0

Controller Summary

Average Cycle Length (s): NA

Number of Complete Cycles : 0



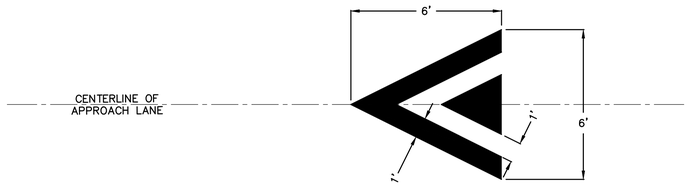
SCALE 1" = 30'-0"
30 0 30

PROJECT NAME:	USM INTERSECTION IMPROVEMENTS
PROJECT NUMBER:	52718.01
FILE NAME: bdr_concepts.dgn	PLOT DATE: 11/04/21
PROJECT LEADER: J.A. CONLEY	DRAWN BY: D.A. GINGRAS
DESIGNED BY: D.A. GINGRAS	CHECKED BY: J.A. CONLEY
BEDFORD STREET CONCEPT	SHEET 1 OF 1



NOTES:
1. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR STREET NAME SIGN ASSEMBLIES.
2. SIGNS TO BE MOUNTED ON DOUBLE 4"X4" POSTS.
3. GUIDE SIGNS ARE WHITE ON GREEN BACKGROUND WITH WHITE BORDER.
4. SHEETING SHALL BE ASTM TYPE III "HIGH INTENSITY" PRISMATIC RETRO-REFLECTIVITY OR APPROVED EQUAL.
5. PAYMENT FOR REMOVAL OF EXISTING SIGNS NOT DESIGNATED TO BE RELOCATED SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT. ALL EXISTING SIGNAGE CONFLICTING WITH NEW TRAFFIC PATTERN SHALL BE REMOVED.

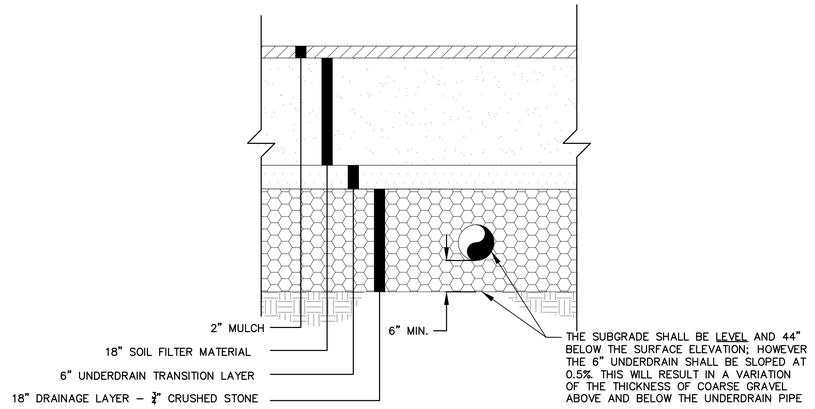
CIRCULAR INTERSECTION DESTINATION SIGNAGE
NOT TO SCALE



PAVEMENT MARKING

TRANSITION DETAIL

TYPICAL RAISED CROSSWALK DETAIL
NOT TO SCALE



SOIL FILTER MATERIAL SHALL HAVE PERMEABILITY OF 2 IN/HR TO 4 IN/HR. UNDERDRAIN SAND SHALL HAVE A PERMEABILITY OF AT LEAST 4 IN/HR.

* CONTRACTOR SHALL PROVIDE PERMEABILITY TEST PER ASTM D2434

SOIL FILTERS SHALL BE CONSTRUCTED IN CONFORMANCE WITH SECTION 900 OF THE SUPPLEMENTAL SPECIFICATIONS.

SOIL FILTER MATERIAL SHALL BE A LOAMY SAND SOIL COMBINED WITH 30% BY VOLUME OF MODERATELY FINE, WOOD FIBER OR BARK MULCH. THE RESULTING MIXTURE SHALL HAVE NO LESS THAN 10% PASSING THE 200 SIEVE. SOIL FILTER MEDIA SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR OBJECTS LARGER THAN 2 INCHES. SUBCOMPONENTS OF THE SOIL FILTER MEDIA INCLUDE:

LOAMY SAND SHALL CONSIST OF NATIVE LOAMY SAND (AS DEFINED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE) THAT CONTAINS NO LESS THAN 10% PASSING THE #200 SIEVE AND BETWEEN 2 – 5% CLAY AS DETERMINED THROUGH SOIL TEXTURAL ANALYSIS.

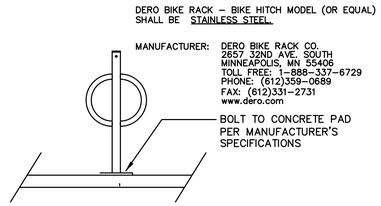
WOOD FIBER MULCH SHALL CONSIST OF A MODERATELY FINE, WELL COMPOSTED HARDWOOD BARK FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. MULCH SHALL HAVE 100% PASSING A 1" SCREEN.

THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION SEQUENCE PLAN THAT OUTLINES THE OVERALL WORK IN RELATION TO THE CONSTRUCTION OF SOIL FILTER SYSTEMS, SPECIFICALLY CONSIDERING SITE STABILIZATION, SOIL FILTER INSTALLATION, AND VEGETATION PLACEMENT IN AND AROUND THE FILTER SYSTEMS. THE SOIL FILTER MEDIA MUST NOT BE INSTALLED UNTIL THE ENTIRE AREA THAT DRAINS TO THE FILTER HAS BEEN PERMANENTLY STABILIZED WITH PAVEMENT, VEGETATION, EROSION CONTROL MATTING, OR OTHER STRUCTURES UNLESS THE RUNOFF IS DIVERTED AROUND THE FILTER OR UNLESS THE FILTER IS COMPLETELY WRAPPED AND PROTECTED BY A NON-WOVEN GEOTEXTILE LINER WHICH CAN BE REMOVED FROM THE SURFACE PRIOR TO FINAL STABILIZATION.

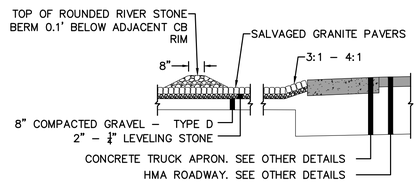
THE AREA THAT DRAINS TO THE SOIL FILTER SHALL BE KEPT STABLE, AVOIDING EROSION AND DEPOSITION OF SEDIMENTS INTO THE STORMWATER MANAGEMENT SYSTEM. ABSOLUTELY NO RUNOFF IS TO ENTER THE FILTER UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN SUFFICIENTLY STABILIZED. IF FILTER MEDIA BECOMES CLOGGED, IT SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST

ADDITIONAL SURFACE LOAM MAY BE UTILIZED TO PROMOTE VEGETATION SURVIVAL. LOAM SHALL CONSIST OF NO MORE THAN ½ DEPTH OF NATIVE SANDY LOAM LIGHTLY RAKED INTO SOIL SURFACE.

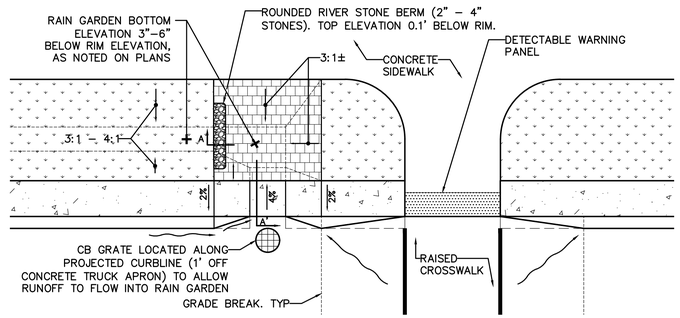
RAIN GARDEN - TYPICAL SECTION
NOT TO SCALE



BIKE RACK DETAIL
NOT TO SCALE



SECTION A–A'



TYPICAL RAIN GARDEN INLET DETAIL
NOT TO SCALE

Project:
Deering's Corner
Roundabout
Design Plans
WIN # 18624.00

Prepared for:
City of Portland
389 Congress Street
Portland, Maine

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Consulting, Inc.
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Portland, Maine 04101
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MTJ ENGINEERING
tjd&a
DuBois & King inc.

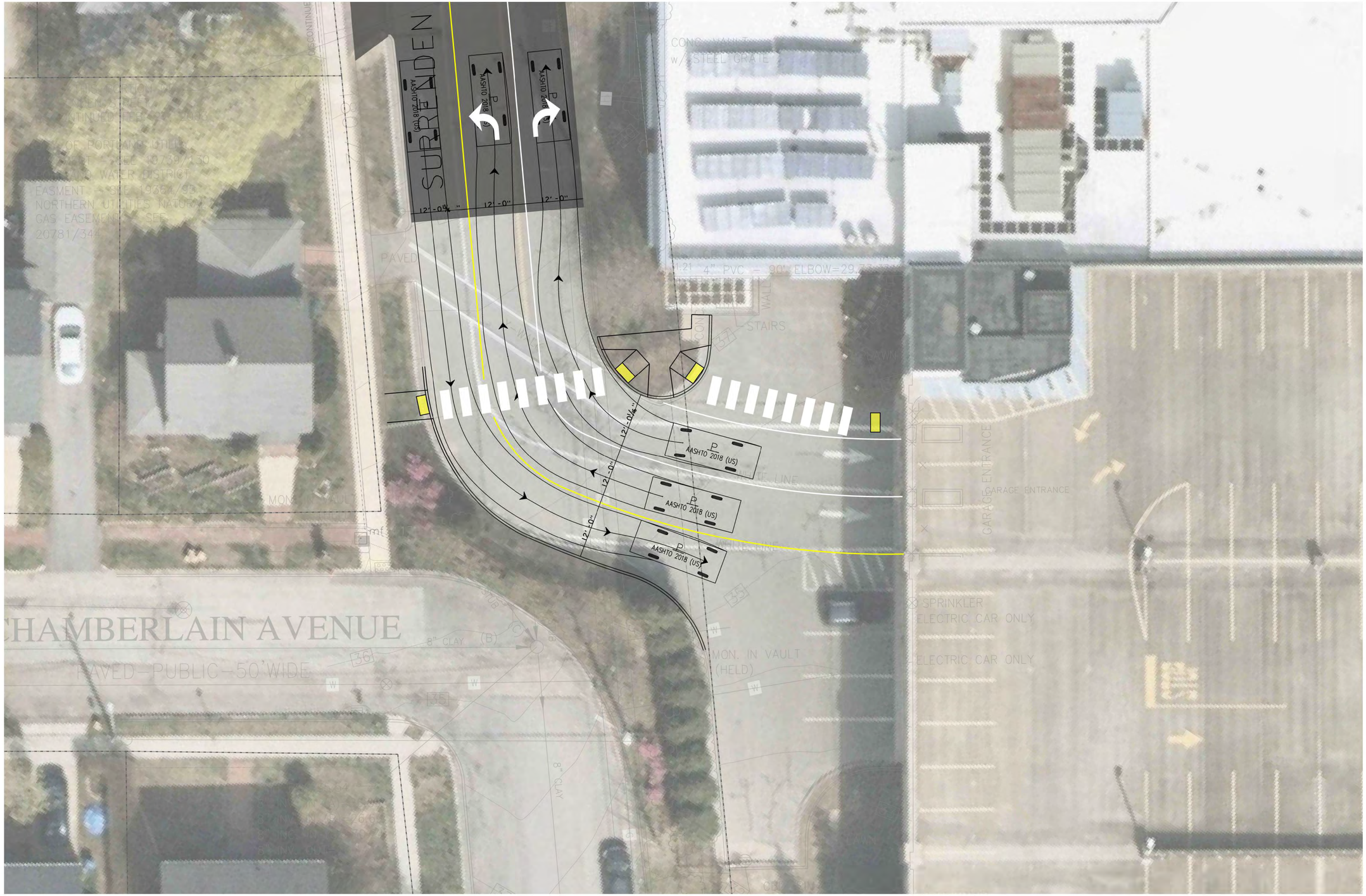
STATE OF MAINE
John I. Mahoney
#12340
LICENSED PROFESSIONAL ENGINEER

Details
Stormwater & Others

No.	Revision/Issue	Date
B	For Bidding	12–18–19
A	City MaineDOT Review	11–25–19

Design by: JIM
Checked by: SJB
Drawn by: JIM
Approved by: SJB
Project: 141.06013

Sheet No:
14.7



SCALE 1" = 10'-0"
10 0 10

PROJECT NAME:	USM GARAGE
PROJECT NUMBER:	52718.01
FILE NAME: ppms*/Section/------.dgn	PLOT DATE: 11/4/2021
PROJECT LEADER: J.A. CONLEY	DRAWN BY: K.M. SENTOFF
DESIGNED BY: K.M. SENTOFF	CHECKED BY: ------
------ ------	SHEET 1 OF 1

COMMITMENT & INTEGRITY
DRIVE RESULTS

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Portland, Maine 04102
www.woodardcurran.com

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T 207.774.2112
F 207.774.6635

Via Electronic Mail

November 23, 2021

Jimmy Dealaman, Planner
Planning and Urban Development Department
City Hall, 389 Congress Street, 4th Floor
Portland, Maine 04101

Re: 50 Bedford Street – Response to Site Plan Application Review Comments on Supplemental Materials for Transportation Demand Management Plan and Traffic Movement Permit

Dear Jimmy:

The following are responses to comments received from the City of Portland via email dated November 12, 2021; the comments received are provided below for your reference, followed by our response in italics:

Site Plan – Supplemental Materials for Traffic Movement Permit Review Comments

Traffic Consultant Reviewer – TyLin International

1. The applicant shall provide conceptual design plans, preliminary and final plans and specifications for Bedford Street Improvements as detailed on the plan prepared by VHB dated xxxx (Plans continue to be reviewed and approval is pending). Said improvements shall be constructed by the applicant prior to completion of a parking garage structure and Final design plans will need to be stamped by a professional engineer.

   RESPONSE: The applicant concurs with the inclusion of this as a condition of approval.

2. The applicant shall provide conceptual design plans, preliminary and final plans and specifications for Traffic calming / pedestrian improvements at the Falmouth Street / Oakdale Street intersection for review and approval by the Department of Public Works and Planning Authority. Said improvements shall be constructed by the applicant prior to completion of a parking garage structure or five years from TMP approval, whichever is sooner.

   RESPONSE: The applicant concurs with the inclusion of this as a condition of approval.

3. The applicant shall be responsible for the implementation of do not block driveway pavement markings and signage on Forest Avenue at the Oakhurst driveway. The applicant shall provide conceptual design plans, preliminary and final plans and specifications to the City for review and approval. Final design plans will need to be stamped by a professional engineer and implementation prior to completion of a parking garage structure.

   RESPONSE: The applicant concurs with the inclusion of this as a condition of approval.

4. The applicant shall be responsible for implementing traffic signal equipment improvements at the Forest Avenue/Bedford Street intersection. This upgrade shall include all equipment necessary for a traffic signal system that is fully active and functioning within the Surtrac Adaptive network. The proposed system shall be coordinated with Rapidflow Technologies and shall be field tested and

verified before being accepted by the City. Said improvements shall be constructed by the applicant prior to completion of a parking garage structure.

RESPONSE: The applicant has committed to procure, install, and field test the detection equipment required to replace the failed detection at this intersection.

5. The applicant shall provide conceptual design plans, preliminary and final plans and specifications for improvements at the Forest Avenue/Bedford Street/Baxter Boulevard intersection based on the Smart Corridor Study recommendations for review and approval by the Department of Public Works and Planning Authority. These shall include geometric modifications to the corners on the Baxter Boulevard approach and upgrades to pedestrian traffic signal equipment. The applicant shall construct the said improvements prior Certificate of Occupancy, with all work complying with ADA standards.

   RESPONSE: The applicant concurs with the inclusion of this as a condition of approval.

6. The applicant shall provide details on installing a dynamic sign message system that provides flexibility in using Surrenden Street for garage access if vehicle queues extend to Forest Avenue. I'm concerned about traffic queues backing up into Forest Avenue. The applicant shall also provide a parking management plan that defines how garage access/egress conditions may change as a function of traffic demand.

   RESPONSE: The applicant has concerns with the confusion caused by a dynamic sign message system. Alternatively, a modification to the circulation is proposed to reduce the queuing at Winslow Street. The attached Ground Level Floor Plan dated 11/17/21 illustrates a revised garage circulation that addresses the City's concerns regarding queuing by continuing to use Surrenden Street as the access for the commuter traffic, while creating a residents only entrance (by pass) for the Winslow Street entrance. The volume at Winslow Street is significantly lower than the commuter demand and provides an option for 24-hour access to residents when the commuter garage may be closed overnight.

7. The applicant shall conduct traffic modeling that evaluates bus stop configuration on Bedford Street to help inform the design of roadway improvements.

   RESPONSE: USM has conducted the requested modeling and with the circulation changes outlined above, the in-line bus stop configuration will not cause excessive delays or queues.

8. I continue to review the construction management plan, but the applicant should also provide construction management plans for the Bedford Street improvements.

   RESPONSE: This plan will be prepared and submitted once the Bedford Street improvements are agreed upon by the City.

Site Plan – Supplemental Materials for Transportation Demand Management (TDM) Plan Review Comments

Mobility Context, Section 2

Updates made to the parking lot figures presented in Figure 7 on page 16. The figure represented the lots on November 11th, 2020. The applicant misstated the date in the narrative.

RESPONSE: This typo has been corrected in the attached revised TDM Addendum.

Monitoring and Reporting Plan, Section 7

Inclusion of EV ownership would stay in the annual transportation survey, as outlined on page 43. This is important for GHG calculations.

The Transportation Manager is also seeking to confirm in the document that USM will still be submitting reports in the meantime while the garage is under construction (in the reporting and monitoring section it looks like the project won't be submitting a report until 2024.) It would be helpful to clarify in the monitoring section what the effective date is for these updates (ex. upon completion of the student center/dormitory and parking garage).

RESPONSE: TDM Reports relevant to existing infrastructure will be submitted prior to 2024 and full TDM reporting will begin in 2024.

In addition to the survey data, the University will provide an EV Use and Forecast Report to the City on or before June 1st of each year beginning in calendar year 2024, summarizing EV ownership and EV charging station use statistics. The Report will also include a proposal regarding the number of EV charging stations for the coming school year, based upon the supply and demand statistics from the previous year. In alignment with the other reporting activities outlined in the TDM plan, the University commits to annual reporting through 2030, the horizon of the Facilities Master Plan, after which a new TDM plan may be proposed.

Planning will be sending out a city-wide email update switching TDM reporting to a May 15th report due date so the June 1st date in the monitoring section should be modified to May 15th.

RESPONSE: The University acknowledges that the City will switch to a May 15th report date and will work to produce annual reports as soon as data is available following the end of the Spring semester.

Site Plan – Additional Site Plan Review Comments

Design

The proposed project meets the design standards. Please add a schedule of materials' indicating type and color to the elevations.

RESPONSE: The materials schedule on Drawings A200 and A201 have been revised with the requested information.

Parking

At the previous Planning Board workshop, the board was interested in understanding if there is an anticipated rate for premium overnight parking available? Please provide more information if available.

RESPONSE: $500-$600 per year is currently planned. This will be reassessed prior to opening day.

EV Waiver

-At the previous Planning Board workshop, the board was interested in data showing the number of current EV vehicle users (registered) on campus. Please share any estimates as general material. Also, it would be helpful to supplement this data with total number of vehicles (registered) on campus.

RESPONSE: Historically, the University has not collected data on which vehicles were fully electric (EV) or plug-in hybrid (PHEV). Therefore, in order to estimate the maximum number of EVs or PHEVs likely to be on campus, the Office of Sustainability surveyed industry and governmental websites to find lists of all potential EV or PHEV model vehicles sold in or prior to 2020. Then these models were identified in parking registration data as possible candidates among the generic makes and models. Given that many of these generic makes and models were not specifically indicated to be EV or PHEV, researchers had to survey market sales data to estimate what percentage of possible EV or PHEV models sold are actually EV or PHEV versions. Researchers used sales data from the last couple of years to develop the percentages. These percentages are likely to be overestimates since significantly more EV and PHEV versions of popular models are being sold now than prior to 2018, and the majority of the vehicle fleet are not brand-new vehicles. Regardless, the result was a maximum estimate of 56 EV or PHEV vehicles belonging to students, staff, and faculty on the Portland campus in 2020, out of 3,158 permits. Moving forward, the University is beginning to collect data on whether vehicles are EV or PHEV for new registrations.

- At the previous Planning Board workshop there was some interest in understanding the costs of the EV charging stations. If available please share what is the cost per EV charging space, and the total cost of providing all necessary conduit and wiring for future EV installation?

RESPONSE: The current estimate is $11,000 per EV charger, or $5,500 per charging space. The estimated cost for the pathways and wiring for power and communications is approximately $1,100 per space. Additionally, we estimate another $2,000/charger or $1,000/space for high level power distribution in the garage related to the chargers. This cost is for EV dedicated electrical panels and feeders. This money also covers the increased size of the main distribution panel related to EV charging. For example, if there was no EV charging, the main distribution panel could likely be 600-amps instead of 1,000-amps.

- Rather than seeking a waiver for the remaining EV chargers, have electrical outlets capable of providing Level 2 EV charging or higher been considered?

RESPONSE: The applicant has considered all options to provide EV charging capability within the garage, including electrical outlets. Electrical outlets (60amp 220V) can offer comparable Level 2 charging; however, they do not provide for an ability to track and charge a fee for users. In addition to helping to recover the electrical cost, charging a fee is a means to encourage turnover at the charging stations when not in use and increase availability. Uncontrolled outlets also present significant risk to the University's ability to control demand charges from the utility company, an issue that the more expensive "smart" stations can address through toggling capabilities, lowering the flow of power when necessary. So, although installing non-smart outlets may seem cheaper, it may not be. For these reasons, installing electrical outlets for EV charging purposes is not a viable alternative solution to the University's request for a waiver. The University remains confident in its assessment of EV demand and that the number of charging stations proposed will meet that need. Further, we remain committed to providing an EV Use

and Forecast Report annually to the City as proposed in our TDM, and as demand increases, increasing the number of EV charging stations.

Wayfinding

Please clarify the locations of any proposed outdoor wayfinding signage. The narrative refers to new 'traffic signage will be provided as shown on the drawings,' but it's unclear how the new garage entrance will be indicated to users and where it will be located. Please also see TMP comments which may apply to wayfinding.

RESPONSE: With the proposed modification to garage circulation, Surrenden Street will continue to be the main entrance to the garage and will be signed as such. Existing signage includes an informational sign on Bedford Street westbound on the far side of Winslow Street indicating that the garage is located on the next left as well as official USM signage at Surrenden Street indicating parking in that direction. Similar signage would be anticipated in the future.

CPTED

It's understood that the garage provides indoor security cameras, but staff are wondering if the outdoor area at the rear of the building includes any surveillance or security monitoring?

RESPONSE: The applicant will be providing camera coverage for the area at the rear of the building.

LIGHTING

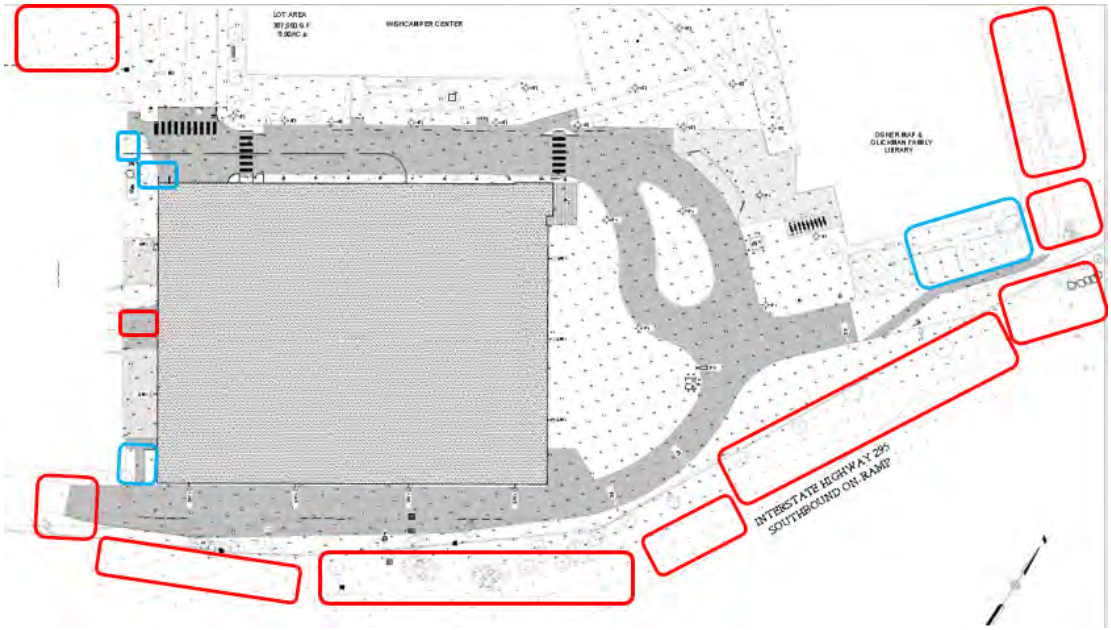
- Please submit a lighting plan for the interior of the parking garage structure. [Note: Please ensure the indoor lighting fixtures do not exceed 20,000 lumens. Additionally, if fixtures are seeking to exceed the max 4.0 foot candles maximum for structured parking, please include this in a waiver request.]

RESPONSE: A photometric plan of the interior of the parking garage will be uploaded separately to Eplan. It will meet the guidelines of the Technical Manual.

-Please see image below identifying areas that appear to be below the required 0.2 foot candles. It's understood the site includes existing site and street lighting which aren't being modeled in the photometric plan provided. However, a written waiver should still be requested (to Section 12.3.2 for illumination levels) stating those reasons why areas of the site are not shown on the plan as meeting the foot candle minimum.

RESPONSE: The calculation points falling outside of the scope of work boundary and outside the property lines of this project will be removed for clarity and a new photometric plan will be uploaded separately to Eplan.

-**In blue** (see image below), staff would like some additional attention given to these areas as it remains unclear whether locations are sufficiently lit by existing lighting, and appears additional lighting may be needed. Please update the plan as necessary to ensure site lighting promotes natural visibility and safety on the site.



RESPONSE: Existing lighting fixtures were omitted from the lighting calculation. The rightmost blue circled boundary area is outside the scope of this project and will not be included in our calculations. The other blue boundaries will be addressed and corrected and a new photometric plan will be uploaded to Eplan.

-The color temperature of the fixtures exceeds the 3,000K color temperature minimum specified in Section 12.3.5 of the Technical Manual. If the fixtures are necessary to promote safety and adequate lighting/visibility, please include this as a basis for being considered for a waiver. A written waiver should then be requested to Section 12.3.5 Luminaire Types.

RESPONSE: 4,000K color temperature fixtures were selected to match the existing fixtures immediately adjacent to the scope of work area. A revised waiver request table is attached.

-Please clarify what the height is for the wall mounted exterior lights proposed. Please see the City's **Technical Manual** Section 12.3.8 to reference the height requirements.

RESPONSE: Wall mounted light fixtures are shown on the east, south, and west elevations. These have been revised according to suggestions above. The height of the fixtures varies between 10' and 12' above adjacent grade, meeting the requirements of 12.3.8.

Fire Department/Life Safety -

-The Fire Department Connection (FDC) must be within 150 feet of the fire hydrant. Please revisit the location of the proposed FDC.

RESPONSE: The FDC has been relocated to the front of the building, along the Wishcamper Drive, across from the fire hydrant. A revised Grading & Utility Plan has been provided.

Thank you for your feedback and comments as we continue to move forward with this project. Please contact me should you have any questions.

Sincerely,

WOODARD & CURRAN, INC.



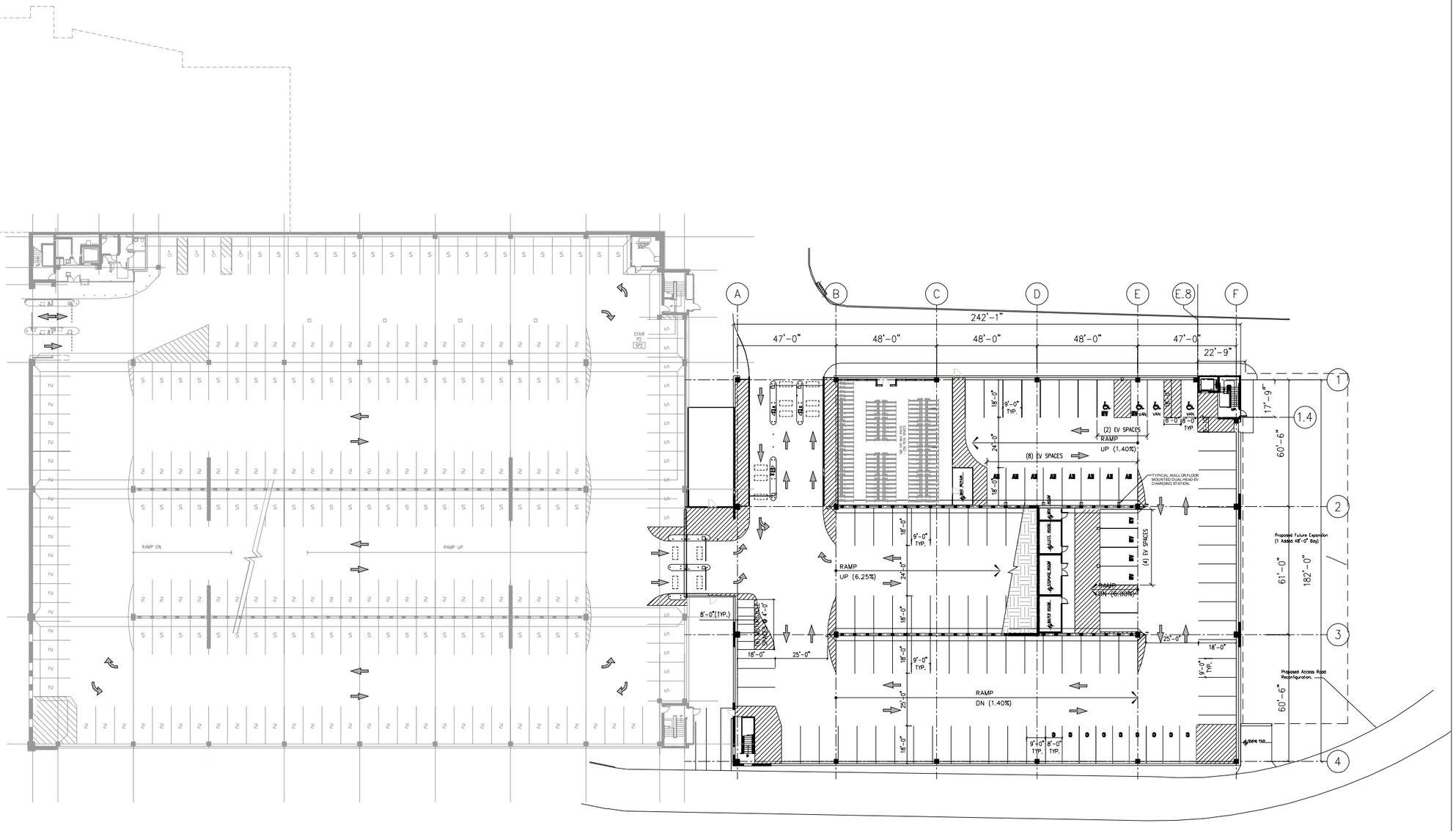
Darrin Stairs, PE
Project Manager

/DS

Enclosure(s)

- Revised Parking Garage Ground Floor Striping Plan dated November 17, 2021 (uploaded separately to Eplan)
- Revised TDM Addendum dated November 22, 2021
- Drawings A200 and A201 dated November 22, 2021
- Photometric Plans (uploaded separately to Eplan)
- Updated Waiver Request Table
- Drawing C-104 Grading & Utility Plan (uploaded separately to Eplan)

cc: Wes Wilson, Desman Design Management
Ann Vashon, USM



1 SITE PLAN
SCALE: 1" = 30'

NORTH

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT
& STRUCTURAL ENGINEER
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VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST.
PORTLAND, ME 04103

SEAL / SIGNATURE

© DESMAN, Inc.
2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
1	9/1/21	Response to City Comments
2	10/25/21	Plng Brd W.S. #2 Updates

SUBMISSIONS:

Date	Issued For:
08/09/21	Schematic Design

SCALE	**1" = 20'-0"**
DATE ISSUED	**11/04/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**W.W.**

SHEET TITLE:

SITE PLAN

A-100

Addendum to University of Southern Maine Portland Campus Transportation Demand Management (TDM) Plan

11-22-2021

The changes below represent modifications to the plan due to changes in the University's structured garage proposal and other dynamic changes (internal & external to USM) that have occurred over the last 12 months. These include:

- The University siting the proposed structured parking on the Wishcamper lot
- Maine Law School moving off campus
- The University downsizing the proposed size of the structured parking, as a result of the Maine Law School move and feedback received from the Planning Board
- The City of Portland adding a requirement for electric vehicle charging stations to its Technical Manual

Mobility Context, Section 2-

The following updates are made to the parking lots represented in Figure 7 on page 16. The figure represented the lots on November 11th, 2020. These updated figures are current as of November 9th, 2021:

- The Woodbury lot - 130 spaces were displaced due to construction of the residence hall and Career & Student Success Center ("CSSC")
- The Facilities lot - 41 spaces were displaced due to construction of the residence hall and CSSC
- The Heat Plant lot - 21 spaces will be reduced to 15 spaces due to construction of the residence hall and CSSC
- The Brighton Ave lot- 26 spaces were displaced from the City roundabout project
- The Wishcamper lot -91 spaces are proposed to be displaced from the new parking garage at this location

TDM Coordinator, Section 4-

The roles of the two point people from the University have been changed, in part to help support the TDM effort:

- The University's TDM Coordinator will still be Aaron Witham, whose new title is Director of Sustainability. The inclusion of TDM duties into his new job description demonstrate the University's commitment to TDM success.
- The supporting role will now be an Associate Vice President of Administration position, rather than Director of Auxiliary Services. This change also represents an increase in focus and attention to transportation matters.

Transportation Demand Reduction Goals, Section 5-

Trip Reduction Goal- This goal stays the same because even though the structured parking will be located in a different area, the trips are not created by the garage, and thus don't change

as a result of location. Even though trips from the Law School won't happen anymore, VHB thought it would be best to be conservative and not deduct those trips from our analysis, so that we can ensure that the traffic mitigation measures proposed are overly sufficient.

Parking Demand Reduction Goal-
The goal remains a 10-14% reduction at the hour of peak demand. The gross number translation, however, changes from the published 159-222 vehicles to 144-201, to reflect a loss of Maine Law School demand in the campus-wide base demand number.

GHG Reduction Goal-

The goal of 20% reduction in GHG emissions from transportation remains the same, as it is a per capita goal, not impacted by the size of the population. How the University plans to achieve this goal is constantly evolving based on the proportion of electric vehicle commuters and based on fuel economy standards, both of which are impacted as much or more by evolving national forces, as they are by University policies.

Summary of Targets-

TDM Plan: Baseline Data, Targets & Monitoring/Reporting

Date of TDM Plan: 11-3-2020				11-4-2021 Addendum
Provide Data in Percentages and Absolute Numbers, where applicable		*Baseline Data (at time of TDM plan adoption*	*TDM Plan Reduction Target (if applicable)*	*Current Reporting Period Data*
Vehicular Trips	*Off-Peak*	N/A	N/A	Report forthcoming in 2024
	AM Peak Hr	581	3-6% (17-35 trips)	Report forthcoming in 2024
	PM Peak Hr	381	3-6% (12-23 trips)	Report forthcoming in 2024
Mode Split (future data may be reported as	*Single-Occupancy Vehicle*	75%	70%	Report forthcoming in 2024

SOV & Non-SOV)	*Non-SOV*	25%	30%	Report forthcoming in 2024
	Carpool	8%	Not specific	Report forthcoming in 2024
	Bicycle	*11% (shared with walk)	Not specific	Report forthcoming in 2024
	Walk	*11% (shared with bike)	Not specific	Report forthcoming in 2024
	Transit	6%	Not specific	Report forthcoming in 2024
On-site Parking (Peak)		Was 1,587 (adjusted to 1,435)	10-14% (144-201)	Report forthcoming in 2024
GHG Emissions Targets		2 MT of CO2e per capita	20% (or .4 MT of CO2e per capita)	Report forthcoming in 2024
Other:_____				

*Adjusted On-site parking number is due to deducting Maine Law School from total demand in the baseline, so that the TDM reduction target accounts for the change in actual conditions on the ground

Trip, Parking, Mode Split & GHG Reduction Strategies, Section 6-

The existing strategy, "Build Additional EV Charging Stations" is clarified to mean the University will endeavor to match demonstrated demand with supply of electric vehicle charging stations, so that demand would not exceed supply.

A year into strategizing implementation of our TDM plan, we have adjusted some launch dates. Some have adjusted to earlier and some later. Please see new launch dates written in red in the table below.

Table 3: Overview of TDM Initiatives for USM

STRATEGY	LAUNCH DATE	INFRASTRUCTURE	INCENTIVES	EDUCATION
Walking				
Create Walk Spot Maps	Fall 2023			X
Publicize the "Complete City Project"	Spring 2022			X
Hold Fitness Challenges	Spring 2022		X	
Biking				
*Co-launch City Bikeshare	Spring 2023	X		
Build Bicycle Repair Station	Spring 2023	X		X
Promote Local Bike Activities	Spring 2022		X	X
Offer Discounted Bike Supplies	Fall 2022		X	
*Improve Bike Infrastructure	Spring 2023	X		
Apply for Bike Friendly University Certification	Fall 2022	X	X	X
Transit				
*Continue METRO Pass Program	Ongoing	X	X	
Propose Husky Line Improvements	Fall 2023	X		
Propose Transit Service Expansion Beyond Husky Line	Spring 2022	X		
Install Transit Screen	Spring 2023	X		
****Carpooling, Telecommuting & Time-of-Day***				
Establish Vanpool Vehicles	Fall 2022	X	X	
Designate Carpool/Vanpool Spaces	Fall 2022	X	X	

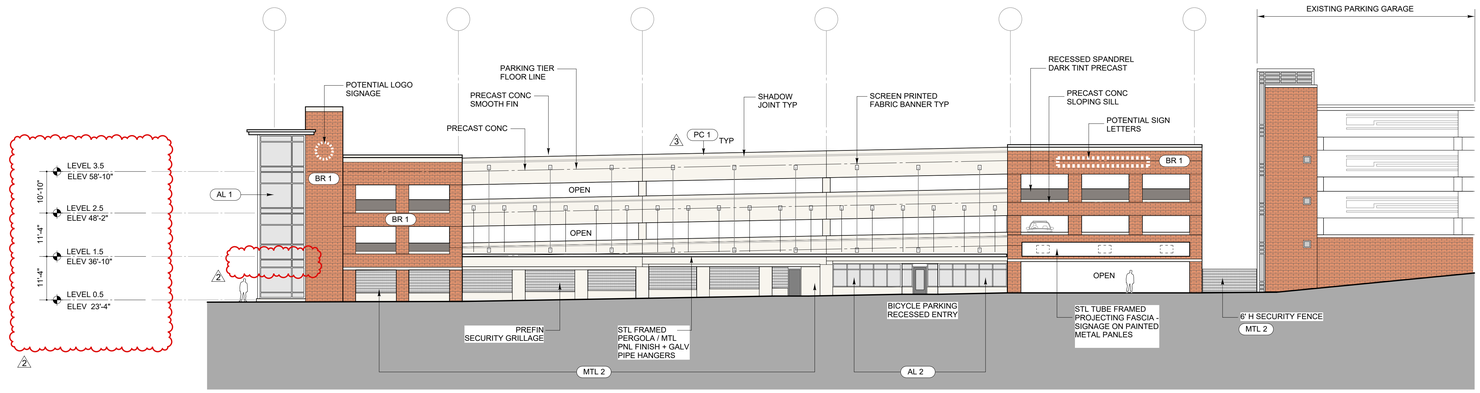
Develop Rideshare Matching Platform	Fall 2022	X		
Promote Telework & Flexwork	Ongoing		X	X
Restructure Course Schedule	Ongoing	X		
Parking Pricing				
Establish Commuter Parking Buyout Program	Fall 2022		X	
*Establish Residential Parking Buyout Program	Fall 2023		X	
Host Carshare Program to Support Buyouts	Spring 2023	X	X	
*Unbundle Student Parking Fees	Fall 2022		X	X
Build Additional EV Charging Stations	Spring 2023	X		
Review Parking Price Levels	Fall 2022		X	
Communications & Marketing				
*Hold New Student & Employee Orientations for Transportation	Spring 2022		X	X
*Revise Transportation Website	Fall 2021			X
*Publish Access Guide	Fall 2021			X
Offer Guaranteed Ride Home Service	Spring 2023		X	

*Core strategies that the University is committing to are indicated by *. In the case of the Carpooling, Telecommuting & Time-of-Day category, the category itself is considered core, but the University will maintain flexibility in which of these strategies it implements, depending on future conditions

Monitoring and Reporting Plan, Section 7-

Inclusion of EV ownership would stay in the annual transportation survey, as outlined on page 43. This is important for GHG calculations.

In addition to the survey data, the University will provide an EV Use and Forecast Report to the City on or before June 1st of each year beginning in calendar year 2024, summarizing EV ownership and EV charging station use statistics. The Report will also include a proposal regarding the number of EV charging stations for the coming school year, based upon the supply and demand statistics from the previous year. In alignment with the other reporting activities outlined in the TDM plan, the University commits to annual reporting through 2030, the horizon of the Facilities Master Plan, after which a new TDM plan may be proposed.



NORTH ELEVATION

1/16" = 1' - 0"

1 ADDED:
- SECURITY FENCE BETWEEN EXISTING AND NEW GARAGE
- RECESSED ENTRY TO BIKE STORAGE
- GLAZED ALUM STOREFRONT AT BIKE STORAGE
- PIERS TO SUBDIVIDE BAYS AT GROUND LEVEL
- STEEL PERGOLA IN LIEU OF FULL CANOPY
- EXTENDED GLASS AT EAST STAIR TO GRADE LEVEL
- ALUM SUNSCREEN FEATURE AT EAST STAIR

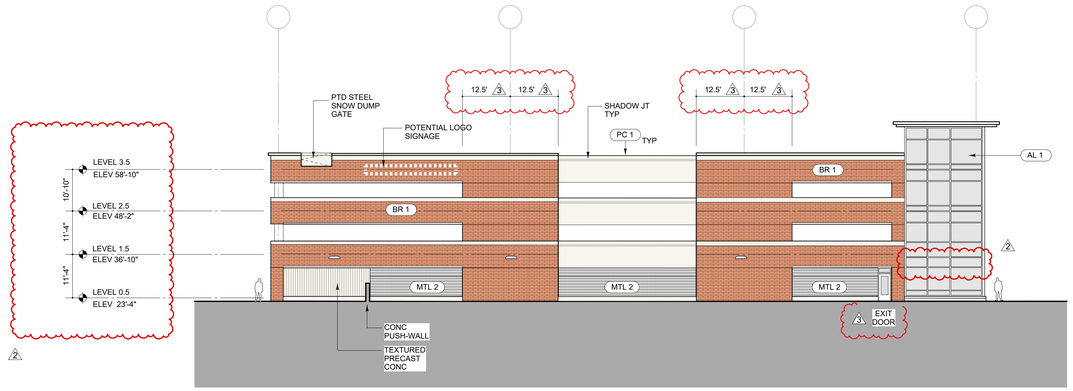
2 DELETED:
- ONE PARKING TIER
- ALUM SUNSCREEN FEATURE AT EAST STAIR

3 • MEDIUM SANDBLASTED FINISH DELETED

MATERIALS SCHEDULE

3 • MATERIALS LEGEND DELETED
• MORE MATERIALS INFORMATION ADDED
• BRICK SELECTION REVISED

KEY	MATERIAL	COLOR	NOTES
AL 1	ALUMINUM FRAMED CURTAINWALL	CLEAR ANODIZED	CLEAR GLASS (UNTINTED)
BR 1	THIN BRICK	 MIXED REDS	THIN BRICK INTEGRAL TO PRECAST UNITS METRO BRICK #350 MAIN STREET FLASHED
MTL 1	FENCING		BLACK VINLY COATED CHAIN-LINK
MTL 2	STEEL SECURITY BAR GRATING		1/8" x 1" BARS 2" x 5" OPENINGS PREFINISHED BLACK
PC 1	PRECAST STRUCTURAL CONCRETE	 BUFF / TAN COLOR	MIXED WITH WHITE PORTLAND CEMENT LIGHTLY SANDBLASTED SIMILAR TO EXISTING GARAGE NO EXPOSED AGGREGATE PRECAST CONCRETE INSTITUTE MIX #113



EAST ELEVATION

1/16" = 1' - 0"

1 • DELETED CANOPY
* ADDED ALUM SUNSHADE FEATURE

2 • DELETED ONE TIER AND ALUM SUNSHADE

3 • WIDEN SHEAR WALLS FROM 12' TO 25'
• STAIR EXIT MOVED FURTHER SOUTH
• MEDIUM SANDBLASTED FINISH DELETED

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

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WOODARD & CURRAN
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GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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PROJECT:

USM - Structured Parking Garage

Address
44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
1	09/07/21	Response to City Comments
2	10/25/21	Plng Brd W.S. #2 Updates
3	11/22/21	Plng Brd W.S. #3 Updates

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

SHEET TITLE:

Building Elevations

A - 200

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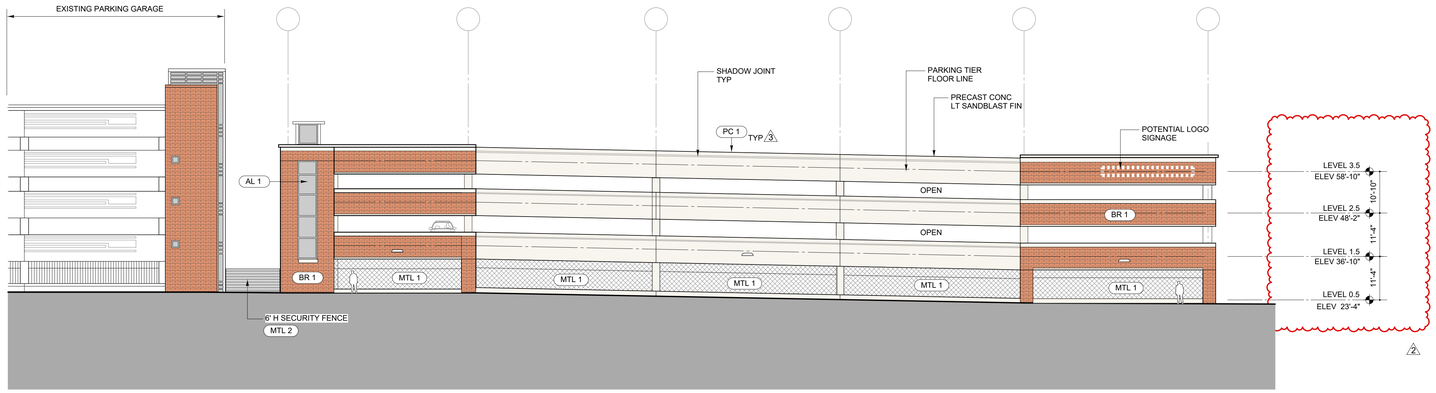

SOUTH ELEVATION

1/16" = 1' - 0"

2 DELETED ONE PARKING TIER
VINYL COATED CHAIN LINK FOR OPENINGS INFILL

3 • MEDIUM SANDBLAST FINISH DELETED

MATERIALS SCHEDULE

3 • MATERIALS LEGEND DELETED
• MORE MATERIALS INFORMATION ADDED
• BRICK SELECTION REVISED

KEY	MATERIAL	COLOR	NOTES
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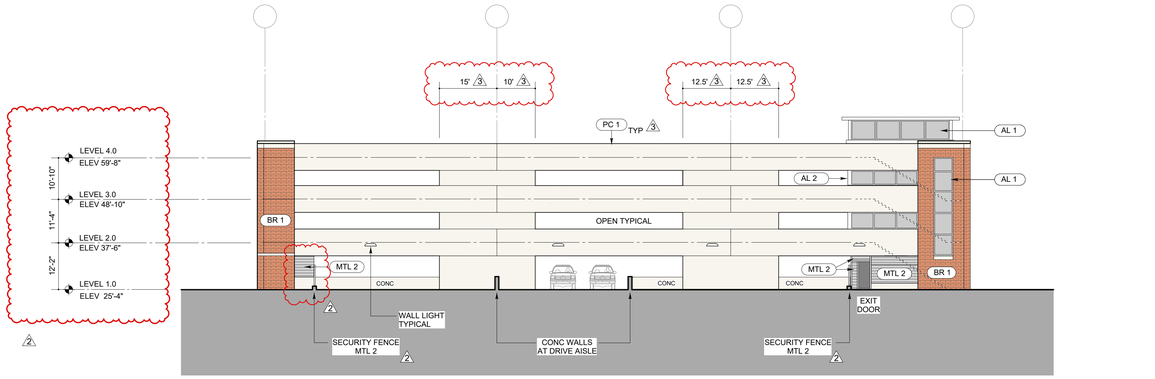
MTL 1	FENCING		BLACK VINLY COATED CHAIN-LINK
MTL 2	STEEL SECURITY BAR GRATING		1/8" x 1" BARS 2" x 5" OPENINGS PREFINISHED BLACK
PC 1	PRECAST STRUCTURAL CONCRETE	 BUFF / TAN COLOR	MIXED WITH WHITE PORTLAND CEMENT LIGHTLY SANDBLASTED SIMILAR TO EXISTING GARAGE NO EXPOSED AGGREGATE PRECAST CONCRETE INSTITUTE MIX #113



WEST ELEVATION

1/16" = 1' - 0"

1 • WALL LIGHTS CALLED OUT
• CONCRETE KNEEWALLS ADDED
• SOUTHWEST STAIR ENCLOSURE MODIFIED
• PIERS TO SUBDIVIDE BAYS AT GROUND LEVEL
• STEEL PERGOLA IN LIEU OF FULL CANOPY
• EXTENDED GLASS AT EAST STAIR TO GRADE LEVEL
• ALUM SUNSCREEN FEATURE AT EAST STAIR

2 • DELETED ONE PARKING TIER

3 • SHEAR WALLS WIDTH INCREASED FROM 12' TO 25'
• ADD SECURITY GRILLE AT NORTH SIDE
• CHANGE SECURITY FENCE FROM MTL-1 TO MTL-2
• MEDIUM SANDBLAST FINISH DELETED

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

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Date	Issued For:
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SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

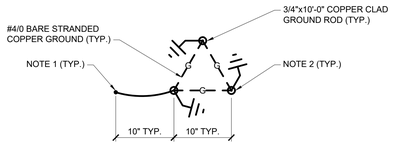
SHEET TITLE:

Building Elevations

A - 501

—OH—	OVERHEAD WIRING, TYPE AS INDICATED
— — — —	UNDERGROUND OR UNDERSLAB WIRING, TYPE AS INDICATED
	UTILITY POLE
	FUSED DISCONNECT SWITCH
	NON-FUSED DISCONNECT SWITCH
	MOTOR
	GROUNDING SYSTEM
(J)	JUNCTION BOX, WALL MOUNTED
J	JUNCTION BOX, IN-GROUND
(M)	ELECTRICAL MANHOLE, COORDINATE LOCATION WITH OTHER UNDERGROUND UTILITIES
(T)	COMMUNICATIONS MANHOLE, COORDINATE LOCATION WITH OTHER UNDERGROUND UTILITIES
T / P S / F	PADMOUNT TRANSFORMER ~ F= FRONT
PB	4'X6' PULL BOX WITH 32" COVER PLATE IN ACCORDANCE WITH UTILITY STANDARDS
P	PEDESTAL LOCATION, PEDESTAL BY SERVICE PROVIDER, STUB UP (2) 2" CONDUITS WITH CONNECTORS AND BUSHINGS FROM HANDHOLE
H	HANDHOLE, MINIMUM 18"x36"x24", SIZE PER NEC FOR NUMBER OF CONDUITS INSTALLED
M	METER & CT CABINET, PEDESTAL MOUNTED
	SINGLE POLE MOUNTED LIGHT
	DOUBLE POLE MOUNTED LIGHT
	WALL MOUNTED LIGHT FIXTURE
	SINGLE POLE HOMERUN: (2)#12+(1)#12G UNO, CONNECT TO PANEL INDICATED
	SINGLE-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT, CONNECT TO PANEL INDICATED
	3-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT, CONNECT TO PANEL INDICATED
A1 / ES-000	DETAIL CALL-OUT
A1 / ES-000	SECTION/ELEVATION CALL-OUT

A1 ELECTRICAL SITE LEGEND

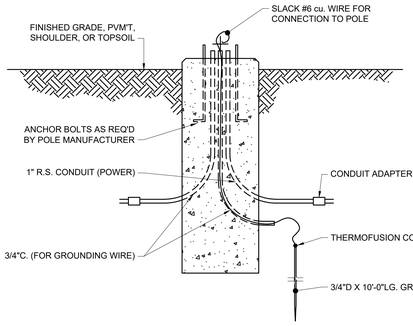


NOTES:

1. RUN #4/0 BARE STRANDED CU GROUND CABLE DOWN IN 1" PVC CONCEALED UNDER ROOF, CEILING AND WALLS. TYPICAL FOR ALL DOWNERS OUT TO GROUNDING COUNTERPOISE.
2. COPPER CLAD STEEL GROUND RODS 3/4"x10'-0", TOP OF RODS BURIED 2'-0" BELOW TOP OF FINISHED GRADE.

B1 GROUNDING ROD DETAILS

DO NOT SCALE

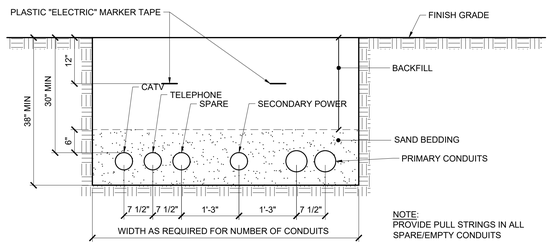


NOTES:

1. LIGHT POLE FOUNDATION SHALL BE PROVIDED BY DIVISION 2. ELECTRICAL SUBCONTRACTOR SHALL FURNISH CONDUITS, AND ANCHOR BOLTS TO CIVIL CONTRACTOR FOR CASTING INTO POLE BASE. THIS DETAIL REFERS TO SITE PARKING LOT AND ROAD LIGHTING FIXTURES ONLY. SEE CIVIL DRAWINGS FOR CONSTRUCTION INFORMATION.
2. ELECTRICAL CONTRACTOR SHALL INSTALL GROUND ROD AND PULL GROUNDING WIRE.

B2 SITE LIGHTING POLE BASE DETAIL

DO NOT SCALE

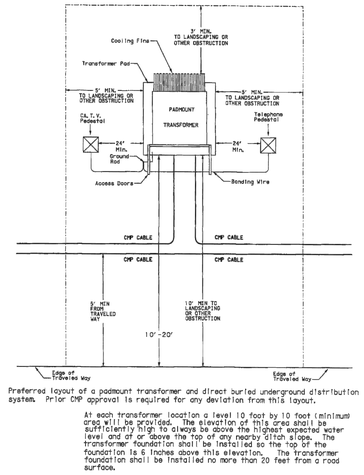


NOTE:
PROVIDE PULL STRINGS IN ALL SPARE/EMPTY CONDUITS

DETAIL INDICATES TYPICAL SPACING BETWEEN CONDUITS OF VARIOUS SYSTEMS, REFER TO SITE PLAN FOR SIZES AND NUMBER OF CONDUITS

B3 TYPICAL SEPARATION OF UTILITIES

DO NOT SCALE



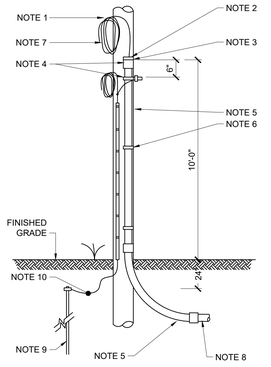
Preferred layout of a padmount transformer and direct buried underground distribution system. Prior CMP approval is required for any deviation from this layout.

At each transformer location a level 10 foot by 10 foot (minimum) area will be provided. The elevation of this area shall be sufficiently high to always be above the highest expected water level and at or above the top of any nearby ditch slope. The transformer foundation shall be installed so the top of the foundation is 6 inches above this elevation. The transformer foundation shall be installed no more than 20 feet from a road surface.

B5 TRANSFORMER CLEARANCE DETAILS

NOTES:

1. PRIMARY CABLES TO BE INSTALLED BY UTILITY COMPANY.
2. CONDUIT SEAL BY CONTRACTOR.
3. INSULATING BUSHING.
4. GALVANIZED STEEL CONDUIT AND BEND SHALL BE GROUNDED BY BONDING TO APPROVED GROUND CLAMP 6" FROM TOP OF THE CONDUIT. A CONDUCTOR OF SUFFICIENT LENGTH SHALL BE PROVIDED TO EXTEND TO UTILITY COMPANY SECONDARY NEUTRAL.
5. PROVIDE 2-4" GALVANIZED STEEL CONDUITS. 2 TOTAL 10 FEET CONDUITS SHALL RISE ON THE SIDE OF THE POLE AWAY FROM THE ROAD, AND SPARE CONDUITS SHALL BE CAPPED 6" ABOVE GRADE.
6. PIPE STRAPS, INSTALL AT NOT MORE THAN 30" INTERVALS.
7. CONTRACTOR TO SEAL CABLE ENDS TO PREVENT ENTRANCE OF MOISTURE.
8. ADAPTER COUPLING STEEL TO PVC.
9. GROUND ROD - 3/4"D.x10'-0" LONG. INSTALL MINIMUM 3 FEET FROM THE POLE.
10. PROVIDE #4cu. GROUND WIRE.



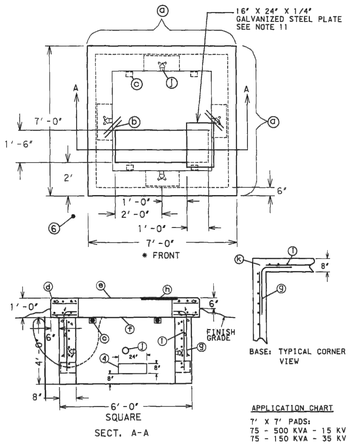
B4 RISER POLE CONDUIT DETAIL

DO NOT SCALE

NOTES:

1. * FRONT denotes the side on which the access doors are located. The concrete base shall be set on a suitable gravel base and located so the FRONT is accessible by truck and suitably protected from plow and traffic damage.
2. Before installing or requiring any active drainage structure (e.g., drain pipe) into the foundation or pad, the contractor, CMP Line Supervisor, or CMP Distribution Engineer must contact Central Maine Power Company's Environmental Services Department at 623-3521 ext. 3479 to request a site inspection.
3. Finish grade shall be graded in such manner to allow surface water to flow away from the pad.
4. Provide 8" x 24" cable holes (band outs) 8' up the wall from the base. Locate one cable hole per wall, more if necessary. Line up cable holes with trench.
5. Conduits entering concrete stuctures shall be set back from the inside wall 1 to 2 inches and the space within the knockout surrounding the conduits completely filled with mortar to prevent soil from entering structure. Inside the structure the mortar shall be finished and beveled from the conduit ends to the inside wall face to cover and smooth the edges of the knockouts.
6. A 3/4"X 8' galvanized ground rod is to be installed six inches in front of the left FRONT corner of the foundation. The top of the ground is to be 6 inches below final grade.
7. A ground wire shall be installed from the ground rod through the cable hole at the bottom of the pad. 10 Feet of ground wire shall be provided so that it can be installed through the two grounding lugs and connected to the neutral spade.
8. Concrete compressive strength shall be 4000 PSI @ 28 days. For cast-in-place early high strength may be used with a minimum of seven day cure time.
9. Reinforcing steel to have: FY = 60 KSI.
10. For precast units: The precast supplier shall provide lifting lugs in the slab (foundation) and base; the precast supplier shall assemble the slab to the base prior to shipping to the site to ensure that the slab and base fit properly (with no rocking of the slab evident).
11. A 16" x 24" x 1/4" galvanized steel plate to cover a portion of the cable hole when the transformer does not completely cover it. Cut the steel plate to fit, if necessary.

a. 7-*5 Rebar evenly spaced each way top to bottom.
b. 2-*4 Corner diagonal rebar 2'-0" long top and bottom.
c. 4"x 4"x 1/2" angle 6' long with 2-3/4" diameter expansion anchors typical - 4 places (two place precast only).
d. Chamfer typical
e. 2" Concrete cover over top rebar.
f. 3" Concrete cover over bottom rebar.
g. *5 L-Bar @ 12" (cast-in-place only)
h. 16"x 24"x1/4" galvanized steel plate. MID*6000621790
i. *5 Rebar on 12" centers.
j. Pulling eye insert, for use with5/8" national course thread eye-bolt, (Richmond LCB-1 or equivalent). Located opposite each cable hole and 2' (two feet) from the bottom.
k. All rebar ends to be covered by 1' of concrete, minimum.



APPLICATION CHART

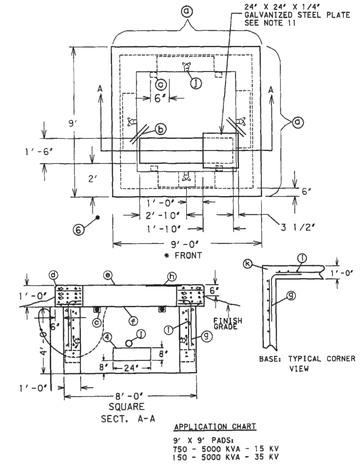
7' X 7' PADS:
75 - 500 KVA - 15 KV
75 - 150 KVA - 35 KV

B6 SMALL TRANSFORMER PAD DETAILS

NOTES:

1. * FRONT denotes the side on which the access doors are located. The concrete base shall be set on a suitable gravel base and located so the FRONT is accessible by truck and suitably protected from plow and traffic damage.
2. Before installing or requiring any active drainage structure (e.g., drain pipe) into the foundation or pad, the contractor, CMP Line Supervisor, or CMP Distribution Engineer must contact Central Maine Power Company's Environmental Services Department at 623-3521 ext. 3479 to request a site inspection.
3. Finish grade shall be graded in such manner to allow surface water to flow away from the pad.
4. Provide 8" X 24" cable holes (band outs) 8' up the wall from the base. Locate one cable hole per wall, more if necessary. Line up cable holes with trench.
5. Conduits entering concrete stuctures shall be set back from the inside wall 1 to 2 inches and the space within the knockout surrounding the conduits completely filled with mortar to prevent soil from entering structure. Inside the structure the mortar shall be finished and beveled from the conduit ends to the inside wall face to cover and smooth the edges of the knockouts.
6. A 3/4" x 8' galvanized ground rod is to be installed six inches in front of the left FRONT corner of the foundation. The top of the ground rod is to be 6 inches below final grade.
7. A ground wire shall be installed from the ground rod through the cable hole at the bottom of the pad. 20 Feet of ground wire shall be provided so that it can be installed through the two grounding lugs and connected to the neutral spade.
8. Concrete compressive strength shall be 4000 PSI @ 28 days. For cast-in-place early high strength may be used with a minimum of seven day cure time.
9. Reinforcing steel to have: FY = 60 KSI.
10. For precast units: The precast supplier shall provide lifting lugs in the slab (foundation) and base; the precast supplier shall assemble the slab to the base prior to shipping to the site to ensure that the slab and base fit properly (with no rocking of the slab evident).
11. Use a 24" x 24" x 1/4" galvanized steel plate to cover a portion of the cable hole when the transformer does not completely cover it. Cut the steel plate to fit, if necessary.

a. 9-*5 Rebar evenly spaced each way top to bottom.
b. 2-*4 Corner diagonal rebar 2'-0" long top and bottom.
c. 4" x 4" x 1/2" angle 6' long with 2-3/4" diameter expansion anchors typical - 4 placed (two place precast only).
d. Chamfer typical
e. 2" Concrete cover over top rebar.
f. 3" Concrete cover over bottom rebar.
g. *5 L-Bar @ 12" (cast-in-place only)
h. 24" x 24" x 1/4" galvanized steel plate. MID*6000621795
i. *5 Rebar on 12" centers.
j. Pulling eye insert, for use with 3/4" national course thread eye-bolt, (Richmond LCB-1 or equivalent). Located opposite each cable hole and 2' (two feet) from the bottom.
k. All rebar ends to be covered by 1' of concrete, minimum.



APPLICATION CHART

9' X 9' PADS:
750 - 5000 KVA - 15 KV
150 - 5000 KVA - 35 KV

B6 LARGE TRANSFORMER PAD DETAILS

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

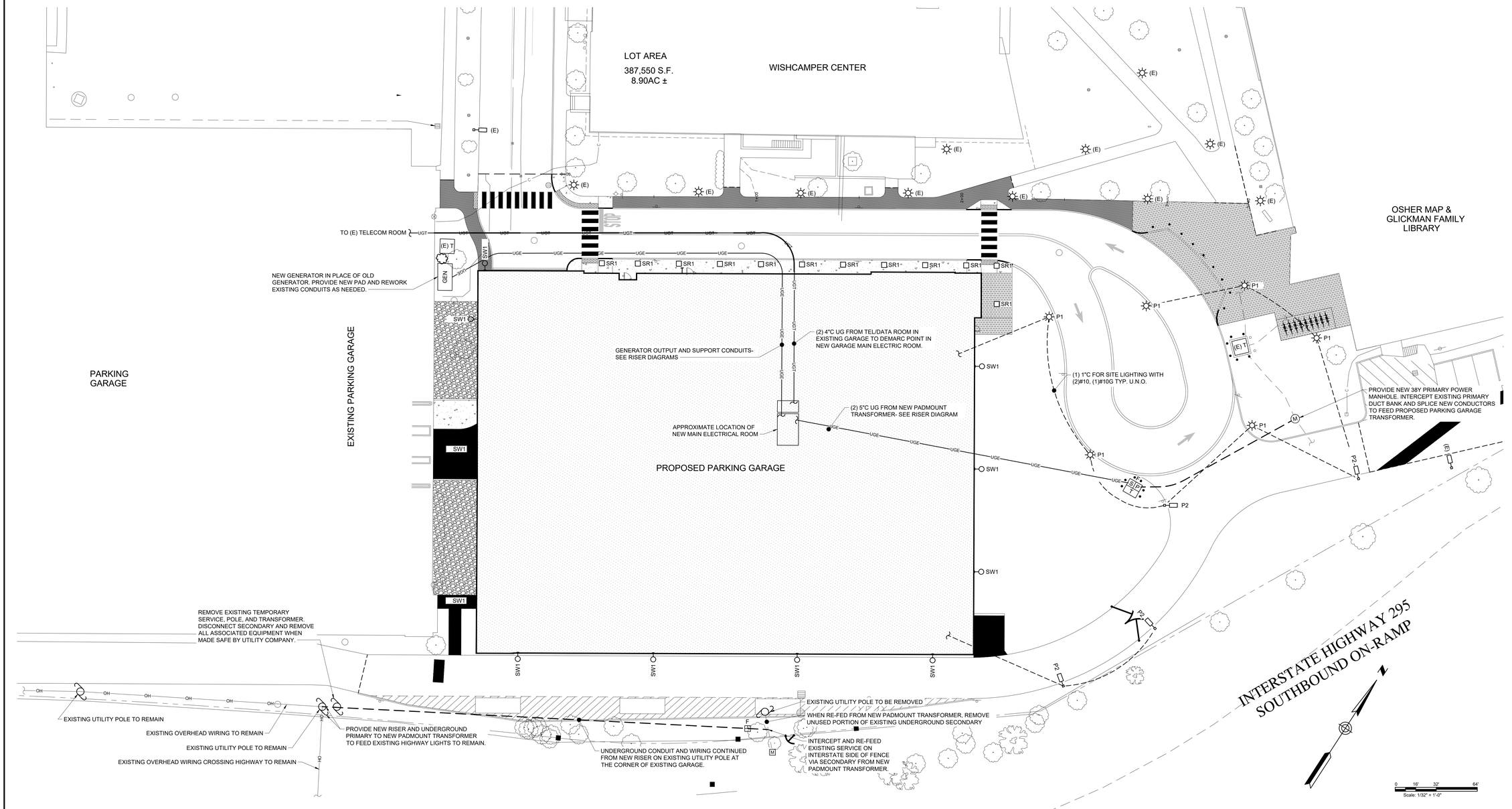
Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

SCALE	AS NOTED
DATE ISSUED	11/23/2021
PROJECT NO	20-20145.00-1
DRAWN BY	GMC
CHECKED BY	BTG

SHEET TITLE:

ELECTRICAL SITE LEGEND, DETAILS, AND NOTES

ES-000



A1	ELECTRICAL SITE PLAN
SCALE: 1"=20'-0"	

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SCALE	**AS NOTED**
DATE ISSUED	**11/23/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

ELECTRICAL SITE PLAN AND NOTES

ES-100

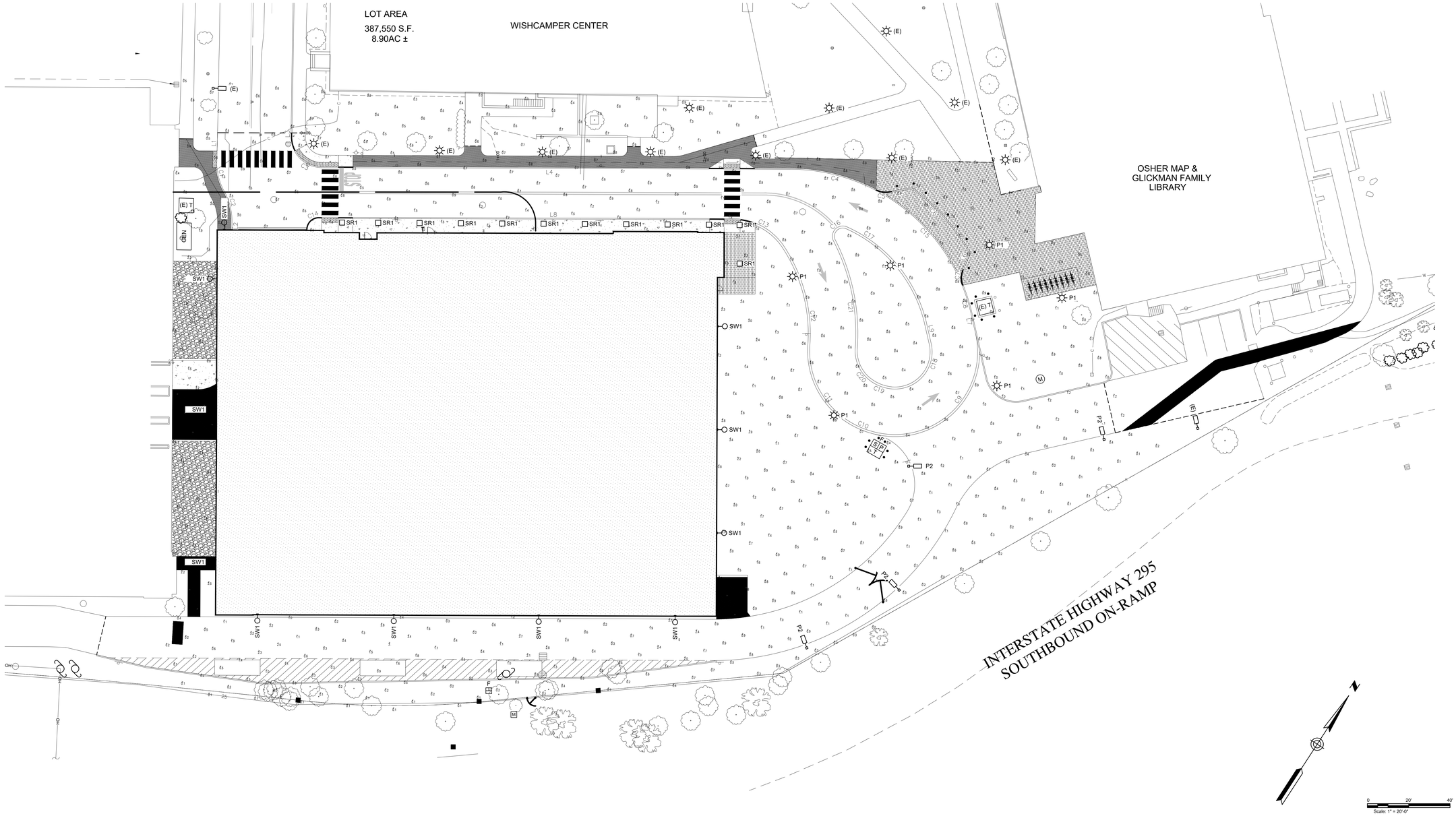
LUMINAIRE SCHEDULE ~ SITE

TYPE	DESCRIPTION	MFR	CATALOG SERIES NUMBER SEE NOTE 1	MOUNTING, U.N.O.	VOLTS	LAMP				KEY NOTES
						QTY PER FIXTURE	WATTS	LUMENS	TYPE	
P1	SITE LIGHT AND POLE, "ICE CREAM CONE" SHAPE	SEE NOTE 8		14' POLE	277	1	24	3,330	LED ARRAY ~ 4000K	8,9
P2	SITE LIGHT AND POLE, "SHOEBOX" SHAPE	SEE NOTE 8		14' POLE	277	1	18	2,160	LED ARRAY ~ 4000K	8,10
SW1	WALL MOUNTED EXTERIOR LIGHT	LITHONIA	KAXW-LED-P1-40K-R4-MVOLT	KEYNOTE 5	UNV	1	29	3,643	LED ARRAY ~ 4000K	5
SR1	RECESSED CANOPY LIGHT	LITHONIA	LDN4SQ-40-07-LS4-AR-LSS-MVOLT	RECESSED CANOPY	UNV	1	8.6	620	LED ARRAY ~ 4000K	

	NOTES
1	**NOTE THAT THESE NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. PROVIDE ALL REQUIREMENTS ON SCHEDULE, NOTES, SPECS, AND DRAWINGS COMBINED.**
2	**CATALOG SERIES NUMBERS ARE USED TO ESTABLISH A LEVEL OF QUALITY AND NOT INTENDED TO LIMIT COMPETITION. SERIES NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. COMPLY WITH ADDITIONAL REQUIREMENTS IN SPECIFICATIONS AND DRAWINGS.**
3	PROVIDE WALL,CEILING, OR PENDANT MOUNTING AS INDICATED ON PLANS. PROVIDE NUMBER OF FACES AND ARROWS AS INDICATED.
4	VERIFY CEILING STRUCTURE AND MOUNTING HEIGHT PRIOR TO ORDERING ANY LIGHT FIXTURES.
5	COORDINATE MOUNTING HEIGHT WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
6	PROVIDE COLD WEATHER OPTION.
7	CONFIRM EXACT FIXTURE CONFIGURATION AND OPTIONS WITH MUNICIPALITY PRIOR TO ORDERING FIXTURE.
8	FIXTURE AND POLE SHALL BE PROVIDED BY OWNER FROM EXISTING OWNER'S STOCK.
9	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8029E345-A.
10	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8039E40-A.

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
DRIVES	Illuminance	Fc	0.99	3.5	0.2	5.15	17.50
WALKWAY- GLICKMAN	Illuminance	Fc	1.00	1.3	0.5	2.00	2.60
WALKWAY- NEW GARAGE	Illuminance	Fc	1.42	1.7	1.2	1.18	1.42



A1	PHOTOMETRIC SITE PLAN
SCALE: 1"=20'-0"	

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
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PROJECT TEAM:

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DESMAN Design Management
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CIVIL ENGINEER
WOODARD & CURRAN
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LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
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MEP/FP ENGINEER
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COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

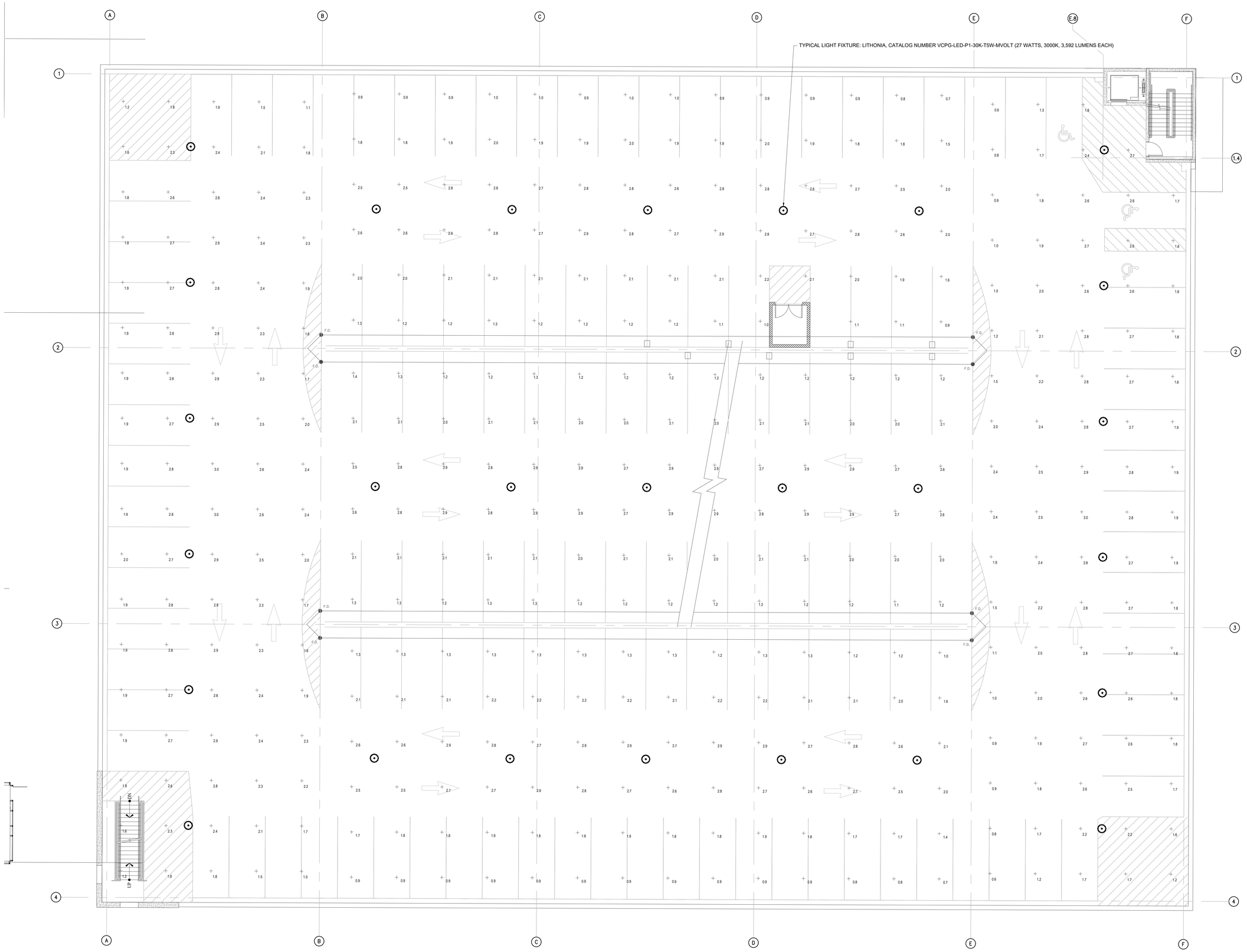
SCALE	**AS NOTED**
DATE ISSUED	**11/23/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

SITE PHOTOMETRIC PLAN AND SCHEDULES

SL-100

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
PARKING DECK OVERALL	Illuminance	Fc	2.02	3.0	0.6	3.37	5.00



A1 TYPICAL INTERIOR PARKING DECK PHOTOMETRIC PLAN

SCALE: 1/8"=1'-0"

7/2/2021 3:16:33 PM

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

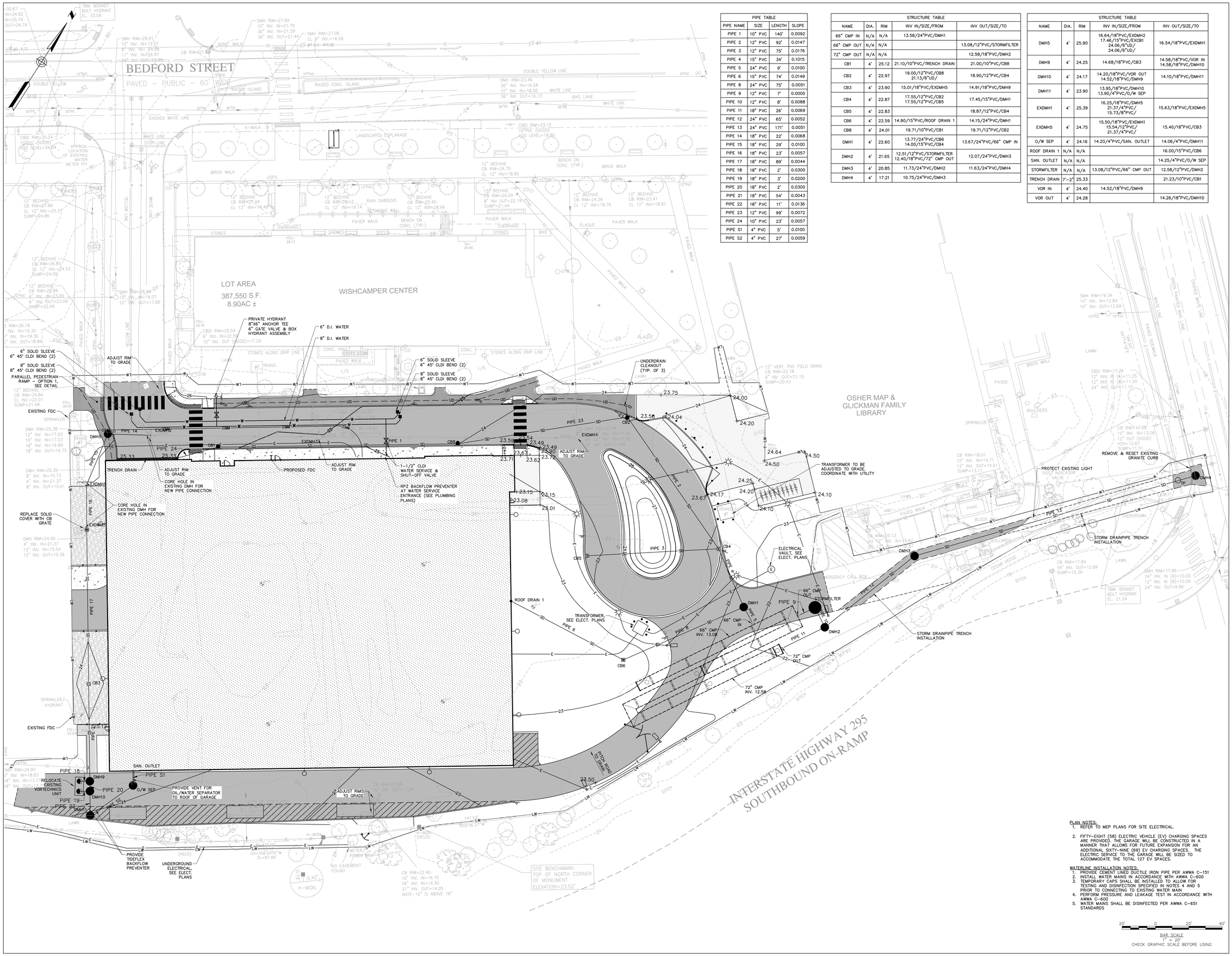
SCALE	**AS NOTED**
DATE ISSUED	**11/23/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

TYPICAL INTERIOR PARKING DECK PHOTOMETRIC PLAN

SL-101

Standard to be Waived: Cite Ordinance or Technical Manual Standard	Cite Standard Language: Cite specific language of applicable Ordinance or Technical Manual Standard	Waiver Being Sought: Describe waiver being sought. Ex. – We are requesting a two-way parking lot drive aisle width of 20' feet.	Justification for Waiver: Address specific waiver criteria, if applicable, and document reasons for the waiver request.
City of Portland Technical Manual Section 1 - Transportation Systems - Subsection 1.17 Electric Vehicle Infrastructure	New structured garages shall provide EV charging to 20% of parking spaces. Remaining spaces must be served by sufficient conduit, wiring, and electrical service to allow for future installation of electric vehicle supply equipment.	58 Charging Stations (9% of garage spaces), tracking usage and forecasting demand, commitment to meet EV charging demand in future and sizing electrical infrastructure to accommodate growth as described in attached narrative.	See Section 8.1 of the Site Plan Narrative for waiver justification.
Technical Manual Section 12.3.5: Luminaire Types	All fixtures must be LED and shall not exceed 3000K Correlated Color Temperature (CCT). Screw in light fixtures must have LED lamps specified to be maximum of 3000K CCT.	Applicant requests a waiver to allow 4,000K CCT fixtures versus 3,000K CCT fixtures.	4,000K color temperature fixtures were selected to match the existing fixtures immediately adjacent to the scope of work area.



PIPE TABLE			
PIPE NAME	SIZE	LENGTH	SLOPE
PIPE 1	10" PVC	140'	0.0092
PIPE 2	12" PVC	92'	0.0147
PIPE 3	12" PVC	75'	0.0176
PIPE 4	15" PVC	34'	0.1015
PIPE 5	24" PVC	9'	0.0100
PIPE 6	15" PVC	74'	0.0149
PIPE 8	24" PVC	75'	0.0051
PIPE 9	12" PVC	7'	0.0000
PIPE 10	12" PVC	8'	0.0088
PIPE 11	18" PVC	26'	0.0069
PIPE 12	24" PVC	65'	0.0052
PIPE 13	24" PVC	171'	0.0051
PIPE 14	18" PVC	22'	0.0068
PIPE 15	18" PVC	29'	0.0100
PIPE 16	18" PVC	23'	0.0057
PIPE 17	18" PVC	89'	0.0044
PIPE 18	18" PVC	2'	0.0300
PIPE 19	18" PVC	3'	0.0200
PIPE 20	18" PVC	2'	0.0300
PIPE 21	18" PVC	54'	0.0043
PIPE 22	18" PVC	11'	0.0136
PIPE 23	12" PVC	99'	0.0072
PIPE 24	10" PVC	23'	0.0057
PIPE S1	4" PVC	5'	0.0100
PIPE S2	4" PVC	27'	0.0059

STRUCTURE TABLE				
NAME	DIA.	RIM	INV IN/SIZE/FROM	INV OUT/SIZE/TO
66" CMP IN	N/A	N/A	13.58/24"PVC/DMH1	
66" CMP OUT	N/A	N/A		13.08/12"PVC/STORMFILTER
72" CMP OUT	N/A	N/A		12.58/18"PVC/DMH2
CB1	4'	25.12	21.10/10"PVC/TRENCH DRAIN	21.00/10"PVC/CB8
CB2	4'	22.97	19.00/12"PVC/CB8 21.13/6"UD/	18.90/12"PVC/CB4
CB3	4'	23.90	15.01/18"PVC/EXDMH5	14.91/18"PVC/DMH9
CB4	4'	22.87	17.55/12"PVC/CB2 17.55/12"PVC/CB5	17.45/15"PVC/DMH1
CB5	4'	22.83		18.87/12"PVC/CB4
CB6	4'	22.59	14.90/15"PVC/ROOF DRAIN 1	14.15/24"PVC/DMH1
CB8	4'	24.01	19.71/10"PVC/CB1	19.71/12"PVC/CB2
DMH1	4'	22.60	13.77/24"PVC/CB6 14.00/15"PVC/CB4	13.67/24"PVC/66" CMP IN
DMH2	4'	21.65	12.51/12"PVC/STORMFILTER 12.40/18"PVC/72" CMP OUT	12.07/24"PVC/DMH3
DMH3	4'	20.85	11.73/24"PVC/DMH2	11.63/24"PVC/DMH4
DMH4	4'	17.21	10.75/24"PVC/DMH3	

STRUCTURE TABLE				
NAME	DIA.	RIM	INV IN/SIZE/FROM	INV OUT/SIZE/TO
DMH5	4'	25.90	16.64/18"PVC/EXDMH2 17.46/15"PVC/EXCB1 24.06/6"UD/ 24.06/6"UD/	16.54/18"PVC/EXDMH1
DMH9	4'	24.25	14.68/18"PVC/CB3	14.58/18"PVC/VOR IN 14.58/18"PVC/DMH10
DMH10	4'	24.17	14.20/18"PVC/VOR OUT 14.52/18"PVC/DMH9	14.10/18"PVC/DMH11
DMH11	4'	23.90	13.95/18"PVC/DMH10 13.90/4"PVC/O/W SEP	
EXDMH1	4'	25.39	16.25/18"PVC/DMH5 21.37/4"PVC/ 15.73/8"PVC/	15.63/18"PVC/EXDMH5
EXDMH5	4'	24.75	15.50/18"PVC/EXDMH1 15.54/12"PVC/ 21.37/4"PVC/	15.40/18"PVC/CB3
O/W SEP	4'	24.16	14.20/4"PVC/SAN. OUTLET	14.06/4"PVC/DMH11
ROOF DRAIN 1	N/A	N/A		16.00/15"PVC/CB6
SAN. OUTLET	N/A	N/A		14.25/4"PVC/O/W SEP
STORMFILTER	N/A	N/A	13.08/12"PVC/66" CMP OUT	12.58/12"PVC/DMH2
TRENCH DRAIN	7'–2"	25.33		21.23/10"PVC/CB1
VOR IN	4'	24.40	14.52/18"PVC/DMH9	
VOR OUT	4'	24.28		14.26/18"PVC/DMH10

PLAN NOTES:
1. REFER TO MEP PLANS FOR SITE ELECTRICAL.
2. FIFTY–EIGHT (58) ELECTRIC VEHICLE (EV) CHARGING SPACES ARE PROVIDED. THE GARAGE WILL BE CONSTRUCTED IN A MANNER THAT ALLOWS FOR FUTURE EXPANSION FOR AN ADDITIONAL SIXTY–NINE (69) EV CHARGING SPACES. THE ELECTRIC SERVICE TO THE GARAGE WILL BE SIZED TO ACCOMMODATE THE TOTAL 127 EV SPACES.

WATERLINE INSTALLATION NOTES:
1. PROVIDE CEMENT LINED DUCTILE IRON PIPE PER AWWA C–151
2. INSTALL WATER MAINS IN ACCORDANCE WITH AWWA C–600
3. TEMPORARY CAPS SHALL BE INSTALLED TO ALLOW FOR TESTING AND DISINFECTION SPECIFIED IN NOTES 4 AND 5 PRIOR TO CONNECTING TO EXISTING WATER MAIN
4. PERFORM PRESSURE AND LEAKAGE TEST IN ACCORDANCE WITH AWWA C–600
5. WATER MAINS SHALL BE DISINFECTED PER AWWA C–651 STANDARDS

20' 0 20' 40'
BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

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PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE
DARRIN B. STAIRS
No. 15118
LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

SCALE	**1"=20'**
DATE ISSUED	**11/23/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**D.B.S.**

SHEET TITLE:

UTILITY & GRADING PLAN

C-104

\\woodardcurran.net\shared\Projects\20233035.00 USM – Falmouth Street Garage\wip\Drawings\Civil\233035.00 C104.dwg, Nov 22, 2021 – 8:59am RMCDEVITT

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

Att. V

Via Electronic Mail

December 3, 2021

Jimmy Dealaman, Planner
Planning and Urban Development Department
City Hall, 389 Congress Street, 4th Floor
Portland, Maine 04101

Re: 50 Bedford Street – Additional Response to Site Plan Application Review Comments on Supplemental Materials for Transportation Demand Management Plan and Traffic Movement Permit

Dear Jimmy:

The following are additional responses to comments received from the City of Portland in an email dated November 19, 2021, pertaining to the project and suggested garage access/egress plan; the comments received are provided below for your reference, followed by our response in italics:

- The City finds the revised garage entry/exit plan to be acceptable based on the results of the traffic modeling. The final acceptance of this change will be pending the review of revised materials including an updated Section 7 Traffic Study and Bedford Street improvement plan.

  RESPONSE: VHB is currently revising the Section 7 documentation to include the analysis shared with the City's peer review consultant on November 19th and will provide that to the City no later than Tuesday, December 7th. Attached please find the revised Bedford Street concept that reflects this circulation change.

- The applicant shall provide details on how traffic will be managed on Surrenden Street under a reversible garage gate scenario. This is related to traffic control entering and exiting the garage (signage, pavement markings, etc.).

  RESPONSE: As shown on the attached Bedford Street Concept Plan, Surrenden Street will be modified to accommodate two exiting lanes at Bedford Street that taper back to a single lane in each direction at the crosswalk and widen at the garage entrance to accommodate two lanes of traffic for at least three vehicles (including the vehicle at the gate). Entry and exits will include active/LED signage inside and outside the garage indicating traffic flow direction at each lane. Please see the attached Entry Signage Plan. Based on queuing analysis, this will accommodate the peak load on Surrenden. This also improves the safety of the crossing by reducing conflicting traffic to a single lane in each direction.

- There are safety concerns for pedestrians crossing Surrenden Street near the Garage entry under a two-lane entry scenario (pedestrians having to navigate through two lanes of queued vehicles). The applicant shall develop a concept plan for a sidewalk to be located on the east side of Surrenden Street.

  RESPONSE: The applicant proposes to improve the pedestrian connection across Surrenden from the garage to the existing sidewalk on the west side. This will formalize the pedestrian space coming

out of the garage and provide refuge and a more direct crossing located with clear sight lines from the garage and from Bedford Street.

As indicated above, the design of Surrenden Street now includes a single lane of traffic in each direction at the crosswalk to provide a safe pedestrian crossing while continuing to accommodate the anticipated peak queue demand entering the garage. The pedestrian demand lines from this side of the garage are to points west, including the Maine Law School site and the "white houses" along Bedford Street. There is no anticipated desire line that results in a need to exit the garage on foot and travel to the east on Bedford Street, lessening the need for a second sidewalk on Surrenden Street. A sidewalk on the east side of Surrenden is not proposed at this time.

- Per the recommendations in the most recent version of the Section 7 Traffic Study, the applicant shall be responsible for the installation of a vehicle queue detection system for the I-295 Southbound Off-Ramp that is compatible with the RapidFlow signal system at Forest/Bedford/Baxter intersection.

  RESPONSE: The applicant is agreeable to this as a permit condition.

- The applicant shall provide a revised Section 7 Traffic Study. The Study shall include LOS/Delay/Queue information from SimTraffic for No-Build (not the Falmouth site) and Build conditions for easy comparison of project impacts.

  RESPONSE: As indicated above, VHB is currently revising the Section 7 documentation and will include the LOS/Delay/Queue information from SimTraffic for No-Build and Build conditions for easy comparison of project impacts. We will provide that to the City no later than Tuesday, December 7th

Thank you for your feedback and comments as we continue to move forward with this project. Please contact me should you have any questions.

Sincerely,

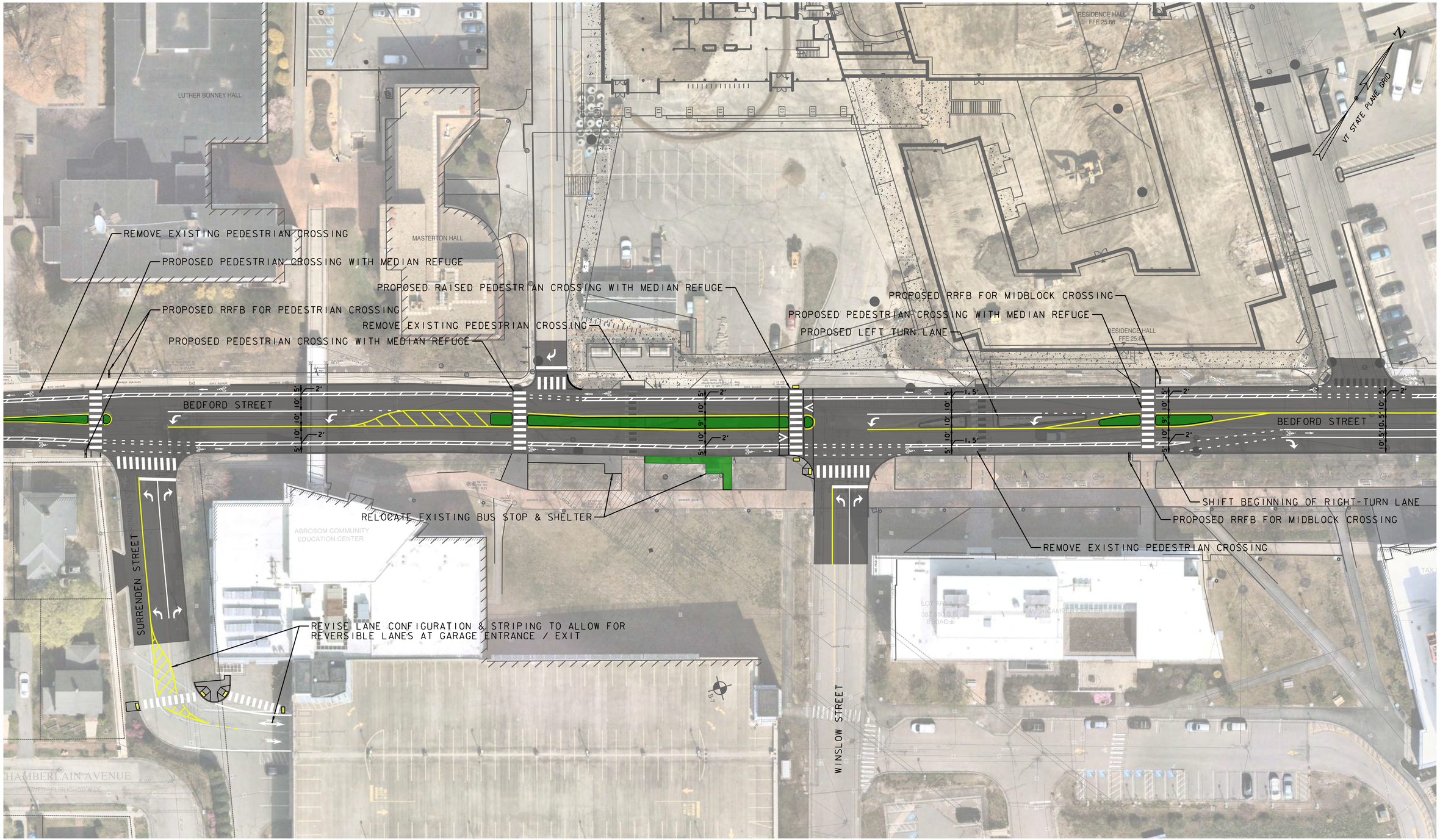
WOODARD & CURRAN, INC.

Darrin Stairs, PE
Project Manager

/DS

Enclosure(s):
- Bedford Street Concept Plan, VHB, dated 12/01/21
- Entry-Exit Signage Plan, Desman Design Management, dated 12/02/21

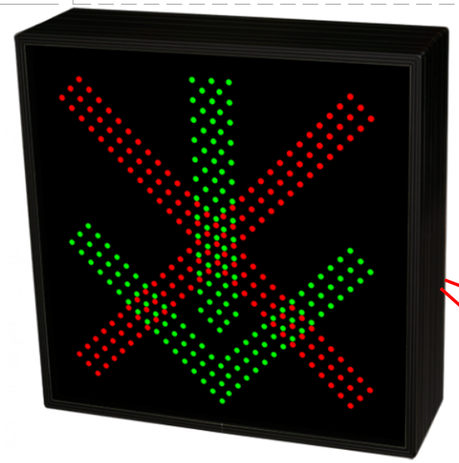
cc: Wes Wilson, Desman Design Management
Ann Vashon, USM



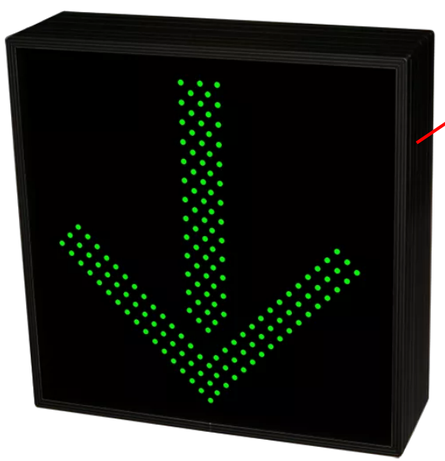
SCALE 1" = 30'-0"
30 0 30

PROJECT NAME:	USM INTERSECTION IMPROVEMENTS
PROJECT NUMBER:	52718.01
FILE NAME: bdr_concepts.dgn	PLOT DATE: 12/01/21
PROJECT LEADER: J.A. CONLEY	DRAWN BY: D.A. GINGRAS
DESIGNED BY: D.A. GINGRAS	CHECKED BY: J.A. CONLEY
BEDFORD STREET CONCEPT	SHEET 1 OF 1

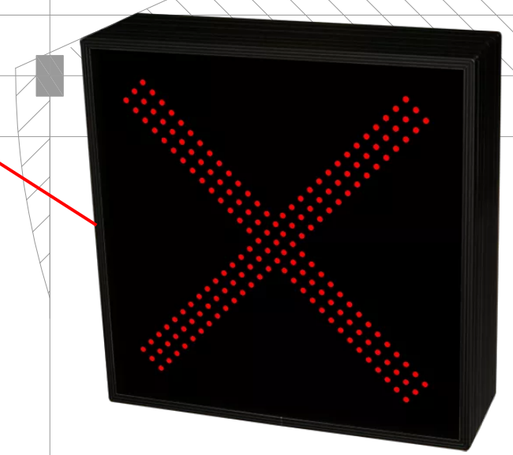
To aid entry/exit traffic flow these signs will be added above each lane



Red X / Green Arrow to align with traffic flow of reversible lane



Green Arrow only



To aid entry/exit traffic flow these signs can be added above each lane

Green Arrow Only

Red X Only

Red X Only

TWO TIER BIKE RACKS – 250 TOTAL SPACES

BIKE REPAIR

RAMP

UP (6.25%)

8'–0"(TYP.)

MOTORCYCLE SPACES @ 4'–0"

24'–0"

18'–0"

University of Southern Maine

Traffic Movement Permit

Revised Section 7

Proposed Residence Hall, Student Center, and Parking Garage

December 2021

Introduction

VHB has conducted a technical analysis in support of a Traffic Movement Permit (TMP) modification for development of a new residence hall and Student Center on the University of Southern Maine (USM) campus. Although in the approved TMP for Project ID PL-001040-2020, a parking garage was not the primary subject of the permit application, for the purposes of the traffic analysis, the proposed parking garage location was situated off of Falmouth Street. Anticipated new trips to and from the campus were assumed to utilize the new parking garage structure.

The proposed location of the parking garage has since been relocated as a response to neighborhood feedback and a site evaluation process. The locations of the 580-bed residence hall and Student Center that were previously permitted have not changed. The new parking garage will now be located adjacent to the existing parking structure on campus with joint access to and from Bedford Street. As a result, the traffic that had previously been assigned to the garage on Falmouth Street will instead access the proposed parking structure location on Bedford Street. This traffic was redistributed across the adjacent street network and reevaluated to assess the resulting traffic impacts.

Future Conditions

The future traffic conditions in the study area were analyzed with the proposed project in place and compared to the conditions outlined in the TMP traffic analysis. The TMP future traffic volumes and intersection operations for the future horizon year of 2028 were analyzed for the Build condition, with the parking garage located off of Bedford Street. At the request of the City of Portland's Traffic Engineering Consultant, the results were compared to a condition without the garage located at either location.

Infrastructure Improvements

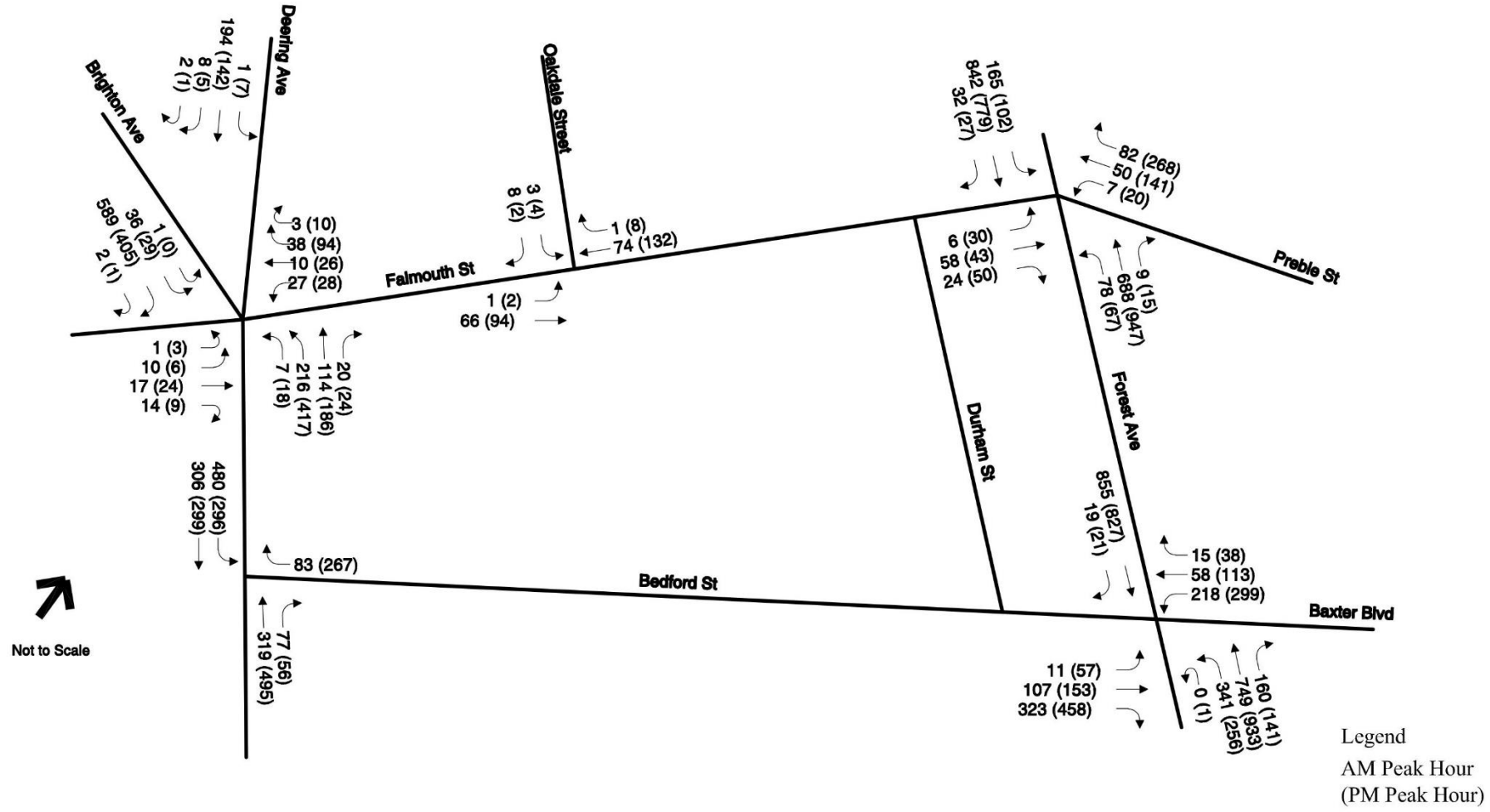
Construction of a roundabout at the intersection of Falmouth Street, Brighton Avenue and Deering Avenue is currently being completed. As such, the TMP permit traffic analysis as well as the traffic analysis for the current garage location on Bedford Street both include a completed roundabout at this location.

The traffic volume data collected at the intersection of Falmouth Street, Brighton Avenue and Deering Avenue was redistributed to represent the volumes that will exist at the five-leg roundabout in the future, rather than the current six-leg condition.

Baseline Traffic Conditions

The TMP traffic analysis included a one percent per year background traffic growth rate and the traffic associated with identified projects in the area. Although the enrollment growth was previously discussed during permitted of the residence hall and garage on Falmouth Street, that traffic was not included in the analysis that follows. The traffic networks from the 2028 No Build conditions are illustrated in Figure 1.

Figure 1. 2028 No Build Network



In anticipation of the proposed garage location on Bedford Street with access to and from the parking garage via Surrenden Street and Winslow Street, baseline data for the intersections would be necessary. The existing parking garage is the primary purpose for trips into or out of either Surrenden Street or Winslow Street. Therefore, data from the existing garage was representative of the entering and exiting movements at these two intersections with Bedford Street. As such, the peak AM and peak PM enters and exits to the existing garage were used as the basis for the baseline turning movements at the intersections.

The peak periods of the adjacent roadway network were reviewed for a three-day garage activity report counted from October 21, 2019 through October 23, 2019 to identify the peak AM and peak PM garage enters and exits. The time period was consistent with the campus-wide parking study which noted 90% occupancy of the parking garage. The AM peak hour had 474 enters and 9 exits and the PM peak hour had 70 enters and 309 exits. These data were distributed on to the network on Bedford Street based on the distributions for the study and adjusted to reflect the directional distribution noted in Bedford Street counts. Additional volumes were added at the intersection of Bedford Street and Winslow Street to address imbalances in the network and the drop off and pick up trips associated with the Wishcamper Center and Glickman Library. A figure outlining the baseline garage count data for the intersections of Bedford Street with Surrenden Street and Winslow Street is included in the appendix.

Trip Generation Assignment

To determine the impact of the proposed garage location, VHB assigned the trips destined for the proposed parking garage to the location on Bedford Street. As a reminder, based on industry standards and MaineDOT guidance, the number of new peak hour trips anticipated with the growth in enrollment is 160 trips (125 in and 35 out) in the highest AM peak hour and 160 trips (51 and 109 out) in the highest PM peak hour with no adjustments for the high portion of transit trips to and from the campus. It is important to note that existing campus mode shares are already high and with additional Transportation Demand Management initiatives, the number of students and employees walking, biking, riding transit, or carpooling is expected to rise. To remain conservative, the trip generation for this analysis was not reduced to reflect the existing or anticipated mode split based on TDM measures.

In order to confirm that the trips estimated based on the anticipated growth in enrollment represents the anticipated trips at a garage on this campus, an addition analysis was conducted. At the completion of this Section 7, the proposed garage was anticipated to accommodate approximately 631 parking spaces which would have consisted of 396 parking spaces associated with the residence hall and an additional 235 spaces that will accommodate parking spaces relocated from elsewhere on campus (i.e. lots closed for development of campus center and residence hall as well as parking at Wishcamper center). Although it is likely that many of the trips relocating from Wishcamper parking are accounted for in the 2019 adjusted volumes, in the event that these are new commuter trips, the anticipated impact was calculated.

The 2019 trip rate at the existing garage was 0.42 trips per parking space during the AM peak hour and 0.33 trips per parking space during the PM peak hour. As the proposed non-residential spaces will likely follow the commuter student pattern of the existing garage, these rates were applied to the 235 non-residential spaces in the proposed garage resulting in 99 AM peak hour trips and 78 PM peak hour trips. Subtracting these commuter trips from the proposed total proposed garage trip generation of 160 trips during each the AM and PM peak hour results in the residential portion of the garage generating 61 AM peak hour trips and 79 PM peak hour trips. The trip rate associated with these residential spaces is 0.15 trips per parking space during the AM peak hour and 0.20 trips per parking space during the PM peak hour. It is reasonable that the residential spaces would result in only 35% of the trips a commuter space would generate during the AM peak hour. The PM peak hour rate for the residential spaces

would calculate to 60% of the trips associated with a commuter space. These ratios reflect what is likely an overestimate of the trips that will be generated by a residential student. Therefore, the trip generation calculated by ITE appears to be conservative when compared to the trip patterns of the existing garage. With the reduction in parking spaces associated with the removal of a garage level, the ITE trip generation based on enrollment is a highly conservative estimate of the likely trips to the proposed garage.

The trips associated with the proposed garage are anticipated to enter and exit at Winslow Street while the existing garage trips are anticipated to continue to enter at Surrenden Street and exit at Winslow Street. The proposed trips to and from the proposed garage were added to the 2028 No Build networks to determine the 2028 Build networks. The trip reassignment based on the new proposed garage location is shown in Figure 2. The resulting 2028 Build networks for the TMP Modification are shown in Figure 3.

Figure 2. Distribution of Parking Garage Trip Generation

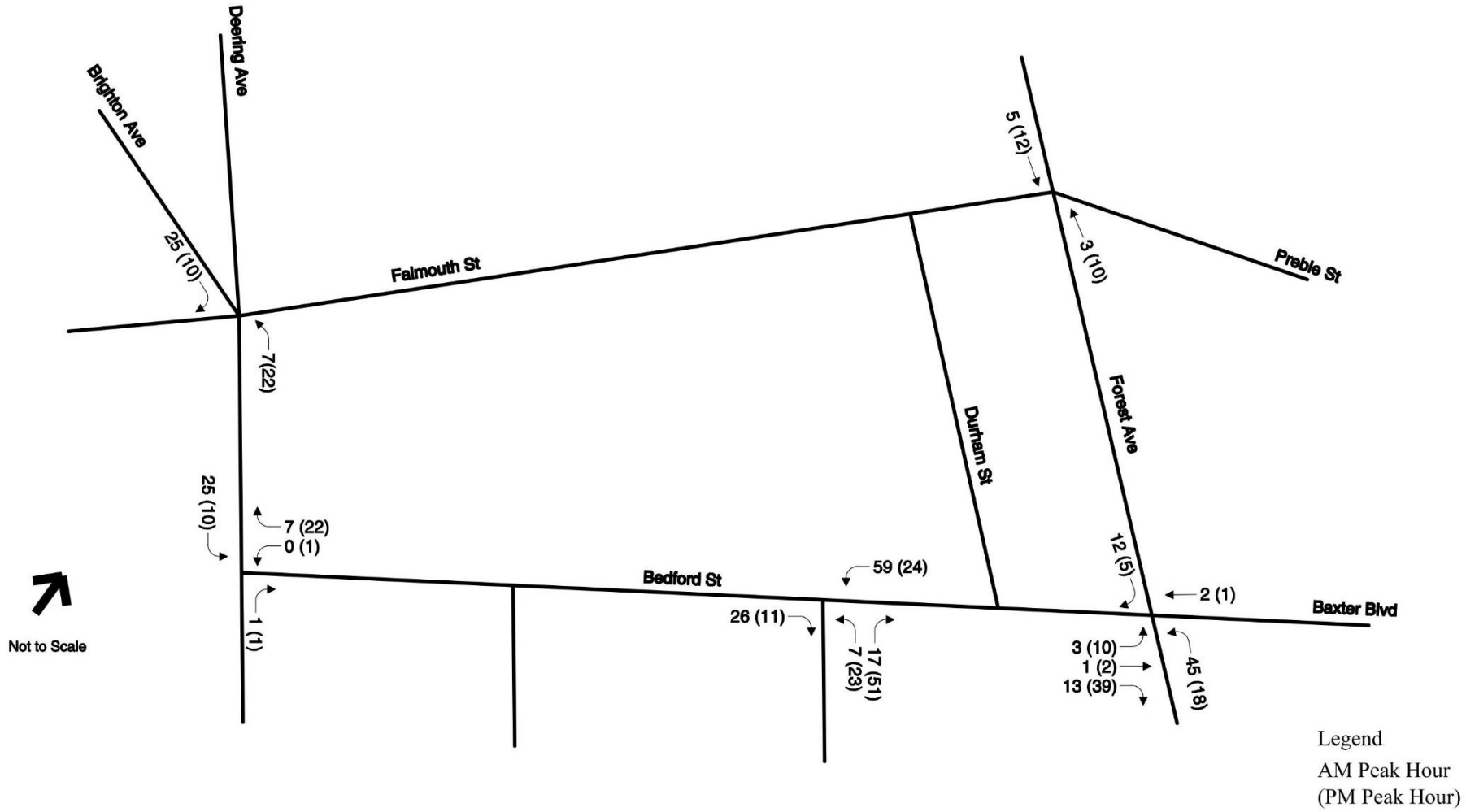
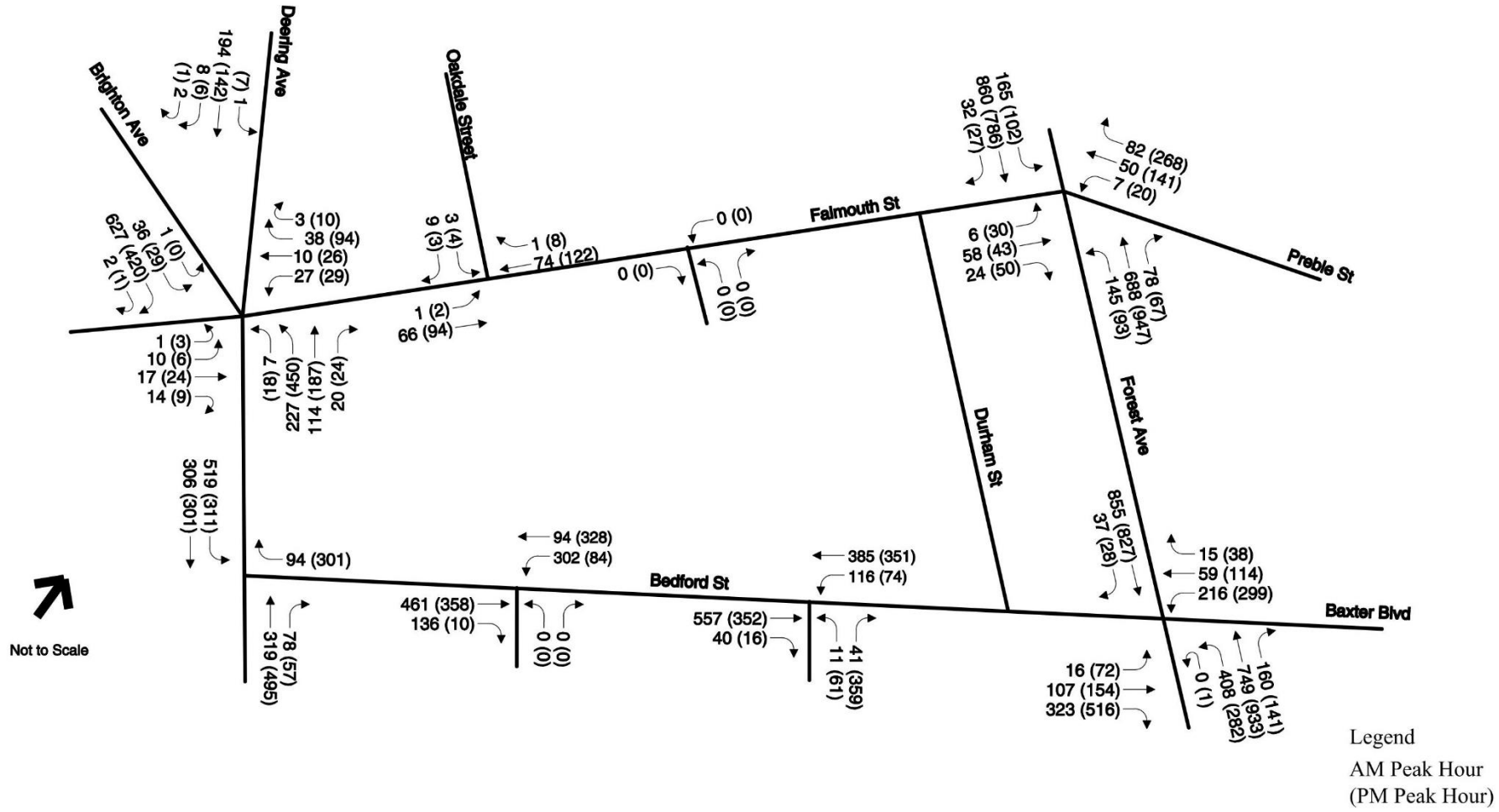


Figure 3. 2028 TMP Modification Build Condition Traffic Volumes



TRAFFIC ANALYSES

Intersection Capacity Analyses

Intersection capacity analyses were performed for the study area intersections based on microsimulations in SimTraffic of the study area network. With delay metrics from the simulations as a basis, levels of service (LOS) were calculated based on the criteria published in the *2000 Highway Capacity Manual*.[1] Level of service is the term that defines the conditions that may occur on a given roadway or at an intersection when accommodating various traffic volume loads. Levels of service range from A to F with LOS A representing generally free flowing operating conditions and LOS F representing generally congested conditions. SimTraffic 11 was used to determine the delays, LOS, and queues at intersections and Sidra Intersection 8 was used to determine the LOS at the proposed roundabout. Copies of the LOS calculations are provided in the Appendix.

SimTraffic Analysis

Simulations in SimTraffic were observed and modified to reflect the operation of the Forest Avenue corridor with the Adaptive Traffic Signal system in place. As shown, the delays at the Forest Avenue intersections fall into range associated with poor levels of service but some of this is due to the simulation requiring vehicles to move into a lane early in anticipation of the ramp downstream. Table 1 provides the delays and queues reported from the simulation for the signalized intersections during the 2028 weekday AM and PM peak hours under No Build (no garage) and Build (Bedford Street garage location) conditions.

As shown, the intersection of Forest Avenue at Falmouth Street is expected to operate at overall LOS B/C in 2028.. Overall delays increased slightly by just over two seconds in the PM peak hour compared to the No Build condition, a negligible increase. Under the Build conditions, the southbound left movement would experience an increase to LOS E during the PM peak hour. However, this change in LOS is the result of an increase in delay of less than two seconds per vehicle, a relatively negligible increase.

The signalized intersection of Forest Avenue at Bedford Street is expected to operate at LOS E in 2028 both in the No Build condition and Build condition. The improvements in delay during the AM peak hour can be attributed to reallocation of green time among the different approaches. While some approaches have modest improvements to their delay during the AM peak hour, the northbound left from Forest Avenue onto Bedford Street experiences an increase in turning volumes and significant increase in delay as a result. During the PM peak hour, with additional trips on all approaches resulting from the proposed garage location, increases in delay across all approaches are anticipated. In general, most movements at the intersection would perform at LOS E/F. The optimization possible through the adaptive signal control system in place at the intersection will help to ensure that operations are responsive to the heaviest volume movements and approaches are served optimally throughout the day.

[1] Highway Capacity Manual, Federal Highway Administration, Transportation Research Board, 2000.

Table 1. Signalized Intersection Operation Summary – SimTraffic Analysis

Intersection		2028 No Build			2028 Build (Bedford Site)		
Peak Hour	SL^	Delay (sec/veh)	LOS	95th Percentile Queue (ft)	Delay (sec/veh)	LOS	95th Percentile Queue (ft)
Forest Avenue at Falmouth Street/Preble Street							
AM Peak Hour							
Falmouth Avenue, EBLT	210	37.2	D	105	52.3	D	113
Falmouth Avenue, EBR	150	16.2	B	45	9.0	A	50
Preble Street, WBLT	630	49.5	D	72	43.5	D	85
Preble Street, WBR	630	5.7	A	35	5.4	A	42
Forest Avenue, NBL	200	33.8	C	98	38.2	D	151
Forest Avenue, NBT/TR	700	10.5	B	179	9.8	A	187
Forest Avenue, SBL	150	47.6	D	238	52.6	D	209
Forest Avenue, SBT/TR	250	22.9	C	374	16.6	B	326
Overall		**21.4**	**C**		**19.4**	**B**	
PM Peak Hour							
Falmouth Avenue, EBLT	210	50.7	D	116	46.6	D	107
Falmouth Avenue, EBR	150	10.0	A	65	10.5	B	60
Preble Street, WBLT	630	43.3	D	183	50.2	D	180
Preble Street, WBR	630	13.5	B	143	12.6	B	150
Forest Avenue, NBL	200	40.9	D	106	38.1	D	101
Forest Avenue, NBT/TR	700	11.0	B	249	11.6	B	137
Forest Avenue, SBL	150	54.7	D	169	56.5	E	260
Forest Avenue, SBT/TR	250	17.5	B	296	19.6	B	332
Overall		**18.2**	**B**		**20.4**	**C**	
Forest Avenue at Bedford Street/Baxter Blvd							
AM Peak Hour							
Bedford Street, EBLT	530	43.7	D	144	38.8	D	169
Bedford Street, EBR	375	25.5	C	254	29.1	C	285
Baxter Blvd, WBL	140	71.0	E	240	63.1	E	231
Baxter Blvd, WBT	690	71.5	E	374	22.6	C	250
Baxter Blvd, WBR	75	3.6	A	29	7.8	A	16
Forest Avenue, NBL	1000+	67.5	E	303	102.2	F	245
Forest Avenue, NBT/TR	1000+	15.9	B	251	14.2	B	248
Forest Avenue, SBT/TR	700	110.3	F	745	78.9	E	655
Overall		**56.4**	**E**		**47.9**	**D**	
PM Peak Hour							
Bedford Street, EBLT	530	52.5	D	490	60.3	E	566
Bedford Street, EBR	375	48.5	D	416	56.7	E	460
Baxter Blvd, WBL	140	183.3	F	234	196.5	F	238
Baxter Blvd, WBT	690	103.8	F	1141	114.1	F	1255
Baxter Blvd, WBR	75	98.0	F	12	102.6	F	14
Forest Avenue, NBL	1000+	92.5	F	274	117.0	F	252
Forest Avenue, NBT/TR	1000+	22.7	C	270	19.3	B	274
Forest Avenue, SBT/TR	700	59.1	E	524	65.9	E	611
Overall		**59.5**	**E**		**67.4**	**E**	

^ Storage length measured in feet, length of turning lane or distance to adjacent intersection

+ Volume to capacity ratio

* Delay expressed in seconds per vehicles

** Level of Service

Queue measured in feet

s Queue lengths determined from SimTraffic simulation

Note: Where multiple movements share a lane group, the maximum movement delay and queue lengths have been expressed in this summary table.

Based on the impact associated with the new garage location trips at the intersection of Forest Avenue at Bedford Street and Baxter Boulevard, potential improvements were investigated. Pedestrian accommodations are being improved at this location by USM as a part of the permit condition for the residence hall and student center. However, vehicular delays will also be impacted. As such, it will be imperative that the adaptive signal control system is operating optimally. Adjustments to the detection and parameters of the system as these changes are adopted will ensure that the adaptive signal system is capturing all of the information it needs to optimize service to each movement at the intersection.

Table **2** provides the delays and queues reported from the simulation for the unsignalized intersections. At the intersection of Bedford Street at Surrenden Street, the traffic is anticipated to experience LOS B conditions during both the AM and PM peak hours, with the highest delay of about 13 seconds occurring for the AM peak hour for those making the left to enter. The driveway proposed for the joint garage on Bedford Street at Winslow Street is anticipated to have about five to seven seconds of delay during both the AM and PM peak hours to enter the garage by making the left turn from Bedford Street. It is anticipated that these left turning movements will be accommodated in a separate left turn lane.

At the I-295 SB ramps, the introduction of additional trips to the garage along both Forest Avenue and the SB exit ramp increase the delays at both the exit ramp location and along northbound Forest Avenue. The ramp operation experiences an increase of about 35 seconds of delay per vehicle. In the PM peak hour there is a more modest increase in delay on the ramp, from LOS A in the No Build condition to LOS B in the Build condition, with an increase of less than eight seconds of delay per vehicle.

Table 2. Unsignalized Intersection Operation Summary – SimTraffic Analysis

Intersection	2028 No Build			2028 Build (Bedford Site)		
Peak Hour	Delay (sec/veh)	LOS	95th Percentile Queue (ft)	Delay (sec/veh)	LOS	95th Percentile Queue (ft)
Bedford St & Surrenden St						
AM Peak Hour						
Bedford St, NETR	2.0	A	31	2.1	A	30
Bedford St, SWLT	12.5	B	146	12.5	B	146
Overall	**4.7**	**A**		**4.7**	**A**	
PM Peak Hour						
Bedford St, NETR	0.8	A	3	0.8	A	0
Bedford St, SWLT	3.7	A	47	3.7	A	52
Overall	**0.9**	**A**		**1.0**	**A**	
Bedford St & Winslow St						
AM Peak Hour						
Winslow St, NWL	13.3	B	16	19.5	C	34
Winslow St, NWR	4.7	A	29	5.6	A	50
Bedford St, NET	0.7	A	0	1.1	A	12
Bedford St, SWT	1.8	A	0	7.0	A	32
Overall	**1.3**	**A**		**2.2**	**A**	
PM Peak Hour						
Winslow St, NWL	14.7	B	102	14.3	B	181
Winslow St, NWR	9.5	A	128	16.8	B	155
Bedford St, NET	0.8	A	8	2.2	A	77
Bedford St, SWT	1.4	A	0	5.4	A	58
Overall	**4.2**	**A**		**7.3**	**A**	
Forest Avenue at I-295						
AM Peak Hour						
I-295, EBR	3.5	A	65	4.7	A	135
I-295, WBR	4.0	A	72	39.2	D	261
Forest Avenue, SET	0.1	A	0	0.1	A	3
Forest Ave, NWT	10.2	B	132	31.7	C	160
Overall	**2.5**	**A**		**14.7**	**B**	
PM Peak Hour						
I-295, EBR	2.7	A	45	2.8	A	54
I-295, WBR	4.5	A	89	12.0	B	156
Forest Avenue, SET	0.1	A	2	0.2	A	4
Forest Ave, NWT	1.9	A	64	11.4	B	171
Overall	**1.5**	**A**		**5.2**	**A**	

^ Storage length measured in feet, length of turning lane or distance to adjacent intersection
+ Volume to capacity ratio
* Delay expressed in seconds per vehicles
** Level of Service
Queue measured in feet
Note: Where multiple movements share a lane group, the maximum movement delay and queue lengths have been expressed in this summary table.

Roundabout Analysis

Table 3 summarizes the operational analysis at the Brighton Avenue, Deering Avenue and Falmouth Street roundabout during the 2028 weekday AM and PM peak hours under No Build and Build conditions. As shown, even with anticipated growth and project related traffic, the proposed infrastructure will result in a LOS B or better condition for all approaches during the peak hours.

Table 3. Roundabout Levels of Service

Peak Hour		2028 No Build				2028 Build (Bedford Site)			
Movement	**SL^**	**v/c+**	**Delay***	**LOS****	**Queue**	**v/c+**	**Delay***	**LOS****	**Queue**
Falmouth Street at Deering Street and Brighton Avenue									
AM Peak Hour									
Deering Ave, SE	200	0.368	4.0	A	6	0.379	4.0	A	6
Falmouth St, NE	290	0.13	5.6	A	1	0.128	5.7	A	1
Deering Ave, NW	420	0.38	4.9	A	5	0.388	5.0	A	5
Brighton Ave, E	165	0.794	9.9	A	26	0.839	11.9	B	33
Falmouth St, SW	625	0.152	11.6	B	2	0.167	12.5	B	2
Overall		**0.794**	**7.2**	**A**		**0.839**	**8.3**	**A**	
PM Peak Hour									
Deering Ave, SE	200	0.643	4.6	A	14	0.675	4.7	A	16
Falmouth St, NE	290	0.378	9.6	A	5	0.407	11	B	6
Deering Ave, NW	420	0.41	9.9	A	5	0.435	11.1	B	6
Brighton Ave, E	165	0.548	4.3	A	10	0.567	4.6	A	11
Falmouth St, SW	625	0.099	7.3	A	1	0.102	7.5	A	1
Overall		**0.643**	**5.8**	**A**		**0.675**	**6.1**	**A**	

^ Storage length measured in feet, distance to adjacent intersection
+ Volume to capacity ratio
* Delay expressed in seconds per vehicles
** Level of Service
Queue measured in feet

Bedford Street Concept

Updated traffic circulation for access and egress to the existing and proposed parking garages will compel updates to the Bedford Street corridor. It is proposed that vehicles will enter and exit the new parking garage via Winslow Street as previously discussed and depicted in Figure 4 below.

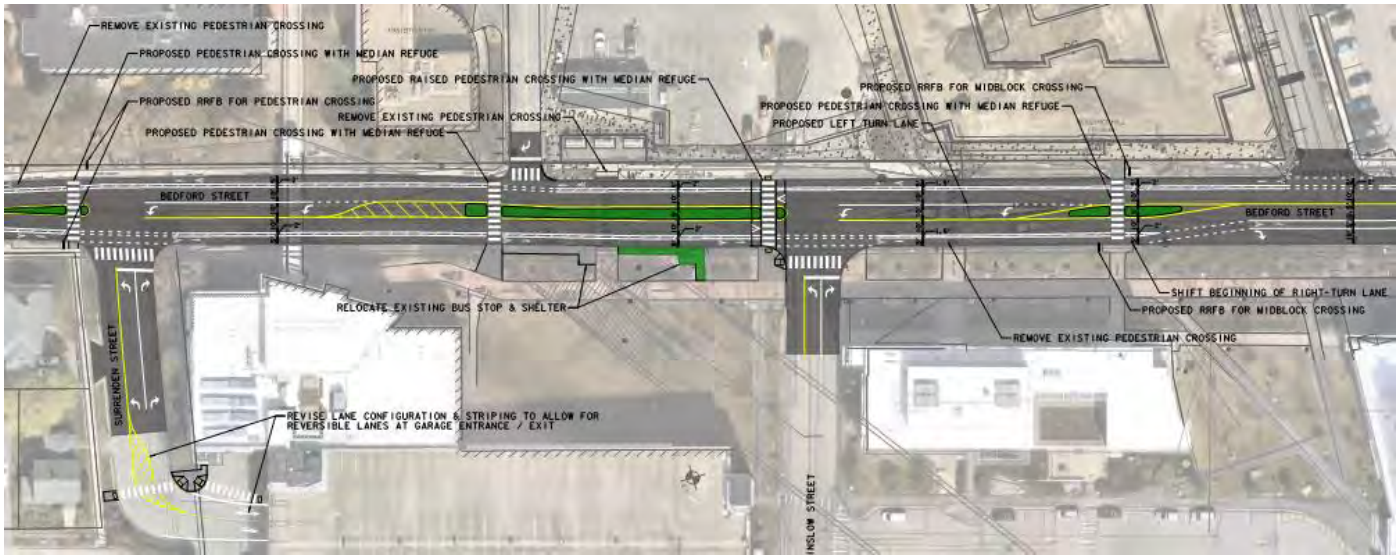
For entering vehicles, a dedicated left turn lane will be provided for vehicles traveling westbound on Bedford Street and entering the parking garage via Winslow Street. The left turn lane will require replacement of the raised median island and crosswalk currently set back from the intersection on the east leg. This crosswalk will be replaced by a raised crossing on the west leg of the intersection, limiting the number of vehicular lanes pedestrians will need to cross to two with a pedestrian refuge island between the lanes.

Although the predominant traffic flow on Surrenden Street will continue to be accessing the existing garage, there will be the potential for an entry lane to be used as an exit lane at peak times.

Along the length of Bedford Street, other multimodal improvements are proposed. Crosswalks with rectangular rapid flashing beacons (RRFBs) are proposed to the west of Surrenden Street and midblock between Winslow Street and Durham Street. The latter is anticipated to serve a desire line between the residence hall and student center to the north and the library and parking garage to the south. A crossing is proposed midblock between Winslow Street and Surrenden Street, shifting the existing crossing approximately 70′ west. The raised island separating opposing traffic on Bedford Street is proposed to extend from the raised crossing at Winslow Street through the midblock crossing between Winslow Street and Surrenden Street, creating a protected, mid-crossing pedestrian refuge. Buffered bike lanes are proposed to flank the eastbound and westbound travel lanes, providing 1 ½ to 2 feet of striped buffer width between vehicular and bicycle modes. The buffered bike lanes and median treatments will narrow the travel lanes to approximately 10′. These features will help to discourage vehicles from passing busses at the bus stops on the north and south sides of Bedford Street and help to reduce vehicular speeds through this critical multimodal area.

To enhance the pedestrian route to points west, a new crosswalk will be painted connecting from the existing parking garage to the sidewalk provided on the west side of Surrenden Street. The revised location will provide better sight lines in each direction. In addition, traffic will be narrowed to a single lane in each direction at the crosswalk and a pedestrian refuge provided. This will improve the predominate pedestrian route at this side of the garage (points to and from the west on Bedford Street and beyond).

Figure 4. Conceptual Plan for Bedford Street and Parking Garage Circulation



Garage Queuing

In order to understand the queuing anticipated at the entry and exit points of the garage facilities, a queuing analysis was conducted for during and post construction scenarios. For analysis purposes, it was assumed that 1148 spaces are served during construction and 1780 spaces are served during post construction, and that the per space trip rate will be the same for the new garage as observed for the existing garage in October 2019. Further, observations from the existing garage on transaction times for permit parkers, transient parkers using pay-on-foot, and transient parkers using pay-at-exit were all factored into the analysis. Based on the analysis, during construction the garage entrance and exit would each require a minimum of 2 lanes with an anticipated design queue of 3 cars per entrance lane and 1

car per exit lane. Following construction, with both garages operational, it is anticipated that 3 entrance and 2 exit lanes will be required for peak operation. Given that the analysis evaluated more spaces than are now anticipated in the new garage and that the predominant use of the new garage is expected to be residential users with less per space trip making than the existing garage serving commuters, the analysis was conservative. The details of the analysis are outlined in the memorandum and supporting calculations included in the appendices.

Transportation Demand Management (TDM)

The University of Southern Maine (USM) has recently developed a Transportation Demand Management (TDM) plan that provides a cohesive strategy for establishing and implementing a successful TDM program for the Portland campus. The TDM plan seeks to enhance multimodal accessibility, ensure the use of non-vehicular modes, and discourage the use of driving through parking management, to achieve and build upon the university's parking demand reduction goals for the campus. The TDM Plan presents a suite of strategies and timeframe for when USM intends to implement the various strategies. The strategies aim at promoting walking and bicycling, improving transit service to promote ridership, promoting carpooling, changing time-of-day travel demands to eliminate or reduce vehicle trips, and managing parking demand via changes to USM's pricing and permit policies. The implementation of TDM will reduce the vehicle trips to the site and reduce delays at area intersections.

Neighbor Concern – Oakhurst Dairy

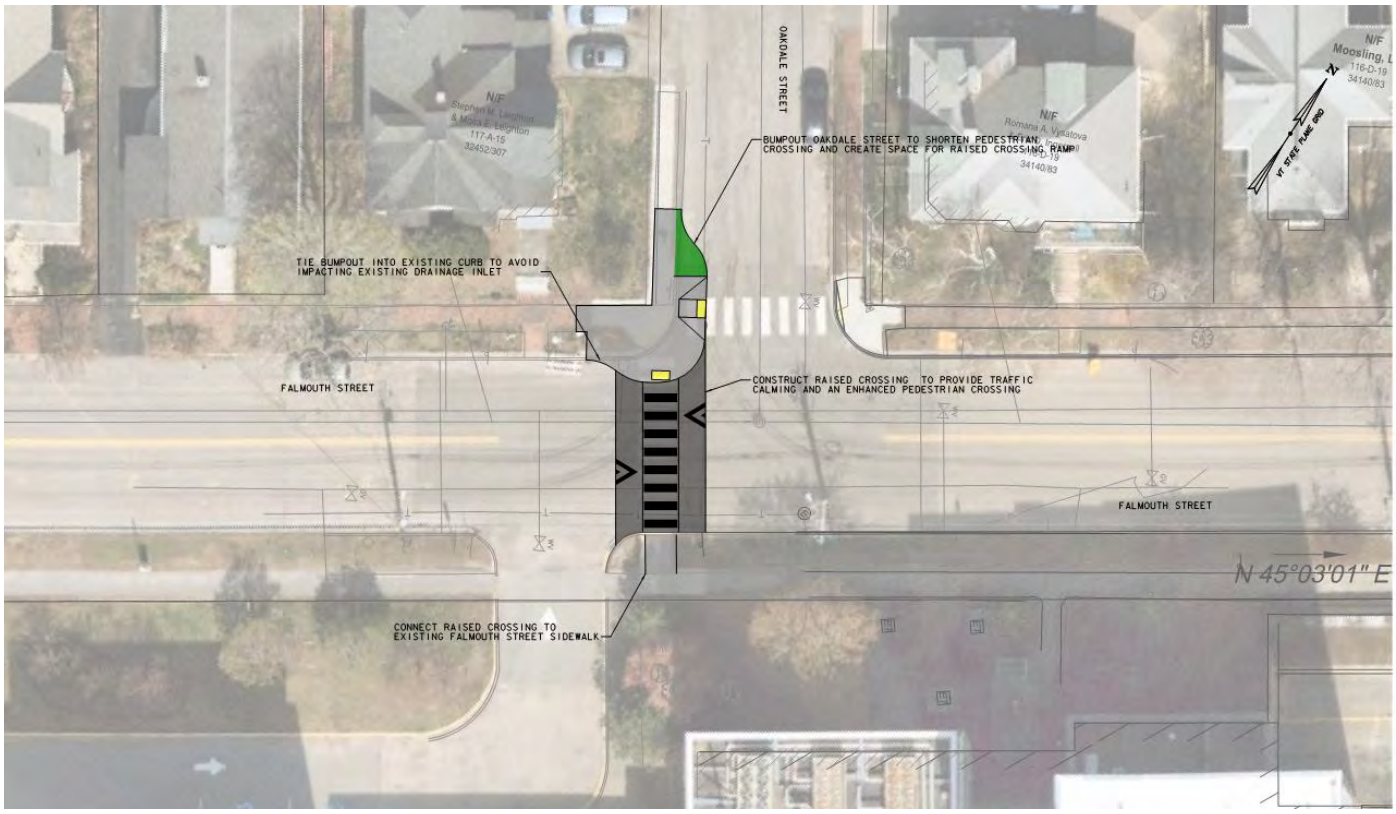
USM has worked with Oakhurst Dairy to understand their concerns associated with the proposed project. Oakhurst Dairy has raised a number of concerns with the queuing along Forest Avenue and the operation of the signals at the intersections of Bedford Street / Baxter Boulevard and Falmouth Street / Preble Street. One concern raised by Oakhurst Dairy is the length of queue on Forest Avenue northbound and that it causes a backup on the I-295 off ramp. As indicated above, USM is committed to addressing this concern. Oakhurst is even more concerned with queues blocking the Oakhurst driveway on Forest Avenue. Although the Bedford Street garage site reduces the anticipated additional volume along the Oakhurst block of Forest Avenue compared to the Falmouth garage site, queuing through this area remains a concern. Further, recent traffic signal operation at Forest Avenue at Bedford Street and Baxter Boulevard has resulted in longer queues. A discussion with the City Traffic Engineer revealed that the City has had an issue with vehicle detection at this location and as a result the signal is not operating optimally. A representative from Oakhurst shared video that documents these queuing concerns. As such, USM is committed to working with the City to replace the camera causing the detection issue at the intersection. Because Oakhurst remains concerned about the operation at their driveway and the queues on Forest Avenue that block that driveway, USM is committed to work with Oakhurst and the City to develop a plan to discourage vehicles from blocking the driveway, including signage and/or striping to not "Block the Box".

Neighbor Concern – Falmouth Street/Oakdale Street and Bedford Street

USM has worked with neighborhood since the previous permitting process to ensure that their concerns are being addressed. USM held an open meeting with residential neighbors on August 26th to discuss traffic impacts and proposed mitigation measures. The neighborhood had previously expressed concern with traffic speed and volumes on Falmouth Street, and as such an undefined traffic calming measure was written into a condition of approval on the residence hall & student center project. The University shared a conceptual draft of the Falmouth Street traffic calming measure at the meeting with the neighborhood (see Figure 5 below). The neighborhood's reception of the drawing seemed favorable. However, the neighborhood expressed some concerns about traffic along Bedford Street and that traffic would be made worse by pedestrian safety measures such as pedestrian island improvements and by higher

volumes of vehicles entering/exiting the South side of Bedford. Several items were brought up from individuals along the lines of wanting traffic to flow efficiently, but one specific item brought up by multiple residents was concern that USM was not proposing bus pull-outs for the METRO, and that this could lead to traffic backing up behind stopped buses. USM explored this issue at length internally, and also had two meetings with METRO to discuss it. Ultimately, USM decided that pedestrian safety should outweigh vehicular traffic efficiency when the two are opposed as an in-line bus stop would minimize the ability of vehicles to drive past buses that are offloading people. USM feels that the suite of measures currently proposed offers the best trade-off between efficiency and safety given the siting of the garage on Bedford Street. Bedford Street was the location the neighborhood favored over Falmouth Street and Deering Avenue, and this was one of the most important factors in deciding on the garage's location.

Figure 5. Conceptual Plan for Pedestrian Improvements at Falmouth Street at Oakdale Street



Conclusions and Recommendations

The proposal to relocate the parking garage to Bedford Street is positive for a number of reasons. However, adding these trips to the roadway network at the new proposed parking garage location along Bedford Street results in some delay increases at the intersection of Forest Avenue with Bedford Street and Baxter Boulevard as compared to the garage location along Falmouth Street. Advance queue detection should be considered in order to ensure that the addition of this traffic to the intersection of Forest Avenue with Bedford Street and Baxter Boulevard does not cause an impact beyond the available queue storage and impact the operation of the I-295 off ramp. In addition, USM is committed to creating a Bedford Street that is hospitable to pedestrians, transit and bicyclists. To assist our neighbor Oakhurst, we proposed to create signage and striping to reduce incidents when traffic blocks that driveway. Finally, USM is working to improve the operations at Forest Street at Bedford Street and Baxter Boulevard in the short term to ensure that the traffic signal is operating as it was intended with the replacement of the detection camera. Overall, this proposed location for the parking garage is not anticipated to adversely affect traffic operations in the vicinity of the USM campus.

Memorandum

Technical Appendix

Existing USM Parking Garage Activity Report

Time		October 21, 2019							October 22, 2019							October 23, 2019						
		Entry			Exit			Entry/Exit	Entry			Exit			Entry/Exit	Entry			Exit			Entry/Exit
		Credential	Transient	Total	Credential	Transient	Total	Total	Credential	Transient	Total	Credential	Transient	Total	Total	Credential	Transient	Total	Credential	Transient	Total	Total
								0							0							0
0:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 -		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 -		2	0	2	1	0	1	3	2	0	2	1	0	1	3	1	0	1	0	1	1	2
6:00 -		10	0	10	6	0	6	16	8	0	8	3	0	3	11	15	0	15	0	6	6	21
7:00 -		79	4	83	6	0	6	89	68	0	68	8	0	8	76	71	4	75	10	0	10	85
8:00 -		433	41	**474**	5	4	**9**	483	410	13	423	9	1	10	433	401	16	417	5	1	6	423
9:00 -		317	14	331	26	4	30	361	384	23	407	11	6	17	424	317	12	329	28	3	31	360
10:00 -		174	8	182	103	13	116	298	204	13	217	124	5	129	346	202	21	223	116	6	122	345
11:00 -		221	5	226	241	5	246	472	228	19	247	291	20	311	558	184	45	229	217	9	226	455
12:00 -		223	15	238	128	6	134	372	252	11	263	119	6	125	388	221	55	276	149	8	157	433
13:00 -		117	8	125	198	5	203	328	115	8	123	174	6	180	303	116	11	127	149	5	154	281
14:00 -		134	9	143	286	7	293	436	139	12	151	283	10	293	444	153	12	165	259	12	271	436
15:00 -		144	11	155	195	21	216	371	187	22	209	221	11	232	441	151	13	164	189	18	207	371
16:00 -		61	3	64	255	20	275	339	73	75	148	224	6	230	378	58	12	**70**	260	49	**309**	379
17:00 -		40	16	56	164	3	167	223	78	48	126	99	144	243	369	40	18	58	241	44	285	343
18:00 -		5	6	11	179	12	191	202	14	5	19	0	301	301	320	13	5	18	169	10	179	197
19:00 -		3	3	6	91	10	101	107	4	1	5	0	171	171	176	5	3	8	75	8	83	91
20:00 -		2	0	2	49	16	65	67	0	1	1	0	84	84	85	3	0	3	45	8	53	56
21:00 -		2	0	2	12	1	13	15	0	0	0	0	24	24	24	1	0	1	19	5	24	25
22:00 -		1	0	1	3	0	3	4	1	0	1	0	6	6	7	1	0	1	6	1	7	8
23:00 -		0	0	0	1	0	1	1	0	0	0	0	2	2	2	0	0	0	2	1	3	3
Total		1,968	143	2,111	1949	127	2076	2203	2167	251	2418	1567	803	2370	3173	1953	227	2180	1939	195	2134	2329

To: University of Southern Maine

Date: August 20, 2021

Memorandum

Project #: 52718.01

From: Jennifer Conley, PE, PTOE
Bill Cranshaw

Re: **DRAFT** Garage Queuing Analysis

VHB has reviewed the operations of the existing and proposed USM parking garages and analyzed the queues that are expected to occur under both the construction (existing) and final (existing and proposed) conditions.

Key assumptions

1. The existing parking garage has 1,148 spaces. The new garage will add 632 spaces.
2. The two garages will use the same entry and exit lanes.
    a. The entry lanes will be located between the two garages. The current concept is for there to be three entry lanes, one of which is reversable as a additional exit lane.
    b. The primary exit will be at the southwest corner of the existing garage, where the entrance to that garage is currently.
3. The garages will be used by a mix of permit holders and transient parkers.
    a. Permit holders have RFID hangtags
    a. Transient parkers pull a ticket at the entry and either pre-pay before exiting or pay at the exit. Based on information from the existing garage, ten percent of transient parkers are expected to pay at the exit.
4. Hourly volumes for October 21-23, 2019 show the following:
    a. The busiest hour for entries was consistently from 8-9 am. The highest single-day hourly entry volume was 474, with 433 permit holders and 43 transients entering.
    b. The busiest hour for exit varied each day – from late morning, to mid-afternoon, to late afternoon. The highest single-day hour exit volume was 311, with 291 permit holders and 20 transients exiting.
    c. The daily percentage of transient parkers ranged from 6 to 10 percent.
    d. The garage was never full during the three days. Peak occupancy ranged from 1,027 to 1,060 cars, approximately 90 to 92 percent of capacity.
5. **The analysis of future volumes, with both garages in operation, assume the same per-space trip rate as the existing garage (conservatively high assumption).** Those rates, calculated from the peak hourly volumes of the 2019 data, are listed below. Two sets of "per-space" rates are calculated, one based on the full garage capacity and one based on the maximum number of spaces used. The higher rates are used in the analysis.
    a. Entering volume = 0.41 cars per space (based on garage capacity)
    b. Exiting volume -= 0.27 cars per space (based on garage capacity)
    c. Entering volume = 0.46 cars per occupied space
    d. Exiting volume = 0.30 cars per occupied space
6. Transaction times are based on information provided by USM.
    a. Permit parkers: 10 seconds at the entrance and 10 seconds at the exit
    b. Transient parkers using pay-on-foot: 15 seconds at the entrance and 17 seconds at the exit

Memorandum

   a. Transient parkers paying at the exit: 15 seconds at the entrance and 120 seconds at the exit.
7. The service rate, i.e., the maximum number of cars per hour that can be accommodated in a lane, is calculated from the transaction times, weighted to reflect the mix of permit and transient cars in the peak hour.
   a. The service rate for entry lanes is 350 cars per hour
   b. The service rate for exit lanes is 335 cars per hour.

Number of Lanes

The determination of the number of lanes required is a two-step process.

1. The first is a simple check on the number of entry/exit lanes by comparing the anticipated hourly volumes with the service capacity of the lanes to ensure that the arriving volumes are not higher than the maximum processing capacity through the lanes.
2. The second next step is to evaluate the anticipate queuing based on the minimum number of lanes, to determine if there may be operational problems related to queuing or excessive delays for drivers

Table 1 presents the results of the calculations.

- The results show that during construction, with the existing garage fully used, two entry and two exit lanes are needed, and that the design queues are 3 and 1 car, respectively.
- Post construction, with the two garages fully used and sharing entry and exit plazas, the minimum number of lanes is 3 for the entry and 2 for the exit. At about 80% lane utilization, both the entry and exit plaza would require queuing space for 4 cars at each lane.

Table 1: Garage Entry/Exit Lane Calculations

	During Construction		Post Construction	
	Entrance	Exit	Entrance	Exit
Spaces	1148	1148	1780	1780
Hourly Rate/Space	0.46	0.30	0.46	0.3
Hourly Volume (V)	528	344	819	534
Max. Service Rate (SR)	350	335	350	335
V/SR	1.5	>1.0	2.3	1.6
Minimum # of Lanes	2	2	3	2
Lane Utilization (SR/V)	75%	51%	78%	80%
Average Queue	2	1	3	2
Design Queue	3	1	4	4

Notes: Average Queue and Design Queue are the number of cars per lane, including the car at the gate.
Queuing calculations assume multichannel queuing, where entry or exit lanes are in the same location and equally accessible to approaching drivers.

Lane Configuration During Construction

There are many factors affecting the proper design and layout of entry and exit plazas. One of the more important is how the service rate throughput of the lanes night be affected the ease for drivers to approach the lane and the ticket/car readers. If drivers need to make a turn as they approach the gate some may have trouble positioning themselves and accessing, say, a payment machine at the exit. This would reduce the effective service rate and thus increase queuing and might increase the number of required lanes.

The service rate used in the Table 1 calculations reflects field measurements made at the existing equipment. However, the proposed temporary lane configuration for the entrance involves a sharp turn towards the entrance plaza immediately after entering the garage.

Such a sharp turn to position a car in the entry lane can reduce the service rate by 25 percent or more, however, in this case the potential reduction is likely relatively small and any adverse impacts can likely be mitigated.
The reason that the potential reduction is relatively small is that the vast majority (90% or more) of parkers use RFID hangtags and an RFID system does not require as precise a vehicle alignment at the gate as would a swipe-card or ticket issuance system. Nonetheless, care should be taken to ensure that the entry lanes are effectively positioned. This could be done by moving the proposed gate location slightly farther into the garage, or by having the entry plaza located outside of the garage.

Garage Queueing Calculations

ENTRY	Spaces	Rate per Space	Volume	Max Service Rate	V/S	No. of Lanes
Typical Occupancy	1148	0.41	471	350	1.3	2
Full Occupancy	1148	0.46	528	350	1.5	2

EXIT	Spaces	Rate per Space	Volume	85% of Service Rate	Ratio	No. of Lanes
Typical Occupancy	1148	0.27	310	335	0.9	1
Full Occupancy	1148	0.30	344	335	1.0	1

ENTRY	Spaces	Rate per Space	Volume	85% of Service Rate	Ratio	No. of Lanes
Typical Occupancy	1780	0.41	730	350	2.1	3
Full Occupancy	1780	0.46	819	350	2.3	3

EXIT	Spaces	Rate per Space	Volume	85% of Service Rate	Ratio	No. of Lanes
Typical Occupancy	1780	0.27	481	335	1.4	2
Full Occupancy	1780	0.30	534	335	1.6	2

350	3	1050	819	0.78	Q =3 cars behind space
335	2	670	534	0.797014925	Q = 3 cars behind space

Typical Occupancy

	Existing		Proposed		New Garage	
	Entrance	**Exit**	**Entrance**	**Exit**	**Entrance**	**Exit**
Spaces	1148	1148	1780	1780	632	632
Hourly Rate/Space	0.46	0.3	0.46	0.3	0.46	0.3
Hourly Volume	528	344	819	534	291	190
Max. Service Rate	350	335	350	335	360	335
Volume/Service Rate	1.5	1.0	2.3	1.6	0.8	0.6
Minimum # of Lanes	2	2.0	3	2	1	1
Lane Utiliization (SR/V)	75%	51%	78%	80%	81%	57%
Average Queue	2	1	2	2	2	1
Design Queue	3	1	4	4	4	2

Garage Queuing Calculations

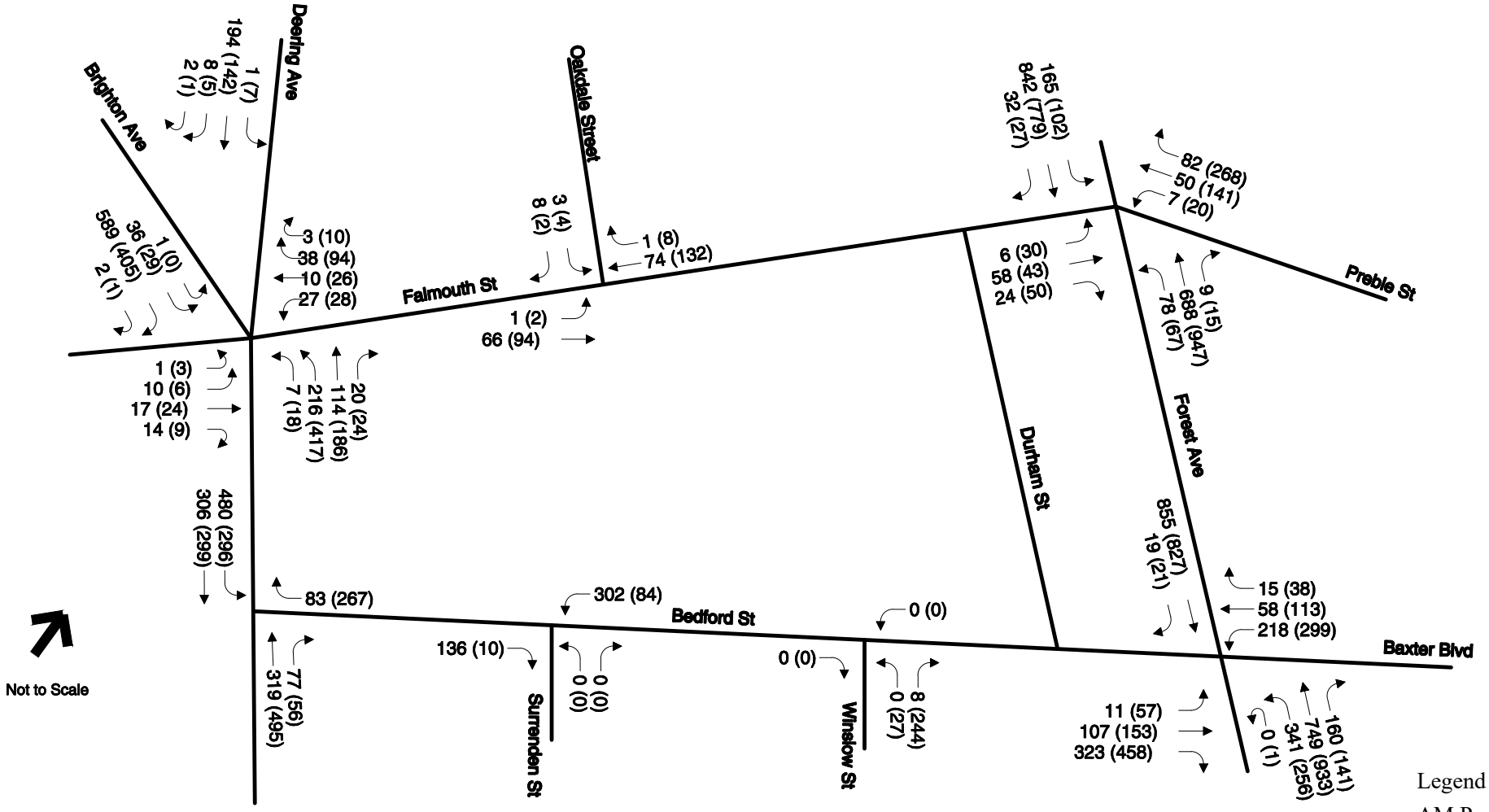
Observations in Existing Garage (by Dewey)

Using hangtag (USM students, staff & faculty):
Entry takes 10 seconds
Exit also takes 10 seconds

Pulling a ticket (visitors & conference goers):
Entry takes 10 seconds if you know exactly what you are doing (we think adding 5 seconds to get to 15 total is more representative of an actual visitor who doesn't know what they are doing and has to read the signs)
Exit takes 12 seconds)+5 for 17 total per logic explained above.
*Additionally, Dewey estimates 10% of this visitor population will try to pay at the exit gate instead of pre-paying (even after accounting for signs and education to deter this behavior). For those 10%, he estimates that exit will take at least 90 seconds, but probably more.

ENTRY	Time (seconds)	Actual Service Rate Per Hour		Hourly Volume			1 Lane	2 Lane	3 Lane					
USM	10	360		443	92%	329.5041					10	443	4430	
Transient				41							15	41	615	
Transient pre-pay	15	240	90%	36	7%	17.85124						484	5045	10.42355 secs per
Transient exit-pay	15	240	10%	5	1%	2.479339								
				484		349.8347	Service Rate	**1.38**	**0.69**	**0.46**	484			

EXIT	Time (seconds)	Actual Service Rate Per Hour		Hourly Volume										
USM	10	360		260	84%	302.9126					10	443	4430	
Transient				49										
Transient pre-pay	17	212	90%	44	14%	30.1542					17	44	748	
Transient exit-pay	120	30	10%	5	2%	0.485437					120	4	480	
												491	5658	11.52342 secs per
				309		333.5523	Service Rate	**1.45**	**0.73**	**0.48**	484			

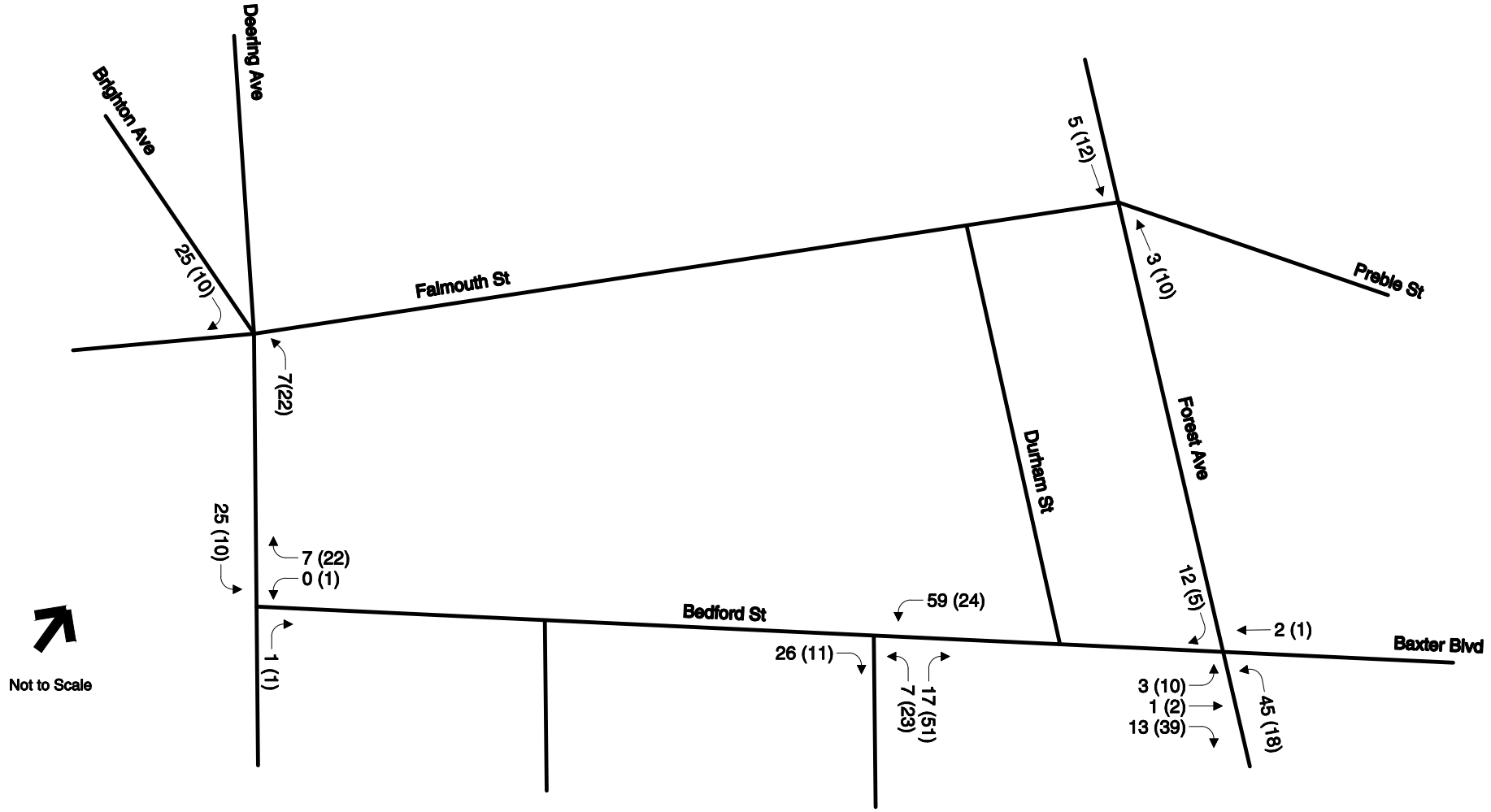


Legend

AM Peak Hour
(PM Peak Hour)

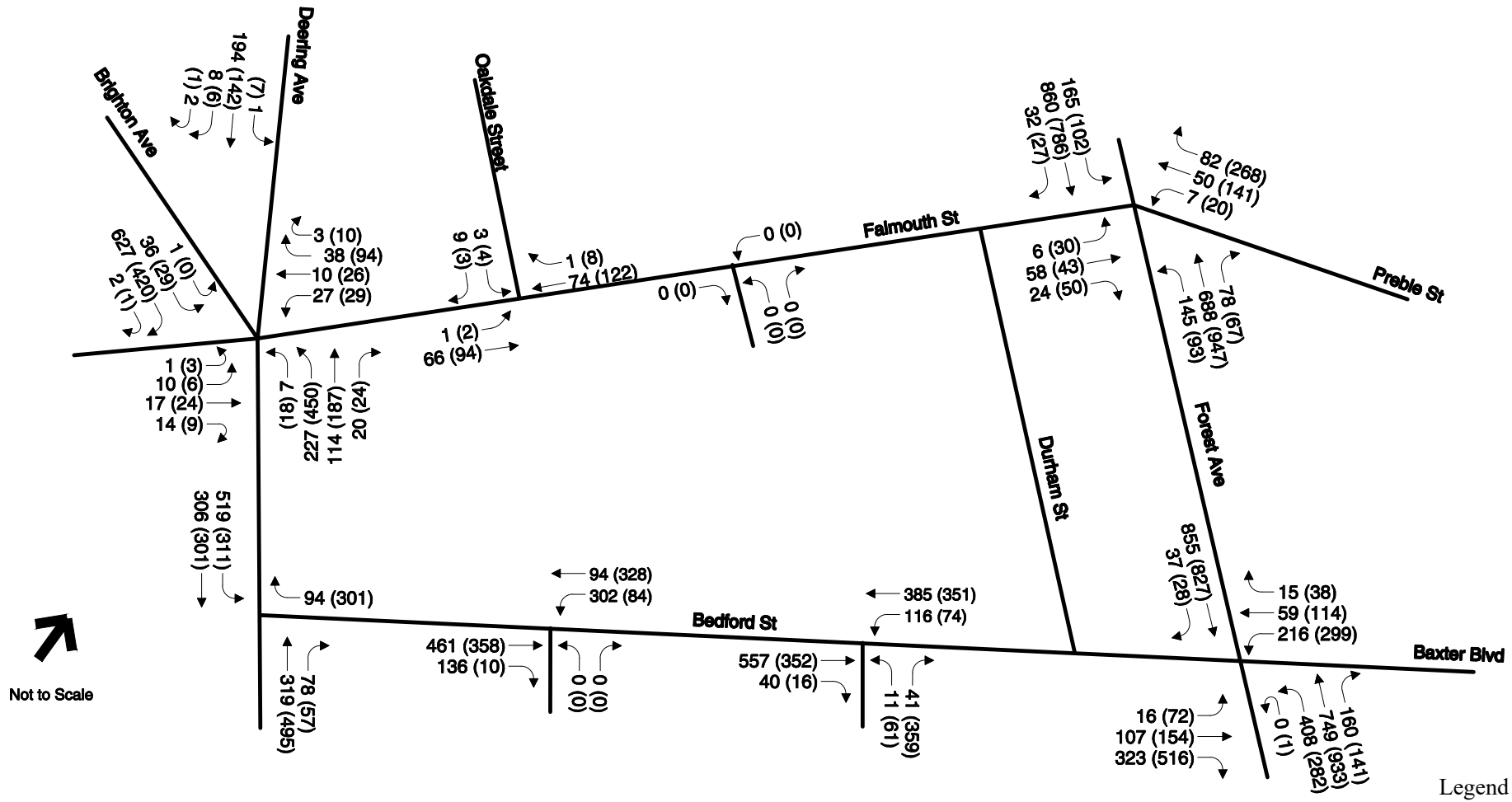
Figure 3

2028 No Build
Weekday Peak Hour Traffic Volumes



Trip Generation

2028 TMP Modification Traffic Volumes



Legend

AM Peak Hour
(PM Peak Hour)

2028 Build Traffic Volumes
(TMP Modification)

MOVEMENT SUMMARY

Site: 101 [AM 2028 Peak Hour - No Build]

Deering Ave / Brighton Ave / Falmouth St
Portland, ME
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Deering Ave												
21	L2	9	0.0	0.368	6.0	LOS A	2.6	18.4	0.32	0.43	0.32	39.5
21a	L1	270	2.4	0.368	5.3	LOS A	2.6	18.4	0.32	0.43	0.32	39.1
22	T1	143	1.0	0.368	1.6	LOS A	2.6	18.4	0.32	0.43	0.32	39.1
23	R2	25	0.0	0.368	2.2	LOS A	2.6	18.4	0.32	0.43	0.32	38.3
Approach		446	1.8	0.368	4.0	LOS A	2.6	18.4	0.32	0.43	0.32	39.1
NorthEast: Falmouth St												
24	L2	34	0.0	0.126	8.5	LOS A	0.7	4.7	0.58	0.60	0.58	39.2
25	T1	13	0.0	0.126	4.1	LOS A	0.7	4.7	0.58	0.60	0.58	38.8
26a	R1	48	0.0	0.126	4.0	LOS A	0.7	4.7	0.58	0.60	0.58	38.5
26	R2	4	0.0	0.126	4.6	LOS A	0.7	4.7	0.58	0.60	0.58	38.0
Approach		98	0.0	0.126	5.6	LOS A	0.7	4.7	0.58	0.60	0.58	38.7
NorthWest: Deering Ave												
27	L2	1	0.0	0.382	9.1	LOS A	2.1	15.1	0.62	0.62	0.62	39.5
28	T1	240	5.4	0.382	4.8	LOS A	2.1	15.1	0.62	0.62	0.62	39.1
29	R2	10	0.0	0.382	5.2	LOS A	2.1	15.1	0.62	0.62	0.62	38.3
29b	R3	2	0.0	0.382	5.7	LOS A	2.1	15.1	0.62	0.62	0.62	38.1
Approach		253	5.1	0.382	4.9	LOS A	2.1	15.1	0.62	0.62	0.62	39.0
West: Brighton Ave												
10b	L3	1	0.0	0.794	14.8	LOS B	12.1	86.7	0.95	1.02	1.26	37.8
10a	L1	40	0.0	0.794	13.3	LOS B	12.1	86.7	0.95	1.02	1.26	37.1
12a	R1	662	2.7	0.794	9.6	LOS A	12.1	86.7	0.95	1.02	1.26	36.8
12b	R3	2	0.0	0.794	10.6	LOS B	12.1	86.7	0.95	1.02	1.26	36.2
Approach		706	2.5	0.794	9.9	LOS A	12.1	86.7	0.95	1.02	1.26	36.8
SouthWest: Falmouth St												
30b	L3	1	0.0	0.152	15.2	LOS B	1.0	7.1	0.90	0.87	0.90	37.1
30	L2	14	0.0	0.152	14.5	LOS B	1.0	7.1	0.90	0.87	0.90	36.8
31	T1	24	0.0	0.152	10.1	LOS B	1.0	7.1	0.90	0.87	0.90	36.5
32	R2	20	8.0	0.152	11.1	LOS B	1.0	7.1	0.90	0.87	0.90	35.8
Approach		59	2.7	0.152	11.6	LOS B	1.0	7.1	0.90	0.87	0.90	36.3
All Vehicles		1562	2.6	0.794	7.2	LOS A	12.1	86.7	0.69	0.76	0.83	37.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [AM 2028 Peak Hour - No Build]

Deering Ave / Brighton Ave / Falmouth St
Portland, ME
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Deering Ave												
21	L2	9	0.0	0.368	6.0	LOS A	2.6	18.4	0.32	0.43	0.32	39.5
21a	L1	270	2.4	0.368	5.3	LOS A	2.6	18.4	0.32	0.43	0.32	39.1
22	T1	143	1.0	0.368	1.6	LOS A	2.6	18.4	0.32	0.43	0.32	39.1
23	R2	25	0.0	0.368	2.2	LOS A	2.6	18.4	0.32	0.43	0.32	38.3
Approach		446	1.8	0.368	4.0	LOS A	2.6	18.4	0.32	0.43	0.32	39.1
NorthEast: Falmouth St												
24	L2	34	0.0	0.126	8.5	LOS A	0.7	4.7	0.58	0.60	0.58	39.2
25	T1	13	0.0	0.126	4.1	LOS A	0.7	4.7	0.58	0.60	0.58	38.8
26a	R1	48	0.0	0.126	4.0	LOS A	0.7	4.7	0.58	0.60	0.58	38.5
26	R2	4	0.0	0.126	4.6	LOS A	0.7	4.7	0.58	0.60	0.58	38.0
Approach		98	0.0	0.126	5.6	LOS A	0.7	4.7	0.58	0.60	0.58	38.7
NorthWest: Deering Ave												
27	L2	1	0.0	0.382	9.1	LOS A	2.1	15.1	0.62	0.62	0.62	39.5
28	T1	240	5.4	0.382	4.8	LOS A	2.1	15.1	0.62	0.62	0.62	39.1
29	R2	10	0.0	0.382	5.2	LOS A	2.1	15.1	0.62	0.62	0.62	38.3
29b	R3	2	0.0	0.382	5.7	LOS A	2.1	15.1	0.62	0.62	0.62	38.1
Approach		253	5.1	0.382	4.9	LOS A	2.1	15.1	0.62	0.62	0.62	39.0
West: Brighton Ave												
10b	L3	1	0.0	0.794	14.8	LOS B	12.1	86.7	0.95	1.02	1.26	37.8
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12a	R1	662	2.7	0.794	9.6	LOS A	12.1	86.7	0.95	1.02	1.26	36.8
12b	R3	2	0.0	0.794	10.6	LOS B	12.1	86.7	0.95	1.02	1.26	36.2
Approach		706	2.5	0.794	9.9	LOS A	12.1	86.7	0.95	1.02	1.26	36.8
SouthWest: Falmouth St												
30b	L3	1	0.0	0.152	15.2	LOS B	1.0	7.1	0.90	0.87	0.90	37.1
30	L2	14	0.0	0.152	14.5	LOS B	1.0	7.1	0.90	0.87	0.90	36.8
31	T1	24	0.0	0.152	10.1	LOS B	1.0	7.1	0.90	0.87	0.90	36.5
32	R2	20	8.0	0.152	11.1	LOS B	1.0	7.1	0.90	0.87	0.90	35.8
Approach		59	2.7	0.152	11.6	LOS B	1.0	7.1	0.90	0.87	0.90	36.3
All Vehicles		1562	2.6	0.794	7.2	LOS A	12.1	86.7	0.69	0.76	0.83	37.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [AM Peak Hour - 2028 Build - Bedford Garage]

Deering Ave / Brighton Ave / Falmouth St
Portland, ME
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Deering Ave											
21	L2	9	0.0	0.379	6.1	LOS A	2.7	19.3	0.33	0.44	39.5
21a	L1	284	2.4	0.379	5.3	LOS A	2.7	19.3	0.33	0.44	39.1
22	T1	143	1.0	0.379	1.6	LOS A	2.7	19.3	0.33	0.44	39.1
23	R2	25	0.0	0.379	2.2	LOS A	2.7	19.3	0.33	0.44	38.3
Approach		460	1.8	0.379	4.0	LOS A	2.7	19.3	0.33	0.44	39.0
NorthEast: Falmouth St											
24	L2	34	0.0	0.128	8.6	LOS A	0.7	4.8	0.59	0.61	39.1
25	T1	13	0.0	0.128	4.2	LOS A	0.7	4.8	0.59	0.61	38.7
26a	R1	48	0.0	0.128	4.1	LOS A	0.7	4.8	0.59	0.61	38.4
26	R2	4	0.0	0.128	4.7	LOS A	0.7	4.8	0.59	0.61	38.0
Approach		98	0.0	0.128	5.7	LOS A	0.7	4.8	0.59	0.61	38.7
NorthWest: Deering Ave											
27	L2	1	0.0	0.388	9.2	LOS A	2.1	15.3	0.63	0.64	39.4
28	T1	240	5.4	0.388	5.0	LOS A	2.1	15.3	0.63	0.64	39.0
29	R2	10	0.0	0.388	5.4	LOS A	2.1	15.3	0.63	0.64	38.2
29b	R3	2	0.0	0.388	5.8	LOS A	2.1	15.3	0.63	0.64	38.0
Approach		253	5.1	0.388	5.0	LOS A	2.1	15.3	0.63	0.64	39.0
West: Brighton Ave											
10b	L3	1	0.0	0.839	16.9	LOS B	15.0	107.1	1.00	1.13	37.0
10a	L1	40	0.0	0.839	15.4	LOS B	15.0	107.1	1.00	1.13	36.4
12a	R1	704	2.7	0.839	11.7	LOS B	15.0	107.1	1.00	1.13	36.1
12b	R3	2	0.0	0.839	12.7	LOS B	15.0	107.1	1.00	1.13	35.5
Approach		748	2.5	0.839	11.9	LOS B	15.0	107.1	1.00	1.13	36.1
SouthWest: Falmouth St											
30b	L3	1	0.0	0.167	16.1	LOS B	1.1	7.9	0.92	0.90	36.8
30	L2	14	0.0	0.167	15.4	LOS B	1.1	7.9	0.92	0.90	36.5
31	T1	24	0.0	0.167	11.0	LOS B	1.1	7.9	0.92	0.90	36.1
32	R2	20	8.0	0.167	12.1	LOS B	1.1	7.9	0.92	0.90	35.5
Approach		59	2.7	0.167	12.5	LOS B	1.1	7.9	0.92	0.90	36.0
All Vehicles		1618	2.6	0.839	8.3	LOS A	15.0	107.1	0.72	0.81	37.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM Peak Hour - 2028 Build - Bedford Garage]

Deering Ave / Brighton Ave / Falmouth St
Portland, ME
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Deering Ave											
21	L2	23	0.0	0.675	6.5	LOS A	7.4	52.6	0.52	0.48	39.1
21a	L1	563	1.7	0.675	5.8	LOS A	7.4	52.6	0.52	0.48	38.7
22	T1	234	0.7	0.675	2.1	LOS A	7.4	52.6	0.52	0.48	38.7
23	R2	30	0.0	0.675	2.6	LOS A	7.4	52.6	0.52	0.48	37.9
Approach		849	1.3	0.675	4.7	LOS A	7.4	52.6	0.52	0.48	38.7
NorthEast: Falmouth St											
24	L2	36	0.0	0.407	14.6	LOS B	2.8	19.8	0.88	0.96	37.1
25	T1	33	0.0	0.407	10.2	LOS B	2.8	19.8	0.88	0.96	36.7
26a	R1	118	0.0	0.407	10.1	LOS B	2.8	19.8	0.88	0.96	36.5
26	R2	13	0.0	0.407	10.7	LOS B	2.8	19.8	0.88	0.96	36.0
Approach		199	0.0	0.407	11.0	LOS B	2.8	19.8	0.88	0.96	36.6
NorthWest: Deering Ave											
27	L2	9	16.7	0.435	16.5	LOS B	2.7	19.0	0.82	0.92	37.0
28	T1	175	0.0	0.435	10.9	LOS B	2.7	19.0	0.82	0.92	36.7
29	R2	7	0.0	0.435	11.4	LOS B	2.7	19.0	0.82	0.92	36.0
29b	R3	1	0.0	0.435	11.9	LOS B	2.7	19.0	0.82	0.92	35.8
Approach		193	0.7	0.435	11.1	LOS B	2.7	19.0	0.82	0.92	36.6
West: Brighton Ave											
10b	L3	1	0.0	0.567	9.5	LOS A	4.9	34.8	0.72	0.66	39.9
10a	L1	33	0.0	0.567	8.0	LOS A	4.9	34.8	0.72	0.66	39.1
12a	R1	472	3.0	0.567	4.3	LOS A	4.9	34.8	0.72	0.66	38.8
12b	R3	1	0.0	0.567	5.3	LOS A	4.9	34.8	0.72	0.66	38.1
Approach		507	2.8	0.567	4.6	LOS A	4.9	34.8	0.72	0.66	38.8
SouthWest: Falmouth St											
30b	L3	4	0.0	0.102	11.4	LOS B	0.6	4.2	0.75	0.71	38.8
30	L2	8	20.0	0.102	11.6	LOS B	0.6	4.2	0.75	0.71	38.4
31	T1	34	0.0	0.102	6.3	LOS A	0.6	4.2	0.75	0.71	38.0
32	R2	13	0.0	0.102	6.8	LOS A	0.6	4.2	0.75	0.71	37.3
Approach		59	2.9	0.102	7.5	LOS A	0.6	4.2	0.75	0.71	38.0
All Vehicles		1806	1.6	0.675	6.1	LOS A	7.4	52.6	0.65	0.63	38.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	5503	5387	5471	5533	5493	5475
Vehs Exited	5501	5384	5457	5510	5548	5479
Starting Vehs	177	166	181	174	200	174
Ending Vehs	179	169	195	197	145	173
Travel Distance (mi)	2769	2740	2744	2782	2762	2759
Travel Time (hr)	180.8	191.4	172.9	182.7	167.6	179.1
Total Delay (hr)	80.8	92.5	73.6	82.3	67.6	79.4
Total Stops	5862	6133	5594	6064	5545	5837
Fuel Used (gal)	115.0	116.3	112.6	115.5	111.8	114.2

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	5503	5387	5471	5533	5493	5475
Vehs Exited	5501	5384	5457	5510	5548	5479
Starting Vehs	177	166	181	174	200	174
Ending Vehs	179	169	195	197	145	173
Travel Distance (mi)	2769	2740	2744	2782	2762	2759
Travel Time (hr)	180.8	191.4	172.9	182.7	167.6	179.1
Total Delay (hr)	80.8	92.5	73.6	82.3	67.6	79.4
Total Stops	5862	6133	5594	6064	5545	5837
Fuel Used (gal)	115.0	116.3	112.6	115.5	111.8	114.2

1: Forest Avenue & Falmouth St/Preble St Performance by lane

Lane	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	All
Movements Served	LT	R	LT	R	L	T	TR	L	T	TR	
Denied Del/Veh (s)											0.1
Total Del/Veh (s)	37.2	16.2	49.5	5.7	33.8	10.5	10.0	47.6	22.9	21.7	21.4

2: Forest Avenue & Bedford St/Baxter Blvd Performance by lane

Lane	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	All
Movements Served	LT	R	L	T	R	L	T	TR	T	TR	
Denied Del/Veh (s)											0.6
Total Del/Veh (s)	43.7	25.5	71.0	71.5	3.6	67.5	15.7	15.9	90.9	110.3	56.4

17: Bedford St & Surrenden St Performance by lane

Lane	NE	SW	SW	All
Movements Served	TR	L	T	
Denied Del/Veh (s)				0.0
Total Del/Veh (s)	2.0	16.2	16.7	7.9

19: Bedford St & Winslow St Performance by lane

Lane	NW	NW	NE	SW	All
Movements Served	L	R	TR	T	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	13.3	4.7	0.7	1.8	1.3

66: Forest Avenue & I-295 SB Performance by lane

Lane	EB	WB	SE	SE	NW	NW	NW	All
Movements Served	R	R	T	T	T	T	T	
Denied Del/Veh (s)								0.2
Total Del/Veh (s)	3.5	4.0	0.1	0.1	10.2	1.4	1.4	2.5

Total Zone Performance

Denied Del/Veh (s)	1.7
Total Del/Veh (s)	1626.6

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	126	47	88	60	140	197	217	224	427	442
Average Queue (ft)	57	18	30	11	43	70	77	141	176	190
95th Queue (ft)	105	45	72	35	98	159	179	238	363	374
Link Distance (ft)	698		1192	1192		669	669		1103	1103
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	0				0	0		9	10	
Queuing Penalty (veh)	0				0	0		38	17	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	177	305	214	381	47	261	255	258	664	675
Average Queue (ft)	86	155	171	126	5	234	152	154	464	500
95th Queue (ft)	144	254	240	374	29	303	251	247	715	745
Link Distance (ft)	662			1118		192	192	192	669	669
Upstream Blk Time (%)						45	4	4	5	7
Queuing Penalty (veh)						187	15	16	22	32
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)		0	31	1						
Queuing Penalty (veh)		0	23	1						

Intersection: 17: Bedford St & Surrenden St

Movement	NE	SW	SW
Directions Served	TR	L	T
Maximum Queue (ft)	38	234	280
Average Queue (ft)	10	163	22
95th Queue (ft)	31	250	145
Link Distance (ft)	387		353
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		210	
Storage Blk Time (%)		2	
Queuing Penalty (veh)		1	

Intersection: 19: Bedford St & Winslow St

Movement	NW	NW
Directions Served	L	R
Maximum Queue (ft)	30	34
Average Queue (ft)	3	7
95th Queue (ft)	16	29
Link Distance (ft)	198	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		150
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 66: Forest Avenue & I-295 SB

Movement	EB	WB	NW	NW	NW
Directions Served	R	R	T	T	T
Maximum Queue (ft)	102	90	142	108	87
Average Queue (ft)	17	35	36	14	9
95th Queue (ft)	65	72	132	70	56
Link Distance (ft)	574	1099	111	111	111
Upstream Blk Time (%)			9	1	0
Queuing Penalty (veh)			33	3	1
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 390

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:45	3:45	3:45	3:45	3:45	3:45
End Time	5:00	5:00	5:00	5:00	5:00	5:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6568	6619	6665	6414	6499	6553
Vehs Exited	6529	6559	6592	6372	6557	6521
Starting Vehs	226	211	229	173	287	220
Ending Vehs	265	271	302	215	229	254
Travel Distance (mi)	3578	3690	3701	3535	3661	3633
Travel Time (hr)	231.8	245.1	272.1	271.3	237.5	251.6
Total Delay (hr)	103.1	112.2	138.9	144.1	105.3	120.7
Total Stops	6682	7036	7123	6644	6840	6863
Fuel Used (gal)	147.2	152.4	158.4	154.7	150.1	152.5

Interval #0 Information Seeding

Start Time	3:45
End Time	4:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6568	6619	6665	6414	6499	6553
Vehs Exited	6529	6559	6592	6372	6557	6521
Starting Vehs	226	211	229	173	287	220
Ending Vehs	265	271	302	215	229	254
Travel Distance (mi)	3578	3690	3701	3535	3661	3633
Travel Time (hr)	231.8	245.1	272.1	271.3	237.5	251.6
Total Delay (hr)	103.1	112.2	138.9	144.1	105.3	120.7
Total Stops	6682	7036	7123	6644	6840	6863
Fuel Used (gal)	147.2	152.4	158.4	154.7	150.1	152.5

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.6	0.1	0.1
Total Del/Veh (s)	50.7	11.0	10.0	42.7	43.3	13.5	40.9	11.0	8.7	54.7	17.5	15.3

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	18.2

2: Forest Avenue & Bedford St/Baxter Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	4.2	1.7	3.5	0.4	0.0	0.1	0.0	0.0	0.5
Total Del/Veh (s)	52.0	52.5	48.5	183.3	103.8	98.0	92.5	22.7	19.3	49.9	59.1	59.5

16: Bedford St & Surrenden St. Performance by movement

Movement	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.0
Total Del/Veh (s)	0.8	0.6	4.0	0.7	0.9

18: Winslow St. & Bedford St Performance by movement

Movement	NWL	NWR	NET	SWT	All
Denied Del/Veh (s)	1.4	3.9	0.0	0.0	1.0
Total Del/Veh (s)	14.7	9.5	0.8	1.4	4.2

67: Forest Avenue & I-295 SB Performance by movement

Movement	EBR	WBR	SET	NWT	All
Denied Del/Veh (s)	0.5	0.2	0.0	0.0	0.1
Total Del/Veh (s)	2.7	4.5	0.1	1.9	1.5

Total Zone Performance

Denied Del/Veh (s)	1.5
Total Del/Veh (s)	695.3

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	143	82	234	179	164	306	320	216	312	348
Average Queue (ft)	62	26	104	77	47	96	106	89	118	148
95th Queue (ft)	116	65	183	143	106	231	249	169	251	296
Link Distance (ft)	604		1193	1193		681	681		1103	1103
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	0	0				2		3	6	
Queuing Penalty (veh)	0	0				1		13	6	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	593	400	215	1051	17	247	256	244	489	532
Average Queue (ft)	212	274	210	597	2	207	190	202	256	294
95th Queue (ft)	490	416	234	1141	12	274	266	270	469	524
Link Distance (ft)	660			1275		165	165	165	681	681
Upstream Blk Time (%)	1			3		53	16	22		
Queuing Penalty (veh)	3			0		234	70	99		
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)	0	8	73	1						
Queuing Penalty (veh)	2	17	110	5						

Intersection: 16: Bedford St & Surrenden St.

Movement	NE	SW
Directions Served	TR	L
Maximum Queue (ft)	4	63
Average Queue (ft)	0	16
95th Queue (ft)	3	47
Link Distance (ft)	362	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		210
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 18: Winslow St. & Bedford St

Movement	NW	NW	NE
Directions Served	L	R	TR
Maximum Queue (ft)	114	152	6
Average Queue (ft)	50	69	1
95th Queue (ft)	102	128	8
Link Distance (ft)	188		384
Upstream Blk Time (%)	1	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)		150	
Storage Blk Time (%)	0	1	
Queuing Penalty (veh)	0	1	

Intersection: 67: Forest Avenue & I-295 SB

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	70	107	4	92	106	89
Average Queue (ft)	13	42	0	15	12	10
95th Queue (ft)	45	89	2	64	60	55
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)				1	0	0
Queuing Penalty (veh)				2	1	1
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 566

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:45	6:45	6:45	6:45	6:45	6:45
End Time	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6043	5793	6055	6039	5893	5963
Vehs Exited	5965	5766	5986	6020	5869	5920
Starting Vehs	222	225	219	234	211	222
Ending Vehs	300	252	288	253	235	261
Travel Distance (mi)	3191	3087	3198	3199	3146	3164
Travel Time (hr)	314.3	342.7	276.6	325.6	353.8	322.6
Total Delay (hr)	199.3	231.3	161.2	210.0	240.7	208.5
Total Stops	7786	7168	7414	7793	7391	7508
Fuel Used (gal)	159.1	162.8	149.2	160.7	165.4	159.4

Interval #0 Information Seeding

Start Time	6:45
End Time	7:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6043	5793	6055	6039	5893	5963
Vehs Exited	5965	5766	5986	6020	5869	5920
Starting Vehs	222	225	219	234	211	222
Ending Vehs	300	252	288	253	235	261
Travel Distance (mi)	3191	3087	3198	3199	3146	3164
Travel Time (hr)	314.3	342.7	276.6	325.6	353.8	322.6
Total Delay (hr)	199.3	231.3	161.2	210.0	240.7	208.5
Total Stops	7786	7168	7414	7793	7391	7508
Fuel Used (gal)	159.1	162.8	149.2	160.7	165.4	159.4

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1	0.1	0.8	0.0	0.1	1.1	0.1	0.2
Total Del/Veh (s)	52.3	39.9	9.0	40.4	43.5	5.4	38.2	9.8	7.6	52.6	16.6	14.1

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	19.4

2: Forest Avenue & Bedford St/Baxter Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	3.0	0.6	2.9	0.0	0.0	0.0	0.1	0.0	0.3
Total Del/Veh (s)	38.8	17.1	29.1	63.1	22.6	7.8	102.2	14.2	12.5	70.7	78.9	47.9

16: Bedford St & Surrenden St Performance by movement

Movement	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.1	1.3	12.5	1.7	4.7

18: Bedford St & Winslow St Performance by movement

Movement	NBL	NBR	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	0.2	4.2	0.1	0.1	0.0	0.0	0.2
Total Del/Veh (s)	19.5	5.6	1.1	0.6	7.0	1.8	2.2

67: Forest Avenue & I-295 SB Performance by movement

Movement	EBR	WBR	SET	NWT	All
Denied Del/Veh (s)	0.5	0.2	0.0	25.1	8.7
Total Del/Veh (s)	4.7	39.2	0.1	31.3	14.7

Total Zone Performance

Denied Del/Veh (s)	13.2
Total Del/Veh (s)	687.3

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	155	72	108	62	179	218	219	224	376	368
Average Queue (ft)	57	16	38	18	74	74	80	125	142	170
95th Queue (ft)	113	50	85	42	151	174	187	209	294	326
Link Distance (ft)	604		1193	1193		681	681		1103	1103
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	1				0	0		7	5	
Queuing Penalty (veh)	0				1	0		31	8	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	239	347	214	302	24	256	215	231	625	668
Average Queue (ft)	83	163	160	83	4	233	78	106	361	409
95th Queue (ft)	169	285	231	250	16	245	199	248	604	655
Link Distance (ft)	514			1275		165	165	165	681	681
Upstream Blk Time (%)	0					85	3	9	0	0
Queuing Penalty (veh)	0					372	15	38	0	0
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)		0	23	0						
Queuing Penalty (veh)		1	17	1						

Intersection: 16: Bedford St & Surrenden St

Movement	NE	SW	SW
Directions Served	TR	L	T
Maximum Queue (ft)	37	143	130
Average Queue (ft)	9	94	13
95th Queue (ft)	30	146	93
Link Distance (ft)	487		375
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		120	
Storage Blk Time (%)		3	
Queuing Penalty (veh)		3	

Intersection: 18: Bedford St & Winslow St

Movement	NB	NB	NE	SW
Directions Served	L	R	TR	L
Maximum Queue (ft)	39	60	25	94
Average Queue (ft)	10	24	2	32
95th Queue (ft)	34	50	12	66
Link Distance (ft)	178		375	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		120		100
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 67: Forest Avenue & I-295 SB

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	191	290	6	187	146	149
Average Queue (ft)	52	110	0	160	72	74
95th Queue (ft)	135	261	3	205	156	161
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)				84	13	15
Queuing Penalty (veh)				310	49	55
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 902

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:45	3:45	3:45	3:45	3:45	3:45
End Time	5:00	5:00	5:00	5:00	5:00	5:00
Total Time (min)	75	75	75	75	75	75
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6276	6469	6471	6391	6308	6387
Vehs Exited	6196	6486	6406	6406	6337	6366
Starting Vehs	218	246	249	245	258	239
Ending Vehs	298	229	314	230	229	253
Travel Distance (mi)	3341	3539	3428	3465	3459	3446
Travel Time (hr)	328.2	307.7	362.4	309.8	337.3	329.1
Total Delay (hr)	207.4	180.0	238.1	184.2	212.1	204.4
Total Stops	7116	7265	7219	7205	7511	7265
Fuel Used (gal)	163.2	164.4	173.1	162.1	168.7	166.3

Interval #0 Information Seeding

Start Time	3:45
End Time	4:00
Total Time (min)	15

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:00
End Time	5:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6276	6469	6471	6391	6308	6387
Vehs Exited	6196	6486	6406	6406	6337	6366
Starting Vehs	218	246	249	245	258	239
Ending Vehs	298	229	314	230	229	253
Travel Distance (mi)	3341	3539	3428	3465	3459	3446
Travel Time (hr)	328.2	307.7	362.4	309.8	337.3	329.1
Total Delay (hr)	207.4	180.0	238.1	184.2	212.1	204.4
Total Stops	7116	7265	7219	7205	7511	7265
Fuel Used (gal)	163.2	164.4	173.1	162.1	168.7	166.3

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.1	0.9	0.2	0.2	0.2	0.1	0.0	0.1	0.9	0.1	0.1
Total Del/Veh (s)	41.0	46.6	10.5	50.2	47.2	12.6	38.1	11.6	9.2	56.5	19.6	18.6

1: Forest Avenue & Falmouth St/Preble St Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	20.4

2: Forest Avenue & Bedford St/Baxter Blvd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.8	0.2	1.0	10.6	8.1	8.9	0.0	0.0	0.1	0.0	0.0	1.6
Total Del/Veh (s)	58.3	60.3	56.7	196.5	114.1	102.6	117.0	19.3	18.9	59.8	65.9	67.4

16: Bedford St & Surrenden St Performance by movement

Movement	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.8	0.5	3.7	0.7	1.0

18: Bedford St & Winslow St Performance by movement

Movement	NBL	NBR	NET	NER	SWL	SWT	All
Denied Del/Veh (s)	5.9	6.8	0.0	0.0	0.0	0.0	2.4
Total Del/Veh (s)	14.3	16.8	2.2	1.5	5.4	1.5	7.3

67: Forest Avenue & I-295 SB Performance by movement

Movement	EBR	WBR	SET	NWT	All
Denied Del/Veh (s)	0.4	0.2	0.0	1.4	0.6
Total Del/Veh (s)	2.8	12.0	0.2	11.4	5.2

Total Zone Performance

Denied Del/Veh (s)	4.0
Total Del/Veh (s)	1493.0

Intersection: 1: Forest Avenue & Falmouth St/Preble St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	129	82	216	198	202	312	335	215	411	444
Average Queue (ft)	55	27	102	75	58	107	118	91	135	167
95th Queue (ft)	107	60	180	150	137	233	260	164	295	332
Link Distance (ft)	604		1193	1193		681	681		1103	1103
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		150			200			150		
Storage Blk Time (%)	0				0	2		2	7	
Queuing Penalty (veh)	0				1	2		6	7	

Intersection: 2: Forest Avenue & Bedford St/Baxter Blvd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LT	R	L	T	R	L	T	TR	T	TR
Maximum Queue (ft)	517	400	215	1128	24	266	236	235	596	617
Average Queue (ft)	280	326	208	622	3	232	154	171	302	346
95th Queue (ft)	566	460	238	1255	14	252	257	274	562	611
Link Distance (ft)	514			1275		165	165	165	681	681
Upstream Blk Time (%)	4			10		81	10	15	0	0
Queuing Penalty (veh)	30			0		367	43	69	0	1
Storage Bay Dist (ft)		375	140		75					
Storage Blk Time (%)	0	16	72	2						
Queuing Penalty (veh)	2	37	109	8						

Intersection: 16: Bedford St & Surrenden St

Movement	SW
Directions Served	L
Maximum Queue (ft)	59
Average Queue (ft)	21
95th Queue (ft)	52
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	120
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 18: Bedford St & Winslow St

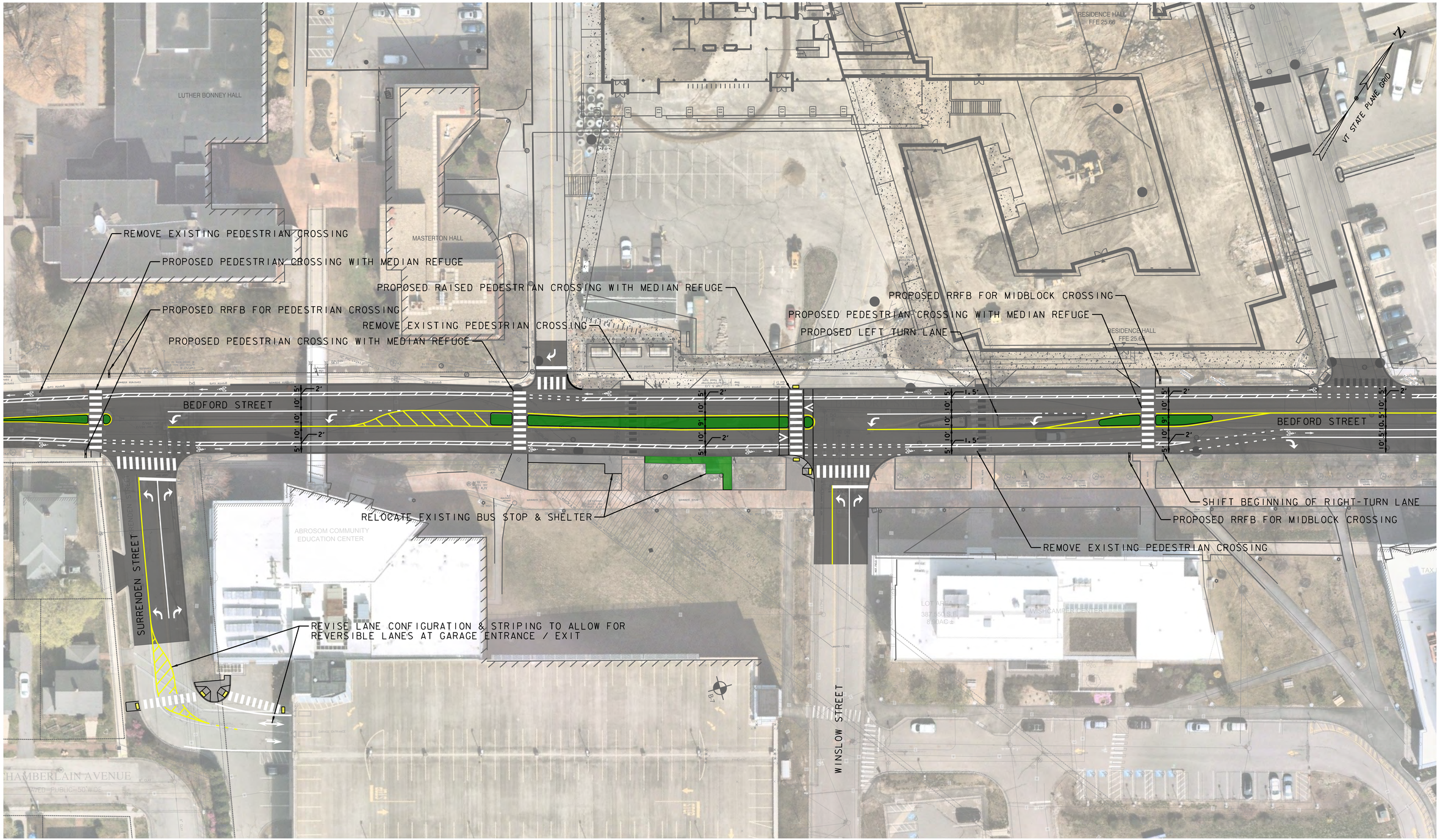
Movement	NB	NB	NE	SW
Directions Served	L	R	TR	L
Maximum Queue (ft)	205	145	132	81
Average Queue (ft)	69	93	15	23
95th Queue (ft)	181	155	77	58
Link Distance (ft)	178		375	
Upstream Blk Time (%)	10			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)		120		100
Storage Blk Time (%)	0	16		0
Queuing Penalty (veh)	0	10		0

Intersection: 67: Forest Avenue & I-295 SB

Movement	EB	WB	SE	NW	NW	NW
Directions Served	R	R	T	T	T	T
Maximum Queue (ft)	78	212	7	148	138	125
Average Queue (ft)	16	63	0	76	46	38
95th Queue (ft)	54	156	4	171	133	120
Link Distance (ft)	574	1099	53	111	111	111
Upstream Blk Time (%)				27	6	4
Queuing Penalty (veh)				87	20	12
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 812



SCALE 1" = 30'-0"
30 0 30

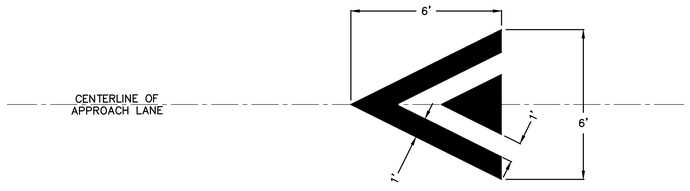
PROJECT NAME:	USM INTERSECTION IMPROVEMENTS
PROJECT NUMBER:	52718.01

FILE NAME: bdr_concepts.dgn	PLOT DATE: 12/01/21
PROJECT LEADER: J.A. CONLEY	DRAWN BY: D.A. GINGRAS
DESIGNED BY: D.A. GINGRAS	CHECKED BY: J.A. CONLEY
BEDFORD STREET CONCEPT	SHEET 1 OF 1



NOTES:
1. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR STREET NAME SIGN ASSEMBLIES.
2. SIGNS TO BE MOUNTED ON DOUBLE 4"X4" POSTS.
3. GUIDE SIGNS ARE WHITE ON GREEN BACKGROUND WITH WHITE BORDER.
4. SHEETING SHALL BE ASTM TYPE III "HIGH INTENSITY" PRISMATIC RETRO-REFLECTIVITY OR APPROVED EQUAL.
5. PAYMENT FOR REMOVAL OF EXISTING SIGNS NOT DESIGNATED TO BE RELOCATED SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT. ALL EXISTING SIGNAGE CONFLICTING WITH NEW TRAFFIC PATTERN SHALL BE REMOVED.

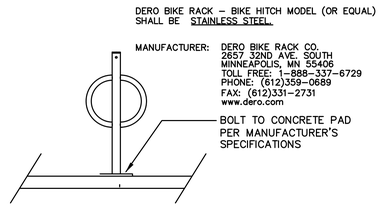
CIRCULAR INTERSECTION DESTINATION SIGNAGE
NOT TO SCALE



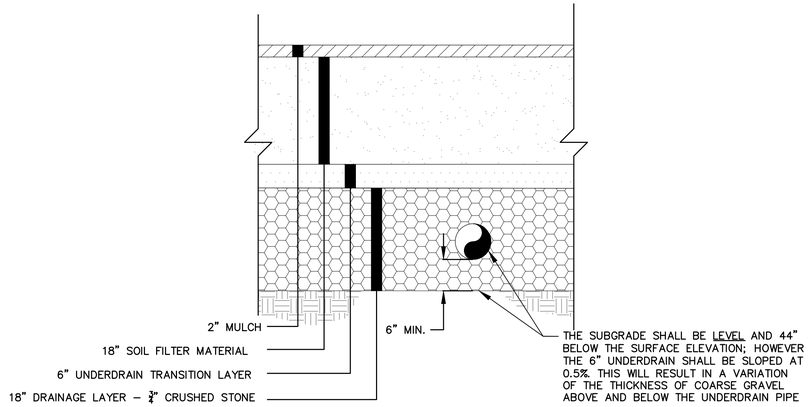
PAVEMENT MARKING

TRANSITION DETAIL

TYPICAL RAISED CROSSWALK DETAIL
NOT TO SCALE



BIKE RACK DETAIL
NOT TO SCALE



SOIL FILTER MATERIAL SHALL HAVE PERMEABILITY OF 2 IN/HR TO 4 IN/HR. UNDERDRAIN SAND SHALL HAVE A PERMEABILITY OF AT LEAST 4 IN/HR.

* CONTRACTOR SHALL PROVIDE PERMEABILITY TEST PER ASTM D2434

SOIL FILTERS SHALL BE CONSTRUCTED IN CONFORMANCE WITH SECTION 900 OF THE SUPPLEMENTAL SPECIFICATIONS.

SOIL FILTER MATERIAL SHALL BE A LOAMY SAND SOIL COMBINED WITH 30% BY VOLUME OF MODERATELY FINE, WOOD FIBER OR BARK MULCH. THE RESULTING MIXTURE SHALL HAVE NO LESS THAN 10% PASSING THE 200 SIEVE. SOIL FILTER MEDIA SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR OBJECTS LARGER THAN 2 INCHES. SUBCOMPONENTS OF THE SOIL FILTER MEDIA INCLUDE:

LOAMY SAND SHALL CONSIST OF NATIVE LOAMY SAND (AS DEFINED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE) THAT CONTAINS NO LESS THAN 10% PASSING THE #200 SIEVE AND BETWEEN 2 – 5% CLAY AS DETERMINED THROUGH SOIL TEXTURAL ANALYSIS.

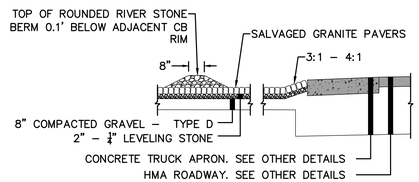
WOOD FIBER MULCH SHALL CONSIST OF A MODERATELY FINE, WELL COMPOSTED HARDWOOD BARK FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. MULCH SHALL HAVE 100% PASSING A 1" SCREEN.

THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION SEQUENCE PLAN THAT OUTLINES THE OVERALL WORK IN RELATION TO THE CONSTRUCTION OF SOIL FILTER SYSTEMS, SPECIFICALLY CONSIDERING SITE STABILIZATION, SOIL FILTER INSTALLATION, AND VEGETATION PLACEMENT IN AND AROUND THE FILTER SYSTEMS. THE SOIL FILTER MEDIA MUST NOT BE INSTALLED UNTIL THE ENTIRE AREA THAT DRAINS TO THE FILTER HAS BEEN PERMANENTLY STABILIZED WITH PAVEMENT, VEGETATION, EROSION CONTROL MATTING, OR OTHER STRUCTURES UNLESS THE RUNOFF IS DIVERTED AROUND THE FILTER OR UNLESS THE FILTER IS COMPLETELY WRAPPED AND PROTECTED BY A NON-WOVEN GEOTEXTILE LINER WHICH CAN BE REMOVED FROM THE SURFACE PRIOR TO FINAL STABILIZATION.

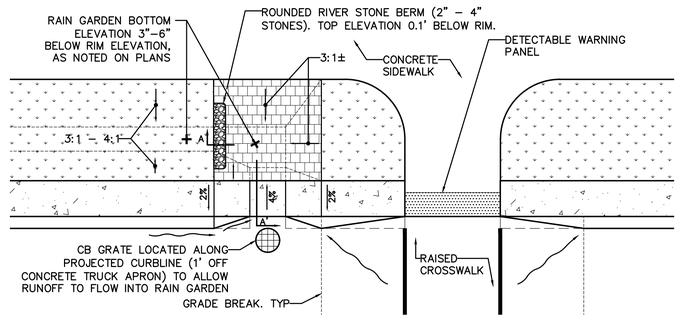
THE AREA THAT DRAINS TO THE SOIL FILTER SHALL BE KEPT STABLE, AVOIDING EROSION AND DEPOSITION OF SEDIMENTS INTO THE STORMWATER MANAGEMENT SYSTEM. ABSOLUTELY NO RUNOFF IS TO ENTER THE FILTER UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN SUFFICIENTLY STABILIZED. IF FILTER MEDIA BECOMES CLOGGED, IT SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST

ADDITIONAL SURFACE LOAM MAY BE UTILIZED TO PROMOTE VEGETATION SURVIVAL. LOAM SHALL CONSIST OF NO MORE THAN ½ DEPTH OF NATIVE SANDY LOAM LIGHTLY RAKED INTO SOIL SURFACE.

RAIN GARDEN - TYPICAL SECTION
NOT TO SCALE



SECTION A–A'



TYPICAL RAIN GARDEN INLET DETAIL
NOT TO SCALE

Project:
Deering's Corner Roundabout
Design Plans
WIN # 18624.00

Prepared for:
City of Portland
389 Congress Street
Portland, Maine

RANSOM Consulting, Inc.
400 Commercial Street, Suite 404,
Portland, Maine 04101
Tel (207) 772-2891
Fax (207) 772-3248
www.ransomenv.com

MTJ ENGINEERING
tjd&a
DuBois & King inc.

STATE OF MAINE
John I. Mahoney
#12340
LICENSED PROFESSIONAL ENGINEER

Details
Stormwater & Others

No.	Revision/Issue	Date
B	For Bidding	12–18–19
A	City MaineDOT Review	11–25–19

Design by: JIM	Checked by: SJB
Drawn by: JIM	Approved by: SJB
Project: 141.06013	

Sheet No:
14.7

Addendum to University of Southern Maine Portland Campus Transportation Demand Management (TDM) Plan

11-22-2021

The changes below represent modifications to the plan due to changes in the University's structured garage proposal and other dynamic changes (internal & external to USM) that have occurred over the last 12 months. These include:

- The University siting the proposed structured parking on the Wishcamper lot
- Maine Law School moving off campus
- The University downsizing the proposed size of the structured parking, as a result of the Maine Law School move and feedback received from the Planning Board
- The City of Portland adding a requirement for electric vehicle charging stations to its Technical Manual

Mobility Context, Section 2-

The following updates are made to the parking lots represented in Figure 7 on page 16. The figure represented the lots on November 11th, 2020. These updated figures are current as of November 9th, 2021:

- The Woodbury lot - 130 spaces were displaced due to construction of the residence hall and Career & Student Success Center ("CSSC")
- The Facilities lot - 41 spaces were displaced due to construction of the residence hall and CSSC
- The Heat Plant lot - 21 spaces will be reduced to 15 spaces due to construction of the residence hall and CSSC
- The Brighton Ave lot- 26 spaces were displaced from the City roundabout project
- The Wishcamper lot -91 spaces are proposed to be displaced from the new parking garage at this location

TDM Coordinator, Section 4-

The roles of the two point people from the University have been changed, in part to help support the TDM effort:

- The University's TDM Coordinator will still be Aaron Witham, whose new title is Director of Sustainability. The inclusion of TDM duties into his new job description demonstrate the University's commitment to TDM success.
- The supporting role will now be an Associate Vice President of Administration position, rather than Director of Auxiliary Services. This change also represents an increase in focus and attention to transportation matters.

Transportation Demand Reduction Goals, Section 5-

Trip Reduction Goal- This goal stays the same because even though the structured parking will be located in a different area, the trips are not created by the garage, and thus don't change

as a result of location. Even though trips from the Law School won't happen anymore, VHB thought it would be best to be conservative and not deduct those trips from our analysis, so that we can ensure that the traffic mitigation measures proposed are overly sufficient.

Parking Demand Reduction Goal-
The goal remains a 10-14% reduction at the hour of peak demand. The gross number translation, however, changes from the published 159-222 vehicles to 144-201, to reflect a loss of Maine Law School demand in the campus-wide base demand number.

GHG Reduction Goal-

The goal of 20% reduction in GHG emissions from transportation remains the same, as it is a per capita goal, not impacted by the size of the population. How the University plans to achieve this goal is constantly evolving based on the proportion of electric vehicle commuters and based on fuel economy standards, both of which are impacted as much or more by evolving national forces, as they are by University policies.

Summary of Targets-

TDM Plan: Baseline Data, Targets & Monitoring/Reporting

Date of TDM Plan: 11-3-2020				11-4-2021 Addendum
Provide Data in Percentages and Absolute Numbers, where applicable		*Baseline Data (at time of TDM plan adoption*	*TDM Plan Reduction Target (if applicable)*	*Current Reporting Period Data*
Vehicular Trips	*Off-Peak*	N/A	N/A	Report forthcoming in 2024
	AM Peak Hr	581	3-6% (17-35 trips)	Report forthcoming in 2024
	PM Peak Hr	381	3-6% (12-23 trips)	Report forthcoming in 2024
Mode Split (future data may be reported as	*Single-Occupancy Vehicle*	75%	70%	Report forthcoming in 2024

SOV & Non-SOV)	*Non-SOV*	25%	30%	Report forthcoming in 2024
	Carpool	8%	Not specific	Report forthcoming in 2024
	Bicycle	*11% (shared with walk)	Not specific	Report forthcoming in 2024
	Walk	*11% (shared with bike)	Not specific	Report forthcoming in 2024
	Transit	6%	Not specific	Report forthcoming in 2024
On-site Parking (Peak)		Was 1,587 (adjusted to 1,435)	10-14% (144-201)	Report forthcoming in 2024
GHG Emissions Targets		2 MT of CO2e per capita	20% (or .4 MT of CO2e per capita)	Report forthcoming in 2024
Other:_____				

*Adjusted On-site parking number is due to deducting Maine Law School from total demand in the baseline, so that the TDM reduction target accounts for the change in actual conditions on the ground

Trip, Parking, Mode Split & GHG Reduction Strategies, Section 6-

The existing strategy, "Build Additional EV Charging Stations" is clarified to mean the University will endeavor to match demonstrated demand with supply of electric vehicle charging stations, so that demand would not exceed supply.

A year into strategizing implementation of our TDM plan, we have adjusted some launch dates. Some have adjusted to earlier and some later. Please see new launch dates written in red in the table below.

Table 3: Overview of TDM Initiatives for USM

STRATEGY	LAUNCH DATE	INFRASTRUCTURE	INCENTIVES	EDUCATION
Walking				
Create Walk Spot Maps	Fall 2023			X
Publicize the "Complete City Project"	Spring 2022			X
Hold Fitness Challenges	Spring 2022		X	
Biking				
*Co-launch City Bikeshare	Spring 2023	X		
Build Bicycle Repair Station	Spring 2023	X		X
Promote Local Bike Activities	Spring 2022		X	X
Offer Discounted Bike Supplies	Fall 2022		X	
*Improve Bike Infrastructure	Spring 2023	X		
Apply for Bike Friendly University Certification	Fall 2022	X	X	X
Transit				
*Continue METRO Pass Program	Ongoing	X	X	
Propose Husky Line Improvements	Fall 2023	X		
Propose Transit Service Expansion Beyond Husky Line	Spring 2022	X		
Install Transit Screen	Spring 2023	X		
****Carpooling, Telecommuting & Time-of-Day***				
Establish Vanpool Vehicles	Fall 2022	X	X	
Designate Carpool/Vanpool Spaces	Fall 2022	X	X	

Develop Rideshare Matching Platform	Fall 2022	X		
Promote Telework & Flexwork	Ongoing		X	X
Restructure Course Schedule	Ongoing	X		
Parking Pricing				
Establish Commuter Parking Buyout Program	Fall 2022		X	
*Establish Residential Parking Buyout Program	Fall 2023		X	
Host Carshare Program to Support Buyouts	Spring 2023	X	X	
*Unbundle Student Parking Fees	Fall 2022		X	X
Build Additional EV Charging Stations	Spring 2023	X		
Review Parking Price Levels	Fall 2022		X	
Communications & Marketing				
*Hold New Student & Employee Orientations for Transportation	Spring 2022		X	X
*Revise Transportation Website	Fall 2021			X
*Publish Access Guide	Fall 2021			X
Offer Guaranteed Ride Home Service	Spring 2023		X	

*Core strategies that the University is committing to are indicated by *. In the case of the Carpooling, Telecommuting & Time-of-Day category, the category itself is considered core, but the University will maintain flexibility in which of these strategies it implements, depending on future conditions

Monitoring and Reporting Plan, Section 7-

Inclusion of EV ownership would stay in the annual transportation survey, as outlined on page 43. This is important for GHG calculations.

In addition to the survey data, the University will provide an EV Use and Forecast Report to the City on or before June 1st of each year beginning in calendar year 2024, summarizing EV ownership and EV charging station use statistics. The Report will also include a proposal regarding the number of EV charging stations for the coming school year, based upon the supply and demand statistics from the previous year. In alignment with the other reporting activities outlined in the TDM plan, the University commits to annual reporting through 2030, the horizon of the Facilities Master Plan, after which a new TDM plan may be proposed.

USM Parking Assessment: Existing and Future Conditions

Presented by
LOURENÇO DANTAS, AICP
FEDERICO TALLIS, AICP

January 17, 2020

Contents

- Study Purpose
- Current Parking Supply
- Future Parking Supply
- Current Parking Demand
- Enrollment and Parking Demand Forecasts
- Future Parking Supply vs. Demand
- Key Takeaways
- Appendix
  - Parking Demand by Lot/Facility
  - Proposed USM TDM Strategies

Study Purpose

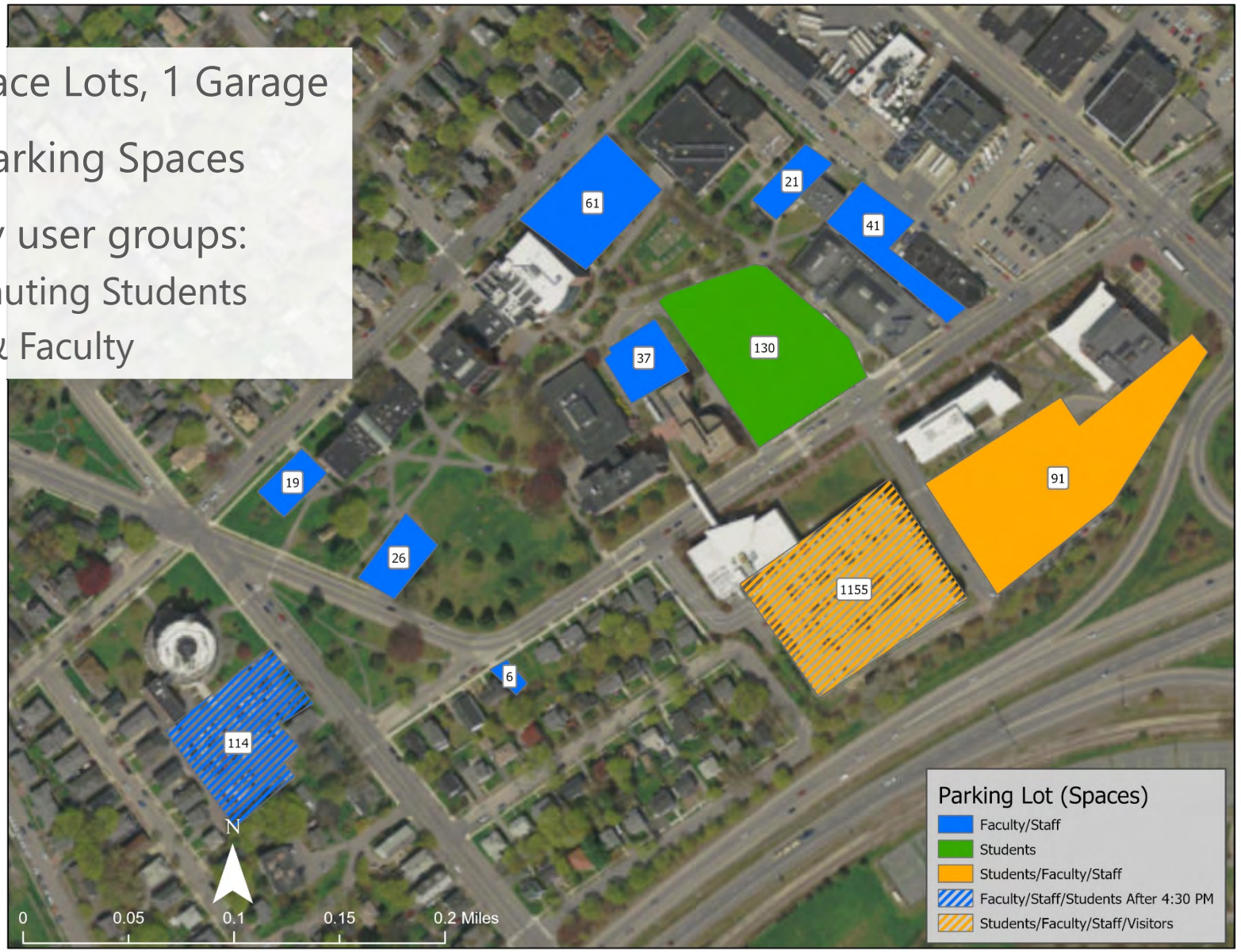
To develop a comprehensive profile of current on-campus parking conditions and to estimate future parking demand levels based upon projections of student enrollment, employment growth, and changes to campus activities.

Key milestones include:

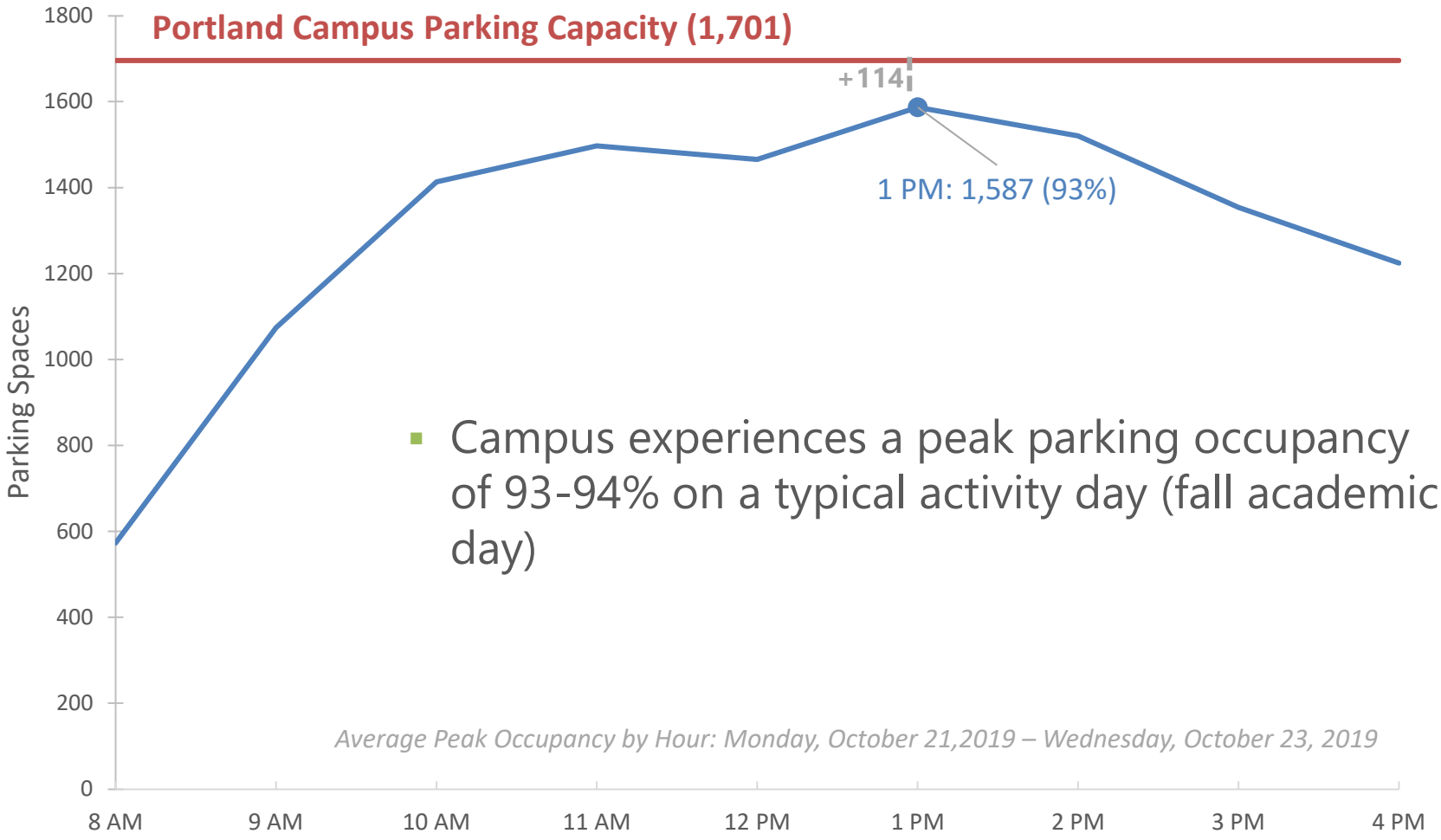
- 2022 – completion of student center & residence hall, including loss of Woodbury parking lot (P2)
- 2025 & 2030

Current Parking Supply

- 10 Surface Lots, 1 Garage
- 1,701 Parking Spaces
- Two key user groups:
  - Commuting Students
  - Staff & Faculty



Current Parking Demand

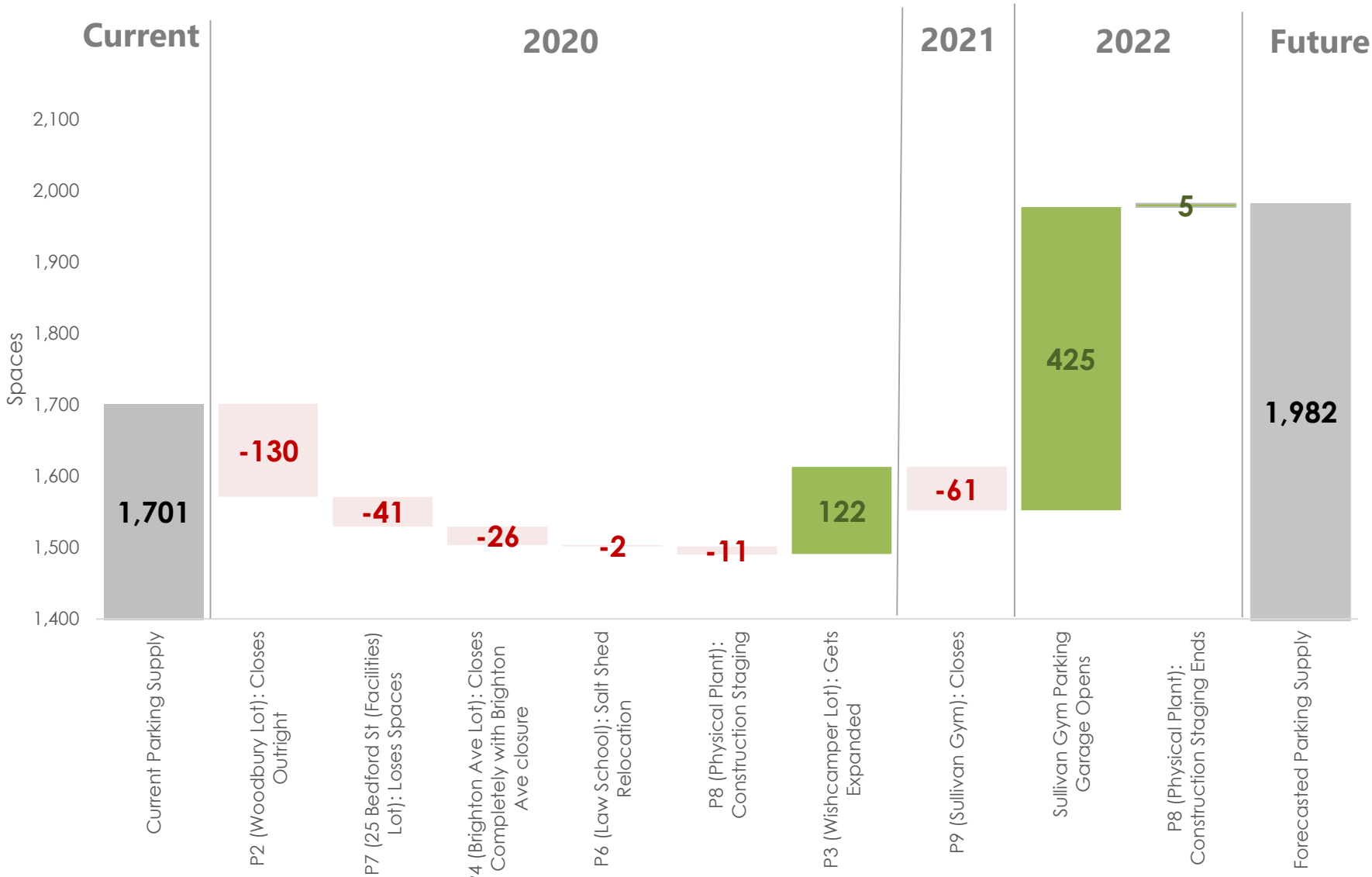


- Campus experiences a peak parking occupancy of 93-94% on a typical activity day (fall academic day)

Current Parking Demand

- Current Parking Peak Hour occurs at 1 PM
- Campus is currently at 93% occupancy during peak, typical activity day
- 5 of 11 lots noted occupancy beyond capacity (see details in appendix) including:
  - P2 Campus Center (Woodbury Parking Lot)
  - P3 Wishcamper Center/Library
  - P4 Off Brighton Ave
  - P5 92-120 Bedford
  - P10 Payson Smith

Future Parking Supply



Future Parking Supply

On-Campus	2019	2020	2021	2022	Milestone Notes (from USM)
Parking Garage	1155	1155	1155	1155	
P1 Luther Bonney & Masterton Halls	37	37	37	37	
P2 Campus Center (Woodbury Parking Lot)	130	0	0	0	Lose all of Woodbury parking lot permanently
P3 Wishcamper Center/Library	91	213	213	213	Wishcamper parking lot will be temporarily lost for the summer 2020 Gain 122 spots in new Wishcamper surface lot by September 2020
P4 Off Brighton Ave	26	0	0	0	Lose Brighton Ave extension parking lot by May 2020
P5 92-120 Bedford	6	6	6	6	
P6 Law Building	114	112	112	112	Salt shed being relocated to this lot to make way for construction of new buildings
P7 Facilities Building	41	0	0	0	Lose all of this lot, except access to oil fill in June of 2020
P8 Physical Plant	21	10	10	15	Lose half of this lot in 2020 and 2021 for use as a laydown/staging area for construction of new buildings and creation of service area
P9 Sullivan Recreation	61	61	0	0	Lose lot to construction zone for new parking garage
P10 Payson Smith	19	19	19	19	
USM Sullivan Lot Garage	0	0	0	425	Parking garage with 425 spaces
Total	**1,701**	**1,613**	**1,552**	**1,982**	

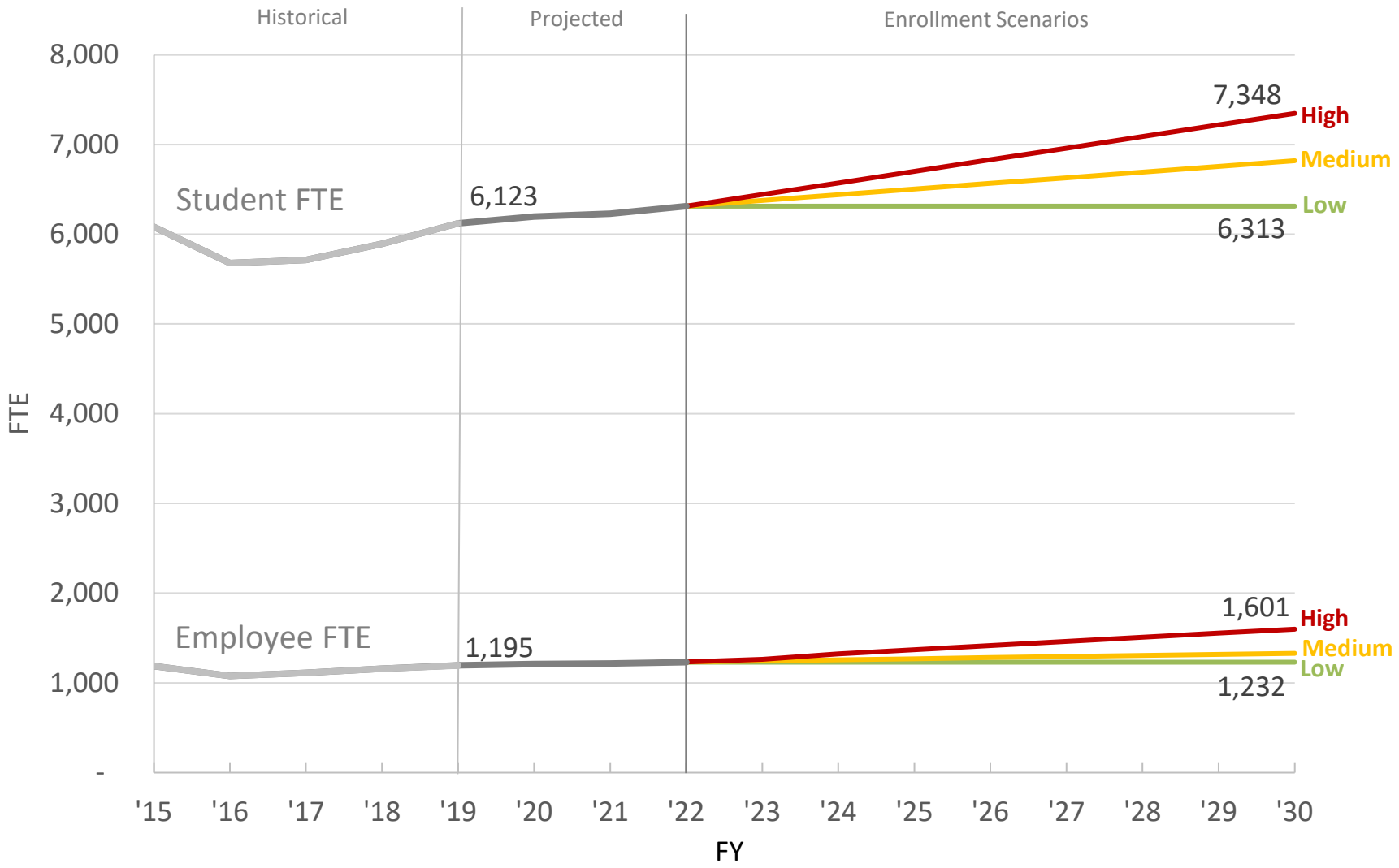
Enrollment Forecast Methodology

- What we know:
  - 2019 Student and Employee FTE
    - Student FTE: 6,123
    - Employee FTE: 1,195
  - Projected Student Growth Through 2022
    - 2020 Student FTE: 6,199
    - 2021 Student FTE: 6,230
    - 2022 Student FTE: 6,313
- What we don't know:
  - 2020 – 2022 Employee FTE
    - Employee FTE was grown proportionally to student enrollment using 2019 ratios for 2020 – 2022; could have a different growth rate
  - How USM will grow beyond 2022

Enrollment Forecast Methodology

- To determine demand beyond 2022 three scenarios were determined:
  - **Low:** Student enrollment and employment remains flat beyond 2022
    - Average Annual Growth Rate: 0%
  - **Mid:** Student enrollment continues to grow steadily based on growth from 2019 to 2022. Employment grows proportionally to student enrollment.
    - Average Annual Growth Rate: 1%
  - **High:** Student enrollment and employment grows back to peak enrollment, 2006 levels.
    - Average Annual Growth Rate: 2%

Student and Employee FTE Projections



Translating Enrollment to Parking Demand

- What we know:
  - Portland Campus Parking Demand
    - Peak hour demand: 1,587 (93%)
  - USM Portland Campus Headcount vs Total USM Enrollment
    - From Master Plan: Portland has 64% of total USM student headcount
  - Employee vs. Student Parking Demand
    - From parking count, 44% of Portland campus permits are from employees whereas 56% are from students
  - Residential Student Parking Permit Demand
    - From Master Plan 1,200 beds in Gorham and 815 registered permits from permit data = 0.68 parking space/bed.
    - Based on demographic of expected student population, a higher 0.75 parking space/bed rate was used.

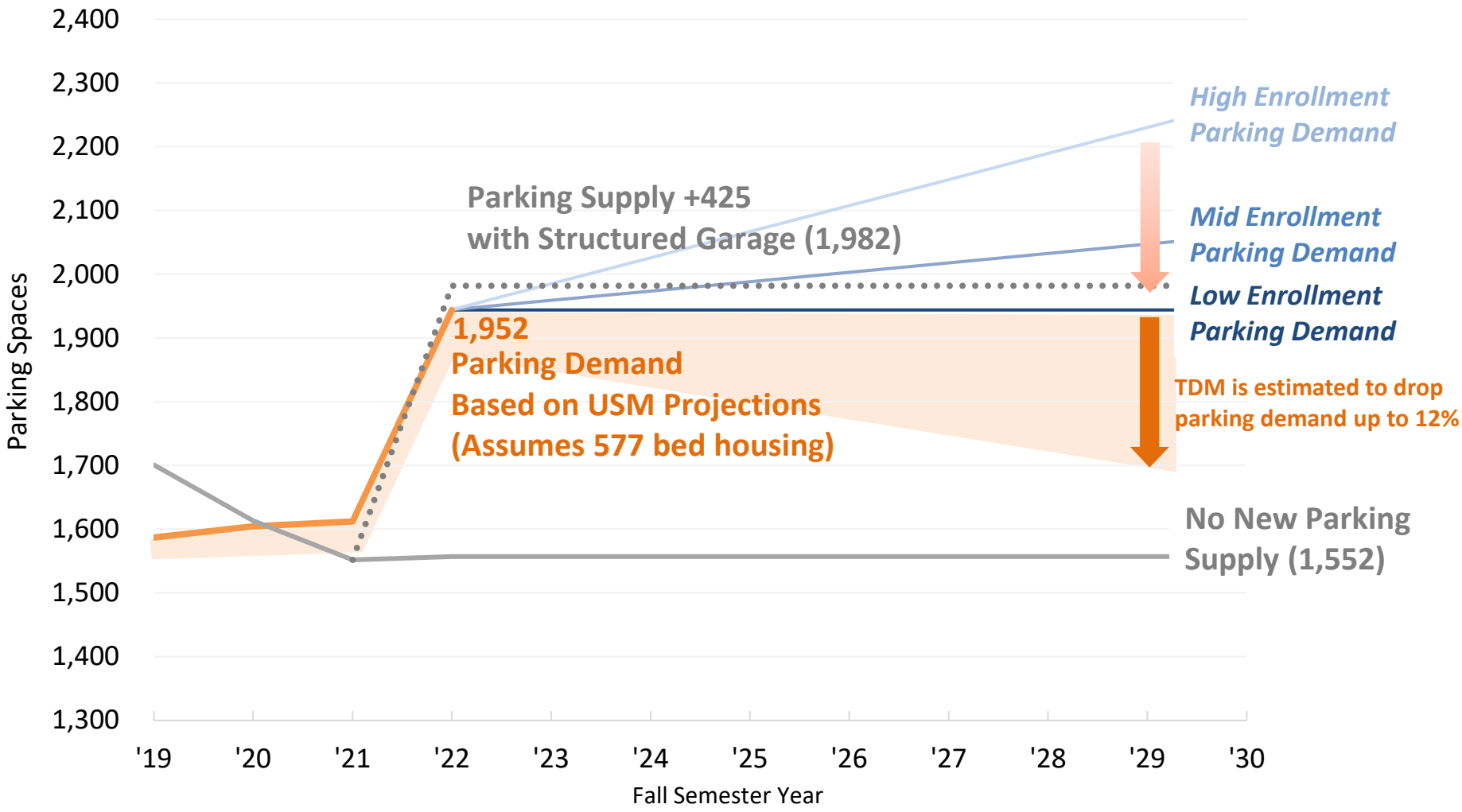
Translating Enrollment to Parking Demand

- To Calculate Parking Demand:
  1. USM Student Enrollment was translated to Portland Campus Student Enrollment
  2. For each forecasted year Portland student enrollment was split into two categories: Commuter student vs Residential student
     - 577 residents assumed on-campus from 2022 into the future.
     - Commuter students equal to total Portland headcount minus on-campus students
  3. Commuter student, residential student, employee, OLLI, and conference attendee parking rates were calculated:
     - Commuter student, employee, OLLI, and conference parking rates were calculated using existing permit demand data ratios
     - Residential student rates were calculated based on Gorham bed counts and resident student permits registered
  4. Calculated parking rates were multiplied by expected population for each year to determine final parking demand by group
  5. Final commuter student, residential student, and employee parking demand were summed to determine total parking demand

Calculating TDM Reduction

- To Calculate the impacts of a TDM program on USM:
  1. A laundry list of appropriate TDM strategies were chosen for USM based the peer review and the assessment of existing transportation conditions.
  2. Impact vs. cost of individual strategies were determined based on USM permit data sales and the transportation survey.
  3. USM narrowed laundry list from step 1 based on political and financial feasibility.
  4. VHB took final package of strategies and simulated potential mode split based on USM permit data and transportation survey.
  5. Mode split was translated to parking reduction based on existing mode split vs. parking demand patterns.
- A list of proposed TDM Strategies are contained in the appendix.

Future Parking Supply vs. Demand

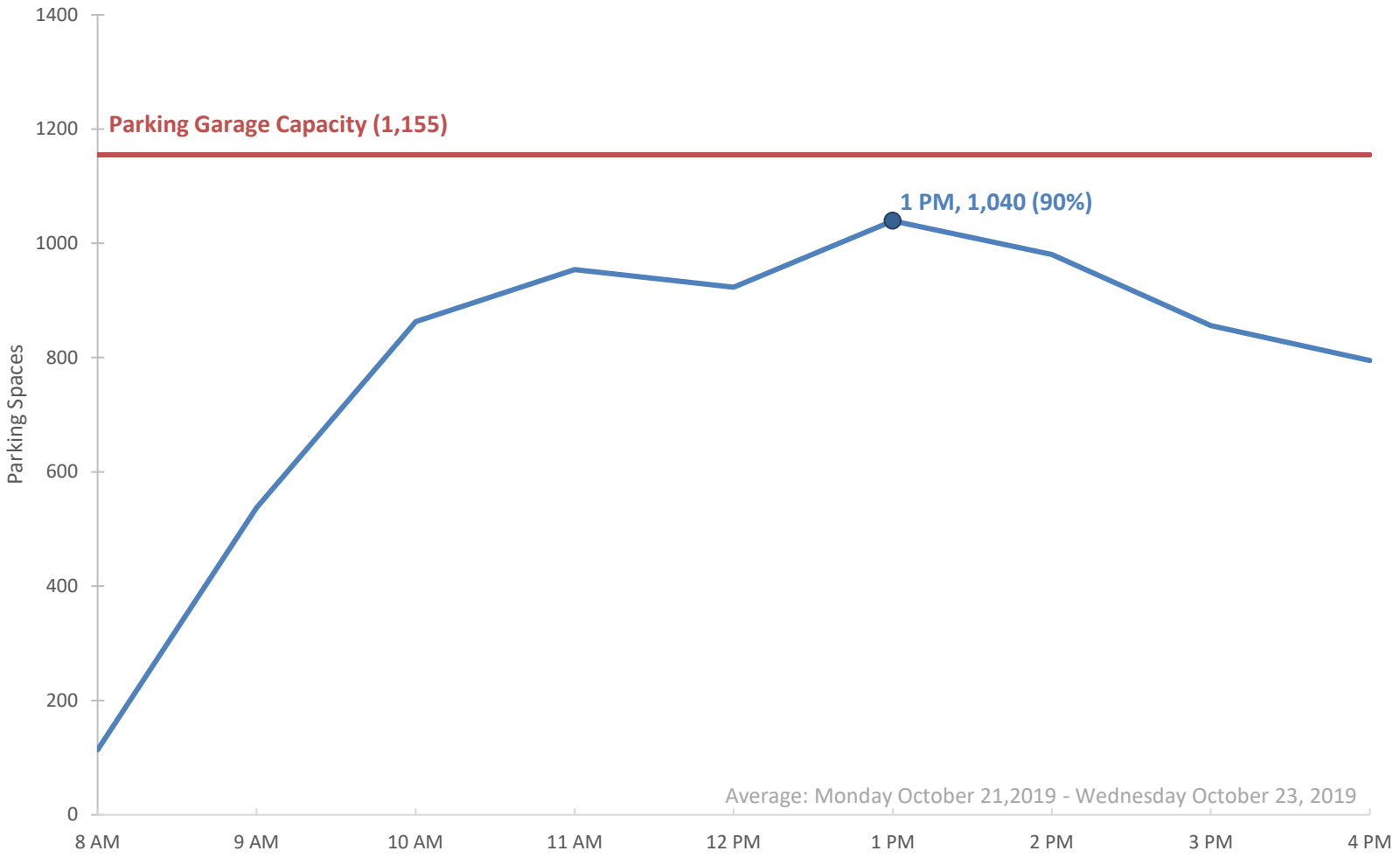


Takeaways

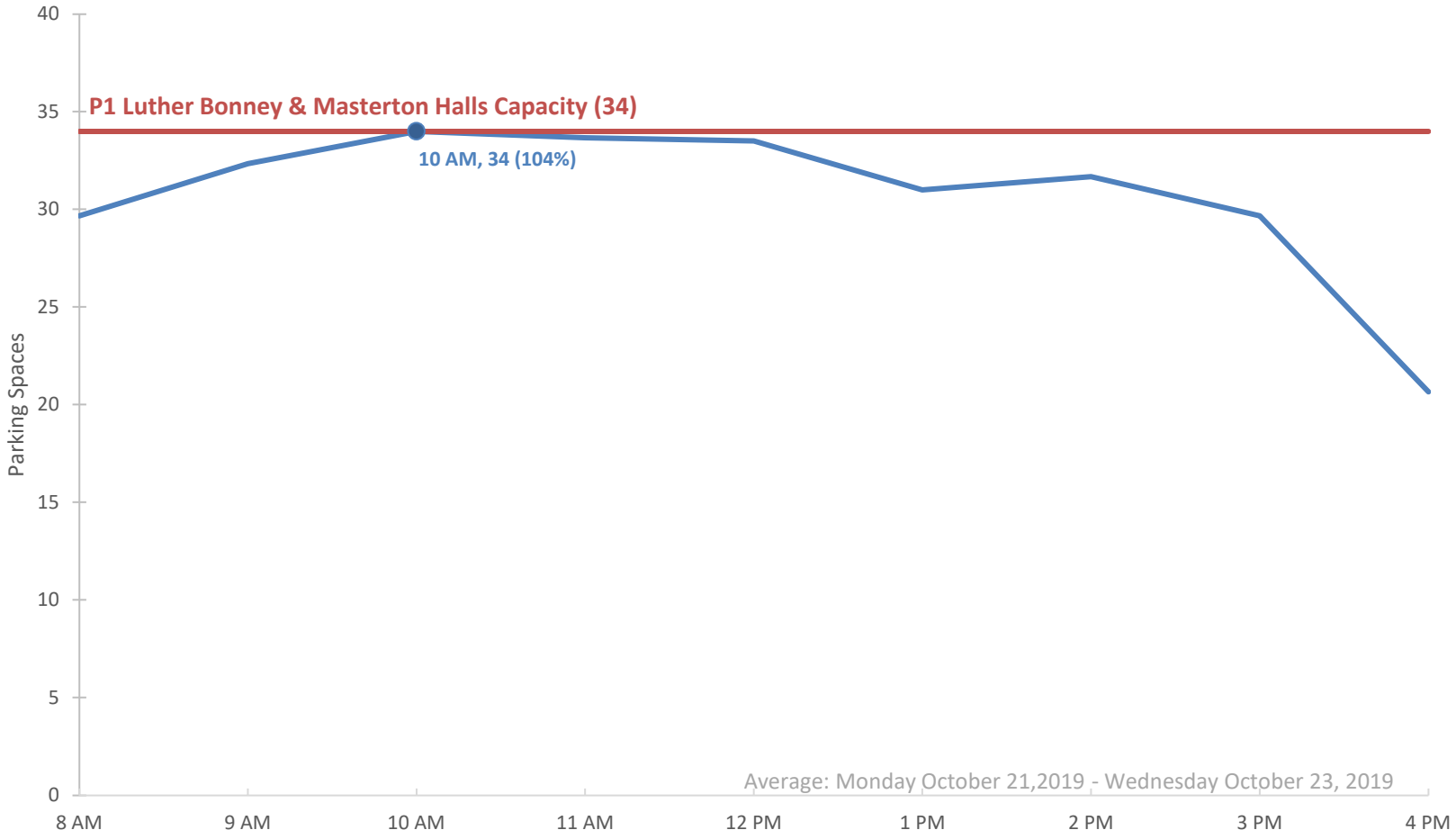
- With construction of a new residence hall and student center, new parking capacity is needed and/or parking demand needs to decrease
  - A moderately aggressive TDM program of strategies, including parking pricing and policy changes, could result in demand reductions of up to about 12 percent for USM
- Depending on enrollment projections, parking supply may not be adequate. USM would have to consider building more parking supply or further reducing parking demand
  - Not anticipated to be an issue until at least 2026 (under a modest 1 percent annual growth in student enrollment and without TDM implementation)
- Enrollment growth may not always directly contribute to growth during the peak demand hour:
  - E.g. Evening classes, distribution of classes among campuses, use of campus for conferences and at-large community events

Appendix:
Hourly Demand Charts by Parking Facility

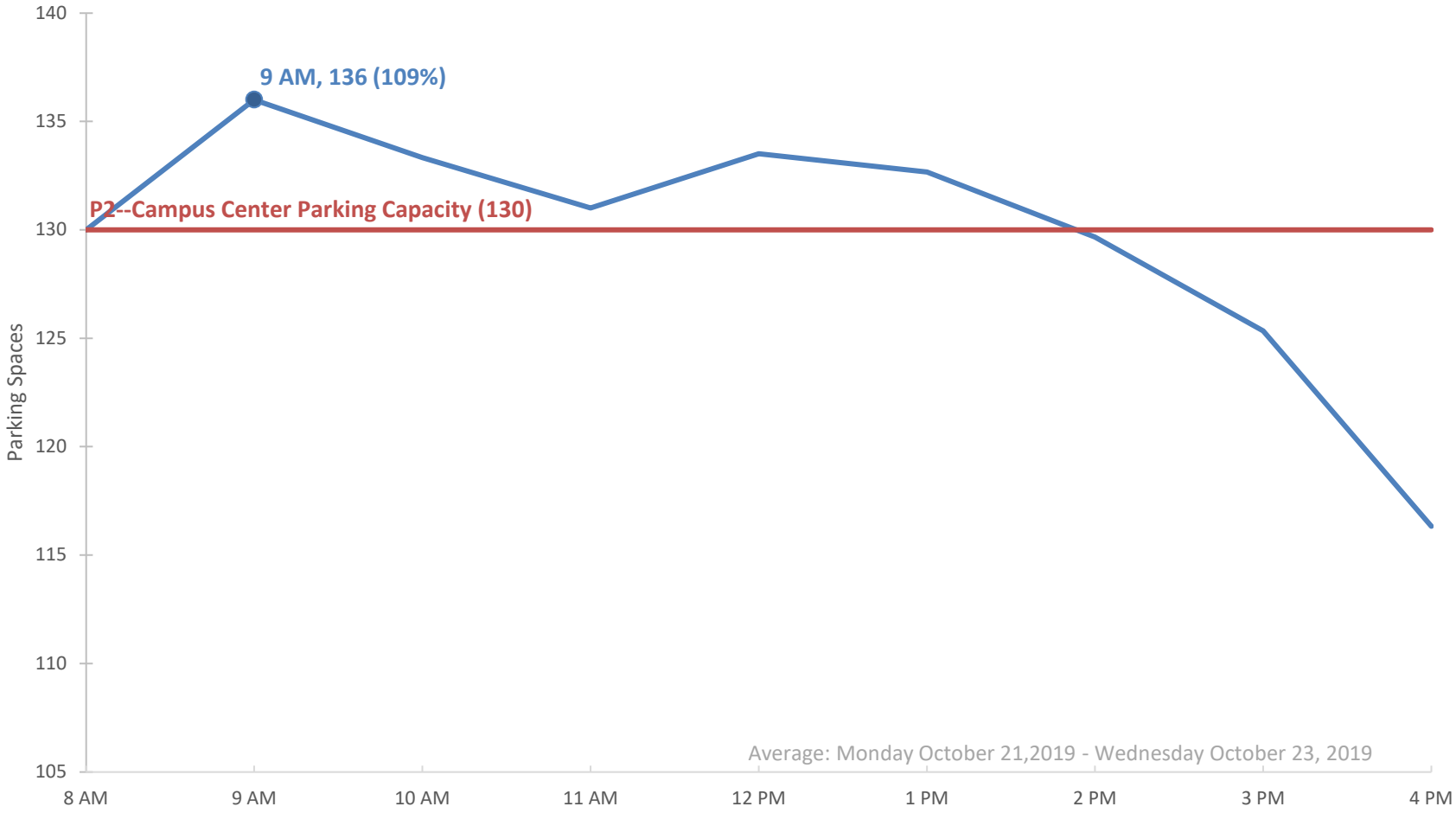
Parking Garage Demand



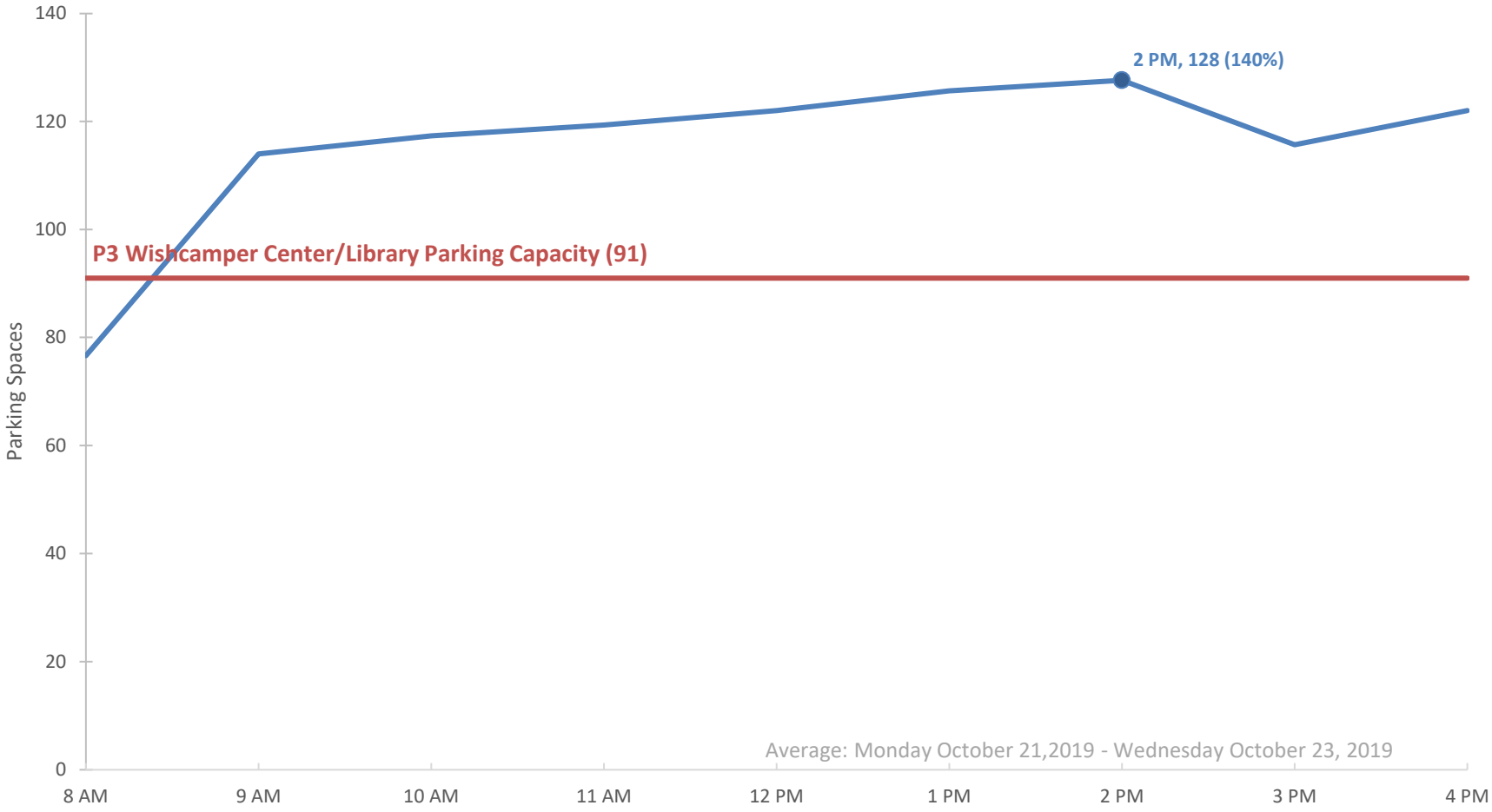
P1 Luther Bonney & Masterton Halls Parking Demand



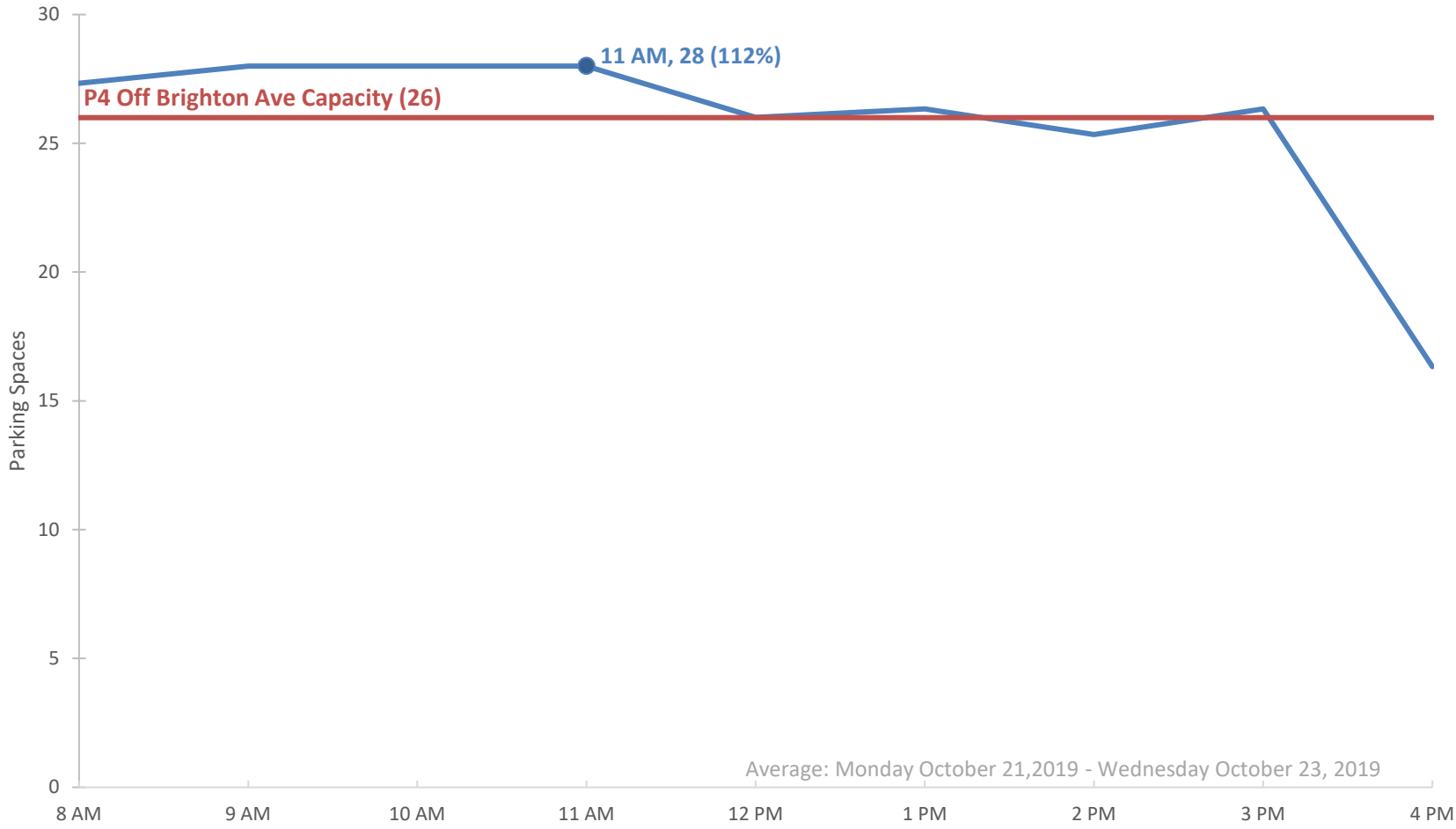
P2 Campus Center (Woodbury Parking Lot)



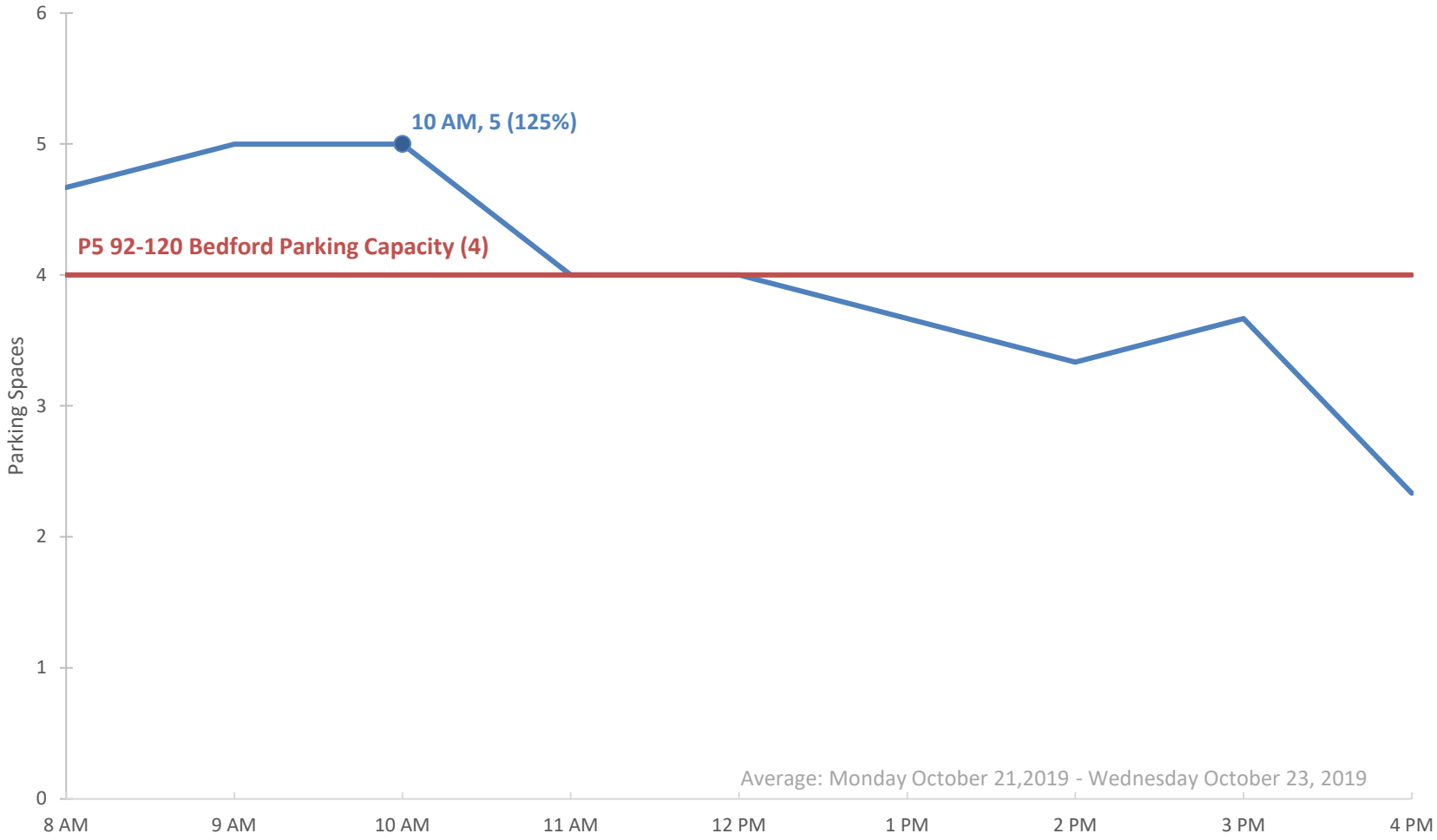
P3 Wishcamper Center/Library Parking Demand



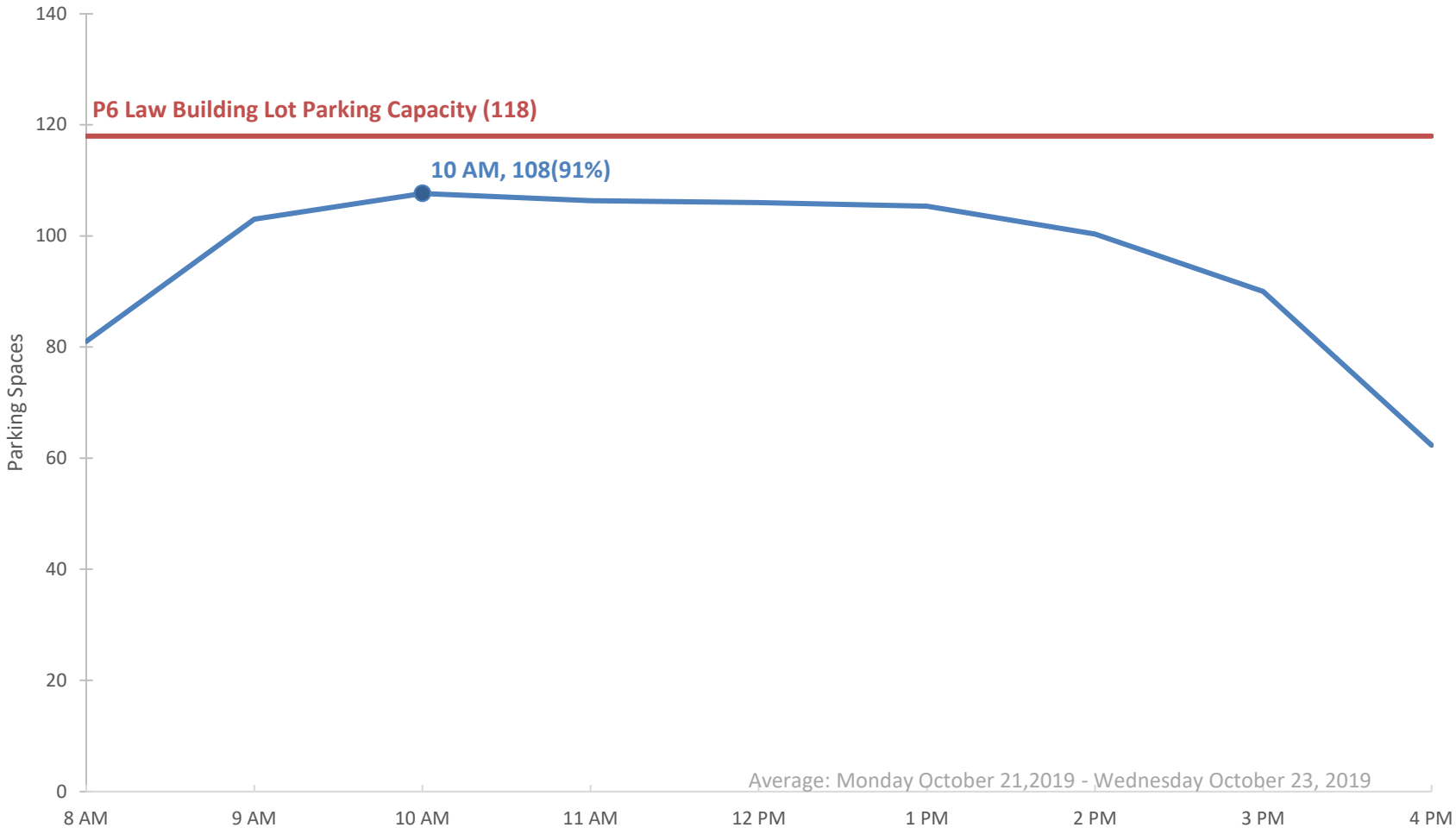
P4 Off Brighton Ave Parking Demand



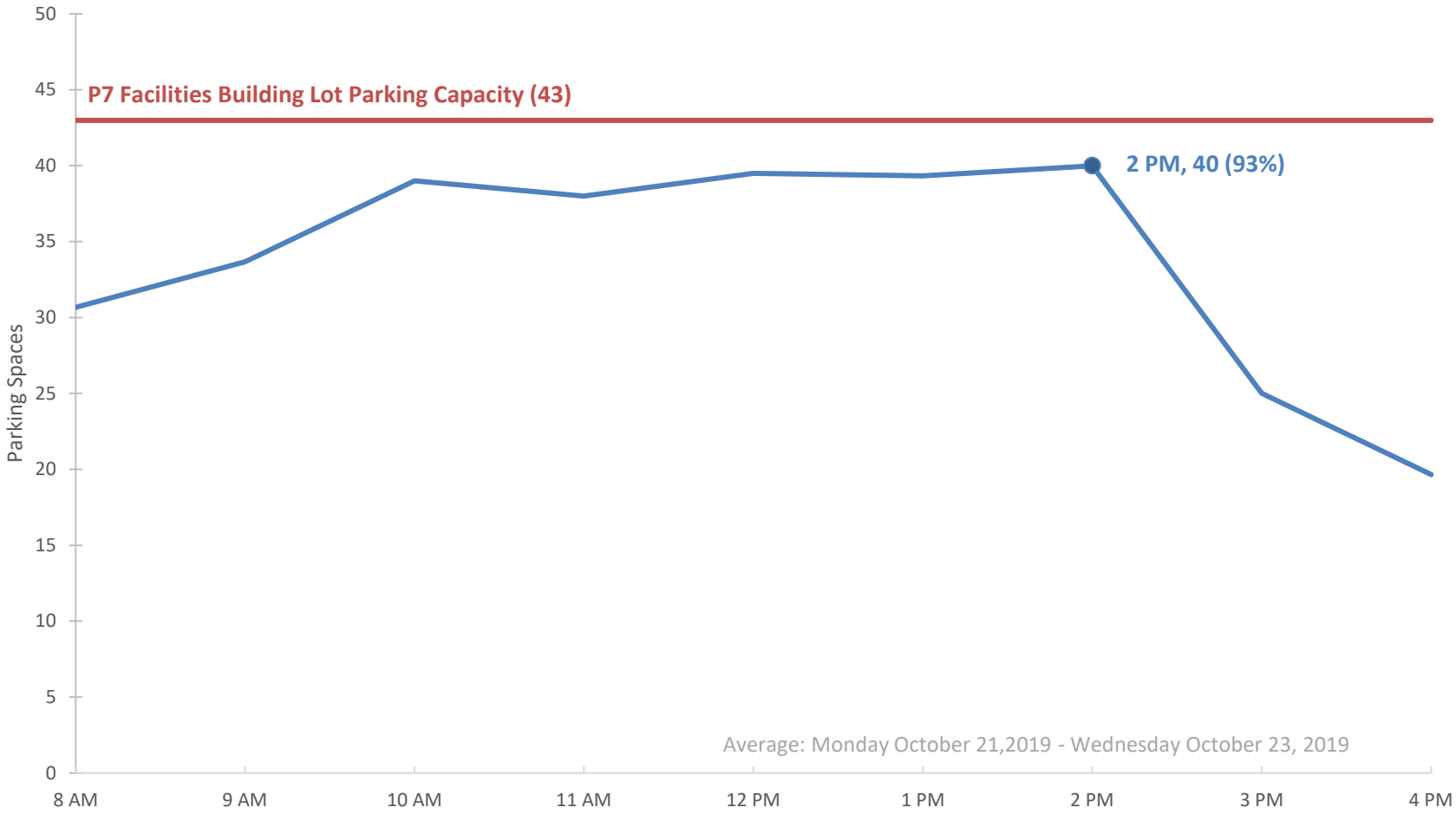
P5 92-120 Bedford Parking Demand



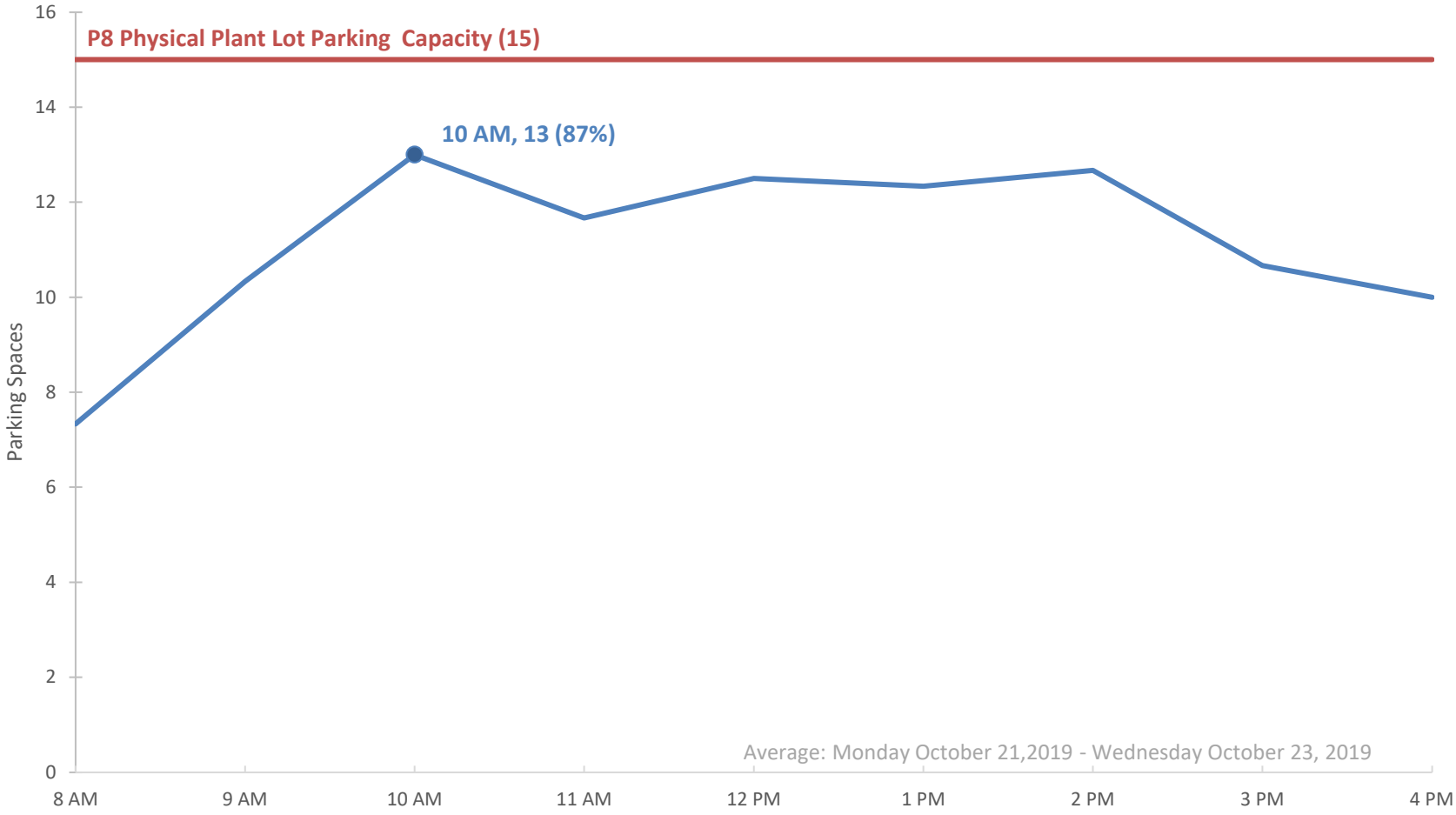
P6 Law Building Lot Parking Demand



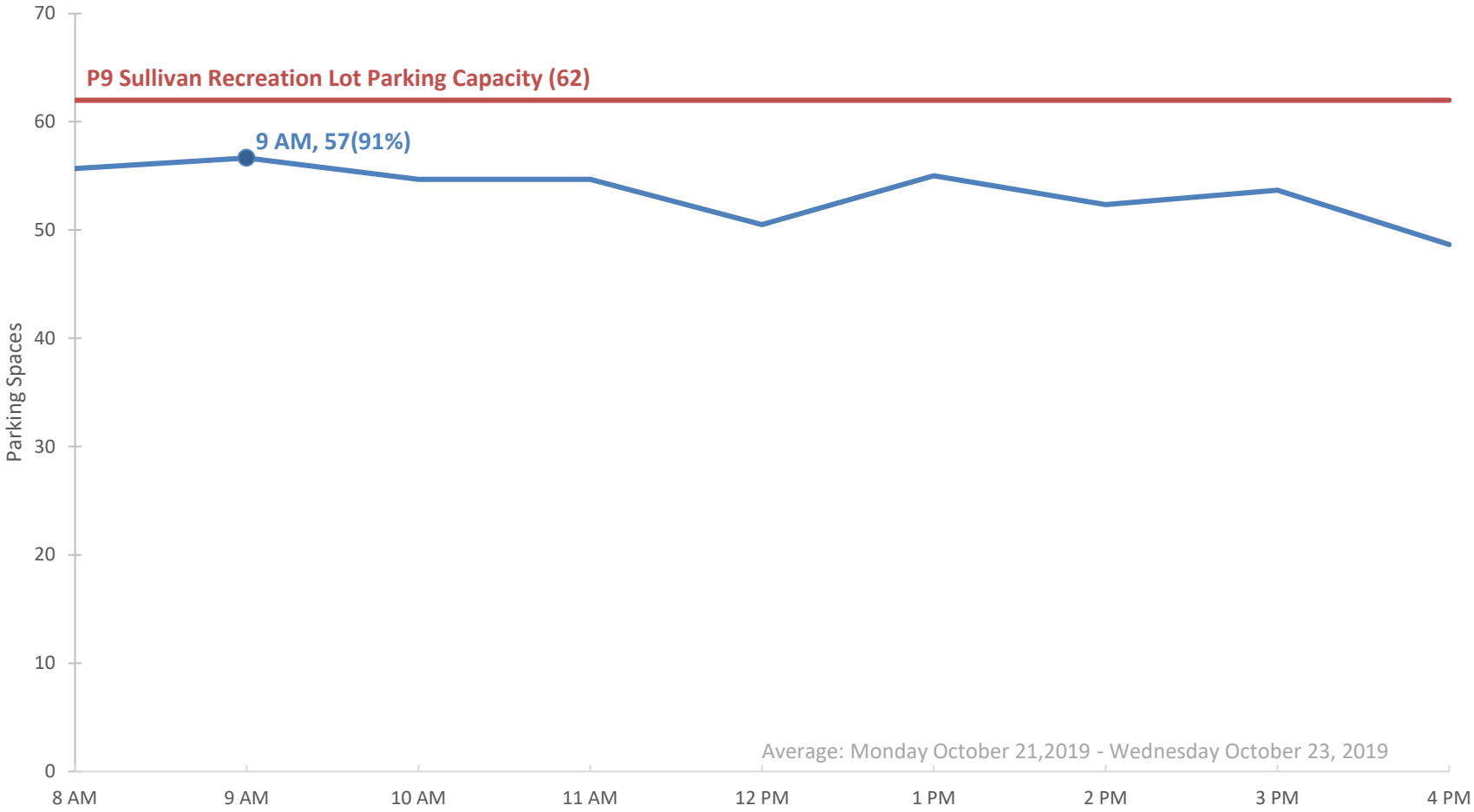
P7 Facilities Building Lot Parking Demand



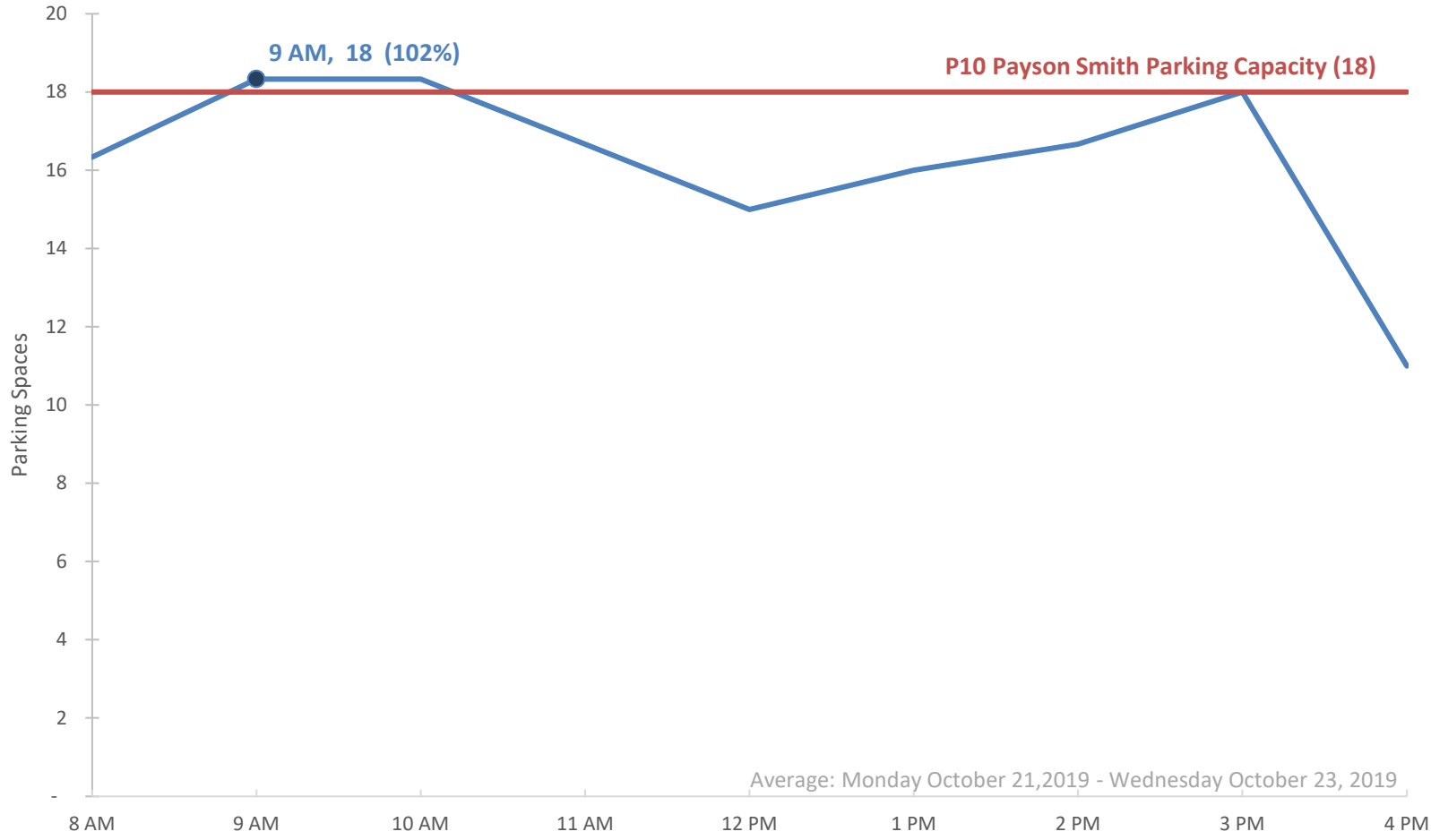
P8 Physical Plant Lot Parking Demand



P9 Sullivan Recreation Lot Parking Demand



P10 Payson Smith Parking Demand



COMMITMENT & INTEGRITY
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41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

Via Electronic Mail

October 13, 2021

Department of Planning & Development
Attn: Jimmy Dealaman
City of Portland
389 Congress Street
Portland, ME 04101

Re: USM Parking Garage – 50 Bedford Street - Neighborhood Meeting Certification

Dear Jimmy:

I, Darrin Stairs, PE of Woodard & Curran, hereby certify that a neighborhood meeting was held on September 22, 2021, at 6:00 p.m., via in person at the USM Glickman Library and virtual platform, regarding the Major Site Plan Application submittal for the proposed USM Parking Garage project located at 50 Bedford Street.

I also certify that on September 10, 2021, invitations were mailed to the following:

1. All addresses on the abutters list provided by the Planning Division which includes property owners within 500 feet of the proposed development.

2. Residents on the "interested parties" list.

Signed,

WOODARD & CURRAN INC.

Darrin Stairs, PE
Project Manager

Attached to this certification are:

1. Copy of the Invitation Sent
2. Meeting Attendance Report
3. Meeting Notes

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September 10, 2021

Dear Neighbor:

On behalf of the University of Southern Maine (Applicant), please join us either in person or via Zoom conference call for a neighborhood meeting to discuss our plans for a parking garage located at 44 Bedford Street in Portland, Maine. A Major Site Plan Application for the proposed development has been filed with the City of Portland Planning Department.

Meeting Location: The University Events Room, Glickman Library, 7th Floor – 314 Forest Avenue, Portland, Maine*

Remote Call-in Information: https://bit.ly/3DETXZS

Meeting Date: Wednesday, September 22, 2021

Meeting Time: 6:00-7:00 PM

***Masks are required indoors for all USM buildings regardless of vaccination status.**

The Land Use Code requires that neighboring property owners and residents on an "interested parties list" be invited to participate in this neighborhood meeting. A sign-in sheet will be circulated, and a record of the meeting will be taken. Both the sign-in sheet and record will be submitted to the Planning Board.

Accommodations can be provided upon request. If you're in need of an accommodation, please contact Katie Andrews at (207) 780-4484 by September 21, 2021; if requests are received after this date, we may not have sufficient time to make necessary arrangements.

If you have any questions, please contact Darrin Stairs at (207)558-3662 or via email at dstairs@woodardcurran.com.

Sincerely,

WOODARD & CURRAN INC.

Darrin B. Stairs, PE
Project Manager

Note: Under the City of Portland land use code, an applicant for a major site plan is required to hold a neighborhood meeting within 30 days of an application being deemed complete and no less than seven calendar days before a public hearing. Should you wish to offer additional comments on this proposed development, you may forward them by e-mail to planning@portlandmaine.gov or by mail to the Planning and Urban Development Department, Planning Division, 4th Floor, 389 Congress Street Portland, ME 04101.

WHO BUT W.B.MASON

9/22/21

NAME	ADDRESS
Katie Andrews	USM
BARRY SHEFF	W&C
John Southern	USM
Alec Jordan	USM
Ann Vashon	USM

ZOOM

Mary Costigan
Gretchen Giumarro
Richard Freund
Tom Blanchard
Lisa Bloss - Washburn
Jenn Conley
Paul Connolly - Oakhurst
Wes Wilson
Aaron Witham
Jeff Henriksen
Justin Swift
Paul Kuplinski
Damnstairs
Brenda Nicholas - Chamberlain
Mark Wilcox
Kristin Sweeney - walks through neighborhood
Linda Simpson neighbor
Annie Leahy neighbor

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MEETING MINUTES

USM – Neighborhood Meeting

PROJECT: USM – Parking Garage

MEETING DATE: 9/22/2021

LOCATION: University Events Room – Glickman Library (7th Floor) and via virtual platform

ISSUED DATE: 10/13/2021

ATTENDEES:

USM Team Members:

Katie Andrews – USM
Aaron Witham – USM
John Souther – USM
Alec Porteous – USM
Richard Freund – USM
Ann Vashon – USM
Tom Blanchard – USM
Paul Kuplinski – USM
Justin Swift - USM
Wes Wilson – Desman Design
Barry Sheff – W&C
Darrin Stairs – W&C
Mark Wilcox – WSA
Jenn Conley – VHB
Gretchen Giumarro - MLBA

Public

Mary Costigan
Lisa Bloss – Washburn
Paul Connolly – Oakhurst
Jeff Henrikson
Brenda Nicholas – Chamberlain
Kristin Sweeney
Linda Stimpson
Annie Leahy

In person and virtual meeting began at 6:00 p.m.

1. **Welcome (Alec Porteous, USM)**
   a. Intro and background
   b. Updates
      - Ongoing neighborhood meetings
      - Board of Trustees Meeting in fall for authorization of construction spending
   c. Agenda
2. **Presentation (Darrin Stairs, W&C)**
   a. Site Plan Application
      - Application has been submitted to the City
      - Comments can be made with the Planning Board
      - Workshop with the City scheduled for September 28th

- TMP Amendment (Aaron Witham, USM)
  - Draft permit has been prepared
  - Scoping meeting to be scheduled with the City

b. Location Overview
   - Adjacent to existing garage

c. Garage Details
   - 5 Levels
   - 637 spaces – 207 spaces displaced with a net gain of 430 spaces
   - 58 EV spaces
   - 250 bike spaces
   - Connected at ground level to existing garage

d. Site Plan Overview
   - Loop road
   - Pedestrian plaza
   - Pathways
   - Landscaping

e. Architecture (Mark Wilcox)
   - Birds Eye View
   - Match existing garage height
   - Scale
   - Ramping
   - Building materials review
   - Plaza View
   - Entrance/exit
   - Bike room
   - Stair elevation tower (east view)

3. Questions and Comments

- Paul Connelly, Oakhurst
  - Positive feedback on proposed location.
  - Forest Avenue - traffic analysis concerns; already a problem.
  - Impact on roundabout.
  - No signalized light at Bedford Street for years. What degree will the intersection improve? Does data reflect the real movement? No recognition of Oakhurst Intersection being

blocked and perception that City is dismissive of intersection. More work needs to be done and will share data.

  - Bus traffic flow to off Ramp, to I295, and Bedford – backups block Durham Street. Studied traffic counts but may only improve with a signalized intersection.
  - Bus turnouts would benefit thru traffic. Not all stops are 10 seconds, has seen bus stopped and a car going over the median too avoid. Concerned about traffic stops and backup. Hard for traffic to recover from bus stops.
  - Oakhurst to have continued conversations with USM to address concerns.

- Jenn Connelly, VHB
  - Traffic calming on Falmouth Street will be included that may help mitigate traffic "cutting thru" using roundabout.
  - Understands concern about bus pullouts. Metro preferred not to have pull out but will re-address with them.
  - Look forward to any additional traffic data that the Oakhurst consultant can provide. Did Oakhurst consultants have any recommendations?
  - City is working to fix signal at Bedford and Forest Ave – camera and detection issues.
- Aaron Witham, USM
  - Appreciated working relationship with Oakhurst, looks forward to ongoing discussion at scoping meeting.
  - Remain open to further discussion for inline stop, mainly adopted for safety.
  - Has observed near misses and vehicular incidents, and cars going around buses.
  - The inline stop is for convenience to keep efficient movement during peak hours. Remember a bus can be carrying up to 40+ people who are not on the road in a single occupancy vehicle (SOV).
  - Curious to know what the City's position is on the bus inline stop?
- Alec Porteous, USM
  - Acknowledged process transparency and working with Oakhurst.
- Brenda Nicolas
  - Issues with racing cars and safety concerns; need to slow down vehicles and calm traffic.
- Alec Porteous
  - Agreed and wants to work with neighbors and City on making the most efficient and safe travel corridor.
- Annie L
  - Grateful for the working relationship with neighbors and USM.
  - Witnessed many of the same safety concerns others have mentioned, including cars moving fast on Falmouth St.
  - Concerned about safety of pedestrians, need to get vehicles to slow down.

- How can the neighborhood participate in creating an overall, comprehensive, traffic calming plan?

- Alec Porteous
  - Agreed again with traffic and safety concerns and will continue to work with the City and the neighbors to find solutions.
- Jenn Connelly
  - Mentioned proposed raised crossings on Falmouth and on Bedford Streets as helpful for traffic calming.
- No further questions or comments.

4. Meeting Close

- Alec Porteous thanks attendees and adjourned the meeting at approximately 6:50 p.m.

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Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

Via Electronic Mail

December 15, 2021

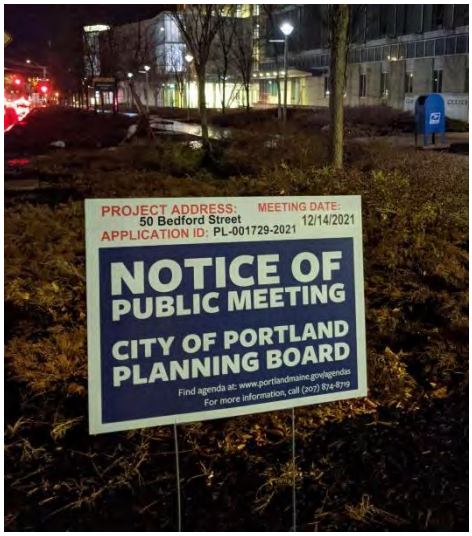
Jimmy Dealaman, Planner
Planning & Urban Development Department
City of Portland
389 Congress Street, 4th Floor
Portland, ME 04101

Re: 50 Bedford Street - Notice of Public Meeting Certification

Dear Jimmy:

I, Darrin Stairs, PE hereby certify that a Notice of Public Meeting sign was posted from 12/02/2021 to 12/14/2021 prior to the public workshop held on 12/14/2021 for the proposed project PL-001729-2021, located at 50 BEDFORD STREET.

Photo documentation of sign in situ:





Sincerely,

WOODARD & CURRAN, INC.

Darrin Stairs, PE
Project Manager

PN: 233035.00

Construction Management Plan

Project: University of Southern Maine - Structured Parking Garage

The University of Southern Maine - Structured Parking Garage Construction Management Plan depicts the overall planning, coordination, and control of the proposed construction site, including sequential phasing, from beginning to completion.

The following construction management plan has been developed by the University's Design Team Members based on the components of the project and the City's goal for a plan is to support a safe construction site and protect the public safety, accessibility (including preserving accessible pedestrian, bicycle, and vehicular modes of transport throughout the city), and welfare during construction. This plan minimizes construction impacts in their duration and magnitude to the surrounding area and provides a visual framework to convey and communication the process for addressing site logistics, minimizing conflicts and addressing access for university, construction and emergency vehicles and pedestrians.

Presently the University is soliciting proposals from qualified Construction Managers. It is the intent of the University to allocate the management of the Construction Management Plan to the selected Construction Manager.

The following construction management plan for the USM - Structured Parking Garage may be subject to adjustments based on coordination with the Construction Manager following selection. The Construction Management Plan shall include the following submissions:

1) a construction management site plan;
2) a construction schedule (time frame); and
3) a written narrative addressing the categories below.

A. Construction Management Principles

The purpose of this Construction Management Plan is to maintain a safe construction site and minimize impacts to adjacent buildings, university operations and surrounding neighborhood. The selected Construction Manager shall maintain open lines of communication between the University, City, Public and Consultants to mitigate concerns in the most effective manner during construction. This goal is to be attained by continued planning, review, update, communication and execution with all parties. The following sections further define this approach for the successful application of the Construction Management Plan.

B. Development Review of Construction Management Plan

The Construction Manager will continually maintain and update the Construction Management Plan for the duration of the project to augment and improve site safety measures. This is intended to be a live document that is updated as the project progresses

and site conditions change. The focus of each update will be to ensure the safety of the public, pro-active elimination of adverse situations and maintenance of accessibility for necessary services in and around the construction site. As a part of this plan development the initial Construction Management Phasing and Logistics Plans are included at the end of this document.

C. Performance Guarantees, Inspection Fees, Preconstruction Meeting, and Permits

Prior to scheduling a preconstruction meeting and the issuance of any city required permits, the University of Southern Maine and their selected Construction Manager shall meet all of the requirements contained in Section 14-530. Development review fees and post approval requirements and 14-532. General requirements and enforcement of Portland's Land Use Code.

Anticipated permits, (if applicable) include:

1. **Street Opening and Street Occupancy Permits:** Construction activity in the public right-of-way shall be in accordance with Chapter 25. Sewer and stormwater system connections shall be in accordance with Chapters 24 and 32 of the Land Use Code. All required permits shall be obtained through the Department of Public Works and the requests shall conform with the approved construction management plan.

2. **Blasting:** Blasting, if required, shall conform with Article VIII. Regulation of Explosives in the Land Use Code and Section 3.7 Standards for Blasting and Regulation of Explosives in Portland's Technical Manual.

   Based on preliminary geotechnical findings and information it is not anticipated that blasting will be required.

3. **Building Code:** Employ the best practices, as applicable, of Chapter 33 Safeguards During Construction, from the 2015 International Building Code.

Vehicular access will be maintained around the construction site for the entirety of the project for emergency fire access to the rear of the existing parking garage and access to the Glickman Loading dock. Pedestrian access will remain to the Glickman and Wishcamper buildings. Work within Bedford Street may require the temporary closure of lanes.

D. Construction Administration and Communication

USM and the Construction Manager will work diligently to implement a communication strategy that is agreed upon by the City, Stakeholders and Neighbors. The communication strategy is intended to ensure that all construction operations are performed in accordance with all agreements, ordinances and special permits applicable to this project. The Construction Manager will work closely with adjacent abutters, businesses, nearby

construction sites, and all parties informed, as far in advance as possible, of scheduled work, particularly work anticipated to cause significant noise, vibrations, or dust. The final construction management plan shall provide for the following:

1. Contact Person and contact information for USM staff and Construction Manager personnel that is available 24 hours.
2. Construction Signage posted on the site with Contact Information for Construction Manager.
3. Describe any additional communication strategies.
4. All construction and temporary site signage, including signage at cross walks, existing garage and main streets, shall be updated, adjusted and removed as project progresses through each construction phase and at project completion.

E. Construction Schedule

Construction of the garage is anticipated to commence in the winter/spring of 2022 and be substantially complete in April 2023. The initial phase of construction will include alterations to the parking access control equipment within the existing garage and closure of the east entry/exit. This schedule is in line with, and is in support of, the nearby construction of the Portland Commons & Student Success Center buildings.

Work hours to follow City of Portland regulations during the daytime hours as defined in Section 17-18 “Construction Activities for Building permit” and Section 25-129 “Noise, dust and debris” of the City’s Code of Ordinances. Any required off-hour work will be coordinated directly with the City.

Material Deliveries will be coordinated within normal work hours and be stored on-site as shown in the site logistics plans. Construction deliveries are expected to travel from 295 to Forrest Avenue to Bedford Street and then onto the project site.

F. Security & Public Safety

The construction site will be enclosed by temporary chain link fencing during construction. The fencing will be moved in a phased approach in coordination with the site logistics plan. Primary site access will be from Bedford Street to the garage access road and then into the construction site via a swinging site gate. Secondary gates will be provided for emergency access to the rear of the existing garage and the roadway will be maintained and open at all times for access. Gates will be locked during non-work hours and equipped with knox box for emergency access. Emergency Access and deliveries around the project site to the existing USM parking structure, Wishcamper building and Glickman will be maintained at all times. The construction site will follow all requirements of IBC Chapter 33 “Safeguards during Construction” and NFPA 241 “Standard for Safeguarding Construction, Alteration, and Demolition Operations" including construction and placement of necessary separation and safety barriers between the existing garage and construction site.

Structures undergoing construction, alteration, or demolition operations, including those in underground locations, shall comply with NFPA 1 Chapter 16. A complete fire safety and access plan will be developed in coordination with the City of Portland prior to project commencement.

G. Construction Permitting and Traffic Control Plans

Construction Activity in Public Streets: Construction activity in the public right-of- way is controlled by Chapter 25 Article VII of the City Code of Ordinances. The contractor will work to minimize impacts from construction and provide safe access around the site. The project shall follow City of Portland requirements for traffic control throughout the duration of the project. Construction activities and deliveries will not impact public access or streets unless directly coordinated and notified prior.

Sewer and Stormwater: Sewer and stormwater water system connections are controlled by Chapters 24 and 32 of the City Code of Ordinance. Tie-ins of the new connections will occur within the existing surface parking lot. All tie-in connections will obtain the appropriate permits and be coordinated with the DPW.

Traffic Control Plans: Construction activity that impacts the existing public street system will (where applicable) be controlled to protect the safety of the construction workers and all modes of the traveling public. Phased construction of the proposed ring road will include traffic control and safety measures. Traffic controls will include temporary signage and barriers where necessary to manage all modes of travel including, vehicle, pedestrian, and bicycle traffic. ADA compliance for affected public pathways will be maintained for the duration of the project.

H. Site Management and Controls

The Construction Manager will address maintaining the site in a safe condition and will include the following:

1. Regular trash and debris removal including the recycling of materials to meet USM's adopted ParkSmart Certification criteria. Trash dumpsters and areas around the dumpsters will be maintained in a clean and orderly manner.
2. Dust controls- The construction shall comply with Portland's requirements under Section 25-129 on Noise, dust and debris (below). Dust control will include street sweeping, water trucks, truck pads and similar measures to minimize dust from construction activities.

Sec. 25-129. Noise, dust and debris.

Each permittee shall conduct and carry out excavation work in such manner as to avoid unnecessary inconvenience and annoyance to the general public and occupants of neighboring property. To the fullest extent practicable, the permittee shall take appropriate measures to reduce noise, dust and unsightly debris in the performance of the excavation work. Excavation work, including the use of any tool, appliance, or equipment, shall be performed between the hours of 7:00 a.m. and 10;00 p.m. only, exclusive of emergency work. Time waiver requests may be submitted to the public works authority for work outside of this time period and will be subject to neighborhood concerns. Excavation work shall not occur on Sundays, holidays or on major holiday weekends, unless expressly authorized by the public works authority or as a result of emergency need.

3. Noise: The construction shall comply with the University's and Portland's requirements as defined under Section 17- 18 of the City Code (below) and Section 25-129 on Noise, dust and debris

Sec. 17-18. Construction activities.

(a) Within the R-zones, from September 1st to May 31st, no person shall engage in construction activities generating noise exceeding fifty (50) decibels, between the hours of 7:00 p.m. and 7:00 a.m., of the following day within five hundred (500) feet of any building used for residential, hospital or nursing home purposes. From June 1st to August 31st construction activity may continue until 8:00 p.m. Any other language notwithstanding, no construction activity shall begin before 8:00 a.m. on a Saturday, Sunday or legal holiday.

(b) Construction activities shall include, but not be limited to, the following:

(1) The use or operation of power or heavy equipment in connection with road, street, or bridge construction, reconstruction or repair;

(2) The use or operation of power or heavy equipment in connection with the installation or repair of utility lines, pipes, wires or cables;

(3) The use or operation of power or heavy equipment in connection with the construction of buildings, including specifically excavation for foundations or landscaping work of any kind;

(4) The renovation, repair, remodeling or demolition of the exterior or foundation of any building or structure.

(c) This section shall not apply in the following situations:

(1) Emergency repair work on any utility line, pipe, wire or cable required to restore normal utility service;

(2) Situations where the public works authority or the office of building inspections determines that the construction activity is of a unique character which cannot reasonably be completed or performed during the permitted hours and which is not of a recurring nature, provided that prior to engaging in such activity the contractor or his representatives gives notice of the time and scope of such proposed activity, the notice to be given in a manner approved by the public works authority.

4. Rodent Control will be provided, if applicable, by a professional exterminator and

consistent with Chapter 22 of the City Code.

5. Snow Removal: Pursuant to Section 25-173 Contractors to ensure a safe means of travel within and areas affected by the work zone including:
    1) Snow/ice removal or commence automatically from (1" of snow and up) or Ice
    2) Remove snow as needed within the work zone, including parking spaces & not to block any driveways or sight lines with the piles of snow.
    3) Clear all walks & ramps with the work zone
    4) Sand or Salt as needed
    5) Clear all basin or drainage to help snow melt
    6) This would include Monday-Friday Sat/Sunday/Holidays
6. The construction manager shall ensure the site follows all requirements of IBC Chapter 33 “Safeguards during Construction” and NFPA 241 “Standard for Safeguarding Construction, Alteration, and Demolition Operations"

I. Erosion Control and Preservation of Trees

Prior to construction, erosion and sediment controls with be installed as shown on the design drawings. These shall be regularly inspected and maintained for the duration of the project. The preservation of trees and landscaping shall be as shown on the landscaping plans. Care will be taken to avoid damage to the trees and landscaping that is to remain. Landscape, soils and plantings damage during construction activities will be restored, replaced and re-planted to assimilate pre-existing conditions as cataloged by pre-construction photographic documentation, surveys and similar records.

J. Construction Staging Area

The site logistics plan shows planned locations for staging and laydown areas, onsite truck washing stations, materials storage and construction trailers.

Standard deliveries will be coordinated with the effort to minimize disruption to both the surrounding public spaces and the construction site as much as possible. Precast concrete piece deliveries will be continuous throughout the day during the superstructure erection. An off-site queuing yard will be coordinated to optimize deliveries in coordination with on-going erection activities and avoid queuing of vehicles.

K. Parking During Construction

For portions of the project, minimal on-site parking will be available for construction workers. It is anticipated during these times, that parking will be required off-site with transportation to the site. Parking for workers will be prohibited along nearby public roads.

Closure of a limited number of spaces within the existing garage will be required during construction. The CM will provide phasing documents showing the timeframe and quantity of required parking closures within the existing garage. Garage patrons will be provided advance

notification of proposed modifications to create awareness prior to application.

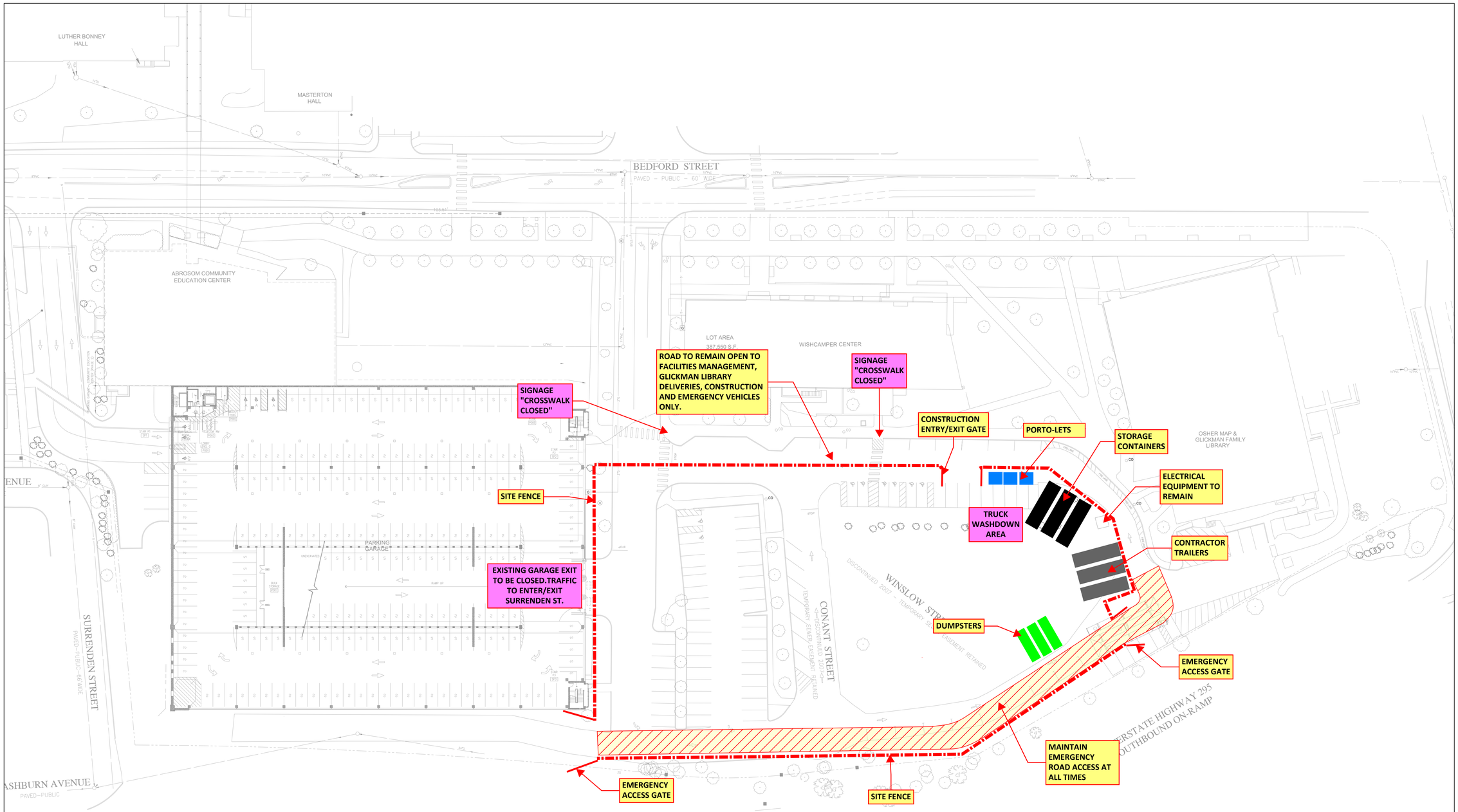
L. Dewatering Plans

A dewatering plan and recommendations will be developed as recommended by the geotechnical report prepared by S.W. Cole. The dewater plan will be submitted and coordinated with the City of Portland. Based on the preliminary geotechnical report it is anticipated that sumping and pumping of shallow excavation will be sufficient to control groundwater.

M. Special Measures as Necessary

The project is proposed to include deep pile-foundations which generally require pile-driving equipment. This technique typically results in ground vibrations in and around the immediate vicinity. To pro-actively mitigate the effects of this construction technique, pre-construction surveys and photographic documentation will be conducted on the surrounding facilities and buildings and, were necessary, vibration monitors installed to document the intensity of the vibrations. An action and monitoring plan along with a photographic catalog of surrounding structures will be will developed and shared with the City and USM in advance of this construction activity.

While is expected that this Construction Management Plan will be updated by the selected Construction Manager, the logistics, staging and control measures presented in this plan are expected in large part, to remain as presented herein. Any modifications, updates or changes in the plan will be submitted to the City of Portland for approval in advance of preceding with any work or portions of work affected by such updates.



UNIVERSITY OF SOUTHERN MAINE

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PORTLAND, ME 04103

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PROJECT:

USM - Structured Parking Garage Phasing Plan

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

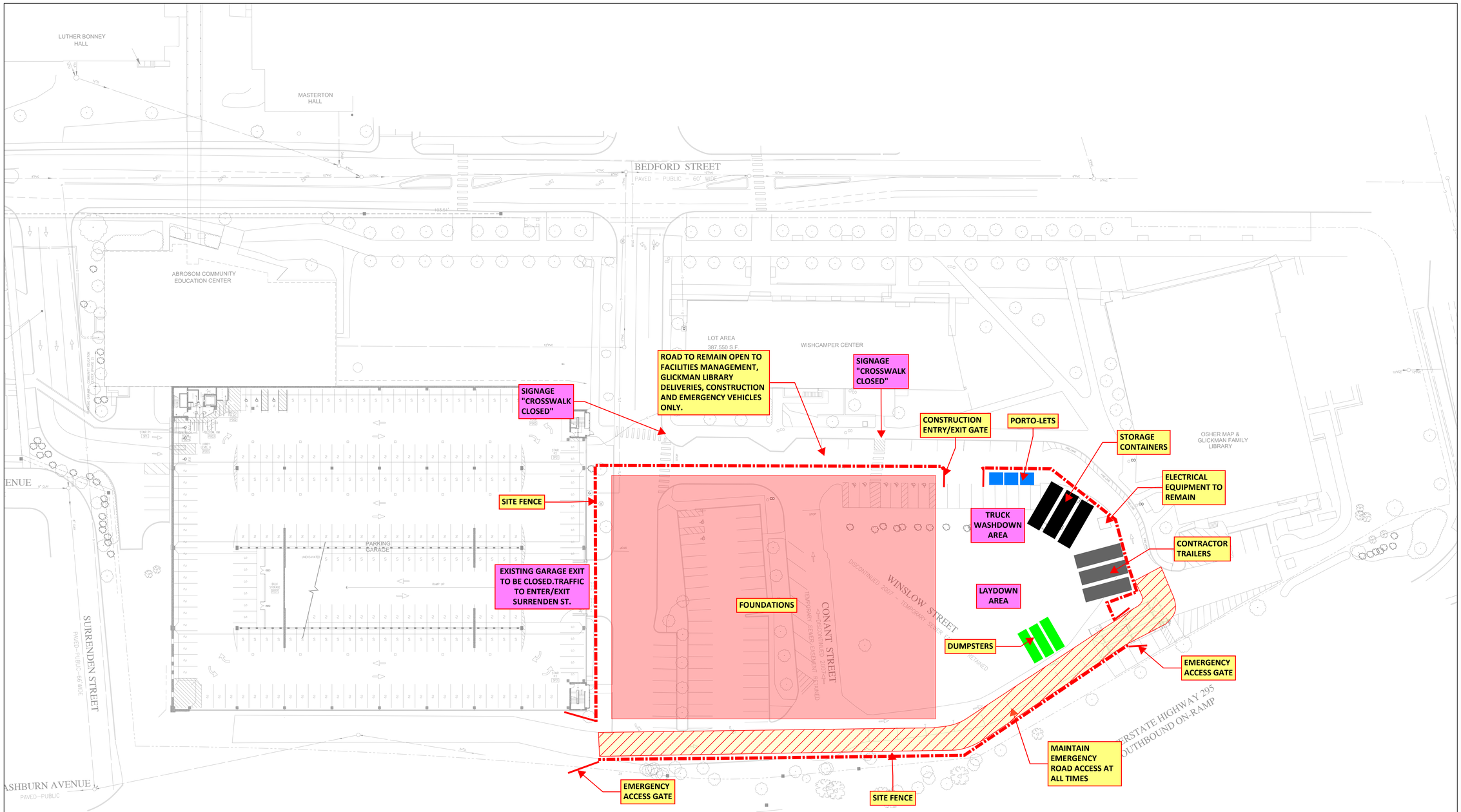
SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**07/12/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

PHASE 1 - SITE PREPARATION



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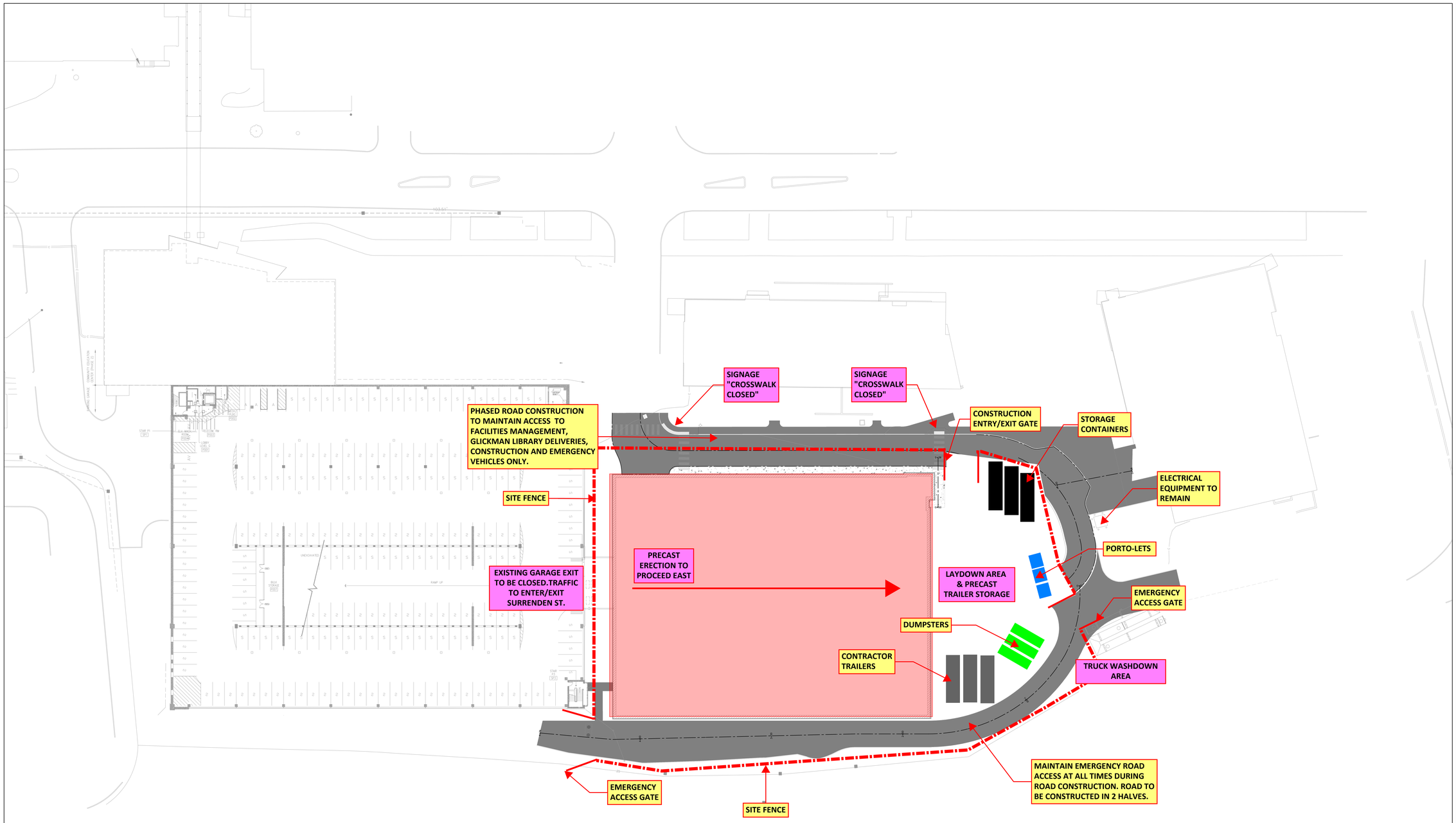
PHASE 2 - FOUNDATIONS



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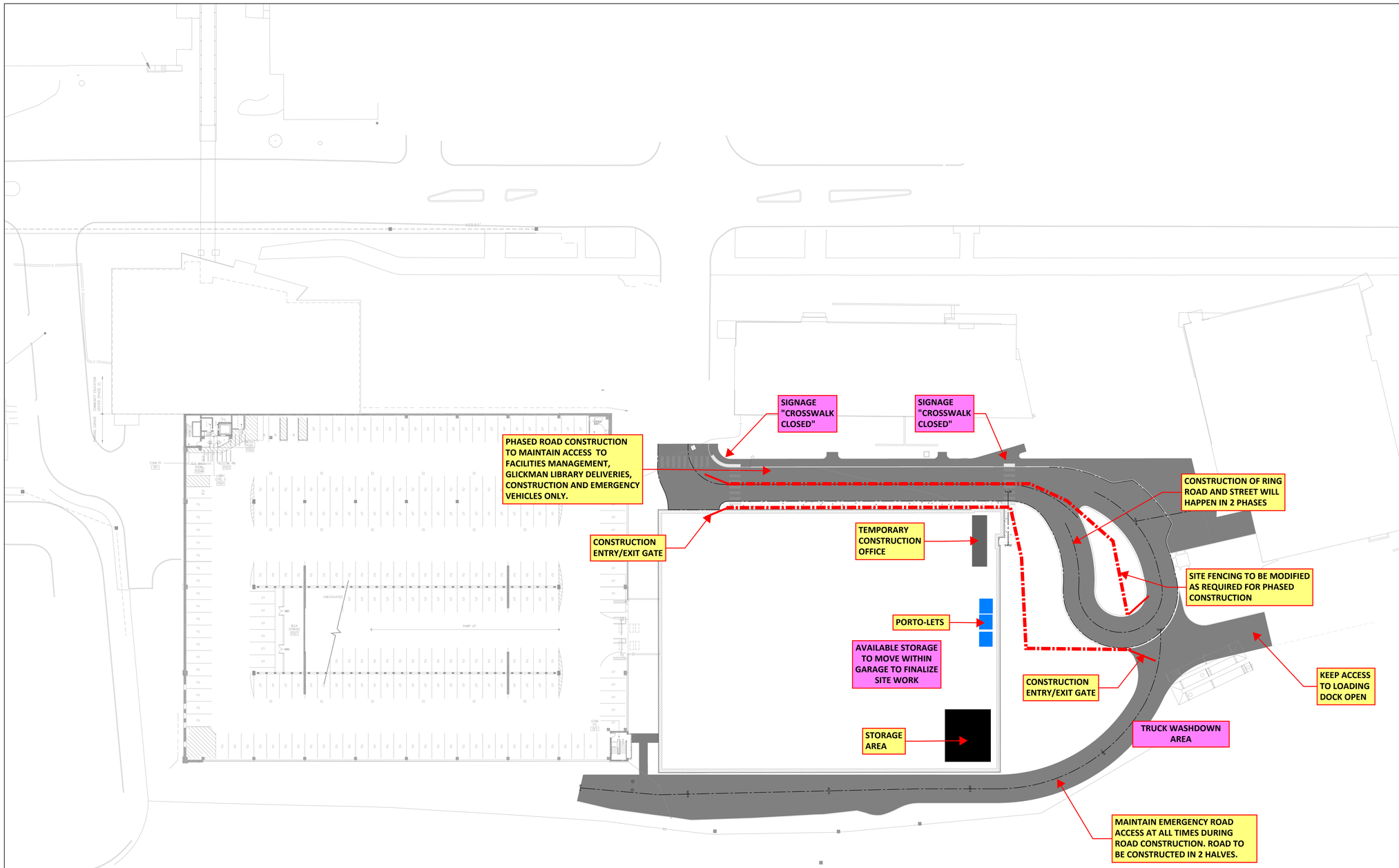
CHECKED BY	**B.F.**

SHEET TITLE:

PHASE 3 - STRUCTURE ERECTION



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PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

PHASE 4 -RING ROAD & LANDSCAPE

From: Robert Bartels <rbartels@pwd.org> on behalf of AMaP MEANS <means@pwd.org>
Sent: Friday, October 8, 2021 1:57 PM
To: Darrin Stairs
Cc: Amy LeBel; Adam Sellick
Subject: RE: 509089-44 Bedford Street, PO

Hello Darrin,

Based on the information provided, the existing **6-inch domestic service** with **2-inch meter** should be able to handle the water demand at the site. As part of this approval, and in accordance with PWD's Cross Connection Control Program, an approved **Reduced Pressure Zone Assembly (RPZ) backflow prevention device** must be installed on the new domestic service branch to the proposed parking garage directly after the service entrance prior to service activation. Please refer to the PWD website for more information on cross-connection control policies.

PLEASE NOTE: The following conditions apply to your project:

- One (1) private fire hydrant may be installed on the fire service on this site. Please refer to the PWD website for more information regarding private hydrant inspection policies. A service application will be required to take a deposit for the inspection of the private hydrant. PWD is currently only processing service applications via email, and accepting completed applications with payment by the drop box at our main office or through the mail at PO Box 3553, Portland, ME 04104-3553. To begin the service application process, please contact the MEANS department at MEANS@pwd.org or by phone at (207)774-5961 Ext. 3199.

Please feel free to reach out if you have any questions.

Thanks,

From: Darrin Stairs <DStairs@woodardcurran.com>
Sent: Wednesday, October 06, 2021 9:27 AM
To: Robert Bartels <rbartels@pwd.org>
Cc: Amy LeBel <alebel@woodardcurran.com>
Subject: RE: 509089-44 Bedford Street, PO

ATTENTION: This email did NOT originate from Portland Water District. This email is from an external source outside of the District. Exercise EXTREME caution when opening external attachments or links from unknown senders.

Robert – Here is the corrected plan. Thank you for pointing that out.

Thank you,

Darrin
Darrin B. Stairs, PE
Project Manager
Woodard & Curran
Direct: 207.558.3662
Cell: 207.405.4805

From: Robert Bartels <rbartels@pwd.org>
Sent: Thursday, September 23, 2021 4:09 PM
To: Darrin Stairs <DStairs@woodardcurran.com>
Cc: Amy LeBel <alebel@woodardcurran.com>
Subject: RE: 509089-44 Bedford Street, PO
Darrin,
You are showing the domestic service coming off the fire line and not the domestic service line. I know this is a small error but it should be shown accurately. Please revise and resubmit.
Thanks,

From: Darrin Stairs <DStairs@woodardcurran.com>
Sent: Wednesday, September 22, 2021 3:31 PM
To: Robert Bartels <rbartels@pwd.org>
Cc: Amy LeBel <alebel@woodardcurran.com>
Subject: RE: 509089-44 Bedford Street, PO
ATTENTION: This email did NOT originate from Portland Water District. This email is from an external source outside of the District. Exercise EXTREME caution when opening external attachments or links from unknown senders.
Robert – we have revised the plan to include the notes below. Please see attached.
Thank you and please let me know if you need anything futher.
--Darrin
Darrin B. Stairs, PE
Project Manager
Woodard & Curran
Direct: 207.558.3662
Cell: 207.405.4805

From: Robert Bartels <rbartels@pwd.org>
Sent: Thursday, September 9, 2021 2:08 PM
To: Darrin Stairs <DStairs@woodardcurran.com>
Subject: 509089-44 Bedford Street, PO [Filed 13 Sep 2021 12:39]
Darrin,
A couple things for you. There is a meter pit on the domestic service line. It is located about 6' from the street line gate valve (between the arrows and the gas line on your plan). You can see the meter pit in Google street view.
The hydrant will be private. Please indicate the hydrant is a private hydrant on the plans.
The garage service will require an RPZ backflow preventer at the service entrance (no meter is required on this service). Please add a callout on the plans for an RPZ backflow preventer.
Thanks,
Robert Bartels, PE

Robert Bartels

Senior Project Engineer

University of Southern Maine (USM) Portland Campus

Transportation Demand Management (TDM) Plan

PREPARED FOR

University of Southern Maine
96 Falmouth Street
Portland, Maine 04103
(207) 228-8124

PREPARED BY

500 Southborough Drive, Suite 105B
South Portland, Maine 04106
207.889.3150

November 11, 2020

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1

Introduction

This Transportation Demand Management (TDM) plan provides a cohesive strategy for establishing and implementing a successful TDM program for the University of Southern Maine (USM) Portland campus. This plan seeks to enhance multimodal accessibility, ensure the use of non-vehicular modes, and discourage the use of driving through parking management, to achieve and build upon the parking demand reduction goals for the campus.

The TDM Plan expresses a TDM program of strategies and timeframe for when USM intends to implement the various strategies. The strategies aim at promoting walking and bicycling, improving transit service to promote ridership, promoting carpooling, changing time-of-day travel demands to eliminate or reduce vehicle trips, and managing parking demand via changes to USM's pricing and permit policies.

USM Portland

The University of Southern Maine (USM) Portland campus encompasses approximately 30 acres, with 27 buildings comprising 1,190,929 assignable square feet (ASF). Located less than one mile from the heart of downtown Portland, the Portland campus provides excellent access to social, cultural and internship opportunities. Linked to the Gorham campus ten miles to the west and the Portland city center via frequent bus service (METRO's Husky Line),

the Portland campus also has convenient access and visibility from Interstate Highway 295, with Forest Avenue serving as the primary roadway arrival point. A second important arrival point onto the campus is at the intersection of Deering Avenue, Brighton Avenue, and Falmouth Streets, soon to be transformed into a roundabout. Bedford Street bisects the campus providing access to most of the parking lots and garage for the campus.

The campus is in a completely developed urban neighborhood. The adjacent land consists of Interstate Highway 295 on the east, commercial uses on the north (along Forest Avenue), and residential uses on the west and south. The largest adjacent land use is the Oakhurst Dairy distribution center between the campus and Forest Avenue. The adjacent residential areas provide housing for some of USM's students but are generally a set of very solid and cohesive neighborhoods. Currently, no students reside on the Portland campus.

In 2017 and 2018, the University of Southern Maine undertook a process that resulted in a final *Facilities Master Plan* approval by the Board of Trustees in January 2019.[1] The process included information gathering via tours of all three campuses, extensive internal and external stakeholder interviews, and public input. The plan incorporates the visions, goals, facilities assessments, and the campus space needs assessments into a set of campus physical development recommendations. USM is now embarking in implementing specific capital projects identified in the plan.

Commitment to TDM

USM has a history of promoting Transportation Demand Management (TDM) strategies on its campuses. For starters, TDM clearly falls within two guiding principles of the University's Facilities Master Plan through its attempt to increase non-private vehicular transportation and reduce related transportation emissions:

- **Mobility**—the plan supports robust pedestrian, bicycle, shuttle bus, ride share and metropolitan and regional public transit systems that look beyond private vehicular parking to meet the transportation needs of the campus community.
- **Sustainability**—the plan supports all existing sustainability policies of the University.

TDM also indirectly relates to several other guiding principles as a result of potential outcomes from a TDM program:

- **Student Experience**—the process, plan and implementation focuses upon improving the students' academic, co-curricular and living experience on each of the campuses.
- **Public Safety**—the plan and subsequent implementation seeks to provide the safest campus environment possible through physical, programmatic and operational improvements, including those in response to public health threats like Covid-19.
- **Neighbors**—the plan seeks to establish campuses and campus communities that are positive members of the neighborhoods, mitigating negative impact and providing a beautiful and inviting campus landscape for all neighborhood members to enjoy.

[1] For more details, please visit *usm.maine.edu/president/master-plan*.

- **Aesthetics**—the visual quality of the campus facilities is important to creating an environment that meets the mission and goals of the University.

The implementation of TDM measures provides USM with the ability to make access to the campus more enjoyable and safer for affiliates (because of reduced traffic), improved relations with neighbors (because of decreased traffic and parking concerns), and decreased campus space dedicated to parking.

As a result, the University introduced TDM for the first time within its 2017 Sustainability Plan. The sustainability plan set a quantitative goal for sustainability efforts related to transportation and established a baseline of strategies to achieve that goal. Per the sustainability plan, the goal related to transportation was to reduce greenhouse gas emissions from transportation by 20 percent from a Fiscal Year (FY) 2006 baseline. TDM-related strategies suggested by the Sustainability Plan are presented in Chapter 3; one recommendation was to develop a TDM plan.

To further understand how TDM will play a role as the campus continues to transform, USM hired VHB to develop a comprehensive TDM Plan that will allow the University to meet their sustainability goals while responsibly meeting user parking demands (and limiting the additional parking supply requirements). To develop a strategic approach for USM transportation that leverages current realities in developing future outcomes, VHB and USM hosted a series of stakeholder meetings and interviews. These conversations helped inform the proposed strategies presented in this TDM plan.

Development Proposal: Facilities Master Plan Program Elements

Consistent with the USM *Facilities Master Plan* approved January 27, 2019, USM has several development program aspirations that have triggered the need to complete this TDM Plan. In the short-term, in the next three years, the University plans on embarking on building the new campus "heart", consisting of the following capital projects:

- **Career and Student Success Center**—This building will replace the dining and cocurricular activity space currently in the Woodbury Campus Center. In addition, the vision for this building is to provide a common place for programs and functions that support both the academic success and long-term professional success of the USM student. The building is anticipated to be approximately 41,000 square feet.
- **Student Housing**— This approximately 216,000 square-feet building will house upwards of 580 beds to accommodate upper class undergraduate students and graduate students.
- **"Quad"**—A key component of the transformation of the Portland Campus is a second campus open space, located adjacent to the residence halls and the Career and Student Success Center.

To accommodate parking needs for these uses, the master plan proposes increasing parking supply. (Actual proposed parking supply is based on a separate study produced in March of 2020 that shows the University will be short on parking supply at the opening of the new buildings even in a 0% enrollment increase scenario.)

The development noted above may be followed by additional capital projects on USM's Portland campus, including a Graduate Center for Professional Studies, housing The University of Maine School of Law, a University of Maine MBA Program, and the Muskie School of Public Service, and Center for the Arts serving as the new home for the USM School of Music.

2

Mobility Context

Understanding the transportation context that is available for students, faculty, staff, and visitors at USM Portland is important to be able to recommend targeted TDM program elements. This section discusses in detail all the different ways that one can access the USM campus as well as opportunities and challenges related to those options.

Walking and the Pedestrian Environment

USM's Portland campus is located on the edge of the Portland peninsula adjacent to the Oakdale residential neighborhood. Oakdale maintains a grid of streets, a majority with sidewalks, and low-volume, low-speed streets that make it generally comfortable and conducive for walking. The University is also adjacent to Forest Avenue, which offers local retail (including a grocery shop) within a short walk of the University. *Walkscore.com*, a real-estate site that evaluates walkability and transportation when choosing where to live, scores

USM a 78 out of 100 and considers it to be a "Very Walkable" location where most errands can be accomplished on foot.

Some built and natural barriers limit accessibility to areas on the south side because of the I-295 highway, to the west and southwest because of a below-grade railroad, and to the northeast because of the Back Cove. Although there is a comfortable shared use path under the interstate, I-295 can pose as a psychological barrier to some people for walking trips to downtown. Figure 1 shows the walkshed in quarter-mile increments out to a mile from the USM Portland campus.

Figure 1: 1-Mile Walkshed from USM Portland Campus



On campus, there is a robust network of pedestrian paths that connect all campus buildings (Figure 2). There are also information kiosks and wayfinding to assist pedestrians in their orientation around campus.

Figure 2: Portland Campus Map



In summary, walking is easy in and around USM; however, natural or human-made barriers may provide some real barriers and some psychological barriers. For example, the primary walk route to downtown from campus is on Forest Ave, which is a wide, fast street with large intersections and long wait times, despite the fact that there is a safe and comfortable shared used pathway crossing the on and off ramps of 295.

TDM strategies within this plan will seek to better connect the University despite these perceived or real barriers.

Bicycling Environment and Infrastructure

The *Walkscore.com* website lists USM at a Bikescore of 93 out of 100, the equivalent of a "Biker's Paradise." In fact, USM is located at the convergence of several key bike routes in the region that ultimately connect to the Portland Peninsula. Bike lanes around USM can be found along Brighton Avenue, Deering Avenue, Bedford Street, and Forest Avenue.

Some work is needed to teach the University community how to overcome certain psychological barriers. The best example, arose in stakeholder input sessions, was the perception that traveling on Forest Avenue to downtown is difficult. The root of the perception may be from the fact that there are six intersections, on ramps, or off ramps on each side of the road for a 1,200 foot-long stretch. See the aerial image in Figure 3 below:

Figure 3: Forest Avenue Bi-Secting I-295



The City has worked hard to increase the safety and comfort of this area by building and maintaining a shared used path on each side of Forest Avenue.

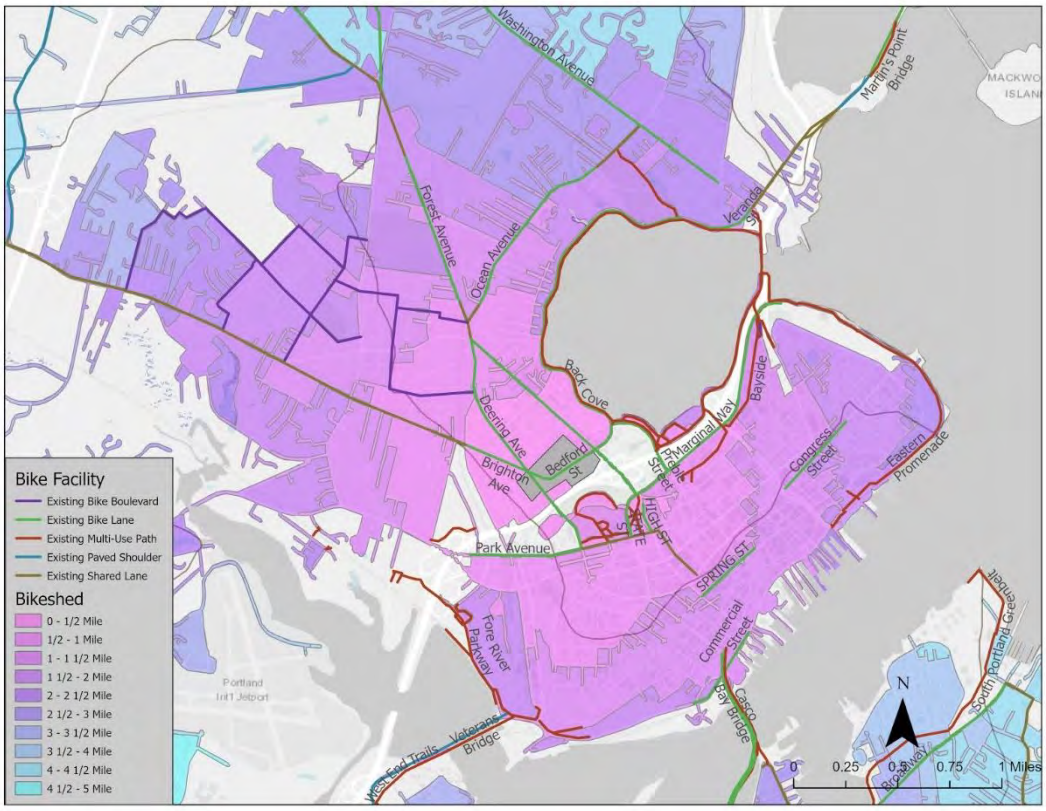
Figure 4: Shared Use Path Available on Forest Avenue Provides Access Under I-295



There is also a shared use path that runs parallel along the Back Cove. In addition to providing beautiful vistas of the downtown skyline, this path provides comfortable and safe bike/ped access to numerous Portland neighborhoods including the Back Cove, Woodfords, East Deering, and Bayside. Even the East End and the Old Port can be accessed this way, via the Eastern Prom Trail connected to the Back Cove path. Through the various shared use paths near the University, the entire Portland peninsula can be accessed within 2 miles of USM.

Within 5 Miles, one can also reach South Portland to the south, Westbrook to the west, and the border of Falmouth to the north. For the bike-to-transit trips, METRO buses serving the University are equipped with bike racks. The Husky line buses have slots for three bikes, and the other METRO buses serving the Portland campus have slots for two.

Figure 5: Bikeshed from USM



On-campus, there are 16 locations with bicycle racks and a bicycle repair stand adjacent to the Woodbury Campus Center. The locations of most of these racks are readily visible within the campus map (Figure 2) posted on kiosks throughout the campus and online. The majority of the racks are easily visible when on foot, except for the covered racks under Masterton's awning and in Abromson parking garage. The condition of the on-campus bicycle racks is fair; however, the Bike Fix-it Station needs repair: its tools have rusted and are bent and unusable. Shower access for campus affiliates is available at the Sullivan Gym. In order to gain access, they must show their campus ID.

In comparison to most places in the United States, the biking network in and around Portland and USM Portland campus is robust. On-campus, commuters have a place to store these bikes. TDM strategies related to biking should focus on marketing this commute option to overcome any fears about perceived barriers and thereby expand the potential pool of people that can bike. The University should also collaborate with the City as they seek to expand and improve the bicycle network.

Public Transit

USM affiliates are granted unlimited free METRO transit access as part of their enrollment and employment at USM. Transit access is paid by way of the student transportation fee and

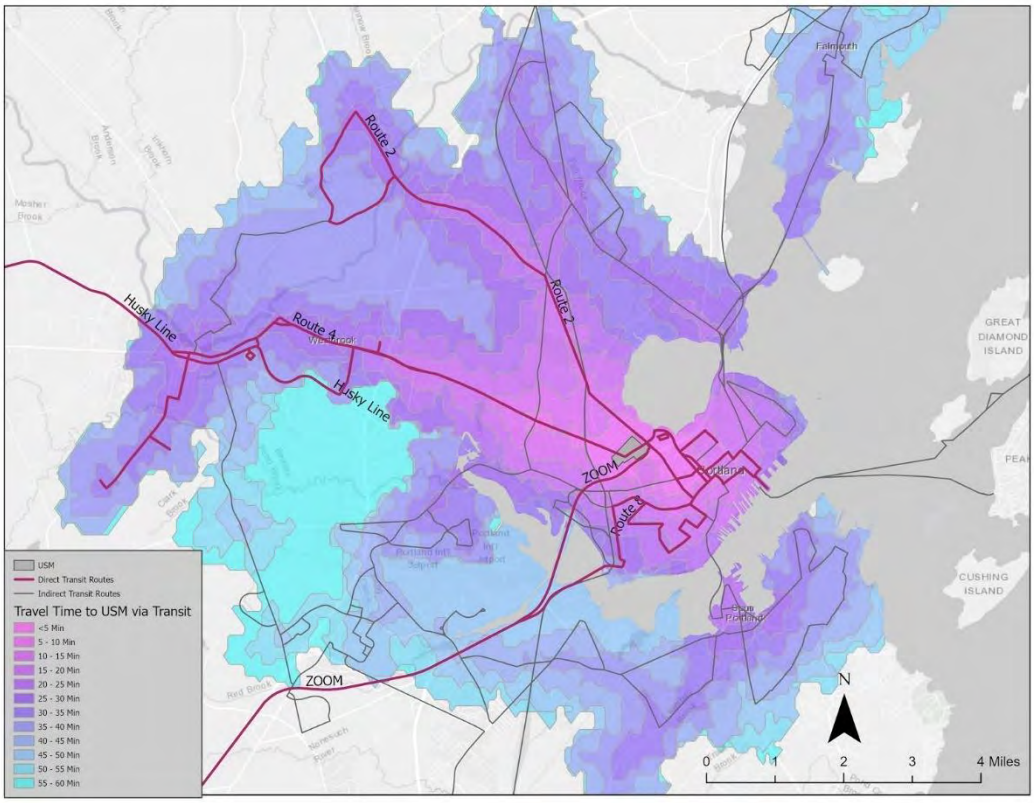
the employee parking permit fee. When boarding a METRO bus, USM affiliates must show their ID to the bus driver.

Four METRO bus routes serve the USM Portland campus: Route 4 and Husky Line serve the campus directly with a stop on Bedford Street, and within a quarter-mile, the Route 2 (via Forest Avenue) and Route 8 (at Hannaford Plaza). In addition to METRO service, the Lakes Region Explorer Bus ($2 one-way) is also nearby. Among the four, only the Husky Line has limited stop service all the way between the Portland and Gorham campuses.

On Bedford Street, at the heart of campus, there are shelters for Route 4 (Westbrook–Portland Pulse) and the Husky Line (USM Gorham via Westbrook–Portland Pulse). Route 2 (Forest Avenue) and Route 8 (Peninsula Loop) can be accessed at nearby Hannaford Plaza roughly a quarter-mile from campus. The Lakes Region Explorer (Windham Route), run by RTP, stops at the corner of Forest Avenue and Bedford Street.

Transit "accessibility" was determined by travel time, including time required to walk to the stop, wait for a transfer when applicable, ride the bus, and walk to the final destination. This differs from accessibility for walk and bike sheds where distance from campus generally determines accessibility. Expected transit travel time to the campus using the existing Portland transit network was mapped out in 5-minute increments (Figure 6). These increments include up to a maximum of a 15-minute walk for the total trip (to account for walk-access to transit).

Figure 6: Transit Service at USM Portland



Transit is not only a function of having a service route present nearby; other important pieces to consider are its span of service (i.e., is the service available at the times of day when needed) and service frequency (i.e., does the service operate at frequent intervals). Scheduled headways and service hours for direct services are included in Table 1 below.

Table 1: Direct Transit Route Headways

Route	Headways (minutes)							Span					
	Weekday			Saturday		Sunday		Weekday		Saturday		Sunday	
	Peak	Day	Evening	Day	Evening	Day	Evening	Start	End	Start	End	Start	End
Bedford St USM (0.0 Miles)													
Husky	30	30	50	45	45	45	45	6:30 AM	10:30 PM	8:30 AM	11:00 PM	8:00 AM	7:00 PM
4	30	30	60	30	60	45	-	5:30 AM	11:30 PM	6:00 AM	11:30 PM	8:30 AM	7:30 PM
Forest at Bedford St. (<0.25 Miles)													
2	20	30	60	60	60	60	-	6:00 AM	11:00 PM	6:30 AM	10:30 PM	8:30 AM	4:40 PM
Lakes Region Explorer	180	180	180	-	-	-	-	6:00 AM	10:30 PM	-	-	-	-
Hannaford Plaza (<0.25 Miles)													
8	30	30	-	60	-	60	-	7:00 AM	6:00 PM	8:00 AM	6:00 PM	9:00 AM	4:00 PM
?													
Zoom Turnpike Express	30	-	-	-	-	-	-	6:00 AM	6:40 PM	-	-	-	-

While all transit services adjacent to USM operate during the schedule of a normal business day and into the evening, the frequency can pose challenges to some of USM's population. As one can see above, the most frequent transit service (Route 2) runs every 20 minutes while the Husky Line, Route 4, and Route 8 run on 30-minute intervals. For many, these frequencies are satisfactory, especially given that the Husky Line is a limited stop service, cutting down on travel time. But, the frequencies don't yet meet the threshold for "transit

freedom" or the ability to travel without planning ("Transit freedom", per the definition by Jarrett Walker in *Human Transit*, is a frequency of at least 15 minutes all day[2]). People who are able to plan are facilitated by helpful resources like the Transit Tracker app and soon-to-be-installed transit screens at certain stops.

Other Mobility

In addition to walking, biking, and riding transit buses, USM affiliates can use ride-hailing services Uber, Lyft, or taxis, which are readily available in and around the peninsula. No carshare vehicles are located within a half-mile of USM. Also, no dedicated carpool parking spaces are designated on campus. Carshare and carpool are opportunities that the TDM Plan can leverage to reduce the number of people parking on campus.

Parking Facilities and Policy

Campus affiliates and visitors can park at 11 distinct parking lots (including one garage) across campus hosting a total of 1,701 spaces (Figure 7). By far, the largest parking facility on campus is the University Garage, which has a total of 1,155 parking spaces. Lots are designated by permit type and only users with that permit can park in that lot. Figure 7 identifies the location of these lots, permitted users, and the total number of spaces. The campus also has dedicated spaces for handicap, service vehicles, and an electric charging station.

[2] Source: humantransit.org/2011/12/how-frequent-is-freedom.html

Figure 7: Parking Spaces at USM Portland



Note: Although the 1,155-space Abromson Garage is primarily for student and visitor parking, faculty and staff may use the facility. The garage is access-controlled by a revenue control system.

All vehicles in University of Southern Maine (USM) parking lots on the Portland campus must display a valid USM parking permit, which comes in the form of a hang tag that must be hung from a vehicle's rear-view mirror. Permits may be obtained from the parking office or online through the University's parking web portal.

USM Portland has the following permit types:

- Student (Commuter, Gorham Residential) – All students are given the same parking privileges on the Portland Campus
- Employee (Faculty, Staff)

On the Portland campus, students may park at three different lots during the day (designated by a green sign) and at a fourth lot only after 4:30 PM. All students pay a transportation fee if registered for on-campus courses. The fee varies based on the number of credits for which they are registered: between $55 and $110 per semester. These payments are mandatory as part of enrollment and are made each semester: fall, spring, and summer.

On the Portland campus, employees are allowed to park in eight different lots on campus (designated by a blue sign). They pay $25 annually for their parking permit, which needs to be renewed each calendar year.

Short-term visitors to the campus may park in the parking garage for $2 an hour between the hours of 7 AM and 5 PM, Monday–Friday. Outside of these hours, visitor parking is free. There is a charge for overnight parking, except during snow bans. Prospective students and their families, campus guests, visitors, and volunteers receive free validation by the office or department they are visiting. To pay for parking, visitors must pay at the Parking Garage Office or use the pay-on-foot stations located by the doors to the parking garage on the first and second floors of Abromson Center and the ground floor of the parking garage by the vehicle exit.

A violation of parking guidelines may result in any number of consequences, including a parking ticket fine, towing of a vehicle (and responsibility of the owner/operator for payment of related towing and storage fees), or suspension of campus parking privileges. Parking tickets range from $25 to $200 depending on the infraction. Students and faculty must pay outstanding tickets before picking up a new permit.

Parking at USM is relatively unconstrained. Typical parking activity is accommodated with the present supply. Although on-street parking is also an option, many of the streets adjacent or near the campus are metered or have 1- or 2-hour parking limits during daytime hours. Recent observations conducted by VHB for USM found approximately one third of the on-street parking spaces available during peak parking periods.

Remote lots have been considered, but a large portion of USM students have one or more off-campus jobs, which require them to have ready access to their vehicles. To be more effective at discouraging parking on-campus, the University plans to make the transactional cost of parking more apparent for students.

The University reviewed parking rates around the City and around the New England market in general to see if there was room to use increased rates as a leverage point. This influenced the University to go from charging $0 for public parking to $2 per hour, which is still on the low to medium end of the market. The University is considering raising prices again to possibly $3-$4 per hour. However, the current plan is to keep it free for the early evening hours (5-11 pm), and to help out the neighborhood by allowing them to park for free during for snow bans from the hours of 5 pm to 8 am the following morning.

Regional TDM Program

At USM's disposal are several regional, state, and national-level TDM programs and services that are intended to support programs such as the one being reviewed by USM. Among these potential programs/services that could support USM include:

GO MAINE: Run by the Maine Turnpike Authority, this state-wide program serves as a rideshare matching service as well as a platform to log any kind of non-single occupancy trips, including non-motorized trips. The range of services include the following:

- ***Emergency Ride Home***- This program essentially serves as "insurance" to provide people an option to get home from work in case of an emergency. The rides are provided using a taxi or Enterprise rent-a-car. It is available to commuters who carpool, vanpool, take transit, bike or walk at least three days a week. The benefit may be used up to eight times per calendar year.
- ***Way 2 Go Maine***- *Way 2 Go Maine* is an annual commuter challenge in October that encourages employees of local businesses to use alternative transportation options through an inter-company competition. The competition recognizes companies for their successful participation and distributes prizes such as gift cards and swag to encourage participation.
- ***Vanpool Matching***- Vanpooling is a common, long-distance commute option for employees headed to the same general area consisting of between 5 to 15 commuters. GO MAINE assists to form these vanpools.
- ***Rewards Program***- GO MAINE has a rewards program for individuals who take greener trips, which include walking, biking, telecommuting, carpooling, vanpooling, or taking public transportation. Participants must sign-up and log their commutes daily. Rewards include gift cards and discounts to various local businesses.

Portland Slow Ride: To get people comfortable with biking, the Bicycle Coalition of Maine offers the "Portland First Friday Slow Ride". These rides are typically done at a relaxed pace and coincide with Portland's "First Friday" art walk event.

Smart Cycling Traffic Skills 101 and Educational Courses: Traffic Skills 101 is hosted by the Bicycle Coalition of Maine and is a course that teaches new and experienced cyclists how to ride in traffic. An individual or employer can specifically request a safety workshop.

Discounted Helmets: The Bicycle Coalition of Maine runs a helmet purchase discount program: when purchased in bulk (8-30 helmets) the cost is $7 per helmet.

Bicycle Benefit: As part of this national program, local businesses offer rewards to patrons who arrive at their establishments by bicycle.

Cycling Savvy: Is a program of the American Bicycling Education Association aimed at helping communities become more livable and sustainable by promoting a civil and cooperative environment on roads through complementary education and infrastructure design.

Best Employers for Commuters: This membership program provides qualified employers with national recognition and an elite designation for offering outstanding commuter benefits.

TDM at USM

TDM related to increasing multimodal transportation is not a new concept for USM. In 2017, the Office of Sustainability worked with various campus stakeholders to develop an eight-year sustainability plan that set a quantitative goal for sustainability efforts related to transportation and established a baseline of strategies to achieve that goal. Per the

sustainability plan, the goal related to transportation was to reduce greenhouse gas emissions from transportation by 20 percent from a FY 2006 baseline.

Table 2 below identifies the original strategies pursued by the sustainability plan as well as current strategies that came as a result of this original proposal:

Table 2: Suggested TDM Tactics from Sustainability Plan

Category	Original TDM Strategy	Present Day (Fall 2019) Response
Shuttle	Extend shuttle routes and improve shuttle footprint	USM has partnered with the Greater Portland bus system, METRO, allowing students, staff and faculty to ride anywhere in the METRO system for free and vastly expanding the reach of University affiliates.
Carsharing	Explore option of starting a carshare program on campus	USM has explored options with one company and discussed ways it could fit into the vehicle fleet.
Comprehensive TDM Strategy	Create a Comprehensive Transportation Demand Management (TDM) strategy	This document is a product of the development of a comprehensive TDM Plan.
Bicycle Infrastructure	Create adequate bicycle infrastructure & education on campus to support people who would consider biking including a bikeshare program.	To accommodate bicycles, USM provides bicycle racks around the campus (16 racks & 250 spaces total). The Portland campus also has a fix-it work stand which is the first of its kind in Portland and allows riders to make simple bike repairs on campus. The University transportation website also highlights the benefits of biking from a health and environmental perspective.
Carpooling	Create adequate carpooling infrastructure & education on campus to support people who would consider carpooling	USM researched different carpool apps and began interviewing stakeholders to create a plan.
Hybrid & EV Vehicle Discounts	Create modest incentives for hybrid or electric vehicles	An EV charging station is provided at the parking garage and is free to use. Additional charging stations are being considered for the garage, Wishcamper, and locations in Gorham.
Incentive Program	Explore a partnership with Rise-Up to award incentives for alternative transportation commuting	The Office of Sustainability has held brainstorming sessions with the Wellness Committee to determine what types of incentives would qualify for the health credit. The Wellness Committee has agreed to work on implementation.
Carbon On-Setting Project	Explore possibility of creating a carbon on-setting project with local low-income households	No transportation related actions were identified. The Office of Sustainability chose a home weatherization project instead.

Category	Original TDM Strategy	Present Day (Fall 2019) Response
Sustainable Business Travel	Develop mechanism for incentivizing more sustainable business travel	Measured carbon footprint of business travel in order to establish a baseline.
Parking Enforcement	Create a parking enforcement division of the University, separate from Public Safety, in order to maximize space utilization of existing lots	Division was created, staff were hired, and enforcement began.

The responsibilities for implementing these strategies have largely fallen on the Parking and Sustainability Offices. According to USM, approximately 0.1 FTE is spent currently implementing TDM strategies, not counting parking enforcement which exceed 1 FTE by itself

The Plan found that it would be useful to conduct a Transportation Survey of campus affiliates to understand transportation patterns, needs and barriers. USM most recently conducted a transportation survey effort in Spring 2019, yielding over 1,000 responses related to current commute patterns, inter-campus travel, and receptiveness of possible TDM strategies.

Not listed within the Sustainability Plan, but nevertheless worth mentioning as TDM measures that have been pursued by the University include:

- Establishing a new USM transportation website to communicate the availability of alternative modes of transportation.
- Charging USM employees, students, and visitors for parking.
- Having a University System-wide telecommuting policy, which allows for telecommuting in certain cases. In response to the global pandemic, this policy has been broadened to incorporate more people for longer periods of time. Post pandemic, the University could more heavily promote its pre-pandemic telecommuting policy.
- Having a larger portion of online classes in response to the global pandemic. Post pandemic, it is not yet known whether the University will continue offering such a high rate of online classes, as it will depend on long-term safety considerations and demand from students.

3

Existing Transportation Patterns

By exploring how USM students, faculty, and staff are currently traveling to campus we can identify which alternative modes may have the greatest potential to reduce drive alone commutes, and save on trips, parking and carbon emissions. This investigation allows for the development of targeted TDM strategies that offer a greater degree of changing commuter behavior.

VHB has reviewed USM affiliates' travel patterns using two data sources: a transportation survey and registered permit data. These data help identify how people are commuting to campus, what modes of transportation may interest commuters, and finally, what types of strategies would be most beneficial towards encouraging alternative commute modes.

Transportation Survey: Mode Shares and Travel Behavior

The Transportation survey conducted in Spring 2019 was done as part of the University's sustainability effort to chart emissions related to transportation. The online survey asked about current travel patterns between home and USM and about travel between the USM campuses. The survey also included questions about one's receptiveness to certain TDM strategies. About 1,000 USM affiliates participated.

Some key findings related to the survey (pulled from the "Final Survey Summary" prepared by USM) include:

- 78 percent of the USM population reported driving alone at least once a week to campus from home. About 72 percent of the population drives 2+ times per week to campus.
- 94 percent of USM employees park on campus; 81 percent of students park on campus.
- 25 percent of commuter students ride the METRO bus
- Dedicated, preferential carpool spots were the highest ranked activity to encourage students to use an alternative mode of transportation
- Per the survey, a new bike would be the best buyout reward for a parking cashout program, which may be a function of it being the highest value option ($500) compared to less valuable options of $100 cash, $200 discount on carshare/bikeshare, $200 discount on carshare/scootershare, $150 gift certificate to bookstore, and $150 gift certificate to dining services.

Additional conclusions from the survey data for the USM population who indicated making a trip to the Portland Campus include:

- 72 percent of USM Portland population reported having driven alone at least once a week to campus, 66 percent of the population drive 2+ times per week alone.
- 14 percent of the USM Portland population reported have taken transit at least once a week, 11.5 percent have taken transit at least twice per week.
- Considering only USM Portland commute trips (of employees and students), the Portland campus mode split is as follows: Drive Alone: 73 percent; Transit: 6 percent; Walk/Bike: 11 percent; Carpool: 8 percent; Motorcycle: 2 percent[3]
- USM's Walk/Bike mode split of 11% exceeds the typical average of 3% among Universities across the country, including those who have implemented TDM programs, according to VHB
- Average One-Way Commute Distance: 13.8 miles.
- 56 percent of the USM Portland population travels to other campuses
- For trips taken between the Portland and Gorham Campus, 40 percent take transit, 37 percent drive alone, 20 percent carpool, 3 percent bike, 1 percent use a motorcycle

Commute Trip Origins Based on Parking Permit Data

USM provided VHB with anonymized home address data for all their parking permit holders, which allows for an investigation of opportunities for providing incentives for reducing drive-alone trips to the campus. The following figures shows the distribution of commute trip origins based on the permit data. Major clusters of population are centered around the City of Portland, Westbrook, Gorham, Lewiston-Auburn, Brunswick, and Sanford (Figure 8). Figure

[3] It is important to note that this survey was taken before the Covid-19 pandemic. The next survey may show considerably different percentages for transit and carpooling.

9 shows a zoomed-in version of the same data, showing that major residential areas include: Portland, South Portland, Westbrook, Gorham, Biddeford, Scarborough, and Yarmouth.

Using the parking permit data, VHB calculated drive time for faculty and staff. About 50 percent live less than a 20-minute drive from the Portland campus and 94 percent live within a 60-minute drive of the campus.

Figure 8: Distribution of Home (Commute Trip Origins) – Southern Maine Area

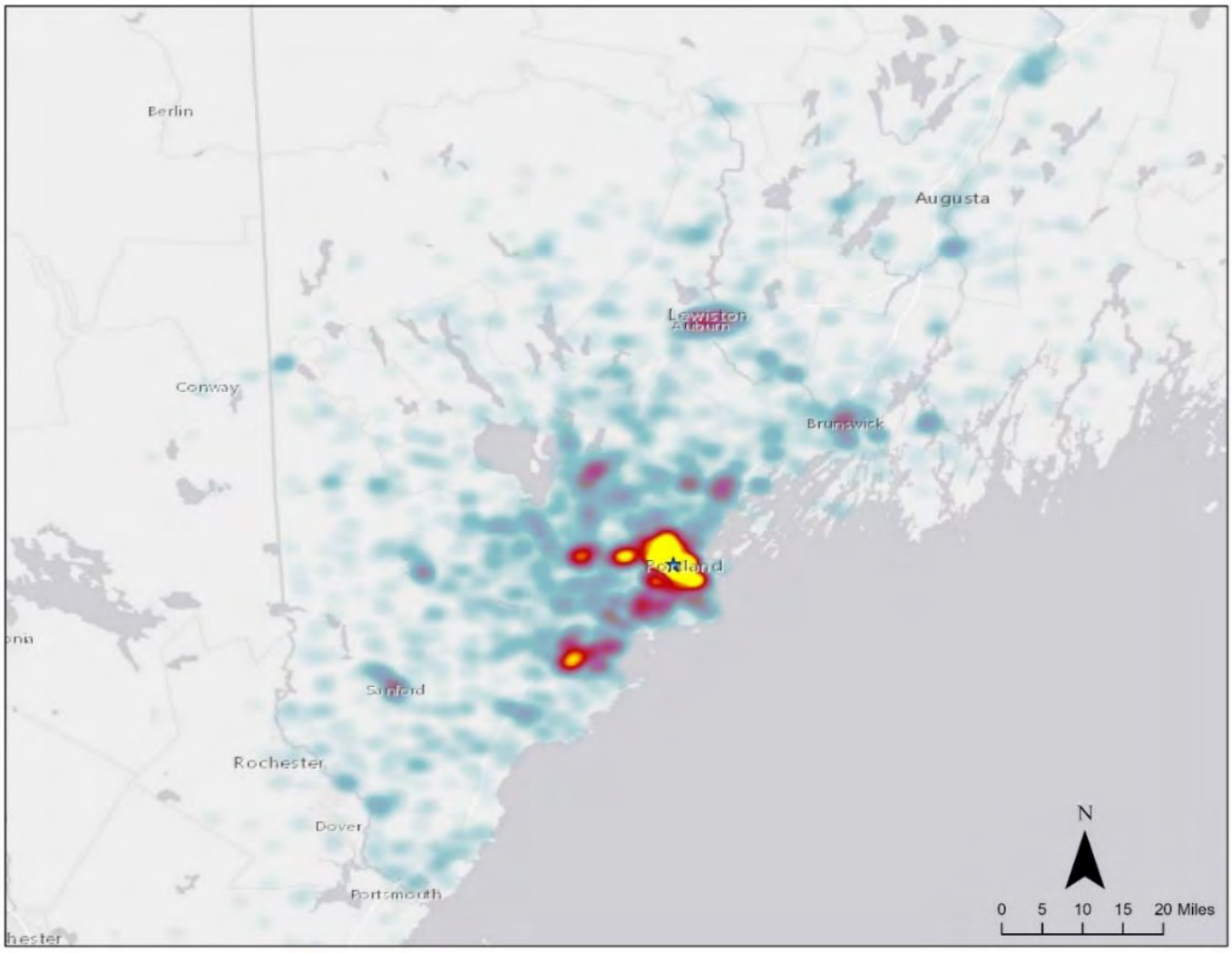
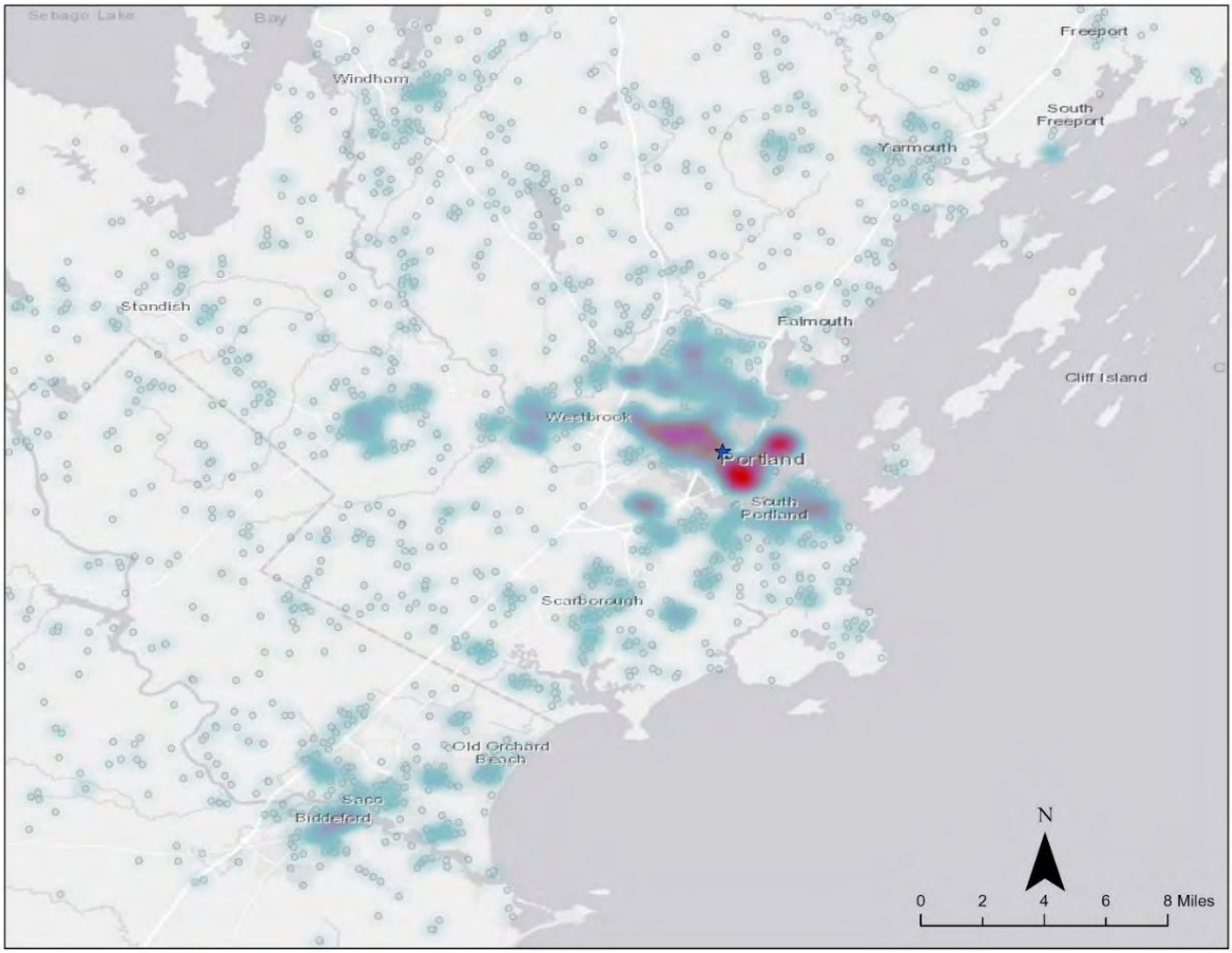


Figure 9: Distribution of Home (Commute Trip Origins) – Greater Portland Area



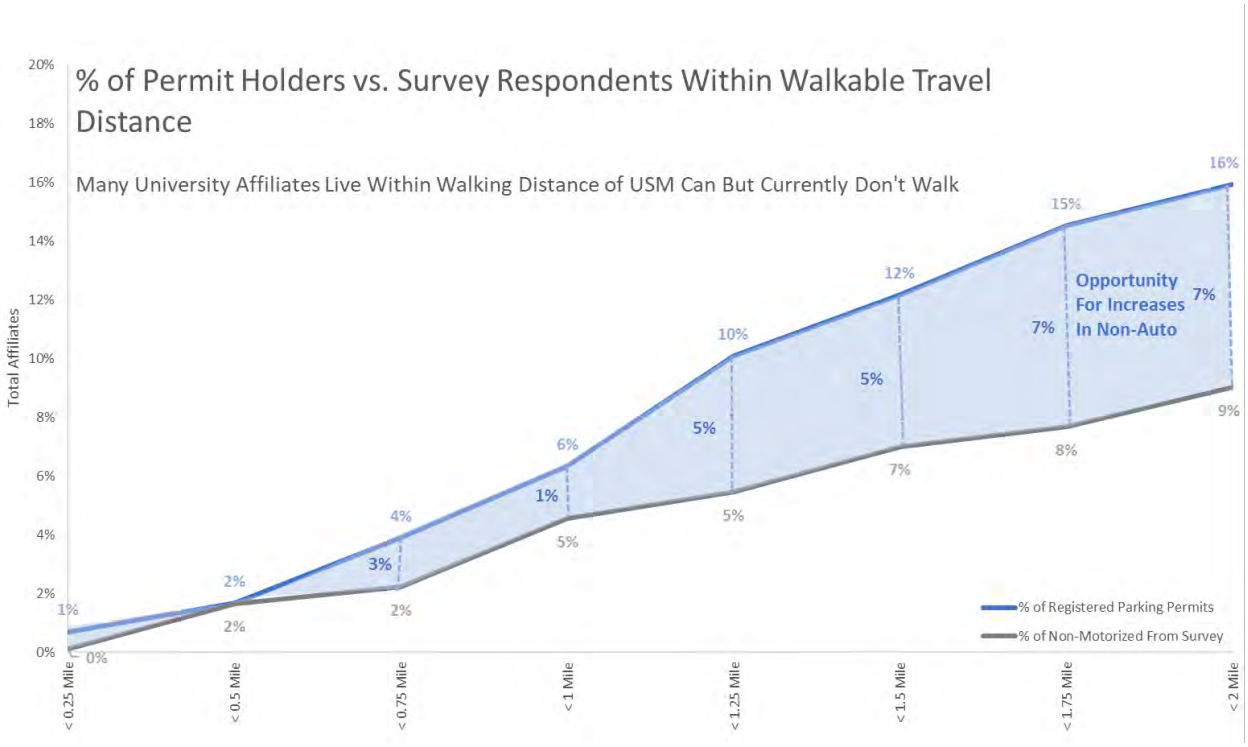
Alternative Mode Potential: Opportunities for TDM

To gauge the modal potential for walking, biking, and transit to USM, the geographic distribution of parking permit trip origin data was compared to the walking, bicycling, and transit travel market sheds. To get an understanding of current travel behavior versus potential travel choices, the 2019 transportation survey results are overlaid against this geographic distribution. The difference between the total number of people matched to a particular mode and the mode choice results from the survey form an "opportunity" zone for a potential increase in the use of a travel mode. People are represented here as FTE (Full-time equivalent) rather than headcount because FTE fits greenhouse gas reporting protocol and the University believes it is a better representation of how trip proportion impacts campus.

Walk Potential

Within a mile walking distance from campus, approximately 5 percent (an estimated 251 full-time equivalent individuals) of USM Portland students/employees reported using non-auto transportation to the USM Portland campus whereas per the permit data 6 percent of parking permit holders were geographically matched to reside a mile from USM (Figure 10). The delta between the two data points increases significantly as distance from campus increases. At 2 miles, only 9 percent of students/employees use non-auto travel modes (per the survey), whereas a total of 16 percent live within 2 miles of campus (per the permit data).

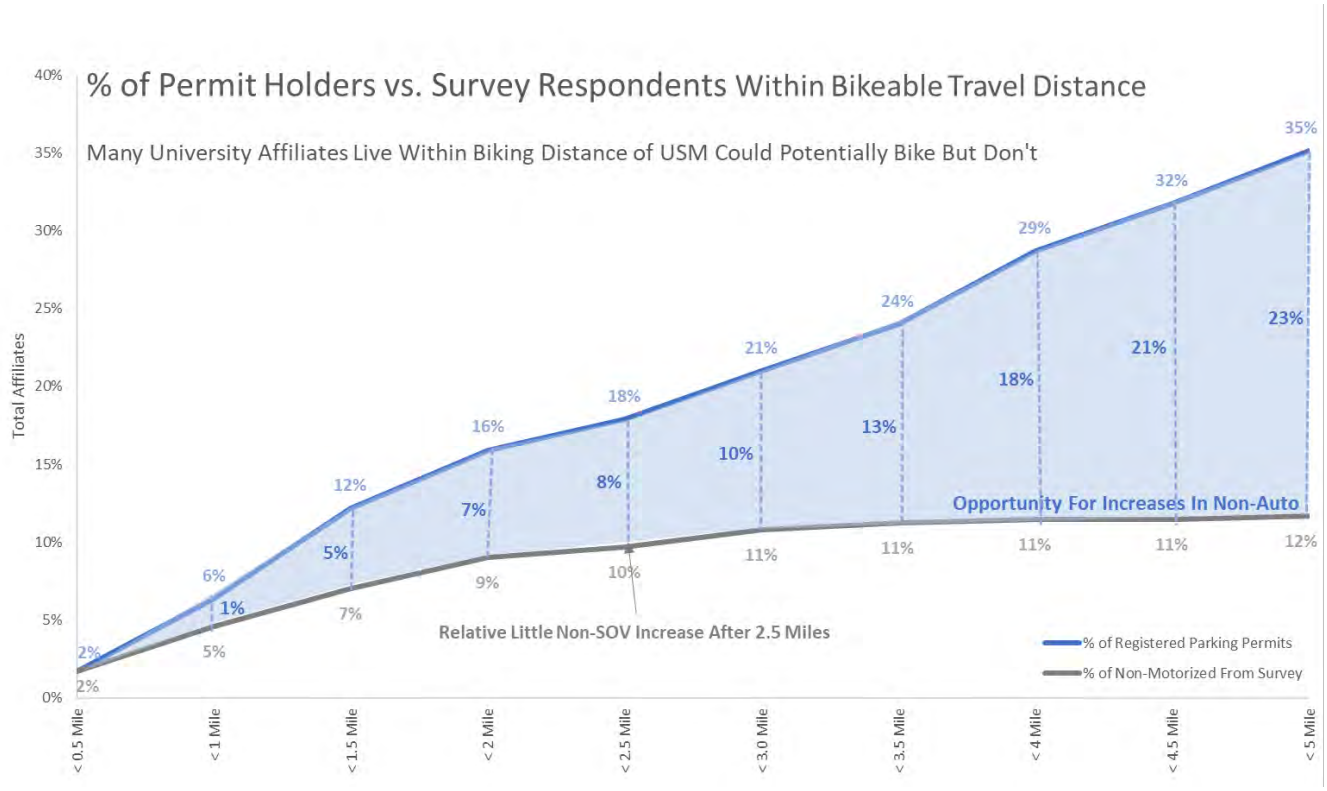
Figure 10: Walk Potential



Bicycling Potential

Biking distance for parking permit holders was compared to non-motorized users based on survey results (Figure 11). Based on the geocoded parking permit data, up to 35 percent of all USM employees and commuter students (an estimated 1,759 full-time equivalent individuals) live within 5 miles of campus, considered the upper limit for a reasonable biking distance for a commute. Per the transportation survey, however, only about 12 percent of commuters who live within 5 miles of campus use a non-motorized form of transportation. According to Figure 11, below, after 2½ miles, most people at USM stop using non-SOV[4] modes of transportation, which may be an indication of the cultural and environmental limits of biking in Maine. Although there is potential beyond 2 ½ miles, that potential should be tempered by barriers of safety, comfort, and weather.

Figure 11: Bike Potential

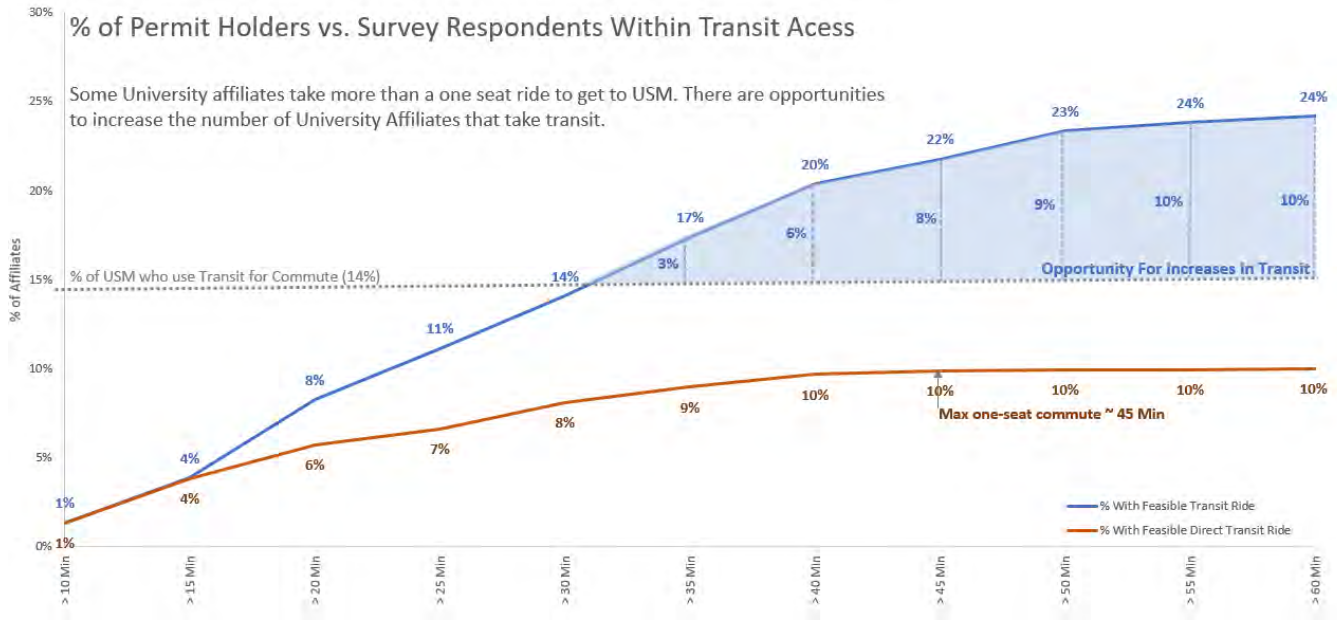


[4] SOV – single-occupancy vehicle (this mode is also referred to as *drive alone*)

Transit Potential

Transit-access time was compared to the percent of commuters from the survey who reported using transit (Figure 12). Up to 10 percent (or 503 FTE individuals) of USM affiliates live within walking distance of a direct transit route to USM Portland (based on the parking permit data). A further 14 percent (summing to 24 percent) can take a transit option that would take less than an hour to access USM Portland. This is 10 percent more than the existing number of University affiliates who indicated taking transit to USM (as reported in the transportation survey).

Figure 12: Transit Potential



Given the higher number of USM affiliates who noted taking transit than the number of affiliates within direct transit routes indicates that either a percentage of affiliates may be connecting on transit service or otherwise driving to a stop first (example driving to Gorham campus and then hopping on the Husky Line). Of all transit routes with direct access to the USM Portland campus, the Husky Line[5] has the highest number of permit holders who live within walking distance (459), followed by Route 4 (451), Route 2 (352), and Route 8 (270). Of all transit routes, the Route 9A and Route 9B serve the most affiliates within walking distance of stops (611), but these routes require a transfer to a transit bus line with direct service to the Portland campus.

[5] This analysis does not account for the fact that the Husky Line is a direct service route with few stops, whereas the other lines are more traditional services; however, the comparison serves to highlight what would be possible if the Husky Line or a route like it where to offer more stops in certain neighborhoods.

4

TDM Coordinator (TC)

TDM program management responsibilities will be designated to a single representative associated with the University.

USM will appoint Aaron Witham, Assistant Director of Facilities Management for Sustainability, as TDM Coordinator for USM; the Director of Auxiliary Services will play a supporting role.

The Assistant Director of Facilities Management for Sustainability can be reached via:

- email at aaron.z.witham@maine.edu
- phone at 207-780-5947.

The responsibilities of the Assistant Director of Facilities Management for Sustainability will include the following:

- Promote non-SOV transportation choices primarily to faculty, staff, students and residents
- Champion the implementation of new TDM strategies to reduce parking demand and increase the use of non-SOV transportation modes
- Conduct new student/new employee orientation to educate incoming affiliates regarding their transportation options to and from the campus.

- Coordinate the implementation of TDM strategies with Campus Scheduling, Human Resources, Parking, and any other departments.
- Work with the City of Portland, METRO, GoMaine, a private carpool app and other potential partners to improve non-SOV transportation access to the campus and to gain support for program implementation.
- Recruit and engage participants for any outreach events or campaigns associated with the TDM program over time.
- Review potential new alternative transportation technology or SOV reduction technology and coordinate implementation efforts associated with them.
- Coordinate all monitoring and evaluation activities necessary to measure the effectiveness of the TDM program in achieving the targets.
- Develop a TDM Report, which will provide an assessment of strategies implemented to date and outline the activities to be implemented in the upcoming year.

The responsibilities of the Director of Auxiliary Services will include the following:

- Provide consultation on TDM strategies that impact parking supply, services, and technology.
- Provide up-to-date data on parking volumes and patterns from the parking garage.
- Provide support for conducting additional parking assessments and measurements annually.
- Co-develop and implement financial parking incentives or disincentives as identified by the TDM plan.
- Maintain existing parking infrastructure and technology, with the support of Facilities Management and Capital Planning.
- Maintain parking services, including payments, campus notifications, and website updates.
- Carry-out parking enforcement.

5

Transportation Demand Reduction Goals

USM expects the TDM program to reduce the number of single-occupancy vehicle trips, thus reducing overall trips, demand for parking and greenhouse gas emissions.

Trip Reduction Goal: USM aims to reduce University-generated peak hour vehicle trips between 3-6% (17-35 trips) for the AM peak hour and by 3-6% (12-23 trips) for the PM peak hour by 2025. This goal is relative to a baseline of 581 and 381 trips, respectively, in the year 2023, at the opening of Portland Commons, the Career & Student Success Center, and a new parking garage (as determined by the Traffic Movement Permit analysis conducted in March of 2020). The peak hours are based on total traffic in the area, inclusive, but not limited to USM's contribution. They are noted to be between 7:30 am- 8:30 am and between 4:30-5:30 pm. Given that the morning hour is a higher peak overall, that hour will be the primary focus of the goal.

Parking Demand Reduction Goal: USM aims to reduce parking demand by 10-14% (159-222 vehicles) by 2025 during the hour of peak demand on campus[6]. The peak parking hour and baseline volume (1,587 vehicles) was established from 12:30-1:30 pm, Monday-Wednesday, inventoried in the Fall of 2018. As strategies are implemented to achieve this

[6] The peak hour for trips is related to the peak hour for parking, but they are not the same. For example, the first peak hour for trips occurs early in the morning when the maximum volume of people are on the road traveling. The peak parking hour occurs later, reflecting cumulative impact as a result of multiple hours of trips coming to campus. This is why the trip reduction goal is smaller than the parking reduction goal.

goal, the peak demand hour may change, so the goal will stand in reference to the volume, not the time, of parking demand measured at the original baseline peak hour in Fall of 2018.

Mode Split Reduction Goal: USM aims to decrease the percentage of SOV (single occupancy vehicle) trips to 70% and increase the percentage of non-SOV trips to 30% by 2030. The SOV category includes personal automobile trips without passengers and motorcycles, while the non-SOV category includes carpools, riding the bus, biking, and walking. The most recent data set of 2019 shows that USM is currently at approximately 75% SOV and 25% non-SOV. Given that measuring this goal relies on self-reported survey data and only includes a sample of the larger population, the University primarily wants to use this goal for internal planning purposes and for estimating greenhouse gas emissions. However, the University will provide the current estimate annually in its reports to the City.

Greenhouse Gas Reduction Goal: USM aims to reduce greenhouse gas emissions from commuting by 20% (or .4 MT of CO2e per capita) by the year 2025, in line with its goal to reduce all scope one emissions at the University by 20%[7]. The 2006 baseline greenhouse gas emissions from commuting on an annual, per capita basis is approximately 2 MT of CO2e. This goal is tied to a larger University pledge called the President's Carbon Commitment, a national commitment among hundreds of colleges and universities to reach carbon neutrality. USM signed the pledge in 2007, and set 2006 as the baseline with a goal of 2040 for carbon neutrality. Since FY 2006, per capita emissions from commuting at the University have fallen by an estimated 5%, according to the last carbon inventory conducted in 2017[8]. The remaining 15% is expected to be surpassed by a combination of the trip and parking goals stated above, promotion and enabling of more electric vehicles relative to gasoline-powered vehicles on campus, and the anticipated increase in fuel economy standards of traditional gasoline-powered vehicles. According to the United States' EPA[9], the SAFE[10] rule announced by the Trump Administration this year will require an increase in MPG by 1.5% every year from 2021 until 2026.

[7] There are three categories of emissions in GHG accounting. Under Second Nature, scope three is comprised of commuting, business travel, study abroad, downstream waste emissions, and transmission and distribution loss from electricity, as well as occasionally other sectors.

[8] The FY 2019 carbon inventory is on track to be completed by Spring of 2021, as it was unfortunately delayed due to pandemic resource constraints.

[9] https://www.epa.gov/regulations-emissions-vehicles-and-engines/safer-affordable-fuel-efficient-safe-vehicles-final-rule

[10] SAFE stands for Safer Affordable Fuel Efficient Vehicles Rule

6

Trip, Parking, Mode Split & GHG Reduction Strategies

The USM Portland TDM Plan establishes an aspirational vision and set of goals for transportation, mobility, and sustainability. The Plan builds off USM's multimodal strengths but pushes forward-thinking and multifaceted solutions.

Ultimately, USM will achieve success if one keeps in mind the following key concepts:

There is no "silver bullet" in TDM. The recommendations represent a package of reforms; implementing only one or two items will not solve USM's parking challenges.

Behavior change is difficult, but critical if USM would like to realize its vision. Future growth at the University will present critical challenges with parking. USM will need to depart from the status quo and rethink parking and transportation in order to grow sustainably.

The Plan is a "living" document. Key to the success of this plan is to implement, measure, learn, and adjust. Over time as the transportation context, technology, institutional culture, and user preferences change, so may the types of strategies that are pursued. This is true now, more than ever, given the current global pandemic, and the need to remain adaptable.

What is presented here is the University's current plan for Transportation Demand Management (TDM). It is subject to change as the global pandemic unfolds, as financial

constraints dictate, and as annual survey data and parking counts inform what is working and what is not working among USM's unique population.

Therefore, the University is not committing to launch every one of these initiatives necessarily or committing to keeping every initiative in place permanently if they prove to not be feasible. Rather, the University is aiming to achieve trip, parking, and greenhouse gas emissions reduction targets using the most effective suite of technologies and policies available and achievable for a particular year. That said, it is the desire of the University to launch most of these initiatives in order to provide a multi-modal suite of options to students, staff and faculty, not all of which have the privilege of owning a personal vehicle. Moreover, the University has identified certain initiatives as "core" initiatives that it is committed to implementing. These are indicated with an asterisk in Table 3.

The matrix below introduces a snapshot of the initiatives that USM hopes to implement. Following the matrix is a section outlining descriptions of the initiatives. To the extent possible, strategies are grouped by categories reflected in the *City of Portland's Technical Manual*. For each strategy, an anticipated launch date is provided.

Table 3: Overview of TDM Initiatives for USM

STRATEGY	LAUNCH DATE	INFRASTRUCTURE	INCENTIVES	EDUCATION
Walking				
Create Walk Spot Maps	Fall 2023			X
Publicize the "Complete City Project"	Fall 2021			X
Hold Fitness Challenges	Spring 2022		X	
Biking				
*Co-launch City Bikeshare	Spring 2023	X		
Build Bicycle Repair Station	Spring 2023	X		X
Promote Local Bike Activities	Spring 2021		X	X
Offer Discounted Bike Supplies	Spring 2021		X	
*Improve Bike Infrastructure	Spring 2023	X		
Apply for Bike Friendly University Certification	Fall 2022	X	X	X
Transit				
*Continue METRO Pass Program	Ongoing	X	X	
Propose Husky Line Improvements	Fall 2022	X		
Propose Transit Service Expansion Beyond Husky Line	Fall 2022	X		
Install Transit Screen	Spring 2023	X		
**Carpooling, Telecommuting & Time-of-Day*				
Establish Vanpool Vehicles	Fall 2022	X	X	
Designate Carpool/Vanpool Spaces	Fall 2022	X	X	

Develop Rideshare Matching Platform	Fall 2022	X		
Promote Telework & Flexwork	Ongoing		X	X
Restructure Course Schedule	Ongoing	X		
Parking Pricing				
Establish Commuter Parking Buyout Program	Fall 2021		X	
*Establish Residential Parking Buyout Program	Spring 2023		X	
Host Carshare Program to Support Buyouts	Spring 2023	X	X	
*Unbundle Student Parking Fees	Fall 2021		X	X
Build Additional EV Charging Stations	Fall 2021	X		
Review Parking Price Levels	Fall 2022		X	
Communications & Marketing				
*Hold New Student & Employee Orientations for Transportation	Spring 2021		X	X
*Revise Transportation Website	Spring 2021			X
*Publish Access Guide	Spring 2021			X
Offer Guaranteed Ride Home Service	Spring 2023		X	

*Core strategies that the University is committing to are indicated by *. In the case of the Carpooling, Telecommuting & Time-of-Day category, the category itself is considered core, but the University will maintain flexibility in which of these strategies it implements, depending on future conditions

Walking Initiatives

Create Walk Spot Maps: Partner with a class and utilize GIS resources to create a semester-long project to build out exciting walking maps that would be made available both online and in print, in high profile locations on campus. The maps would include walkable points of interest, such as bus stops, public restrooms, cafes, breweries, scenic areas, and parks. The online version could be a user interface where you can select your points of interest and create a preferred route around the city. The online version should also include a forum, or a place for individuals to leave comments so they may spread information about the safest and most scenic routes, and also work to create a community of walkers.

This potential initiative program could also be made into a bi-annual "Walking Challenge" where individuals keep track of the various routes and enter that information into a type of raffle or other contest where they win a gift certificate to a sporting goods or shoe store.

Publicize "The Complete City" project: Participate in this project through a class or creation of a stakeholder group. The project is being run by the Portland Society for Architecture. They are reaching out to the Greater Portland community to make the area more accessible, more attractive, more just and equitable. This includes creating what they

(and others) describe as "The Complete City," where within the city, each neighborhood has all it needs within a half mile, incentivizing alternative transportation by intentionally planning communities.

Hold Fitness Challenges: Partner with an existing health app or utilize the USM student app to create a fitness challenge for most steps per week. This will be accessible to most students, as most individuals have a smartphone that would be compatible with such an app. Each week, the app could send out a public note of congratulations to the walker with the most steps. The app could also create benchmarks where if a member of the community reaches a certain number of steps in a certain number of days, they receive a percent discount code to a local sporting goods store or shoe store.

Biking Initiatives

Co-Launch City Bikeshare: Partner with the City of Portland to co-launch a Bikeshare program that will cover, at a minimum, the USM-Portland campus, the back cove, Oakdale, Brighton, Bayside and Parkside. The University will provide financial support for Bikeshare parking spaces on the Portland campus if necessary.

Build Bicycle Repair Station: Install a new student-run bike repair station or shop (deemed "the Hub") in a central part of their campus. Shop will be located in a corner of the Abromson parking garage, a stand-alone shed or some other covered location, where it can be out of the wind and the rain. The University aims to make it a social hub as well, where information about alternative modes of transportation can be offered. If survey data suggests additional need, then we can build a stand-alone self-service fix-it station near the center of campus.

Promote Local Bicycle Activities: Promote the participation in (and facilitation of) local bike activities such as the Portland Slow Ride, Smart Cycling Traffic Skills 101, and Cycling Savvy events. At least one opportunity or event will take place each semester.

Offer Discounted Bike Supplies: Provide Discount Sales for Bike Supplies (through a partnership with Bicycle Coalition of Maine or another program). Sales will either be ongoing in the bookstore and/or combined with the special events noted above once per semester.

Improve Bicycle Infrastructure: Improve bicycle infrastructure on campus, and propose improvements off campus. The University plans to increase bicycle parking spaces to 2.5 times what is currently offered on the Portland campus. Currently there are 250 spaces with another 10 being planned for the Wishcamper lot remodeling. Forty-one of these spaces are covered.

USM plans to add 122 short-term (uncovered spaces) to campus, with a lot of them slated for the new quad and some of them being distributed throughout campus to fill in gaps. USM also plans to add 288 long-term (covered spaces). Forty of these long-term spaces are proposed for a bike room inside the Portland Commons residence hall, and 248 long-term spaces are proposed for another location somewhere near Portland Commons and the Career & Student Success Center (CSSC). Possible sites include the new parking garage if it is located near the other two new buildings, in a stand-alone shelter, or in a secure area of the

Abromson parking garage. In addition to spaces for personal bikes, the current plan is to offer dedicated spaces for the proposed bikeshare bikes. Bikeshare notwithstanding, the total spaces on campus by the Spring of 2023 is planned to be 670.

These volumes of new bike parking meet or exceed several important standards that align with the University's aggressive plan to increase biking among its students, staff and faculty:

- 5.5 times higher than City of Portland's Technical Specs, campus-wide[11]
- Double the amount suggested by APBP for short-term parking for students & employees[12]
- Meets APBP's recommended long-term space allocation per bed[13]
- Exceeds City of Washington D.C.'s requirement by over 50% for long-term spaces per dwelling units in residential apartments[14]
- Double City of Cambridge, MA's requirements for short-term spaces and exceeds their requirements for long-term spaces.[15]

Off campus, the University will collaborate with the City of Portland on identifying improvements to bicycling infrastructure along corridors traveled by USM commuters through the annual transportation survey.

Apply for Bike Friendly University Certification: Apply for Bike Friendly University Certification. The application process, completed every four years, will help the University identify areas for improvement, and inform the types of questions that need to be asked in the annual survey of students, faculty and staff.

Transit Initiatives

Bus ridership has obviously been impacted by the global pandemic by some customers deciding not to ride the bus and by bus capacity being limited to comply with Federal standards. Despite these challenges, VHB believes that transit ridership demand will fully rebound again within a couple of years, so they do not recommend changes to long-term ridership predictions at this point. However, they note that the ability for ridership to be accommodated depends on supply of seats being available, which could possibly be impacted by future policy decisions coming from the Federal government. For the time being, the University is not adjusting expected transit impact for TDM goals set on a 2023 horizon.

Continue METRO Pass Program: In 2018, the University established a program with the Greater Portland METRO to allow students, staff & faculty to ride any METRO route for no

[11] Per City of Portland Code of Ordinances, Section 14-526

[12] Per Association of Pedestrian & Bicycle Professionals' Bicycle Parking Guidelines, 2nd Edition, assuming that student & faculty vehicle spaces are a reasonable proxy for individuals on campus at one time

[13] Per Association of Pedestrian & Bicycle Professionals' Bicycle Parking Guidelines, 2nd Edition multi-family housing criteria of .5 spaces per bed

[14] Per Table 1: https://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/DDOT%20bike%20parking%20guide_060118_Screen.pdf

[15] Per College or University Student Activity Facilities, page 4: https://www.cambridgema.gov/-/media/Files/CDD/Transportation/Bike/Bicycle_Parking_Guide_20130926_2017PictureEdits.pdf

cost to the individual, so long as they show a USM ID. The program has been popular for students, as it increased the number of trips offered between Portland and Gorham via the newly established limited stop Husky line. Post pandemic, it has great potential to shift USM commuters out of personal vehicles if they live on or near an existing line. As an initiative, the University endeavors to keep this program in place with METRO for the foreseeable future.

Propose Husky Line Improvements: Conduct graduate-level research on how to increase ridership on the METRO using a community-based social marketing model. Then, make a proposal to METRO with goal of increasing the frequency of the Husky Line to 15 minutes to achieve "transit freedom."

Propose Transit Service Expansion Beyond Husky Line: Conduct graduate-level research, using GIS and USM student, staff, and zip code data to analyze route potential. Then, make a proposal to METRO for potential local on-demand bus shuttle connecting downtown Portland to campus and/or increasing the frequency on other non-Husky line routes that serve the Portland campus.

Install Transit Screen: Install a real-time transit screen in the new Career & Student Success Center. Potential locations include the first floor lobby or near the elevators on the first or second floor. This effort will supplement METRO's own effort to install a transit screen in one of the bus shelters on campus.

Carpooling, Telecommuting & Time of Day Initiatives

The initiatives below, when taken together, are some of the strongest leverage points the University has and some of the most nimble. They are paired together here so that they can be substituted for one another when responding to the risks created by the pandemic. For example, under non-pandemic circumstances, the telework and class schedule initiatives could constitute 50% of the demand management that this category is capable of, while under a pandemic scenario they may need to constitute 100% of the demand management. The aggregate goal for this collection of initiatives is to get 125 vehicles out of parking lots during the peak parking demand hour.

Establish Vanpool Vehicles: Establish a program to lease vanpool vehicles and initiative vanpools in high commuter corridors. A candidate for the first potential vanpool is a Lewiston-Auburn Campus to Portland Campus trip.

Designate Carpool/Vanpool Spaces: Designate prime parking spaces for carpool or vanpool on the Portland campus, starting with 50.

Develop Rideshare Matching Platform: Develop rideshare matching platform or meet n' greet events to pair potential carpool participants. University will consider using Go Maine if Go Maine can increase safety measures for student ridership. The University has provided Go Maine with feedback on how to improve safety.

Promote Telework & Flexwork: Establish teleworking arrangements with more employees. The University would promote its existing voluntary telecommuting policy.

Restructure Course Schedule: Conduct course catalog review with the goal of spreading out courses by day, time, and/or location. A first iteration of this initiative was started this Fall semester, but the effects of it are currently invisible due to the high percentage of classes being taught online due to Covid-19.

Parking Pricing Initiatives

Establish Commuter Parking Buyout Program: Launch a parking buyout program to encourage employee and student commuters to give up their parking pass in exchange for an incentive of upwards of $500 per year. Only individuals who previously purchased a parking pass the semester before may enter the buyout program. Buyouts would be offered on a first come, first serve basis. A max of 50 buyouts would be given out the first year (so that the University can monitor and increase when/if effectiveness is proven). Ten emergency parking passes will be offered each semester, which gives individuals the right to park on campus if they have extenuating circumstances, such as childcare issues or emergent health challenges. Emergency passes could be printed from an online form that records number used per individual).

Establish Residential Parking Buyout Program: Launch a parking buyout program to encourage students residents on the Portland campus to give up their parking pass in exchange for a cash incentive, value toward a bikeshare subscription, and value toward a carshare subscription (if available). The value of each of the three incentives is proposed to be $20 per month, totaling $60 in value, for the nine months comprising the Fall, Spring and Winter semesters. The first 40 applicants would get secure, covered parking inside Portland Commons. The second 60 applicants could utilize secure, covered parking in the larger covered parking area in the vicinity. A max of 100 buyouts would be given out the first year (so that the University can monitor and increase when/if effectiveness is proven).

Host Carshare Program to Support Buyouts: Establish a carshare program in partnership with the City, that may be utilized as part of the residential student buy-out program (in subsidized form), or by commuter students, staff, faculty and non-USM community members. The University recognizes that the carshare business plan has been challenged by covid due to the financial losses sustained by car rental businesses, so this initiative may not prove reliable. To that end, it is not a critical leverage point within this TDM plan; rather it is supplemental to the buy-out initiative. The hope is that the industry will rebound by 2023.

Unbundle Student Parking Fees: Unbundle student transportation fee from their other tuition-related fees, so that the payment for a parking permit must be made separately through a manual opt-in program. This action which will draw attention to the cost of those applying and serve as a disincentive to some.

Build Additional EV Charging Stations: Install additional electric vehicle charging stations at select locations. Goal will be to ensure there are enough charging stations available to meet the next year's expected demand of staff & faculty driving EV vehicles to campus (as

indicated by annual survey), so that spaces to park do not limit potential EV drivers. Stations are likely to be pay-as-you-go. As part of this initiative, the University also endeavors to run conduit to future structured parking facilities, regardless of whether or not it currently has the funds to install EV charging stations at every space.

Review Parking Price Levels: Review of staff member parking to determine if there is a pricing model that will reduce transportation demand. Goal will be to achieve greater parity between employee and student parking pricing.

Communications & Marketing Initiatives

Communications & Marketing: Hold new student & employee orientations for alternative transportation modes, infrastructure, resources and incentives. This initiative may build upon current student and employee orientation programs to maximize participation.

Revise Transportation Website: Build upon current website (launched in May of 2019) by adding new & expanded alternative transportation options and benefits, and performing ongoing maintenance and updates.

Publish Access Guide: Develop a "slick sheet" access guide summarizing ways to travel to campus and nearby destinations.

Offer Guaranteed Ride Home Service: Promote a guaranteed ride home program from Go Maine or a private carpool app to compliment alternative mode use, and provide security to students, staff and faculty.

Potential Greater Portland Initiatives

The University recognizes that it is only one entity within a much larger complex system of transportation within the greater Portland. Toward that end, VHB researched potential improvements that could be considered by the METRO, the City of Portland, and other supporting entities to support USM's TDM plan. VHB also estimated the potential impact these initiatives could have on USM's trip generation and parking goals. The proposed initiatives and their potential impacts are summarized here:

- **Increase frequency of Husky Line to 15 minutes:** Reduction of 39 (2.5%) to 79 (5%) Peak Hour Parking Spaces
- **Increase frequency of METRO Routes 2 & 4 to 15 minutes**: Reduction of 39 (2.5%) to 79 (5%) Peak Hour Parking Spaces
- **Restructure departures and arrivals of all METRO routes serving the Portland campus in order to create 10 minute headways to downtown:** Reduction of 8 (0.5%) to 16 (1%) Peak Hour Parking Spaces, with even greater reductions possible if all routes were routed to serve the same stop on campus
- **Create local on-demand circulator route (shuttle):** Reduction of 56 (3.5%) to 111 (7%) Peak Hour Parking Spaces

- **Improve downtown METRO loop (Route 8) & route it through the USM campus:** Reduction of 43 (2.7%) to 86 (5.4%) Peak Hour Parking Spaces
- **In support of the above initiatives, METRO could begin to plan around USM as an anchor node in their network when the new residence hall comes online**
- **Create a better defined & safer bicycle/pedestrian corridor from USM to downtown:** Reduction too difficult to estimate until the goal is more defined

The reduction ranges featured above should be considered for each initiative individually, as opposed to being additive if all initiatives were implemented. In other words, some individual riders may be affected by more than one initiative. To further explore these initiatives, the University recommends that a coalition of METRO, the City, the University and others research what the potential cost per rider would be for implementing these strategies, in order to determine which may warrant further consideration.

7

Monitoring and Reporting Plan

Program monitoring and evaluation are important components of any successful TDM Program, because they provide a quantitative benchmark of the program's effectiveness in reducing single occupancy vehicle trips and parking demand. The Transportation Coordinator (TC) can use the information gathered via the monitoring plan to direct the ongoing implementation of the TDM Program, allowing for adjustments and the introduction of new strategies.

Furthermore, via regular periodic reports, USM will provide evidence to the City of the applicant's diligence in implementing the program.

There are different methods for collecting the data necessary to monitor a TDM Program, including surveys, program participation documentation, vehicle parking counts, and activity logs. USM's TDM program monitoring will use trip generation counts, vehicle parking counts and person surveys in evaluating the effectiveness of the program. Each of these tools is discussed below.

Trip Generation Counts

Trip generation counts refer to estimating the potential contribution of USM students, staff, and faculty to the total volume of vehicles on the roads feeding the Portland campus. The peak trip hours will be used as the boundary for this metric, and the data will originate from recorded vehicles entering and exiting the parking garage structures on campus, as well as observed vehicles entering and exiting the large surface lots on campus (defined as those lots with more than 20 parking spaces. The peak hours will be assumed to be between the hours of 7:30-8:30 am and 4:30-5:30 pm, Monday through Wednesday, in October, unless future analysis shows they should be at a different time.

The Director of Auxiliary Services at USM will provide vehicle count data from the automated garage entry systems. Data for the surface lots will be collected by direct observation from University staff or contractors hired to stand at the entries and exits and tally vehicles. Qualified University staff or a third-party contractor will compile and analyze the data.

Parking Occupancy Counts

Parking counts refer to a visual or automated account of occupied and/or empty parking spaces. These data are used to ensure that the amount of parking supply (spaces) on site is appropriate to meet peak hour parking demand (parked vehicles).

Under the direction of the Transportation Coordinator, the university will collect observations of vehicle parking during a representative (typically busy, classes-in-session) 3-day period in October. The TC will report the peak parking demand for the campus parking for those observed days.

Parking occupancy of the campus's garages will be based on data retrieved for the parking revenue control system, whereas occupancy of the campus's surface parking lots will require manual field observations. Observations of spaces occupied will be made during each hour in a ten-hour period of 8:00 AM to 6:00 PM.

The reporting of parking transactions and garage use should distinguish, to the extent possible, those users who are USM employees, students, and transient/visitors (hourly, public) users.

A parking occupancy rate relative to total supply of parking on campus will be reported.

Survey of Commuting Patterns, Mode Split & GHG Emissions

The Transportation Coordinator will administer a survey of both employees and students of USM Portland.

Surveys provide a qualitative understanding of how well TDM (and Parking Management) program elements are working. The survey will also be used to estimate greenhouse gas emissions associated with commuting, as well as the current mode split.

The TC will conduct the surveys in either the spring or fall session (e.g., March or October), depending on available resources and labor relative to the resources and labor required to conduct the trip generation and parking analysis. The survey will be completed during a week without any holidays and when classes are in session.

Survey questions will incorporate the following components, in addition to others:

- Type and frequency of modes of transportation used in a typical week
- Destinations traveled to via particular modes
- Reasons why people are driving alone
- Reasons why people are not driving alone
- Level of enthusiasm for incentives that would encourage drive-alone respondents to use an alternative mode
- Ideas for improvements to transportation system, including ideas for incentives
- Routes traveled by foot or bike & associated improvements desired
- Trip generation during time of day (in order to supplement USM-generated contribution to peak traffic generation)
- Ownership of electric vehicles
- Questions required for Bike Friendly University application
- Questions about health concerns (e.g. Covid-19) with different modes and how that is impacting behavior and expected to impact behavior in the future

Status and Monitoring Report

Each year, after data are conducted, the TC will prepare a report summarizing TDM program status and monitoring results. In addition to reporting the results of the data collection, the report will detail (1) what/when strategies were implemented, (2) an estimate of how many individuals participated in certain programs, (3) the lessons learned regarding the most effective TDM strategies, including barriers to not driving alone from the survey.

A core summary table of the goals will be provided in the report that includes baseline numbers, progress to date, goal numbers, and dates by which the University is striving to reach the goals. Goals included will be trip generation, parking counts, mode split, and greenhouse gases. The University will work with the City every year to ensure it is meeting expectations of the City regarding format of the report.

The TC will submit the report to the City of Portland's TDM Program Manager (a position currently staffed in the Planning and Transportation Division of the Planning and Urban Development Department). A report should be issued within 3 months following the last of

the three data collection activities (e.g., if the survey is done in March, then a report should be issued no later than June of that same year). The TC will meet with the City of Portland Planning Department and discuss suggestions for changes to the TDM Program, and will make adjustments before the start of the Fall semester.

Monitoring Schedule

Monitoring (survey, parking, and traffic data collection) should begin within the year following the opening of the planned residence hall. Monitoring will occur according to the schedule detailed below, until the year 2030, the horizon year of the *Facilities Master Plan*. Updates to the *Sustainability Strategic Plan* and/or *Facilities Master Plan* may conclude that further monitoring is warranted.

Annually, the University will:

- Conduct analysis of trip generation (as described above)
- Conduct parking occupancy observations (as described above)
- Conduct a travel survey (as described above)
- Prepare a TDM monitoring report (as described above)

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December 23, 2021

Jimmy Dealaman, Planner
Planning and Urban Development Department
City Hall
389 Congress Street, 4th Floor
Portland, ME 04101

Re: 50 Bedford Street – Additional Response to Site Plan Application Review Comments on Supplemental Materials for Transportation Demand Management Plan and Traffic Movement Permit

Dear Jimmy:

The following are additional responses to comments received from the City of Portland in an email dated December 10, 2021, pertaining to the project and suggested garage access/egress plan; the comments received are provided below for your reference, followed by our response in italics:

TY Lin International – Follow-up Comments

1. The applicant shall provide conceptual design plans, preliminary and final plans and specifications for Bedford Street Improvements as detailed on the conceptual plan prepared by VHB dated December 23, 2021 (Plans continue to be reviewed and approval is pending). Said improvements shall be constructed by the applicant prior to completion of a parking garage structure and Final design plans will need to be stamped by a professional engineer. These improvements are being required to facilitate access and egress movements to the garage and providing safe pedestrian and bicycle movements.

   RESPONSE: The applicant is committed to implementing the complete street improvements for Bedford Street from Durham Street to Surrenden Street and is amenable to a condition to this effect. Final roadway plans would be subject to review and approval by both Portland and MaineDOT.

2. The applicant shall provide conceptual design plans, preliminary and final plans, and specifications for Traffic calming/pedestrian improvements at the Falmouth Street / Oakdale Street intersection for review and approval by the Department of Public Works and Planning Authority. Said improvements shall be constructed by the applicant prior to completion of a parking garage structure or five years from TMP approval, whichever is sooner. This improvement is required to address safety concerns as it relates to vehicles speeds and general neighborhood impacts on Falmouth Street.

   RESPONSE: The applicant is committed to the pedestrian improvements at Falmouth Street and Oakdale Street and is amenable to a condition to that effect.

3. The applicant shall be responsible for the implementation of do not block driveway pavement markings and signage on Forest Avenue at the Oakhurst driveway. The applicant shall provide conceptual design plans, preliminary and final plans, and specifications to the City for review and approval. Final design plans will need to be stamped by a professional engineer and implementation prior to completion of a parking garage structure. This improvement is required due to vehicle blockage and impacts at Oakhurst's driveway as traffic queues extend from the Bedford/Baxter intersection.

RESPONSE: The applicant is amenable to designing and implementing these improvements for Oakhurst's access.

4. The applicant shall be responsible for implementing traffic signal equipment improvements at the Forest Avenue/Bedford Street intersection. This upgrade shall include all equipment necessary for a traffic signal system that is fully active and functioning within the Surtrac Adaptive network. The proposed system shall be coordinated with Rapidflow Technologies and shall be field tested and verified before being accepted by the City. Said improvements shall be constructed by the applicant prior to completion of a parking garage structure. This improvement is to address congestion issues documented at the subject intersection.

   RESPONSE: The applicant has directed VHB to complete this work. On 12/21/21, VHB staff along with Suretrac worked together to replace the faulty detection and troubleshoot issues at the site. A site visit on 12/22/21 confirmed the improved operation. This improvement is complete.

5. The applicant shall provide conceptual design plans, preliminary and final plans, and specifications for improvements at the Forest Avenue/Bedford Street/Baxter Boulevard intersection based on the Smart Corridor Study recommendations for review and approval by the Department of Public Works and Planning Authority. These shall include geometric modifications to the corners on the Baxter Boulevard approach and upgrades to pedestrian traffic signal equipment. The applicant shall construct the said improvements prior Certificate of Occupancy, with all work complying with ADA standards. This improvement is to address pedestrian safety concerns at the subject intersection.

   RESPONSE: The applicant has committed to this improvement as a condition of the Portland Commons residence hall site plan approval.

6. The applicant shall be responsible for implementing traffic signal equipment improvement on the I-295 Southbound Off-Ramp. The improvements shall include all equipment necessary for installing a vehicle queue detection system that is compatible with the RapidFlow signal system at Forest/Bedford/Baxter intersection. The proposed system shall be field tested and verified before being accepted by the City. Said improvements shall be constructed by the applicant prior to completion of a parking garage structure. This improvement is being required to address long vehicle queues on the ramp with the goal of avoiding any backups onto I-295.

   RESPONSE: The applicant is amenable to a condition to add detection on the I-295 southbound off ramp.

Status Comments

The applicant shall conduct traffic modeling that evaluates bus stop configuration on Bedford Street to help inform the design of roadway improvements.

Status: The applicant has conducted the requested modeling and significant vehicle queueing at the bus stops is not expected. I have no further comment.

RESPONSE: Resolved

I continue to review the construction management plan, but the applicant should also provide construction management plans for the Bedford Street improvements.

Status: I continue to work with City staff on this item.

RESPONSE: The construction management plan will be updated to include the Bedford Street improvements upon approval and submitted for review and approval by the City prior to the start of construction. The applicant is amendable to a condition of approval to that effect.

The City finds the revised garage entry/exit plan to be acceptable based on the results of the traffic modeling. The final acceptance of this change will be pending the review of revised materials including an updated Section 7 Traffic Study and Bedford Street improvement plan.

Status: The revised Section 7 Study was transmitted this week and review is on-going.

RESPONSE: Noted

The applicant shall provide details on how traffic will be managed on Surrenden Street under a reversible garage gate scenario. This is related to traffic control entering and exiting the garage (signage, pavement markings, etc.).

Status: The applicant has provided a revised plan and my initial review indicates a need for changes to pavement markings in the area of the reversible lane. The diagonal markings seem confusing and not appropriate for the intended purpose.

RESPONSE: The applicant is committed to continuing to work with the City to resolve this item as a condition of this approval if not resolved in advance.

There are safety concerns for pedestrians crossing Surrenden Street near the Garage entry under a two-lane entry scenario (pedestrians having to navigate through two lanes of queued vehicles). The applicant shall develop a concept plan for a sidewalk to be located on the east side of Surrenden Street.

Status: This continues to be a concern given the proposed garage access/egress plan. Specifically, I am concerned about two lanes of entry vehicles at the curve and how unsafe this condition may be for pedestrian crossings. We recommended that a sidewalk concept be developed for consideration.

RESPONSE: The applicant is proposing to improve the pedestrian connection across Surrenden from the garage to the existing sidewalk on the west side. This will formalize the pedestrian space coming out of the garage and provide refuge and a more direct crossing located with clear sight lines from the garage and from Bedford Street. The design of Surrenden Street now includes a single lane of traffic in each direction with a refuge area between to allow for better sight lines at the crosswalk to provide a safe pedestrian crossing while continuing to accommodate the anticipated peak queue demand entering the garage. The pedestrian demand lines from this side of the garage are to points west including the Maine Law School site and the "white houses" along Bedford Street. There is no anticipated desire line that results in a need to exit the garage on foot and travel to the east on Bedford Street reducing the need for a sidewalk on east side of Surrenden Street. In addition, constructing a sidewalk on the east side of Surrenden would be challenging due to conflicts with existing mature vegetation, a fire hydrant, utility pole, and ventilation intake serving Abromson Community Education Center.

The applicant shall provide a revised Section 7 Traffic Study. The Study shall include LOS/Delay/Queue information from SimTraffic for No-Build (not the Falmouth site) and Build conditions for easy comparison of project impacts.

Status: The revised Section 7 Study was transmitted this week and review is on-going.

RESPONSE: Noted.

City of Portland – Parking Director

Request for the Board/Applicant to reconsider the parking garage size and to revisit the originally proposed 631 parking spaces. Parking supply is much needed in the area.

Does not think the size of the proposed garage should be reduced for the following reasons.

1. Students living in the dorms will be storing their cars in the garage.
2. It appears that USM is anticipating continued expansions at the Portland campus over the next several years, and a larger garage will accommodate some of that demand.
3. The cost of a future expansion will be considerably more expensive and inconvenient than building the additional spaces now.
4. Since the pandemic mass transit numbers have been down.
5. If there is adequate off-street parking for all USM uses, the complaints from the neighborhood will remain low, and there will be less "cruising" in the neighborhood.

RESPONSE:

1. *It is correct that the main purpose of the proposed garage is to provide long-term parking to the residents of the student housing.*
2. *There are plans for additional growth on the USM campus, but none of those projects are imminent. When the projects do come to fruition, accommodations for parking will be determined at that time. As previously discussed, the exodus of the law school from Campus has also resulted in additional supply and less demand.*
3. *The ability to expand the proposed garage in the future with an additional level has been accommodated in the design.*
4. *It is agreed that transit numbers are down, as has been the demand for in-person classes. The applicant anticipates both to rebound in some form as the pandemic abates.*
5. *The applicant agrees that "right-sizing" the garage is important to balance the need for parking and keeping campus-visitors from parking in the neighborhoods, and over-building a garage that is not fully utilized.*

City of Portland Arborist – Garage Landscape

The tree species, 'Princeton' American Elm, which we like but... we maintain dozens of these in various parks and public grounds and while resistant to Dutch Elm Disease, they do get this once and awhile. Our recommendation would be to diversify the planting with one or two others, either break up the large

planting of 12, creating 5 & 7 or change the center trees or the 6 on the right side. Other tree types might include:

'Street-Keeper' Honey locust
'Regal Prince' (upright) Oak
'Bowhall' Red Maple.

The proposed caliper size of 4" is above the required 2.5"-3" caliper and maybe easier to source.

Overall, the plan looks good, it might be best to mix up the tree types to prevent future decline. Dutch Elm Disease can spread by root graft making a large planting somewhat iffy.

RESPONSE: The applicant's landscape architect, MBLA, spoke with Jeff Tarling on Dec 15 regarding these comments. He advised us to keep the planting plan as it is currently shown. Despite the concern he mentioned with Dutch Elm disease, he has revised his opinion and feels the liability with Princeton Elm is not significant enough to warrant us not specifying this otherwise reliable tree.

Suggest adding some trees along the 295 ramp as a buffer.

RESPONSE: The majority of the trees along the 295 ramp are not on USM property. These were included in the survey, but we cannot be sure they were all surveyed (as they are off our property) and they are represented on the survey at a smaller scale than they appear in google earth, and in site visits/photos.

As shown on the demolition plan, and the applicant is not removing a single tree along the 295 ramp, and thus the buffer here, which largely lies off USM property, will remain as it is currently.

Thank you for your feedback and comments as we continue to move forward with this project. Please contact me should you have any questions.

Sincerely,

WOODARD & CURRAN, INC.

Darrin Stairs, PE
Project Manager

/DS

Enclosure(s): Bedford Corridor Improvement Plan – by VHB, dated 12/22/21

cc: Wes Wilson - Desman Design Management
Ann Vashon, Aaron Witham - USM

REMOVE EXISTING PEDESTRIAN CROSSING

PROPOSED PEDESTRIAN CROSSING WITH MEDIAN REFUGE

PROPOSED RRFB FOR PEDESTRIAN CROSSING

PROPOSED PEDESTRIAN CROSSING WITH MEDIAN REFUGE

REMOVE EXISTING PEDESTRIAN CROSSING

PROPOSED PEDESTRIAN CROSSING WITH MEDIAN REFUGE

PROPOSED RAISED PEDESTRIAN CROSSING WITH MEDIAN REFUGE

PROPOSED LEFT TURN LANE

RELOCATE EXISTING BUS STOP & SHELTER

REVISE LANE CONFIGURATION & STRIPING TO ALLOW FOR REVERSIBLE LANES AT GARAGE ENTRANCE / EXIT

SHIFT BEGINNING OF RIGHT-TURN LANE

REMOVE EXISTING PEDESTRIAN CROSSING

LUTHER BONNEY HALL

MASTERTON HALL

RESIDENCE HALL
FFE 25.66

RESIDENCE HALL
FFE 25.66

ABROSOM COMMUNITY
EDUCATION CENTER

WISHCAMPER CENTER

LOT AREA
387,655 S.F.
8.90AC ±

BEDFORD STREET

BEDFORD STREET

SURRENDEN STREET

WINSLOW STREET

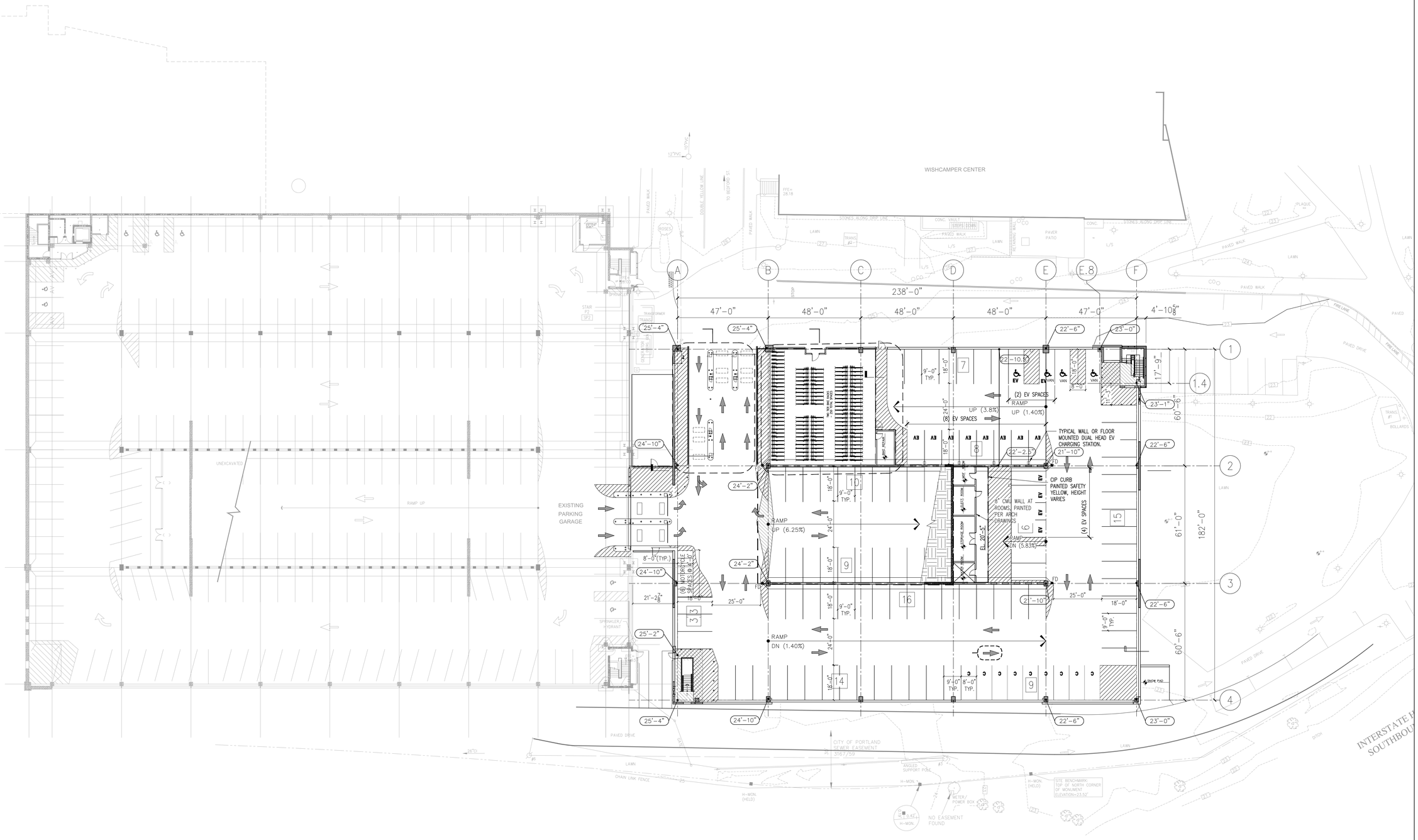
CHAMBERLAIN AVENUE
PAVED - PUBLIC - 50' WIDE

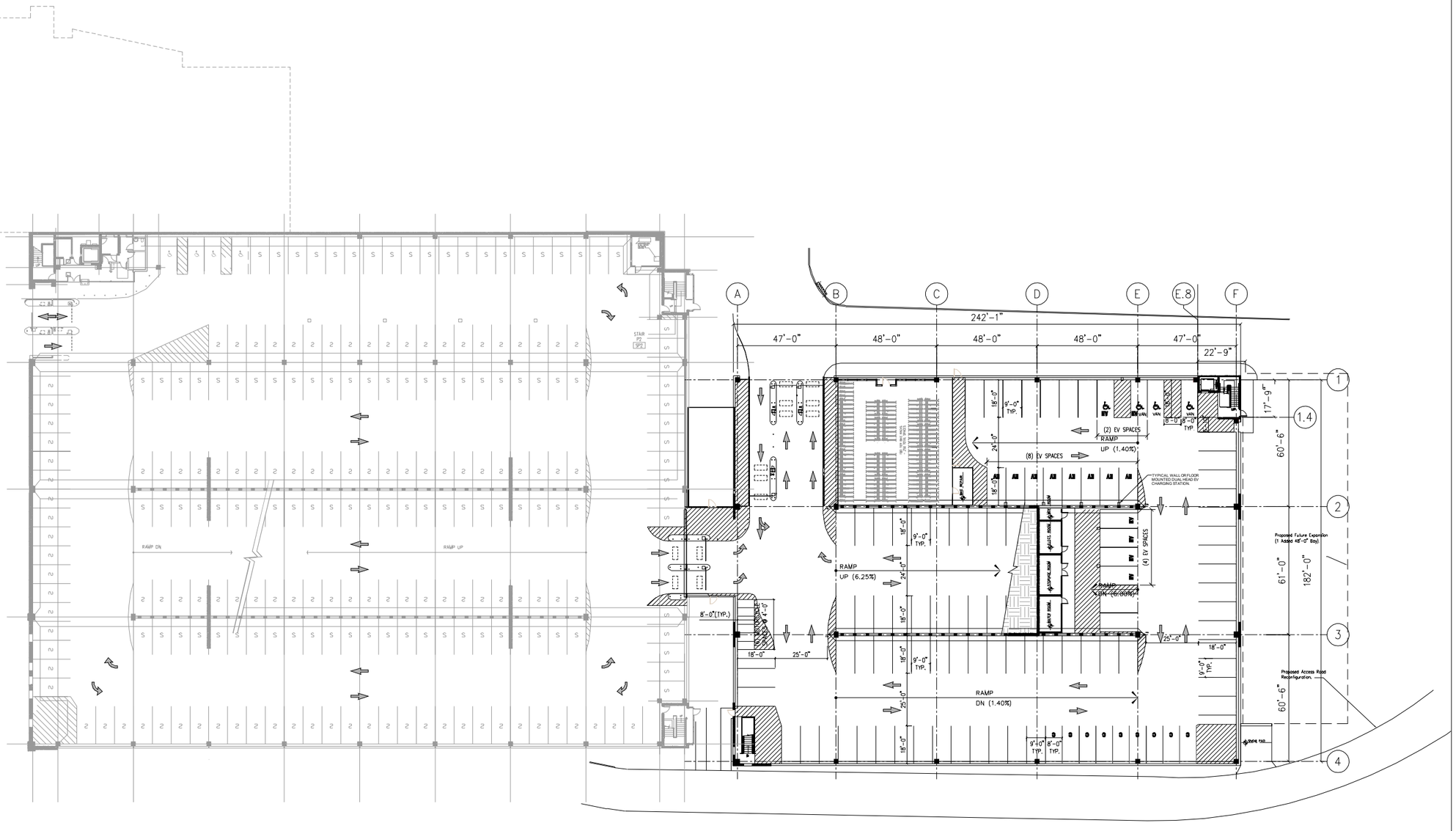
VT STATE PLANE GRID

N

SCALE 1" = 30'-0"
30 0 30

PROJECT NAME:	USM INTERSECTION IMPROVEMENTS
PROJECT NUMBER:	52718.01
FILE NAME: bdr_concepts.dgn	PLOT DATE: 12/22/21
PROJECT LEADER: J.A. CONLEY	DRAWN BY: D.A. GINGRAS
DESIGNED BY: D.A. GINGRAS	CHECKED BY: J.A. CONLEY
BEDFORD STREET CONCEPT	SHEET 1 OF 1


WISHCAMPER CENTER
EXISTING PARKING GARAGE
UNEXCAVATED
RAMP UP
238'-0"
47'-0"
48'-0"
48'-0"
48'-0"
47'-0"
4'-10 3/8"
RAMP UP (6.25%)
RAMP DN (1.40%)
RAMP UP (3.8%)
RAMP UP (1.40%)
RAMP DN (5.83%)
(2) EV SPACES
(8) EV SPACES
(4) EV SPACES
TYPICAL WALL OR FLOOR MOUNTED DUAL HEAD EV CHARGING STATION.
CIP CURB PAINTED SAFETY YELLOW, HEIGHT VARIES
8" CMU WALL AT ROOMS, PAINTED PER ARCH DRAWINGS
(6) MOTORCYCLE SPACES @ 9'-0" EACH
CITY OF PORTLAND SEWER EASEMENT 3167/59
ANGLED SUPPORT POLE
NO EASEMENT FOUND
SITE BENCHMARK: TOP OF NORTH CORNER OF MONUMENT ELEVATION=23.52'
METER/ POWER BOX
CHAIN LINK FENCE
INTERSTATE HIGHWAY SOUTHBOUND
PAVED DRIVE
LAWN
PAVED WALK
FIRE LANE
BOLLARDS
SIGN
PLAQUE
TRANS #2
TRANSFORMER
SPRINKLER / HYDRANT
STAIR P2
SP2
ELEV. P2
ELEV. P1
ELEV. 20'-5"
ELEV. 20'-5"
TRASH ROOM
ELEVATOR ROOM
STAIR P1
SP1
TRASH ROOM
ELEVATOR ROOM
STAIR P1
SP1
TRASH ROOM
ELEVATOR ROOM
STAIR P1
SP1
ELEV. P1
ELEV. P2
ELEV. P2
ELEV. P1
ELEV. P2
ELEV. P1
ELEV. P2
ELEV. P1



1 SITE PLAN
SCALE: 1" = 30'

NORTH

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
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& STRUCTURAL ENGINEER
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COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST.
PORTLAND, ME 04103

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
1	9/1/21	Response to City Comments
2	10/25/21	Plng Brd W.S. #2 Updates

SUBMISSIONS:

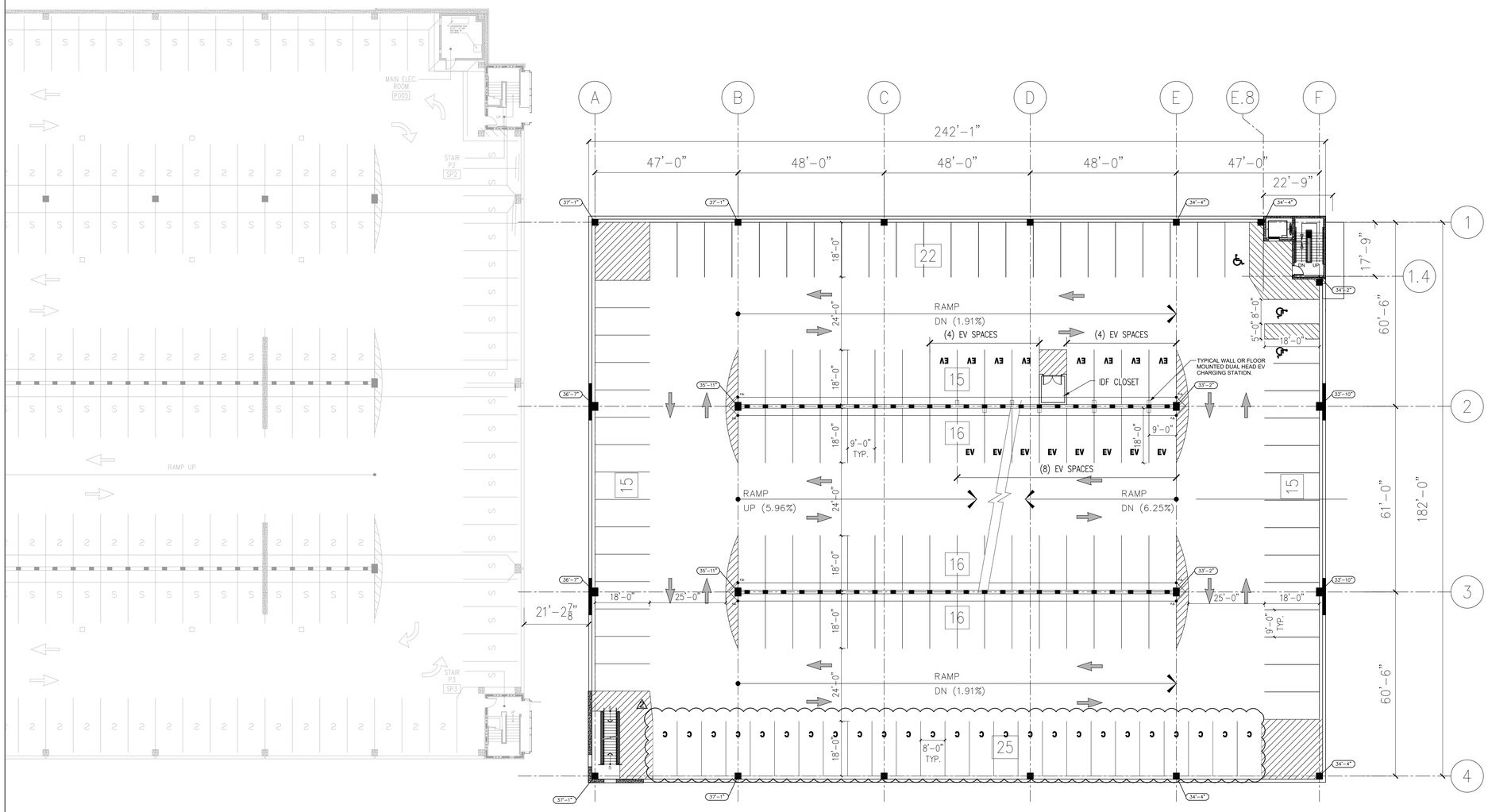
Date	Issued For:
08/09/21	Schematic Design

SCALE	**1" = 20'-0"**
DATE ISSUED	**11/04/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**W.W.**

SHEET TITLE:

SITE PLAN

A-100



1 FIRST LEVEL
SCALE: 1/16" = 1'-0"

NORTH

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PROJECT TEAM:

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USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

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SUBMISSIONS:

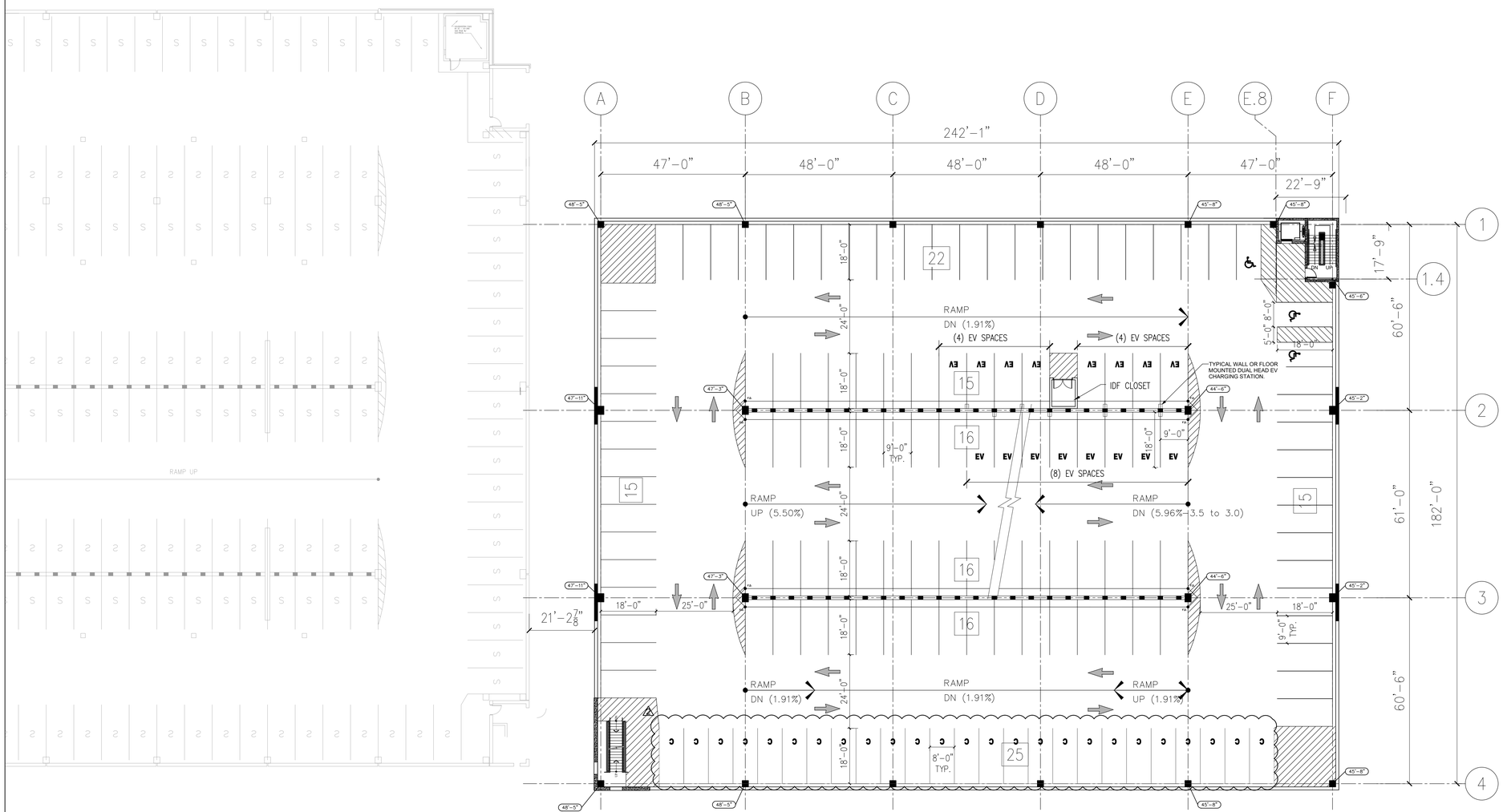
Date	Issued For:
08/09/21	Schematic Design

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

FIRST LEVEL STRIPING PLAN

A-102



1 SECOND LEVEL
SCALE: 1/16" = 1'–0"

NORTH

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Address

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Portland ME 04104

REVISIONS:

No.	Date	Description
1	9/1/21	Response to City Comments
2	10/25/21	Ping Brd W.S. #2 Updates

SUBMISSIONS:

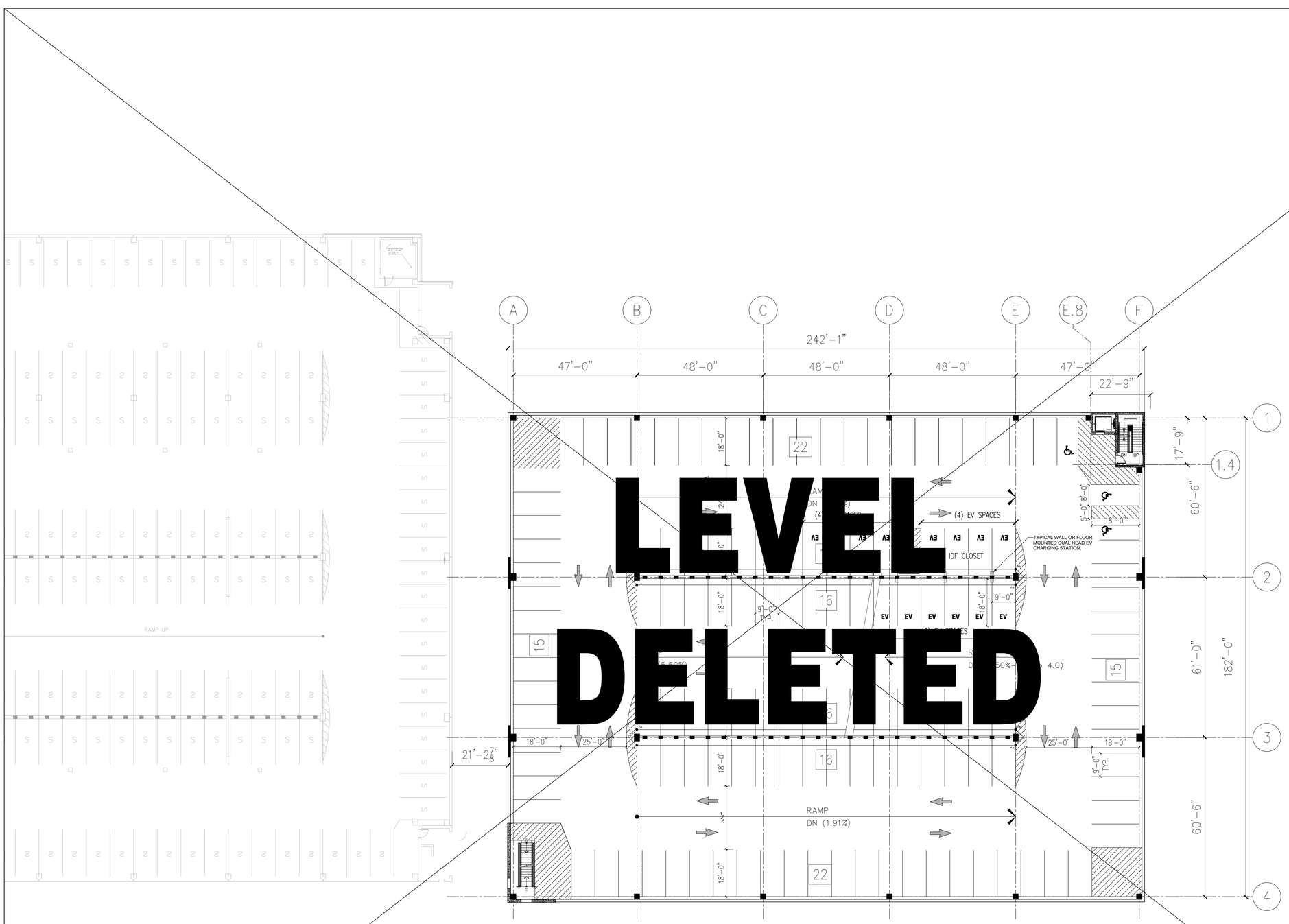
Date	Issued For:
08/09/21	Schematic Design

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

SECOND LEVEL STRIPING PLAN

A-103



THIS LEVEL REMOVED
(GARAGE IS NOW A 4 LEVEL STRUCTURE)

1 T1

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PROJECT TEAM:

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SUBMISSIONS:

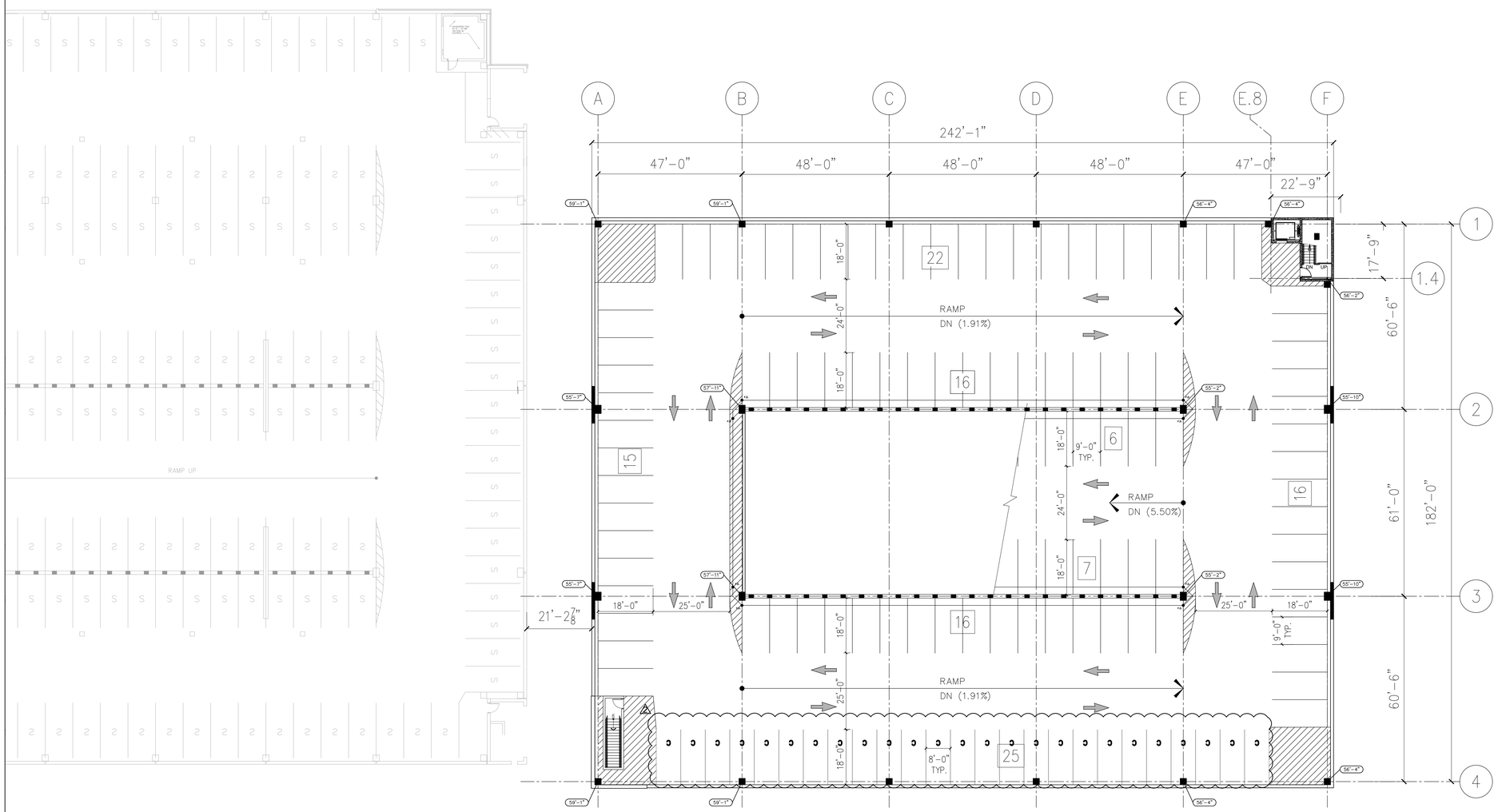
Date	Issued For:
08/09/21	Schematic Design

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

THIRD LEVEL STRIPING PLAN

A-104



1 ROOF LEVEL
SCALE: 1/16" = 1'-0"

NORTH

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
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PROJECT TEAM:

CLIENT
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Design Management

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
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SUBMISSIONS:

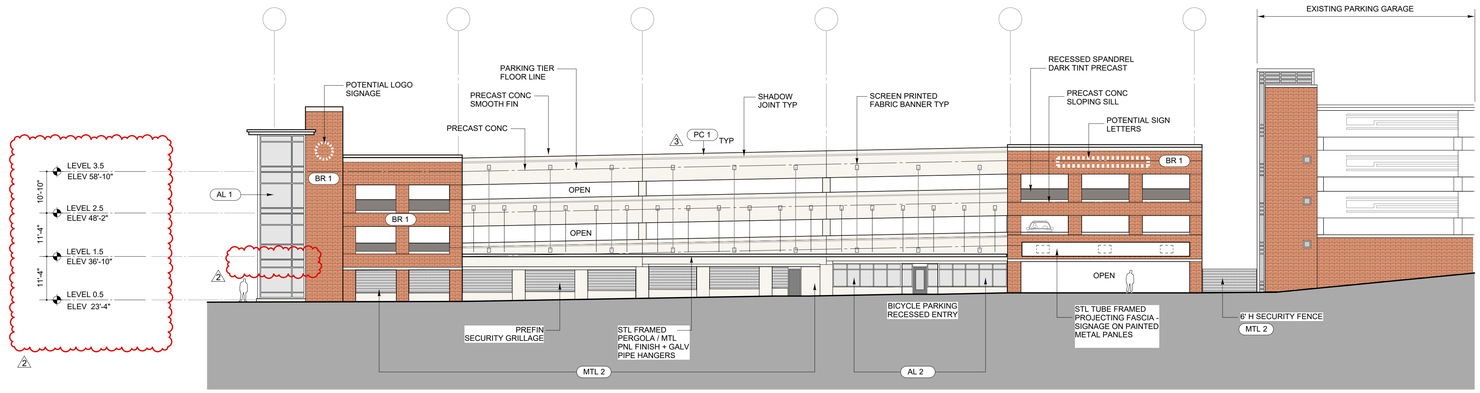
Date	Issued For:
08/09/21	Schematic Design

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**08/31/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

ROOF LEVEL STRIPING PLAN

A-105



NORTH ELEVATION

1/16" = 1' - 0"

1 ADDED:
- SECURITY FENCE BETWEEN EXISTING AND NEW GARAGE
- RECESSED ENTRY TO BIKE STORAGE
- GLAZED ALUM STOREFRONT AT BIKE STORAGE
- PIERS TO SUBDIVIDE BAYS AT GROUND LEVEL
- STEEL PERGOLA IN LIEU OF FULL CANOPY
- EXTENDED GLASS AT EAST STAIR TO GRADE LEVEL
- ALUM SUNSCREEN FEATURE AT EAST STAIR

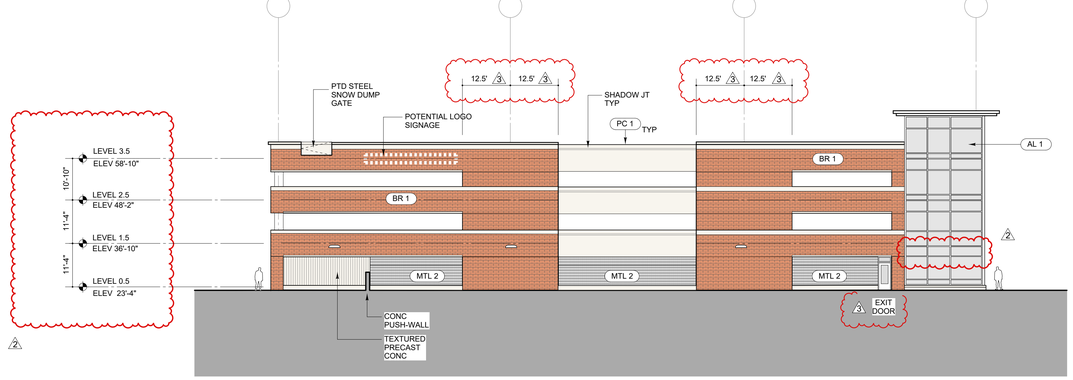
2 DELETED:
- ONE PARKING TIER
- ALUM SUNSCREEN FEATURE AT EAST STAIR

3 - MEDIUM SANDBLASTED FINISH DELETED

MATERIALS SCHEDULE

3 - MATERIALS LEGEND DELETED
- MORE MATERIALS INFORMATION ADDED
- BRICK SELECTION REVISED

KEY	MATERIAL	COLOR	NOTES
AL 1	ALUMINUM FRAMED CURTAINWALL	CLEAR ANODIZED	CLEAR GLASS (UNTINTED)
BR 1	THIN BRICK	 MIXED REDS	THIN BRICK INTEGRAL TO PRECAST UNITS METRO BRICK #350 MAIN STREET FLASHED
MTL 1	FENCING		BLACK VINLY COATED CHAIN-LINK
MTL 2	STEEL SECURITY BAR GRATING		1/8" x 1" BARS 2" x 5" OPENINGS PREFINISHED BLACK
PC 1	PRECAST STRUCTURAL CONCRETE	 BUFF / TAN COLOR	MIXED WITH WHITE PORTLAND CEMENT LIGHTLY SANDBLASTED SIMILAR TO EXISTING GARAGE NO EXPOSED AGGREGATE PRECAST CONCRETE INSTITUTE MIX #113



EAST ELEVATION

1/16" = 1' - 0"

1 - DELETED CANOPY
- ADDED ALUM SUNSHADE FEATURE

2 - DELETED ONE TIER AND ALUM SUNSHADE

3 - WIDEN SHEAR WALLS FROM 12' TO 25'
- STAIR EXIT MOVED FURTHER SOUTH
- MEDIUM SANDBLASTED FINISH DELETED

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
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PROJECT TEAM:

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TRAFFIC ENGINEER
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BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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PROJECT:

USM - Structured Parking Garage

Address
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Portland ME 04104

REVISIONS:

No.	Date	Description
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2	10/25/21	Plng Brd W.S. #2 Updates
3	11/22/21	Plng Brd W.S. #3 Updates

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SCALE	1/16" = 1'-0"
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DRAWN BY	
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SHEET TITLE:

Building Elevations

A - 200

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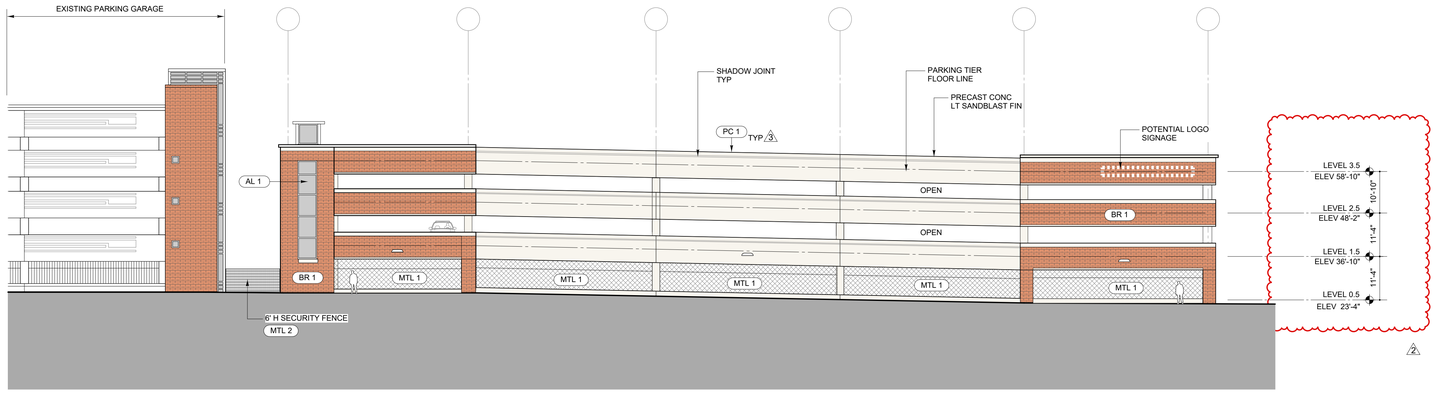


SOUTH ELEVATION

1/16" = 1' - 0"

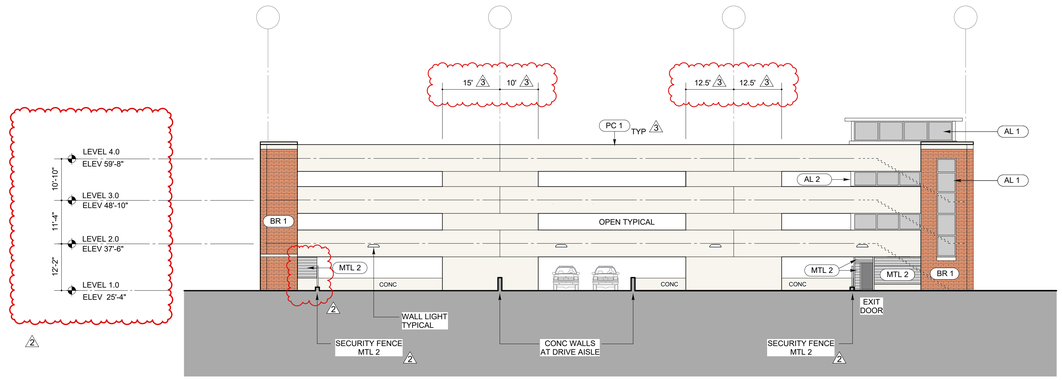
2 DELETED ONE PARKING TIER
VINYL COATED CHAIN LINK FOR OPENINGS INFILL

3 • MEDIUM SANDBLAST FINISH DELETED

MATERIALS SCHEDULE

3 • MATERIALS LEGEND DELETED
• MORE MATERIALS INFORMATION ADDED
• BRICK SELECTION REVISED

KEY	MATERIAL	COLOR	NOTES
AL 1	ALUMINUM FRAMED CURTAINWALL	CLEAR ANODIZED	CLEAR GLASS (UNTINTED)
BR 1	THIN BRICK	 MIXED REDS	THIN BRICK INTEGRAL TO PRECAST UNITS METRO BRICK #350 MAIN STREET FLASHED
MTL 1	FENCING		BLACK VINLY COATED CHAIN-LINK
MTL 2	STEEL SECURITY BAR GRATING		1/8" x 1" BARS 2" x 5" OPENINGS PREFINISHED BLACK
PC 1	PRECAST STRUCTURAL CONCRETE	 BUFF / TAN COLOR	MIXED WITH WHITE PORTLAND CEMENT LIGHTLY SANDBLASTED SIMILAR TO EXISTING GARAGE NO EXPOSED AGGREGATE PRECAST CONCRETE INSTITUTE MIX #113



WEST ELEVATION

1/16" = 1' - 0"

1 • WALL LIGHTS CALLED OUT
• CONCRETE KNEEWALLS ADDED
• SOUTHWEST STAIR ENCLOSURE MODIFIED
• PIERS TO SUBDIVIDE BAYS AT GROUND LEVEL
• STEEL PERGOLA IN LIEU OF FULL CANOPY
• EXTENDED GLASS AT EAST STAIR TO GRADE LEVEL
• ALUM SUNSCREEN FEATURE AT EAST STAIR

2 • DELETED ONE PARKING TIER

3 • SHEAR WALLS WIDTH INCREASED FROM 12' TO 25'
• ADD SECURITY GRILLE AT NORTH SIDE
• CHANGE SECURITY FENCE FROM MTL-1 TO MTL-2
• MEDIUM SANDBLAST FINISH DELETED

16 0 16 32

BAR SCALE

1" = 16'

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Building Elevations

A - 501

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OVERVIEW

2 ONE TIER DELETED



BEDFORD STREET VIEW

2 ONE TIER DELETED



GARAGE ENTRANCE

1 DESIGN REVISIONS

2 ONE TIER DELETED

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Building Views

A - 202

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STAIRWAY ENTRANCE

1 DESIGN REVISIONS
2 ONE TIER DELETED



BICYCLE ROOM ENTRANCE

1 DESIGN REVISIONS
2 ONE TIER DELETED

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Building Views

A - 203

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GENERAL NOTES:

1. EXISTING CONDITIONS SHOWN HEREON HAVE BEEN PROVIDED FROM A FIELD SURVEY PREPARED BY OWEN HASKELL, INC TITLED "EXISTING CONDITIONS SURVEY – USM PORTLAND – WISHCAMPER LOT – PORTLAND MAINE", DATED JANUARY 27, 2019 AND REVISED WITH ADDITIONAL SURVEY ON APRIL 30, 2021.
2. ELEVATIONS ARE BASED ON CITY OF PORTLAND DATUM, NGVD 29.
3. BEARING ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD 83 PER COORDINATE DATA PROVIDED BY THE CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS..
4. EXISTING UTILITIES SHOWN ON THESE PLANS WERE COMPILED FROM A FIELD SURVEY PREPARED BY OWEN HASKELL, INC. THESE PLANS DO NOT NECESSARILY DEPICT THE EXACT LOCATIONS OF ALL UTILITIES, WHICH MAY EXIST AT THIS TIME WITHIN THE SURVEY LIMITS. THERE MAY BE EXISTING LINES OTHER THAN THOSE INDICATED. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES SHALL BE CONSIDERED APPROXIMATE AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY UTILITY CONNECTIONS OR CROSSINGS OF PROPOSED OR EXISTING UTILITIES. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER IN WRITING. THE CONTRACTOR SHALL CONTACT THE RESPECTIVE UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THESE LINES. NO SEPARATE OR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR DUE TO ANY VARIANCE BETWEEN THE DATA SHOWN ON THE PLANS AND ACTUAL FIELD CONDITIONS ENCOUNTERED. THE CONTRACTOR IS RESPONSIBLE FOR HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF THE EXISTING UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE AND TO FACILITATE THE PROPOSED CONNECTION(S).
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE SITE DRAWINGS, INCLUDING BUT NOT LIMITED TO ALL UTILITIES, STORM INFRASTRUCTURE, SIGNS, UTILITY POLES, FENCES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH THE GOVERNING AUTHORITY'S SPECIFICATIONS AND SHALL BE APPROVED BY SUCH. ALL COSTS SHALL BE INCURRED BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL CALL "DIG SAFE" (811) AT LEAST 72 HOURS PRIOR TO EXCAVATION IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL SAFETY CODES.
7. LAND OUTSIDE THE PROPOSED LIMIT OF WORK SHALL NOT BE DISTURBED BY THE CONTRACTOR.
8. PRIOR TO CONSTRUCTION, THE ENGINEER AND CONTRACTOR WILL REVIEW THE PERMITTED LIMITS OF WORK.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCH MARKS NECESSARY FOR THE WORK.
10. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL SAFETY CODES, REGULATIONS, LEGAL REQUIREMENTS, PERMIT CONDITIONS, ETC.
11. THE CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, STREETS, PAVEMENTS, CURBING, TREES, PLANTINGS, LAWN, FENCING TO REMAIN ON OR OFF THE PREMISES, AND SHALL REPAIR AND REPLACE AT HIS/HER OWN EXPENSE, AS DIRECTED BY THE ENGINEER, ANY ITEMS DAMAGED AS A RESULT OF THE CONTRACTOR'S WORK.
12. THE CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SHORING OF ALL EXCAVATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ALL GOVERNING CODES AND REGULATIONS.
13. WORK WITHIN PUBLIC RIGHT–OF–WAY SHALL COMPLY WITH APPLICABLE MUNICIPAL AND STATE REQUIREMENTS.
14. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY.
15. IF IMPORTED FILL MATERIAL IS REQUIRED, IT SHALL BE CERTIFIED IN WRITING BY A STATE LICENSED PROFESSIONAL ENGINEER AS NON–CONTAMINATED, CLEAN FILL SUITABLE FOR THE INTENDED USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTING OF ENVIRONMENTAL PARAMETERS AS OUTLINED IN THE PROJECT SPECIFICATIONS.
16. RESTORE ALL AREAS DISTURBED BY CONTRACTOR'S OPERATIONS TO ORIGINAL FINISH (GRAVEL, PAVEMENT, RIPRAP, GRASS, ETC.) UNLESS OTHERWISE NOTED ON PLANS. RESTORATION OF ALL AREAS DAMAGED BY CONTRACTOR SHALL BE INCIDENTAL TO THE PROJECT.
17. ALL CURB DAMAGED DURING CONSTRUCTION SHALL BE REPLACED IN KIND AND SHALL CONFORM TO SPECIFICATIONS. COST IS INCIDENTAL TO CONTRACT.
18. PROPERLY PROTECT AND DO NOT DISTURB PROPERTY IRONS, MONITORING WELLS, AND MONUMENTS. IF DISTURBED, THE PROPERTY MONUMENT WILL BE RESET AT THE CONTRACTOR'S EXPENSE BY A REGISTERED LAND SURVEYOR APPROVED BY THE ENGINEER.
19. ALL MATERIAL SHALL BE FURNISHED BY CONTRACTOR UNLESS OTHERWISE NOTED.
20. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS PRIOR TO START OF CONSTRUCTION.
21. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMITS SO AS NOT TO DELAY CONSTRUCTION.
22. ALL SIGNAGE SHALL CONFORM WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL CONDITIONS OF THE LOCAL/ STATE/ FEDERAL PERMITS.
24. THE ENTIRE SITE SHALL BE DEVELOPED AND/OR MAINTAINED AS DEPICTED ON THE SITE PLAN. APPROVAL OF THE PLANNING AUTHORITY OR PLANNING BOARD SHALL BE REQUIRED FOR ANY ALTERATION TO OR DEVIATION FROM THE APPROVED SITE PLAN, INCLUDING, WITHOUT LIMITATION: TOPOGRAPHY, DRAINAGE, LANDSCAPING, RETENTION OF WOODED OR LAWN AREAS, ACCESS, SIZE, LOCATION, AND SURFACING OF PARKING AREAS.
25. DO NOT PARK, IMPEDE ACCESS TO, OR STORE EQUIPMENT ON ADJACENT CITY OR PRIVATELY OWNED LOTS, UNLESS PERMISSION HAS BEEN GRANTED IN ADVANCE IN WRITING BY CITY AND/OR LAND OWNER
26. PRIOR TO CONSTRUCTION, A PRECONSTRUCTION MEETING SHALL BE HELD AT THE PROJECT SITE WITH THE CONTRACTOR, ENGINEER, CITY OF PORTLAND DEVELOPMENT REVIEW COORDINATOR, CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS REPRESENTATIVE, AND OWNER TO REVIEW THE CONSTRUCTION SCHEDULE AND CRITICAL ASPECTS OF THE SITE WORK. AT THAT TIME, THE SITE/BUILDING CONTRACTOR SHALL PROVIDE THREE (3) COPIES OF A DETAILED CONSTRUCTION SCHEDULE TO THE ATTENDING CITY REPRESENTATIVE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE A MUTUALLY AGREEABLE TIME FOR THE PRECONSTRUCTION MEETING.
27. CONTRACTOR SHALL PROVIDE AND MAINTAIN EROSION AND SEDIMENTATION CONTROL MEASURES IN ACCORDANCE WITH THESE PLANS AND THE LATEST EDITION OF THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION'S BEST MANAGEMENT PRACTICES MANUAL. KEEP ALL STREETS FREE OF DUST, MUD, AND DEBRIS. STREETS AND WALKWAYS SHALL BE SWEPT REGULARLY, AND TEMPORARY CONSTRUCTION ENTRANCES SHALL BE UTILIZED DURING CONSTRUCTION.
28. CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN ACCORDANCE WITH REQUIREMENTS OUTLINED WITHIN THE MAINE CONSTRUCTION GENERAL PERMIT. CONTRACTOR SHALL FILE A NOTICE OF TERMINATION WITH PHOTOGRAPHS AND REQUIRED ATTACHMENTS TO THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION UPON COMPLETION OF THE PROJECT. A DRAFT OF THE NOTICE WILL BE PROVIDED TO THE OWNER AND THE OWNER'S REPRESENTATIVE FOR REVIEW PRIOR TO SUBMISSION. A COPY OF THE NOTICE CAN BE OBTAINED AT WWW.MAINE.GOV/DEP/LAND/STORMWATER/CONSTRUCTION.HTML
29. CONTRACTOR SHALL MAINTAIN EROSION CONTROL AND STORMWATER POLLUTION PREVENTION SYSTEMS IN COMPLIANCE WITH THE REQUIREMENTS OF THE MAINE CONSTRUCTION GENERAL PERMIT (MCGP). CONTRACTOR SHALL CONDUCT AND MAINTAIN RECORDS OF EROSION CONTROL INSPECTIONS PER THE NOTICE OF INTENT TO COMPLY WITH THE MAINE CONSTRUCTION GENERAL PERMIT. SUBMIT A COPY OF THE INSPECTION RECORDS TO THE OWNER AND ENGINEER.
30. A COMPLETE SET OF "RECORD" DRAWINGS THAT REFLECT ANY AND ALL MODIFICATIONS TO THE STORM SEWER SYSTEM AND ANY OTHER UTILITY INSTALLATIONS OR ALTERATIONS WITHIN THE PROJECT LIMITS SHALL BE SUBMITTED TO THE OWNER AND ENGINEER.
31. ACTIVITIES THAT HAVE THE POTENTIAL TO DISTURB SOIL SUCH AS UTILITY AND SUBSURFACE STRUCTURE INSTALLATION/RELOCATION WORK, GRADING, PAVING, AND LANDSCAPING SHALL BE CONDUCTED IN ACCORDANCE WITH THE SOIL MANAGEMENT PLAN. APPLICABLE SOIL MANAGEMENT PROCEDURES INCLUDE SITE CONTROLS AND CONSTRUCTION MEASURES TO REDUCE EXPOSURE TO SOIL DURING CONSTRUCTION, AS WELL AS TO FACILITATE THE PROPER HANDLING, STORAGE, CHARACTERIZATION, TRANSPORT, ONSITE REUSE, AND/OR OFFSITE REUSE, OR DISPOSAL, OF EXCESS SOIL THAT MAY BE GENERATED DURING CONSTRUCTION.
32. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE A MAINTENANCE AND PROTECTION OF TRAFFIC (MPT) PLAN IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS.

DEMOLITION NOTES:

1. PRIOR TO THE START OF DEMOLITION, THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND/OR APPROVALS FROM THE CITY OF PORTLAND, AND ALL OTHER AUTHORITIES HAVING JURISDICTION.
2. CONSTRUCTION/DEMOLITION DEBRIS NOT APPROVED FOR REUSE ON–SITE, SHALL BE REMOVED AND DISPOSED OFF SITE IN ACCORDANCE WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION. WASTE MANIFEST FORMS DOCUMENTING PROPER OFF–SITE DISPOSAL SHALL BE PROVIDED TO THE SITE/CIVIL ENGINEER AND THE CITY OF PORTLAND.
3. PRIOR TO THE START OF DEMOLITION, THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES TO BE DEMOLISHED OR TO REMAIN PROTECTED DURING CONSTRUCTION. IF ANY DISCREPANCIES ARE FOUND, THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER IN WRITING OF THE CONFLICT.
4. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES TO REMAIN. ANY TEMPORARY SHUT DOWNS REQUIRED TO FACILITATE THE PROPOSED CONSTRUCTION, WHICH MAY AFFECT USES ON ADJACENT PROPERTIES SHALL BE COORDINATED BY THE CONTRACTOR AND THE APPROPRIATE UTILITY.
5. CONTRACTOR SHALL REPAIR OR REPLACE ANY STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION. THE CONTRACTOR SHALL PROCEED WITH CAUTION WITHIN THE PROPOSED WORK AREA TO PREVENT ANY INTERRUPTION TO EXISTING UTILITY SERVICE.
6. CONTRACTOR SHALL COVER CONSTRUCTION DUMPSTERS AND ROLL–OFF CONTAINERS, AND STORE ALL CONSTRUCTION CHEMICALS INSIDE THE CONSTRUCTION TRAILER OR UNDER A COVERED AREA DURING PERIODS WHEN CONSTRUCTION CEASES.
7. SAWCUTS IN EXISTING PAVEMENT SHALL BE SMOOTH AND STRAIGHT.
8. EXISTING FACILITIES (I.E. SIGNS, POLES, CURB, ETC.) SHALL BE REMOVED AND PROTECTED DURING CONSTRUCTION. OWNER RETAINS RIGHT TO KEEP ANY AND ALL REMOVED FACILITIES. CONTRACTOR SHALL DISPOSE OF ANY REMOVED FACILITY AT THE REQUEST OF THE OWNER AT CONTRACTOR'S EXPENSE.

LAYOUT AND MATERIALS NOTES:

1. ALL DIMENSIONS AND RADII ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.

GRADING AND DRAINAGE NOTES:

1. CASTINGS FOR EXISTING STRUCTURES TO REMAIN AND PROPOSED STRUCTURES SHALL BE SET TO THE PROPOSED ELEVATIONS SHOWN ON THE DRAWINGS.
2. THE FILLING OF SOIL OVER THE ROOTS OF TREES TO BE PRESERVED IS PROHIBITED.
3. CLEAN AND/OR FLUSH ALL MANHOLES AND SITE PIPING AFTER THE WORK HAS BEEN COMPLETED. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.
4. PROVIDE END CAPS ON ALL UNDERDRAIN PIPING EXCEPT WHERE DAYLIGHTED, UNLESS OTHERWISE NOTED.

UTILITIES NOTES:

1. ALL PROPOSED UTILITIES (WATER, ELECTRIC, SANITARY, STORM SEWER, ETC.) AND THEIR CONNECTIONS, DISCONNECTION AND RELOCATION OF EXISTING UTILITIES SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY HAVING JURISDICTION. ANY COORDINATION WITH THE MUNICIPALITY AND/OR UTILITY COMPANY, PERMITS OR APPROVALS REQUIRED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

CONSTRUCTION PHASING:

CONSTRUCTION SHALL BE PHASED SUCH THAT ALL DISTURBED AREAS SHALL FIRST BE PROTECTED WITH EROSION AND SEDIMENT CONTROLS AS INDICATED ON THE PLANS PRIOR TO THE START OF ANY GROUND DISTURBING ACTIVITIES. THE CONSTRUCTION PHASING DESCRIBED BELOW IS FOR GENERAL PURPOSES ONLY, AND WILL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR HIS/HER MEANS AND METHODS OF CONSTRUCTION. GENERAL CONSTRUCTION SEQUENCING IS AS FOLLOWS:

1. INSTALLATION OF EROSION AND SEDIMENT CONTROL PRACTICES AS INDICATED ON THE PLANS.
2. DEMOLITION AND REMOVAL OF EXISTING PAVEMENT, CURB, TREES, UTILITIES, ETC.
3. STRIP AND STOCKPILE TOPSOIL AT DESIGNATED STORAGE AREA.
4. BEGIN ROUGH GRADING AND EARTHWORK ACTIVITIES (EXCAVATION OPERATIONS).
5. INSTALL STORM SEWER SYSTEM (BEGINNING AT FURTHEST DOWNSTREAM STRUCTURE).
6. PLACE INLET PROTECTION ON PROPOSED CATCH BASINS AS SHOWN ON THE DRAWINGS.
7. INSTALL ELECTRICAL UTILITIES.
8. INSTALL BITUMINOUS CONCRETE PAVEMENT SUBBASE AND BITUMINOUS CONCRETE BINDER COURSES AS SPECIFIED ON PLANS.
9. FINISH GRADING, REDISTRIBUTE STOCKPILED TOPSOIL AND ESTABLISH VEGETATION ON ALL DISTURBED AND NEW PERVIOUS AREAS.
10. CLEAN BITUMINOUS CONCRETE PAVEMENT AND STORM SEWER OF ALL DEBRIS AND SEDIMENT.
11. COMPLETE SITE CONSTRUCTION.
12. INSTALLATION OF BITUMINOUS PAVEMENT CONCRETE TOP COURSE (THIS WEARING COURSE SHALL BE INSTALLED NEAR COMPLETION OF PROJECT).
13. ACHIEVE PERMANENT AND FINAL STABILIZATION OF AREAS DISTURBED DURING CONSTRUCTION.
14. REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL PRACTICES FROM THE SITE.

LEGEND

EXISTING		PROPOSED
122	CONTOUR (1' INTERVAL)	122
120	CONTOUR (INDEX)	120
S	SANITARY SEWER	S
FM	FORCE MAIN	
SD	STORM DRAIN	SD
UD	UNDERDRAIN	UD
W	WATER MAIN	
E	UNDERGROUND ELECTRIC	E
T	UNDERGROUND TELEPHONE	
G	GAS LINE	G
OE	OVERHEAD ELECTRIC	
P	PROPERTY LINE	
R/W	RIGHT OF WAY	
	EASEMENT	
X X	FENCE	
	VERTICAL CURB	
	SLOPED GRANITE CURB	
	TIPDOWN CURB	
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	GUARDRAIL	
	STORM DRAIN PIPE & CATCH BASIN	
	SEDIMENT BARRIER	
	LIMIT OF WORK	LW
	SANITARY SEWER MANHOLE	
	CLEAN OUT	CO
	DRAINAGE MANHOLE	DMH
	CATCH BASIN	
	SEWER MANHOLE	SMH
	GAS METER BOX	
	GAS VENT	
	GATE GATE	
	TRANSFORMER	
	UTILITY POLE	
	UTILITY PILE WITH GUY	
	LIGHTPOST	
	WATER GATE	
	CURB STOP	
	HYDRANT	
	PROPERTY MONUMENT	
	STREET AND MISCELLANEOUS SIGNS	
XXX.XX	SPOT ELEVATION	XXX.XX
	DECIDUOUS TREE	
	CONIFEROUS TREE	
	SHRUB	
	BITUMINOUS PAVEMENT	
	POROUS PAVEMENT	
	CONCRETE SIDEWALK	
	PAVER AREA, SEE LANDSCAPING PLANS	
	STONE AREA, SEE LANDSCAPING PLANS	

UNIVERSITY OF SOUTHERN MAINE
25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT
& STRUCTURAL ENGINEER
DESMAN Design Management
18 Tremont Street #300
Boston, MA 02108

ARCHITECT
WINTON-SCOTT ARCHITECTS
5 MILK STREET
PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN
41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
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40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE
ASHLEY FLETCHER
No. 13750
LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
	08/09/21	Schematic Design

SUBMISSIONS:

Date	Issued For:

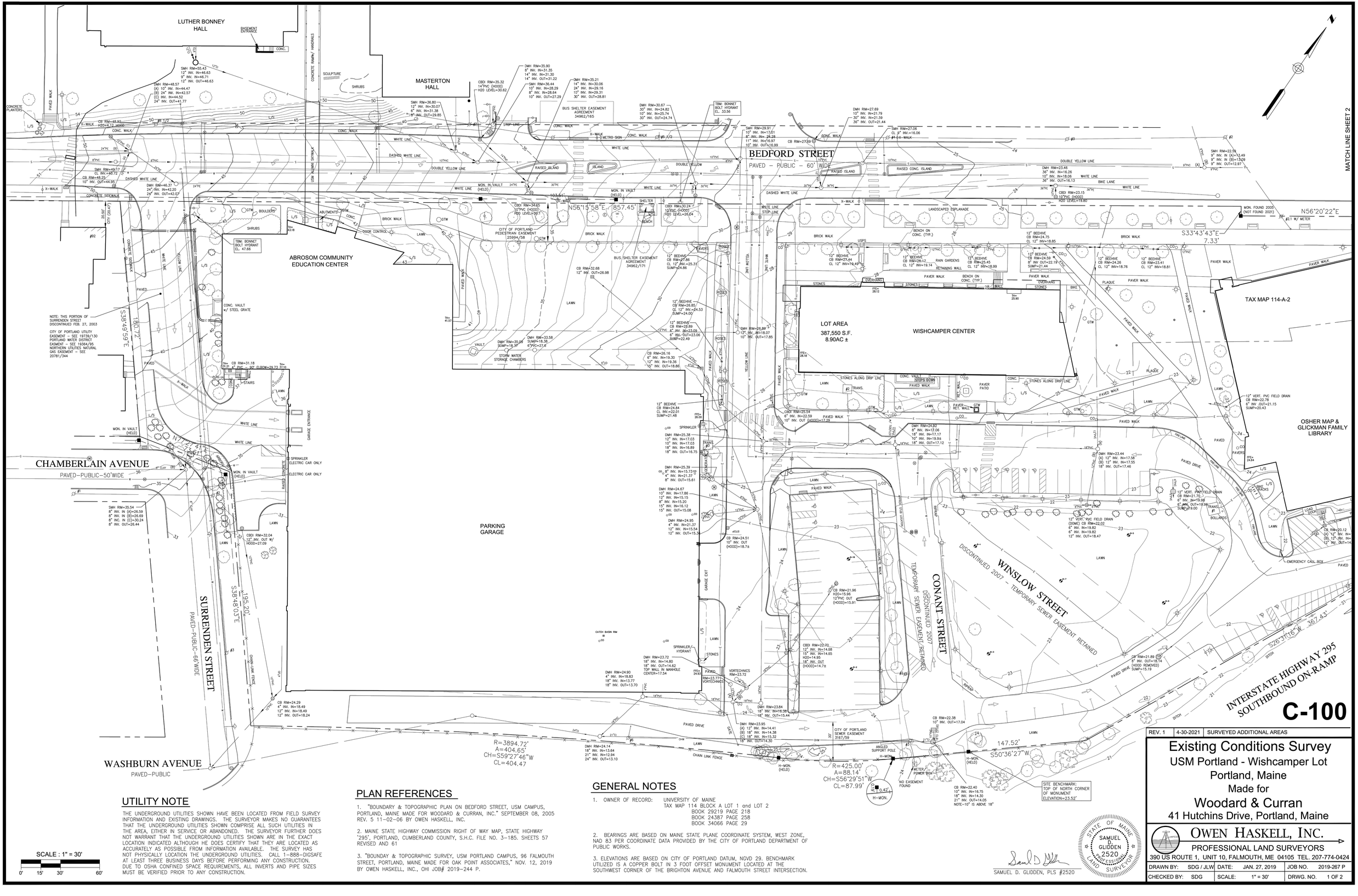
SCALE	**1"=20'**
DATE ISSUED	**8/9/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

GENERAL NOTES & LEGEND

C-000

\\woodardcurran.net\shared\Projects\023535.00 USM - Falmouth Street Garage\wip\Drawings\General\023535.00 G001.dwg, Aug 06, 2021 - 1:08pm BMCDEVITT



UTILITY NOTE

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEY HAS NOT PHYSICALLY LOCATION THE UNDERGROUND UTILITIES. CALL 1-888-DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

SCALE : 1" = 30'

0' 15' 30' 60'

PLAN REFERENCES

1. "BOUNDARY & TOPOGRAPHIC PLAN ON BEDFORD STREET, USM CAMPUS, PORTLAND, MAINE MADE FOR WOODARD & CURRAN, INC." SEPTEMBER 08, 2005 REV. 5 11-02-06 BY OWEN HASKELL, INC.

2. MAINE STATE HIGHWAY COMMISSION RIGHT OF WAY MAP, STATE HIGHWAY '295', PORTLAND, CUMBERLAND COUNTY, S.H.C. FILE NO. 3-185. SHEETS 57 REVISED AND 61

3. "BOUNDAY & TOPOGRAPHIC SURVEY, USM PORTLAND CAMPUS, 96 FALMOUTH STREET, PORTLAND, MAINE MADE FOR OAK POINT ASSOCIATES," NOV. 12, 2019 BY OWEN HASKELL, INC., OHI JOB# 2019-244 P.

GENERAL NOTES

1. OWNER OF RECORD: UNIVERSITY OF MAINE
TAX MAP 114 BLOCK A LOT 1 and LOT 2
BOOK 29219 PAGE 218
BOOK 24387 PAGE 258
BOOK 34066 PAGE 29

2. BEARINGS ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD 83 PER COORDINATE DATA PROVIDED BY THE CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS.

3. ELEVATIONS ARE BASED ON CITY OF PORTLAND DATUM, NGVD 29. BENCHMARK UTILIZED IS A COPPER BOLT IN 3 FOOT OFFSET MONUMENT LOCATED AT THE SOUTHWEST CORNER OF THE BRIGHTON AVENUE AND FALMOUTH STREET INTERSECTION.

SAMUEL D. GLIDDEN, PLS #2520

STATE OF MAINE – SAMUEL GLIDDEN – 2520 – PROFESSIONAL LAND SURVEYOR

C-100

REV.	DATE	DESCRIPTION
1	4-30-2021	SURVEYED ADDITIONAL AREAS

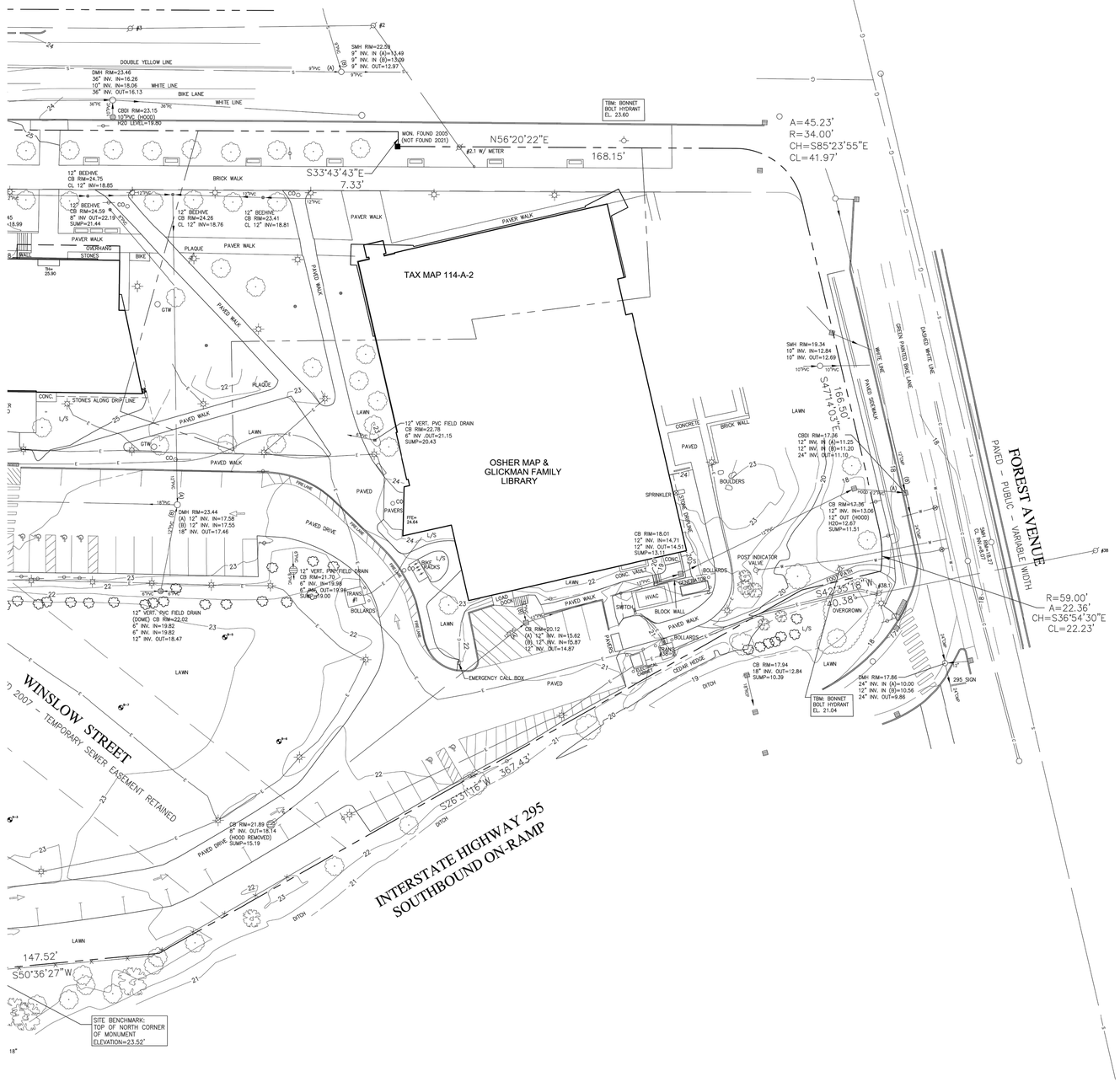
Existing Conditions Survey

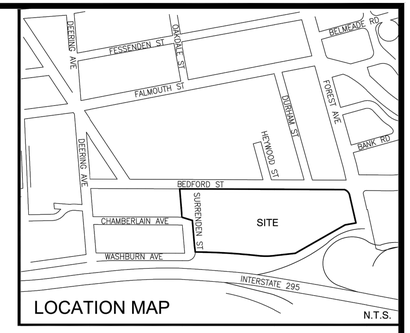
USM Portland - Wishcamper Lot
Portland, Maine
Made for
Woodard & Curran
41 Hutchins Drive, Portland, Maine

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 US ROUTE 1, UNIT 10, FALMOUTH, ME 04105 TEL. 207-774-0424

DRAWN BY:	SDG / JLW	DATE:	JAN. 27, 2019	JOB NO.	2019-267 P
CHECKED BY:	SDG	SCALE:	1" = 30'	DRWG. NO.	1 OF 2

MATCH LINE SHEET 1





LEGEND

- IRON PIPE OR ROD FOUND
- MONUMENT FOUND
- UTILITY POLE
- MANHOLE
- ELECTRIC/GAS METER
- SIGN
- CATCH BASIN
- HYDRANT
- WATER VALVE OR SHUTOFF
- GAS VALVE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SHRUB / BUSH
- GTW GEOTHERMAL WELL
- ELECTRICAL JUNCT. BOX
- FENCE
- CURB
- OVERHEAD WIRES
- E UNDERGROUND POWER
- C COMMUNICATION
- W WATER LINE
- G GAS LINE
- T TELEPHONE
- SD STORM DRAIN
- SS SANITARY SEWER
- STM STEAM LINE

IPF/IRF	IRON PIPE OR ROD FOUND
L/S	LANDSCAPED AREA
CONC.	CONCRETE
FFE	FINISHED FLOOR ELEVATION
THRES.	THRESHOLD
N/F	NOW OR FORMERLY
000/000	DEED BOOK / PAGE

SCALE : 1" = 30'

0' 15' 30' 60'

UTILITY NOTE

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2. MAINE STATE HIGHWAY COMMISSION RIGHT OF WAY MAP, STATE HIGHWAY '295', PORTLAND, CUMBERLAND COUNTY, S.H.C. FILE NO. 3-185. SHEETS 57 REVISED AND 61

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GENERAL NOTES

1. OWNER OF RECORD: UNIVERSITY OF MAINE
TAX MAP 114 BLOCK A LOT 1 and LOT 2
BOOK 29219 PAGE 218
BOOK 24387 PAGE 258
BOOK 34066 PAGE 29

2. BEARINGS ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD 83 PER COORDINATE DATA PROVIDED BY THE CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS.

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SAMUEL D. GLIDDEN, PLS #2520

STATE OF MAINE · SAMUEL D GLIDDEN · 2520 · PROFESSIONAL LAND SURVEYOR

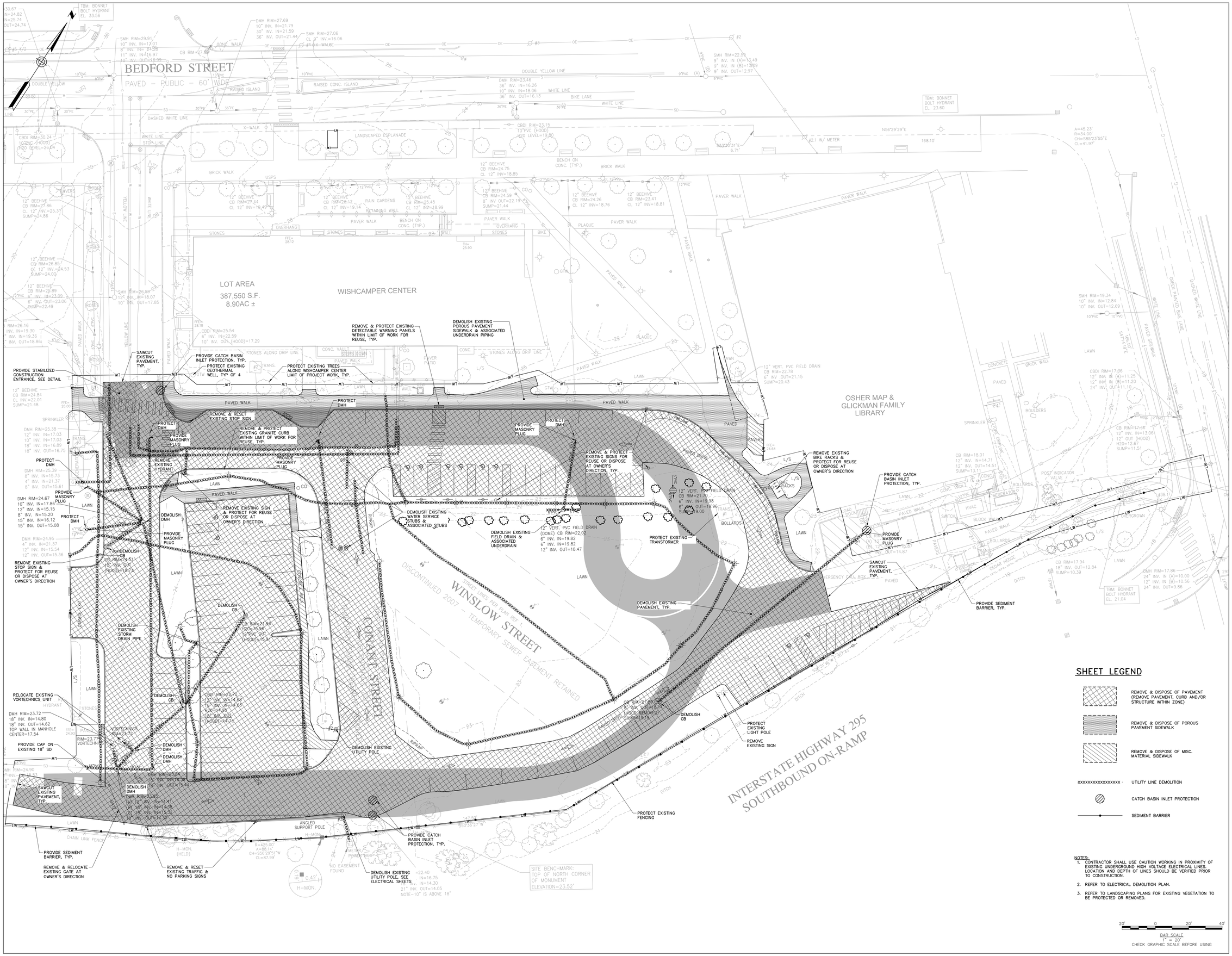
C-101

REV. 1	4-30-2021	SURVEYED ADDITIONAL AREAS

Existing Conditions Survey
USM Portland - Wishcamper Lot
Portland, Maine
Made for
Woodard & Curran
41 Hutchins Drive, Portland, Maine

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 US ROUTE 1, UNIT 10, FALMOUTH, ME 04105 TEL. 207-774-0424

DRAWN BY: SDG / JLW	DATE: JAN 27, 2019	JOB NO. 2019-267 P	
CHECKED BY: SDG	SCALE: 1" = 30'	DRWG. NO. 2 OF 2	



\\woodardcurran.net\shared\Projects\023035.00 USM – Falmouth Street Garage\wip\Drawings\Civil\235035.00 C102.dwg, Aug 06, 2021 – 1:10pm BMCDEVITT

UNIVERSITY OF SOUTHERN MAINE
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207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

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457 US ROUTE 1 SUITE 2
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S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE
ASHLEY FLETCHER
No. 13750
LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
	08/09/21	Schematic Design

SUBMISSIONS:

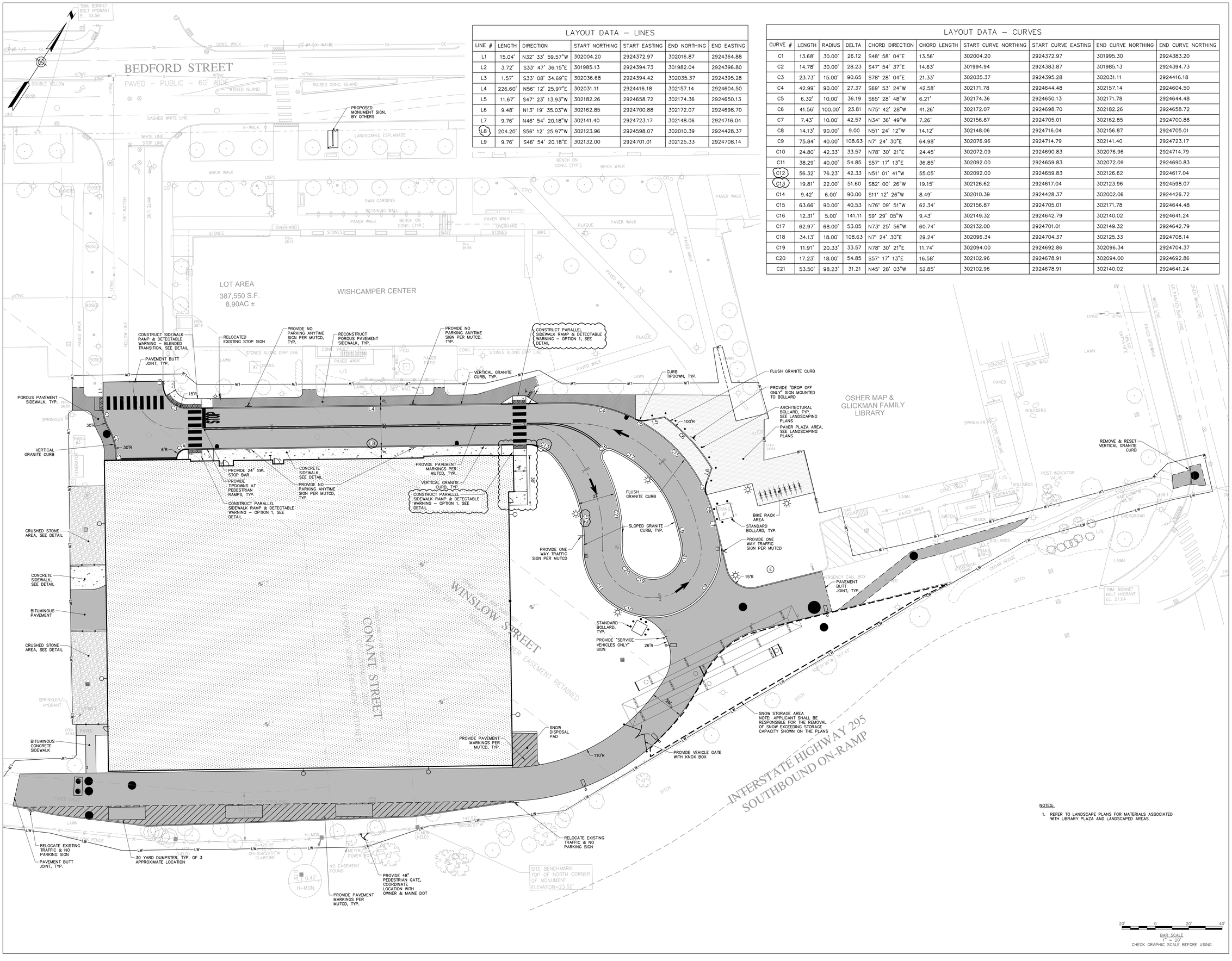
Date	Issued For:

SCALE	**1"=20'**
DATE ISSUED	**8/9/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

DEMOLITION & EROSION & SEDIMENT CONTROL PLAN

C-102



LAYOUT DATA – LINES

LINE #	LENGTH	DIRECTION	START NORTHING	START EASTING	END NORTHING	END EASTING
L1	15.04'	N32° 33' 59.57"W	302004.20	2924372.97	302016.87	2924364.88
L2	3.72'	S33° 47' 36.15"E	301985.13	2924394.73	301982.04	2924396.80
L3	1.57'	S33° 08' 34.69"E	302036.68	2924394.42	302035.37	2924395.28
L4	226.60'	N56° 12' 25.97"E	302031.11	2924416.18	302157.14	2924604.50
L5	11.67'	S47° 23' 13.93"W	302182.26	2924658.72	302174.36	2924650.13
L6	9.48'	N13° 19' 35.03"W	302162.85	2924700.88	302172.07	2924698.70
L7	9.76'	N46° 54' 20.18"W	302141.40	2924723.17	302148.06	2924716.04
L8	204.20'	S56° 12' 25.97"W	302123.96	2924598.07	302010.39	2924428.37
L9	9.76'	S46° 54' 20.18"E	302132.00	2924701.01	302125.33	2924708.14

LAYOUT DATA – CURVES

CURVE #	LENGTH	RADIUS	DELTA	CHORD DIRECTION	CHORD LENGTH	START CURVE NORTHING	START CURVE EASTING	END CURVE NORTHING	END CURVE NORTHING
C1	13.68'	30.00'	26.12	S48° 58' 04"E	13.56'	302004.20	2924372.97	301995.30	2924383.20
C2	14.78'	30.00'	28.23	S47° 54' 37"E	14.63'	301994.94	2924383.87	301985.13	2924394.73
C3	23.73'	15.00'	90.65	S78° 28' 04"E	21.33'	302035.37	2924395.28	302031.11	2924416.18
C4	42.99'	90.00'	27.37	S69° 53' 24"W	42.58'	302171.78	2924644.48	302157.14	2924604.50
C5	6.32'	10.00'	36.19	S65° 28' 48"W	6.21'	302174.36	2924650.13	302171.78	2924644.48
C6	41.56'	100.00'	23.81	N75° 42' 28"W	41.26'	302172.07	2924698.70	302182.26	2924658.72
C7	7.43'	10.00'	42.57	N34° 36' 49"W	7.26'	302156.87	2924705.01	302162.85	2924700.88
C8	14.13'	90.00'	9.00	N51° 24' 12"W	14.12'	302148.06	2924716.04	302156.87	2924705.01
C9	75.84'	40.00'	108.63	N7° 24' 30"E	64.98'	302076.96	2924714.79	302141.40	2924723.17
C10	24.80'	42.33'	33.57	N78° 30' 21"E	24.45'	302072.09	2924690.83	302076.96	2924714.79
C11	38.29'	40.00'	54.85	S57° 17' 13"E	36.85'	302092.00	2924659.83	302072.09	2924690.83
C12	56.32'	76.23'	42.33	N51° 01' 41"W	55.05'	302092.00	2924659.83	302126.62	2924617.04
C13	19.81'	22.00'	51.60	S82° 00' 26"W	19.15'	302126.62	2924617.04	302123.96	2924598.07
C14	9.42'	6.00'	90.00	S11° 12' 26"W	8.49'	302010.39	2924428.37	302002.06	2924426.72
C15	63.66'	90.00'	40.53	N76° 09' 51"W	62.34'	302156.87	2924705.01	302171.78	2924644.48
C16	12.31'	5.00'	141.11	S9° 29' 05"W	9.43'	302149.32	2924642.79	302140.02	2924641.24
C17	62.97'	68.00'	53.05	N73° 25' 56"W	60.74'	302132.00	2924701.01	302149.32	2924642.79
C18	34.13'	18.00'	108.63	N7° 24' 30"E	29.24'	302096.34	2924704.37	302125.33	2924708.14
C19	11.91'	20.33'	33.57	N78° 30' 21"E	11.74'	302094.00	2924692.86	302096.34	2924704.37
C20	17.23'	18.00'	54.85	S57° 17' 13"E	16.58'	302102.96	2924678.91	302094.00	2924692.86
C21	53.50'	98.23'	31.21	N45° 28' 03"W	52.85'	302102.96	2924678.91	302140.02	2924641.24

NOTES:

1. REFER TO LANDSCAPE PLANS FOR MATERIALS ASSOCIATED WITH LIBRARY PLAZA AND LANDSCAPED AREAS.

UNIVERSITY OF SOUTHERN MAINE
25 Bedford Street, Portland, ME 04104
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PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE · DARRIN B. STAIRS No. 15778 · LICENSED PROFESSIONAL ENGINEER

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12/14/2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
12/14/21	Conformed Design Documents

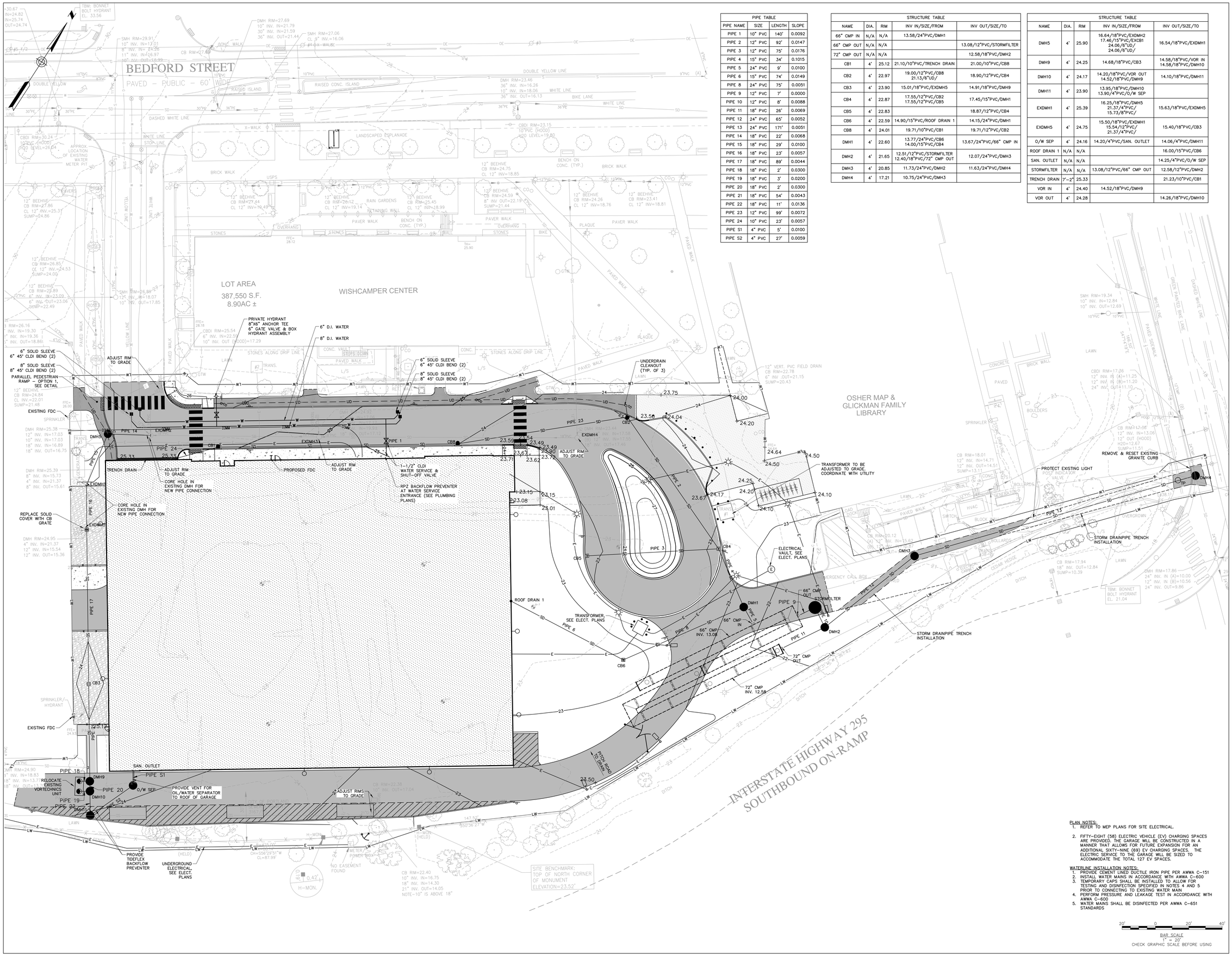
SCALE	1"=20'
DATE ISSUED	12/14/2021
PROJECT NO	20-20145.00-1
DRAWN BY	B.C.M.
CHECKED BY	D.B.S.

SHEET TITLE:

SITE LAYOUT & MATERIALS PLAN

C-103

\\woodardcurran.net\shared\Projects\20230035.00 USM - Falmouth Street Garage\wip\Drawings\Civil\20230035.00 C101.dwg, Jan 05, 2022 - 1:48pm BMCBEVITT



PIPE TABLE			
PIPE NAME	SIZE	LENGTH	SLOPE
PIPE 1	10" PVC	140'	0.0092
PIPE 2	12" PVC	92'	0.0147
PIPE 3	12" PVC	75'	0.0176
PIPE 4	15" PVC	34'	0.1015
PIPE 5	24" PVC	9'	0.0100
PIPE 6	15" PVC	74'	0.0149
PIPE 8	24" PVC	75'	0.0051
PIPE 9	12" PVC	7'	0.0000
PIPE 10	12" PVC	8'	0.0088
PIPE 11	18" PVC	26'	0.0069
PIPE 12	24" PVC	65'	0.0052
PIPE 13	24" PVC	171'	0.0051
PIPE 14	18" PVC	22'	0.0068
PIPE 15	18" PVC	29'	0.0100
PIPE 16	18" PVC	23'	0.0057
PIPE 17	18" PVC	89'	0.0044
PIPE 18	18" PVC	2'	0.0300
PIPE 19	18" PVC	3'	0.0200
PIPE 20	18" PVC	2'	0.0300
PIPE 21	18" PVC	54'	0.0043
PIPE 22	18" PVC	11'	0.0136
PIPE 23	12" PVC	99'	0.0072
PIPE 24	10" PVC	23'	0.0057
PIPE S1	4" PVC	5'	0.0100
PIPE S2	4" PVC	27'	0.0059

STRUCTURE TABLE				
NAME	DIA.	RIM	INV IN/SIZE/FROM	INV OUT/SIZE/TO
66" CMP IN	N/A	N/A	13.58/24"PVC/DMH1	
66" CMP OUT	N/A	N/A		13.08/12"PVC/STORMFILTER
72" CMP OUT	N/A	N/A		12.58/18"PVC/DMH2
CB1	4'	25.12	21.10/10"PVC/TRENCH DRAIN	21.00/10"PVC/CB8
CB2	4'	22.97	19.00/12"PVC/CB8 21.13/6"UD/	18.90/12"PVC/CB4
CB3	4'	23.90	15.01/18"PVC/EXDMH5	14.91/18"PVC/DMH9
CB4	4'	22.87	17.55/12"PVC/CB2 17.55/12"PVC/CB5	17.45/15"PVC/DMH1
CB5	4'	22.83		18.87/12"PVC/CB4
CB6	4'	22.59	14.90/15"PVC/ROOF DRAIN 1	14.15/24"PVC/DMH1
CB8	4'	24.01	19.71/10"PVC/CB1	19.71/12"PVC/CB2
DMH1	4'	22.60	13.77/24"PVC/CB6 14.00/15"PVC/CB4	13.67/24"PVC/66" CMP IN
DMH2	4'	21.65	12.51/12"PVC/STORMFILTER 12.40/18"PVC/72" CMP OUT	12.07/24"PVC/DMH3
DMH3	4'	20.85	11.73/24"PVC/DMH2	11.63/24"PVC/DMH4
DMH4	4'	17.21	10.75/24"PVC/DMH3	

STRUCTURE TABLE				
NAME	DIA.	RIM	INV IN/SIZE/FROM	INV OUT/SIZE/TO
DMH5	4'	25.90	16.64/18"PVC/EXDMH2 17.46/15"PVC/EXCB1 24.06/6"UD/ 24.06/6"UD/	16.54/18"PVC/EXDMH1
DMH9	4'	24.25	14.68/18"PVC/CB3	14.58/18"PVC/VOR IN 14.58/18"PVC/DMH10
DMH10	4'	24.17	14.20/18"PVC/VOR OUT 14.52/18"PVC/DMH9	14.10/18"PVC/DMH11
DMH11	4'	23.90	13.95/18"PVC/DMH10 13.90/4"PVC/O/W SEP	
EXDMH1	4'	25.39	16.25/18"PVC/DMH5 21.37/4"PVC/ 15.73/8"PVC/	15.63/18"PVC/EXDMH5
EXDMH5	4'	24.75	15.50/18"PVC/EXDMH1 15.54/12"PVC/ 21.37/4"PVC/	15.40/18"PVC/CB3
O/W SEP	4'	24.16	14.20/4"PVC/SAN. OUTLET	14.06/4"PVC/DMH11
ROOF DRAIN 1	N/A	N/A		16.00/15"PVC/CB6
SAN. OUTLET	N/A	N/A		14.25/4"PVC/O/W SEP
STORMFILTER	N/A	N/A	13.08/12"PVC/66" CMP OUT	12.58/12"PVC/DMH2
TRENCH DRAIN	7'–2"	25.33		21.23/10"PVC/CB1
VOR IN	4'	24.40	14.52/18"PVC/DMH9	
VOR OUT	4'	24.28		14.26/18"PVC/DMH10

PLAN NOTES:
1. REFER TO MEP PLANS FOR SITE ELECTRICAL.
2. FIFTY-EIGHT (58) ELECTRIC VEHICLE (EV) CHARGING SPACES ARE PROVIDED. THE GARAGE WILL BE CONSTRUCTED IN A MANNER THAT ALLOWS FOR FUTURE EXPANSION FOR AN ADDITIONAL SIXTY-NINE (69) EV CHARGING SPACES. THE ELECTRIC SERVICE TO THE GARAGE WILL BE SIZED TO ACCOMMODATE THE TOTAL 127 EV SPACES.

WATERLINE INSTALLATION NOTES:
1. PROVIDE CEMENT LINED DUCTILE IRON PIPE PER AWWA C-151
2. INSTALL WATER MAINS IN ACCORDANCE WITH AWWA C-600
3. TEMPORARY CAPS SHALL BE INSTALLED TO ALLOW FOR TESTING AND DISINFECTION SPECIFIED IN NOTES 4 AND 5 PRIOR TO CONNECTING TO EXISTING WATER MAIN
4. PERFORM PRESSURE AND LEAKAGE TEST IN ACCORDANCE WITH AWWA C-600
5. WATER MAINS SHALL BE DISINFECTED PER AWWA C-651 STANDARDS

20' 0 20' 40'
BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

UNIVERSITY OF SOUTHERN MAINE
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PROJECT TEAM:

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SEAL / SIGNATURE

STATE OF MAINE
DARRIN B. STAIRS
No. 15118
LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

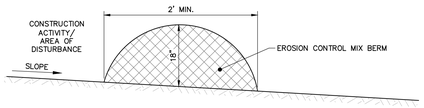
SCALE	**1"=20'**
DATE ISSUED	**11/23/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**D.B.S.**

SHEET TITLE:

UTILITY & GRADING PLAN

C-104

\\wsodcdcurran.net\shared\Projects\20233035.00 USM - Falmouth Street Garage\wip\Drawings\Civil\233035.00 C10X.dwg, Nov 22, 2021 - 8:59am BMCDEVITT

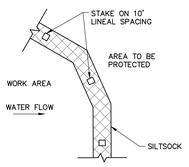


NOTES:

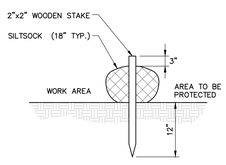
1. EROSION CONTROL MIX CAN BE MANUFACTURED ON OR OFF THE PROJECT SITE. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.
2. EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS:
   - THE ORGANIC MATTER CONTENT SHALL BE BETWEEN 80 AND 100%, DRY WEIGHT BASIS.
   - PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 6" SCREEN AND A MINIMUM OF 70%, MAXIMUM OF 85%, PASSING A 0.75" SCREEN.
   - THE ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED.
   - LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
   - SOLUBLE SALTS CONTENT SHALL BE < 4.0 MMHOS/CM.
   - THE PH SHOULD FALL BETWEEN 5.0 AND 8.0.

EROSION CONTROL MIX BERM (SEDIMENT BARRIER OPTION)

N.T.S.



PLAN VIEW



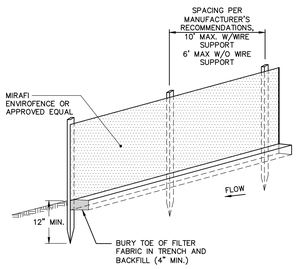
SECTION

NOTE:

1. WHEN STAKING IS NOT POSSIBLE, HEAVY CONCRETE BLOCKS SHALL BE USED BEHIND THE SEDIMENT BARRIER TO HELP STABILIZE DURING RAINFALL/RUNOFF EVENTS.

SILT SOCK (SEDIMENT BARRIER OPTION)

N.T.S.



NOTES:

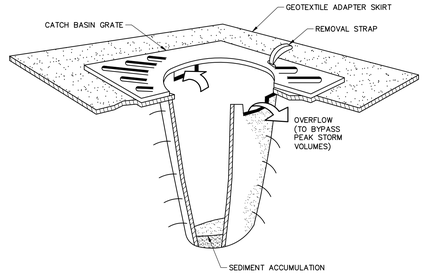
- INSTALL FABRIC ON UPHILL SIDE OF SUPPORT POSTS
- INSTALL SILT FENCE ACROSS SLOPES
- SILT FENCE SHALL NOT BE USED IN DRAINAGE WAYS

MAINTENANCE: INSPECT FOR TEARS IN THE FABRIC OR DAMAGE TO SUPPORTS. REPAIR AS NECESSARY. REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES A DEPTH OF SIX-INCHES OR LESS.

REMOVAL: WHEN UPSLOPE AREAS ARE STABILIZED, THE STRUCTURE AND ANY ACCUMULATED SEDIMENT WILL BE REMOVED.

SILTATION FENCE (SEDIMENT BARRIER OPTION)

N.T.S.



NOTES:

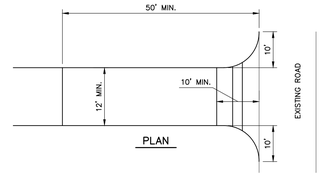
CATCH BASIN PROTECTION TO BE "SILTSACK" (BY ACF ENVIRONMENTAL) OR "STREAM GUARD" (BY FOSS ENVIRONMENTAL SERVICES).

INSERT TO BE EMPTIED IN AN APPROVED MANNER WHEN IT IS 1/2 FULL OF SEDIMENT.

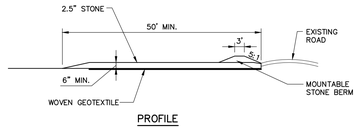
INSPECT INSERT AFTER ALL RAINFALL EVENTS, REPAIR AND MAINTAIN AS REQUIRED.

CATCH BASIN INLET PROTECTION DEVICE (SILTSACK OR EQUAL)

N.T.S.



PLAN



PROFILE

NOTES:

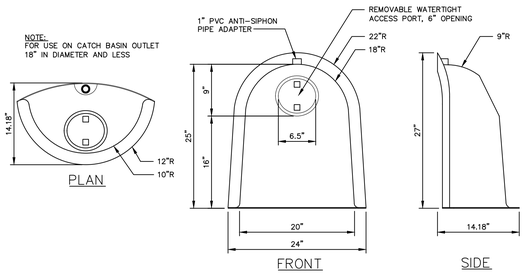
- CONSTRUCTION ENTRANCES MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
- WHEEL WASH PITS MAY ALSO BE USED, IF APPROVED.

MAINTENANCE: INSPECT FOR EFFECTIVE REMOVAL OF SOIL FROM VEHICLES PRIOR TO LEAVING THE SITE. SWEEP ANY SOIL FROM ADJACENT ROADWAYS.

AT LEAST ONE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED UNTIL ALL AREAS OF THE SITE ARE STABILIZED.

STABILIZED CONSTRUCTION ENTRANCE

N.T.S.



PLAN FRONT SIDE

"THE SNOUT"

N.T.S.

EROSION AND SEDIMENT CONTROL NOTES

Temporary Controls

Contractor shall prepare and submit a soil erosion and water pollution control plan to engineer.

Measure	Dates For Use	Timing, Activity, and Location
Sediment Barrier	ALL	Before soil disturbance, install downhill of areas to be disturbed and around material stockpiles.
Up-slope Diversion	ALL	Before soil disturbance, install uphill of areas to be disturbed and material stockpiles.
Catch Basin Protection	ALL	Before soil or pavement disturbance, install ACF Environmental, Inc. High Flow Siltsack, Siltsaver Inlet Filter. or equal, installed per manufacturer's requirements.
Dust Control	ALL	During dry weather, apply water and calcium chloride to control dust.
Temporary Seeding	April 15 to Oct. 1	Soil stockpiles that are not covered and disturbed areas that will not be disturbed again within 14 days. If grass growth provides less than 85% soil coverage by Nov. 1, apply mulch and anchor with erosion control blanket.
Mulch	April 15 to Sept. 15	On all areas of exposed soil prior to rain events or every 7 days, apply 100-150 lbs (2.5 bales) per 1,000 sq ft. by mechanical blower.
Winter Mulch	Sept. 16 to Oct. 31	On all areas of exposed soil prior to precipitation or every 7 days, apply 150 to 170 lbs. mulch (4 bales) per 1,000 sq. ft. by mechanical blower, Erosion control blanket may be used as a substitute for winter mulch.
	Nov. 1 to April 14	On all areas of exposed soil, apply 150 to 170 lbs. mulch (4 bales) per 1,000 sq. ft. and anchor with netting at the end of each working day. Erosion control blanket may be used as a substitute for winter mulch.
Inspections	Until site is permanently stabilized	Inspect the erosion and sedimentation control measures daily, and maintain and repair as necessary.

Permanent Controls:

Measure	Dates For Use	Timing, Activity, and Location
Pavement – Base Course – Final Course	When no frost is in ground	Install only in areas shown on the plan, shortly after pavement base is brought to final grade. Install near completion of project.
Permanent Seeding	April 15 to Sept. 15	On final grade areas, within 7 days of grade preparation, prepare topsoil, followed by seed and mulch application.
Dormant Seeding	Sept. 16 to April 15	On final grade areas, with prepared topsoil. Apply seed at double the specified rate on bare soil, and follow with an application of winter mulch.
Ground Cover, Trees, Shrubs	April 15 to Nov. 1	Install with final landscaping.
Permanent Mulch	ALL	Install with final landscaping.

Inspections:

Regular inspections of all erosion and sedimentation controls shall be made at least weekly and prior to and following storm events. Minimum inspections shall be made as listed in the table below.

Inspected Item	Look For
Mulched Surfaces	Thin mulch or inadequate application. Wind movement.
Seeded Surfaces	Poor seed germination. Loss of mulch. Development of rivulets.
Sediment Barrier	Sediment build-up to one half the height of the barrier. Undermining of the barrier. Supporting stakes loose, toppled, or unmarked. Breaks in barrier.
Perimeter Diversion	Discharge is to stabilized area. Erosion or breaks in barrier. Supporting stakes loose, toppled or unmarked.
Catch Basin Protection	Sediment build-up and structure blockages. Slow flow/Ponding water. Breaks in fabric or voids in barrier.
Dewatering Filter	Breaks in fabric or supporting structure. Slow flow, indicating high sediment build-up.
Construction Entrance	Sedimentation of roadways. Off-site dust complaints.

EROSION AND SEDIMENT CONTROL NOTES

TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE THE USE OF STABILIZED CONSTRUCTION ENTRANCES, HYDRAULIC MULCH, HAY AND STRAW MULCH, EROSION CONTROL BLANKET, TURF REINFORCED MATTING, RIPRAP AND TEMPORARY SEEDING. TEMPORARY SEDIMENT CONTROL MEASURES INCLUDE THE USE OF SILT FENCE, EROSION CONTROL MIX BERMS, CATCHBASIN SEDIMENT COLLECTION BAGS AND GEOTEXTILE FILTER BAGS. PERMANENT MEASURES INCLUDE PERMANENT VEGETATION OR PAVING.

GENERAL

A. THE PROJECT SHALL CONFORM WITH THE STANDARDS OF THE MAINE CONSTRUCTION GENERAL PERMIT.

B. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK PUBLISHED BY THE MAINE DEP UNLESS OTHERWISE NOTED IN THESE PLANS.

C. ANY ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES DEEMED NECESSARY BY THE OWNER'S REPRESENTATIVE, DEPARTMENT OF ENVIRONMENTAL PROTECTION, AND/OR MUNICIPAL OFFICIALS SHALL BE INSTALLED BY THE CONTRACTOR.

D. THE CONTRACTOR IS RESPONSIBLE FOR ALL FINES RESULTING FROM EROSION OR SEDIMENTATION FROM THE SITE TO SURROUNDING PROPERTIES, WATER BODIES, OR WETLANDS AS A RESULT OF THIS PROJECT.

E. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE SITE WHENEVER POSSIBLE WHILE ALLOWING PROPER SITE DEVELOPMENT.

F. CONSTRUCTION STAGING SHALL BE CONDUCTED IN A WAY TO MINIMIZE THE POTENTIAL FOR STORMWATER RUN-ON TO DISTURBED AREAS.

G. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR/REPLACEMENT/MAINTENANCE OF ALL EROSION CONTROL MEASURES UNTIL ALL DISTURBED AREAS ARE STABILIZED TO THE SATISFACTION OF THE ABOVE PERSONNEL. DESCRIPTIONS OF PERMANENT STABILIZATION FOR VARIOUS COVER TYPES FOLLOWS:

   i. FOR SEEDED AREAS, PERMANENT STABILIZATION MEANS THAT 90% OF THE DISTURBED AREA IS COVERED WITH REASONABLY THICK UNIFORM STAND OF PERMANENT GRASS SPECIES, FREE FROM SIZABLE THIN OR BARE SPOTS.
   ii. FOR SODDED AREAS, PERMANENT STABILIZATION MEANS THAT COMPLETE BINDING OF THE SOD ROOTS INTO THE UNDERLYING SOIL WITH NO SLUMPING OF THE SOD OR DIE OFF.
   iii. FOR MULCHED AREAS, PERMANENT STABILIZATION MEANS TOTAL COVERAGE OF THE EXPOSED AREA WITH AN APPROVED MULCH MATERIAL.
   iv. FOR PAVED AREAS, PERMANENT STABILIZATION MEANS THE PLACEMENT OF THE ASPHALT BINDER COURSE.

H. IF THE AREA WILL REMAIN UNWORKED FOR MORE THAN ONE YEAR OR HAS BEEN BROUGHT TO FINAL GRADE, AND WILL NOT BE BUILT ON, THEN IMMEDIATELY PROVIDE PERMANENT STABILIZATION USING VEGETATION THROUGH PLANTING, SEEDING, SOD OR THROUGH THE USE OF PERMANENT MULCH OR RIPRAP. IF USING VEGETATION FOR STABILIZATION, SELECT THE PROPER VEGETATION FOR THE LIGHT, MOISTURE, AND SOIL CONDITIONS. AMEND AREAS OF DISTURBED, OVERLY-COMPACTED SUBSOIL WITH TOPSOIL OR COMPOST AND LIGHTLY TILL 2-3" OF SOIL AMENDMENTS INTO THE TOP 8" OF SOIL.

I. PERMANENT SEEDING SPECIFICATION: IT IS RECOMMENDED THAT PERMANENT SEEDING BE COMPLETED BETWEEN APRIL 1 AND AUGUST 15 OF EACH YEAR. LATE SEASON SEEDING MAY BE DONE BETWEEN AUGUST 15 AND SEPTEMBER 15. AREAS NOT SEEDED OR WHICH DO NOT OBTAIN A SATISFACTORY GROWTH BY OCTOBER 1 SHALL BE SEEDED WITH AROOSTOCK WINTER RYE OR MULCHED AT SPECIFIED RATES. SEE WINTER SEEDING AND MULCHING SPECIFICATIONS FOR STABILIZATION AFTER NOVEMBER 1.

   i. APPLY TOPSOIL TO A DEPTH OF 6 INCHES. IN COMPACTED AREAS TILL 2-3" OF COMPOST INTO UPPER 8" OF DISTURBED SOIL AND THEN APPLY 6 INCHES OF TOPSOIL.
   ii. APPLY LIME AND FERTILIZER ACCORDING TO SOIL TESTS. IN LIEU OF SOIL TESTS, APPLY GROUND LIMESTONE AT A RATE OF 33 LBS PER 1000 SQUARE FEET AND GRANULAR, COMMERCIAL-GRADE FERTILIZER 10-10-10 AT A RATE OF 18 LBS PER 1000 SQUARE FEET.
   iii. UNIFORMLY APPLY SEED MIXTURE AT THE RECOMMENDED SEEDING RATES AND DATES, APPLY HAY OR STRAW MULCH AT A RATE OF 2.5 BALES PER 1000 SQUARE FEET AND ANCHOR AS NECESSARY.

J. PROTECT ALL SEEDED AREAS WITH MULCH OR EROSION CONTROL BLANKET IN AREAS OF SHEET OR CONCENTRATED FLOWS. MULCH ALL AREAS SO THAT SOIL IS NOT VISIBLE THROUGH THE MULCH REGARDLESS OF THE APPLICATION RATE. SCHEDULE SEEDING OR SODDING TO AVOID FAILURE DUE TO SUMMER DROUGHT AND FALL FROST. NEWLY SEEDED AREAS SHOULD BE PROTECTED FROM VEHICLE TRAFFIC, PEDESTRIAN TRAFFIC AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL ESTABLISHED. AREAS MUST BE REWORKED AND RESTABILIZED IF GERMINATION IS SPARSE OR SURFACE EROSION IS EVIDENT.

K. EROSION CONTROL BLANKET SHALL BE INSTALLED ON ALL PERMANENT SLOPES STEEPER THAN 3:1 OR AS OTHERWISE NOTED, EROSION CONTROL BLANKET SHALL BE NORTH AMERICAN GREEN S150BN OR APPROVED EQUAL. EROSION CONTROL BLANKET SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

L. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL TEMPORARY EROSION CONTROL MEASURE UPON STABILIZATION OF PROJECT AREA & COST SHALL BE INCIDENTAL TO CONTRACT.

WINTER CONDITIONS

A. WINTER CONSTRUCTION IS CONSTRUCTION ACTIVITY PERFORMED DURING THE PERIOD FROM NOVEMBER 1 THROUGH APRIL 1. IF AREAS WITHIN THE CONSTRUCTION AREA ARE NOT STABILIZED WITH TEMPORARY OR PERMANENT MEASURES OUTLINED ABOVE BY NOVEMBER 15 THEN THE SITE MUST BE PROTECTED WITH ADDITIONAL STABILIZATION MEASURES THAT ARE SPECIFIC TO WINTER CONDITIONS.

GOOD HOUSEKEEPING AND POLLUTION PREVENTION

A. SPILL PREVENTION CONTROLS MUST BE USED TO PREVENT POLLUTANTS FROM BEING DISCHARGED FROM MATERIALS ON SITE, INCLUDING STORAGE PRACTICES TO MINIMIZE EXPOSURE OF THE MATERIALS TO STORMWATER RUNOFF AND APPROPRIATE SPILL PREVENTION, CONTAINMENT AND RESPONSE PLANNING AND IMPLEMENTATION.

B. DURING CONSTRUCTION, PETROLEUM PRODUCTS AND OTHER HAZARDOUS MATERIALS WITH THE POTENTIAL TO CONTAMINATE GROUND OR SURFACE WATERS MAY NOT BE STORED OR HANDLED IN AREAS OF THE SITE DRAINING TO INFILTRATION AREAS. AN "INFILTRATION AREA" IS ANY ARE OF THE SITE THAT BY DESIGN, OR AS A RESULTS OF SOIL AND TOPOGRAPHY, ACCUMULATES RUNOFF THAT INFILTRATES IN THE SOIL. DIKES, BERMS, SUMPS AND OTHER FORMS OF TEMPORARY SECONDARY CONTAINMENT THAT PREVENT DISCHARGE TO GROUNDWATER MAY BE USED TO ISOLATE PORTIONS OF THE SITE FOR THE PURPOSES OF STORAGE AND HANDLING OF THESE MATERIALS.

C. LOCATE ALL MATERIAL STOCKPILES WITH CONSIDERATION FOR STORMWATER DRAINAGE PATTERNS AND INFRASTRUCTURE.

D. TAKE ALL REASONABLE MEASURES TO MINIMIZE DUST RESULTING FROM THE PROJECT. OIL MAY NOT BE USED FOR DUST CONTROL.

E. LOCATE ALL LITTER, CONSTRUCTION DEBRIS AND CONSTRUCTION CHEMICALS WITH CONSIDERATION FOR STORMWATER DRAINAGE PATTERNS AND INFRASTRUCTURE.

F. TRENCH OR FOUNDATION DE-WATERING MUST BE SPREAD THROUGH SUFFICIENT NATURAL BUFFERS THAT HAVE CAPACITY TO INFILTRATE THE PUMPED WATER OR SHOULD BE PUMPED TO DESIGNED CONSTRUCTION DEWATERING DEVICES AS DESCRIBED IN THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK.

G. SEDIMENTS AND SOIL MATERIALS SHOULD BE SWEPT FROM PAVED SURFACES AT THE END OF EACH WORKDAY OR PRIOR TO RAIN EVENTS, WHENEVER POSSIBLE.

INSPECTION AND MAINTENANCE

A. A PERSON WITH KNOWLEDGE OF EROSION AND STORMWATER CONTROLS, INCLUDING THE STANDARDS IN THE MAINE CONSTRUCTION GENERAL PERMIT, THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK OR ANY MUNICIPAL REQUIREMENTS MUST CONDUCT THE INSPECTION. THIS PERSON MUST BE IDENTIFIED IN THE INSPECTION LOG. IF ADDITIONAL BMPS OR MODIFICATIONS TO BMPS ARE NECESSARY, THE MODIFICATIONS MUST BE IMPLEMENTED WITH 7 CALENDAR DAYS OR PRIOR TO ANY PRECIPITATION EVENT. ALL MEASURES MUST BE MAINTAINED IN EFFECTIVE OPERATING CONDITION UNTIL AREAS ARE PERMANENTLY STABILIZED.

B. AN INSPECTION AND MAINTENANCE LOG MUST BE KEPT BY THE CONTRACTOR, SUMMARIZING THE SCOPE OF THE INSPECTION, DATE, AND MAJOR OBSERVATIONS RELATING TO THE OPERATION OF EROSION AND SEDIMENT CONTROL BMPS, MATERIAL STORAGE AREAS, AND VEHICLE ACCESS POINTS TO THE CONSTRUCTION AREA. THE INSPECTION LOG SHOULD BE DELIVERED TO THE PROPERTY OWNER OR RESPONSIBLE CONTRACTING ENTITY UPON COMPLETION OF THE PROJECT.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INSPECTION AND MAINTENANCE DESCRIBED HEREIN.

D. EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED PRIOR TO INITIATING CONSTRUCTION ACTIVITIES, SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION, AND REMOVED UPON ACHIEVING FINAL STABILIZATION.

E. WET WEATHER INSPECTIONS SHALL BE CONDUCTED AFTER ALL RAIN EVENTS EXCEEDING 0.5-INCHES IN 24-HOURS.

F. ALL INSPECTION AND MAINTENANCE DOCUMENTATION SHALL BE KEPT AS PROJECT RECORD FOR A MINIMUM OF THREE YEARS.

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PROJECT TEAM:

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PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE · ASHLEY FLETCHER No. 13750 · LICENSED PROFESSIONAL ENGINEER

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2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

CIVIL DETAILS - 1

D-200

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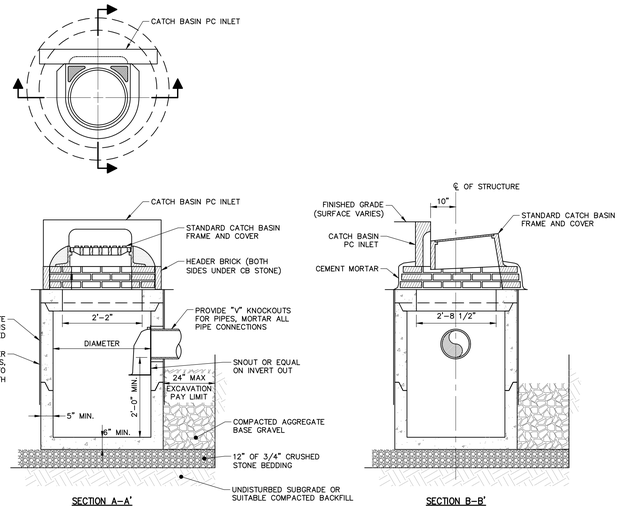
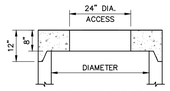
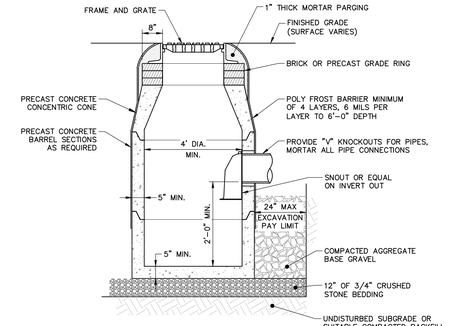


NOTES:
1. CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.
2. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS.

PRECAST CONCRETE CATCH BASIN WITH CURB INLET
N.T.S.



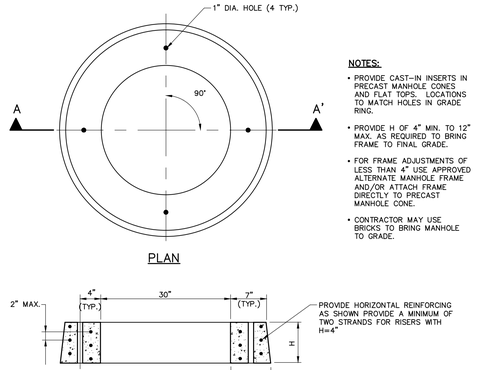
ALTERNATIVE TOP SLAB



NOTES:
1. PRECAST CONCRETE STRUCTURES AND CASTINGS SHALL BE SUITABLE FOR HS-20 LOADINGS.
2. PRECAST CONCRETE STRUCTURES SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478.
3. ALTERNATE TOP SLAB MAY BE USED AS DICTATED BY DESIGN AND/OR FIELD CONDITIONS.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
5. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS.

NOTE: CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.

PRECAST CONCRETE CATCH BASIN WITHOUT CURB INLET
N.T.S.

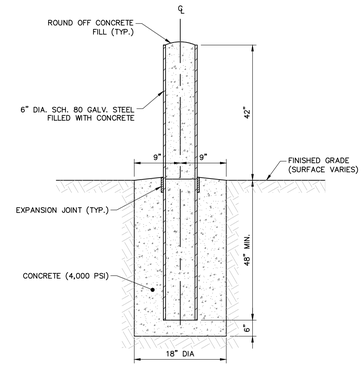


PLAN

SECTION A-A'

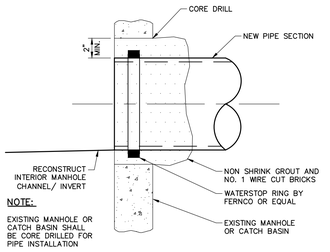
NOTES:
- PROVIDE CAST-IN INSERTS IN PRECAST MANHOLE CONES AND FLAT TOPS. LOCATIONS TO MATCH HOLES IN GRADE RING.
- PROVIDE H OF 4" MIN. TO 12" MAX. AS REQUIRED TO BRING FRAME TO FINAL GRADE.
- FOR FRAME ADJUSTMENTS OF LESS THAN 4" USE APPROVED ALTERNATE MANHOLE FRAME AND/OR ATTACH FRAME DIRECTLY TO PRECAST MANHOLE CONE.
- CONTRACTOR MAY USE BRICKS TO BRING MANHOLE TO GRADE.

PRECAST CONCRETE GRADE RING
N.T.S.



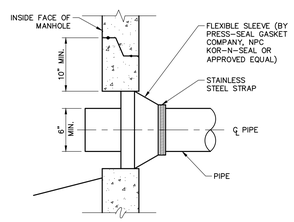
NOTE:
1. ALL BOLLARDS SHALL BE PAINTED. COLOR SELECTED BY OWNER.

6" DIA. SECURITY BOLLARD
N.T.S.

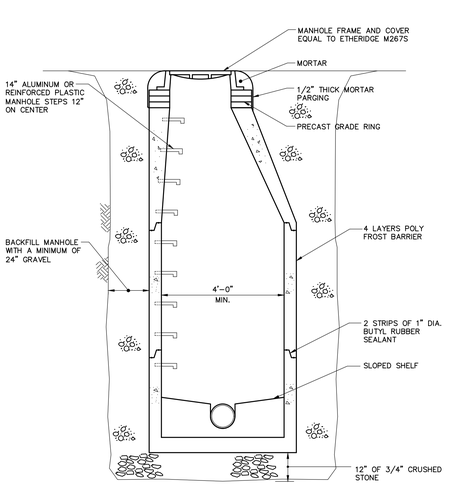


NOTE:
EXISTING MANHOLE OR CATCH BASIN SHALL BE CORE DRILLED FOR PIPE INSTALLATION

NEW PIPE TO EXISTING STRUCTURE
N.T.S.

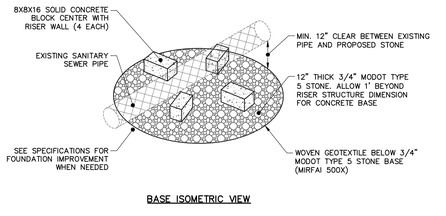


NEW PIPE TO NEW STRUCTURE CONNECTION DETAIL
N.T.S.

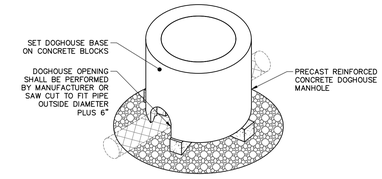


NOTES:
1. CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.
2. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS.

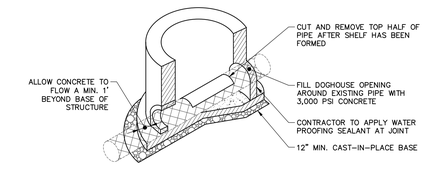
PRECAST MANHOLE
N.T.S.



BASE ISOMETRIC VIEW



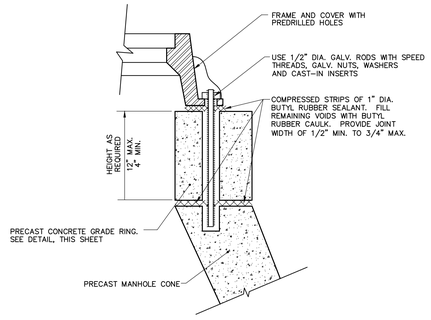
RISER ISOMETRIC VIEW



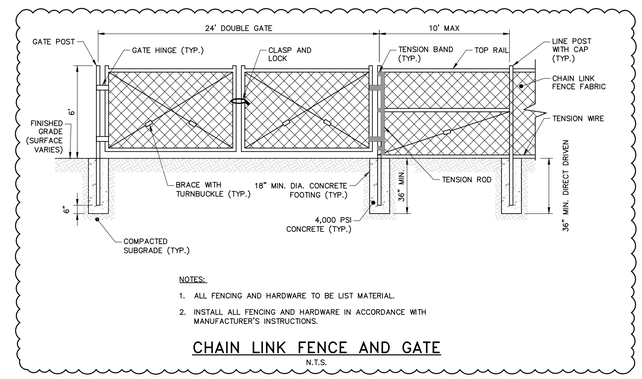
FOUNDATION SECTION VIEW

DOG HOUSE MANHOLE
N.T.S.

CLEANOUT
N.T.S.

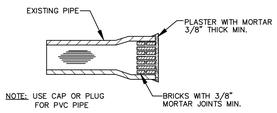


MANHOLE FRAME FASTENING
N.T.S.



NOTES:
1. ALL FENCING AND HARDWARE TO BE LIST MATERIAL.
2. INSTALL ALL FENCING AND HARDWARE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

CHAIN LINK FENCE AND GATE
N.T.S.



MASONRY PLUG
N.T.S.

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CIVIL ENGINEER
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PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
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GREY, ME 04039

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PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE · DARRIN B. STAIRS No. 15118 · LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
	08/09/21	Schematic Design
1	9/1/21	Response to City Comments

SUBMISSIONS:

Date	Issued For:

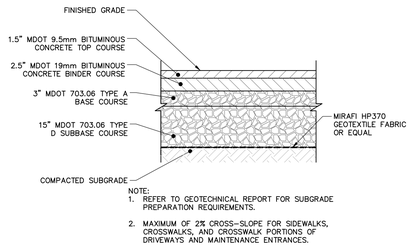
SCALE	**AS NOTED**
DATE ISSUED	**8/9/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**D.B.S.**

SHEET TITLE:

CIVIL DETAILS - 2

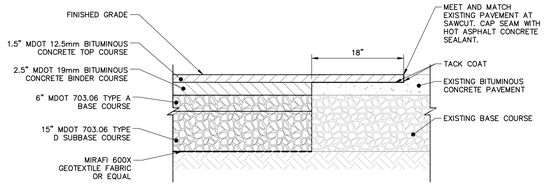
C-201

\\vedesktourrnet\shared\Projects\02330335.00 USM - Falmouth Street Garage\wip\Drawings\Civil\233035.00 C20X.dwg, Sep 07, 2021 - 9:20am BMCDEVITT

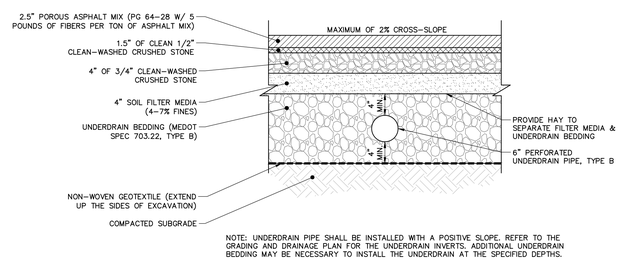


NOTE:
1. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS.
2. MAXIMUM OF 2% CROSS-SLOPE FOR SIDEWALKS, CROSSWALKS, AND CROSSWALK PORTIONS OF DRIVEWAYS AND MAINTENANCE ENTRANCES.

BITUMINOUS CONCRETE PAVEMENT SECTION
N.T.S.

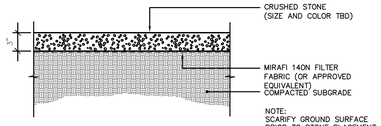


BITUMINOUS CONCRETE PAVEMENT BUTT JOINT
N.T.S.

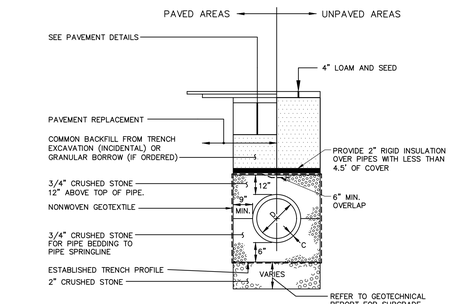


NOTE: UNDERDRAIN PIPE SHALL BE INSTALLED WITH A POSITIVE SLOPE. REFER TO THE GRADING AND DRAINAGE PLAN FOR THE UNDERDRAIN INVERTS. ADDITIONAL UNDERDRAIN BEDDING MAY BE NECESSARY TO INSTALL THE UNDERDRAIN AT THE SPECIFIED DEPTHS.

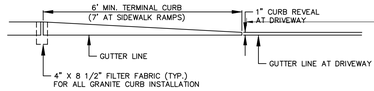
POROUS ASPHALT PAVEMENT
N.T.S.



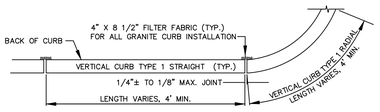
CRUSHED STONE AREA
N.T.S.



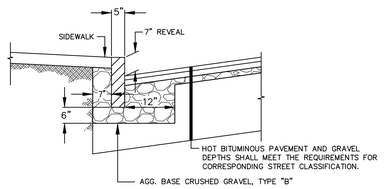
TYPICAL STORMDRAIN PIPE TRENCH INSTALLATION
N.T.S.



TERMINAL CURB PROFILE

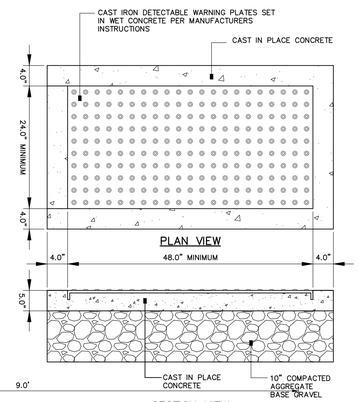


VERTICAL GRANITE CURB PLAN VIEW



VERTICAL GRANITE CURB CROSS SECTION

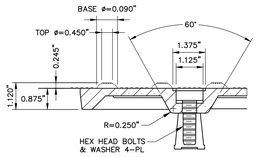
VERTICAL GRANITE CURB
N.T.S.



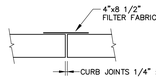
SECTION VIEW

SIDEWALK RAMP DETECTABLE WARNING
N.T.S.

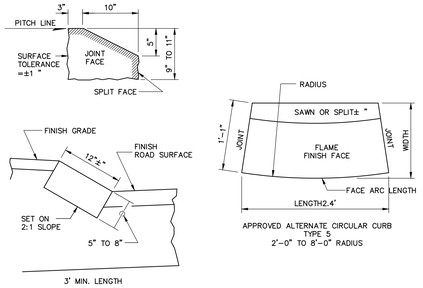
NOTES:
1. ALL DETECTABLE WARNING PLATES SHALL BE UNCOATED CAST IRON. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.
2. CAST IN PLACE CONCRETE SHALL MEET SPECIFICATIONS FOR MAINE D.O.T. CLASS A STRUCTURAL CONCRETE, MINIMUM COMPRESSIVE STRENGTH 4,000 PSI. THE EXPOSED CONCRETE BORDER SHALL RECEIVE A UNIFORM BROOM FINISH PERPENDICULAR TO THE FLOW OF PEDESTRIAN TRAFFIC.
3. TRUNCATED DOMES SHALL BE ALIGNED IN ROWS, PARALLEL AND PERPENDICULAR TO THE PREDOMINANT DIRECTION OF TRAVEL. TRUNCATED DOME BRICKS AND GRANITE PAVERS ARE NOT ALLOWED.
4. SIZE: THE DETECTABLE WARNING PLATES SHALL EXTEND 24 INCHES MINIMUM IN THE DIRECTION OF TRAVEL AND THE PLATE WIDTH AND CONCRETE SHALL EXTEND THE WIDTH OF THE CURB RAMP, LANDING, OR BLENDING TRANSITION TO THE STREET.
5. ORIENTATION: THE DETECTABLE WARNING PANEL SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS 6 INCHES MINIMUM AND 8 INCHES MAXIMUM FROM THE CURB LINE. THE PANEL SHALL BE ORIENTED TO THE DIRECTION OF TRAVEL AS IDENTIFIED BY THE POINT OF EGRESS.



BOLT DETAIL

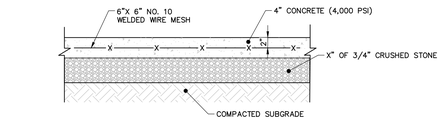


PLAN



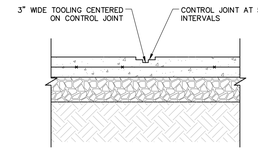
APPROVED ALTERNATE CIRCULAR CURB TYPE 5
2'-0" TO 8'-0" RADIUS

TYPICAL TYPE 5 SLOPED GRANITE CURB INSTALLATION
N.T.S.

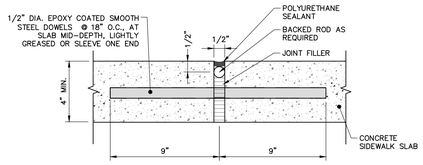


NOTES:
1. PROVIDE 1/2-INCH PREMOLDED BITUMINOUS EXPANSION JOINTS AT 20 FT. INTERVALS.
2. PROVIDE CONTROL JOINTS AT 5-FEET INTERVALS.
3. PROVIDE LIGHT BROOM FINISH WITH 3-INCH EDGE.

CAST-IN-PLACE CONCRETE SIDEWALK
NOT TO SCALE

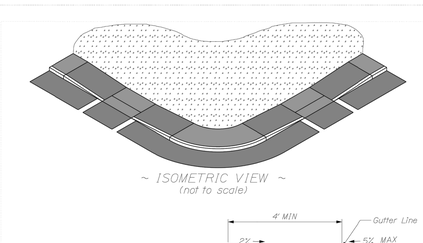


SIDEWALK CONTROL JOINT
NOT TO SCALE



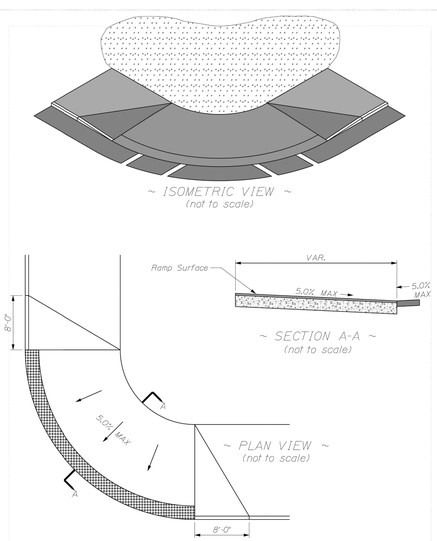
NOTES:
1. EXPANSION JOINTS SHALL BE 60' O.C.
2. DISCONTINUE REINFORCING AT EACH SIDE OF JOINT.
3. DOWELS SHALL BE CUT STRAIGHT AND DEBURRED.

CONCRETE SIDEWALK EXPANSION JOINT
NOT TO SCALE



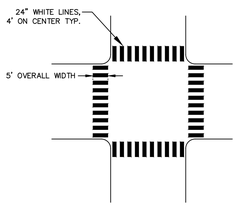
Note:
- This desirable design is the prefered option. Use other options only when required by design constraints.

PARALLEL PEDESTRIAN RAMP - OPTION I
801(14)

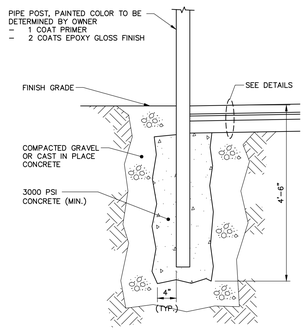


Note:
This option should only be used after all other options have been considered and deemed infeasible.

BLENDED TRANSITION
801(26)



CROSSWALK MARKINGS
N.T.S.



POST SPECIFICATION			
TYPE	HEIGHT ABOVE FIN. GRADE	POST DIAMATER	POST MATERIAL
STREET SIGNAGE	7'-0"	2 3/8" (I.D.)	GALV. STEEL

TYPICAL POST DETAIL
N.T.S.

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PROJECT TEAM:

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PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN
41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING
160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
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PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE · ASHLEY FLETCHER No. 13750 · LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

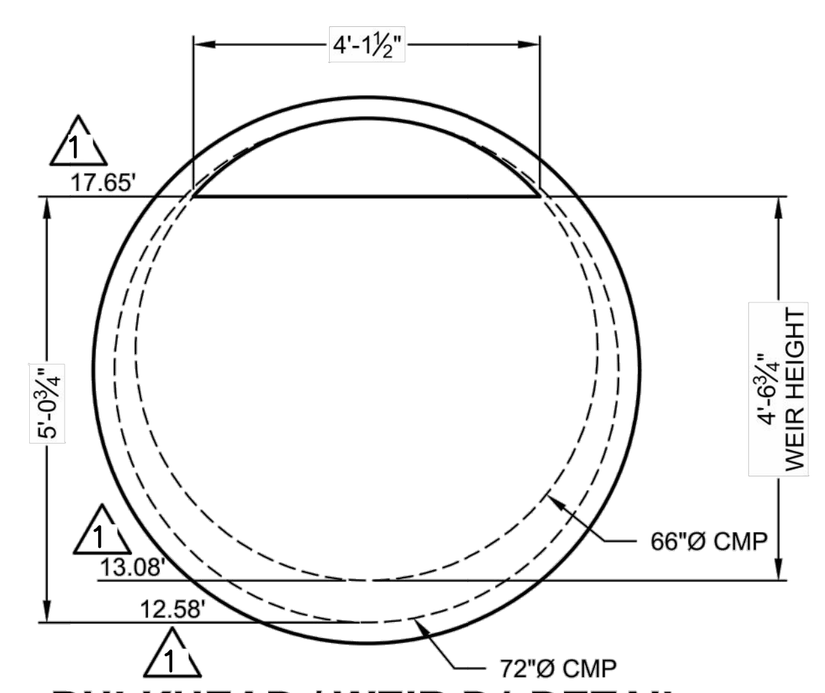
SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

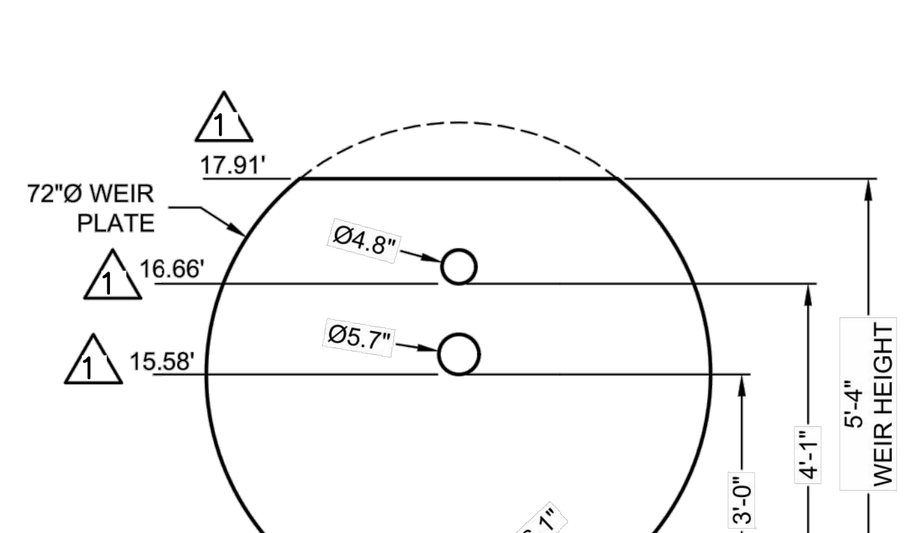
CIVIL DETAILS - 3

D-202

\\woodardcurran.net\shared\Projects\20233035.00 usm - falmouth street garage\wip\Drawings\Civil\233035.00 C20X.dwg, Jul 29, 2021 - 2:51pm BMCDEVITT



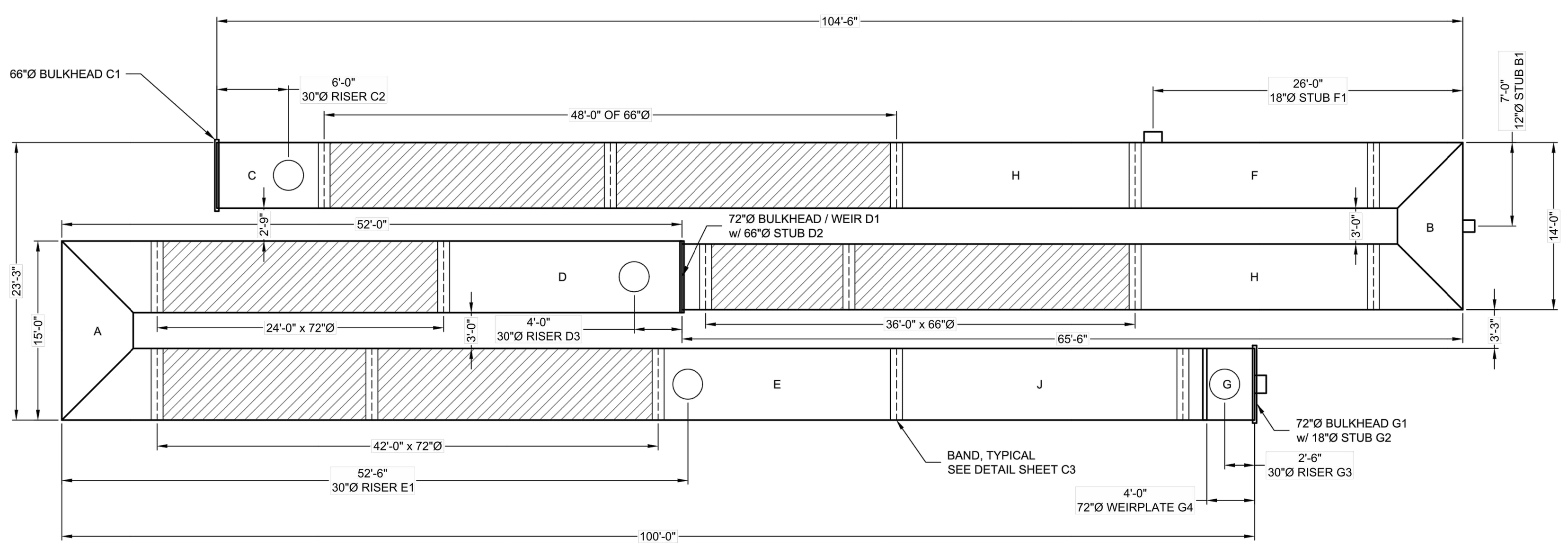
BULKHEAD / WEIR D1 DETAIL
NOT TO SCALE



WEIR PLATE G4 DETAIL
NOT TO SCALE

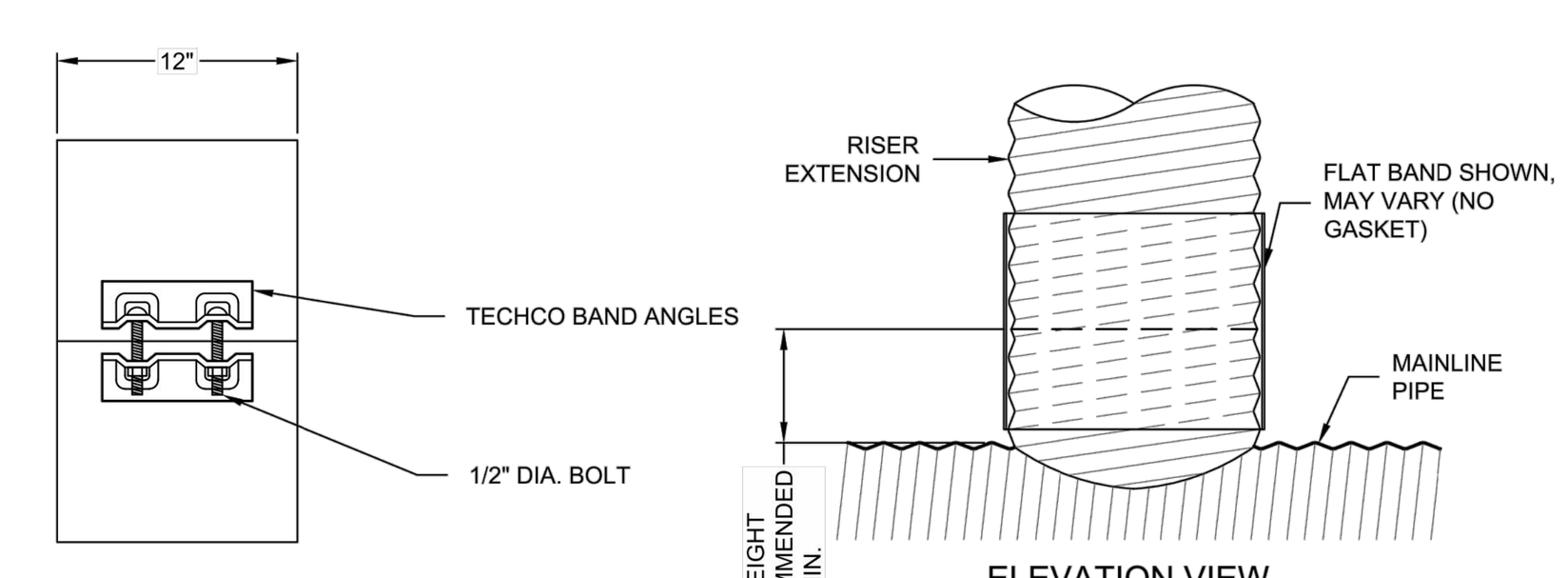
RISER INFORMATION		
PIECE	RIM ELEV.	SYSTEM INVERT
30"Ø RISER C2	20.38	13.08
30"Ø RISER D3	20.60	12.58
30"Ø RISER E1	20.39	12.58
30"Ø RISER G3	21.27	12.58

STUB INFORMATION		
PIECE	STUB INVERT	SYSTEM INVERT
12"Ø STUB B1	13.58	13.08
66"Ø STUB D2	13.08	12.58
18"Ø STUB F1	13.58	13.08
18"Ø STUB G2	12.58	12.58



CMP STORAGE SYSTEM HAS BEEN PREVIOUSLY PROCURED, BUT WILL NEED TO BE MODIFIED AND SUPPLEMENTED WITH ADDITIONAL MATERIALS AS SHOWN.

ASSEMBLY
SCALE: 1" = 10'
PIPE STORAGE: 8492.5 CF
LOADING: H20
66" PIPE INV. = 13.08±
72" PIPE INV. = 12.58±



CONNECTION DETAIL
7 1/2" TECHCO SHOWN - MAY VARY

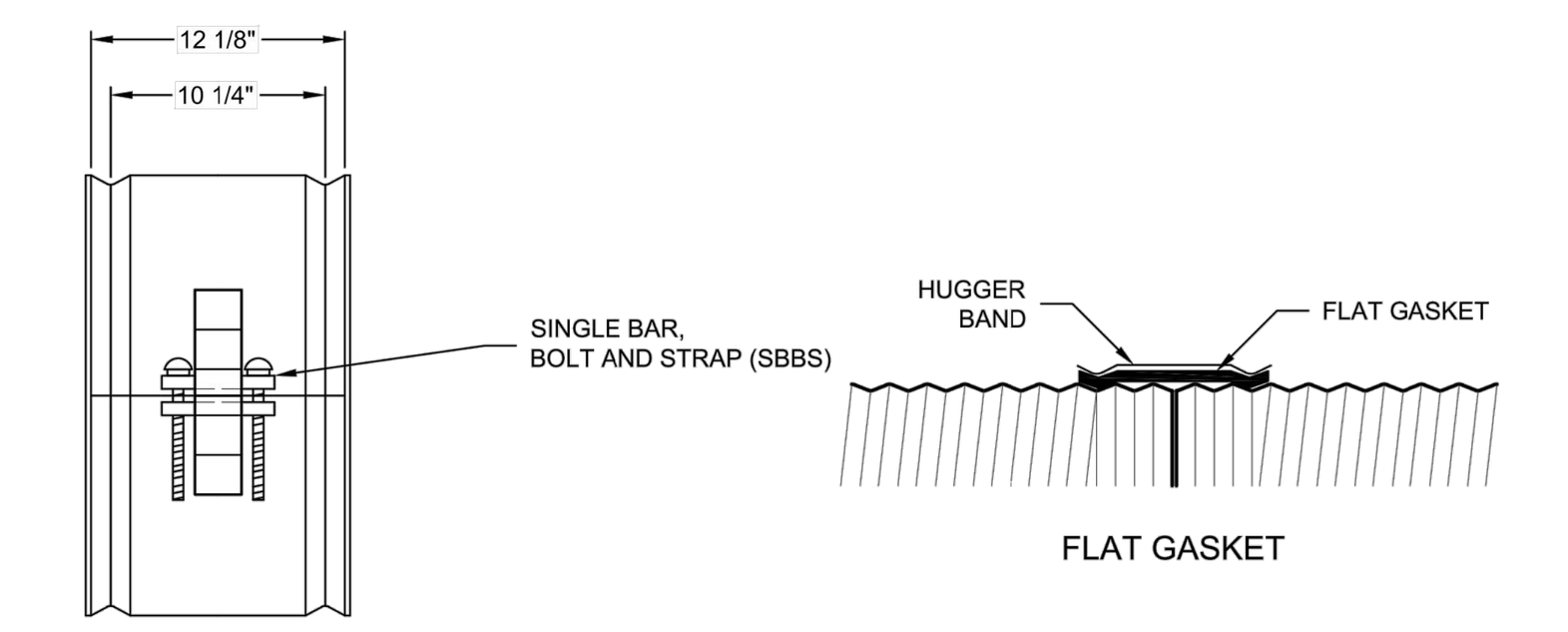
ELEVATION VIEW
OF CMP AND RISER

PLAIN END CMP RISER PIPE

GENERAL NOTES:

1. **DELIVERED BAND STYLE AND FASTENER TYPE MAY VARY BY FABRICATION PLANT.**
2. JOINT IS TO BE ASSEMBLED PER AASHTO BRIDGE CONSTRUCTION SPECIFICATION SEC 26.4.2.4.
3. BAND MATERIAL AND GAGE TO BE SAME AS RISER MATERIAL.
4. IF RISER HAS A HEIGHT OF COVER OF 10' OR MORE, USE A SLIP JOINT.
5. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
   - 12" THRU 48" 1-PIECE
   - 54" 2-PIECES
6. ALL RISER JOINT COMPONENTS WILL BE FIELD ASSEMBLED.
7. MANHOLE RISERS IN APPLICATIONS WHERE TRAFFIC LOADS ARE IMPOSED REQUIRE SPECIAL DESIGN CONSIDERATIONS.
8. DIMENSIONS SUBJECT TO MANUFACTURING TOLERANCES.

12" RISER BAND DETAIL
NOT TO SCALE



CONNECTION DETAIL
(SBBS)

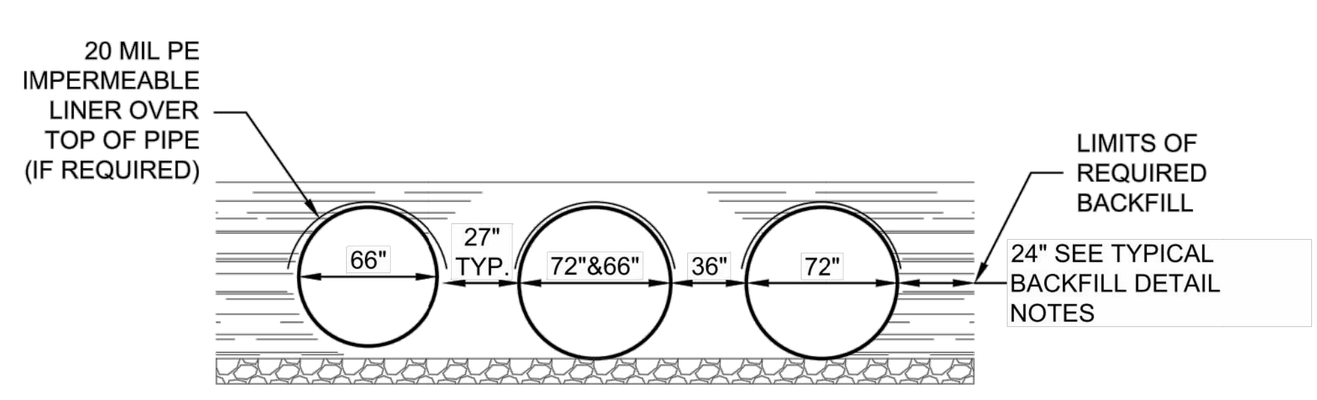
FLAT GASKET

2 2/3"x1/2" RE-ROLLED END HEL-COR PIPE

GENERAL NOTES:

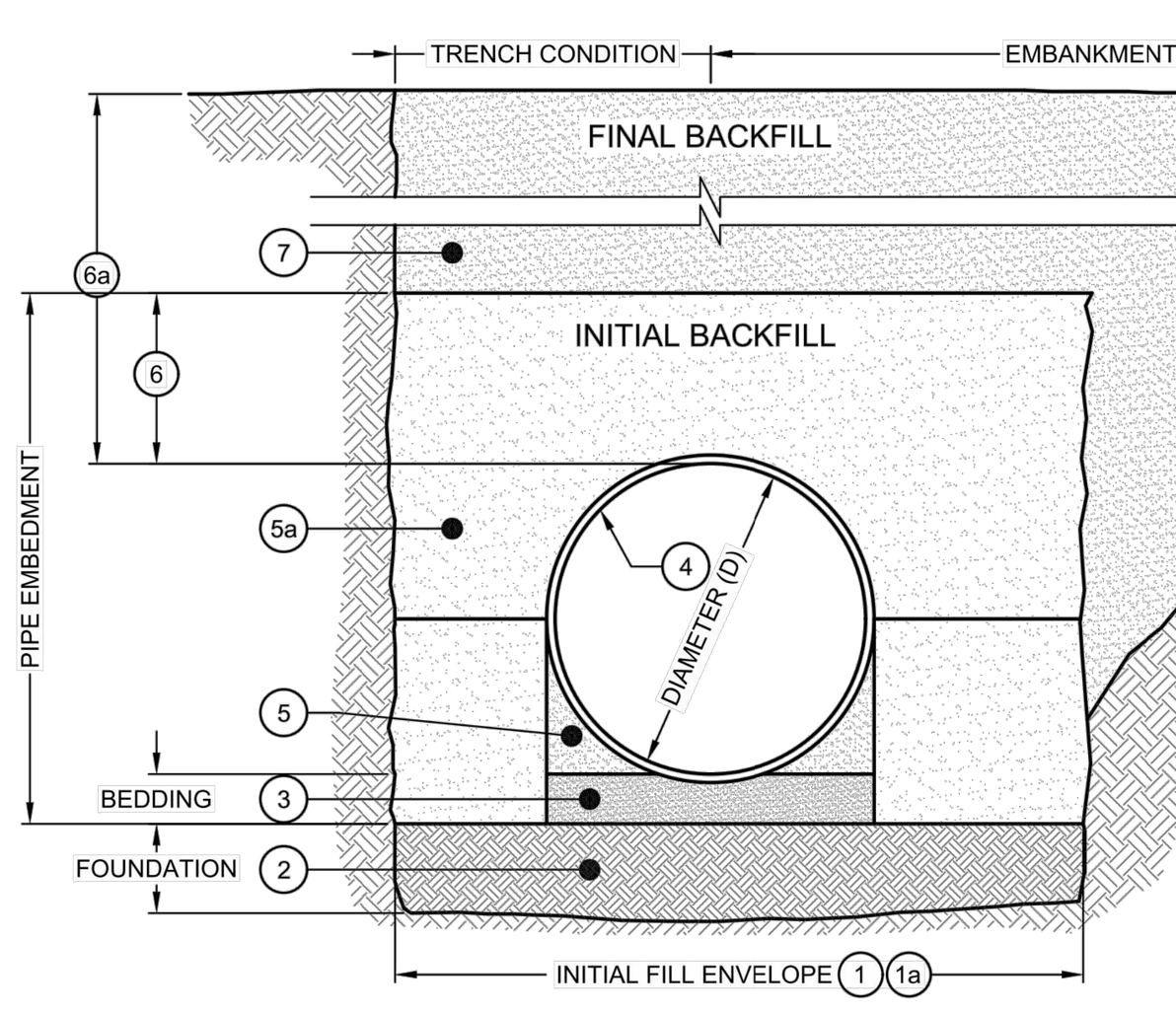
1. JOINT IS TO BE ASSEMBLED PER AASHTO BRIDGE CONSTRUCTION SPECIFICATION SEC 26.4.2.4.
2. BAND MATERIALS AND/OR COATING CAN VARY BY LOCATION. CONTACT YOUR CONTECH REPRESENTATIVE FOR AVAILABILITY.
3. BANDS ARE SHAPED TO MATCH THE PIPE-ARCH WHEN APPLICABLE.
4. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
   - 12" THRU 48" 1-PIECE
   - 54" THRU 96" 2-PIECES
   - 102" THRU 144" 3-PIECES
5. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS.
6. ALL CMP IS REROLLED TO HAVE ANNULAR END CORRUGATIONS OF 2 2/3"x1/2"
7. DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
8. ORDER SHALL DESIGNATE GASKET OPTION, IF REQUIRED (SEE DETAILS ABOVE).

H-12 HUGGER BAND DETAIL
NOT TO SCALE



TYPICAL SECTION VIEW
NOT TO SCALE

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.



DIAMETER	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
54"-96"	12"	3" x 1", 5" x 1"
102"-144"	D/8	3" x 1", 5" x 1"

BACKFILL REQUIREMENTS FOLLOW THE GUIDELINES OF AASHTO LRFD BRIDGE DESIGN (SEC 12) AND CONSTRUCTION (SEC 26)

1 MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE.
THE MINIMUM TRENCH WIDTH (12.6.6.1):
PIPE ≤ 12": D + 16"
PIPE > 12": 1.5D + 12"

1a MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE (12.6.6.2):
PIPE < 24": 3.0D
PIPE 24" - 144": D + 4'0"
PIPE > 144": D + 10'0"

2 THE FOUNDATION UNDER THE PIPE AND SIDE BACKFILL SHALL BE ADEQUATE TO SUPPORT THE LOADS ACTING UPON IT (26.5.2).

3 ENGINEER TO DETERMINE IF BEDDING IS REQUIRED. BEDDING MATERIAL SHALL BE A RELATIVELY LOOSE MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, AND A MINIMUM OF TWICE THE CORRUGATION DEPTH IN THICKNESS, WITH THE MAXIMUM PARTICLE SIZE OF ONE-HALF OF THE CORRUGATION DEPTH (26.3.8.1, 26.5.3).

4 CORRUGATED STEEL PIPE (CSP / HEL-COR).

5 HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION (26.5.4).

5a INITIAL BACKFILL FOR PIPE EMBEDMENT TO MEET AASHTO A-1, A-2 OR A-3 CLASSIFICATION, OR APPROVED EQUAL, COMPACTED TO 90% STANDARD PROCTOR (T 99). MAXIMUM PARTICLE SIZE NOT TO EXCEED 3" (12.4.1.2). ALL LIFTS PLACED IN A CONTROLLED MANNER. IT IS RECOMMENDED THAT LIFTS NOT EXCEED AN 8" UNCOMPACTED LIFT HEIGHT TO PREVENT UNEVEN LOADING, AND THE LESSER OF 1/3 THE DIAMETER OR 24" AS THE MAXIMUM DIFFERENTIAL SIDE-TO-SIDE (26.5.4).

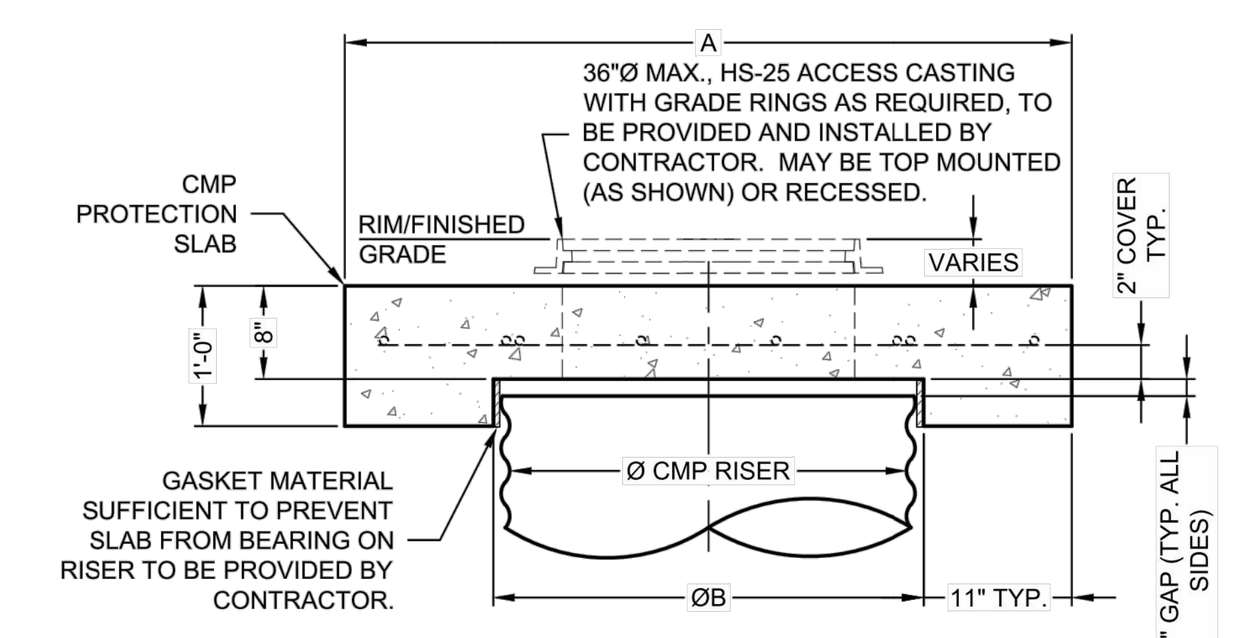
6 INITIAL BACKFILL ABOVE PIPE MAY INCLUDE ROAD BASE MATERIAL (AND RIGID PAVEMENT IF APPLICABLE). SEE TABLE ABOVE.

6a TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT (12.6.6.3).

7 FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD (26.5.4.1).

NOTES:
- ENGINEER TO DETERMINE IF GEOTEXTILE SHOULD BE USED TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES (PROJECT ENGINEER).
- FOR MULTIPLE BARREL INSTALLATIONS THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE PIPE DIA./2 BUT NO LESS THAN 12", OR 36" FOR PIPE DIAMETERS 72" AND LARGER.
- CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING (TABLE C12.6.7-1).

TYPICAL BACKFILL DETAIL
NOT TO SCALE

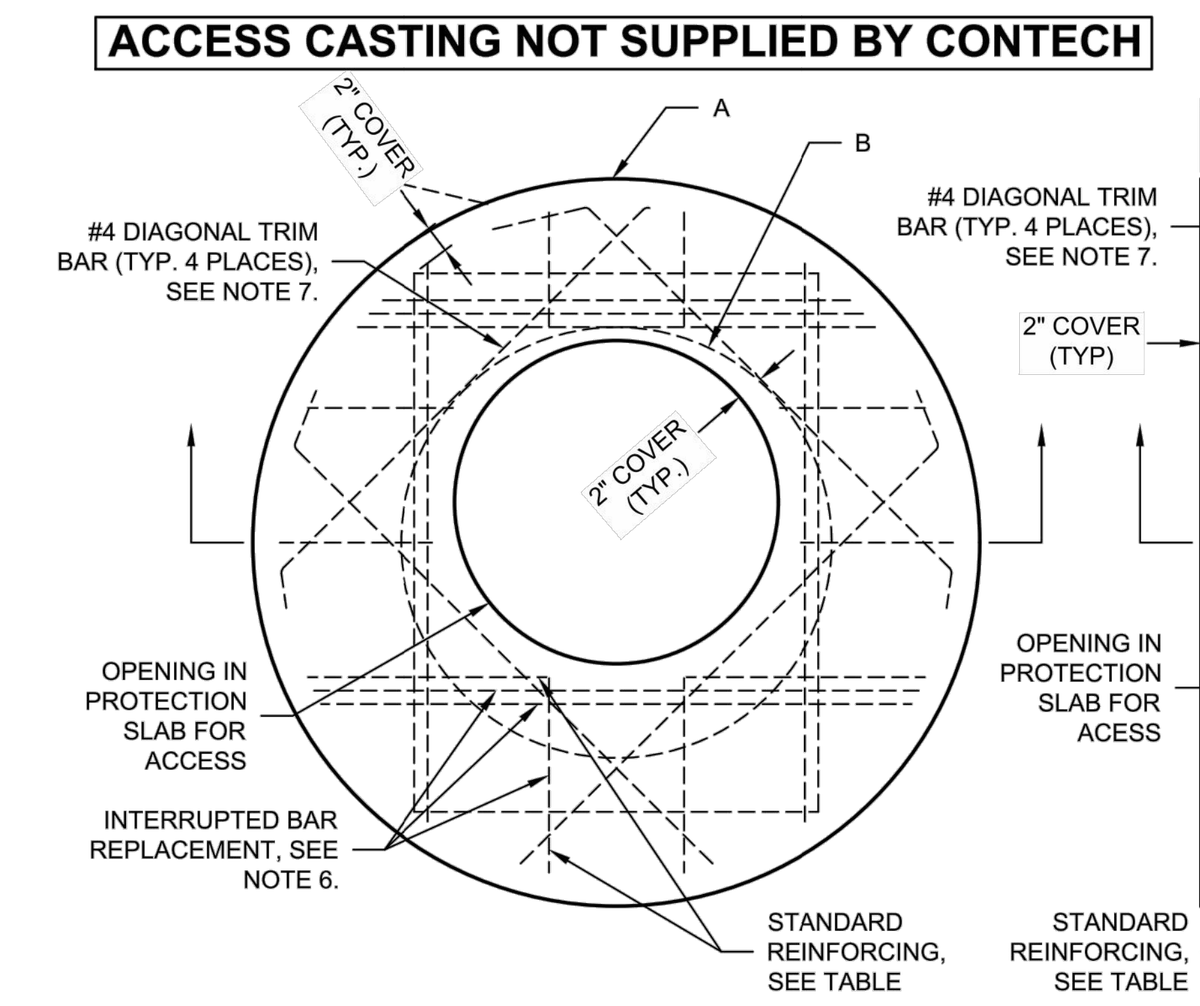


SECTION VIEW

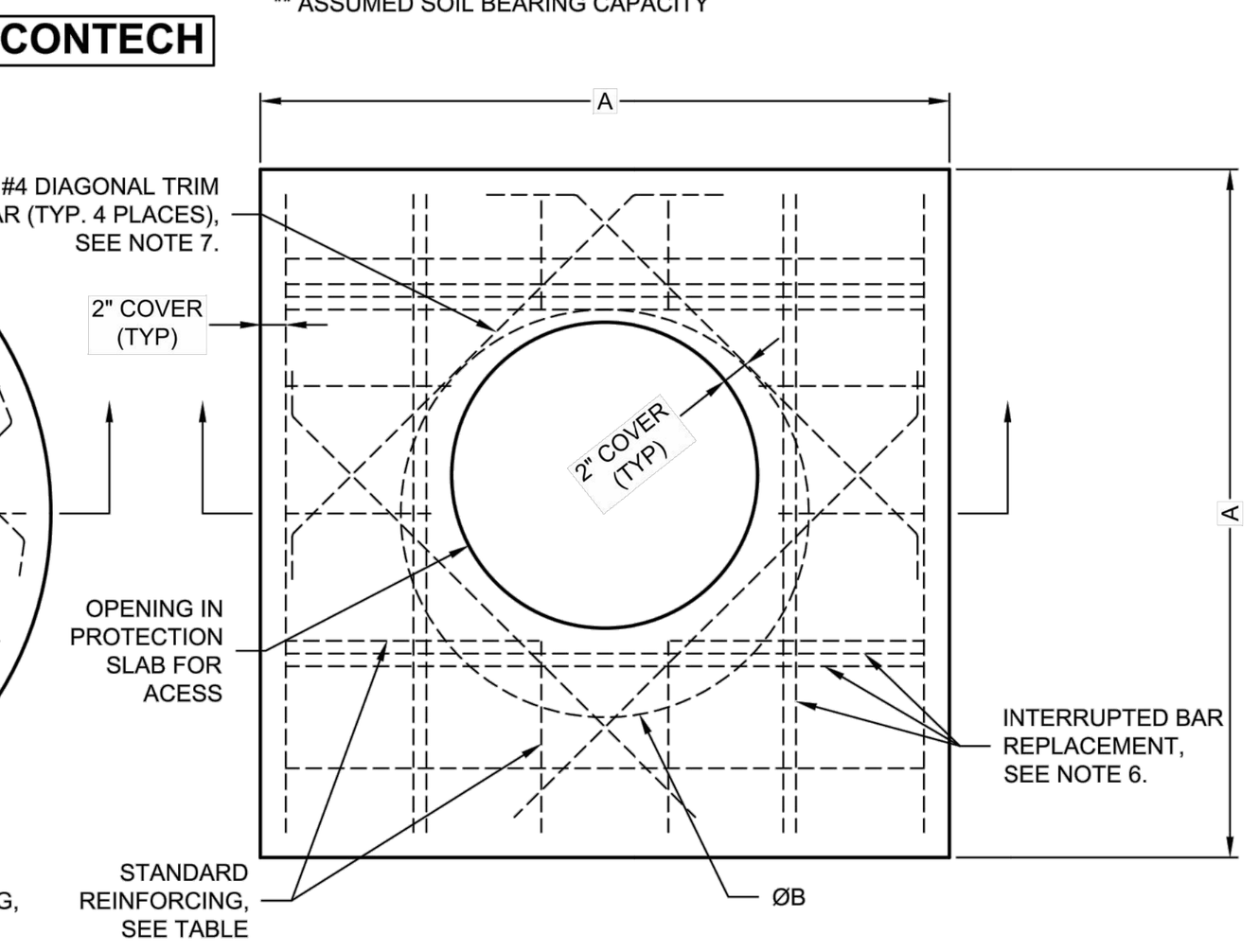
ACCESS CASTING NOT SUPPLIED BY CONTECH

REINFORCING TABLE				
Ø CMP RISER	A	B Ø	REINFORCING	**BEARING PRESSURE (PSF)
24"	4'Ø 4'x4'	26"	#5 @ 10" OCEW #5 @ 10" OCEW	2,540 1,900
30"	4'-6"Ø 4'-6" x 4'-6"	32"	#5 @ 10" OCEW #5 @ 9" OCEW	2,260 1,670
36"	5'Ø 5' x 5'	38"	#5 @ 9" OCEW #5 @ 8" OCEW	2,060 1,500
42"	5'-6"Ø 5'-6" x 5'-6"	44"	#5 @ 8" OCEW #5 @ 8" OCEW	1,490 1,370
48"	6'Ø 6' x 6'	50"	#5 @ 7" OCEW #5 @ 7" OCEW	1,210 1,270

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION AND ACI 350.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 4,000 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERS, ARCHITECTS AND LAND SURVEYORS, ENDWELL, NY.

MANHOLE CAP DETAIL
NOT TO SCALE

NOTE: CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.

CMP STORAGE SYSTEM DETAILS
N.T.S.

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

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UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT & STRUCTURAL ENGINEER
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41 HUTCHINS DRIVE
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LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
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ALLIED ENGINEERING
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GEOTECHNICAL ENGINEER
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286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
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BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE
ASHLEY FLETCHER
No. 13750
LICENSED
PROFESSIONAL ENGINEER

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2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

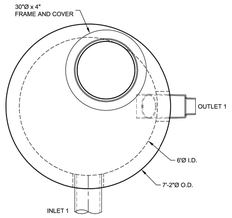
SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

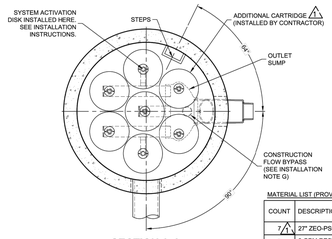
CIVIL DETAILS - 4

D-203

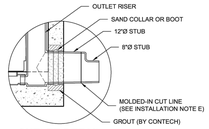
\\woodardcurran.net\shared\Projects\0233035.00 usm - falmouth street garage\wip\Drawings\Civil\233035.00 C20X.dwg, Jul 29, 2021 - 2:52pm BMCDEVITT



PLAN VIEW
CARTRIDGES AND FLOW KIT NOT SHOWN



SECTION A-A

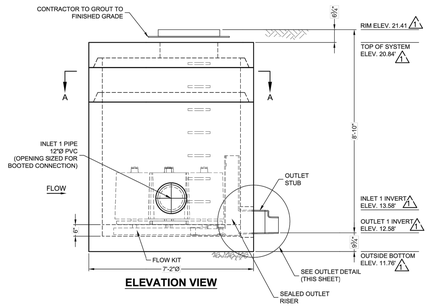


OUTLET DETAIL
(ILLUSTRATION ONLY)

• INLET PIPE CONNECTION SHALL HAVE A BOOTED CONNECTOR

MATERIAL LIST (PROVIDED BY CONTECH)

COUNT	DESCRIPTION	INSTALLED BY
7 1	27" ZEO-PSORB CARTRIDGE	CONTECH
7	2 GPM RESTRICTOR DISK (BLK)	CONTECH
0 1	2" PVC SLIP PLUG	CONTECH
1	42A FLOWKIT	CONTECH
1	SF ACTIVATION DISK	CONTECH
1	SEALED OUTLET RISER	CONTECH
7	STEPS, P10CTS, LANE LADDER, OR EQUIV.	CONTECH
1	GENERIC PIPE BOOT	CONTECH
1	SEALANT FOR JOINTS	CONTRACTOR
1	30"Ø x 4" FRAME & COVER, EJ#41600484, OR EQUIV.	CONTRACTOR



ELEVATION VIEW

PERFORMANCE SPECIFICATION
FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
SPECIFIC FLOW RATE SHALL BE 0 GPM/SF (MAXIMUM). SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE 6 GPM/CF OF MEDIA (MAXIMUM).

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STORMFILTER STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

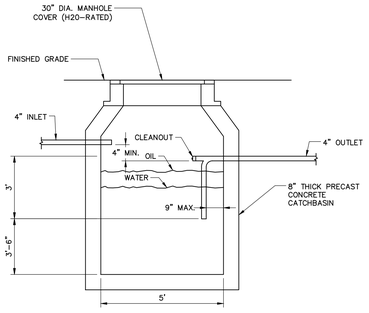
INSTALLATION NOTES
A. ANTI-FLOTATION PROVISIONS SHALL BE DESIGNED AND PROVIDED BY CONTRACTOR.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET PIPE(S). ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO PROVIDE AND INSTALL CONNECTOR TO THE OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB. IF OUTLET PIPE IS LARGER THAN 8 INCHES, CONTRACTOR TO REMOVE THE 8 INCH OUTLET STUB AT MOLDED IN CUT LINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
G. CONTRACTOR TO INSTALL SUPPLIED PLUG IN CONSTRUCTION FLOW BYPASS WHEN SYSTEM IS BROUGHT ON LINE (PRESSURE FIT ONLY, DO NOT GLUE).

STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK = 18,000 LBS. OF 3 PIECES
BASE SECTION SHIPPED WITH CARTRIDGES INSTALLED
MAX FOOTPRINT = 07'-2"

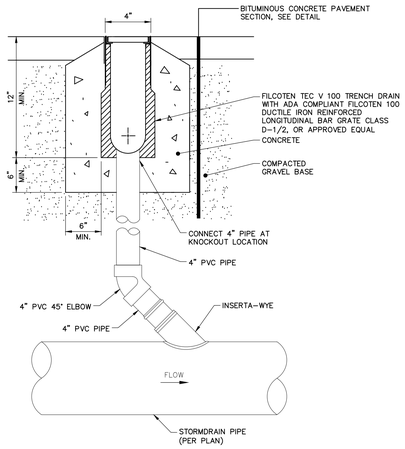
1 STORMFILTER STRUCTURE HAS BEEN PREVIOUSLY PROCURED, BUT WILL NEED TO BE MODIFIED AND SUPPLEMENTED WITH ADDITIONAL CARTRIDGE AS SHOWN.

NOTE: CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.

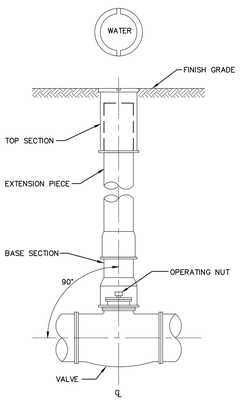
STORMFILTER DETAIL
N.T.S.



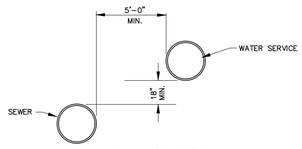
OIL WATER SEPARATOR
N.T.S.



TRENCH DRAIN DETAIL
N.T.S.



VALVE WITH VALVE BOX, 18" AND SMALLER
N.T.S.



UNUSUAL CONDITION PARALLEL INSTALLATION

NOTES:

THE SEPARATION OF WATER MAINS AND SEWERS SHALL COMPLY WITH THE FOLLOWING GENERAL REQUIREMENTS.

A. PARALLEL INSTALLATION:

1. NORMAL CONDITIONS: THE INSIDE EDGE OF A WATER MAIN SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM THE INSIDE EDGE OF ANY SANITARY SEWER, STORM SEWER OR SEWER MANHOLE.
2. UNUSUAL CONDITIONS: WHEN LOCAL CONDITIONS PREVENT A HORIZONTAL SEPARATION OF 10 FEET, THE INSIDE EDGE OF A WATER MAIN MAY BE LAID A MINIMUM OF 5 FEET FROM THE INSIDE EDGE OF A SEWER PROVIDED THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES HIGHER THAN THE TOP OF THE SEWER (SEE DETAIL).

B. CROSSINGS:

1. NORMAL CONDITIONS: WHENEVER POSSIBLE, THE BOTTOM OF THE WATER MAIN SHALL BE AT LEAST 18 INCHES HIGHER THAN THE TOP OF THE SEWER.
2. UNUSUAL CONDITIONS: IF A WATER MAIN MUST CROSS UNDER A SEWER, THE TOP OF THE WATER MAIN SHALL BE AT LEAST 18 INCHES LOWER THAN THE BOTTOM OF THE SEWER, THE WATER MAIN PIPE SHALL BE CENTERED AT THE CROSSING SO THAT THE JOINTS ARE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER, AND ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO PREVENT EXCESSIVE DEFLECTION OF THE SEWER AT THE CROSSING.

MINIMUM WATER AND SEWER PIPE SEPARATION DETAIL
NTS

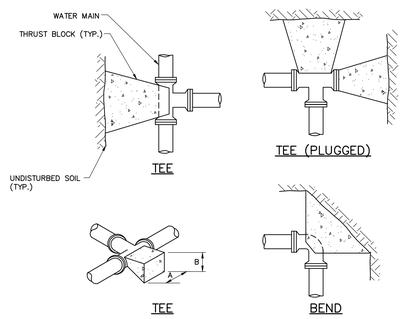
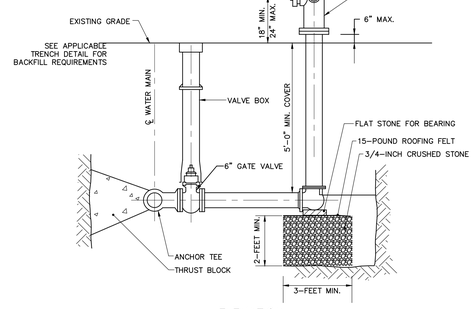


TABLE 1: 4" THRU 10" FITTINGS				
SOIL TYPE	TEES		BENDS	
	A	B	A	B
SOFT CLAY	48"	24"	48"	24"
SAND	24"	24"	24"	24"
GRAVEL	24"	18"	24"	18"

TABLE 2: 12" THRU 16" FITTINGS				
SOIL TYPE	TEES		BENDS	
	A	B	A	B
SOFT CLAY	60"	36"	72"	36"
SAND	36"	30"	48"	30"
GRAVEL	30"	24"	40"	24"

NOTES:
1. CONCRETE FOR ALL THRUST BLOCKS TO BE MINIMUM 3,000 PSI., 28 DAY STRENGTH, TYPE I CEMENT, 3/4" STONE.
2. WHERE POSSIBLE, CONSTRUCT THRUST BLOCKS AGAINST UNDISTURBED SOIL. WHERE NOT POSSIBLE, PLACE FILL BETWEEN THE THRUST BLOCK AND THE UNDISTURBED SOIL COMPACTED TO 95% STANDARD PROCTOR DENSITY.
3. WRAP FITTINGS WITH POLYETHYLENE PRIOR TO CONSTRUCTING THRUST BLOCKS. NO JOINTS SHALL BE COVERED WITH CONCRETE.
4. THRUST BLOCK DIMENSIONS ARE BASED ON A MAXIMUM WATER MAIN PRESSURE OF 150 PSI.

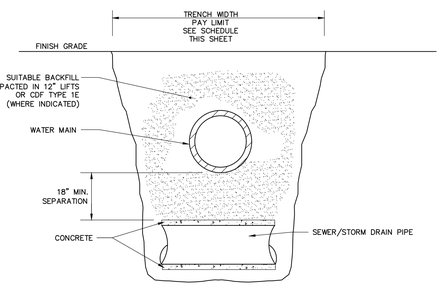
TYPICAL THRUST BLOCK DETAIL
N.T.S.



ELEVATION

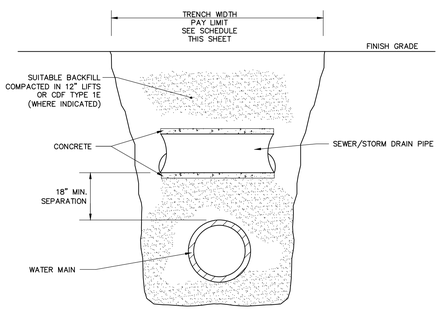
HYDRANT DETAIL
N.T.S.

NOTES:
- ALL JOINTS FOR HYDRANT INSTALLATION SHALL BE APPROVED RETAINER GLANDS.
- HYDRANT LATERALS SHALL BE CONSTRUCTED FROM ONE CONTINUOUS PIPE LENGTH. HYDRANT LATERALS WITH BELL JOINTS AND COUPLINGS SHALL NOT BE ACCEPTED.
- CONTRACTOR SHALL CONSTRUCT A HYDRANT DRAINING SUMP TO EITHER SIDE OF THE HYDRANT. THE HYDRANT DRAINING SUMP SHALL BE 3-FEET WIDE BY 2-FEET IN DEPTH. THE SUMP SHALL CONSIST OF 3/4-INCH GRAVEL STONE WITH 15-POUND ROOFING FELT LAID OVER THE 3/4-INCH GRAVEL STONE.



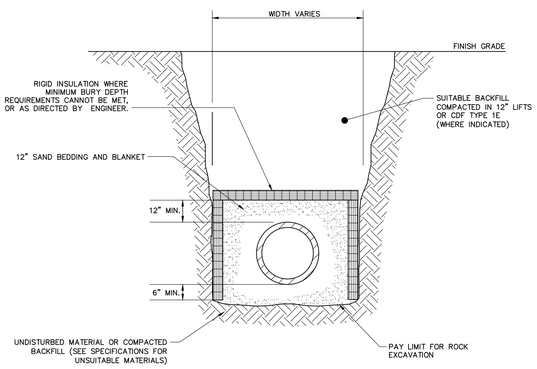
NOTE:
SEE ADDITIONAL REQUIREMENTS AS SPECIFIED IN SECTION 33 10 00, ARTICLE 3.030.

TYPICAL UTILITY CROSSING TRENCH DETAIL 1
N.T.S.

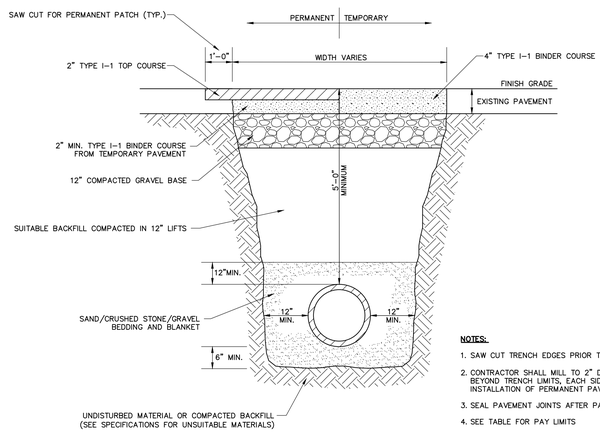


NOTE:
SEE ADDITIONAL REQUIREMENTS AS SPECIFIED IN SECTION 33 10 00, ARTICLE 3.030.

TYPICAL UTILITY CROSSING TRENCH DETAIL 2
N.T.S.



TYPICAL TRENCH DETAIL FOR PIPE INSULATION
N.T.S.



NOTES:
1. SAW CUT TRENCH EDGES PRIOR TO EXCAVATING.
2. CONTRACTOR SHALL MILL TO 2" DEPTH, 1'-0" BEYOND TRENCH LIMITS, EACH SIDE, PRIOR TO INSTALLATION OF PERMANENT PAVEMENT.
3. SEAL PAVEMENT JOINTS AFTER PAVING.
4. SEE TABLE FOR PAY LIMITS

TYPICAL WATER TRENCH DETAIL
N.T.S.

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PROJECT:

USM - Structured Parking Garage

Address

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REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

CIVIL DETAILS - 5

D-204

\\woodardcurran.net\shared\Projects\20233035.00 usm - falmouth street garage\wip\Drawings\Civil\233035.00 C20X.dwg, Jul 29, 2021 - 2:52pm BMCDEVITT

A	AMPERE	MLO	MAIN LUG ONLY
AC	ALTERNATING CURRENT	MT	MOUNT
AFF	ABOVE FINISHED FLOOR	MTS	MANUAL TRANSFER SWITCH
AFG	ABOVE FINISHED GRADE	MCP	MOTOR CONTROL PANEL
AHU	AIR HANDLING UNIT	MH	METAL HALIDE
AIC	AMPERES INTERRUPTING CAPACITY	MDP	MAIN DISTRIBUTION PANEL
		MIN	MINIMUM
ATS	AUTOMATIC TRANSFER SWITCH	N	NEUTRAL
AWG	AMERICAN WIRE GAUGE	NC	NORMALLY CLOSED
BAS	BUILDING AUTOMATION SYSTEM	NEC	NATIONAL ELECTRICAL CODE
BKBD	BACKBOARD	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
C	CONDUIT		
CAT	CATALOG, CATEGORY	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
CATV	CABLE TV		
CB	CIRCUIT BREAKER	NIC	NOT IN CONTRACT
CCTV	CLOSED CIRCUIT TELEVISION	NF	NON-FUSED
CM	CIRCULAR MILS	NO	NORMALLY OPEN
COMM	COMMUNICATIONS	NO., #	NUMBER
CU	MECH CONDENSING UNIT	NTS	NOT TO SCALE
CU	COPPER	OC	ON CENTER
CUH	CABINET UNIT HEATER	OCC	OCCUPANCY
DC	DIRECT CURRENT	OH	OVERHEAD
DDC	DIGITAL DIRECT CONTROL	P	POLE
DN	DOWN	PA	PUBLIC ADDRESS
DW	DISHWASHER	PB	PULLBOX
DWG	DRAWING	PH,	PHASE
EF	EXHAUST FAN	PIR	PASSIVE INFRARED
ELEV	ELEVATOR	PNL	PANELBOARD
EMT	ELECTRICAL METALLIC TUBING	P/O	PART OF
EP	EXPLOSION PROOF	PV	PHOTOVOLTAIC
ERU	ENERGY RECOVERY UNIT	PVC	POLY-VINYL CHLORIDE
EWC	ELECTRIC WATER COOLER	REC RECEPT	RECEPTACLE
FACP	FIRE ALARM CONTROL PANEL	REF	REFRIGERATOR
FB	FLOOR BOX	RF	RETURN FAN
FLA	FULL LOAD AMPS	RGS	RIGID GALVANIZED STEEL
FWE	FURNISHED WITH EQUIPMENT	RM	ROOM
G, GND	GROUND	RMC	RIGID METAL CONDUIT
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	RTU	ROOFTOP UNIT
GFP	GROUND FAULT PROTECTION	REF	REFRIGERATOR
HID	HIGH INTENSITY DISCHARGE	SF	SUPPLY FAN
HOA	HAND-OFF-AUTO SELECTOR SWITCH	ST	SHUNT TRIP
		SPDT	SINGLE POLE, DOUBLE THROW
HP	HORSEPOWER		
HVAC	HEATING, VENTILATION AND COOLING UNIT	SQ	SQUARE
		TEL	TELEPHONE
IDS	INTRUSION DETECTION SYSTEM	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
IG	ISOLATED GROUND		
IMC	INTERMEDIATE METAL CONDUIT	TYP	TYPICAL
IR	INFRARED	UF	UNDER FLOOR
K	KILO	UG	UNDERGROUND
KCMIL	KILO CIRCULAR MILS	UH	UNIT HEATER
KW	KILOWATT	UL	UNDERWRITER'S LABORATORY
KVA	KILO VOLT-AMPS		
LAN	LOCAL AREA NETWORK	UNO	UNLESS NOTED OTHERWISE
LC	LIGHTING CONTACTOR	UPS	UNINTERRUPTIBLE POWER SUPPLY
LF	LINEAR FEET		
LC	LOADCENTER	V	VOLTS
LCP	LIGHTING CONTROL PANEL	VFD	VARIABLE FREQUENCY DRIVE
LED	LIGHT EMITTING DIODE	W	WATT
LTG	LIGHTING	WP	WEATHERPROOF
LTS	LIGHTS	WG	WIREGUARD
MAX	MAXIMUM	XFMR	TRANSFORMER
MCB	MAIN CIRCUIT BREAKER		
MECH	MECHANICAL	(E)	EXISTING ITEM TO REMAIN
MH	MOUNTING HEIGHT	(R)	REMOVE ITEM AND DISPOSE OF PROPERLY
MC	MICROPHONE	(ER)	RELOCATED ITEM AT NEW LOCATION
MW	MICROWAVE	(RL)	REMOVE AND RELOCATE

NOTE

SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET ARE FOR REFERENCE ONLY AND DO NOT NECESSARILY INDICATE THEIR INCORPORATION INTO THE DESIGN

A1 ABBREVIATIONS

- FACP — FIRE ALARM CONTROL PANEL, MOUNT WITH TOP OF PANEL NOT MORE THAN 72"AFF
- FAA — FIRE ALARM ANNUNCIATOR, MOUNT WITH TOP OF PANEL NOT MORE THAN 72"AFF, WIRED TO FACP
- SMOKE DETECTOR, WIRED TO FACP
- E — SMOKE DETECTOR, "E" INDICATES CONNECTION FOR ELEVATOR RECALL, WIRED TO FACP
- SS — SINGLE STATION SMOKE DETECTOR WITH AUDIBLE INDICATING APPLIANCE, WALL MOUNTED
- SS AV — SINGLE STATION SMOKE DETECTOR WITH AUDIBLE/VISUAL INDICATING APPLIANCE, CEILING MOUNTED
- SS CO — SINGLE/MULTI-STATION SMOKE/CARBON MONOXIDE DETECTOR WITH AUDIBLE/VISIBLE INDICATING APPLIANCE, CEILING MOUNTED
- SS CO — SINGLE/MULTI-STATION SMOKE/CARBON MONOXIDE DETECTOR WITH AUDIBLE INDICATING APPLIANCE, WALL MOUNTED
- HEAT DETECTOR, WIRED TO FACP ~ COMBINATION 135° FIXED TEMPERATURE AND RATE-OF-RISE U.N.O.
- E — HEAT DETECTOR, "E" INDICATES CONNECTION FOR ELEVATOR RECALL, WIRED TO FACP
- DUCT SMOKE DETECTOR, WIRED TO FACP
- GAS — GAS DETECTOR, WIRED TO FACP
- GAS VALVE, WIRED TO FACP
- FLAME DETECTOR, WIRED TO FACP
- RTS RTS — REMOTE TEST/INDICATOR FOR DUCT SMOKES, MOUNT ON CEILING BENEATH UNIT, OR WALL MOUNT WHERE INDICATED ON PLANS
- F — MANUAL PULL STATION, MOUNT 48" AFF
- F — HORN/STROBE, WALL MOUNTED CANDELA AS NOTED ON PLANS, WIRED TO FACP
- F — HORN/STROBE, CEILING MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- STROBE ONLY INDICATING APPLIANCE, WALL MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- STROBE ONLY INDICATING APPLIANCE, CEILING MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- R — STROBE ONLY INDICATING APPLIANCE, CEILING MOUNTED, CANDELA AS NOTED ON PLANS, 120V, CONNECT TO OPERATE UPON ACTIVATION OF ROOM SMOKE DETECTOR
- R — STROBE ONLY INDICATING APPLIANCE, WALL MOUNTED, CANDELA AS NOTED ON PLANS, 120V, CONNECT TO OPERATE UPON ACTIVATION OF ROOM SMOKE DETECTOR
- MH — MINI HORN, WALL MOUNTED, WIRED TO FACP
- MH — MINI HORN, CEILING MOUNTED, WIRED TO FACP
- F — F — HORN/STROBE WITH PULL STATION DIRECTLY BELOW
- FIRE ALARM BEACON
- MAGNETIC DOOR HOLD OPEN DEVICE, WIRED TO FACP
- T — TRANSFORMER
- SPRINKLER SYSTEM WATER FLOW SWITCH, PROVIDED UNDER DIVISION 23, WIRED TO FACP UNDER DIVISION 26
- SPRINKLER SYSTEM TAMPER SWITCH, PROVIDED UNDER DIVISION 23, WIRED TO FACP UNDER DIVISION 26
- SPRINKLER SYSTEM CHECK VALVE PRESSURE SWITCH, FURNISHED AND INSTALLED UNDER DIVISION 23, WIRED TO FACP UNDER DIVISION 26
- SPRINKLER SYSTEM PRE-ACTION VALVE, FURNISHED AND INSTALLED UNDER DIVISION 21, WIRED TO FACP UNDER DIVISION 26
- K — KNOX BOX, MOUNT 60" AFF
- SD — SMOKE DAMPER, WIRED TO FACP
- FSD — FIRE AND SMOKE DAMPER, WIRED TO FACP
- HORN/STROBE, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- S — SPEAKER/STROBE, WALL MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- S — SPEAKER/STROBE, CEILING MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- M — MASTER BOX

A3 FIRE ALARM

- SEC — SECURITY PANEL, MOUNT WITH TOP OF PANEL NOT MORE THAN 72"AFF
- ANN — ANNUNCIATOR, MOUNT WITH TOP OF PANEL NOT MORE THAN 72"AFF
- KP — KEYPAD, MOUNT 48"AFF
- MSP — MOTION SENSOR, PASSIVE INFRARED (PIR), WALL MOUNTED 96"AFF
- MSP — MOTION SENSOR, PASSIVE INFRARED (PIR), CEILING MOUNTED
- MSM — MOTION SENSOR, MICROWAVE, WALL MOUNTED
- MSM — MOTION SENSOR, MICROWAVE, CEILING MOUNTED
- MS — MOTION SENSOR, DUAL TECHNOLOGY, PIR/MICROWAVE, WALL MOUNTED
- MS — MOTION SENSOR, DUAL TECHNOLOGY, PIR/MICROWAVE, CEILING MOUNTED
- T — TRANSFORMER
- C — CAMERA
- CA — CARD ACCESS, PROVIDE 3/4" CONDUIT FROM 48" AFF/AFG TO ABOVE CEILING
- DC — DOOR CONTACT
- DL — MAGNETIC DOOR LOCK
- DR — DOOR RELEASE BUTTON
- DS — DOOR SWITCH
- C — CHIME
- SS — STROBE
- SH — HORN
- B — BELL
- D — JUNCTION BOX WITH 120V POWER FOR DOORS
- REX — REQUEST-TO-EXIT MOTION SENSOR

B5 SECURITY

- PANELBOARD ~ SURFACE MOUNTED
- PANELBOARD ~ FLUSH MOUNTED
- FUSED DISCONNECT SWITCH
- NON-FUSED DISCONNECT SWITCH
- 00 — MOTOR STARTER ~ NUMBER INDICATES NEMA SIZE
- 00 — COMBINATION MOTOR STARTER/FUSED DISCONNECT
- MOTOR OR FAN
- M — METER AND CABINET
- J — JUNCTION BOX ~ CEILING MOUNTED
- J — JUNCTION BOX ~ WALL MOUNTED
- J — JUNCTION BOX ~ FLUSH FLOOR MOUNTED
- P J — JUNCTION BOX ~ PEDESTAL MOUNTED
- T# — TRANSFORMER ~ NUMBER INDICATES DESIGNATION SEE TRANSFORMER SCHEDULE
- VFD — VARIABLE FREQUENCY DRIVE
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR
- E — EMERGENCY SHUTOFF SWITCH ~ WALL MOUNTED 48" TO CENTERLINE ~ PROVIDE TAMPER-PROOF COVER
- S — SHUT-OFF SWITCH
- CONDUIT TURNING UP
- CONDUIT TURNING DOWN
- WIRING UNDERGROUND OR UNDERSLAB
- HOMERUN ~ (2)#12+(1)#12G UNO (EXCEPT LIGHTING CIRCUITS: (1)#12+(1)#10N+(1)#12G UNO)
- SINGLE-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT
- 3-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT
- FLEXIBLE CONNECTION
- GROUNDING SYSTEM
- P — POWER POLE
- PUSHBUTTON
- C — DOORBELL CHIME
- F — SYSTEMS FURNITURE WHIP, DUAL SERVICE, WALL MOUNTED
- P — MOTORIZED DOOR OPERATOR AND PUSH PADDLE ~ DEVICES FURNISHED BY DIV 08, POWER WIRING, BOXES, AND CONDUIT BY DIV 26
- CB — ENCLOSED CIRCUIT BREAKER
- ATS — AUTOMATIC TRANSFER SWITCH
- H — HAND DRYER, COORDINATE HEIGHT WITH ARCHITECTURAL PLANS
- SF — SYSTEMS FURNITURE FEED

A5 POWER DISTRIBUTION

- PS — PAY STATION KIOSK ~ SEE INSTALLATION DETAIL D3 ON DRAWING E501.
- EC — EMERGENCY CALL BOX LOCATION WITH BLUE LIGHT BEACON ~ SEE DETAIL B4 ON DRAWING E501.
- EVSE — ELECTRIC VEHICLE SUPPLY EQUIPMENT (VEHICLE CHARGING STATION). DUAL SERVICE UNIT. SEE DETAIL C4 ON DRAWING E501.

B7 SPECIALTY EQUIPMENT

SINGLE RECEPTACLES

- 20A, 125V, 2P, 3W, NEMA 5-20R
- 20A, 125V, 2P, 3W, NEMA L5-20R (TWISTLOCK)
- 30A DRYER RECEPTACLE ~ 125/250V, 3P, 4W, GROUNDING, NEMA 14-30R, (3)#10+(1)#10G TO 30A, 2P CIRCUIT BREAKER
- 30A, 250V, 2P, 3W, NEMA 6-30R
- 50A RANGE RECEPTACLE ~ 125/250V, 3P, 4W, GROUNDING, NEMA 14-50R, (3)#6+(1)#10 TO 50A, 2P CIRCUIT BREAKER
- 20A, 250V, 2P, 3W, NEMA 6-20R

NOTE:

PROVIDE MATCHING CORD AND PLUG FOR SINGLE RECEPTACLES

FLOOR AND CEILING DEVICES

- F — DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W, NEMA 5-20R, MOUNT IN FLUSH FLOOR BOX
- F — DOUBLE DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W, NEMA 5-20R, MOUNT IN FLUSH FLOOR BOX
- P — DUPLEX RECEPTACLE, PEDESTAL MOUNTED
- P — SINGLE RECEPTACLE, PEDESTAL MOUNTED
- C — DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING
- C — DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING
- C — DUPLEX GFCI RECEPTACLE, FLUSH MOUNTED IN CEILING
- C — DOUBLE DUPLEX GFCI RECEPTACLE, FLUSH MOUNTED IN CEILING
- OVERHEAD RECEPTACLE DROP, DUPLEX
- OVERHEAD RECEPTACLE DROP, DOUBLE DUPLEX
- OVERHEAD RECEPTACLE DROP, GFCI
- PT-1 — 4" POKE-THRU DEVICE, DUAL SERVICE FURNITURE FEED. BASIS OF DESIGN: WIREMOLD AFFATC
- PT-2 — 6" POKE-THRU DEVICE, WITH (2) DUPLEX RECEPTACLES AND TEL/DATA AS INDICATED ON PLANS. BASIS OF DESIGN: LEGRAND 6AT SERIES.
- F — MULTI-SERVICE FLUSH FLOOR BOX ~ WIREMOLD EFB45 SERIES OR APPROVED EQUAL. COVER SHALL BE FLUSH STYLE WITH FLOOR INSERT. COVER FINISH COLOR SHALL BE SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD FINISHES.

RECEPTACLES

- DUPLEX RECEPTACLE ~ 20A, 125V, 2P, 3W, NEMA 5-20R
- DOUBLE DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE, HATCH INDICATES AFCI PROTECTION AND TAMPERPROOF
- T — TAMPERPROOF DUPLEX RECEPTACLE
- GFCI DUPLEX RECEPTACLE, MOUNT 44" AFF UNO
- GFCI DOUBLE DUPLEX RECEPTACLE, MOUNT 44" AFF UNO
- EWC — GFCI RECEPTACLE FOR ELECTRIC WATER COOLER - COORDINATE LOCATION WITH DIVISION 22.
- WP — GFCI RECEPTACLE WITH WEATHERPROOF COVER
- WP — GFCI RECEPTACLE IN WP ENCLOSURE ON ROOF
- MULTI-OUTLET STRIP, PROVIDE OUTLETS 24" OC UNO, MOUNT 48" AFF UNO
- SURFACE RACEWAY WITH DIVIDER, MOUNT 44" AFF UNO. PROVIDE NEMA 5-20 RECEPTACLES AND TECHNOLOGY OUTLETS AS SHOWN ON PLAN

NOTES:

1. MOUNT RECEPTACLES WITH CENTERLINE 18" AFF UNO
2. MOUNT EXTERIOR RECEPTACLES WITH CENTERLINE 24" AFG UNO

A7 RECEPTACLES

LIGHTING SWITCHES

- $a — LIGHT SWITCH, 20A,125/277V
- $3 — THREE-WAY LIGHT SWITCH
- $4 — FOUR-WAY LIGHT SWITCH
- $2 — TWO-POLE SWITCH
- $K — KEY OPERATED SWITCH
- $M — MOTOR RATED SWITCH
- $P — SINGLE POLE SWITCH WITH RED PILOT LIGHT ~ RED LIGHT SHALL GLOW WHEN CIRCUIT IS ENERGIZED
- $a $b — MULTI-GANGED SWITCHES, GANG UNDER ONE PLATE, LETTER INDICATES SWITCHING
- $OS — OCCUPANCY SENSOR SWITCH, WALL MOUNTED
- $OS2 — 2-BUTTON OCCUPANCY SENSOR SWITCH
- $OS3 — OCCUPANCY SENSOR SWITCH WIRED FOR 3-WAY OPERATION
- $OSD — OCCUPANCY SENSOR SWITCH WITH DIMMING ~ COORDINATE DIMMING TECHNOLOGY WITH LOAD TO BE DIMMED
- OS — OCCUPANCY SENSOR, CEILING MOUNTED
- OS — OCCUPANCY SENSOR, WALL MOUNTED
- $D — DIMMER SWITCH ~ COORDINATE DIMMING TECHNOLOGY WITH LOAD TO BE DIMMED
- $F $L — HANDICAP SWITCHES FOR HOOD LIGHT AND FAN
- $T — TIMER SWITCH
- $LV — LOW VOLTAGE LIGHT SWITCH, MOMENTARY CONTACT
- LTC — LIGHTING TIME CLOCK
- LC — LIGHTING CONTACTOR
- LCP — LIGHTING CONTROL PANEL
- PC — OUTDOOR PHOTOELECTRIC SWITCH
- DS — DAYLIGHT HARVESTING SENSOR

NOTES:

1. MOUNT LIGHT SWITCHES WITH CENTERLINE 48" AFF, UNO
2. LOWER CASE LETTER AT SWITCH INDICATES SWITCHING

EMERGENCY LIGHTING

- WHERE NOTED ON PLANS FIXTURE CONNECTED TO CENTRAL INVERTER. CONTROL AS INDICATED ON PLANS.
- EM — "EM" INDICATES EMERGENCY WHERE SYMBOL HATCHING IS UNCLEAR
- BP# — EMER BATTERY UNIT WITH NO HEADS, MT 7'-6"AFF BP# INDICATES BATTERY UNIT DESIGNATION, CONNECT TO UNSWITCHED PORTION OF AREA LIGHTING BRANCH CIRCUIT, U.N.O.
- BP# — EMER BATTERY UNIT WITH INTEGRAL HEADS, MT 7'-6"AFF BP# INDICATES BATTERY UNIT DESIGNATION, CONNECT TO UNSWITCHED PORTION OF AREA LIGHTING BRANCH CIRCUIT, U.N.O.
- BP# — SINGLE REMOTE EMERGENCY LIGHT HEAD, MOUNT 7'-6"AFF BP# INDICATES BATTERY UNIT CONNECTED TO
- BP# — DOUBLE REMOTE EMERGENCY LIGHT HEAD, MOUNT 7'-6"AFF BP# INDICATES BATTERY UNIT CONNECTED TO
- BP# — DOUBLE REMOTE EMERGENCY LIGHT HEAD, CEILING MOUNTED BP# INDICATES BATTERY UNIT CONNECTED TO
- EXIT SIGN, CEILING MOUNTED, SHADING INDICATES FACE(S) ARROWHEAD INDICATES CHEVRON(S) REQUIRED, CONNECT TO UNSWITCHED PORTION OF AREA LIGHTING BRANCH CIRCUIT, U.N.O.
- EXIT SIGN, WALL MOUNTED, SHADING INDICATES FACE(S) MOUNT AT 7'-6"AFF OR OVER DOOR, CONNECT TO UNSWITCHED PORTION OF AREA LIGHTING BRANCH CIRCUIT, U.N.O.
- INV — CENTRAL LIGHTING INVERTER

REFER TO LUMINAIRE SCHEDULE FOR FIXTURE LEGEND

TYPICAL FOR ALL FIXTURE TYPES:

- R1 a — INDICATES LUMINAIRE TYPE ON SCHEDULE
- LOWER CASE LETTER INDICATES SWITCHING
- # — INDICATES CIRCUIT NUMBER

A9 LUMINAIRES

7/2/2021 3:16:33 PM

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PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
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SEAL / SIGNATURE

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2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

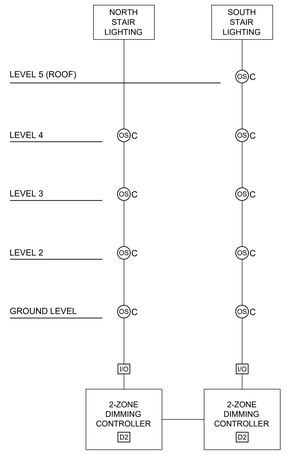
SHEET TITLE:

ELECTRICAL LEGEND AND ABBREVIATIONS

E-000

LIGHTING CONTROL DIAGRAM LEGEND & NOTES:

- D2 — 2-ZONE DIMMER CONTROLLER (WATTSTOPPER #LMRC-212)
- I/O — INPUT/OUTPUT INTERFACE MODULE (WATTSTOPPER #LMIO)
- QTD — EMERGENCY LIGHTING CONTROL UNIT (WATTSTOPPER #ELCU-200). PROVIDE (1) UNIT FOR EACH EMERGENCY CIRCUIT
- OSC — COLD TEMPERATURE WEATHERPROOF PASSIVE INFRARED OCCUPANCY SENSOR WITH MIDDLE AREA COVERAGE (WATTSTOPPER #FS-L3W)

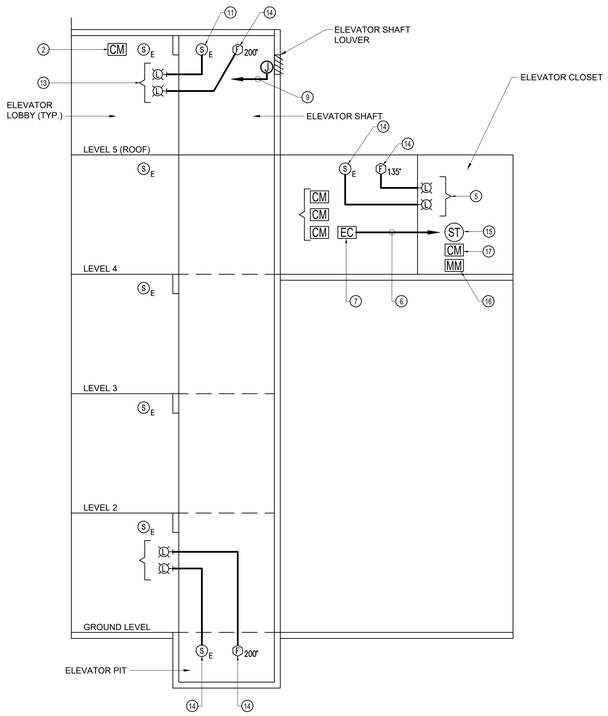


A2 — STAIR LIGHTING CONTROL DETAIL

DO NOT SCALE

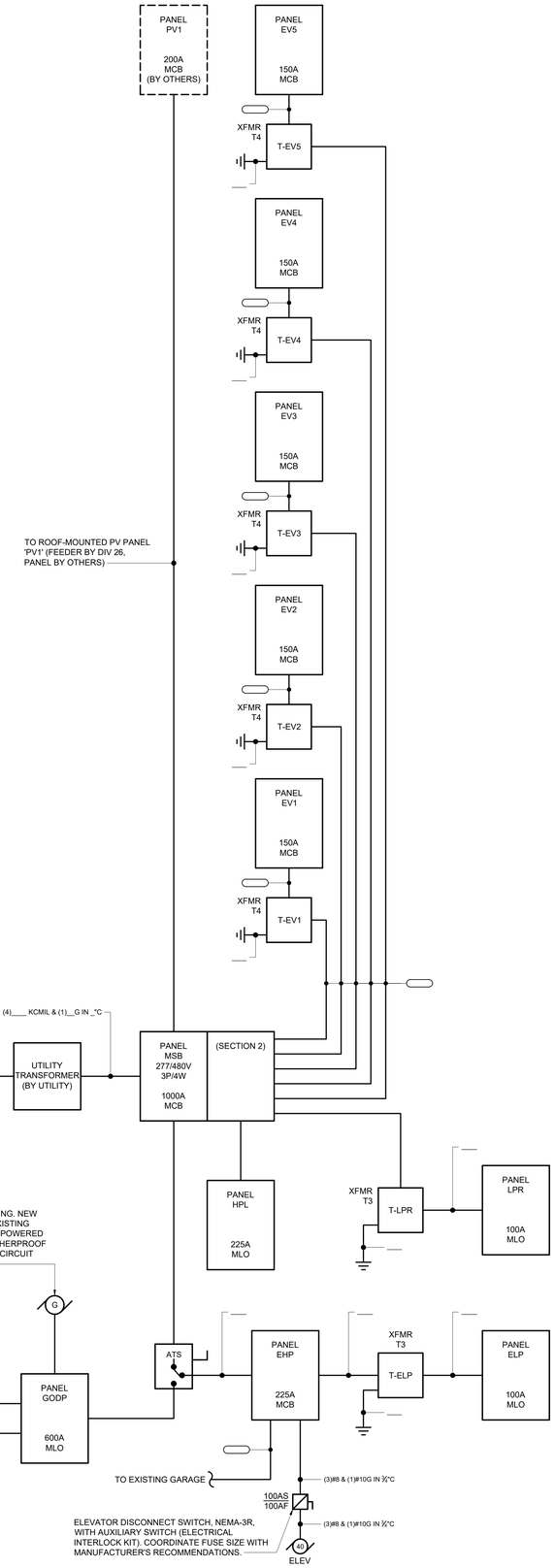
NOTES:

1. ELEVATOR MACHINE ROOM; REFER TO FLOOR PLANS FOR EXACT FLOOR LOCATION AND ADJACENCY (EG TOP FLOOR, PENTHOUSE, FIRST FLOOR, BASEMENT)
2. FIRE ALARM CONTROL MODULE, RELAY AND WIRING PROVIDED FOR SENDING FIRE ALARM SYSTEM CONTROL SIGNAL TO OPEN ELEVATOR SHAFT LOUVER DURING A FIRE EVENT; REFER TO MECHANICAL PLANS FOR EXACT LOCATION AND CONTROL CIRCUIT INTEGRATION POINT. THE CONTROL MODULE SHALL BE LOCATED ABOVE CLOSEST ACCESSIBLE CEILING TO THE LOUVER CONTROL CIRCUIT INTEGRATION POINT. THE CONTROL WIRING FROM THE CONTROL MODULE TO THE LOUVER OPERATOR SHALL BE PERFORMED BY THE CONTRACTOR RESPONSIBLE FOR DIVISION 23 SCOPE. THE CONTROL MODULE SHALL BE PROGRAMMED TO RECEIVE A SIGNAL UPON ACTIVATION OF ANY FIRE ALARM DETECTION DEVICE WITHIN THE RESPECTIVE BUILDING.
3. SMOKE DETECTOR LOCATED WITHIN 21 FEET OF THE CENTERLINE OF EACH ELEVATOR DOOR (FOR LOBBY CEILINGS 15'-0" AFF OR LESS); REFER TO FLOOR PLAN FOR PROPOSED LOCATION AND QUANTITY OF DETECTORS IN RESPECTIVE ELEVATOR LOBBY.
4. "E" ON DETECTORS DENOTES THAT THE RESPECTIVE FIRE ALARM SYSTEM DETECTOR (UPON ACTIVATION) SHALL BE PROGRAMMED TO INITIATE THE REQUIRED ELEVATOR RECALL SEQUENCE.
5. REMOTE INDICATOR LIGHT(S) LOCATED OUTSIDE AND ABOVE THE RESPECTIVE ELEVATOR MACHINE ROOM DOOR. THE INDICATOR LIGHT SHALL BE ACTIVATED WHEN THE ASSOCIATED DETECTOR WITHIN THE ELEVATOR MACHINE ROOM ENTERS AN ALARM CONDITION.
6. POWER FEEDER TO ELEVATOR CONTROLLER (REFER TO POWER PLANS FOR SOURCE AND FEEDER SIZE)
7. ELEVATOR CONTROLLER; FURNISHED AND INSTALLED BY THE CONTRACTOR RESPONSIBLE FOR DIVISION 14 SCOPE.
8. PROVIDE THREE FIRE ALARM CONTROL MODULES, RELAYS AND WIRING FOR SENDING FIRE ALARM SYSTEM CONTROL SIGNAL TO THE ELEVATOR CONTROLLER; ONE TO ACTIVATE THE ELEVATOR RECALL SEQUENCE (PRIMARY LEVEL), THE SECOND TO ACTIVATE THE ELEVATOR RECALL SEQUENCE (ALTERNATE LEVEL), AND THE THIRD TO ACTIVATE THE ELEVATOR CAB WARNING SEQUENCE (FIREMAN'S HAT) . THE CONTROL WIRING FROM EACH MODULE TO THE ELEVATOR CONTROLLER SHALL BE PERFORMED BY THE CONTRACTOR RESPONSIBLE FOR DIVISION 14 SCOPE.
9. POWER BRANCH CIRCUIT TO ELEVATOR SHAFT LOUVER OPERATOR (REFER TO PLAN FOR SOURCE AND BRANCH CIRCUIT SIZE).
10. REFER TO POWER PLANS FOR REQUIRED ELEVATOR EQUIPMENT POWER AND MAINTENANCE POWER PROVISIONS.
11. SMOKE DETECTOR LOCATED AT THE TOP OF THE ELEVATOR SHAFT (EXACT LOCATION PER NFPA 72 STANDARDS).
12. SMOKE DETECTOR LOCATED AT THE ELEVATOR PIT (EXACT LOCATION PER NFPA 72 STANDARDS).
13. REMOTE INDICATOR LIGHT(S) LOCATED OUTSIDE AND ABOVE THE RESPECTIVE FLOOR ELEVATOR CAB DOOR. THE INDICATOR LIGHT SHALL BE ACTIVATED WHEN THE ASSOCIATED DETECTOR ENTERS AN ALARM CONDITION.
14. WHEN SPRINKLER HEADS ARE PRESENT IN THE ELEVATOR SHAFT, ELEVATOR PIT OR ELEVATOR MACHINE ROOM, LOCATE THE FIRE ALARM SYSTEM DETECTOR(S) WITHIN (2) FEET OF THE RESPECTIVE SPRINKLER HEAD.
15. SHUNT TRIP MODULE PROVIDED WITH THE RESPECTIVE ELEVATOR FEEDER CIRCUIT BREAKER FOR SHUTTING DOWN ELEVATOR POWER.
16. FIRE ALARM MONITOR MODULE, RELAY AND WIRING PROVIDED FOR RECEIVING FIRE ALARM SYSTEM MONITOR SIGNAL FROM THE ELEVATOR FEEDER SHUNT TRIP MODULE FOR VERIFYING THE SHUNT TRIP CONTROL POWER CIRCUIT IS FUNCTIONING PROPERLY. THE MONITOR MODULE SHALL BE PROGRAMMED TO SEND A SIGNAL (SUPERVISORY) IF THE CONTROL POWER CIRCUIT IS DE-ENERGIZED.
17. FIRE ALARM CONTROL MODULE, RELAY AND WIRING PROVIDED FOR SENDING FIRE ALARM SYSTEM CONTROL SIGNAL TO INITIATE THE ELEVATOR POWER SHUNT TRIP SEQUENCE. THE CONTROL MODULE SHALL BE PROGRAMMED TO RECEIVE A SIGNAL UPON ACTIVATION OF ANY HEAT DETECTOR LOCATED WITHIN THE ELEVATOR SHAFT, ELEVATOR PIT OR ELEVATOR MACHINE ROOM.
18. FIXED TEMPERATURE (135 DEGREE F) HEAT DETECTOR LOCATED IN THE ELEVATOR MACHINE ROOM.
19. FIXED TEMPERATURE (135 DEGREE F) HEAT DETECTOR LOCATED AT THE ELEVATOR PIT.
20. FIXED TEMPERATURE (190 DEGREE F) HEAT DETECTOR LOCATED AT THE TOP OF THE ELEVATOR SHAFT.
21. ALL HEAT DETECTORS WITHIN ELEVATOR SHAFT/PIT/MACHINE ROOM SHALL BE PROVIDED WITH TEMPERATURE AND RTI RATINGS THAT ARE LOWER THAN THE ASSOCIATED SPRINKLER HEAD.



A1 — FIRE ALARM CONTROL DIAGRAM FOR ELEVATOR WITH SHAFT/ MACHINE ROOM PROTECTION SPRINKLERS

DO NOT SCALE



A3 — POWER RISER DIAGRAM

DO NOT SCALE

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SHEET TITLE:

ELECTRICAL DETAILS

E-500

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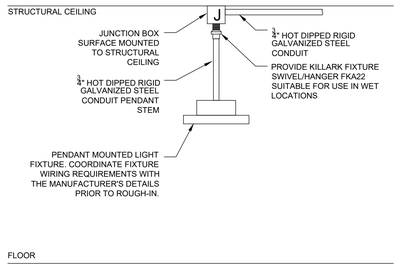
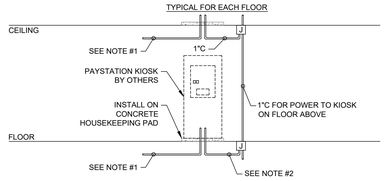


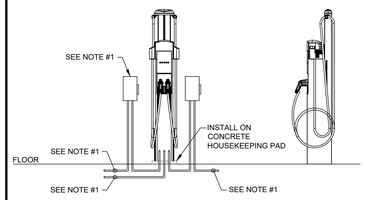
D2	CEILING MOUNTED GARAGE FIXTURE DETAIL
DO NOT SCALE	



NOTES:

1. PROVIDE (1) 1"C EMPTY CONDUIT WITH NYLON PULLSTRING BACK TO THE MAIN ELECTRICAL ROOM FOR EACH PAYSTATION KIOSK. TELECOMMUNICATIONS CABLING BY OTHERS. STUB CONDUIT UP TO 6" ABOVE FINISHED FLOOR AND CAP FOR FUTURE.
2. PROVIDE (1) 1"C EMPTY CONDUIT WITH NYLON PULLSTRING AND JUNCTION BOX AT EACH LEVEL FOR FUTURE POWER BRANCH CIRCUIT WIRING. STUB CONDUIT UP TO 6" ABOVE FINISHED FLOOR AND CAP FOR FUTURE. AT THE LOWER LEVEL, CONDUIT SHALL BE ROUTED BACK TO THE MAIN ELECTRICAL ROOM AND TERMINATED IN PANELBOARD 'RP2G'. CONDUITS SHALL BE MARKED FOR FUTURE PAYSTATION KIOSK.

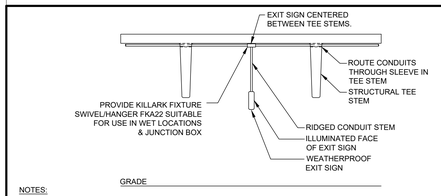
D3	PAYSTATION KIOSK DETAIL
DO NOT SCALE	



NOTES:

1. ELECTRICAL VEHICLE CHARGING SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH NEC 625. THE ELECTRICAL CONTRACTOR SHALL MEET ALL INSTALLATION REQUIREMENTS WHETHER INCORPORATED INTO THE MANUFACTURED ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) OR PROVIDED SEPARATELY.
2. PROVIDE DISCONNECT IN A READILY ACCESSIBLE LOCATION FOR ELECTRIC VEHICLE CHARGING STATIONS 480/277V ONLY. DISCONNECT SHALL BE LOCKABLE OPEN TYPE IN ACCORDANCE WITH NEC 110.25. WHERE 208/120V (EVSE) IS UTILIZED, DISCONNECTING MEANS IS NOT REQUIRED.
3. PROVIDE (2) 1" HOT-DIPPED GALVANIZED RIGID STEEL POWER CONDUITS STUBBED UP 12"AFF AND TERMINATED IN WEATHERPROOF CAST JUNCTION BOX WITHIN THE (EVSE). PROVIDE LFMC WHIP CONNECTION TO EQUIPMENT TERMINATION POINT.
4. PROVIDE (1) 1" HOT-DIPPED GALVANIZED RIGID STEEL TELECOMMUNICATIONS CONDUITS STUBBED UP 12" AFF FOR COMMUNICATION CABLING FOR RFID OR CREDIT CARD EQUIPMENT. ROUTE CONDUIT TO TELECOMMUNICATIONS BACKBOARD/SERVER EQUIPMENT.

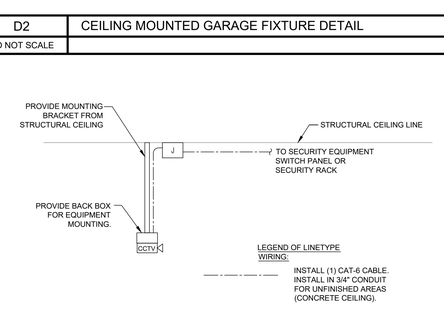
C4	ELECTRIC VEHICLE CHARGING SYSTEM
DO NOT SCALE	



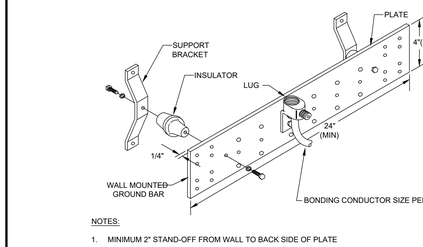
NOTES:

1. EXIT SIGNS SHALL BE INSTALLED SUCH THAT THE FACE OF THE EXIT SIGN IN THE PRIMARY DIRECTION OF EGRESS (SHORTEST PATH TO EGRESS DOOR) IS FACING OUT AND AWAY FROM THE STRUCTURAL TEE STEM.
2. EXIT SIGN SHALL BE INSTALLED SUCH THAT THE BOTTOM OF THE EXIT SIGN IS A MINIMUM OF 7'-2" ABOVE FINISHED FLOOR WHERE LOCATED IN THE GARAGE DRIVE LANE OR PARKING STALL.
3. WHERE EXIT SIGNS ARE PROTECTED FROM VEHICULAR DAMAGE VIA BOLLARDS, PARKING STOPPERS, STRUCTURAL MEMBERS, ETC. THE SIGNAGE SHALL BE PENDANT MOUNTED TO TOP OF EXIT SIGN FLUSH WITH THE BOTTOM OF THE TEE STEM (I.E. ELEVATOR LOBBY, STAIR LOBBY, ETC.)

C1	EXIT SIGN GARAGE AREA MOUNTING DETAIL
DO NOT SCALE	



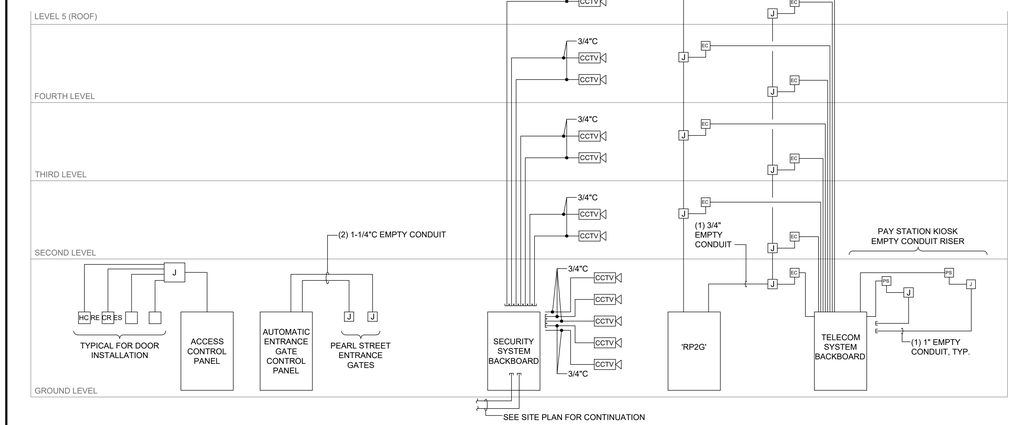
C2	CAMERA MOUNTING DETAIL
DO NOT SCALE	



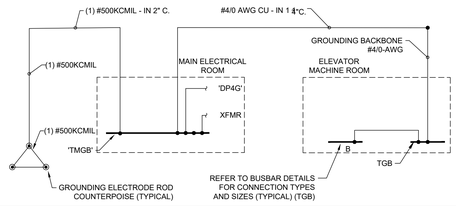
NOTES:

1. MINIMUM 2" STAND-OFF FROM WALL TO BACK SIDE OF PLATE

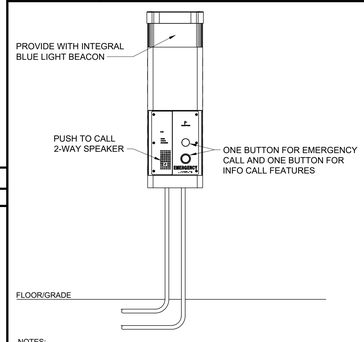
C3	GROUND BAR DETAIL
DO NOT SCALE	



A1	CONDUIT RISER DIAGRAM
DO NOT SCALE	



B3	GROUNDING RISER DIAGRAM
DO NOT SCALE	



NOTES:

1. COORDINATE INSTALLATION DETAILS WITH MANUFACTURER'S INSTRUCTIONS.
2. PROVIDE (1) 3/4"C EMPTY CONDUIT WITH NYLON PULLSTRING BACK TO THE MAIN ELECTRICAL ROOM FOR EACH EMERGENCY PHONE STATION. TELECOMMUNICATIONS CABLING BY OTHERS.

B4	CALLSTATION WITH BLUE LIGHT
DO NOT SCALE	

7/2/2021 3:16:33 PM

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USM - Structured Parking Garage

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CHECKED BY	**BTG**

SHEET TITLE:

ELECTRICAL DETAILS

E-501

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	MFR	CATALOG SERIES NUMBER SEE NOTE 1	MOUNTING, U.N.O.	VOLTS	LAMP				KEY NOTES
						QTY PER FIXTURE	WATTS	LUMENS	TYPE	
G	LED PARKING GARAGE LIGHT	LITHONIA	VCPG-LED-V4-P4-40K-70CRI-___-MVOLT-PM	PENDANT	UNV	1	56	____	LED ARRAY ~ 4000K	
B	LED STRIP LIGHT	LITHONIA	FEM-L48-4000LM-LPPFL-WD-MVOLT-GZ10-40K-80CRI	SURFACE	UNV	1	30	4,257	LED ARRAY ~ 4000K	
GP	GARAGE ROOF LED LIGHT AND POLE	LITHONIA	LIGHT: RSX1-LED-P3-40K-R5-MVOLT-SPA POLE: SSS-14-4C-DM19AS	SURFACE	UNV	1	109	14,397	LED ARRAY ~ 4000K	
EXIT	EXIT SIGN, AC ONLY	LITHONIA	LV-S-W-*-R	SEE PLAN	UNV	1		PER CODE	LED ARRAY	3,6
P1	SITE LIGHT AND POLE, "ICE CREAM CONE" SHAPE	SEE NOTE 8		14' POLE	277	1	24	3,330	LED ARRAY ~ 4000K	8,9
P2	SITE LIGHT AND POLE, "SHOEBOX" SHAPE	SEE NOTE 8		14' POLE	277	1	18	2,160	LED ARRAY ~ 4000K	8,10
SW1	WALL MOUNTED EXTERIOR LIGHT	LITHONIA	KAXW-LED-P1-40K-R4-MVOLT	KEYNOTE 5	UNV	1	29	3,643	LED ARRAY ~ 4000K	5
SR1	RECESSED CANOPY LIGHT	LITHONIA	LDN4SQ-40-07-LS4-AR-LSS-MVOLT	RECESSED CANOPY	UNV	1	8.6	620	LED ARRAY ~ 4000K	

	NOTES
1	**NOTE THAT THESE NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. PROVIDE ALL REQUIREMENTS ON SCHEDULE, NOTES, SPECS, AND DRAWINGS COMBINED.**
2	**CATALOG SERIES NUMBERS ARE USED TO ESTABLISH A LEVEL OF QUALITY AND NOT INTENDED TO LIMIT COMPETITION. SERIES NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. COMPLY WITH ADDITIONAL REQUIREMENTS IN SPECIFICATIONS AND DRAWINGS.**
3	PROVIDE WALL,CEILING, OR PENDANT MOUNTING AS INDICATED ON PLANS. PROVIDE NUMBER OF FACES AND ARROWS AS INDICATED.
4	VERIFY CEILING STRUCTURE AND MOUNTING HEIGHT PRIOR TO ORDERING ANY LIGHT FIXTURES.
5	COORDINATE MOUNTING HEIGHT WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
6	PROVIDE COLD WEATHER OPTION.
7	CONFIRM EXACT FIXTURE CONFIGURATION AND OPTIONS WITH MUNICIPALITY PRIOR TO ORDERING FIXTURE.
8	FIXTURE AND POLE SHALL BE PROVIDED BY OWNER FROM EXISTING OWNER'S STOCK.
9	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8029E345-A.
10	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8039E40-A.

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ELECTRICAL SCHEDULES

E-600

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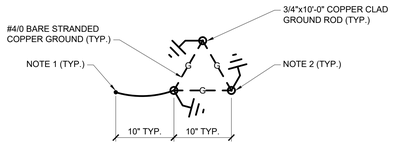
—OH—	OVERHEAD WIRING, TYPE AS INDICATED
— — — —	UNDERGROUND OR UNDERSLAB WIRING, TYPE AS INDICATED
	UTILITY POLE
	FUSED DISCONNECT SWITCH
	NON-FUSED DISCONNECT SWITCH
	MOTOR
	GROUNDING SYSTEM
J	JUNCTION BOX, WALL MOUNTED
J	JUNCTION BOX, IN-GROUND
M	ELECTRICAL MANHOLE, COORDINATE LOCATION WITH OTHER UNDERGROUND UTILITIES
T	COMMUNICATIONS MANHOLE, COORDINATE LOCATION WITH OTHER UNDERGROUND UTILITIES
T / P S / F	PADMOUNT TRANSFORMER ~ F= FRONT
PB	4'X6' PULL BOX WITH 32" COVER PLATE IN ACCORDANCE WITH UTILITY STANDARDS
P	PEDESTAL LOCATION, PEDESTAL BY SERVICE PROVIDER, STUB UP (2) 2" CONDUITS WITH CONNECTORS AND BUSHINGS FROM HANDHOLE
H	HANDHOLE, MINIMUM 18"x36"x24", SIZE PER NEC FOR NUMBER OF CONDUITS INSTALLED
M	METER & CT CABINET, PEDESTAL MOUNTED
	SINGLE POLE MOUNTED LIGHT
	DOUBLE POLE MOUNTED LIGHT
	WALL MOUNTED LIGHT FIXTURE
	SINGLE POLE HOMERUN: (2)#12+(1)#12G UNO, CONNECT TO PANEL INDICATED
	SINGLE-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT, CONNECT TO PANEL INDICATED
	3-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT, CONNECT TO PANEL INDICATED
A1 / ES-000	DETAIL CALL-OUT
A1 / ES-000	SECTION/ELEVATION CALL-OUT

A1 ELECTRICAL SITE LEGEND

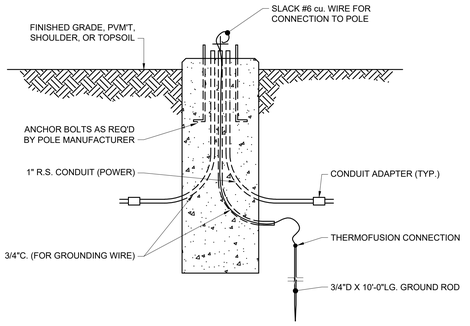


NOTES:

1. RUN #4/0 BARE STRANDED CU GROUND CABLE DOWN IN 1" PVC CONCEALED UNDER ROOF, CEILING AND WALLS. TYPICAL FOR ALL DOWNERS OUT TO GROUNDING COUNTERPOISE.
2. COPPER CLAD STEEL GROUND RODS 3/4"x10'-0", TOP OF RODS BURIED 2'-0" BELOW TOP OF FINISHED GRADE.

B1 GROUNDING ROD DETAILS

DO NOT SCALE

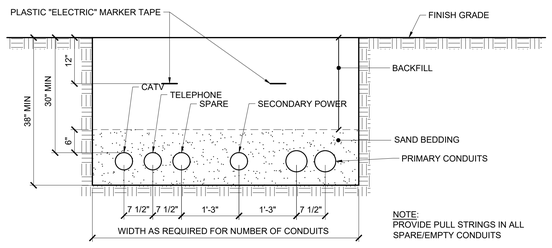


NOTES:

1. LIGHT POLE FOUNDATION SHALL BE PROVIDED BY DIVISION 2. ELECTRICAL SUBCONTRACTOR SHALL FURNISH CONDUITS, AND ANCHOR BOLTS TO CIVIL CONTRACTOR FOR CASTING INTO POLE BASE. THIS DETAIL REFERS TO SITE PARKING LOT AND ROAD LIGHTING FIXTURES ONLY. SEE CIVIL DRAWINGS FOR CONSTRUCTION INFORMATION.
2. ELECTRICAL CONTRACTOR SHALL INSTALL GROUND ROD AND PULL GROUNDING WIRE.

B2 SITE LIGHTING POLE BASE DETAIL

DO NOT SCALE

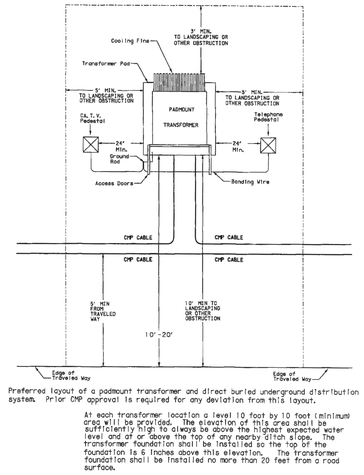


NOTE:
PROVIDE PULL STRINGS IN ALL SPARE/EMPTY CONDUITS

DETAIL INDICATES TYPICAL SPACING BETWEEN CONDUITS OF VARIOUS SYSTEMS, REFER TO SITE PLAN FOR SIZES AND NUMBER OF CONDUITS

B3 TYPICAL SEPARATION OF UTILITIES

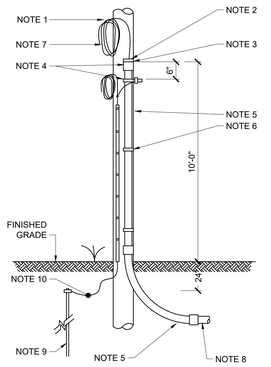
DO NOT SCALE



Preferred layout of a padmount transformer and direct buried underground distribution system. Prior CMP approval is required for any deviation from this layout.

At each transformer location a level 10 foot by 10 foot (minimum) area will be provided. The elevation of this area shall be sufficiently high to always be above the highest expected water level and at or above the top of any nearby ditch slope. The transformer foundation shall be installed so the top of the foundation is 6 inches above this elevation. The transformer foundation shall be installed no more than 20 feet from a road surface.

B5 TRANSFORMER CLEARANCE DETAILS



NOTES:

1. PRIMARY CABLES TO BE INSTALLED BY UTILITY COMPANY.
2. CONDUIT SEAL BY CONTRACTOR.
3. INSULATING BUSHING.
4. GALVANIZED STEEL CONDUIT AND BEND SHALL BE GROUNDED BY BONDING TO APPROVED GROUND CLAMP 6" FROM TOP OF THE CONDUIT. A CONDUCTOR OF SUFFICIENT LENGTH SHALL BE PROVIDED TO EXTEND TO UTILITY COMPANY SECONDARY NEUTRAL.
5. PROVIDE 2-4" GALVANIZED STEEL CONDUITS. 2 TOTAL 10 FEET CONDUITS SHALL RISE ON THE SIDE OF THE POLE AWAY FROM THE ROAD, AND SPARE CONDUITS SHALL BE CAPPED 6" ABOVE GRADE.
6. PIPE STRAPS, INSTALL AT NOT MORE THAN 30" INTERVALS.
7. CONTRACTOR TO SEAL CABLE ENDS TO PREVENT ENTRANCE OF MOISTURE.
8. ADAPTER COUPLING STEEL TO PVC.
9. GROUND ROD - 3/4"D.x10'-0" LONG. INSTALL MINIMUM 3 FEET FROM THE POLE.
10. PROVIDE #4cu. GROUND WIRE.

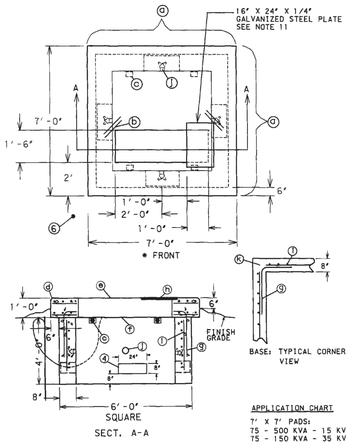
B4 RISER POLE CONDUIT DETAIL

DO NOT SCALE

NOTES:

1. * FRONT denotes the side on which the access doors are located. The concrete base shall be set on a suitable gravel base and located so the FRONT is accessible by truck and suitably protected from plow and traffic damage.
2. Before installing or requiring any active drainage structure (e.g., drain pipe) into the foundation or pad, the contractor, CMP Line Supervisor, or CMP Distribution Engineer must contact Central Maine Power Company's Environmental Services Department at 623-3521 ext. 3479 to request a site inspection.
3. Finish grade shall be graded in such manner to allow surface water to flow away from the pad.
4. Provide 8" x 24" cable holes (bond outs) 8' up the wall from the base. Locate one cable hole per wall, more if necessary. Line up cable holes with trench.
5. Conduits entering concrete stuctures shall be set back from the inside wall 1 to 2 inches and the space within the knockout surrounding the conduits completely filled with mortar to prevent soil from entering structure. Inside the structure the mortar shall be finished and beveled from the conduit ends to the inside wall face to cover and smooth the edges of the knockouts.
6. A 3/4"X 8' galvanized ground rod is to be installed six inches in front of the left FRONT corner of the foundation. The top of the ground is to be 6 inches below final grade.
7. A ground wire shall be installed from the ground rod through the cable hole at the bottom of the pad. 10 Feet of ground wire shall be provided so that it can be installed through the two grounding lugs and connected to the neutral spade.
8. Concrete compressive strength shall be 4000 PSI @ 28 days. For cast-in-place early high strength may be used with a minimum of seven day cure time.
9. Reinforcing steel to have: FY = 60 KSI.
10. For precast units: The precast supplier shall provide lifting lugs in the slab (foundation) and base; the precast supplier shall assemble the slab to the base prior to shipping to the site to ensure that the slab and base fit properly (with no rocking of the slab evident).
11. A 16" x 24" x 1/4" galvanized steel plate to cover a portion of the cable hole when the transformer does not completely cover it. Cut the steel plate to fit, if necessary.

a. 7-#5 Rebar evenly spaced each way top to bottom.
b. 2-#4 Corner diagonal rebar 2'-0" long top and bottom.
c. 4"x 4"x 1/2" angle 6' long with 2-3/4" diameter expansion anchors typical - 4 places (two place precast only).
d. Chamfer typical
e. 2" Concrete cover over top rebar.
f. 3" Concrete cover over bottom rebar.
g. #5 L-Bar @ 12" (cast-in-place only)
h. 16"x 24"x1/4" galvanized steel plate. MID#6000621790
i. #5 Rebar on 12" centers.
j. Pulling eye insert, for use withNV national course thread eye-bolt, (Richmond LCB-1 or equivalent). Located opposite each cable hole and 2' (two feet) from the bottom.
k. All rebar ends to be covered by 1" of concrete, minimum.



APPLICATION CHART

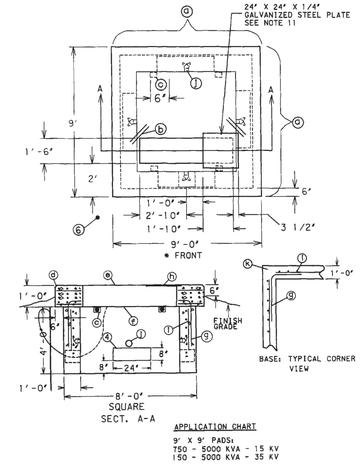
7' X 7' PADS:
75 - 500 KVA - 15 KV
75 - 150 KVA - 35 KV

B6 SMALL TRANSFORMER PAD DETAILS

NOTES:

1. * FRONT denotes the side on which the access doors are located. The concrete base shall be set on a suitable gravel base and located so the FRONT is accessible by truck and suitably protected from plow and traffic damage.
2. Before installing or requiring any active drainage structure (e.g., drain pipe) into the foundation or pad, the contractor, CMP Line Supervisor, or CMP Distribution Engineer must contact Central Maine Power Company's Environmental Services Department at 623-3521 ext. 3479 to request a site inspection.
3. Finish grade shall be graded in such manner to allow surface water to flow away from the pad.
4. Provide 8" X 24" cable holes (bond outs) 8' up the wall from the base. Locate one cable hole per wall, more if necessary. Line up cable holes with trench.
5. Conduits entering concrete stuctures shall be set back from the inside wall 1 to 2 inches and the space within the knockout surrounding the conduits completely filled with mortar to prevent soil from entering structure. Inside the structure the mortar shall be finished and beveled from the conduit ends to the inside wall face to cover and smooth the edges of the knockouts.
6. A 3/4" x 8' galvanized ground rod is to be installed six inches in front of the left FRONT corner of the foundation. The top of the ground is to be 6 inches below final grade.
7. A ground wire shall be installed from the ground rod through the cable hole at the bottom of the pad. 20 Feet of ground wire shall be provided so that it can be installed through the two grounding lugs and connected to the neutral spade.
8. Concrete compressive strength shall be 4000 PSI @ 28 days. For cast-in-place early high strength may be used with a minimum of seven day cure time.
9. Reinforcing steel to have: FY = 60 KSI.
10. For precast units: The precast supplier shall provide lifting lugs in the slab (foundation) and base; the precast supplier shall assemble the slab to the base prior to shipping to the site to ensure that the slab and base fit properly (with no rocking of the slab evident).
11. Use a 24" x 24" x 1/4" galvanized steel plate to cover a portion of the cable hole when the transformer does not completely cover it. Cut the steel plate to fit, if necessary.

a. 9-#5 Rebar evenly spaced each way top to bottom.
b. 2-#4 Corner diagonal rebar 2'-0" long top and bottom.
c. 4" x 4" x 1/2" angle 6' long with 2-3/4" diameter expansion anchors typical - 4 placed (two place precast only).
d. Chamfer typical
e. 2" Concrete cover over top rebar.
f. 3" Concrete cover over bottom rebar.
g. #5 L-Bar @ 12" (cast-in-place only)
h. 24" x 24" x 1/4" galvanized steel plate. MID#6000621795
i. #5 Rebar on 12" centers.
j. Pulling eye insert, for use with 3/4" national course thread eye-bolt, (Richmond LCB-1 or equivalent). Located opposite each cable hole and 2' (two feet) from the bottom.
k. All rebar ends to be covered by 1" of concrete, minimum.



APPLICATION CHART

9' X 9' PADS:
750 - 5000 KVA - 15 KV
150 - 5000 KVA - 35 KV

B6 LARGE TRANSFORMER PAD DETAILS

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
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PROJECT TEAM:

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BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

SCALE	AS NOTED
DATE ISSUED	11/23/2021
PROJECT NO	20-20145.00-1
DRAWN BY	GMC
CHECKED BY	BTG

SHEET TITLE:

ELECTRICAL SITE LEGEND, DETAILS, AND NOTES

ES-000

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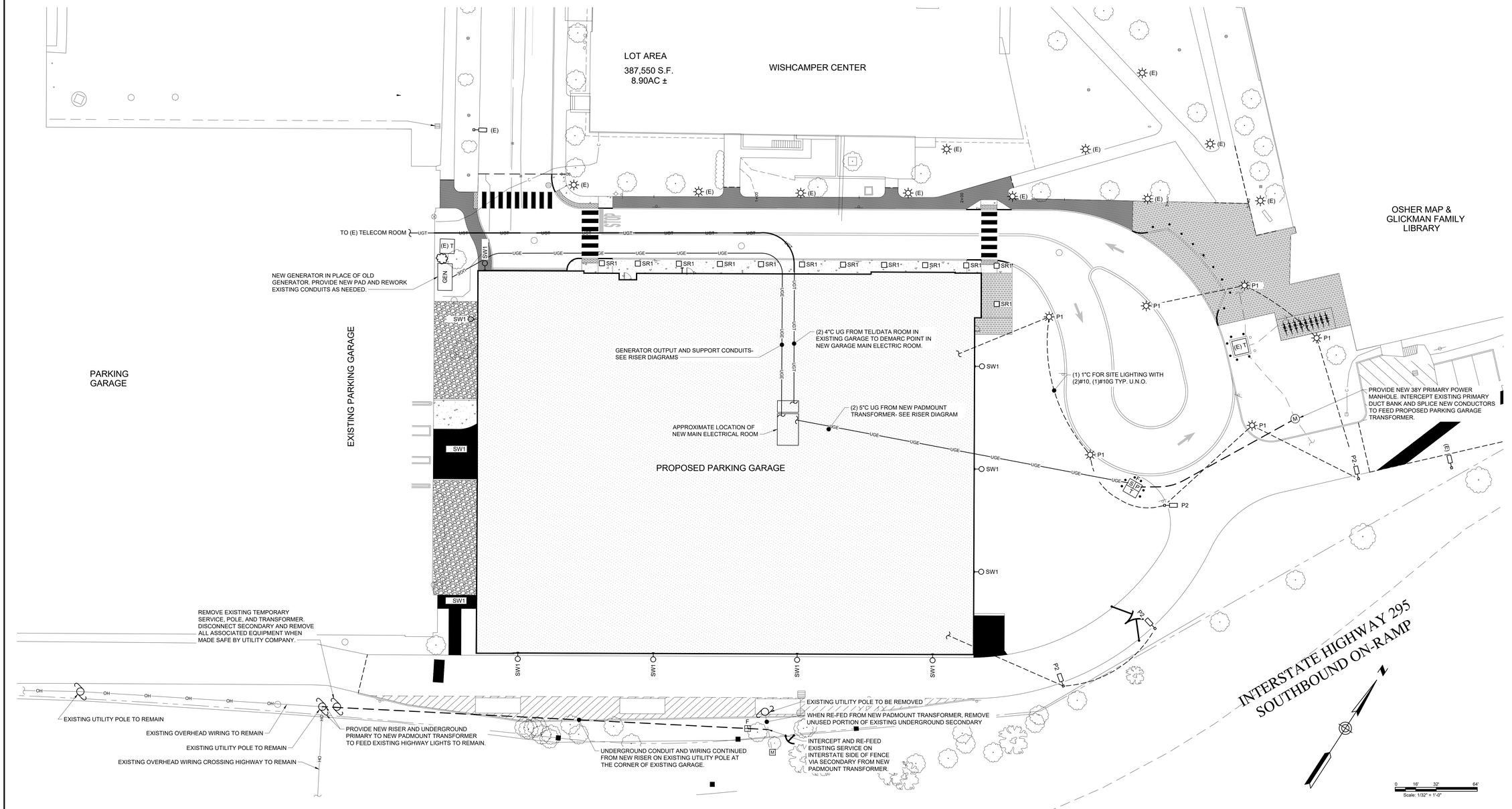

A1	ELECTRICAL SITE PLAN
SCALE: 1"=20'-0"	

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PORTLAND, ME 04103

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PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

SCALE	**AS NOTED**
DATE ISSUED	**11/23/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

ELECTRICAL SITE PLAN AND NOTES

ES-100

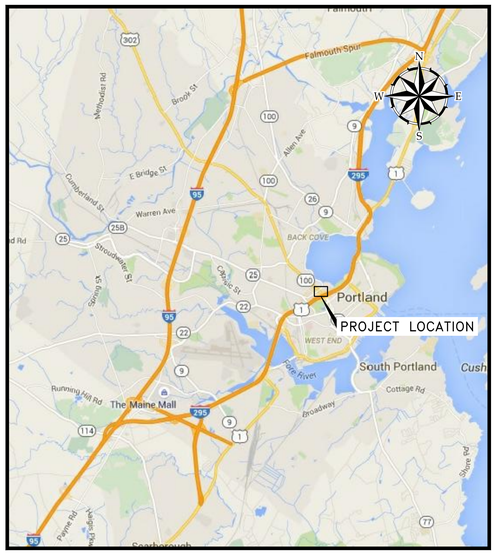
UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

USM STRUCTURED PARKING GARAGE

PROJECT NO.
0233035.00

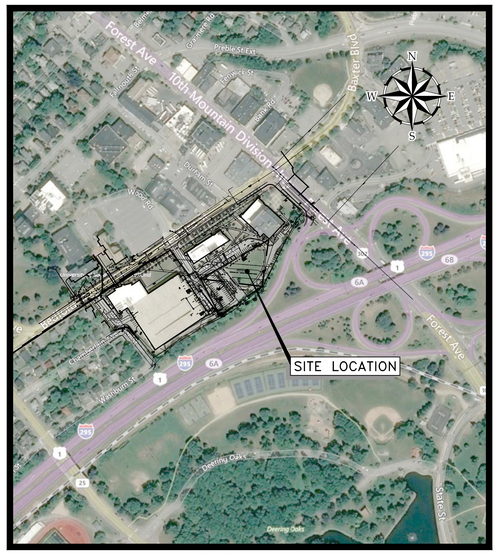
7/30/2021

SHEET INDEX		
Sheet Number	Sheet Title	Sheet Description
COVER	G-000	
1	G-001	GENERAL NOTES & LEGEND
2	EC-001	EXISTING CONDITIONS SURVEY -1
3	EC-002	EXISTING CONDISITONS SURVEY - 2
4	C-001	DEMOLITION & EROSION & SEDIMENT CONTROL PLAN
5	C-100	SITE LAYOUT & MATERIALS PLAN
6	C-101	UTILITY & GRADING PLAN
7	D-200	CIVIL DETAILS - 1
8	D-201	CIVIL DETAILS - 2
9	D-202	CIVIL DETAILS - 3
10	D-203	CIVIL DETAILS - 4
11	D-204	CIVIL DETAILS - 5



PROJECT LOCATION MAP

1 0 1 2
scale mile



SOURCE: BING MAPS

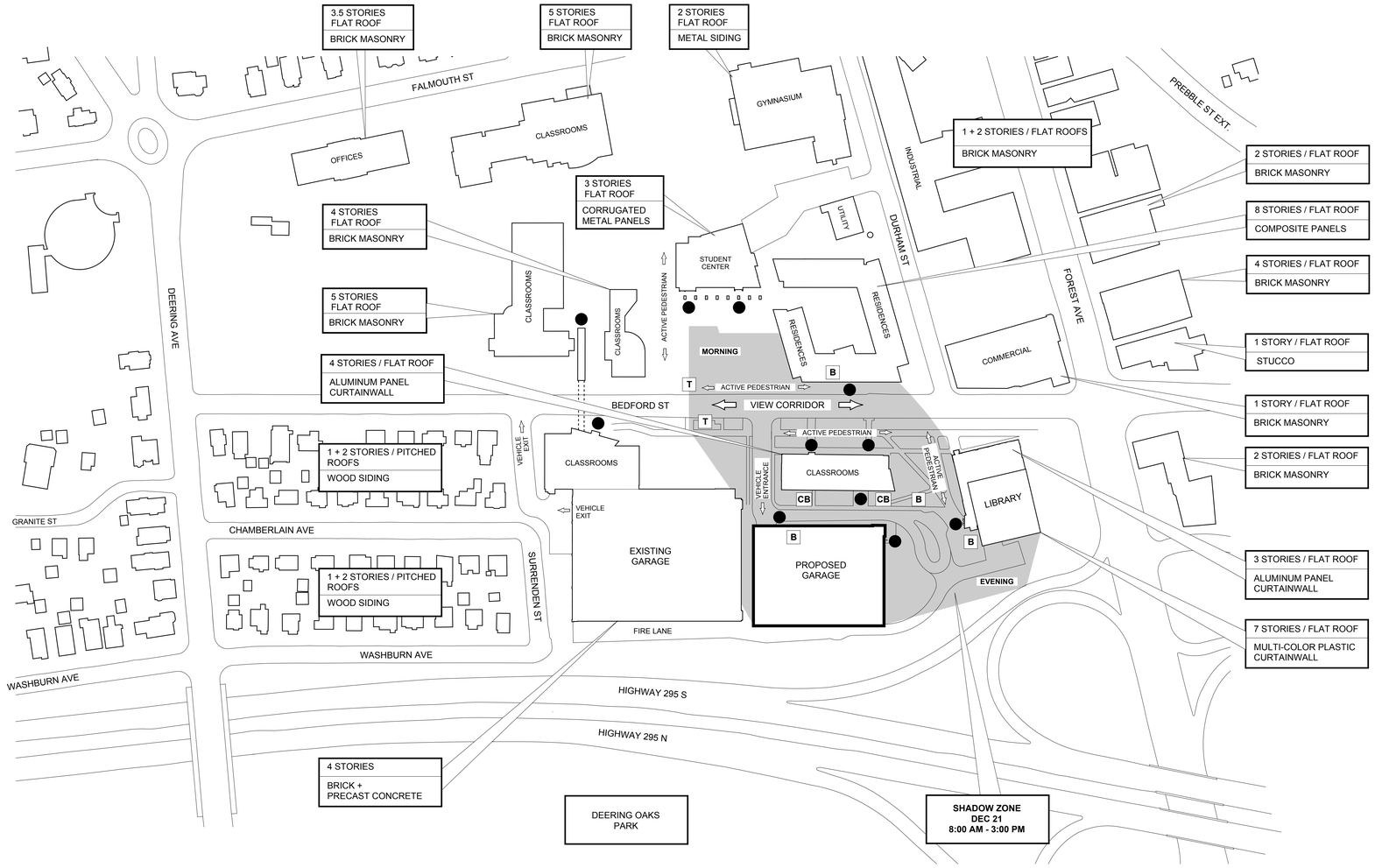
SITE LOCATION MAP

600 0 300 600
scale feet

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

\\woodardcurran.net\shared\Projects\0233035.00 usm - falmouth street garage\wip\Drawings\General\0233035.00 G000.dwg, Jul 29, 2021 - 2:58pm BMCDEVITT



G: 25.0 T: 74.0 H: 49	G: 23.0 T: 72.0 H: 49
G: 25.0 T: 74.0 H: 49	G: 23.0 T: 72.0 H: 49

PROPOSED GARAGE HEIGHT DIAGRAM

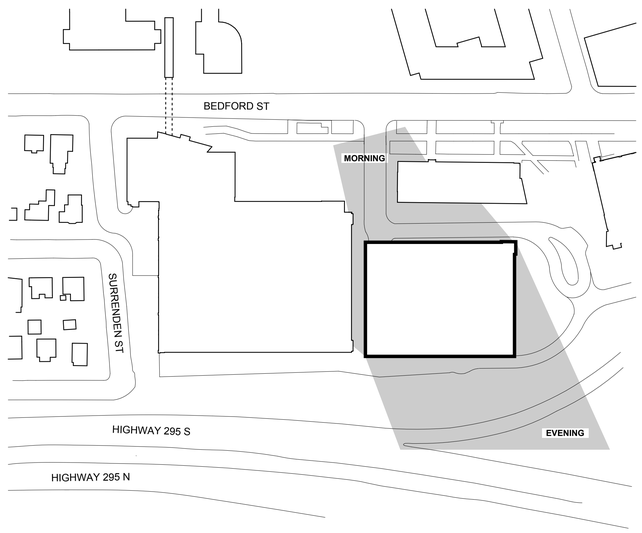
G - ELEVATION OF GRADE AT CORNER
T - ELEVATION OF TOP OF ROOF LEVEL SPANDREL BEAM
H - HEIGHT OF BUILDING AT CORNER

AVERAGE HEIGHT = 49'

USM OVERLAY ZONE ALLOWS 85'

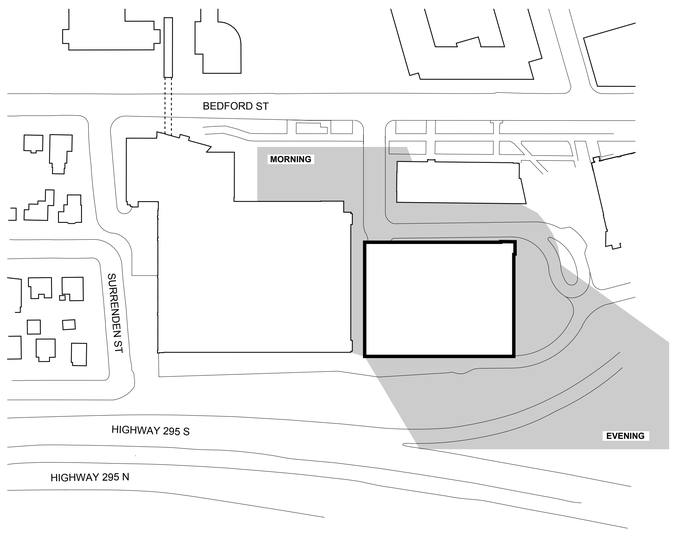
LEGEND

- AREA SUBJECT TO SHADOW CAST BY PROPOSED GARAGE ON WINTER SOLSTICE BETWEEN 1 HOUR AFTER SUNRISE TO 1 HOUR BEFORE SUNSET
- MAJOR PEDESTRIAN ARRIVAL POINTS
- B — BICYCLE RACK OR STORAGE ROOM
- CB — FUTURE CITIBIKE STATION
- T — BUS STOP



SHADOWS CAST MARCH + SEPTEMBER 21ST

6:46 AM TO 4:50 PM



SHADOWS CAST JUNE 21ST

5:05 AM TO 6:20 PM

NORTH

100 0 100 200

BAR SCALE
1" = 100'
CHECK GRAPHIC SCALE BEFORE USING

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PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

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2021

PROJECT:

USM - Structured Parking Garage

Address
44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	1" = 100'
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

SHEET TITLE:

Context +

Shadow Plans

G - 100

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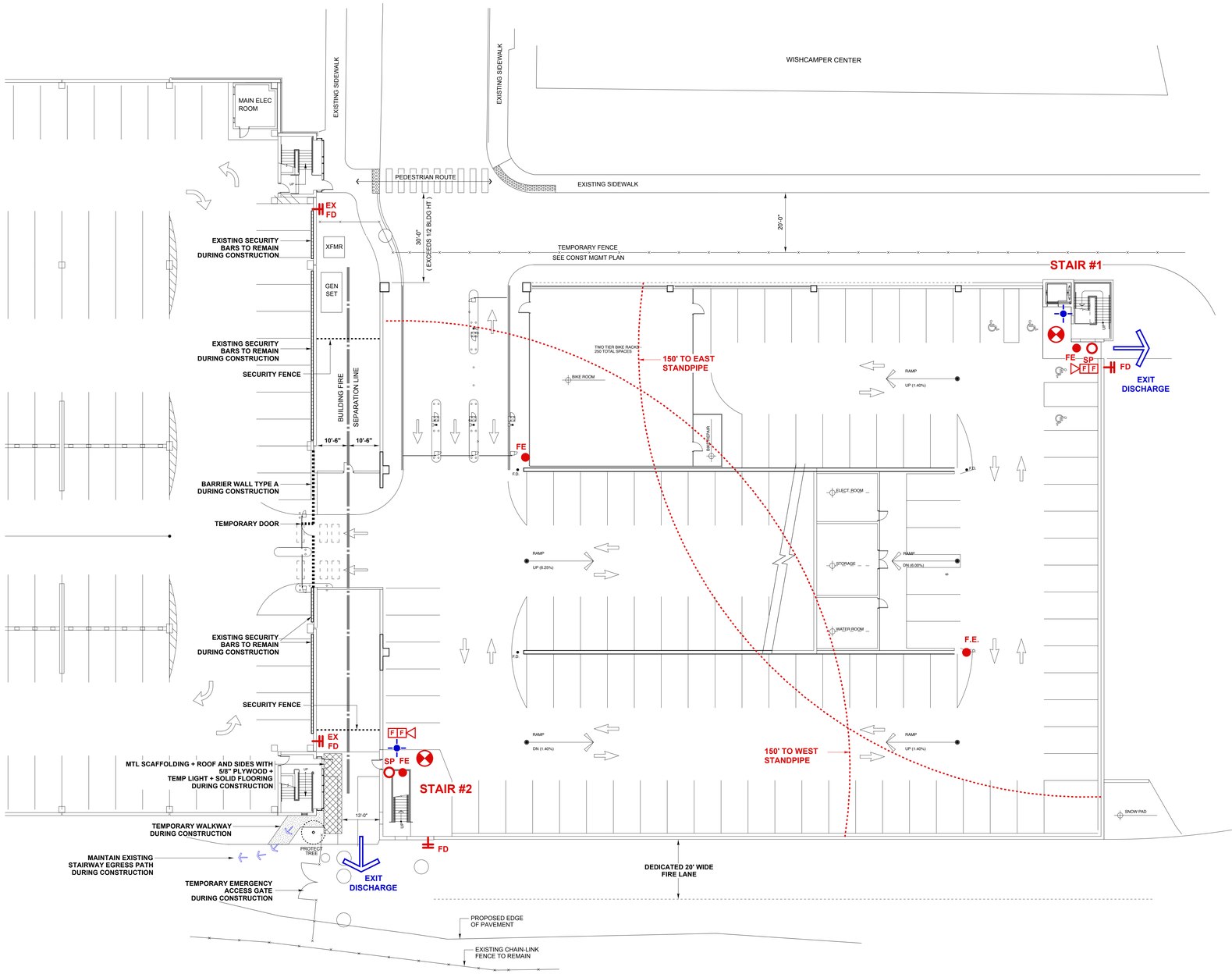
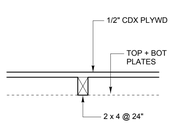


GROUND LEVEL LAYOUT PLAN

1" = 16' - 0"



BARRIER WALL TYPE A

INFILL OPENING IN EXISTING PRECAST CONC WALL

TEMPORARY BARRIER WALL TYPES

1" = 1' - 0"

Legend

- EXIT
- SP — DRY STANDPIPE
- EX FD — EXISTING STANDPIPE HOSE CONNECTION
- FD — STANDPIPE HOSE CONNECTION
- FE — FIRE EXTINGUISHER
- SECURITY CALL BOX
- F F — FIRE ALARM PULL STATION + ANNUNCIATOR

NORTH

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

BUILDING CODE SUMMARY

University of Southern Maine Parking Garage
Building Address: Portland, ME

APPLICABLE CODES (Per MUBEC: Maine Uniform Building and Energy Code)

Building	IBC 2015 (International Building Code)
	IEBC 201 (International Existing Building Code)
Electrical	National Electrical Code 2009
Fire Protection	NFPA Life Safety Code 2015 and NFPA 1 Uniform Fire Code
Mechanical	International Mechanical Code 2015
Plumbing	Maine State Internal Plumbing Code (UPC 2015)
Energy	IECC 2015 (International Energy Conservation Code)
Accessibility	ADA 2010 (Americans With Disabilities Act)

PROJECT DESCRIPTION:
New Construction - Parking Garage

Open or Closed	**Open**
Proposed Construction Type :	Type II B / NFPA II (000)
Gross Area Per Tier:	45,050 +/- Per Tier
Height :	Grade + 4 Tiers / 49'-9" (Top of Roof Spandrel Beams)
Use Group IBC :	Open Parking Garage Section 406
Use Group NFPA :	Open Parking Garage Chapter 42.8
High Rise Requirements	Not Applicable
Automatic Suppression System	No
Dry Standpipe System	Yes
Multiple Occupancies	No

BUILDING CODE REQUIREMENTS (IBC 2015)

Height and Area Summary (Table 406.5.4)

Allowable Height :	8 Tiers
Allowable Area	50,000 SF/Tier

REQUIRED FIRE RESISTANCE RATINGS

ELEMENT (IBC Table 601/NFPA 101 Table A8.2.1.2)	RATING (In Hours)
Primary Structural Frame	**0**
Bearing Walls:	
Exterior	**0**
Interior	**0**
Non-Bearing Walls & Partitions	
Exterior	**0**
Interior	**0**
Floor Construction & Secondary Members	**0 (1 Hour Provided)**
Roof Construction & Secondary Members	**0 (1 Hour Provided)**

SPECIFIC ROOM RATINGS	RATING (In Hours)
Stairs and Floor Openings	**0**
Parking Open Ramps	**0**
Offices + Break Room	**0**
Electrical	**0**
Elevator Shaftway	**2**

EXTERIOR WALL PROTECTION

Wall Fire Resistance Rating (Table 602)	**0** (No rating for 10' or greater per Note c.)
Openings Rating (Table 705.8)	**0** (No rating for 10' or greater per Note g.)

OCCUPANCY LOADS

NFPA Per Chapter 42.8.1.7 :	None
IBC Per Table 1004.1.2 :	1 Per 200 GSF / 226 Per Tier
Egress Width Required : Stairs @ 0.3" Per Person	68"
Egress Width Provided :	96"' / (2) 48" Wide Stairs
Stair Exit Door Width Required: 0.2" Per Person	46"
Stair Exit Door Width Provided:	32" Clear Door @ Each Stair

NOTES

1. THE CONSTRUCTION MANAGER SHALL PROVIDE A CONSTRUCTION PHASING PLAN OUTLINING WORK ZONES AND PROTECTION AND SEPARATION FEATURES.
2. CONSTRUCTION MANAGER SHALL OBTAIN APPROVAL OF PROTECTION AND SEPARATION PROVISIONS PRIOR TO EACH PHASE FROM THE CITY CODES ENFORCEMENT OFFICE.

UNIVERSITY OF SOUTHERN MAINE
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207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

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Address
44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

SHEET TITLE:

Ground Level Code Information Plan

G - 101

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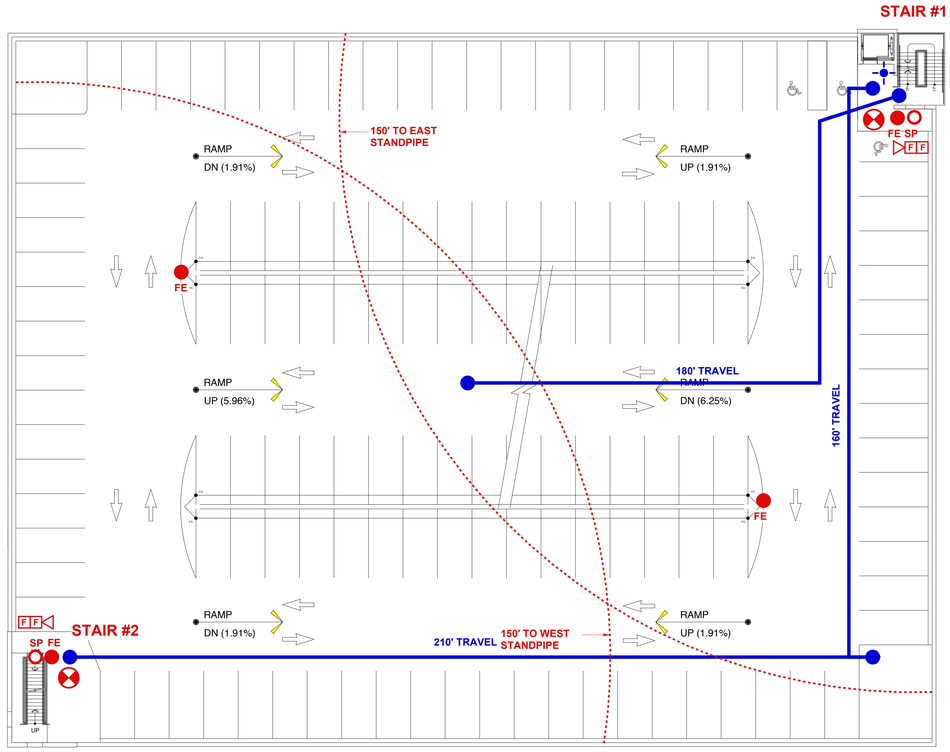

TYPICAL FLOOR LAYOUT PLAN

1" = 16' - 0"

Legend

- EXIT
- SP — DRY STANDPIPE
- EX FD — EXISTING STANDPIPE HOSE CONNECTION
- FD — STANDPIPE HOSE CONNECTION
- FE — FIRE EXTINGUISHER
- SECURITY CALL BOX
- F F — FIRE ALARM PULL STATION + ANNUNCIATOR

NORTH

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

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& STRUCTURAL ENGINEER
DESMAN Design Management
18 Tremont Street #300
Boston, MA 02108

ARCHITECT
WINTON-SCOTT ARCHITECTS
5 MILK STREET
PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN
41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER
LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING
160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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PROJECT:

USM - Structured Parking Garage

Address
44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

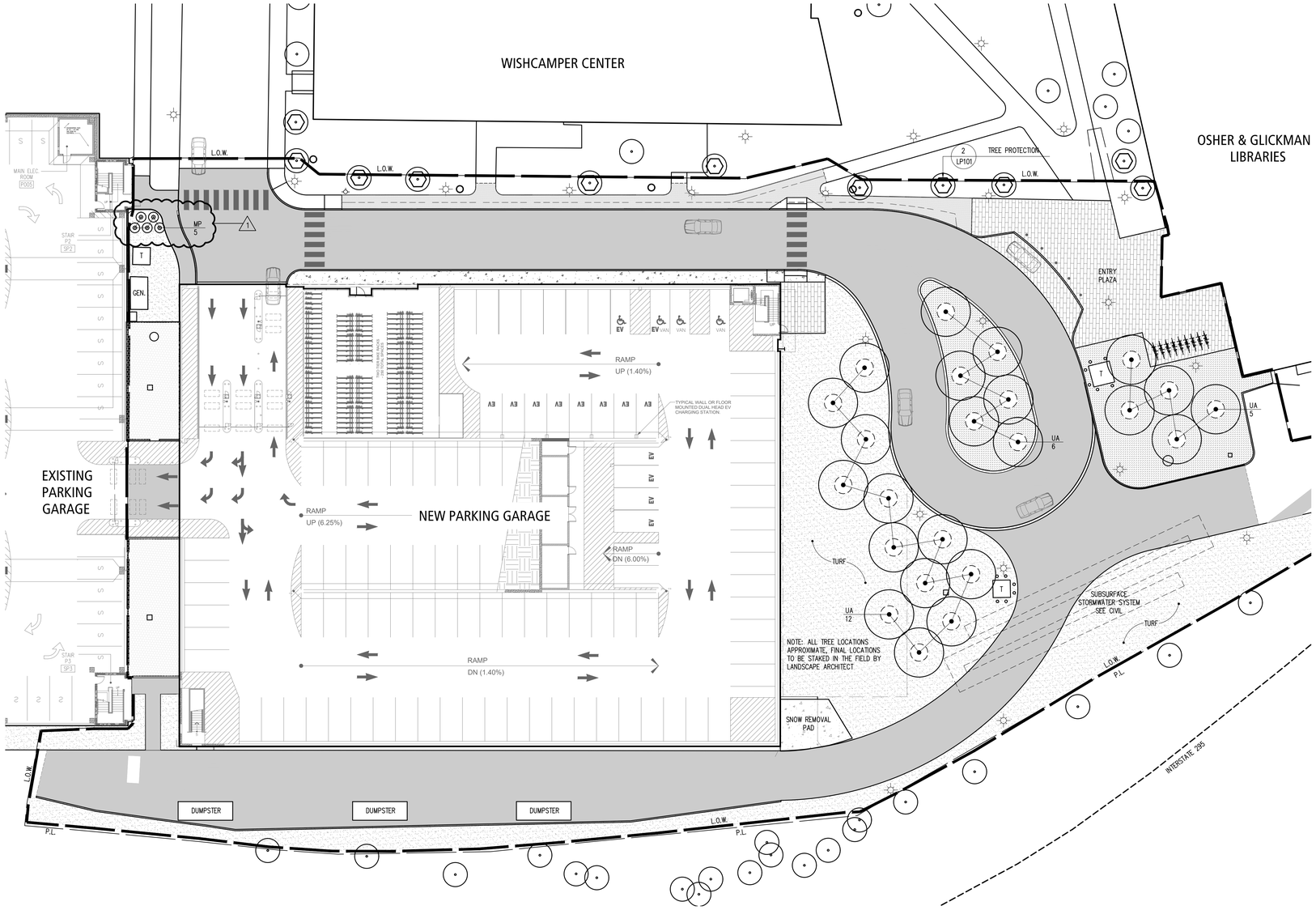
SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

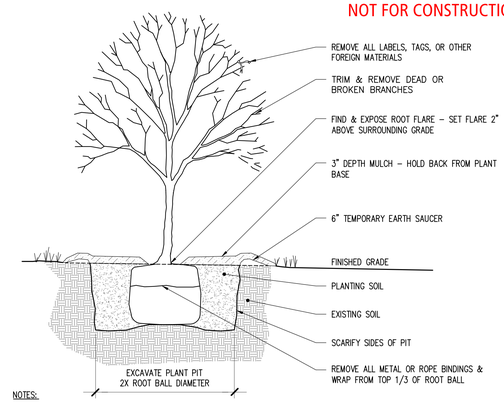
SHEET TITLE:

Upper Levels Code Information Plan
Levels 1 / 2 / 3 + ROOF

G - 102

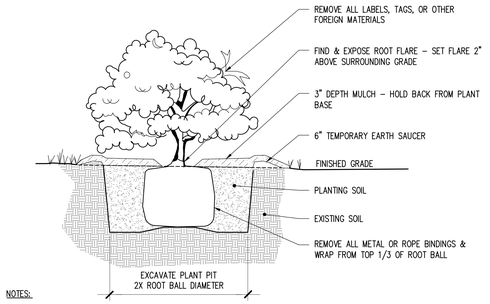
NOT FOR CONSTRUCTION





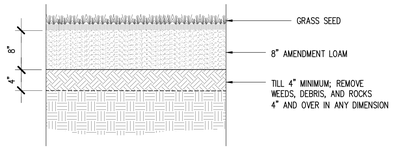
NOTES:

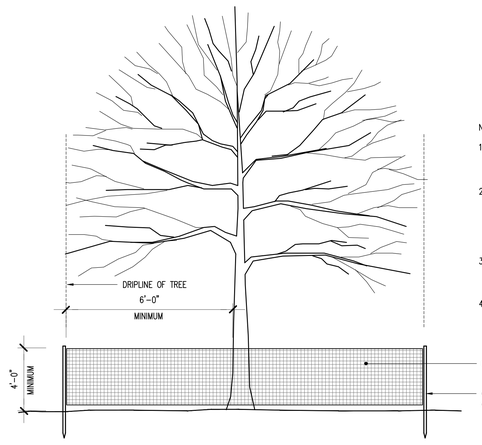
1. TREE TO BE SET PLUMB.
2. SECURE TREE AS MAY BE REQUIRED ACCORDING TO TREE SIZE, LOCATION, & WIND/WEATHER CONDITIONS.
3. IF USING ROOTBALL STABILIZATION, FOLLOW MANUFACTURER'S RECOMMENDATIONS.



NOTES:

1. SHRUB TO BE SET PLUMB.
2. SECURE SHRUB AS MAY BE REQUIRED ACCORDING TO SIZE, LOCATION, & WIND/WEATHER CONDITIONS.
3. IF USING ROOTBALL STABILIZATION, FOLLOW MANUFACTURER'S RECOMMENDATIONS.





NOTES:

1. TREE PROTECTION FENCING SHALL BE INSTALLED PRIOR TO ANY CONSTRUCTION ACTIVITY.
2. INSTALL FENCING TO LIMIT OF DRIPLINE ON TREE OR A MINIMUM OF 6' FROM TRUNK WHEN NECESSARY, WITH PRIOR PERMISISON OF LANDSCAPE ARCHITECT.
3. DO NOT STORE CONSTRUCTION EQUIPMENT, MATERIALS, TOOLS, ETC. WITHIN PROTECTIVE FENCING.
4. MAINTAIN FENCING IN A NEAT AND ORDERLY FASHION THROUGHOUT CONSTRUCTION PERIOD.

PLANT LIST

KEY	QTY	AREA	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	COMMENT
TREES							
UA	23		ULMUS AMERICANA 'PRINCETON'	PRINCETON ELM	4" CAL.	B&B	REC. TREE LIST
SHRUBS							
MP	5	1	MYRICA PENNSYLVANICA	BAYBERRY	#3	POT	
GROUNDCOVER							
	GC	4,760 SF	--	NATIVE GROUNDCOVER	--	--	
	TURF	17,990 SF	--	TURF GRASS	--	SEED	COMPLIANT WITH CITY OF PORTAND PESTICIDE ORDINANCE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

NORTH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
08/09/21	Schematic Design
09/01/21	Revision 1

SCALE	**AS NOTED**
DATE ISSUED	**08/09/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**G.G.**
CHECKED BY	-

SHEET TITLE:

Planting and Landscape Plan

L-100



University of Southern Maine Parking Garage

Overview From North

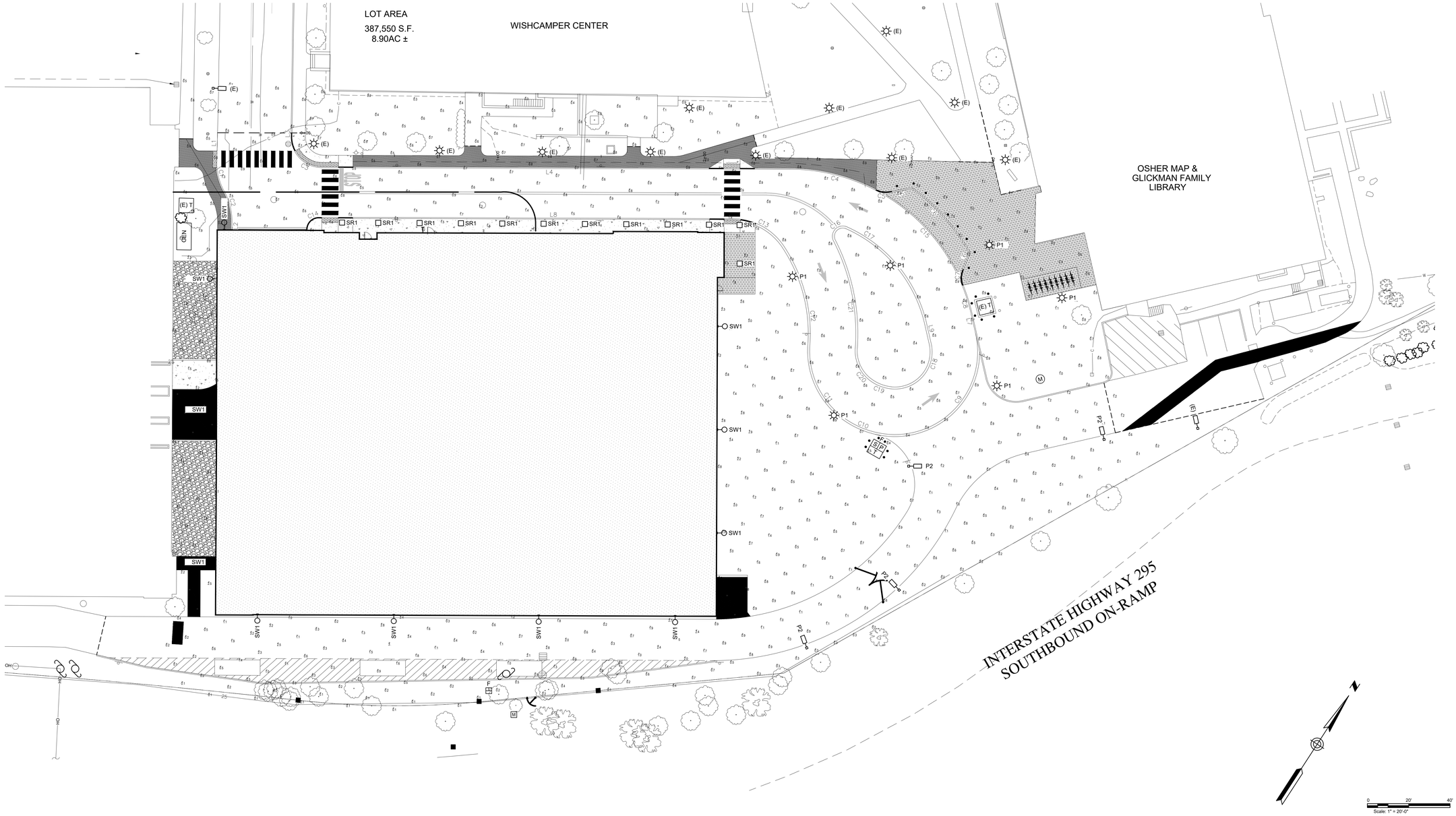
LUMINAIRE SCHEDULE ~ SITE

TYPE	DESCRIPTION	MFR	CATALOG SERIES NUMBER SEE NOTE 1	MOUNTING, U.N.O.	VOLTS	LAMP				KEY NOTES
						QTY PER FIXTURE	WATTS	LUMENS	TYPE	
P1	SITE LIGHT AND POLE, "ICE CREAM CONE" SHAPE	SEE NOTE 8		14' POLE	277	1	24	3,330	LED ARRAY ~ 4000K	8,9
P2	SITE LIGHT AND POLE, "SHOEBOX" SHAPE	SEE NOTE 8		14' POLE	277	1	18	2,160	LED ARRAY ~ 4000K	8,10
SW1	WALL MOUNTED EXTERIOR LIGHT	LITHONIA	KAXW-LED-P1-40K-R4-MVOLT	KEYNOTE 5	UNV	1	29	3,643	LED ARRAY ~ 4000K	5
SR1	RECESSED CANOPY LIGHT	LITHONIA	LDN4SQ-40-07-LS4-AR-LSS-MVOLT	RECESSED CANOPY	UNV	1	8.6	620	LED ARRAY ~ 4000K	

	NOTES
1	**NOTE THAT THESE NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. PROVIDE ALL REQUIREMENTS ON SCHEDULE, NOTES, SPECS, AND DRAWINGS COMBINED.**
2	**CATALOG SERIES NUMBERS ARE USED TO ESTABLISH A LEVEL OF QUALITY AND NOT INTENDED TO LIMIT COMPETITION. SERIES NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. COMPLY WITH ADDITIONAL REQUIREMENTS IN SPECIFICATIONS AND DRAWINGS.**
3	PROVIDE WALL,CEILING, OR PENDANT MOUNTING AS INDICATED ON PLANS. PROVIDE NUMBER OF FACES AND ARROWS AS INDICATED.
4	VERIFY CEILING STRUCTURE AND MOUNTING HEIGHT PRIOR TO ORDERING ANY LIGHT FIXTURES.
5	COORDINATE MOUNTING HEIGHT WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
6	PROVIDE COLD WEATHER OPTION.
7	CONFIRM EXACT FIXTURE CONFIGURATION AND OPTIONS WITH MUNICIPALITY PRIOR TO ORDERING FIXTURE.
8	FIXTURE AND POLE SHALL BE PROVIDED BY OWNER FROM EXISTING OWNER'S STOCK.
9	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8029E345-A.
10	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8039E40-A.

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
DRIVES	Illuminance	Fc	0.99	3.5	0.2	5.15	17.50
WALKWAY- GLICKMAN	Illuminance	Fc	1.00	1.3	0.5	2.00	2.60
WALKWAY- NEW GARAGE	Illuminance	Fc	1.42	1.7	1.2	1.18	1.42



A1	PHOTOMETRIC SITE PLAN
SCALE: 1"=20'-0"	

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
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PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

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94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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2021

PROJECT:

USM - Structured Parking Garage

Address

50 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

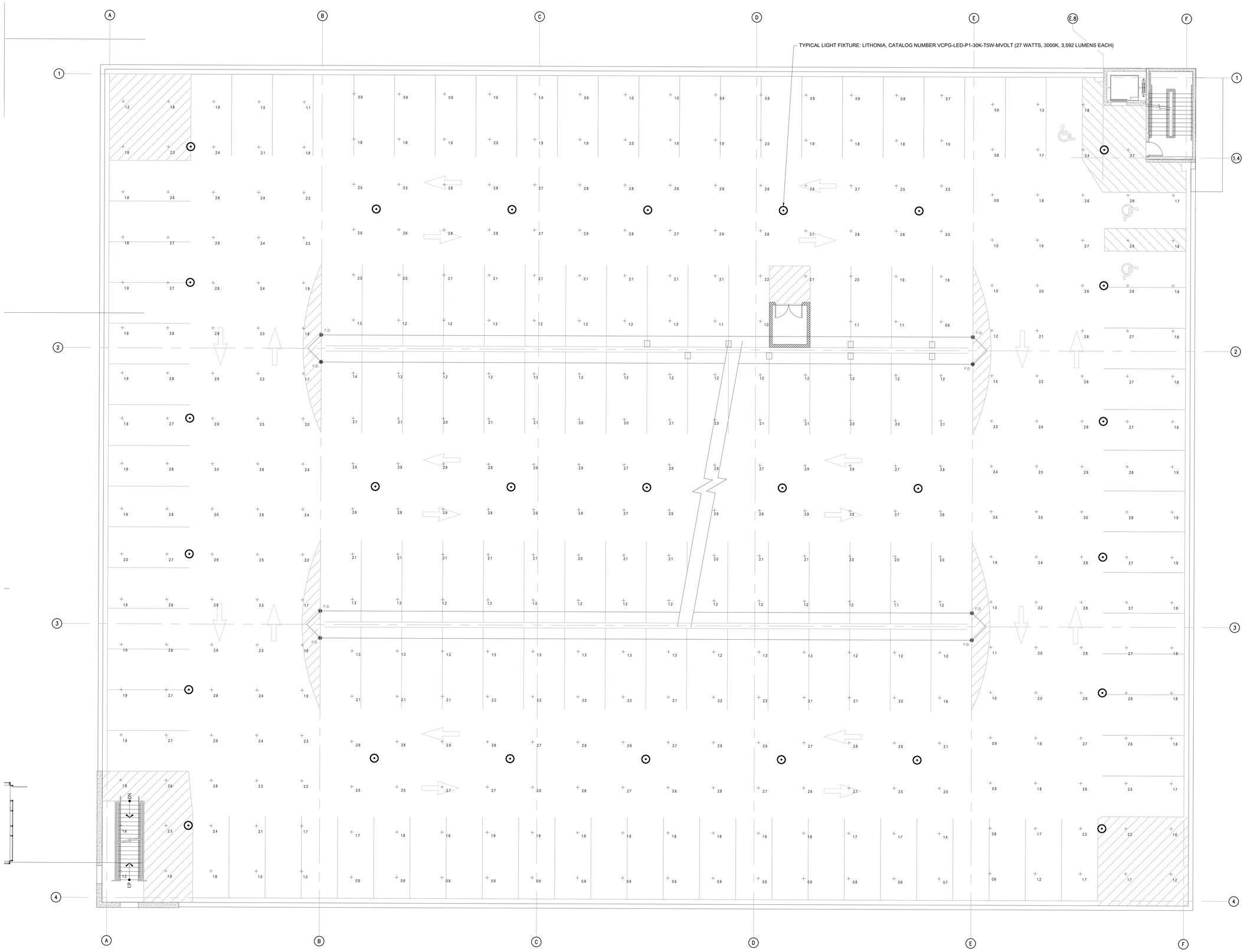
SCALE	**AS NOTED**
DATE ISSUED	**11/23/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

SITE PHOTOMETRIC PLAN AND SCHEDULES

SL-100

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
PARKING DECK OVERALL	Illuminance	Fc	2.02	3.0	0.6	3.37	5.00



A1 TYPICAL INTERIOR PARKING DECK PHOTOMETRIC PLAN

SCALE: 1/8"=1'-0"

7/2/2021 3:16:33 PM

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PROJECT TEAM:

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PROJECT:

USM - Structured Parking Garage

Address

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REVISIONS:

No.	Date	Description

SUBMISSIONS:

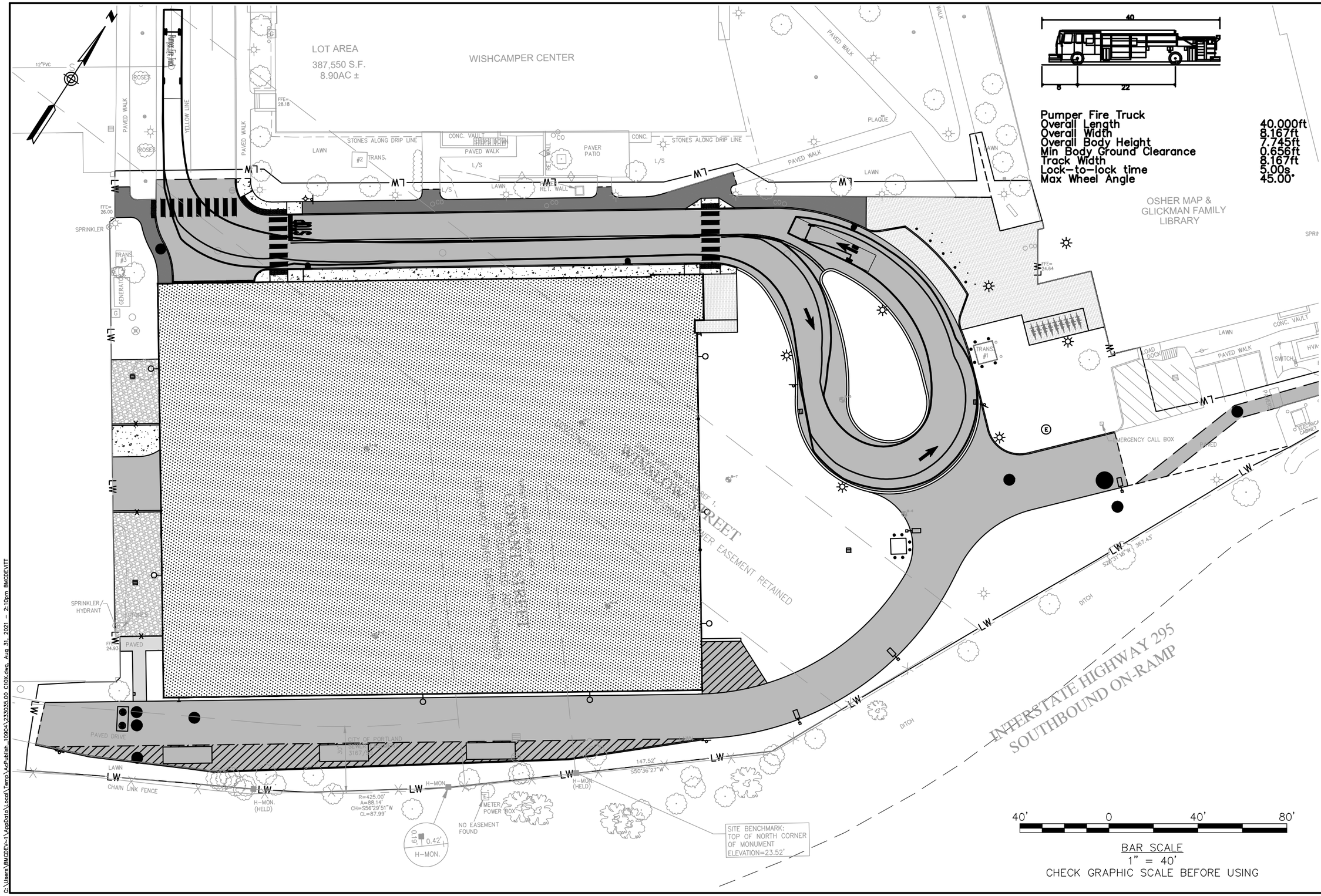
Date	Issued For:
11/23/21	Foundations, Site, Landscape Pkg

SCALE	**AS NOTED**
DATE ISSUED	**11/23/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

TYPICAL INTERIOR PARKING DECK PHOTOMETRIC PLAN

SL-101



41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS
WOODARD &CURRAN

VEHICLE MOVEMENT

DESIGNED BY: ANL
DRAWN BY: BCM
CHECKED BY: DBS
233035.00 C10X.dwg

UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

USM – STRUCTURED PARKING GARAGE
50 BEDFORD ST. PORTLAND, ME 04104

JOB NO: 233035.00
DATE: SEPTEMBER 2021
SCALE: 1"=40'

VEH. 1

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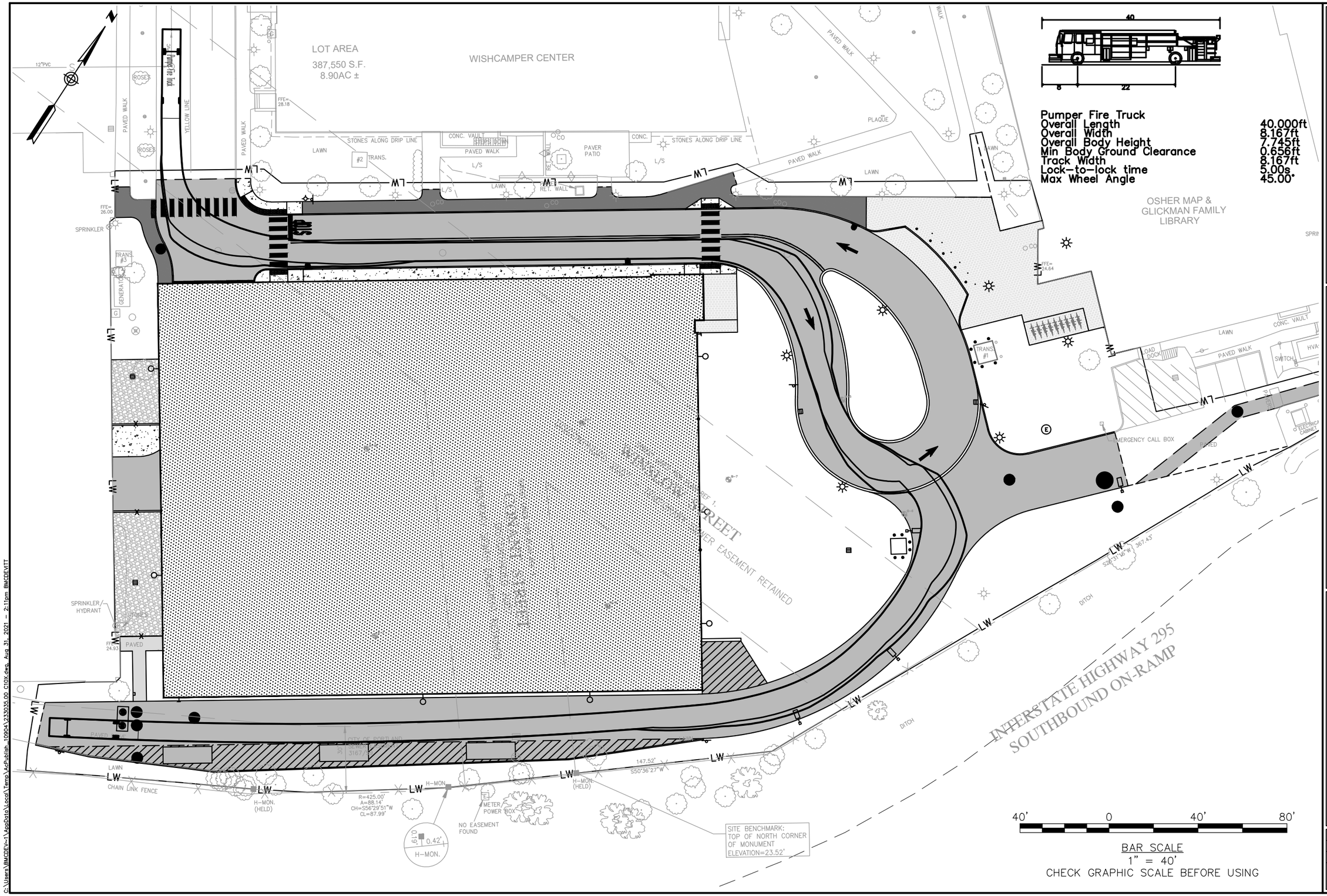

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS
WOODARD &CURRAN

VEHICLE MOVEMENT

DESIGNED BY:	ANL
DRAWN BY:	BCM
CHECKED BY:	DBS
233035.00 C10X.dwg	

UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

USM – STRUCTURED PARKING GARAGE
50 BEDFORD ST. PORTLAND, ME 04104

JOB NO: 233035.00
DATE: SEPTEMBER 2021
SCALE: 1"=40'

VEH. 2

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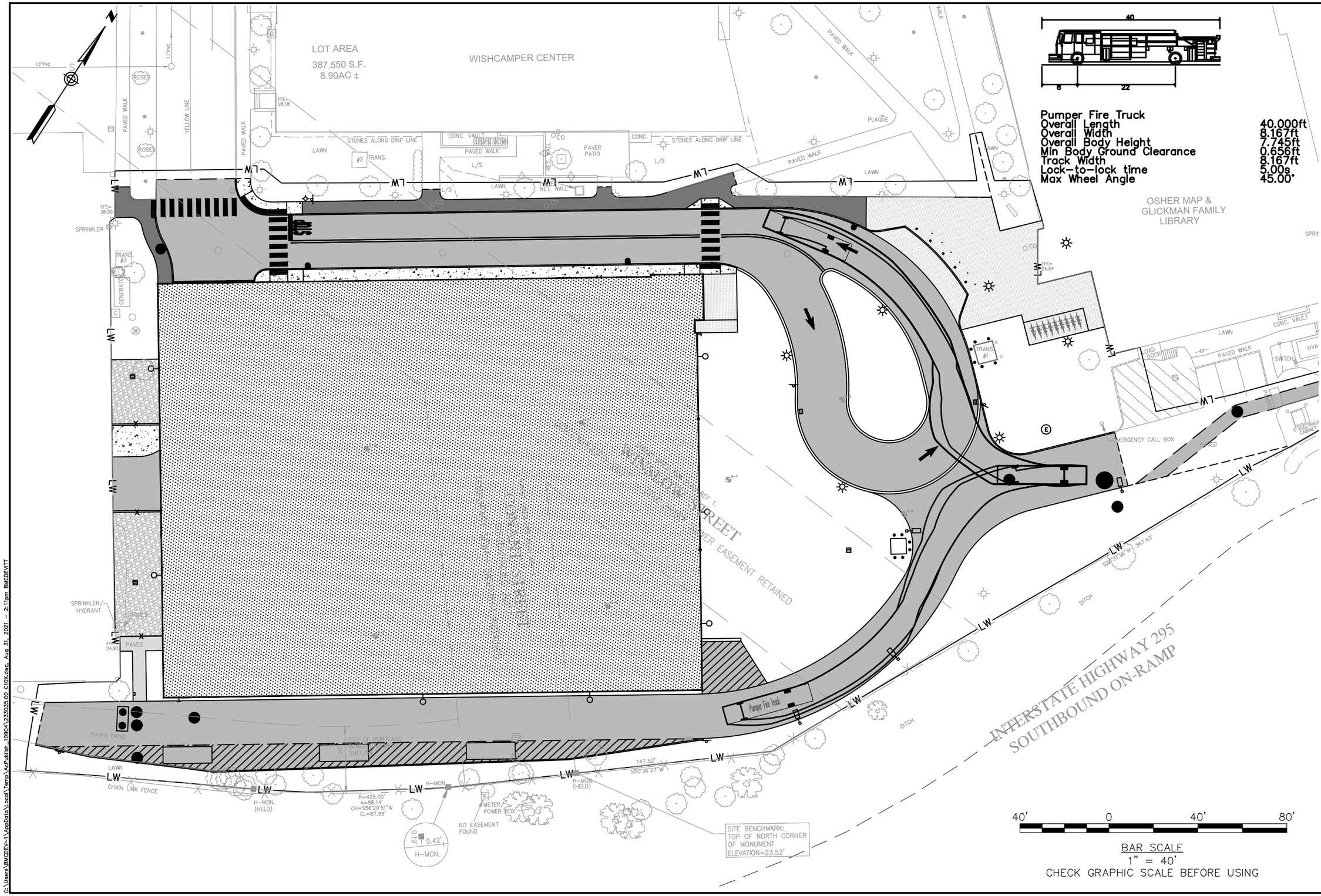

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

VEHICLE MOVEMENT FIGURE – 3

DESIGNED BY:	ANL
DRAWN BY:	BCM
CHECKED BY:	DBS
233035.00 C10X.dwg	

UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

USM – STRUCTURED PARKING GARAGE
50 BEDFORD ST. PORTLAND, ME 04104

JOB NO:	233035.00
DATE:	SEPTEMBER 2021
SCALE:	1"=40'

VEH. 3

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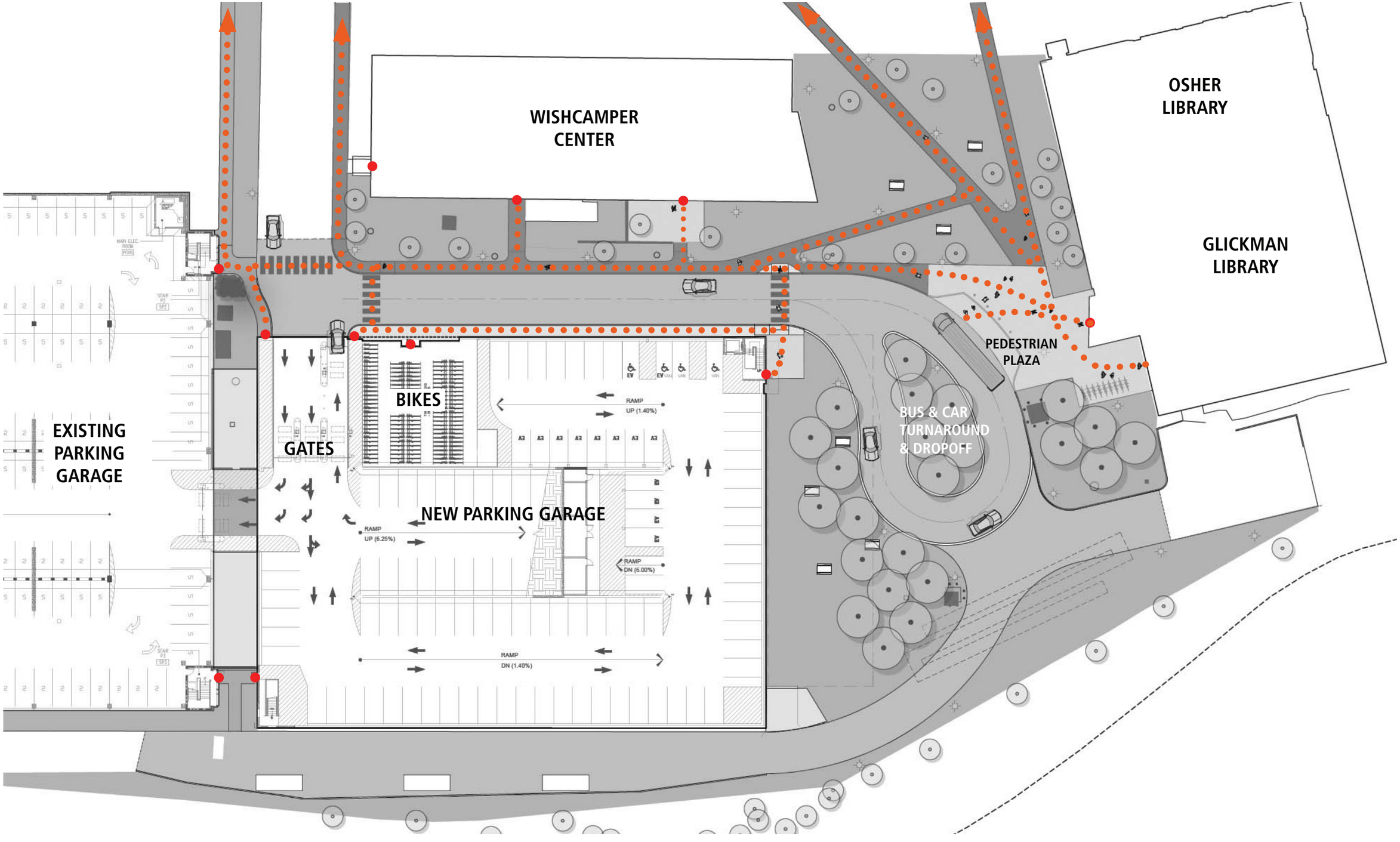
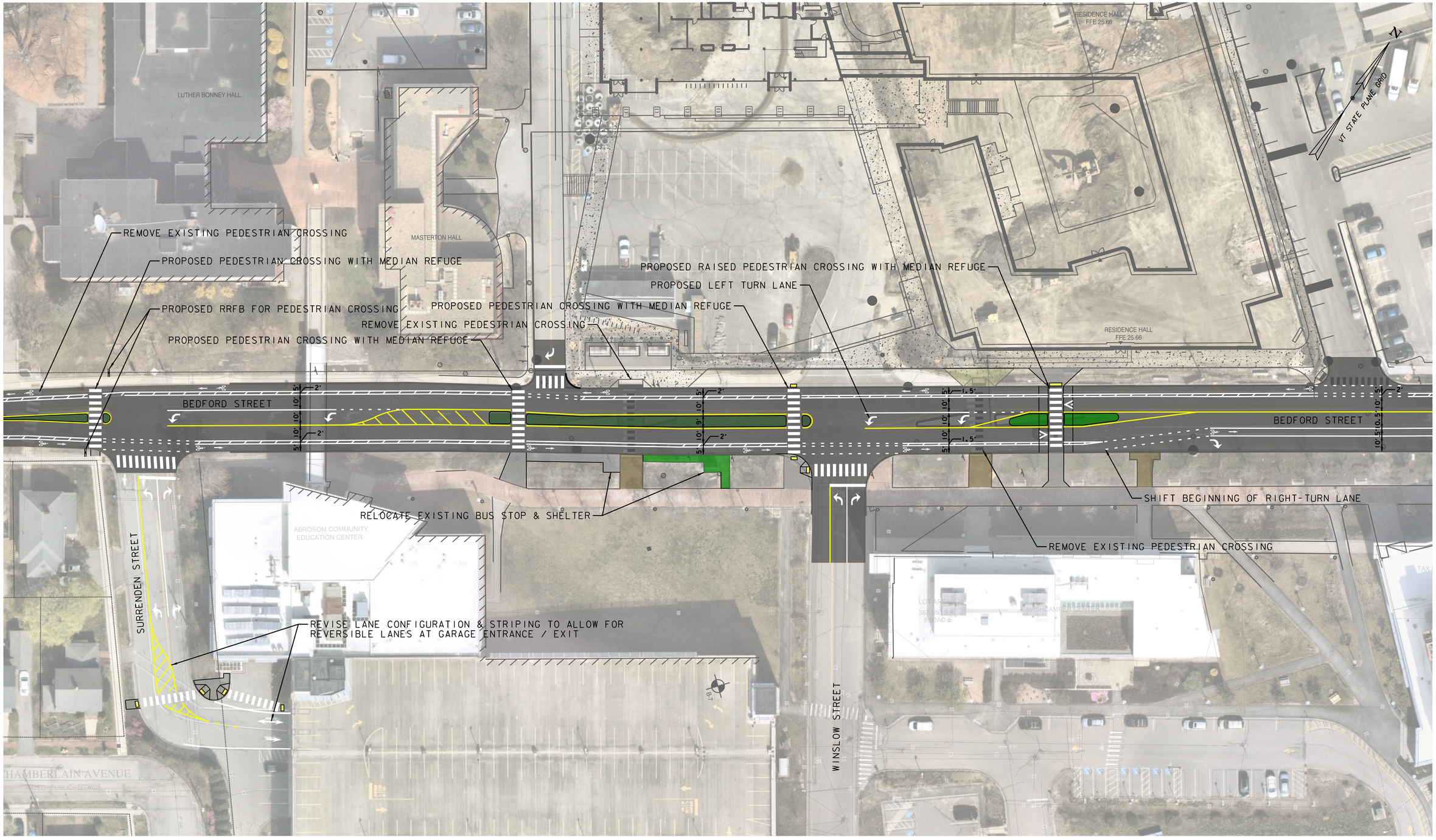


USM PARKING GARAGE: **WISHCAMPER SITE**
Portland, Maine

PEDESTRIAN ROUTES

1 SEPTEMBER 2021
mbla | inc



SCALE 1" = 30'-0"
30 0 30

PROJECT NAME:	USM INTERSECTION IMPROVEMENTS
PROJECT NUMBER:	52718.01
FILE NAME: bdr_concepts.dgn	PLOT DATE: 12/22/21
PROJECT LEADER: J.A. CONLEY	DRAWN BY: D.A. GINGRAS
DESIGNED BY: D.A. GINGRAS	CHECKED BY: J.A. CONLEY
BEDFORD STREET CONCEPT	SHEET 1 OF 1

December 14, 2021

City of Portland Maine
ATT: Mr. Jimmy Dealaman, Planner
Department of Planning and Urban Development
389 Congress Street, 4th Floor
Portland, ME 04101

VIA EMAIL: planningboard@portlandmaine.gov

RE: Plan Number PL-001729-2021 (50 Bedford Street – USM Parking Garage)

Dear Mr. Dealaman:

On behalf of Oakhurst Dairy, I respectfully submit the attached report "Oakhurst Dairy Detailed Response & Request for Consideration" to serve as our official public comment to the aforementioned project. We hope that the city planning team will give careful consideration to all elements contained within this report.

My team has done their best to perform a review to the nearly 950 pages of documents related to this project that were recently posted prior to the workshop. We have persistent concerns that were initially raised during the approval process for project PL-001040-2020 (USM Career & Student Success Center – Portland Commons). The TMP process was largely tabled for that project and deferred to the approval process for this element of the overall project. We submitted a report during the public comment phase of that project and simply refer to it in this response. (*Oakhurst Dairy Detailed Response & Request for Consideration – dated 11/10/2020*)

We have elected not to repeat all of the justifications that we presented in that report, however we assert that many remain relevant to this application and would ask the Planning Board extend consideration on those grounds.

First, we commend USM and the engineering / design teams for the decision to move the parking garage to the new proposed location behind Wishcamper. This shifts our area of concern slightly, but with the right approach appears to present the opportunity for a better overall outcome with respect to traffic management.

The USM project team (primarily Aaron Witham) has put forth a tremendous effort to keep Oakhurst better informed throughout this application process. We have worked with both he and Jenn Conley from VHB to try to understand and address concerns related to the TMP and other elements of the project. It has been a much more collaborative approach over the past few months and for that we are very grateful.

As with most projects of this magnitude, it is hard to fit analysis and resolution into a limited time envelope. We understand that USM desires a very aggressive schedule to get the project underway. Our concern is that we feel that this application for approval may be our last opportunity to address concerns that will influence an outcome that we will live with for many, many years to come.

As I have said before, the dairy processing business is a very logistically challenging, fast-moving operational exercise to produce and distribute high quality dairy products from farm to table. Our single plant operates to a degree every day of the week including all holidays, to receive milk from our extended family of independent farms in Maine. We process that milk and distribute it back to thousands of New England businesses including supermarkets, convenience stores, schools, hospitals and foodbanks.

Oakhurst Dairy
(207) 772-7468
364 Forest Avenue
Fax (207) 874-0714
Portland, Maine 04101
www.oakhurstdairy.com

We are proud to call Portland our home for the past 100 years and have watched the city grow and change around us. Our desire is to remain an important employer and contributor to the community. Logistical movement with our trucking equipment in and around our plant controls most everything we do inside. From the plastic pellets that arrive in a tanker truck to make our bottles, the raw milk from the farms, the boxes, pallets and paper products. Everything arrives in a truck and everything we sell departs in a truck or trailer. Traffic delays that restrict our ability to get the right truck in the right door at the right time are devastating to our operation.

Over the past six months, I have grown to understand how much of an impact 30 seconds can have at a traffic light with respect to trucks safely entering and exiting our property. We have many delicate internal processes that keep or milk products safe and fresh and they rely on that same efficiency with all the processes that support them. We hope that the planning board gives the utmost consideration to the importance of us maximizing technology to maintain safe and efficient roadways in and around our plant.

While we have done our best to present the most relevant topics in the attached report, we are also happy to participate in a separate meeting or workshops if necessary, to address any of the issues we have presented in greater detail.

Lastly, we would respectfully request that the city staff consider our conceptual presentation with similar weight of the engineered studies and reports. There is exhaustive data provided throughout the original TMP and the revisions as well as updated information as part of the official responses to staff. While we do not have tools such as “SimTraffic” software as well as the expertise to interpret everything related, what we do have are real video, stopwatch timings, traffic counts and years of experiencing living the Falmouth Street to Bedford Street corridor on Forest Ave. We simply ask that the staff give consideration to our perspective and presentation and not dismiss us due to any lack of elegance and engineering expertise.

In summary, Oakhurst Dairy will support the proposed project given some assurances that the USM will work collectively with the city to develop some enhanced conditions of approval over and above what we have reviewed in the application packet and attachments as it relates to traffic movement and parking.

Please let us know if it would be more effective for us to address some of these issues prior to full and final approval. Thank you very much for your consideration.

Sincerely,

John H Bennett

John Bennett
President, Oakhurst Dairy

Enclosure: “Detailed Response & Request for Consideration”

Oakhurst Dairy Detailed Response & Request for Consideration

City of Portland, Maine Project Plan Number PL-001729-2021 (50 Bedford Street – USM Parking Garage)

Submitted to Portland Planning Board Workshop on 12/14/21

Purpose / Overview

This document will serve as Oakhurst Dairy's preliminary response to the University of Southern Maine's request for approval of Project PL-001729-2021 (50 Bedford Street – USM Parking Garage).

As stated in our cover, please refer to the previously provided document related to project PL-001040-2020 (*Oakhurst Dairy Detailed Response & Request for Consideration – dated 11/10/2020)* as we presented justifications for the proposed modifications for the original TMP in that project. Oakhurst would assert that many of the elements presented in that report still apply due to growth and traffic impact to Oakhurst. We address in this document specific impacts related to the modified TMP and other associated design changes with respect to the new parking garage location.

Documents and Approach for This Review

For the purpose of this response, we have just gained the opportunity to review most of the documents over the past two business days. We did see an initial draft of the revised TMP some time ago, but did not have the opportunity to review the modified draft or any of the detailed response to city staff contained in the attachments.

It is important to note that all of these materials comprise approximately roughly 950 pages of information, some very technical. We have had to learn to interpret the most relevant elements of the study without many technical resources. We also understand that the City of Portland has diligently reviewed at least a portion of these materials and asked for some modifications or considerations that may help to address some of Oakhurst's concerns.

Submittal Document	Pages	Doc/Rev Date
PB Memo	22	12/10/21
Bedford St. - 50 (Report Attachments)	181	12/10/21
Bedford St. - 50 (Applicants Submittal 1 of 2)	436	12/10/21
Bedford St. - 50 (Applicants Submittal 2 of 2)	270	12/10/21
Bedford St. - 50 (Plans 1 of 2)	16	12/10/21
Bedford St. - 50 (Plans 2 of 2)	24	12/10/21

We have concluded our position and present our concerns and requests for remedy based upon the following:

- Our common-sense, non-expert review and comprehension of the materials that were available as documented above
- Content collected via neighborhood meetings, conference calls, emails and presentations made by USM or by their designees
- Analysis including traffic counts and video capture of actual roadway traffic at intersections and in and out of our property

Areas of Concern & Requests for Consideration - Detail

Parking

The relocation of the parking garage adjacent to Wishcamper addresses much of our concerns related to parking. Additionally, we will forego concerns related directly to the infrastructure of the previously approved dormitory and student success center as those were already presented. There are a few topics of interest relative to this application that we feel are relevant for consideration. Oakhurst does not officially object to the proposed design plan including the recent design change from five levels to four levels. USM did present us with the mathematics related to the growth plan and coverage for displaced parking. The recent departure of the law school off campus was largely the justification to remove one floor of the garage. While we understand the structure is designed so that an additional level could be constructed at some point in the future, we would argue that it would be likely difficult and costly to do so. USM is in the midst of design approval for a new Center for the Arts Performance Center and if you reference their own "Master Plan", it calls for a return of the law school and potential for additional graduate space. This was most recently presented at the last Neighborhood Meeting on 12/9/21. There does not appear to be a lot of additional space left on the campus to build more parking. We simply are in hopes the approach is not short-sighted.

One element that should be linked to the TMP is to verify that the parking data aligns with the TMP peak hour analysis. We struggled to understand alignment between the data outlined in the Appendix "Hourly Demand Charts by Parking Facility" to the TMP movement numbers used to indicate volume through intersections. We understand there are many variables and it is impossible to understand the exact route all commuters will use to approach or depart the new or existing garage. However, we should be mindful of these numbers as we evaluate the traffic impact analysis.

Pedestrian & Public Safety

Before we address the bulk of our specific concerns related to traffic movement, we want to stress the importance of pedestrian, bicyclist and motorist safety. A significant part of the traffic related studies incorporate a desire to convert commuter traffic to other forms of transportation. While we do not specifically challenge the level of success that USM may have in achieving this objective, it is important to note a few things as it relates to the vicinity around USM and the Oakhurst Plant. USM intends to develop incentives or rewards to further encourage those coming to the campus to utilize forms other than a vehicle to travel to campus. It is important to note that it is very difficult to fully understand the impact to traffic throughput at the relevant intersections. There is a considerable amount of design and construction expense related to new pedestrian bump-outs and shortened cross walks. We did not note any additional plans to reduce travel lanes with new or more restrictive bicycle lanes in the Forest Ave corridor. If there are such plans, we would like to understand how that may reduce traffic capacity. When we inquired, VHB did agree that additional pedestrian traffic will cause more delays to both the Bedford/Forest and Falmouth/Forest intersections. Pedestrian crossing interruptions throw off adaptive control signaling on a main throughfare and can take some considerable time to recover. We understand that this is difficult to analyze. Oakhurst was provided the opportunity to review the peak AM and PM hours in the SimTraffic model last Friday 12/10/21 with VHB and staff. During that review, we did not observe any elements of simulating pedestrian impact and the Bedford/Forest intersection. More about our conclusions with the SimTraffic below.

Oakhurst does not specifically object to the assumptions and approach to grow alternative forms of transportation to and from the campus, we simply point out that from our interpretation, the TMP does not seem to contain or simulate the delay impact to traffic caused by alternative commuter methods, only the positive gain of the reduction of vehicular traffic.

Lastly, the Forest Avenue corridor, especially the west sidewalk is an already busy sidewalk. That sidewalk intersects with four very busy driveways to our property. We want to make sure we maximize safety by minimizing any "blind" entrances and exits to our property especially if we expect to grow this type of traffic.

Cascading Traffic Impact

Oakhurst recognizes the challenges related to the traffic element of the project and again, appreciates the effort and expertise of all involved parties. We feel an obligation to really make sure we present a strong voice to highlight an already problematic corridor to becoming simply unpassable or unsafe. The VHB study covers several roadways adjacent to the project (Up/Down Bedford, Winslow, Surrenden, Falmouth, Baxter Blvd, I295, etc). In addition, there are many considerations including road design, cross-walks, bus stops, signals etc. Oakhurst's primary concern is the 800' stretch of roadway between Falmouth Street and Bedford Street on Forest Avenue. We recognize some adjacent considerations such as the I295 off-ramp and any roadway that are directly adjacent. We applaud VHB and USM for the detection solution proposed to protect the off-ramp from backing up on the I295. The remaining focus of our response and request for consideration will largely focus on our interpretation of the reports and what we have observed and lived especially over the past year.

There are multiple versions of the VHB TMP data. The original permit was used for the basis and it was modified to address the new locations, but largely utilized the previous assumptions for future growth estimates. Oakhurst has no basis to refute future growth assumptions, so for the purposes of our response will accept growth as specified. In addition, there are multiple responses to staff comments contained throughout the appendices.

Oakhurst first presented to city staff during a traffic scoping meeting on September 27, 2021. At that time, we presented our own analysis of our primary entrance to our yard in the roadway directly in front of our plant. We provided traffic counts and collected video for two 24-hour periods. Our immediate concern was that our area of analysis was simply outside of the scope that VHB identified for analysis. There was no real identification of the stretch of roadway backing up from Bedford to Falmouth both inbound and outbound. Their analysis reviewed traffic counts at the intersections but real analysis of backups appeared to be out of scope. They did subsequently place a camera at our entrance for the period of 1 day to evaluate and perform traffic counts. Our results differed, but that simply could relate to the day of week they performed their capture.

More importantly, VHB presented to us last Friday (12/10/21) the final SimTraffic model that was provided to Tom Errico per his request. We reviewed an expedited time lapse showing traffic modeling assumptions during peak hours for largely the Bedford/Forest intersection. We were surprised at the level of traffic queuing entering and exiting the Forest intersection from or to the new parking garage. We had simply never seen the modeling. It was much more than we expected and clearly more than observed today. We were pleased to see an aggressive approach to the model to ensure the intersection will perform. However, we strongly disagreed with how the model presented the main Forest Ave corridor. Simply stated, the backups inbound between Bedford and Falmouth Street were grossly understated – even with the additional proposed volume to and from the college.

The modeling shown to us was not a valid representation of what is happening today even without the new growth. We conveyed that to VHB during the session and the conclusion was that it may be attributed to the inputs being different than the actuality of the signal controls at the intersection, or it may be related to the signal not performing to standard.

Over the past few months, by first report of Oakhurst, we identified excessive "Pause" time at both the Bedford and Forest Ave intersections. Since there can be many variables, we requested that VHB investigate primarily the Bedford Street intersection. Upon that investigation, VHB discovered a handful of issues with the intersection including but not limited to:

1. One of the thermal detection cameras at the intersection is malfunctioning and likely causing delays to Forest
2. Detection cards have been locking up at various controllers along Forest Ave at random intervals
3. Camera power supplies may be set to a higher voltage than specified for the equipment causing auto-reboots of the cards
4. Lack of a full analysis to determine if Bedford is using any data from the Falmouth Street controller to operate in an adaptive manner (i.e. traffic counts or modeling)

In addition, we have recorded multiple segments of video that demonstrate the source of pause time at Bedford Street being primarily the distinct left-turn lane from Forest outbound to Bedford Street. Even when there is no traffic calling for green, that signal operates to the max time of approximately 30 seconds. This results in only 32 seconds of flow inbound on Forest Ave. between Falmouth and Bedford when in many cases it could be up to a full 60 seconds. The 800' of roadway between Falmouth Street and Bedford Street inbound to Portland is the biggest pinch point, safety issue and impediment to Oakhurst entering or exiting Forest Ave and the Bedford traffic signal currently allows flow for roughly 30 seconds. This is the section of roadway most at risk to back up into the other intersection (and it does frequently in the AM) and it has almost the least amount of flow time associated with it. VHB presents in the analysis an LOS of "E" or "F" related to the southbound through traffic on Forest Ave. Excessive pause time at this intersection is Oakhurst's biggest complaint. There are plenty of other functional intersections in the city that have a very aggressive and reactive interaction to detected traffic. We feel that this corridor needs all the help we can give it in order to get traffic cleared.

We respect that signaling is a balance and that we cannot have so much time for the inbound that we tie up traffic on the I295. We also understand that various times of the day present different challenges. We have studied this intersection during the AM and PM rush ours. We have also watched it on a Saturday with little traffic. It seems to perform the same so it leads us to believe that "Max Settings" are largely utilized or something is not functioning properly. USM communicated to us that they were willing to provide the city with equipment to repair the intersection. We attempted to communicate with City of Portland personnel and were instructed that the most appropriate approach would be to address it as part of this application process.

The biggest hazard to Oakhurst for safety and efficiency is when our entrances are blocked by stopped traffic. Oakhurst does not expect and is not requesting a dedicated traffic signal. But there must be some recognition that we enter and exit the roadway with 45'-53' trailers, trucks and tankers. They require a larger turn radius. We cannot "sneak" between a car waving us out on to the roadway. We cannot "beat" the driver closing in on our trucker quickly. We need a good break in the action to be able to get in and out. If there is an adaptive method to

count vehicles between Bedford and Forest as they pass thru Falmouth Street and use that data to slightly increase green time at Bedford, we would like to see that employed. If not, we would request a similar method that has become a condition for the applicant to install at the I295 offramp to detect if vehicles are likely blocking our entrance and/or backing up into the Falmouth Street intersection. USM and the city staff have proposed a painting and/or signage scheme to our roadway to alert motorists to not "Block the Box" as a deterrent to people blocking our driveway. While we do not object to this approach as an additional step, we feel it will likely be ignored most of the time or become ineffective over time, so we do not feel this is a viable primary approach. We understand that city staff do not desire to do something special with respect to signal or controls for a single tax payer, but keep in mind that there are other property owners in this corridor as well as the entrance to Fenway Street. Lastly, this improves the safety related to pedestrians moving across our entrances while trucks are trying to get in and out.



The photo above was captured on 12/14/21 at 11:01AM a non-peak hour and is fairly representative of normal conditions at this section of roadway.

Our analysis also identified the potential for some improvements at the Falmouth Street intersection. This intersection appears to perform much better than the Bedford Street intersection, but there can be some significant pause time related to this intersection as well. We observed motorist frustration at this intersection, excessive emissions and handfuls of examples of motorists simply proceeding through the red signal because they got tired of waiting. This seems like it would merely be a tuning exercise vs. a massive redesign. The bigger request we would have for this intersection would be to fully utilize data interpretation through the intersection to "help" the Bedford intersection perform in an optimal manner.

Traffic Summary

We have several videos and photo documentation showing traffic queuing from Bedford back to Falmouth. Our measured timings at this intersection do not match our observations of the inputs used to drive the SimTraffic analysis. We know there is hardware failure at this signal as well as potential other detection issues and it is unknown how much data is being used from adjacent intersections for any adaptive control. There appear to be only minor differences between AM or PM peak to the inbound or outbound lanes. Oakhurst would prefer to see the intersection working in an optimal manner in 2021 so that we can truly understand the modeling presented that is expected to hold up through 2028. We hope the city staff and the associated consultants and engineers will develop an approach to make sure this is addressed so that we can feel comfortable and confident of a solid design plan moving forward.

Summary & Closing

Oakhurst appreciates all of the work to move this project forward. We also genuinely appreciate USM's efforts to work directly with us to best understand our concerns and attempts to address them proactively. As we have previously indicated, it is possible that we have misinterpreted some of the technical information, especially as it relates to the traffic studies. All we request is that simple and practical analysis also be employed. We want to make sure that the proper equipment and engineering is in place in order to support growth and scale to future needs. We look forward to continuing a collaborative relationship with USM and the City of Portland to contribute to the best approach to resolving these challenges and keeping our city safe and prosperous.

Att. 1

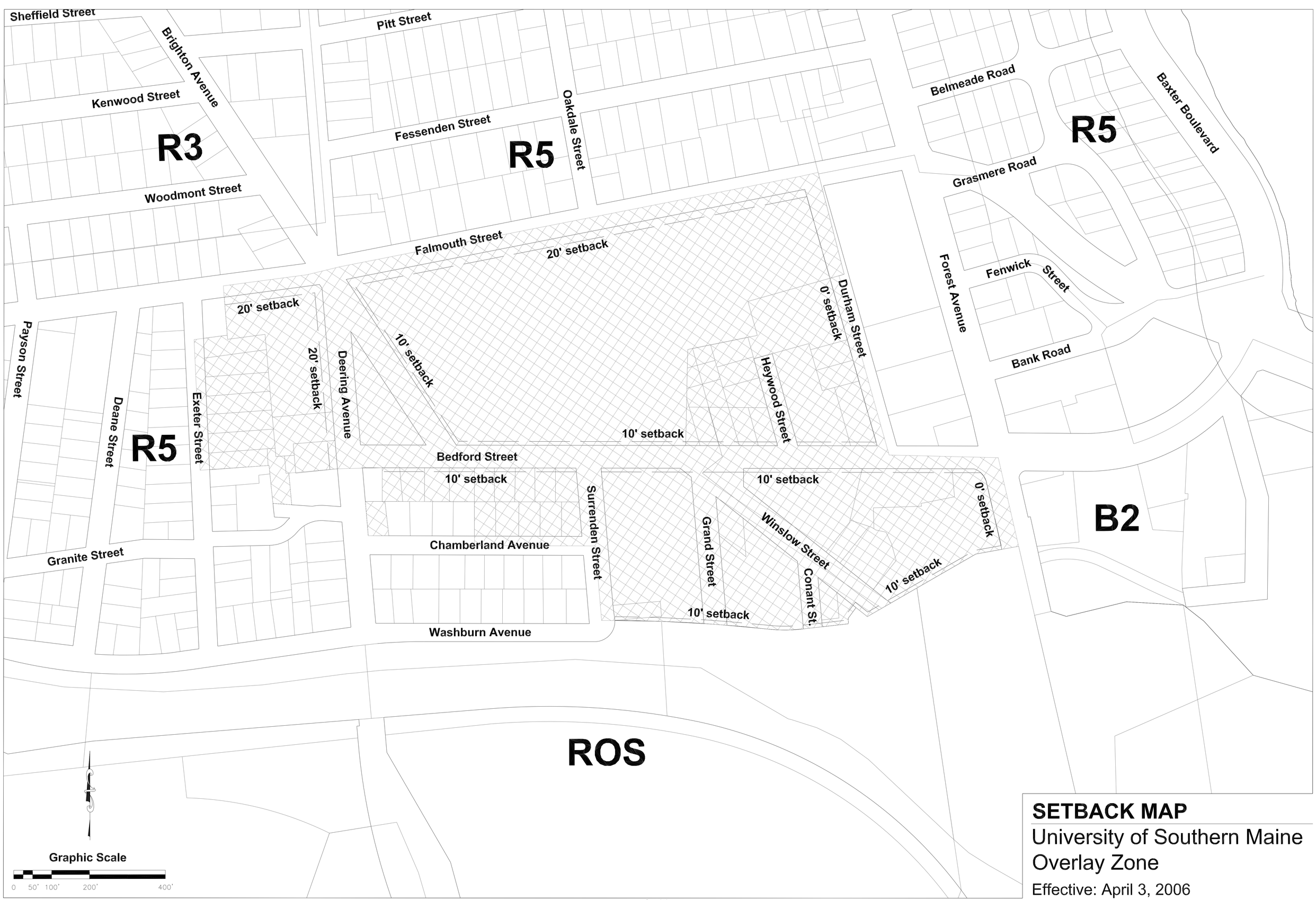
Sheffield Street
Brighton Avenue
Kenwood Street
R3
Woodmont Street
Pitt Street
Fessenden Street
R5
Oakdale Street
Belmeade Road
R5
Baxter Boulevard
Grasmere Road
Falmouth Street
Forest Avenue
Fenwick Street
Durham Street
Payson Street
Deering Avenue
Heywood Street
Deane Street
R5
Exeter Street
Bedford Street
Bank Road
Surrenden Street
Grand Street
Winslow Street
Conant St.
Chamberland Avenue
Granite Street
Washburn Avenue
B2
ROS

Graphic Scale
0 50' 100' 200' 400'

OVERLAY ZONE MAP
University of Southern Maine

Overlay Zone

Efffective: April 3, 2006



SETBACK MAP

University of Southern Maine
Overlay Zone

Effective: April 3, 2006

Sheffield Street
Brighton Avenue
Kenwood Street
R3
Woodmont Street
Pitt Street
Fessenden Street
R5
Oakdale Street
Belmeade Road
R5
Baxter Boulevard
Grasmere Road
160'
Falmouth Street
Forest Avenue
Fenwick Street
Bank Road
Durham Street
80'
B: 75'
B: 75'
C: 85'
Heywood Street
Payson Street
Deane Street
R5
Exeter Street
Deering Avenue
Bedford Street
800'
384'
A: 45'
R5: 35'
R5: 35'
Chamberland Avenue
Surrenden Street
B: 75'
Grand Street
Winslow Street
Conant St.
C: 85'
B2
Granite Street
Washburn Avenue
ROS
Graphic Scale
0 50' 100' 200' 400'

HEIGHT MAP

University of Southern Maine
Overlay Zone

Effective: April 3, 2006

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Land Quality Control
State House Station 17
Augusta, Maine 34333
Tel: (207) 287-2111

FOR DEP USE

#L- _____

Date Received _____

NOTIFICATION OF APPLICATION ACCEPTANCE
MUNICIPAL REVIEW OF DEVELOPMENT
(38 M.R.S.A. Section 489-A)

This form is to be used by a registered municipality to notify the Department upon the acceptance of an application for review pursuant to 38 M.R.S.A. Section 489-A. This form must be received by the Department within 14 days of acceptance of an application. The municipality must also submit one copy of the project application and one copy of the record of review and action.

If the application which is the subject of this notice should subsequently be amended during the review process, this form should also be used to submit notice to the Department of the amendment.

Municipality: Portland, ME

Contact Person: James Dealaman, Planner

Address/Phone: Portland Planning and Urban Development, 389 Congress St., Portland, ME 04101. General Number (207) 874-8719.

Project Applicant: University of Southern Maine

Address/Phone: 25 Bedford St., Portland ME (207)780-4177

Title of Project: Structured Parking Garage

Date Accepted as Complete by Municipality: 8/24/2021

I. Type of Project for which permit is sought: (Check One)

_____ Subdivision as described in section 482, subsection 5 of more than 20 acres but less than 100 acres; *(Note: Subdivision review will occur at future dates)*

__✓__ Structure as described in section 482, subsection 6, paragraph B, in excess of 3 acres but less than 7 acres;

_____ Excavation on more than 5 acres of land for borrow, topsoil, clay or silt, whether alone or in combination as described in section 482, subsection 2-B.

II. Description of Project. (Include number of units or lots, parcel size, footprint, etc.)

The project is seeking an amendment to the Site Location of Development (SLOD) Permit for the University of Southern Maine (USM) Portland campus located at 44 Bedford Street. The proposed work will take place on a single parcel, identified by the City of Portland Assessor as Tax Map 114, Lot A001001, which is approximately 8.1 acres in size. The proposed work will be limited to approximately 2.4-acres of the property.

The project proposes constructing a new five-level, 632 space structured parking garage with a footprint of 45,100 square feet, along with associated site improvements, at 50 (44) Bedford Street. Site work includes installing sidewalks, landscaping, utilities, and stormwater management infrastructure.

III. Submit as attachments to this form:

A. One copy of complete application filed with municipality (include site plans);

Included as an attachment.

B. Identification of any outside review agents or consultants who will be performing reviews of any aspect of the application;

Thomas Errico, P.E. TY Lin, Traffic
Michael Guethle, P.E., Wright Pierce, Stormwater

C. One copy of the legal notices served by the municipality.

The Legal Notice for Receipt of Application is included as an attachment.

NOTE: APPLICANT IS ADVISED TO REVIEW THE NATURAL RESOURCES PROTECTION ACT 38 M.R.S.A. SECTIONS 480-A 480-U (N.R.P.A.) TO ENSURE CONSISTENCY WITH THAT LAW. THE MUNICIPALITY'S DELEGATED REVIEW AUTHORITY PURSUANT TO 38 M.R.S.A. SECTION 489-A DOES NOT EXTEND TO THE N.R.P.A. IF AN N.R.P.A. PERMIT IS NECESSARY IT MUST BE OBTAINED FROM THE DEPARTMENT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

Town or City of: PORTLAND, ME Date: September 1, 2021

By: _____

Printed Name: James Dealaman

Title: Planner

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

July 26, 2021

James Rather
City of Portland Development Review Services Manager
389 Congress Street
Portland, ME 04101

Re: University of Southern Maine Structured Parking Garage
Major Site Plan Application & Site Location of Development Amendment

Dear James:

On behalf of the University of Southern Maine, Woodard & Curran is pleased to submit applications for a Major Site Plan Review and a Site Location of Development (SLOD) Amendment for a structured parking garage located at 44 Bedford Street. The proposed development includes a five-level structured parking garage, vehicle turnaround and drop-off area, fire access drive, pedestrian walkways, site landscaping, exterior lighting, and associated site improvements. The proposed parking garage will be approximately 45,100 square-feet in size and will create a total of 632 parking spaces, which includes 13 ADA accessible parking stalls, for a net increase in 425 additional off-street parking spaces for the University. The proposed garage will provide parking for the Portland Commons Residence Hall, which is currently under construction, and enable future developments at the University by replacing some of the parking that will be displaced by future developments (to be submitted under separate cover at a later date). The proposed stormwater management plan will consist of a subsurface detention and proprietary treatment device.

This application has been prepared in accordance with the City of Portland's Land Use Code of Ordinances and the applicable sections of the City of Portland Design and Technical Manuals. The SLOD Amendment has been prepared in accordance with Maine Department of Environmental Protection Chapter 500 Rules. It is our understanding that the City will be reviewing the SLOD Amendment under their Delegated Review Authority.

The application materials, supporting documents, and design drawings will be uploaded into the Eplan folder when it is available for the project. Thank you for coordinating the review of this project. If you have any questions regarding this application, please feel free to contact me at (207) 558-3665 or by email at aefletcher@woodardcurran.com.

Sincerely,

WOODARD & CURRAN INC.

Ashley Fletcher, PE
Technical Manager

cc: Ann Vashon, University of Southern Maine
Wes Wilson, Desman Design Management, Inc.

Department of Environmental Protection
Bureau of Land & Water Quality
17 State House Station
Augusta, Maine 04333
Telephone: 207-287-3901

FOR DEP USE **FORM A PAGE 1**
ATS # _____
L-_____
Total Fees: _____
Date: Received _____

****

SITE LOCATION OF DEVELOPMENT PERMIT APPLICATION 38 M.R.SA. §§481-490

PLEASE TYPE OR PRINT IN *INK ONLY*

This application is for: (CHECK THE ONE THAT APPLIES)	☐ **20 acre development** ☐ **Planning Permit** ☐ **Metallic Mining**	☐ **Marine Oil Terminal** ☐ **Structure** ☐ **Subdivision**	☐ **Major Amendment** ☒ **Minor Amendment**

1. Name of Applicant:	University of Southern Maine	**6. Name of Agent (if applicable):**	Ashley Fletcher, PE (W&C)
2. Applicant's Mailing Address:	25 Bedford St., Portland ME	**7. Agent's Mailing Address:**	41 Hutchins Drive, Portland, ME
3. Applicant's Daytime Phone #:	(207)780-4177	**8. Agent's Daytime Phone # :**	(207)558-3665
4. Applicant's Fax # (if available):	N/A	**9. Agent's Fax # (if available):**	N/A
5. Applicant's *e-mail address* (REQUIRED -license will be sent via: e-mail):	ann.vashon@maine.edu	**10. Agent's *e-mail address* (REQUIRED - license will be sent via e-mail):**	aefletcher@woodardcurran.com

PROJECT INFORMATION

11. Name of Development:	USM Structured Parking Garage						
12. Map and Lot #'s:	**Map #:** 114	**Lot #:** A001	**13. Deed Reference #'s:**		**Book #:**	**Page #:**	
14. Location of Project City/Town:	Portland	**15. County:**	Cumberland	**16. UTM Northing**		**17. UTM Easting**	
18. Brief Description of Project including total parcel size:	Construction of a new structured parking garage and associated storm water infrastructure.						

19. Type of Direct Watershed: (Check all that apply)

☐ Lake not most at risk ☐ River, stream or brook ☒ Coastal wetland
☐ Lake most at risk ☐ Urban impaired stream ☐ Wellhead or public water
☐ Lake most at risk, severely blooming ☐ Freshwater wetland

20. Name of Waterbody Project Site drains to:	Casco Bay		
21. Amount of Developed Area:	Total acres: 2.37	Existing Developed area: 2.37 acres	New Developed area: 0 acres
22. Amount of Impervious Area:	Total acres: 1.95	Existing Impervious areas 1.45 acres	New Impervious area: 0.5 acres

23. Development started prior to obtaining a license?:	☐ **Yes** ☒ **No**		
24. .Development or any portion of the site subject to enforcement action?	☐ **Yes** ☐ **No**	**If yes**, name of enforcement staff involved?	
25. Common scheme of development?:	☐ **Yes** ☐ **No**	**26. Title, Right or Interest:**	☒ **own** ☐ **lease** ☐ **purchase option** ☐ **written agreement**
27. Natural Resources Protection Act permit required?:	☐ **Yes** ☐ **No**	**If yes:** ☐ **PBR**	☐ **Tier 1** ☐ **Full Permit** ☐ **Tier 2**
28. Existing DEP Permit number (if applicable):	L-20438-22-D-A		
29. Names of DEP staff person(s) present at the pre-application meeting:	N/A		
30. Does agent have an interest in project? If yes, what is the interest?	☐ **Yes** ☒ **No**		

CERTIFICATIONS AND SIGNATURES LOCATED ON PAGE 2

IMPORTANT: IF THE SIGNATURE BELOW IS NOT THE APPLICANT'S SIGNATURE, ATTACH LETTER OF AGENT AUTHORIZATION SIGNED BY THE APPLICANT.

By signing below the applicant (or authorized agent), certifies that he or she has read and understood the following :

CERTIFICATIONS / SIGNATURES

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein.

Further, I hereby authorize the DEP to send me an electronically signed decision on the license I am applying for with this application by emailing the decision to the electronic address located on the front page of this application (see #5 for the applicant and #10 for the agent)"..

Signed: _____ **Title** Technical Manager **Date:** 7/28/21

Notice of Intent to Comply with Maine Construction General Permit	**With this Site Law application form and my signature, I am filing notice of my intent to carry out work which meets the requirements of the Maine Construction General Permit (MCGP). I have read and will comply with all of the MCGP standards.** **If this form is not being signed by the landowner or lessee of the property, attach documentation showing authorization to sign.** **Signed** _____ **Date:** 7/28/21

NOTE: You must file a MCGP Notice of Termination (Form K) within 20 days of completing permanent stabilization of the project site.

CERTIFICATION

The person responsible for preparing this application and/or attaching pertinent site and design information hereto, by signing below, certifies that the application for development approval is complete and accurate to the best of his/her knowledge.

Signature: _____

Name (print): Ashley Fletcher, PE

Date: 7/29/21

Re/Cert/Lic No.: _____

Engineer 13750

Geologist _____

Soil Scientist _____

Land Surveyor _____

Site Evaluator _____

Active Member of the Maine Bar _____

Professional Landscape Architect _____

Other _____

University Services
Facilities Management

University of Southern Maine

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

University of Southern Maine
Facilities Management Department (CPPM)
96 Falmouth St
Portland, ME 04103
Tel: 207-780-4655
Fax: 207-780-4538
umaine.edu

July 28, 2021

To: Local, State, and Federal Review Officials

RE: AUTHORIZED REPRESENTATIVE – USM Structured Parking Garage

The University of Southern Maine, a member of the University of Maine System, is preparing plans for the new USM Structured Parking Garage located on the University of Southern Maine, Portland Campus. The University has retained Woodard & Curran, Inc., via Desman Design Management Inc., as our garage consultant, to assist in the preparation of the applications associated with permitting approvals for this project. When necessary, Woodard & Curran, Inc., is authorized as its agent to represent the University in addressing questions on the plans, or applicable applications, for this project.

Sincerely,

John M. Souther,
Executive Director of Facilities Management,
University of Southern Maine for the
University of Maine System

cc: to file.

FORM D

SUBMISSIONS CHECKLIST

If a provision is not applicable, put "NA"

Section 1. Development description

A. Narrative

X 1. Objectives and details

X 2. Existing facilities (with dates of construction)

B. Topographic map

X 1. Location of development boundaries

X 2. Quadrangle name

C. Construction plan

X 1. Outline of construction sequence (major aspects)

2. Dates

D. Drawings

X 1. Development facilities

X a. Location, function and ground area

X b. Length/cross-sections for roads

X 2. Site work (nature and extent)

X 3. Existing facilities (location, function ground area and floor area)

4. Topography

X a. Pre- and post-development (contours 2 ft or less)

X b. Previous construction, facilities and lot lines

X **Section 2. Title, right or interest** (copy of document)

Section 3. Financial capacity

X A. Estimated costs

B. Financing

____ 1. Letter of commitment to fund

2. Self-financing

____ a. Annual report

____ b. Bank statement

3. Other

____ a. Cash equity commitment

____ b. Financial plan

X c. Letter

NA 4. Affordable housing information

Section 4. Technical ability (description)

X A. Prior experience (statement)

x B. Personnel (documents)

Section 5. Noise

X A. Developments producing a minor noise impact (statement)

NA 1. Residential developments

NA 2. Certain non-residential subdivisions

NA 3. Schools and hospitals

X 4. Other developments

X a. Type, source and location of noise

NA b. Uses, zoning and plans

NA c. Protected locations

X d. Minor nature of impact

NA e. Demonstration
NA B. Developments producing a major noise impact (full noise study)
NA 1. Baseline
NA a. Uses, zoning and plans
NA b. Protected locations
NA c. Quiet area
NA 2. Noise generated by the development
NA a. Type, source and location of noise
NA b. Sound levels
NA c. Control measures
NA d. Comparison with regulatory limits
NA e. Comparison with local limits

X **Section 6. Visual quality and scenic character**(narrative, description, visual impact analysis)

X **Section 7. Wildlife and fisheries** (narrative)

X **Section 8. Historic sites** (narrative)

X **Section 9. Unusual natural areas** (narrative)

Section 10. Buffers
NA A. Site plan and narrative

Section 11. Soils
X A. Soil survey map and report
X 1. Soil investigation narrative
X 2. Soil survey map
NA B. Soil survey intensity level by development type
1. Class A (High Intensity) Soil Survey
2. Class B (High Intensity) Soil Survey
3. Class C (Medium High-Intensity) Soil Survey
4. Class D (Medium Intensity) Soil Survey
C. Geotechnical Investigation
NA D. Hydric soils mapping

Section 12. Stormwater management
A. Narrative
X 1. Development location
NA 2. Surface water on or abutting the site
NA 3. Downstream ponds and lakes
X 4. General topography
X 5. Flooding
NA 6. Alterations to natural drainage ways
X 7. Alterations to land cover
X 8. Modeling assumptions
X 9. Basic standard
X 10. Flooding standard
X 11. General standard
X 12. Parcel size
X 13. Developed area
X 14. Disturbed area
X 15. Impervious area
B. Maps
X 1. U.S.G.S. map with site boundaries
X 2. S.C.S. soils map with site boundaries
X C. Drainage Plans (a pre-development plan and a post-development plan)

X 1. Contours
X 2. Plan elements
X 3. Land cover types and boundaries
X 4. Soil group boundaries
X 5. Stormwater quantity subwatershed boundaries
X 6. Stormwater quality subwatershed boundaries
X 7. Watershed analysis points
X 8. Hydrologic flow lines (w/flow types and flow lengths labeled)
X 9. Runoff storage areas
X 10. Roads and drives
X 11. Buildings, parking lots, and other facilities
X 12. Drainage system layout for storm drains, catch basins, and culverts
NA 13. Natural and man-made open drainage channels
NA 14. Wetlands
NA 15. Flooded areas
X 16. Benchmark
X 17. Stormwater detention, retention, and infiltration facilities
X 18. Stormwater treatment facilities
NA 19. Drainage easements
X 20. Identify reaches, ponds, and subwatersheds matching stormwater model
NA 21. Buffers

X D. Runoff analysis (pre-development and post development)
X 1. Curve number computations
X 2. Time of concentration calculations
X 3. Travel time calculations
X 4. Peak discharge calculations
NA 5. Reservoir routing calculations

X E. Flooding Standard
NA 1. Variance submissions (if applicable)
NA a. Submissions for discharge to the ocean, great pond, or major river
NA i. Map
NA ii. Drainage plan
NA iii. Drainage system design
NA iv. Outfall design
NA v. Easements
NA b. Insignificant increase
NA i. Downstream impacts
NA
NA c. Submissions for discharge to a public stormwater system
NA i. Letter of permission
NA ii. Proof of capacity
NA ii. Outfall analysis and design (pictures)
X 2. Sizing of storm drains and culverts
NA 3. Stormwater ponds and basins
NA a. Impoundment sizing calculations
NA b. Inlet calculations
NA c. Outlet calculations
NA d. Emergency spillway calculations
NA e. Subsurface investigation report
NA f. Embankment specifications
NA g. Embankment seepage controls
NA h. Outlet seepage controls
NA i. Detail sheet
NA j. Basin cross sections
NA k. Basin plan sheet
NA 4. Infiltration systems
NA a. Well locations map
NA b. Sand and gravel aquifer map
NA c. Subsurface investigation report with test pit or boring logs

NA d. Permeability analysis
NA e. Infiltration structure design
NA f. Pollutant generation and transport analysis
NA g. Monitoring and operations plan
NA i. Locations of storage points of potential contaminants
NA ii. Locations of observation wells and infiltration monitoring plan
NA iii. Groundwater quality monitoring plan
NA 5. Drainage easement declarations.
X F. Stormwater quality treatment plan peak discharge calculations
X 1. Basic stabilization plan
NA a. Ditches, swales, and other open channel stabilization
NA b. Culvert and storm-drain outfall stabilization
NA c. Earthen slope and embankment stabilization
X d. Disturbed area stabilization
NA e. Gravel roads and drives stabilization

X 2. General Standard
X a. Calculations for sizing BMP
X b. Impervious area calculation
X c. Developed area calculation
X d. Summary spreadsheet of calculations

NA 3. Phosphorus control plan
NA a. Calculations for the site's allowable phosphorus export
NA b. Calculations for determining the developed site's phosphorus export
NA c. Calculations for determining any phosphorus compensation fees
NA 4. Offset Credits
NA a. Urban impaired stream
NA Offset credit calculation
NA b. Phosphorus credit determination
NA i. Location map
NA ii. Scaled plan
NA iii. Title and right
NA iv. Demolition plan
NA v. Vegetation plan
NA vi. Offset credit calculation
NA vii. Calculation for the new allowable export
X 5. Runoff treatment measures
X a. structural measures
X i. Design drawings and specifications
X ii. Design calculations
X iii. Maintenance plan
X iv. TSS removal or phosphorus treatment factor determinations
X v. Stabilization plan
NA b. Vegetated buffers
NA i. Soil survey
NA ii. Buffer plan
NA iii. Turnout and level spreader designs
NA iv. Deed restrictions
NA 6. Control plan for thermal impacts to coldwater fisheries
NA 7. Control plan for other pollutants
X 8. Engineering inspection of stormwater management facilities

X G. Maintenance of common facilities or property
X 1. Components of the maintenance plan
X A. Maintenance of facilities by owner or operator
X 1. Site owner or operator (name legally responsible party)
X 2. Contact person responsible for maintenance
X 3. Transfer mechanism

X 4. List of facilities to be maintained
X 5. List of inspection and maintenance tasks for each facility
X 6. Identifications of any deed covenants, easements, or restrictions
X 7. Sample maintenance log
X 8. Copies of any third-party maintenance contracts
NA B. Maintenance of facilities by homeowner's association
NA 1. Incorporation documents for the association
NA 2. Membership criteria
NA 3. Association officer responsible for maintenance
NA 4. Establishment of fee assessment for maintenance work
NA 5. Establishment of lien system
NA 6. Reference to department order(s) in association charter
NA 7. Transfer mechanism from developer to association
NA 8. List of facilities to be maintained
NA 9. Identification of any deed covenants, easements, or restrictions
NA 10. Renewal of covenants and leases
NA 11. List of inspection and maintenance tasks for each facility
NA 12. Sample maintenance log
NA 13. Copies of any third-party maintenance contracts
NA C. Maintenance of facilities by municipality or municipal district
NA 1. Identification of the municipal department or utility district
NA 2. Contact person responsible for maintenance
NA 3. Evidence of acceptance of maintenance responsibility
NA 4. Transfer mechanism from developer
NA 5. List of facilities to be maintained
NA 6. List of inspection and maintenance tasks for each facility
NA 7. Identifications of any deed covenants, easements, or restrictions
NA 8. Sample maintenance log
X 2. General inspection and maintenance requirements
NA a. Drainage easements
X b. Ditches, culverts, and catch-basin systems
X c. Roadways and parking surfaces
X d. Stormwater detention and retention facilities
NA 1. Embankment inspection and maintenance
X 2. Outlet inspection and clean-out
NA 3. Spillway maintenance
X 4. Sediment removal and disposal
NA e. Stormwater infiltration facilities
NA 1. Sediment protection plan
NA 2. Infiltration rehabilitation plan
NA 3. Sediment removal and disposal
NA 4. Groundwater monitoring plan
X f. Proprietary treatment devices
NA g. Buffers
NA h. Other practices and measures

Section 13. Urban Impaired Stream Submissions

NA 1. Off-site credits
NA 2. Compensation fees (Urban Impaired Stream/Phosphorus)
NA 3. Development impacts

Section 14. Basic Standards

X A. Narrative
X 1. Soil types
NA 2. Existing erosion problems
NA 3. Critical areas
NA 4. Protected natural resources
X 5. Erosion control measures

X 6. Site stabilization
X B. Implementation schedule
X C. Erosion and sediment control plan
X 1. Pre-development and post-development contours
X 2. Plan scale and elements
X 3. Land cover types and boundaries
NA 4. Existing erosion problems
NA 5. Critical areas
NA 6. Protected natural resources
X 7. Locations (general)
X 8. Locations of controls
X 9. Disturbed areas
X 10. Stabilized construction entrance
X D. Details and specifications (for both temporary and permanent measures)
X E. Design calculations
X F. Stabilization plan
X 1. Temporary seeding
X 2. Permanent seeding
NA 3. Sodding
X 4. Temporary mulching
X 5. Permanent mulching
X G. Winter construction plan
X 1. Dormant seeding
X 2. Winter mulching
X H. Third-party inspections
1. Inspector's name, address, and telephone number
X 2. Inspector's qualifications
X 3. Inspection schedule
4. Contractor contact
X 5. Reporting protocol

Section 15. Groundwater

X A. Narrative
NA 1. Location and maps
NA 2. Quantity
NA 3. Sources
NA 4. Measures to prevent degradation
NA B. Groundwater protection plan
NA C. Monitoring plan
NA 1. Monitoring points
NA 2. Monitoring frequency
NA 3. Background conditions
NA 4. Monitoring parameters
NA 5. Personnel qualifications
NA 6. Proof of training
NA 7. Equipment and methods
NA 8. Quality assurance/quality control
NA 9. Reporting requirements
NA 10. Remedial action plan
NA D. Monitoring well installation report
NA 1. Well location map
NA 2. Elevation data
NA 3. Well installation data
NA 4. Well construction details
NA 5. Borehole logs
NA 6. Summary of depth measurements
NA 7. Characteristics of subsurface strata
NA 8. Well installation contract

NA 9. Schematic cross-sections
NA 10. Monitoring point summary table
NA 11. Protective casing
NA 12. On-site well identification

Section 16. Water supply

NA A. Water supply method
NA 1. Individual wells (evidence of sufficient/healthful supply)
NA a. Support of findings by well drillers
NA b. Support of findings by geologist
NA 2. Common well(s) (reports)
NA a. Hydrogeology report
NA b. Engineering report
NA c. Well installation report
NA d. Long-term safe yield and zone of influence determination
NA e. Public water supply
NA i. Proposed well or wells
NA ii. Existing well or wells
NA iii. Water quality analysis
NA 3. Well construction in shallow-to-bedrock areas
NA 4. Additional information
NA 5. Off-site utility company or public agency
NA 6. Other sources
NA B. Subsurface wastewater disposal systems (locations of systems and wells)
NA C. Total usage (statement re: total anticipated water usage)

Section 17. Wastewater disposal

NA A. On-site subsurface wastewater disposal systems (investigation results)
NA 1. Site plan
2. Soil conditions summary table
NA 3. Logs of subsurface explorations
4. Additional test pits, borings or probes
NA a. Soil conditions A
NA b. Soils with Profiles 8 and 9 parent material
NA c. Soil conditions D
NA d. Disposal field length 60 feet or greater
NA 5. 3-bedroom design
NA 6. Larger disposal systems
a. System design details
NA b. Plan view
NA c. Cross sections
NA d. Test pit data
NA e. Mounding analysis
NA B. Nitrate-nitrogen impact assessment
NA 1. When required
NA a. Exempted____
i. Conventional systems meeting certain setbacks
NA ii. Denitrification systems
NA b. Special conditions and other exemptions
NA 2. Assumptions
NA a. Initial concentration
NA b. Background concentration
NA c. Contribution from development
NA d. Mixing and dilution
NA e. Severe-drought scenario
NA f. Wastewater flow to subsurface wastewater disposal fields

NA 3. Assessment report minimum requirements
NA a. Narrative and calculations
NA b. Site plan
NA i. Well locations
NA ii. 10 mg/l and 8 mg/l isocons
NA iii. Groundwater contours and groundwater flow divides
NA c. References
NA 4. Denitrification systems
NA a. Design plans and specifications
NA b. Installation information
NA c. Monitoring plan
NA d. Maintenance
NA e. Backup system
X D. Municipal facility or utility company letter
NA E. Storage or treatment lagoons

X **Section 18. Solid waste** (list: type, quantity, method of collection and location)
NA A. Commercial solid waste facility (final disposal location)
X B. Off-site disposal of construction/demolition debris (final disposal location)
C. On-site disposal of woodwaste/land clearing debris
NA 1. Applicability of rules (evidence re: applicability of rules)
2. Burning of wood wastes
NA a. Delineation on site plan
NA b. Plans for handling unburned woodwaste and woodash
NA c. Evidence of capacity to accept waste (approved facility)
NA d. Usage of materials
NA e. Data on mixing ratios and application rates
X D. Special or Hazardous Waste

Section 19. Flooding
NA A. Explanation of flooding impact
NA B. Site plan showing 100-year flood elevation
NA C. Hydrology analysis
X D. FEMA flood zone map with site boundaries

Section 20. Blasting
NA A. Site Plan or map
NA B. Report
1. Assessment
2. Blasting plan

Section 21. Air emissions (narrative and summary)
NA A. Point and non-point sources identified
NA B. Emission components (point sources)

Section 22. Odors
NA A. Identification of nature/source
NA B. Estimate of areas affected
NA C. Methods of control)

NA **Section 23. Water vapor** (narrative)

NA **Section 24. Sunlight** (statement and drawing, if required)

Section 25. Notices
NA A. Evidence that notice sent
NA B. List of abutters for purposes of notice

DEPARTMENT OF ENVIRONMENTAL PROTECTION
STORMWATER APPLICATION CHECKLIST

Applicant: University of Southern Maine			
Project Name: Structured Parking Garage			
Town: Portland			
Application Type:		☐ Stormwater	☑ Site Law
Watershed Name: MS4			
Watershed Type:	☐ UIS	☐ Phosphorus	☑ Neither

Project Area Information

	Existing to Remain[1]	New / Proposed	Total
Impervious (Im)	1.45 acres	0.5 acres	1.95 acres
Landscaped (Land)	0.92 acres	-0.5 acres	0.42 acres
Developed (Dev)[2]	2.37 acres	0	2.37 acres

1- If area is not subject to treatment, provide reason and show in a separate column in the Water Quality Calc table.
2- Developed area = Impervious Area + Landscaped Area

A. BASIC STANDARD

1. **Erosion and Sedimentation Controls** (Appendix A, page 32 of Chapter 500: https://www.maine.gov/sos/cec/rules/06/096/096c500.docx:)
   - Guidance in Department ESC BMP Manuals

2. **Inspection & Maintenance** (Appendix B, page 37 of Chapter 500)

   Construction Phase: Show on Plans the following:
   - Responsibility for inspection and maintenance
   - Construction schedule (how long will it take and in what sequence/critical path to build)
   - Inspection frequency
   - Scope of inspection
   - Inspector qualifications
   - Define storm event that triggers a wet weather inspection (0.5” of rain in 24 hours)
   - Documentation (3 years minimum)

   Post-Construction: Include in written I&M Plan the following:
   - Responsibility for inspection and maintenance
   - Inspection frequency for each BMP
   - Inspection form for each BMP
   - Inspector qualifications
   - Define storm event that triggers a wet weather inspection (1” of rain in 24 hours)
   - Documentation (5 years, minimum)
   - Project is subject to Department 5-Year Recertification

3. **Good Housekeeping** (Appendix C, page 41 of Chapter 500**)**
   - Show all seven elements on Plans.

B. GENERAL STANDARD

Must provide the following on WQ Treatment Plan: All BMPs with subcatchments including time of concentration (Tc) lines, flow lengths and flow types.

1. **Soil Explorations** (test pit completed by a certified soil scientist) at each proposed BMP
   - Include test pit summary table on detail plan.
   - If there is potential ledge, address in design.
   - If shallow groundwater, address in design.

2. **Treatment Standards** (modify to fit project): Fill out the following table for the applicable standards that apply.

Applicable Standard	Section in Ch. 500	Required Treatment (Im / Dev)	Area Eligible		Area Treated		Provided Treatment %	
			Im	Dev	Im	Dev	Im	Dev
General Standard	4(C)(2(a)(i)	95% / 80%						
Increased Runoff Treated[1]	4(C)(2)(a)(ii)	90% / 80% min						
% Parcel Developed[2]	4(C)(2)(a)(iii)	90% / 75% min						
Redevelopment[3] (Dev Area)	4(C)(2)(d)	0% min (SW) 50% min (Site)		2.37 ac.		1.42 ac.		60%
Linear	4(C)(5)(c)	75% / 50% min						
Other: Offsite Treatment/Mitigation								
Project Total Area =				2.37 ac.		1.42 ac.		60%

1- If proposing to treat more than the first flush, state why meeting Ch. 500, § 4(C)(2(a)(i) is not practicable.
2- Reduced % based on portion of parcel developed.
3- Include pollutant impact ranking calculations (current and proposed) and a figure showing the Redevelopment window.

3. **Proposed BMPs:** Please provide the following information on the Table below for EACH BMP.

BMPs Proposed	#	Pretreatment	Sizing calcs	Detail on Plans[1]	CPV Draindown Time	HydroCAD
StormFilter	1	See Contech Letter		D-204	See Contech Letter	14P

1- BMP details (cross sections, elevation sections, plan view)

Link to Stormwater Design BMP Volumes I, II, III
https://www.maine.gov/dep/land/stormwater/stormwaterbmps/index.html

- Provide Construction Oversight Notes.
- If BMP is unlined, review and satisfy (Appendix E Sections 4(b) and 4(c), page 50 of Chapter 500).
- Treatment buffers (Appendix F, page 56 of Chapter 500): must provide sample deed restriction (Appendix G, page 64 of Chapter 500).
- Infiltration must satisfy Appendix D, page 44 of Chapter 500.
- Is conveyance designed to a 10-year, 24-hour storm?
- Is a drainage easement required for any areas to be flooded?
- Discharge to a public storm sewer system: Must provide authorization from the authority.

If proposing Proprietary BMPs, provide:

- Letter from vendor approving sizing and siting https://www.maine.gov/dep/land/stormwater/stormwaterbmps/index.html.
- Executed 5-Year I&M Agreement with a provider approved by vendor.
- Narrative section and specific inspection forms in the written I&M Plan.
- Pervious pavement: Must provide Executed 5-Year I&M Agreement and vacuum equipment used.

C. PHOSPHORUS STANDARD

MUST provide on the WQ Treatment Plan: BMPs with subcatchments including time of concentration (Tc) lines, flow lengths and flow types;

Provide export calculations clearly showing distinct BMPs: Phosphorus Table Calculations Worksheet 4 july 2015.xlsx.

D. FLOODING STANDARD

1. Add pre- and post- peak flow rates table to post development plan for storms (2-, 10-, 25-year).
2. Is primary access road passable up to a 25-year, 24-hour storm?
3. If requesting a waiver of the Flooding Standard, must state justification for the waiver.
4. HydroCad or other runoff model
   - If post peak flow rate is > pre-peak flow, a waiver request will be needed with justification Ch. 500, § 4(F)(3)(a) or (b),
   - If discharging to wetland see Chap. 500, § 4(I).

This checklist has been designed by DEP stormwater engineers as a guidance tool to assist applicants and their consultants when preparing stormwater applications. Completing the checklist is recommended and valuable, but it is not a substitute for reviewing Ch. 500, and completing all the items on the checklist does not automatically mean all the Ch. 500 requirements have been satisfied. The contents of Ch. 500 should be reviewed carefully for the applicable requirements that apply to your proposed project.

I have reviewed this checklist and included in my submission all the required elements of this checklist that apply to the proposed project.

Maine Engineer of Record:



7/27/21

Signature **Date**

Ashley Fletcher, PE

Name (print)

USM Structured Parking Garage

Site Location of Development Amendment

41 Hutchins Drive
Portland, ME 04102
800-426-4262

0233035.00
University of Southern Maine
July 2021

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

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1. DEVELOPMENT DESCRIPTION

This narrative is being submitted in support of an amendment to the Site Location of Development (SLOD) Permit for the University of Southern Maine (USM) Portland campus located at 44 Bedford Street. The proposed work will take place on a single parcel, identified by the City of Portland Assessor as Tax Map 114, Lot A001001, which is approximately 8.1 acres in size. The proposed work will be limited to approximately 2.4-acres of the property. Proposed work includes construction of a structured parking garage and associated site improvements, sidewalks, landscaping, utilities, and stormwater management infrastructure.

In addition to this SLOD Amendment, the proposed project will require a City of Portland Site Plan Review. It is our understanding that the City of Portland will have delegated review authority over this project.

1.1 OBJECTIVES & DETAILS

As the University of Southern Maine expands to better serve its growing student body, available surface parking will be displaced. The proposed parking garage will enable future developments (a new residence hall (Portland Commons) and Career and Student Success Center (CSSC)) at the University by meeting parking demand for these developments and replacing displaced surface parking spaces.

The proposed development includes a five-level structured parking garage, access drive, pedestrian walkways, and associated site improvements, including landscaping and exterior lighting. The proposed parking garage will provide 632 parking spaces for a net increase in 425 parking spaces for the University. The proposed garage includes the required ADA accessible parking. A 250-space bike storage room and bike repair room will be included on the interior of the garage, and additional bike spaces will be provided outside. A small plaza and drop-off area will be developed in front of the Osher/Glickman Library entrance.

The proposed stormwater management system is comprised of a series of catch basins which discharge to a subsurface detention and treatment system that ultimately discharges to the separated storm sewer on Forest Avenue. Design drawings for the proposed project are included with this application.

1.2 EXISTING FACILITIES

The existing Site consists of several buildings, a parking lot, and a parking garage. Stormwater runoff from the project site drains to City of Portland infrastructure, and ultimately discharges to the Casco Bay. Existing site conditions are described in greater detail in the following sections of this Report.

1.3 TOPOGRAPHIC MAP

A USGS topographic map showing the approximate location of proposed development is attached to this Section for your reference.

1.4 CONSTRUCTION PLAN

Construction is anticipated to commence in the Spring of 2022 upon receipt of permit approvals, and will be completed by the Spring of 2023. The following is the anticipated sequence of construction for major aspects of the development:

- Installation of erosion and sediment control measures;
- Clearing and site preparation activities;
- Demolition and relocation of utilities and other subsurface infrastructure displaced by the building foundation;
- Construction of the structured parking garage and associated stormwater management system;
- Stabilization of the Site; and

- Removal of erosion and sediment control measures.

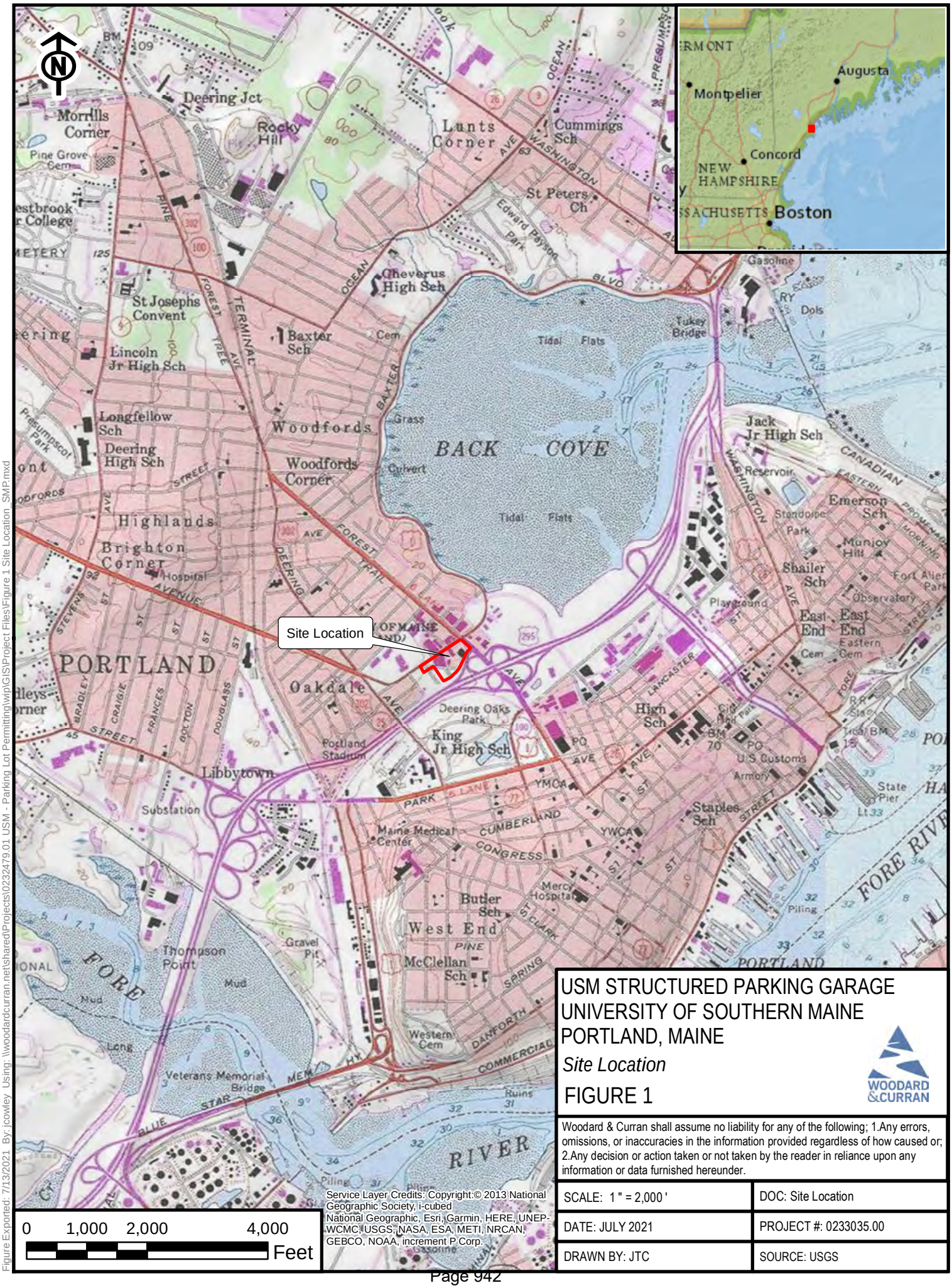
1.5 DRAWINGS

A survey of the existing Site, as well as design drawings of the proposed development, is attached to this Section for your reference. The design drawings show all proposed construction activities, site work, existing facilities, and topography.

1.6 LIST OF ATTACHMENTS

The following documents are attached to this Section:

- Topographic Map; and
- Design Drawings (bound separately).



USM STRUCTURED PARKING GARAGE
UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

Site Location

FIGURE 1

WOODARD &CURRAN

Woodard & Curran shall assume no liability for any of the following; 1.Any errors, omissions, or inaccuracies in the information provided regardless of how caused or; 2.Any decision or action taken or not taken by the reader in reliance upon any information or data furnished hereunder.

SCALE: 1 " = 2,000 '	DOC: Site Location
DATE: JULY 2021	PROJECT #: 0233035.00
DRAWN BY: JTC	SOURCE: USGS

Figure Exported: 7/13/2021 By: jcowley Using: \\woodardcurran.net\shared\Projects\0232479.01 USM - Parking Lot Permitting\wip\GIS\Project Files\Figure 1 Site Location_SMP.mxd

2. TITLE, RIGHT, OR INTEREST

The proposed development is located on properties owned by the Applicant and identified as Tax Map 114, Lot A001001. Attached is a copy of the deeds associated with this property.

2.1 LIST OF ATTACHMENTS

- Deeds.

GOVERNOR'S DEED
(with Reverter)

KNOW ALL PERSONS BY THESE PRESENTS, that the STATE OF MAINE, acting by and through its Governor, on recommendation of the Commissioner of its DEPARTMENT OF TRANSPORTATION, under and pursuant to the provisions of 23 M.R.S.A., Section 61, for consideration, the sufficiency of which is hereby acknowledged, RELEASES to THE UNIVERSITY OF MAINE SYSTEM, organized as a non-profit corporation of the State of Maine, with offices at 16 Central Street in Bangor, Maine, its successors and assigns forever, all its right, title and interest in and to a certain lot or parcel of land situated on the southerly side of Winslow Street, so-called, at its intersection with the westerly sideline of the right-of-way of State Highway "295", also known as Interstate 295, in Portland, County of Cumberland and State of Maine, and being as shown on a Right-of-way Map for State Highway "295" Portland, Cumberland County, Federal Aid Project Number I-295-3(28), dated January 1967, File Number 3-185, sheet 57 of 73, on file at the offices of the Maine Department of Transportation in Augusta, bounded and described as follows:

BEGINNING at a point on the southerly sideline of Winslow Street at its intersection with the westerly sideline of the right-of-way of Route 295;

THENCE S 26° 51' 18" W along said westerly sideline of Route 295, a distance of 34.00 feet;

THENCE S 51° 22' 05" W continuing along said westerly sideline of Route 295, a distance of 23.93 feet to land now or formerly of the University Of Southern Maine Foundation;

THENCE N 38° 37' 55" W along said University Of Southern Maine Foundation land 20.00 feet;

THENCE N 6° 51' 23" E continuing along said University Of Southern Maine Foundation land, 33.28 feet to the southerly sideline of said Winslow Street;

THENCE S 85° 26' 46" E along said southerly sideline of Winslow Street, 42.70 feet, more or less to the aforementioned westerly sideline of the right-of-way of Route 295 and the POINT OF BEGINNING, and containing one thousand four hundred twenty-seven square feet, more or less (1,427 sq. ft. ±).

EXCEPTING AND RESERVING from this conveyance any and all rights of access from the herein described parcel of land to State Highway "295", also known as Interstate 295, all of which rights of access are expressly reserved to, and retained by, the State of Maine.

ALSO RESERVING to the State of Maine the perpetual right to enter upon said parcel to maintain any highway slopes and drainage facilities or installations that may exist.

SUBJECT TO all utility easements and installations located on the above described premises, including those shown on the herein referred to Right-of-way Map, and to those rights which any utility enjoys over the subject premises for maintenance, location or relocation of poles and other installations.

NOTWITHSTANDING the foregoing, Grantor gives this deed, and Grantee accepts the same, upon the express CONDITION that the property hereby conveyed is to be retained by the University of Maine system and used for

public purposes only; and if said property or any interest in it, or any portion of it, is transferred, or if it is used for any commercial or other non-public purposes, said property shall at once REVERT to, and re-vest in, the Grantor, its successors or assigns; and that such reversion, should it occur, shall be automatic and require no further act of conveyance or documentation in order to be effective.

BEING a portion of premises acquired by the State of Maine from Charles T. Hayes, Jr. and Beatrice Hayes by warranty deed dated July 19, 1968 and recorded at the Cumberland County Registry of Deeds on July 23, 1968 in Volume 3049 at Page 553; and a portion of premises acquired from Reuben Katz by warranty deed dated January 10, 1969 and recorded at said Registry Of Deeds on January 15, 1969 in Volume 3072 at Page 435.

THE STATE OF MAINE makes no representations or warranties with respect to the premises hereby conveyed. The representations and warranties so excluded encompass, but are not limited to, those pertaining to: land use and environmental matters; fitness of the premises or any portion thereof for any particular purposes; water quality or quantity; the condition or quality of the soil; inchoate or unrecorded liens; status of title to or rights within that area lying between the high and low water marks; or the existence, status, or condition of access to, or public utilities serving the premises. Any subsequent use of, improvement to, or construction on the parcel shall be subject to all applicable laws, regulations, ordinances, and permitting requirements.

IN WITNESS WHEREOF, I, John E. Baldacci, Governor of the State of Maine, have caused the name and Great Seal of the State of Maine to be hereunto affixed this 11th day of Sept. in the year two thousand six.

STATE OF MAINE

By: _____, Governor
John E. Baldacci

Received
Recorded Register of Deeds
Sep 20,2006 02:29:02P
Cumberland County
John B OBrien

Affixed by: _____
Secretary of State

STATE OF MAINE
Kennebec, *ss.*

Sept. 11th, 2006

Personally appeared the above-named, John E. Baldacci, Governor of the State of Maine and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of the State of Maine.

Before me, _____
Notary Public/~~Attorney at Law~~

Print Name: _____

My commission expires: _____

ROSEMARIE D. SMITH
Notary Public, Maine
My Commission Expires January 6, 2009

SEAL

SHORT FORM QUITCLAIM DEED WITH COVENANT

MAINE REAL ESTATE TAX PAID

THE UNIVERSITY OF SOUTHERN MAINE FOUNDATION, a Maine nonprofit corporation with a mailing address of 96 Falmouth Street, Portland, Maine 04104, FOR CONSIDERATION PAID, grants to UNIVERSITY OF MAINE SYSTEM, a body politic and instrumentality of the State of Maine, with a mailing address of 16 Central Street, Bangor, Maine 04401, with QUITCLAIM COVENANT, certain real property, together with any improvements thereon, located in the City of Portland, Cumberland County, Maine and more particularly described on Exhibit A attached hereto and made a part hereof.

Being the same premises conveyed to the grantor herein by a Short Form Quitclaim Deed With Covenant from Frederick J. Olsen dated April 27, 2005 and recorded at the Cumberland County Registry of Deeds in Book 22577, Page 79.

IN WITNESS WHEREOF, The University of Southern Maine Foundation, has caused this instrument to be executed and delivered as of the 20th day of December, 2011.

The University of Southern Maine Foundation

Witness

By: Margaret A. Weston
Name: Margaret A. Weston
Its: President

State of Maine
County of Cumberland, ss. December 16, 2011

Personally appeared the above-named Margaret A. Weston, President of The University of Southern Maine Foundation, and acknowledged the foregoing instrument to be her free act and deed in her said capacity and the free act and deed of The University of Southern Maine Foundation.

Before me,

Amy Blaisdell
Notary Public/Attorney at Law
Name: Amy Blaisdell
Commission Expires: 10/16/2015

Amy Blaisdell
NOTARY PUBLIC
Lisbon Falls, ME
Commission expires on
October 16, 2015

Exhibit A

Formerly Tax Map 114, Block D, Lot 21:

Three (3) certain lots or parcels of land, with the buildings thereon, situated on the northerly side of Winslow Street in the City of Portland, County of Cumberland, State of Maine, being lots numbered 1, 2 and 3 on an unrecorded plan of the Heater piece at and adjoining the junction of said Winslow Street and Bedford Street made by E.C. Jordan & Co., Civ. Eng., in January 1918, and on file in the office of said E.C. Jordan & Co., said three lots taken together, being bounded and described as follows:

Beginning at a point on said northerly line of Winslow Street at the southwest corner of land now or formerly of John W. Lovely heirs and thence running, with an included angle of 88° 43' and by the westerly line of said Lovely land eighty-six (86) feet to a post and land now or formerly of the T.A. Huston & Co.; thence northwesterly and along said Huston land, forty-nine (49) feet to a post; thence northwesterly and along said Huston land thirty-two and three tenths (32.3) feet to an iron post; thence westerly and along said Huston land twenty-two and thirty-five hundredths (22.35) feet to an iron post; thence westerly and along said Huston land nineteen and eighty-four hundredths (19.84) feet to a post; said post being the southeasterly corner of lot numbered 11 on said plan; thence westerly and along the rear or southerly line of said lot numbered 11, fifty-nine and thirty-seven hundredths (59.37) feet to the southwesterly corner of lot numbered 11; thence southwesterly at right angles to said Winslow Street one hundred (100) feet to said northerly line of Winslow Street; thence easterly and along said northerly line of Winslow Street one hundred fifty-nine (159) feet to the point or place of beginning; said three lots having together an area of 18,027 square feet, be the same more or less.

EXCEPTING AND RESERVING from the above-described premises that portion thereof which was conveyed by Ellestad Hansen, Warren K. Webber and Mary E. Hansen to Charles A. Adams by deed dated April 8, 1924 and recorded in the Cumberland County Registry of Deeds in Book 1165, Page 79, and such portion thereof as may have been conveyed by Mary E. Hansen to the State of Maine by deed dated January 7, 1970 and recorded in the said Registry of Deeds in Book 3114, Page 724.

Formerly Tax Map 114, Block D, Lot 22:

ALSO a certain lot or parcel of land situated on the northerly side of Winslow Street in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows, to wit:

Beginning at an iron hub at the southwest corner of a lot of land conveyed by Edward D. Noyes, et al. to Ellestad Hansen and Warren K. Webber by deed dated November 14, 1923 and recorded in the Cumberland County Registry of Deeds in Book 1153, Page 280; thence easterly along the northerly side line of Winslow Street forty-seven (47) feet to a stake; thence northerly at right angles to said Winslow Street one hundred sixteen and thirty-three hundredths (116.33) feet to an iron hub in the northerly line of the lot above mentioned; thence westerly with an included angle of seventy (70) degrees and thirty-six (36) minutes to the right, forty-nine and seventy-six hundredths (49.76) feet to a stake at the northwest corner of the lot above mentioned; thence southerly on a line at right angles to said Winslow Street one hundred (100) feet to the point of beginning.

Formerly Tax Map 114, Block C, Lot 1:

ALSO a certain lot or parcel of land in the City of Portland, County of Cumberland and State of Maine, described as follows: Beginning at a stake on the southerly side of Winslow Street at the intersection with the easterly side of Conant Street; thence 25° E by Conant Street one hundred ten (110) feet; thence easterly at right angles with Conant Street forty-six and thirty-one hundredths (46.31) feet to a stake; thence northerly to a point in the southerly side of Winslow Street distant easterly sixty-three and seventy-two hundredths (63.72) feet from the point of beginning; thence N 71° 37' W by said Winslow Street sixty-three and seventy-two hundredths (63.72) feet to the point of beginning.

Formerly Tax Map 114, Block C, Lot 2:

ALSO a certain lot or parcel of land situated in the City of Portland, County of Cumberland and State of Maine bounded and described as follows, to wit:

Beginning at a point on the present southerly boundary line of Winslow Street at the northeasterly line of land now or formerly of Frederick J. Olsen; thence southeasterly along the northeasterly line of land now or formerly of said Olsen, about sixty-six (66) feet to a corner; thence southwesterly along the southeasterly line of land now or formerly of said Olsen, about forty-six and three tenths (46.3) feet to the northeasterly boundary line of Conant Street; thence southeasterly along the northeasterly boundary line of Conant Street about eighteen (18) feet to a monument located about seventy-one (71) feet northwesterly from and as measured along a line normal to the Ramp F.A. 6 Base Line at about Sta. 5+50; thence northeasterly about sixty-six (66) feet to a point on a line, said line being a projected line between the beforementioned monument and a monument located fifty (50) feet northwesterly from and as measured along a line normal to the Ramp F.A. 6 Base Line at Sta. 4+50, said point being twenty-five (25) feet southwesterly of and as measured along said projected line from said monument located

northwesterly of Sta. 4+50; thence northwesterly at right angles to said projected line twenty (20) feet to a point; thence northerly by a direct course to a point on the present southerly boundary line of Winslow Street; thence westerly along the present southerly boundary line of Winslow Street sixty (60) feet to the point of beginning. Said lot or parcel of land contains about 2,867 square feet and is a portion of that land as acquired from Charles T. Hayes, Jr. and Beatrice Hayes, pursuant to a Notice of Layout and Taking dated March 8, 1973 and recorded at the Cumberland County Registry of Deeds in Book 3367, Page 58. Said parcel is shown on a certain Maine Department of Transportation Right-of-way Map entitled "State Highway '295', Portland, Cumberland County, Federal Aid Project No. 1-295-3(28)" dated January 1967, on file in Augusta, File No. 3-185.

The premises herein conveyed is SUBJECT to a State of Maine Notice of Layout and Taking dated February 28, 1973 and recorded in said Cumberland County Registry of Deeds in Book 3367, Page 58.

Received
Recorded Register of Deeds
Dec 21,2011 12:40:48P
Cumberland County
Pamela E. Lovley

3. FINANCIAL CAPACITY

The proposed project will cost approximately $22,000,000 to construct. Evidence of the University's financial capability to complete the proposed project is attached to this Section.

3.1 LIST OF ATTACHMENTS

- Evidence of Financial Capability.

DocuSign Envelope ID: 78157A2A-6DE5-4E27-B7A8-4B2065B0545F

UNIVERSITY OF
SOUTHERN MAINE
Finance and Administration

July 27, 2021

Mr. Darrin Stairs
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

Dear Mr. Stairs:

The University of Southern Maine expects the Structured Parking project to cost approximately $22 million.

To fund the project, the University would utilize bond anticipation notes and revenue bonding pursuant to approval by the University of Maine System Board of Trustees.

Thank you for your consideration.

Sincerely,

DocuSigned by:
Alexander E. Porteous
73AFFEE3455845F...

Alexander E. Porteous
Chief Operating Officer & Chief Business Officer

P.O. Box 9300, Portland, ME 04104-9300
(207) 780-4484 TTY (207) 780-5646, FAX (207) 780-4549
www.usm.maine.edu
A member of the University of Maine System

4. TECHNICAL ABILITY

On behalf of the Applicant, Woodard & Curran is preparing this application for the proposed development. Woodard & Curran (W&C), a Portland-based consulting firm, has provided engineering services to the public and private sector for over 40 years, including permitting, civil/site engineering, stormwater management, and construction services. W&C has completed projects for colleges, universities, and healthcare institutions that build strong, sustainable infrastructure and environmental programs serving both their business needs and the communities that make them so vibrant. With extensive experience in design and permitting for site development projects, W&C has completed many projects within the City of Portland and for the University of Maine System.

The University of Southern Maine (USM) is a public university with over 8,000 undergraduate and graduate students taking courses online and at campuses in Portland, Gorham, and Lewiston. Known for its academic excellence, student focus and engagement with the community, USM provides students with hands-on experience that complements classroom learning and leads to employment opportunities in one of the nation's most desirable places to live. USM is a member of the University of Maine System (UMS), the State's largest educational enterprise that includes seven universities and an annual enrollment of nearly 30,000 students.

Desman, Inc. is recognized as one of the nation's leading consulting architectural and engineering firms specializing in the planning, design and restoration of structured parking facilities, transportation improvements and other parking related consulting services. Desman offers a complete scope of services in the parking industry including planning, design, restoration, construction administration, financing methods, parking access/revenue control, operational and management techniques. In brief, its core business is parking planning, design, and all other parking related consulting services. Desman has over 45 years of experience in providing these services for parking structures and parking related projects.

Winston Scott Architects Established in 1975, Winton Scott Architects is a small, design-oriented architectural practice located in Portland, Maine. Their work encompasses a diverse array of project types and scales ranging from multi-block urban developments to historic renovations, commercial and institutional buildings, and multifamily and single-family residences. The firm has been recognized numerous times for design excellence by the Maine and New England Chapters of the American Institute of Architects, as well as the United States Green Building Council; and our work has been profiled in national trade journals, local publications, and several books focused on design and architecture.

Michael Boucher Landscape Architecture (MBLA) is a professional landscape design firm located in southern Maine. MBLA, founded in 1994, is engaged in ongoing collaborations with many acclaimed architecture firms. The office is currently involved in a variety of projects nationally and internationally, connecting them to many landscape typologies, cultural viewpoints, and methods of building. This experience benefits their clients and projects in providing a sense of objectivity that we fold into each new undertaking. MBLA offers a full scope of landscape architecture services tailored to assist clients in developing clear visions for their properties.

5. NOISE

The noise impact from the proposed development will be minor. The primary source of noise from the proposed project will be the result of construction. Construction activities will be limited to the hours permitted by the City. Noise associated with the proposed development will not exceed regulated levels and is not anticipated to negatively impact the surrounding urban environment.

6. VISUAL QUALITY & SCENIC CHARACTER

The proposed parking garage structure has been sited adjacent to the existing parking garage structure, and the architecture and landscaping have been designed to be consistent with the scenic character of the surrounding urban area and to meet City of Portland Standards, as shown on the drawings. It is not anticipated that the proposed development will result in any negative visual impacts.

7. WILDLIFE & FISHERIES

The Site has been previously developed and there are no known areas of significant natural features, including areas of significant wildlife habitats or wetlands. The attached Official Species List identifies the northern long-eared bat, which has been listed as a Federally Threatened Species, in association with the project area; however, there are no critical habitat areas located within the project area. Based on US Fish & Wildlife information, the northern long-eared bat typically lives in caves during the winter months and in trees larger than three inches in diameter during the summer, with migration between these two habitats in the spring in the fall. Tree-clearing for this project will be minimal.

A letter has been sent to the Maine Department of Inland Fisheries and Wildlife (MDIFW) requesting information regarding any known threatened or endangered species or critical habitat relative to the project area; a copy of this letter is attached to this Section for your reference. A copy of the MDIFW response can be provided upon receipt. It is not anticipated that the proposed development will have a negative impact on the northern long-eared bat.

7.1 LIST OF ATTACHMENTS

- Official Species List; and
- MDIFW Environmental Review Request Letter.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588
http://www.fws.gov/mainefieldoffice/index.html

In Reply Refer To: April 01, 2021
Consultation Code: 05E1ME00-2021-SLI-0915
Event Code: 05E1ME00-2021-E-02772
Project Name: USM Garage

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies the threatened, endangered, candidate, and proposed species and designated or proposed critical habitat that may occur within the boundary of your proposed project or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC Web site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the Endangered Species Consultation Handbook at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

This species list also identifies candidate species under review for listing and those species that the Service considers species of concern. Candidate species have no protection under the Act but are included for consideration because they could be listed prior to completion of your project. Species of concern are those taxa whose conservation status is of concern to the Service (i.e., species previously known as Category 2 candidates), but for which further information is needed.

If a proposed project may affect only candidate species or species of concern, you are not required to prepare a Biological Assessment or biological evaluation or to consult with the Service. However, the Service recommends minimizing effects to these species to prevent future conflicts. Therefore, if early evaluation indicates that a project will affect a candidate species or species of concern, you may wish to request technical assistance from this office to identify appropriate minimization measures.

Please be aware that bald and golden eagles are not protected under the Endangered Species Act but are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). Projects affecting these species may require development of an eagle conservation plan: http://www.fws.gov/windenergy/eagle_guidance.html Information on the location of bald eagle nests in Maine can be found on the Maine Field Office Web site: http://www.fws.gov/mainefieldoffice/Project%20review4.html

Additionally, wind energy projects should follow the wind energy guidelines: http://www.fws.gov/windenergy/ for minimizing impacts to migratory birds and bats. Projects may require development of an avian and bat protection plan.

Migratory birds are also a Service trust resource. Under the Migratory Bird Treaty Act, construction activities in grassland, wetland, stream, woodland, and other habitats that would result in the take of migratory birds, eggs, young, or active nests should be avoided. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm and at:

http://www.towerkill.com; and at:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
(207) 469-7300

Project Summary

Consultation Code: 05E1ME00-2021-SLI-0915
Event Code: 05E1ME00-2021-E-02772
Project Name: USM Garage
Project Type: DEVELOPMENT
Project Description: An addition to the existing USM Surrenden Street Parking Garage on the University of Southern Maine's campus.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.66203135,-70.27331546908917,14z



Counties: Cumberland County, Maine

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis*	Threatened

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9045

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, ME 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

July 27, 2021

Maine Department of Inland Fisheries and Wildlife
41 State House Station
Augusta, ME 04333

RE: USM Structured Parking Garage – Environmental Review Request

To Whom It May Concern:

The University of Southern Maine Portland Campus is proposing to construct a structured parking garage adjacent to the existing garage located at 44 Bedford Street in Portland, Maine. The proposed project will include the construction of a structured parking garage and associated lighting, landscaping, utilities, and stormwater management infrastructure. The entire limit of work has been previously developed. The proposed work will require a Maine Department of Environmental Protection Site Location of Development Permit Amendment, which requires coordination with the Maine Department of Inland Fisheries and Wildlife.

On behalf of the University, we are requesting a review of the project area for any known threatened or endangered species or critical habitat. A site location map and Site Plan have been attached for your reference. If you have any questions regarding this information or the proposed project, please do not hesitate to contact me at (207) 558-3665 or aefletcher@woodardcurran.com. Thank you for your assistance.

Sincerely,

WOODARD & CURRAN INC.

Ashley Fletcher, PE
Technical Manager

Enclosures: Site Location Map
Site Plan

Cc: MaineDEP

8. HISTORIC SITES

A letter has been sent to the Maine Historic Preservation Commission (MHPC) requesting a review of the project area relative to historic properties; a copy of this letter is attached to this Section for your reference. A copy of the MHPC response can be provided upon receipt.

8.1 LIST OF ATTACHMENTS

- MHPC Project Review Request Letter.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, ME 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

July 27, 2021

Kirk F. Mohney, Director
Maine Historic Preservation Commission
55 Capitol Street, 65 State House Station
Augusta, Maine 04333-0065

Re: USM Structured Parking Garage – Project Review Request

Dear Mr. Mohney:

The University of Southern Maine Portland Campus is proposing to construct a structured parking garage adjacent to the existing garage located at 44 Bedford Street in Portland, Maine. The proposed project will include the construction of a structured parking garage and associated lighting, landscaping, utilities, and stormwater management infrastructure. The entire limit of work has been previously developed. The proposed work will require a Maine Department of Environmental Protection Site Location of Development Permit Amendment, which requires coordination with the Maine Historic Preservation Commission.

On behalf of the University, we are requesting a review of the project area relative to historic properties. Please note that no bridges or buildings or other structures will be directly impacted by the proposed work, but that the proposed project is located adjacent to the Glickman Family Library, which was built in 1900. The building is located northeast of the proposed project, across a site access road, as shown on the enclosed Site Plan; a photo of the building, a USGS topographic map, and proposed Site Plan have been enclosed for your reference. The project is not located adjacent to or within any known historic properties or districts.

We appreciate your review of this project. If you have any questions regarding this information or the proposed project, please do not hesitate to contact me at (207) 558-3665 or aefletcher@woodardcurran.com. Thank you for your assistance.

Sincerely,

WOODARD & CURRAN INC.

Ashley Fletcher, PE
Technical Manager

Enclosures: Photograph of Glickman Family Library
USGS Map
Site Plan

Cc: MaineDEP

9. UNUSUAL NATURAL AREAS

The Site has been previously developed and there are no known unusual natural areas. A letter has been sent to the Maine Natural Areas Program (MNAP) requesting a review of the Site relative to rare and exemplary botanical features; a copy of their response confirming that there are no rare botanical features located within the project area is attached to this Section for your reference.

9.1 LIST OF ATTACHMENTS

- MNAP Site Review Letter.

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
177 STATE HOUSE STATION
AUGUSTA, MAINE 04333

JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

July 27, 2021

Ashley Fletcher
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

Via email: aefletcher@woodardcurran.com

Re: Rare and exemplary botanical features in proximity to: #0233035.00, USM Structured Parking Garage, Portland, Maine

Dear Ms. Fletcher:

I have searched the Maine Natural Areas Program's Biological and Conservation Data System files in response to your request received July 27, 2021 for information on the presence of rare or unique botanical features documented from the vicinity of the project in Portland, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. Based on the information in our files and the landscape context of this project, there is a low probability that rare or significant botanical features occur at this project location.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Maine Natural Areas Program (MNAP) is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. MNAP welcomes coordination with individuals or organizations proposing environmental alteration or conducting environmental assessments. If, however, data provided by MNAP are to be published in any form, the Program should be informed at the outset and credited as the source.

The Maine Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $150.00 for two hours of our services.

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM
BLOSSOM LANE, DEERING BUILDING

PHONE: (207) 287-804490
WWW.MAINE.GOV/DACF/MNAP

Thank you for using MNAP in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Lisa St. Hilaire

Lisa St. Hilaire | Information Manager | Maine Natural Areas Program
207-287-8044 | lisa.st.hilaire@maine.gov

10. BUFFERS

The Site has been previously developed. There are no existing or proposed buffers. This Section is not applicable.

11. SOILS

A copy of the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey is attached to this Section for your reference. Environmental assessments of the Site have been conducted and the Owner is a participant in the Maine Department of Environmental Protection Voluntary Response Action Program (VRAP). A soil management plan will be developed for the site.

11.1 LIST OF ATTACHMENTS

- United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Cumberland County and Part of Oxford County, Maine



May 3, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,190 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 17, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
WmB	Windsor loamy sand, 0 to 8 percent slopes	2.8	100.0%
Totals for Area of Interest		**2.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Cumberland County and Part of Oxford County, Maine

WmB—Windsor loamy sand, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w2x2
Elevation: 0 to 1,410 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: Deltas, outwash plains, dunes, outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Outwash plains, eskers, deltas, kames
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent
Landform: Kames, moraines, outwash terraces, kame terraces, outwash plains
Landform position (two-dimensional): Footslope, summit, backslope, shoulder
Landform position (three-dimensional): Side slope, crest, tread, riser, rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Deerfield

Percent of map unit: 5 percent
Landform: Outwash plains, deltas, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

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12. STORMWATER MANAGEMENT

The attached Stormwater Management Plan describes the proposed stormwater management measures for the project, as shown on the design drawings attached to Section 1 of this Report. A USGS map and a soils map are attached to Section 1 and Section 11 of this Report, respectively.

12.1 LIST OF ATTACHMENTS

- Stormwater Management Plan (Bound Separately)

13. URBAN IMPAIRED STREAM

The proposed development is not located within the watershed of an Urban Impaired Stream; the Urban Impaired Stream Standard does not apply.

14. BASIC STANDARD

The overall goal of the Soil Erosion and Sediment Control Plan is to restrict the potential for erosion and sedimentation at the site and down-gradient of the site. A variety of erosion control techniques will be implemented to achieve this goal. During construction, these include:

- Positive grades throughout the construction site to direct flow to sediment control barriers;
- Diversion barriers to keep up-gradient runoff from flowing through the active construction areas;
- Preservation and maintenance of vegetated areas to the maximum extent possible;
- Temporary stabilization of disturbed vegetated areas to be exposed for more than seven days;
- Installation and maintenance of sediment barriers adjacent to and down-gradient of the construction site;
- Installation and maintenance of construction entrances at the travelled interface between stabilized and non-stabilized areas;
- Controls for fugitive sediment and dust, debris, and other materials;
- Application of seeding and mulching (or other permanent surface treatment as indicated on the drawings) applied as soon as areas achieve final grades; and
- Inspection of all in-place measures after every significant rainfall until permanent measures are in place and the Site has been stabilized.

Structural measures will be installed where shown on the design drawings. Details for the installation of these measures, as well as implementation notes, are included on the drawings. All measures will be implemented in accordance with the "Maine Erosion and Sedimentation Handbook for Construction: Best Management Practices". All temporary measures will be installed prior to any earthmoving operation and removed after the areas are permanently stabilized. Permanent erosion control measures for the development will include vegetation and pavement. The anticipated construction schedule is provided in Section 1.3 of this Report, and information on soil types and protected natural resources is provided in Section 11 of this Report.

All measures will be maintained in an effective operating condition until the Site is permanently stabilized. During construction, the Contractor will be responsible for conducting inspections in accordance with the attached *Stormwater Erosion & Sediment Control Inspection Report Form* (or equivalent). Inspections shall be performed at least once a week, as well as before and after storm events. A person with knowledge of stormwater management and erosion and sediment control, including the standards and conditions in the permit, shall conduct the inspections and perform maintenance of the facilities. If maintenance or modifications are necessary, implementation will be completed within seven days and prior to any rainfall event. After construction, the responsible party for the owner will conduct inspections of the Site per the inspection and maintenance requirements outlined in Section 12 of this Report.

14.1 LIST OF ATTACHMENTS

- Stormwater Erosion & Sediment Control Inspection Report Form.

EROSION & SEDIMENT CONTROL
INSPECTION REPORT FORM

Inspectors: Date: ___ / ___ / _____

_____ of _____ (Project Owner)
_____ of _____ (Contractor)
_____ of _____
_____ of _____

Storm Event? ☐ Yes ☐ No Rainfall Amount _____ Storm Duration _____ hours

Visual Observations of Activity and Site Conditions:

Disturbed Soil Areas:

Storage Of Soils:

Sediment & Erosion Control Measures:

Construction Site Entrance:

Surface Stabilization:

Corrective Action Taken:

Attachments (if any):

Signature:

Name Title Date

15. GROUNDWATER

The proposed development is not located within a Significant Sand and Gravel Aquifer. Environmental assessments of the Site have been conducted and the Owner is a participant in the Maine Department of Environmental Protection Voluntary Response Action Program (VRAP). The proposed development will not infiltrate to or extract groundwater and is not anticipated to produce any hazardous waste. It is not anticipated that the proposed development will result in any impacts to groundwater.

16. WATER SUPPLY

The proposed project will not include any new water services; this Section is not applicable.

17. WASTEWATER DISPOSAL

The proposed parking garage will include floor drains and an associated oil/water separator that will discharge to the City's combined sewer system. A Wastewater Capacity Application was submitted to the City under separate cover as part of the Site Plan Application for the proposed development. A copy of the City's approval can be provided upon receipt.

18. SOLID WASTE

18.1 SOLID WASTE

The proposed project will not result in any additional solid waste after construction has been completed.

18.2 CONSTRUCTION & DEMOLITION DEBRIS

As with any construction project, the proposed construction will generate construction waste and demolition debris (CDD). The construction contractor(s) will be responsible for hauling the CDD or contracting with a waste management service to haul the CDD from the project site. The contractor(s) will be fully responsible for handling, managing, and disposing of all waste generated by construction in accordance with Maine Solid Waste Management Regulations – 06-096 CMR 400-409. The contractor(s) will be bound by contract to dispose of all materials in full accordance with all applicable local state and federal regulations.

18.3 SPECIAL & HAZARDOUS WASTE

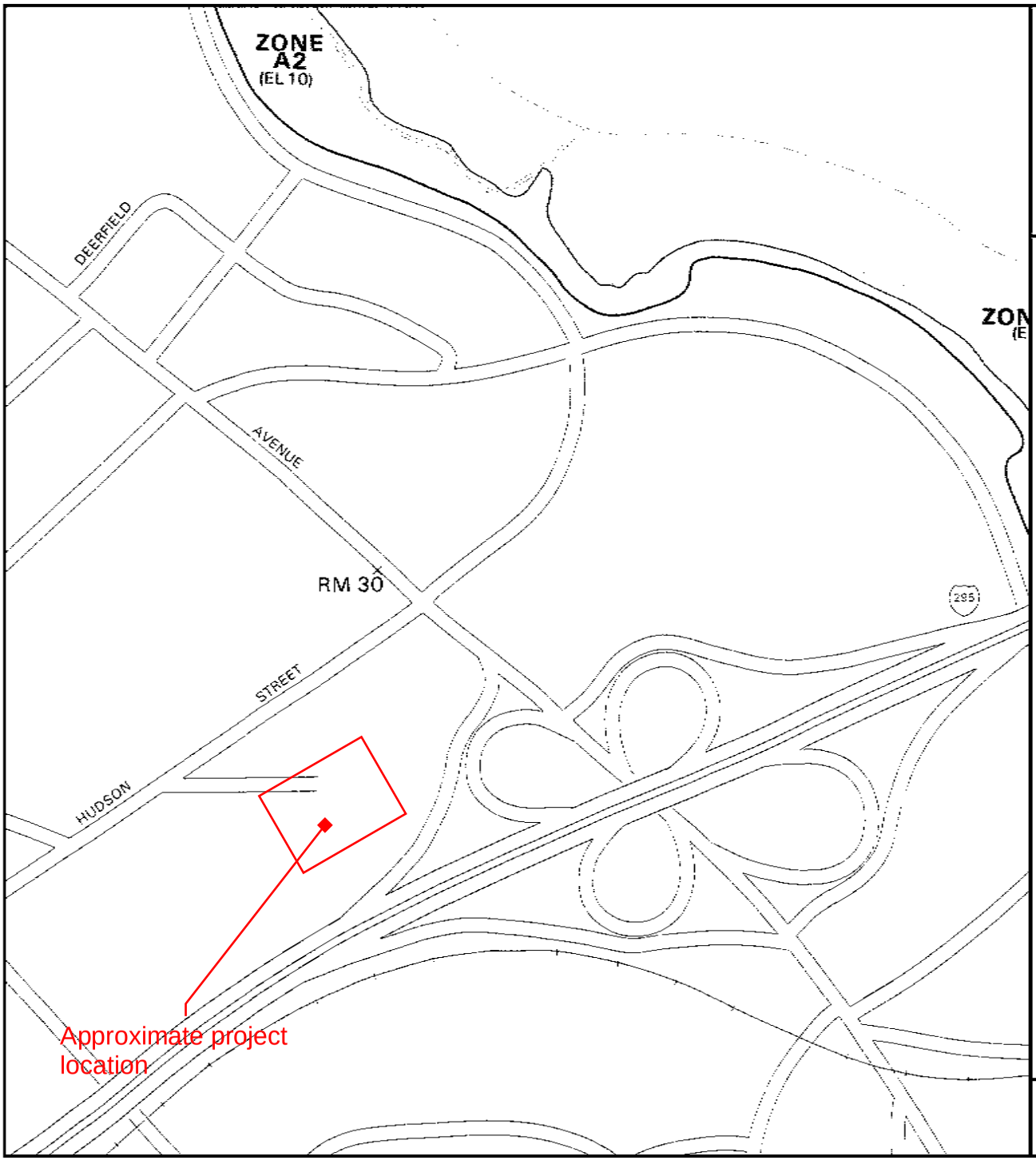
The proposed development is not anticipated to produce any hazardous waste. Environmental assessments of the Site have been conducted and the Owner is a participant in the Maine Department of Environmental Protection Voluntary Response Action Program (VRAP). A soil management plan will be developed for the Site.

19. FLOODING

The project is not located in a flood hazard zone, as shown on the attached FEMA FIRM Map.

19.1 LIST OF ATTACHMENTS

- FEMA Flood Insurance Rate Map.



APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CITY OF
PORTLAND, MAINE
CUMBERLAND COUNTY

PANEL 13 OF 17
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230051 0013 B

EFFECTIVE DATE:
JULY 17, 1986

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

20. BLASTING

No blasting is anticipated for this project; this Section is not applicable.

21. AIR EMISSIONS

The project will not require an air emissions license; this Section is not applicable.

22. ODORS

The proposed development will not involve any processes that emit significant odors; this Section is not applicable.

23. WATER VAPOR

The proposed development will not use water for any processes that would emit water vapor; this Section is not applicable.

24. SUNLIGHT

The proposed development will not block access to sunlight for any structures utilizing solar energy; this Section is not applicable.

25. NOTICES

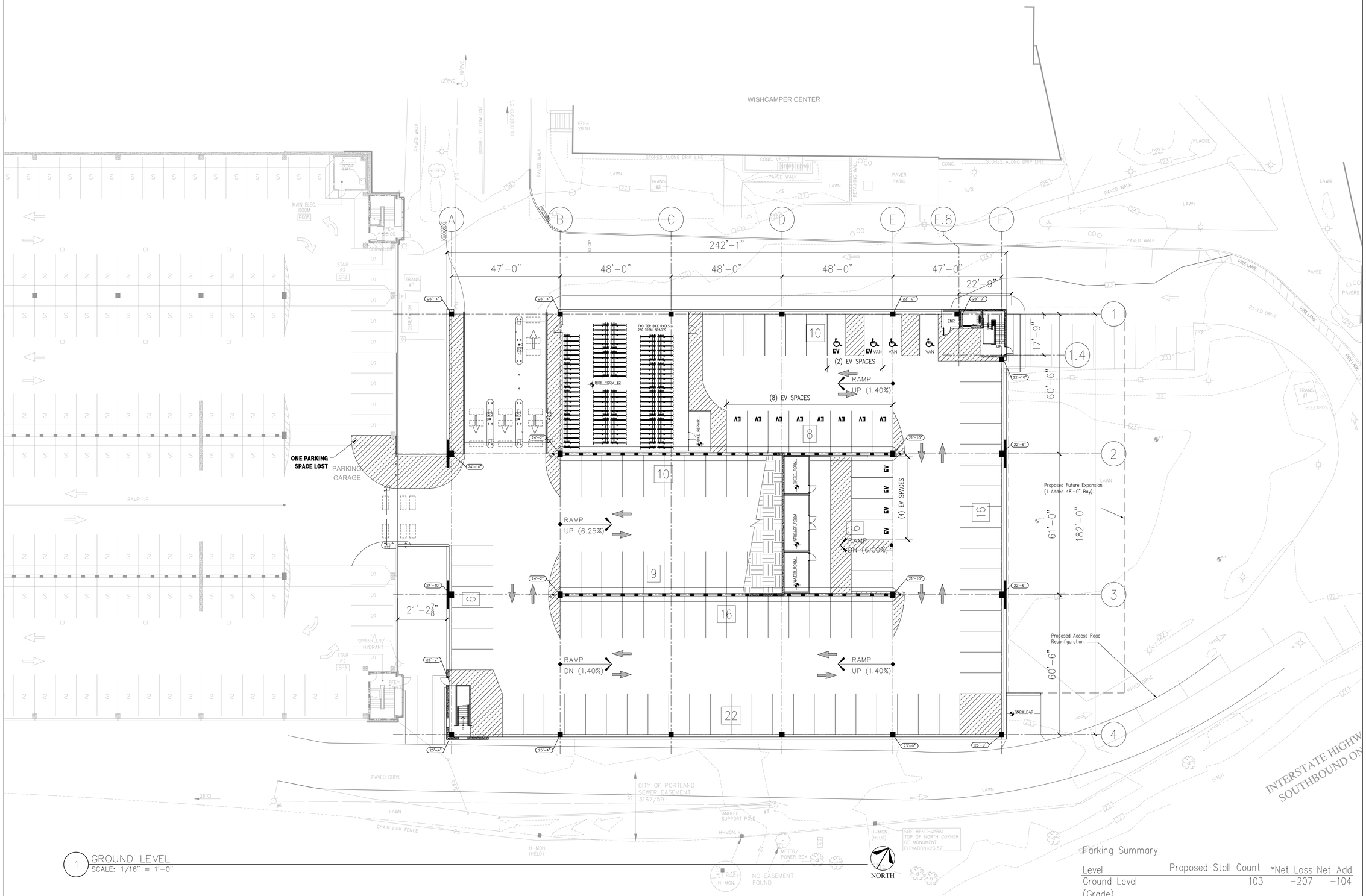
The City of Portland has Delegated Review Authority for this application; as such, it is our understanding that the public notice requirements associated with MaineDEP Site Law do not apply.

[redacted]

WOODARD &CURRAN

woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS



1 GROUND LEVEL
SCALE: 1/16" = 1'-0"

Parking Summary

Level	Proposed Stall Count	*Net Loss	Net Add
Ground Level (Grade)	103	−207	−104
First Level	137	0	137
Second Level	137	0	137
Third Level	137	0	137
Fourth Level (Roof)	120	0	120
Total	634	−207	427

*Includes loss of stalls in the adjacent parking garage and off-site parking

** Includes 13 ADA Parking Stalls

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT & STRUCTURAL ENGINEER
DESMAN Design Management
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CIVIL ENGINEER
WOODARD & CURRAN
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BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
	07/30/21	Site Plan Submittal

SUBMISSIONS:

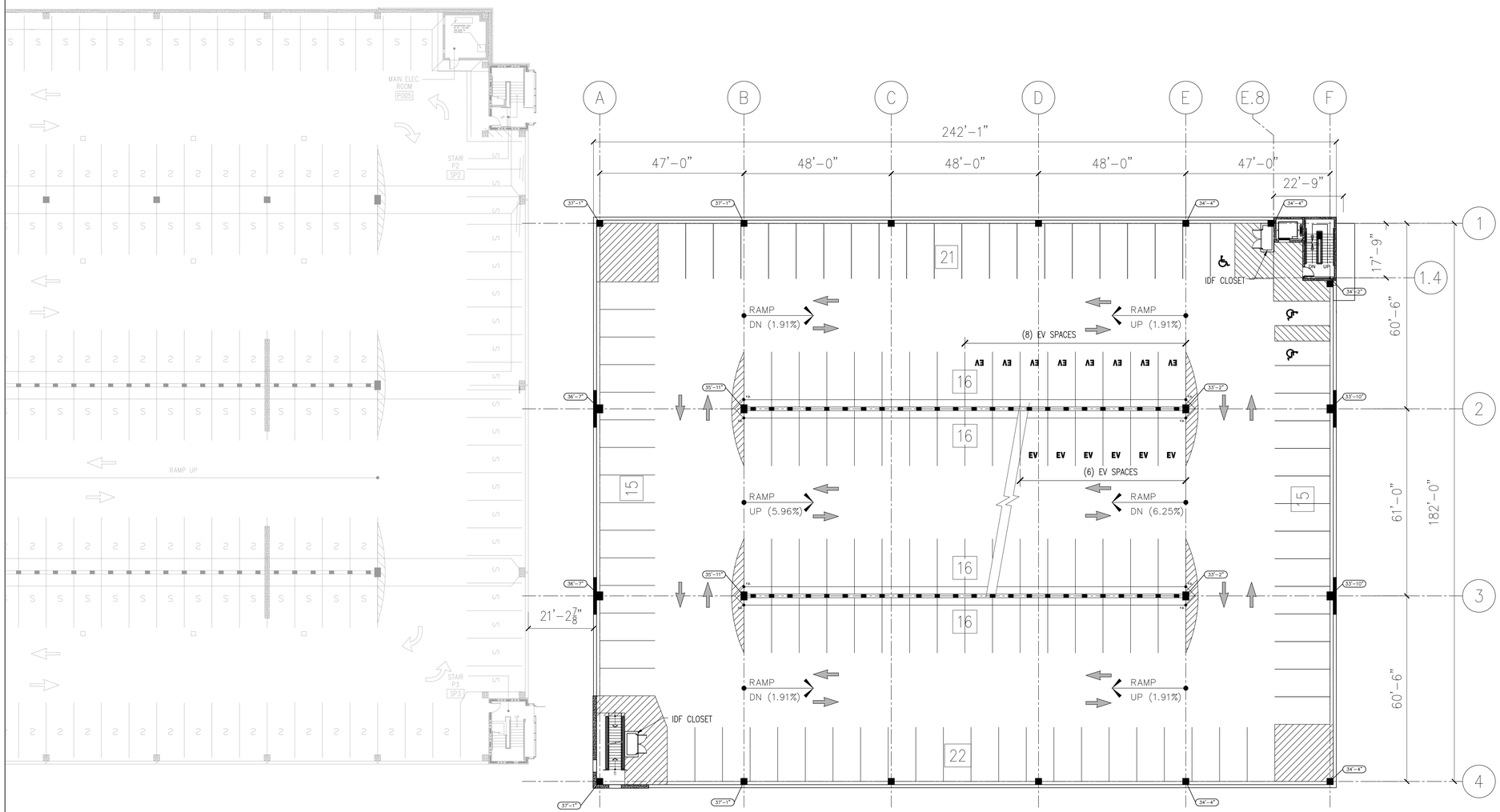
Date	Issued For:

SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	C.M.
CHECKED BY	B.F.

SHEET TITLE:

GROUND LEVEL STRIPING PLAN

A-101



1 FIRST LEVEL
SCALE: 1/16" = 1'-0"

NORTH

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT
& STRUCTURAL ENGINEER

DESMAN
Design Management

18 Tremont Street #300
Boston, MA 02108

ARCHITECT
WINTON-SCOTT ARCHITECTS

5 MILK STREET
PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN

41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE

457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING

160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE

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GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC

40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT

94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description
	07/30/21	Site Plan Submittal

SUBMISSIONS:

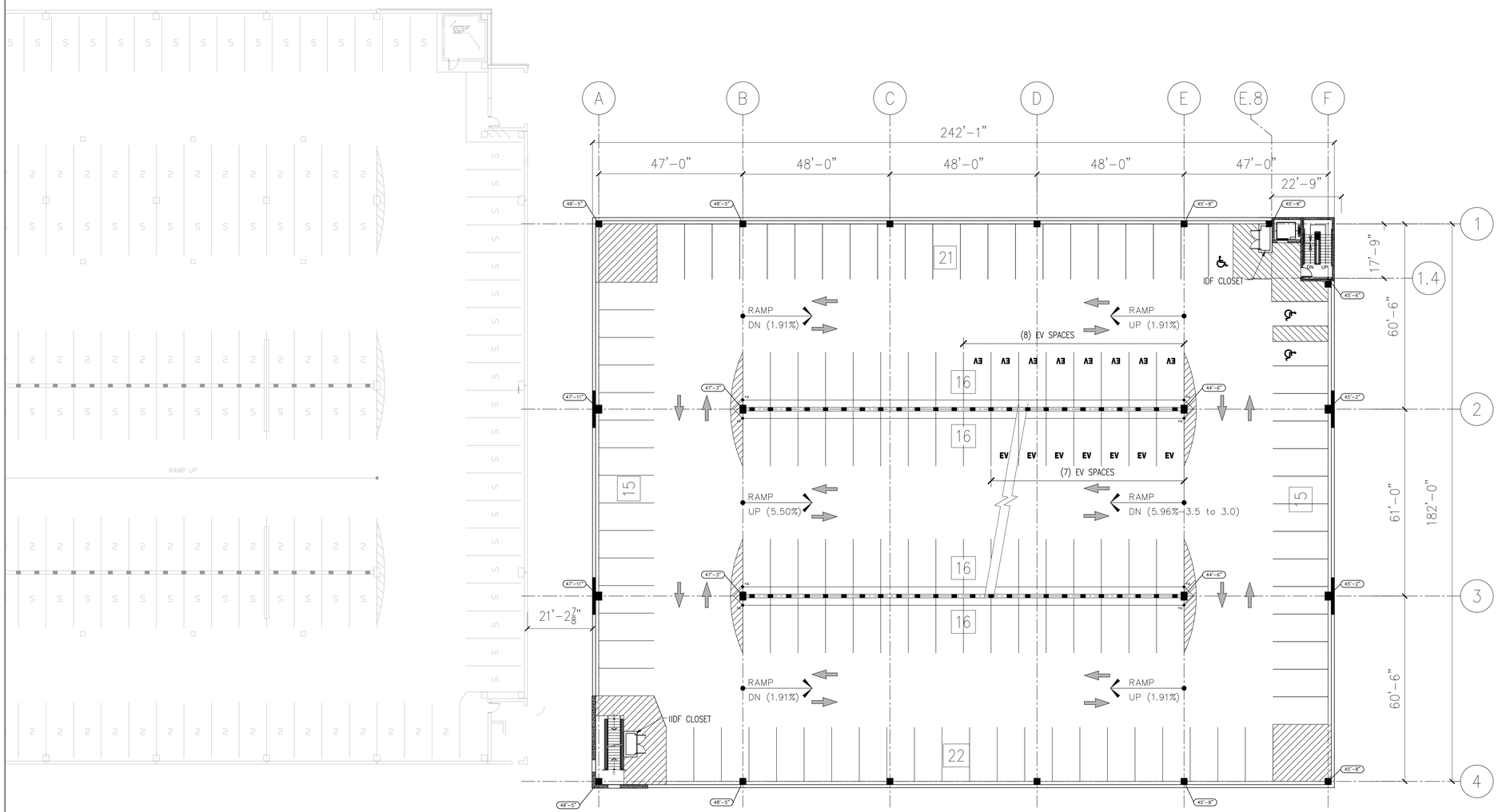
Date	Issued For:

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

FIRST LEVEL STRIPING PLAN

A-102



1 SECOND LEVEL
SCALE: 1/16" = 1'-0"

NORTH

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USM - Structured Parking Garage

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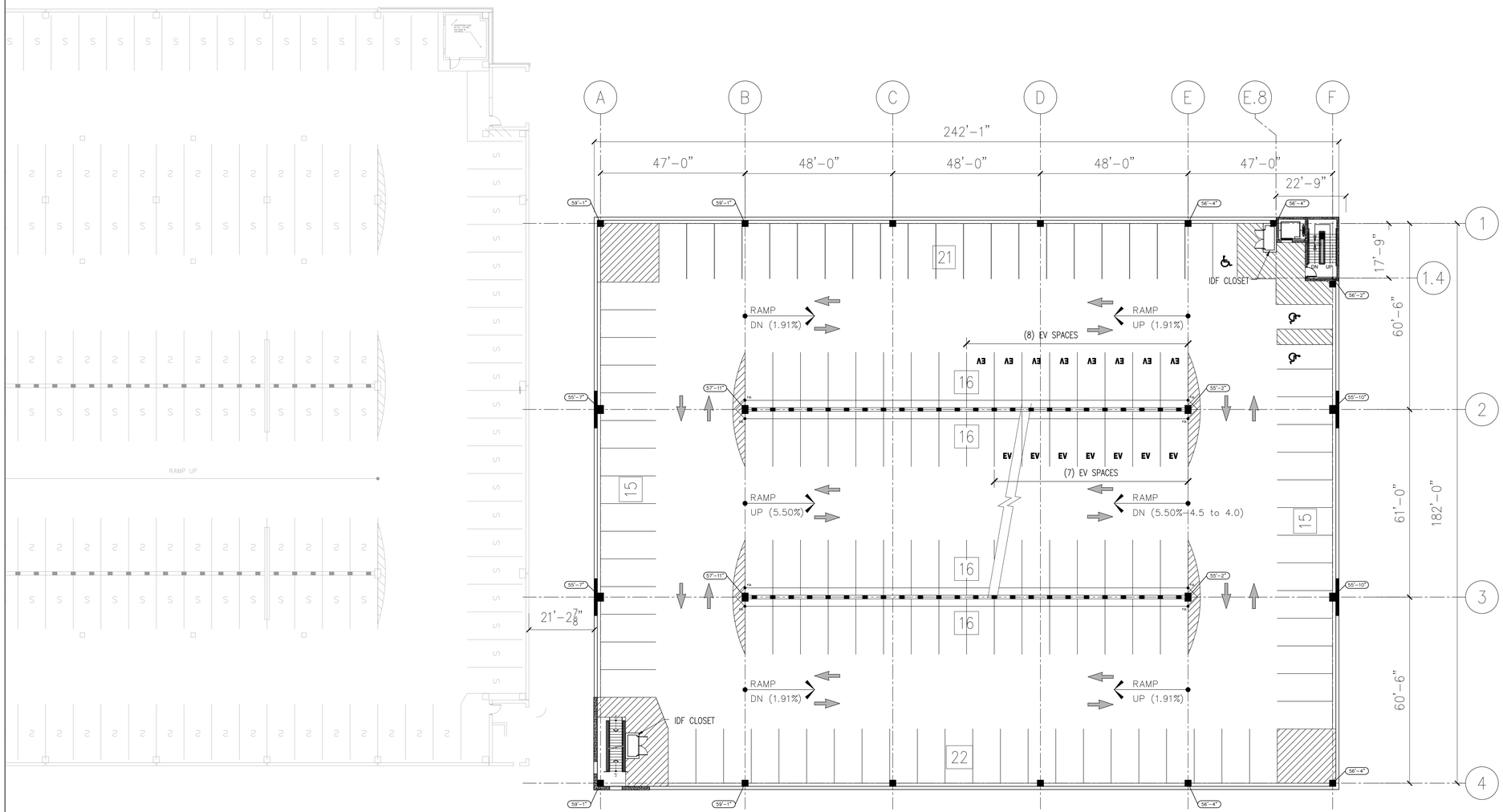
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

SECOND LEVEL STRIPING PLAN

A-103



1 THIRD LEVEL
SCALE: 1/16" = 1'-0"

NORTH

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PROJECT:

USM - Structured Parking Garage

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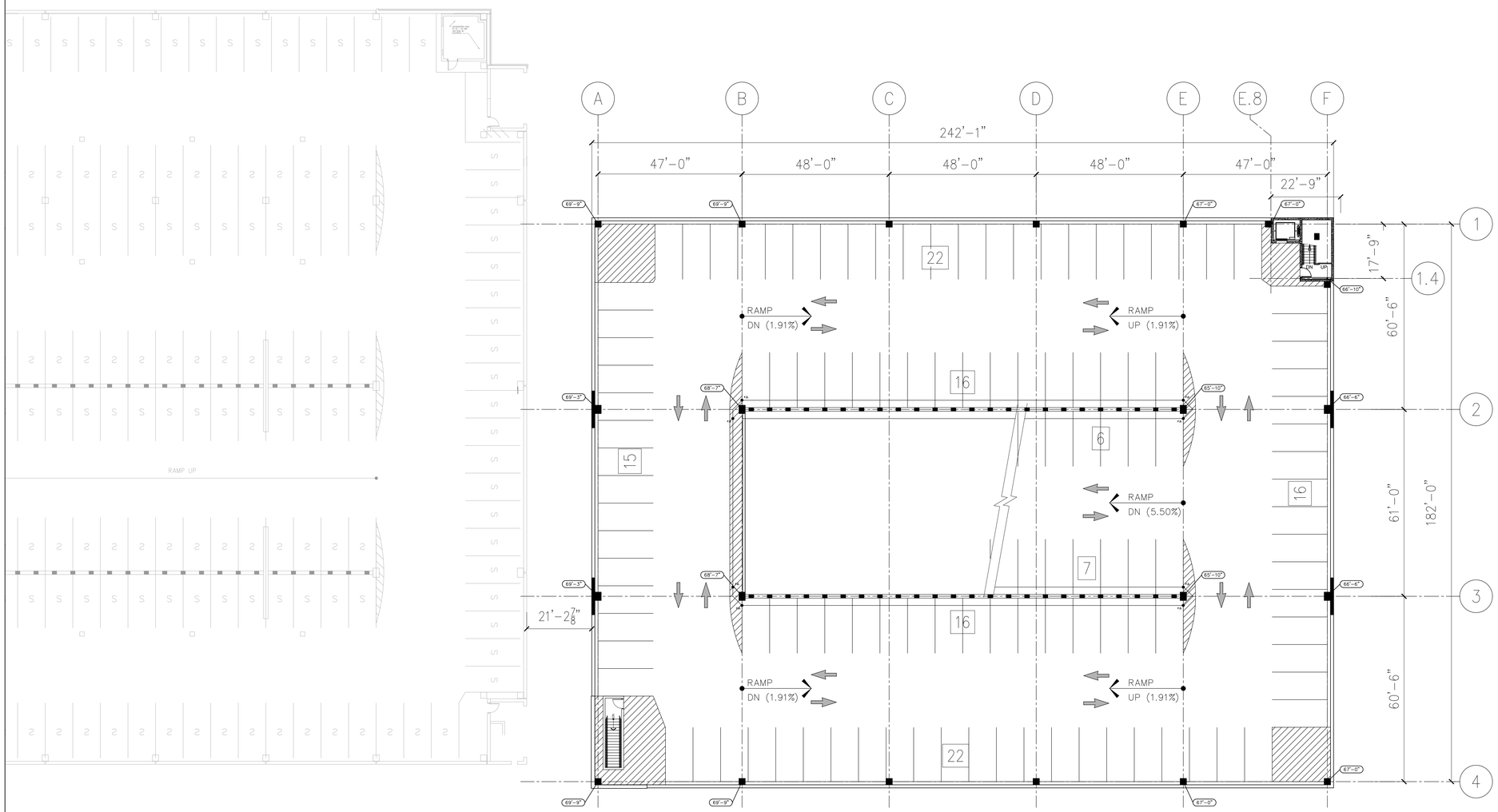
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

THIRD LEVEL STRIPING PLAN

A-104



1 ROOF LEVEL
SCALE: 1/16" = 1'-0"

NORTH

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PROJECT TEAM:

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USM - Structured Parking Garage

Address

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REVISIONS:

No.	Date	Description
	07/30/21	Site Plan Submittal

SUBMISSIONS:

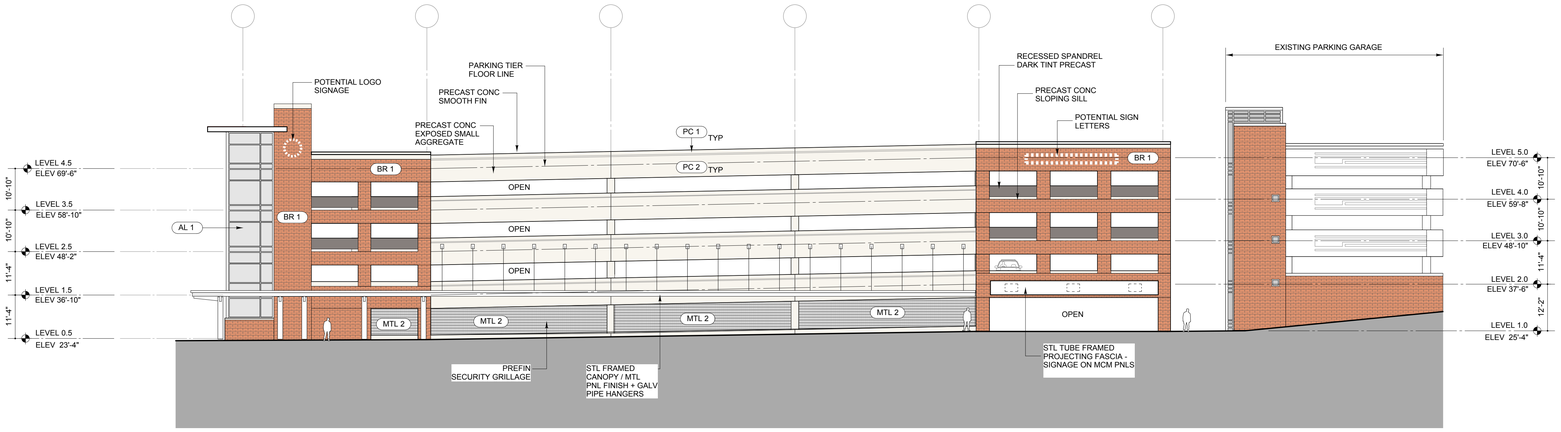
Date	Issued For:

SCALE	**1/16" = 1'-0"**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**C.M.**
CHECKED BY	**B.F.**

SHEET TITLE:

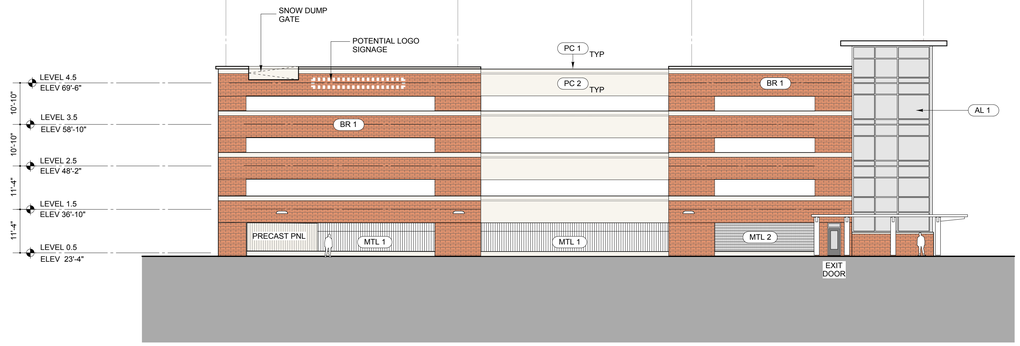
ROOF LEVEL STRIPING PLAN

A-105



NORTH ELEVATION

1/16" = 1' - 0"



EAST ELEVATION

1/16" = 1' - 0"



SECURITY BAR GRATING - MTL 2



BRICK - BR 1
GLEN-GERY 387 RUSTIC RED

MATERIALS LEGEND

KEY	MATERIAL	NOTES
AL 1	ALUMINUM CURTAINWALL	CLEAR ANODIZED / UN-TINTED GLASS
BR 1	BRICK	THIN BRICK INTEGRAL TO PRECAST
MTL 1	SECURITY BARS	1/2" BAR @ 9" O.C. / PAINTED DK BLUE
MTL 2	SECURITY BAR GRATING	2" x 5" OPENING / DK BLUE PREFINISH
MTL 3	PAINTED STEEL	FLUSH PANEL
PC 1	PRECAST CONCRETE	SMOOTH FINISH
PC 2	PRECAST CONCRETE	MEDIUM SANDBLASTED FINISH

16 0 16 32

BAR SCALE
1" = 16'
CHECK GRAPHIC SCALE BEFORE USING

UNIVERSITY OF SOUTHERN MAINE

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PROJECT TEAM:

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41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER
LANDSCAPE ARCHITECTURE
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BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
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PROJECT:

USM - Structured Parking Garage

Address
44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07 /30/21	Site Plan Submittal

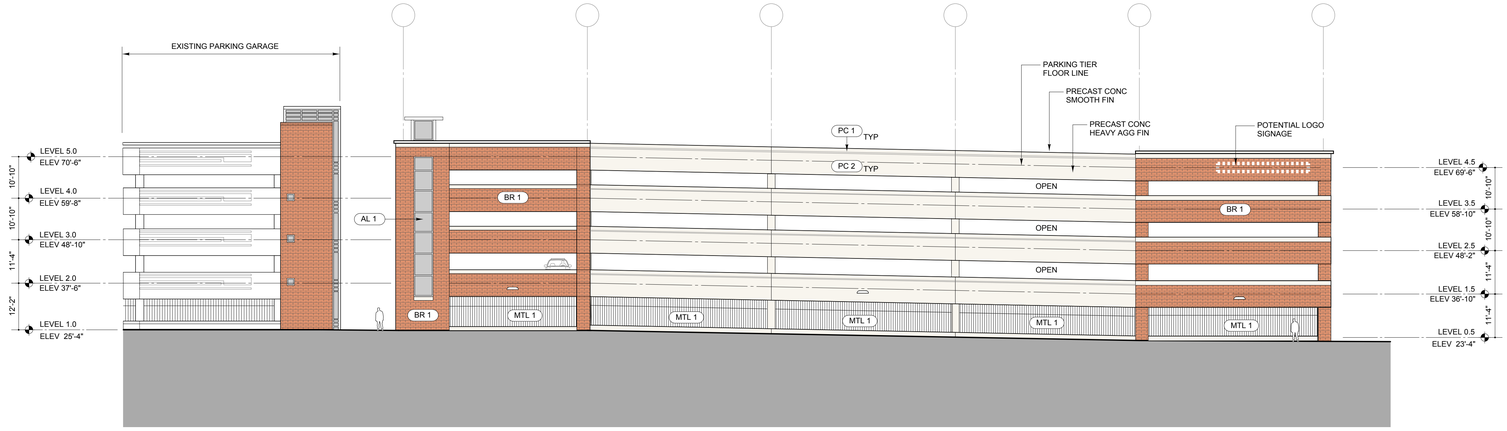
SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

SHEET TITLE:

Building Elevations

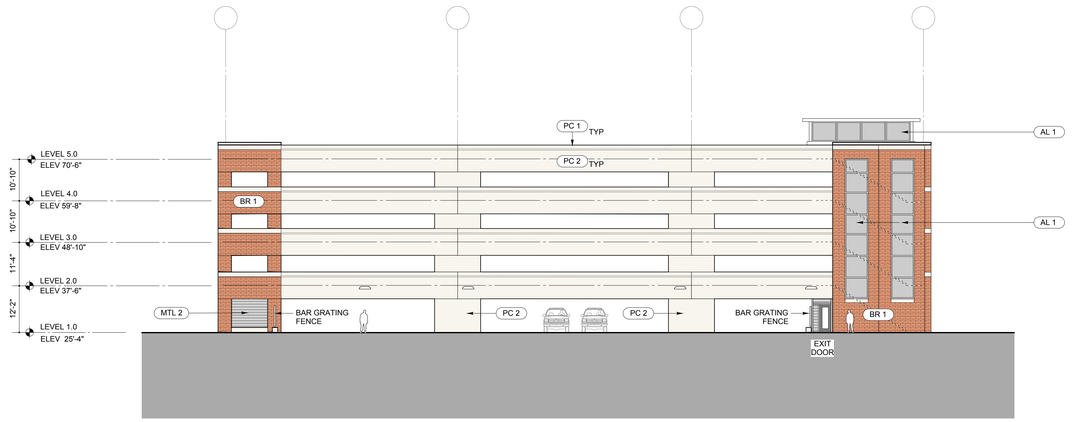
A - 200

7/2/2021 3:16:33 PM



SOUTH ELEVATION

1/16" = 1' - 0"



WEST ELEVATION

1/16" = 1' - 0"

MATERIALS LEGEND

KEY	MATERIAL	NOTES
AL 1	ALUMINUM CURTAINWALL	CLEAR ANODIZED / UN-TINTED GLASS
BR 1	BRICK	THIN BRICK INTEGRAL TO PRECAST
MTL 1	SECURITY BARS	1/2" BAR @ 9" O.C. / PAINTED DK BLUE
MTL 2	SECURITY BAR GRATING	2" x 5" OPENING / DK BLUE PREFINISH
MTL 3	PAINTED STEEL	FLUSH PANEL
PC 1	PRECAST CONCRETE	SMOOTH FINISH
PC 2	PRECAST CONCRETE	MEDIUM SANDBLASTED FINISH

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

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PROJECT TEAM:

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ARCHITECT
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5 MILK STREET
PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN
41 HUTCHINS DRIVE
PORTLAND, ME 04102

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MICHAEL BOUCHER
LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
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160 VERANDA STREET
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VANASSE HANGEN BRUSTLIN INC
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PROJECT:

USM - Structured Parking Garage

Address
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Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
PROJECT NO	20-20145.00-1
DRAWN BY	
CHECKED BY	

SHEET TITLE:

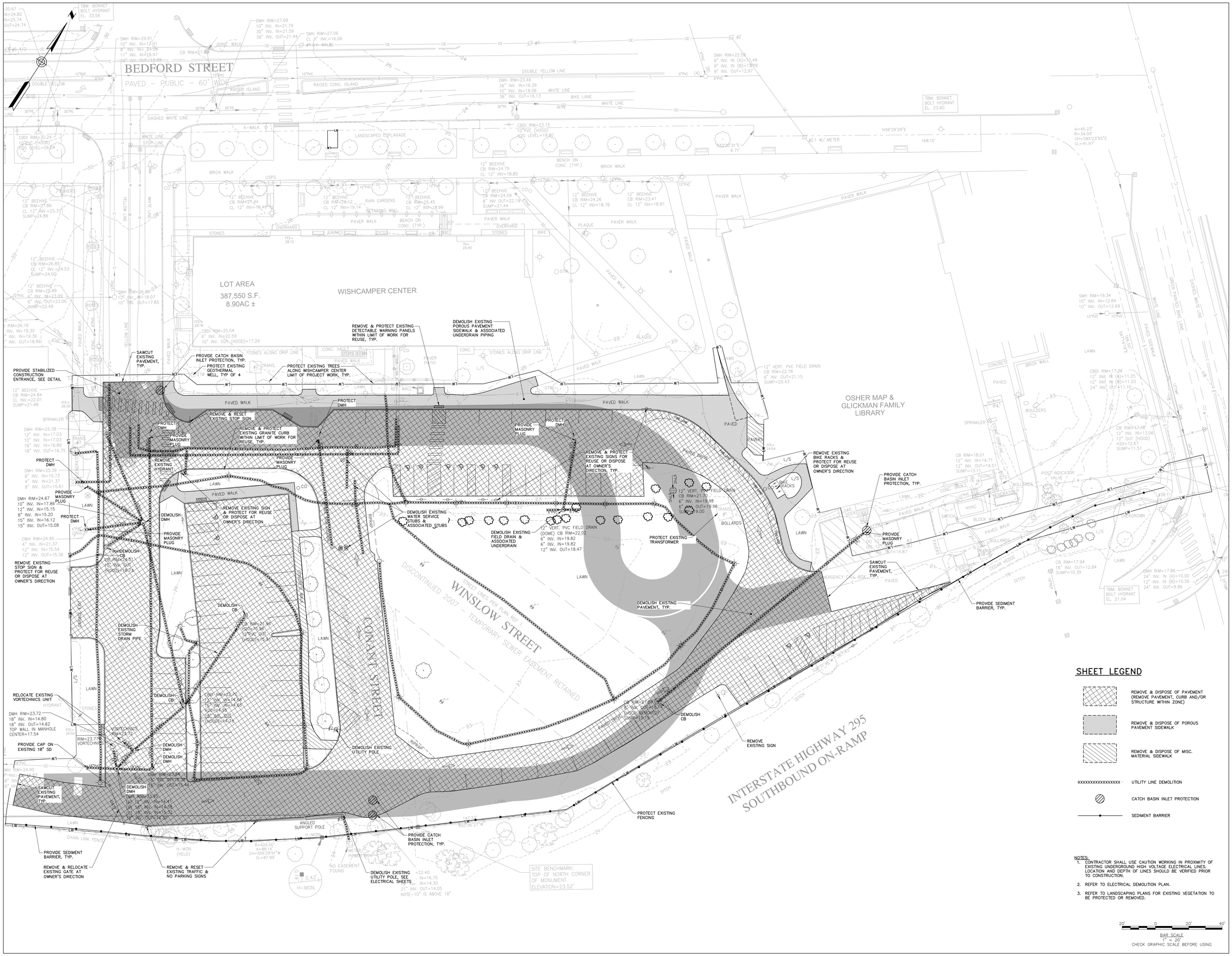
Building Elevations

A - 501



University of Southern Maine Parking Garage

Bedford Street View



\\wsodcdcsrvcn.net\shared\Projects\0233535.00 usm - falmouth street garage\vcp\Drawings\Civil\233535.00 C10X.dwg, Jul 29, 2021 - 2:56pm BMCDEVITT

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PROJECT TEAM:

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STATE OF MAINE
ASHLEY FLETCHER
No. 13750
LICENSED PROFESSIONAL ENGINEER

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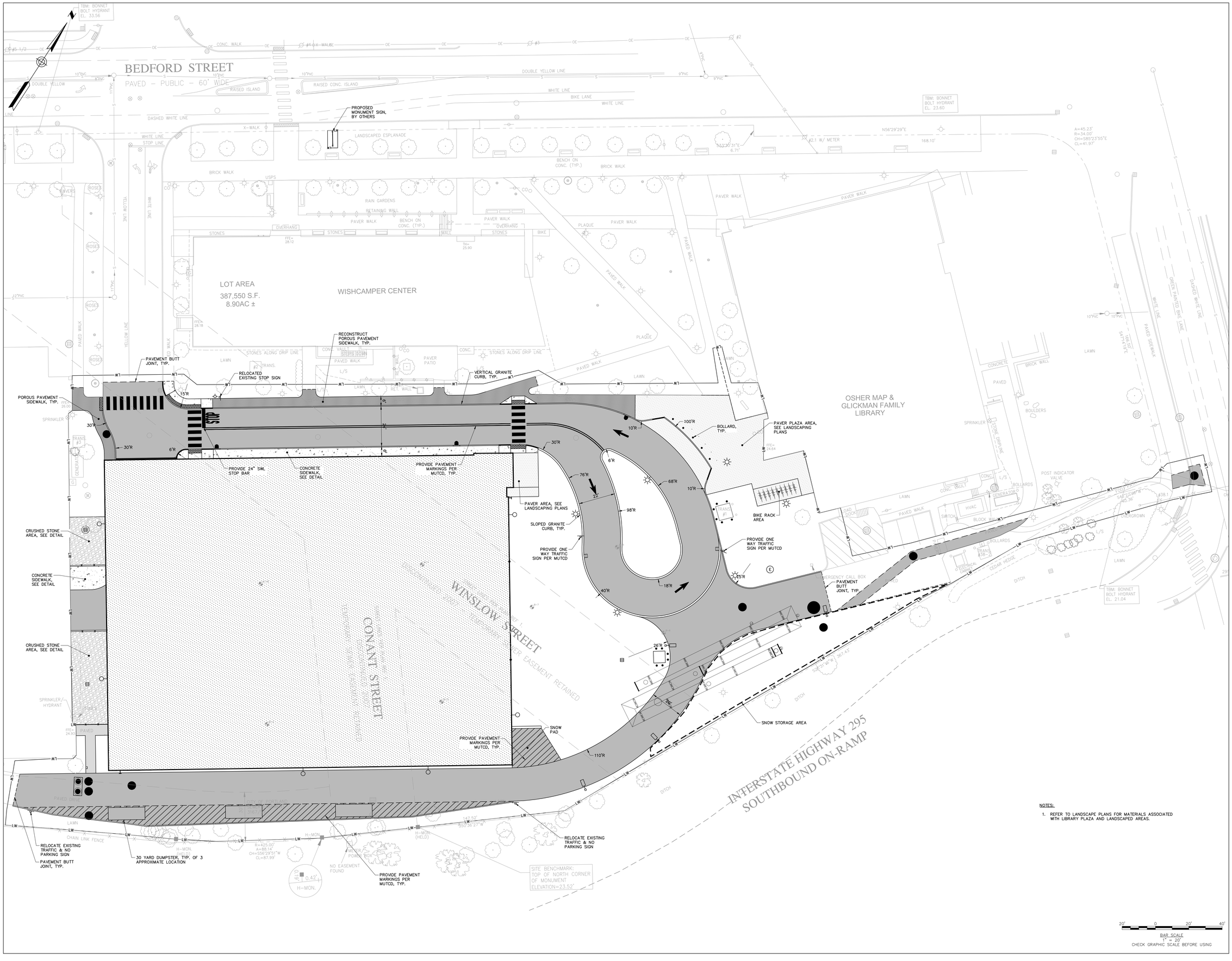
07/30/21	Site Plan Submittal

SCALE	**1"=20'**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

DEMOLITION & EROSION & SEDIMENT CONTROL PLAN

C-001


BEDFORD STREET
PAVED – PUBLIC – 60' WIDE
TBM: BONNET BOLT HYDRANT EL. 33.56
TBM: BONNET BOLT HYDRANT EL. 23.60
PROPOSED MONUMENT SIGN, BY OTHERS
LANDSCAPED ESPLANADE
RAISED CONC. ISLAND
RAISED ISLAND
DOUBLE YELLOW LINE
WHITE LINE
BIKE LANE
DASHED WHITE LINE
X-WALK
STOP LINE
BRICK WALK
USPS
BENCH ON CONC. (TYP.)
RAIN GARDENS
RETAINING WALL
PAVER WALK
PAVED WALK
PLAQUE
OVERHANG
STONES
BIKE
WALL
LOT AREA
387,550 S.F.
8.90AC ±
WISHCAMPER CENTER
RECONSTRUCT POROUS PAVEMENT SIDEWALK, TYP.
PAVEMENT BUTT JOINT, TYP.
RELOCATED EXISTING STOP SIGN
VERTICAL GRANITE CURB, TYP.
STONES ALONG DRIP LINE
PAVER PATIO
LAWN
TRANS.
L/S
RET. WALL
POROUS PAVEMENT SIDEWALK, TYP.
SPRINKLER
PROVIDE 24" SWL STOP BAR
CONCRETE SIDEWALK, SEE DETAIL
PROVIDE PAVEMENT MARKINGS PER MUTCD, TYP.
PAVER AREA, SEE LANDSCAPING PLANS
SLOPED GRANITE CURB, TYP.
PROVIDE ONE WAY TRAFFIC SIGN PER MUTCD
CRUSHED STONE AREA, SEE DETAIL
CONCRETE SIDEWALK, SEE DETAIL
CRUSHED STONE AREA, SEE DETAIL
SNOW PAD
PROVIDE PAVEMENT MARKINGS PER MUTCD, TYP.
WINSLOW STREET
CONANT STREET
PUBLIC RIGHT OF WAY
SEWER EASEMENT RETAINED
OSHER MAP & GLICKMAN FAMILY LIBRARY
PAVER PLAZA AREA, SEE LANDSCAPING PLANS
BOLLARD, TYP.
BIKE RACK AREA
PROVIDE ONE WAY TRAFFIC SIGN PER MUTCD
PAVEMENT BUTT JOINT, TYP.
SNOW STORAGE AREA
INTERSTATE HIGHWAY 295
SOUTHBOUND ON-RAMP
DITCH
GREEN PAINTED BIKE LANE
DASHED WHITE LINE
WHITE LINE
PAVED SIDEWALK
CONCRETE
BRICK WALL
PAVED
BOULDERS
STONE DRIPLINE
POST INDICATOR VALVE
CONC. VAULT
GENERATOR
HVAC
SWITCH
BLOCK WALL
OAK
CEDAR HEDGE
EVERGREEN
UNDERGROWN
CHAIN LINK FENCE
RELOCATE EXISTING TRAFFIC & NO PARKING SIGN
PAVEMENT BUTT JOINT, TYP.
30 YARD DUMPSTER, TYP. OF 3 APPROXIMATE LOCATION
H-MON. (HELD)
METER POST
NO EASEMENT FOUND
PROVIDE PAVEMENT MARKINGS PER MUTCD, TYP.
SITE BENCHMARK: TOP OF NORTH CORNER OF MONUMENT ELEVATION=23.52'
RELOCATE EXISTING TRAFFIC & NO PARKING SIGN
#2 W/ METER
#2.1 W/ METER
#3
#4
#5 1/2
#38.1
#38.2
#38.3
#38.4
#38.5
#38.6
#38.7
#38.8
#38.9
#38.10
#38.11
#38.12
#38.13
#38.14
#38.15
#38.16
#38.17
#38.18
#38.19
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#38.36
#38.37
#38.38
#38.39
#38.40
#38.41
#38.42
#38.43
#38.44
#38.45
#38.46
#38.47
#38.48
#38.49

PIPE TABLE			
PIPE NAME	SIZE	LENGTH	SLOPE
PIPE 1	18" PVC	140'	0.0092
PIPE 2	18" PVC	92'	0.0147
PIPE 3	18" PVC	75'	0.0176
PIPE 4	18" PVC	34'	0.1015
PIPE 5	18" PVC	9'	0.0556
PIPE 6	10" PVC	88'	0.0051
PIPE 7	10" PVC	65'	0.0051
PIPE 8	18" PVC	75'	0.0479
PIPE 9	12" PVC	7'	0.0000
PIPE 10	12" PVC	8'	0.0088
PIPE 11	18" PVC	26'	0.0069
PIPE 12	24" PVC	65'	0.0052
PIPE 13	24" PVC	171'	0.0051
PIPE 14	18" PVC	22'	0.0068
PIPE 15	18" PVC	29'	0.0045
PIPE 16	18" PVC	23'	0.0048
PIPE 17	18" PVC	89'	0.0049
PIPE 18	18" PVC	2'	0.0300
PIPE 19	18" PVC	3'	0.0200
PIPE 20	18" PVC	2'	0.0300
PIPE 21	18" PVC	54'	0.0033
PIPE 22	18" PVC	11'	0.0136
PIPE 23	18" PVC	99'	0.0072
PIPE 24	12" PVC	23'	0.0057
PIPE S1	4" PVC	5'	0.0100
PIPE S2	18" PVC	27'	0.0059

STRUCTURE TABLE				
NAME	DIA.	RIM	INV IN/SIZE/FROM	INV OUT/SIZE/TO
66" CMP IN	N/A	N/A	13.08/18"PVC/DMH1	
66" CMP OUT	N/A	N/A		13.08/12"PVC/STORMFILTER
72" CMP OUT	N/A	N/A		12.58/18"PVC/DMH2
CB1	4'	25.12	21.10/12"PVC/TRENCH DRAIN	21.00/18"PVC/CB8
CB2	4'	22.97	19.00/18"PVC/CB8 21.13/6"UD/	18.90/18"PVC/CB4
CB3	4'	23.90	14.96/18"PVC/EXDMH5	14.86/18"PVC/DMH9
CB4	4'	22.87	17.55/18"PVC/CB2 17.55/18"PVC/CB5	17.45/18"PVC/DMH1
CB5	4'	22.83		18.87/18"PVC/CB4
CB6	4'	22.50	17.70/10"PVC/ROOF DRAIN 2 17.70/10"PVC/ROOF DRAIN 1	17.59/18"PVC/DMH1
CB8	4'	24.01	19.71/18"PVC/CB1	19.71/18"PVC/CB2
DMH1	4'	22.60	14.00/18"PVC/CB6 14.00/18"PVC/CB4	13.58/18"PVC/66" CMP IN
DMH2	4'	21.65	12.51/12"PVC/STORMFILTER 12.40/18"PVC/72" CMP OUT	12.07/24"PVC/DMH3
DMH3	4'	20.85	11.73/24"PVC/DMH2	11.63/24"PVC/DMH4
DMH4	4'	17.21	10.75/24"PVC/DMH3	

STRUCTURE TABLE				
NAME	DIA.	RIM	INV IN/SIZE/FROM	INV OUT/SIZE/TO
DMH5	4'	25.90	16.64/18"PVC/EXDMH2 17.46/15"PVC/EXCB1 24.06/6"UD/ 24.06/6"UD/	16.54/18"PVC/EXDMH1
DMH9	4'	24.25	14.68/18"PVC/CB3	14.58/18"PVC/VOR IN 14.58/18"PVC/DMH10
DMH10	4'	24.17	14.20/18"PVC/VOR OUT 14.52/18"PVC/DMH9	14.10/18"PVC/DMH11
DMH11	4'	23.90	13.95/18"PVC/DMH10 13.90/18"PVC/O/W SEP	
EXDMH1	4'	25.39	16.41/18"PVC/DMH5 21.37/4"PVC/ 15.73/8"PVC/	15.61/18"PVC/EXDMH5
EXDMH5	4'	24.75	15.50/18"PVC/EXDMH1 15.54/12"PVC/ 21.37/4"PVC/	15.40/18"PVC/CB3
O/W SEP	4'	24.16	14.20/4"PVC/SAN. OUTLET	14.06/18"PVC/DMH11
ROOF DRAIN 1	N/A	N/A		18.15/10"PVC/CB6
ROOF DRAIN 2	N/A	N/A		18.03/10"PVC/CB6
SAN. OUTLET	N/A	N/A		14.25/4"PVC/O/W SEP
STORMFILTER	7'-2"	21.41	13.08/12"PVC/66" CMP OUT	12.58/12"PVC/DMH2
TRENCH DRAIN	1'	25.33		21.23/12"PVC/CB1
VOR IN	4'	24.40	14.52/18"PVC/DMH9	
VOR OUT	4'	24.28		14.26/18"PVC/DMH10

PLAN NOTES:
1. REFER TO MEP PLANS FOR SITE ELECTRICAL.

WATERLINE INSTALLATION NOTES:
1. PROVIDE CEMENT LINED DUCTILE IRON PIPE PER AWWA C-151
2. INSTALL WATER MAINS IN ACCORDANCE WITH AWWA C-600
3. TEMPORARY CAPS SHALL BE INSTALLED TO ALLOW FOR TESTING AND DISINFECTION SPECIFIED IN NOTES 4 AND 5 PRIOR TO CONNECTING TO EXISTING WATER MAIN
4. PERFORM PRESSURE AND LEAKAGE TEST IN ACCORDANCE WITH AWWA C-600
5. WATER MAINS SHALL BE DISINFECTED PER AWWA C-651 STANDARDS

20' 0 20' 40'
BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

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SEAL / SIGNATURE

STATE OF MAINE
ASHLEY FLETCHER
No. 13750
LICENSED PROFESSIONAL ENGINEER

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2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**1"=20'**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

UTILITY & GRADING PLAN

C-101

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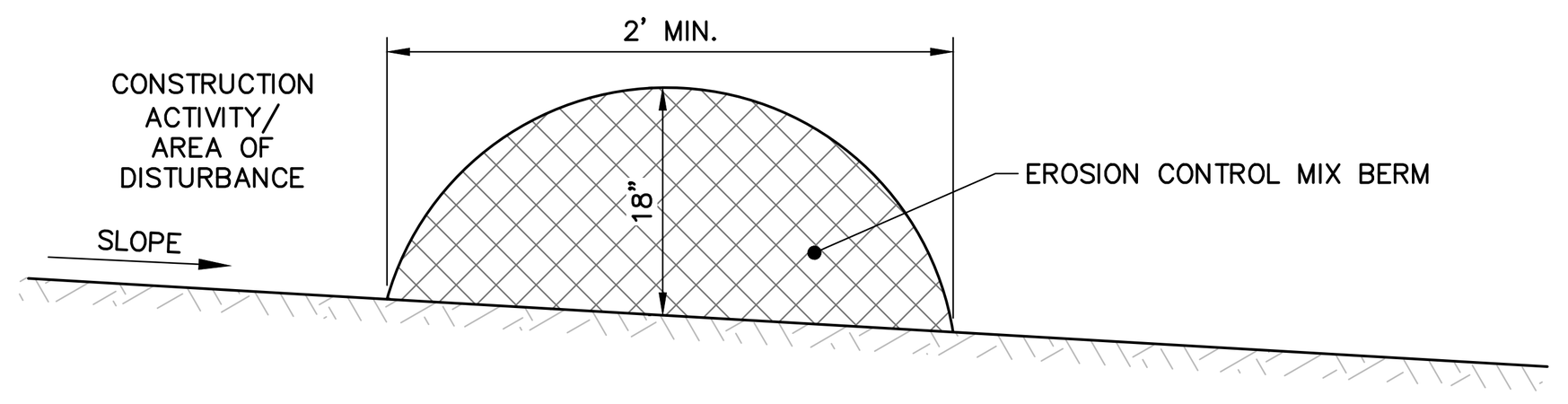
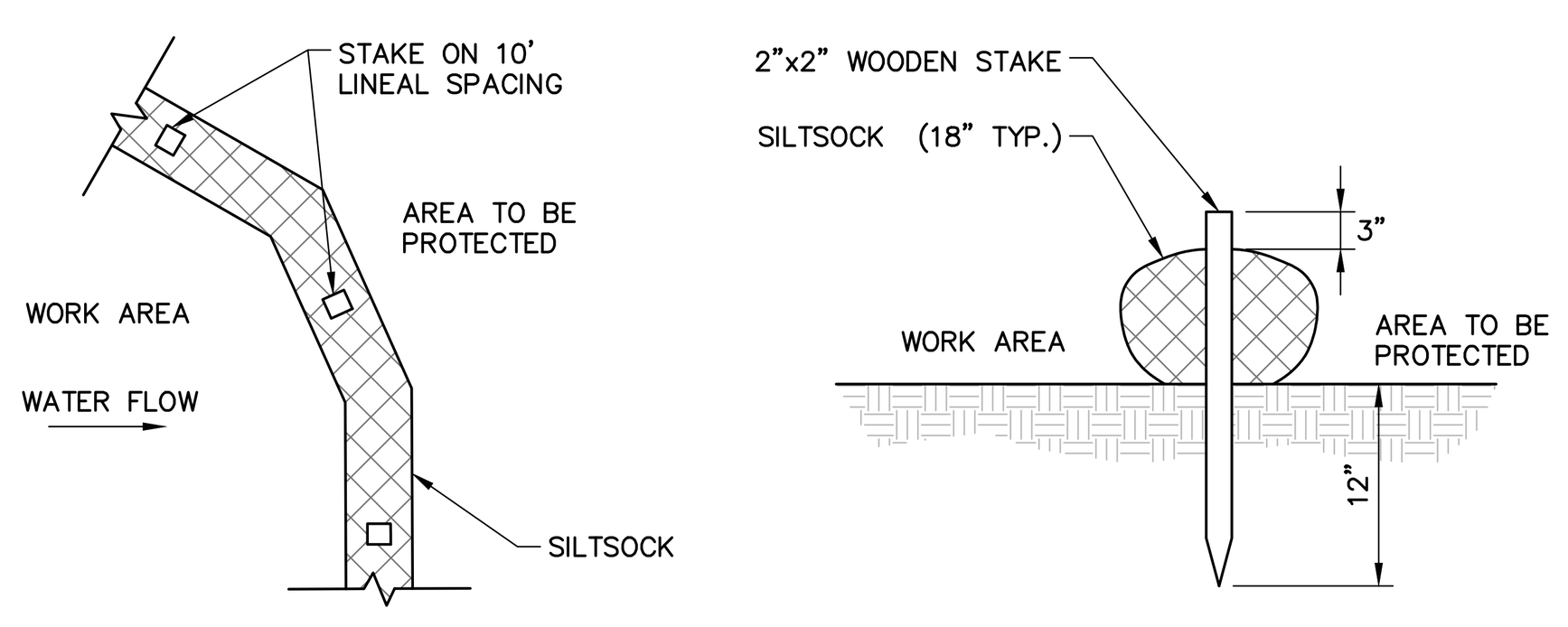


NOTES:

1. EROSION CONTROL MIX CAN BE MANUFACTURED ON OR OFF THE PROJECT SITE. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.
2. EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS:
   - THE ORGANIC MATTER CONTENT SHALL BE BETWEEN 80 AND 100%, DRY WEIGHT BASIS.
   - PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 6" SCREEN AND A MINIMUM OF 70%, MAXIMUM OF 85%, PASSING A 0.75" SCREEN.
   - THE ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED.
   - LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
   - SOLUBLE SALTS CONTENT SHALL BE < 4.0 MMHOS/CM.
   - THE PH SHOULD FALL BETWEEN 5.0 AND 8.0.

EROSION CONTROL MIX BERM (SEDIMENT BARRIER OPTION)

N.T.S.

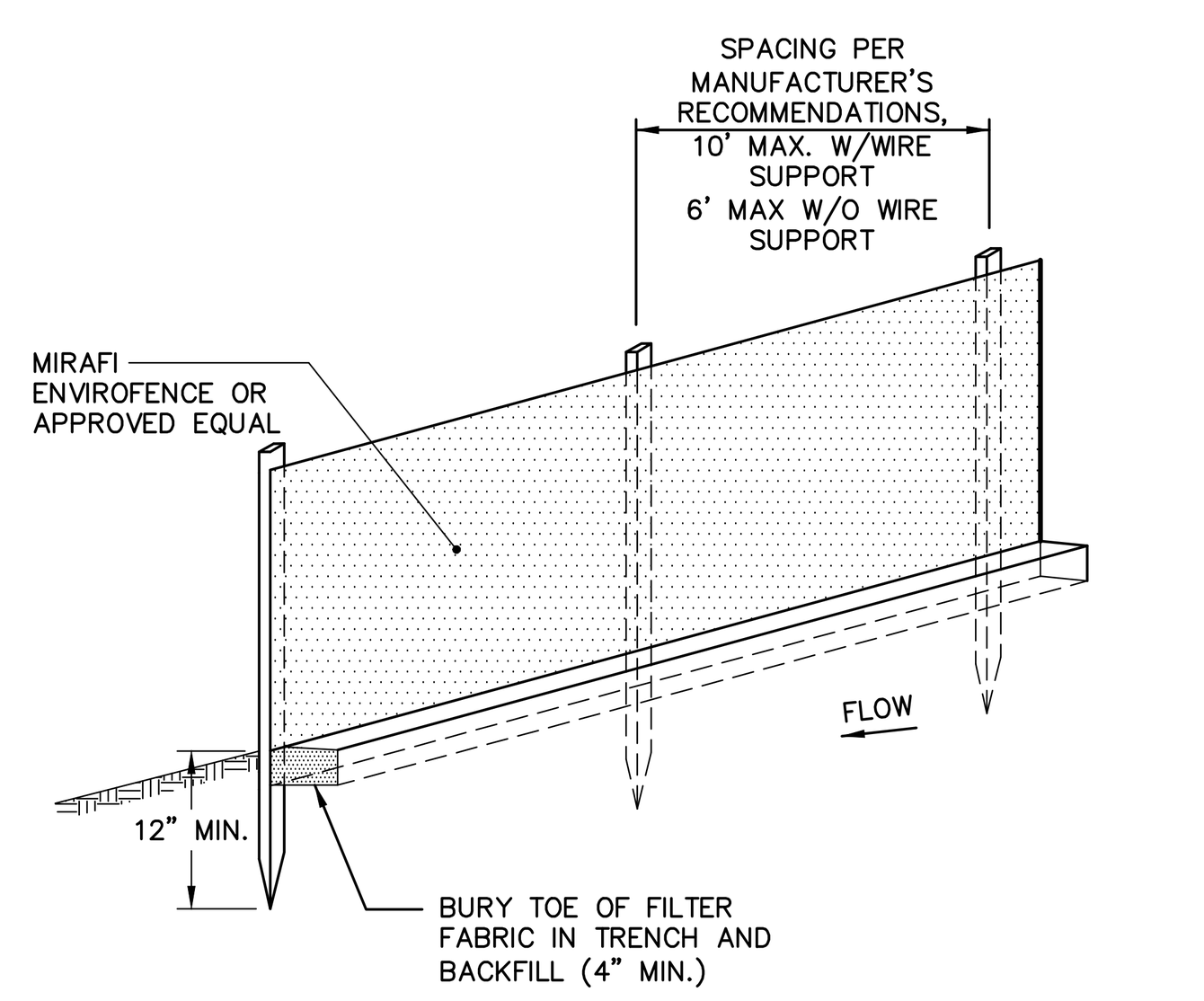


NOTE:

1. WHEN STAKING IS NOT POSSIBLE, HEAVY CONCRETE BLOCKS SHALL BE USED BEHIND THE SEDIMENT BARRIER TO HELP STABILIZE DURING RAINFALL/RUNOFF EVENTS.

SILT SOCK (SEDIMENT BARRIER OPTION)

N.T.S.



NOTES:

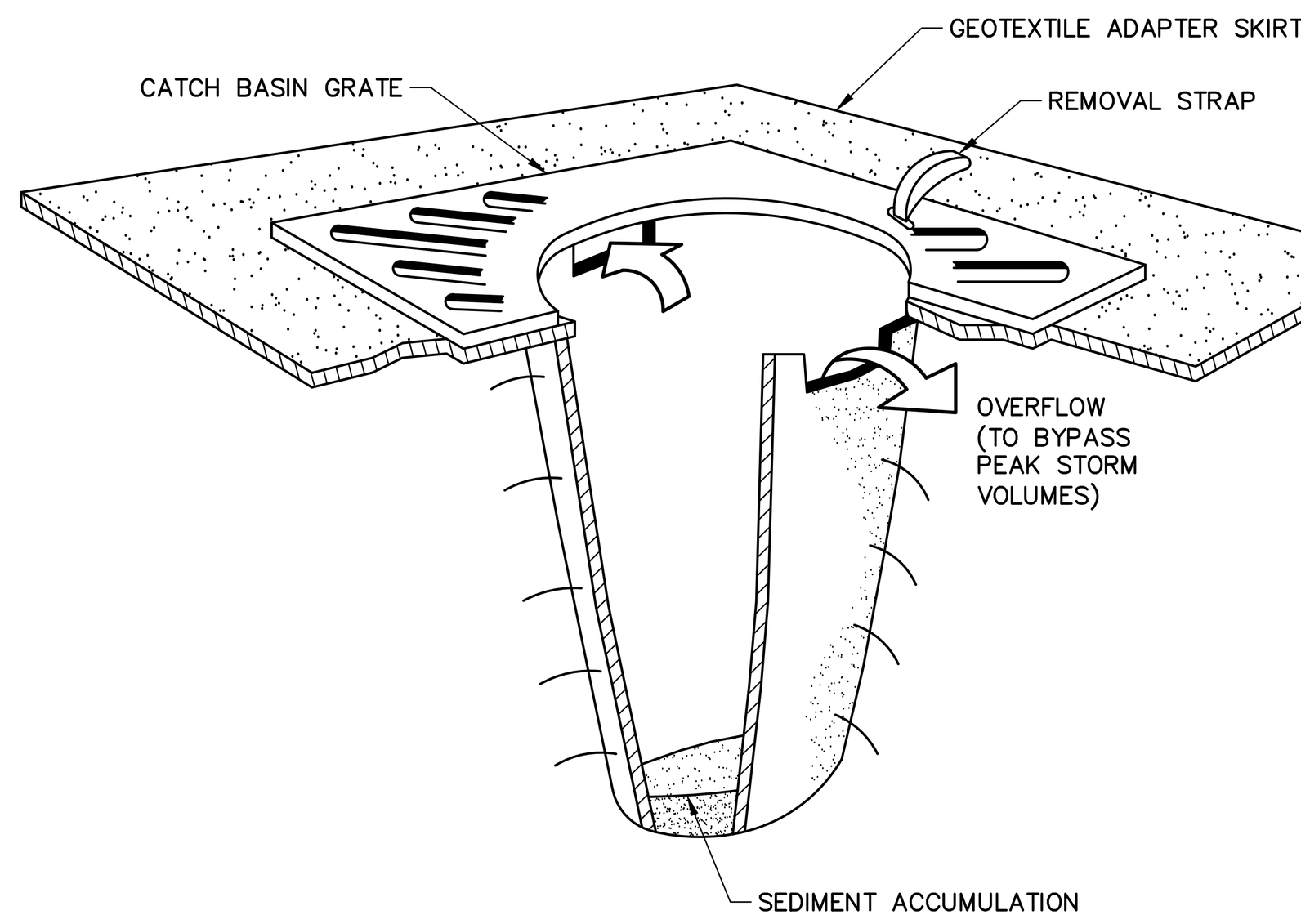
- INSTALL FABRIC ON UPHILL SIDE OF SUPPORT POSTS
- INSTALL SILT FENCE ACROSS SLOPES
- SILT FENCE SHALL NOT BE USED IN DRAINAGE WAYS

MAINTENANCE: INSPECT FOR TEARS IN THE FABRIC OR DAMAGE TO SUPPORTS. REPAIR AS NECESSARY. REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES A DEPTH OF SIX-INCHES OR LESS.

REMOVAL: WHEN UPSLOPE AREAS ARE STABILIZED, THE STRUCTURE AND ANY ACCUMULATED SEDIMENT WILL BE REMOVED.

SILTATION FENCE (SEDIMENT BARRIER OPTION)

N.T.S.



NOTES:

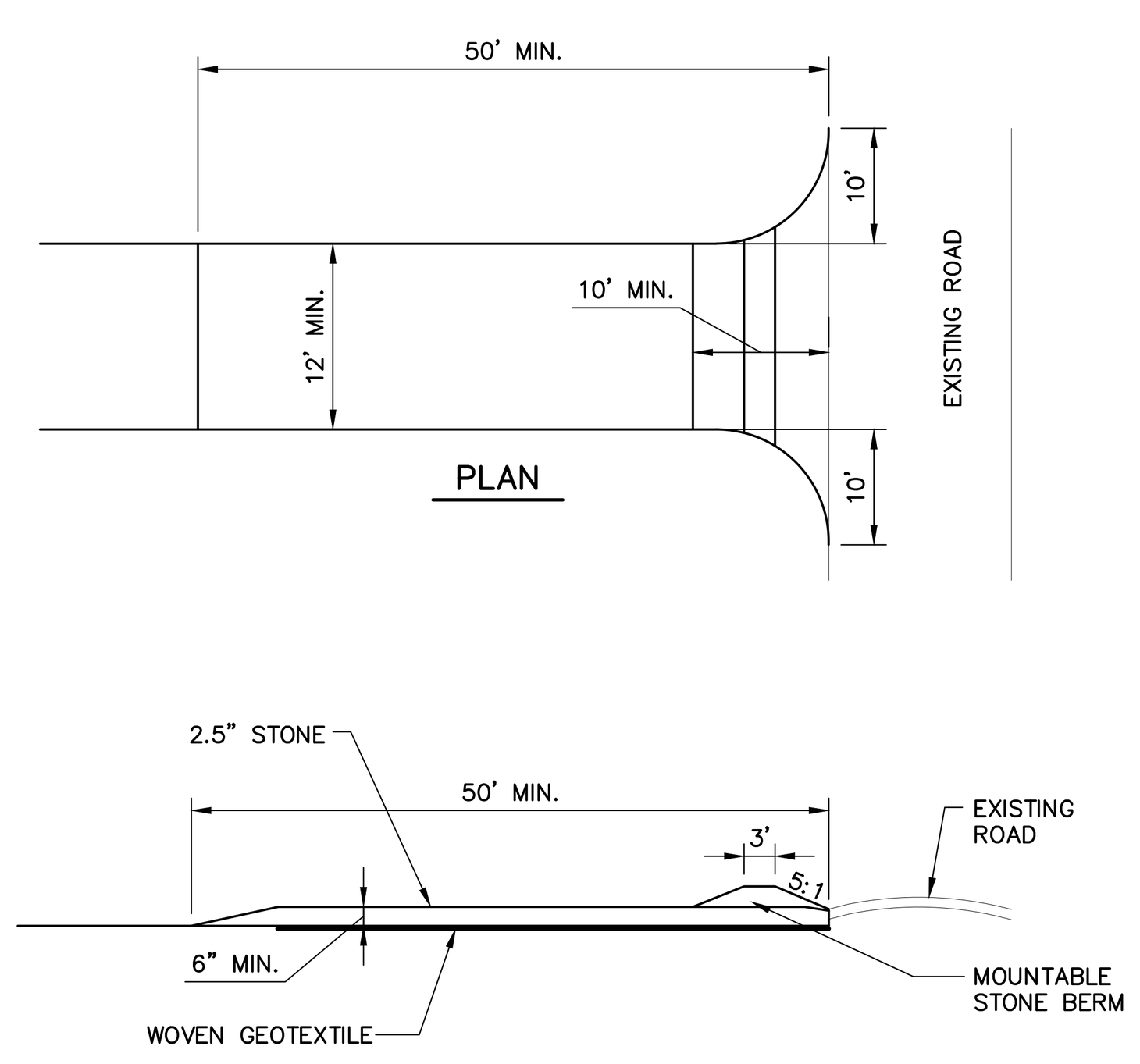
CATCH BASIN PROTECTION TO BE "SILTSACK" (BY ACF ENVIRONMENTAL) OR "STREAM GUARD" (BY FOSS ENVIRONMENTAL SERVICES).

INSERT TO BE EMPTIED IN AN APPROVED MANNER WHEN IT IS 1/2 FULL OF SEDIMENT.

INSPECT INSERT AFTER ALL RAINFALL EVENTS, REPAIR AND MAINTAIN AS REQUIRED.

CATCH BASIN INLET PROTECTION DEVICE (SILTSACK OR EQUAL)

N.T.S.



NOTES:

- CONSTRUCTION ENTRANCES MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
- WHEEL WASH PITS MAY ALSO BE USED, IF APPROVED.

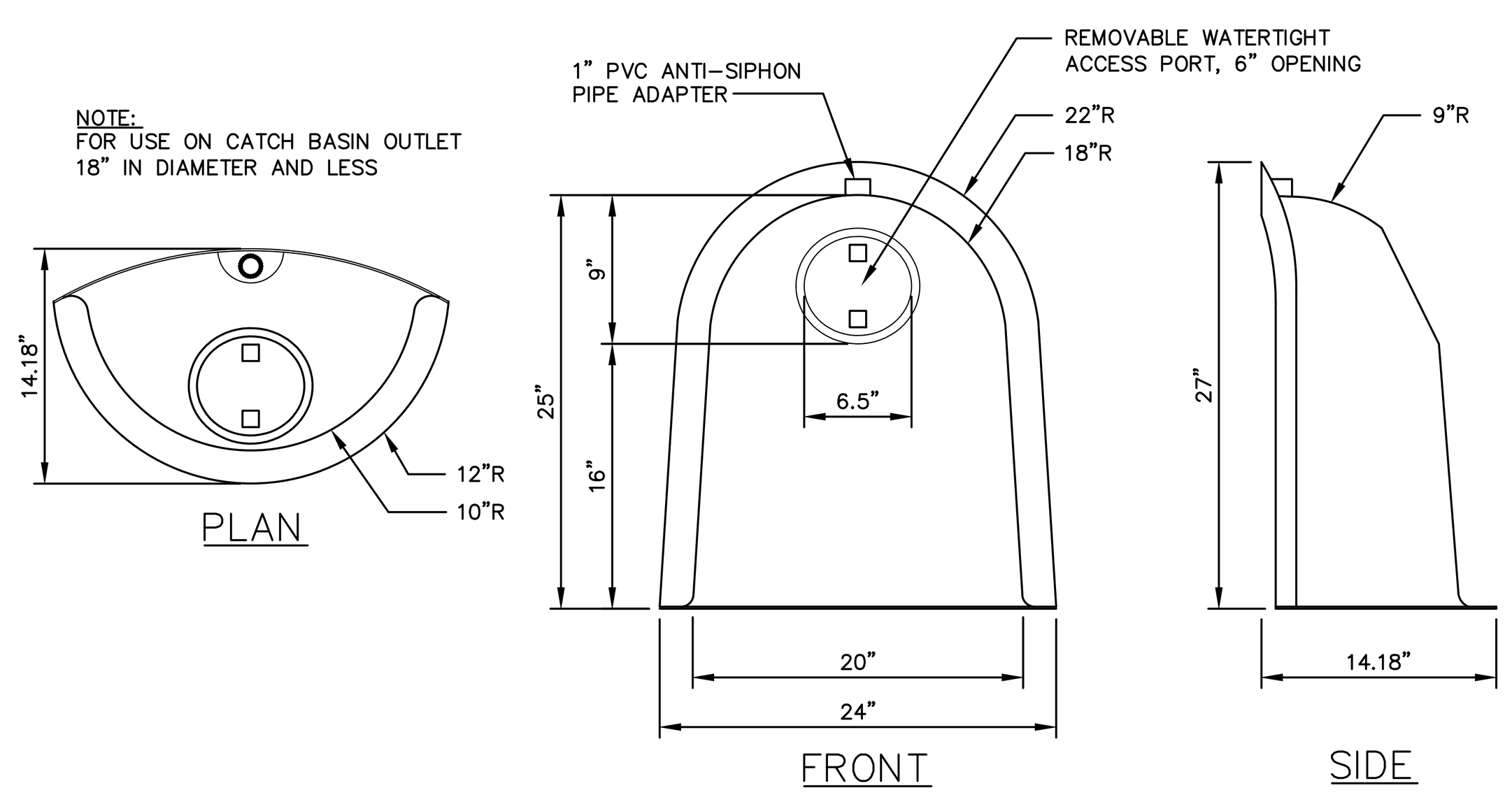
MAINTENANCE: INSPECT FOR EFFECTIVE REMOVAL OF SOIL FROM VEHICLES PRIOR TO LEAVING THE SITE. SWEEP ANY SOIL FROM ADJACENT ROADWAYS.

AT LEAST ONE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED UNTIL ALL AREAS OF THE SITE ARE STABILIZED.

STABILIZED CONSTRUCTION ENTRANCE

N.T.S.

NOTE:
FOR USE ON CATCH BASIN OUTLET 18" IN DIAMETER AND LESS



"THE SNOUT"

N.T.S.

EROSION AND SEDIMENT CONTROL NOTES

Temporary Controls

Contractor shall prepare and submit a soil erosion and water pollution control plan to engineer.

Measure	Dates For Use	Timing, Activity, and Location
Sediment Barrier	ALL	Before soil disturbance, install downhill of areas to be disturbed and around material stockpiles.
Up-slope Diversion	ALL	Before soil disturbance, install uphill of areas to be disturbed and material stockpiles.
Catch Basin Protection	ALL	Before soil or pavement disturbance, install ACF Environmental, Inc. High Flow Siltsack, Siltsaver Inlet Filter. or equal, installed per manufacturer's requirements.
Dust Control	ALL	During dry weather, apply water and calcium chloride to control dust.
Temporary Seeding	April 15 to Oct. 1	Soil stockpiles that are not covered and disturbed areas that will not be disturbed again within 14 days. If grass growth provides less than 95% soil coverage by Nov. 1, apply mulch and anchor with erosion control blanket.
Mulch	April 15 to Sept. 15	On all areas of exposed soil prior to rain events or every 7 days, apply 100-150 lbs (2.5 bales) per 1,000 sq ft. by mechanical blower.
Winter Mulch	Sept. 16 to Oct. 31	On all areas of exposed soil prior to precipitation or every 7 days, apply 150 to 170 lbs. mulch (4 bales) per 1,000 sq. ft. by mechanical blower. Erosion control blanket may be used as a substitute for winter mulch.
	Nov. 1 to April 14	On all areas of exposed soil, apply 150 to 170 lbs. mulch (4 bales) per 1,000 sq. ft. and anchor with netting at the end of each working day. Erosion control blanket may be used as a substitute for winter mulch.
Inspections	Until site is permanently stabilized	Inspect the erosion and sedimentation control measures daily, and maintain and repair as necessary.

Permanent Controls:

Measure	Dates For Use	Timing, Activity, and Location
Pavement - Base Course - Final Course	When no frost is in ground	Install only in areas shown on the plan, shortly after pavement base is brought to final grade. Install near completion of project.
Permanent Seeding	April 15 to Sept. 15	On final grade areas, within 7 days of grade preparation, prepare topsoil, followed by seed and mulch application.
Dormant Seeding	Sept. 16 to April 15	On final grade areas, with prepared topsoil. Apply seed at double the specified rate on bare soil, and follow with an application of winter mulch.
Ground Cover, Trees, Shrubs	April 15 to Nov. 1	Install with final landscaping.
Permanent Mulch	ALL	Install with final landscaping.

Inspections:

Regular inspections of all erosion and sedimentation controls shall be made at least weekly and prior to and following storm events. Minimum inspections shall be made as listed in the table below.

Inspected Item	Look For
Mulched Surfaces	Thin mulch or inadequate application. Wind movement.
Seeded Surfaces	Poor seed germination. Loss of mulch. Development of rivulets.
Sediment Barrier	Sediment build-up to one half the height of the barrier. Undermining of the barrier. Supporting stakes loose, toppled, or unmarked. Breaks in barrier.
Perimeter Diversion	Discharge is to stabilized area. Erosion or breaks in barrier. Supporting stakes loose, toppled or unmarked.
Catch Basin Protection	Sediment build-up and structure blockages. Slow flow/Ponding water. Breaks in fabric or voids in barrier.
Dewatering Filter	Breaks in fabric or supporting structure. Slow flow, indicating high sediment build-up.
Construction Entrance	Sedimentation of roadways. Off-site dust complaints.

EROSION AND SEDIMENT CONTROL NOTES

TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE THE USE OF STABILIZED CONSTRUCTION ENTRANCES, HYDRAULIC MULCH, HAY AND STRAW MULCH, EROSION CONTROL BLANKET, TURF REINFORCED MATTING, RIPRAP AND TEMPORARY SEEDING. TEMPORARY SEDIMENT CONTROL MEASURES INCLUDE THE USE OF SILT FENCE, EROSION CONTROL MIX BERMS, CATCHBASIN SEDIMENT COLLECTION BAGS AND GEOTEXTILE FILTER BAGS. PERMANENT MEASURES INCLUDE PERMANENT VEGETATION OR PAVING.

GENERAL

A. THE PROJECT SHALL CONFORM WITH THE STANDARDS OF THE MAINE CONSTRUCTION GENERAL PERMIT.

B. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK PUBLISHED BY THE MAINE DEP UNLESS OTHERWISE NOTED IN THESE PLANS.

C. ANY ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES DEEMED NECESSARY BY THE OWNER'S REPRESENTATIVE, DEPARTMENT OF ENVIRONMENTAL PROTECTION, AND/OR MUNICIPAL OFFICIALS SHALL BE INSTALLED BY THE CONTRACTOR.

D. THE CONTRACTOR IS RESPONSIBLE FOR ALL FINES RESULTING FROM EROSION OR SEDIMENTATION FROM THE SITE TO SURROUNDING PROPERTIES, WATER BODIES, OR WETLANDS AS A RESULT OF THIS PROJECT.

E. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE SITE WHENEVER POSSIBLE WHILE ALLOWING PROPER SITE DEVELOPMENT.

F. CONSTRUCTION STAGING SHALL BE CONDUCTED IN A WAY TO MINIMIZE THE POTENTIAL FOR STORMWATER RUN-ON TO DISTURBED AREAS.

G. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR/REPLACEMENT/MAINTENANCE OF ALL EROSION CONTROL MEASURES UNTIL ALL DISTURBED AREAS ARE STABILIZED TO THE SATISFACTION OF THE ABOVE PERSONNEL. DESCRIPTIONS OF PERMANENT STABILIZATION FOR VARIOUS COVER TYPES FOLLOWS:

i. FOR SEEDED AREAS, PERMANENT STABILIZATION MEANS THAT 90% OF THE DISTURBED AREA IS COVERED WITH REASONABLY THICK UNIFORM STAND OF PERMANENT GRASS SPECIES, FREE FROM SIZABLE THIN OR BARE SPOTS.
ii. FOR SODDED AREAS, PERMANENT STABILIZATION MEANS THAT COMPLETE BINDING OF THE SOD ROOTS INTO THE UNDERLYING SOIL WITH NO SLUMPING OF THE SOD OR DIE OFF.
iii. FOR MULCHED AREAS, PERMANENT STABILIZATION MEANS TOTAL COVERAGE OF THE EXPOSED AREA WITH AN APPROVED MULCH MATERIAL.
iv. FOR PAVED AREAS, PERMANENT STABILIZATION MEANS THE PLACEMENT OF THE ASPHALT BINDER COURSE.

H. IF THE AREA WILL REMAIN UNWORKED FOR MORE THAN ONE YEAR OR HAS BEEN BROUGHT TO FINAL GRADE, AND WILL NOT BE BUILT ON, THEN IMMEDIATELY PROVIDE PERMANENT STABILIZATION USING VEGETATION THROUGH PLANTING, SEEDING, SOD OR THROUGH THE USE OF PERMANENT MULCH OR RIPRAP. IF USING VEGETATION FOR STABILIZATION, SELECT THE PROPER VEGETATION FOR THE LIGHT, MOISTURE, AND SOIL CONDITIONS. AMEND AREAS OF DISTURBED, OVERLY-COMPACTED SUBSOIL WITH TOPSOIL OR COMPOST AND LIGHTLY TILL 2-3" OF SOIL AMENDMENTS INTO THE TOP 8" OF SOIL.

I. PERMANENT SEEDING SPECIFICATION: IT IS RECOMMENDED THAT PERMANENT SEEDING BE COMPLETED BETWEEN APRIL 1 AND AUGUST 15 OF EACH YEAR. LATE SEASON SEEDING MAY BE DONE BETWEEN AUGUST 15 AND SEPTEMBER 15. AREAS NOT SEEDED OR WHICH DO NOT OBTAIN A SATISFACTORY GROWTH BY OCTOBER 1 SHALL BE SEEDED WITH AROOSTOCK WINTER RYE OR MULCHED AT SPECIFIED RATES. SEE WINTER SEEDING AND MULCHING SPECIFICATIONS FOR STABILIZATION AFTER NOVEMBER 1.

i. APPLY TOPSOIL TO A DEPTH OF 6 INCHES. IN COMPACTED AREAS TILL 2-3" OF COMPOST INTO UPPER 8" OF DISTURBED SOIL AND THEN APPLY 6 INCHES OF TOPSOIL.
ii. APPLY LIME AND FERTILIZER ACCORDING TO SOIL TESTS. IN LIEU OF SOIL TESTS, APPLY GROUND LIMESTONE AT A RATE OF 33 LBS PER 1000 SQUARE FEET AND GRANULAR, COMMERCIAL-GRADE FERTILIZER 10-10-10 AT A RATE OF 18 LBS PER 1000 SQUARE FEET.
iii. UNIFORMLY APPLY SEED MIXTURE AT THE RECOMMENDED SEEDING RATES AND DATES, APPLY HAY OR STRAW MULCH AT A RATE OF 2.5 BALES PER 1000 SQUARE FEET AND ANCHOR AS NECESSARY.

J. PROTECT ALL SEEDED AREAS WITH MULCH OR EROSION CONTROL BLANKET IN AREAS OF SHEET OR CONCENTRATED FLOWS. MULCH ALL AREAS SO THAT SOIL IS NOT VISIBLE THROUGH THE MULCH REGARDLESS OF THE APPLICATION RATE. SCHEDULE SEEDING OR SODDING TO AVOID FAILURE DUE TO SUMMER DROUGHT AND FALL FROST. NEWLY SEEDED AREAS SHOULD BE PROTECTED FROM VEHICLE TRAFFIC, PEDESTRIAN TRAFFIC AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL ESTABLISHED. AREAS MUST BE REWORKED AND RESTABILIZED IF GERMINATION IS SPARSE OR SURFACE EROSION IS EVIDENT.

K. EROSION CONTROL BLANKET SHALL BE INSTALLED ON ALL PERMANENT SLOPES STEEPER THAN 3:1 OR AS OTHERWISE NOTED, EROSION CONTROL BLANKET SHALL BE NORTH AMERICAN GREEN S150BN OR APPROVED EQUAL. EROSION CONTROL BLANKET SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

L. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL TEMPORARY EROSION CONTROL MEASURE UPON STABILIZATION OF PROJECT AREA & COST SHALL BE INCIDENTAL TO CONTRACT.

WINTER CONDITIONS

A. WINTER CONSTRUCTION IS CONSTRUCTION ACTIVITY PERFORMED DURING THE PERIOD FROM NOVEMBER 1 THROUGH APRIL 1. IF AREAS WITHIN THE CONSTRUCTION AREA ARE NOT STABILIZED WITH TEMPORARY OR PERMANENT MEASURES OUTLINED ABOVE BY NOVEMBER 15 THEN THE SITE MUST BE PROTECTED WITH ADDITIONAL STABILIZATION MEASURES THAT ARE SPECIFIC TO WINTER CONDITIONS.

GOOD HOUSEKEEPING AND POLLUTION PREVENTION

A. SPILL PREVENTION CONTROLS MUST BE USED TO PREVENT POLLUTANTS FROM BEING DISCHARGED FROM MATERIALS ON SITE, INCLUDING STORAGE PRACTICES TO MINIMIZE EXPOSURE OF THE MATERIALS TO STORMWATER RUNOFF AND APPROPRIATE SPILL PREVENTION, CONTAINMENT AND RESPONSE PLANNING AND IMPLEMENTATION.

B. DURING CONSTRUCTION, PETROLEUM PRODUCTS AND OTHER HAZARDOUS MATERIALS WITH THE POTENTIAL TO CONTAMINATE GROUND OR SURFACE WATERS MAY NOT BE STORED OR HANDLED IN AREAS OF THE SITE DRAINING TO INFILTRATION AREAS. AN "INFILTRATION AREA" IS ANY ARE OF THE SITE THAT BY DESIGN, OR AS A RESULTS OF SOIL AND TOPOGRAPHY, ACCUMULATES RUNOFF THAT INFILTRATES IN THE SOIL. DIKES, BERMS, SUMPS AND OTHER FORMS OF TEMPORARY SECONDARY CONTAINMENT THAT PREVENT DISCHARGE TO GROUNDWATER MAY BE USED TO ISOLATE PORTIONS OF THE SITE FOR THE PURPOSES OF STORAGE AND HANDLING OF THESE MATERIALS.

C. LOCATE ALL MATERIAL STOCKPILES WITH CONSIDERATION FOR STORMWATER DRAINAGE PATTERNS AND INFRASTRUCTURE.

D. TAKE ALL REASONABLE MEASURES TO MINIMIZE DUST RESULTING FROM THE PROJECT. OIL MAY NOT BE USED FOR DUST CONTROL.

E. LOCATE ALL LITTER, CONSTRUCTION DEBRIS AND CONSTRUCTION CHEMICALS WITH CONSIDERATION FOR STORMWATER DRAINAGE PATTERNS AND INFRASTRUCTURE.

F. TRENCH OR FOUNDATION DE-WATERING MUST BE SPREAD THROUGH SUFFICIENT NATURAL BUFFERS THAT HAVE CAPACITY TO INFILTRATE THE PUMPED WATER OR SHOULD BE PUMPED TO DESIGNED CONSTRUCTION DEWATERING DEVICES AS DESCRIBED IN THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK.

G. SEDIMENTS AND SOIL MATERIALS SHOULD BE SWEPT FROM PAVED SURFACES AT THE END OF EACH WORKDAY OR PRIOR TO RAIN EVENTS, WHENEVER POSSIBLE.

INSPECTION AND MAINTENANCE

A. A PERSON WITH KNOWLEDGE OF EROSION AND STORMWATER CONTROLS, INCLUDING THE STANDARDS IN THE MAINE CONSTRUCTION GENERAL PERMIT, THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK OR ANY MUNICIPAL REQUIREMENTS MUST CONDUCT THE INSPECTION. THIS PERSON MUST BE IDENTIFIED IN THE INSPECTION LOG. IF ADDITIONAL BMPS OR MODIFICATIONS TO BMPS ARE NECESSARY, THE MODIFICATIONS MUST BE IMPLEMENTED WITH 7 CALENDAR DAYS OR PRIOR TO ANY PRECIPITATION EVENT. ALL MEASURES MUST BE MAINTAINED IN EFFECTIVE OPERATING CONDITION UNTIL AREAS ARE PERMANENTLY STABILIZED.

B. AN INSPECTION AND MAINTENANCE LOG MUST BE KEPT BY THE CONTRACTOR, SUMMARIZING THE SCOPE OF THE INSPECTION, DATE, AND MAJOR OBSERVATIONS RELATING TO THE OPERATION OF EROSION AND SEDIMENT CONTROL BMPS, MATERIAL STORAGE AREAS, AND VEHICLE ACCESS POINTS TO THE CONSTRUCTION AREA. THE INSPECTION LOG SHOULD BE DELIVERED TO THE PROPERTY OWNER OR RESPONSIBLE CONTRACTING ENTITY UPON COMPLETION OF THE PROJECT.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INSPECTION AND MAINTENANCE DESCRIBED HEREIN.

D. EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED PRIOR TO INITIATING CONSTRUCTION ACTIVITIES, SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION, AND REMOVED UPON ACHIEVING FINAL STABILIZATION.

E. WET WEATHER INSPECTIONS SHALL BE CONDUCTED AFTER ALL RAIN EVENTS EXCEEDING 0.5-INCHES IN 24-HOURS.

F. ALL INSPECTION AND MAINTENANCE DOCUMENTATION SHALL BE KEPT AS PROJECT RECORD FOR A MINIMUM OF THREE YEARS.

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COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
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PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE
ASHLEY FLETCHER
No. 13750
LICENSED
PROFESSIONAL ENGINEER

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2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

CIVIL DETAILS - 1

D-200

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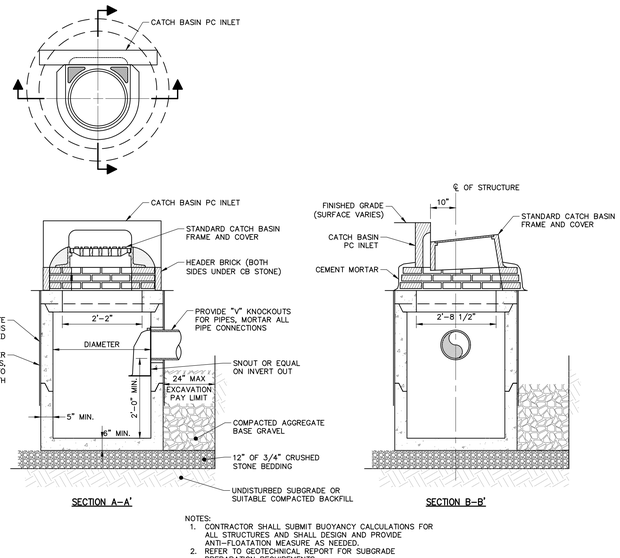
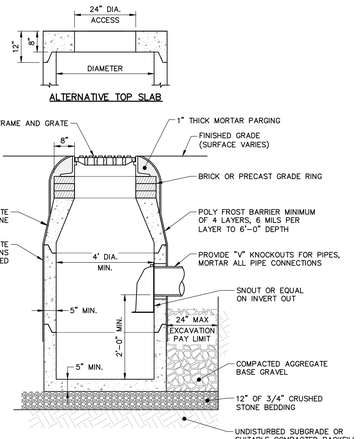


NOTES:
1. CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.
2. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS.

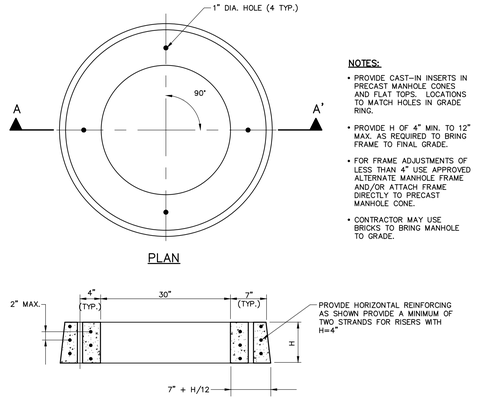
PRECAST CONCRETE CATCH BASIN WITH CURB INLET
N.T.S.



NOTES:
1. PRECAST CONCRETE STRUCTURES AND CASTINGS SHALL BE SUITABLE FOR HS-20 LOADINGS.
2. PRECAST CONCRETE STRUCTURES SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478.
3. ALTERNATE TOP SLAB MAY BE USED AS DICTATED BY DESIGN AND/OR FIELD CONDITIONS.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
5. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS.

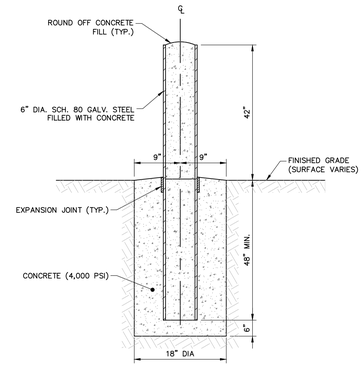
NOTE: CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.

PRECAST CONCRETE CATCH BASIN WITHOUT CURB INLET
N.T.S.



NOTES:
- PROVIDE CAST-IN INSERTS IN PRECAST MANHOLE CONES AND FLAT TOPS. LOCATIONS TO MATCH HOLES IN GRADE RING.
- PROVIDE H OF 4" MIN. TO 12" MAX. AS REQUIRED TO BRING FRAME TO FINAL GRADE.
- FOR FRAME ADJUSTMENTS OF LESS THAN 4" USE APPROVED ALTERNATE MANHOLE FRAME AND/OR ATTACH FRAME DIRECTLY TO PRECAST MANHOLE CONE.
- CONTRACTOR MAY USE BRICKS TO BRING MANHOLE TO GRADE.

PRECAST CONCRETE GRADE RING
N.T.S.



NOTE:
1. ALL BOLLARDS SHALL BE PAINTED. COLOR SELECTED BY OWNER.

6" DIA. SECURITY BOLLARD
N.T.S.

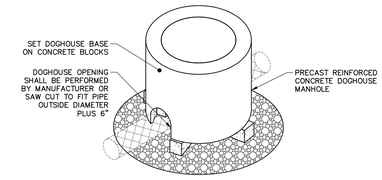
NEW PIPE TO EXISTING STRUCTURE
N.T.S.

NEW PIPE TO NEW STRUCTURE CONNECTION DETAIL
N.T.S.

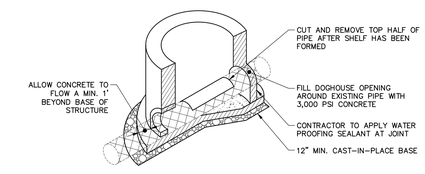
NOTES:
1. CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.
2. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS.

PRECAST MANHOLE
N.T.S.

BASE ISOMETRIC VIEW

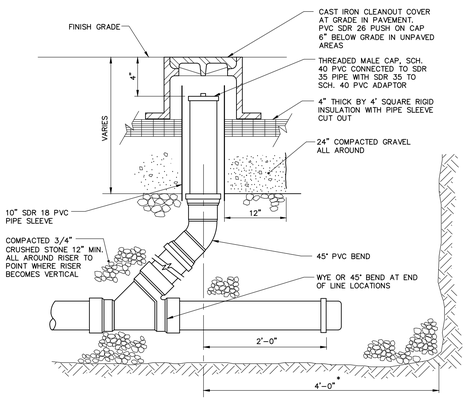


RISER ISOMETRIC VIEW

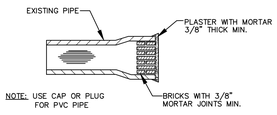


FOUNDATION SECTION VIEW

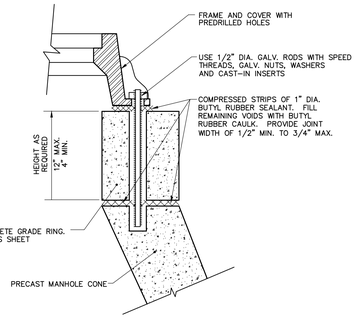
DOG HOUSE MANHOLE
N.T.S.



CLEANOUT
N.T.S.



MASONRY PLUG
N.T.S.



MANHOLE FRAME FASTENING
N.T.S.

UNIVERSITY OF SOUTHERN MAINE
25 Bedford Street, Portland, ME 04104
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94 AUBURN ST.
PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE — ASHLEY FLETCHER No. 13750 — LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

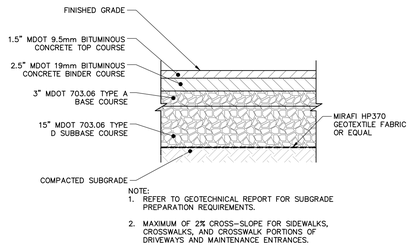
SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

CIVIL DETAILS - 2

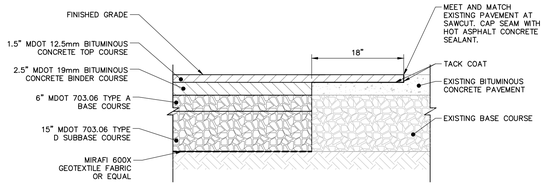
D-201

\\woodardcurran.net\shared\Projects\02330535.00 usm - falmouth street garage\wip\Drawings\Civil\233035.00 C20X.dwg, Jul 29, 2021 - 2:51pm, RMCDEVITT

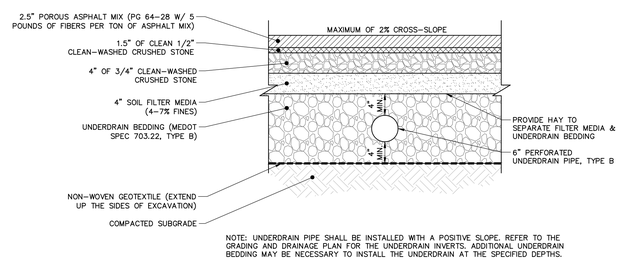


NOTE:
1. REFER TO GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION REQUIREMENTS.
2. MAXIMUM OF 2% CROSS-SLOPE FOR SIDEWALKS, CROSSWALKS, AND CROSSWALK PORTIONS OF DRIVEWAYS AND MAINTENANCE ENTRANCES.

BITUMINOUS CONCRETE PAVEMENT SECTION
N.T.S.

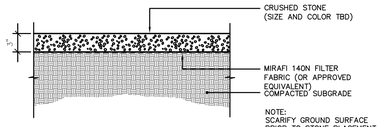


BITUMINOUS CONCRETE PAVEMENT BUTT JOINT
N.T.S.

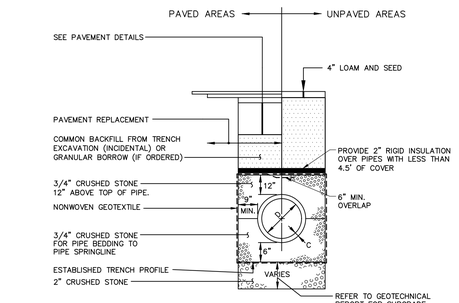


NOTE: UNDERDRAIN PIPE SHALL BE INSTALLED WITH A POSITIVE SLOPE. REFER TO THE GRADING AND DRAINAGE PLAN FOR THE UNDERDRAIN INVERTS. ADDITIONAL UNDERDRAIN BEDDING MAY BE NECESSARY TO INSTALL THE UNDERDRAIN AT THE SPECIFIED DEPTHS.

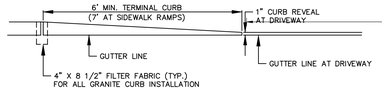
POROUS ASPHALT PAVEMENT
N.T.S.



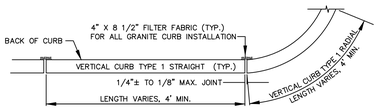
CRUSHED STONE AREA
N.T.S.



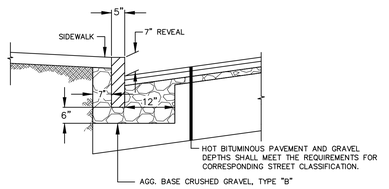
TYPICAL STORMDRAIN PIPE TRENCH INSTALLATION
N.T.S.



TERMINAL CURB PROFILE

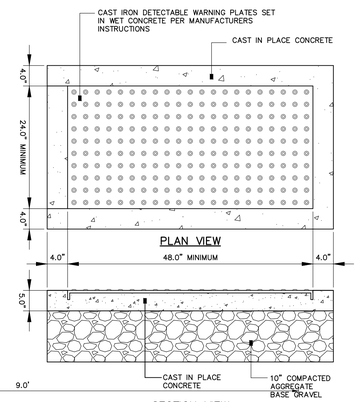


VERTICAL GRANITE CURB PLAN VIEW



VERTICAL GRANITE CURB CROSS SECTION

VERTICAL GRANITE CURB
N.T.S.

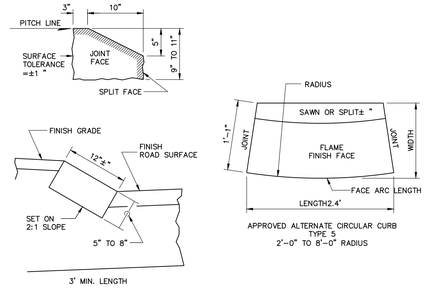


PLAN VIEW

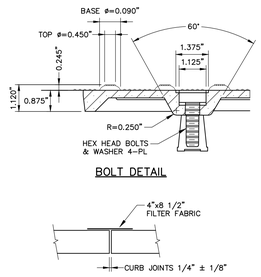
SECTION VIEW

SIDEWALK RAMP DETECTABLE WARNING
N.T.S.

NOTES:
1. ALL DETECTABLE WARNING PLATES SHALL BE UNCOATED CAST IRON. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.
2. CAST IN PLACE CONCRETE SHALL MEET SPECIFICATIONS FOR MAINE D.O.T. CLASS A STRUCTURAL CONCRETE, MINIMUM COMPRESSIVE STRENGTH 4,000 PSI. THE EXPOSED CONCRETE BORDER SHALL RECEIVE A UNIFORM BROOM FINISH PERPENDICULAR TO THE FLOW OF PEDESTRIAN TRAFFIC.
3. TRUNCATED DOMES SHALL BE ALIGNED IN ROWS, PARALLEL AND PERPENDICULAR TO THE PREDOMINANT DIRECTION OF TRAVEL. TRUNCATED DOME BRICKS AND GRANITE PAVERS ARE NOT ALLOWED.
4. SIZE: THE DETECTABLE WARNING PLATES SHALL EXTEND 24 INCHES MINIMUM IN THE DIRECTION OF TRAVEL AND THE PLATE WIDTH AND CONCRETE SHALL EXTEND THE WIDTH OF THE CURB RAMP, LANDING, OR BLENDING TRANSITION TO THE STREET.
5. ORIENTATION: THE DETECTABLE WARNING PANEL SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS 6 INCHES MINIMUM AND 8 INCHES MAXIMUM FROM THE CURB LINE. THE PANEL SHALL BE ORIENTED TO THE DIRECTION OF TRAVEL AS IDENTIFIED BY THE POINT OF EGRESS.

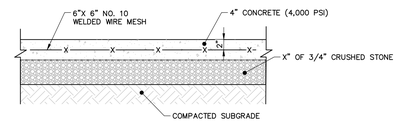


TYPICAL TYPE 5 SLOPED GRANITE CURB INSTALLATION
N.T.S.



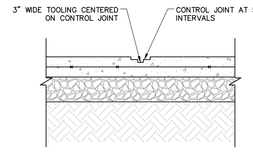
BOLT DETAIL

PLAN

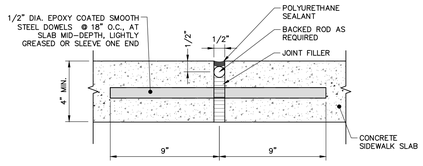


NOTES:
1. PROVIDE 1/2-INCH PREMOLDED BITUMINOUS EXPANSION JOINTS AT 20 FT. INTERVALS.
2. PROVIDE CONTROL JOINTS AT 5-FEET INTERVALS.
3. PROVIDE LIGHT BROOM FINISH WITH 3-INCH EDGE.

CAST-IN-PLACE CONCRETE SIDEWALK
NOT TO SCALE

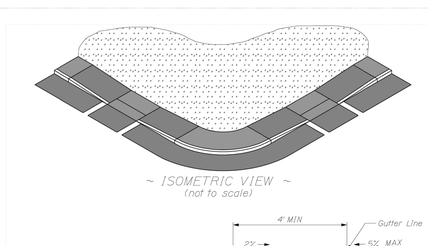


SIDEWALK CONTROL JOINT
NOT TO SCALE



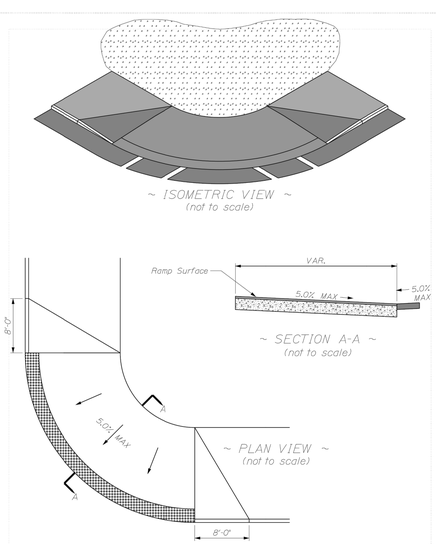
NOTES:
1. EXPANSION JOINTS SHALL BE 60' O.C.
2. DISCONTINUE REINFORCING AT EACH SIDE OF JOINT.
3. DOWELS SHALL BE CUT STRAIGHT AND DEBURRED.

CONCRETE SIDEWALK EXPANSION JOINT
NOT TO SCALE



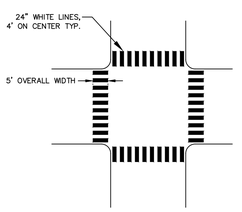
Note:
- This desirable design is the prefered option. Use other options only when required by design constraints.

PARALLEL PEDESTRIAN RAMP - OPTION I
801(14)

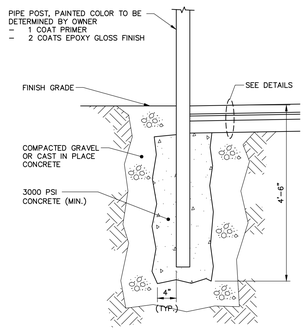


Note:
This option should only be used after all other options have been considered and deemed infeasible.

BLENDED TRANSITION
801(26)



CROSSWALK MARKINGS
N.T.S.



POST SPECIFICATION			
TYPE	HEIGHT ABOVE FIN. GRADE	POST DIAMATER	POST MATERIAL
STREET SIGNAGE	7'-0"	2 3/8" (I.D.)	GALV. STEEL

TYPICAL POST DETAIL
N.T.S.

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PROJECT TEAM:

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PORTLAND, ME 04101

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LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
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ALLIED ENGINEERING
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GEOTECHNICAL ENGINEER
S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
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COST ESTIMATOR
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PORTLAND, ME 04103

SEAL / SIGNATURE

STATE OF MAINE · ASHLEY FLETCHER No. 13750 · LICENSED PROFESSIONAL ENGINEER

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2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

CIVIL DETAILS - 3

D-202

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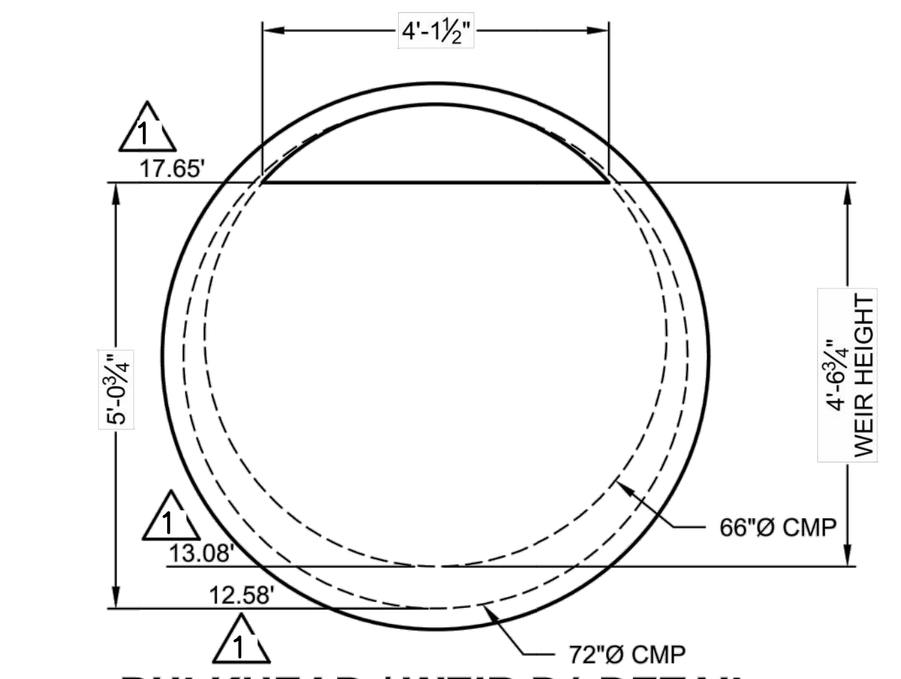
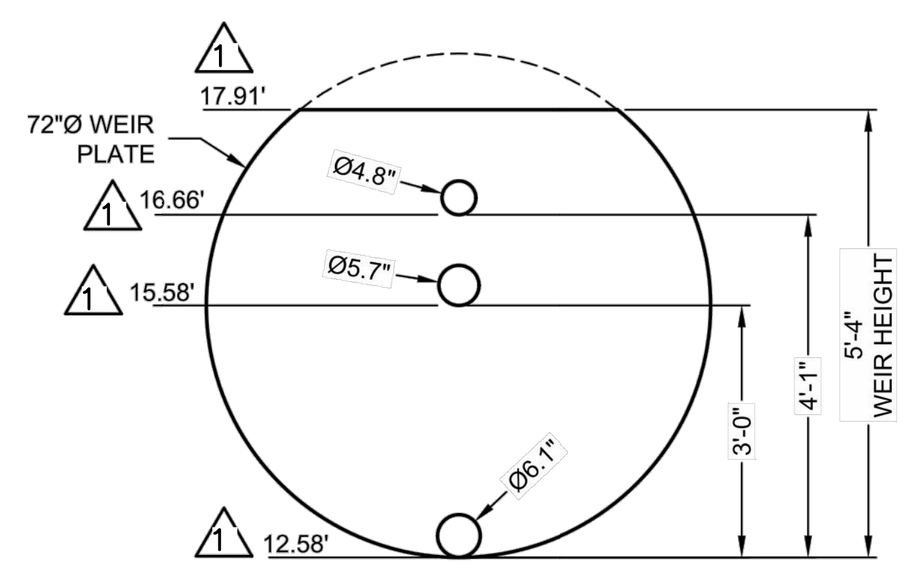


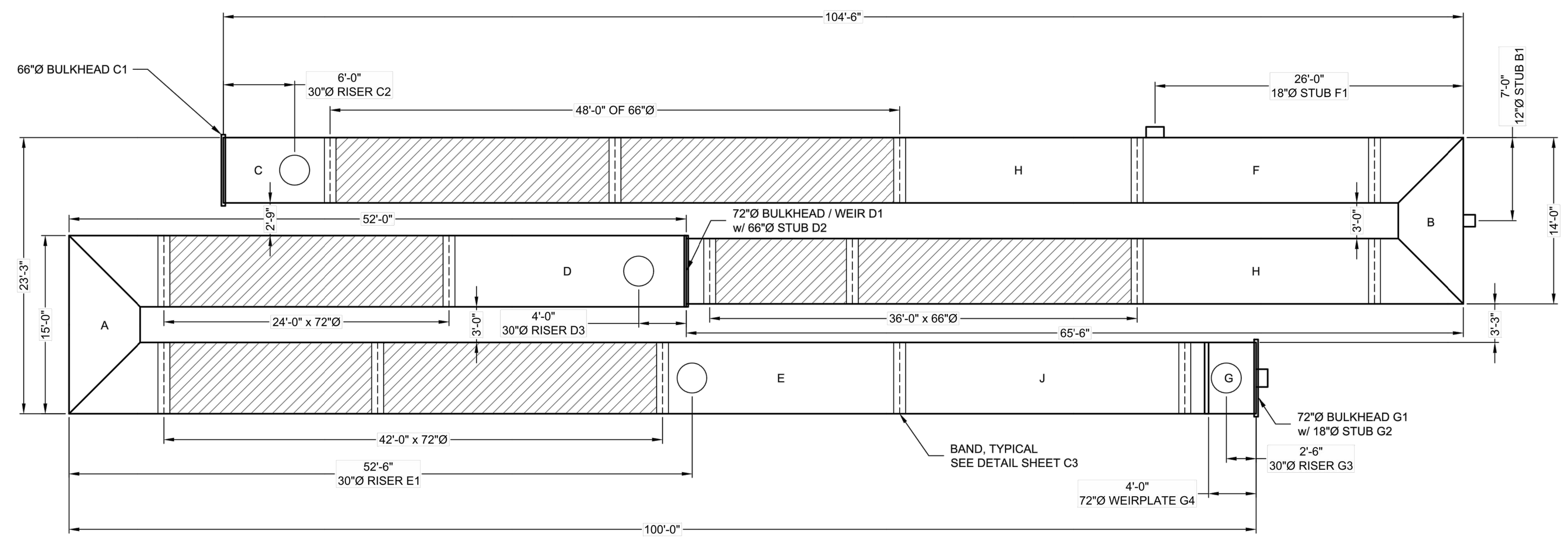
BULKHEAD / WEIR D1 DETAIL
NOT TO SCALE



WEIR PLATE G4 DETAIL
NOT TO SCALE

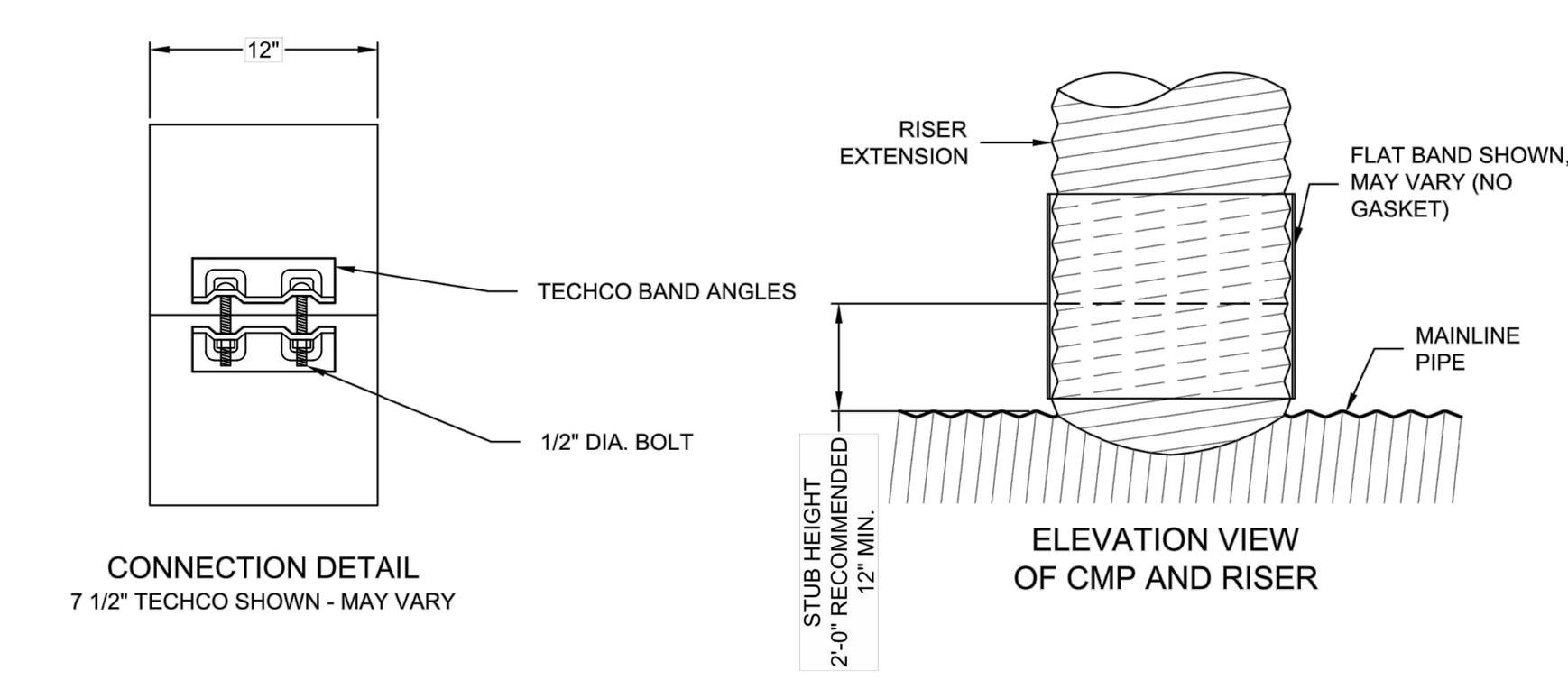
RISER INFORMATION		
PIECE	RIM ELEV.	SYSTEM INVERT
30"Ø RISER C2	20.38	13.08
30"Ø RISER D3	20.60	12.58
30"Ø RISER E1	20.39	12.58
30"Ø RISER G3	21.27	12.58

STUB INFORMATION		
PIECE	STUB INVERT	SYSTEM INVERT
12"Ø STUB B1	13.58	13.08
66"Ø STUB D2	13.08	12.58
18"Ø STUB F1	13.58	13.08
18"Ø STUB G2	12.58	12.58



CMP STORAGE SYSTEM HAS BEEN PREVIOUSLY PROCURED, BUT WILL NEED TO BE MODIFIED AND SUPPLEMENTED WITH ADDITIONAL MATERIALS AS SHOWN.

ASSEMBLY
SCALE: 1" = 10'
PIPE STORAGE: 8492.5 CF
LOADING: H20
66" PIPE INV. = 13.08±
72" PIPE INV. = 12.58±

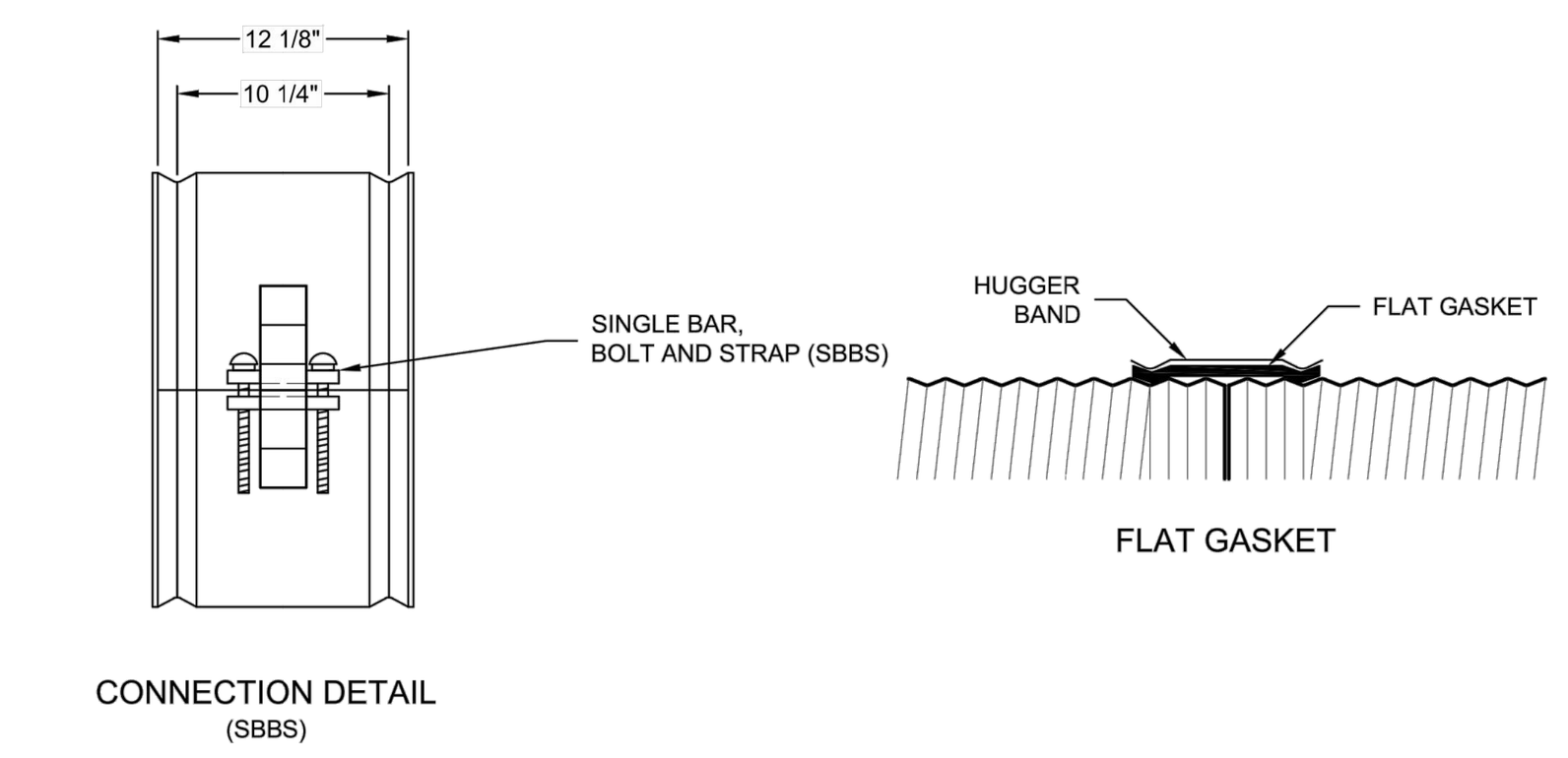


PLAIN END CMP RISER PIPE

GENERAL NOTES:

1. **DELIVERED BAND STYLE AND FASTENER TYPE MAY VARY BY FABRICATION PLANT.**
2. JOINT IS TO BE ASSEMBLED PER AASHTO BRIDGE CONSTRUCTION SPECIFICATION SEC 26.4.2.4.
3. BAND MATERIAL AND GAGE TO BE SAME AS RISER MATERIAL.
4. IF RISER HAS A HEIGHT OF COVER OF 10' OR MORE, USE A SLIP JOINT.
5. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
   - 12" THRU 48" 1-PIECE
   - 54" 2-PIECES
6. ALL RISER JOINT COMPONENTS WILL BE FIELD ASSEMBLED.
7. MANHOLE RISERS IN APPLICATIONS WHERE TRAFFIC LOADS ARE IMPOSED REQUIRE SPECIAL DESIGN CONSIDERATIONS.
8. DIMENSIONS SUBJECT TO MANUFACTURING TOLERANCES.

12" RISER BAND DETAIL
NOT TO SCALE

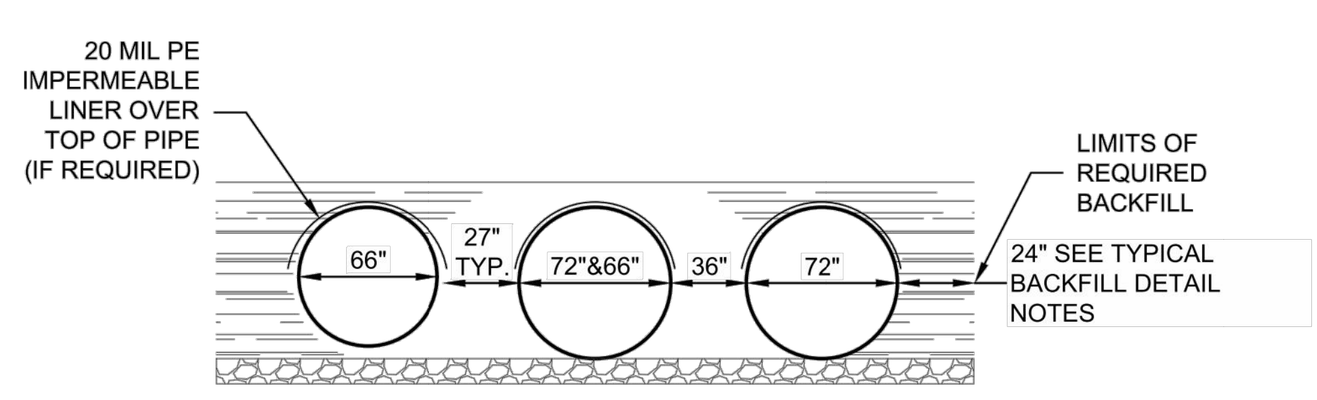


2 2/3"x1/2" RE-ROLLED END HEL-COR PIPE

GENERAL NOTES:

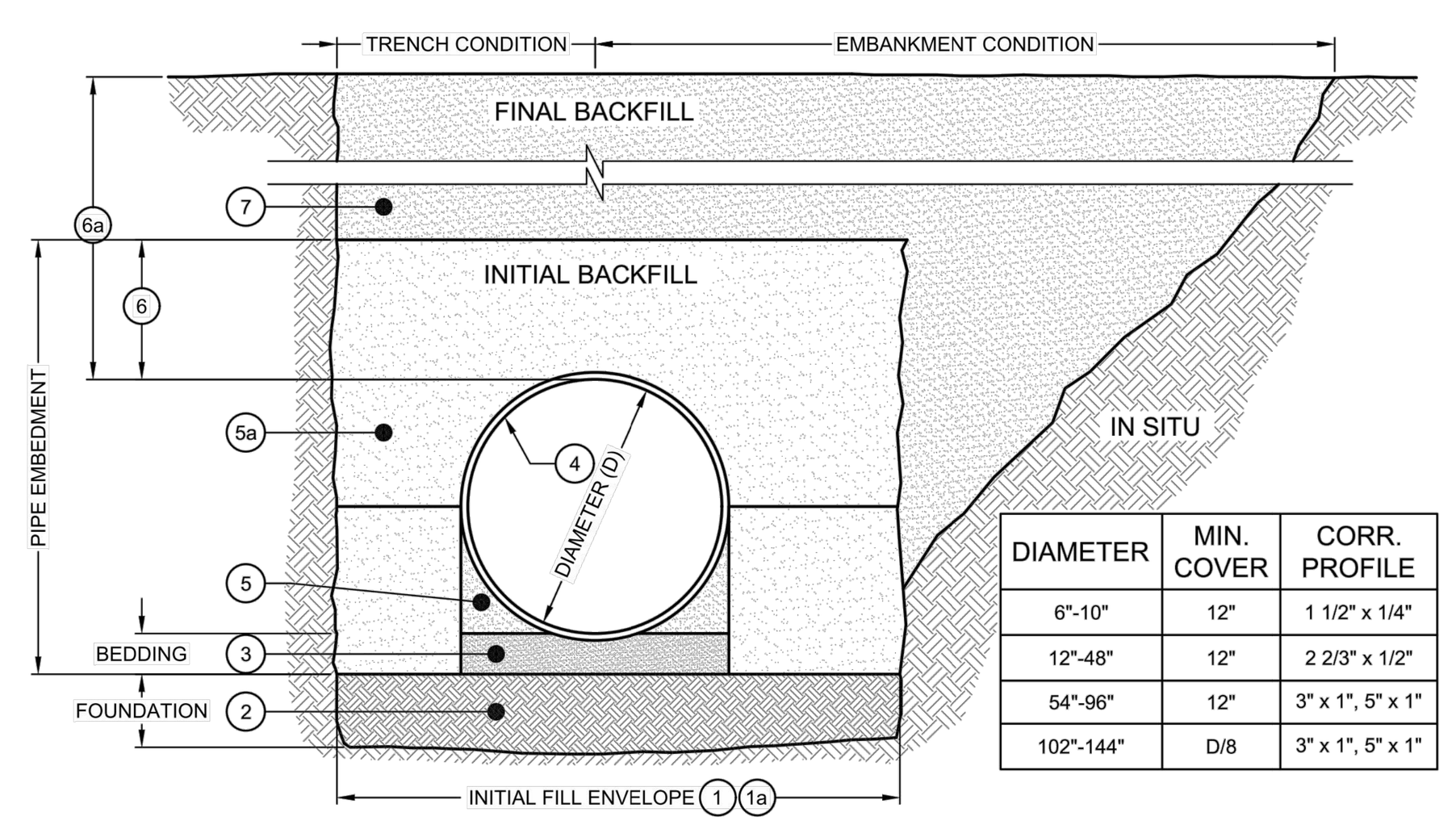
1. JOINT IS TO BE ASSEMBLED PER AASHTO BRIDGE CONSTRUCTION SPECIFICATION SEC 26.4.2.4.
2. BAND MATERIALS AND/OR COATING CAN VARY BY LOCATION. CONTACT YOUR CONTECH REPRESENTATIVE FOR AVAILABILITY.
3. BANDS ARE SHAPED TO MATCH THE PIPE-ARCH WHEN APPLICABLE.
4. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
   - 12" THRU 48" 1-PIECE
   - 54" THRU 96" 2-PIECES
   - 102" THRU 144" 3-PIECES
5. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS.
6. ALL CMP IS REROLLED TO HAVE ANNULAR END CORRUGATIONS OF 2 2/3"x1/2"
7. DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
8. ORDER SHALL DESIGNATE GASKET OPTION, IF REQUIRED (SEE DETAILS ABOVE).

H-12 HUGGER BAND DETAIL
NOT TO SCALE



TYPICAL SECTION VIEW
NOT TO SCALE

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.



DIAMETER	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
54"-96"	12"	3" x 1", 5" x 1"
102"-144"	D/8	3" x 1", 5" x 1"

BACKFILL REQUIREMENTS FOLLOW THE GUIDELINES OF AASHTO LRFD BRIDGE DESIGN (SEC 12) AND CONSTRUCTION (SEC 26)

1 MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE MINIMUM TRENCH WIDTH (12.6.6.1):
PIPE ≤ 12": D + 16"
PIPE > 12": 1.5D + 12"

1a MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE (12.6.6.2):
PIPE < 24": 3.0D
PIPE 24" - 144": D + 4'0"
PIPE > 144": D + 10'0"

2 THE FOUNDATION UNDER THE PIPE AND SIDE BACKFILL SHALL BE ADEQUATE TO SUPPORT THE LOADS ACTING UPON IT (26.5.2).

3 ENGINEER TO DETERMINE IF BEDDING IS REQUIRED. BEDDING MATERIAL SHALL BE A RELATIVELY LOOSE MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, AND A MINIMUM OF TWICE THE CORRUGATION DEPTH IN THICKNESS, WITH THE MAXIMUM PARTICLE SIZE OF ONE-HALF OF THE CORRUGATION DEPTH (26.3.8.1, 26.5.3).

4 CORRUGATED STEEL PIPE (CSP / HEL-COR).

5 HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION (26.5.4).

5a INITIAL BACKFILL FOR PIPE EMBEDMENT TO MEET AASHTO A-1, A-2 OR A-3 CLASSIFICATION, OR APPROVED EQUAL, COMPACTED TO 90% STANDARD PROCTOR (T 99). MAXIMUM PARTICLE SIZE NOT TO EXCEED 3" (12.4.1.2). ALL LIFTS PLACED IN A CONTROLLED MANNER. IT IS RECOMMENDED THAT LIFTS NOT EXCEED AN 8" UNCOMPACTED LIFT HEIGHT TO PREVENT UNEVEN LOADING, AND THE LESSER OF 1/3 THE DIAMETER OR 24" AS THE MAXIMUM DIFFERENTIAL SIDE-TO-SIDE (26.5.4).

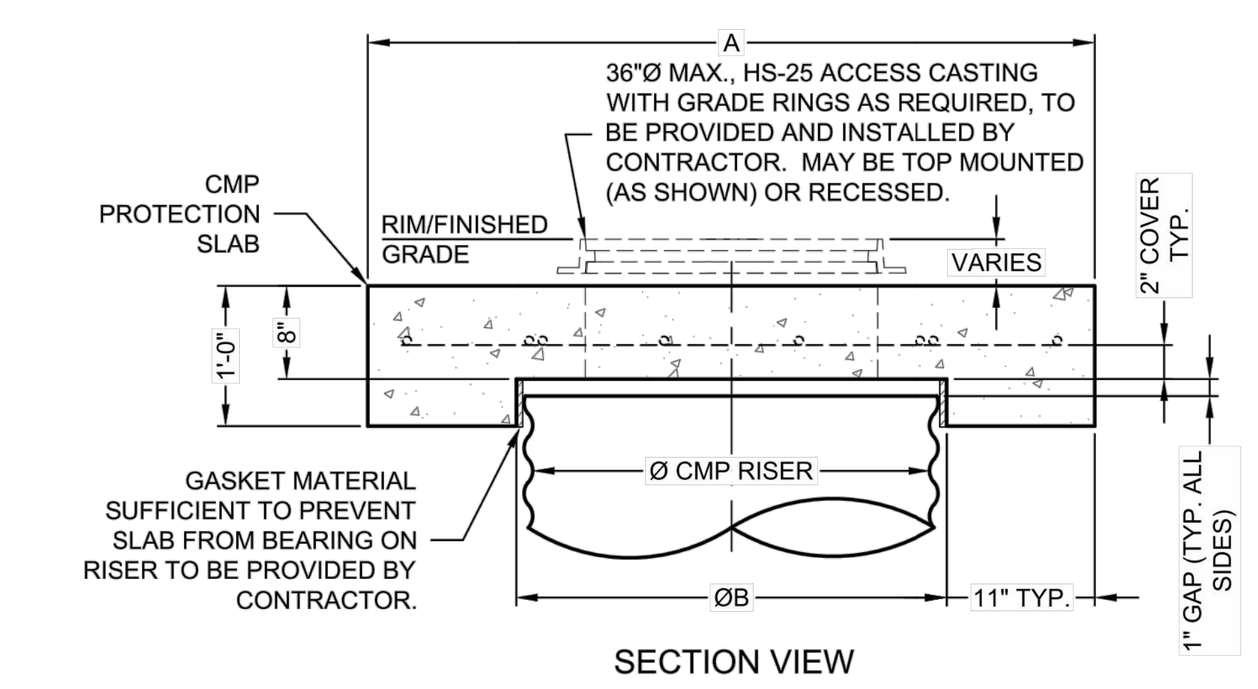
6 INITIAL BACKFILL ABOVE PIPE MAY INCLUDE ROAD BASE MATERIAL (AND RIGID PAVEMENT IF APPLICABLE). SEE TABLE ABOVE.

6a TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT (12.6.6.3).

7 FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD (26.5.4.1).

NOTES:
- ENGINEER TO DETERMINE IF GEOTEXTILE SHOULD BE USED TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES (PROJECT ENGINEER).
- FOR MULTIPLE BARREL INSTALLATIONS THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE PIPE DIA./2 BUT NO LESS THAN 12", OR 36" FOR PIPE DIAMETERS 72" AND LARGER.
- CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING (TABLE C12.6.7-1).

TYPICAL BACKFILL DETAIL
NOT TO SCALE

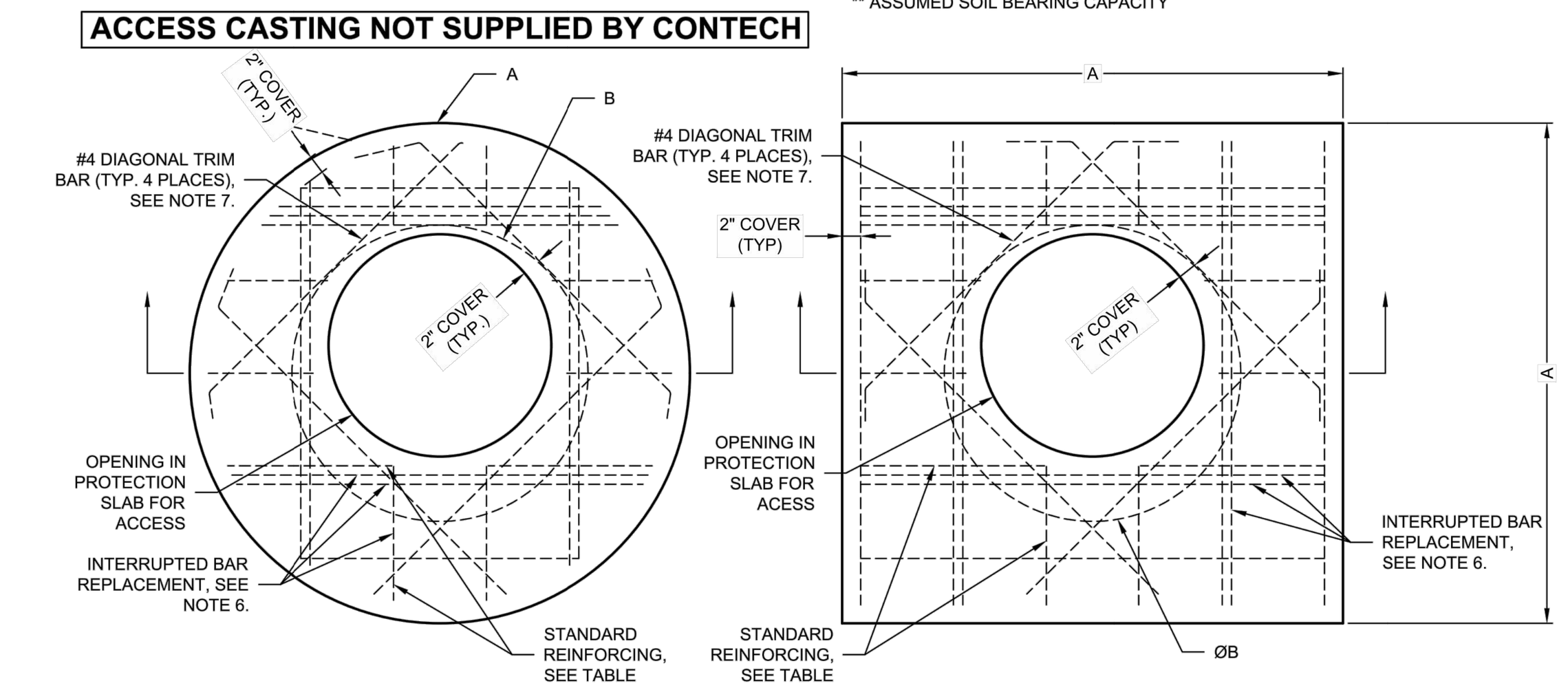


SECTION VIEW

ACCESS CASTING NOT SUPPLIED BY CONTECH

REINFORCING TABLE				
Ø CMP RISER	A	B Ø	REINFORCING	**BEARING PRESSURE (PSF)
24"	4'Ø 4'x4'	26"	#5 @ 10" OCEW #5 @ 10" OCEW	2,540 1,900
30"	4'-6"Ø 4'-6" x 4'-6"	32"	#5 @ 10" OCEW #5 @ 9" OCEW	2,260 1,670
36"	5'Ø 5' x 5'	38"	#5 @ 9" OCEW #5 @ 8" OCEW	2,060 1,500
42"	5'-6"Ø 5'-6" x 5'-6"	44"	#5 @ 8" OCEW #5 @ 8" OCEW	1,490 1,370
48"	6'Ø 6' x 6'	50"	#5 @ 7" OCEW #5 @ 7" OCEW	1,210 1,270

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW

SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION AND ACI 350.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 4,000 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERS, ARCHITECTS AND LAND SURVEYORS, ENDWELL, NY.

MANHOLE CAP DETAIL
NOT TO SCALE

NOTE: CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.

CMP STORAGE SYSTEM DETAILS
N.T.S.

UNIVERSITY OF SOUTHERN MAINE

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S.W. COLE

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GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC

40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT

94 AUBURN ST,
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SEAL / SIGNATURE

STATE OF MAINE
ASHLEY FLETCHER
No. 13750
LICENSED
PROFESSIONAL ENGINEER

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2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

CIVIL DETAILS - 4

D-203

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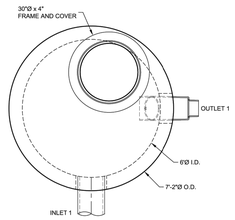
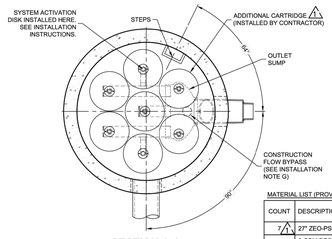
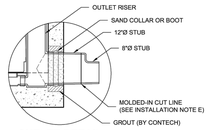


PLAN VIEW
CARTRIDGES AND FLOW KIT NOT SHOWN

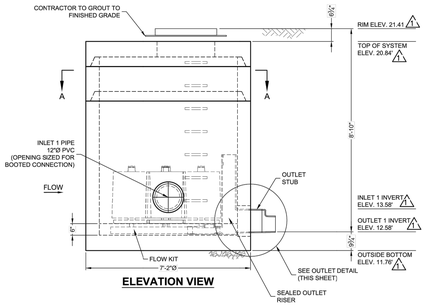


SECTION A-A



OUTLET DETAIL
(ILLUSTRATION ONLY)

• INLET PIPE CONNECTION SHALL HAVE A BOOTED CONNECTOR



ELEVATION VIEW

⚠1 STORMFILTER STRUCTURE HAS BEEN PREVIOUSLY PROCURED, BUT WILL NEED TO BE MODIFIED AND SUPPLEMENTED WITH ADDITIONAL CARTRIDGE AS SHOWN.

MATERIAL LIST (PROVIDED BY CONTECH)

COUNT	DESCRIPTION	INSTALLED BY
7 ⚠1	27" ZEO-PSORB CARTRIDGE	CONTECH
7	2 GPM RESTRICTOR DISK (BLK)	CONTECH
0 ⚠1	3" PVC SLIP PLUG	CONTECH
1	42A FLOWKIT	CONTECH
1	SF ACTIVATION DISK	CONTECH
1	SEALED OUTLET RISER	CONTECH
7	STEPS, P10CTS, LANE LADDER, OR EQUIV.	CONTECH
1	GENERIC PIPE BOOT	CONTECH
1	SEALANT FOR JOINTS	CONTRACTOR
1	30"Ø x 4" FRAME & COVER, EJ#41600484, OR EQUIV.	CONTRACTOR

PERFORMANCE SPECIFICATION
FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
SPECIFIC FLOW RATE SHALL BE 0 GPM/SF (MAXIMUM). SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE 6 GPM/CF OF MEDIA (MAXIMUM).

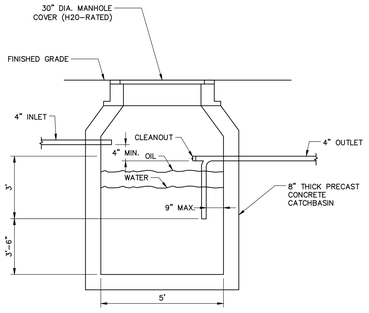
GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STORMFILTER STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANTI-FLOTATION PROVISIONS SHALL BE DESIGNED AND PROVIDED BY CONTRACTOR.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET PIPE(S). ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO PROVIDE AND INSTALL CONNECTOR TO THE OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB. IF OUTLET PIPE IS LARGER THAN 8 INCHES, CONTRACTOR TO REMOVE THE 8 INCH OUTLET STUB AT MOLDED IN CUT LINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
G. CONTRACTOR TO INSTALL SUPPLIED PLUG IN CONSTRUCTION FLOW BYPASS WHEN SYSTEM IS BROUGHT ON LINE (PRESSURE FIT ONLY, DO NOT GLUE).

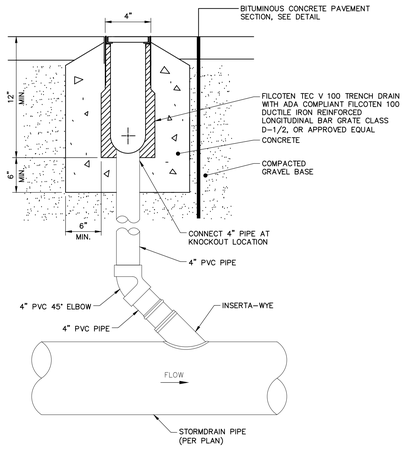
STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK = 18,000 LBS. OF 3 PIECES
BASE SECTION SHIPPED WITH CARTRIDGES INSTALLED
MAX FOOTPRINT = 07'-2"

NOTE: CONTRACTOR SHALL SUBMIT BUOYANCY CALCULATIONS FOR ALL STRUCTURES AND SHALL DESIGN AND PROVIDE ANTI-FLOATATION MEASURE AS NEEDED.

STORMFILTER DETAIL
N.T.S.



OIL WATER SEPARATOR
N.T.S.



TRENCH DRAIN DETAIL
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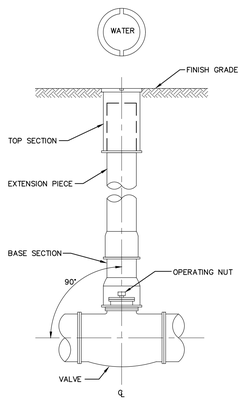
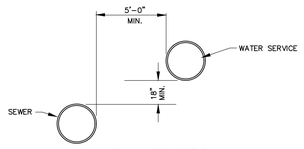


VALVE WITH VALVE BOX, 18" AND SMALLER
N.T.S.



UNUSUAL CONDITION PARALLEL INSTALLATION

NOTES:

THE SEPARATION OF WATER MAINS AND SEWERS SHALL COMPLY WITH THE FOLLOWING GENERAL REQUIREMENTS.

A. PARALLEL INSTALLATION:

1. NORMAL CONDITIONS: THE INSIDE EDGE OF A WATER MAIN SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM THE INSIDE EDGE OF ANY SANITARY SEWER, STORM SEWER OR SEWER MANHOLE.
2. UNUSUAL CONDITIONS: WHEN LOCAL CONDITIONS PREVENT A HORIZONTAL SEPARATION OF 10 FEET, THE INSIDE EDGE OF A WATER MAIN MAY BE LAID A MINIMUM OF 5 FEET FROM THE INSIDE EDGE OF A SEWER PROVIDED THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES HIGHER THAN THE TOP OF THE SEWER (SEE DETAIL).

B. CROSSINGS:

1. NORMAL CONDITIONS: WHENEVER POSSIBLE, THE BOTTOM OF THE WATER MAIN SHALL BE AT LEAST 18 INCHES HIGHER THAN THE TOP OF THE SEWER.
2. UNUSUAL CONDITIONS: IF A WATER MAIN MUST CROSS UNDER A SEWER, THE TOP OF THE WATER MAIN SHALL BE AT LEAST 18 INCHES LOWER THAN THE BOTTOM OF THE SEWER, THE WATER MAIN PIPE SHALL BE CENTERED AT THE CROSSING SO THAT THE JOINTS ARE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER, AND ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO PREVENT EXCESSIVE DEFLECTION OF THE SEWER AT THE CROSSING.

MINIMUM WATER AND SEWER PIPE SEPARATION DETAIL
NTS

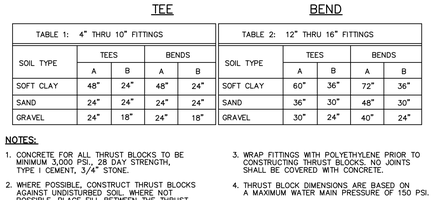


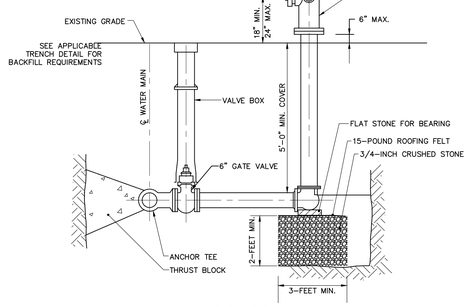
TABLE 1: 4" THRU 10" FITTINGS				
SOIL TYPE	TEES		BENDS	
	A	B	A	B
SOFT CLAY	48"	24"	48"	24"
SAND	24"	24"	24"	24"
GRAVEL	24"	18"	24"	18"

TABLE 2: 12" THRU 16" FITTINGS				
SOIL TYPE	TEES		BENDS	
	A	B	A	B
SOFT CLAY	60"	36"	72"	36"
SAND	36"	30"	48"	30"
GRAVEL	30"	24"	40"	24"

NOTES:

1. CONCRETE FOR ALL THRUST BLOCKS TO BE MINIMUM 3,000 PSI., 28 DAY STRENGTH, TYPE I CEMENT, 3/4" STONE.
2. WHERE POSSIBLE, CONSTRUCT THRUST BLOCKS AGAINST UNDISTURBED SOIL. WHERE NOT POSSIBLE, PLACE FILL BETWEEN THE THRUST BLOCK AND THE UNDISTURBED SOIL COMPACTED TO 95% STANDARD PROCTOR DENSITY.
3. WRAP FITTINGS WITH POLYETHYLENE PRIOR TO CONSTRUCTING THRUST BLOCKS. NO JOINTS SHALL BE COVERED WITH CONCRETE.
4. THRUST BLOCK DIMENSIONS ARE BASED ON A MAXIMUM WATER MAIN PRESSURE OF 150 PSI.

TYPICAL THRUST BLOCK DETAIL
N.T.S.

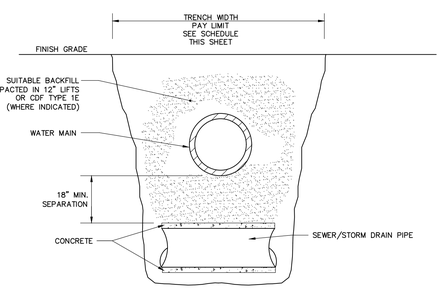


ELEVATION

HYDRANT DETAIL
N.T.S.

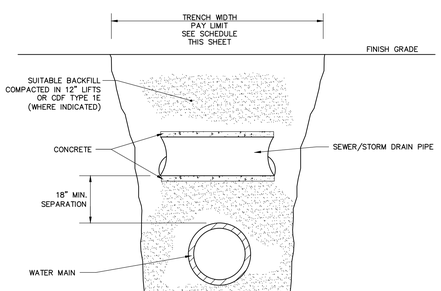
NOTES:

- ALL JOINTS FOR HYDRANT INSTALLATION SHALL BE APPROVED RETAINER GLANDS.
- HYDRANT LATERALS SHALL BE CONSTRUCTED FROM ONE CONTINUOUS PIPE LENGTH. HYDRANT LATERALS WITH BELL JOINTS AND COUPLINGS SHALL NOT BE ACCEPTED.
- CONTRACTOR SHALL CONSTRUCT A HYDRANT DRAINING SUMP TO EITHER SIDE OF THE HYDRANT. THE HYDRANT DRAINING SUMP SHALL BE 3-FEET WIDE BY 2-FEET IN DEPTH. THE SUMP SHALL CONSIST OF 3/4-INCH GRAVEL STONE WITH 15-POUND ROOFING FELT LAID OVER THE 3/4-INCH GRAVEL STONE.



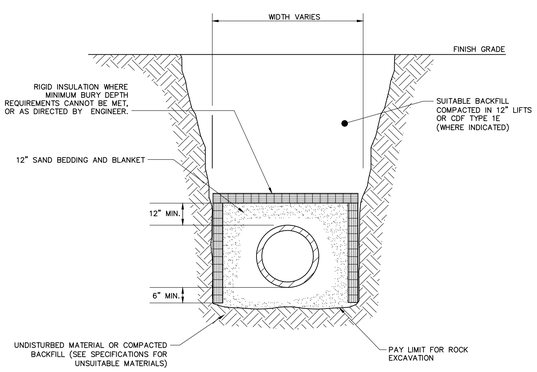
NOTE:
SEE ADDITIONAL REQUIREMENTS AS SPECIFIED IN SECTION 33 10 00, ARTICLE 3.030.

TYPICAL UTILITY CROSSING TRENCH DETAIL 1
N.T.S.

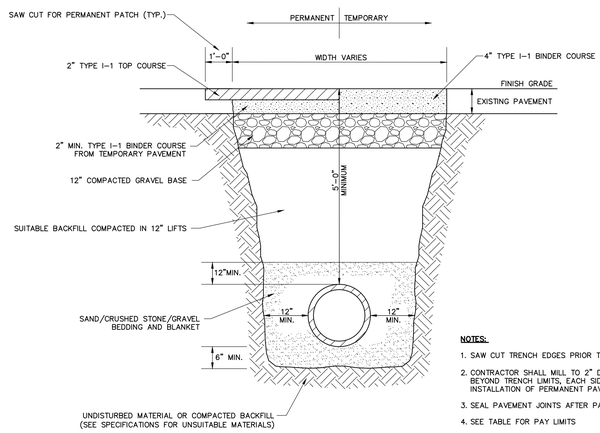


NOTE:
SEE ADDITIONAL REQUIREMENTS AS SPECIFIED IN SECTION 33 10 00, ARTICLE 3.030.

TYPICAL UTILITY CROSSING TRENCH DETAIL 2
N.T.S.



TYPICAL TRENCH DETAIL FOR PIPE INSULATION
N.T.S.



NOTES:

1. SAW CUT TRENCH EDGES PRIOR TO EXCAVATING.
2. CONTRACTOR SHALL MILL TO 2" DEPTH, 1'-0" BEYOND TRENCH LIMITS, EACH SIDE, PRIOR TO INSTALLATION OF PERMANENT PAVEMENT.
3. SEAL PAVEMENT JOINTS AFTER PAVING.
4. SEE TABLE FOR PAY LIMITS

TYPICAL WATER TRENCH DETAIL
N.T.S.

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SEAL / SIGNATURE

STATE OF MAINE · ASHLEY FLETCHER No. 13750 · LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

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Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

CIVIL DETAILS - 5

D-204

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A1 ABBREVIATIONS

A	AMPERE
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AIC	AMPERES INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BKBD	BACKBOARD
C	CONDUIT
CAT	CATALOG, CATEGORY
CATV	CABLE TV
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CM	CIRCULAR MILS
COMM	COMMUNICATIONS
CU	MECH CONDENSING UNIT
CU	COPPER
CUH	CABINET UNIT HEATER
DC	DIRECT CURRENT
DDC	DIGITAL DIRECT CONTROL
DN	DOWN
DW	DISHWASHER
DWG	DRAWING
EF	EXHAUST FAN
ELEV	ELEVATOR
EMT	ELECTRICAL METALLIC TUBING
EP	EXPLOSION PROOF
ERU	ENERGY RECOVERY UNIT
EWC	ELECTRIC WATER COOLER
FACP	FIRE ALARM CONTROL PANEL
FB	FLOOR BOX
FLA	FULL LOAD AMPS
FWE	FURNISHED WITH EQUIPMENT
G, GND	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTO SELECTOR SWITCH
HP	HORSEPOWER
HVAC	HEATING, VENTILATION AND COOLING UNIT
IDS	INTRUSION DETECTION SYSTEM
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
IR	INFRARED
K	KILO
KCMIL	KILO CIRCULAR MILS
KW	KILOWATT
KVA	KILO VOLT-AMPS
LAN	LOCAL AREA NETWORK
LC	LIGHTING CONTACTOR
LF	LINEAR FEET
LC	LOADCENTER
LCP	LIGHTING CONTROL PANEL
LED	LIGHT EMITTING DIODE
LTG	LIGHTING
LTS	LIGHTS
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MECH	MECHANICAL
MH	MOUNTING HEIGHT
MC	MICROPHONE
MW	MICROWAVE
MLO	MAIN LUG ONLY
MT	MOUNT
MTS	MANUAL TRANSFER SWITCH
MCP	MOTOR CONTROL PANEL
MH	METAL HALIDE
MDP	MAIN DISTRIBUTION PANEL
MIN	MINIMUM
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NF	NON-FUSED
NO	NORMALLY OPEN
NO., #	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OCC	OCCUPANCY
OH	OVERHEAD
P	POLE
PA	PUBLIC ADDRESS
PB	PULLBOX
PH,	PHASE
PIR	PASSIVE INFRARED
PNL	PANELBOARD
P/O	PART OF
PV	PHOTOVOLTAIC
PVC	POLY-VINYL CHLORIDE
REC RECEPT	RECEPTACLE
REF	REFRIGERATOR
RF	RETURN FAN
RGS	RIGID GALVANIZED STEEL
RM	ROOM
RMC	RIGID METAL CONDUIT
RTU	ROOFTOP UNIT
REF	REFRIGERATOR
SF	SUPPLY FAN
ST	SHUNT TRIP
SPDT	SINGLE POLE, DOUBLE THROW
SQ	SQUARE
TEL	TELEPHONE
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UF	UNDER FLOOR
UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORY
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VFD	VARIABLE FREQUENCY DRIVE
W	WATT
WP	WEATHERPROOF
WG	WIREGUARD
XFMR	TRANSFORMER
(E)	EXISTING ITEM TO REMAIN
(R)	REMOVE ITEM AND DISPOSE OF PROPERLY
(ER)	RELOCATED ITEM AT NEW LOCATION
(RL)	REMOVE AND RELOCATE

NOTE

SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET ARE FOR REFERENCE ONLY AND DO NOT NECESSARILY INDICATE THEIR INCORPORATION INTO THE DESIGN

A3 FIRE ALARM

- FACP — FIRE ALARM CONTROL PANEL, MOUNT WITH TOP OF PANEL NOT MORE THAN 72"AFF
- FAA — FIRE ALARM ANNUNCIATOR, MOUNT WITH TOP OF PANEL NOT MORE THAN 72"AFF, WIRED TO FACP
- SMOKE DETECTOR, WIRED TO FACP
- E — SMOKE DETECTOR, "E" INDICATES CONNECTION FOR ELEVATOR RECALL, WIRED TO FACP
- SS — SINGLE STATION SMOKE DETECTOR WITH AUDIBLE INDICATING APPLIANCE, WALL MOUNTED
- SS AV — SINGLE STATION SMOKE DETECTOR WITH AUDIBLE/VISUAL INDICATING APPLIANCE, CEILING MOUNTED
- SS CO — SINGLE/MULTI-STATION SMOKE/CARBON MONOXIDE DETECTOR WITH AUDIBLE/VISIBLE INDICATING APPLIANCE, CEILING MOUNTED
- SS CO — SINGLE/MULTI-STATION SMOKE/CARBON MONOXIDE DETECTOR WITH AUDIBLE INDICATING APPLIANCE, WALL MOUNTED
- HEAT DETECTOR, WIRED TO FACP ~ COMBINATION 135° FIXED TEMPERATURE AND RATE-OF-RISE U.N.O.
- E — HEAT DETECTOR, "E" INDICATES CONNECTION FOR ELEVATOR RECALL, WIRED TO FACP
- DUCT SMOKE DETECTOR, WIRED TO FACP
- GAS — GAS DETECTOR, WIRED TO FACP
- GAS VALVE, WIRED TO FACP
- FLAME DETECTOR, WIRED TO FACP
- RTS RTS — REMOTE TEST/INDICATOR FOR DUCT SMOKES, MOUNT ON CEILING BENEATH UNIT, OR WALL MOUNT WHERE INDICATED ON PLANS
- F — MANUAL PULL STATION, MOUNT 48" AFF
- F — HORN/STROBE, WALL MOUNTED CANDELA AS NOTED ON PLANS, WIRED TO FACP
- F — HORN/STROBE, CEILING MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- STROBE ONLY INDICATING APPLIANCE, WALL MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- STROBE ONLY INDICATING APPLIANCE, CEILING MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- R — STROBE ONLY INDICATING APPLIANCE, CEILING MOUNTED, CANDELA AS NOTED ON PLANS, 120V, CONNECT TO OPERATE UPON ACTIVATION OF ROOM SMOKE DETECTOR
- R — STROBE ONLY INDICATING APPLIANCE, WALL MOUNTED, CANDELA AS NOTED ON PLANS, 120V, CONNECT TO OPERATE UPON ACTIVATION OF ROOM SMOKE DETECTOR
- MH — MINI HORN, WALL MOUNTED, WIRED TO FACP
- MH — MINI HORN, CEILING MOUNTED, WIRED TO FACP
- F F — HORN/STROBE WITH PULL STATION DIRECTLY BELOW
- FIRE ALARM BEACON
- MAGNETIC DOOR HOLD OPEN DEVICE, WIRED TO FACP
- T — TRANSFORMER
- SPRINKLER SYSTEM WATER FLOW SWITCH, PROVIDED UNDER DIVISION 23, WIRED TO FACP UNDER DIVISION 26
- SPRINKLER SYSTEM TAMPER SWITCH, PROVIDED UNDER DIVISION 23, WIRED TO FACP UNDER DIVISION 26
- SPRINKLER SYSTEM CHECK VALVE PRESSURE SWITCH, FURNISHED AND INSTALLED UNDER DIVISION 23, WIRED TO FACP UNDER DIVISION 26
- SPRINKLER SYSTEM PRE-ACTION VALVE, FURNISHED AND INSTALLED UNDER DIVISION 21, WIRED TO FACP UNDER DIVISION 26
- K — KNOX BOX, MOUNT 60" AFF
- SD — SMOKE DAMPER, WIRED TO FACP
- FSD — FIRE AND SMOKE DAMPER, WIRED TO FACP
- HORN/STROBE, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- S — SPEAKER/STROBE, WALL MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- S — SPEAKER/STROBE, CEILING MOUNTED, CANDELA AS NOTED ON PLANS, WIRED TO FACP
- M — MASTER BOX

A5 POWER DISTRIBUTION

- SEC — SECURITY PANEL, MOUNT WITH TOP OF PANEL NOT MORE THAN 72"AFF
- ANN — ANNUNCIATOR, MOUNT WITH TOP OF PANEL NOT MORE THAN 72"AFF
- KP — KEYPAD, MOUNT 48"AFF
- MSP — MOTION SENSOR, PASSIVE INFRARED (PIR), WALL MOUNTED 96"AFF
- MSP — MOTION SENSOR, PASSIVE INFRARED (PIR), CEILING MOUNTED
- MSM — MOTION SENSOR, MICROWAVE, WALL MOUNTED
- MSM — MOTION SENSOR, MICROWAVE, CEILING MOUNTED
- MS — MOTION SENSOR, DUAL TECHNOLOGY, PIR/MICROWAVE, WALL MOUNTED
- MS — MOTION SENSOR, DUAL TECHNOLOGY, PIR/MICROWAVE, CEILING MOUNTED
- T — TRANSFORMER
- C — CAMERA
- CA — CARD ACCESS, PROVIDE 3/4" CONDUIT FROM 48" AFF/AFG TO ABOVE CEILING
- DC — DOOR CONTACT
- DL — MAGNETIC DOOR LOCK
- DR — DOOR RELEASE BUTTON
- DS — DOOR SWITCH
- C — CHIME
- SS — STROBE
- SH — HORN
- B — BELL
- D — JUNCTION BOX WITH 120V POWER FOR DOORS
- REX — REQUEST-TO-EXIT MOTION SENSOR

B5 SECURITY

- PANELBOARD ~ SURFACE MOUNTED
- PANELBOARD ~ FLUSH MOUNTED
- FUSED DISCONNECT SWITCH
- NON-FUSED DISCONNECT SWITCH
- 00 — MOTOR STARTER ~ NUMBER INDICATES NEMA SIZE
- 00 — COMBINATION MOTOR STARTER/FUSED DISCONNECT
- MOTOR OR FAN
- M — METER AND CABINET
- J — JUNCTION BOX ~ CEILING MOUNTED
- J — JUNCTION BOX ~ WALL MOUNTED
- J — JUNCTION BOX ~ FLUSH FLOOR MOUNTED
- P J — JUNCTION BOX ~ PEDESTAL MOUNTED
- T# — TRANSFORMER ~ NUMBER INDICATES DESIGNATION SEE TRANSFORMER SCHEDULE
- VFD — VARIABLE FREQUENCY DRIVE
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR
- E — EMERGENCY SHUTOFF SWITCH ~ WALL MOUNTED 48" TO CENTERLINE ~ PROVIDE TAMPER-PROOF COVER
- S — SHUT-OFF SWITCH
- CONDUIT TURNING UP
- CONDUIT TURNING DOWN
- WIRING UNDERGROUND OR UNDERSLAB
- HOMERUN ~ (2)#12+(1)#12G UNO (EXCEPT LIGHTING CIRCUITS: (1)#12+(1)#10N+(1)#12G UNO)
- SINGLE-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT
- 3-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT
- FLEXIBLE CONNECTION
- GROUNDING SYSTEM
- P — POWER POLE
- PUSHBUTTON
- C — DOORBELL CHIME
- F — SYSTEMS FURNITURE WHIP, DUAL SERVICE, WALL MOUNTED
- P — MOTORIZED DOOR OPERATOR AND PUSH PADDLE ~ DEVICES FURNISHED BY DIV 08, POWER WIRING, BOXES, AND CONDUIT BY DIV 26
- CB — ENCLOSED CIRCUIT BREAKER
- ATS — AUTOMATIC TRANSFER SWITCH
- H — HAND DRYER, COORDINATE HEIGHT WITH ARCHITECTURAL PLANS
- SF — SYSTEMS FURNITURE FEED

A7 RECEPTACLES

- PS — PAY STATION KIOSK ~ SEE INSTALLATION DETAIL D3 ON DRAWING E501.
- EC — EMERGENCY CALL BOX LOCATION WITH BLUE LIGHT BEACON ~ SEE DETAIL B4 ON DRAWING E501.
- EVSE — ELECTRIC VEHICLE SUPPLY EQUIPMENT (VEHICLE CHARGING STATION). DUAL SERVICE UNIT. SEE DETAIL C4 ON DRAWING E501.

B7 SPECIALTY EQUIPMENT

SINGLE RECEPTACLES

- 20A, 125V, 2P, 3W, NEMA 5-20R
- 20A, 125V, 2P, 3W, NEMA L5-20R (TWISTLOCK)
- 30A DRYER RECEPTACLE ~ 125/250V, 3P, 4W, GROUNDING, NEMA 14-30R, (3)#10+(1)#10G TO 30A, 2P CIRCUIT BREAKER
- 30A, 250V, 2P, 3W, NEMA 6-30R
- 50A RANGE RECEPTACLE ~ 125/250V, 3P, 4W, GROUNDING, NEMA 14-50R, (3)#6+(1)#10 TO 50A, 2P CIRCUIT BREAKER
- 20A, 250V, 2P, 3W, NEMA 6-20R

NOTE:

PROVIDE MATCHING CORD AND PLUG FOR SINGLE RECEPTACLES

FLOOR AND CEILING DEVICES

- F — DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W, NEMA 5-20R, MOUNT IN FLUSH FLOOR BOX
- F — DOUBLE DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W, NEMA 5-20R, MOUNT IN FLUSH FLOOR BOX
- P — DUPLEX RECEPTACLE, PEDESTAL MOUNTED
- P — SINGLE RECEPTACLE, PEDESTAL MOUNTED
- C — DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING
- C — DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED IN CEILING
- C — DUPLEX GFCI RECEPTACLE, FLUSH MOUNTED IN CEILING
- C — DOUBLE DUPLEX GFCI RECEPTACLE, FLUSH MOUNTED IN CEILING
- OVERHEAD RECEPTACLE DROP, DUPLEX
- OVERHEAD RECEPTACLE DROP, DOUBLE DUPLEX
- OVERHEAD RECEPTACLE DROP, GFCI
- PT-1 — 4" POKE-THRU DEVICE, DUAL SERVICE FURNITURE FEED. BASIS OF DESIGN: WIREMOLD AFFATC
- PT-2 — 6" POKE-THRU DEVICE, WITH (2) DUPLEX RECEPTACLES AND TEL/DATA AS INDICATED ON PLANS. BASIS OF DESIGN: LEGRAND 6AT SERIES.
- F — MULTI-SERVICE FLUSH FLOOR BOX ~ WIREMOLD EFB45 SERIES OR APPROVED EQUAL. COVER SHALL BE FLUSH STYLE WITH FLOOR INSERT. COVER FINISH COLOR SHALL BE SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD FINISHES.

RECEPTACLES

- DUPLEX RECEPTACLE ~ 20A, 125V, 2P, 3W, NEMA 5-20R
- DOUBLE DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE, HATCH INDICATES AFCI PROTECTION AND TAMPERPROOF
- T — TAMPERPROOF DUPLEX RECEPTACLE
- GFCI DUPLEX RECEPTACLE, MOUNT 44" AFF UNO
- GFCI DOUBLE DUPLEX RECEPTACLE, MOUNT 44" AFF UNO
- EWC — GFCI RECEPTACLE FOR ELECTRIC WATER COOLER - COORDINATE LOCATION WITH DIVISION 22.
- WP — GFCI RECEPTACLE WITH WEATHERPROOF COVER
- WP — GFCI RECEPTACLE IN WP ENCLOSURE ON ROOF
- MULTI-OUTLET STRIP, PROVIDE OUTLETS 24" OC UNO, MOUNT 48" AFF UNO
- SURFACE RACEWAY WITH DIVIDER, MOUNT 44" AFF UNO. PROVIDE NEMA 5-20 RECEPTACLES AND TECHNOLOGY OUTLETS AS SHOWN ON PLAN

NOTES:

1. MOUNT RECEPTACLES WITH CENTERLINE 18" AFF UNO
2. MOUNT EXTERIOR RECEPTACLES WITH CENTERLINE 24" AFG UNO

A9 LUMINAIRES

LIGHTING SWITCHES

- $a — LIGHT SWITCH, 20A,125/277V
- $3 — THREE-WAY LIGHT SWITCH
- $4 — FOUR-WAY LIGHT SWITCH
- $2 — TWO-POLE SWITCH
- $K — KEY OPERATED SWITCH
- $M — MOTOR RATED SWITCH
- $P — SINGLE POLE SWITCH WITH RED PILOT LIGHT ~ RED LIGHT SHALL GLOW WHEN CIRCUIT IS ENERGIZED
- $a $b — MULTI-GANGED SWITCHES, GANG UNDER ONE PLATE, LETTER INDICATES SWITCHING
- $OS — OCCUPANCY SENSOR SWITCH, WALL MOUNTED
- $OS2 — 2-BUTTON OCCUPANCY SENSOR SWITCH
- $OS3 — OCCUPANCY SENSOR SWITCH WIRED FOR 3-WAY OPERATION
- $OSD — OCCUPANCY SENSOR SWITCH WITH DIMMING ~ COORDINATE DIMMING TECHNOLOGY WITH LOAD TO BE DIMMED
- OS — OCCUPANCY SENSOR, CEILING MOUNTED
- OS — OCCUPANCY SENSOR, WALL MOUNTED
- $D — DIMMER SWITCH ~ COORDINATE DIMMING TECHNOLOGY WITH LOAD TO BE DIMMED
- $F $L — HANDICAP SWITCHES FOR HOOD LIGHT AND FAN
- $T — TIMER SWITCH
- $LV — LOW VOLTAGE LIGHT SWITCH, MOMENTARY CONTACT
- LTC — LIGHTING TIME CLOCK
- LC — LIGHTING CONTACTOR
- LCP — LIGHTING CONTROL PANEL
- PC — OUTDOOR PHOTOELECTRIC SWITCH
- DS — DAYLIGHT HARVESTING SENSOR

NOTES:

1. MOUNT LIGHT SWITCHES WITH CENTERLINE 48" AFF, UNO
2. LOWER CASE LETTER AT SWITCH INDICATES SWITCHING

EMERGENCY LIGHTING

- WHERE NOTED ON PLANS FIXTURE CONNECTED TO CENTRAL INVERTER. CONTROL AS INDICATED ON PLANS.
- EM — "EM" INDICATES EMERGENCY WHERE SYMBOL HATCHING IS UNCLEAR
- BP# — EMER BATTERY UNIT WITH NO HEADS, MT 7'-6"AFF BP# INDICATES BATTERY UNIT DESIGNATION, CONNECT TO UNSWITCHED PORTION OF AREA LIGHTING BRANCH CIRCUIT, U.N.O.
- BP# — EMER BATTERY UNIT WITH INTEGRAL HEADS, MT 7'-6"AFF BP# INDICATES BATTERY UNIT DESIGNATION, CONNECT TO UNSWITCHED PORTION OF AREA LIGHTING BRANCH CIRCUIT, U.N.O.
- BP# — SINGLE REMOTE EMERGENCY LIGHT HEAD, MOUNT 7'-6"AFF BP# INDICATES BATTERY UNIT CONNECTED TO
- BP# — DOUBLE REMOTE EMERGENCY LIGHT HEAD, MOUNT 7'-6"AFF BP# INDICATES BATTERY UNIT CONNECTED TO
- BP# — DOUBLE REMOTE EMERGENCY LIGHT HEAD, CEILING MOUNTED BP# INDICATES BATTERY UNIT CONNECTED TO
- EXIT SIGN, CEILING MOUNTED, SHADING INDICATES FACE(S) ARROWHEAD INDICATES CHEVRON(S) REQUIRED, CONNECT TO UNSWITCHED PORTION OF AREA LIGHTING BRANCH CIRCUIT, U.N.O.
- EXIT SIGN, WALL MOUNTED, SHADING INDICATES FACE(S) MOUNT AT 7'-6"AFF OR OVER DOOR, CONNECT TO UNSWITCHED PORTION OF AREA LIGHTING BRANCH CIRCUIT, U.N.O.
- INV — CENTRAL LIGHTING INVERTER

REFER TO LUMINAIRE SCHEDULE FOR FIXTURE LEGEND

TYPICAL FOR ALL FIXTURE TYPES:

- R1 a # — INDICATES LUMINAIRE TYPE ON SCHEDULE; LOWER CASE LETTER INDICATES SWITCHING; INDICATES CIRCUIT NUMBER

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SEAL / SIGNATURE

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2021

PROJECT:

USM - Structured Parking Garage

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REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

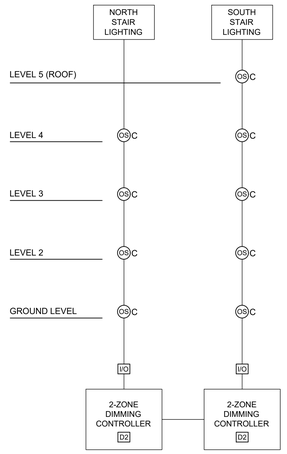
SHEET TITLE:

ELECTRICAL LEGEND AND ABBREVIATIONS

E-000

LIGHTING CONTROL DIAGRAM LEGEND & NOTES:

- D2 — 2-ZONE DIMMER CONTROLLER (WATTSTOPPER #LMRC-212)
- I/O — INPUT/OUTPUT INTERFACE MODULE (WATTSTOPPER #LMIO)
- QTD — EMERGENCY LIGHTING CONTROL UNIT (WATTSTOPPER #ELCU-200). PROVIDE (1) UNIT FOR EACH EMERGENCY CIRCUIT
- OSC — COLD TEMPERATURE WEATHERPROOF PASSIVE INFRARED OCCUPANCY SENSOR WITH MIDDLE AREA COVERAGE (WATTSTOPPER #FS-L3W)

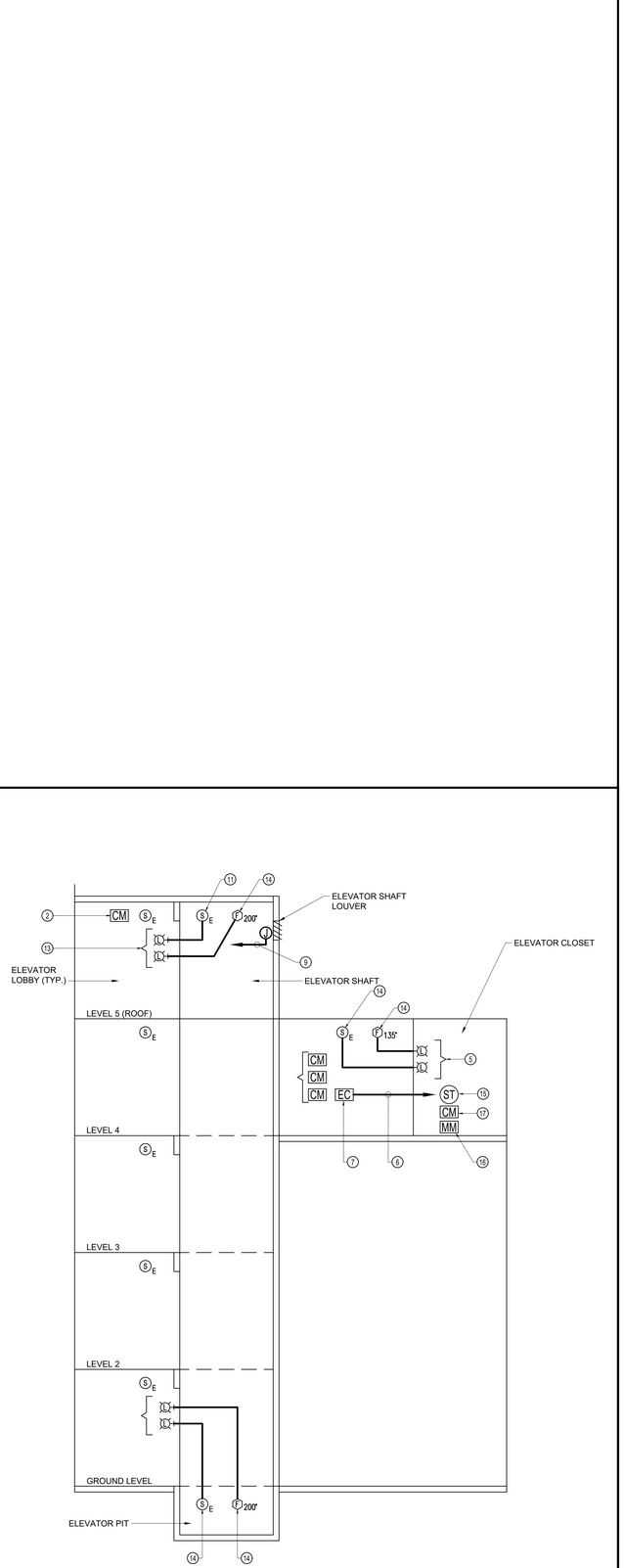


A2 — STAIR LIGHTING CONTROL DETAIL

DO NOT SCALE

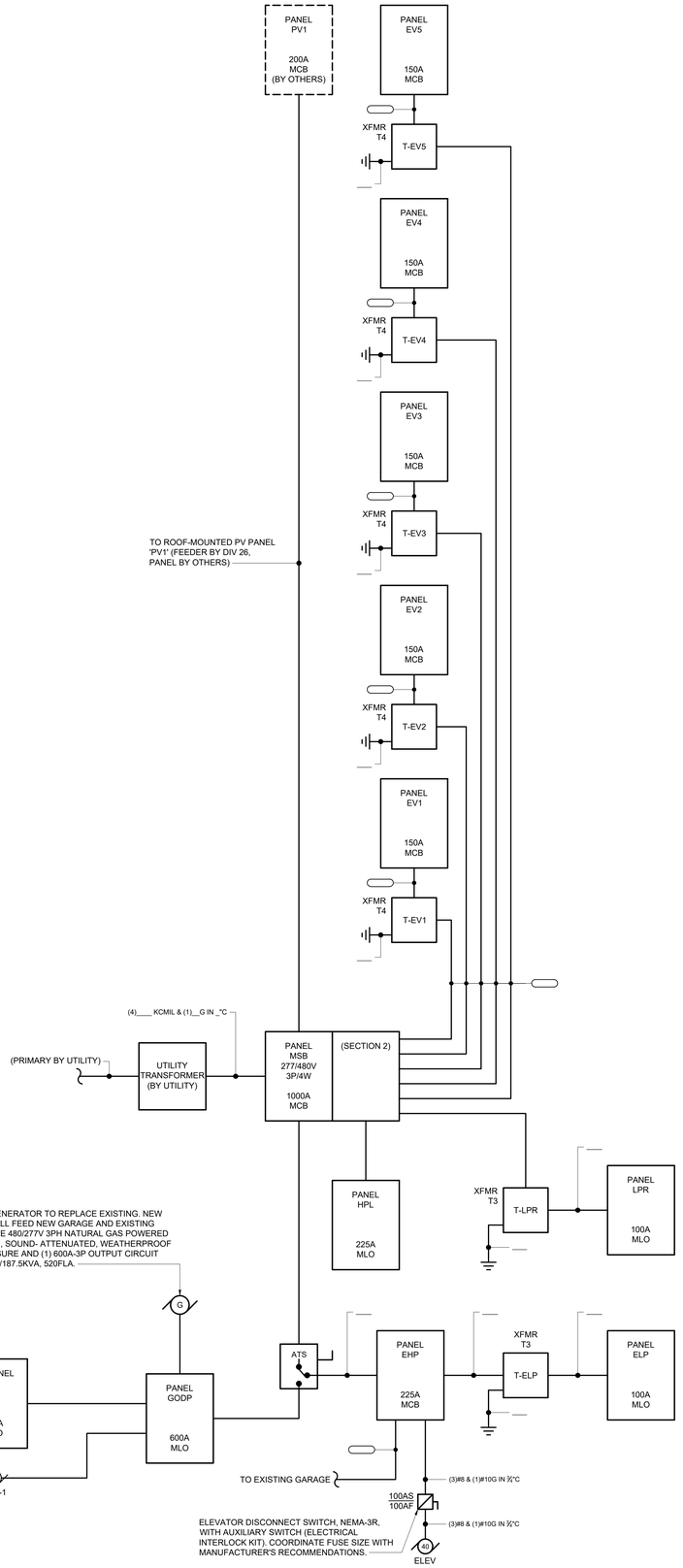
NOTES:

1. ELEVATOR MACHINE ROOM; REFER TO FLOOR PLANS FOR EXACT FLOOR LOCATION AND ADJACENCY (EG TOP FLOOR, PENTHOUSE, FIRST FLOOR, BASEMENT)
2. FIRE ALARM CONTROL MODULE, RELAY AND WIRING PROVIDED FOR SENDING FIRE ALARM SYSTEM CONTROL SIGNAL TO OPEN ELEVATOR SHAFT LOUVER DURING A FIRE EVENT; REFER TO MECHANICAL PLANS FOR EXACT LOCATION AND CONTROL CIRCUIT INTEGRATION POINT. THE CONTROL MODULE SHALL BE LOCATED ABOVE CLOSEST ACCESSIBLE CEILING TO THE LOUVER CONTROL CIRCUIT INTEGRATION POINT. THE CONTROL WIRING FROM THE CONTROL MODULE TO THE LOUVER OPERATOR SHALL BE PERFORMED BY THE CONTRACTOR RESPONSIBLE FOR DIVISION 23 SCOPE. THE CONTROL MODULE SHALL BE PROGRAMMED TO RECEIVE A SIGNAL UPON ACTIVATION OF ANY FIRE ALARM DETECTION DEVICE WITHIN THE RESPECTIVE BUILDING.
3. SMOKE DETECTOR LOCATED WITHIN 21 FEET OF THE CENTERLINE OF EACH ELEVATOR DOOR (FOR LOBBY CEILINGS 15'-0" AFF OR LESS); REFER TO FLOOR PLAN FOR PROPOSED LOCATION AND QUANTITY OF DETECTORS IN RESPECTIVE ELEVATOR LOBBY.
4. "E" ON DETECTORS DENOTES THAT THE RESPECTIVE FIRE ALARM SYSTEM DETECTOR (UPON ACTIVATION) SHALL BE PROGRAMMED TO INITIATE THE REQUIRED ELEVATOR RECALL SEQUENCE.
5. REMOTE INDICATOR LIGHT(S) LOCATED OUTSIDE AND ABOVE THE RESPECTIVE ELEVATOR MACHINE ROOM DOOR. THE INDICATOR LIGHT SHALL BE ACTIVATED WHEN THE ASSOCIATED DETECTOR WITHIN THE ELEVATOR MACHINE ROOM ENTERS AN ALARM CONDITION.
6. POWER FEEDER TO ELEVATOR CONTROLLER (REFER TO POWER PLANS FOR SOURCE AND FEEDER SIZE)
7. ELEVATOR CONTROLLER; FURNISHED AND INSTALLED BY THE CONTRACTOR RESPONSIBLE FOR DIVISION 14 SCOPE.
8. PROVIDE THREE FIRE ALARM CONTROL MODULES, RELAYS AND WIRING FOR SENDING FIRE ALARM SYSTEM CONTROL SIGNAL TO THE ELEVATOR CONTROLLER; ONE TO ACTIVATE THE ELEVATOR RECALL SEQUENCE (PRIMARY LEVEL), THE SECOND TO ACTIVATE THE ELEVATOR RECALL SEQUENCE (ALTERNATE LEVEL), AND THE THIRD TO ACTIVATE THE ELEVATOR CAB WARNING SEQUENCE (FIREMAN'S HAT) . THE CONTROL WIRING FROM EACH MODULE TO THE ELEVATOR CONTROLLER SHALL BE PERFORMED BY THE CONTRACTOR RESPONSIBLE FOR DIVISION 14 SCOPE.
9. POWER BRANCH CIRCUIT TO ELEVATOR SHAFT LOUVER OPERATOR (REFER TO PLAN FOR SOURCE AND BRANCH CIRCUIT SIZE).
10. REFER TO POWER PLANS FOR REQUIRED ELEVATOR EQUIPMENT POWER AND MAINTENANCE POWER PROVISIONS.
11. SMOKE DETECTOR LOCATED AT THE TOP OF THE ELEVATOR SHAFT (EXACT LOCATION PER NFPA 72 STANDARDS).
12. SMOKE DETECTOR LOCATED AT THE ELEVATOR PIT (EXACT LOCATION PER NFPA 72 STANDARDS).
13. REMOTE INDICATOR LIGHT(S) LOCATED OUTSIDE AND ABOVE THE RESPECTIVE FLOOR ELEVATOR CAB DOOR. THE INDICATOR LIGHT SHALL BE ACTIVATED WHEN THE ASSOCIATED DETECTOR ENTERS AN ALARM CONDITION.
14. WHEN SPRINKLER HEADS ARE PRESENT IN THE ELEVATOR SHAFT, ELEVATOR PIT OR ELEVATOR MACHINE ROOM, LOCATE THE FIRE ALARM SYSTEM DETECTOR(S) WITHIN (2) FEET OF THE RESPECTIVE SPRINKLER HEAD.
15. SHUNT TRIP MODULE PROVIDED WITH THE RESPECTIVE ELEVATOR FEEDER CIRCUIT BREAKER FOR SHUTTING DOWN ELEVATOR POWER.
16. FIRE ALARM MONITOR MODULE, RELAY AND WIRING PROVIDED FOR RECEIVING FIRE ALARM SYSTEM MONITOR SIGNAL FROM THE ELEVATOR FEEDER SHUNT TRIP MODULE FOR VERIFYING THE SHUNT TRIP CONTROL POWER CIRCUIT IS FUNCTIONING PROPERLY. THE MONITOR MODULE SHALL BE PROGRAMMED TO SEND A SIGNAL (SUPERVISORY) IF THE CONTROL POWER CIRCUIT IS DE-ENERGIZED.
17. FIRE ALARM CONTROL MODULE, RELAY AND WIRING PROVIDED FOR SENDING FIRE ALARM SYSTEM CONTROL SIGNAL TO INITIATE THE ELEVATOR POWER SHUNT TRIP SEQUENCE. THE CONTROL MODULE SHALL BE PROGRAMMED TO RECEIVE A SIGNAL UPON ACTIVATION OF ANY HEAT DETECTOR LOCATED WITHIN THE ELEVATOR SHAFT, ELEVATOR PIT OR ELEVATOR MACHINE ROOM.
18. FIXED TEMPERATURE (135 DEGREE F) HEAT DETECTOR LOCATED IN THE ELEVATOR MACHINE ROOM.
19. FIXED TEMPERATURE (135 DEGREE F) HEAT DETECTOR LOCATED AT THE ELEVATOR PIT.
20. FIXED TEMPERATURE (190 DEGREE F) HEAT DETECTOR LOCATED AT THE TOP OF THE ELEVATOR SHAFT.
21. ALL HEAT DETECTORS WITHIN ELEVATOR SHAFT/PIT/MACHINE ROOM SHALL BE PROVIDED WITH TEMPERATURE AND RTI RATINGS THAT ARE LOWER THAN THE ASSOCIATED SPRINKLER HEAD.



A1 — FIRE ALARM CONTROL DIAGRAM FOR ELEVATOR WITH SHAFT/ MACHINE ROOM PROTECTION SPRINKLERS

DO NOT SCALE



A3 — POWER RISER DIAGRAM

DO NOT SCALE

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

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41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
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FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING
160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200. SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

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PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

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Date	Issued For:
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CHECKED BY	**BTG**

SHEET TITLE:

ELECTRICAL DETAILS

E-500

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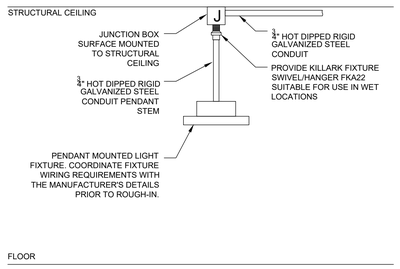
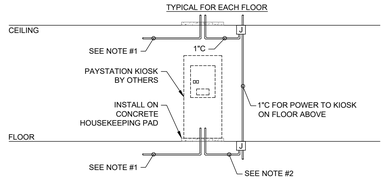


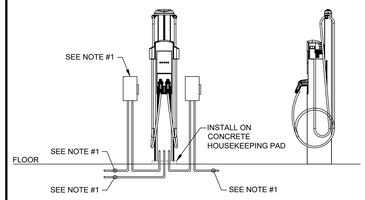
D2	CEILING MOUNTED GARAGE FIXTURE DETAIL
DO NOT SCALE	



NOTES:

1. PROVIDE (1) 1"C EMPTY CONDUIT WITH NYLON PULLSTRING BACK TO THE MAIN ELECTRICAL ROOM FOR EACH PAYSTATION KIOSK. TELECOMMUNICATIONS CABLING BY OTHERS. STUB CONDUIT UP TO 6" ABOVE FINISHED FLOOR AND CAP FOR FUTURE.
2. PROVIDE (1) 1"C EMPTY CONDUIT WITH NYLON PULLSTRING AND JUNCTION BOX AT EACH LEVEL FOR FUTURE POWER BRANCH CIRCUIT WIRING. STUB CONDUIT UP TO 6" ABOVE FINISHED FLOOR AND CAP FOR FUTURE. AT THE LOWER LEVEL, CONDUIT SHALL BE ROUTED BACK TO THE MAIN ELECTRICAL ROOM AND TERMINATED IN PANELBOARD 'RP2G'. CONDUITS SHALL BE MARKED FOR FUTURE PAYSTATION KIOSK.

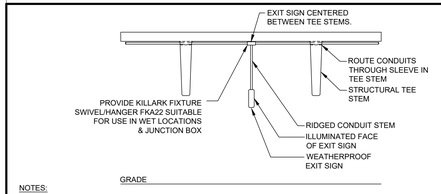
D3	PAYSTATION KIOSK DETAIL
DO NOT SCALE	



NOTES:

1. ELECTRICAL VEHICLE CHARGING SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH NEC 625. THE ELECTRICAL CONTRACTOR SHALL MEET ALL INSTALLATION REQUIREMENTS WHETHER INCORPORATED INTO THE MANUFACTURED ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) OR PROVIDED SEPARATELY.
2. PROVIDE DISCONNECT IN A READILY ACCESSIBLE LOCATION FOR ELECTRIC VEHICLE CHARGING STATIONS 480/277V ONLY. DISCONNECT SHALL BE LOCKABLE OPEN TYPE IN ACCORDANCE WITH NEC 110.25. WHERE 208/120V (EVSE) IS UTILIZED, DISCONNECTING MEANS IS NOT REQUIRED.
3. PROVIDE (2) 1" HOT-DIPPED GALVANIZED RIGID STEEL POWER CONDUITS STUBBED UP 12"AFF AND TERMINATED IN WEATHERPROOF CAST JUNCTION BOX WITHIN THE (EVSE). PROVIDE LFMC WHIP CONNECTION TO EQUIPMENT TERMINATION POINT.
4. PROVIDE (1) 1" HOT-DIPPED GALVANIZED RIGID STEEL TELECOMMUNICATIONS CONDUITS STUBBED UP 12" AFF FOR COMMUNICATION CABLING FOR RFID OR CREDIT CARD EQUIPMENT. ROUTE CONDUIT TO TELECOMMUNICATIONS BACKBOARD/SERVER EQUIPMENT.

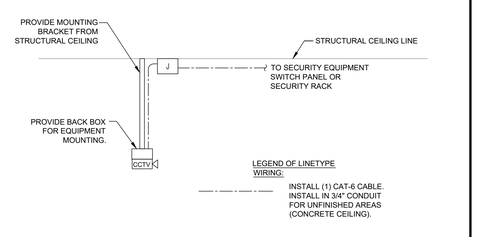
C4	ELECTRIC VEHICLE CHARGING SYSTEM
DO NOT SCALE	



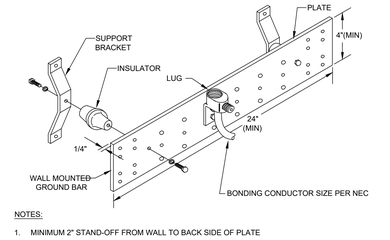
NOTES:

1. EXIT SIGNS SHALL BE INSTALLED SUCH THAT THE FACE OF THE EXIT SIGN IN THE PRIMARY DIRECTION OF EGRESS (SHORTEST PATH TO EGRESS DOOR) IS FACING OUT AND AWAY FROM THE STRUCTURAL TEE STEM.
2. EXIT SIGN SHALL BE INSTALLED SUCH THAT THE BOTTOM OF THE EXIT SIGN IS A MINIMUM OF 7'-2" ABOVE FINISHED FLOOR WHERE LOCATED IN THE GARAGE DRIVE LANE OR PARKING STALL.
3. WHERE EXIT SIGNS ARE PROTECTED FROM VEHICULAR DAMAGE VIA BOLLARDS, PARKING STOPPERS, STRUCTURAL MEMBERS, ETC. THE SIGNAGE SHALL BE PENDANT MOUNTED TO TOP OF EXIT SIGN FLUSH WITH THE BOTTOM OF THE TEE STEM (I.E. ELEVATOR LOBBY, STAIR LOBBY, ETC.)

C1	EXIT SIGN GARAGE AREA MOUNTING DETAIL
DO NOT SCALE	



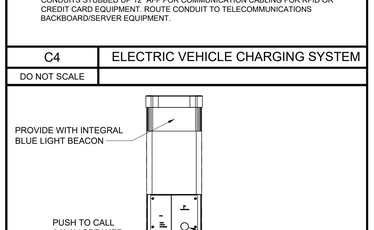
C2	CAMERA MOUNTING DETAIL
DO NOT SCALE	



NOTES:

1. MINIMUM 2" STAND-OFF FROM WALL TO BACK SIDE OF PLATE

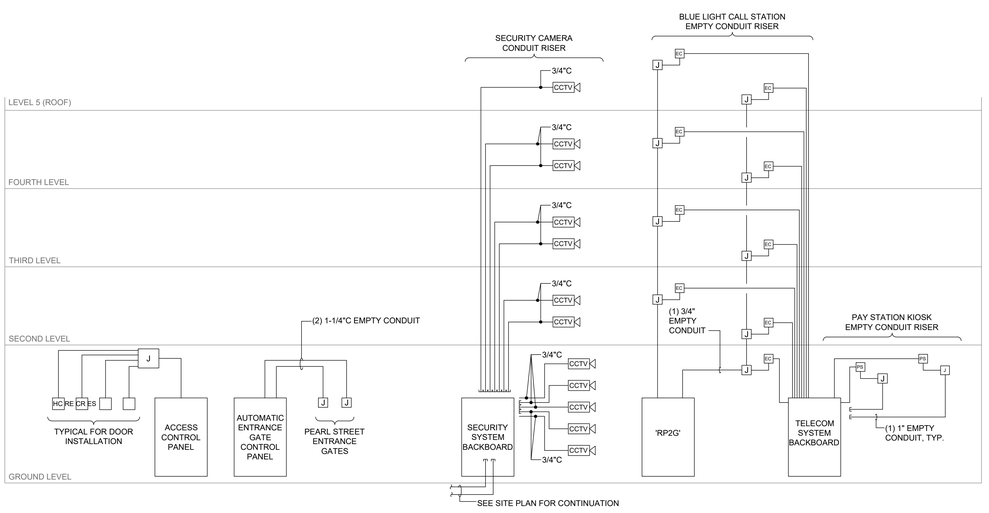
C3	GROUND BAR DETAIL
DO NOT SCALE	



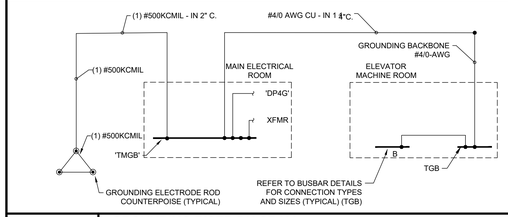
NOTES:

1. COORDINATE INSTALLATION DETAILS WITH MANUFACTURER'S INSTRUCTIONS.
2. PROVIDE (1) 3/4"C EMPTY CONDUIT WITH NYLON PULLSTRING BACK TO THE MAIN ELECTRICAL ROOM FOR EACH EMERGENCY PHONE STATION. TELECOMMUNICATIONS CABLING BY OTHERS.

B4	CALLSTATION WITH BLUE LIGHT
DO NOT SCALE	



A1	CONDUIT RISER DIAGRAM
DO NOT SCALE	



B3	GROUNDING RISER DIAGRAM
DO NOT SCALE	

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SHEET TITLE:

ELECTRICAL DETAILS

E-501

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	MFR	CATALOG SERIES NUMBER SEE NOTE 1	MOUNTING, U.N.O.	VOLTS	LAMP				KEY NOTES
						QTY PER FIXTURE	WATTS	LUMENS	TYPE	
G	LED PARKING GARAGE LIGHT	LITHONIA	VCPG-LED-V4-P4-40K-70CRI-___-MVOLT-PM	PENDANT	UNV	1	56	____	LED ARRAY ~ 4000K	
B	LED STRIP LIGHT	LITHONIA	FEM-L48-4000LM-LPPFL-WD-MVOLT-GZ10-40K-80CRI	SURFACE	UNV	1	30	4,257	LED ARRAY ~ 4000K	
GP	GARAGE ROOF LED LIGHT AND POLE	LITHONIA	LIGHT: RSX1-LED-P3-40K-R5-MVOLT-SPA POLE: SSS-14-4C-DM19AS	SURFACE	UNV	1	109	14,397	LED ARRAY ~ 4000K	
EXIT	EXIT SIGN, AC ONLY	LITHONIA	LV-S-W-*-R	SEE PLAN	UNV	1		PER CODE	LED ARRAY	3,6
P1	SITE LIGHT AND POLE, "ICE CREAM CONE" SHAPE	SEE NOTE 8		14' POLE	277	1	24	3,330	LED ARRAY ~ 4000K	8,9
P2	SITE LIGHT AND POLE, "SHOEBOX" SHAPE	SEE NOTE 8		14' POLE	277	1	18	2,160	LED ARRAY ~ 4000K	8,10
SW1	WALL MOUNTED EXTERIOR LIGHT	LITHONIA	KAXW-LED-P1-40K-R4-MVOLT	KEYNOTE 5	UNV	1	29	3,643	LED ARRAY ~ 4000K	5
SR1	RECESSED CANOPY LIGHT	LITHONIA	LDN4SQ-40-07-LS4-AR-LSS-MVOLT	RECESSED CANOPY	UNV	1	8.6	620	LED ARRAY ~ 4000K	

	NOTES
1	**NOTE THAT THESE NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. PROVIDE ALL REQUIREMENTS ON SCHEDULE, NOTES, SPECS, AND DRAWINGS COMBINED.**
2	**CATALOG SERIES NUMBERS ARE USED TO ESTABLISH A LEVEL OF QUALITY AND NOT INTENDED TO LIMIT COMPETITION. SERIES NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. COMPLY WITH ADDITIONAL REQUIREMENTS IN SPECIFICATIONS AND DRAWINGS.**
3	PROVIDE WALL,CEILING, OR PENDANT MOUNTING AS INDICATED ON PLANS. PROVIDE NUMBER OF FACES AND ARROWS AS INDICATED.
4	VERIFY CEILING STRUCTURE AND MOUNTING HEIGHT PRIOR TO ORDERING ANY LIGHT FIXTURES.
5	COORDINATE MOUNTING HEIGHT WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
6	PROVIDE COLD WEATHER OPTION.
7	CONFIRM EXACT FIXTURE CONFIGURATION AND OPTIONS WITH MUNICIPALITY PRIOR TO ORDERING FIXTURE.
8	FIXTURE AND POLE SHALL BE PROVIDED BY OWNER FROM EXISTING OWNER'S STOCK.
9	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8029E345-A.
10	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8039E40-A.

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2021

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USM - Structured Parking Garage

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ELECTRICAL SCHEDULES

E-600

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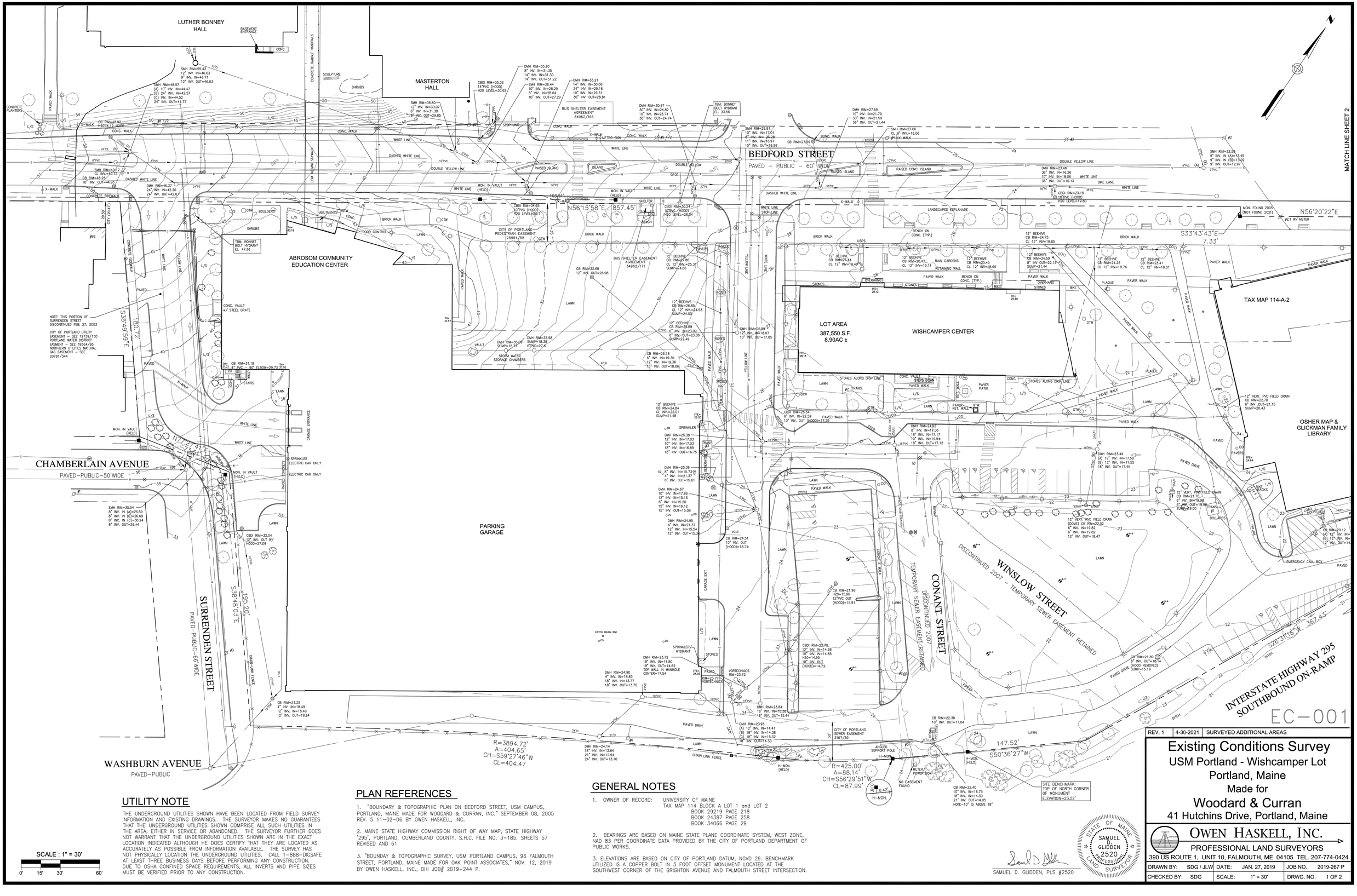
LUTHER BONNEY HALL
BASEMENT ENTRANCE
CONC.
SMH RIM=55.43
12" INV. IN=46.63
8" INV. IN=46.71
12" INV. OUT=46.63
DMH RIM=48.57
(A) 10" INV. IN=44.47
(B) 24" INV. IN=42.57
(C) INV. IN=44.52
24" INV. OUT=41.77
CONCRETE PLANTERS
PAVED WALK
CONCRETE RAMP / HANDRAILS
SCULPTURE
SHRUBS
MASTERTON HALL
CBDI RIM=35.32
10"PVC (HOOD)
H20 LEVEL=30.62
SMH RIM=36.80
12" INV. IN=30.07
6" INV. IN=31.38
8" INV. OUT=29.85
DMH RIM=35.90
8" INV. IN=31.35
14" INV. IN=31.30
14" INV. OUT=31.22
SMH RIM=36.44
10" INV. IN=28.29
8" INV. IN=28.64
10" INV. OUT=27.29
DMH RIM=35.21
14" INV. IN=30.06
24" INV. IN=29.16
10" INV. IN=29.31
30" INV. OUT=28.81
BUS SHELTER EASEMENT AGREEMENT 34962/165
DMH RIM=30.67
30" INV. IN=24.82
10" INV. IN=25.74
30" INV. OUT=24.74
TBM: BONNET BOLT HYDRANT EL. 33.56
DMH RIM=27.69
10" INV. IN=21.79
30" INV. IN=21.59
36" INV. OUT=21.44
SMH RIM=29.91
8" INV. IN= 24.28
11" INV. IN=16.97
10" INV. OUT=16.99
SMH RIM=27.06
CL 9" INV.=16.06
8" INV.=16.06
CB RIM=27.09
BEDFORD STREET
PAVED – PUBLIC – 60' WIDE
CONC. WALK
X-WALK
METRO SIGN
WHITE LINE
DASHED WHITE LINE
DOUBLE YELLOW LINE
RAISED ISLAND
ISLAND
RAISED CONC. ISLAND
BIKE LANE
SMH RIM=22.59
8" INV. IN (A)=13.49
9" INV. IN (B)=13.09
9" INV. OUT=12.97
DMH RIM=23.46
36" INV. IN=16.26
10" INV. IN=18.06
36" INV. OUT=16.13
CBDI RIM=23.15
@ 10"PVC (HOOD)
H20 LEVEL=19.80
MON. FOUND 2002 (NOT FOUND 2021)
#2,1 W/ METER
N56°20'22"E
S33°43'43"E
7.33'
MON. IN VAULT (HELD)
103.64'
N56°15'58"E
857.45'
SHELTER
BENCH
CBDI RIM=34.65
10"PVC (HOOD)
H20 LEVEL=29.71
CBDI RIM=30.24
10"PVC-C (HOOD)
H20 LEVEL=26.04
ABUTMENTS
GTW
CONC.
BOULDERS
SHRUBS
BRICK WALK
LAWN
DOOR CONTROL
TBM: BONNET BOLT HYDRANT EL. 47.66
ABROSOM COMMUNITY EDUCATION CENTER
CITY OF PORTLAND PEDESTRIAN EASEMENT 25994/58
BUS SHELTER EASEMENT AGREEMENT 34962/171
CB RIM=32.68
12" INV. OUT=26.98
CB RIM=27.86
CB RIM=25.31
SUMP=24.66
USPS
BENCH ON CONC. (TYP.)
12" BEEHIVE
CB RIM=27.44
CL 12" INV=19.49
12" BEEHIVE
CB RIM=29.17
CL 12" INV=19.14
RAIN GARDENS
RETAINING WALL
12" BEEHIVE
CB RIM=25.45
CL 12" INV=18.99
12" BEEHIVE
CB RIM=24.59
8" INV OUT=22.19
SUMP=21.44
12" BEEHIVE
CB RIM=24.26
CL 12" INV=18.76
12" BEEHIVE
CB RIM=23.41
CL 12" INV=18.81
PAVER WALK
OVERHANG
STONES
BENCH ON CONC. (TYP.)
BIKE
PLAQUE
TAX MAP 114-A-2
LOT AREA
387,550 S.F.
8.90AC ±
WISHCAMPER CENTER
NOTE: THIS PORTION OF SURRENDEN STREET DISCONTINUED FEB 27, 2003
CITY OF PORTLAND UTILITY EASEMENT – SEE 19739/130
PORTLAND WATER DISTRICT EASEMENT – SEE 19364/95
NORTHERN UTILITIES NATURAL GAS EASEMENT – SEE 20781/344
S38°49'59"E
180.72'
CONC. VAULT w/ STEEL GRATE
CB RIM=31.18
4" PVC 90° ELBOW=29.73
12" PVC 22.10
CONC. WALL
STAIRS
LAWN
PAVED
X-WALK
WHITE LINE
YELLOW LINE
PAVED WALK
CONCRETE SIDEWALK
CITY (20.0')
#92
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11
#12
#13
#14
#15
#16
#17
#18
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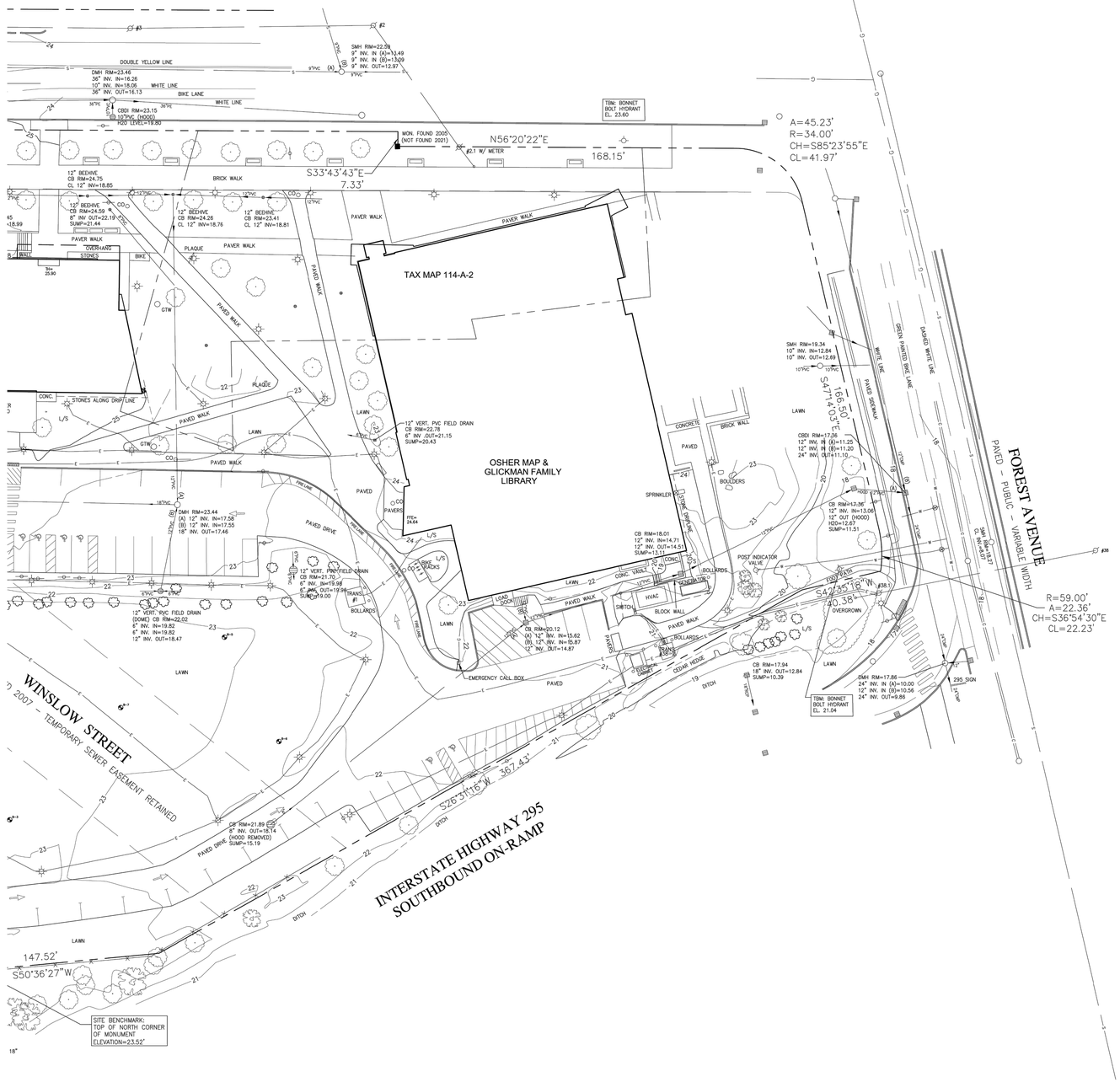
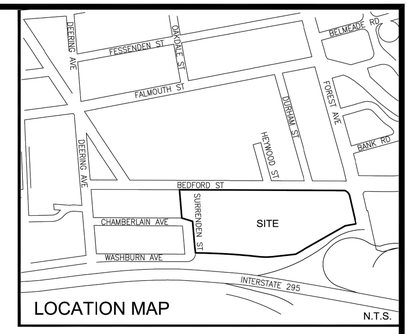
#37
#38
#39
#40
#41

MATCH LINE SHEET 1





LOCATION MAP N.T.S.

LEGEND

- IRON PIPE OR ROD FOUND
- MONUMENT FOUND
- UTILITY POLE
- MANHOLE
- ELECTRIC/GAS METER
- SIGN
- CATCH BASIN
- HYDRANT
- WATER VALVE OR SHUTOFF
- GAS VALVE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SHRUB / BUSH
- GTW GEOTHERMAL WELL
- ELECTRICAL JUNCT. BOX
- FENCE
- CURB
- OVERHEAD WIRES
- E UNDERGROUND POWER
- C COMMUNICATION
- W WATER LINE
- G GAS LINE
- T TELEPHONE
- SD STORM DRAIN
- SS SANITARY SEWER
- STM STEAM LINE

IPF/IRF	IRON PIPE OR ROD FOUND
L/S	LANDSCAPED AREA
CONC.	CONCRETE
FFE	FINISHED FLOOR ELEVATION
THRES.	THRESHOLD
N/F	NOW OR FORMERLY
000/000	DEED BOOK / PAGE

UTILITY NOTE

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEY HAS NOT PHYSICALLY LOCATION THE UNDERGROUND UTILITIES. CALL 1-888-DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

SCALE : 1" = 30'

0' 15' 30' 60'

PLAN REFERENCES

1. "BOUNDARY & TOPOGRAPHIC PLAN ON BEDFORD STREET, USM CAMPUS, PORTLAND, MAINE MADE FOR WOODARD & CURRAN, INC." SEPTEMBER 08, 2005 REV. 5 11-02-06 BY OWEN HASKELL, INC.

2. MAINE STATE HIGHWAY COMMISSION RIGHT OF WAY MAP, STATE HIGHWAY '295', PORTLAND, CUMBERLAND COUNTY, S.H.C. FILE NO. 3-185. SHEETS 57 REVISED AND 61

3. "BOUNDAY & TOPOGRAPHIC SURVEY, USM PORTLAND CAMPUS, 96 FALMOUTH STREET, PORTLAND, MAINE MADE FOR OAK POINT ASSOCIATES," NOV. 12, 2019 BY OWEN HASKELL, INC., OHI JOB# 2019-244 P.

GENERAL NOTES

1. OWNER OF RECORD: UNIVERSITY OF MAINE
TAX MAP 114 BLOCK A LOT 1 and LOT 2
BOOK 29219 PAGE 218
BOOK 24387 PAGE 258
BOOK 34066 PAGE 29

2. BEARINGS ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD 83 PER COORDINATE DATA PROVIDED BY THE CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS.

3. ELEVATIONS ARE BASED ON CITY OF PORTLAND DATUM, NGVD 29. BENCHMARK UTILIZED IS A COPPER BOLT IN 3 FOOT OFFSET MONUMENT LOCATED AT THE SOUTHWEST CORNER OF THE BRIGHTON AVENUE AND FALMOUTH STREET INTERSECTION.

SAMUEL D. GLIDDEN, PLS #2520

STATE OF MAINE · SAMUEL D GLIDDEN · 2520 · PROFESSIONAL LAND SURVEYOR

EC-002

REV.	DATE	DESCRIPTION
1	4-30-2021	SURVEYED ADDITIONAL AREAS

Existing Conditions Survey

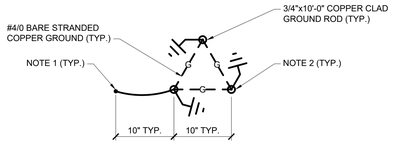
USM Portland - Wishcamper Lot
Portland, Maine
Made for
Woodard & Curran
41 Hutchins Drive, Portland, Maine

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 US ROUTE 1, UNIT 10, FALMOUTH, ME 04105 TEL. 207-774-0424

DRAWN BY:	SDG / JLW	DATE: JAN 27, 2019	JOB NO. 2019-267 P
CHECKED BY:	SDG	SCALE: 1" = 30'	DRWG. NO. 2 OF 2

OH	OVERHEAD WIRING, TYPE AS INDICATED
	UNDERGROUND OR UNDERSLAB WIRING, TYPE AS INDICATED
	UTILITY POLE
	FUSED DISCONNECT SWITCH
	NON-FUSED DISCONNECT SWITCH
	MOTOR
	GROUNDING SYSTEM
J	JUNCTION BOX, WALL MOUNTED
J	JUNCTION BOX, IN-GROUND
M	ELECTRICAL MANHOLE, COORDINATE LOCATION WITH OTHER UNDERGROUND UTILITIES
T	COMMUNICATIONS MANHOLE, COORDINATE LOCATION WITH OTHER UNDERGROUND UTILITIES
T / P S / F	PADMOUNT TRANSFORMER ~ F= FRONT
PB	4'X6' PULL BOX WITH 32" COVER PLATE IN ACCORDANCE WITH UTILITY STANDARDS
P	PEDESTAL LOCATION, PEDESTAL BY SERVICE PROVIDER, STUB UP (2) 2" CONDUITS WITH CONNECTORS AND BUSHINGS FROM HANDHOLE
H	HANDHOLE, MINIMUM 18"x36"x24", SIZE PER NEC FOR NUMBER OF CONDUITS INSTALLED
M	METER & CT CABINET, PEDESTAL MOUNTED
	SINGLE POLE MOUNTED LIGHT
	DOUBLE POLE MOUNTED LIGHT
	WALL MOUNTED LIGHT FIXTURE
	SINGLE POLE HOMERUN: (2)#12+(1)#12G UNO, CONNECT TO PANEL INDICATED
	SINGLE-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT, CONNECT TO PANEL INDICATED
	3-PHASE HOMERUN OR MULTIPLE HOMERUN UTILIZING THE SAME CONDUIT, CONNECT TO PANEL INDICATED
A1 / ES-000	DETAIL CALL-OUT
A1 / ES-000	SECTION/ELEVATION CALL-OUT

B1 ELECTRICAL SITE LEGEND

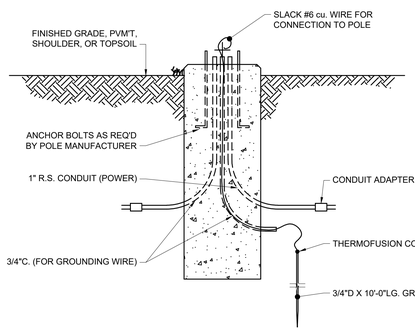


NOTES:

1. RUN #4/0 BARE STRANDED CU GROUND CABLE DOWN IN 1" PVC CONCEALED UNDER ROOF, CEILING AND WALLS. TYPICAL FOR ALL DOWNERS OUT TO GROUNDING COUNTERPOISE.
2. COPPER CLAD STEEL GROUND RODS 3/4"x10'-0", TOP OF RODS BURIED 2'-0" BELOW TOP OF FINISHED GRADE.

A3 GROUNDING ROD DETAILS

DO NOT SCALE

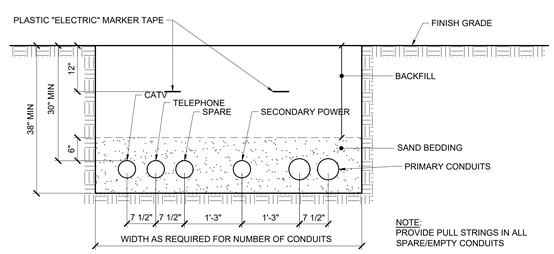


NOTES:

1. LIGHT POLE FOUNDATION SHALL BE PROVIDED BY DIVISION 2. ELECTRICAL SUBCONTRACTOR SHALL FURNISH CONDUITS, AND ANCHOR BOLTS TO CIVIL CONTRACTOR FOR CASTING INTO POLE BASE. THIS DETAIL REFERS TO SITE PARKING LOT AND ROAD LIGHTING FIXTURES ONLY. SEE CIVIL DRAWINGS FOR CONSTRUCTION INFORMATION.
2. ELECTRICAL CONTRACTOR SHALL INSTALL GROUND ROD AND PULL GROUNDING WIRE.

A2 SITE LIGHTING POLE BASE DETAIL

DO NOT SCALE

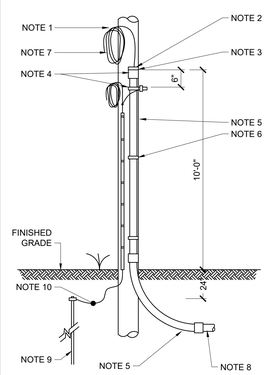


NOTE:
PROVIDE PULL STRINGS IN ALL SPARE/EMPTY CONDUITS

DETAIL INDICATES TYPICAL SPACING BETWEEN CONDUITS OF VARIOUS SYSTEMS, REFER TO SITE PLAN FOR SIZES AND NUMBER OF CONDUITS

A1 TYPICAL SEPARATION OF UTILITIES

DO NOT SCALE



NOTES:

1. PRIMARY CABLES TO BE INSTALLED BY UTILITY COMPANY.
2. CONDUIT SEAL BY CONTRACTOR.
3. INSULATING BUSHING.
4. GALVANIZED STEEL CONDUIT AND BEND SHALL BE GROUNDED BY BONDING TO APPROVED GROUND CLAMP 6" FROM TOP OF THE CONDUIT. A CONDUCTOR OF SUFFICIENT LENGTH SHALL BE PROVIDED TO EXTEND TO UTILITY COMPANY SECONDARY NEUTRAL.
5. PROVIDE 2-4" GALVANIZED STEEL CONDUITS. 2 TOTAL 10 FEET CONDUITS SHALL RISE ON THE SIDE OF THE POLE AWAY FROM THE ROAD, AND SPARE CONDUITS SHALL BE CAPPED 6" ABOVE GRADE.
6. PIPE STRAPS, INSTALL AT NOT MORE THAN 30" INTERVALS.
7. CONTRACTOR TO SEAL CABLE ENDS TO PREVENT ENTRANCE OF MOISTURE.
8. ADAPTER COUPLING STEEL TO PVC.
9. GROUND ROD - 3/4"D.x10'-0" LONG. INSTALL MINIMUM 3 FEET FROM THE POLE.
10. PROVIDE #4cu. GROUND WIRE.

B1 RISER POLE CONDUIT DETAIL

DO NOT SCALE

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT & STRUCTURAL ENGINEER
DESMAN Design Management
18 Tremont Street #300
Boston, MA 02108

ARCHITECT
WINTON-SCOTT ARCHITECTS
5 MILK STREET
PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN
41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING
160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200. SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

© **DESMAN, Inc.**
2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

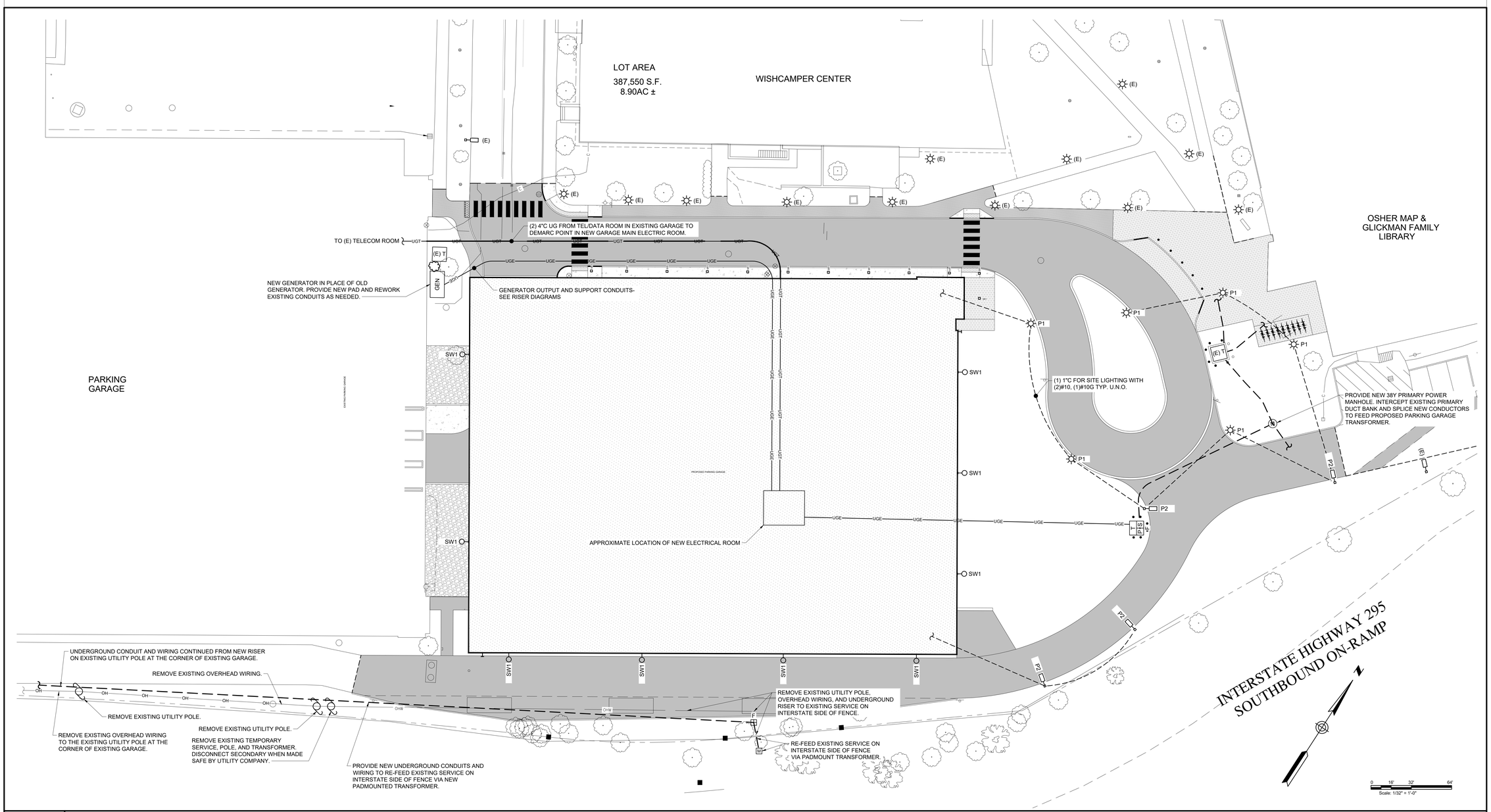
Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

ELECTRICAL SITE LEGEND, DETAILS, AND NOTES

ES-000



A1	ELECTRICAL SITE PLAN
SCALE: 1"=20'-0"	

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

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SEAL / SIGNATURE

© DESMAN, Inc.
2021

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USM - Structured Parking Garage

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Portland ME 04104

REVISIONS:

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07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

ELECTRICAL SITE PLAN AND NOTES

ES-100

UNIVERSITY OF SOUTHERN MAINE
PORTLAND, MAINE

USM STRUCTURED PARKING GARAGE

PROJECT NO.
0233035.00

7/30/2021

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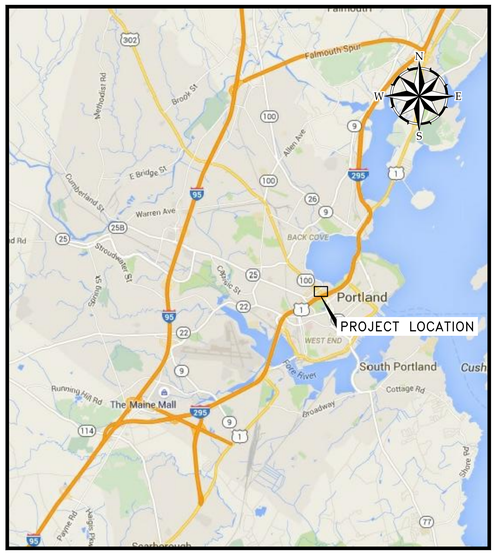
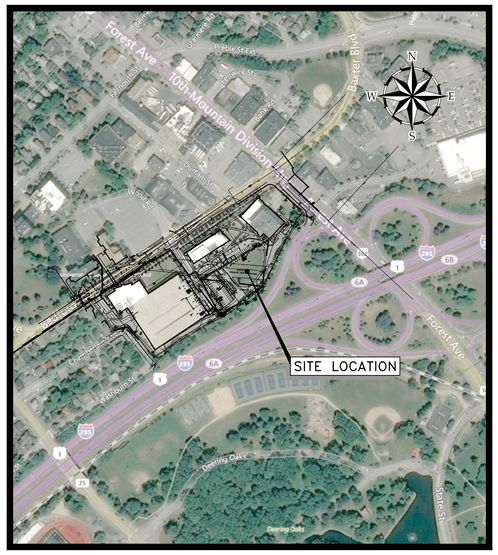
1	G-001	GENERAL NOTES & LEGEND
2	EC-001	EXISTING CONDITIONS SURVEY -1
3	EC-002	EXISTING CONDISITONS SURVEY - 2
4	C-001	DEMOLITION & EROSION & SEDIMENT CONTROL PLAN
5	C-100	SITE LAYOUT & MATERIALS PLAN
6	C-101	UTILITY & GRADING PLAN
7	D-200	CIVIL DETAILS - 1
8	D-201	CIVIL DETAILS - 2
9	D-202	CIVIL DETAILS - 3
10	D-203	CIVIL DETAILS - 4
11	D-204	CIVIL DETAILS - 5



PROJECT LOCATION MAP

1 0 1 2
scale mile



SOURCE: BING MAPS

SITE LOCATION MAP

600 0 300 600
scale feet

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

\\woodardcurran.net\shared\Projects\0233035.00 usm - falmouth street garage\wip\Drawings\General\0233035.00 G000.dwg, Jul 29, 2021 - 2:58pm BMCDEVITT

GENERAL NOTES:

1. EXISTING CONDITIONS SHOWN HEREON HAVE BEEN PROVIDED FROM A FIELD SURVEY PREPARED BY OWEN HASKELL, INC TITLED "EXISTING CONDITIONS SURVEY – USM PORTLAND – WISHCAMPER LOT – PORTLAND MAINE", DATED JANUARY 27, 2019 AND REVISED WITH ADDITIONAL SURVEY ON APRIL 30, 2021.
2. ELEVATIONS ARE BASED ON CITY OF PORTLAND DATUM, NGVD 29.
3. BEARING ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD 83 PER COORDINATE DATA PROVIDED BY THE CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS..
4. EXISTING UTILITIES SHOWN ON THESE PLANS WERE COMPILED FROM A FIELD SURVEY PREPARED BY OWEN HASKELL, INC. THESE PLANS DO NOT NECESSARILY DEPICT THE EXACT LOCATIONS OF ALL UTILITIES, WHICH MAY EXIST AT THIS TIME WITHIN THE SURVEY LIMITS. THERE MAY BE EXISTING LINES OTHER THAN THOSE INDICATED. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES SHALL BE CONSIDERED APPROXIMATE AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY UTILITY CONNECTIONS OR CROSSINGS OF PROPOSED OR EXISTING UTILITIES. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER IN WRITING. THE CONTRACTOR SHALL CONTACT THE RESPECTIVE UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THESE LINES. NO SEPARATE OR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR DUE TO ANY VARIANCE BETWEEN THE DATA SHOWN ON THE PLANS AND ACTUAL FIELD CONDITIONS ENCOUNTERED. THE CONTRACTOR IS RESPONSIBLE FOR HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF THE EXISTING UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE AND TO FACILITATE THE PROPOSED CONNECTION(S).
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE SITE DRAWINGS, INCLUDING BUT NOT LIMITED TO ALL UTILITIES, STORM INFRASTRUCTURE, SIGNS, UTILITY POLES, FENCES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH THE GOVERNING AUTHORITY'S SPECIFICATIONS AND SHALL BE APPROVED BY SUCH. ALL COSTS SHALL BE INCURRED BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL CALL "DIG SAFE" (811) AT LEAST 72 HOURS PRIOR TO EXCAVATION IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL SAFETY CODES.
7. LAND OUTSIDE THE PROPOSED LIMIT OF WORK SHALL NOT BE DISTURBED BY THE CONTRACTOR.
8. PRIOR TO CONSTRUCTION, THE ENGINEER AND CONTRACTOR WILL REVIEW THE PERMITTED LIMITS OF WORK.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCH MARKS NECESSARY FOR THE WORK.
10. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL SAFETY CODES, REGULATIONS, LEGAL REQUIREMENTS, PERMIT CONDITIONS, ETC.
11. THE CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, STREETS, PAVEMENTS, CURBING, TREES, PLANTINGS, LAWN, FENCING TO REMAIN ON OR OFF THE PREMISES, AND SHALL REPAIR AND REPLACE AT HIS/HER OWN EXPENSE, AS DIRECTED BY THE ENGINEER, ANY ITEMS DAMAGED AS A RESULT OF THE CONTRACTOR'S WORK.
12. THE CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SHORING OF ALL EXCAVATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ALL GOVERNING CODES AND REGULATIONS.
13. WORK WITHIN PUBLIC RIGHT–OF–WAY SHALL COMPLY WITH APPLICABLE MUNICIPAL AND STATE REQUIREMENTS.
14. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY.
15. IF IMPORTED FILL MATERIAL IS REQUIRED, IT SHALL BE CERTIFIED IN WRITING BY A STATE LICENSED PROFESSIONAL ENGINEER AS NON–CONTAMINATED, CLEAN FILL SUITABLE FOR THE INTENDED USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTING OF ENVIRONMENTAL PARAMETERS AS OUTLINED IN THE PROJECT SPECIFICATIONS.
16. RESTORE ALL AREAS DISTURBED BY CONTRACTOR'S OPERATIONS TO ORIGINAL FINISH (GRAVEL, PAVEMENT, RIPRAP, GRASS, ETC.) UNLESS OTHERWISE NOTED ON PLANS. RESTORATION OF ALL AREAS DAMAGED BY CONTRACTOR SHALL BE INCIDENTAL TO THE PROJECT.
17. ALL CURB DAMAGED DURING CONSTRUCTION SHALL BE REPLACED IN KIND AND SHALL CONFORM TO SPECIFICATIONS. COST IS INCIDENTAL TO CONTRACT.
18. PROPERLY PROTECT AND DO NOT DISTURB PROPERTY IRONS, MONITORING WELLS, AND MONUMENTS. IF DISTURBED, THE PROPERTY MONUMENT WILL BE RESET AT THE CONTRACTOR'S EXPENSE BY A REGISTERED LAND SURVEYOR APPROVED BY THE ENGINEER.
19. ALL MATERIAL SHALL BE FURNISHED BY CONTRACTOR UNLESS OTHERWISE NOTED.
20. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS PRIOR TO START OF CONSTRUCTION.
21. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMITS SO AS NOT TO DELAY CONSTRUCTION.
22. ALL SIGNAGE SHALL CONFORM WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL CONDITIONS OF THE LOCAL/ STATE/ FEDERAL PERMITS.
24. THE ENTIRE SITE SHALL BE DEVELOPED AND/OR MAINTAINED AS DEPICTED ON THE SITE PLAN. APPROVAL OF THE PLANNING AUTHORITY OR PLANNING BOARD SHALL BE REQUIRED FOR ANY ALTERATION TO OR DEVIATION FROM THE APPROVED SITE PLAN, INCLUDING, WITHOUT LIMITATION: TOPOGRAPHY, DRAINAGE, LANDSCAPING, RETENTION OF WOODED OR LAWN AREAS, ACCESS, SIZE, LOCATION, AND SURFACING OF PARKING AREAS.
25. DO NOT PARK, IMPEDE ACCESS TO, OR STORE EQUIPMENT ON ADJACENT CITY OR PRIVATELY OWNED LOTS, UNLESS PERMISSION HAS BEEN GRANTED IN ADVANCE IN WRITING BY CITY AND/OR LAND OWNER
26. PRIOR TO CONSTRUCTION, A PRECONSTRUCTION MEETING SHALL BE HELD AT THE PROJECT SITE WITH THE CONTRACTOR, ENGINEER, CITY OF PORTLAND DEVELOPMENT REVIEW COORDINATOR, CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS REPRESENTATIVE, AND OWNER TO REVIEW THE CONSTRUCTION SCHEDULE AND CRITICAL ASPECTS OF THE SITE WORK. AT THAT TIME, THE SITE/BUILDING CONTRACTOR SHALL PROVIDE THREE (3) COPIES OF A DETAILED CONSTRUCTION SCHEDULE TO THE ATTENDING CITY REPRESENTATIVE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE A MUTUALLY AGREEABLE TIME FOR THE PRECONSTRUCTION MEETING.
27. CONTRACTOR SHALL PROVIDE AND MAINTAIN EROSION AND SEDIMENTATION CONTROL MEASURES IN ACCORDANCE WITH THESE PLANS AND THE LATEST EDITION OF THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION'S BEST MANAGEMENT PRACTICES MANUAL. KEEP ALL STREETS FREE OF DUST, MUD, AND DEBRIS. STREETS AND WALKWAYS SHALL BE SWEPT REGULARLY, AND TEMPORARY CONSTRUCTION ENTRANCES SHALL BE UTILIZED DURING CONSTRUCTION.
28. CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN ACCORDANCE WITH REQUIREMENTS OUTLINED WITHIN THE MAINE CONSTRUCTION GENERAL PERMIT. CONTRACTOR SHALL FILE A NOTICE OF TERMINATION WITH PHOTOGRAPHS AND REQUIRED ATTACHMENTS TO THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION UPON COMPLETION OF THE PROJECT. A DRAFT OF THE NOTICE WILL BE PROVIDED TO THE OWNER AND THE OWNER'S REPRESENTATIVE FOR REVIEW PRIOR TO SUBMISSION. A COPY OF THE NOTICE CAN BE OBTAINED AT WWW.MAINE.GOV/DEP/LAND/STORMWATER/CONSTRUCTION.HTML
29. CONTRACTOR SHALL MAINTAIN EROSION CONTROL AND STORMWATER POLLUTION PREVENTION SYSTEMS IN COMPLIANCE WITH THE REQUIREMENTS OF THE MAINE CONSTRUCTION GENERAL PERMIT (MCGP). CONTRACTOR SHALL CONDUCT AND MAINTAIN RECORDS OF EROSION CONTROL INSPECTIONS PER THE NOTICE OF INTENT TO COMPLY WITH THE MAINE CONSTRUCTION GENERAL PERMIT. SUBMIT A COPY OF THE INSPECTION RECORDS TO THE OWNER AND ENGINEER.
30. A COMPLETE SET OF "RECORD" DRAWINGS THAT REFLECT ANY AND ALL MODIFICATIONS TO THE STORM SEWER SYSTEM AND ANY OTHER UTILITY INSTALLATIONS OR ALTERATIONS WITHIN THE PROJECT LIMITS SHALL BE SUBMITTED TO THE OWNER AND ENGINEER.
31. ACTIVITIES THAT HAVE THE POTENTIAL TO DISTURB SOIL SUCH AS UTILITY AND SUBSURFACE STRUCTURE INSTALLATION/RELOCATION WORK, GRADING, PAVING, AND LANDSCAPING SHALL BE CONDUCTED IN ACCORDANCE WITH THE SOIL MANAGEMENT PLAN. APPLICABLE SOIL MANAGEMENT PROCEDURES INCLUDE SITE CONTROLS AND CONSTRUCTION MEASURES TO REDUCE EXPOSURE TO SOIL DURING CONSTRUCTION, AS WELL AS TO FACILITATE THE PROPER HANDLING, STORAGE, CHARACTERIZATION, TRANSPORT, ONSITE REUSE, AND/OR OFFSITE REUSE, OR DISPOSAL, OF EXCESS SOIL THAT MAY BE GENERATED DURING CONSTRUCTION.
32. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE A MAINTENANCE AND PROTECTION OF TRAFFIC (MPT) PLAN IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS.

DEMOLITION NOTES:

1. PRIOR TO THE START OF DEMOLITION, THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND/OR APPROVALS FROM THE CITY OF PORTLAND, AND ALL OTHER AUTHORITIES HAVING JURISDICTION.
2. CONSTRUCTION/DEMOLITION DEBRIS NOT APPROVED FOR REUSE ON–SITE, SHALL BE REMOVED AND DISPOSED OFF SITE IN ACCORDANCE WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION. WASTE MANIFEST FORMS DOCUMENTING PROPER OFF–SITE DISPOSAL SHALL BE PROVIDED TO THE SITE/CIVIL ENGINEER AND THE CITY OF PORTLAND.
3. PRIOR TO THE START OF DEMOLITION, THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES TO BE DEMOLISHED OR TO REMAIN PROTECTED DURING CONSTRUCTION. IF ANY DISCREPANCIES ARE FOUND, THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER IN WRITING OF THE CONFLICT.
4. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES TO REMAIN. ANY TEMPORARY SHUT DOWNS REQUIRED TO FACILITATE THE PROPOSED CONSTRUCTION, WHICH MAY AFFECT USES ON ADJACENT PROPERTIES SHALL BE COORDINATED BY THE CONTRACTOR AND THE APPROPRIATE UTILITY.
5. CONTRACTOR SHALL REPAIR OR REPLACE ANY STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION. THE CONTRACTOR SHALL PROCEED WITH CAUTION WITHIN THE PROPOSED WORK AREA TO PREVENT ANY INTERRUPTION TO EXISTING UTILITY SERVICE.
6. CONTRACTOR SHALL COVER CONSTRUCTION DUMPSTERS AND ROLL–OFF CONTAINERS, AND STORE ALL CONSTRUCTION CHEMICALS INSIDE THE CONSTRUCTION TRAILER OR UNDER A COVERED AREA DURING PERIODS WHEN CONSTRUCTION CEASES.
7. SAWCUTS IN EXISTING PAVEMENT SHALL BE SMOOTH AND STRAIGHT.
8. EXISTING FACILITIES (I.E. SIGNS, POLES, CURB, ETC.) SHALL BE REMOVED AND PROTECTED DURING CONSTRUCTION. OWNER RETAINS RIGHT TO KEEP ANY AND ALL REMOVED FACILITIES. CONTRACTOR SHALL DISPOSE OF ANY REMOVED FACILITY AT THE REQUEST OF THE OWNER AT CONTRACTOR'S EXPENSE.

LAYOUT AND MATERIALS NOTES:

1. ALL DIMENSIONS AND RADII ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.

GRADING AND DRAINAGE NOTES:

1. CASTINGS FOR EXISTING STRUCTURES TO REMAIN AND PROPOSED STRUCTURES SHALL BE SET TO THE PROPOSED ELEVATIONS SHOWN ON THE DRAWINGS.
2. THE FILLING OF SOIL OVER THE ROOTS OF TREES TO BE PRESERVED IS PROHIBITED.
3. CLEAN AND/OR FLUSH ALL MANHOLES AND SITE PIPING AFTER THE WORK HAS BEEN COMPLETED. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.
4. PROVIDE END CAPS ON ALL UNDERDRAIN PIPING EXCEPT WHERE DAYLIGHTED, UNLESS OTHERWISE NOTED.

UTILITIES NOTES:

1. ALL PROPOSED UTILITIES (WATER, ELECTRIC, SANITARY, STORM SEWER, ETC.) AND THEIR CONNECTIONS, DISCONNECTION AND RELOCATION OF EXISTING UTILITIES SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY HAVING JURISDICTION. ANY COORDINATION WITH THE MUNICIPALITY AND/OR UTILITY COMPANY, PERMITS OR APPROVALS REQUIRED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

CONSTRUCTION PHASING:

CONSTRUCTION SHALL BE PHASED SUCH THAT ALL DISTURBED AREAS SHALL FIRST BE PROTECTED WITH EROSION AND SEDIMENT CONTROLS AS INDICATED ON THE PLANS PRIOR TO THE START OF ANY GROUND DISTURBING ACTIVITIES. THE CONSTRUCTION PHASING DESCRIBED BELOW IS FOR GENERAL PURPOSES ONLY, AND WILL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR HIS/HER MEANS AND METHODS OF CONSTRUCTION. GENERAL CONSTRUCTION SEQUENCING IS AS FOLLOWS:

1. INSTALLATION OF EROSION AND SEDIMENT CONTROL PRACTICES AS INDICATED ON THE PLANS.
2. DEMOLITION AND REMOVAL OF EXISTING PAVEMENT, CURB, TREES, UTILITIES, ETC.
3. STRIP AND STOCKPILE TOPSOIL AT DESIGNATED STORAGE AREA.
4. BEGIN ROUGH GRADING AND EARTHWORK ACTIVITIES (EXCAVATION OPERATIONS).
5. INSTALL STORM SEWER SYSTEM (BEGINNING AT FURTHEST DOWNSTREAM STRUCTURE).
6. PLACE INLET PROTECTION ON PROPOSED CATCH BASINS AS SHOWN ON THE DRAWINGS.
7. INSTALL ELECTRICAL UTILITIES.
8. INSTALL BITUMINOUS CONCRETE PAVEMENT SUBBASE AND BITUMINOUS CONCRETE BINDER COURSES AS SPECIFIED ON PLANS.
9. FINISH GRADING, REDISTRIBUTE STOCKPILED TOPSOIL AND ESTABLISH VEGETATION ON ALL DISTURBED AND NEW PERVIOUS AREAS.
10. CLEAN BITUMINOUS CONCRETE PAVEMENT AND STORM SEWER OF ALL DEBRIS AND SEDIMENT.
11. COMPLETE SITE CONSTRUCTION.
12. INSTALLATION OF BITUMINOUS PAVEMENT CONCRETE TOP COURSE (THIS WEARING COURSE SHALL BE INSTALLED NEAR COMPLETION OF PROJECT).
13. ACHIEVE PERMANENT AND FINAL STABILIZATION OF AREAS DISTURBED DURING CONSTRUCTION.
14. REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL PRACTICES FROM THE SITE.

LEGEND

EXISTING		PROPOSED
122	CONTOUR (1' INTERVAL)	122
120	CONTOUR (INDEX)	120
S	SANITARY SEWER	S
FM	FORCE MAIN	
SD	STORM DRAIN	SD
UD	UNDERDRAIN	UD
W	WATER MAIN	
E	UNDERGROUND ELECTRIC	E
T	UNDERGROUND TELEPHONE	
G	GAS LINE	G
OE	OVERHEAD ELECTRIC	
P	PROPERTY LINE	
R/W	RIGHT OF WAY	
	EASEMENT	
X X	FENCE	
	VERTICAL CURB	
	SLOPED GRANITE CURB	
	TIPDOWN CURB	
	EDGE OF PAVEMENT	
	EDGE OF GRAVEL	
	GUARDRAIL	
	STORM DRAIN PIPE & CATCH BASIN	
	SEDIMENT BARRIER	
	LIMIT OF WORK	LW
	SANITARY SEWER MANHOLE	
	CLEAN OUT	CO
	DRAINAGE MANHOLE	DMH
	CATCH BASIN	
	SEWER MANHOLE	SMH
	GAS METER BOX	
	GAS VENT	
	GATE GATE	
	TRANSFORMER	
	UTILITY POLE	
	UTILITY PILE WITH GUY	
	LIGHTPOST	
	WATER GATE	
	CURB STOP	
	HYDRANT	
	PROPERTY MONUMENT	
	STREET AND MISCELLANEOUS SIGNS	
XXX.XX	SPOT ELEVATION	XXX.XX
	DECIDUOUS TREE	
	CONIFEROUS TREE	
	SHRUB	
	BITUMINOUS PAVEMENT	
	POROUS PAVEMENT	
	CONCRETE SIDEWALK	
	PAVER AREA, SEE LANDSCAPING PLANS	
	STONE AREA, SEE LANDSCAPING PLANS	

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STATE OF MAINE
ASHLEY FLETCHER
No. 13750
LICENSED PROFESSIONAL ENGINEER

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PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

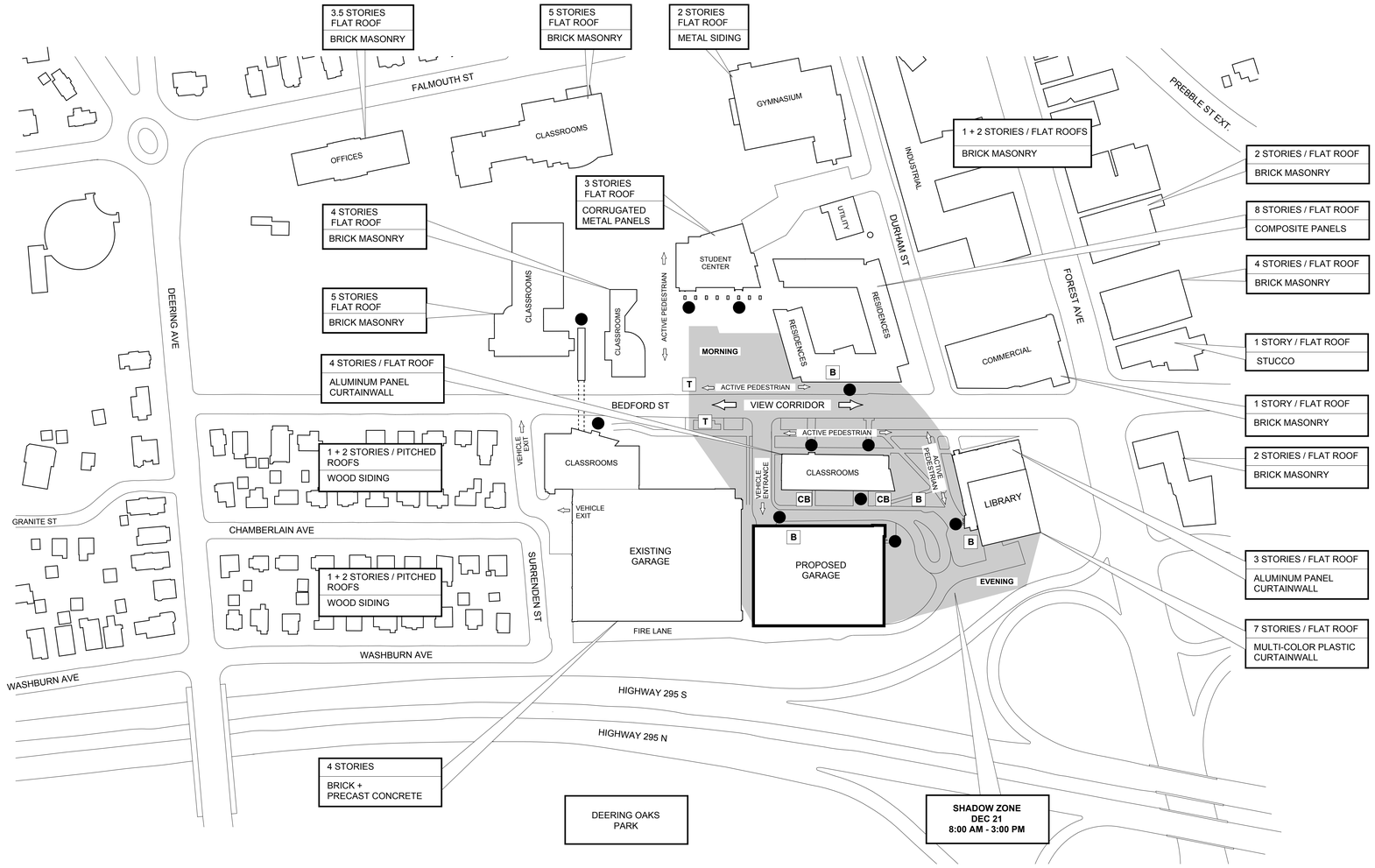
SCALE	**1"=20'**
DATE ISSUED	**7/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**B.C.M.**
CHECKED BY	**A.E.F.**

SHEET TITLE:

GENERAL NOTES & LEGEND

G-001

\\woodardcurran.net\shared\Projects\02235035.00 usm - falmouth street garage\vpk\Drawings\General\02235035.00 G001.dwg, Jul 29, 2021 - 2:48pm RMCDEVITT



G: 25.0 T: 74.0 H: 49	G: 23.0 T: 72.0 H: 49
G: 25.0 T: 74.0 H: 49	G: 23.0 T: 72.0 H: 49

PROPOSED GARAGE HEIGHT DIAGRAM

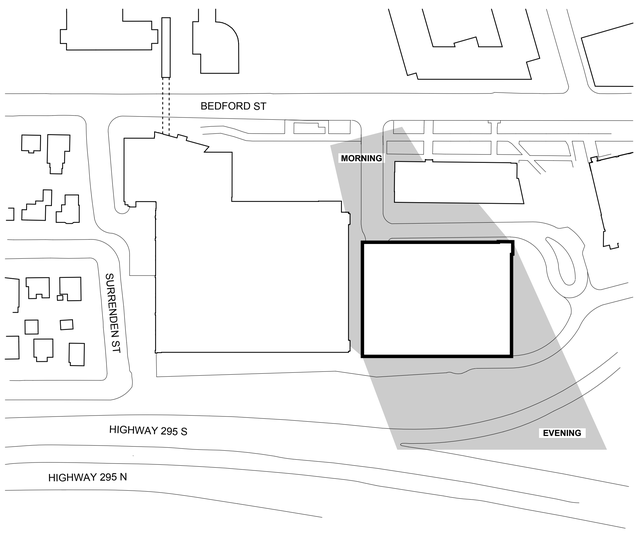
G - ELEVATION OF GRADE AT CORNER
T - ELEVATION OF TOP OF ROOF LEVEL SPANDREL BEAM
H - HEIGHT OF BUILDING AT CORNER

AVERAGE HEIGHT = 49'

USM OVERLAY ZONE ALLOWS 85'

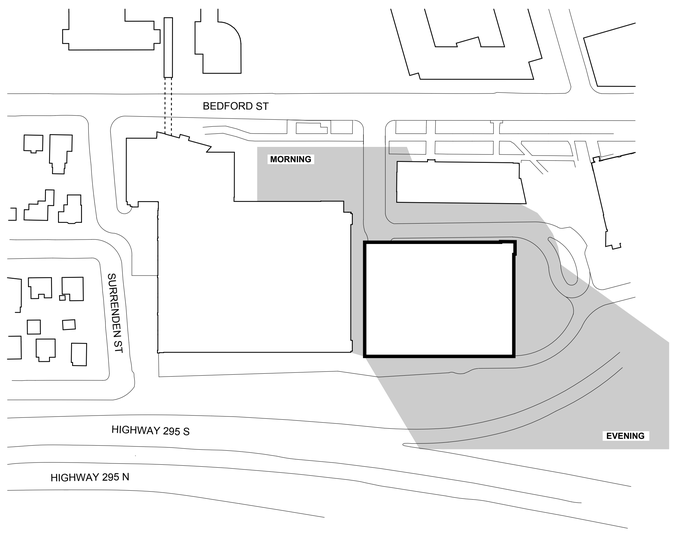
LEGEND

- AREA SUBJECT TO SHADOW CAST BY PROPOSED GARAGE ON WINTER SOLSTICE BETWEEN 1 HOUR AFTER SUNRISE TO 1 HOUR BEFORE SUNSET
- MAJOR PEDESTRIAN ARRIVAL POINTS
- B — BICYCLE RACK OR STORAGE ROOM
- CB — FUTURE CITIBIKE STATION
- T — BUS STOP



SHADOWS CAST MARCH + SEPTEMBER 21ST

6:46 AM TO 4:50 PM



SHADOWS CAST JUNE 21ST

5:05 AM TO 6:20 PM

NORTH

100 0 100 200

BAR SCALE
1" = 100'
CHECK GRAPHIC SCALE BEFORE USING

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2021

PROJECT:

USM - Structured Parking Garage

Address
44 Bedford Street,
Portland ME 04104

REVISIONS:

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07/30/21	Site Plan Submittal

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SHEET TITLE:

Context +

Shadow Plans

G - 100

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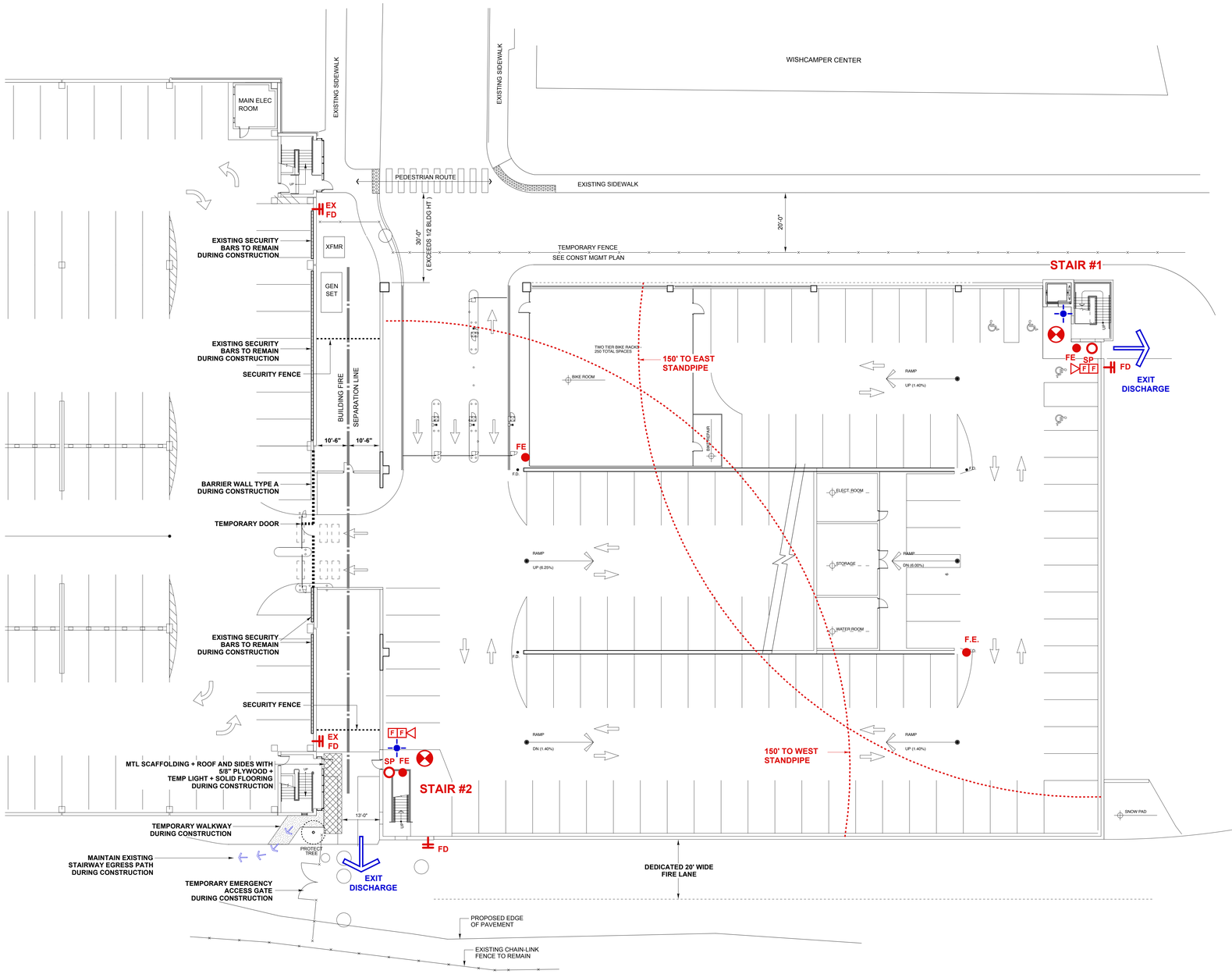
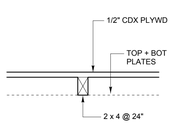


GROUND LEVEL LAYOUT PLAN

1" = 16' - 0"



BARRIER WALL TYPE A

INFILL OPENING IN EXISTING PRECAST CONC WALL

TEMPORARY BARRIER WALL TYPES

1" = 1' - 0"

Legend

- EXIT
- SP — DRY STANDPIPE
- EX FD — EXISTING STANDPIPE HOSE CONNECTION
- FD — STANDPIPE HOSE CONNECTION
- FE — FIRE EXTINGUISHER
- SECURITY CALL BOX
- F F — FIRE ALARM PULL STATION + ANNUNCIATOR

NORTH

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

BUILDING CODE SUMMARY

University of Southern Maine Parking Garage
Building Address: Portland, ME

APPLICABLE CODES (Per MUBEC: Maine Uniform Building and Energy Code)

Building	IBC 2015 (International Building Code)
	IEBC 201 (International Existing Building Code)
Electrical	National Electrical Code 2009
Fire Protection	NFPA Life Safety Code 2015 and NFPA 1 Uniform Fire Code
Mechanical	International Mechanical Code 2015
Plumbing	Maine State Internal Plumbing Code (UPC 2015)
Energy	IECC 2015 (International Energy Conservation Code)
Accessibility	ADA 2010 (Americans With Disabilities Act)

PROJECT DESCRIPTION:
New Construction - Parking Garage

Open or Closed	**Open**
Proposed Construction Type :	Type II B / NFPA II (000)
Gross Area Per Tier:	45,050 +/- Per Tier
Height :	Grade + 4 Tiers / 49'-9" (Top of Roof Spandrel Beams)
Use Group IBC :	Open Parking Garage Section 406
Use Group NFPA :	Open Parking Garage Chapter 42.8
High Rise Requirements	Not Applicable
Automatic Suppression System	No
Dry Standpipe System	Yes
Multiple Occupancies	No

BUILDING CODE REQUIREMENTS (IBC 2015)

Height and Area Summary (Table 406.5.4)

Allowable Height :	8 Tiers
Allowable Area	50,000 SF/Tier

REQUIRED FIRE RESISTANCE RATINGS

ELEMENT (IBC Table 601/NFPA 101 Table A8.2.1.2)	RATING (In Hours)
Primary Structural Frame	**0**
Bearing Walls:	
Exterior	**0**
Interior	**0**
Non-Bearing Walls & Partitions	
Exterior	**0**
Interior	**0**
Floor Construction & Secondary Members	**0 (1 Hour Provided)**
Roof Construction & Secondary Members	**0 (1 Hour Provided)**

SPECIFIC ROOM RATINGS	RATING (In Hours)
Stairs and Floor Openings	**0**
Parking Open Ramps	**0**
Offices + Break Room	**0**
Electrical	**0**
Elevator Shaftway	**2**

EXTERIOR WALL PROTECTION

Wall Fire Resistance Rating (Table 602)	**0** (No rating for 10' or greater per Note c.)
Openings Rating (Table 705.8)	**0** (No rating for 10' or greater per Note g.)

OCCUPANCY LOADS

NFPA Per Chapter 42.8.1.7 :	None
IBC Per Table 1004.1.2 :	1 Per 200 GSF / 226 Per Tier
Egress Width Required : Stairs @ 0.3" Per Person	68"
Egress Width Provided :	96"' / (2) 48" Wide Stairs
Stair Exit Door Width Required: 0.2" Per Person	46"
Stair Exit Door Width Provided:	32" Clear Door @ Each Stair

NOTES

1. THE CONSTRUCTION MANAGER SHALL PROVIDE A CONSTRUCTION PHASING PLAN OUTLINING WORK ZONES AND PROTECTION AND SEPARATION FEATURES.
2. CONSTRUCTION MANAGER SHALL OBTAIN APPROVAL OF PROTECTION AND SEPARATION PROVISIONS PRIOR TO EACH PHASE FROM THE CITY CODES ENFORCEMENT OFFICE.

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PROJECT:

USM - Structured Parking Garage

Address
44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

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SCALE	1/16" = 1'-0"
DATE ISSUED	07/30/2021
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SHEET TITLE:

Ground Level Code Information Plan

G - 101

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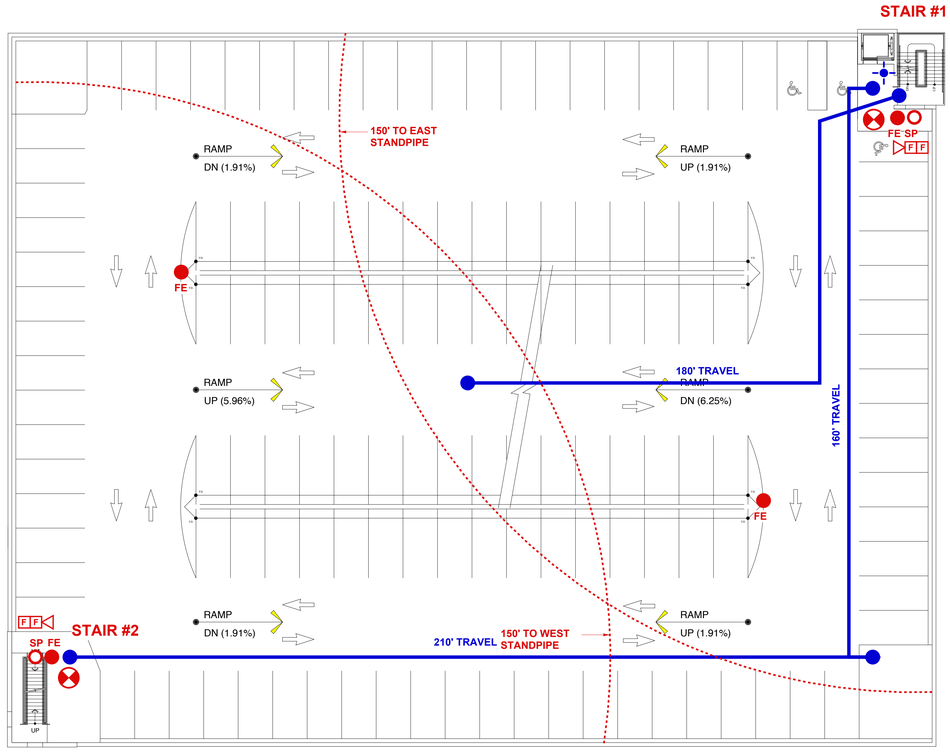

TYPICAL FLOOR LAYOUT PLAN

1" = 16' - 0"

Legend

- EXIT
- SP — DRY STANDPIPE
- EX FD — EXISTING STANDPIPE HOSE CONNECTION
- FD — STANDPIPE HOSE CONNECTION
- FE — FIRE EXTINGUISHER
- SECURITY CALL BOX
- F F — FIRE ALARM PULL STATION + ANNUNCIATOR

NORTH

16 0 16 32

BAR SCALE

1" = 16'

CHECK GRAPHIC SCALE BEFORE USING

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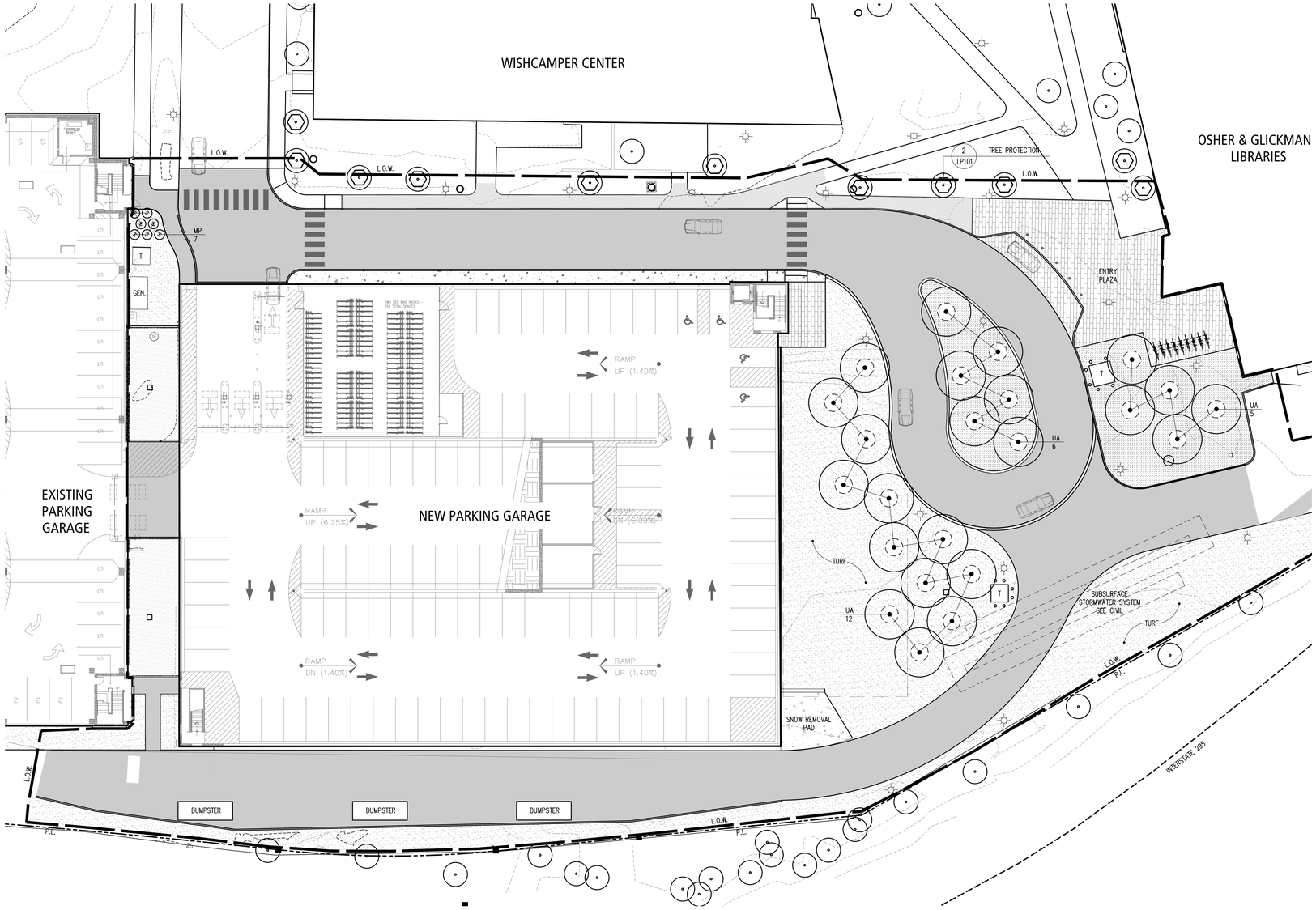
SHEET TITLE:

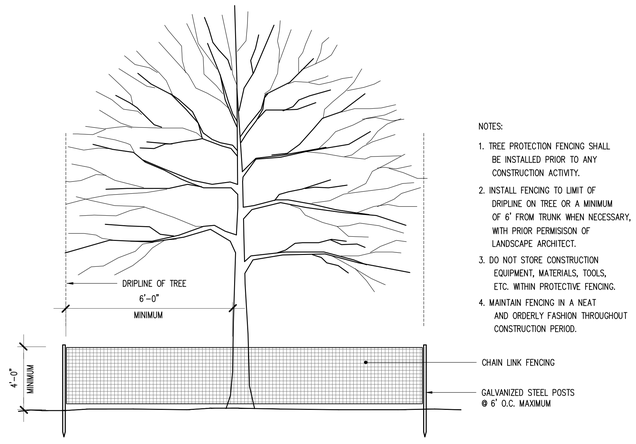
Upper Levels Code Information Plan
Levels 1 / 2 / 3 + ROOF

G - 102

NOT FOR CONSTRUCTION



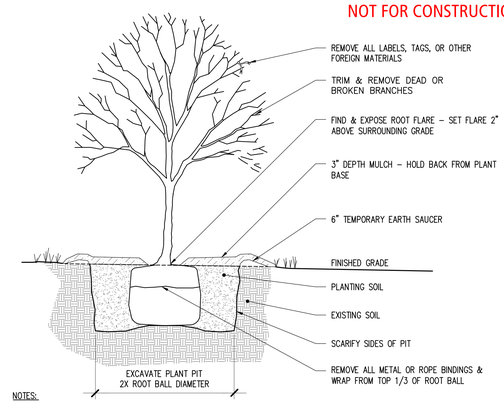
1 PLANTING PLAN
1" = 20'-0"



NOTES:

1. TREE PROTECTION FENCING SHALL BE INSTALLED PRIOR TO ANY CONSTRUCTION ACTIVITY.
2. INSTALL FENCING TO LIMIT OF DRIPLINE ON TREE OR A MINIMUM OF 6' FROM TRUNK WHEN NECESSARY, WITH PRIOR PERMISISON OF LANDSCAPE ARCHITECT.
3. DO NOT STORE CONSTRUCTION EQUIPMENT, MATERIALS, TOOLS, ETC. WITHIN PROTECTIVE FENCING.
4. MAINTAIN FENCING IN A NEAT AND ORDERLY FASHION THROUGHOUT CONSTRUCTION PERIOD.

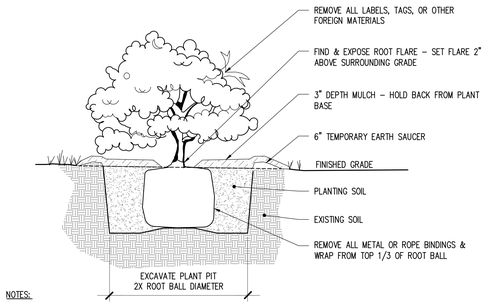
2 TREE PROTECTION DETAIL
N.T.S.



NOTES:

1. TREE TO BE SET PLUMB.
2. SECURE TREE AS MAY BE REQUIRED ACCORDING TO TREE SIZE, LOCATION, & WIND/WEATHER CONDITIONS.
3. IF USING ROOTBALL STABILIZATION, FOLLOW MANUFACTURER'S RECOMMENDATIONS.

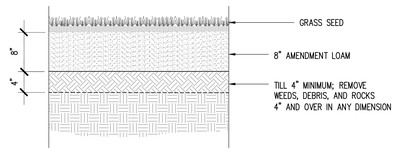
3 TREE PLANTING DETAIL
1/2" = 1'-0"



NOTES:

1. SHRUB TO BE SET PLUMB.
2. SECURE SHRUB AS MAY BE REQUIRED ACCORDING TO SIZE, LOCATION, & WIND/WEATHER CONDITIONS.
3. IF USING ROOTBALL STABILIZATION, FOLLOW MANUFACTURER'S RECOMMENDATIONS.

4 SHRUB / GROUNDCOVER PLANTING DETAIL
1/2" = 1'-0"



5 TURF PLANTING DETAIL
1" = 1'-0"

PLANT LIST

KEY	QTY	AREA	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	COMMENT
TREES							
UA	23		ULMUS AMERICANA 'PRINCETON'	PRINCETON ELM	4" CAL.	B&B	REC. TREE LIST
SHRUBS							
MP	7		MYRICA PENNSYLVANICA	BAYBERRY	#3	POT	
GROUNDCOVER							
	GC	4,760 SF	--	NATIVE GROUNDCOVER	--	--	
	TURF	17,990 SF	--	TURF GRASS	--	SEED	COMPLIANT WITH CITY OF PORTAND PESTICIDE ORDINANCE

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SCALE	**AS NOTED**
DATE ISSUED	**07/30/2021**
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DRAWN BY	**G.G.**
CHECKED BY	**-**

SHEET TITLE:

Planting and Landscape Plan

LP-101



University of Southern Maine Parking Garage

Overview From North

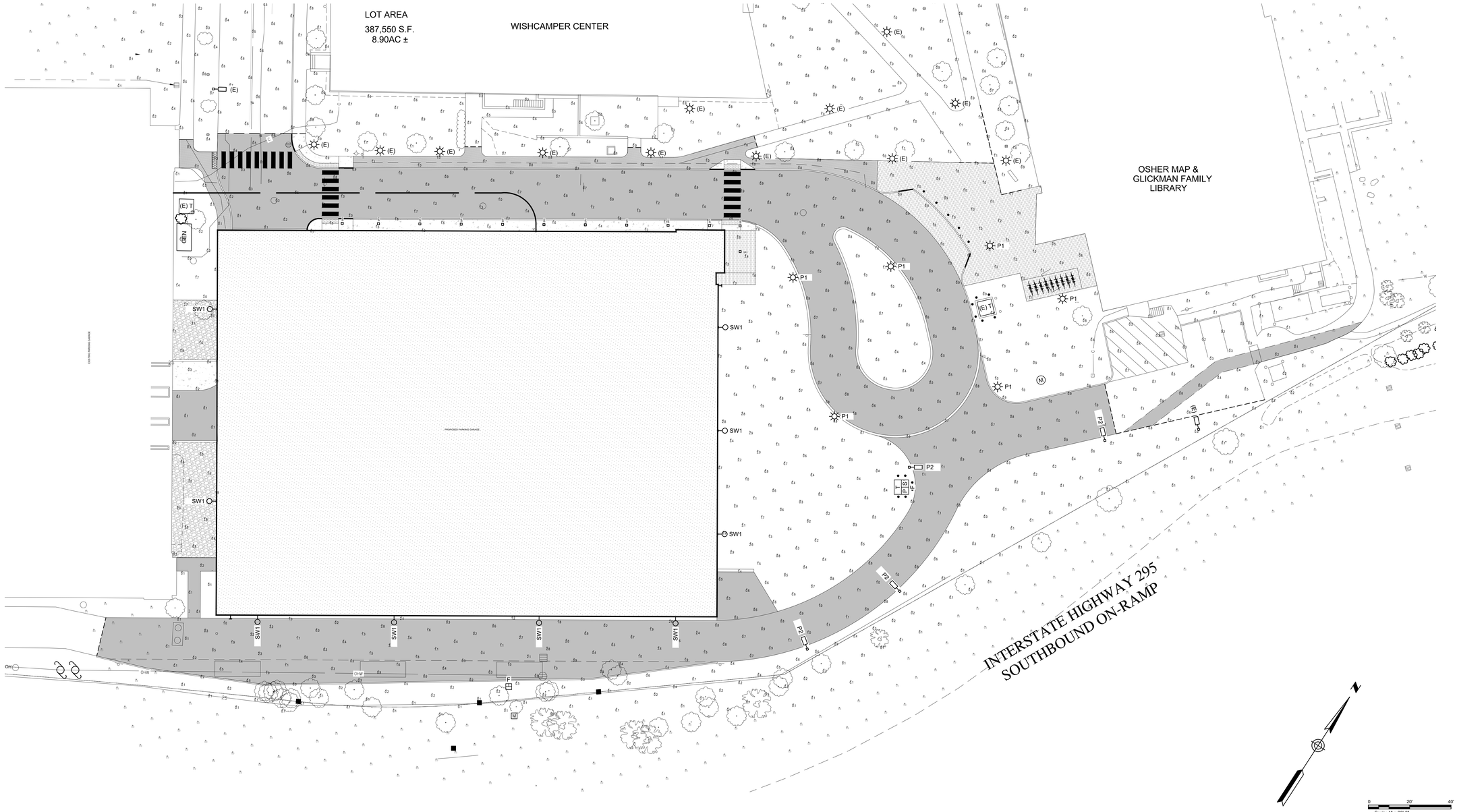
LUMINAIRE SCHEDULE ~ SITE

TYPE	DESCRIPTION	MFR	CATALOG SERIES NUMBER SEE NOTE 1	MOUNTING, U.N.O.	VOLTS	LAMP				KEY NOTES
						QTY PER FIXTURE	WATTS	LUMENS	TYPE	
P1	SITE LIGHT AND POLE, "ICE CREAM CONE" SHAPE	SEE NOTE 8		14' POLE	277	1	24	3,330	LED ARRAY ~ 4000K	8,9
P2	SITE LIGHT AND POLE, "SHOEBOX" SHAPE	SEE NOTE 8		14' POLE	277	1	18	2,160	LED ARRAY ~ 4000K	8,10
SW1	WALL MOUNTED EXTERIOR LIGHT	LITHONIA	KAXW-LED-P1-40K-R4-MVOLT	KEYNOTE 5	UNV	1	29	3,643	LED ARRAY ~ 4000K	5
SR1	RECESSED CANOPY LIGHT	LITHONIA	LDN4SQ-40-07-LS4-AR-LSS-MVOLT	RECESSED CANOPY	UNV	1	8.6	620	LED ARRAY ~ 4000K	

	NOTES
1	**NOTE THAT THESE NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. PROVIDE ALL REQUIREMENTS ON SCHEDULE, NOTES, SPECS, AND DRAWINGS COMBINED.**
2	**CATALOG SERIES NUMBERS ARE USED TO ESTABLISH A LEVEL OF QUALITY AND NOT INTENDED TO LIMIT COMPETITION. SERIES NUMBERS ARE NOT COMPLETE CATALOG NUMBERS. COMPLY WITH ADDITIONAL REQUIREMENTS IN SPECIFICATIONS AND DRAWINGS.**
3	PROVIDE WALL,CEILING, OR PENDANT MOUNTING AS INDICATED ON PLANS. PROVIDE NUMBER OF FACES AND ARROWS AS INDICATED.
4	VERIFY CEILING STRUCTURE AND MOUNTING HEIGHT PRIOR TO ORDERING ANY LIGHT FIXTURES.
5	COORDINATE MOUNTING HEIGHT WITH STRUCTURAL AND ARCHITECTURAL DRAWINGS.
6	PROVIDE COLD WEATHER OPTION.
7	CONFIRM EXACT FIXTURE CONFIGURATION AND OPTIONS WITH MUNICIPALITY PRIOR TO ORDERING FIXTURE.
8	FIXTURE AND POLE SHALL BE PROVIDED BY OWNER FROM EXISTING OWNER'S STOCK.
9	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8029E345-A.
10	PROVIDE SCREW-IN LED RETROFIT LAMP. BASIS OF DESIGN IS MFG. BY LIGHT EFFICIENT DESIGN, PART NO. LED-8039E40-A.

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
DRIVES	Illuminance	Fc	0.99	3.5	0.2	4.95	17.50
WALKWAY- GLICKMAN	Illuminance	Fc	1.00	1.3	0.5	2.00	2.60
WALKWAY- NEW GARAGE	Illuminance	Fc	1.46	1.7	1.2	1.22	1.42



A1	PHOTOMETRIC SITE PLAN
SCALE: 1"=20'-0"	

7/2/2021 3:16:33 PM

UNIVERSITY OF SOUTHERN MAINE

25 Bedford Street, Portland, ME 04104
207.712.5183 | USM.MAINE.EDU

PROJECT TEAM:

CLIENT
UNIVERSITY OF SOUTHERN MAINE

PRIME CONSULTANT
& STRUCTURAL ENGINEER
DESMAN Design Management
18 Tremont Street #300
Boston, MA 02108

ARCHITECT
WINTON-SCOTT ARCHITECTS
5 MILK STREET
PORTLAND, ME 04101

CIVIL ENGINEER
WOODARD & CURRAN
41 HUTCHINS DRIVE
PORTLAND, ME 04102

LANDSCAPE ARCHITECT
MICHAEL BOUCHER LANDSCAPE ARCHITECTURE
457 US ROUTE 1 SUITE 2
FREEPORT, ME 04032

MEP/FP ENGINEER
ALLIED ENGINEERING
160 VERANDA STREET
PORTLAND, ME 04103

GEOTECHNICAL ENGINEER
S.W. COLE
286 PORTLAND ROAD
GREY, ME 04039

TRAFFIC ENGINEER
VANASSE HANGEN BRUSTLIN INC
40 IDX DR 100 #200, SOUTH
BURLINGTON, VT 05403

COST ESTIMATOR
PREFERRED CONSTRUCTION MGMT
94 AUBURN ST,
PORTLAND, ME 04103

SEAL / SIGNATURE

© DESMAN, Inc.
2021

PROJECT:

USM - Structured Parking Garage

Address

44 Bedford Street,
Portland ME 04104

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/30/21	Site Plan Submittal

SCALE	**AS NOTED**
DATE ISSUED	**07/30/2021**
PROJECT NO	**20-20145.00-1**
DRAWN BY	**GMC**
CHECKED BY	**BTG**

SHEET TITLE:

SITE PHOTOMETRIC PLAN AND SCHEDULES

SL-100



University of Southern Maine Parking Garage

Stairway Entrance



University of Southern Maine Parking Garage

Garage Entrance

NOTICE FROM CITY OF PORTLAND PLANNING DIVISION

IN THE VICINITY OF 50 BEDFORD ST

To residents and property owners: The University of Southern Maine has submitted a Major Site Plan application to facilitate the development of a five-level, 632 space parking garage with a footprint of 45,100 square feet, along with associated site improvements, at 50 (44) Bedford Street. The subject property is 8.1 acres in size and is located in the R-5 Residential and B-2 Community Business zones as well as in the USM Overlay Zone.

In accordance with the Portland Land Use Ordinance, notices of receipt of a Major Site Plan application must be sent to property owners within 500 ft. of the subject property (or 1,000 ft. if the project is a subdivision or map amendment for a site located within an Industrial Zone). You will be notified of future Planning Board meetings by receiving notices from the Planning Division prior to any workshops or public hearings.

A project and plan summary is available for viewing on the Citizen Self Service Portal (https://css.portlandmaine.gov/), by referencing Plan Number PL-001729-2021. Written comments should be submitted to planningboard@portlandmaine.gov. If you have any questions regarding the proposal, please contact James Dealaman, Planner, by phone at (207)874-8718 or e-mail at jdealaman@portlandmaine.gov.

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Att.3

Portland Maine Yes. Google's good here.

Jimmy Dealaman <jdealaman@portlandmaine.gov>

USM Bedford Street Garage - Final Traffic Comments

Tom Errico <thomas.errico@tylin.com> Thu, Jan 6, 2022 at 4:08 PM
To: James Dealaman <jdealaman@portlandmaine.gov>

Hi Jimmy – the following are final mitigation requirements related to the TMP and other comments related to the final traffic review.

1. The applicant shall provide conceptual design plans, preliminary and final plans and specifications for Bedford Street Improvements as detailed on the plan prepared by VHB dated December 22, 2021). Final design plans will need to be stamped by a professional engineer. *These improvements are being required to facilitate access and egress movements to the garage and providing safe pedestrian and bicycle movements.*
2. The applicant shall provide conceptual design plans, preliminary and final plans and specifications for Traffic calming / pedestrian improvements at the Falmouth Street / Oakdale Street intersection for review and approval by the Department of Public Works and Planning Authority. *This improvement is required to address safety concerns as it relates to vehicles speeds and general neighborhood impacts on Falmouth Street.*
3. The applicant shall be responsible for the implementation of do not block driveway pavement markings and signage on Forest Avenue at the Oakhurst driveway. The applicant shall provide conceptual design plans, preliminary and final plans and specifications to the City for review and approval. Final design plans will need to be stamped by a professional engineer. *This improvement is required due to vehicle blockage and impacts at Oakhurst's driveway as traffic queues extend from the Bedford/Baxter intersection.*
4. The applicant shall be responsible for implementing traffic signal equipment improvements at the Forest Avenue/Bedford Street intersection. This upgrade shall include all equipment necessary for a traffic signal system that is fully active and functioning within the Surtrac Adaptive network. The proposed system shall be coordinated with Rapidflow Technologies and shall be field tested and verified before being accepted by the City. This testing shall be part of a monitoring requirement as defined in the conditions of approval. *This improvement is to address congestion issues documented at the subject intersection.*
5. The applicant shall provide conceptual design plans, preliminary and final plans and specifications for improvements at the Forest Avenue/Bedford Street/Baxter Boulevard intersection based on the Smart Corridor Study recommendations for review and approval by the Department of Public Works and Planning Authority. These shall include geometric modifications to the corners on the Baxter Boulevard approach and upgrades to pedestrian traffic signal equipment. *This improvement is to address pedestrian safety concerns at the subject intersection. It should be noted that this mitigation requirement which will be addressed via a condition set by the November 10, 2020 Planning Board approval for the Student Center and Dorm project at 25 Bedford (PL-001040-2020)*
6. The applicant shall be responsible for implementing traffic signal equipment improvement on the I-295 Southbound Off-Ramp. The improvements shall include all equipment necessary for installing a vehicle queue detection system that is compatible with the RapidFlow signal system at Forest/Bedford/Baxter intersection. The proposed system shall be field tested and verified before being accepted by the City. This testing shall be part of a monitoring requirement as defined in the conditions of approval. *This improvement is being required to address long vehicle queues on the ramp with the goal of avoiding any backups onto I-295.*

Status Comments

- The applicant shall conduct traffic modeling that evaluates bus stop configuration on Bedford Street to help inform the design of roadway improvements.

Final Status: The applicant has conducted the requested modeling and significant vehicle queueing at the bus stops is not expected. I have no further comment.

- I continue to review the construction management plan, but the applicant should also provide construction management plans for the Bedford Street improvements.

Status: I continue to work with City staff on this item.

Final Status: A condition of approval has been added regarding providing this information. I have no further comment.

- The City finds the revised garage entry/exit plan to be acceptable based on the results of the traffic modeling. The final acceptance of this change will be pending the review of revised materials including an updated Section 7 Traffic

Study and Bedford Street improvement plan.

Status: The revised Section 7 Study was transmitted this week and review is on-going.

Final Status: I have reviewed the Section 7 Traffic Study and I find the proposed access/egress plan to be acceptable.

- The applicant shall provide details on how traffic will be managed on Surrenden Street under a reversible garage gate scenario. This is related to traffic control entering and exiting the garage (signage, pavement markings, etc.).

Status: The applicant has provided a revised plan and my initial review indicates a need for changes to pavement markings in the area of the reversible lane. The diagonal markings seem confusing and not appropriate for the intended purpose.

Final Status: I find the current plan to be acceptable. It is my understanding the applicant is willing to commit parking staff to install traffic cones in order to delineate the change in traffic direction at the gate when the lane is reversed. I find this to be acceptable.

- There are safety concerns for pedestrians crossing Surrenden Street near the Garage entry under a two-lane entry scenario (pedestrians having to navigate through two lanes of queued vehicles). The applicant shall develop a concept plan for a sidewalk to be located on the east side of Surrenden Street.

Status: This continues to be a concern given the proposed garage access/egress plan. Specifically, I am concerned about two lanes of entry vehicles at the curve and how unsafe this condition may be for pedestrian crossings. We recommended that a sidewalk concept be developed for consideration.

Final Status: The applicant has provided supporting information as it relates to constraints to building the sidewalk and general pedestrian origin and destination patterns. Combined with the proposed pavement markings and adjustments to the crosswalk design, I find conditions to be acceptable.

- The applicant shall provide a revised Section 7 Traffic Study. The Study shall include LOS/Delay/Queue information from SimTraffic for No-Build (not the Falmouth site) and Build conditions for easy comparison of project impacts.

Status: The revised Section 7 Study was transmitted this week and review is on-going.

Final Status: The revised Study has been provided and I have no further comment.

Additional Final Comments

- **The implementation of roadway improvements for this application are based on concept plans that have lack design details. I would note that the design review and acceptance will include but not be limited to the following: drainage, signage, curbing details, pavement marking specifications, removal methods of existing pavement markings, ADA infrastructure compliance, median island specifications, pavement design, geometric details (radii, width, etc.), and bus shelter stop design details.**
- **I have reviewed the parking garage circulation condition between the existing garage and proposed garaged and generally find it to be acceptable. The applicant proposes active and static signage and has indicated that additional signage will be included above the main entrance directing visitors to the appropriate entry lane. Internal to the garage signage, floor striping with directional arrows will further direct visitors to the appropriate zone of parking. I find this to be acceptable.**

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
TY·LIN INTERNATIONAL
12 Northbrook Drive
Falmouth, ME 04105
+1.207.781.4721 main
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Visit us online at www.tylin.com
Twitter | Facebook | LinkedIn | Instagram

WRIGHT-PIERCE
Engineering a Better Environment

MEMORANDUM

TO:	Jimmy Dealaman, Planner	**DATE:**	9/24/2021
FROM:	Michael Guethle, PE	**PROJECT NO.:**	20309C
SUBJECT:	50 Bedford Street – Level III Site Plan, PL - 001729-2021		

Wright-Pierce has reviewed the initial Level III Site Plan Application information provided for the redevelopment at 50 Bedford Street, as defined in the above subject line. The proposed project is located on a 2.4 +/- acre site of land at the USM campus. The proposed project includes redevelopment of existing parking area with a new parking garage facility.

Documents Reviewed by Wright-Pierce:

- Level III Site Plan application, dated (most recent) September 17, 2021
- Engineering Permitting Plans, uploaded (most recent) September 13, 2021
- Comment Response Letter, dated September 17, 2021

Comments:

For stormwater treatment, Level III Site Plan applications with the City of Portland must submit a stormwater plan pursuant to the regulations of MaineDEP Chapter 500 Stormwater Management Rules. This includes conformance with the Basic, General, and Flooding Standards (Ref: Technical Manual, Section 5. II. Applicability in Portland. C. a.; and Ref: City of Portland Code of Ordinances, former code Sec. 14-526. Site Plan Standards, (b). 3. b.)

1) Basic Standard: Per the City's Technical Manual *Portland Stormwater Management Standards And Maine Dep Chapter 500 Stormwater Management*, an Erosion & Sediment Control management plan, notes, and details per the Chapter 500 Rules must be provided to meet the Basic Standard.
    a. Erosion and Sedimentation Control best management practices were observed on the Erosion and Sediment Control Plan and associated Details. An Inspection, Maintenance, and Housekeeping Plan has been provided with the erosion details and notes.

b. In general, application of erosion and sedimentation control devices is appropriate.
    i. Applicant has confirmed the oil/water separator is part of the wastewater services for the project and is separate to the stormwater management system;
    ii. Inspection and Maintenance Log has been updated to incorporate modifications to the project plans as requested. No further action necessary.

2) General Standard: The applicant has provided information regarding the size and scope of the project, and has indicated the project is subject to the General Standard under the requirements of the Site Location of Development Act (SLODA). The project is being reviewed under the redevelopment guidelines and requirements.
    a. The applicant has provided an impact analysis to compare pre-development and post-development land use pollutant rankings under MaineDEP redevelopment guidelines. The written analysis indicated that the proposed development had a higher pollutant ranking than the existing site by a magnitude between 0 and 1, and is therefore required to treat 60% of the proposed site's disturbed surface area.
        i. Applicant has provided updated information confirming the pollutant rankings meet the required standard for surface runoff treatment. No further action necessary.
    b. An executed maintenance contract for the BMP systems is required. Applicant has acknowledged maintenance agreements may be provided as a condition of approval.
3) Porous Pavement, Stormfilter, and Subsurface Storage Design:
    a. Porous pavement design is for repair work and excluded from treatment quantities. No further action necessary.
4) Flooding Standard: The applicant has submitted HydroCAD files indicating the pre-development runoff rates do not exceed the post-development runoff rates for the combined flow rates from the two study points at the facility.
    a. It is understood that these two study points are located in separate watersheds for the proposed project, with one study point leading towards a combined sewer

system, and the other conveying flows towards a separated sewer system. As such, the reviewer does not necessarily agree with the statement that the proposed flow rates have the represented net change in the Peak Runoff Rates table as these flow rates are not necessarily additive.

i. The City of Portland Department of Public Works is responsible for issuing certification of any connection to Existing Stormwater Systems. E-mail, or otherwise written, confirmation from the Department of Public Works accepting this connection is requested to confirm that this connection is appropriate under Land Use section (prior number) 14-526 (b) 3 a. (iv); and 14-526 (c) 3 a., as well as adherence to MaineDEP Chapter 500.
    1. It is understood the connection to the combined sewer system has not been approved by Public Works at this time.

ii. It is appreciated there are two competing design requirements; to both remove stormwater flows to the combined sewer system, and to also meet the requirement to reduce flow rates to each study point. In many ways, these requirements work in opposition to achieve a common goal.

iii. There is a potential ability to waive the requirements of the Flooding Standard, governing flow rates to each study point, within the existing codes. This would require the following information:
    1. The applicant indicating the storm drainage system ultimately discharges to tidal waterways;
    2. The applicant indicating through calculations, or receiving confirmation from the Department of Public Works, to allow an increase for surface water flows to the drainage system in interval rain events as noted in the Land Use Code;
    3. The applicant requesting this waiver to discharge to tidal waterways, and having such waiver approved by the City Planning authority.

iv. Connection to the existing combined sewer must be coordinated with the Department of Public Works.

5) Utility Connections
    a. Ability to serve letters have not been provided for utilities impacted by the proposed project, but have been requested by the applicant for applicable utilities. Applicant has indicated they will forward these letters to the planning authority upon receipt.
    b. Standard design for the electrical utility has been provided. Additional clarity confirming coordination with MaineDOT at the fence line has been provided. No further action necessary.

CITY OF PORTLAND, MAINE

PLANNING BOARD

Brandon Mazer, Chair
Maggie Stanley, Vice Chair
Marpheen Chann
Sean Dundon
Bob Dunfey
David Silk
Austin Smith

11/18/2020

Alec Porteous
University of Southern Maine
P.O. Box 9300
Portland, Maine 04101

Darrin Stairs
Woodard & Curran
41 Hutchins Drive
Portland, ME 04102

Project Name:	Student Center, Dorm, & Quad	**Project ID:**	PL-001040-2020
Address:	25 Bedford Street	**CBL:**	114A G009
Applicant:	University of Southern Maine		
Planner:	Christian Roadman		

Mr. Porteous,

On November 10, the Planning Board approved your application to construct a 218,612 square foot student housing facility, a 41,249 square foot student center, and associated open space at 25 Bedford Street in the B-2 and R-5 zones and the University of Southern Maine overlay zone.

The Planning Board reviewed the proposal for conformance with the site plan and site location of development standards of Portland's Land Use Code. The Planning Board voted 7-0 to approve the application with the following waivers and conditions as presented below.

Waivers

1. The Planning Board voted unanimously (7-0) based upon the submitted materials, that extraordinary conditions exist or undue hardship may result from strict compliance with the Design Manual standard (e) University of Southern Maine Overlay Zone, Appendix 3 Standard D-7 Materials which prohibits use of fiber cement panels. The Planning Board waived the Design Manual standard (e) University of Southern Maine Overlay Zone, Appendix 3 Standard D-7 Materials to allow use of fiber cement panel.

Site Plan and Site Location of Development Review

The Planning Board voted unanimously (7-0) that the plan is in conformance with the site plan standards of the Land Use Code and the Site Location of Development Act standards subject to the following conditions of approval:

PRIOR TO APPLYING FOR A BUILDING PERMIT

1. The applicant shall submit an ability to serve letter from the Portland Water District.

2. The applicant shall submit confirmation of adequate wastewater capacity from the Department of Public Works.

3. The applicant shall submit a dewatering plan for review and approval by the Department of Public Works.

4. The applicant shall submit an updated construction management plan for review and approval by the Department of Public Works.

5. The applicant shall submit a request to connect to the municipal storm drain system with updated calculations for review and approval by the Department of Public Works.

6. The applicant shall submit an updated stormwater management report, including calculations and updated stormwater infrastructure designs and details, for review and approval by the Planning Authority and consulting civil engineer.

7. If modifications to the stormwater management design impact design plans, then the applicant shall submit an updated grading and drainage plan for review and approval by the Planning Authority and consulting civil engineer.

SIX MONTHS AFTER ISSUANCE OF A BUILDING PERMIT

8. The applicant shall provide proof of parking commitments sufficient to provide the 396 parking spaces required by the proposed development, or shall submit a site plan application for a parking garage providing these spaces, for review and approval by the Planning Authority.

PRIOR TO CERTIFICATE OF OCCUPANCY

9. The applicant shall obtain a certificate of occupancy for a parking garage providing the 396 parking spaces required by the proposed development, or shall provide a final parking management plan and executed leases providing these spaces, for review and approval by the Planning Authority.

Traffic Movement Permit

On the basis of the application, plans, reports and other information submitted by the applicant; findings and recommendations contained in the Planning Board report for the public hearing on November 10, 2020 for application PL-001040-2020 relevant to Portland's technical and design standards and other regulations; and the testimony presented at the Planning Board hearing, the Planning Board voted unanimously (7-0) to find that the plan is in conformance with 23 MRSA 704-A and Chapter 305 Rules and Regulations pertaining to Traffic Movement Permits, subject to the following conditions of approval:

1) The applicant shall provide conceptual design plans, preliminary and final plans and specifications for Traffic calming / pedestrian improvements at the Falmouth Street / Oakdale Street intersection for review and approval by the Department of Public Works and Planning Authority. Said improvements shall be constructed by the applicant prior to completion of a parking garage structure or five years from TMP approval, whichever is sooner.

PRIOR TO CERTIFICATE OF OCCUPANCY

2) The applicant shall provide a $10,000 contribution to the City towards Forest Avenue traffic signal optimization at the Forest Avenue / Bedford Street / Baxter Boulevard and Forest Avenue / Falmouth Street / Preble Street Extension intersections with the intent of improving mobility efficiencies.

3) The applicant shall provide conceptual design plans, preliminary and final plans and specifications for improvements at the Forest Avenue/Bedford Street/Baxter Boulevard intersection based on the Smart Corridor Study recommendations for review and approval by the Department of Public Works and Planning Authority. These shall include geometric modifications to the corners on the Baxter Boulevard approach and upgrades to pedestrian traffic signal equipment on those corners. The applicant shall construct the said improvements prior to Certificate of Occupancy, with all work complying with ADA standards.

4) The applicant shall provide conceptual design plans, preliminary and final plans and specifications for improvements at the Forest Avenue/Falmouth Street/Preble Street Extension intersection based on the Smart Corridor Study recommendations for review and approval by the Department of Public Works and Planning Authority. These shall include geometric modifications to the southeast corner, a crosswalk on the southerly Forest Avenue approach, and upgraded pedestrian traffic signal equipment. It should be noted that the new crosswalk will require installation of a new sidewalk ramp on the westerly side of Forest Avenue. Thus, improvements are proposed on the southeast and southwest corners of the intersection as a part of this condition. The applicant shall construct the said improvements prior to Certificate of Occupancy, with all work complying with ADA standards.

The approval is based on the submitted plans and findings related to site plan review, site location of development review, and traffic movement permit review as contained in the Planning Board report dated 11/106/2020 for application PL-001040-2020 which is attached.

Standard Procedures

Please Note: The following standard procedures apply to all approved site plans:

1. Stormwater Management Agreement The developer / contractor / subcontractor must comply with the conditions of the construction stormwater management plan and sediment and erosion control plan based on City standards and state guidelines.

   The owner / operator of the approved stormwater management system, and all assigns, shall comply with the conditions of Chapter 32 Stormwater including Article III, Post Construction Stormwater Management, which specifies the annual inspections and reporting requirements.

A maintenance agreement for the stormwater drainage system, as attached, or in substantially the same form, shall be submitted for review by Corporation Counsel. Once approved, the document shall be signed and recorded at the Cumberland County Registry of Deeds prior to the issuance of a building permit. Please submit final copies to both the Department of Planning and Urban Development and the Department of Public Works.

2. Site Plan Expiration Site plan approval will be deemed to have expired unless work has commenced within one (1) year of the approval or within a time period up to three (3) years from the approval date as agreed upon in writing by the City and the applicant. Requests to extend approvals must be received before the one (1) year expiration date.

3. Separate Building Permits Are Required This approval does not constitute approval of building plans, which must be reviewed and approved by the City of Portland's Permitting and Inspections Department.

4. Performance Guarantee and Inspection Fees A performance guarantee covering the site improvements and an inspection fee payment of 2.0% of the guarantee amount must be submitted to and approved by the Planning and Urban Development Department and Public Works Department prior to the release of a building permit, street opening permit or certificate of occupancy for site plans.

5. Construction Management Plans The applicant, contractor and subcontractors are required to conform to the approved Construction Management Plan, and all conditions contained within the project's approval, for the entire duration of the project. Any amendments to the approved Construction Management Plan shall be reviewed and approved by the Department of Public Works prior to the execution. The Planning Authority and the Department of Public Works have the right to seek revisions to an approved Construction Management Plan. The applicant shall coordinate the project's construction schedule with the timing of nearby construction activities to avoid cumulative impacts on a neighborhood and prevent unsafe vehicle and pedestrian movements. Accordingly, nearby construction activities could involve a delay in the commencement of construction.

6. Preconstruction Meeting A pre-construction meeting shall be held at the project site with the contractor, Development Review Coordinator, Public Works representative and owner to review the construction schedule and critical aspects of the site work. At that time, the Development Review Coordinator will confirm that the contractor is working from the approved site plan and the approved Construction Management Plan. It shall be the contractor's responsibility to arrange a mutually agreeable time for the pre-construction meeting.

7. Department of Public Works Permits If work or obstructions will occur within the public right-of-way, such as utilities, curb, sidewalk, driveway construction, site deliveries and equipment siting, a Street Opening and/or Occupancy Permits are required for your site. Please contact the Department of Public Works Permit Clerk at 874-8300, ext. 8828. (Only excavators licensed by the City of Portland are eligible.)

8. Develop Site According to Plan The site shall be developed and maintained as depicted on the site plan and in the written submission of the applicant. Any modifications of an approved site

plan or alteration of a parcel, or of approved exterior elevations, which was the subject of site plan approval after May 20, 1974, shall require the prior approval of an amended site plan by the Planning Board or Planning Authority pursuant to the terms of Chapter 14, Land Use, of the Portland City Code.

9. Design Review of Exterior Elevations If the project is subject to design review, then the exterior elevations shall be constructed and maintained as depicted on the approved elevation drawings and in the written submission of the applicant. Modification of any approved exterior elevations shall require the approval of the revised plans by the Planning Board or Planning Authority pursuant to the terms of Chapter 14, Land Use of the Portland City Code.

10. Defect Guarantee A defect guarantee, consisting of 10% of the performance guarantee, must be posted before the performance guarantee will be released.

11. As-Built Final Plans Final sets of as-built plans shall be submitted digitally to the Planning and Urban Development Department, on a CD or DVD, in AutoCAD format (.dwg), release AutoCAD 2005 or greater.

12. Impact Fees New development or changes of use that result in net new residential dwelling units, non-residential building square footage, or water meters are subject to the City of Portland's impact fee ordinance (Chapter 14, Article XVII). Impact fees are calculated at the time of building permit and must be paid prior to the certificate of occupancy. For more information, visit https://www.portlandmaine.gov/2409/Impact-Fees

The Development Review Coordinator must be notified five (5) working days prior to the date required for final site inspection. The Development Review Coordinator can be reached at the Planning and Urban Development Department at (207) 874-8632. All site plan requirements must be completed and approved by the Development Review Coordinator prior to issuance of a Certificate of Occupancy. Please schedule any property closing with these requirements in mind.

If there are any questions, please contact Christian Roadman at (207) 874-8984.

Sincerely,

Brandon Mazer
Chair, Portland Planning Board

Attachments:
1. Planning Board Report for Application PL-001040-2020
2. Draft Stormwater Maintenance Agreement
3. Performance Guarantee Packet

PLANNING BOARD REPORT
PORTLAND, MAINE

Student Center, Dormitory, & Quad
25 Bedford Street
Level III Site Plan and Site Location of Development Review
PL-001040-2020
University of Southern Maine, Applicant

Submitted to: Portland Planning Board **Public Hearing Date:** 11/10/2020	**Prepared by:** Christian Roadman, Planner **Date Prepared:** 11/6/2020

I. INTRODUCTION / PROPOSED DEVELOPMENT

The University of Southern Maine (USM) seeks to redevelop a portion of their campus, replacing two existing buildings and a parking lot with a 42,000 square foot student center, a 580 bed dormitory, and one-acre quad.

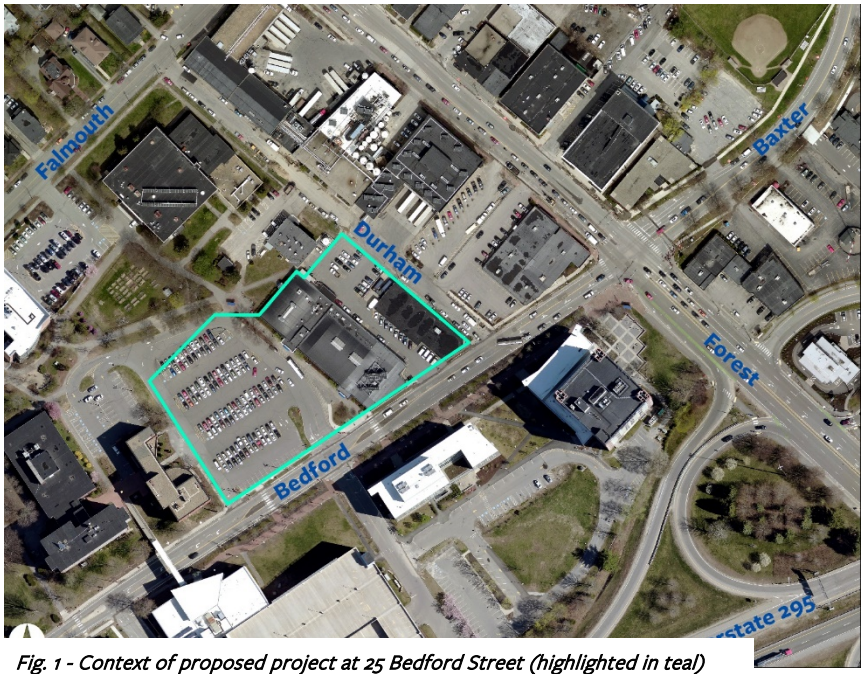

Fig. 1 - Context of proposed project at 25 Bedford Street (highlighted in teal)

The proposed project is located mostly within the R-5 Residential Zone, with a portion at the easternmost edge of the site in the B-2 Community Business Zone. USM's entire Portland campus also lies within the USM overlay zone, created to allow the University the flexibility to operate uses typical of an institution of higher education.

In addition to the City's site plan review requirements, this development is subject to a Site Location of Development (SLODA) review and requires a Maine DOT Traffic Movement Permit (TMP). The City of Portland is the delegated review authority for both.

Between removal of an existing 171 space parking lot and the new buildings, the development as currently proposed would result in a deficit of approximately 400 parking spaces. The University plans to construct a parking garage prior to completing this project; however, the Planning Board cannot assume that an appropriate facility would be planned, reviewed, permitted, and constructed within the necessary time frame. Because of this, USM developed a contingency plan (**Attachment D**) involving remote parking at offsite lots along METRO routes (or utilizing shuttles) and potential changes to existing parking operations to increase efficiency. Progress towards, and then provision of, adequate parking is suggested as a **condition of approval**.

Notices have been sent to 190 property owners and a legal advertisement was published in the October 30 and October 31 editions of the *Portland Press Herald*.



Fig. 2 - Rendering of proposed project at 25 Bedford Street in context viewed from the southwest (image: Applicant)

Applicant: University of Southern Maine
Consultants: Woodard & Curran, Inc. (civil engineering); SMRT Architects & Elkus Manfredi Architects (building design) Capstone Development Partners (student housing developer)

II. REQUIRED REVIEWS

Waiver Requests	Applicable Standards
Use of materials (fiber cement panel) identified as 'low quality' Staff support this waiver based on improved quality of fiber cement paneling	City of Portland Design Manual – (e) University of Southern Maine Overlay Zone, Appendix 3 Standard D-7 Materials
Review	**Applicable Standards**
Site Plan	Section 14-526
Site Location of Development	Technical Manual Section 14
Traffic Movement Permit	Delegated Review from Maine DOT

III. PROJECT DATA

Existing Zoning	R-5 Residential, B-2 Community Business, USM Overlay Zone
Existing Use	Student center, university facilities building, parking
Proposed Use	Student center, dormitory, quad
Property Size (sf.)	~673,000 (~144, 600 disturbed)

	Existing	Proposed	Net Change
Building Footprint (sf.)	36,906	48,477	+8,571
Building Floor Area (sf.)	36,906	259,861	+222,955
Impervious Surface Area (sf.)	123,178	70,334	-52,844
Parking Spaces	~171	0 (offsite spaces plan intended to offset need)	-171
Bicycle Parking Spaces	14	~36	+22



Fig. 3 - Rendering of the proposed project Bedford Street; the proposed dorm is to the right, partially visible. (image: applicant)

IV. EXISTING CONDITIONS

The University of Southern Maine's Portland Campus occupies more than 15 acres of land just outside of Portland's peninsula in the Oakdale neighborhood, and is bounded by Forest Avenue and Durham Street to the East, Falmouth Street to the North, Exeter Street to the West and I-295 and Chamberlain Street to the South. The campus operates in conjunction with USM's two other campuses located in Gorham and Lewiston, and at present, largely serves a commuter student population, with residence halls housed on the university's Gorham campus. The campus consists of 34 buildings ranging from repurposed single-family homes to large academic buildings, ten surface parking lots, one parking garage, and pathways across campus.

The buildings proposed for demolition as part of the redevelopment house campus services and facilities management.

V. PUBLIC COMMENT AND NEIGHBORHOOD MEETING

The applicant held a required neighborhood meeting virtually via Zoom on July 15, 2020. 21 members of the public attended. Those who spoke commented their appreciation for the architecture of the new buildings and overall design. The neighborhood meeting notification, sign-in sheet and minutes are included as **Attachment B**.

As of this writing, public comment received (**PC1 – PC7**) generally expresses neighborhood concern regarding potential traffic and parking impacts on the nearby residential neighborhood and also the business operations of Oakhurst Dairy. One "comment" is a neighborhood petition supported by approximately 44 neighbors which expresses particular concern regarding the applicant's intended parking garage and how it is not included in this application.

VI. RIGHT, TITLE, & INTEREST AND FINANCIAL & TECHNICAL CAPACITY

The applicant provided four deeds (**Attachment F**) to evidence ownership of the property.

The applicant provided a letter listing voter-approved general obligation debt, philanthropic contributions, and revenue bonds as financial resources facilitating the proposed project (**Attachment F**).

The applicant cited consultant experience and expertise as evidence of technical capacity (**Attachment F**).

VII. ZONING ANALYSIS

The development site is located within the R-5 Residential Zone, the B-2 Community Business Zone, and the USM Overlay Zone. The purpose of the USM Overlay Zone is to allow the University's existing campus to "be continued and reasonably expanded within defined boundaries" while recognizing "the unique qualities of a university campus while at the same time protecting the value and integrity of established neighborhoods."

University buildings and structures are subject to the requirements of the underlying zoning districts, except as modified by the USM Overlay Zone. The Overlay Zone allows for an 85 foot building height in the area of the campus where this development is to occur, with required setbacks of 10 feet along Bedford Street, 0 feet along Durham Street, and 20 feet along Falmouth Street.

The uses proposed for this project, which are classified as 'university uses', are permitted within the USM Overlay Zone. These include classrooms, student unions, dining halls, bookstores, auditoriums, outdoor use areas, student housing and offices.

The proposed buildings conform to height restrictions in the zone – a portion of one building exceeding the height limit (**Attachment P17**) is for a stair tower and elevator overrun, which is allowable.

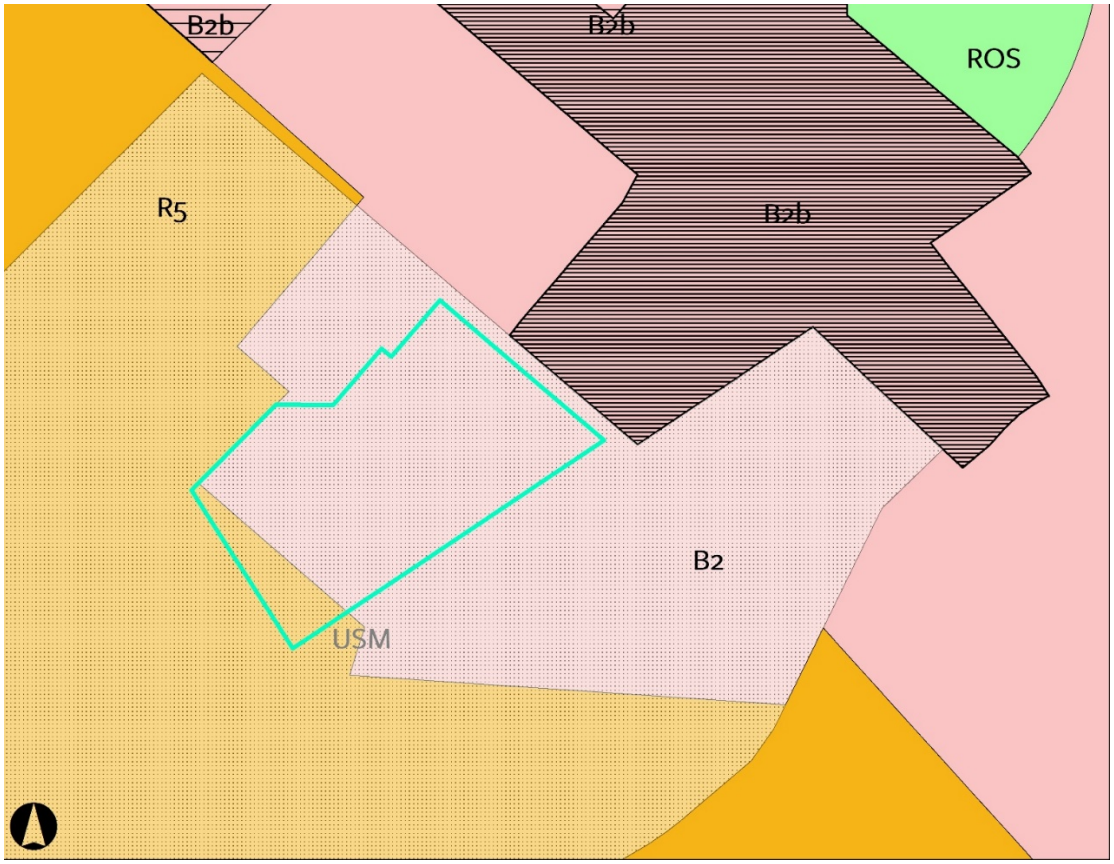

Fig. 4 - Zoning context of the proposed project at 25 Bedford Street (highlighted in teal). The stippled portion of the map represents the USM overlay zone.

VIII. DEVELOPMENT REVIEW

A. SITE PLAN STANDARDS (Section 14-526)

Staff reviewed the proposed development for conformance with the relevant review standards of Portland's site plan ordinance and applicable regulations, and staff comments relative to each standard are below:

a) Transportation Standards

Impact on Surrounding Street Systems and Access and Circulation; Access and Circulation; Public Transit Access; Parking; Transportation Demand Management

The proposed development is not expected to significantly impact the surrounding street system as the proposed uses are not expected to generate more traffic than current uses; the residence hall may reduce traffic demand on campus. Two curb cuts along Bedford Street would be eliminated, which should improve traffic flow on campus. Prior to the completion of this development, a new roundabout will be built at the intersection of Brighton Avenue and Deering Avenue, which at present is the most deficient intersection in the vicinity of the university. The roundabout is anticipated to improve traffic flow through that intersection and is currently under construction.

The University is located along the 2, 4, and Husky METRO (the latter connects its Gorham and Portland campuses). On campus, proposed pedestrian infrastructure connections are intended to improve pedestrian mobility.

In the short term, this development is expected to result in an overall decrease in the supply of off-street parking, as 171 surface spaces are being eliminated. As noted above, the University plans to construct a parking garage prior to completing this project; however, the Planning Board cannot assume that an appropriate facility would be planned, reviewed, permitted, and constructed within the necessary time frame.

Because of this, USM developed a contingency plan (**Attachment D**) involving remote parking at offsite lots along METRO routes or shuttle service, and potential changes to existing parking operations; utilizing parking attendants would allow cars to be "parked in" to maximize efficiency, and then be retrieved when needed by attendants. Additionally, USM proposed leasing parking spaces at one of two locations in Westbrook: Rock Row or 183 County Road in Westbrook. At the former, the existing Husky Line would allow students to then take the bus to campus and back. At the latter, the University would need to coordinate additional bus service or institute a shuttle service to that lot.

Progress towards, and then provision of, adequate parking is suggested as a **condition of approval**.

The University provided a Transportation Demand Management (TDM) plan (**Attachment C**) including a trip reduction goal of between 3% and 6%, and a parking reduction of between 10% and 14 % by the year 2025 (after presumed completion of the student center, residence hall and desired garage). The plan was reviewed and approved by the City's Transportation Programs Manager (**Attachment 1**), who noted that previous staff comments based on commitment to core strategies, development of greenhouse gas and mode split targets, expansion of monitoring / reporting on trip and parking reductions were addressed substantively to the satisfaction of staff.

The Department of Public Works senior engineer (**Attachment 3**) and consulting traffic engineer (**Attachment 2**) also participated in review of the project. Both are generally satisfied with the current application, but request specific conditions of approval tied to the applicant's Traffic Movement Permit (addressed below) and improvements to the applicant's construction management plan.

b) Environmental Quality Standards

Preservation of Significant Natural Features; Landscaping & Landscape Preservation; Water Quality, Storm Water Management and Erosion Control

The proposed project site is entirely developed, and as such, contains no significant natural features. The project introduces two new major green spaces: a one-acre campus quadrangle and a semi-private half-acre courtyard partially surrounded by the residence hall.

The proposed redevelopment will reduce the amount of impervious surface for this site but still must treat at least 50% of impervious area. To meet this threshold, the applicant proposes grassed underdrained soil filters and bioretention cell soil filters. The City's consulting civil engineer reviewed the applicant's proposal (**Attachment 4**) and requested updates and clarifications to several stormwater calculations and details. Revisions are anticipated prior to the Planning Board's public hearing on Tuesday. Otherwise, additional conditions of approval may be necessary.

The Department of Public Works requires (**Attachment 5**) a dewatering plan from the applicant. This is suggested as a **condition of approval**.

c) Public Infrastructure and Community Safety Standards

a. Consistency with related Master Plans; Public Safety and Fire Prevention; Availability and Capacity of Public Utilities

The project as shown appears consistent with master plans adopted by the City. The application was reviewed for compliance with relevant life/safety requirements and deemed satisfactory in this regard. The project proposes new utility connections for water, gas, electric and sewer. Confirmation of adequate wastewater capacity by the Department of Public Works and confirmation of ability to serve by the Portland Water District are suggested as **conditions of approval**.

d) Site Design Standards

1. Massing, Ventilation and Wind Impact; Shadows; Snow and Ice Loading; View Corridors; Historic Resources; Exterior Lighting; Noise and Vibration; Signage and Wayfinding

   The proposed building massing complements the existing campus environment, and promotes an improved pedestrian experience along Bedford Street with a more uniform street wall. The development is not anticipated to have adverse impacts related to either ventilation or wind, nor adverse impacts related to building shadows or snow and ice loading.

   There are no designated view corridors within the project vicinity, and lighting proposed (**Attachments G and P11**) meets City standards for light trespass and full cutoff fixtures. Lighting consists of bollard, wall pack and pole mounted fixtures that are concentrated along walkways, at building entrances and within the residence hall courtyard.

   No adverse impacts related to noise and vibration are anticipated as mechanical equipment is to be roof-mounted and away from public open spaces and other residential areas.

2. Zoning Related Design Standards

   The City's Urban Designer reviewed the proposed project (**Attachment 6**) against the USM Campus Design Principles and Standards (Appendix 3 of the Design Manual), and generally supported the proposed project design.

B. COMPREHENSIVE PLAN

Portland's Plan 2030 identifies a vision statement and policy goals for the City. Several of these are applicable to the proposed project and are reproduced below.

Vision statement:

- Equitable:
  "We will incorporate the needs of all our residents in planning for our future."

- Sustainable*:*

  "Portland will grow in order to sustain our community, infrastructure, and economy."

- Dynamic:

  "We will welcome new residents into our community because they enrich and sustain our community."

- Secure:
  "We will be committed to accessible housing and healthy food for all our residents."

- Authentic:
  "We will invest in and support our local economy.

  Policy goals:

- Environment:

  "Adopt sustainable land use and transportation policies that support connectivity, walkable neighborhoods, and multi-modal transportation."

- Economy:

  "Support sustainable growth in our educational, medical, and cultural institutions."

- Housing:
  "Encourage additional contextually appropriate housing density in and proximate to neighborhood centers, concentrations of services, and transit nodes and corridors as a means of supporting complete neighborhoods."

- Transportation:
  "Promote multi-modal accessibility, enabling residents and visitors of all ages and abilities to participate fully in the social and economic life of the community."

C. SITE LOCATION OF DEVELOPMENT

The City of Portland has delegated review authority from the Maine DEP for large projects that trigger Site Location of Development Act (SLODA) review. The standards for this review include the items below, which largely dovetail with Portland's existing site plan review standards:

- *Financial & Technical Capacity*: see section VI, above.
- *Traffic Movement*: see site plan standards, a, above, and Traffic Movement Permit, below.
- *No Adverse Effect on the Natural Environment, Ground Water, Flooding, Storm Water Management & Erosion and Sedimentation Control*: see site plan standards, b, above. The development is not located within a flood hazard zone, as shown on the FEMA Flood Insurance Rate Map provided in this application. The proposed development is not anticipated to cause or increase flooding or cause an unreasonable hazard to any adjacent structures.
- *Soil Types:* The applicant provided a draft geotechnical report and information regarding strategies to appropriately stabilize the building (Attachment X).
- *Infrastructure*: see site plan standards, c, above.

D. TRAFFIC MOVEMENT PERMIT

As defined under Maine state statute 704—A, a traffic movement permit is required of any project that generates 100 or more passenger car equivalents at peak hour. Any project surpassing this threshold is required to make adequate provision for traffic movement of all types into and out of the project area such that any traffic increase that is attributable to the project will not result in unreasonable congestion or unsafe conditions within the vicinity of the development.

Per the applicant's TMP materials (Attachment U) The proposed development is expected to generate 160 new morning peak hour trips am peak hour trips, and 160 new evening peak hour trips. Based on staff and

reviewer feedback, the applicant agreed to help fund and implement, in coordination with the City, physical infrastructure and signal timing improvements intended to mitigate traffic impacts and increase pedestrian safety in the area of the USM campus. Specifically, the applicant is required as a condition of approval, to:

1) Implement improvements at the Forest Avenue/Bedford Street/Baxter Boulevard intersection based on the Smart Corridor Study recommendations. This shall include geometric modifications to the corners on the Baxter Boulevard approach, upgrading pedestrian traffic signal equipment with all work complying with ADA standards.

2) Implement improvements at the Forest Avenue/Falmouth Street/Preble Street Extension intersection based on the Smart Corridor Study recommendations. This shall include geometric modifications to the southeast corner, implementing a crosswalk on the southerly Forest Avenue approach, upgrading pedestrian traffic signal equipment with all work complying with ADA requirements. It should be noted that the new crosswalk will require installation of a new sidewalk ramp on the westerly side of Forest Avenue.

3) Contribute $10,000 towards Forest Avenue Traffic Signal Optimization at the Forest Avenue/Bedford Street/Baxter Boulevard and Forest Avenue/Falmouth Street/Preble Street Extension intersections with the intent of improving mobility efficiencies.

4) Implement traffic calming / pedestrian improvements at the Falmouth Street / Oakdale Street intersection (including a raised intersection with supporting features for review and design by the Portland Department of Public Works) before completion of a parking garage structure or five years from TMP approval, whichever is sooner.

IX. PROPOSED MOTIONS

A. WAIVERS

On the basis of the application, plans, reports and other information submitted by the applicant, findings and recommendations contained in the Planning Board report for the public hearing on November 10, 2020 for application PL-001040-2020 relevant to Portland's technical and design standards and other regulations; and the testimony presented at the Planning Board hearing:

1. The Planning Board **[finds / does not find]** based upon the submitted materials, that extraordinary conditions exist or undue hardship may result from strict compliance with the Design Manual standard (e) University of Southern Maine Overlay Zone, Appendix 3 Standard D-7 Materials which prohibits use of fiber cement panels. The Planning Board **[waives / does not waive]** the Design Manual standard ((e) University of Southern Maine Overlay Zone, Appendix 3 Standard D-7 Materials) to allow use of fiber cement panel.

B. SITE PLAN REVIEW & SITE LOCATION OF DEVELOPMENT

On the basis of the application, plans, reports, and other information submitted by the applicant; findings and recommendations contained in the Planning Board report for the public hearing on November 10, 2020 for application PL-001040-2020 relevant to the site plan and Site Location of Development Act regulations; and the testimony presented at the Planning Board hearing, the Planning Board finds that the plan **[is / is not]** in conformance with the site plan standards of the land use code and the Site Location of Development Act standards, subject to the following conditions of approval:

PRIOR TO APPLYING FOR A BUILDING PERMIT

1. The applicant shall submit an ability to serve letter from the Portland Water District.

2. The applicant shall submit confirmation of adequate wastewater capacity from the Department of Public Works.

3. The applicant shall submit a dewatering plan for review and approval by the Department of Public Works.

SIX MONTHS AFTER ISSUANCE OF A BUILDING PERMIT

4. The applicant shall provide proof of parking commitments sufficient to provide the 396 parking spaces required by the proposed development, or shall submit a site plan application for a parking garage providing these spaces, for review and approval by the Planning Authority.

PRIOR TO CERTIFICATE OF OCCUPANCY

5. The applicant shall obtain a certificate of occupancy for a parking garage providing the 396 parking spaces required by the proposed development, or shall provide a final management plan and executed leases providing these spaces, for review and approval by the Planning Authority.

C. TRAFFIC MOVEMENT PERMIT

On the basis of the application, plans, reports, and other information submitted by the applicant; findings and recommendations contained in the Planning Board report for the public hearing on November 10, 2020 for application PL-001040-2020 relevant to Portland's technical and design standards and other regulations; and the testimony presented at the Planning Board hearing, the Planning Board finds that the plan [is / is not] in conformance with 23 MRSA 704-A and Chapter 305 Rules and Regulations pertaining to Traffic Movement Permits, subject to the following conditions of approval:

1. The applicant shall provide conceptual design plans, preliminary and final plans and specifications (for review and approval by the Department of Public Works and Planning Authority) and then implementation of Traffic calming / pedestrian improvements at the Falmouth Street / Oakdale Street intersection (including a raised intersection with supporting features for review and design by the Portland Department of Public Works) before completion of a parking garage structure or five years from TMP approval, whichever is sooner.

PRIOR TO CERTIFICATE OF OCCUPANCY

2. The applicant shall provide a $10,000 contribution to the City towards Forest Avenue traffic signal optimization at the Forest Avenue / Bedford Street / Baxter Boulevard and Forest Avenue / Falmouth Street / Preble Street Extension intersections with the intent of improving mobility efficiencies.

3. The applicant shall provide conceptual design plans, preliminary and final plans and specifications (for review and approval by the Department of Public Works and Planning Authority) and then implementation of the following:

    - Improvements at the Forest Avenue/Bedford Street/Baxter Boulevard intersection based on the Smart Corridor Study recommendations. This shall include geometric modifications to the corners on the Baxter Boulevard approach, upgrading pedestrian traffic signal equipment with all work complying with ADA standards.

- Improvements at the Forest Avenue/Falmouth Street/Preble Street Extension intersection based on the Smart Corridor Study recommendations. This shall include geometric modifications to the southeast corner, implementing a crosswalk on the southerly Forest Avenue approach, upgrading pedestrian traffic signal equipment with all work complying with ADA requirements. It should be noted that the new crosswalk will require installation of a new sidewalk ramp on the westerly side of Forest Avenue.

XI. ATTACHMENTS

Report Attachments

1. Transportation Programs Manager TDM Memo
2. Consulting Transportation Engineer TMP Comments
3. Department of Public Works Senior Engineer CM Plan Memo
4. Consulting Civil Engineer Comments Memo
5. Department of Public Works Water Resources Comments
6. Urban Designer Review Memo

Public Comment

PC1 - PC 7.

Applicant's Submittals

A. Cover Letter and Project Summary
B. Neighborhood Meeting Materials
C. Transportation Demand Management
D. Interim Parking Management Plan Memo
E. Site Location of Development Application
F. Site Plan Requirements Narratives
G. Lighting Cut Sheets
H. Stormwater Report
I. USM Facilities Master Plan
J. Traffic Memo
K. Street Parking Memo
L. Design Narrative
M. Response to Comments Letters
N. Portland Commons Window to Wall Ratio
O. Landscape Design Concept Memo
P. Housing Survey Market Analysis
Q. Parking Analysis
R. Parking Garage Feasibility Study
S. Preliminary Plan for Move-In
T. Sightline Diagrams
U. TMP Section 7

Plans

P1. Cover Sheet
P2. Site Notes & Legends

P3. Existing Conditions & Removals Plan
P4. Building Demolition Plan
P5. Site Layout
P6. Utilities
P7. Planting & Landscape
P8. Grading & Drainage
P9. Erosion & Sedimentation Controls
P10. Steam Line
P11. Photometric
P12. Post Development Watershed Plan
P13. Post Development Water Quality Plan
P14. Construction Management
P15. USM Survey
P16. Floor Plans
P17. Elevations
P18. Renderings

CITY OF PORTLAND

Planning & Urban Development

Performance Guarantee, Inspection Fee, and Infrastructure Financial Contribution Packet

A. Site Plan/Subdivision Performance Guarantees Required

Portland's Land Use Code requires all developers with approved site plan and/or subdivision applications to submit a performance guarantee to the City prior to the start of any construction or site improvements. The performance guarantee represents 100% of the total cost of site improvements, as determined by the City.

The code further requires developers to pay an inspection fee of 2% of the performance guarantee amount to the City for the administrative costs associated with inspecting construction activity to ensure that it conforms with plans and specifications.

(Portland's Land Use Code, Sections 14-501 and 14-530)

B. Cost Estimate Form and Inspection Fee

The performance guarantee covers major site improvements related to site plan and subdivision review, such as paving, roadway, utility connections, drainage, landscaping, lighting, etc. Please submit an itemized cost estimate form to determine the detailed costs of both public and private site improvements to the Planning Division for review and approval. The cost estimate form (excel format) can be downloaded from the city's website here: http://portlandmaine.gov/costestimate The approved amount on the Cost Estimate form is the amount to be covered by the performance guarantee and is the basis for calculating the 2% inspection fee.

C. Acceptable Types of Performance Guarantees

The accepted forms of a performance guarantee, covering the amount approved on the Cost Estimate form, must be one of the following options consistent with the attached templates, with **NO** exceptions. The templates and instructions be located on our website at: https://www.portlandmaine.gov/2157/Performance-Guarantee

1. A letter of credit from a bank/credit union
2. A deposit into a bank-held escrow account
3. A deposit into a City-held escrow account

NOTE: No land use application of any kind shall be processed, reviewed or issued, no signed subdivision plat shall be released or recorded, and no building permit of any kind shall be issued unless all fees have been paid and every aspect of the proposed development is in compliance with City Codes as determined by the Development Review Coordinator in the Planning Division.

The developer is eligible to receive up to three reductions from the performance guarantee in a calendar year equal to the estimated cost of the completed improvements. In no case, however, shall any performance guarantee be reduced 1) in any line item where improvements remain to be completed; or 2) to a value which is less than the estimated cost of completing all remaining required improvements; or 3) to a value less than 10% of the Performance Guarantee. *(The Cost Estimate Form can also be used during the construction phase to submit reductions of fully completed site work items)*

At the conclusion of the project, the City will release 90% of the performance guarantee after the Development Review Coordinator determines that site improvements have been satisfactorily completed at the time of the final inspection. The City will then retain a 10% defect guarantee to cover the workmanship and durability of materials used in construction. The defect guarantee will be released one
(1) year from date of acceptance, subject to the Development Review Coordinator inspecting the site and finding it in compliance with the approved site plan.

D. Housing Replacement Performance Guarantees

For those projects that are subject to Portland's Housing Preservation and Replacement Ordinance (Section 24-
483) and have an approved plan, then a performance guarantee is required for housing replacement. An owner or developer must post a performance guarantee in the form of a letter of credit in the amount equivalent to the amount the applicant would have been required to contribute to the City's Housing Fund, if the applicant had chosen that option. The guarantee shall be valid for no more than three years, after which the full amount shall be provided to the City's Housing Trust Fund, if replacement units meeting the code do not have certificates of occupancy. The guarantee can be released upon the issuance of a certificate of occupancy for the replacement units. A suggested template for a Housing Replacement Performance Guarantee is included as Attachment 4.

E. Infrastructure Accounts

Contributions to infrastructure accounts may be required as part of the conditions of site plan approval. The contributions must be submitted prior to the issuance of any permits, unless stated otherwise in the approval. The form for submitted required contributions is included as Attachment 5.

F. Administrative Process for Submitting Performance Guarantee

- **Step 1 – Submit a Cost Estimate for Review**

  Submit completed cost estimate form to the Planning Division for review and approval. Once approved, use this total amount as the performance guarantee amount in Step 2.

- **Step 2 – Drafting a Performance Guarantee**

  Complete a draft of 1 of the 3 attached performance guarantee templates, inputting project specific information (Reference Guide for Drafting for help) into blank and bracketed areas, and submit to the Planning Division for final approval. Submit a draft to **planning@portlandmaine.gov** to

ensure fields are correctly entered. Once staff approved the draft, the applicant shall submit the official signed original performance guarantee document, which for option 1) or 2) must be on Bank/Credit Union letterhead with original signatures.

- **Step 3 - Submit Performance Guarantee, Inspection Fee, and Infrastructure Contributions** Submit the final original Performance Guarantee, the required inspection fee, and any infrastructure contributions (Include Attachment 6 form) to the Planning Division. The Planning Division will confirm that the final documents are accurate and acceptable.

- **Step 4 - Release of Recording Plat and Permits**
  Only after the performance guarantee is issued, fees paid, and all other conditions of site plan approval and compliance are met, will the recording plat be released for recording at the Cumberland County Registry of Deeds and/or City permits issued.

Contact: Please email the Cost Estimate Form to Jodie Keene at **jkeene@portlandmaine.gov** After the cost estimate is approved, all Performance Guarantees and Infrastructure Contributions can be submitted by mail to: **City of Portland Planning Division, 389 Congress Street, 4th Floor, Portland, ME 04101**. Please call our office with any questions: 207-874-8632

STORMWATER DRAINAGE SYSTEM
MAINTENANCE AGREEMENT

For SITE PLANS (THAT ARE NOT SUBDIVISIONS)

IN CONSIDERATION OF the site plan approval granted by the Planning Board/Planning Authority of the City of Portland to the proposed _____ (*name of development and project number)*), and the associated Grading, Drainage & Erosion Control Plan (*insert correct name of plan)* (Exhibit A) submitted by_____, prepared by _____ (*engineer/agent*) of _____(address) dated _____, and pursuant to a condition thereof, _____ (*name of owner*) a Maine limited liability company with a principal place of business in Portland, Maine, and having a mailing address of _____, the owner of the subject premises, does hereby agree, for itself, its successors and assigns (the "Owner"), as follows:

Maintenance Agreement

That it, its successors and assigns, will, at its own cost and expense and at all times in perpetuity, maintain in good repair and in proper working order the _____ (*details of the system such as underdrained subsurface sand filter BMP system, rain gardens, storm drain pipes, underdrain pipes, catch basins*), (hereinafter collectively referred to as the "stormwater system"), as shown on the _____Plan in Exhibit A and in strict compliance with the approved Stormwater Maintenance and Inspection Agreement (*insert correct name of document)* prepared for the Owner by _____ (copy attached at Exhibit B) and Chapter 32 of the Portland City Code.

Owner of the subject premises further agrees, at its own cost, to keep a Stormwater Maintenance Log. Such log shall be made available for inspection by the City of Portland upon reasonable notice and request.

Said agreement is for the benefit of the said City of Portland and all persons in lawful possession of said premises and abutters thereto; further, that the said City of Portland and said persons in lawful possession may enforce this Agreement by an action at law or in equity in any court of competent jurisdiction; further, that after giving the Owner written notice and a stated time to perform, the said City of Portland, by its authorized agents or representatives, may, but is not obligated to, enter upon said premises to maintain, repair, or replace said stormwater system in the event of any failure or neglect thereof, the cost and expense thereof to be reimbursed in full to the said City of Portland by the Owner upon written demand. Any funds owed to the City under this paragraph shall be secured by a lien on the property.

This Agreement shall also not be construed to allow any change or deviation from the requirements of the site plan most recently and formally approved by the Planning Board/Planning Authority of the City of Portland.

This agreement shall bind the undersigned only so long as it retains any interest in said premises, and shall run with the land and be binding upon the Owner's successors and assigns as their interests may from time to time appear.

The Owner agrees to record a copy of this Agreement in the Cumberland County Registry of Deeds within thirty (30) days of final execution of this Agreement. The Owner further agrees to provide a copy of this Agreement to any Condominium Association or management company, and to any successor or assign and to forward to the City an Addendum signed by any successor or assign in which the successor or assign states that the successor or assign has read the Agreement, agrees to all its terms and conditions and the successor or assign will obtain and forward to the City's Department of Public Services and Department of Planning and Urban Development a similar Addendum from any other successor or assign.

For the purpose of this agreement and release "Owner" is any person or entity who is a successor or assign and has a legal interest in part, or all, of the real estate and any building. The real estate shown by chart, block and lot number in the records on file in the City Assessor's office shall constitute "the property" that may be entered by the City and liened if the City is not paid all of its costs and charges following the mailing of a written demand for payment to the owner pursuant to the process and with the same force and effect as that established by 36 M.R.S.A. §§ 942 and 943 for real estate tax liens.

Any written notices or demands required by the agreement shall be complete on the date the notice is attached to one or more doors providing entry to any buildings and mailed by certified mail, return receipt requested or ordinary mail or both to the owner of record as shown on the tax roles on file in the City Assessor's Office.

If the property has more than one owner on the tax rolls, service shall be complete by mailing it to only the first listed owner. The failure to receive any written notice required by this agreement shall not prevent the City from entering the property and performing maintenance or repairs on the stormwater system, or any component thereof, or liening it or create a cause of action against the City.

Dated at Portland, Maine this _____ day of _____, 2014.

_____
(*name of company*)

_____
(*representative of owner, name and title*)

STATE OF MAINE
CUMBERLAND, ss. Date: _____

Personally appeared the above-named _____(*name and title*), and acknowledged the foregoing instrument to be his free act and deed in his said capacity.

Before me,

_____
Notary Public/Attorney at Law

Print name: _____

Exhibit A: Approved Grading and Drainage Plan *(name of the plan showing the Stormwater System in detail)*

Exhibit B: Approved Stormwater Maintenance and Inspection Agreement

CITY OF PORTLAND, MAINE

PLANNING BOARD

Brandon Mazer, Chair
Maggie Stanley, Vice-Chair
Marpheen Chann
David Silk
Austin Smith
Bob Dunfey
Sean Dundon

June 15, 2020

Joe Gallant
University of Southern Maine
25 Bedford Street
Portland, ME, 04101

Ashley Fletcher
Woodard & Curran
41 Hutchins Drive
Portland, ME, 04102

Project Name:	Wishcamper Parking Lot Expansion	**Project ID:**	PL-000974-2020
Address:	44 Bedford Street	**CBL:**	114 A001
Applicant:	University of Southern Maine		
Planner:	Andrew Tufts		

Dear Mr. Gallant:

On May 26, 2020, the Planning Board considered the University of Southern Maine's Level III Site Plan application for the proposed Wishcamper parking expansion and associated site improvements at 44 Bedford Street. The Planning Board reviewed the proposal for conformance with the site plan standards of the City of Portland Land Use Code and with the Site Location of Development Act permit requirements. The Planning Board voted (6-1, Silk opposed) to approve the application with the following conditions as presented below.

The approval is based on the submitted plans and findings, as contained in the attached Planning Report (5-26-2020) for application PL-000974-2020.

Site Plan Review

The Planning Board voted (6-1, Silk opposed) that the plan is in conformance with the site plan standards of the Land Use Code and the *Site Location of Development Act*, subject to the following conditions of approval:

PRIOR TO ISSUANCE OF A BUILDING PERMIT

1. The applicant shall submit a revised final plan set to include the addition of landscape islands for the interior of the parking lot and proposed bicycle parking spaces to be reviewed and approved by the Planning Authority.

Standard Procedures

Note: The following standard procedures and requirements apply to all approved site plans:

1. Site Plan Expiration The site plan approval will be deemed to have expired unless work has commenced within one (1) year of the approval or within a time period up to three (3) years from the approval date as agreed upon in writing by the City and the applicant. Requests to extend approvals must be received before the one (1) year expiration date.

2. Separate Building Permits Are Required This approval does not constitute approval of building plans, which must be reviewed and approved by the City of Portland's Permitting and Inspections Department.

3. Performance Guarantee and Inspection Fees A performance guarantee covering the site improvements and an inspection fee payment of 2.0% of the guarantee amount and three (3) final sets of plans must be submitted to and approved by the Planning and Urban Development Department and Public Works Department prior to the release of a building permit, street opening permit or certificate of occupancy for site plans.

7. Construction Management Plans The applicant, contractor and subcontractors are required to conform to the approved Construction Management Plan, and all conditions contained within the project's approval, for the entire duration of the project. Any amendments to the approved Construction Management Plan shall be reviewed and approved by the Department of Public Works prior to the execution. The Planning Authority and the Department of Public Works have the right to seek revisions to an approved Construction Management Plan. The applicant shall coordinate the project's construction schedule with the timing of nearby construction activities to avoid cumulative impacts on a neighborhood and prevent unsafe vehicle and pedestrian movements. Accordingly, nearby construction activities could involve a delay in the commencement of construction.

8. Preconstruction Meeting Prior to the release of a building permit and scheduling of a preconstruction meeting, a hard copy set of approved plans shall be submitted to the Development Review Coordinator. A pre-construction meeting shall be held at the project site with the contractor, Development Review Coordinator, Public Works representative, and owner to review the construction schedule and critical aspects of the site work. At that time, the Development Review Coordinator will confirm that the contractor is working from the approved site plan and the approved Construction Management Plan. The site/building contractor shall provide one (1) copy of a detailed construction schedule to the attending City representative. It shall be the contractor's

responsibility to arrange a mutually agreeable time for the pre-construction meeting.

9. Department of Public Works Permits If work or obstructions will occur within the public right-of-way, such as utilities, curb, sidewalk, driveway construction, site deliveries and equipment siting, a Street Opening and/or Occupancy Permits are required for your site. Please contact the Department of Public Works Permit Clerk at (207) 874-8300, ext. 8828. (Only excavators licensed by the City of Portland are eligible.)

10. Develop Site According to Plan The site shall be developed and maintained as depicted on the site plan and in the written submission of the applicant. Any modifications of an approved site plan or alteration of a parcel, or of any approved exterior elevations, which were the subject of site plan approval after May 20, 1974, shall require the prior approval of an amended site plan by the Planning Board or Planning Authority pursuant to the terms of Chapter 14, Land Use, of the Portland City Code.

11. Stormwater Management The owner/operator of an approved stormwater management system, and all assigns shall comply with the conditions of Chapter 32, Stormwater including Article III, Post Construction Stormwater Management, which specifies the annual inspections and reporting requirements.

    A maintenance agreement for the stormwater drainage system, as attached, or in substantially the same form, shall be submitted for review by Corporation Counsel. Once approved, the document shall be signed and recorded at the Cumberland County Registry of Deeds prior to the issuance of a building permit. Final copies shall be submitted to both the Department of Planning and Urban Development and the Department of Public Works.

12. Defect Guarantee A defect guarantee, consisting of 10% of the performance guarantee, must be posted before the performance guarantee will be released.

13. As-Built Final Plans Final sets of as-built plans shall be submitted digitally to the Planning and Urban Development Department, on a CD or DVD, in AutoCAD format (.dwg), release AutoCAD 2005 or greater.

14. Mylar Copies Mylar copies of the as-built drawings for the public streets and other public infrastructure in the subdivision must be submitted to Public Works prior to the issuance of a certificate of occupancy.

The Development Review Coordinator must be notified five (5) working days prior to the date required for final site inspection. The Development Review Coordinator can be reached at the Planning and Urban Development Department at (207) 874-8632. All site plan requirements must be completed and approved by the Development Review Coordinator prior to issuance of a Certificate of Occupancy. Please schedule any property closing with these requirements in mind.

If there are any questions, please contact Andrew Tufts at (207) 874-8724.

Sincerely,



Brandon Mazer, Chair
Portland Planning Board

ATTACHMENTS

PLANNING BOARD REPORT

PLANNING BOARD REPORT
PORTLAND, MAINE

44 Bedford Street Development
Level III Site Plan Review
University of Southern Maine, Applicant
PL-000974-2020 CBL: 114 A001

Submitted to: Portland Planning Board Public Hearing Date: May 26, 2020	Prepared by: Andrew Tufts, Planner Date: May 22, 2020



Figure 1: Parcel outline - Source: City of Portland Maine Parcel Viewer

I. INTRODUCTION

The University of Southern Maine has submitted a Level III Site Plan application for the expansion of the Wishcamper parking lot located at 44 Bedford Street. The proposed project would create 122 additional parking spaces. The site is located in the R-5 and B-2 Zones, as well as the University of Southern Maine Overlay Zone. The proposed activity will not result in any change to the site's existing use.

The Planning Department sent 41 notices advertising this meeting to property owners within 500 feet of the site. Legal advertisements ran in the May 15th & May 16th editions of the Portland Press Herald.

Applicant: University of Southern Maine

Consultants: Ashley Fletcher (Woodard & Curran) John Schwanda (Owen Haskell Inc (Surveying)) Joe Gallant (University of Southern Maine)

II. REQUIRED REVIEWS

Waiver Requests	*Applicable Standards*
Review	*Applicable Standards*
Site Plan	*Section 14-526*

III. PROJECT DATA

Existing Zoning	R-5, B-2 Zones, USM Overlay
Existing Use	*Parking Lot*
Proposed Use	*Parking Lot*
Parcel Size	63,200 SF

	Existing	*Proposed*	*Net Change*
Building Footprint	NA	NA	NA
Building Floor Area	NA	NA	NA
Impervious Surface Area	27,900 SF	52,300 SF	+ 24,400 SF
Parking Spaces	82	214	+ 132
Bicycle Parking Spaces	0	0	0



Figure 2: Existing Conditions - Source: Google Maps

IV. EXISTING CONDITIONS

The proposed development site is located on 44 Bedford Street which extends between Forest Avenue and Deering Avenue. The parcel is approximately 63,200 SF in size. The site is part of the University of Southern Maine Portland campus, and is surrounded by Hannaford Hall Parking Garage to the west, the Muskie School's Wishcamper Building to the north, Osher Library to the east, and Interstate 295 to the south. The existing grassed area interior to the site that will be converted to parking is not considered open space used for recreation; it is currently used for overflow parking and storage.

The applicant and owner of the parcel is the University of Southern Maine. The site is currently developed as an 82-space surface parking lot with landscaped islands. Owen Haskell, Inc. completed a boundary and topographic survey of the site. There were no existing or proposed easements identified.

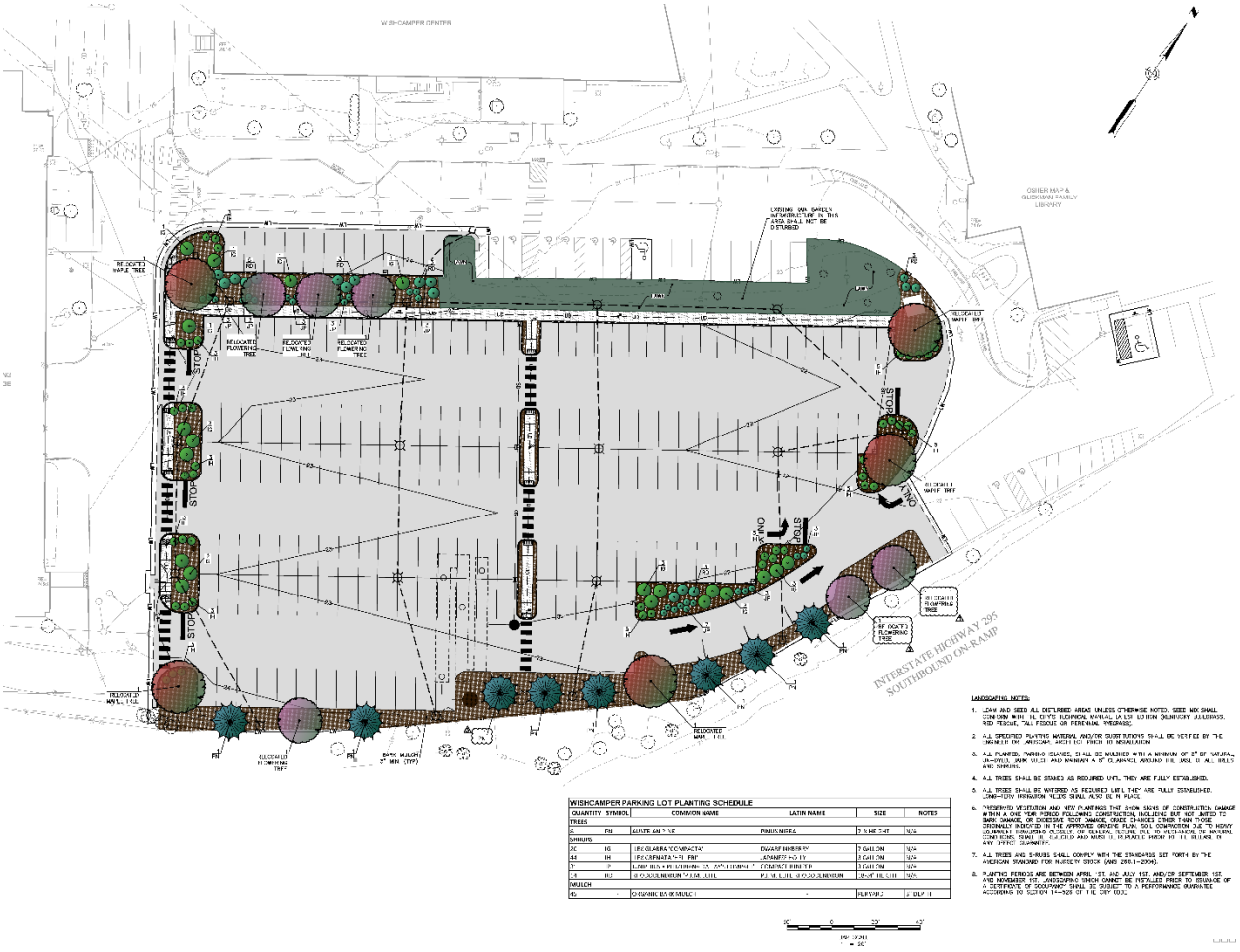

Figure 3: Proposed Landscape Plan - Source: Woodard & Curran

V. PROPOSED DEVELOPMENT

The proposed development includes the creation of an additional 122 parking spaces resulting in a total of 214 surface parking spaces (82 existing + 122 additional). The proposed project is intended to enable the University to replace some of the parking that will be displaced by the planned future development of a new Student Center and Student Residential Building (to be submitted under a separate application). The proposed parking lot will include the necessary ADA accessible parking spaces as well as compact spaces. The proposed stormwater management plan will consist of porous pavement walkways, similar to existing walkways throughout the University, and a subsurface detention and proprietary treatment device. The parking field consists of 166 standard spaces, 38 compact spaces and 10 handicap accessible spaces comprising 52,300 square feet of impervious paving. The total area of the project is 63,200 square feet.

VI. PUBLIC COMMENT AND NEIGHBORHOOD MEETING

The applicant team held a neighborhood meeting on the evening of March 4, 2020 from 5:30 PM at the Talbot Lecture Hall within Luther Bonney Hall on Bedford Street in Portland, ME. The meeting was attended by two abutters and one individual who did not sign in, along with members of the project team. Attending on behalf of the development team were Ashley Fletcher and Darrin Stairs of Woodard & Curran, and Alec Porteous of USM. A presentation was provided by Darrin Stairs & Alec Porteous. Comments

included questions regarding associated traffic from the project, as well as specifics on overall campus parking plans. **(See Attachment Q)**

VII. RIGHT, TITLE, & INTEREST AND FINANCIAL & TECHNICAL CAPACITY

The owner of the property is The University of Southern Maine Foundation. The applicant provided a copy of the warranty deed, recorded at the Cumberland County Registry of Deeds in CCRD Book 29219 page 218, which demonstrates their right, title and interest in the property. The applicant team cited their experience and qualifications to demonstrate capacity to design and construct the project. The anticipated total cost of the project is projected to be $1,710,000. **(See Attachments D & E)**

VIII. ZONING ANALYSIS

Dimensional requirements for this project are dictated by the R-5, B-2, & USM Overlay Zones.

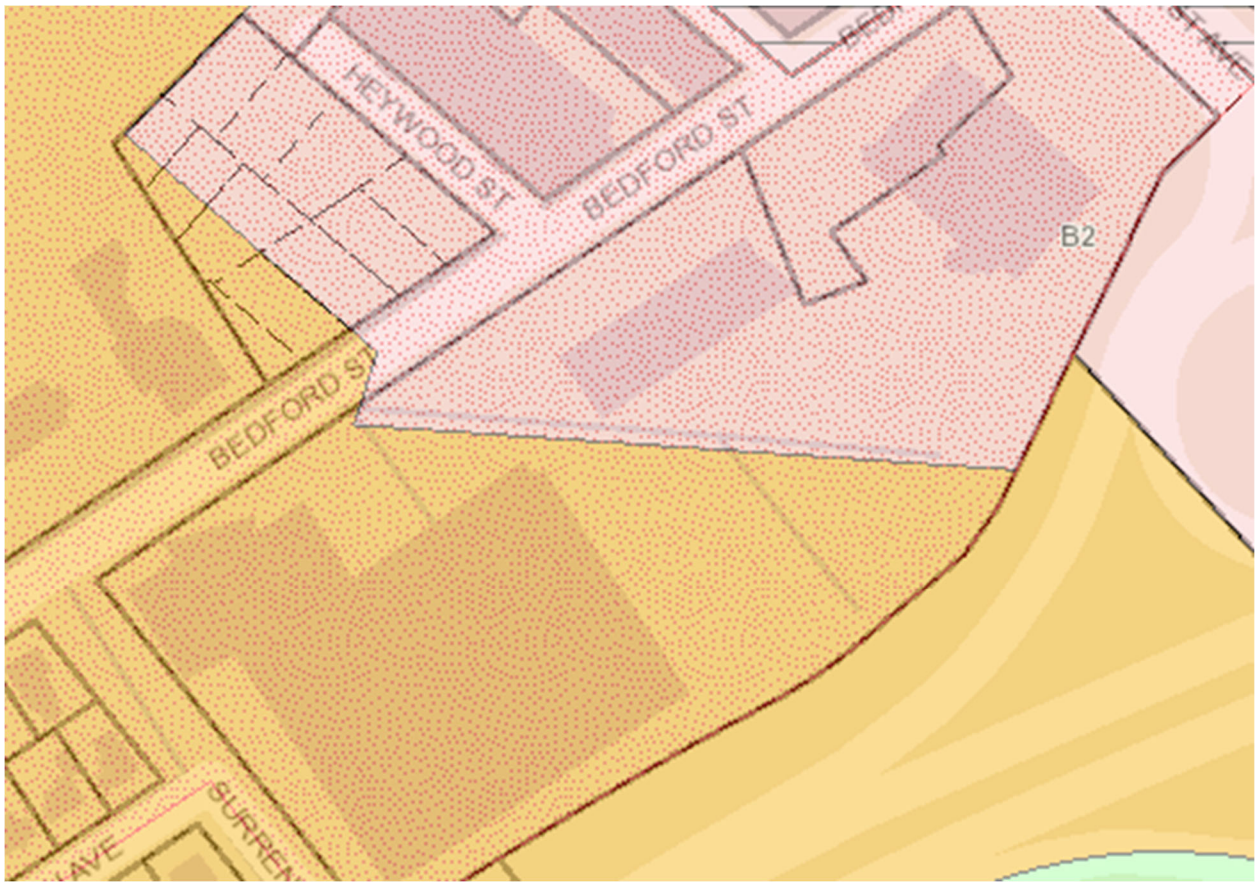

Figure 4: Zoning Map

Zoning Requirements	I-M	Provided	+/-
Minimum Lot Size	None	62,300 SF	N/A
Minimum Street Frontage	NA	NA	
Maximum Lot Coverage	66%	55%	-11%
Parking	NA	214	NA
Bicycle Parking	NA	NA	NA

IX. DEVELOPMENT REVIEW

A. SITE PLAN SUBMISSION REQUIREMENTS (Section 14-527)

SITE PLAN STANDARDS (Section 14-526)

The proposed development has been reviewed by staff for conformance with the relevant review standards of Portland's site plan ordinance and applicable regulations. Staff comments are listed below.

1. *Transportation Standards*

a. Impact on Surrounding Street Systems and Access and Circulation

The proposed parking lot will include the construction of ADA accessible parking and pedestrian walkways. Traffic signage and pavement markings will be provided to circulate pedestrian and vehicular traffic throughout the Site. The proposed project will maintain Site's existing access and traffic patterns.

b. Sidewalks

Internal sidewalks and ADA ramps will be provided, as shown and detailed on the design drawings. The proposed project will not include any work along street frontages or in the public Right-of-Way.

c. Public Transit Access

No changes to public transit access are proposed as part of this project.

d. Parking

The purpose of the proposed parking lot is to replace parking that will be displaced by the University's future developments; the intent is to construct the proposed parking lot in advance of future developments in order to satisfy the University's existing parking demands. The University is currently conducting a campus-wide parking study that will be submitted as part of future applications. The proposed project will create 122 additional off-street parking spaces, including required ADA parking; a parking summary is provided on the Site Plan. The proposed parking lot has been designed in accordance with the

dimensional standards of Section 1 of the City's Technical Design Manual, as shown on the design drawings.

e. Bicycle Parking

The University does not currently anticipate an increase in the demand for bicycle parking; additional bicycle parking may be provided as part of future developments. In response to comments from planning staff, 10 bike spaces will be added to the site plan.

2. Environmental Quality Standards

a. Preservation of Significant Natural Features

The Site has been previously developed and there are no known areas of significant natural features, including rare or endangered botanical features, significant wildlife habitats, or wetland areas.

b. Landscaping and Landscape Preservation

Landscaping Plans are included in the drawings referenced in Section 3 of this Report. These Plans show proposed landscaped islands within the proposed parking area, as well as screening of the Site; plant sizes are specified in the planting schedule provided on the Plans. A Tree Preservation & Removals Plan is included in the design drawings; this Plan shows what existing trees will be preserved and specifies protection measures.

c. Water Quality, Storm Water Management and Erosion Control

The project must comply with the water quality, stormwater management, and erosion control standards identified by the City of Portland in the Land Use Chapter of the Code of Ordinances and Section 5 of the City's Technical Manual, as well as the Maine DEP Chapter 500 Stormwater Standards associated with Site Location of Development Act Permit requirements. The Stormwater Management Plan included with the application demonstrates that the proposed development meets the applicable standards. Stormwater treatment will be provided by porous pavement walkways and a Storm Filter system. Erosion and sediment control measures are shown and detailed on the drawings.

The Stormwater Management Plan was reviewed by consulting civil engineer Wright-Pierce and found to be in conformance with City standards and Chapter 500.

3. Public Infrastructure and Community Safety Standards

a. Public Safety and Fire Prevention

Overhead lighting will be provided to promote public safety and emergency vehicle access to the Site will be maintained. No new structures requiring Fire Department review are proposed as part of this project.

b. Availability and Adequate Capacity of Public Utilities

Proposed lighting will connect to an existing underground electric conduit, as shown on the drawings, and will be served by an existing electrical panel in Wishcamper Center. Water and sewer utilities are not included in the proposed work. The proposed project will also generate construction waste and demolition debris (CDD). The contractor will be responsible for hauling the CDD or contracting with a waste management service to haul the CDD from the project site.

4. Site Design Standards

a. Snow and Ice Loading

Proposed snow storage areas are indicated on the drawings. The proposed landscaped areas will be the primary source for snow storage. Parking demands are lower during the winter months, so some of the proposed parking along the southern perimeter of the site may be utilized for additional snow storage. Snow that exceeds the available space on-site will be hauled off-site.

b. View Corridors

N/A

c. Historic Resources

N/A

d. Exterior Lighting

Overhead lighting is proposed in accordance with Section 12 of the City's Technical Manual. A Photometric Plan and details for the proposed lighting fixtures are included in the drawings; cut sheets of the proposed lighting fixtures are also attached to this Section for your reference. It should be noted that the project abuts the I-295 corridor; according to Section 12 of the Technical Manual, public rights-of-way is considered a non-sensitive use and, as such, illumination at the property boundary must not exceed 1.0 foot-candles; the lighting plan has been designed in accordance with these standards.

e. Noise and Vibration

The proposed project will not result in any increase in noise or vibration on the Site.

f. Signage and Wayfinding

Existing signage will be maintained, and new traffic signage will be provided as shown on the drawings.

g. Zoning Related Design Standards

According to the City's Land Use Ordinance, Chapter 14 of the Code of Ordinances, the proposed work is subject to a maximum impervious surface ratio of 66% of the total land

area within the University of Southern Maine overlay zone exclusive of public streets. Based on available data from the City of Portland's Online Stormwater Fee Lookup service, the University currently has an impervious surface ratio of approximately 54%; the proposed parking lot will result in an impervious surface ratio of approximately 55%.

h. Construction Management Plan

The construction management plan was reviewed and approved by city staff. **(See Attachment P16. CONSTRUCTION MANAGEMENT PLAN)**

X. SITE LOCATION OF DEVELOPMENT REVIEW

The City of Portland has delegated review authority from the Maine DEP for large projects that trigger Site Location of Development Act (SLODA) review; this project meets the threshold requiring SLODA review. The standards for this review generally dovetail with Portland's existing site plan and subdivision standards:

- Financial & Technical Capacity: see section VII, above.
- Traffic Movement: see site plan standards, a, above.
- No Adverse Effect on the Natural Environment: see site plan standards, b, above.
- Soil Types: see site plan standards, b, above.
- Ground Water: see site plan standards, 2, above.
- Infrastructure: see site plan 2, 3, and 4, above.
- Flooding: see site plan, 2, above.
- Storm Water Management & Erosion and Sedimentation Control: see site plan 2, above.

Staff finds that the project meets SLODA standards.

XI. STAFF RECOMMENDATION

Subject to the proposed motions and conditions of approval listed below, Planning Division staff recommends that the Planning Board find that the 44 Bedford Street development project meets the applicable standards of Portland's Land Use Code.

XII. PROPOSED MOTIONS FOR THE BOARD TO CONSIDER

A. SITE PLAN REVIEW & SITE LOCATION OF DEVELOPMENT

On the basis of the application, plans, reports and other information submitted by the applicant; findings and recommendations contained in the Planning Board Report for the public hearing on May 26, 2020, for application #PL-000974-2020, 44 Bedford Street relevant to the site plan and Site Location of Development Act regulations; and the testimony presented at the Planning Board hearing, the Planning Board [finds/does not find] that the plan is in conformance with the site plan standards of the Land Use Code.

XIII. ATTACHMENTS
PLANNING BOARD REPORT ATTACHMENTS

1. COMMENT RESPONSE LETTER
2. WRIGHT PIERCE STORMWATER COMMENTS
3. WISHCAMPER PARKING LOT STORMWATER CONNECTION
4. JEFF TARLING LANDSCAPE COMMENTS

APPLICANT'S SUBMITTALS

A - COVER
B – SUBMISSION CHECKLIST
C – PROJECT DESCRIPTION
D – RIGHT, TITLE & INTEREST
E – FINANCIAL CAPACITY
F – STATE & FEDERAL APPROVALS
G – APPLICATION FEES
H - ZONING
I - EASEMENTS
J – SURVEY
K – CONSTRUCTION MANAGEMENT PLAN
L – SLOD
M – COMPLIANCE WITH SITE PLAN STANDARDS
N – STORMWATER REPORT
O – REVISED STORMWATER INSPECTION CHECKLIST
P – REQUEST FOR SD CONNECTION
Q - NEIGHBORHOOD MEETING
R - MHPC REVIEW LETTER
S - MNAP REVIEW LETTER
T - MDIFW REVIEW LETTER
U - 3.25 RESPONSE TO COMMENTS LETTER
V - 5.07 RESPONSE TO COMMENTS LETTER

PLANS

P1. COVER SHEET
P2. SITE PLAN
P3. EXISTING CONDITIONS
P4. LANDSCAPE PLAN
P5. LANDSCAPE DETAILS
P6. TREE PRESERVATION & REMOVALS PLAN
P7. GRADING & DRAINAGE PLAN
P8. MATERIALS & LAYOUT
P9. EROSION & SEDIMENT CONTROL PLAN
P10. CIVIL DETAILS
P11. ELECTRICAL & PHOTOMETRICS
P12. GENERAL NOTES & LEGEND

Att. 7

Portland Maine Yes. Google's good here.

Jimmy Dealaman <jdealaman@portlandmaine.gov>

USM Garage - Comments for PB Workshop?

Jeff Tarling <jst@portlandmaine.gov> Fri, Sep 17, 2021 at 2:05 PM
To: Jimmy Dealaman <jdealaman@portlandmaine.gov>

Hi Jimmy -

Sorry for the delay, was in the field most of the day.

In review of the USM parking garage landscape, the tree numbers look good.

The tree species, 'Princeton' American Elm, which we like but... we maintain dozens of these
in various parks and public grounds and while resistant to Dutch Elm Disease, they do
get this once and awhile. Our recommendation would be to diversify the planting with one or
two others, either break up the large planting of 12, creating 5 & 7 or change the center trees
or the 6 on the right side. Other tree types might include:

'Street-Keeper' Honeylocust
'Regal Prince' (upright) Oak
'Bowhall' Red Maple.

The proposed caliper size of 4" is above the required 2.5"-3" caliper and maybe easier to source.

Overall the plan looks good, it might be best to mix up the tree types to prevent future decline.
Dutch Elm Disease can spread by rootgraft making a large planting somewhat iffy.

Thanks,

Jeff

Jeff Tarling
City Arborist - City of Portland Maine
Parks, Recreation & Facilities

Forestry, Parks & Horticulture
212 Canco Road - Suite A
Portland, ME. 04103
(207) 808-5400
jst@portlandmaine.gov

[Quoted text hidden]

University of Southern Maine
Campus Design Principles and Standards

Adopted May 23, 2006

1. PURPOSE

The *University of Southern Maine Campus Design Principles and Standards* have been created in recognition of the need of the university to grow in a vibrant, aesthetic, and sustainable manner that provides a strong sense of place, and conveys an identity as a high-quality institution of learning.

All new buildings shall be designed to create a visual connection with existing campus buildings with a goal of achieving a cohesive campus appearance. New development shall be characterized by excellence in architectural design, craftsmanship, materials, streetscape and landscape improvements, signage and lighting appropriate for a university in an urban setting in the Northeast.

These principles and standards are intended to regulate the future build out of the institution while ensuring that new development is sensitive to adjacent residential neighborhoods and commercial areas, and is successfully integrated with the City as a whole.

2. APPLICABILITY

The following principles and standards shall apply to all development on the University of Southern Maine Portland campus.

3. PRINCIPLES AND STANDARDS

PRINCIPLE A Campus Design

The campus design shall create a strong identity and sense of place. New development may be contemporary in architectural style, but shall be organized according to time-tested and traditional principles of urban and landscape design in order to integrate these buildings into a coherent whole. These principles shall serve to strengthen the overall image of the campus, establish defined boundaries, ensure a sensitive interface with surrounding neighborhoods and the city, enhance the physical amenities of the campus, create a pedestrian oriented environment with safe and vital streets, and provide a series of significant open spaces.

STANDARD A-1: **Campus Edges.** New development along the edges of the campus shall be designed to coordinate with the surrounding neighborhood, and provide a transition between institutional and smaller-scale uses through mitigation of height, stepbacks and materials. Parking lots and structures, blank walls, or backs of buildings shall not be sited in a manner that forms a boundary to neighborhoods and the city. Dormitories shall be sited in a manner that is sensitive to private residential neighborhoods. Campus facilities that are available for use by the public shall be sited so that they are accessible to the surrounding neighborhoods.

STANDARD A-2: **Building Orientation**. Development shall be oriented to streets, major pedestrian access routes, and large scale open spaces in order to create a cohesive pedestrian-oriented environment. Buildings shall not be oriented toward parking lots. Large-scale open spaces shall be partially bordered by buildings in order to form defined courtyards or quadrangles. Structures shall be sited to create safe pedestrian spaces that maximize exposure to sun and block winds.

STANDARD A-3: **Pedestrian Environment.** Development along public streets shall be designed to enhance the pedestrian environment through such means as fully-functioning building entries oriented to the street; traffic calming, visible crosswalks and adequately sized sidewalks; pedestrian scaled street lights; exterior gathering spaces; trees and landscaping; street furniture; and public art and other visual amenities. To the extent that the campus includes a mix of campus-related uses that serve students and neighborhood residents (*e.g.*, cafes, bookstores, day care facilities, health facilities, libraries, and meeting spaces), the University shall endeavor to locate such uses at the public street level in order to enhance the neighborhood and create a vital pedestrian environment.

STANDARD A-4: **Gateways.** Gateways to the campus shall be designed to signify the arrival to a distinct place and shall be clearly articulated through the use of elements such as distinguishing architecture, landscaping, signage, lighting, and other amenities. The key campus gateways are at Deering Avenue and Falmouth Street, Deering Avenue and Bedford Street, Durham Street and Falmouth Street, and Forest Avenue and Bedford Street.

STANDARD A-5: **Views and Landmarks.** View corridors and terminations to landmarks such as campus buildings, city buildings and natural resources, shall be highlighted with design elements such as significant architectural features, quality materials, landscaping, public art or other visual amenities. View corridors and termination points shall include the view up Bedford Street and west across Deering Ave., and other important views as may be identified during campus planning and the City's development review process.

PRINCIPLE B Access and Circulation

Campus streets and sidewalks shall be scaled for expected traffic; encourage pedestrian, bicycle, and transit activity; and connect to neighborhood streets and sidewalks.

STANDARD B-1: **Connectivity.** An internal campus circulation system shall coordinate and intersect with neighborhood streets and sidewalks at multiple access points.

STANDARD B-2: **Circulation.** A primary circulation system shall be developed through the creation of streets, sidewalks and walkways at ground level. A secondary circulation system shall be provided internally within non-residential buildings through the use of fully functioning entrances on every side of a building, and internal corridors that permeate through buildings unless the building program precludes such design for security reasons (See Standard D-5). Skywalks shall be utilized only when a compelling case can be made for the need from a pedestrian safety or traffic management perspective.

STANDARD B-3: **Multi-modality.** New development shall relate to a campus circulation system that serves pedestrians/bicyclists, autos, public transportation, service vehicles, and emergency vehicles. New development along transit corridors shall provide convenient and accessible routes from the building to the nearest transit stop.

STANDARD B-4: **Traffic-calming.** Circulation improvements internal to the campus shall be designed to create a pedestrian-oriented environment and to discourage speed. Appropriate traffic calming measures may include gateway treatments that signal arrival in to the campus environment, corner neck-downs, narrowed travel lanes, roundabouts, speed tables, and other devices. Development along public streets shall be designed with traffic calming measures to the extent allowed by City and State policies and requirements at a minimum.

STANDARD B-5: **Sidewalks.** Clay brick sidewalks shall be provided on both sides of all public streets. New sidewalks along public streets shall be at least 8 feet wide, except where it can be demonstrated that site constraints preclude such width.

STANDARD B-6: **Street lights.** Streetlights along public streets shall be pedestrian in scale and distinctive in design in order to help establish an identity for the neighborhood.

PRINCIPLE C Parking, Loading and Service Areas

Parking structures shall be designed and located so as to present an attractive façade to neighboring uses in order to minimize the impact along streets and residential areas. Surface parking lots shall be sited and designed to minimize their visual presence on the campus.

STANDARDS C-1: **Structures**. Parking structures shall be compatible with adjacent uses and architecture in form, bulk, massing, articulation, and materials. Parking structures shall incorporate architectural design elements in order to achieve visual interest on street frontage facades, and along major pedestrian ways, for the full height of the structure, that serve to enhance the pedestrian experience.

STANDARD C-2: **Active Uses:** Parking structures shall incorporate liner buildings or enclosed active uses on the first floor along all primary frontages (excluding frontage dedicated to entrances, lobbies, and stair towers). Such space shall be provided with a minimum of 9 foot floor to ceiling clearance height and a 25 foot depth (measured from the exterior building wall). Alternatively, the parking structures may be set back at least 35 feet from the primary street right of way and that space shall not be occupied by surface parking or access lanes, and shall be designated for future development. The set back space shall be provided with all stubbed utilities and other provisions needed to accommodate further development.

STANDARD C-3: **Decks and Ramps.** Parking structures shall have horizontal decks on all levels where the decks are visible from the public rights of way. Ramps and non-horizontal parking decks shall be screened from all visible angles and shall not be permitted

on facades located along or within 45 feet of a public street (Note: such space would allow for the construction of a liner building and a ten foot separation).

STANDARD C-4: **Surface Lots**. Parking lots shall be located behind buildings or to the side of existing or future buildings, but shall not occupy more than 64 feet of public street frontage within 45 feet of the street right of way (to allow for a future building). The areas devoted to surface parking shall be screened from streets, walkways, and significant views through the use of design elements such as plantings, fencing, grade changes, and/or walls.

STANDARD C-5: **Loading and Service Areas.** Wherever possible, loading ramps and service entrances shall be located near industrial uses, such as along Durham Street. Loading ramps and service entrances shall be located at the rear or side of structures. If visible from the public right of way, the garage doors shall be minimized and the loading shall be screened from view and with materials, colors and finishes that are consistent with the exterior elevations of the overall building. Buildings that face more than one public street shall have loading and service entrances oriented to the more secondary street.

STANDARD C-6: **Utility Services.** Service and utility infrastructure such as power generators, HVAC, fuel tanks and similar campus or building services shall be located unobtrusively and shall be visually screened from adjacent residences and shall not result in adverse visual and audible or other impacts on adjacent residential properties.

PRINCIPLE D Architectural Design

All new buildings shall be designed to create a visual connection with existing campus buildings with a goal of achieving a cohesive campus appearance. Buildings shall be characterized by excellence in architectural design, craftsmanship, materials, signage and lighting appropriate for a university in an urban setting in the Northeast.

STANDARD D-1: **Height**. Building heights along campus edges shall transition to the scale of adjacent off campus development through design elements such as stepbacks, variations in massing, and through the use of design details and materials.

STANDARD D-2: **Setbacks**. Buildings along public streets shall have a front yard setback that does not exceed ten (10) feet from the street right of way, except where existing campus buildings create a consistent street wall, in which instance the setback may conform to that existing street wall. An alternative would be to create a landscaped design feature such as a boulevard for vehicles, or a promenade for pedestrian access, and to set the building back along the line of this feature.

STANDARD D-3: **Stepbacks.** The street wall heights of campus buildings on Falmouth Street shall be stepped back 15 feet minimum once they exceed 50% more height than the average height of the buildings in close proximity, across the street.

STANDARD D-4: **Massing**. Facades visible from public streets shall incorporate design elements that break the facades into components scaled to the context of buildings on

the street. Buildings shall include features such as expression of the building's base, middle and top, vertical fenestration, variation in the planes of the façade, and architectural details such as trim, entries, balconies, cornices, etc. No more than 20 consecutive linear feet of blank wall shall be allowed at the first floor level along public streets. Windows and functional doors shall be used to break up blank walls. Design elements such as pilasters, materials, permanent artwork, distinctive lighting and/or landscaping may be used to mitigate blank walls if it can be demonstrated that the purposes of the building interior preclude the use of windows or functional doors every 20 feet at the first floor level.

STANDARD D-5: **Entrances.** Buildings along public streets shall have the primary entrances oriented to the street. Buildings that are internal to the campus shall have primary entrances oriented to major pedestrian corridors. Primary entrances may not be oriented to a parking lot. Academic buildings shall be permeable and accessible on all sides unless the building program precludes such design for reasonably necessary security purposes. Dormitory buildings are only required to have one entrance for security purposes. All building entrances should be fully functional in design and use and shall provide access to lobbies, elevators, stairs and common areas. Primary entrances shall be emphasized and integrated into the design of the building through features such as expressed or recessed entries, trim detailing, lighting, and landscaping. Entrances shall be scaled to the overall massing of the building.

STANDARD D-6: **Windows**. Windows with a visible transmittance of .7 or greater shall be located on all facades visible from public ways in order to provide light and views internally, and to provide security and vitality to external spaces. Window style shall be appropriate to the overall building style and scaled to the overall massing. The first floor transparency along public streets shall be equal to at least 50% of the wall area between the height of 2 and 9 feet. Upper floors of all new buildings shall have at least 15% to 40% transparency of wall surface along public street facades, with the range depending on program requirements. If it can be demonstrated that the building program precludes transparent windows along first floor street frontages, then other surface details shall be used (See Standard D-4).

STANDARD D-7: **Materials**. Facades visible from public rights of way shall use natural building materials that are considered to be permanent for 100 years. Predominant materials shall be brick, stone, precast concrete and other masonry products, wood, glass and high quality metals such as titanium and copper. Renewable and recyclable materials approved for use by LEED Standards (Leadership in Environmental Design) may be used. Low grade materials such as enamel metal panels and exterior insulation and finish systems (EIFS), panelized "thin brick", fiber-cement or cementitious panel siding, vinyl siding or vinyl dimensional stock, or stucco shall not be used on facades visible from public rights of way. Fiber-cement clapboard and shingles may be used but shall be installed with a reveal commonly found on the street.

First floor windows shall use untinted or lightly tinted glass, or the minimum tint needed to meet LEED Standards. Upper windows shall use untinted, lightly tinted, or the minimum tint needed to meet LEED Standards, or spandrel glass. Heavily tinted or reflective glass shall

not be allowed on facades that are visible from public rights of way. The selection of façade materials shall be consistent with the façade design (e.g. brick facing should not appear to be thin layers on the façade, or to overhang without apparent support). Loading and service areas and rooftop appurtenances that are visible from public rights of way shall be screened with materials, colors and finishes that are consistent with the overall building. Public spaces shall be constructed of permanent, durable materials such as concrete, brick or stone.

STANDARD D-8: **Signage.** New buildings shall have a building name and street address mounted in a location that is highly visible from public rights of way by both pedestrians and motorists. The size of the lettering shall be proportional to the size of the building. Building signage shall be made of high-quality permanent materials such as fabricated dimensional lettering or cut or cast metal lettering that is pinned to the building, carved stone or concrete, or painted wood or glass. Internally illuminated or screen printed plastic signage shall not be allowed on facades visible from public rights of way.

STANDARD D-9: **Historic Structures**. Historic structures shall be rehabilitated in a way that is consistent with their original architectural intent. New additions to historic buildings shall be designed to be compatible with the original structure in size, style, and material, and should result in the minimum necessary loss of original architectural material.

STANDARD D-10: **Original Residential Structures** The architectural and structural integrity of buildings that were originally residential uses shall be preserved when such buildings are renovated or enlarged. If a common treatment is utilized (i.e. the same siding is used for all university structures that were originally residential structures), the treatment must reflect the original residential character of the building and of other buildings on the street (e.g. contrasting paint between the trim and body of the structure, and building details which are expressed). Original siding shall be preserved, repaired or replaced with like material as needed. Vinyl siding and vinyl dimensional stock shall not be allowed. Fiber-cement clapboard and shingles may be used but shall be installed with a reveal commonly found on the street. Windows, doors and other features shall be preserved, repaired or replaced in a manner consistent with the original residential character of the building. Signage on buildings that were originally residential structures shall be subdued, and in scale with the building. This Standard D-10 does not apply to replacement buildings.

GLOSSARY [To be defined]

Active uses
Auto-oriented
Building Orientation
Campus Edges
Circulation system
Cohesive
Connectivity
Contemporary
Contextual
Defensible Space
Gateways
Institutional
Landmarks
Liner Buildings
Massing
Multi-modality
Pedestrian oriented environment
Proportion
Scale
Setbacks
Stepbacks
Traffic calming
View Corridors
View Terminations

Att. 9

Portland Maine Yes. Google's good here.

Jimmy Dealaman <jdealaman@portlandmaine.gov>

Proposed USM Garage

John Peverada <jbp@portlandmaine.gov> Wed, Dec 1, 2021 at 10:40 AM
To: Jimmy Dealaman <jdealaman@portlandmaine.gov>
Cc: Anne McGuire <amcguire@portlandmaine.gov>, Errico Thomas <thomas.errico@tylin.com>, James Rather <jrather@portlandmaine.gov>, Jeremiah Bartlett <jbartlett@portlandmaine.gov>, Kevin Kraft <kkraft@portlandmaine.gov>

Jimmy,
To follow up on our discussion concerning the proposed USM parking garage, I just want to reiterate my thoughts as to why I think it is shortsighted for the size of the garage to be reduced from what was originally proposed.

I was on the building committee for the original garage, and at that time it was decided to build additional spaces for future demand, which worked out well. It is my understanding that prior to the pandemic the garage was at capacity. I should also point out that prior to the construction of that garage we were receiving a lot of parking complaints from the neighborhood about the negative impact on their streets. After the garage opened most of those complaints went away.

I do not think the size of the proposed garage should be reduced for the following reasons.
1. Students living in the dorms will be storing their cars in the garage.
2. It appears that USM is anticipating continued expansions at the Portland campus over the next several years, and a larger garage will accommodate some of that demand.
3. The cost of a future expansion will be considerably more expensive and inconvenient than building the additional spaces now.
4. Since the pandemic mass transit numbers have been down.
5. If there is adequate off street parking for all USM uses, the complaints from the neighborhood will remain low, and there will be less “cruising” in the neighborhood.

Feel free to pass this along to USM and or the Planning Board.
Thanks
John

 Att. 10

Portland Maine Yes. Google's good here.

Jimmy Dealaman <jdealaman@portlandmaine.gov>

Additional Response Needed - 50 Bedford Street

Jason Grant <jgrant@portlandmaine.gov> Thu, Dec 2, 2021 at 10:18 AM
To: Jimmy Dealaman <jdealaman@portlandmaine.gov>

Jimmy,

The Fire Department approves amended site plans for 50 Bedford Street parking garage with the new FDC locations.

Jason Grant
NFPA Certified Fire Inspector 2 & Fire Plans Examiner
Fire Marshal / Fire Prevention Coordinator
Portland Fire Department
Phone:(207) 756-8187

[Quoted text hidden]

Portland Maine Yes. Google's good here.

Jimmy Dealaman <jdealaman@portlandmaine.gov>

Addendum to USM's TDM Plan

Bruce Hyman <bhyman@portlandmaine.gov> Fri, Dec 3, 2021 at 8:55 AM
To: Jimmy Dealaman <jdealaman@portlandmaine.gov>

Good morning, Jimmy,

I have reviewed the revised USM TDM Plan Addendum, dated 11-22-21, and find it very responsive to the initial comments that were provided. I have no further comments. The Addendum will be appended to and are updates to particular sections based on updated data from the full TDM Plan dated November 11, 2020.

Please don't hesitate to contact me if you or the applicant have any questions.

Bruce
[Quoted text hidden]
--
Bruce Hyman
Transportation Program Manager

Department of Planning & Urban Development
389 Congress Street
Portland, Maine 04101
(207) 874-8717 phone

bhyman@portlandmaine.gov
http://www.portlandmaine.gov/1363/Transportation-Division
http://www.portlandmaine.gov
Yes! Transportation's Good Here ....

PLANNING BOARD REPORT
PORTLAND, MAINE

India Street Form-Based Code Zone Text Amendment
35 Commercial Street
Text Amendment
ZN-001756-2021
Maine Public Broadcasting Corporation, Applicant

Submitted to:	Portland Planning Board	**Prepared By:**	Charles Tetelman
Public Hearing Date:	January 11, 2022	**Date:**	January 7, 2022

I. INTRODUCTION

Maine Public Broadcasting Corporation ("Maine Public") has submitted a zoning text amendment application to amend Chapter 14, Article 9 of the City's Land Use Code to allow a height bonus in the Urban Active (UA) Subdistrict along Commercial Street within the India Street Form-Based Code Zone (IS-FBC). This application is being referred to the Planning Board for compliance with the City of Portland's Comprehensive Plan *Portland's Plan 2030* and adopted zoning policies stated in the IS-FBC section 9.1.

The Planning and Urban Development Department mailed 104 notices advertising this meeting to property owners within 500 feet of the site. A legal advertisement ran in the December 31, 2021 and January 1, 2022 editions of the *Portland Press Herald*.

The Planning Board held an initial workshop on December 14, 2021.

Applicant: Maine Public Broadcasting Corporation
Applicant Representatives: Simons Architects

II. REQUIRED REVIEWS

Review	*Applicable Standards*
India Street Form-Based Code Zone	Section 9.1

III. BACKGROUND

Recommended by the Planning Board and formally adopted by the City Council (Order 83-15/16) in 2015, the India Street Form-Based Code Zone (IS-FBC) serves as a zoning district that encourages a vibrant, walkable, mixed-use, urban district, preserves and values the existing historic neighborhood fabric, and fosters and supports local businesses and residential areas. Form-based zones differ from standard Euclidean zoning and focuses on form, dimensional, and design elements of zoning. Where traditional zoning includes dimensional and use requirements with a focus on land use, the IS-FBC emphasizes a building's physical form with its relationship to the street and de-emphasizes land use.

In 2021, Maine Public purchased 29 and 35 Commercial Street which includes the Galt Block Building and the adjacent surface parking lot. The applicant plans to construct a new building in the location of the surface parking lot, which would be reviewed under a forthcoming Site Plan application.

IV. EXISTING CONDITIONS AND SURROUNDING AREA

There are five lots that would be impacted by the proposed text amendment. These lots are shown below:

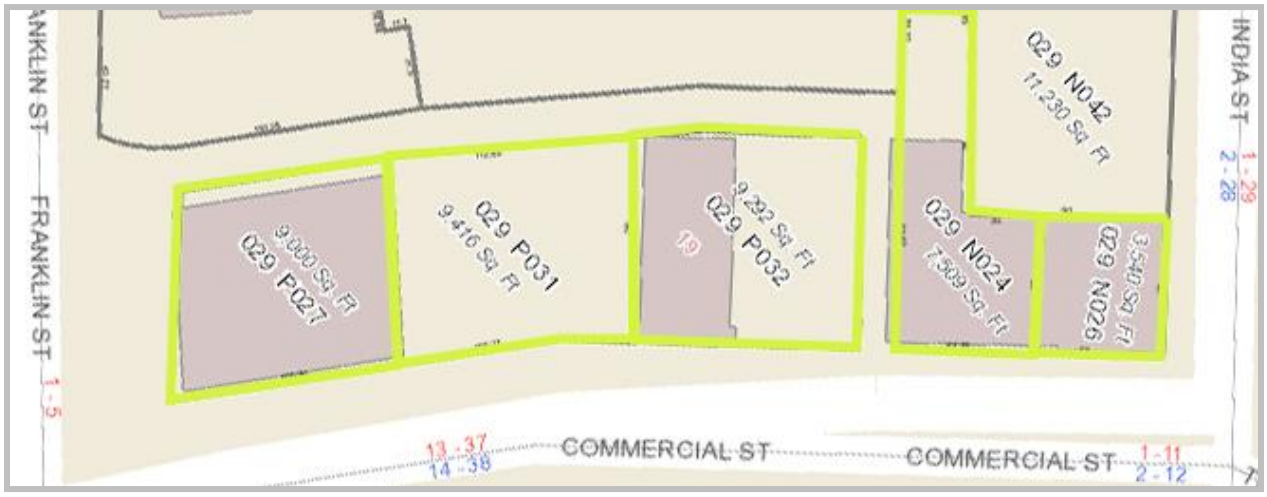

Figure 1: Parcels along Commercial Street

- Lot 029-P027 (9,000 square feet) contains the Galt Block Warehouse building, a **five story** office building on the corner of Commercial and Franklin Street. The building was purchased by Maine Public in 2021.
- Lot 029-P031 (9,416 square feet) is currently a surface parking lot and will be the site for Maine Public's new Portland headquarters.
- Lot 029-P032 (9,292 square feet) contains the **three story** Workingmen's Club building which has three office buildings inside. The lot also includes a surface level parking lot.
- Lot 029-N024 (7,509 square feet) is a **one story** building containing two units for commercial use.
- Lot 029-N026 (3,540 square feet) is a **four story** mixed-use building that formerly functioned as the New England House Hotel.

The IS-FBC applies to all new development designated on the India Street Regulating Plan (Section 9.1.3, Figure 9-A: IS-FBC Regulating Plan). The regulating plan shows the location of the zone boundary and subdistricts subject to regulation by the IS-FBC and is divided into three subdistricts: (i) Urban Neighborhood (UN) Subdistrict (ii) Urban Transitional (UT) Subdistrict (iii) Urban Active (UA) Subdistrict. With respect to height, the three subdistricts have the following standards:

Subdistrict	Pre-Bonus Height (max)	Bonus Height (max)	Bonus Floor Stepback (min)
UN	45 ft. and 4 stories	57 ft. up to 5 stories	15 ft.
UT	65 ft. and 6 stories	77 ft. up to 7 stories	15 ft.
UA (Congress Street Only)	50 ft. and 4 stories	62 ft. up to 5 stories	15 ft.

If a buildings frontage faces a UT street, UN street, or Congress Street, then the portion of the building facing that street is eligible for a height bonus. For lots with multiple frontages where a frontage faces an ineligible street, the bonus story must be stepped back at least 35 feet from the ineligible street line. For lots fronting an eligible street, the bonus story must be stepped back at least 15 feet from the street line

(Section 9.1.7; Tables 9-C Height Bonuses; Footnote 2). Only one height bonus may be applied per structure.

Recent IS-FBC Urban Active Subdistrict Site Plan Approvals:

- **7 India Street** (Level III Site Plan - 2020): Construction of a four story mixed-use building.
- **83 Middle Street** (Level III Site Plan - 2020): Construction of a five story building with 50 affordable residential units and rental commercial space on the first floor.

Commercial Street is a primary corridor for tourism, commercial activity, and economic development. Access and proximity to the Portland waterfront is a significant draw for many businesses located in and around the Old Port. The block itself contains a variety of commercial uses including restaurants, a bank, and office space. The surrounding India Street neighborhood is characterized by a variety of mixed-use, commercial, and residential buildings.



Figure 2: Street View of Commercial Street

The block being considered is also within the Portland Waterfront (Old Port) Historic District. The block includes the Galt Block Warehouse building, Workingmen's Club Building, and the former New England House Hotel which are all contributing structures.

V. PROPOSED TEXT AMENDMENT

Text Amendment

The proposed text amendment would allow a Height Bonus along Commercial Street in the Urban Active (UA) Subdistrict of the IS-FBC. As shown below, the Commercial Street UA District includes five parcels between Franklin Street and India Street. Currently, UA Subdistrict height bonuses are only allowed along Congress Street.

There are two proposed text changes associated with this application (Attachment F and G):

1) A text amendment to 'Table 9-C: Height Bonuses' shown in the table below.
2) A text amendment to the Land Use Code Section 9 (9.1.7.C.1.a):

"If a frontage faces a UT street, UN street, ~~or Congress Street~~ or allowed UA street according to Table 9-C, *then the portion of the building facing that street is eligible for a height bonus. For lots with multiple frontages where a frontage faces an ineligible street, bonus story must be stepped back at least 35 feet from ineligible street line."*

TABLE 9-C: HEIGHT BONUSES

Subdistrict	Pre-Bonus Height (max.)	Mid-Block Permeability[1]	Residential Density	Green Roof	Affordable Housing	Height With Bonus (max.)	Bonus Floor Stepback[2] (min.)
UN	45 ft. and 4 stories	n/a	n/a	n/a	1 story up to 12 ft.	57 ft. up to 5 stories	15 ft.
UT	65 ft. and 6 stories	1 story up to 12 ft.	1 story up to 12 ft.	1 story up to 12 ft.	1 story up to 12 ft.	77 ft. up to 7 stories	15 ft.
UA (Congress Street and Commercial Street only)	50 ft. and 4 stories	1 story up to 12 ft.	1 story up to 12 ft.	1 story up to 12 ft.	1 story up to 12 ft.	62 ft. up to 5 stories	15 ft.

[1] Must be publicly accessible.
[2] Measured from the ground floor building edge facing any public right-of-way.

Staff Analysis

As mentioned above, only a small section of Commercial Street falls within the IS-FBC and this change would impact five parcels in the zone. However, two of the parcels will still be partially restricted due to frontages along the UA Subdistrict portions of Franklin Street and India Street. "*For lots with multiple frontages where a frontage faces an ineligible street, bonus story must be stepped back at least 35 feet from ineligible street line.*" The dominant, or more restrictive, dimensional requirements take precedent in the IS-FBC. With this change, Lots 029-P027 and 029-N026 will have height restriction setbacks 35 feet from Franklin Street and India Street respectively. In addition, the subject block contains a mix of building types that range from one- to five-stories.

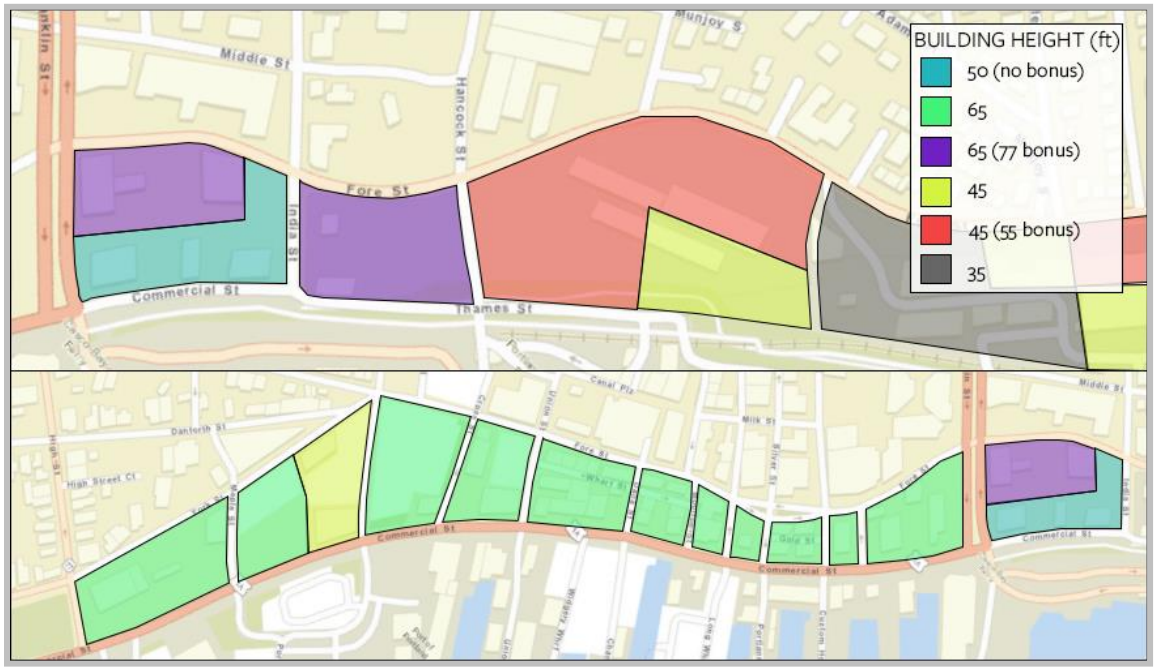

Figure 4: Building Height along Commercial Street

Staff also considered the height bonus in relation to the rest of Commercial Street as well as Thames Street moving towards the Eastern Promenade. The Downtown Height Overlay map dictates building heights within the B-3 zone on Commercial Street west of Franklin Street to Center Street. The maximum building

height is 65 feet. The B-5b zone, mapped along Commercial Street between State Street and Maple Street roughly to a depth of 250 feet also has a permitted maximum height of 65 feet. To the east, Thames Street, between India Street and Hancock Street, is part of the IS-FBC Urban Transitional Subdistrict with a maximum height of 65 feet (and up to 77 feet with a height bonus). The proposed text amendment to allow a height bonus of 12 feet or one story on Commercial Street within the IS-FBC (62 foot maximum building height up to 5 stories) would be consistent with the rest of Commercial Street and Thames Street along the waterfront and would create continuity in the street wall, enhancing the pedestrian streetscape. Furthermore, the bonus floor would be required to step back 15 feet from the building edge (Section 9.1.7; Table 9-C Height Bonuses; Footnote 2)

As part of the original IS-FBC adoption process in 2015, a key development principle was to ensure that neighborhood growth would carefully consider form and scale. This would include graduation of form to vary by location so that future development would be appropriately scaled to its surrounding context. In conducting its review of the application staff also evaluated the surrounding context to ensure compatibility. As mentioned above the majority of Commercial Street allows building heights of 65 feet. To the west, north, and east of the subject block nearby Franklin, Fore, and Thames streets allow buildings to be constructed up to 65 feet or 77 feet up to seven stories max. Furthermore, the subject block is located along Commercial Street and near the confluence of Franklin Street and Commercial Street, both wide major thoroughfares that run perpendicular and parallel to the expansive waterfront, respectively. This context contributes to the appropriateness of increasing height at this location.

Staff note that the proposed text amendment would encourage a range of building forms, allowing sufficient flexibility for building envelopes to facilitate feasible development within the India Street neighborhood and along the waterfront that can produce the multiple goals and objectives outlined in the Comprehensive Plan for these areas. Including, ensuring that employment and housing growth can be supported. Additional flexibility within the zoning envelope is critical to ensuring that buildings are able to accommodate a variety of uses, activities, and experiences within the same building or achieve optimal floor to floor heights for a variety uses. The proposed text amendment would increase building heights along Commercial Street one additional story up to 12 feet in height for buildings that incorporate either mid-block permeability, residential density, a green roof, or include 20 percent of residential units as workforce. These bonus provisions encourage development that further supports the City's goals of increasing housing opportunities, particularly in walkable transit oriented locations and incorporating sustainable design features such as green roofs.

Staff also note that the existing pre-bonus height, bonus heights, and setback requirements along with other design controls allows for articulation of buildings that would relate to the surrounding context. This graduated bulk envelope approach allows the bases of buildings and additional floors to relate to its immediate context and streets by requiring the bonus story to stepback from the building edge above the pre-bonus height.

VI. PREVIOUS WORKSHOPS

At the December 14, 2021 workshop, the Planning Board primarily asked clarifying questions related to the IS-FBC. The qualifying provisions for a height bonus remain unchanged; 1) residential developments with a density of 150 dwelling units per acre, 2) any developments providing a green roof, or 3) residential developments where 20% of the units are workforce housing units or low-income unit for rent. The

Planning Board also asked if rooftop appurtenances could exceed the bonus height limit. Staff note that Chapter 14 Article 7 allows rooftop appurtenances to be erected above the height limitations.

VII. COMPREHENSIVE PLAN CONSISTENCY

Portland's Plan 2030

As part of their application, the applicant highlighted a variety of elements from *Portland's Plan 2030* as it relates to the proposed text amendment (Attachment D). Many elements of this attachment relate more directly to the future use associated with 29 Commercial Street. However, the applicant cites objectives outlined in the City's Historic Resources guide related to *Authenticity* and *Security*.

Secure

"We will prepare for emergencies and ready for a changing climate."

The height bonus along Commercial Street will allow for more space protected against any flooding associated with a category 4 Hurricane or larger. Potentially including important broadcasting infrastructure during emergencies.

Authentic

"The uniqueness and integrity of our neighborhoods will be maintained and enhanced."

The height bonus along the Urban Active Subdistrict of the IS-FBC will match the scale and style of other buildings along Commercial Street include the Galt Block building and the Workingmen's Club.

In conducting its review of the application, Staff identified a number of objectives outlined in *Portland's Plan 2030* that support the requested text amendment. Those sections include the Plan's stated desire to stabilize and enhance historic areas of the city by ensuring quality investment in existing structures and compatible infill development and ensuring both an appropriate balance of continuity and change as Portland grows and evolves (*Portland's Plan Historic Resources Policy Guide, Local Goals*). The Plan also highlights the importance of promoting and fostering an economic climate that increases job opportunities and overall economic well-being as well as evaluating zoning to ensure employment and housing growth can be supported. Furthermore, the proposed change supports the principles of future land use outlined in Portland's Plan 2030 including the vision for One Portland, where the form and characteristics of neighborhoods vary, but the City functions as a whole and Complete Neighborhoods by creating opportunities for all residents to have access to services. The proposed text amendment supports the Comprehensive Plan in the following ways:

Historic Resources

"Stabilize and enhance historic areas of the city by ensuring quality investment in existing structures and compatible infill development."

"Ensure an appropriate balance of continuity and change as Portland grows and evolves."



Figure 5: From *Portland's Plan 2030*

Waterfront:
"Prioritize and promote Portland's unique mix of water-dependent, marine-related uses and compatible non-marine uses."

Economy:
"Respect that our unique quality of place is key to our current and future economic success."

"Pursue policies that create, nurture, and retain local businesses."

"Evaluate zoning and the condition of existing infrastructure in priority areas – downtown, identified neighborhood nodes, and along transit corridors – to ensure that employment and housing growth can be supported."

Housing:
"Increase, preserve, and modify the overall supply of housing city-wide to meet the needs, preferences and financial capabilities of all Portland residents."

"Encourage additional contextually appropriate housing density in and proximate to neighborhood centers, concentrations of services, and transit nodes and corridors as a means of supporting complete neighborhoods."

"Pursue policies to enable people who work in Portland to have the option to live in Portland."

VIII. PUBLIC COMMENT

Four public comments were received regarding the proposed text amendment (Attachments PC 1 - 4).

Three of the public comments were opposed to the proposed text amendment citing the differences between Congress Street as a downtown urban location and Commercial Street as a historic working waterfront. These comments were concerned that taller building heights are not appropriate in the historic Old Port and worry that continued expansion of height bonuses in the area could impact the character and future cityscape. One final comment noted the applicant's lack of reasoning or applicant's need to add a height bonus.

The fourth public comment (from an abutting tenant) wrote neither for nor against the text amendment, but expressed concern about future development on the 29 Commercial Street surface parking lot and how a new building could impact the use of the existing ATM on the side of the Five County Credit building by creating a blind spot or alley with limited visibility.

IX. REQUISITE COUNCIL ACTION

Any proposed rezoning, regardless of whether it is recommended by the Planning Board, must be approved by City Council vote in order to take effect.

X. PROPOSED MOTIONS

1. On the basis of materials submitted by the applicant, the City of Portland Land Use Code, Portland's Comprehensive Plan, public comment, and the information provided in public hearing on January 11, 2022 for the application ZN-1756-2021 (35 Commercial Street), and/or other findings, the

Planning Board finds that the proposed text amendment to Land Use Code Table 9-C, Height Bonuses, and to Land Use Code Section 9.1.7.C.1.a to allow height bonuses in the Urban Active Subdistrict along Commercial Street within the India Street Form-Based Code Zone [is/is not] consistent with the Comprehensive Plan for the City of Portland.

Therefore, the Planning Board [recommends/does not recommend] to the City Council adoption of the zoning text amendment.

XI. ATTACHMENTS

Applicant Submittal

A. Application Check-List
B. Deed QC with Covenant (EssexNorth 25)
C. Deed QC with Covenant (EssexNorth 35)
D. MP Consistency with Comprehensive Plan 10082021
E. MP Proposed text amendment 11302021
F. Table 9-C IS-FBC 11302021

Drawings

Plan 1. SITE PLAN & Massing
Plan 2. Location – 35 Commercial Street
Plan 3. ALTA_NSPS Land Title Survey 2019

Public Comment

PC 1 – PFS + MS
PC 2 – Voicemail
Pc 3 – KM
Pc 4 - MF

CITY OF PORTLAND
Planning & Urban Development Department

MAP AND TEXT AMENDMENT SUBMISSION CHECKLIST * Please submit each document and drawing as a separate PDF file * Please submit all drawings in a 24 x 36 sheet size * Please confirm each item by electronically checking the boxes to the left for each document/drawing	
GENERAL APPLICATION DOCUMENTS	
☑	**Project Description** • Cover Letter with detailed project description
☑	**Consistency with Comprehensive Plan** • Analysis of the consistency of the zone change request with the goals, policies and land use plan of Portland's Comprehensive Plan.
☑	**Proposed Text Amendment** • Provide proposed language for text amendment(s) and cite the relevant sections to be revised in the Land Use code.
☑	**Completed Checklist – Map and Text Amendment Application (this document)**
☑	**Right, Title and Interest** • Deeds, leases, or purchase and sales agreements
PLANS	
☑	**Vicinity Map**
☐	**Proposed Map Amendment** (please use the Portland zoning map as a reference)
☑	**Site Plan (if applicable)** On a separate sheet, please provide a site plan of the property showing existing and proposed improvements, including such features as buildings, parking, driveways, walkways, landscape and property boundaries.

This document has been recorded electronically
on 09/24/2021 at 08:18:09 AM
Please see the attached copy to view the
Recorder's Stamp as it now appears in the public record.
State: ME Jurisdiction: Cumberland County Registry of Deeds
Instrument # 68164
Book: 38692 Page: 244
Submitted by Monument Title Company

DLN: 10021401638O4

QUITCLAIM DEED WITH COVENANT

ESSEXNORTH 25 COMMERCIAL LLC, a Maine limited liability company, having a mailing address of P.O. Box 394, Topsfield, MA 01983 (the "Grantor"), FOR CONSIDERATION PAID, grants to MAINE PUBLIC BROADCASTING CORPORATION, a Maine nonprofit corporation, having a mailing address of 1450 Lisbon Street, Lewiston, ME 04240 (the "Grantee"), with QUITCLAIM COVENANT, certain real property, together with any improvements thereon, located on Commercial Street, City of Portland, County of Cumberland and State of Maine, more particularly described on **Exhibit A** attached hereto and made a part hereof.

For Grantor's source of title see Quitclaim Deed with Covenant granted by Auto Europe, LLC to EssexNorth 25 Commercial LLC dated October 25, 2019 and recorded in the Cumberland County Registry of Deeds in Book 36156, Page 203.

IN WITNESS WHEREOF, EssexNorth 25 Commercial LLC has caused this instrument to be executed by Terri Lee Carabillo, Manager of EssexNorth Portland LLC, Manager of EssexNorth 25 Commercial LLC, thereunto duly authorized, as of this 23rd day of September, 2021.

ESSEXNORTH 25 COMMERCIAL LLC
By: EssexNorth Portland LLC, its Manager

Witness

By: _____
Terri Lee Carabillo, Manager

Commonwealth of Massachusetts
County of Essex, ss

September 23, 2021

PERSONALLY APPEARED the above-named Terri Lee Carabillo, Manager of EssexNorth Portland LLC, Manager of EssexNorth 25 Commercial LLC as aforesaid, and acknowledged the foregoing instrument to be his/her free act and deed in his/her said capacity and the free act and deed of said limited liability companies.

Before me,

JOHN T. McLAUGHLIN
Notary Public
Commonwealth of Massachusetts
My Commission Expires November 25, 2022

_____
Notary Public/Attorney at Law
Commission Expires:
Print Name:

Exhibit A

A certain lot or parcel of land with the buildings thereon, situated on the northwesterly side of Commercial Street, in the City of Portland, County of Cumberland, Maine, comprising the premises numbered 23-31 on said Commercial Street and being bounded and described as follows:

Beginning on said Commercial Street at the center of the brick wall at the easterly end of the block of stores erected by Samuel Tyler, the center of said brick wall being distant from the easterly side of Franklin Street a distance of 100.85 feet; thence northwesterly through the center of said brick wall and in continuation of the same course to the southerly side of a passageway, which said passageway extends from said Franklin Street northeasterly; thence northeasterly by said passageway by various courses a distance of 112.65 feet, more or less, to line of land now or formerly of the heirs of Lemuel Dyer as established July 13, 1853 by deed recorded in the Cumberland County Registry of Deeds in Book 248, Page 183; thence southeasterly by said Dyer line a distance of ninety (90) feet to said Commercial Street; thence westerly by the northerly side line of said Commercial Street 105.27 feet, more or less, to the point of beginning, together with all its right, title and interest in and to all structures on the lot hereby conveyed which may extend into the limits of said passageway as originally laid out, also the right to the use in common with others of said passageway.

The above-described premises is subject to the following:

1. Certificate of Variance of Approval dated August 11, 1988 and recorded in the said Registry of Deeds in Book 8422, Page 121.

2. Rights and easements granted by Auto Europe Inc. to Central Maine Power Company and New England Telephone and Telegraph Company by instrument dated January 25, 1996 and recorded in the Cumberland County Registry of Deeds in Book 12368, Page 67.

3. Rights of others in and to the 20' common passageway located in the rear of the above described parcel.

4. Rights of the owners of the property next westerly thereof on Commercial Street to maintain one-half of the easterly wall of the building on said adjoining premieses along the westerly line of the premises above described.

5. Rights and easements set forth in the Easement Deed granted by EssexNorth 25 Commercial LLC to EssexNorth 35 Commercial LLC dated November 4, 2019 and recorded in the Cumberland County Registry of Deeds in Book 36156, Page 206.

This document has been recorded electronically
on 09/24/2021 at 08:19:08 AM
Please see the attached copy to view the
Recorder's Stamp as it now appears in the public record.
State: ME Jurisdiction: Cumberland County Registry of Deeds
Instrument # 68670
Book: 38692 Page: 246
Submitted by Monument Title Company

DLN: 10021401163867

QUITCLAIM DEED WITH COVENANT

ESSEXNORTH 35 COMMERCIAL LLC, a Maine limited liability company, having a mailing address of P.O. Box 394, Topsfield, MA 01983 (the "Grantor"), FOR CONSIDERATION PAID, grants to MAINE PUBLIC BROADCASTING CORPORATION, a Maine nonprofit corporation, having a mailing address of 1450 Lisbon Street, Lewiston, ME 04240 (the "Grantee"), with QUITCLAIM COVENANT, certain real property, together with any improvements thereon, located on Commercial Street, City of Portland, County of Cumberland and State of Maine, more particularly described on **Exhibit A** attached hereto and made a part hereof.

For Grantor's source of title see Quitclaim Deed with Covenant granted by Auto Europe, LLC to EssexNorth 35 Commercial LLC dated October 25, 2019 and recorded in the Cumberland County Registry of Deeds in Book 36156, Page 200.

IN WITNESS WHEREOF, EssexNorth 35 Commercial LLC has caused this instrument to be executed by Terri Lee Carabillo, Manager of EssexNorth Portland LLC, Manager of EssexNorth 35 Commercial LLC, thereunto duly authorized, as of this 23rd day of September, 2021.

ESSEXNORTH 35 COMMERCIAL LLC
By: EssexNorth Portland LLC, its Manager

Witness

By: _____
Terri Lee Carabillo, Manager

Commonwealth of Massachusetts
County of Essex, ss

September 23, 2021

PERSONALLY APPEARED the above-named Terri Lee Carabillo, Manager of EssexNorth Portland LLC, Manager of EssexNorth 35 Commercial LLC as aforesaid, and acknowledged the foregoing instrument to be his/her free act and deed in his/her said capacity and the free act and deed of said limited liability companies.

Before me,

JOHN T. McLAUGHLIN
Notary Public
Commonwealth of Massachusetts
My Commission Expires November 25, 2022

_____
Notary Public/~~Attorney at Law~~
Commission Expires:
Print Name:

Exhibit A

PARCEL 1

A certain lot or parcel of land with the buildings thereon, situated in the City of Portland, County of Cumberland, Maine, bounded and described as follows:

Beginning at the junction of the northwesterly side of Commercial Street and northeasterly side of Franklin Street; thence running easterly on Commercial Street fifty (50) feet to the middle of a partition wall; thence northerly by the middle line of said wall about ninety (90) feet to the common passageway hereinafter named; thence westerly on the line of said passageway to Franklin Street; thence southerly by Franklin Street to the point begun at, together with the right of way in a common passageway twenty (20) feet wide laid out and reserved in the rear of said lot.

PARCEL 2

A certain lot or parcel of land, with the buildings thereon situated on the northerly side of Commercial Street in said Portland, and bounded and described as follows:

Commencing at the center of the partition wall of two brick stores in the block situated at the corner of Commercial and Franklin Streets, and formerly owned by A. and S.E. Spring; thence running northerly through the center of said brick wall ninety (90) feet to a passageway in the rear of said premises; thence easterly on the line of said passageway a distance of fifty (50) feet, more or less, to the outer or easterly face or outside of the wall forming the foundation wall on the easterly side of the block on the premises hereby conveyed; thence southeasterly by said wall ninety (90) feet, more or less, to said Commercial Street; thence southerly by said Commercial Street fifty (50) feet, more or less, to the point begun at; intending hereby to convey the third and fourth stores in the block of four stores fronting on Commercial Street at its intersection with Franklin Street,.together with a right of way in common passageway twenty (20) feet in width, extending in the rear of said premises.

The above-described premises is subject to the following:

1. Certificate of Variance of Approval dated August 11, 1988 and recorded in the said Registry of Deeds in Book 8422, Page 121.

2. Rights and easements granted by Auto Europe Inc. to Central Maine Power Company and New England Telephone and Telegraph Company by instrument dated January 25, 1996 and recorded in the Cumberland County Registry of Deeds in Book 12368, Page 67.

3. Rights of others in and to the 20' common passageway located in the rear of the above described parcels.

4. Rights of the owners of the property next westerly thereof on Commercial Street to maintain one-half of the easterly wall of the building on said adjoining premieses along the westerly line of the premises above described.

5. Rights and easements set forth in the Easement Deed granted by EssexNorth 25 Commercial LLC to EssexNorth 35 Commercial LLC dated November 4, 2019 and recorded in the Cumberland County Registry of Deeds in Book 36156, Page 206.

simons architects
designed for human potential

75 York Street
Portland, Maine 04101
phone 207 772 4656
fax 207 828 4656
www.simonsarchitects.com

Memorandum – Consistency with Comprehensive Plan

date: Friday, October 08, 2021
project: Maine Public 2019-0090
To: Portland Planning Department
From: Steve Hoffman, Simons Architects
Maine Public

RE. Text Amendment for the Urban Active designation within the India Street Form Based Code
Property: 35 Commercial Street. Parcel: 029-P027
29 Commercial Street. Parcel: 029-P031

Consistency with Portland's Comprehensive Plan 2030

The vision of Portland's Plan 2030 is represented by the venn diagram of the city's core belief that Portland is equitable, sustainable, connected, dynamic, authentic and secure. This proposed application and text amendment aligns with the specific Comprehensive Plan goals outlined below:

Dynamic

- Vibrant arts and cultural life will be central to our identity

  Maine Public Mission Statement includes this vision:
  "Maine Public will inform, inspire and delight" In addition to news, Maine Public delivers a variety of cultural content across radio, television, web and print. The proposed Commercial Street facility will include a public engagement space for up to 150 people to view live broadcasts, performances and programs.

- We will embrace innovation in order for our community too thrive

  Maine Public Mission Statement includes a core value of:
  "Life Long Learning — We believe in the power of knowledge to transform lives and promote greater understanding. We endeavor to maximize the opportunities available to the public to participate in a culture of learning throughout their lives."

- We will encourage an active and informed citizenry and facilitate civil discourse

  Maine Public Mission Statement includes a core value of:
  Civic Engagement — "We view our responsibility to promote awareness and participation in the democratic process as supremely important. We actively seek to make workings of government and the public conversation as accessible as possible."

Secure

- We will prepare for emergencies and ready for a changing climate

  Maine Public serves as the state's emergency broadcast facility. It will be 'hardened' to insure operation under any number of emergencies. The height exception of the text amendment will allow critical components to be positioned on upper floors as protection against any flooding associated with a category 4 hurricane.

Authentic

- The uniqueness and integrity of our neighborhoods will be maintained and enhanced

The scale and fabric of Commercial Street will be reinforced with the proposed Maine Public Facility. An existing surface parking lot will be replaced with a new infill building matching the scale and detailing of its adjacent neighbors, the Galt Block and the Workingmen's Club.

Connected

- Our Success will be tied to our connections to each other, our state, and our region

  Maine Public utilizes Web, radio, television and print to connect the people of Maine

- Diverse forums for community engagement will remain essential to a strong civil society

  Maine Public Mission Statement includes a core value of:
  Civic Engagement — "We view our responsibility to promote awareness and participation in the democratic process as supremely important. We actively seek to make workings of government and the public conversation as accessible as possible."

Under Future Land Use / Land Use Context

29 Commercial Street is shown as Mixed-Use / Commercial Offices (page 81). Maine Public will be a mixture of both broadcast studios and office space.

Under Future Land Use / Priority Nodes and Corridors

29 Commercial Street has been labeled in the "Enhance" designation (page 86). By replacing the surface parking lot with a new five story infill building Commercial Street will be given additional density and the existing streetscape and urban fabric will be complete.

simons architects
designed for human potential

75 York Street
Portland, Maine 04101
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fax 207 828 4656
www.simonsarchitects.com

Memorandum

date: Monday August 16, 2021 Revised November 30, 2021
project: Maine Public 2019-0090
To: Portland Planning Department
From: Scott Simons, Simons Architects
Maine Public

RE. Text Amendment for the Urban Active designation within the India Street Form Based Code
Property: 35 Commercial Street. Parcel: 029-P027
29 Commercial Street. Parcel: 029-P031

Maine Public is currently in negotiations with the owner of 29 & 35 Commercial Street for the purchase on the Galt Block Building and the adjacent surface parking lot. The area in consideration is located at the corner of Commercial Street and Franklin Arterial. Both parcels are included in a single sale.

29 Commercial Street has an area of 9,476 SF and Maine Public is considering building a 31,000 sf office and broadcast facility to serve as the center of its statewide system. The Galt Block, a four story masonry building to the west, would be separated and sold.

Within the India Street Form Based Code there are three designations of subdistricts; Urban Active, Urban Transitional and Urban Neighborhood, (Figure 9-A IS-FBC Regulating Plan). 29 Commercial Street is located within the Urban Active Zone (UA) and has a height limitation of 50 feet, maximum. The ISFBC does, however, have a height bonus within the UA subdistrict for Congress Street. Height bonuses are granted for mid-block permeability, residential density, green roofs, and affordable housing. (Table 9-C)

Our request is that the same bonus floor provision be granted to Commercial Street that exists for Congress Street.
In Table 9-C Height Bonuses, Commercial Street would be added to the UA Subdistrict. Under 9.1.7 General Development Standards, C.1.a Height Bonus Applicability, I. first sentence, delete “or Congress Street”. Substitute “or allowed UA street according to Table 9-C”.
The Commercial Street height bonus criteria would be the same as those for Congress Street.

The results for Maine Public is, if meeting the exception criteria of an amended Table 9-C, that they would have a larger building-by-right envelope. Also of note, the adjacent existing Galt Block has a 50 foot street elevation. With the requested height bonus Maine Public would maintain a 50 foot street elevation. The bonus 12 feet of height would be recessed 15 feet from the street façade, and would be considerably lower than the roof structure on the Galt Block building.

simons architects
designed for human potential

75 York Street
Portland, Maine 04101
phone 207 772 4656
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www.simonsarchitects.com

Memorandum – Proposed Text Amendment

date:	Wednesday, October 06, 2021 Revised November 30, 2021
project:	Maine Public 2019-0090
To:	Portland Planning Department
From:	Steve Hoffman, Simons Architects Maine Public
RE.	Text Amendment for the Urban Active designation within the India Street Form Based Code
Property:	35 Commercial Street. Parcel: 029-P027 29 Commercial Street. Parcel: 029-P031

Within the India Street Form Based Code there are three designations of subdistricts; Urban Active, Urban Transitional and Urban Neighborhood, (Figure 9-A IS-FBC Regulating Plan). 29 Commercial Street is located within the Urban Active Zone (UA) and has a height limitation of 50 feet, maximum. The ISFBC does, however, have a height bonus within the UA subdistrict for Congress Street. Height bonuses are granted for mid-block permeability, residential density, green roofs, and affordable housing. (Table 9-C)

Our request is that the same bonus floor provision be granted to Commercial Street that exists for Congress Street.
In Table 9-C Height Bonuses, Commercial Street would be added to the UA Subdistrict.
The Commercial Street height bonus criteria would be the same as those for Congress Street.

PROPOSED TEXT AMENDMENT

At Table 9-C Height Bonuses
Under UA Subdistrict: Change: "Congress Street Only" to "Congress Street **and Commercial Street** Only"

Under 9.1.7 General Development Standards, C.1.a Height Bonus Applicability
Delete "or Congress Street", substitute "or allowed UA street according to Table 9-C"

Proposed Text Amendment 11302021



TABLE 9-C: HEIGHT BONUSES

Subdistrict	Pre-Bonus Height (max.)	Mid-Block Permeability[1]	Residential Density	Green Roof	Affordable Housing	Height With Bonus (max.)	Bonus Floor Stepback[2] (min.)
UN	45 ft. and 4 stories	n/a	n/a	n/a	1 story up to 12 ft.	57 ft. up to 5 stories	15 ft.
UT	65 ft. and 6 stories	1 story up to 12 ft.	1 story up to 12 ft.	1 story up to 12 ft.	1 story up to 12 ft.	77 ft. up to 7 stories	15 ft.
UA ~~(Congress Street only)~~	50 ft. and 4 stories	1 story up to 12 ft.	1 story up to 12 ft.	1 story up to 12 ft.	1 story up to 12 ft.	62 ft. up to 5 stories	15 ft.

[1] Must be publicly accessible.
[2] Measured from the ground floor building edge facing any public right-of-way.

Change from "Congress Street Only" to "Congress Street and Commercial Street Only"

Delete "or Congress Street". Substitute "or allowed UA street according to Table 9-C,"

C. Height standards

1. *Height bonus applicability*
   a. If a frontage faces a UT street, UN street, ~~or Congress Street~~, then the portion of the building facing that street is eligible for a height bonus. For lots with multiple frontages where a frontage faces an ineligible street, bonus story must be stepped back at least 35 feet from ineligible street line. (See Subsection 9.1.8(D).)
   b. Only one height bonus may be applied per structure.
2. One additional story of up to 12 feet in height is allowed if one of the following provisions is met:
   a. For residential development with residential density equal to or greater than 150 dwelling units per acre (density may be achieved with the bonus floor).
   b. For any development providing a green roof, where:
      i. At least 50% of the cumulative lot area is pervious.
      ii. At least 50% of the cumulative roof area is a green roof. Green roof area may be applied towards the 50% lot area requirement.
   c. For residential development where 20% of the units meet the definition of either "Workforce Housing Unit for Sale" or "Low-income Housing Unit for Rent" as per Article 3.

D. Parking standards

1. Parking shall be provided as per Article 19.
2. Structured parking must meet the Building Design Standard for structured parking. (See City of Portland *Design Manual.*)
3. In the case of a building addition, non-conforming existing surface parking may remain. In the case of new construction, surface parking must be brought into conformance with IS-FBC standards.

Charles Tetelman - Planner
Planning Board, Portland Maine

Re: Plan Number ZN-001756-2021

Dear Mr. Tetelman,

We understand that you are the planner in charge of the proposed subject project along with the suggested zoning text amendment. We have reviewed the documents submitted by Maine Public Broadcasting Corporation that were available on the citizen portal. It appears that the property owner would like to modify the Land Use Code to allow an additional 12 feet of additional building height.

We live at 207 Fore Street, a block away from the proposed project and consider 35 Commercial Street to be a part of our neighborhood. We oppose the City of Portland granting a Land Use Code amendment for the following reasons:

1) Commercial Street is not downtown Congress Street. Simply because Congress Street has a bonus provision for projects meeting certain requirements does not mean Commercial Street should also have a bonus. To suggest that the Land Use Code be changed to allow additional building height is not consistent with the building height and character of existing buildings in the project area including the adjacent Workingmens' Club building.

2) Because of the ongoing pandemic, there is an abundance of office space available on the peninsula that would seem to meet the operational needs of the Maine Public Broadcasting Corporation. At this time, there is no reason to change the Land Use Code when plenty of commercial space is already available.

3) The City's Land Use Code including building height restrictions is important and is in place for a reason. The City's Comprehensive Plan states that "*over the past several years, the City has amended its zoning ordinance to … increase allowable heights in some parts of downtown…"* The Plan does not appear to contain language or otherwise promote allowance of increased building heights on Commercial Street. Further, the City should not decide to loosen existing height restrictions absent demonstration of real need by the applicant.

Sincerely,

Paula Foley-Stelmack
Mark Stelmack
207 Fore Street, Unit 1
Portland, Maine

On Thursday November 4th, 2021, the Planner received a voicemail from a Wireless Caller:

Good Afternoon,

I was calling to comment, Charles, on Commercial Street Text Amendment. I am a fourth generation Portlander and am so disheartened by what the town has just allowed to occur and reoccur and amend and add to and I'm shocked here reading another 12 feet added to a height that already people opposed back when it was approved. I mean where does it end? Do you want New York City? That's what's happening. Really disappointed and I just think Portland is robbing us who've been here of the historic charm that we all consider home and have for generations. It's a working waterfront – it should not be this metropolitan city urban gardens the whole works. So disappointed.

Portland Maine Yes. Google's good here.

Charles Tetelman <ctetelman@portlandmaine.gov>

Fwd: Maine Public Broadcasting Corporation development at 35 Commercial Street

jmy <jmy@portlandmaine.gov> Mon, Nov 22, 2021 at 8:05 AM
To: Charles Tetelman <ctetelman@portlandmaine.gov>

HI, this was saved to the project file.

Jen

---------- Forwarded message ---------
From: Kevin Mahoney <kevin@cascoworks.com>
Date: Friday, November 19, 2021 at 9:01:02 AM UTC-5
Subject: Maine Public Broadcasting Corporation development at 35 Commercial Street
To: planningboard@portlandmaine.gov <planningboard@portlandmaine.gov>
Cc: ksnyder@portlandmaine.gov <ksnyder@portlandmaine.gov>, bsr@portlandmaine.gov <bsr@portlandmaine.gov>, sthibodeau@portlandmaine.gov <sthibodeau@portlandmaine.gov>, tchong@portlandmaine.gov <tchong@portlandmaine.gov>, azarro@portlandmaine.gov <azarro@portlandmaine.gov>, mdion@portlandmaine.gov <mdion@portlandmaine.gov>, pali@portlandmaine.gov <pali@portlandmaine.gov>, nmm@portlandmaine.gov <nmm@portlandmaine.gov>, afournier@portlandmaine.gov <afournier@portlandmaine.gov>, dga@portlandmaine.gov <dga@portlandmaine.gov>, hcd@portlandmaine.gov <hcd@portlandmaine.gov>, Christine Grimando <cdg@portlandmaine.gov>, kkraft <kkraft@portlandmaine.gov>, rwiener@portlandmaine.gov <rwiener@portlandmaine.gov>, permitting@portlandmaine.gov <permitting@portlandmaine.gov>, hanscombe@portlandmaine.gov <hanscombe@portlandmaine.gov>, mdisanto@portlandmaine.gov <mdisanto@portlandmaine.gov>, mbud@portlandmaine.gov <mbud@portlandmaine.gov>, psf@portlandmaine.gov <psf@portlandmaine.gov>, kah@portlandmaine.gov <kah@portlandmaine.gov>, msarapas@portlandmaine.gov <msarapas@portlandmaine.gov>, inspections@portlandmaine.gov <inspections@portlandmaine.gov>, drm@portlandmaine.gov <drm@portlandmaine.gov>, amachado@portlandmaine.gov <amachado@portlandmaine.gov>, Stacey Tutorow <StaceyTutorow@epcs.com>, Christina V. Nguyen (Christina.Nguyen@eciusa.com) <Christina.Nguyen@eciusa.com>, publiccomment@portlandmaine.go <publiccomment@portlandmaine.go>

Dear Members of the Portland Planning Board,

I am a resident of Portland's East End who is being directly impacted by the proposed Maine Public Broadcasting Corporation development at 35 Commercial Street. While I fully respect the right of any landowner to develop their property, **I strongly object to the proposed zoning amendment** to modify Land Use Code Table 9-C: Height Bonuses to include Commercial Street in addition to Congress Street, allowing 12 feet of additional building height for qualifying developments located within the Urban Active (UA) sub-district of the India Street Form-Based Code Zone (IS-FBC).

Taller buildings allowed on Congress Street are simply not appropriate in the historic Old Port. Development of other buildings in the area have generally respected pre-existing zoning requirements and I am against exceptions for a specific project. There is no reasonable basis for allowing an even taller structure to overshadow the surrounding buildings and must not be permitted.

Preserving the character of the Old Port is critical to the quality of life for residents and appeal to tourists. The cumulative effect of small changes to the existing regulations will continue to "chip away" at this unique and vibrant cityscape! Save the Portland we love for future generations.

Thank you,

Kevin Mahoney

Kevin Mahoney

207 Fore Street

Portland, ME 04101

Cell 207-712-0590

Portland Maine Yes. Google's good here.

Charles Tetelman <ctetelman@portlandmaine.gov>

Maine Public Broadcasting Plan - Five County Credit Union 19 Commercial St.

1 message

Mike Foley <mfoley@fivecounty.com> Tue, Nov 23, 2021 at 10:06 AM
To: "ctetelman@portlandmaine.gov" <ctetelman@portlandmaine.gov>

Good Morning Charles,

Thank you for taking the time to speak with me this morning about Plan Number ZN-001756-2021, the Maine Public Broadcasting proposal for the lot adjacent to 19 Commercial St.

Five County Credit Union has been a tenant at 19 Commercial St since 1999 and has operated an ATM on the west side of the building, with approval from the City of Portland, for the last twenty years. At this early stage of the planning process for the Maine Public Broadcasting project, our current concerns are specific to the visibility and accessibility of the existing ATM for credit union members and employees, and all aspects of security relating to the use and servicing of the machine that may be impacted by the construction of a new building. These security considerations would include but not be limited to lighting, camera accessibility (we have a camera on the side of the 19 Commercial St. building, about halfway down, for a wide angle view), and general visibility without blind spots or alleys that could contribute to unsafe use of the ATM. Secondarily, I should note that multiple tenants of 19 Commercial St. do have signage on the west side of the building that may be impacted by the construction of a new building.

Should this project move forward to the site-plan phase, we look forward to seeing what the Maine Public Broadcasting team proposes.

Sincerely,

Mike

Michael J. Foley

Senior Vice President,

Support Services

Five County Credit Union

1-800-750-0959 Ext. 2207

mfoley@fivecounty.com

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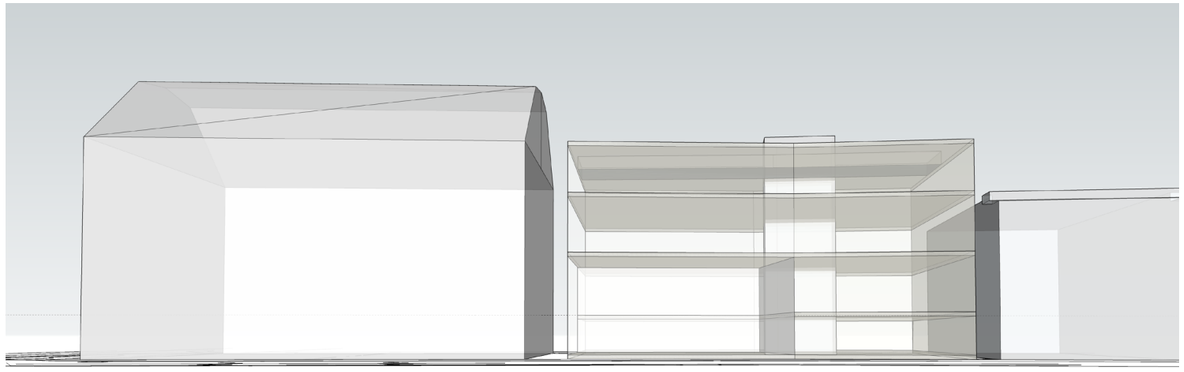
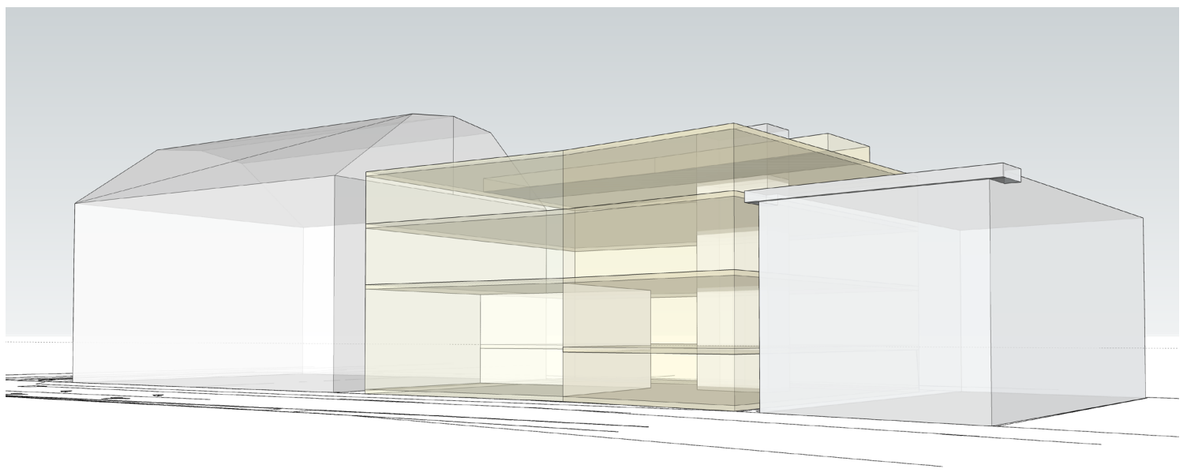
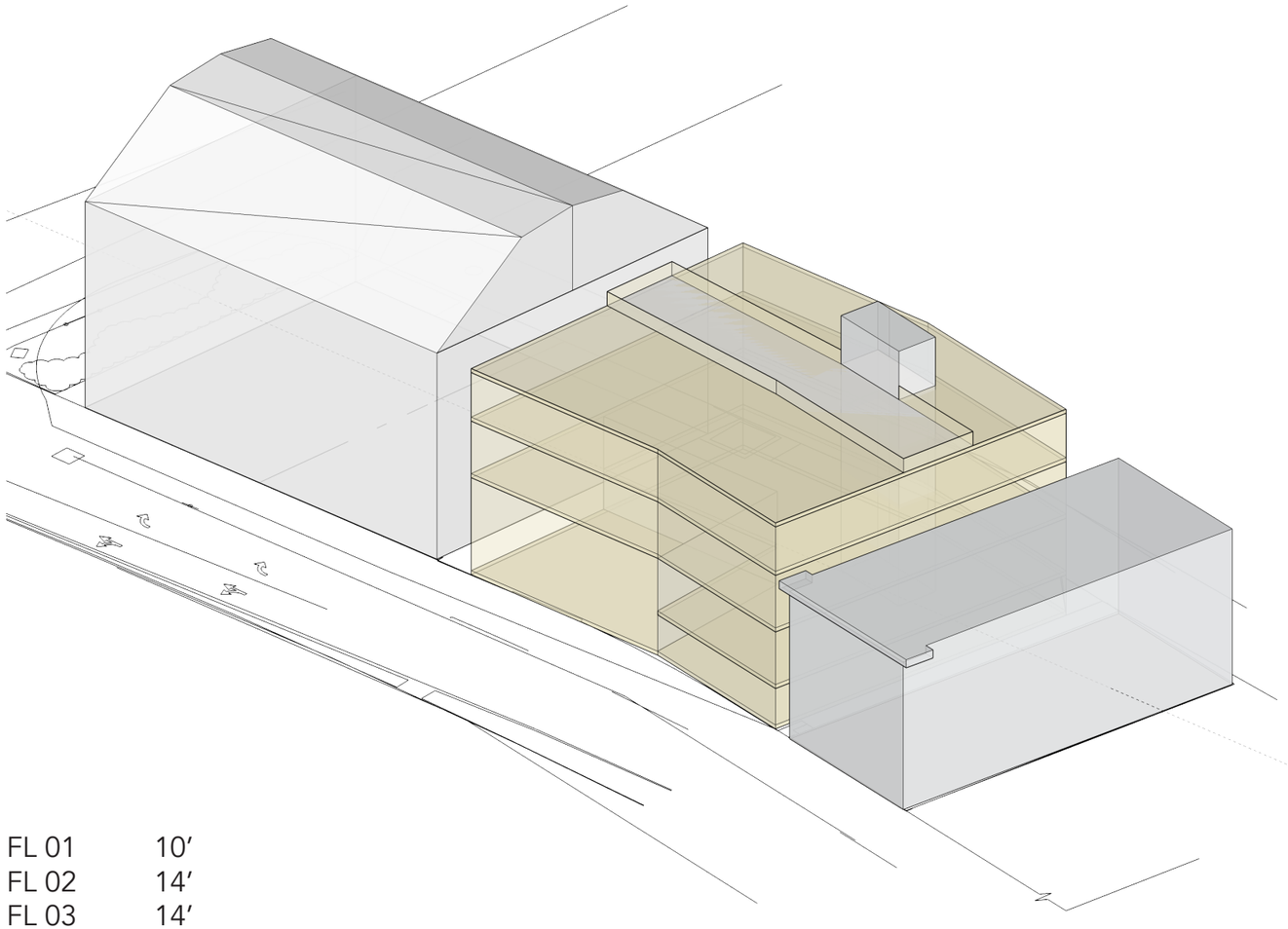
WORKINGMENS' CLUB
BUILDING
GALT BLOCK
BUILDING
COMMERCIAL STREET
10'-0"
15'-0"
10'-0"
GL
GL
GL
GL
9
8
AOR BUILDING
AREA
FLOORS 1-4
50' HEIGHT
PROPOSED
BONUS FLOOR
AREA



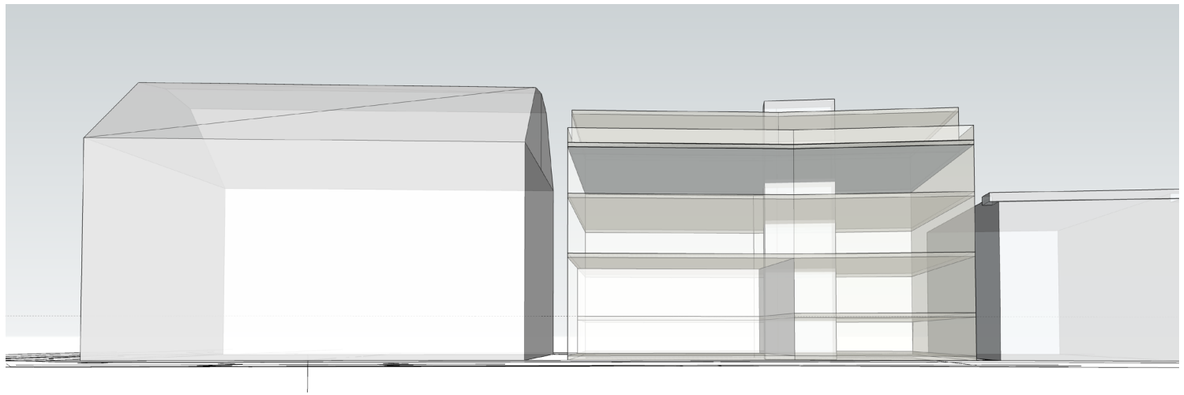


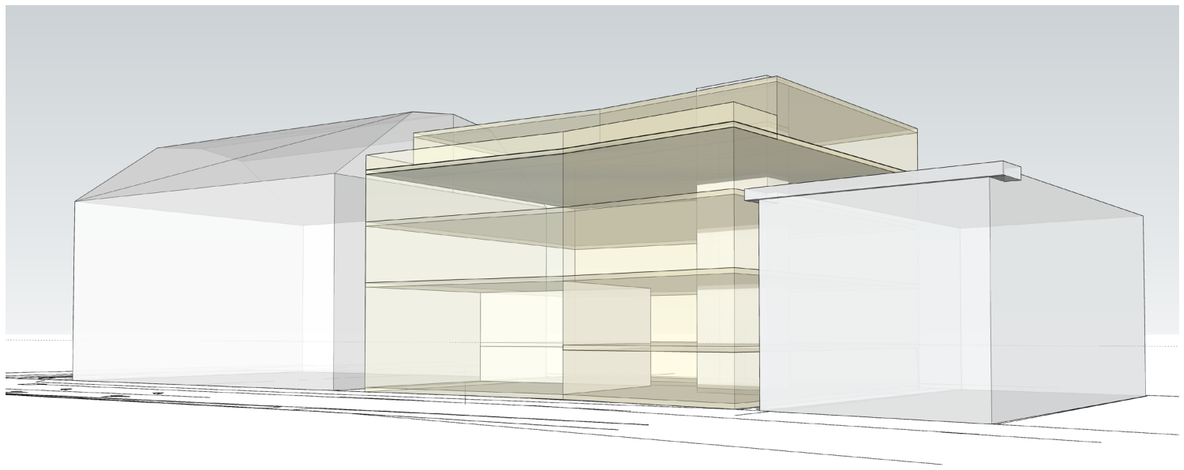


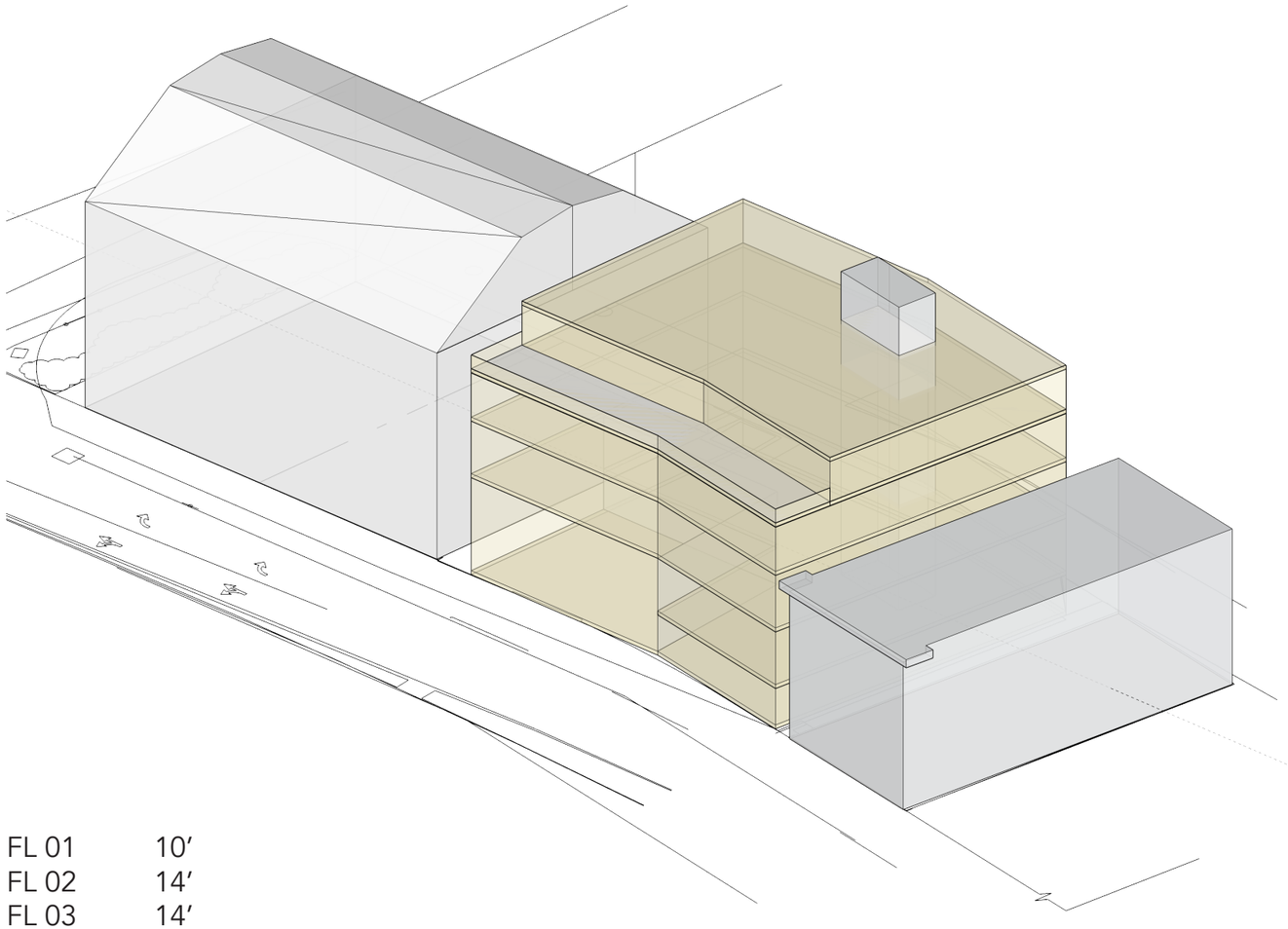
FL 01	10′
FL 02	14′
FL 03	14′
FL 04	12′

SCHEME A: "AS OF RIGHT" ALLOWED BY ZONING

Ground Floor	7800
Second Floor	7800
Third Floor	7800
Fourth Floor	7800
TOTAL	31,200





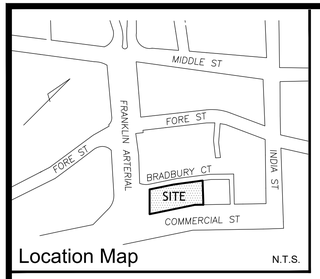


SCHEME B: TEXT AMMENDMENT TO UA SUB-DISTRICT TO ALLOW BONUS FLOOR; 4th FLOOR 15′ SET BACK

Ground Floor (01)	7800	
Mezzanine (02)	4680	
Second Floor (03)	7800	
Third Floor (04)	7800	
Fourth Floor (05)	6400	(MAX AS-OF-RIGHT)
TOTAL	34,480	

FL 01	10′
FL 02	14′
FL 03	14′
FL 04	12′
FL 05	12′

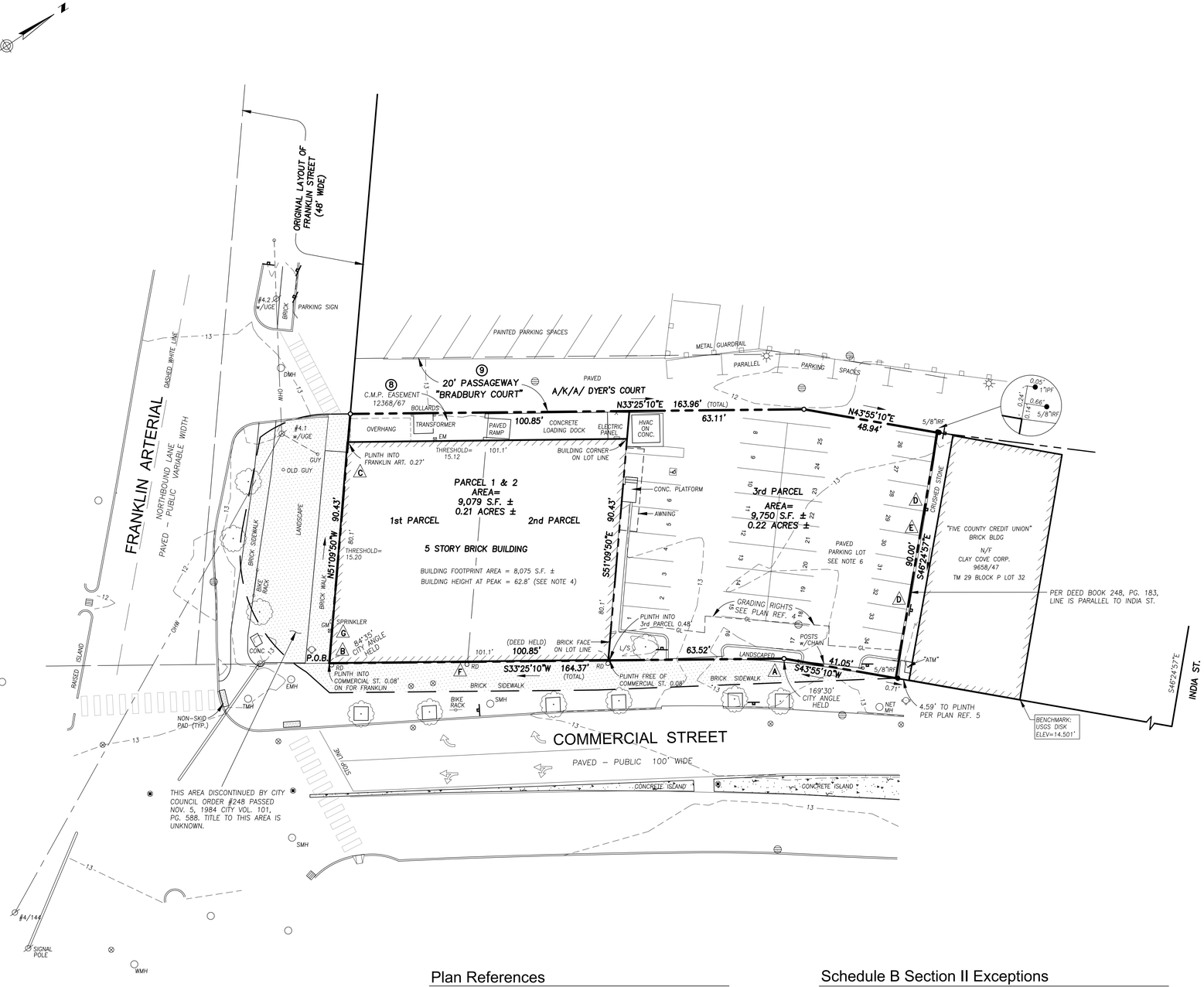

Page 1125
City of Portland, DPS



Location Map N.T.S.

Legend

- IRON PIPE OR ROD FOUND
- CAPPED IRON ROD TO BE SET
- UTILITY POLE
- EM/GM ELECTRIC OR GAS METER
- RD ROOF DRAIN
- GAS VALVE
- WATER VALVE
- HYDRANT
- UTILITY POLE
- MANHOLE
- CATCH BASIN
- SIGN
- DECIDUOUS TREE
- METAL GUARDRAIL
- FENCE
- CURB
- OHW OVERHEAD WIRES
- UGE UNDERGROUND ELETRIC
- SS SANITARY SEWER
- 60 1' CONTOUR
- CIRF CAPPED IRON ROD FOUND
- N/F NOW OR FORMERLY
- 000/000 DEED BOOK / PAGE
- CONC. CONCRETE
- A POSSIBLE ENCROACHMENT
- 1 SCHEDULE B EXCEPTION
- P.O.B. POINT OF BEGINNING



Legal Description

PARCEL 1.

A CERTAIN LOT OR PARCEL OF LAND WITH THE BUILDINGS THEREON, SITUATED IN SAID PORTLAND, BOUNDED AND DESCRIBED AS FOLLOWS:
BEGINNING AT THE JUNCTION OF THE NORTHWESTERLY SIDE OF COMMERCIAL STREET AND NORTHEASTERLY SIDE OF FRANKLIN STREET; THENCE RUNNING EASTERLY ON COMMERCIAL STREET FIFTY (50) FEET TO THE MIDDLE OF A PARTITION WALL; THENCE NORTHERLY BY THE MIDDLE LINE OF SAID WALL ABOUT NINETY (90) FEET TO THE COMMON PASSAGEWAY HEREINAFTER NAMED; THENCE WESTERLY ON THE LINE OF SAID PASSAGEWAY TO FRANKLIN STREET; THENCE SOUTHERLY BY FRANKLIN STREET TO THE POINT BEGUN AT; TOGETHER WITH THE RIGHT OF WAY IN A COMMON PASSAGEWAY TWENTY (20) FEET WIDE LAID OUT AND RESERVED IN THE REAR OF SAID LOT.

PARCEL 2.

A CERTAIN LOT OR PARCEL OF LAND, WITH THE BUILDINGS THEREON SITUATED ON THE NORTHERLY SIDE OF COMMERCIAL STREET IN SAID PORTLAND, AND BOUNDED AND DESCRIBED AS FOLLOWS:
COMMENCING AT THE CENTER OF THE PARTITION WALL OF TWO BRICK STORES IN THE BLOCK SITUATED AT THE CORNER OF COMMERCIAL AND FRANKLIN STREETS, AND FORMERLY OWNED BY A. AND S.E. SPRING; THENCE RUNNING NORTHERLY THROUGH THE CENTER OF SAID BRICK WALL NINETY (90) FEET TO A PASSAGEWAY IN THE REAR OF SAID PREMISES; THENCE EASTERLY ON THE LINE OF SAID PASSAGEWAY A DISTANCE OF FIFTY (50) FEET, MORE OR LESS, TO THE OUTER OR EASTERLY FACE OR OUTSIDE OF THE WALL FORMING THE FOUNDATION WALL ON THE EASTERLY SIDE OF THE BLOCK ON THE PREMISES HEREBY CONVEYED; THENCE SOUTHEASTERLY BY SAID WALL NINETY (90) FEET,MORE OR LESS, TO SAID COMMERCIAL STREET ; THENCE SOUTHERLY BY SAID COMMERCIAL STREET FIFTY (50) FEET, MORE OR LESS, TO THE POINT BEGUN AT; INTENDING HEREBY TO CONVEY THE THIRD AND FOURTH STORES IN THE BLOCK OF FOUR STORES FRONTING ON COMMERCIAL STREET AT ITS INTERSECTION WITH FRANKLIN STREET, TOGETHER WITH A RIGHT OF WAY IN A COMMON PASSAGEWAY TWENTY–SIX (26) FEET IN WIDTH, EXTENDING IN THE REAR OF SAID PREMISES.

PARCEL 3:

ALSO, ANOTHER CERTAIN LOT OR PARCEL OF LAND WITH THE BUILDINGS THEREON SITUATED ON THE NORTHWESTERLY SIDE OF COMMERCIAL STREET, IN PORTLAND, COUNTY OF CUMBERLAND AND STATE OF MAINE, COMPRISING THE PREMISES NUMBERED 23–31 ON SAID COMMERCIAL STREET AND BEING BOUNDED AND DESCRIBED AS FOLLOWS, TO WIT:
BEGINNING ON SAID COMMERCIAL STREET AT THE CENTER OF THE BRICK WALL AT THE EASTERLY END OF THE BLOCK OF STORES ERECTED BY SAMUEL TYLER, THE CENTER OF SAID BRICK WALL BEING DISTANT FROM THE EASTERLY SIDE OF FRANKLIN STREET A DISTANCE OF ONE HUNDRED AND EIGHTY–FIVE HUNDREDTHS (100.85) FEET; THENCE NORTHWESTERLY THROUGH THE CENTER OF SAID BRICK WALL AND IN CONTINUATION OF THE SAME COURSE TO THE SOUTHERLY SIDE OF A PASSAGEWAY, WHICH SAID PASSAGEWAY EXTENDS FROM SAID FRANKLIN STREET NORTHEASTERLY; THENCE NORTHEASTERLY BY SAID PASSAGEWAY BY VARIOUS COURSES A DISTANCE OF ONE HUNDRED TWELVE AND SIXTY–FIVE HUNDREDTHS (112.65) FEET, MORE OR LESS, TO LINE OF LAND NOW OR FORMERLY OF THE HEIRS OF LEMUEL DYER AS ESTABLISHED JULY 13, 1853 BY DEED RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 248, PAGE 183; THENCE SOUTHEASTERLY BY SAID DYER LINE A DISTANCE OF NINETY (90) FEET TO SAID COMMERCIAL STREET; THENCE WESTERLY BY THE NORTHERLY SIDE LINE OF SAID COMMERCIAL STREET ONE HUNDRED FIVE AND TWENTY–SEVEN HUNDREDTHS FEET, MORE OR LESS, TO THE POINT OF BEGINNING, TOGETHER WITH ALL ITS RIGHT, TITLE AND INTEREST IN AND TO ALL STRUCTURES ON THE LOT HEREBY CONVEYED WHICH MAY EXTEND INTO THE LIMITS OF SAID PASSAGEWAY AS ORIGINALLY LAID OUT, ALSO THE RIGHT TO THE USE IN COMMON WITH OTHERS OF SAID PASSAGEWAY.

THE ABOVE DESCRIBED PARCEL IS HEREBY CONVEYED SUBJECT TO THE RIGHT OF THE OWNERS OF THE PROPERTY NEXT WESTERLY THEREOF ON COMMERCIAL STREET TO MAINTAIN ONE–HALF OF THE EASTERLY WALL OF THE BUILDING ON SAID ADJOINING PREMISES ALONG THE WESTERLY LINE OF THE PREMISES ABOVE DESCRIBED.

Utility Note

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. CALL 1–888–DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

Flood Zone Note

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS LOCATED IN ZONE C, AREAS OF MINIMUM FLOODING) ON THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 230051 0014B, WHICH BEARS AN EFFECTIVE DATE OF JULY 17, 1986.

Zoning Information

NONE PROVIDED

Possible Encroachments

- A LANDSCAPED ISLAND WITHIN LIMITS OF COMMERCIAL STREET 1.3'±
- B PLINTH AT BUILDING CORNER INTO COMMERCIAL STREET 0.08' ±
- C PLINTH AT BUILDING CORNER INTO FRANKLIN ARTERIAL 0.27'±
- D PARKING SIGNS ONTO LAND OF THE ABUTTER 1.3'±
- E BACK OF CURB ONTO LAND OF THE ABUTTER 0.5'±
- F ROOF DRAINS INTO COMMERCIAL STREET 1'±
- G GAS METER LIES ENTIRELY WITHIN THE LIMITS OF FRANKLIN ARTERIAL

SCALE : 1" = 20'

0' 10' 20' 40'

General Notes

1. OWNER OF RECORD: AUTO EUROPE, LLC, 39 COMMERCIAL STREET, PORTLAND, MAINE C.C.R.D. BOOK 13205 PAGE 28, BOOK 20957 PAGE 21
2. LOCUS IS SHOWN AS LOTS 27 AND 31, BLOCK P, ON CITY OF PORTLAND ASSESSORS MAP 29.
3. BEARINGS ARE BASED ON STATE PLANE COORDINATE SYSTEM, MAINE WEST ZONE, NAD83.
4. ELEVATIONS ARE BASED ON CITY DATUM, NGVD29.
5. BUILDING HEIGHT DOES NOT INCLUDE ANYTHING ABOVE VISIBLE BUILDING LINE.
6. THERE ARE 33 REGULAR PARKING SPACES AND 1 HANDICAP PARKING SPACE.
7. NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, BUILDING ADDITIONS, OR RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS WAS OBSERVED.
8. NO PROPOSED CHANGES IN STREET LINES IS KNOWN BY THIS SURVEYOR.

Plan References

1. PLAN OF PROPERTY IN PORTLAND, MAINE MADE FOR CHASE TRANSFER CO. DATED JANUARY 1940 BY H.I. JORDAN.
2. TITLE PLAN OF PROPERTY IN PORTLAND, MAINE MADE FOR CHASE TRANSFER CORP. DATED SEPT. 1950 BY H.I. AND E.C. JORDAN.
3. STATE OF MAINE DEPARTMENT OF TRANSPORTATION RIGHT OF WAY MAP DATED AUGUST 1985 DOT FILE NO. 3–339.
4. ALTA/ACSM LAND TITLE SURVEY, 29 COMMERCIAL ST., PORTLAND, MAINE DATED FEBRUARY 19, 2004 BY INTERNATIONAL LAND SERVICES, INC./OWEN HASKELL, INC.
5. PLAN OF PROPERTY IN PORTLAND, MAINE MADE FOR THE ROMAN CATHOLIC BISHOP OF PORTLAND, BY H.I. & E.C. JORDAN, DATED NOV. 1974.
6. PLAN DEPICTING THE RESULTS OF A BOUNDARY SURVEY MADE FOR B.I.W. FIVE COUNTY CREDIT UNION, 13–19 COMMERCIAL STREET, PORTLAND, MAINE, PREPARED BY NADEAU & LODGE, DATED 05/09/2001.
7. PLAN OF PROPERTY, COMMERCIAL STREET, PORTLAND, MAINE MADE FOR W.L. BLAKE & CO., BY ROBERT P. TITCOMB, INC., SHEET 2 OF 3, DATED 7/02/81.

Schedule B Section II Exceptions

OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY
COMMITMENT FILE NO. 22956.2 EFFECTIVE DATE: SEPTEMBER 1, 2019

1 – 7. NON SURVEY ITEMS

8. EASEMENT DEED FROM AUTO EUROPE INC. TO CENTRAL MAINE POWER COMPANY DATED 1–25–1996, RECORDED IN THE REGISTRY IN BOOK 12368, PAGE 67. –AFFECTS SURVEYED PARCEL AS SHOWN HEREON.

RIGHTS OF OTHERS, IN COMMON WITH THE INSURED, TO THE USE OF (I) A COMMON PASSAGEWAY TWENTY (20) FEET WIDE AND (II) A COMMON PASSAGEWAY TWENTY–SIX (26) FEET WIDE TO THE "REAR" OR WESTERLY SIDE OF THE PREMISES, ALL AS RECITED IN PRIOR DEEDS IN THE TITLE RECORDED IN BOOK 3992, PAGE 18 (PARCEL 1, THEREIN; PARCEL 3 OF INSURED PREMISES), AND BOOK 2970, PAGE 847 (PARCEL 1 AND PARCEL 2, THEREIN, AND IN INSURED PREMISES) AND DEEDS THEREAFTER. –BENEFITS SURVEYED PARCEL AS SHOWN HEREON. HISTORICALLY, BRADBURY (DYERS COURT) HAS BEEN SHOWN AS 20 FEET WIDE. NO INDICATION OF A 26 FOOT WIDE PASSAGEWAY COULD BE FOUND.

9. SUCH STATE OF FACTS, NOTES OR CONDITIONS AS SHOWN ON A PLAN PREPARED BY INTERNATIONAL LAND SERVICES, INC. DATED FEBRUARY 19, 2004, PROJECT ADDRESS: 29 COMMERCIAL STREET, PORTLAND, MAINE, JOB NO. 03–11–036:001. –ALL PERTINENT ITEMS ARE SHOWN.

ALTA / NSPS Land Title Survey

29-39 Commercial Street
Portland, Cumberland County, Maine
Made For
EssexNorth Portland, LLC
P.O. Box 394, Topsfield, MA 01983

Surveyor's Certification

TO: ESSEXNORTH 35 COMMERCIAL LLC, ESSEXNORTH 25 COMMERCIAL LLC, NBT BANK, NATIONAL ASSOCIATION AND OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 6(A), 11, 13, 14, 16, 17, 19 AND 21 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON OCTOBER 3, 2019.

SAMUEL D. GLIDDEN
PROFESSIONAL LAND SURVEYOR NO. 2520

STATE OF MAINE — SAMUEL D. GLIDDEN 2520 — PROFESSIONAL LAND SURVEYOR

DATE OF PLAT OR MAP: NOVEMBER 6, 2019
DATE OF LAST REVISION:

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 U.S. ROUTE 1, UNIT 10, FALMOUTH, ME 04105 TEL. 207-774-0424

DRAWN BY: JCS / JLW	FIELD BOOK: FILE	JOB NO.	2019-256 P
CHECKED BY: JCS	SCALE: 1" = 20'	DRWG. NO.	1

EN35C 000941