

CITY OF PORTLAND, MAINE

PLANNING BOARD



Maggie Stanley, Chair
Brandon Mazer, Vice Chair
Justin Barker
Marpheen Chann
Sean Murphy
David Silk
Austin Smith

AGENDA PORTLAND PLANNING BOARD MEETING

The Planning Board/Historic Preservation Board will hold a remote meeting on **Tuesday, May 10, 2022, 4:30 p.m.** This meeting will take place remotely using Zoom pursuant to the Remote Meeting Policy adopted by the Planning Board and as authorized under 1 M.R.S. 403-B because of the existence of an emergency or urgent issue that requires the committee to meet by remote methods. Allow your computer to install the free Zoom app to get the best meeting experience.

If you are not able to attend live, a recording will be available following the meeting. 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 unmuted by the host when it is time for public comment.

For more information on how to access the meeting remotely and how to give public comment, please go to <http://www.portlandmaine.gov/remotepud> Public comments will be taken for each item on the agenda during the estimated allotted time and written comments should be submitted to planningboard@portlandmaine.gov.

Please note that the placement of each item on the agenda is subject to change. Please check the Agenda & Minutes Center prior to the meeting for the item start time.

ZOOM MEETING INSTRUCTIONS

You are invited to a Zoom webinar.

When: May 10, 2022 04:30 PM Eastern Time (US and Canada)

Topic: Planning Board Workshop 5/10/2022

Please click the link below to join the webinar:

<https://portlandmaine-gov.zoom.us/j/81997596539>

Or One tap mobile: US: +13126266799,,81997596539# or +19292056099,,81997596539#

Or Telephone: Dial(for higher quality, dial a number based on your current location): US: +1 312 626 6799 or +1 929 205 6099 or +1 301 715 8592 or +1 346 248 7799 or +1 669 900 6833 or +1 253 215 8782

Webinar ID: 819 9759 6539

International numbers available: <https://portlandmaine-gov.zoom.us/j/kcT7WpREI0>

1. **ROLL CALL AND DECLARATION OF QUORUM**
2. **COMMUNICATION AND REPORTS**
3. **REPORT OF ATTENDANCE AT THE MEETING HELD ON APRIL 26, 2022**

Afternoon Workshop

7 Marion Street: Barker, Chann, Mazer, Murphy, Silk, and Smith present; Stanley absent.

Evening Hearing

392 Saint John Street: All Present.

54 York Street: Barker, Chann, Murphy, Silk, Smith, and Stanley present; Mazer absent.

4. **REPORTS OF DECISIONS AT THE MEETING HELD ON APRIL 26, 2022**

- i. Major Site Plan and Conditional Use; 392 St. John Street; Bosco Holdings, LLC., Applicant. Mazer moved and Murphy seconded a motion to waive Technical Manual Section

1.7.2.3 to allow a driveway width of 18 feet. Vote 7-0. Mazer moved and Silk seconded a motion to waive Technical Manual Section 1.14 to allow a drive aisle width of 22 feet. Vote 7-0. Mazer moved and Silk seconded a motion to find the plan in conformance with the conditional use standards of the Land Use Code with one condition of approval. Vote 7-0. Mazer moved and Murphy seconded a motion to find the plan in conformance with the site plan standards of the Land Use Code with two conditions of approval. Vote 7-0.

- ii. Major Site Plan; 54 York Street; 54 York, LLC., Applicant. Chann moved and Silk seconded a motion to find the plan in conformance with the site plan standards of the Land Use Code with one condition of approval. Vote 6-0, Mazer absent.

WORKSHOP - 4:30 PM

- i. Technical Manual Amendments; City of Portland, Applicant. (estimated time 4:30 – 5:30 p.m.) The Planning Board will hold a remote workshop to consider amendments to Sections 1, 2, 4 and 10 of the City of Portland Technical Manual, focusing on technical standards related to transportation systems and street design, sewer and storm drain design, site landscaping, and street lighting.
- ii. Major Site Plan; 57 Douglass Street; Douglass Commons, LLC., Applicant. (estimated time 5:30 p.m.) The Planning Board will hold a remote workshop on a proposal for a 120-unit affordable residential development under Planned Residential Unit Development (PRUD) standards with 112,900 square feet of floor area, along with associated improvements, at 57 (43-91) Douglass Street. The subject property is 3.34 acres in size and is zoned R-5a Residential.

To: Chair Stanley & Members of the Planning Board
From: Matthew Grooms, AICP
Date: May 6, 2022
Re: Technical Manual Updates: Sections 1, 2, 4, and 10
Meeting Date: May 10, 2022

I. INTRODUCTION

The Department of Planning & Urban Development, in collaboration with the Department of Public Works and the Department of Parks and Recreation, has prepared a package of amendments to the City of Portland Technical Manual, Sections 1, 2, 4 and 10, pertaining to transportation systems and street design, sanitary sewer and storm drain design, landscaping and landscape preservation, and municipal street lighting. These edits include both substantive amendments, such as new or revised review standards and technical details, along with less substantive edits, such as updates to terminology and code references. Per Section 2.1.10 of the Land Use Code, revisions to the *Technical Manual* fall under the jurisdiction of the Planning Board.

II. GENERAL EDITS TO TECHNICAL MANUAL

Below is a summary of proposed changes. For the changes shown in redline format, please refer to Attachments 1-8.

A. Section 1 and Section 17 - Transportation Systems and Street Design Standards and Transportation Studies and Plans. (Attachments 1-3)

- Removed traffic study, parking study, transportation demand management plan, and construction management plan requirements from Section 1 and created new Section 17 of the Technical Manual for transportation studies and plans.
- Renumbered sections based upon these edits.
- ‘Department of Public Services’ has been replaced by ‘Department of Public Works’.
- Where applicable, exact requirements written verbatim (i.e. DOT, AASHTO, local code) have been removed and replaced with references to the current local, state or federal requirements.

B. Section 2 – Sanitary Sewer and Storm Drain Design Standards (Attachments 4-5)

- Separated out standards for sewer systems and storm systems across the section.
- ‘Department of Public Services’ has been replaced by ‘Department of Public Works’.
- Revised approval authority in certain instances from ‘City Engineer’ to ‘Public Works Director’.

C. Section 4 - Landscaping and Landscape Preservation Standards (Attachments 6-7)

- References to appendix figures were revised to be consistent in terminology, (i.e. ‘Figure-XX’).
- In certain instances, existing content was assigned new sub-headings or relocated

within the section to help with navigation, legibility, and administration.

- Instances where the term, 'Department of Public Services' remain have been replaced with 'Department of Public Works'.

D. Section 10 – Municipal Street Lighting Standards (Attachment 8)

- City has selected a comparable replacement for the X-3 lighting bollard, for use in public rights of way, due to the existing model no longer being manufactured.

Note that in addition to the above list, changes to code references have been incorporated into nearly every section of the *Technical Manual*.

III. PROPOSED ADDITIONS TO SECTION 1 AND SECTION 17 (NEW) – TRANSPORTATION SYSTEMS AND STREET DESIGN STANDARDS, AND TRANSPORTATION STUDIES & PLANS (ATTACHMENTS 1-3)

Existing Section 1 of the Technical Manual has been comprehensively reformatted and reorganized, which gives the edited document the appearance of being almost entirely rewritten. As such, content shifts and reformatting are being presented within the redlined version of this document as existing material to aid with legibility. Only substantive edits are shown in redline. These include updated ADA requirements, standards for concrete sidewalks, driveway aprons, curbing, bike lanes, bus stops, curb extensions, traffic islands and pedestrian crossings. Further, several elements that currently exist within Section 1, such as requirements around traffic studies, parking studies, and transportation demand management (TDM) plans, have been relocated to a new Section 17.

For a complete overview of the substantive changes being proposed within this section, please see the accompanying memo from the Department of Public Works (Attachment 8).

IV. PROPOSED ADDITIONS TO SECTION 2 – SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS (ATTACHMENTS 4-5)

Section 2 of the Technical Manual has been comprehensively reformatted and reorganized, which gives the edited document the appearance of being almost entirely rewritten. As such, content shifts and reformatting are being presented within the redlined version of this document as existing material to aid with legibility. Only substantive edits are shown in redline. The majority of this update is a reorganization of the standards to make it more clear which standards are intended for sewer systems and which are for storm drain systems. Previously, these were mixed together and described individually throughout the section. Other substantive edits include provisions to allow accessory dwelling units (ADUs) to tie into the principal unit's sewer lateral, as opposed to a new connection within the City right-of-way. Similarly, standards were introduced for grease interceptors, force mains, and the use of catch basins for on-site field inlets. These standards generally represent a matter of codifying existing practice.

For a complete overview of the substantive changes being proposed within this section, please see the accompanying memo from the Department of Public Works, Water Resources Division

(Attachment 9).

V. PROPOSED ADDITIONS TO SECTION 4 – LANDSCAPING AND LANDSCAPE PRESERVATION STANDARDS (ATTACHMENTS 6-7)

A. Definitions (Section 4.1)

- Feature Mature Tree – A new definition was drafted for feature mature tree, based upon the current definition of a ‘heritage tree’. The heritage tree ordinance, as currently in effect, provides additional protections and enhanced tree replacement/fee requirements for certain trees located within established historic districts. These trees include trees on the ‘Register of Big Trees’ list promulgated by the Maine Department of Agriculture, Conservation & Forestry, certain trees 24” inches in diameter or greater, and rare tree specimens. The ‘feature mature tree’ term is currently in use within Section 4, clearly referring to what would be a heritage tree located outside of established historic districts. Given this, and that no definition currently exists, staff have drafted a new definition based upon the heritage tree definition that is more general and broadly applicable in nature. Staff also removed the term ‘heritage tree’ from the section, as heritage trees are governed under a separate ordinance.

B. Preservation of Existing Vegetation (Section 4.3)

- Section 4.3.1 - Staff recommend introducing a tree survey requirement to identify trees 10” DBH (Diameter at Breast Height) not only on the development site, as is currently required, but also within the right of way (ROW) adjacent to the site.
- Section 4.3.4 - Staff recommend requiring that all tree preservation signage required to be erected and maintained throughout construction be placed outside of the drip line of individual, groupings, or perimeter trees to be preserved. This is consistent with other preservation elements, such as fencing or other protective barriers, and is intended to maintain the health of the tree(s).

C. Site Landscaping (Section 4.5)

- All Landscape Design (Section 4.5.1) - Staff have introduced new introductory language pertaining to all landscape design, which expands the stated purpose of site vegetation and landscaping. The current version encourages low-maintenance landscaping that provides site definition and screening, while supporting biodiversity. The statement has been expanded to encourage landscaping which achieves one or more additional functions, such as furthering climate resiliency and mitigation, creating or enhancing areas of native habitat, improving stormwater management and treatment, and increasing local food production. These edits are supported by policies adopted in Portland’s Plan, One Climate Future, and the currently drafted Community Agriculture Plan.
- Screening and Buffers (Section 4.5.2) - Currently, opaque fencing may be utilized as a site element to screen or buffer contrasting land uses. Staff have introduced additional clarifying language requiring that such fencing be of high architectural quality.
- Parking Areas (Section 4.5.5) - The language requiring some form of separation between

vehicular parking areas and landscaped areas has been modified to allow for either physical or visual forms of separation, with bollards being introduced as an example of such separation.

- Snow Storage (Section 4.5.6) - Staff propose striking a requirement that snow storage be sited so as not to encroach upon required off-street parking. The rationale for this is that off-street parking requirements do not explicitly permit the temporary occupation of required off-street parking spaces, and as such, per Article 19 of the City's Land Use Code, an applicant would not be permitted to routinely store snow atop required off-street parking.
- Slope Stabilization (Section 4.5.8) – Within this subsection, staff have modified the requirement for a retaining wall. Currently, any wall measuring four (4) feet in height from the bottom of the footing to the top of the wall is required to be designed by a licensed engineer. This differs from the City's building permit requirement, which only requires a building permit and engineered design if the wall measures four (4) feet from the proposed finished grade to the top of the wall. Staff recommend modifying this requirement to reflect this, and to also specify that the wall must be designed by a licensed structural engineer.
- Climate Positive Planting (Section 4.5.10) – A new sub-section was introduced titled 'Climate Positive Planting', which encourages new development to prioritize landscaping that furthers the City's climate goals; specifically by requiring that the viability of planted vegetation in a warming climate be considered, by prioritizing expansion of the City's tree canopy in an equitable manner to address the urban heat island effect, and encouraging the use of landscaping elements to reduce energy consumption.

D. Street Trees (Section 4.6)

- Street Trees/Residential Development (Sections 4.6 and 4.6.1) - Staff recommend expanding the street tree requirements to include not only public right-of-way (ROW) but also along private roadways, for example as part of a PRUD.
- Street Trees (Section 4.6) – Edits are suggested to revise planting area requirements for street trees from 10 feet to 20 feet. This aligns with the requirement in Section 4.6.4., which allows for existing trees located within 20 feet of the right-of-way to be counted towards a project's street tree requirement.
- Street Tree Alternatives (Section 4.6.4) – Where an applicant can demonstrate that it is infeasible to plant street trees in the prescribed amount within the right-of-way, that applicant may fulfill the requirement by providing one of six street tree alternatives.
 - The City's preferred alternative is to have the required street trees planted elsewhere within the neighborhood in which the development is occurring on public land, within esplanades or within parks, playgrounds or other locations with tangible public benefit. Staff have introduced two additional alternative locations, those being in areas of the city identified as having minimal tree coverage, or within existing empty street tree wells or planting strips. The first additional alternative is recommended as a means to prioritize and further tree equity across the city. The second alternative is being proposed to reinforce the primary purpose of street

trees, to create comfortable streetscapes and expand the City's tree canopy.

- Staff propose striking one of the alternatives, which was already struck from the Land Use Code as part of ReCode, which states that the incorporation of measures to enhance tree survival, such as raised planters, irrigation and structural soils, may count towards street tree requirements. Staff's rationale for this edit is that a developer should take necessary measures to ensure a tree's survival, and in the event that such measures are cost prohibitive, a developer should pursue one of the other alternatives.
- Staff propose striking a second alternative, which states that other planted features may count towards a development's street tree requirement. Staff's rationale for this edit is that other planted features, such as green screens, green roofs, new trees well away from public spaces, and shrubbery, do not provide an in-kind public benefit when compared with street trees, particularly shading of public right-of-way.
- A new alternative has been introduced which would allow for existing, healthy trees located within the right-of-way to be counted towards a development's street tree requirement. Currently, we explicitly permit existing trees to be maintained on an applicant's property as an alternative, and in practice, permit existing trees within the right of way to count. This amendment simplify codifies existing practice and encourages preservation of existing mature trees.
- Similar to the above recommendation where a developer would be encouraged to plant new street trees in neighborhoods or locations with minimal tree coverage, staff recommend that street tree contribution funds be similarly directed to increase tree equity city-wide. Staff also recommend eliminating an existing requirement which states that 85% of the Tree Fund be allocated towards new trees, and 15% be allocated towards maintenance. In discussions with Parks and Forestry staff, it was determined that this prescriptive requirement did not adequately account for the constantly evolving needs of our street tree network, and that for example, this requirement might artificially limit the City's ability to respond when additional on-going maintenance is required.

E. Installation and Maintenance of Plantings (Section 4.8)

- Planting Selection (Existing Section 4.7) – This section has been split into two separate sections, with standards related to the installation and on-going maintenance requirements of site vegetation now housed within a standalone section for improved legibility and navigation.
- Section 4.8.2 - A statement requiring that landscaping not installed prior to an issuance of a certificate of occupancy be subject to a performance guarantee has been struck, as performance guarantee requirements already require this, and are listed in the City's Land Use Code.
- Section 4.8.5 - An existing requirement, currently located within Section 4.3, which requires that new vegetation planted as part of site development which shows signs of construction damage within a one-year period following construction be rejected and replaced in kind

prior to the release of the defect guarantee. As Section 4.3 specifically pertains to landscape preservation, this language has been introduced within this proposed new section to apply directly to new vegetation.

VI. STAFF ANALYSIS

Section 2.1.10 of the City's Land Use Code requires that in order for the Planning Board to approve technical standards, such standards should be additional to and consistent with the provisions of the Land Use Code, necessary and reasonable, and "in accordance with sound engineering...practice." As discussed above, the proposed updates to the *Technical Manual* represent clerical edits, reorganization to assist with document legibility and administration, or new policy directly informed either by engineering best practice, or in the case of landscape standards, recommendations from One Climate Future and Portland's Plan, which are in line with best practices observed elsewhere. For example, a major theme expressed in these edits is the notion of tree equity, and ensuring that we not only expand our city's tree canopy, but target expansion in areas with limited tree canopy. In looking at the city's tree coverage, these areas often coincide with neighborhoods exhibiting lower median household incomes, and higher percentages of households of color as well as neighborhoods that have transitioned from predominantly manufacturing to commercial or residential uses. The emphasis on tree equity in our street tree alternatives, and the direction of tree funds towards areas of low tree coverage as opposed to other locations within the neighborhood of development, is an important step towards achieving this goal. Similar changes include the introduction of a climate positive planting standard, and revision to the landscaping purpose statement.

VII. NEXT STEPS

Following the Planning Board workshop on May 10th, staff will consider and incorporate feedback from the Board and members of the public as necessary, and will prepare revised drafts for further Board consideration or action.

VIII. ATTACHMENTS

1. Section 1 – Transportation Systems and Street Design Standards - Suggested Edits
2. Section 1 –Detail Revisions
3. Section 17 – Transportation Studies and Plans – Suggested Edits
4. Section 2 – Sewer and Storm Drain Design Standards – Suggested Edits
5. Section 2 – Detail Revisions
6. Section 4 – Landscaping and Landscape Standards – Suggested Edits
7. Section 10 – Municipal Street Lighting Detail Revision
8. Department of Public Works – Transportation Division Memo
9. Department of Public Works – Water Resources Division Memo

1. TRANSPORTATION SYSTEMS AND STREET DESIGN STANDARDS

1.1. TRAFFIC STUDIES

For the purposes of this section, **passenger car equivalents (PCE)** shall be defined as the number of passenger cars or, in the case of non-passenger vehicles, the number of passenger cars that would be displaced by non-passenger vehicles. One tractor trailer combination is the equivalent of two passenger cars.

Developments that generate 100 PCE or more, thus requiring a Traffic Movement Permit (TMP), shall meet the requirements of TMP regulations of State Law, in addition to all applicable transportation site plan standards of the City Code. For more information concerning state TMP requirements, please refer to <http://www.maine.gov/mdot/traffic-counts/traffic-mvmnt-app.php> or contact the Maine Department of Transportation (MDOT). The City of Portland is the delegated reviewing authority for TMP applications.

Developments that generate less than 100 passenger car equivalents (PCE) but require a scoping meeting because they generate 25 PCE or more and are located

(1) on an arterial; and/or

(2) within ½ mile of a high crash location; and/or

(3) within ¼ mile of an intersection that has been identified in a previous traffic study as a failing intersection, with an overall level of service below level of service D,

shall meet the following standards, if a traffic study is required:

- 1.1.1. Traffic studies shall be prepared, stamped and signed by a Professional Engineer licensed in the State of Maine.
- 1.1.2. Scope of Study: The City Transportation Engineer, in consultation with the applicant's engineer, shall determine the need for and scope of the traffic study. The requirements for the study shall be based on standard transportation engineering practice

A typical traffic study includes the following major sections:

- A description of the development proposal
- A description of existing conditions.
- Estimated trip generation by the development and design hour volume for affected driveway(s) and study intersections.
- Trip generation will be based upon the latest edition of the ITE *Trip Generation* publication unless suitable documented local data that meets ITE methodology is available.
- Trip distribution
- Capacity analysis for adjacent roadways and for any existing or proposed driveways.
- Traffic crash analysis for adjacent roadways.
- Key findings concerning traffic impacts, problems, and deficiencies.
- Proposed traffic improvements.
- Summary of findings and recommendations for transportation improvements and other impact mitigation measures.

Commented [ND1]: Move to Section 17.

~~1.2. Reserved~~**1.31. HORIZONTAL ALIGNMENT OF STREETS**

The horizontal alignment of all proposed streets shall conform to the following standards:

- Horizontal curves shall have centerline radii of not less than 110 feet.
- The alignment centerline shall be straight for at least 100 feet between reverse curves whenever either curve has a centerline radius of less than 200 feet.
- When two streets intersect and one street is an arterial or collector street, or both streets are arterial or collector streets, the angle of intersection shall be 90 degrees. When two streets intersect and neither street is an arterial or collector street, the angle of intersection shall be at least 75 degrees and no greater than 105 degrees.
- When two streets intersect, adjoining right-of-way lines shall be connected by a circular arc with radius of at least ten (10) feet. The connecting arc shall be tangent to the right-of-way lines on both streets. When the angle of intersection is other than 90 degrees, a radius greater than ten (10) feet may be required.
- All dead-end streets shall provide for a turnaround at the end of the street, subject to approval by the reviewing authority. Turnarounds shall be designed to facilitate future street connectivity and shall always be

designed to the right (refer to Figure I-5).

- Street intersections with more than four (4) legs shall be prohibited.
- The minimum distance between intersections on any street shall be as follows unless the City Engineer determines that unique conditions of the site necessitate a lesser length. The distance between intersections shall be measured from the intersection of street centerlines at one intersection to the intersection of street centerlines at the other intersection. Streets shall be classified in accordance with the Federal Highway Administration Functional Classification Guidelines.

Local Street and Local Street Intersection	<u>2</u> 300 feet
Local Street and Collector Street Intersection	<u>2</u> <u>5</u> 300 feet
Local Street and Arterial Street Intersection	<u>3</u> 500 feet
Collector Street and Collector Street Intersection	<u>4</u> 500 feet
Collector Street and Arterial Street Intersection	500 feet
Arterial Street and Arterial Street Intersection	500 feet

1.24. STREET GRADES

1.24.1. Street grades shall conform to the following standards, as shown in Figures I-1, I-2, and I-3:

- The maximum grade for the centerline of all streets shall not exceed eight (8) percent.
- The minimum grade for the centerline of all streets shall not be less than one-half (0.5) percent.
- The cross slope for local streets shall be three (3) percent~~0.03~~. The cross slope for other street classifications shall be two (2) percent~~0.02~~.
- Cross slopes for sidewalks shall be one (1) percent minimum and two (2) percent maximum~~0.02~~, sloping down and away from the street line to the top of the curb at the gutter line, including pedestrian access routes.

across driveways, as shown in Figure I-10C13.

- Street grades at intersections shall not be more than three (3) percent for a distance of one hundred (100) feet from the center of the intersection.

1.2.2 Curbless “shared streets” shall be considered on a case-by-case basis after consideration of context, design, and maintenance. Approval of any curbless “shared street” shall be subject to review by the Department of Public Works.

1.35. VERTICAL ALIGNMENT

Where two adjacent street segments are proposed to have different straight line centerline finish grades, vertical curves shall be used to connect the adjacent street segments. Vertical curves shall be parabolic and tangent to each of the adjacent grades. The minimum vertical curve length, “L”, shall be calculated based on the following formula

$$L = K \times A$$

where “A” is the absolute value of the algebraic difference between the beginning grade and the ending grade of the vertical curve, with both grades expressed in percent, and “K” is a factor whose value depends on street design speed, ~~which is related to street classification. The design speeds, in miles per hour, for this section’s street classifications are as follows:~~

Local Street	25 mph
Collector Street	30 mph
Arterial Street	35 mph

The K values corresponding to the minimum vertical curve lengths for the above street classifications and vertical curve types (sag curve or crest curve) are as follows:

Local Streets

Crest Vertical Curves: K = 20

Sag Vertical Curves: K = 30

Collector Streets

Crest Vertical Curves: K = 30

Sag Vertical Curves: K = 40

Arterial Streets

Crest Vertical Curves: K = 50

Sag Vertical Curves: K = 50

1.46. SIGHT DISTANCE

Where driveways or new streets enter an existing street, vehicular sight-distance shall conform to standards established by the Maine DOT as contained in their publication, Chapter 299, Highway Driveway and Entrances Rules ~~and noted below for entrances with standard vehicles~~. For driveways frequently accessed by large vehicles, greater sight distance will be required according to Maine DOT guidelines. Along sloped roadways, or where the design vehicle is larger than a standard passenger vehicle, additional sight distance may be required.

Speed Limit (mph)	Measured Distance (feet)
25	200
30	250
35	305
40	360
45	425
50	495
55	570
60	645

1.57. DRIVEWAY DESIGN

1.75.1. All driveways shall be designed according to the following table, unless otherwise approved by the Department of Public Works.

Requirement	Minor Driveway (serving < 10 residential spaces)	All other driveways
<u>A) Number of Driveways</u>	<u>No more than one (1) driveway shall be permitted.</u>	<u>No more than two (2) driveways shall be permitted. Adjacent sites under common ownership shall have no more than two (2) driveways combined.</u>
<u>B) Minimum/ maximum driveway width</u>	<u>10 feet minimum, 20 feet maximum, measured at the property line</u>	<u>For two-way driveways (preferred): 20 feet minimum; 24 feet maximum for residential/commercial uses; 30 foot maximum for industrial uses.</u>
<u>C) Driveway spacing</u>	<u>Spacing of new or reconfigured driveways shall take the existing pattern of driveways in the</u>	<u>50 feet along local streets; 100 feet along arterial and collector streets with posted speeds of 35mph or</u>

	<u>surrounding context into account, and shall limit the impact to on-street parking and existing street trees. Shared driveways are encouraged.</u>	<u>less; 150 feet for roadways posted at 35mph or greater. Driveway locations may be rejected based on documented or anticipated safety or operational issues.</u>
<u>D) Driveway separation from Intersections</u>	<u>At least 35 feet along local roads and 50 feet along collectors/arterials, measured from the projection of the right-of-way line at the roadway to the centerline of the driveway.</u>	<u>At least 35 feet along local roads, 100 feet along collectors/arterials, measured from the projection of the right-of-way line at the driveway to the centerline of the driveway.</u>
<u>E) Curbing</u>	<u>2-foot granite corner radius “bugs” (also known as a “bullnose”) shall be used where possible. Tipdowns may be used if the driveway crosses a narrow sidewalk</u>	<u>Granite radii (where sufficient esplanade is available) or tipdowns shall be used. Granite radii shall not cross the pedestrian access route.</u>
<u>F) Driveway intersection angle</u>	<u>Perpendicular to the street, where possible. Where necessary, the driveway shall intersect the street between 75 and 105 degrees unless otherwise approved by the Department of Public Works.</u>	
<u>G) Design vehicle</u>	<u>Driveways shall be designed to accommodate site-specific design vehicles, and shall not be designed larger than necessary, as determined by turning movement diagrams and engineering judgment.</u>	
<u>H) Loading</u>	<u>All necessary functions for loading, circulation, and parking maneuvers shall occur within the site and outside of the right-of-way to the extent practicable, given the site context.</u>	
<u>I) Circulation</u>	<u>Vehicle circulation shall be completely contained within the site to the extent practicable, given the site context.</u>	
<u>J) Backing maneuvers</u>	<u>Backing maneuvers may be permitted to enter the site. Backing maneuvers from a site may be permitted based on upon site context including functional class of the adjacent street, traffic volumes, and speeds.</u>	<u>Backing maneuvers into and out of the site are prohibited. All vehicles must enter and exit the site facing forward.</u>
<u>L) Parking area size</u>	<u>All driveways shall serve a parking area of at least 8'x16', clear of any encroachment, plus any setbacks required by zoning. Parking areas and parked cars shall not encroach upon the public right-of-way.</u>	

~~Residential development with nine (9) parking spaces or less:~~

~~Minimum/maximum driveway width: Any site shall have a minimum driveway width of ten (10) feet and a maximum width of twenty (20) feet measured at the property line.~~

~~Location of driveway: A driveway shall be located on the lot in a manner to provide a minimum distance of twenty (20) ft spacing between it and adjacent driveways. This spacing shall be measured between edge of driveways at the property line. If the development is a major site plan with frontage on an arterial roadway, the standards listed in the table under section 1.6.1.7 shall apply.~~

~~No more than one (1) driveway shall be permitted.~~

~~1.7.2. Multi-Family Residential with 10 (ten) parking spaces or more, Commercial and Industrial shall meet the following standards:~~

~~1.7.2.1. All driveways shall be designed to connect perpendicular to the street, where feasible. In no case shall the angle of intersection be less than 75 degrees or greater than 105 degrees.~~

~~1.7.2.2. Minimum driveway width (one way): Any site with driveway access to a street shall have a minimum 12 foot wide driveway (at the property line) for one-way ingress or egress. Driveways shall permit traffic to enter and leave the site simultaneously without conflict in aisles, parking or maneuvering areas. If parking is adjacent to the property line, then the appropriate aisle width shall apply. Both the entrance and exit drives shall be identified with appropriate signage.~~

~~1.7.2.3. Minimum driveway width (two way): Any site with driveway access to a street shall have a minimum width of 20 feet for two-way ingress and egress, with a preferred width of 24 feet.~~

~~1.7.2.4. Maximum driveway width (two way): The maximum width of a driveway will be based upon site conditions or vehicle characteristics that warrant a wider access (e.g., dedicated turn lanes at exits) and will require approval of the reviewing authority. Maximum widths shall not exceed the following, although confirmation of exact capacity requirements will be necessary:~~

- ~~• Commercial—24 feet~~
- ~~• Industrial—30 feet~~

~~1.7.2.5. Curbing of driveways: Where driveways enter on an existing street, the full radius of the driveway shall be designed and constructed of granite curb. The radius size shall be based upon information in the following tables. The radii listed below are recommended standards. A vehicle template analysis may be~~

submitted for review as an alternative to the use of the following table:

		Departure Lane			
	Passenger-Car	12 foot or less	12 to 14 feet	14 to 16 feet	16 to 18 feet
Receiving Lane	12 foot or less	15 ft.	15 ft.	15 ft.	15 ft.
	12 to 14 foot	15 ft.	15 ft.	15 ft.	15 ft.
	14 to 16 foot	15 ft.	15 ft.	15 ft.	15 ft.
	SU-30 Truck				
	12 foot or less	35 ft.	30 ft.	30 ft.	30 ft.
	12 to 14 foot	30 ft.	30 ft.	30 ft.	30 ft.
	14 to 16 foot	30 ft.	30 ft.	30 ft.	30 ft.
	WB-50 Truck				
	12 foot or less	45 ft.	45 ft.	45 ft.	45 ft.
	12 to 14 foot	35 ft.	35 ft.	35 ft.	35 ft.
	14 to 16 foot	25 ft.	25 ft.	25 ft.	25 ft.
	WB-62 Truck				
	12 foot or less	85 ft.	85 ft.	85 ft.	85 ft.
	12 to 14 foot	85 ft.	85 ft.	85 ft.	85 ft.
	14 to 16 foot	65 ft.	65 ft.	65 ft.	65 ft.

~~1.7.2.6. Maneuvering: The area within the site to which a driveway provides access shall be of sufficient size to allow all necessary functions for loading, unloading and parking maneuvers to be carried out on the site and completely off the street right of way. Backing out of vehicles from the driveway is prohibited. The design vehicle used in the analysis shall be the predominant vehicle type and shall be approved by the reviewing authority.~~

~~1.7.2.7. Location and spacing of driveways: The location and spacing of driveways shall be determined as follows:~~

- ~~• The angle of intersection between an access driveway and the right of way shall be 90 degrees where feasible and shall in no case be less than 75 degrees or greater than 105 degrees.~~
- ~~• Along local streets, access driveways to corner lots shall be located a minimum of thirty-five (35) feet from the intersection of the projection of right-of-way lines to the center line of the driveway, except as provided hereinafter.~~

- ~~Along arterial and collector streets, access driveways to corner lots shall be located a minimum of one hundred fifty (150) feet from the intersection of the projection of right-of-way lines to the center line of the driveway except as provided for hereinafter.~~
- ~~Along arterial, collector and local streets, minimum acceptable spacing between double or multiple driveways for driveways on adjacent lots or on the same parcel shall meet the criteria below:~~

Speed Limit (mph)	Minimum Separation* (feet)
25 or less	100
30	125
35	150
40	185
45	230

~~*Spacing of driveways shall be measured from center of driveway to center of driveway and shall include driveways on both sides of the street.~~

- 1.7.2.8. ~~Number of driveways: No more than two (2) driveways shall be permitted for ingress and egress purposes to any commercial, industrial or residential (with 10 or more parking spaces) site. A joint access driveway shall be considered as adequate access for any adjacent sites and shall be encouraged. An easement for joint access shall be required.~~

- 1.7.2.9. ~~Off-street vehicular circulation: An off-street facility shall have full internal vehicular circulation and storage. Vehicle circulation shall be completely contained within the facility, and vehicles located within one portion of the facility shall have access to all other portions without using the adjacent street system.~~

- 1.5.27.3. Auxiliary Lanes Serving Driveways: A left-turn lane and/or right-turn lane with appropriate storage and transition may be considered where engineering analysis indicates a need. The need for auxiliary lanes shall be considered within the context of the impacts to sidewalks, bikeways, transit stops, on-street parking, and traffic safety. All new auxiliary lanes are subject to the approval of the Department of Public Works.

~~Ingress left turn lanes requirements: A left turn lane with appropriate storage and transition shall be provided where a submitted engineering analysis indicates a need.~~

~~Ingress right turn lanes: For any site, a right turn lane with appropriate storage and transition shall be provided where a submitted engineering analysis indicates a need.~~

1.68. SIDEWALKS AND ~~DRIVEWAY APRONS~~ CURB RAMPS

1.8.1. Driveway Aprons: Any driveway, or section thereof, located within any public street right-of-way shall be designed and built with a permanent, erosion resistant, surface, such as hot mix asphalt pavement, concrete, or brick, as illustrated in Figures I-10 through I-12. At a minimum, all driveway aprons shall be constructed of the designated sidewalk material within the pedestrian access route.

Commented [ND2]: MOVED TO 1.7

1.6.18-2. Sidewalk Construction and Materials: Sidewalks shall be brick, concrete or hot mix asphalt. The City Sidewalk Materials Policy (Appendix ~~-1 of this manual~~) shall be consulted to determine the appropriate type of sidewalk and driveway construction to use on various streets and in different areas of the City. Within the city's historic districts, only brick shall be used. Sidewalk and driveway construction details are illustrated in Figures I-10 and I-11 through I-15. All new concrete sidewalks ~~and driveway aprons~~ which abut existing concrete sidewalks must be doweled in prior to pouring. All new brick sidewalks shall be constructed with bricks running perpendicular to the path of pedestrian travel, including through driveway crossings.

1.68.32. Sidewalk ~~Design for~~ Accessibility: All sidewalks shall meet any minimum standards set forth by current Americans for Disabilities Act (ADA) and Public Right-of-Way Accessibility Guidelines (PROWAG) guidance. There are no exceptions unless technical infeasibilities are identified, documented, and approved by the Department of Public Works. In case of conflict, these standards shall supersede this manual.

1.6.2.1 Sidewalk width: The minimum sidewalk clear width shall be five (5) feet, ~~including the pedestrian access route through driveway aprons~~. Where obstructions, such as utility poles, are located in sidewalks, a minimum clear and direct pedestrian access route path width of five (5) feet shall be provided between the obstruction and one edge of the sidewalk. Wider sidewalks may be required in locations where heavy pedestrian traffic is expected, based on the site context. New sidewalks shall be at least as wide within the right-of-way as the sidewalk(s) along the adjacent properties, required between the obstruction and one edge of the sidewalk.

1.6.2.2 Level changes: The maximum allowable vertical level change at any point is ¼-inch. A level change of ¼-inch to ½-inch shall be formed with a beveled slope no steeper than 26.6 degrees (2:1). Level changes greater than ½-inch shall be designed as ramps.

1.6.2.3 Running slope: Sidewalks shall be designed with a running slope no greater than the adjacent street slope.

1.6.3.4 Cross-slope: Sidewalks, including pedestrian access routes across driveways, shall be constructed ~~designed~~ with a minimum cross slope of 1% and a maximum cross-slope of 2% post-construction, ~~including the pedestrian access route through driveway aprons.~~ Finished cross-slopes of greater than 2% shall not be acceptable. Designed cross-slopes of 1.5% are encouraged. Cross-slopes shall be consistent across the width of the sidewalk.

~~Accessible sidewalk ramps shall be required on all projects involving construction of new streets or new sidewalks and all projects involving major alteration, including repaving, of existing streets and sidewalks.~~

- 1.6.38-4. Sidewalk Ramp Design Curb ramps: ADA-compliant curb ramps are required on all projects involving construction of new streets or new sidewalks, and on all projects involving alterations to the abutting street, including repaving of existing streets and sidewalks.

Curb ramps shall be designed to prevent ponding of water at the base of the ramp. Ramp designs and details will indicate how positive drainage away from the landing in the vicinity of curb ramps will be achieved.

1.6.3.1. Applicability: ADA-compliant curb ramps are required at all marked and unmarked crossing locations. ~~Ramps shall not be provided only where there is no crossing present due to safety concerns or a lack of pedestrian facilities on the opposite corner.~~

1.6.3.2 Orientation: Curb ramps shall be designed with the direction of travel on the ramp perpendicular to the curb line and parallel to the crosswalk, where feasible. Where existing conditions, such as narrow right-of-way width or utility constraints, preclude such layouts, parallel ramps, where the entire sidewalk ramps down, are acceptable. Diagonal ramps are not desirable, but may be approved by DPW on a case-by-case basis. Ramp design standards are provided in Figure I-6 and the subsequent set of details.

1.6.3.3. ~~Detectable w~~Detectable warning panels: All pedestrian crosswalks shall include truncated dome warning panels as shown in Figure I-7. Any curb ramp that is not intended to be used by pedestrians (e.g. ramps serving bikeways) shall not include warning panels. Warning panels shall also be provided where a crossing is present without a curb ramp (for example, where pedestrian facilities are at the same grade as the street, within a median refuge, etc.). All warning panels shall be uncoated cast iron, as detailed in Figure I-7

1.6.4 Shared use paths: Shared use paths and other pedestrian access routes in the right-of-way shall conform to the same ADA requirements as sidewalks discussed herein. The appropriate material for shared use paths may differ from the material prescribed in the Sidewalk Material Policy; the appropriate material shall be determined by the review authority if not already documented in a transportation plan or master plan. Shared use paths shall be 10 feet in width or greater to allow for two-way traffic and passing.

1.6.5 Curb extensions: Curb extensions (also known as bump-outs, bulb-outs, or neckdowns) describe any localized narrowing of the roadway, typically at pedestrian crosswalk locations. The installation of any curb extension is subject to the approval of the Department of Public Works.

1.6.5.1. Applicability: Curb extensions may be considered where one or more of the following conditions are met:

- There is a documented speeding issue confirmed by a speed study;
- Curb extensions are necessary to construct one or more ADA-compliant curb ramps at an existing or proposed crosswalk;
- At signalized intersections, where reducing the pedestrian crossing time improves signal timing;
- At High Crash Locations, particularly where there is a history of crashes involving pedestrians and/or crashes involving right-turning vehicles; or
- Where they are prescribed in a master plan or transportation plan.

1.6.5.2. Curb extension design: Curb extensions, where permitted, shall be constructed to achieve the applicable goal(s) without disrupting the functionality of the roadway or intersection. Curb extensions:

- Shall not impede necessary turning movements for trucks or emergency vehicles;
- Shall not negatively impact drainage without adequate mitigation;
- Shall not impede upon, or narrow to an unacceptable degree, the adjacent travel or bicycle lanes; and
- Shall be constructed with radial curb (typically 10-foot radius or greater).

at transition points to assist with drainage and maintenance.

Curb extensions that encompass on-street parallel parking lanes should generally not exceed six (6) feet in width.

1.6.6. Non-compliance: ADA-compliance is required both within and outside of the public right-of-way. Any construction within the public right-of-way that is not built to ADA-compliance shall be reconstructed at the Applicant's expense.

Where strict compliance with ADA is technically infeasible in an alteration of an existing condition, the alteration must be made to the maximum extent technically feasible. The extent to which compliance is technically infeasible shall be documented, and an acceptable design shall be approved by DPW. This process should occur during the design phase.

Ramps, flares, landings and approaches shall be designed as follows:

1. Maximum ramp running slope shall be 8.33% for new construction. In retrofit situations, ramp slope may be between 8.33% to 10% for a rise of up to six (6) inches and 10% to 12.5% for a rise of up to three (3) inches. Ramp cross slope shall be 2% or less.
2. Minimum ramp width shall be four (4) feet in new construction and three (3) feet for retrofits.
3. Sidewalk ramps adjacent to all public streets shall be constructed with truncated dome detectable warning surface panels. The detectable warning panel shall be located so that the edge nearest the curb line is 6 inches minimum or 8 inches maximum from the curb line. The panel shall be oriented to the direction of travel as identified by the point of egress. The panel shall extend 24 inches minimum up the ramp in the direction of travel. The panel shall extend the full width of the ramp.
4. Detectible warning panels shall be uncoated cast iron, following manufacturer's instruction for installation and meeting Portland's specifications for Sidewalk Ramp Detectable Warning Panel, Figure 1-7.
5. Reserved
6. Flares shall be designed with a maximum slope of 10% provided that a landing area at least 48 inches x 48 inches is provided at the top of the ramp. If the landing area is less than 48 inches x 48 inches, the maximum slope of the flares shall be 8.33%.
7. Landings shall be at least 48 inches by 48 inches for new construction and

~~at least 36 inches x 36 inches for retrofits. Landings shall be designed with slopes in both directions that are no greater than 2%.~~

- ~~8. Approaches shall be designed with a cross slope no greater than 2% and a running slope that does not exceed the slope requirements for sidewalk ramps.~~

~~1.8.5. Sidewalk Ramp Location and Orientation:~~

~~Sidewalk ramps shall be designed as perpendicular ramps with the direction of travel on the ramp perpendicular to the curb line and parallel to the crosswalk. Where existing conditions (such as narrow right of way width) preclude such layouts, parallel ramps or diagonal ramps may be approved.~~

~~Diagonal ramps are located in the middle of a section of circular curb at a corner, where the ramp is at an angle of about 45 degrees to one or two marked crosswalks. In such cases, the crosswalks shall be laid out to encompass a 48 inch by 48 inch landing and wheelchair maneuvering area at the base of the ramp in the street.~~

1.7 DRIVEWAY APRONS

Any driveway, or section thereof, located within any public street right-of-way shall be designed and built according to the following specifications, with a permanent, erosion-resistant, surface, such as hot mix asphalt pavement, concrete, or brick, as illustrated in Figures I-10 through I-12. At a minimum, all driveway aprons shall be constructed of the designated sidewalk material within the pedestrian access route.

1.7.1. Construction and materials: The portion of the driveway within the public right-of-way within the pedestrian access route shall be comprised of the same material as the abutting sidewalk as identified in the Sidewalk Material Policy (Appendix 1) and constructed according to Figures I-10 through I-12.

1.7.2. Pedestrian access route: Where a driveway crosses a sidewalk, shared use path, or other pedestrian access route, a pedestrian access route shall be constructed across the driveway apron with a maximum cross-slope of 2% (1.5% preferred). The pedestrian access route shall be designed and constructed to meet the elevation of the adjacent sidewalk or shared use pathway to the extent feasible.

The pedestrian access route shall be constructed at the same width as the adjacent sidewalk or shared use path to the extent feasible. For pedestrian access routes connecting to adjacent sidewalks, the minimum width is 5'.

1.7.3. Driveway apron slope: The driveway apron shall ramp up to the grade of the sidewalk, where feasible. The portion of the driveway between the roadway and the pedestrian access route shall be designed to a maximum slope of 15%, unless otherwise approved by the Department of Public Works. This slope should be minimized to the extent possible while maintaining ADA-compliance and continuity of travel along the pedestrian access route.

1.7.4 Driveway design: Where feasible, driveways shall be designed to keep the pedestrian access route at a consistent elevation for continuity of travel. The portion of the driveway between the roadway and pedestrian access route shall be sloped to provide the full transition between the roadway and sidewalk elevations where feasible. Along roadways where the sidewalk width plus esplanade width is less than seven (7) feet, the sidewalk may be transitioned using ADA-compliant ramps in order to create a suitable driveway crossing.

1.9. Reserved

1.810. ROADWAY CONSTRUCTION, SURFACE, AND AGGREGATES

1.810.1. All roadways shall be constructed in accordance with Chapter 25 of the City of Portland Code of Ordinances and the MaineDOT Standard Specifications unless otherwise indicated herein or otherwise directed in writing by the Department of Public Works.

1.8.2 Aggregates used in concrete mixes and in the construction of streets, sidewalks and aprons shall meet the requirements in SECTION 703 - AGGREGATES of the *State of Maine Department of Transportation Standard Specifications* ~~Revision of December 2002~~ with the following additions and modifications:

703.02 Coarse Aggregate for Concrete: Designated Aggregate Size

Sieve Size	Percent Passing Sieve				
	2 in.	1½ in.	1 in.	¾ in.	½ in.
2 in.	95-100	100	-	-	-
1-1/2 in.	-	95-100	100	-	-
1 in.	50-70	-	90-100	100	-
3/4 in.	-	50-70	-	90-100	100
1/2 in.	15-30	-	25-60	-	90-100
3/8 in.	-	10-30	-	20-55	-

No. 4	0-5	0-5	0-10	0-10	0-15
F.M. (+0.20)	7.45	7.20	6.95	6.70	6.10

1. ~~8.310-2~~. Aggregate used in concrete shall not exceed the following maximum designated sizes:

- 2 inches for mass concrete
- 1-1/2 inch for piles, pile caps, footings, foundation mats, and walls 8 inches or more thick
- 3/4 inch for slabs, beams, and girders.
- 1/2 inch for fireproofing on steel columns and beams
- 1 inch for all other concrete

1. ~~8.410-3~~. 703.06 (a) Aggregate Base:

Aggregate base - crushed, type "B" shall not contain particles of rock which will not pass a two inch (2") square mesh sieve, and shall conform to the type "B" aggregate, as listed in the subsection of the Standard Specifications.

"Crushed" shall be defined as consisting of rock particles with at least 50 per cent of the portion retained on a 1/4 inch square mesh sieve, having a minimum of 2 fracture faces.

1. ~~8.510-4~~. 703.06 (b) Aggregate Subbase:

Sand subbase shall not contain particles of rock which will not pass a one inch (1") square mesh sieve, and shall conform to the type "F" Aggregate, as listed in this subsection of the Standard Specifications.

Gravel subbase shall not contain particles of rock which will not pass a three inch (3") square mesh sieve, and shall conform to type "D" Aggregate, as listed in this subsection of the Standard Specifications.

1. ~~8.610-5~~. 703.18 Common Borrow:

Common borrow shall not contain any particle of bituminous material.

1. ~~8.710-6~~. 703.19 Granular Borrow:

Granular borrow shall contain no particles which will not pass a three inch (3") square mesh sieve.

1. ~~8.910.7~~. 703.20 Gravel Borrow:

Gravel borrow shall not contain particles of rock which will not pass a three inch ("3") square mesh sieve.

1. ~~8.1010.8~~. 703.31 Crushed Stone for Pipe Bedding and Underdrain:

"Crushed Stone" shall be defined as rock of uniform quality and shall consist of clean, angular fragments of quarried rock, free from soft disintegrated pieces, vegetable matter, lumps or balls of clay, and other unsuitable substances.

Crushed stone used as a bedding material for pipe and underdrain shall be uniformly graded and shall meet the gradations listed in the tables below. The stone shall be free from vegetable matter, lumps or balls of clay, and other unsuitable substances.

Sieve Designation	Percentage by Weight Passing
3/4 – inch	100
3/8 – inch	20 - 55
No. 4	0 - 10

For pipe sizes 42 inches and larger

Sieve Designation (square mesh sieve)	Percentage by Weight Passing
1-1/4 – inch	100
3/8 – inch	20-55
No. 4	0-10

Minimum thicknesses for pavement structure materials

Street Classification	Minimum Materials Thicknesses (Inches)			
	Wearing Course Pavement	Base Course Pavement	Agg. Base Course	Agg. Subbase Course
Minor Residential	1 ½	2	3	15
Residential	1 ½	2	3	15
Collector	1 ½	2 ½	3	18
Commercial/Industrial	2	3	3	18

Minimum placement temperatures for hot mix asphalt pavement

Base Temp. ° f	Mat Thickness, Inches					
	½	¾	1	1 ½	2	3+
40 - 50*	--	--	--	--	285	275
50 - 60	--	310	300	295	280	270
60 - 70	310	300	290	285	275	265
70 - 80	300	290	285	280	270	265
80 - 90	290	280	275	270	265	260
90+	280	275	270	265	260	255

* Surface course pavement shall not be placed when the air or road base temperature is less than 50 degrees F.

1.911. STREETS ON ISLANDS IN CASCO BAY

Reserved.

1.12. PARKING STUDY

Parking studies shall be produced by a licensed transportation professional engineer.

Where a parking study is required, data shall be determined by values contained in the most up to date version of the Institute of Transportation Engineers (ITE) publication titled Parking Generation, or through local, regional or other pertinent national data. If local or regional data is to be used, the scope and methodology of the parking study shall be coordinated with the City Transportation Engineer.

Where a parking study is required, the applicant's engineer shall have a scoping meeting with the City Transportation Engineer or their designee to determine the need for and required scope of the study. The requirements for the study shall be based on standard transportation engineering practices.

Commented [ND3]: Moved to Section 17.

1.13. TRANSPORTATION DEMAND MANAGEMENT (TDM)

All TDM Plans shall include specific provisions for the following:

1.13.1. Transportation Narrative:

Every TDM plan shall describe how the project fits within the multimodal transportation system serving the district in which the development is located. The narrative should address the specifics of the use, occupants,

visitors, and location of the development and how it is anticipated to relate to its transportation context.

1.13.2. Identify a TDM Coordinator to administer the TDM plan:

Every TDM Plan needs to identify the plan administrator and establish the roles and responsibilities of the administrator.

1.13.3. Employee and Customer Survey:

The TDM plan shall develop and use an employee and/or customer survey format that:

- Is specifically designed to reflect the use mix within the development.
- Is electronically tabulated.
- Produces comparable data from year to year
- Allows for compilation of data from multiple employers by third party.
- Allows for data use by employees to foster car pooling and ride sharing.
- Identifies barriers to or best practices in public transit, bicycle, and pedestrian transportation.
- Can be conducted periodically (typically annually) and can be used to monitor program effectiveness and provide the basis for periodic plan adjustment (see monitoring section below).

1.13.4. Set Parking and Trip Reduction Target:

The TDM plan shall use ITE trip generation and parking demand projections as the basis to establish a projected transportation demand and/or impact of the development. Alternatively, project-specific parking and trip generation projections may be used in place of ITE standards, if estimated by a licensed professional engineer and approved by the City. A project specific demand analysis may be advantageous to projects that can demonstrate reduced parking demand and trip generation based on approved assumptions in their TDM and Site Plan.

The TDM plan must use the specific use, location, local alternative transportation opportunities, and initial survey results to establish an achievable percentage reduction in transportation demand for the project. The TDM plan will utilize the

stated parking and trip reduction targets as the basis for reduced infrastructure and contribution requirements for the Planning Board's evaluation.

1.13.5. Customize Parking and Trip Reduction Strategies:

Every TDM plan must be customized to reflect the specific mix of use proposed for the development. For example, A residential development will utilize a very different approach to reducing project generated parking and trips than an office building. Likewise, the administration of the TDM plan and the role of the TDM Coordinator must adequately respond to the scale of the development, the uses in the development, as well as the ownership framework and management of the facility.

1.13.6. Education:

The TDM plan shall, at a minimum include provisions for the following. All educational information and programs shall be readily accessible to all project occupants.

- Transit maps and schedules. These shall be posted and updated by the TDM Coordinator, as necessary.
- Access to Information concerning transportation providers and guaranteed ride home services such as: carpooling list serves and/or van pool providers.
- Internal information sharing such as posting a "Ride Board" or employee email list-serve to facilitate carpooling and to share the results of employee and customer surveys.
- Educational and promotional materials that describe and identify the advantages and cost saving opportunities of using alternative transportation, including specific incentives offered by the employer.
- Recognition of employees who reduce the traffic impact of the development through newsletter, email, bulletin board, or other announcements.
- Information on bicycling routes, parking infrastructure and locations and other amenities or incentives that may be available.

1.13.7. Monitoring:

All TDM plans must include provisions for monitoring program effectiveness over time to establish whether trip reduction targets are being met.

Responsibility: TDM Coordinators and/or plan administrators are responsible for

monitoring the efficacy of the TDM plan periodically over time and making adjustments to the plan needed to achieve trip reduction targets.

Methods: The methods and scheduling of monitoring shall be outlined in the TDM plan and shall follow accepted transportation engineering. Monitoring methods will typically involve use of the periodic survey combined with direct observation.

Reporting: TDM plan monitoring shall be compiled into a report that compares the results to trip reduction targets and parking demand projections. The monitoring results shall be provided to the Reviewing Authority according to the monitoring schedule established in the TDM plan.

1.13.8. Project Specific Standards:

Individual TDM Plans shall assess the following topics on a site- specific basis tailored to the transportation needs of the development.

1. Infrastructure:

On-site and off-site infrastructure improvements may be incorporated to achieve trip reduction targets and may include the following:

- **Public Transit Access:** The TDM plan shall identify how occupants and/or visitors will access public transit. Pedestrian links to bus routes and other transit links shall be identified and their usability assessed for sidewalk condition, ADA accessibility, street lighting, cross walk facilities, wayfinding, and general safety and attractiveness. The nearest sheltered public transit facility shall be identified. Deficiencies in the links to public transit that constitute barriers to its use shall be addressed in the TDM plan and in the site plan.
- **Bicycle Parking:** Minimum bicycle parking is a site plan requirement according to Article 14 of the Land Use Code. The TDM plan may incorporate additional bicycle parking, bicycle wayfinding, and/or covered parking to further encourage bicycle use.
- **On-site Shower and Locker Facilities:** Access to showers and locker facilities may be incorporated into the TDM Plan in order to encourage human powered transportation alternatives.
- **TDM Bulletin Board or Kiosk:** TDM plans shall identify to occupants where information and educational material will be provided within the development a visible and convenient facility such as a transportation bulletin board and/or kiosk. In multi-tenanted facilities, transportation

information shall be provided in the lobby of the structure or other such location that is accessible and frequented by a significant majority of occupants and visitors to the facility. The TDM coordinator shall be responsible for keeping all material current and available, as needed.

2. Incentives: Incentives available to users and/or occupants of the development may be incorporated to achieve trip reduction targets and may include the following:

- Parking "Cash Out": TDM plans may include "parking cash out" incentives where employees have the choice of receiving monetary payments in lieu of provided parking. The efficacy of these programs will need to be carefully assessed and the method of monitoring must be described in the TDM plan.
- Public Transit Passes/Van Pool vouchers: Free or reduced price bus passes or van pool vouchers may be used as an incentive in the TDM plan. The use of transit options should be incorporated into the employee/customer survey and incorporated into the plan monitoring program. Transit payment options may be combined with parking cash out incentives, where appropriate.
- Preferred parking for car pool: Car pooling employees may be provided with more convenient and attractive parking, if available. If this option is incorporated into the TDM plan, the location of preferred parking shall be identified on the site plan and signed accordingly.
- Car sharing: Residential developments may incorporate shared car services or jointly owned vehicles into the TDM plan. Commercial development TDM plans may identify use of a shared vehicle for use by employees for either commercial or personal trips through the work day as a means to encourage alternative commuting to work.
- Telecommuting, flex time, and other flexible work scheduling mechanisms that promote fewer employee trips to work or promote alternative transportation travel.

*Other incentives infrastructure improvements and/or methods as may also be appropriate to the development.

Commented [ND4]: Moved to Section 17

1.1014. PARKING LOT AND PARKING SPACE DESIGN

~~Refer to Article 19 of the City Land Use Code for zoning ordinance requirements concerning the number of parking spaces required for off-street parking.~~

1.104.1. Parking lots, except for temporary lots to be used for less than one year, shall be constructed of a permanent and durable hard surface that is not subject to ponding or erosion.

1.104.2. Parking spaces shall meet the following dimensional requirements:

- Standard parking space: 9 feet wide by 18 feet long, except that low turnover parking spaces, such as those used by residents or employees, may be designed with a width of 8'-6" and considered a standard parking space.
- Compact parking space: 8 feet wide by 15 feet long.
- Motorcycle/motorized scooter parking space: 4 feet wide by 8 feet long.

Obstructions within parking areas, including columns and other permanent fixtures, shall not be located within the dimensions of a parking space. Where these obstructions are present, parking shall be striped and dimensioned to omit these obstructions. Such obstructions should not significantly impact vehicle maneuverability, visibility, ability to open doors, etc.

All spaces provided shall be safely accessible. Substandard and specialty spaces that are open to the general public shall be labeled as such using signage or pavement markings to inform users.

1.10.2.1. Compact spaces: Any parking lot with 10 or fewer spaces shall contain standard sized parking spaces. Five or more spaces may contain a mix of standard and compact spaces. Up to 20% of parking spaces in a parking area may be compact. Compact parking spaces should be limited in high-turnover parking areas or locations where the typical vehicle is likely to be larger than a typical passenger vehicle. Vehicle turning analysis may be required for review by the Department of Public Works to ensure that spaces function as designed.

1.10.2.2. Accessible Parking: All parking areas shall provide accessible parking per ADA and the Maine Fair Housing Act. ADA standards for number of spaces, dimensions, buffers, cross-slopes, materials, pedestrian accessibility, and other requirements shall apply with no exceptions. Accessible spaces shall be considered "standard" parking spaces for the purposes of calculating the allowable number of compact spaces.

~~1.14.3. Parking lot layout shall conform to Figures I-28 thru I-32.~~

~~1.14.4. Where off street parking for more than six vehicles is required or provided, the~~

following construction requirements shall apply:

- ~~Appropriate driveways from streets or alleys, as well as maneuvering areas, shall be provided. Location and width of approaches over public sidewalks shall be approved by the traffic engineer.~~
- ~~The surface of driveways, maneuvering areas and parking areas shall be uniformly graded with a subgrade consisting of gravel or equivalent materials at least six inches in depth, well compacted, and with a wearing surface equivalent in quantities of compaction and durability to fine gravel.~~
- ~~A system of surface drainage shall be provided in such a way that the waste run-off shall not run over or across any public sidewalk or street.~~
- ~~Where artificial lighting is provided, it shall be shaded or screened so that no light source shall be visible from outside the area and its access driveways.~~

1.104.35. Vehicular access shall be provided by one or more aisles. The minimum two-way drive aisle width is 24 feet for standard, right-angle parking, and is otherwise dependent on parking space orientation, as illustrated in Figures I-16A. Minimum widths of aisles are illustrated in Figures I-28 thru I-31. Accessible parking spaces shall be served by at least one aisle of standard width or greater.

1.118. **MOTORCYCLE/-MOTORIZED SCOOTER/-MOPED PARKING (ON-STREET):**

To distinguish motorcycle/motorized scooter/moped parking spaces from standard parking spaces the spaces shall be painted and delineated with signage. These painted spaces shall be angled and shall be four (4) feet wide by eight (8) feet long. The dimensions for on-street motorcycle/motorized scooter/moped parking are outlined in Figure I-31. On-street motorcycle/motorized scooter/~~and~~ moped parking may also be located where standard vehicle parking would be prohibited because of sight restrictions, such as, adjacent to a crosswalk or an approach to a traffic control device. Motorcycles/motorized scooter/mopeds do not ~~have create~~ the same sight impediment as a standard vehicle.

1.152. **BICYCLE PARKING**

~~Refer to Article 19 of the City Land Use Code for zoning ordinance requirements concerning the number of bicycle parking spaces required.~~

1.12.1 Bicycle parking shall:

- Provide secure, durable racks that maintain bicycles in an upright position and to which bicycles can be affixed with customary lock and cable mechanisms. Fence-type ("wheel bender") racks designed to secure the front wheel only and wave racks are prohibited from counting.

toward bicycle parking requirements.

- Be installed on a hard surface that is suitably sized and provides sufficient clearance from obstacles.
- Be separated from car parking by a physical barrier such as curbing, wheel stops, parking bollards or similar features.
- Be adequately illuminated where nighttime use is anticipated.
- Be provided under covered areas and/or in secure storage lockers or rooms, if intended for long-term use.
- Be provided within the public right-of-way or publicly accessible for uses that expect visitation, customers or short-term usage.

~~1.15.1. Bicycle parking intended for long-term use (residential or full-time employee parking) shall be provided under covered areas and/or in secure storage lockers.~~

1.125.2. Placement of off-street bicycle parking racks shall conform to the Bicycle Parking Rack Placement Criteria (drawn from the *Bicycle Facility Design Guide of the District Department of Transportation, 2006*) as illustrated in Figure I-33.

1.125.3. ~~For c~~Commercial or i-Industrial ~~uses #~~ (requiring more than ten (10) bicycle parking spaces):

- A minimum of ten percent (10%) of required bicycle parking shall be provided within fifty (50) feet of the main ~~egress-entry~~ point of the structure, or shall be no further from such entry than the nearest five (5) non- handicapped parking spaces.
- Where there is more than one structure on a site, or where a structure has more than one main entrance, the parking shall be distributed to adequately serve all structures or main entrances.

1.125.4. Directional Signage: If bicycle parking is not directly visible from the public right-of-way, directional signage shall be provided indicating the availability and location of bicycle parking facilities.

1.125.5. Approved Bicycle Racks:

1.12.5.1. Design: Bicycle racks that are required to meet site plan requirements shall:

- Provide multiple points of contact between the rack and the bicycle;
- Allow bicycles to be locked without the need to lift the bicycle into the rack; and
- Be placed in such a way as to allow the intended number of bikes to be securely locked.

1.12.5.2 Approved Racks by Location:

- Private property: A variety of commercially available racks are acceptable for installation on private property, including but not limited to those catalogue listings identified herein (Figures I-34 and I-35).
- In the Public Right-of-Way: Where site conditions cannot reasonably accommodate bicycle parking on private property, it may be located within a public sidewalk area either adjacent to or within reasonable walking distance of the site, if such areas are available that meet the Bicycle Parking Rack Placement Criteria of this chapter (*drawn from the Bicycle Facility Design Guide of the District Department of Transportation, 2006*) as illustrated in—see Figure I-33. Bicycle racks within the public right-of-way shall be placed to allow for the safe storage of bicycles while limiting encroachment onto adjacent sidewalks. If no ~~such~~ location within the right-of-way is available, a financial contribution commensurate with the cost for purchase and installation of the required number of bicycle racks shall be made to a City infrastructure account.

The following approved brands, installed according to company specifications, shall be permitted in the public right-of-way. Equivalent bicycle racks by other manufacturers are acceptable upon prior approval by the reviewing authority.

- DERO 'Downtown Rack' Inverted U-Rack (Figure I-35)
- DERO 'Bike Hitch' (Figure I-34)
- Old Port District, including Commercial Street: DERO Bike Hitch only (Figure I-34)

Bicycle racks in the public right-of-way shall become the property of the City of Portland.

Bicycle racks in the public right-of-way shall match the designated street furniture color for that location as described in the Municipal Street Lighting Standards in this manual. Where there is no designated street furniture color, bicycle racks in the public right-of-way shall be black (manufacturer's specification).

1.163. BICYCLE ROUTES AND LANES

The City has developed a Bike Route Network Map (~~Figure 1-35~~) to show present and proposed bike routes on City streets. These routes are typically accomplished by providing ~~either~~ dedicated bicycle lanes, shared use paths, or shared lanes—~~“Share the Road” methodology~~. Positive identification of the lanes shall be provided by pavement markings, bike lane symbols, and /or signage. The following standards shall be applied to the installation of bike lanes on City streets:

1.13.1. Design: The design of any new or modified bicycle facility shall be reviewed and approved by the Department of Public Works prior to application and shall be consistent with the following design standards:

- Vehicular travel lanes and bicycle lanes shall be separated by a six (6) inch solid white painted edge line. At intersections the white edge line shall be a ~~dotted-dashed~~ line (two (2) foot painted length by four (4) foot opening) across the intersection.
- Bike lanes shall have a minimum width of five (5) feet. Six (6) feet is preferred for bicycle lanes adjacent to curbed street sections. Where sufficient ~~shoulder~~ width is provided, a ~~second edge line shall be painted off the face of the curb at~~ painted buffer of one (1) foot or more may be provided between the bicycle lane and vehicle travel lanes. ~~or two (2) feet. This edge line shall not extend across intersections.~~ Where a bicycle lane is adjacent to on-street parking, this buffer may be placed between the bicycle lane and parking lane. Where a buffer of one foot or greater is provided, the width of the bicycle lane may be reduced to four (4) feet, if necessary, with approval from the Department of Public Works. ~~See Figure 1-36~~
- Where the minimum or recommended width for bicycle lanes is not immediately available, reallocation of general travel lane widths should be considered, as appropriate.
- On-street bicycle lanes and associated buffers shall not exceed eight (8) feet in total width unless vertical delineation is provided in the buffer area. Applicability and materials of vertical delineation shall be determined by the Department of Public Works.
- Shared use paths shall be designed to facilitate two-way traffic by users of multiple, nonmotorized modes. In general, shared use paths shall be ten (10) feet or greater in width, and free of any obstructions. Refer to the AASHTO Guide for the Development of Bicycle Facilities for shared use path design considerations.

- ~~When bike lanes are provided on streets with on-street parking, the bike lane shall be a minimum of six (6) feet wide delineated by edge lines on either side of the bike lane. See Figure I-37.~~

1.13.2. Bike Network Considerations: Bicycle facilities shall be designed within the context of the city-wide bicycle network.

- Bicycle lanes shall be marked with appropriate stenciled symbols, as illustrated in, ~~see Figure I-2138 for two examples.~~
- On bicycle routes, or other roads with considerable bicycle traffic and insufficient roadway width to provide a bicycle lane, shared lane markings ("sharrows") may be used. Where used, sharrows shall be placed in the center of the travel lane(s) serving the bike route(s) or where bicyclists are expected.
- On two-way roadways with excess roadway width for one bicycle lane, but not two, installation of a single bicycle lane should be considered. The single bicycle lane should be placed in the uphill direction, if located on a hill. Otherwise, if parking is provided on only one side of the roadway, bicycle lane placement should be prioritized on the side of the street with no parking. Where possible, streets with bicycle lanes in only one direction should be paired with another lane on an adjacent parallel street to achieve bicycle mobility in both directions, if possible.
- Bike routes shall be identified by appropriate signage as found in the FHWA 'Manual of Uniform Traffic Control Devices,' as illustrated in. ~~See Figure I-2138 for examples.~~

1.174. 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 (rounded down to the nearest whole number). Remaining spaces must be served by sufficient conduit, wiring, and electrical service to allow for future installation of electric vehicle supply equipment.

1.18. MOTORCYCLE / MOPED PARKING (ON-STREET):

To distinguish motorcycle/moped parking spaces from standard parking spaces the spaces shall be painted and delineated with signage. These painted spaces shall be angled and shall be four (4) feet wide by eight (8) feet long. The dimensions for on-street motorcycle/moped parking are outlined in Figure I-31. On-street motorcycle and moped parking may also be located where standard vehicle parking would be prohibited

because of sight restrictions, such as, adjacent to a crosswalk or an approach to a traffic control device. Motorcycles/mopeds do not have the same sight impediment as a standard vehicle.

Commented [ND5]: Moved to 1.11

1.15. TRAFFIC CONTROL DEVICES SIGNALS

All intersections of two or more roadways shall be controlled by one of the traffic control methods listed herein. All traffic control shall be selected and installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

1.15.1. Traffic signals. All new traffic signals are subject to the approval of the Department of Public Works. Proposed traffic signals are required to meet at least one traffic signal warrant set by the MUTCD. Signals justified using Warrant 3 (Peak Hour Volume), Warrant 7 (Crash Experience), or Warrant 8 (Roadway Network) without meeting at least one other warrant may require additional study. Development projects that trigger, or further exceed, one or more signal warrants at one or more existing or proposed intersections or driveways may be required to install a traffic signal at those locations.

New or modified traffic signals also require the submission of a traffic signal plan, including locations of all equipment, underground utilities, a phasing and timing plans, and a specific list of all traffic signal hardware. ~~For new or modified traffic signal installations, a new plan~~ shall be submitted to the Department of Public Works for review and approval prior to installation. ~~reviewing authority for review and approval before installation can proceed.~~

New traffic signal proposals are subject to review by MaineDOT, as appropriate. All city, state, and federal guidelines with regard to installation, activation, and monitoring shall apply.

Existing traffic signals that do not meet MUTCD signal warrants may be removed if they present operational or safety issues. All removals of existing traffic signals are subject to the approval of the Department of Public Works.

The City of Portland's traffic signal specifications can be found in the City of Portland Traffic Signal Policy and Guidance Manual.

1.15.2 Stop Control. Stop signs shall be installed in accordance with MUTCD. Stop signs shall be accompanied by a stop line 12" in width.

Stop control shall not be used for speed control. Stop control should generally not be used on intersection approaches with multiple travel lanes. Stop control shall not be used for intersections with five (5) or more approaches. Such intersections shall be signalized (if warranted), equipped

with a roundabout, or otherwise realigned or regulated so that the number of approaches is reduced to four (4) or fewer.

1.15.3. Roundabouts: Where sufficient right-of-way is available, circular intersections (i.e. roundabouts or traffic circles) should be considered. Such intersections may provide operational and safety benefits compared to signalized or stop-controlled intersections. Where selected as the appropriate traffic control measure, roundabouts shall be designed in accordance with the MUTCD Chapter 3C, with signage according to MUTCD Section 2B.07. Neighborhood traffic circles may be considered at stop-controlled intersections as a traffic calming measure. All such treatments are subject to the approval of the Department of Public Works.

1.15.4. Yield Control: Yield control should generally only be implemented in the following scenarios:

- At certain channelized turning lanes separated from adjacent travel lanes by an island (even if the adjacent lanes are controlled by a stop sign or signal);
- At the entering roadway for a merging movement, including at a roundabout;
or
- Where engineering judgment determines that yield control is appropriate, subject to the approval of the Department of Public Works.

Listed below are the traffic signal items required for traffic signal installations. These items or an approved equivalent shall be provided.

1.19.1. Controller Equipment:

- Controllers shall be compatible with existing Naztec Street Wise ATMS Software
- Traffic control cabinets shall be Naztec Model M34 or P44 TS2 Type 1 Series only
- Secondary traffic controllers shall be Naztec Model 980 TS2 Type 1 Series only
- Master controllers shall be Naztec Model 981 Series only
- Malfunction management units shall be Naztec Model MMU-516E only

1.19.2. Video Detection Equipment:

- Video detection units shall be Traficon Model VIP3.1 & VIP3.2 Series only
- Video detection cameras shall be Traficon approved models only

1.19.3. Signal Equipment:

- Signal housings shall be McCain Model MTSTA or MTSTP Series only

- ~~LED modules for vehicle indications shall be GELcore Model DR6 Series only~~
- ~~LED modules for pedestrian indications shall be GELcore Model PS7 Series only~~
- ~~Accessible Pedestrian Signals shall be Campbell Advisor Series only~~

1.19.4. Traffic Structures:

- ~~Mast arms shall be Valmont SM16 or CB16 Series only~~
- ~~Strain poles shall be Valmont SW56 Series only.~~

1.1620. PUBLIC CROSSWALKS

1.16.1. Public crosswalks shall meet the requirements of The Manual on Uniform Traffic Control Devices (MUTCD), unless City standards specify a stricter measure. Public improvements may include but shall not be limited to any one or combination of the following:

- Crosswalks;
- Curb Bump Outs or Curb Extensions, where warranted;
- Pedestrian Crossing Signs (curbside, overhead or in the street);
- ~~Rectangular Rapid Flashing Beacons (RRFBs)~~ Pedestrian Activated Yellow Flashing Warning Lights;
- Pedestrian Hybrid Beacons;
- Pedestrian Activated Traffic Control Signal (Red, yellow, green); and
- Medians or raised islands

1.1620.12. Crossing locations shall be designed to the following standards unless otherwise directed by the Department of Public Works:

- Street markings: Crosswalks on public streets shall consist of 24-inch block style white lines, placed 48 inches apart on center, for an overall width of 8 feet (or wider; at least as wide as the sidewalks served by the crosswalk).
- Street lighting: Crosswalk locations shall be adequately illuminated for visibility at nighttime.
- Signage: Select crosswalk locations may need to be accentuated through the use of signage mounted curbside, overhead, or on the roadway centerline, as described hereinafter. Crosswalk signs shall be placed directly adjacent to crosswalks, and advance warning signs shall be placed in accordance with MUTCD. Standard signs shall be black legend on a fluorescent background.

Critical Physical Factors:

Walking Speed:

- This factor is applicable at signalized intersections and affects the length of the pedestrian clearance (flashing “don’t walk”) interval.
- Average walking speed is generally measured as three and a half (3.5) feet per second. In areas with elderly or young children pedestrians, a rate of three (3) feet per second is appropriate.

Vehicular Sight Distance:

- Sight distance shall be based on the posted speed plus 5 miles per hour or the 85th percentile travel speed as tabulated below.

Stopping Sight Distances (1)

Speed (mph)	Stopping Sight Distance (feet) ^a
25	155
30	200
35	250
40	305
45	360
50	425

^aAssumes level grade

Source: AASHTO Policy reference 1, Exhibit 3-1 of that publication.

- Sight distance shall be based on a driver eye height of 3.5 feet and a pedestrian height of 2.0 feet.
- Parking shall be prohibited within twenty (20) feet from the centerline of a crosswalk and within thirty (30) feet at signalized and STOP sign locations.

1.20.2. General Standards for Crosswalk Installation:

1. The Manual on Uniform Traffic Control Devices (MUTCD) provides guidance for placement of crosswalks. In addition, crosswalks should:
 - Occur where substantial pedestrian/vehicle conflicts exist. (See the Federal Highway Administration notebook titled “Traffic Conflict Techniques for Safety and Operations” which provides methods for conflict evaluation.)
 - Occur at points of pedestrian concentration that can meet applicable standards or where pedestrians may not recognize the appropriate place to cross (e.g., loading islands, mid-block pedestrian crossings).
 - Maintain suitable separation (approximately 300 feet) between

~~non-intersection or mid-block crosswalks.~~

- ~~• Be installed based on an engineering study if located other than at a STOP sign or traffic signal. For mid-block locations, a study shall evaluate factors of need including but not limited to school crossings, age of pedestrians, and nearest alternative crosswalk location as well as safety issues such as traffic speed, volume, and sight lines.~~
- ~~• Consider advance warning signage if installed at uncontrolled locations and allow for restriction of parking for adequate visibility of the advance signage.~~
- ~~• No crosswalk spacing requirements are to be imposed at intersection locations. Other engineering factors are to be reviewed in the determination of suitability of the location.~~

~~2. The Crosswalk Installation Guidelines (Figure I-24) provide criteria for guiding evaluations of when crosswalks may be desirable at uncontrolled locations based on pedestrian and vehicular volumes. Crosswalks at uncontrolled locations shall be placed where these criteria are met, or where special requirements and/or plans exist that support the installation of a crosswalk.~~

~~3. Crosswalks proposed at signalized intersections shall include pedestrian signal indications for substantial pedestrian crossings.¹ Each proposed location shall be evaluated based on through traffic volumes, turning vehicle volumes and signal phasing to determine which legs of the intersection are most appropriate for pedestrian crossings.~~

~~The default assumption is that crosswalks shall be provided on all intersection approaches and supplemental analysis must be provided that identifies specific engineering conclusions on why this cannot be accomplished.~~

¹ Design and Safety of Pedestrian Facilities, 1998, ITE Technical Committee 5A-5

~~4. Marked crosswalks across stop-controlled intersection approaches shall be considered where vehicular traffic may block pedestrian traffic². This will be assessed based on a visual observation of vehicular and pedestrian traffic flow at the intersection to determine if there is sufficient vehicular traffic to block the pedestrian crossing path for a significant period of time.~~

1.20.3. Design Criteria:

~~Street Markings: Crosswalks on public streets shall use a minimum of eight (8)-inch wide solid white lines, which should be spaced to provide a minimum overall width of eight (8) feet. Wider line width is required for locations with higher posted speeds as shown below. Paint, wherever used, shall meet Maine Department of Transportation (Maine DOT) specifications. Additional designs may consist of longitudinal lines. Figure I-21 illustrates these typical crosswalk markings and the table below provides dimensions utilized in the City of Portland for various applications.~~

Crosswalk Dimensions

Type	Overall Width	Line Width	Spacing
Standard Crosswalk Marking (two lines)			
Posted Speed $\leq$ 35 mph	8'	8"	N.A.
Posted Speed $>$ 35 mph	8'	12"	N.A.
Crosswalk with Longitudinal Lines (block style) (See Pedestrian Crossing Distances table)	8'	24"	Spacing 4'-6'-6'

~~The longitudinal or block style striping of crosswalks should be reserved for use at the following locations (see Pedestrian Crossing Distances table):~~

- ~~• Uncontrolled locations of special significance, such as school walking routes, trail/shared use paths and mid-block crossings;~~
- ~~• High volume pedestrian locations with at least 25 pedestrian crossings for each 4 hours or 40 crossings during the peak hour; and~~
- ~~• High vehicle speed ($>$ 35 mph posted speed) crossings.~~

- ~~1. Street Lighting: Crosswalk locations shall be adequately illuminated for night time use.~~

^a ~~Pedestrian Facilities Users Guide, March 2002, USDOT – FHWA~~

- ~~2. Signage: Select crosswalk locations may need to be accentuated through the use of signage mounted curbside, overhead, or on the road centerline, as described below:~~
- ~~3. Curbside Signs: There are three standard curbside signs consisting of a crosswalk warning sign, a school crossing warning sign, and an advance warning pedestrian crossing sign. The City of Portland also installs “yield for pedestrians” signs at crosswalks, as shown in Figures I-22 and I-23. Crosswalk signs shall be placed directly adjacent to~~

~~crosswalks and advance warning signs shall be placed in accordance with the MUTCD guidelines as shown below.~~

Advance Warning Sign Placement (2)

85th Percentile Speed* (mph)	Advance Placement (feet)
25	125**
30	125**
35	125**
40	125
45	175

*or the posted speed when a speed study is not available.

**recommended minimum for the City of Portland

Source: Table 2C-4 of the MUTCD.

~~1.20.4. Standard signs shall be black legend on a yellow background. The MUTCD also allows the use of a yellow-green fluorescent high grade reflective background for increased visibility. These higher grade signs shall be used where locations meet at least one of the following criteria:~~

- ~~• Vehicle 85th percentile speeds or the posted speed is greater than or equal to 35 mph;~~
- ~~• Pedestrian crossing volume of at least 25 per hour for four hours or~~
- ~~• 40 during the peak hour; or~~
- ~~• School crossing.~~

- ~~1. Overhead Signs and Flashing Warning Lights: Overhead signs supplemented with pedestrian activated flashers may be placed at high volume pedestrian crossing locations or where specific pedestrian safety issues have been identified.~~
- ~~2. Centerline Signs: Centerline signs shall be able to withstand vehicle impact without damage to the vehicle and with minimal damage to the device and shall be anchored in place. Note that these devices must be removed without damaging the pavement prior to the start of winter season. The City recommends a device with a base anchored to the pavement with epoxy and a flexible upright paddle that is replaceable. The following criteria should be considered for these devices to be utilized:~~

- ~~• Presence of a high crash location (HCL) as defined by Maine DOT: Both of the following criteria must be met in order to be classified as an HCL:~~
 - ~~○ A critical rate factor of 1.00 or more for a three-year period. (A Critical Rate Factor (CRF) compares the actual accident rate to the rate for similar intersections in the State; and~~

~~0 – A minimum of eight (8) accidents over a three (3) year period.~~

- ~~• Principal or minor arterial, as identified in Figure 24.~~
- ~~• At least 25 pedestrian crossings per hour for four (4) hours or 40 pedestrian crossings for the peak hour.~~

~~1.20.5. Traffic Control Signals: The following provides general guidance concerning installation of a pedestrian-activated red-yellow-green traffic control signal. The MUTCD should be consulted for specific details:~~

- ~~• The location is a school crossing and a traffic engineering study reveals that there are not adequate gaps in the traffic stream; or~~
- ~~• There are 107 pedestrian crossings for each of four (4) hours or 133 crossings during any one hour and under both conditions for high-volume roadways. Higher rates of pedestrian crossings are necessary for lower volume streets. The number of pedestrians may be reduced by 50% where they are predominantly elderly or young children to include crossing locations along school walking routes for elementary and middle school students.~~

~~1.20.6. Specific Guidelines for Crosswalk Use: The City of Portland has established the following guidelines for pedestrian street crossing devices:~~

Pedestrian Crossing Devices

Device	Use*
Crosswalk	
8" lines, 8' total width	Where volume criteria of Figure I-25 are met and speeds are less than 35 mph and at signalized intersections.
12" lines, 8' total width	At all unsignalized locations where volume criteria of Figure I-25 are met and speeds are between 35 and 45 mph.
24" block-style lines, 8' width	At mid-block locations where volume criteria of Figure I-25 are met and speeds are between 35 and 45 mph, at all school and trail/shared use path crossings and as noted in 1.20.3 (Design Criteria) above or at uncontrolled locations as determined by the Traffic Engineer.
Curbside signs	
Advance Crossing Signs	For all mid-block crosswalks and other uncontrolled locations as determined by Traffic Engineer.
Standard Grade Crossing Sign	At all locations where crosswalk lines alone are not sufficient to define the crossing location to motorists at the discretion of the Crosswalk Committee.
High Grade Crossing Sign	Speed greater than or equal to 35 mph; or 25 pedestrians crossing per hour for four hours or 40 pedestrians crossing for the peak hour
School Crossing Sign	In accordance with MUTCD

Other	
Overhead Signs/Flashers	On arterial roadways or roadways with at least two lanes of traffic in at
Centerline Signs	As noted in 1.20.4 above.
Traffic Control Signal	Consider at locations meeting MUTCD warrants for school crossings or

**All speeds are 85th percentile speeds for off-peak daytime periods or the posted speed.*

1.1721. PUBLIC TRANSIT FACILITIES

Where required, public transit facilities shall meet the following standards:

1.1721.1. Transit Pullout Bays:

- Transit pullout bays shall be located in the City right-of-way along the property frontage; or
- Where space constraints prevent locating a transit pullout bay along the property frontage, transit pullout bays may be located within reasonable walking distance of the site.
- Where possible, transit pullout bays shall be located at intersections. At signalized intersections, far-side bus stops are preferred. Mid-block bays are not preferred due to impacts to parking and traffic.
- The design of the pullout bay shall provide adequate space for vehicles to maneuver through facilities without causing damage to either the vehicles or facilities, as detailed ~~in Section I of the Technical Manual~~ herein.

1.1721.2. Transit Shelters:

1. Transit shelters shall be located within the site, directly adjacent to the right-of-way on which the public transportation route is established; or
2. Where site constraints prevent locating a transit shelter on the site, it shall be located within a public sidewalk area along the property frontage. If a transit shelter is to be located within a public sidewalk area, City sidewalk clearance requirements shall apply.
3. Where space constraints prevent locating a transit shelter within a public sidewalk area along the property frontage, it may be located within reasonable walking distance of the site.
4. Installation and ongoing maintenance of transit shelters on private property shall be the responsibility of the property owner. Ongoing maintenance of transit shelters located within the City right-of-way

or within an easement held by the City shall be the responsibility of the City or of the local or regional transit authority serving the facility.

1. ~~1.724~~.3. Where necessary, developments shall provide easements to the City, sufficient in size to accommodate public transit infrastructure and access to the transit stop.

1.22. CONSTRUCTION PERMITTING AND TRAFFIC CONTROL PLANS

1.22.1. Construction activity in the public right-of-way is controlled by Chapter 25 Article VII of the City Code of Ordinances. Required licenses and permits, restrictions on activity, and fees & charges are all outlined in that Chapter. Rules and Regulations for Excavation Activity are available through the Street Opening Clerk at the Department of Public Services.

1.22.2. Sewer and stormwater system connections are controlled by Chapters 24 and 32 of the City Code of Ordinance. Required permits for new connections and/or abandonment of existing connections are available through the Street Opening Clerk at the Department of Public Services. Rules and Regulations for these utility systems are available through the City Engineer's office of the Department of Public Services. See also Section II of the Technical Manual for lateral abandonment requirements associated with demolition permits.

1.22.3. Traffic Control Plans: Construction activity that impacts the existing public street system must be controlled to protect the safety of the construction workers and all modes of the traveling public. Projects that will occur along arterial and/or collector streets are required to submit a satisfactory 'maintenance of traffic' (MOT) plan prior to any site plan, subdivision, or street opening permit approval.

Maintenance of Traffic (MOT) plans shall provide for the safe passage of the public through or along the construction work zone. On a case-by-case basis applicants may be allowed to close a street and/or detour a mode of traffic when absolutely necessary for safety. MOT plans shall employ the appropriate techniques and devices as called for in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). In addition:

- Construction speed signing may be used as needed to slow traffic
- Traffic Control signs shall not be placed where they are an obstruction to bicycles or pedestrians.
- In extreme situations, flaggers may be required to allow for safe pedestrian and bicycle movement

1.22.4. All existing modes of travel in the work zone area shall be accommodated if

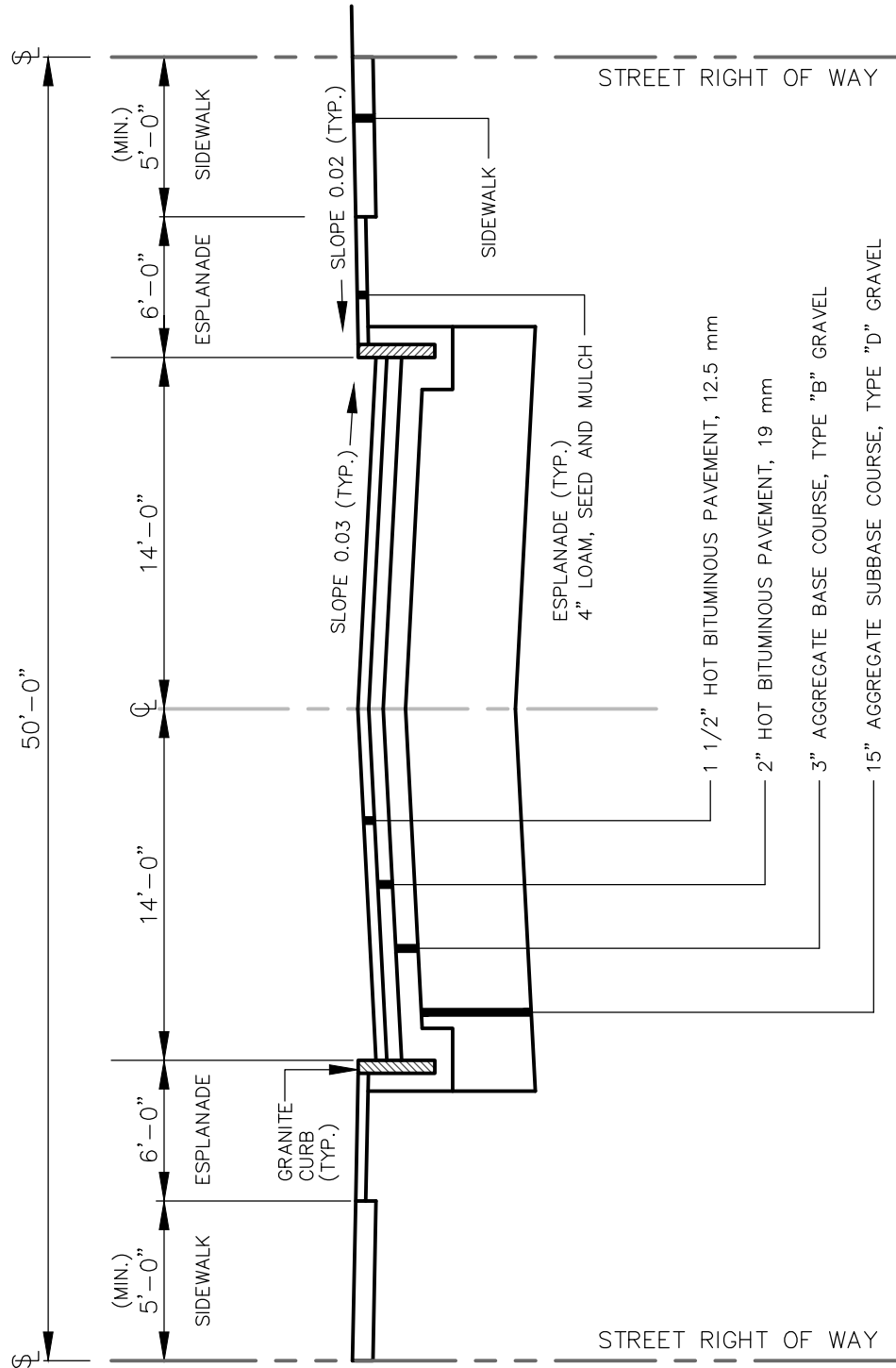
impacted by the activity. The safe passage of pedestrians, bicyclists, transit providers, and motorists are of equal importance when planning out the work zone; no pre-existing travel mode may be eliminated without the express approval of the Department of Public Services.

- Traffic control for bicycle and pedestrian facilities or routes through work zones shall be maintained until the bicycle and pedestrian facilities or routes are ready for safe operation. Traffic control will not be removed to allow auto travel at the expense of bicycles and pedestrians.
- Barrier systems utilized to separate the construction activity from the public street and/or sidewalk shall not inhibit sight distances, particularly for visibility of pedestrians and bicyclists.

1.22.5. Use of public parking spaces or the blockage of any portion of sidewalk for the purpose of construction activity shall require an occupancy permit and appropriate fee as assessed by the Department of Public Services.

Commented [ND6]: Moved to Section 17.

Name of Detail	June 2022 Proposed	
	2014 Detail Number	Detail Number
LOCAL STREET CROSS SECTION	I-1	I-1
COLLECTOR STREET CROSS SECTION	I-2	I-2
ARTERIAL STREET CROSS SECTION	I-3	I-3
UTILITY LOCATIONS IN STREETS	I-4	I-4
TURNAROUND ON DEAD END STREET	I-5	I-5
ACCESSIBLE RAMP GENERAL NOTES		I-6
PERPENDICULAR RAMP FOR WIDE SIDEWALK WITH NO ESPLANE	I-6A	I-6A
APEX PEDESTRIAN RAMP FOR SIDEWALK LESS THAN 6.5' WIDE		I-6B
APEX PEDESTRIAN RAMP FOR SIDEWALK 6.5' WIDE AND GREATER		I-6C
SIDE STREET PEDESTRIAN RAMP WHEN NO INTERSECTING SIDEWALK IS PRESENT		I-6D
RAMP LENGTH TABLE		I-6E
PEDESTRIAN RAMP REQUIREMENTS		I-6F
ISLAND PEDESTRIAN CROSSINGS		I-6G
PARALLEL ADA RAMP LAYOUT FOR NARROW SIDEWALK WITH NO ESPLANE	I-6B	
PERPENDICULAR RAMP FOR NARROW SIDEWALK WITH ESPLANE	I-6C	
DIAGONAL SIDEWALK RAMP LAYOUT FOR SIDEWALK WITH ESPLANE	I-6D	
PREFERRED SIDEWALK RAMP LOCATION AT INTERSECTION	I-6E	
SIDEWALK RAMP DETECTABLE WARNING PANEL	I-7	I-7
SIDEWALK RAMP DETECTABLE WARNING PANEL (HISTORIC DISTRICT)	I-7A	
GRANITE STREET MONUMENT	I-8	I-8
DRIVEWAY APRON LAYOUT	I-9	I-9A
DRIVEWAY APRON LAYOUT COMMERCIAL/INDUSTRIAL		I-9B
DRIVEWAY APRON AT CONSTRAINED SIDEWALK 6.5' OR LESS		I-9C
DRIVEWAY APRON LAYOUT ALONG STREET FRONTAGE WITHOUT PED ACCESS		I-9D
BRICK SIDEWALK WITH BITUMINOUS BASE	I-10	I-11A
BRICK DRIVEWAY APRON WITH BITUMINOUS BASE	I-11	I-10A
BITUMINOUS SIDEWALK	I-12	I-11C
BITUMINOUS DRIVEWAY APRON	I-13	I-10C
REINFORCED CONCRETE SIDEWALK	I-14	I-11B
REINFORCED CONCRETE DRIVEWAY APRON	I-15	I-10B
SIDEWALK EXPANSION JOINT		I-11D
VERTICAL GRANITE CURB FULL DEPTH STREET CONSTRUCTION	I-16	I-12
VERTICAL GRANITE CURB INSTALLATION IN EXISTING STREETS	I-17	
SLOPED GRANITE CURB FULL DEPTH STREET CONSTRUCTION	I-18	I-13
SLOPED GRANITE CURB INSTALLATION IN EXISTING STREETS	I-19	
MOUNTABLE BEVLED GRANITE CURB		I-15
GRANITE RADIUS CURB		I-14
SLIPFORM CONCRETE CURB		I-16
TYPICAL CROSSWALK MARKINGS	I-22	I-19
VEHICLE PARKING DIMENSIONS	I-27	I-17
MOTORCYCLE PARKING	I-31	I-18
BIKE LANE CROSS SECTION WITH NO PARKING		I-20A
BIKE LANE CROSS SECTION WITH PARKING		I-20B
TYPICAL BICYCLE LANE PAVEMENT MARKINGS AND BICYCLE ROUTE SIGNAGE	I-38	I-21
BUS STOP BOARDING AREA LAYOUT FOR SIDEWALK WITH OR WITHOUT ESPLANE	I-39	I-39
BUS SHELTER AND SHELTER SITING LAYOUT FOR SIDEWALK WITHOUT ESPLANE	I-40	I-40



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JUNE 2022

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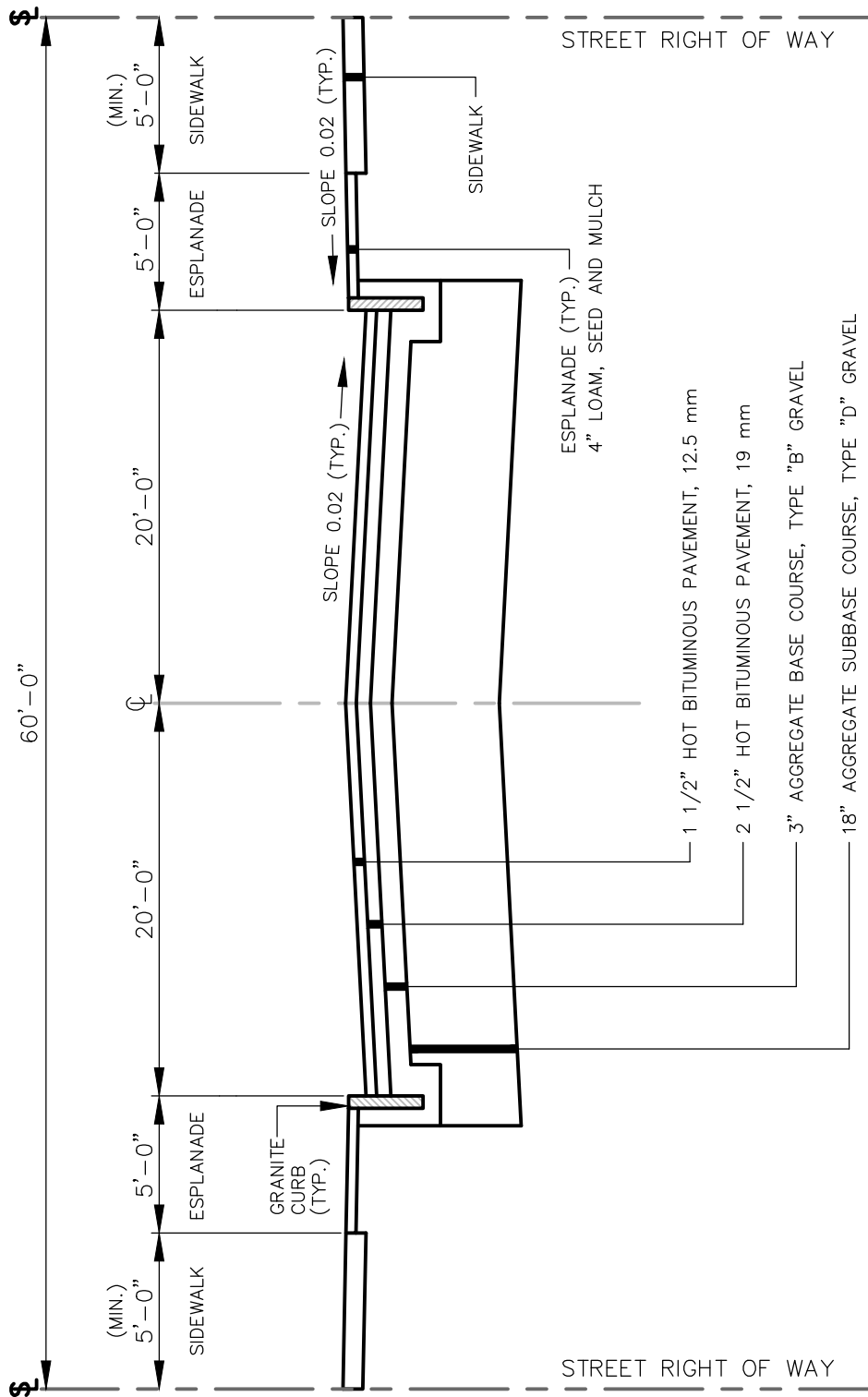
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

LOCAL STREET CROSS SECTION

I-1



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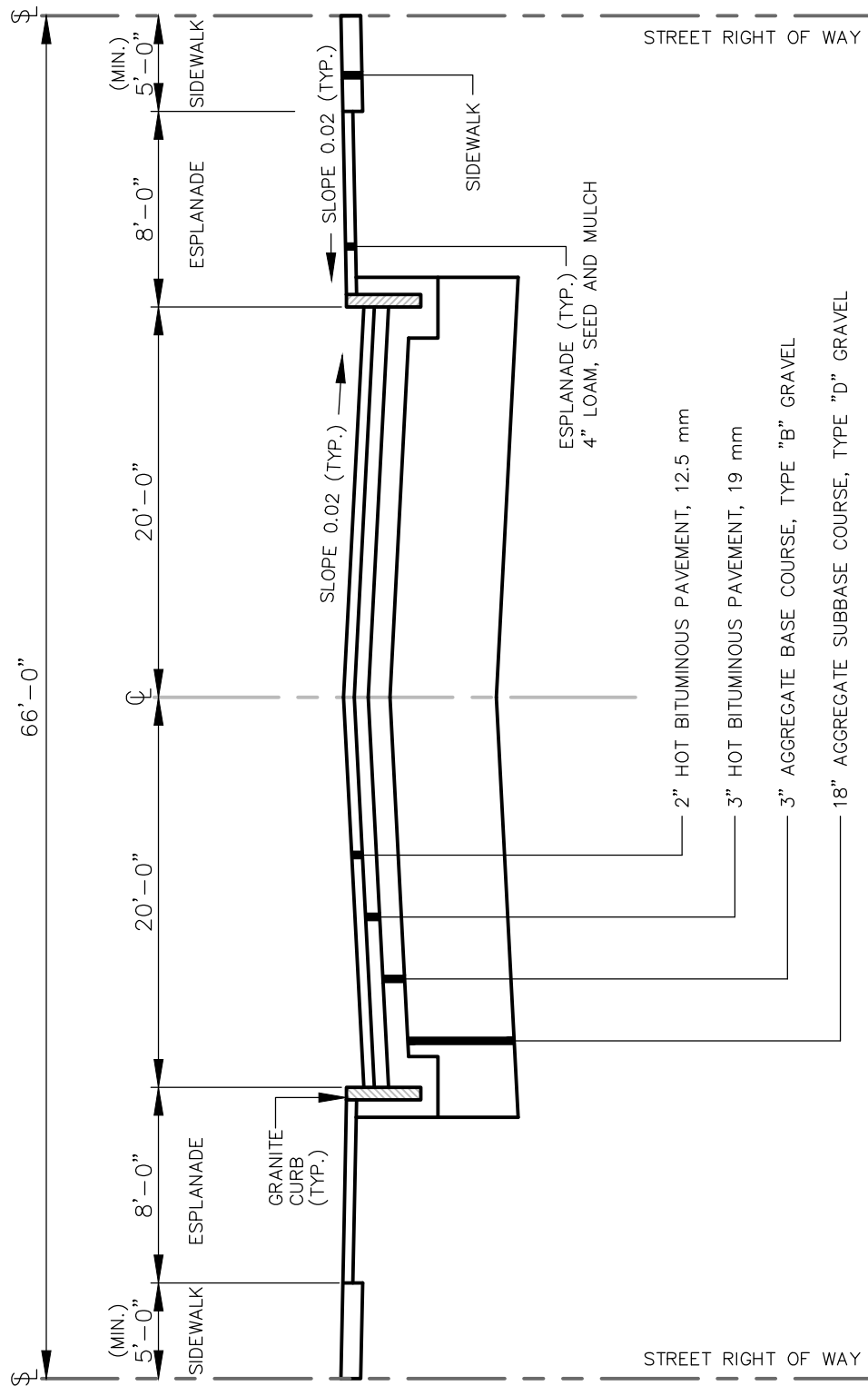
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

COLLECTOR STREET CROSS SECTION

I-2



ARTERIAL STREET CROSS SECTION

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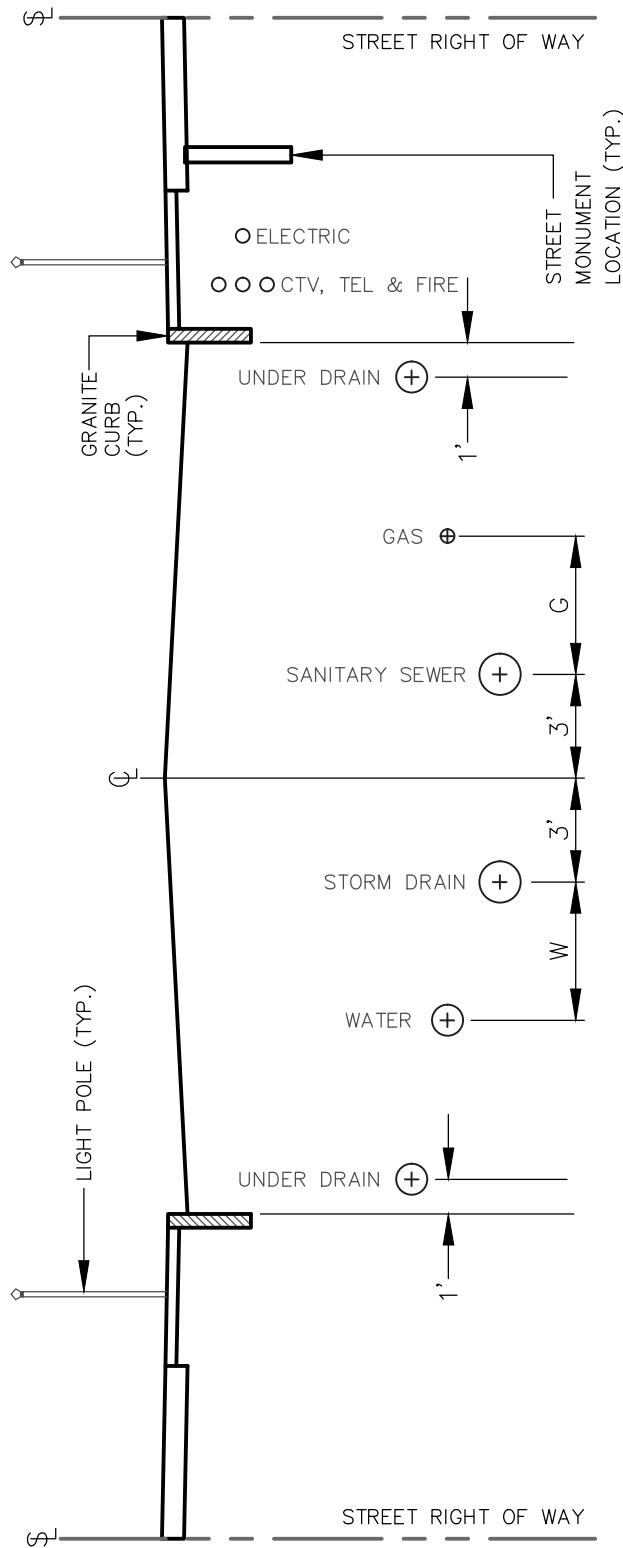
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**TRANSPORTATION
DESIGN STANDARDS
SECTION I**

FIGURE:

ARTERIAL STREET CROSS SECTION

I-3



NOTES:

1. DEPTH OF SANITARY SEWER AND STORM DRAIN PER CITY ENGINEER.
2. DEPTH OF UNDER DRAIN SHALL BE 3'-6" FROM GUTTER LINE TO PIPE INVERT.
3. DEPTHS OF ELECTRIC, TELEPHONE, CABLE TELEVISION AND FIRE TO BE AT LEAST 36 INCHES BELOW FINISH GRADE. DEPTHS OF OTHER UTILITIES PER REQUIREMENTS OF APPLICABLE UTILITY COMPANY. WHEN TREES ARE PROPOSED FOR THE ESPLANADE, THE UTILITIES DESIGNATED FOR THAT LOCATION SHALL MAKE NECESSARY PROVISIONS.
4. APPLICABLE WARNING TAPE SHALL BE PLACED OVER EACH UTILITY.
5. RIGID PVC CONDUIT IS REQUIRED FOR STREET AND DRIVEWAY CROSSINGS AND OTHER PAVEMENT CROSSINGS MORE THAN 12 FEET IN LENGTH. CONDUITS CROSSING STREETS SHALL BE ENCASED IN CONCRETE.
6. UTILITY MANHOLES SHALL NOT BE LOCATED WITHIN TRAVEL LANE VEHICLE TRACKING TO THE EXTENT POSSIBLE.

STREET CLASSIFICATION	R.O.W. WIDTH (ft.)	UTILITY LOCATION DIMENSIONS	
		W (ft.)	G (ft.)
LOCAL	50	5	5
COLLECTOR	60	7	7
ARTERIAL	66	8	8

UTILITY LOCATIONS IN STREETS

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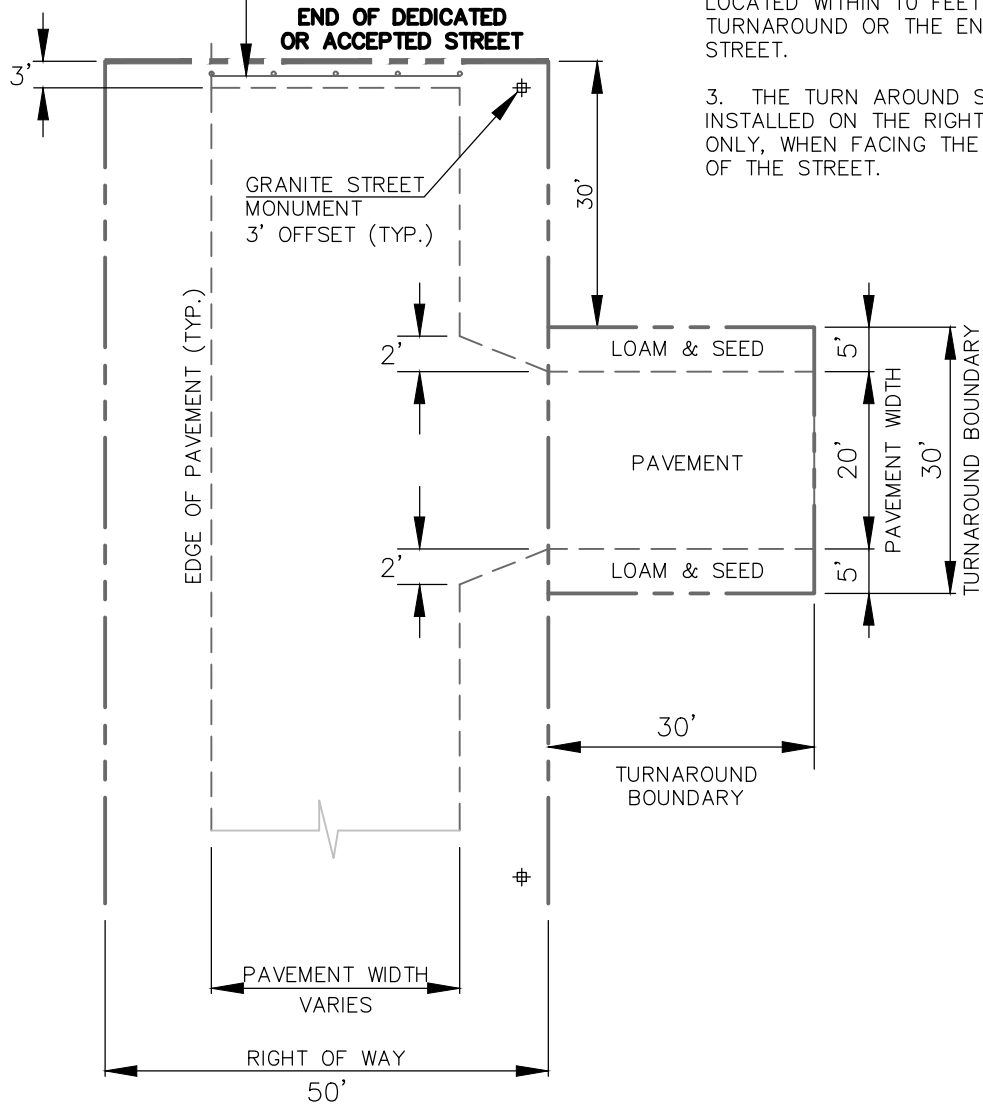
TRANSPORTATION
DESIGN STANDARDS
SECTION I

FIGURE:

I-4

UTILITY LOCATIONS IN STREETS

GALVANIZED STEEL OR PRESSURE
TREATED WOOD GUARDRAIL
WITH OM4-2 END OF ROADWAY
MARKER SIGN OR APPROVED
EQUAL



NOTES

1. A TURNAROUND EASEMENT SHALL BE CONVEYED TO THE CITY.
2. NO DRIVEWAYS SHALL BE LOCATED WITHIN 10 FEET OF THE TURNAROUND OR THE END OF THE STREET.
3. THE TURN AROUND SHALL BE INSTALLED ON THE RIGHT SIDE ONLY, WHEN FACING THE DEAD END OF THE STREET.

TURNAROUND ON DEAD END STREET

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TECHNICAL STANDARDS MANUAL

**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

TURNAROUND ON DEAD END STREET

I-5

GENERAL NOTES

1. DESIGN OF ACCESSIBLE RAMPS AND ASSOCIATED FACILITIES ARE GOVERNED BY THE 2010 AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS FOR ACCESSIBLE DESIGN, WHICH IS DETAILED IN DOJ SECTION 28 CFR 35.151. ADDITIONAL GUIDANCE AND INFORMATION CAN BE FOUND IN THE PROPOSED PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES PUBLISHED BY THE U.S. ACCESS BOARD. IN ANY CASE WHERE THE DESIGN REQUIREMENTS ARE MORE STRINGENT BETWEEN ADA STANDARDS AND CITY REQUIREMENTS, THE ADA STANDARDS SHALL GOVERN.
2. SIDEWALKS SHALL BE CONSTRUCTED IN BRICK, CONCRETE, OR BITUMINOUS, ACCORDING TO THE SIDEWALK & DRIVEWAY APRON MATERIALS POLICY, UNLESS DIRECTED OTHERWISE BY THE CITY ENGINEER.
3. SIDEWALKS AND RAMPS SHALL BE BUILT ACCORDING TO THE FOLLOWING DIMENSIONS AND GRADES:
SIDEWALK RUNNING SLOPE: MATCH ADJACENT STREET GRADE
SIDEWALK CROSS SLOPE: 1.0% MINIMUM, 2.0% MAXIMUM
SIDEWALK WIDTH: 5'-0" MINIMUM, WIDER PREFERRED
ESPLANADE (WHERE PROVIDED) 2'-0" MINIMUM, 4'-0" OR GREATER PREFERRED IF LANDSCAPED.
4. TWO CURB RAMPS ARE REQUIRED AT EACH SIDEWALK CORNER. EACH CURB RAMP SHALL CONNECT THE PEDESTRIAN ACCESS ROUTE AT EACH PEDESTRIAN STREET CROSSING. IN ALTERATIONS WHERE PHYSICAL CONSTRAINTS PREVENT TWO CURB RAMPS FROM BEING INSTALLED AT A STREET CORNER, A SINGLE PEDESTRIAN CURB RAMP MAY BE PERMITTED.
5. OPPOSING CURB RAMPS AT A SINGLE CROSSING SHALL ALIGN TO PROVIDE A STRAIGHT PATH OF TRAVEL FROM THE TOP OF THE RAMP TO THE CURB RAMP ON THE OPPOSITE SIDE OF THE ROADWAY TO THE MAXIMUM EXTENT FEASIBLE.
6. ALL SIDEWALKS AND RAMPS SHALL DRAIN TOWARD THE STREET, DRIVEWAY, OR PARKING AREA, WITH A MAXIMUM CROSS SLOPE OF 2.0%.
7. LEVEL LANDINGS (NO GREATER THAN 2.0% SLOPE IN ANY DIRECTION) AT THE BOTTOM OF PERPENDICULAR RAMPS SHALL BE WHOLLY CONTAINED WITHIN MARKED CROSSWALKS.
8. PONDING SHALL NOT BE PERMITTED WITHIN THE CURB RAMP LIMITS. RAMPS SHALL NOT ALTER ROADWAY DRAINAGE PATTERNS.
9. TRANSITION FROM RAMPS TO WALKS OR STREET SURFACE SHALL BE FLUSH AND FREE OF ABRUPT CHANGES. PAVEMENT AT THE STREET SURFACE SHALL BE MILLED TO ACHIEVE FLUSH CONDITION.
10. CURB RAMP AND FORM WORK SLOPES SHALL BE CHECKED WITH A DIGITAL LEVEL OF AN APPROPRIATE LENGTH. NO PORTION OF A RAMP RUN SHALL EXCEED THE MAXIMUM SLOPE REQUIREMENT.
11. THE COUNTER SLOPE WITHIN 2' OF THE CURB RAMP SHALL BE 5% MAXIMUM. IN ALTERATIONS, IF THE COUNTER SLOPE OF 5% MAXIMUM CANNOT BE ACHIEVED, THE SLOPE ELEVATION MAY BE ADJUSTED SO THAT THE COMBINED COUNTER SLOPE AND RAMP SLOPE DO NOT EXCEED 13.3%.
12. VERTICAL DROP-OFF EDGES TO RAMPS SHALL NOT BE BUILT UNLESS THE RAMP ABUTS AN ESPLANADE OR OTHER AREA NOT TO BE USED BY PEDESTRIANS.
13. AT MARKED CROSSWALKS, THE FULL WIDTH OF THE RAMP OR LANDING SHALL BE CONTAINED WITHIN THE PAVEMENT MARKINGS.
14. TACTILE WARNING PANELS SHALL BE PROVIDED ON ALL RAMPS AS PER FIGURE I-7 (OR I-7A) OF THESE STANDARD DETAILS.
15. RAMP FLARES SHOULD BE LOCATED OUTSIDE THE DIRECT LINE OF TRAVEL MOST LIKELY TO BE FOLLOWED BY THE VISUALLY IMPAIRED.
16. SIGNS, POLES, PLANTERS, MAILBOXES, ETC. SHALL NOT BE LOCATED WHERE THEY WILL INTERFERE WITH THE USE OF SIDEWALK RAMPS. UTILITY POLES MAY BE INCORPORATED INTO THE FLARES OF THE CURB RAMP.
17. SIDEWALK RAMPS SHALL NOT BE LOCATED WHERE USERS MUST CROSS DROP INLET GRATES, MANHOLE COVERS, OR OTHER ACCESS LIDS. IF THIS CANNOT BE AVOIDED, THEN GRATE DESIGN AND PLACEMENT SHALL CONFORM TO ADA REQUIREMENTS.
18. THE PUBLIC SIDEWALK CURB RAMP STANDARDS DEPICTED HERE MAY NOT BE APPROPRIATE FOR ALL LOCATIONS. FIELD CONDITIONS AT INDIVIDUAL LOCATIONS MAY REQUIRE SPECIFIC DESIGNS. RAMP DESIGNS THAT ARE COMPLIANT WITH ADA BUT NOT LISTED IN THESE DETAILS MAY BE APPROVED BY THE CITY ENGINEER.
19. DESIGNS MUST BE CONSISTENT WITH THE PROVISIONS OF THESE DETAILS AND TO ADA GUIDELINES TO THE MAXIMUM EXTENT FEASIBLE ON ALTERATION PROJECTS, AND WHEN STRUCTURALLY PRACTICABLE ON NEW CONSTRUCTION PROJECTS AS REQUIRED BY THE ADA ACCESSIBILITY GUIDELINES.
20. MAXIMUMS AND MINIMUMS DO NOT HAVE TOLERANCES AND ARE NOT TO BE EXCEEDED OR UNMET.
21. THE STANDARD TURNING SPACE (LEVEL LANDING) IS 4'-0" X 4'-0" SLOPING NO MORE THAN 2.0%. WHERE THE TURNING SPACE SHALL BE 4'-0" MINIMUM BY 5'-0" MINIMUM. THE 5'-0" DIMENSION SHALL BE PROVIDED IN THE DIRECTION OF THE RAMP RUN.
22. DETECTABLE WARNINGS SHALL BE INSTALLED AT ALL SIGNED OR SIGNALIZED INTERSECTIONS. THEY SHALL HAVE A TRUNCATED DOME SURFACE. THE DOMES SHALL BE IN A SQUARE PATTERN AND ALIGNED WITH PEDESTRIAN TRAFFIC WHERE POSSIBLE.
23. DETECTABLE WARNINGS SHALL SPAN THE WIDTH OF THE PEDESTRIAN RAMP. SEE STANDARD DETAIL FIGURE I-7 (I-7A).
24. ALL DETECTABLE WARNING FIELDS PLACED AT THE SAME INTERSECTION SHALL BE MADE UP OF THE SAME UNIFORM MATERIAL TYPE. DETECTABLE WARNINGS SHALL BE CONTRASTING IN COLOR TO THE ADJACENT WALKWAY.
25. A RAMP WITH A RUNNING SLOPE LESS THAN 5.0% IS DEFINED AS A "BLENDED TRANSITION". BLENDED TRANSITIONS DO NOT REQUIRE A LEVEL LANDING AT THE TOP OF THE RAMP.
26. THE RAMP LENGTH SHALL NOT EXCEED 15 FEET. ADJUST RAMP LENGTH OR SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
27. ALL CURB RAMP JOINTS AND GRADE BREAKS SHALL BE FLUSH.
28. RAMP GRADE BREAKS SHALL BE PERPENDICULAR TO THE RUNNING SLOPE.
29. THERE SHALL BE A MINIMUM OF 12" AGGREGATE SUBBASE COURSE - GRAVEL UNDER THE SIDEWALK SURFACE ON PEDESTRIAN RAMPS.
30. DRAINAGE STRUCTURES, UTILITY POLES, TRAFFIC SIGNAL EQUIPMENT OR OTHER OBSTRUCTIONS SHALL NOT BE INSTALLED IN THE CURB RAMP OR TURNING SPACE AREAS.
31. BEFORE RETROFITTING RAMPS, THE CONTRACTOR SHALL VERIFY REMOVAL LIMITS ARE SUFFICIENT TO PROVIDE POSITIVE DRAINAGE, MAINTAIN EXISTING DRAINAGE PATTERNS AND AVOID PONDING IN THE FINAL CONFIGURATION.
32. A TEMPORARY PEDESTRIAN ACCESS ROUTE SHALL BE PROVIDED WHENEVER THE EXISTING PEDESTRIAN ACCESS ROUTE IN THE PUBLIC RIGHT OF WAY IS BLOCKED BY CONSTRUCTION, ALTERATION, MAINTENANCE OR OTHER TEMPORARY CONDITIONS. REFER TO MUTCD FOR GUIDANCE.

DATE:
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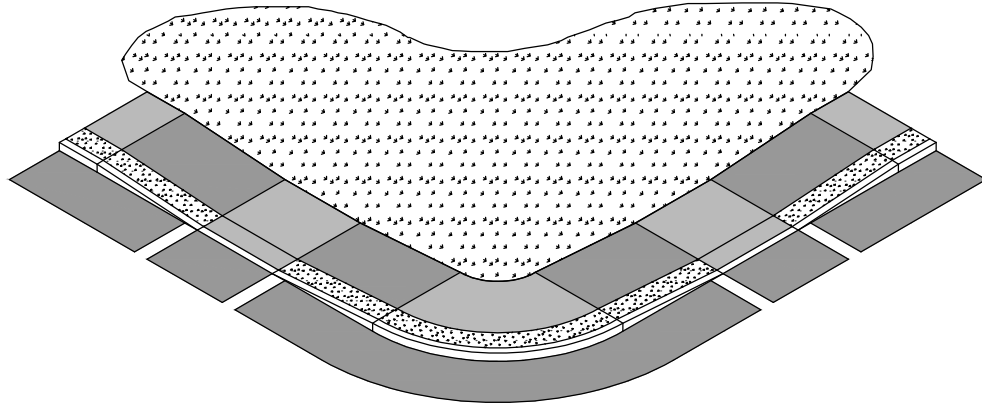
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DESIGN STANDARDS**
SECTION I

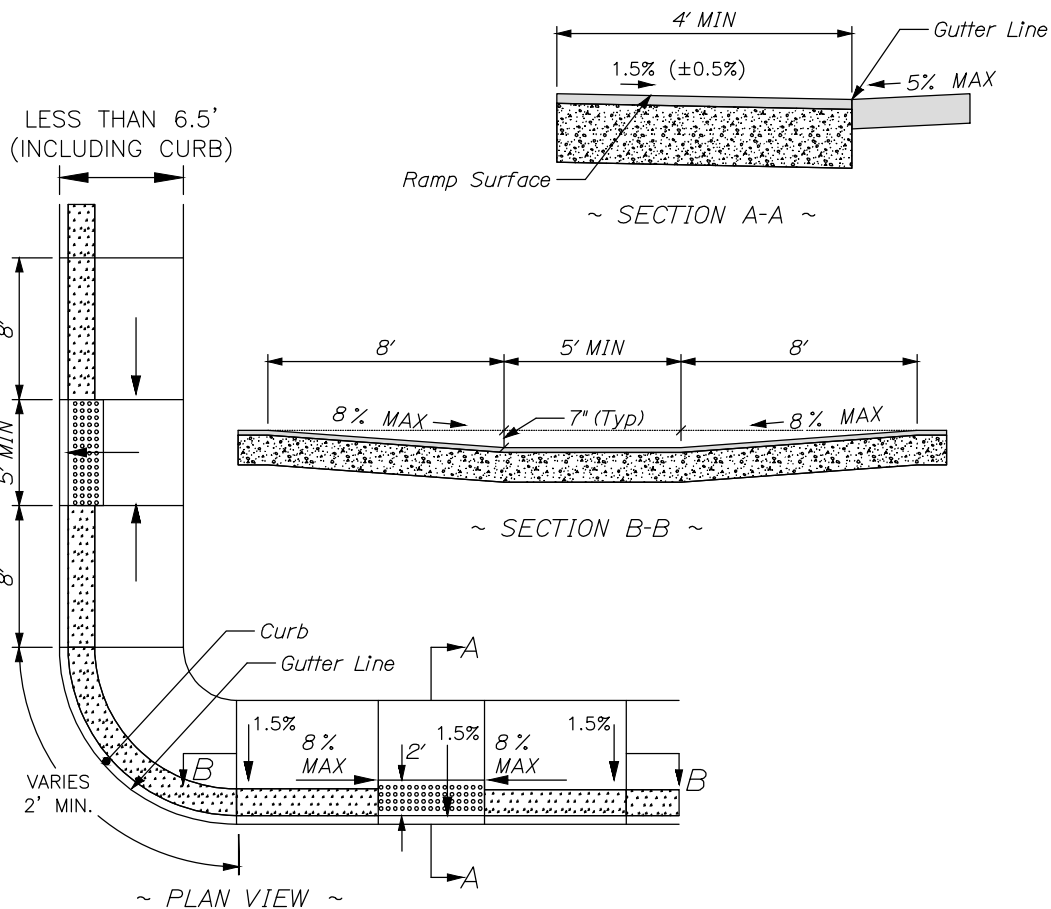
FIGURE:

**ACCESSIBLE RAMP
GENERAL NOTES**

I-6



~ ISOMETRIC VIEW ~
(NOT TO SCALE)



NOTES:

1. THIS DESIGN IS THE PREFERRED OPTION WHEN THE SIDEWALK & ESPLANADE WIDTH IS LESS THAN 6.5'. USE OTHER OPTIONS ONLY WHEN REQUIRED BY DESIGN CONSTRAINTS.
2. A MINIMUM CURB REVEAL OF 4" IS REQUIRED AT THE APEX OF THE CURB RADIUS.
3. MINIMUM TERMINAL CURB LENGTH SHALL BE 4 FEET.
4. SIDEWALK MATERIAL PER CITY SIDEWALK MATERIAL POLICY.

**PARALLEL ADA RAMP — SIDEWALK LESS THAN 6.5' WIDE
WITH OR WITHOUT ESPLANADE**

NOT TO SCALE

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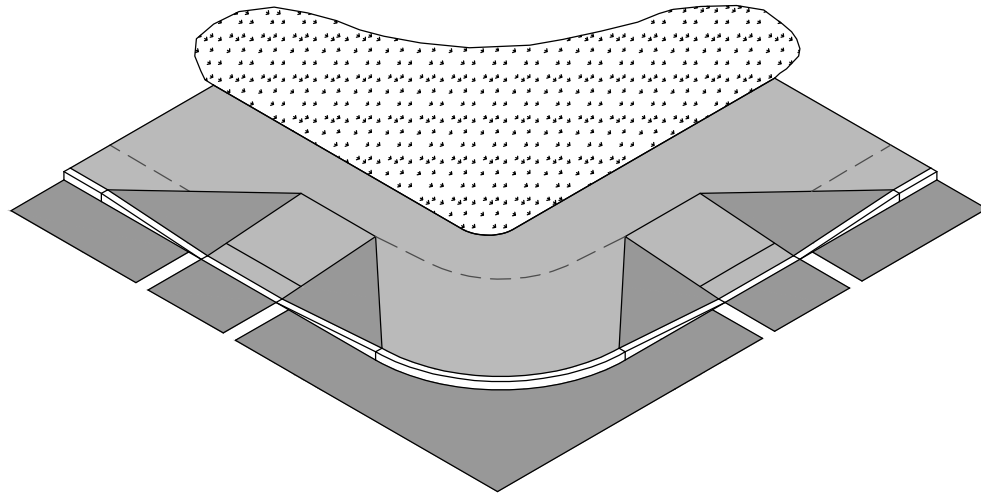
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

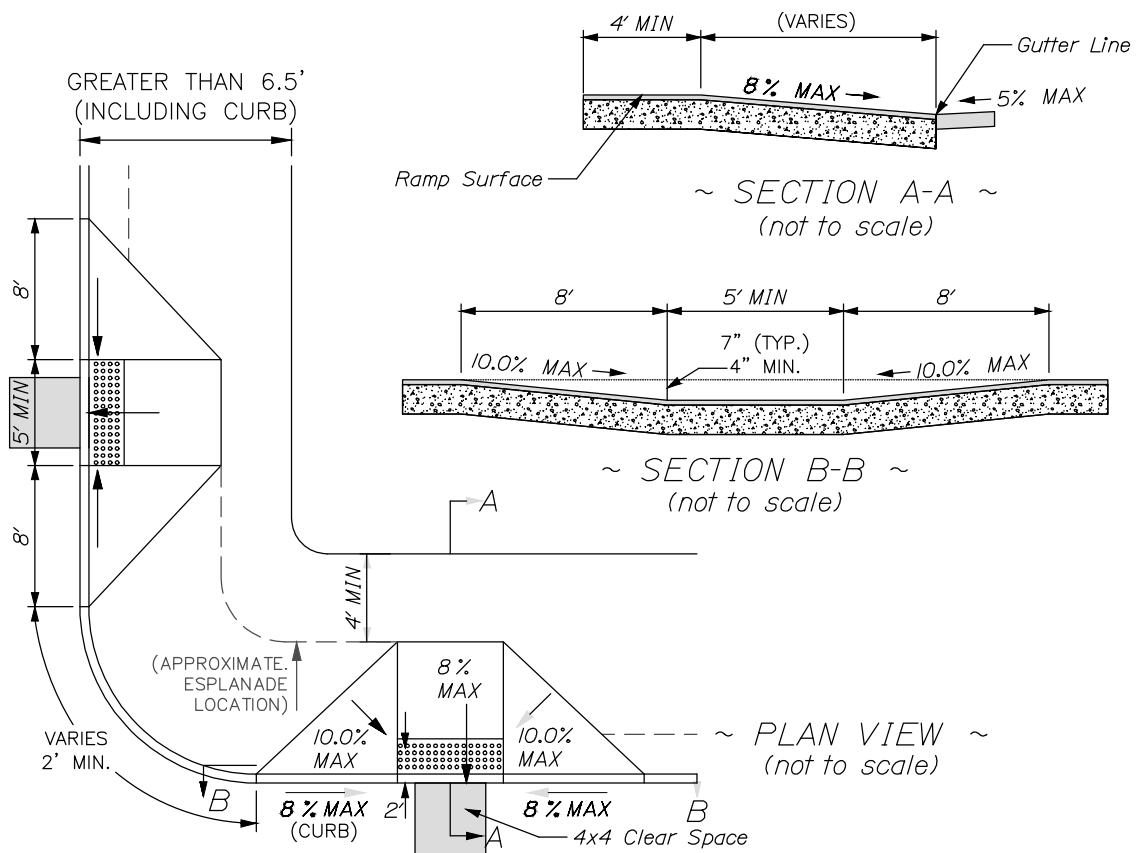
**PARALLEL ADA RAMP FOR SIDEWALK
LESS THAN 6.5' WIDE**

FIGURE:

I-6A



~ ISOMETRIC VIEW ~
(not to scale)



NOTES:

1. THIS DESIGN IS THE PREFERRED OPTION WHEN THE SIDEWALK WIDTH IS GREATER THAN 6.5'. USE OTHER OPTIONS ONLY WHEN REQUIRED BY DESIGN CONSTRAINTS.
2. A MINIMUM CURB REVEAL OF 4" IS REQUIRED AT THE APEX OF THE CURB RADIUS.
3. MINIMUM TERMINAL CURB LENGTH SHALL BE 4 FEET.
4. SIDEWALK MATERIAL PER CITY SIDEWALK MATERIAL POLICY.

PERPENDICULAR ADA RAMP – SIDEWALK WIDTH GREATER THAN 6.5' WIDE
WITH OR WITHOUT ESPLANADE

NOT TO SCALE

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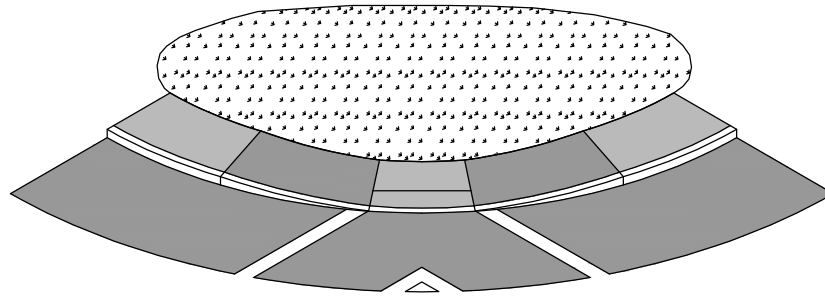
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TRANSPORTATION
DESIGN STANDARDS
SECTION I

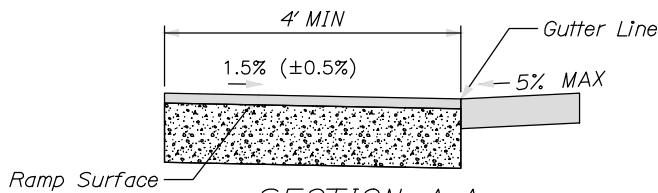
FIGURE:

PERPENDICULAR ADA RAMP FOR SIDEWALK
GREATER THAN 6.5'

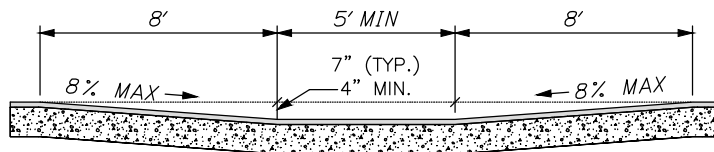
I-6B



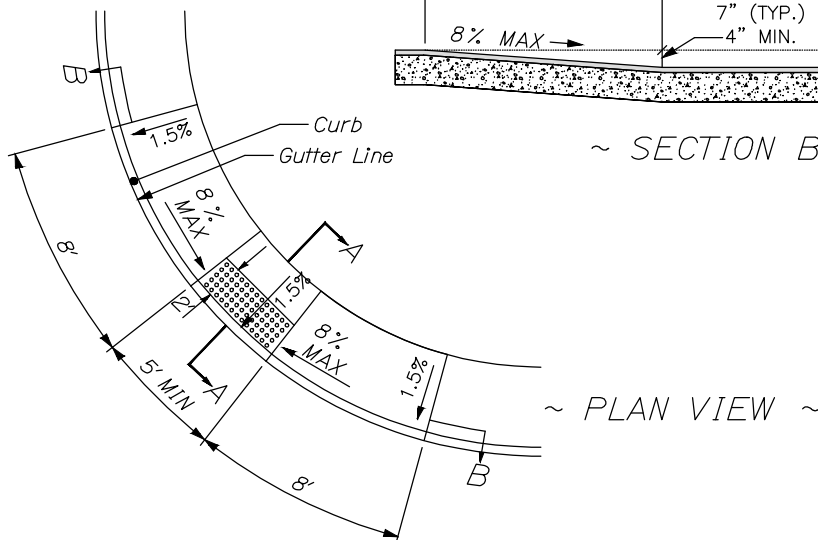
~ ISOMETRIC VIEW ~
(NOT TO SCALE)



~ SECTION A-A ~



~ SECTION B-B ~



~ PLAN VIEW ~

NOTES:

1. THIS LESS DESIRABLE DESIGN SHOULD NOT BE USED UNLESS REQUIRED BY DESIGN CONSTRAINTS. IT DOES NOT PROVIDE DIRECTIONAL CUES.
2. A MINIMUM CURB REVEAL OF 4" IS REQUIRED AT THE APEX OF THE CURB RADIUS.
3. MINIMUM TERMINAL CURB LENGTH SHALL BE 4 FEET.
4. SIDEWALK MATERIAL PER CITY SIDEWALK MATERIAL POLICY.

APEX RAMP – SIDEWALKS **LESS THAN 6.5'** WIDE
WITH NO ESPLANADE

NOT TO SCALE

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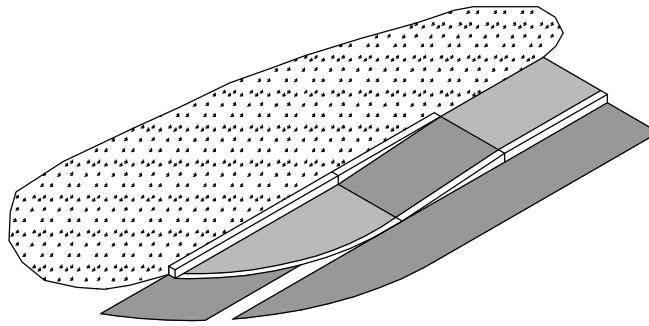
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TRANSPORTATION
DESIGN STANDARDS
SECTION I

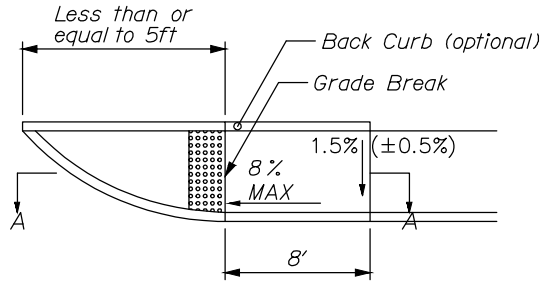
FIGURE:

**APEX RAMP FOR SIDEWALK
LESS THAN 6.5' WIDE**

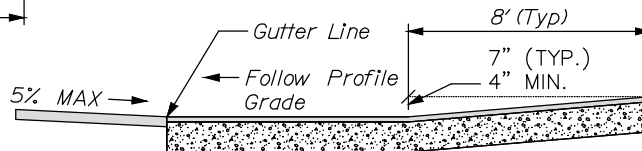
I-6C



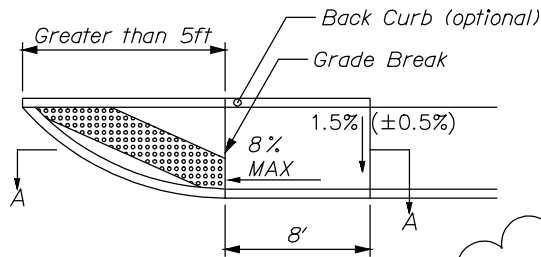
~ PERSPECTIVE VIEW ~
(NOT TO SCALE)



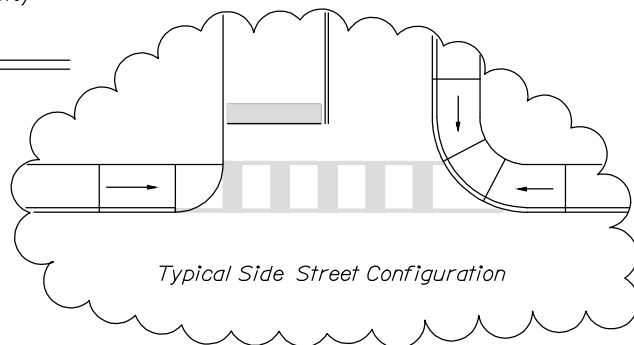
~ *PLAN VIEW* ~



~ SECTION A-A ~



~ **PLAN VIEW** ~



Typical Side Street Configuration

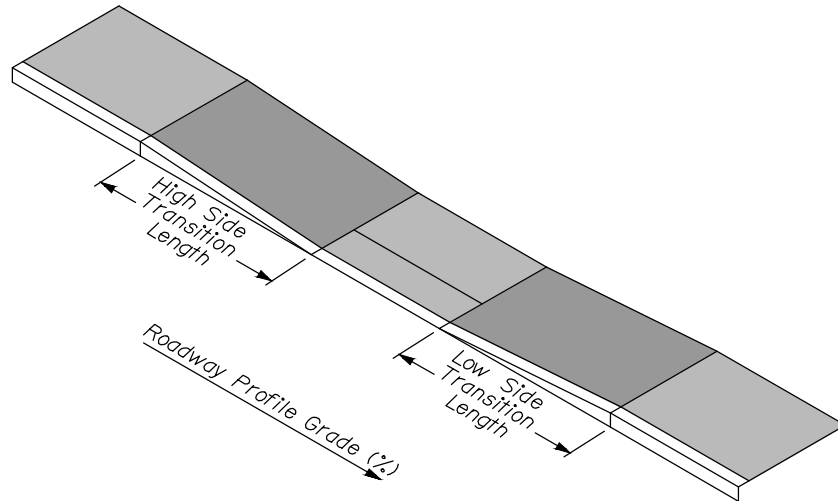
NOTES:

1. FOR USE ONLY WHEN NO SIDEWALK IS PRESENT ON THE SIDE ROAD.
2. USE *THIS* DETECTABLE WARNING PLACEMENT IF THE DISTANCE FROM THE GRADE BREAK TO THE GUTTERLINE IS LESS THAN OR EQUAL TO 5 FEET.
2. USE **THIS** DETECTABLE WARNING PLACEMENT IF THE DISTANCE FROM THE GRADE BREAK TO THE GUTTERLINE IS GREATER THAN 5 FEET.
3. SIDEWALK MATERIAL PER CITY SIDEWALK MATERIAL POLICY.

SIDE STREET RAMP
WITH OR WITHOUT ESPLANADE

NOT TO SCALE

DATE: JUNE 2022	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	TRANSPORTATION DESIGN STANDARDS SECTION I	FIGURE:
REVISED:	SIDE STREET RAMP WHEN NO INTERSECTING SIDEWALK IS PRESENT		I-6E



Pedestrian Ramp Length Table						
Curb Reveal (Inches)		7	6	5	4	3
	Roadway Profile Grade	Minimum Transition Length Required (Feet)				
Low Side Transition Length	-7% and Lower	4.0	4.0	4.0	4.0	4.0
	-6%	8.0	4.0	4.0	4.0	4.0
	-5%	8.0	4.0	4.0	4.0	4.0
	-4%	8.0	8.0	4.0	4.0	4.0
	-3%	8.0	8.0	4.0	4.0	4.0
	-2%	8.0	8.0	8.0	4.0	4.0
	-1%	8.0	8.0	8.0	4.0	4.0
	0%	8.0	8.0	8.0	8.0	4.0
High Side Transition Length	1%	8.0	8.0	8.0	8.0	4.0
	2%	10.0	8.0	8.0	8.0	4.0
	3%	12.0	10.0	8.0	8.0	8.0
	4%	14.0	12.0	10.0	8.0	8.0
	5%	15.0	15.0	14.0	10.0	8.0
	6%	15.0	15.0	15.0	15.0	12.0
	7% and Higher	15.0	15.0	15.0	15.0	15.0

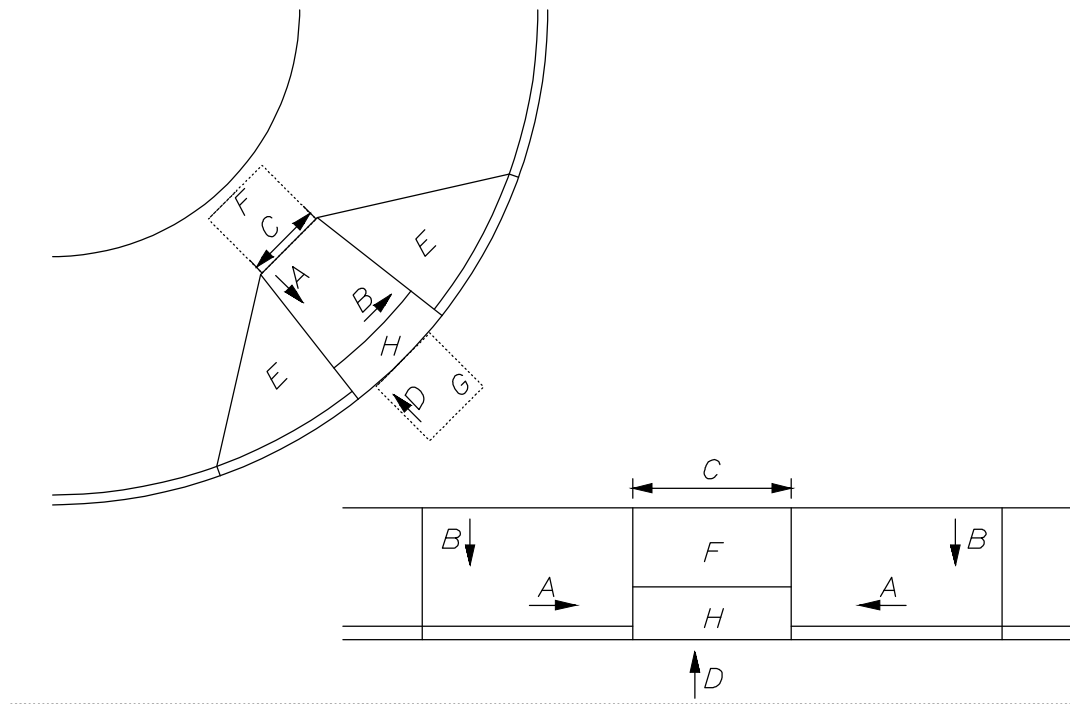
Choose roadway profile grade by rounding up for positive grades and down for negative grades. Round to the nearest whole integer. If constraints prevent placement of the ramp length required by the table, place the maximum length possible and check the slope. If above the maximum allowable slope, consider design modifications before considering technical infeasibility.

RAMP LENGTH TABLE FOR SIDEWALK RAMPS

NOT TO SCALE

DATE: JUNE 2022	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	TRANSPORTATION DESIGN STANDARDS SECTION I	FIGURE: I-6F
REVISED:			
PEDESTRIAN RAMP LENGTH TABLE FOR SIDEWALK RAMPS			

CURB RAMP REQUIREMENTS		
Running Slope	A	Max. 8.33% (1:12)
Cross Slope	B	Max. 2% (1:50) <i>Ramp cross slope at street crossings without stop or signal control may match roadway profile.</i>
Clear Width	C	Min. 5 feet <i>For existing ramps only, ramp width may remain 4 feet.</i>
Counter Slope	D	Max. 5% (1:20) <i>Adjacent surface must be flush with the ramp.</i>
Flared Sides	E	Max. 10% (1:10)
Turning Space	F	4 feet by 4 feet <i>Maximum slope of 2% in any direction. May include Detectable Warnings</i>
Clear Space	G	4 feet by 4 feet <i>Located at the bottom of the ramp outside active travel lanes.</i>
Detectable Warnings	H	<i>Required at traffic controlled intersections and mid-block crossings, full ramp width.</i>



PEDESTRIAN RAMP REQUIREMENTS FOR SIDEWALK RAMPS

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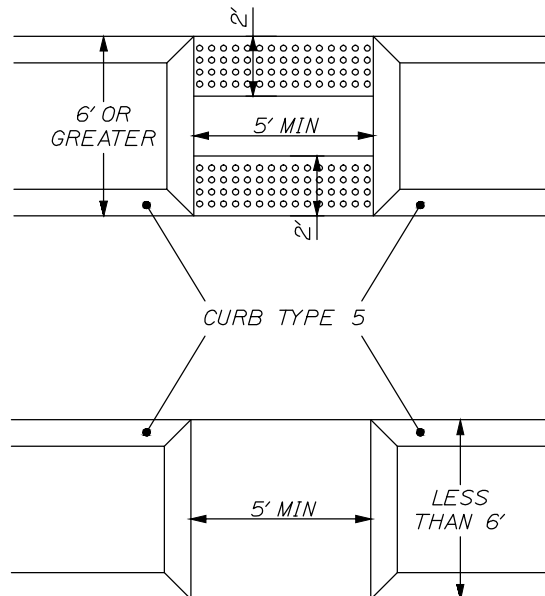
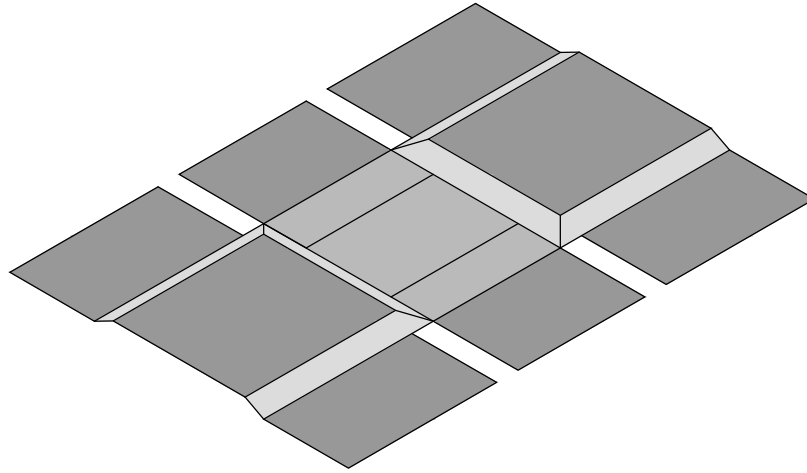
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TRANSPORTATION
DESIGN STANDARDS
SECTION I

FIGURE:

**PEDESTRIAN RAMP REQUIREMENTS
FOR SIDEWALK RAMPS**

I-6G



NOTES:

1. OMIT DETECTABLE WARNINGS IF THE ISLAND CROSSING IS LESS THAN 6'-0".
2. INSURE POSITIVE DRAINAGE (2% MAXIMUM CROSS SLOPE).

**ISLAND PEDESTRIAN CROSSINGS
FOR ISLANDS 6' OR GREATER**

NOT TO SCALE

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**TRANSPORTATION
DESIGN STANDARDS
SECTION I**

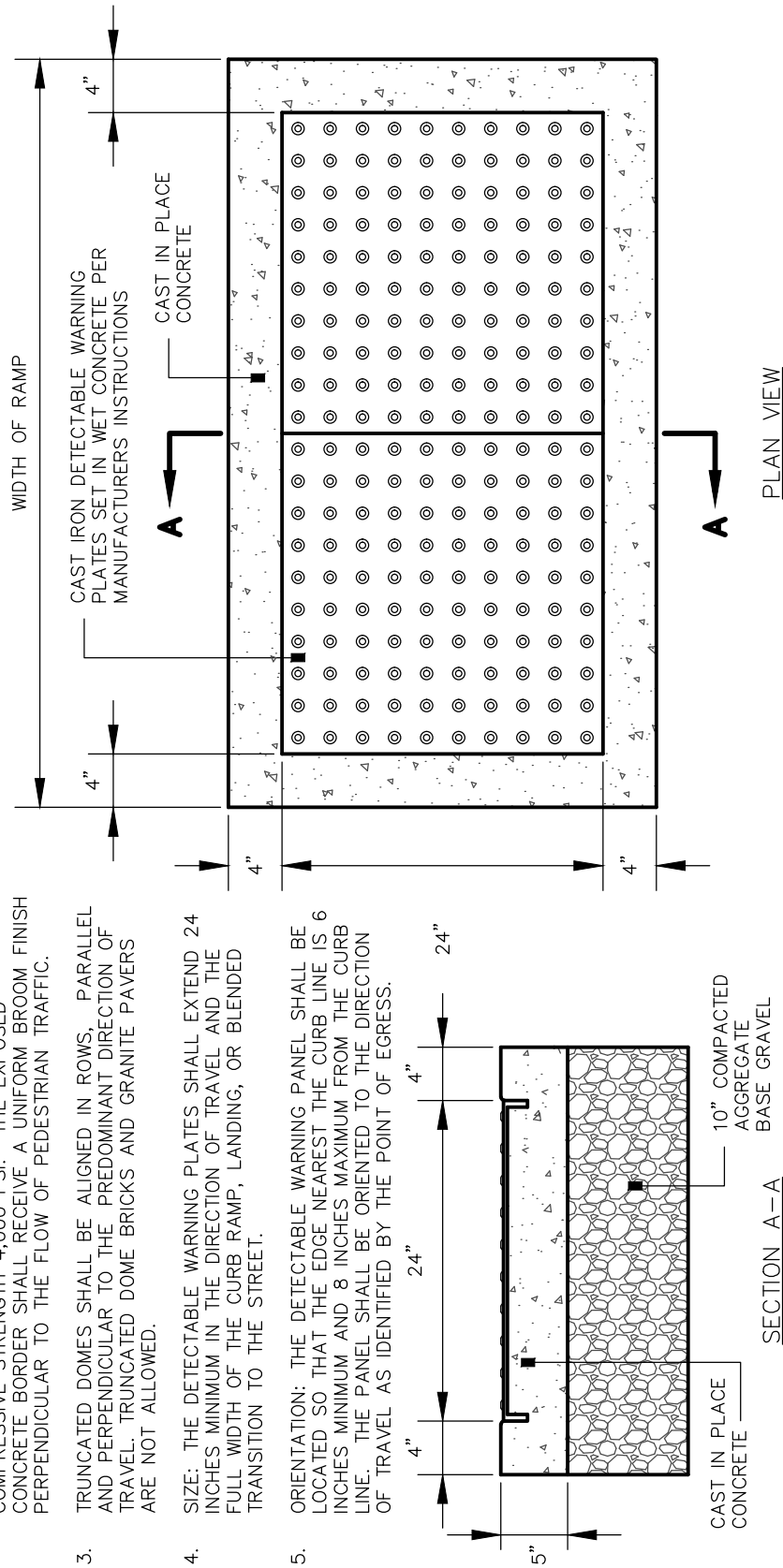
**ISLAND PEDESTRIAN CROSSINGS
FOR ISLANDS 6' OF GREATER**

FIGURE:

I-6H

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 MDOT 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 FULL WIDTH OF THE CURB RAMP, LANDING, OR BLENDED 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.



SIDEWALK RAMP DETECTABLE WARNING PANEL

NOT TO SCALE

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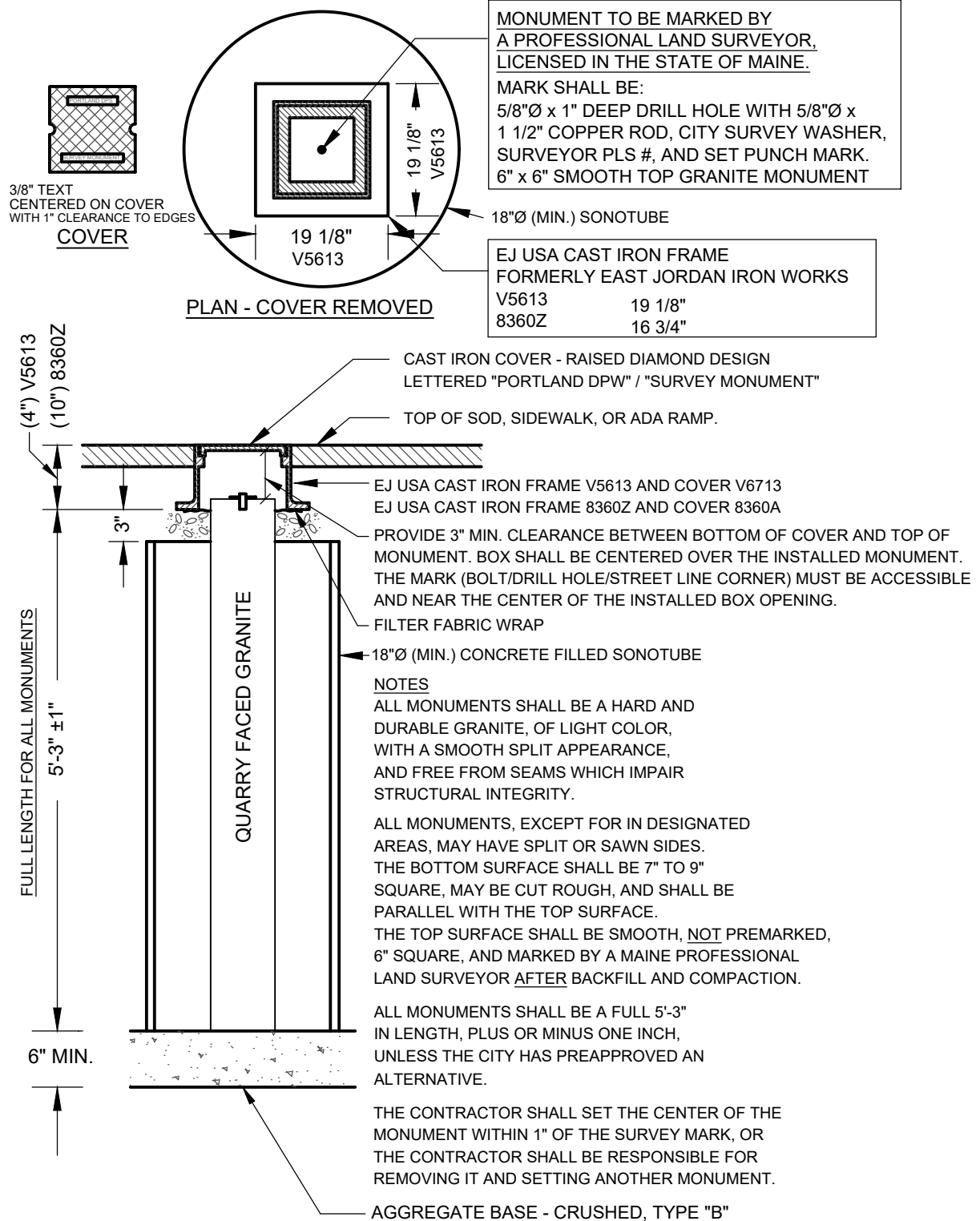
CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

SIDEWALK RAMP DETECTABLE WARNING PANEL

I-7



GRANITE STREET MONUMENTS - NEW OR REPLACEMENT

NOT TO SCALE

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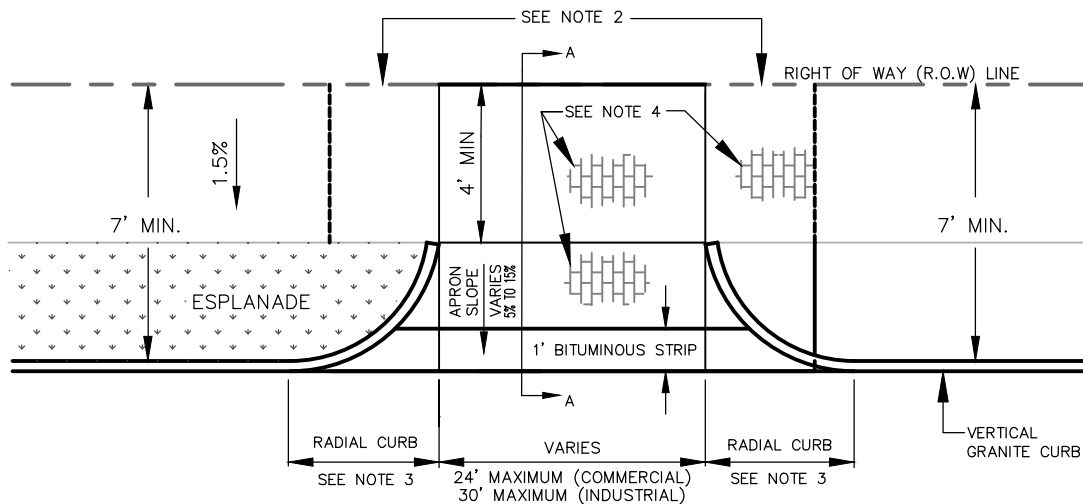
CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

TRANSPORTATION
DESIGN STANDARDS
SECTION I

FIGURE:

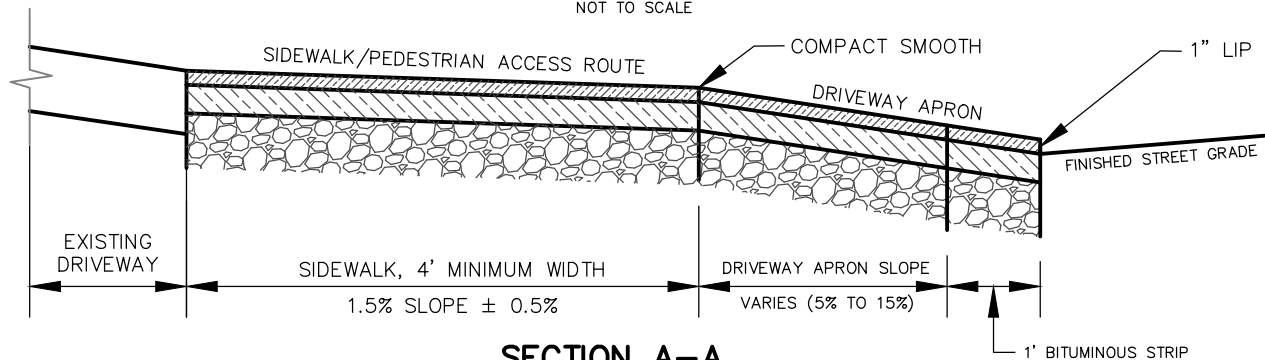
GRANITE STREET MONUMENT - NEW OR REPLACEMENT

I-8



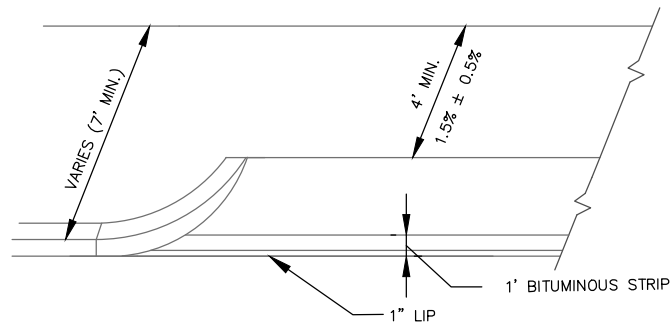
STANDARD COMMERCIAL DRIVEWAY APRON LAYOUT

NOT TO SCALE



SECTION A-A

NOT TO SCALE



NOTES:

1. MATCH EXISTING GRADE AT R.O.W LINE. WHERE REQUIRED TO MEET A.D.A. AND DRIVEWAY APRON SLOPE REQUIREMENTS, A CONSTRUCTION EASEMENT MAY BE REQUIRED.
2. IF MATCHING THE EXISTING GRADE AT ROW CAUSES APRON SLOPE TO EXCEED RECOMMENDED %, SIDEWALK TRANSITION AREAS MAY BE ADDED, BUT SHALL NOT EXCEED 8.33%.
3. DRIVEWAY CURB RADIUS SHALL NOT BE LARGER THAN REQUIRED BY THE SITE'S DESIGN VEHICLE.
4. ALL MATERIALS IN ROW TO COMPLY WITH CITY'S SIDEWALK & DRIVEWAY MATERIAL POLICY. BRICK IN DRIVEWAY APRONS, WHERE APPLICABLE, SHALL BE ORIENTED IN THE SAME WAY AS THE ADJACENT BRICK SIDEWALK..

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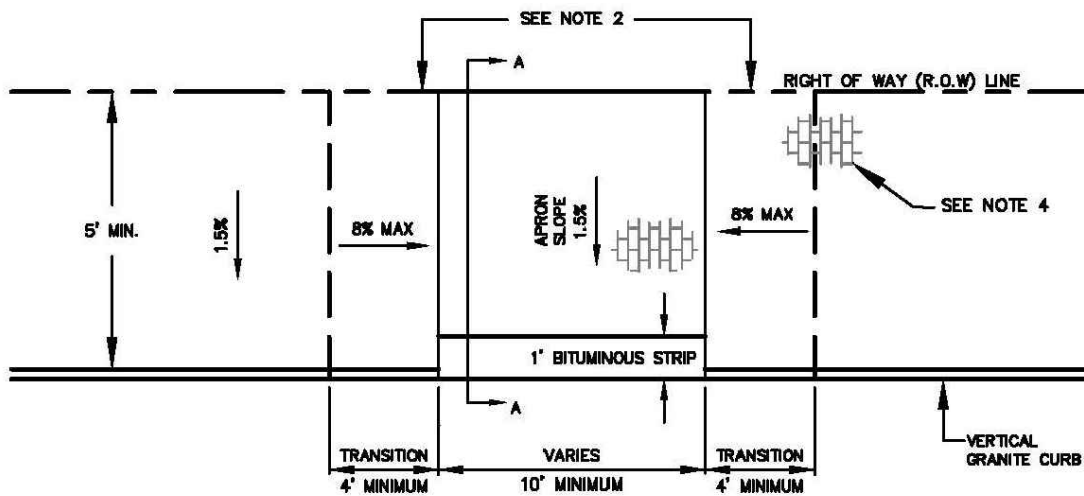
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TRANSPORTATION
DESIGN STANDARDS
SECTION I

COMMERCIAL/INDUSTRIAL DRIVEWAY APRON

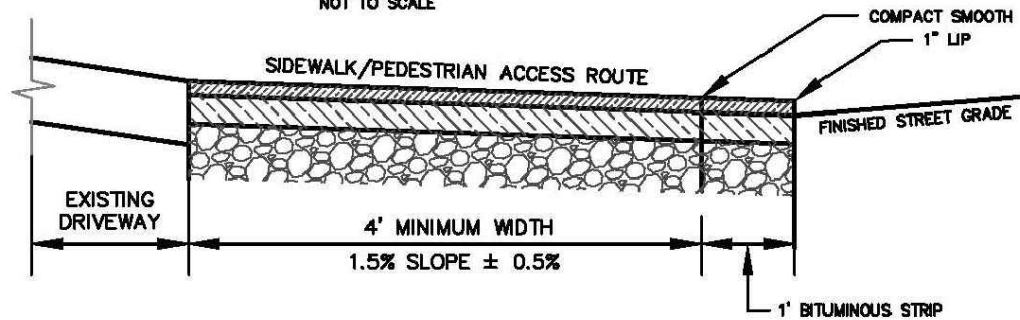
FIGURE:

I-9B



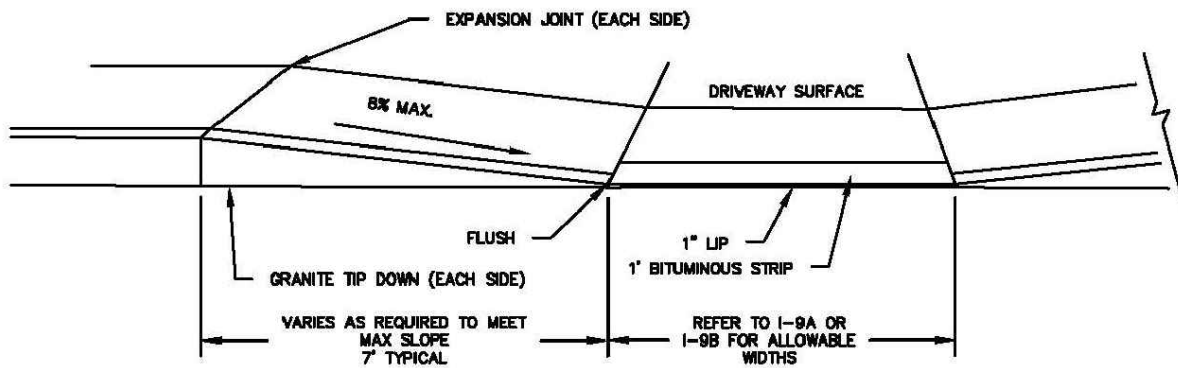
DRIVEWAY APRON AT CONSTRAINED SIDEWALK LAYOUT

NOT TO SCALE



SECTION A-A

NOT TO SCALE



NOTES:

1. MATCH EXISTING GRADE AT R.O.W LINE. WHERE REQUIRED TO MEET A.D.A. AND DRIVEWAY APRON SLOPE REQUIREMENTS, A CONSTRUCTION EASEMENT MAY BE REQUIRED.
2. SIDEWALK TRANSITION SLOPE SHALL NOT EXCEED 8.33%. RAMP LENGTH SHALL ACCOMMODATE THIS CONSTRAINT UP TO 15 FOOT RAMP LENGTH OR AS OTHERWISE REQUIRED BY ADA STANDARDS.
3. MOUNTABLE CURB (SEE DETAIL I-12B) OR INCREASE IF BITUMINOUS LIP IS PREFERRED TO MAINTAIN SIDEWALK GRADE THROUGH APRON.
4. ALL MATERIALS IN ROW TO COMPLY WITH CITY'S SIDEWALK & DRIVEWAY MATERIAL POLICY. BRICK IN DRIVEWAY APRONS, WHERE APPLICABLE, SHALL BE ORIENTED IN THE SAME WAY AS THE ADJACENT BRICK SIDEWALK.

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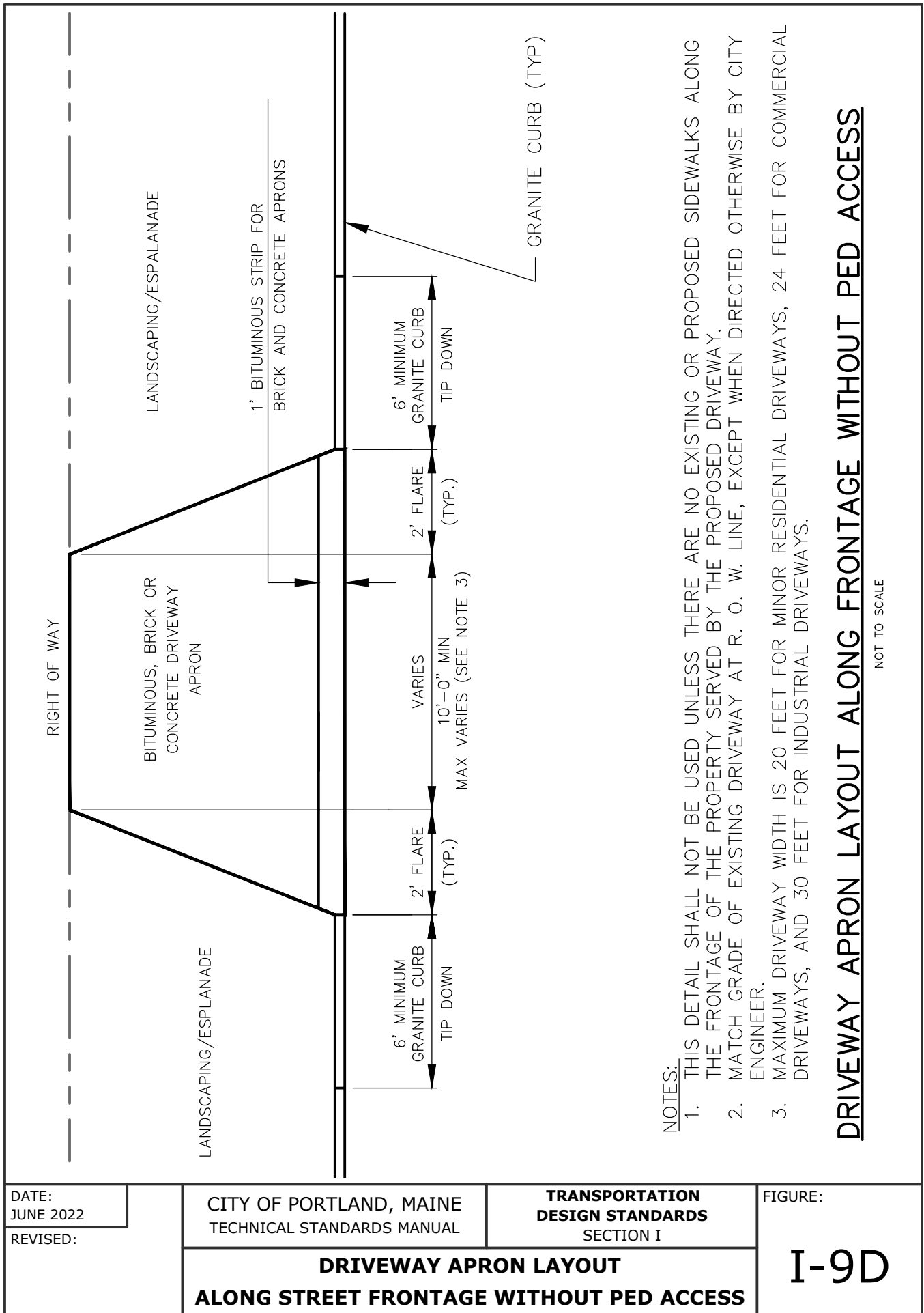
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TRANSPORTATION
DESIGN STANDARDS
SECTION I

FIGURE:

**DRIVEWAY APRON AT CONSTRAINED SIDEWALKS
6.5' OR LESS**

I-9C

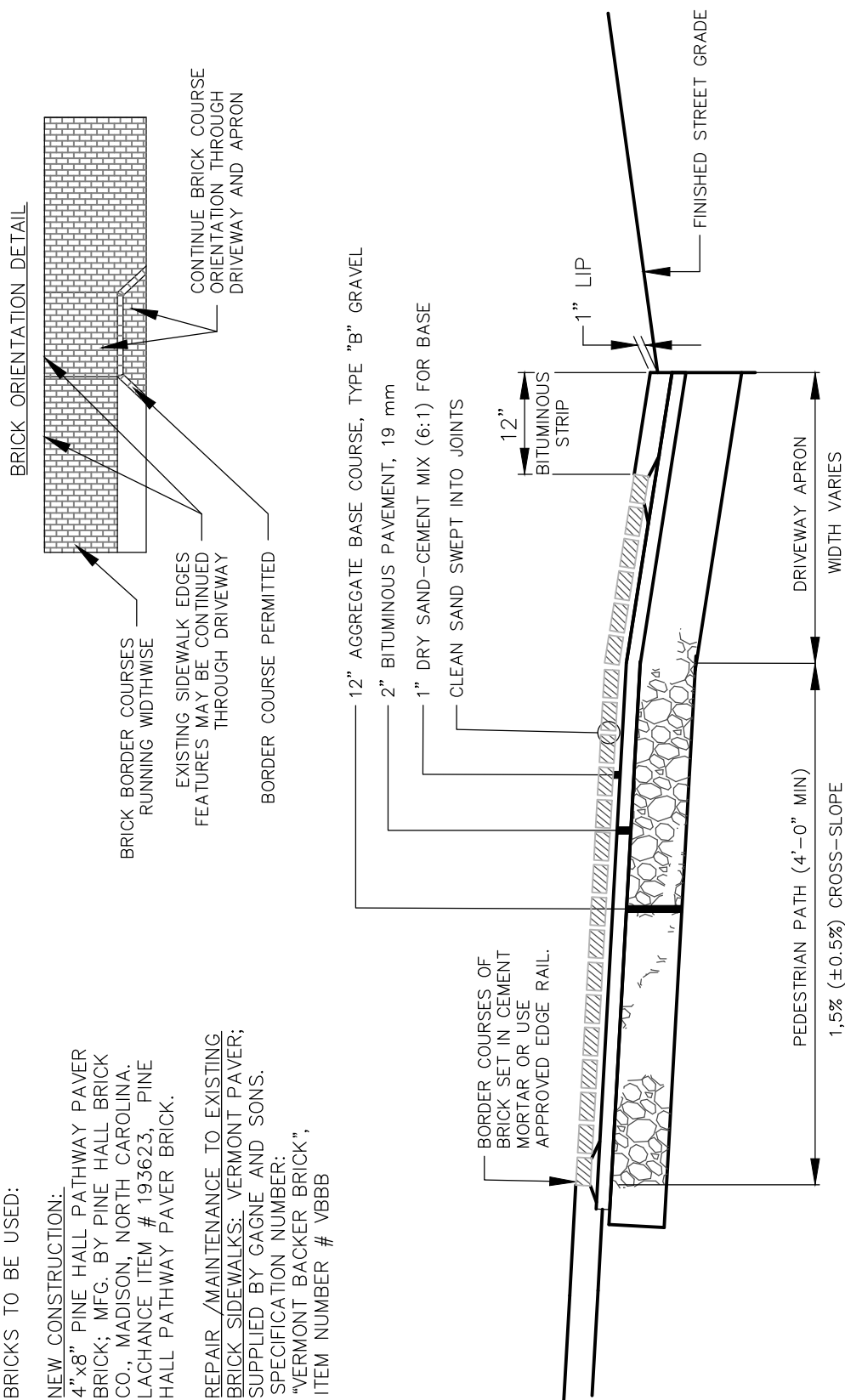


DATE: JUNE 2022	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	TRANSPORTATION DESIGN STANDARDS SECTION I	FIGURE:
REVISED:	DRIVEWAY APRON LAYOUT ALONG STREET FRONTAGE WITHOUT PED ACCESS		I-9D

BRICKS TO BE USED:

NEW CONSTRUCTION:
4"x8" PINE HALL PATHWAY PAVER
BRICK; MFG. BY PINE HALL BRICK
CO., MADISON, NORTH CAROLINA.
LACHANCE ITEM # 193623, PINE
HALL PATHWAY PAVER BRICK.

REPAIR /MAINTENANCE TO EXISTING:
BRICK SIDEWALKS: VERMONT PAVES;
SUPPLIED BY GAGNE AND SONS.
SPECIFICATION NUMBER:
"VERMONT BACKER BRICK",
ITEM NUMBER # VB88



BRICK DRIVEWAY APRON WITH BITUMINOUS BASE

NOT TO SCALE

DATE:
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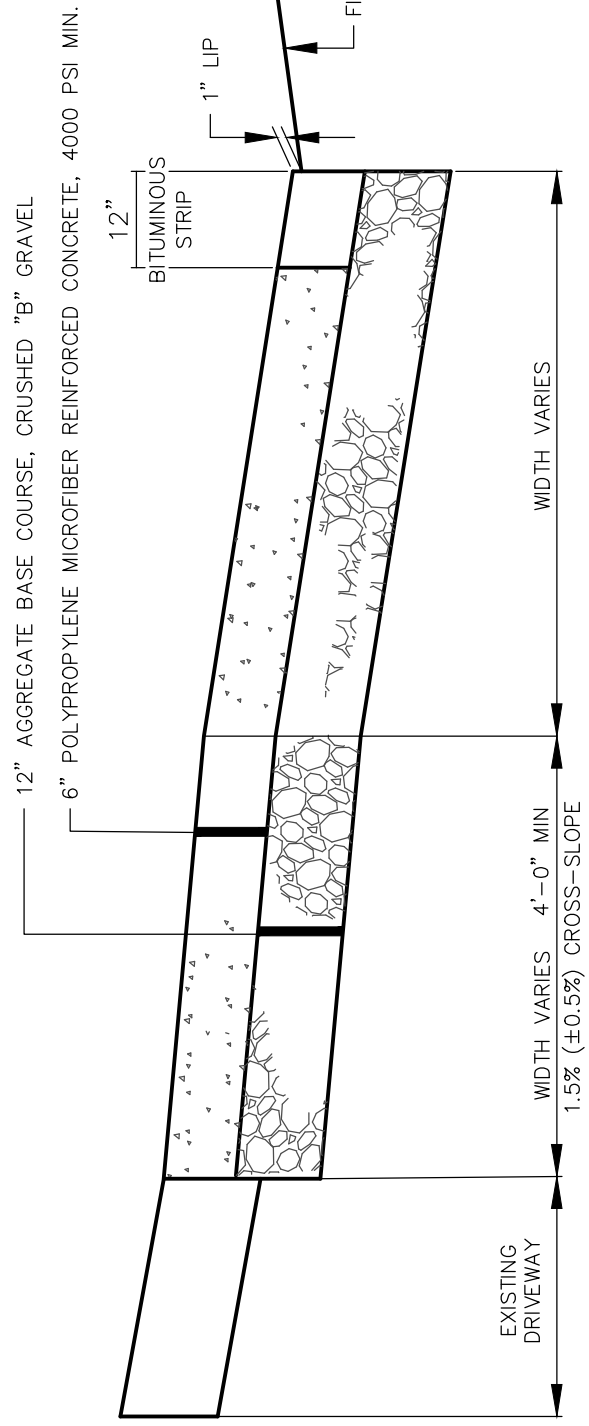
CITY OF PORTLAND, MAINE
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TRANSPORTATION
DESIGN STANDARDS
SECTION I

FIGURE:

**BRICK DRIVEWAY APRON
WITH BITUMINOUS BASE**

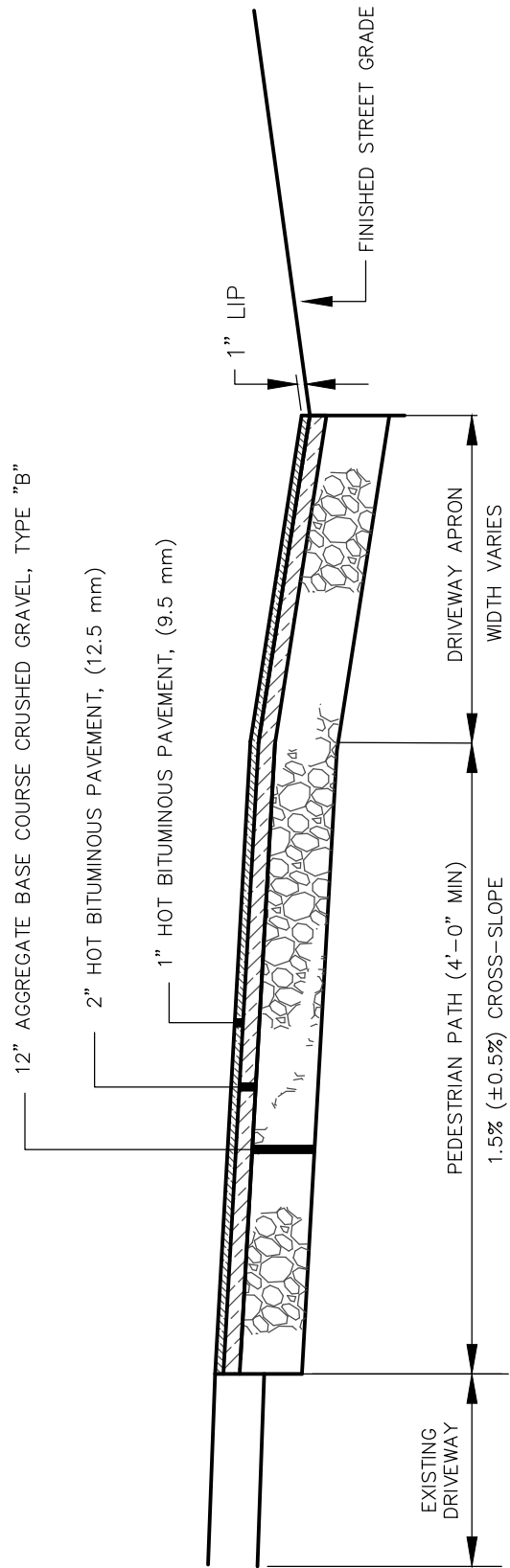
I-10A



REINFORCED CONCRETE DRIVEWAY APRON

NOT TO SCALE

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REINFORCED CONCRETE DRIVEWAY APRON			I-10B



BITUMINOUS DRIVEWAY APRON

NOT TO SCALE

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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

BITUMINOUS DRIVEWAY APRON

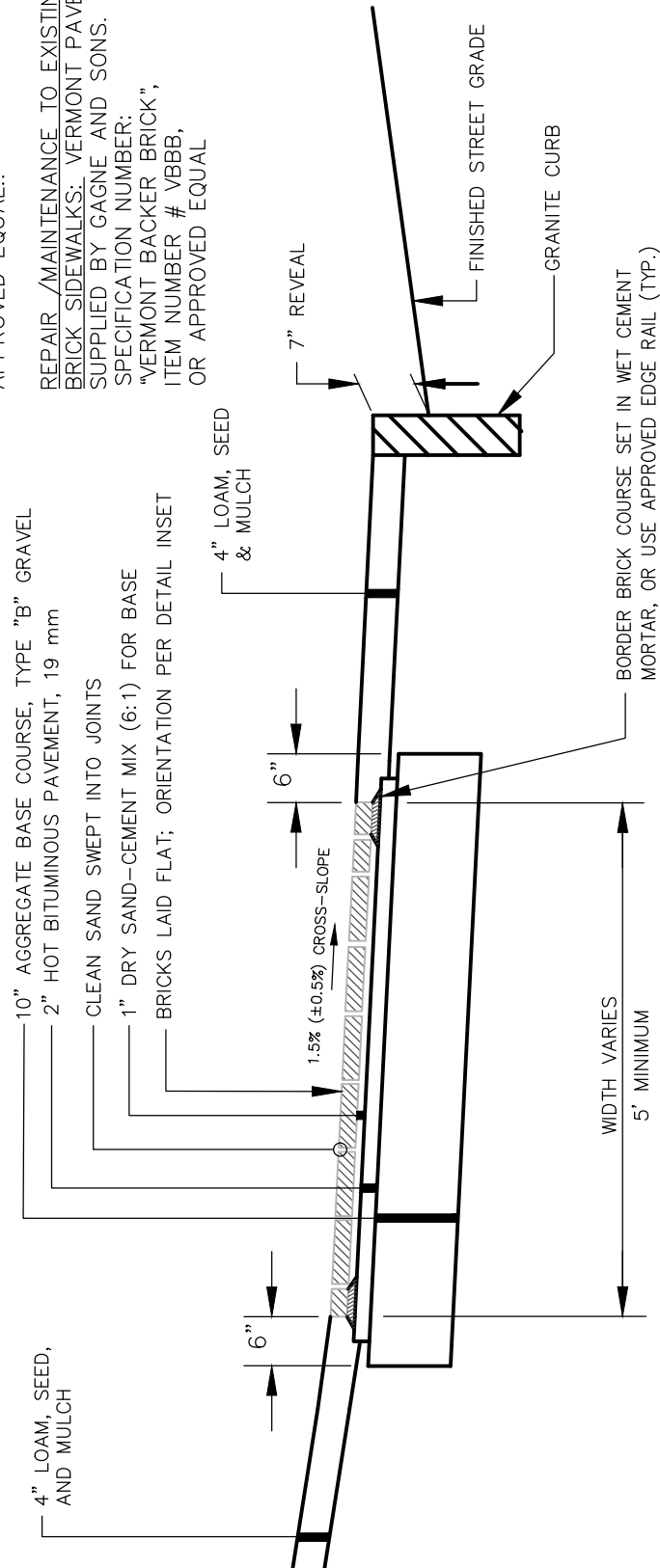
I-10C

BRICKS TO BE USED:

NEW CONSTRUCTION:

4"x8" PINE HALL PATHWAY PAVER
BRICK; MFG. BY PINE HALL BRICK
CO., MADISON, NORTH CAROLINA, OR
APPROVED EQUAL..
LACHANCE ITEM # 193623, PINE
HALL PATHWAY PAVER BRICK, OR
APPROVED EQUAL..

REPAIR /MAINTENANCE TO EXISTING
BRICK SIDEWALKS: VERMONT PAVER;
SUPPLIED BY GAGNE AND SONS.
SPECIFICATION NUMBER:
"VERMONT BACKER BRICK",
ITEM NUMBER # VBBB,
OR APPROVED EQUAL



BRICK SIDEWALK WITH BITUMINOUS BASE

NOT TO SCALE

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TRANSPORTATION
DESIGN STANDARDS
SECTION I

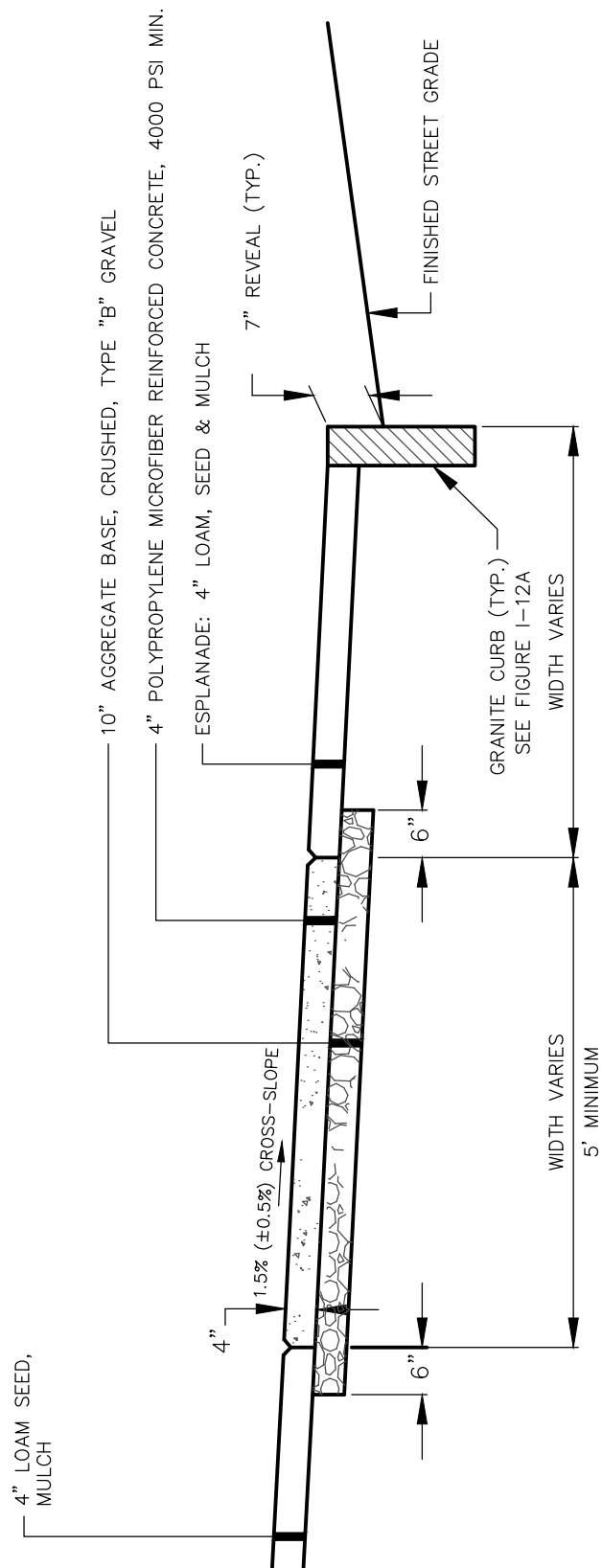
FIGURE:

BRICK SIDEWALK WITH BITUMINOUS BASE

I-11A

NOTE

CONCRETE SIDEWALKS TO BE TREATED WITH CONSOLIDECK SALTGUARD WB OR APPROVED EQUAL. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR APPLICATION.



REINFORCED CONCRETE SIDEWALK

NOT TO SCALE

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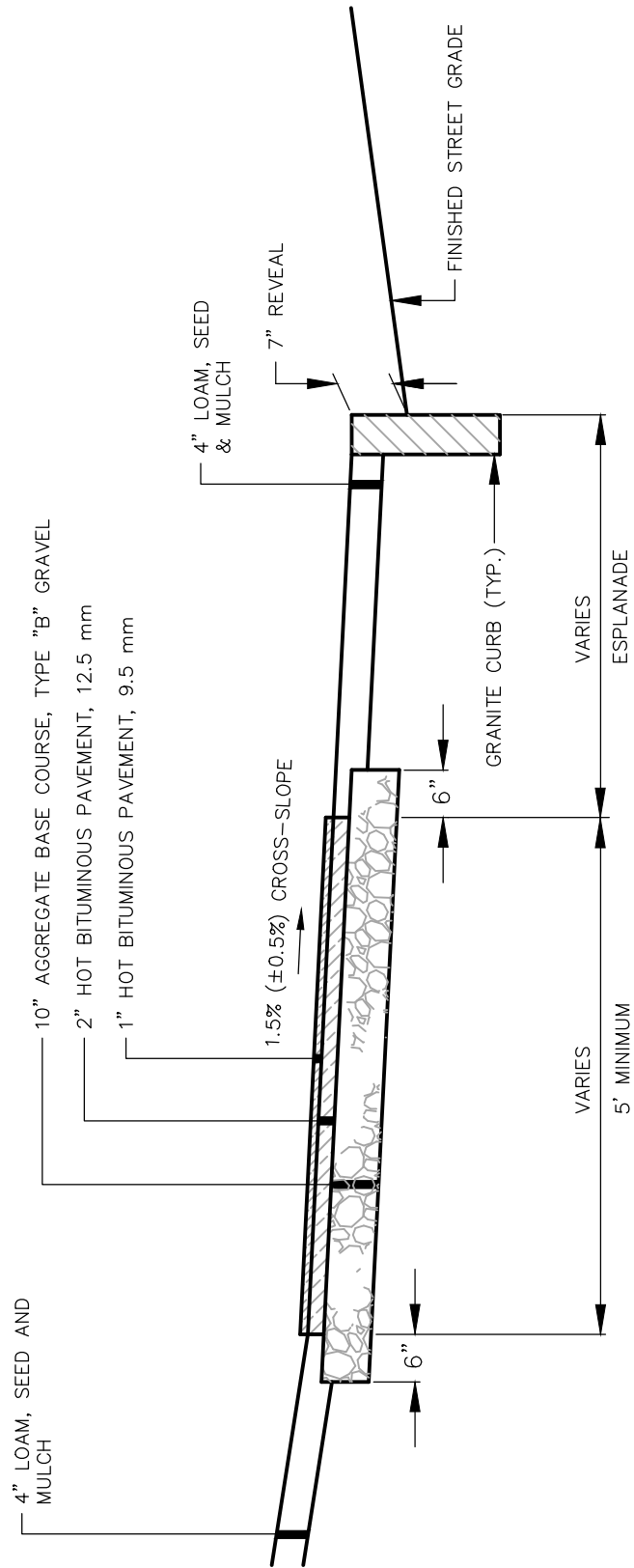
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

REINFORCED CONCRETE SIDEWALK

I-11B



BITUMINOUS SIDEWALK

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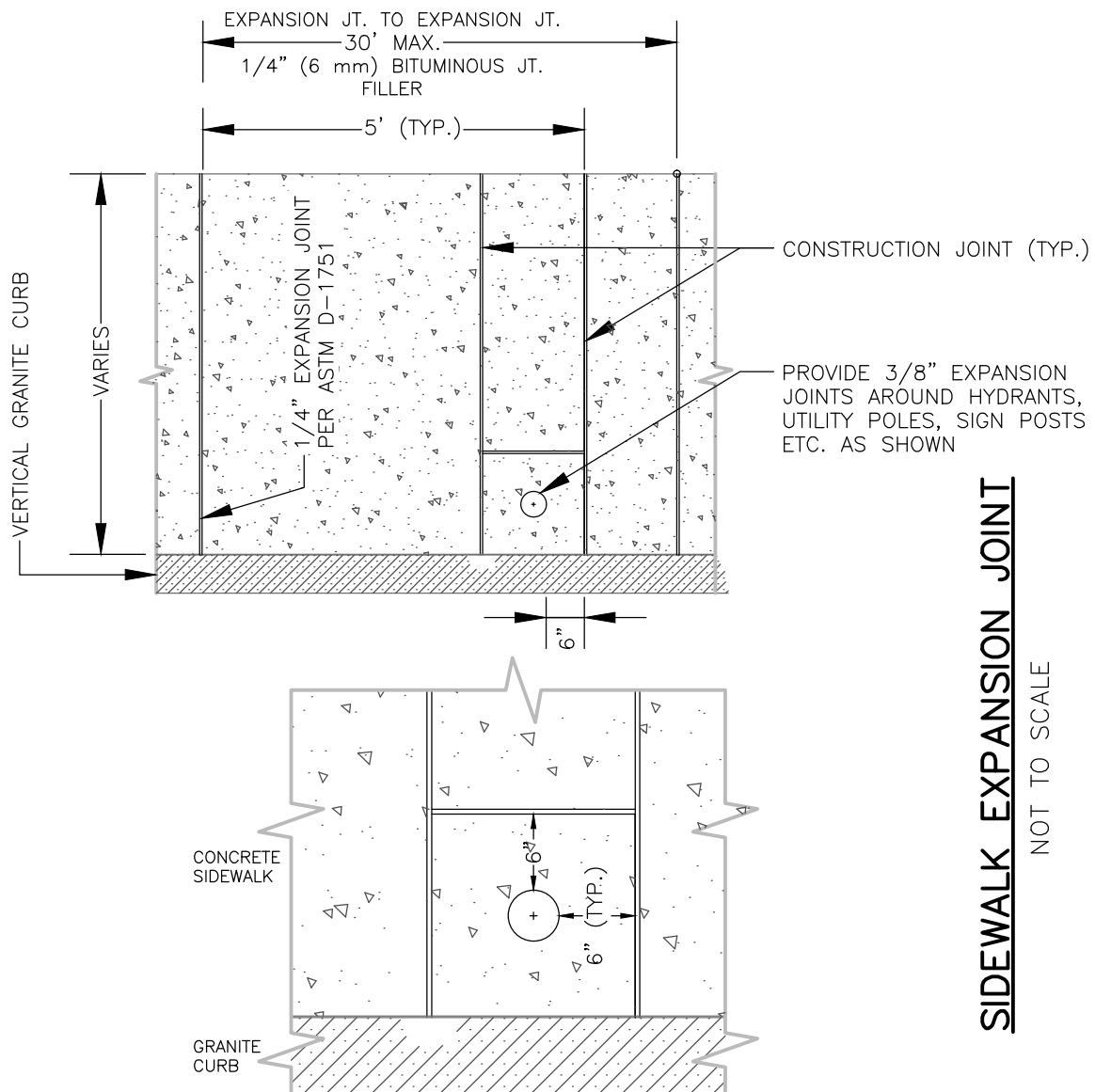
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TRANSPORTATION
DESIGN STANDARDS
SECTION I

FIGURE:

BITUMINOUS SIDEWALK

I-11C

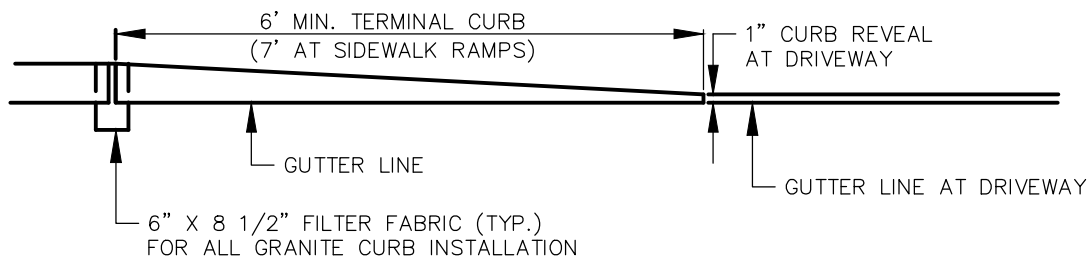


SIDEWALK EXPANSION JOINT
NOT TO SCALE

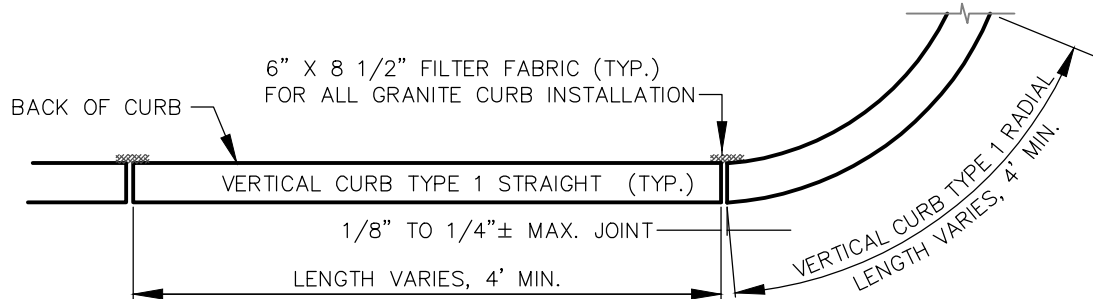
CONCRETE SIDEWALK EXPANSION JOINT NOTES:

1. EXPANSION JOINTS SHALL BE LOCATED WHERE SIDEWALK ABUTS DRIVEWAYS, CURB OR OTHER ADJACENT STRUCTURES.
2. 1/4" (6mm) BITUMINOUS JOINT FILLER SHALL BE INSTALLED AT THE EXPANSION JOINT LOCATIONS AND SHALL EXTEND THE FULL LENGTH/DEPTH OF THE CONCRETE.
3. 1" DEEP CONSTRUCTION JOINTS SHALL BE PLACED:
 - A. AT INTERVALS OF APPROXIMATELY 15 FEET
 - B. AT THE SPACING THAT MATCHES ADJACENT TIP DOWN CURB
 - C. EXTENSION OF EXPANSION JOINTS LOCATED AT HYDRANTS & UTILITY POLES.
4. FORMED CONSTRUCTION JOINTS SHALL BE FINISHED WITH A TOOL HAVING A 1/4" (6 mm) RADIUS.
5. SCORED JOINTS SHALL BE 1/4" (6 mm) DEEP AND PLACED AT THE SPACING INDICATED FOR THE WIDTH OF THE SIDEWALK.
6. CONCRETE SHALL BE FINISHED BY MEANS OF A FLOAT, STEEL TROWELED AND BROOMED WITH A FINE BRUSH IN A TRANSVERSE DIRECTION.
7. 1/4" (6 mm) DEEP SCORED JOINTS (TYP.) SPACES AT 5 FOOT OR EQUAL TO SIDEWALK WIDTH AS GOVERNED BY PLAN AND/OR DPW ENGINEER.

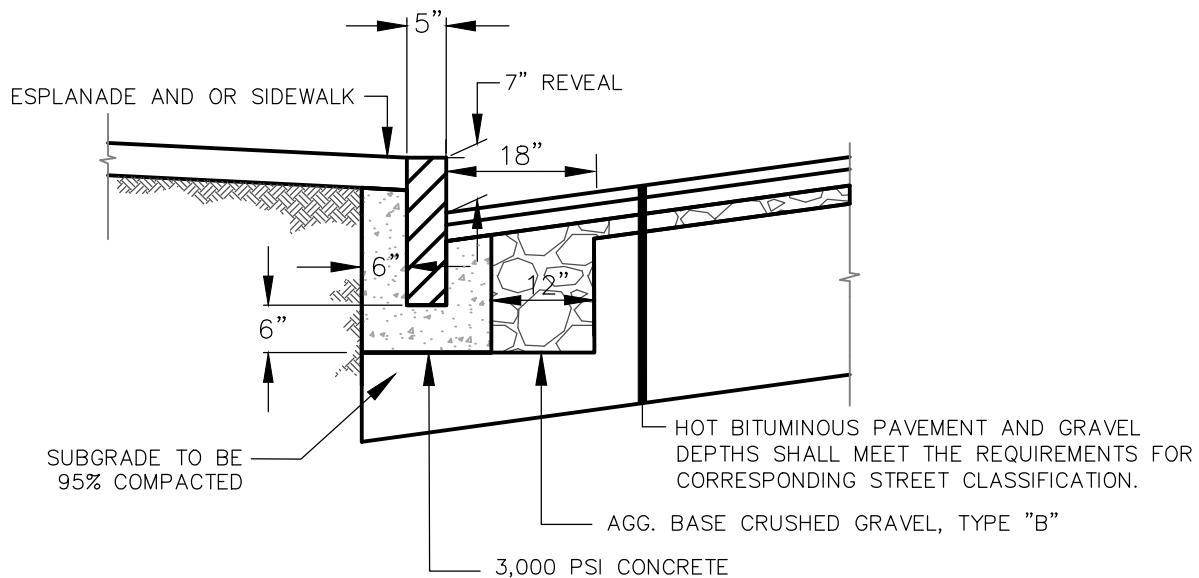
DATE: JUNE 2022	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	TRANSPORTATION DESIGN STANDARDS SECTION I	FIGURE:
REVISED:			I-11D
SIDEWALK EXPANSION JOINT			



TERMINAL CURB PROFILE



VERTICAL GRANITE CURB PLAN VIEW



VERTICAL GRANITE CURB CROSS SECTION

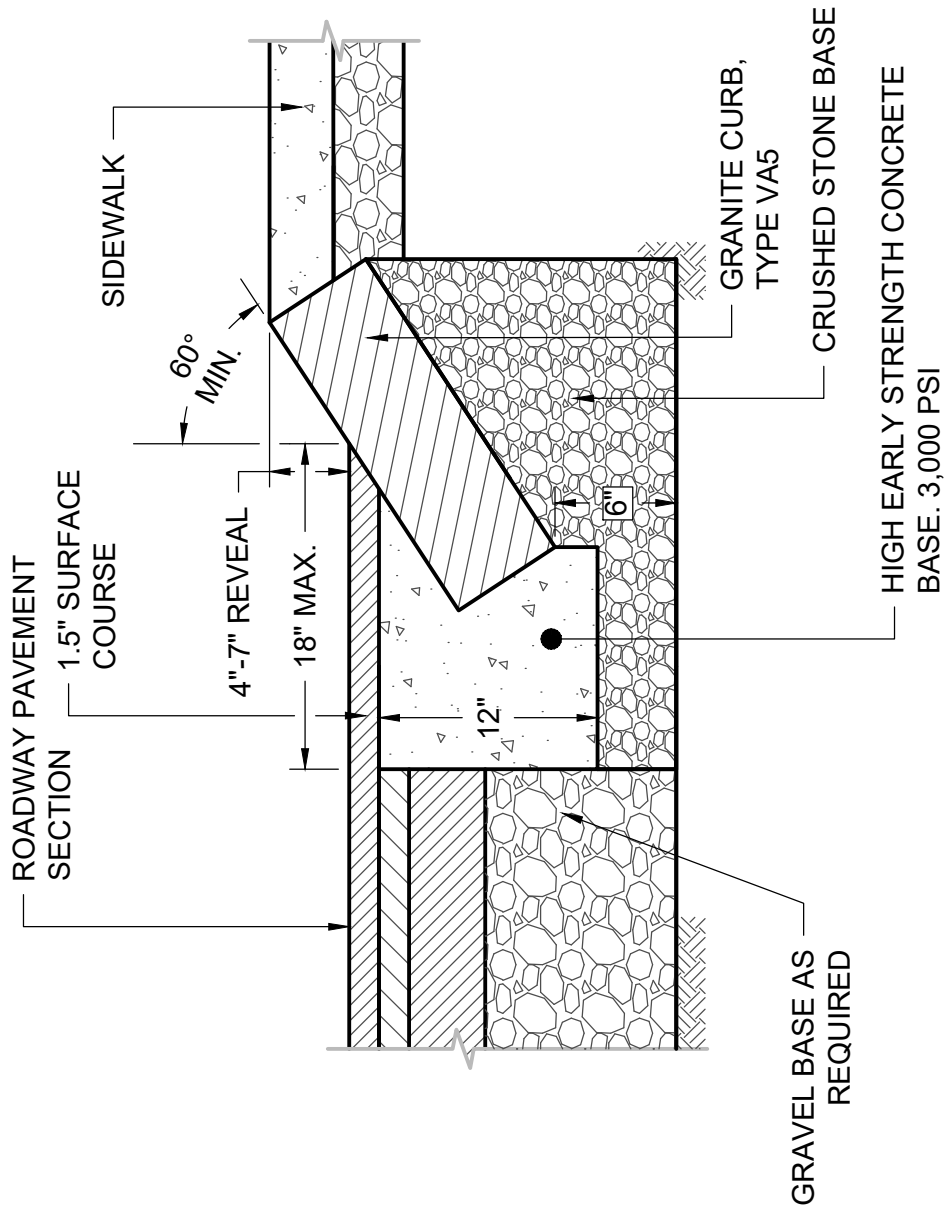
NOTES:

1. INDIVIDUAL PIECES OF CURB SHORTER THAN 4 L.F. ARE NOT ALLOWED, WITH THE EXCEPTION OF RADIAL CURB.
2. THE MINIMUM HEIGHT OF THE CONCRETE BACKING SHALL BE 10-INCHES OR TO THE BOTTOM OF THE HOT MIX ASPHALT PAVEMENT, WHICHEVER IS GREATER, MEASURED FROM THE BOTTOM OF CURB.
3. CURBING SHALL BE SET IN A 6-INCH BED OF POURED IN PLACE 3,000 PSI CONCRETE MIX.
4. WOODEN SHIMS MAY BE USED TO SET CURB.

VERTICAL GRANITE CURB

NOT TO SCALE

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	VERTICAL GRANITE CURB		I-12



SLOPED GRANITE CURB

NOT TO SCALE

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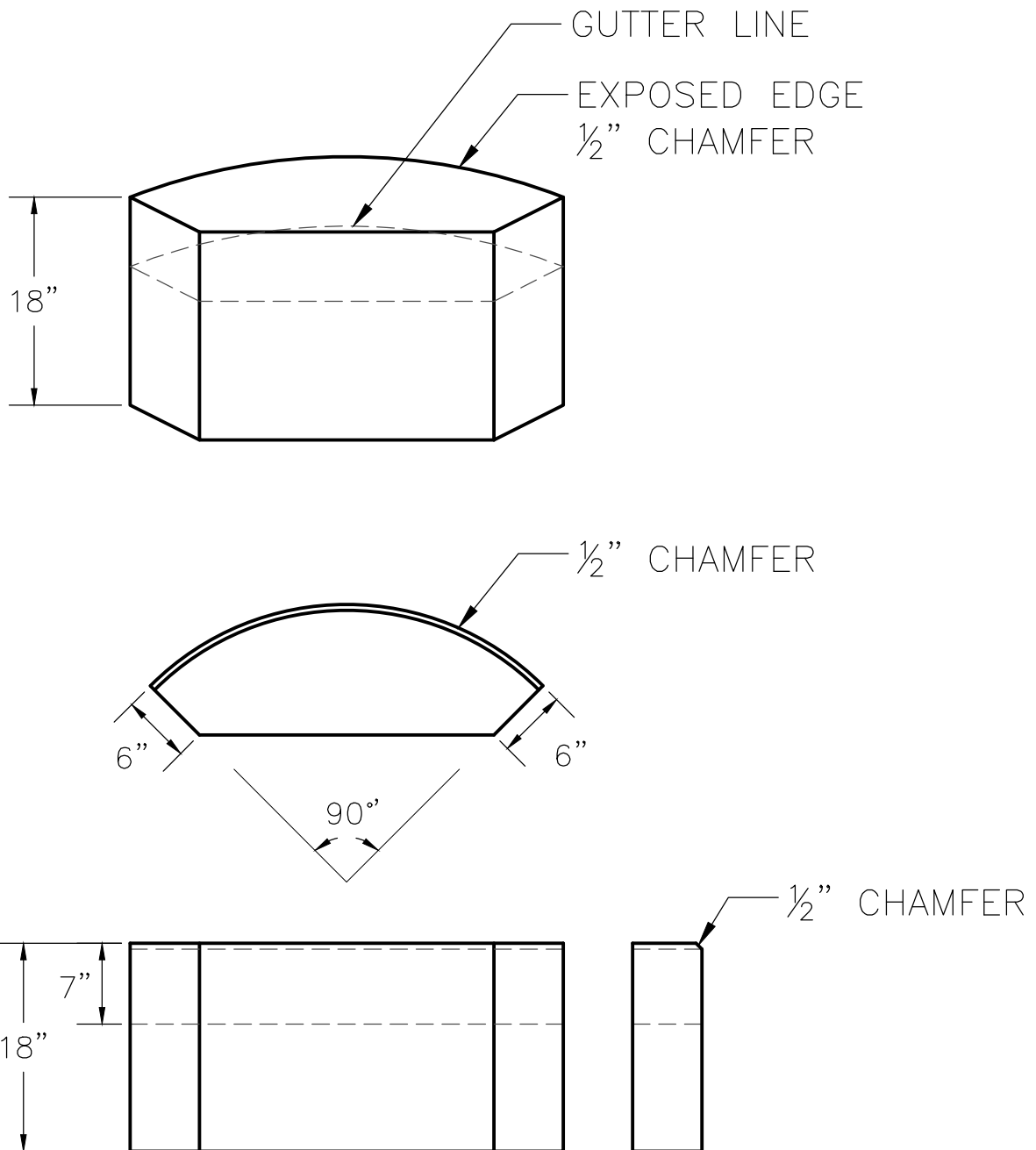
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DESIGN STANDARDS**
SECTION I

FIGURE:

SLOPED GRANITE CURB

I-13



GRANITE RADIUS CORNER "BUG"

NOT TO SCALE

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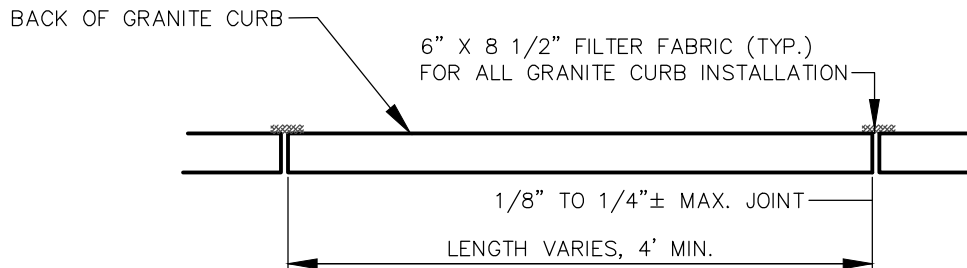
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DESIGN STANDARDS**
SECTION I

FIGURE:

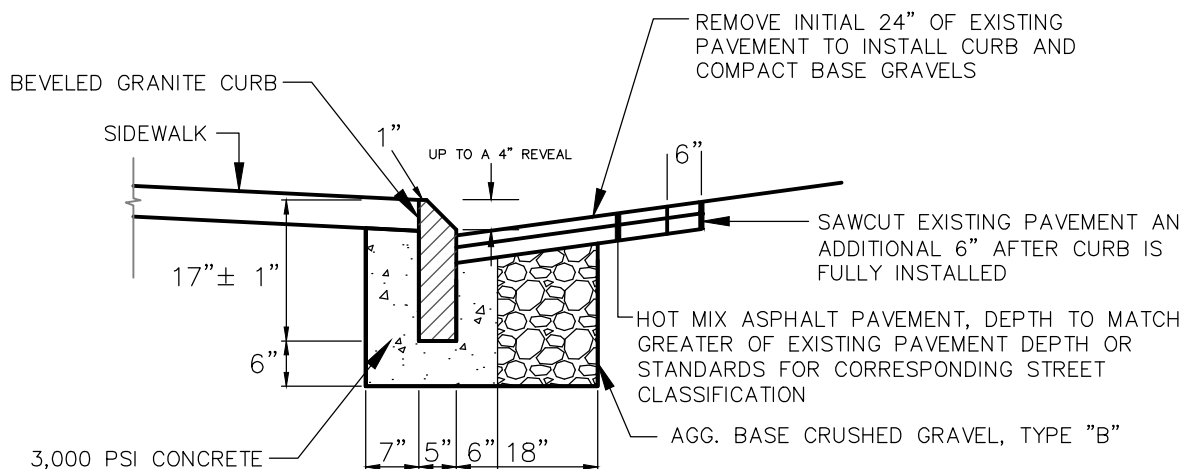
**GRANITE RADIUS CORNER
"BUG"**

I-14



VERTICAL GRANITE CURB PLAN VIEW

NOT TO SCALE



NOTES:

1. INSTALL PER MANUFACTURER'S SPEC'S
2. PROVIDE CUSTOM TRANSITION CURB THAT TIPS DOWN 3" IN BETWEEN MOUNTABLE AND VERTICAL CURBS. SAWCUT TRANSITION STONE IN THE FIELD FOR FLUSH JOINT WITH ADJACENT VERTICAL CURB
3. INDIVIDUAL PIECES OF CURB SHORTER THAN 4 L.F. ARE NOT ALLOWED, WITH THE EXCEPTION OF RADIAL CURB.
4. THE MINIMUM HEIGHT OF THE CONCRETE BACKING SHALL BE 10-INCHES OR TO THE BOTTOM OF THE HOT MIX ASPHALT PAVEMENT, WHICHEVER IS GREATER, MEASURED FROM THE BOTTOM OF CURB.
5. CURBING SHALL BE SET IN A 6-INCH BED OF POURED IN PLACE 3,000 PSI CONCRETE MIX.
6. WOODEN SHIMS MAY BE USED TO SET CURB.

MOUNTABLE BEVELED GRANITE CURB CROSS SECTION

NOT TO SCALE

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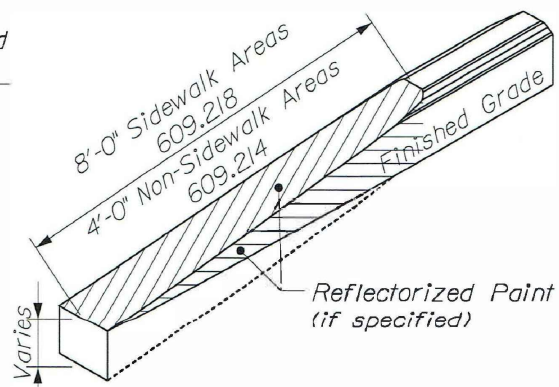
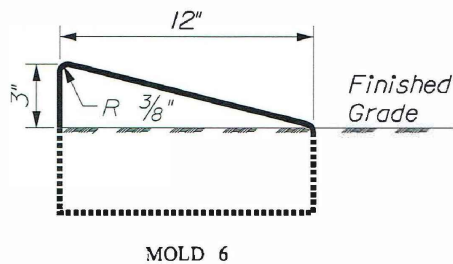
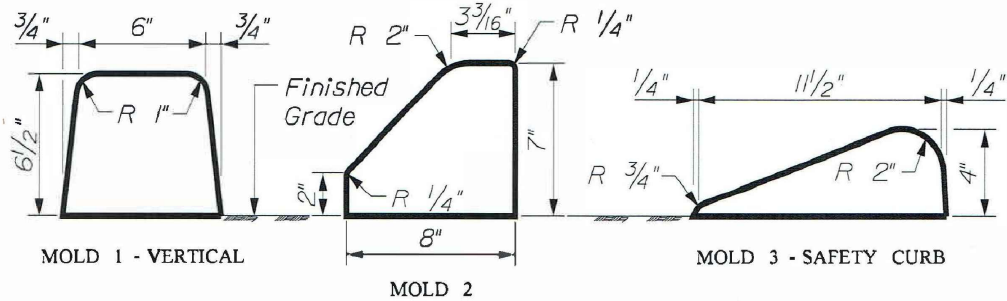
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DESIGN STANDARDS
SECTION I**

MOUNTABLE BEVELED GRANITE CURB

FIGURE:

I-15



SLIPFORM CONCRETE CURB

NOT TO SCALE

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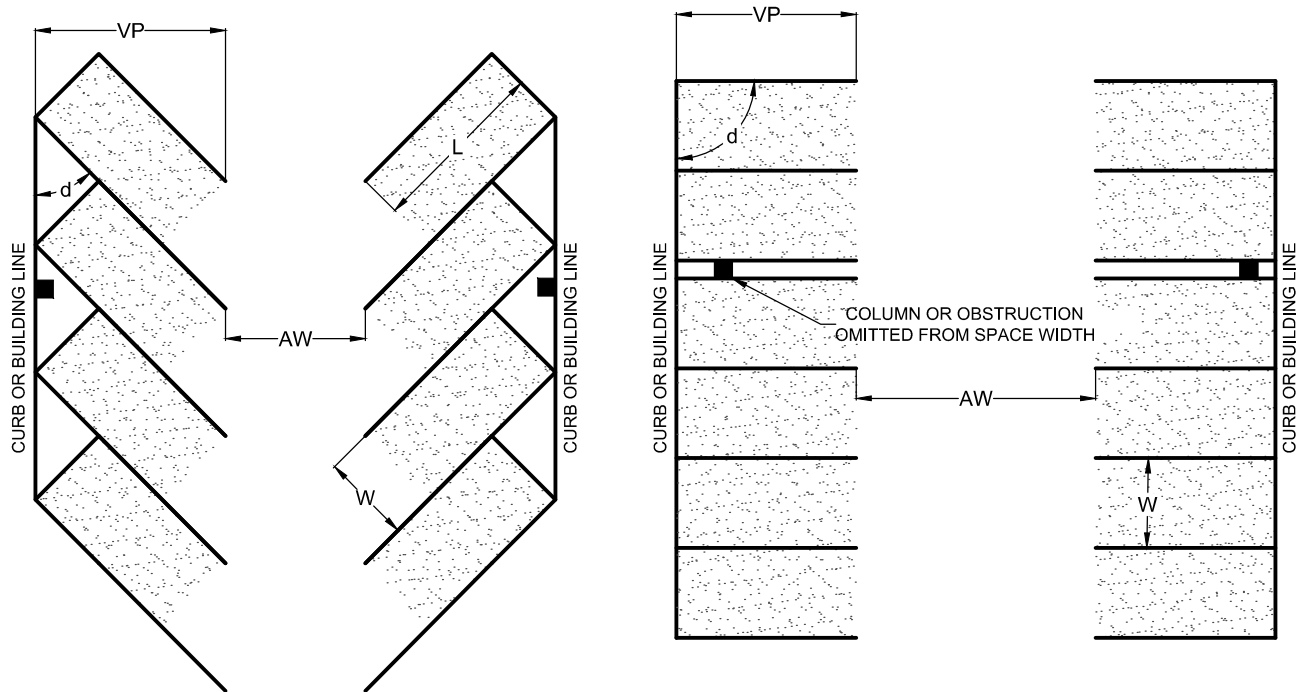
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

SLIPFORM CONCRETE CURB

I-16



Standard Parking Dimensions

Parking Angle (d)	Space Length (L)	Space Width (W)	Aisle Width (AW)	Vehicle Projection (VP)
90°	18	9	24	18.0
75°	18	9	22	19.7
60°	18	9	19	20.1
45°	18	9	14	19.0
30°	18	9	12	16.7
0° (parallel)	20	8	12	8.0

Compact Parking Dimensions

Parking Angle (d)	Space Length (L)	Space Width (W)	Aisle Width (AW)	Vehicle Projection (VP)
90°	15	8	24	15.0
75°	15	8	22	16.8
60°	15	8	19	17.5
45°	15	8	14	16.9
30°	15	8	12	15.2
0° (parallel)	15	7	10	7.0

NOTES:

All dimensions in feet

1. STANDARD SPACE WIDTH MAY BE REDUCED TO 8.5 FEET IN LOW-TURNOVER LOTS.
2. COMPACT SPACES SHOULD BE DESIGNED AS CLOSE TO STANDARD AS POSSIBLE WITHIN SITE CONSTRAINTS.
3. ACCESSIBLE PARKING SPACES SHALL BE PROVIDED IN ACCORDANCE WITH ADA, AND SHALL BE CONSIDERED A STANDARD PARKING SPACE WHEN CALCULATING THE PERMISSIBLE NUMBER OF COMPACT SPACES.

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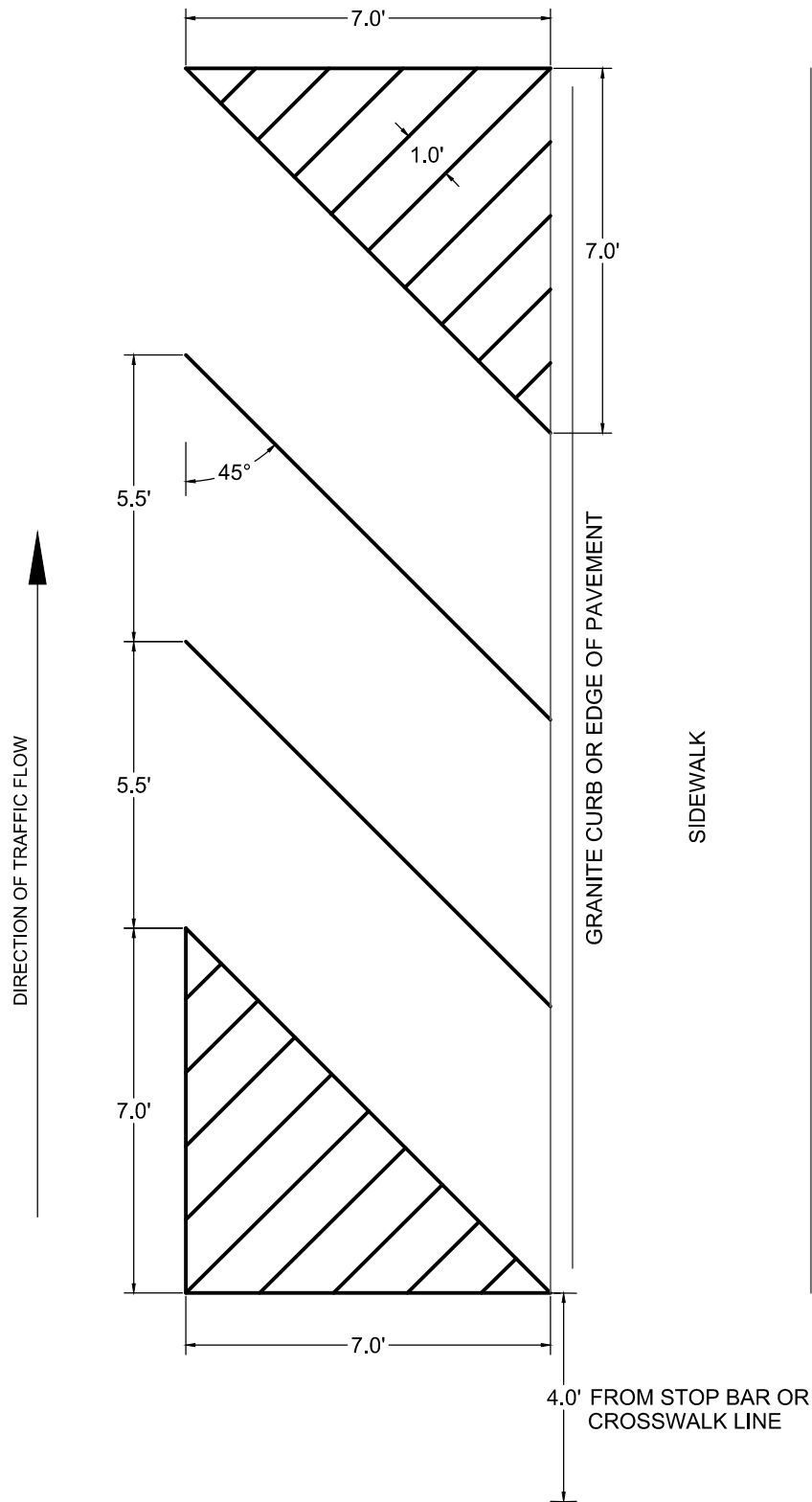
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

VEHICLE PARKING DIMENSIONS

I-16A



MOTORCYCLE PARKING

*ALL PAVEMENT MARKINGS SHALL BE 4 INCH WIDE WHITE LINES.

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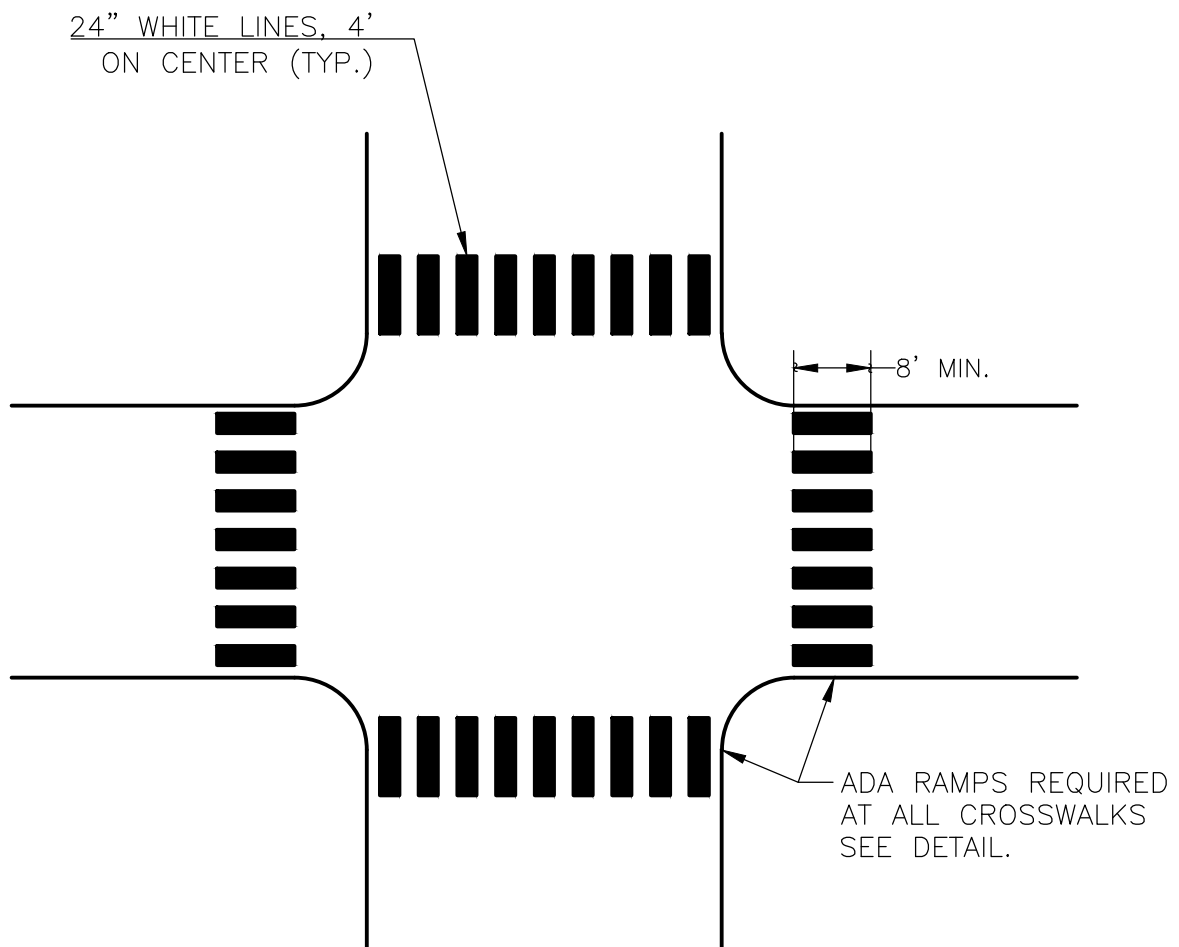
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

MOTORCYCLE PARKING DIMENSIONS

I-16B



CROSSWALK MARKINGS

NOT TO SCALE

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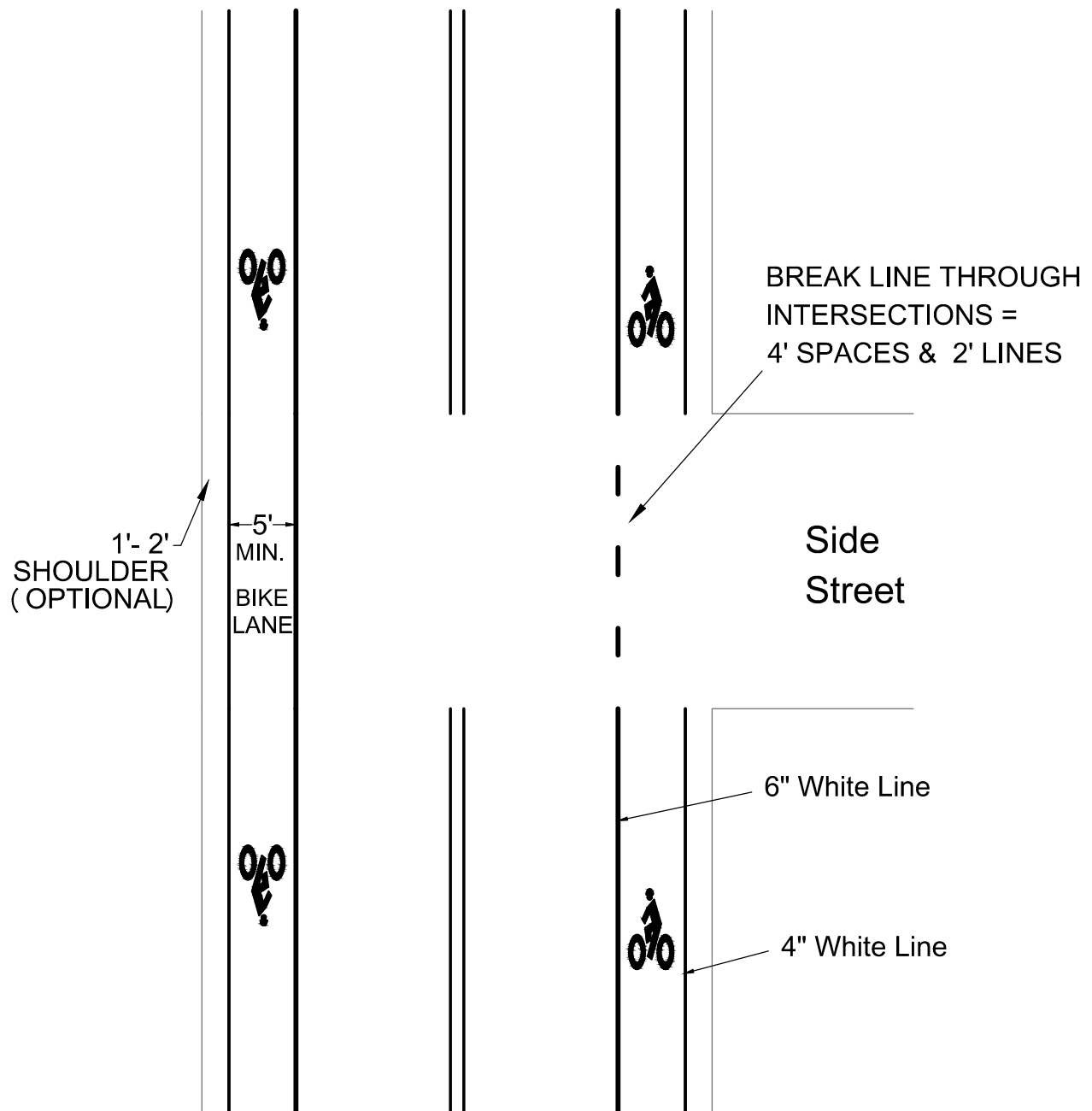
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

I-17

TYPICAL CROSSWALK MARKINGS



CITY STREET W/ BIKE LANES

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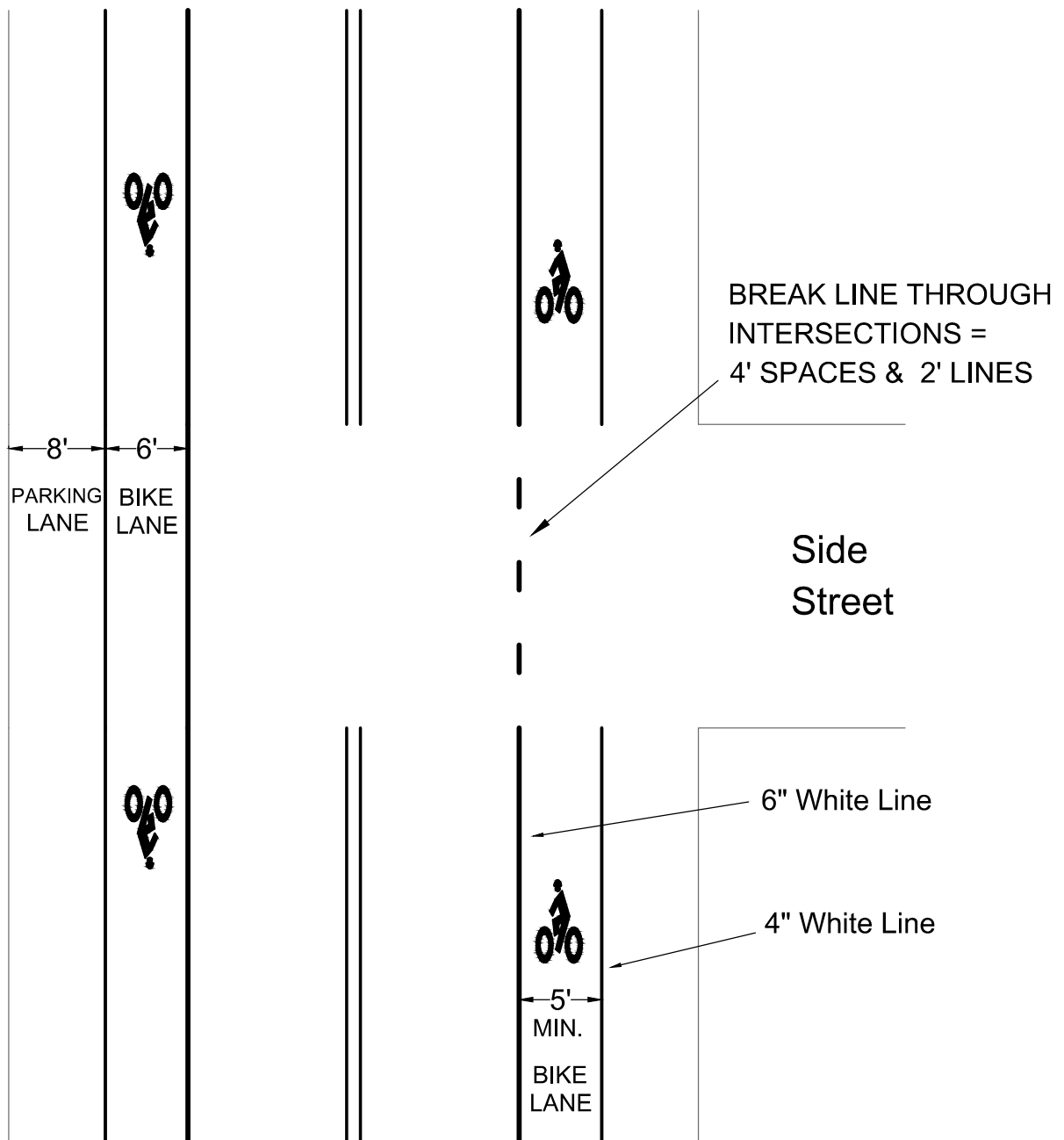
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**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

CITY STREET W/BIKE LANES & NO PARKING

I-20A



CITY STREET W/ PARKING & BIKE LANES

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TECHNICAL STANDARDS MANUAL

**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

FIGURE:

CITY STREET W/BIKE LANES & PARKING

I-20B

TYPICAL BICYCLE LANE PAVEMENT MARKINGS



SHARED USE LANE
SYMBOL



BICYCLE LANE
SYMBOL

TYPICAL BICYCLE ROUTE SIGNAGE



R3-17
30"x24"



R3-17
30"x24"



R3-17B
30"x12"



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TECHNICAL STANDARDS MANUAL

**TRANSPORTATION
DESIGN STANDARDS**
SECTION I

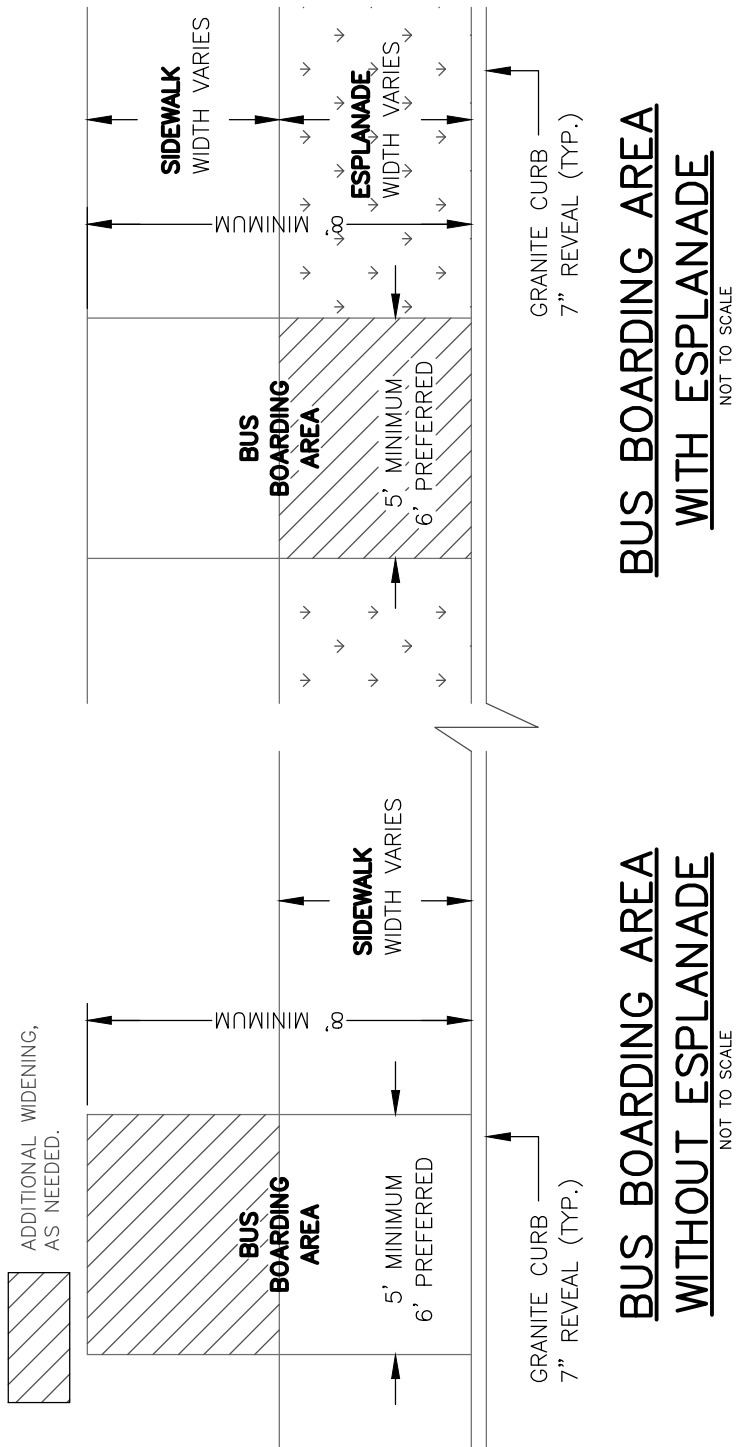
FIGURE:

**TYPICAL BIKEWAY PAVEMENT MARKINGS
AND BICYCLE ROUTE SIGNAGE**

I-21

NOTES:

1. **SURFACE.** BUS STOP BOARDING AREAS SHALL HAVE A FIRM, STABLE SURFACE.
2. **DIMENSIONS.** BUS STOP BOARDING AREAS SHALL PROVIDE A CLEAR LENGTH OF 8' MINIMUM, MEASURED PERPENDICULAR TO THE CURB OR VEHICLE ROADWAY EDGE, AND A CLEAR WIDTH OF 5' MINIMUM, MEASURED PARALLEL TO THE VEHICLE ROADWAY. THIS AREA SHALL BE CLEAR OF ANY OBSTRUCTIONS, INCLUDING BUT NOT LIMITED TO: BICYCLE RACKS, LIGHT POLES, UTILITY POLES, FIRE HYDRANTS, STREET SIGNS, STREET FURNITURE, NEWSPAPER BOXES OR SIMILAR OBSTACLES.
3. **CONNECTION.** BUS STOP BOARDING AREAS SHALL BE CONNECTED TO STREETS, SIDEWALKS OR PEDESTRIAN PATHS BY AN ADA ACCESSIBLE ROUTE.
4. **SLOPE.** PARALLEL TO THE ROADWAY, THE SLOPE OF THE BUS STOP BOARDING AREA SHALL BE THE SAME AS THE ROADWAY, TO THE MAXIMUM EXTENT PRACTICABLE. PERPENDICULAR TO THE ROADWAY, THE SLOPE OF THE BUS STOP BOARDING AREA SHALL NOT EXCEED 2%.



**BUS BOARDING AREA
WITH ESPLANADE**
NOT TO SCALE

**BUS BOARDING AREA
WITHOUT ESPLANADE**
NOT TO SCALE

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**TRANSPORTATION
DESIGN STANDARDS
SECTION I**

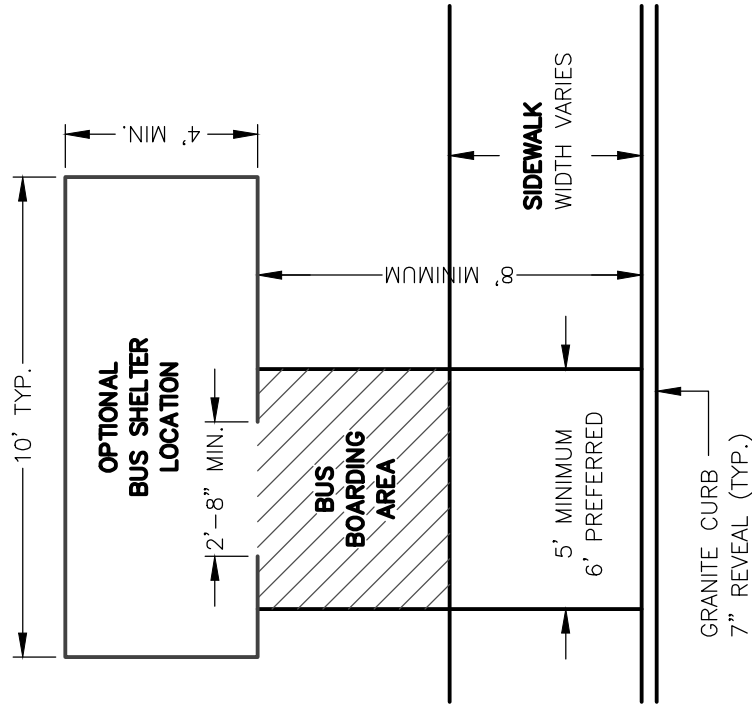
FIGURE:

I-39

**BUS STOP BOARDING AREA LAYOUT FOR
SIDEWALK WITH OR WITHOUT ESPLANADE**

NOTES:

1. **DIMENSIONS.** MINIMUM CLEAR FLOOR INTERIOR AREA ENTIRELY WITHIN THE PERIMETER OF THE SHELTER IS 2'-6" WIDE BY 4' DEEP TO PERMIT WHEELCHAIR OR MOBILITY AID USER ACCESS. THE MINIMUM SHELTER OPENING FOR WHEELCHAIR ACCESS IS 2'-8".
2. **CONNECTION.** BUS SHELTER OPENINGS WILL BE CONNECTED TO THE BUS BOARDING AREA BY AN ADA ACCESSIBLE ROUTE.
3. **SLOPE.** PARALLEL TO THE ROADWAY, THE SLOPE OF THE BUS BOARDING AREA SHALL BE THE SAME AS THE ROADWAY, TO THE MAXIMUM EXTENT PRACTICABLE. PERPENDICULAR TO THE ROADWAY, THE SLOPE OF THE BUS BOARDING AREA SHALL NOT EXCEED 2%.



**BUS SHELTER AND SHELTER SITING
WITHOUT ESPLANADE**

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CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**TRANSPORTATION
DESIGN STANDARDS
SECTION I**

**BUS SHELTER AND SHELTER SITING LAYOUT
FOR SIDEWALK WITHOUT ESPLANADE**

FIGURE:

I-40

17. TRANSPORTATION STUDIES & PLANS

17.1. TRANSPORTATION STUDIES

17.1.1. Definitions. For the purposes of this section, **passenger car equivalents (PCE)** shall be defined as the number of passenger cars or, in the case of non-passenger vehicles, the number of passenger cars that would be displaced by non-passenger vehicles. One tractor trailer combination is the equivalent of two passenger cars.

17.1.2. Applicability: Developments that generate 100 PCE or more during a peak hour period, thus requiring a Traffic Movement Permit (TMP), shall meet the requirements of TMP regulations of State Law, in addition to all applicable transportation site plan standards of the City Code. For more information concerning state TMP requirements, please refer to <https://www.maine.gov/mdot/traffic/docs/229c305.pdf> <http://www.maine.gov/mdot/traffic-counts/traffic-mvmnt-app.php> or contact the Maine Department of Transportation (MaineDOT). The City of Portland is the delegated reviewing authority for TMP applications. The calculation of the PCE trip level for determination of TMP thresholds shall be made prior to trip reductions for other modes or shared trips.

Developments ~~that generating at least~~ less than 100 PCE and less than 100 PCE during a peak hour period may be required to complete a transportation study. The determination shall be made by the City Traffic Engineer, based upon the proximity of the development site to identified issues related to safety, congestion, and/or multi-modal accessibility. ~~passenger car equivalents (PCE) but require a scoping meeting because they generate 25 PCE or more and are located~~

~~(1) on an arterial; and/or~~

~~(2) within ½ mile of a high crash location; and/or~~

~~(3) within ¼ mile of an intersection that has been identified in a previous traffic study as a failing intersection, with an overall level of service below level of service D;~~

~~shall meet the following standards, if a traffic study is required:~~

17.1.3. Preparation: ~~Transportation~~ studies shall be prepared, stamped, and signed by a Professional Engineer licensed in the State of Maine.

17.1.4. Scope of Study: The City Transportation Engineer, in consultation with the applicant's engineer, shall determine the ~~need for and~~ scope of the ~~transportation~~ study. The scope of the study may include, but is not limited to, the following elements: ~~The requirements for the study shall be based on standard transportation engineering practice~~

A typical traffic study includes the following major sections:

- A description of the development proposal.
- A description of the existing multi-modal transportation conditions and context.
- Estimated trip generation by the development and design hour volume for site-affected driveway(s) and study intersections by mode.
- Trip generation, ~~will be~~ based upon ~~the latest edition of the current~~ Institute of Transportation Engineers data, or approved alternate methodology, by mode. ~~Trip Generation publication unless suitable documented local data that meets ITE methodology is available.~~
- Trip distribution.
- Capacity analysis at study area intersections, including level of service (LOS), delay, volume-to-capacity ratios, and queue analysis. ~~for adjacent roadways and for any existing or proposed driveways.~~
- ~~C~~Traffic crash analysis within the study area, or expanded study area if deemed appropriate for adjacent roadways.
- Key findings ~~concerning regarding~~ traffic and safety issues in the existing condition or as a result of project-generated trips. ~~impacts, problems, and deficiencies.~~
- Analysis of impacts to pedestrians, bicyclists, and transit service and users. ~~Proposed traffic improvements.~~
- Summary of findings and recommendations for transportation improvements and other impact mitigation measures.

17.1.5. Mitigation: Mitigation of development project impacts may be required under MaineDOT TMP regulations by the City of Portland. In some cases, where safety or capacity improvements to vehicle operations are not feasible due to constraints, mitigation may consist of in-kind improvements to pedestrian, bicycle, and/or transit facilities. Where required, mitigation measures shall be included in the applicant's traffic study, and shall be approved by the Department of Public Works prior to site plan approval.

17.2. PARKING STUDY

Parking studies shall be produced by a licensed transportation professional engineer.

Where a parking study is required, data shall be determined by values contained in the current most up-to-date version of the Institute of Transportation Engineers (ITE) publication titled Parking Generation, or through local, regional or other pertinent national data. If local or regional data is to be used, the scope and methodology of the parking study shall be coordinated with the City Transportation

Engineer.

Parking studies for mixed-use developments shall reference best practices for shared parking, both in terms of calculations and studies, such as the Urban Land Institute's Shared Parking.

Where a parking study is required, the ~~applicant's engineer shall have a scoping meeting with the City Transportation Engineer or their designee to determine the need for and required scope of the study~~ scope of study shall be determined in coordination with the City Transportation Engineer. The requirements for the study shall be based on standard transportation engineering practices.

17.3. TRANSPORTATION DEMAND MANAGEMENT (TDM)

All TDM Plans shall ~~include specific provisions for the following:~~

17.3.1. Include a T~~ransportation~~ ~~n~~arrative:

Every TDM plan shall describe how the project fits within the multimodal transportation system serving the district in which the development or site is located. The narrative should address the specifics of the land uses, occupants, visitors, and location of the development and how it is anticipated to relate to its transportation context.

The narrative for the transportation context should address applicable existing conditions and TDM challenges and opportunities for the site related to vehicular access and circulation, the quality of the bicycling and pedestrian environment and facilities, transit service levels and the transit-supportive environment, and current levels of parking and parking policies. For existing developed sites, the current state of any TDM-related efforts should be described.

17.3.2. Identify a TDM Coordinator to administer the TDM plan:

Every TDM Plan ~~shall~~needs to identify a TDM coordinator~~the plan administrator~~ and establish the roles and responsibilities of the ~~administrator~~coordinator. The plan should demonstrate how the administration of the TDM plan and role of the TDM coordinator will reflect the scale of the site/development, proposed uses, parking and vehicle trip reduction targets, as well as the ownership and property management framework.

17.3.3. Employee and Customer Survey~~Document~~ baseline TDM data:

The TDM plan shall identify baseline travel demand and supply data for the

development or site, against which future performance can be measured. Baseline data shall include existing trip generation and projections (where applicable), existing or proposed parking supply and projected demand, and existing or projected modal split. Baseline data shall correspond to the transportation analysis required for the project, and shall be prepared by a qualified professional using ITE trip and parking generation data or project-specific trip and parking generation figures based on another methodology as approved by the reviewing authority. ~~develop and use an employee and/or customer survey format that:~~

- ~~• Is specifically designed to reflect the use mix within the development.~~
- ~~• Is electronically tabulated.~~
- ~~• Produces comparable data from year to year~~
- ~~• Allows for compilation of data from multiple employers by third party.~~
- ~~• Allows for data use by employees to foster car pooling and ride sharing.~~
- ~~• Identifies barriers to or best practices in public transit, bicycle, and pedestrian transportation.~~
- ~~• Can be conducted periodically (typically annually) and can be used to monitor program effectiveness and provide the basis for periodic plan adjustment (see monitoring section below).~~

1.13.4. Set ~~Parking and Trip Reduction~~ TDM ~~Targets~~:

The TDM plan shall establish TDM targets, based on the combination of land uses, location, transportation context, and other data for the site. TDM targets shall relate directly to the transportation infrastructure provided, TDM strategies to be employed, and site context. The metrics for TDM targets shall be measurable, and shall include goals for reductions in single-occupancy vehicle trips, parking demand/utilization, and/or mode split. The targets shall be described in both absolute values and percentage terms. ~~, intended TDM strategies to be employed~~ use ITE trip generation and parking demand projections as the basis to establish a projected transportation demand and/or impact of the development. Alternatively, project-specific parking and trip generation projections may be used in place of ITE standards, if estimated by a licensed professional engineer and approved by the City. A project specific demand analysis may be advantageous to projects that can demonstrate reduced parking demand and trip generation based on approved assumptions in their TDM and Site Plan.

~~The TDM plan must use the specific use, location, local alternative transportation opportunities, and initial survey results to establish an achievable percentage reduction in transportation demand for the project. The TDM plan will utilize the stated parking and trip reduction targets as the basis for reduced infrastructure and contribution requirements for the Planning Board's evaluation.~~

17.3.5. Set cCustomized Pparking and Ttrip Rreduction and modal split Sstrategies:

~~Every TDM plan shall include a set of strategies designed to achieve the TDM targets. The strategies should must be customized to reflect the specific mix of uses, the population that will access the site, the scale of development, the location, the vehicle trip and parking reduction targets, modal split targets, and the transportation opportunities available to the site. proposed for the development. For example, A residential development will utilize a very different approach to reducing project generated parking and trips than an office building. Likewise, the administration of the TDM plan and the role of the TDM Coordinator must adequately respond to the scale of the development, the uses in the development, as well as the ownership framework and management of the facility.~~

1.13.6. Education:

~~The TDM plan shall, at a minimum include provisions for the following. All educational information and programs shall be readily accessible to all project occupants.~~

- ~~• Transit maps and schedules. These shall be posted and updated by the TDM Coordinator, as necessary.~~
- ~~• Access to information concerning transportation providers and guaranteed ride home services such as: carpooling list serves and/or van pool providers.~~
- ~~• Internal information sharing such as posting a "Ride Board" or employee email list serve to facilitate carpooling and to share the results of employee and customer surveys.~~
- ~~• Educational and promotional materials that describe and identify the advantages and cost saving opportunities of using alternative transportation, including specific incentives offered by the employer.~~
- ~~• Recognition of employees who reduce the traffic impact of the development through newsletter, email, bulletin board, or other announcements.~~
- ~~• Information on bicycling routes, parking infrastructure and locations and~~

~~other amenities or incentives that may be available.~~

17.3.6-7. ~~M~~Establish a monitoring plan:

All TDM plans must include provisions for monitoring program effectiveness over time to establish whether progress toward TDM trip reduction targets are being met.

Responsibility: TDM Coordinators and/or plan administrators are responsible for monitoring the efficacy of the TDM plan ~~periodically over time~~ and making adjustments to the plan needed to achieve trip reduction targets.

Methods: The methods ~~and scheduling~~ of monitoring shall be outlined in the TDM plan ~~and shall follow accepted transportation engineering~~. Monitoring methods will typically involve use of the periodic survey combined with ~~direct observation~~ other data collection, such as parking utilization counts.

Reporting: The results of TDM plan monitoring shall be reported to the City of Portland using reporting tools(s) provided by the city. ~~compiled into a report that compares the results to trip reduction targets and parking demand projections. The monitoring results shall be provided to the Reviewing Authority according to the monitoring schedule established in the TDM plan.~~

1.13.8. Project Specific Standards:

~~Individual TDM Plans shall assess the following topics on a site-specific basis tailored to the transportation needs of the development.~~

1. ~~Infrastructure:~~

~~On-site and off-site infrastructure improvements may be incorporated to achieve trip reduction targets and may include the following:~~

- ~~• Public Transit Access: The TDM plan shall identify how occupants and/or visitors will access public transit. Pedestrian links to bus routes and or other transit links shall be identified and their usability assessed for sidewalk condition, ADA accessibility, street lighting, cross walk facilities, wayfinding, and general safety and attractiveness. The nearest sheltered public transit facility shall be identified. Deficiencies in the links to public transit that constitute barriers to its use shall be addressed in the TDM plan and in the site plan.~~
- ~~• Bicycle Parking: Minimum bicycle parking is a site plan requirement according to Article 14 of the Land Use Code. The TDM plan may incorporate additional bicycle parking, bicycle wayfinding, and/or covered parking to further~~

~~encourage bicycle use.~~

- ~~• On-site Shower and Locker Facilities: Access to showers and locker facilities may be incorporated into the TDM Plan in order to encourage human-powered transportation alternatives.~~
 - ~~• TDM Bulletin Board or Kiosk: TDM plans shall identify to occupants where information and educational material will be provided within the development a visible and convenient facility such as a transportation bulletin board and/or kiosk. In multi-tenanted facilities, transportation information shall be provided in the lobby of the structure or other such location that is accessible and frequented by a significant majority of occupants and visitors to the facility. The TDM coordinator shall be responsible for keeping all material current and available, as needed.~~
- ~~2. Incentives: Incentives available to users and/or occupants of the development may be incorporated to achieve trip reduction targets and may include the following:~~
- ~~• Parking “Cash Out”: TDM plans may include “parking cash out” incentives where employees have the choice of receiving monetary payments in lieu of provided parking. The efficacy of these programs will need to be carefully assessed and the method of monitoring must be described in the TDM plan.~~
 - ~~• Public Transit Passes/Van Pool vouchers: Free or reduced price bus passes or van pool vouchers may be used as an incentive in the TDM plan. The use of transit options should be incorporated into the employee/customer survey and incorporated into the plan monitoring program. Transit payment options may be combined with parking cash out incentives, where appropriate.~~
 - ~~• Preferred parking for car pool: Car pooling employees may be provided with more convenient and attractive parking, if available. If this option is incorporated into the TDM plan, the location of preferred parking shall be identified on the site plan and signed accordingly.~~
 - ~~• Car sharing: Residential developments may incorporate shared car services or jointly owned vehicles into the TDM plan. Commercial development TDM plans may identify use of a shared vehicle for use by employees for either commercial or personal trips through the work day as a means to encourage alternative commuting to work.~~
 - ~~• Telecommuting, flex time, and other flexible work scheduling mechanisms that promote fewer employee trips to work or promote alternative~~

~~transportation travel.~~

~~*Other incentives infrastructure improvements and/or methods as may also be appropriate to the development.~~

1.1822. CONSTRUCTION PERMITTING AND TRAFFIC CONTROL PLANS

1.1822.1. Construction activity in the public right-of-way is controlled by Chapter 25 Article VII of the City Code of Ordinances. Required licenses and permits, restrictions on activity, and fees & charges are all outlined in that Chapter. Rules and Regulations for Excavation Activity are available through the Street Opening Clerk at the Department of Public Services.

1.1822.2. Sewer and stormwater system connections are controlled by Chapters 24 and 32 of the City Code of Ordinance. Required permits for new connections and/or abandonment of existing connections are available through the Street Opening Clerk at the Department of Public Services. Rules and Regulations for these utility systems are available through the City Engineer's office of the Department of Public Services. See also Section II of the Technical Manual for lateral abandonment requirements associated with demolition permits.

1.1822.3. Traffic Control Plans: Construction activity that impacts the existing public street system must be controlled to protect the safety of the construction workers and all modes of the traveling public. Projects that will occur along arterial and/or collector streets are required to submit a satisfactory 'maintenance of traffic' (MOT) plan prior to any site plan, subdivision, or street opening permit approval.

Maintenance of Traffic (MOT) plans shall provide for the safe passage of the public by all modes of transportation through or along the construction work zone. On a case-by-case basis applicants may be allowed to close a street and/or detour a mode of traffic when absolutely necessary for safety. MOT plans shall employ the appropriate techniques and devices as called for in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). In addition:

- Construction speed signing may be used as needed to slow traffic
- Traffic Control signs shall not be placed where they are an obstruction to bicycles or pedestrians. ADA-compliant access shall be maintained at all times and documented within Traffic Control Plans.
- In ~~extreme~~ some situations, flaggers may be required to allow for safe pedestrian and bicycle movement

Additional information for temporary traffic control plans is provided in Chapter

6 of the MUTCD. (https://mutcd.fhwa.dot.gov/htm/2009/part6/part6_toc.htm)

1.~~1722~~.4. All existing modes of travel in the work zone area shall be accommodated if impacted by the activity. The safe passage of pedestrians, bicyclists, transit providers, and motorists are of equal importance when planning out the work zone; no pre-existing travel mode may be eliminated without the express approval of the Department of Public WorksServices.

- Traffic control for bicycle and pedestrian facilities or routes through work zones shall be maintained until the bicycle and pedestrian facilities or routes are ready for safe operation. Traffic control will not be removed to allow auto travel at the expense of bicycles and pedestrians.
- Where pedestrian traffic is significant, and/or where a detour would present a significant delay to pedestrians, a temporary walkway in the shoulder/parking lane/outside travel lane may be required where possible. Any temporary walkway shall be ADA-accessible, including temporary ADA ramps leading to/from the walkway where needed, and solid, detectable barriers along the edges of the walkway. Temporary walkways shall be kept clear of snow, ice and debris by the contractor at all times. Temporary walkways shall have a minimum clear width of five (5) feet.
- Pedestrian detours shall be considered as a last resort where no other practical option is available. Where pedestrian detours are allowed, pedestrians shall be directed to cross at existing crosswalk locations where practical. Temporary crosswalks may be required to shorten the overall detour. Any temporary crosswalk shall be ADA-compliant and shall be located where sight distance is adequate. All temporary crosswalks shall be approved by the Department of Public Works.
- Where construction requires the closure of a bicycle lane or shared use pathway alongside a high-volume and/or high-speed roadway, bicycle traffic shall be managed by the contractor in coordination with the Department of Public Works. Treatments may include a barrier-protected bicycle lane or shared use path, or bicycle detours as a last resort.
- Barrier systems utilized to separate the construction activity from the public street and/or sidewalk shall not inhibit sight distances, particularly for visibility of pedestrians and bicyclists.

For reference, see also “How to Plan, Document, and Implement Pedestrian Mobility in and around Work Zones”
(<https://portlandmaine.gov/DocumentCenter/View/30884/Work-Zone-ADA>)

1.22.5. Use of public parking spaces or the blockage of any portion of sidewalk for the purpose of construction activity shall require an occupancy permit and appropriate fee as assessed by the Department of Public Works~~Services~~.

2. SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS

2.1. Technical Reference

- 2.1.1. The following technical publications are recognized by the City of Portland for use in the design, construction and testing of sanitary and storm water systems:
- 2.1.2. Technical Report #16 (TR-16): Guides for the Design of Wastewater Treatment Works, Prepared by the New England Interstate Water Pollution Control Commission available for review at the Department of Public Works or online at www.neiwpcc.org/tr16guides.asp
- 2.1.3. Maine Department of Transportation (MDOT) Standard Specifications for Highways and Bridges, Current Edition.

2.2. Sanitary Standards and Specifications

- 2.2.1. Sewer and Storm drain systems shall be planned and constructed in accordance with the regulations contained in Chapter 24 of the City Code of Ordinances.
- 2.2.2. The information presented below are City of Portland exceptions to the TR-16 or additional required standards.
- 2.2.3. The introduction of non-contaminated water such as rain water, non-contact cooling water, groundwater from foundation drains, sump pumps, surface drains or any other sources of inflow shall not be ~~allow~~allowed to discharge into a sewer which conveys sanitary waste unless approved by the Public Works Director~~City Engineer. When no other practical alternatives exist, this condition may be waived by the City Engineer. All~~
- 2.2.4. Appeals will be considered by the Director of Public Works~~Services~~. (Refer to: Sec. 24-44 of the City Code - Public sewer connection limitations).
- 2.2.5. It is not permissible to backfill any excavation with frozen materials, organic materials, clay or blasted ledge. The maximum size of backfill material shall not exceed six inch (6"). (Please refer to Division 2, Street Opening Permits in the City Code).
- 2.2.6. The Department of Public Works~~Services~~ shall be responsible for televising all new sewer construction for acceptability as soon as backfilling has been completed and access is available. The permittee will be invoiced for these services. Information on current rates is available in Chapter 24 Sewer Ordinance~~through the City of Portland Wastewater Maintenance Division.~~
- 2.2.7. Permits to connect to the municipal stormwater and sanitary sewer system are required and may be obtained from the Department of Public Works~~Services~~.
- 2.2.8. Enclosed parking, mechanical rooms, garages (parking areas not exposed to rain and snow) shall direct surface drainage to a sanitary sewer. Drainage from these areas shall be collected by an Oil/ Grit Separator as shown in Figure II-20 or an approved equal.

2.3. Sanitary Manholes

- 2.3.1. All manholes shall be designed in conformance with City of Portland standards as illustrated in Figure II-~~01~~02.
- 2.3.2. When constructing sanitary manhole channels, if the ~~mathematical~~Vertical difference between the invert elevation of the manhole channel and the invert elevation of the sewer pipe connecting to such manhole is two vertical feet (2') or greater, a standard City of Portland internal drop manhole shall be provided. Such drop manholes shall conform to the engineering specifications illustrated in Figure II-03. A minimum of two stainless steel pipe anchors shall be used and the manhole diameter shall be five feet (5') minimum. Drop manholes on stormwater collection systems are permitted.
- ~~2.3.3. Internal drop connections are prohibited unless site specific constraints warrant an exception. Where exceptional circumstances necessitate a waiver to allow for construction of an internal drop connection, a minimum of two stainless steel pipe anchors shall be use and the manhole diameter shall be five (5) feet minimum. Waiver requests will be evaluated on a case by case basis.~~
- 2.3.3. Sanitary ~~Service-service~~ laterals that are four inch (4") or six inch (6") shall not be connected to either stormwater or sanitary manhole into a sanitary manhole and only into a sanitary sewer main.
- 2.3.4. ~~Stormwater and~~ Sanitary manholes shall include frames and covers as shown in Figure II-05 or an approved equivalent. Both the frame and riser shall be machined to assure a proper fit.
- 2.3.5. Manhole covers shall be marked "SEWER" ~~or "Drain" accordingly.~~
- 2.3.6. Manhole frames shall be raised to grade using only brick and mortar as shown in Figure II-02 or approved equal.
- 2.3.7. Riser Rings without tabs as shown in Figure II-06 may ~~shall~~ be used to adjust manholes to grade with approval of the Department of Public Works. ~~Wastewater Maintenance Division.~~
- ~~2.3.6.~~2.3.8. All new sanitary manholes shall be vacuum tested before backfilling. Refer to TR-16 for testing standards.
- 2.3.9. All manholes shall have copolymer polypropylene plastic steps with 3/8" grade 60-rebar continuous throughout, spaced at one foot (1') intervals. Steps are not required in sewer manholes. Any structures delivered to the site with step "holes" shall be filled with mortar

2.4. Sanitary Gravity Pipes

- 2.4.1. The types of allowable pipe shall be used for purposes of sanitary sewers, ~~storm sewers, catch basin drains, or underdrains shall be:~~
- ~~Reinforced Concrete Pipe (RCP) with a minimum strength of Class III;~~
 - PVC Ring Type Sewer Pipe (SDR 35 or equivalent, minimum PS-46 rating)
 - PVC Ring Type Sewer Pipe meeting ASTM F 789 or equal to SDR
 - Ductile iron Pipe (DIP)
 - ~~ADS N-12 HP triple wall pipe meeting a minimum PS-46~~
 - ~~ADS SaniTite HP meeting a minimum PS-46~~
 - High Performance Polypropylene Dual Wall Sewer Pipe (ADS SaniTite HP or equal) meeting ASTM F2736 and have a minimum pipe stiffness of 46 psi with pipes sizes twelve inch (12") through thirty inch (30").
 - High Performance Polypropylene Triple Wall Sewer Pipe (ADS SaniTite HP or equal) meeting ASTM F2764 and have a minimum pipe stiffness of 46 psi with pipe sizes thirty inch (30") through sixty inch (60").
- 2.4.2. Minimum velocities ~~of surface water drains~~ for sanitary pipes shall not be less than ~~three (3.0) feet per second~~ two feet per second (2 ft/s).
- 2.4.3. All PVC connections shall be made with Solid PVC Couplings.
- 2.4.4. The classes of pipe indicated shall be minimums, however the actual class of pipe used shall be determined by soil weight and compaction loads applied to such pipe in accordance with standard engineering design criteria and subject to the approval of the City Engineer.

2.5. Force Mains:

- 2.5.1. Force mains four inches (4") or greater shall terminate at a transition manhole and flow by gravity within a minimum sized eight inch (8") pipe to a City manhole.
- 2.5.2. Force mains less than four inches (4") may terminate to the nearest precast concrete manhole as directed by the City.
- 2.5.3. Cores into existing manholes shall be made with coring machines and have link seal or equivalent wall penetration seals.
- 2.5.4. Existing brick manholes shall be allowed for less than four inch (4") termination of force mains if full manhole reconstruction or replacement is performed as determined by the Department of Public Works.
- 2.5.5. All force mains shall be at a minimum HDPE SDR-21 made with fully restrained connections or equal. Piping pressure ratings shall be at least two (2) times the operating pressure of the system.
- 2.5.6. Force main discharge shall be directed into the channel in the direction of gravity flow.

2.5.2.6. Building Sewer Laterals

2.5.1.2.6.1. Construction of building sewers and drains shall conform to Chapter 24 (Sewers) of the City Code of Ordinance.

2.5.2.2.6.2. All building sewer laterals shall have a minimum diameter of four inch (4") and a minimum slope of one eighth inch per foot (1/8 in/ft) installed, as shown in Figure II-12.

2.5.3.2.6.3. Typical Pipe Installation: Where a building sewer lateral is to be installed from the sewer main in the street to a property or building to be served, the lateral shall either extend to the building or to the street line of each lot to be served and the pipe shall be capped air-tight.

2.5.4.2.6.4. An accurate record of each building sewer, its location and its depth at the street line shall be kept by the developer's engineer and a copy of the same shall be provided to the City Engineer-Department of Public Works.

2.5.5.2.6.5. For new construction, the location of the building sewer at the street line shall be physically marked by the placement of a two inch by four inch (2" x 4") wooden stake placed at the end of the lateral end-cap and extending one foot above finished grade.

2.5.6.2.6.6. Each stake shall be painted with a fluorescent paint and marked as storm or sanitary sewer with the depth indicated from grade to end-cap. A one quarter inch (1/4") thick by six inch (6") square ferrous metal plate or equivalent shall be placed horizontally one foot below grade over the end of the storm drain.

2.5.7.2.6.7. Building sewers and drains shall be connected to the main sanitary sewer line by the use of wyes, tee/gyes, Inserta-Tees or similar approved methods as determined by the Department of Public ServicesWorks. A manhole shall be installed at the sewer main to connect building laterals when the building lateral is eight inches (8") or larger in diameter. The lateral connections shall be installed from the main toward the lot where possible. Inserta-Tees can be installed on pipes when the main receiving pipe is at least twelve inches (12") in size and the lateral is not more than half the size of the main receiving pipe in order to use a coring tee-type connection.

2.6.8. Before connecting new pipes into an existing sewer line, the contractor shall obtain a sewer connection permit from the Department of Public ServicesWorks.

2.6.9. Accessory Dwelling Units (ADU) -sewer laterals

2.6.9.1. Per Chapter 24 of the City Code of Ordinance "A separate and independent building sewer shall be provided for every new building, and a separate connection shall be made for each building sewer." The Department of Public Works recognizes the following scenarios for the

successful connection of the proposed ADU to the public sewer system. See Figure II-21 for additional information.

- A. The proposed ADU is connected to the primary residence. In this scenario, the ADU may be connected to the primary residence sewer lateral internal to the primary residence.
- B. The proposed ADU is a separate standalone building: In this scenario, a separate and independent sewer lateral will be provided from both buildings with independent connections to the sewer.
- C. The proposed ADU is a separate standalone building: In this scenario, a separate and independent sewer lateral will be provided from both buildings with a connection of the two laterals into a sewer manhole at the property line. The sewer manhole will be a minimum two-foot (2') size providing access to each sewer lateral. The sewer manhole may be placed on the existing sewer lateral from the primary residence with the ADU sewer lateral being fed into it.

2.5.8-2.6.10. All new laterals connecting to a combined sewer system shall have a Backflow Prevention Valve. The valve shall be installed to assure easy access and maintenance. When a Backflow Valve is installed, it is imperative that introduction of rain water, non- contact cooling water, groundwater from foundation drains, sump pumps, surface drains or any other sources of inflow not be allowed on the building side of the valve.

2.5.9-2.6.11. All building floor drains shall discharge to the sanitary sewer system.

2.5.10-2.6.12. Plugging of Abandoned Sewer Laterals: Prior to abandoning any storm water or sanitary sewer lateral, the applicant shall acquire a permit from the Department of Public Works. The applicant shall provide a 48 hour notice to the Public Works Dispatch stating the date and time the applicant wished to complete the work. The Water Resources Sewer Maintenance Division will mobilize to the site and allow one hour to assist the applicant to plug the lateral in the following manner. The location of the lateral to be plugged shall be televised by the applicant and witnessed by Water Resources staff. ~~City staff will televise the sewer main in the street on site to determine the location of the lateral to be plugged.~~ The applicant shall excavate or other means plug the lateral at the main where the lateral connects to the street sewer, as determined by City staff. The lateral must be filled with pumped grout starting at the plug and filling out to the points of excavation.

2.7. Storm Water Manholes

~~2.5.11.~~2.7.1. Storm water manholes shall include frames and covers as shown in Figure II-05 or an approved equivalent. Both the frame and riser shall be machined to assure a proper fit.

2.7.2. Manhole frames shall be raised to grade using only brick and mortar as shown in Figure II-042.

~~2.5.12.~~2.7.3. Riser Rings without tabs as shown in Figure II-06 may ~~shall~~ be used to adjust manholes to grade with approval of the Department of Public Works. ~~Wastewater Maintenance Division.~~

~~2.5.13.~~2.7.4. Manhole covers shall be marked "DRAIN".

~~2.5.14.~~2.7.5. Steps are not required in storm manholes. Any structures delivered to the site with step "holes" shall be filled with mortar.

2.8. Storm Drains

2.8.1. The types of allowable pipe and fittings shall be used for purposes of storm drains:

- All pipes listed for sanitary sewers
- Reinforced Concrete Pipe (RCP) with a minimum strength of Class III;
- Smooth Bore High Performance Polypropylene Dual Wall Storm Drain Pipe. (ADS HP Storm or equal) meeting a minimum PS- 46.

2.8.2. Storm drain lateral may be connected into storm drain mains without the use of a manhole when the lateral is less than half the diameter of the receiving pipe.

~~2.5.15.~~2.8.3. Minimum velocities of surface water drains shall not be less than three feet per second (3 ft/s).

~~2.5.16.~~2.8.4. Ribbed corrugated polyethylene pipe material, smooth wall interior, is not permitted except for underdrain installation. Underdrain diameter shall be no larger than six inches (6").

~~2.5.17.~~2.8.5. The classes of pipe indicated shall be minimums, however the actual class of pipe used shall be determined by soil weight and compaction loads applied to such pipe in accordance with standard engineering design criteria and subject to the approval of the Department of Public Works~~City Engineer.~~

2.8.6. Pre-fabricated tees are allowable on storm drains. A pre-fabricated tee connection shall be used and installed in accordance with manufacturer specifications.

~~2.5.18.~~2.8.7. Connection of catch basin/storm drain lateral leads to storm drain larger than eighteen inch (18") diameter may be performed with the use of a coring machine and suitable connection device. The connecting pipe shall not be more than half the size of the main receiving pipe in order to use a coring tee-type connection.

2.6.2.9. Catch Basins

- ~~2.6.1.2.9.1.~~ All catch basins and catch basin inlets shall be designed and constructed in accordance with Figures II-~~072 and~~ THROUGH II-811.
- ~~2.6.2.2.9.2.~~ Catch basin drain pipes of less than ten inches (10") in diameter are not permitted.
- ~~2.6.3. All catch basin drains shall be supplied, laid and bedded in a minimum of six inches (6") of crushed stone.~~
- ~~2.6.4.2.9.3.~~ All catch basins shall have a four-foot (4') granite headstone of catch basin inlets conforming to City standards as shown in Figure II-11.
- ~~2.6.5.2.9.4.~~ No radius catch basin stones shall be permitted.
- ~~2.6.6.2.9.5.~~ All catch basins shall be constructed with a minimum sump of three feet (3').
- ~~2.6.7.2.9.6.~~ Catch basins shall not be located in driveway openings.
- ~~2.6.8.2.9.7.~~ No storm drains or storm drain laterals ~~lines~~, with the exception of street field inlets and underdrains, shall be connected into a catch basin structure.
- ~~2.6.9.2.9.8.~~ Catch basin drains and catch basin inlet drain pipe slopes shall be such that minimum flow velocities shall not be less than three feet per second (3 ft/s).
- 2.9.9. Bee hive casting shall be used on drainage structures located at low points in grassed off road locations.
- 2.9.10. Field inlets or Type-F catch basins may be used when- outside of city street right of ways within lawn areas, with Department of Public Works approval. They must have a minimum of a twelve-inch (12") sump and can be plastic or concrete.
- 2.9.11. All catch basins are required to have a hood on the outlet pipe as shown in Figure II-09.

2.10. Subsurface Wastewater Disposal

- ~~2.6.10.2.10.1.~~ To ensure that adequate provisions have been made for subsurface wastewater disposal, developers are required to locate, design, and install all septic systems in accordance with the latest version of the Maine Subsurface Wastewater Disposal Rules, 144 CMR minimum 241, as described in Chapter 6, Section 6-18(A) of the City Code.
- ~~2.6.11.2.10.2.~~ Developers are required to obtain a permit through the City of Portland Inspections Division prior to the installation of any subsurface wastewater disposal

system identified on an approved site plan.

2.11. Grease Interceptor

2.11.1. Grease Control Equipment is required for all food establishments based on the City of Portland's Fats, Oils, and Grease Program found in the Rules and Regulations for Use of the Sewer System.

2.11.2. Concrete grease interceptors must have two chambers. Chamber A, where influent enters, must be two thirds (2/3)s of the tank volume.

2.11.3. Concrete grease interceptors must have three twenty-four-inch (24") access points.

2.11.4. Tank must be designed for H-20 traffic wheel load and a concrete strength of 5000 PSI at 28 days.

2.11.5. Joints must be sealed with butyl rubber joint sealant such as CS-102 Butyl Rubber Sealant.

2.11.6. Tees inside grease interceptors must be supported. Galvanized riser clamps on drops must be rodded to tank wall with galvanized fasteners six inch (6") below service weight tee. Tees must be accessible via an unobstructed view for cleaning through top of grease interceptor.

~~2.6.12.~~2.11.7. High density polyethylene grease interceptors are accepted as an equivalent to concrete grease interceptors. Polyethylene units shall be properly anchored to prevent floatation.

~~2.6.13.~~2.11.8. A control manhole must be installed downstream of the interceptor. Alternatively, a manhole must be installed at the connection to the sanitary sewer.

2.7.2.12. Aggregate Specifications

~~2.7.1.~~2.12.1. The provisions of Section 703 of the State of Maine Department of Transportation (MDOT) *Standard Specifications for Highways and Bridges* shall apply with the following additions and modifications:

~~2.7.2.~~2.12.2. 703.02 Coarse Aggregate for Concrete:

Designated Aggregate Size

	Percent Passing Sieve				
Sieve Size	2 in.	1½ in.	1 in.	¾ in.	½ in.
2 in.	95-100	100	-	-	-
1-1/2 in.	-	95-100	100	-	-
1 in.	50-70	-	90-100	100	-
3/4 in.	-	50-70	-	90-100	100
1/2 in.	15-30	-	25-60	-	90-100
3/8 in.	-	10-30	-	20-55	-
No. 4	0-5	0-5	0-10	0-10	0-15
F.M. (+0.20)	7.45	7.20	6.95	6.70	6.10

2.7.3-2.12.3. Aggregate used in concrete shall not exceed the following maximum designated sizes:

- Two inches (2") for mass concrete.
- One and half inch (1 ½") for piles, pile caps, footings, foundation mats, and walls eight inches (8") or more thick.
- Three quarters of an inch (¾") for slabs, beams, and girders.
- Half inch (½") for fireproofing on steel columns and beams.
- One inch (1") for all other concrete.

2.7.4-2.12.4. 703.06 (a) Aggregate Base: Aggregate base - crushed, type "B" shall not contain particles of rock which will not pass the two inch (2") square mesh sieve, and shall conform to the type "B" aggregate, as listed in the subsection of the Standard Specifications. "Crushed" shall be defined as consisting of rock particles with at least fifty per cent (50%) of the portion retained on the one quarter inch (¼") square mesh sieve, having a minimum of two (2) fracture faces.

2.7.5-2.12.5. 703.06 (b) Aggregate Subbase: Gravel subbase shall not contain particles of rock which will not pass the three inch (3") square mesh sieve, and shall conform to type "D" Aggregate, as listed in this subsection of the Standard Specifications.

<u>Gravel Aggregate Table</u>			
<u>Sieve Size</u>	<u>Type B</u>	<u>Type D</u>	<u>Type F</u>
<u>3 in.</u>	--	<u>100</u>	--
<u>2 in.</u>	<u>100</u>	--	--
<u>1 in.</u>	--	--	<u>100</u>
<u>1/2 in.</u>	<u>35-75</u>	--	--
<u>1/4 in.</u>	<u>25-60</u>	<u>25-70</u>	<u>60-100</u>
<u>No. 40</u>	<u>0-25</u>	<u>0-30</u>	<u>0-50</u>
<u>No. 200</u>	<u>0-5</u>	<u>0-7</u>	<u>0-7</u>

2.7.6-2.12.6. 703.18 Common Borrow: Common borrow shall not contain any particle of bituminous material.

2.7.7-2.12.7. 703.19 Granular Borrow: Granular borrow shall contain no particles which will not pass a three inch (3") square mesh sieve.

2.7.8-2.12.8. 703.20 Gravel Borrow: Gravel borrow shall not contain particles of rock which will not pass three inch (3") square mesh sieve.

2.7.9-2.12.9. 703.31 Crushed Stone for Pipe Bedding and Underdrain: "Crushed Stone" shall be defined as rock of uniform quality and shall consist of clean, angular fragments of quarried rock, free from soft disintegrated pieces or other objectionable matter. Crushed stone used as a bedding material for pipe and underdrain shall be uniformly graded and shall meet the follow gradations. The

stone shall be free from vegetable matter, lumps or balls of clay, and other inappropriate substances.

Sieve Designation	<u>City of Portland</u> Percentage by Weight Passing Square Mesh Sieve
<u>1 inch</u>	<u>100</u>
$\frac{3}{4}$ inch	<u>90-100</u> 100
$\frac{3}{8}$ inch	<u>0-75</u> 20-55
No. 4	<u>0-25</u> 0-10
<u>No. 10</u>	<u>0-5</u>

~~For pipe sizes 42 inches and larger:~~

Sieve Designation	Percentage by Weight Passing Square Mesh Sieve
1 $\frac{1}{4}$ inch	100
$\frac{3}{8}$ inch	20-55
No. 4	0-10

2. SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS

2.1. Technical Reference

- 2.1.1. The following technical publications are recognized by the City of Portland for use in the design, construction and testing of sanitary and storm water systems:
- 2.1.2. Technical Report #16 (TR-16): Guides for the Design of Wastewater Treatment Works, Prepared by the New England Interstate Water Pollution Control Commission available for review at the Department of Public Works or online at www.neiwpcc.org/tr16guides.asp
- 2.1.3. Maine Department of Transportation (MDOT) Standard Specifications for Highways and Bridges, Current Edition.

2.2. Sanitary Standards and Specifications

- 2.2.1. Sewer and Storm drain systems shall be planned and constructed in accordance with the regulations contained in Chapter 24 of the City Code of Ordinances.
- 2.2.2. The information presented below are City of Portland exceptions to the TR-16 or additional required standards.
- 2.2.3. The introduction of non-contaminated water such as rain water, non-contact cooling water, groundwater from foundation drains, sump pumps, surface drains or any other sources of inflow shall not be allowed to discharge into a sewer which conveys sanitary waste unless approved by the Public Works Director
- 2.2.4. Appeals will be considered by the Director of Public Works. (Refer to: Sec. 24-44 of the City Code - Public sewer connection limitations).
- 2.2.5. It is not permissible to backfill any excavation with frozen materials, organic materials, clay or blasted ledge. The maximum size of backfill material shall not exceed six inch (6"). (Please refer to Division 2, Street Opening Permits in the City Code).
- 2.2.6. The Department of Public Works shall be responsible for televising all new sewer construction for acceptability as soon as backfilling has been completed and access is available. The permittee will be invoiced for these services. Information on current rates is available in Chapter 24 Sewer Ordinance.
- 2.2.7. Permits to connect to the municipal stormwater and sanitary sewer system are required and may be obtained from the Department of Public Works.
- 2.2.8. Enclosed parking, mechanical rooms, garages (parking areas not exposed to rain and snow) shall direct surface drainage to a sanitary sewer. Drainage from these areas shall be collected by an Oil/ Grit Separator as shown in Figure II-20 or an approved equal.

2.3. Sanitary Manholes

- 2.3.1. All manholes shall be designed in conformance with City of Portland standards as illustrated in Figure II-02.
- 2.3.2. When constructing sanitary manhole channels, if the Vertical difference between the invert elevation of the manhole channel and the invert elevation of the sewer

pipe connecting to such manhole is two vertical feet (2') or greater, a standard City of Portland internal drop manhole shall be provided. Such drop manholes shall conform to the engineering specifications illustrated in Figure II-03. A minimum of two stainless steel pipe anchors shall be used and the manhole diameter shall be five feet (5') minimum.

- 2.3.3. Sanitary service laterals that are four inch (4") or six inch (6") shall not be connected into a sanitary manhole and only into a sanitary sewer main.
- 2.3.4. Sanitary manholes shall include frames and covers as shown in Figure II-05 or an approved equivalent. Both the frame and riser shall be machined to assure a proper fit.
- 2.3.5. Manhole covers shall be marked "SEWER".
- 2.3.6. Manhole frames shall be raised to grade using only brick and mortar as shown in Figure II-02 or approved equal.
- 2.3.7. Riser Rings without tabs as shown in Figure II-06 may be used to adjust manholes to grade with approval of the Department of Public Works.
- 2.3.8. All new sanitary manholes shall be vacuum tested before backfilling. Refer to TR-16 for testing standards.
- 2.3.9. Steps are not required in sewer manholes. Any structures delivered to the site with step "holes" shall be filled with mortar

2.4. Sanitary Gravity Pipes

- 2.4.1. The types of allowable pipe shall be used for purposes of sanitary sewers:
 - PVC Ring Type Sewer Pipe (SDR 35 or equivalent, minimum PS-46 rating)
 - PVC Ring Type Sewer Pipe meeting ASTM F 789 or equal to SDR
 - Ductile iron Pipe (DIP)
 - High Performance Polypropylene Dual Wall Sewer Pipe (ADS SaniTite HP or equal) meeting ASTM F2736 and have a minimum pipe stiffness of 46 psi with pipes sizes twelve inch (12") through thirty inch (30").
 - High Performance Polypropylene Triple Wall Sewer Pipe (ADS SaniTite HP or equal) meeting ASTM F2764 and have a minimum pipe stiffness of 46 psi with pipe sizes thirty inch (30") through sixty inch (60")
- 2.4.2. Minimum velocities for sanitary pipes shall not be less than two feet per second (2 ft/s).
- 2.4.3. All PVC connections shall be made with Solid PVC Couplings.
- 2.4.4. The classes of pipe indicated shall be minimums, however the actual class of pipe used shall be determined by soil weight and compaction loads applied to such pipe in accordance with standard engineering design criteria and subject to the approval of the City Engineer.

2.5. Force Mains:

- 2.5.1. Force mains four inches (4") or greater shall terminate at a transition manhole and flow by gravity within a minimum sized eight inch (8") pipe to a City manhole.
- 2.5.2. Force mains less than four inches (4") may terminate to the nearest precast concrete manhole as directed by the City.
- 2.5.3. Cores into existing manholes shall be made with coring machines and have link seal or equivalent wall penetration seals.
- 2.5.4. Existing brick manholes shall be allowed for less than four inch (4") termination of force mains if full manhole reconstruction or replacement is performed as determined by the Department of Public Works.
- 2.5.5. All force mains shall be at a minimum HDPE SDR-21 made with fully restrained connections or equal. Piping pressure ratings shall be at least two (2) times the operating pressure of the system.
- 2.5.6. Force main discharge shall be directed into the channel in the direction of gravity flow.

2.6. Building Sewer Laterals

- 2.6.1. Construction of building sewers and drains shall conform to Chapter 24 (Sewers) of the City Code of Ordinance.
- 2.6.2. All building sewer laterals shall have a minimum diameter of four inch (4") and a minimum slope of one eighth inch per foot (1/8 in/ft) installed, as shown in Figure II-12.
- 2.6.3. Typical Pipe Installation: Where a building sewer lateral is to be installed from the sewer main in the street to a property or building to be served, the lateral shall either extend to the building or to the street line of each lot to be served and the pipe shall be capped air-tight.
- 2.6.4. An accurate record of each building sewer, its location and its depth at the street line shall be kept by the developer's engineer and a copy of the same shall be provided to the Department of Public Works.
- 2.6.5. For new construction, the location of the building sewer at the street line shall be physically marked by the placement of a two inch by four inch (2" x 4") wooden stake placed at the end of the lateral end-cap and extending one foot above finished grade.
- 2.6.6. Each stake shall be painted with a fluorescent paint and marked as storm or sanitary sewer with the depth indicated from grade to end-cap. A one quarter inch (1/4") thick by six inch (6") square ferrous metal plate or equivalent shall be placed horizontally one foot below grade over the end of the storm drain.
- 2.6.7. Building sewers and drains shall be connected to the main sanitary sewer line by the use of wyes, tee/wyes, Inserta-Tees or similar approved methods as determined by the Department of Public Works. A manhole shall be installed at the sewer main to connect building laterals when the building lateral is eight inches (8")

or larger in diameter. The lateral connections shall be installed from the main toward the lot where possible. Inserta-Tees can be installed on pipes when the main receiving pipe is at least twelve inches (12") in size and the lateral is not more than half the size of the main receiving pipe in order to use a coring tee-type connection.

2.6.8. Before connecting new pipes into an existing sewer line, the contractor shall obtain a sewer connection permit from the Department of Public Works.

2.6.9. Accessory Dwelling Units (ADU) sewer laterals

2.6.9.1. Per Chapter 24 of the City Code of Ordinance "A separate and independent building sewer shall be provided for every new building, and a separate connection shall be made for each building sewer." The Department of Public Works recognizes the following scenarios for the successful connection of the proposed ADU to the public sewer system. See Figure II-21 for additional information.

- A. The proposed ADU is connected to the primary residence. In this scenario, the ADU may be connected to the primary residence sewer lateral internal to the primary residence.
- B. The proposed ADU is a separate standalone building: In this scenario, a separate and independent sewer lateral will be provided from both buildings with independent connections to the sewer.
- C. The proposed ADU is a separate standalone building: In this scenario, a separate and independent sewer lateral will be provided from both buildings with a connection of the two laterals into a sewer manhole at the property line. The sewer manhole will be a minimum two-foot (2') size providing access to each sewer lateral. The sewer manhole may be placed on the existing sewer lateral from the primary residence with the ADU sewer lateral being fed into it.

2.6.10. All new laterals connecting to a combined sewer system shall have a Backflow Prevention Valve. The valve shall be installed to assure easy access and maintenance. When a Backflow Valve is installed, it is imperative that introduction of rain water, non- contact cooling water, groundwater from foundation drains, sump pumps, surface drains or any other sources of inflow not be allowed on the building side of the valve.

2.6.11. All building floor drains shall discharge to the sanitary sewer system.

2.6.12. Plugging of Abandoned Sewer Laterals: Prior to abandoning any storm water or sanitary sewer lateral, the applicant shall acquire a permit from the Department of Public Works. The applicant shall provide a 48 hour notice to the Public Works Dispatch stating the date and time the applicant wished to complete the work. The Water Resources Division will mobilize to the site and allow one hour to assist the applicant to plug the lateral in the following manner. The location of the lateral to be plugged shall be televised by the applicant and witnessed by Water Resources staff on site. The applicant shall excavate or other means plug the lateral at the main where the lateral connects to the street sewer, as determined by City staff.

The lateral must be filled with pumped grout starting at the plug and filling out to the points of excavation.

2.7. Storm Water Manholes

- 2.7.1. Storm water manholes shall include frames and covers as shown in Figure II-05 or an approved equivalent. Both the frame and riser shall be machined to assure a proper fit.
- 2.7.2. Manhole frames shall be raised to grade using only brick and mortar as shown in Figure II-02.
- 2.7.3. Riser Rings without tabs as shown in Figure II-06 may be used to adjust manholes to grade with approval of the Department of Public Works.
- 2.7.4. Manhole covers shall be marked "DRAIN".
- 2.7.5. Steps are not required in storm manholes. Any structures delivered to the site with step "holes" shall be filled with mortar.

2.8. Storm Drains

- 2.8.1. The types of allowable pipe and fittings shall be used for purposes of storm drains:
 - All pipes listed for sanitary sewers
 - Reinforced Concrete Pipe (RCP) with a minimum strength of Class III;
 - Smooth Bore High Performance Polypropylene Dual Wall Storm Drain Pipe. (ADS HP Storm or equal) meeting a minimum PS- 46.
- 2.8.2. Storm drain lateral may be connected into storm drain mains without the use of a manhole when the lateral is less than half the diameter of the receiving pipe.
- 2.8.3. Minimum velocities of surface water drains shall not be less than three feet per second (3 ft/s).
- 2.8.4. Ribbed corrugated polyethylene pipe material, smooth wall interior, is not permitted except for underdrain installation. Underdrain diameter shall be no larger than six inches (6").
- 2.8.5. The classes of pipe indicated shall be minimums, however the actual class of pipe used shall be determined by soil weight and compaction loads applied to such pipe in accordance with standard engineering design criteria and subject to the approval of the Department of Public Works.
- 2.8.6. Pre-fabricated tees are allowable on storm drains. A pre-fabricated tee connection shall be used and installed in accordance with manufacturer specifications.
- 2.8.7. Connection of catch basin/storm drain lateral leads to storm drain larger than eighteen inch (18") diameter may be performed with the use of a coring machine and suitable connection device. The connecting pipe shall not be more than half the size of the main receiving pipe in order to use a coring tee-type connection.

2.9. Catch Basins

- 2.9.1. All catch basins and catch basin inlets shall be designed and constructed in accordance with Figures II-07 THROUGH II-11.
- 2.9.2. Catch basin drain pipes of less than ten inches (10") in diameter are not permitted.
- 2.9.3. All catch basins shall have a four-foot (4') granite headstone of catch basin inlets conforming to City standards as shown in Figure II-11.
- 2.9.4. No radius catch basin stones shall be permitted.
- 2.9.5. All catch basins shall be constructed with a minimum sump of three feet (3').
- 2.9.6. Catch basins shall not be located in driveway openings.
- 2.9.7. No storm drains or storm drain laterals, with the exception of street underdrains, shall be connected into a catch basin structure.
- 2.9.8. Catch basin drains and catch basin inlet drain pipe slopes shall be such that minimum flow velocities shall not be less than three feet per second (3 ft/s).
- 2.9.9. Bee hive casting shall be used on drainage structures located at low points in grassed off road locations.
- 2.9.10. Field inlets or Type-F catch basins may be used when outside of city street right of ways within lawn areas, with Department of Public Works approval. They must have a minimum of a twelve-inch (12") sump and can be plastic or concrete.
- 2.9.11. All catch basins are required to have a hood on the outlet pipe as shown in Figure II-09.

2.10. Subsurface Wastewater Disposal

- 2.10.1. To ensure that adequate provisions have been made for subsurface wastewater disposal, developers are required to locate, design, and install all septic systems in accordance with the latest version of the Maine Subsurface Wastewater Disposal Rules, 144 CMR minimum 241, as described in Chapter 6, Section 6-18(A) of the City Code.
- 2.10.2. Developers are required to obtain a permit through the City of Portland Inspections Division prior to the installation of any subsurface wastewater disposal system

identified on an approved site plan.

2.11. Grease Interceptor

- 2.11.1. Grease Control Equipment is required for all food establishments based on the City of Portland's Fats, Oils, and Grease Program found in the Rules and Regulations for Use of the Sewer System.
- 2.11.2. Concrete grease interceptors must have two chambers. Chamber A, where influent enters, must be two thirds (2/3) of the tank volume.
- 2.11.3. Concrete grease interceptors must have three twenty-four-inch (24") access points.
- 2.11.4. Tank must be designed for H-20 traffic wheel load and a concrete strength of 5000 PSI at 28 days.
- 2.11.5. Joints must be sealed with butyl rubber joint sealant such as CS-102 Butyl Rubber Sealant.
- 2.11.6. Tees inside grease interceptors must be supported. Galvanized riser clamps on drops must be rodded to tank wall with galvanized fasteners six inch (6") below service weight tee. Tees must be accessible via an unobstructed view for cleaning through top of grease interceptor.
- 2.11.7. High density polyethylene grease interceptors are accepted as an equivalent to concrete grease interceptors. Polyethylene units shall be properly anchored to prevent floatation.
- 2.11.8. A control manhole must be installed downstream of the interceptor. Alternatively, a manhole must be installed at the connection to the sanitary sewer.

2.12. Aggregate Specifications

- 2.12.1. The provisions of Section 703 of the State of Maine Department of Transportation (MDOT) *Standard Specifications for Highways and Bridges* shall apply with the following additions and modifications:
- 2.12.2. 703.02 Coarse Aggregate for Concrete:

Designated Aggregate Size

	Percent Passing Sieve				
Sieve Size	2 in.	1½ in.	1 in.	¾ in.	½ in.
2 in.	95-100	100	-	-	-
1-1/2 in.	-	95-100	100	-	-
1 in.	50-70	-	90-100	100	-
3/4 in.	-	50-70	-	90-100	100
1/2 in.	15-30	-	25-60	-	90-100
3/8 in.	-	10-30	-	20-55	-
No. 4	0-5	0-5	0-10	0-10	0-15
F.M. (+0.20)	7.45	7.20	6.95	6.70	6.10

2.12.3. Aggregate used in concrete shall not exceed the following maximum designated sizes:

- Two inches (2") for mass concrete.
- One and half inch (1 ½") for piles, pile caps, footings, foundation mats, and walls eight inches (8") or more thick.
- Three quarters of an inch (¾") for slabs, beams, and girders.
- Half inch (½") for fireproofing on steel columns and beams.
- One inch (1") for all other concrete.

2.12.4. 703.06 (a) Aggregate Base: Aggregate base - crushed, type "B" shall not contain particles of rock which will not pass the two inch (2") square mesh sieve, and shall conform to the type "B" aggregate, as listed in the subsection of the Standard Specifications. "Crushed" shall be defined as consisting of rock particles with at least fifty per cent (50%) of the portion retained on the one quarter inch (¼") square mesh sieve, having a minimum of two (2) fracture faces.

2.12.5. 703.06 (b) Aggregate Subbase: Gravel subbase shall not contain particles of rock which will not pass the three inch (3") square mesh sieve, and shall conform to type "D" Aggregate, as listed in this subsection of the Standard Specifications.

Gravel Aggregate Table			
Sieve Size	Type B	Type D	Type F
3 in.	--	100	--
2 in.	100	--	--
1 in.	--	--	100
1/2 in.	35-75	--	--
1/4 in.	25-60	25-70	60-100
No. 40	0-25	0-30	0-50
No. 200	0-5	0-7	0-7

2.12.6. 703.18 Common Borrow: Common borrow shall not contain any particle of bituminous material.

2.12.7. 703.19 Granular Borrow: Granular borrow shall contain no particles which will not pass a three inch (3") square mesh sieve.

2.12.8. 703.20 Gravel Borrow: Gravel borrow shall not contain particles of rock which will not pass three inch (3") square mesh sieve.

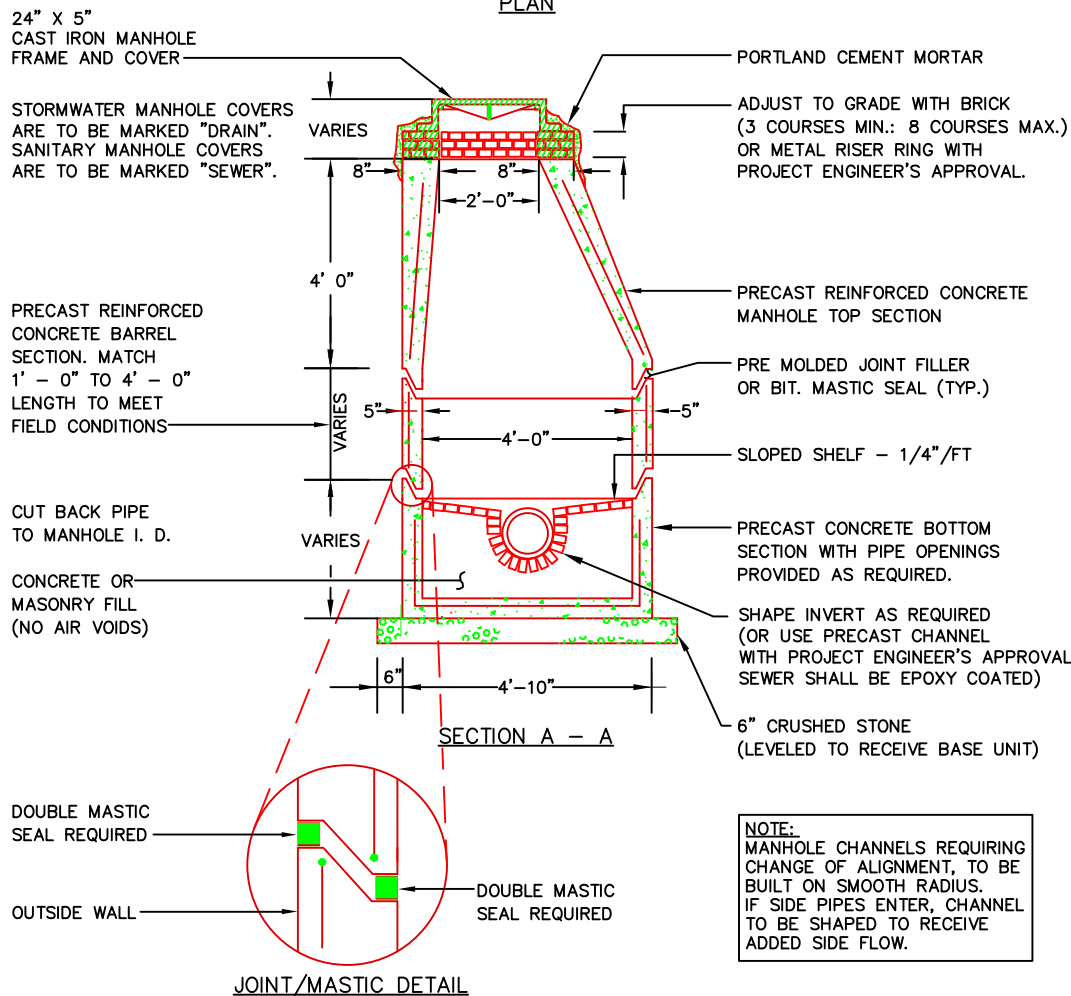
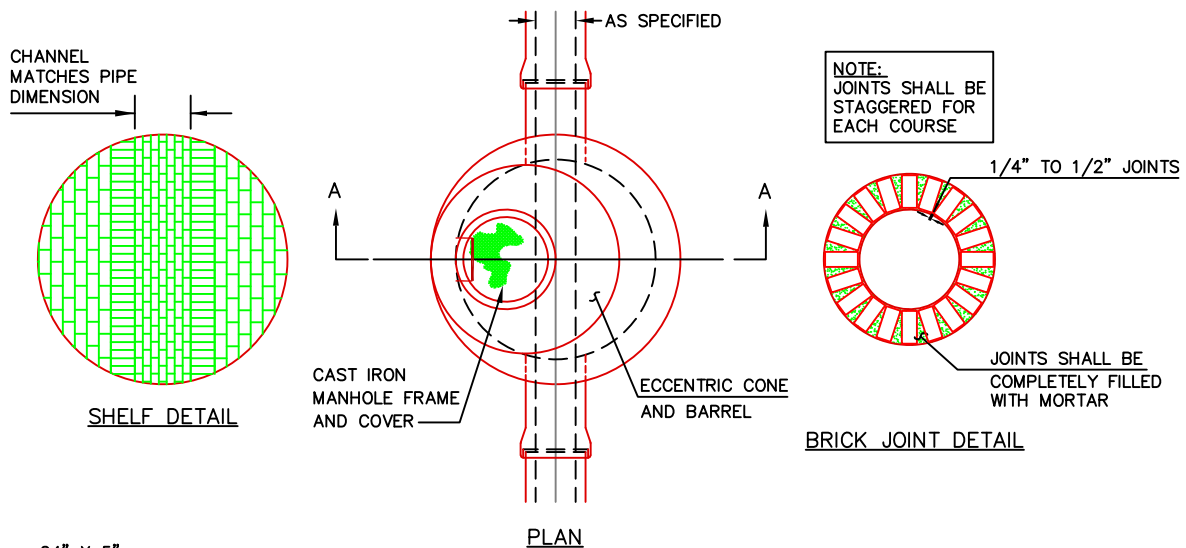
2.12.9. 703.31 Crushed Stone for Pipe Bedding and Underdrain: "Crushed Stone" shall be defined as rock of uniform quality and shall consist of clean, angular fragments of quarried rock, free from soft disintegrated pieces or other objectionable matter. Crushed stone used as a bedding material for pipe and underdrain shall be

uniformly graded and shall meet the follow gradations. The stone shall be free from vegetable matter, lumps or balls of clay, and other inappropriate substances.

Sieve Designation	City of Portland Percentage by Weight Passing Square Mesh Sieve
1 inch	100
¾ inch	90-100
3/8 inch	0-75
No. 4	0-25
No. 10	0-5

- FIGURE II-01 = LIST OF DETAILS
- FIGURE II-02 = PRECAST CONCRETE MANHOLE
- FIGURE II-03 = TYPICAL INSIDE DROP MANHOLE
- FIGURE II-04 = GENERAL NOTES FOR MANHOLES AND CATCH BASINS
- FIGURE II-05 = CAST IRON MANHOLE COVER AND FRAME
- FIGURE II-06 = MANHOLE RISER RING
- FIGURE II-07 = PRECAST CONCRETE CATCH BASIN
- FIGURE II-08 = CATCH BASIN FRAME AND GRATE
- FIGURE II-09 = CATCH BASIN HOOD
- FIGURE II-10 = TYPICAL PAVEMENT GRADING FOR CATCH BASIN INLETS
- FIGURE II-11 = 4' GRANITE HEADSTONE FOR CATCH BASIN INLET
- FIGURE II-12 = TYPICAL PIPE TRENCH INSTALLATION AND NOTES
- FIGURE II-13 = PLASTIC PIPE CONNECTION METHODS 1 & 2
- FIGURE II-14 = PLASTIC PIPE CONNECTION METHODS 3 & 4
- FIGURE II-15 = MASONRY PLUG
- FIGURE II-16 = TYPICAL EXISTING LATERAL CONNECTION
- FIGURE II-17 = TYPICAL HOUSE LATERAL TEE/WYE CONNECTION
- FIGURE II-18 = FORCE MAIN CONCRETE THRUST BLOCK PLACEMENT
- FIGURE II-19 = EXTERNAL GREASE TRAP DESIGN
- FIGURE II-20 = OIL / GRIT SEPARATOR
- FIGURE II-21 = SEWER LINE CONFIGURATIONS FOR PRIMARY RESIDENCES
WITH AN ACCESSORY DWELLING UNIT
- FIGURE II-22 = TYPE "B" UNDERDRAIN INSTALLATION ALTERNATIVE A
- FIGURE II-23 = TYPE "B" UNDERDRAIN INSTALLATION ALTERNATIVE B

DATE: APRIL 2022	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS SECTION II	FIGURE:
REVISED:	LIST OF DETAILS		II-1



PRECAST CONCRETE MANHOLE

NOT TO SCALE

DATE:
DEC. 2009

REVISED:
DEC. 2021

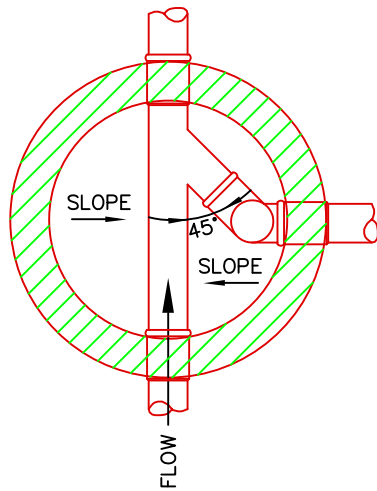
CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

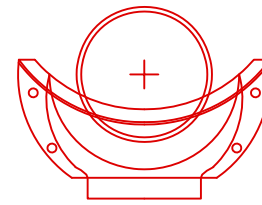
FIGURE:

II-2

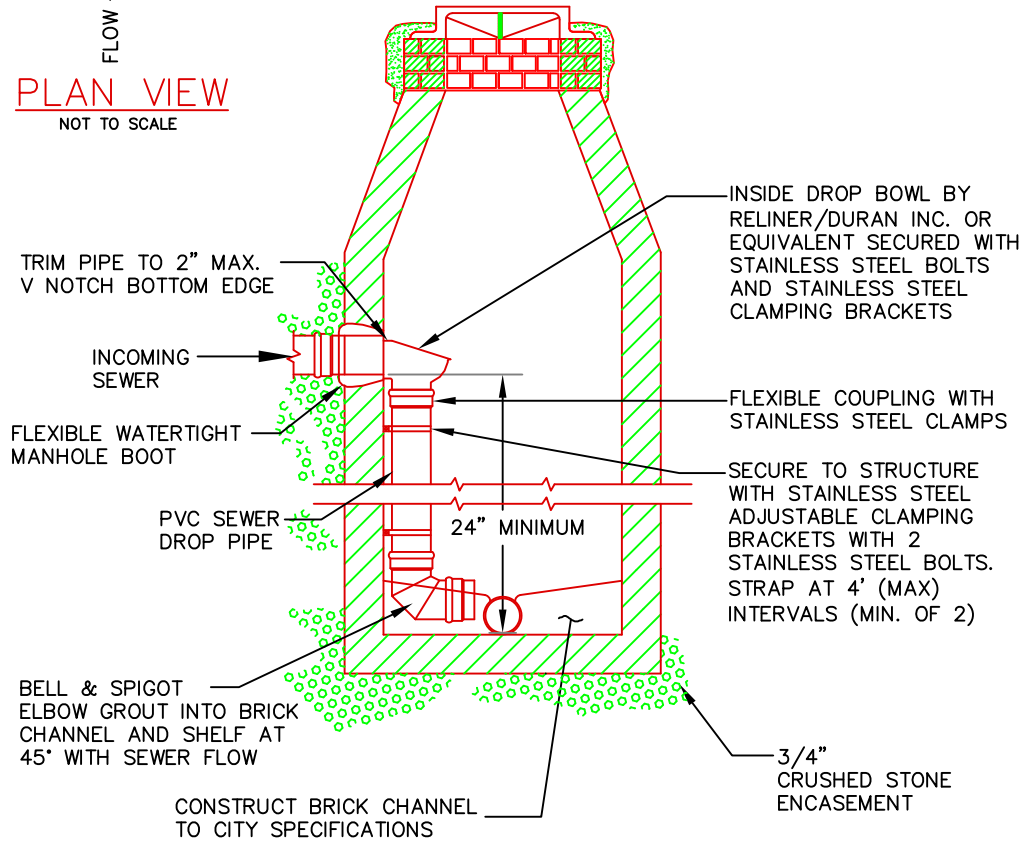
PRECAST CONCRETE MANHOLE



PLAN VIEW
NOT TO SCALE



**DROP BOWL
MOUNTING POSITION**
NOT TO SCALE



NOTES:

- 1) DROP MANHOLES ARE NOT REQUIRED FOR STORMWATER SYSTEMS.
- 2) MANHOLE MUST HAVE A MINIMUM DIAMETER OF 5' TO USE AN INSIDE DROP
- 3) ALL INSIDE DROP CONNECTIONS FOR SERVICES AND COLLECTOR SEWERS SHALL USE THE DROP BOWL AS SHOWN.

NOT TO SCALE

DATE:
APRIL 2022
REVISED:

CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

II-3

TYPICAL INSIDE DROP MANHOLE

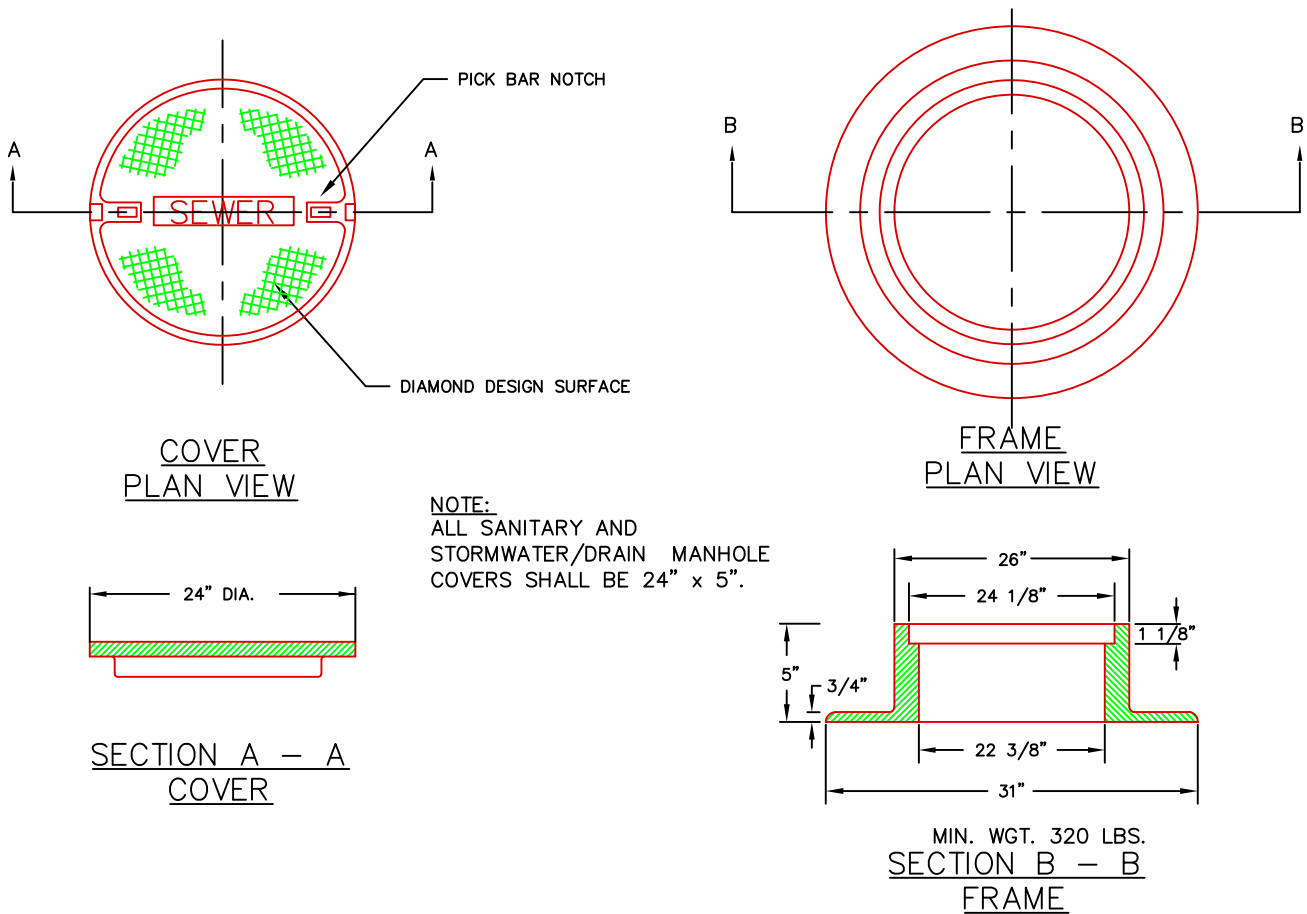
1. ALL CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 4000 lbs. PER SQ. INCH AT THE END OF 28 DAYS, UNLESS OTHERWISE NOTED.
2. MANHOLES MAY BE CONSTRUCTED OF PRECAST REINFORCED CONCRETE, OR CAST IN PLACE.
3. PRECAST REINFORCED CONE BARREL MANUFACTURED PER ASTM SPEC. C-478.
4. ALL PIPES ENTERING MANHOLES AND CATCH BASINS SHALL HAVE FLEXIBLE PIPE CONNECTIONS WITH STAINLESS STEEL BANDS. FILL ANY ANNUAL SPACE WITH NON SHRINK GROUT.
5. ALL STORM AND SEWER MANHOLE COVERS SHALL BE SOLID
6. ALL SANITARY MANHOLE COVERS SHALL HAVE "SEWER" CAST INTO THE COVER. ALL STORMWATER/DRAIN MANHOLE COVERS SHALL HAVE "DRAIN" CAST INTO THE COVER.
7. SEWER BRICK SHALL CONFORM TO ASTM SPEC. DESIGNATE ON C-32-63, GRADE MA AND SA.
8. INVERTS SHALL BE BUILT TO THE HEIGHT OF THE FOLLOWING AS DETERMINED BY THE LARGEST PIPE SIZE.
 - 8.1. FOR PIPE SIZES 4"-12" INVERTS SHALL GO TO THE TOP OF THE PIPE.
 - 8.2. FOR PIPE SIZES 15"-36" INVERTS SHALL GO TO THE SPRING LINE.
 - 8.3. FOR PIPE SIZES 42"-60" INVERTS SHALL GO TO THE 1/3 OF PIPE SIZE
9. ALL SANITARY MANHOLES SHALL HAVE A WATERPROOFING COATING APPLIED TO THE EXTERIOR SURFACE.
10. CASTINGS SHALL CONFORM TO ASTM DESIGNATION A48-CLASS 35.
11. EXISTING MANHOLES, CATCH BASINS, FRAMES, AND COVERS SHALL BE SALVAGED BY THE CONTRACTOR, AND SHALL REMAIN THE PROPERTY OF THE CITY OF PORTLAND.
12. ALL CATCH BASIN OUTLETS SHALL BE INSTALLED WITH A HOOD / CASCO TRAP. SEE FIGURE II-09.

GENERAL NOTES FOR MANHOLES AND CATCH BASINS

DATE: MARCH 2019	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS SECTION II	FIGURE:
REVISED: DEC. 2021	GENERAL NOTES FOR MANHOLES AND CATCH BASINS		II-4

NOTES:

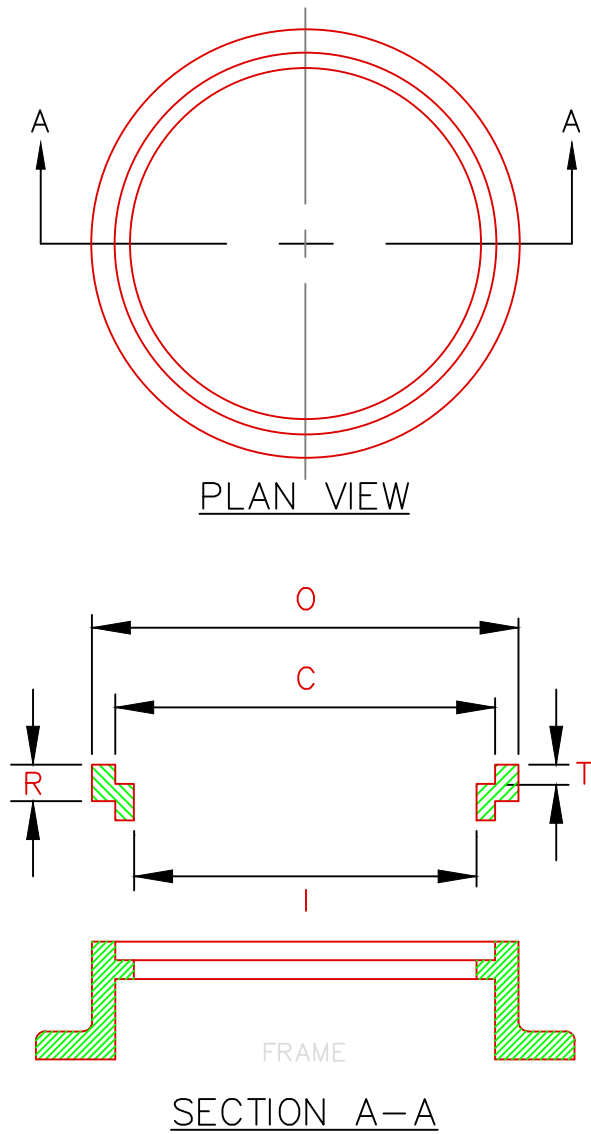
1. ALL SANITARY MANHOLE COVERS SHALL HAVE "SEWER" CAST INTO THE COVER. ALL STORMWATER/DRAIN MANHOLE COVERS SHALL HAVE "DRAIN" CAST INTO THE COVER.
2. APPROVED MANHOLE FRAMES:
 - 2.1. EAST JORDAN = 1690Z
 - 2.2. NEENAH = R-1496
 - 2.3. OR APPROVED EQUAL
3. APPROVED MANHOLE COVERS
 - 3.1. EAST JORDAN = 2160A
 - 3.2. NEENAH = R-1496
 - 3.3. OR APPROVED EQUAL



CAST IRON MANHOLE COVER AND FRAME

NOT TO SCALE

DATE: AUG 2009	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS SECTION II	FIGURE:
REVISED: DEC 2021	CAST IRON MANHOLE COVER AND FRAME		II-5



SIZE	C	R	T	O	I	Wt.
R241 1/2	24	1 1/2	1 1/8	26 1/4	22 1/2	60
R242	24	2	1 1/8	26 1/4	22 1/2	80
R242 1/2	24	2 1/2	1 1/8	26 1/4	22	100
R243	24	3	1 1/8	26 1/4	22	120

MANHOLE RISER RING NOT TO SCALE

DATE:
DEC 2009
REVISED:

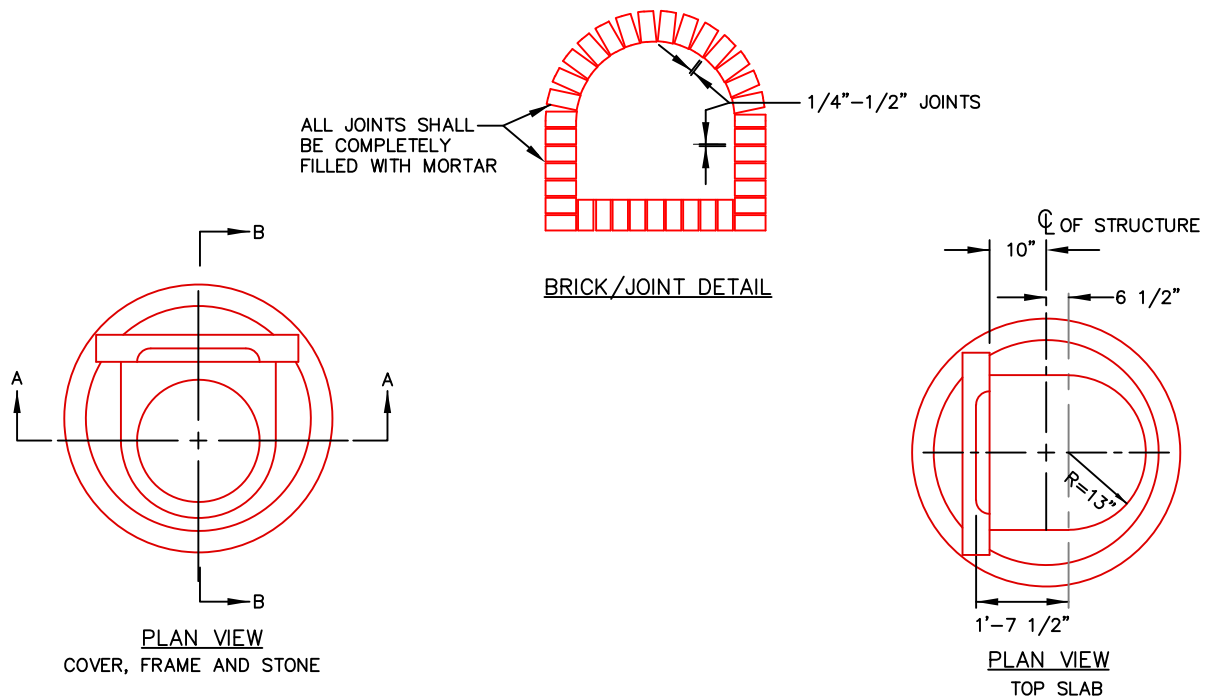
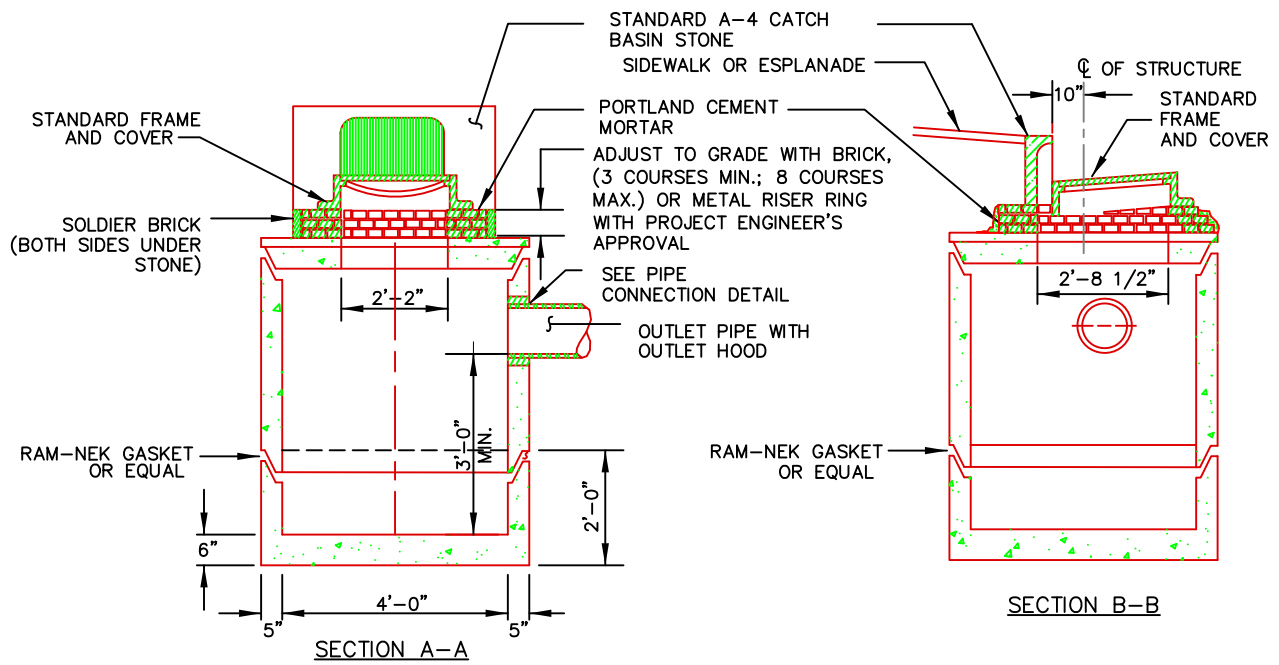
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**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

II-6

MANHOLE RISER RING



PRECAST CONCRETE CATCH BASIN – TYPE "E"
NOT TO SCALE

DATE:
MARCH 2009

REVISED:
DEC. 2021

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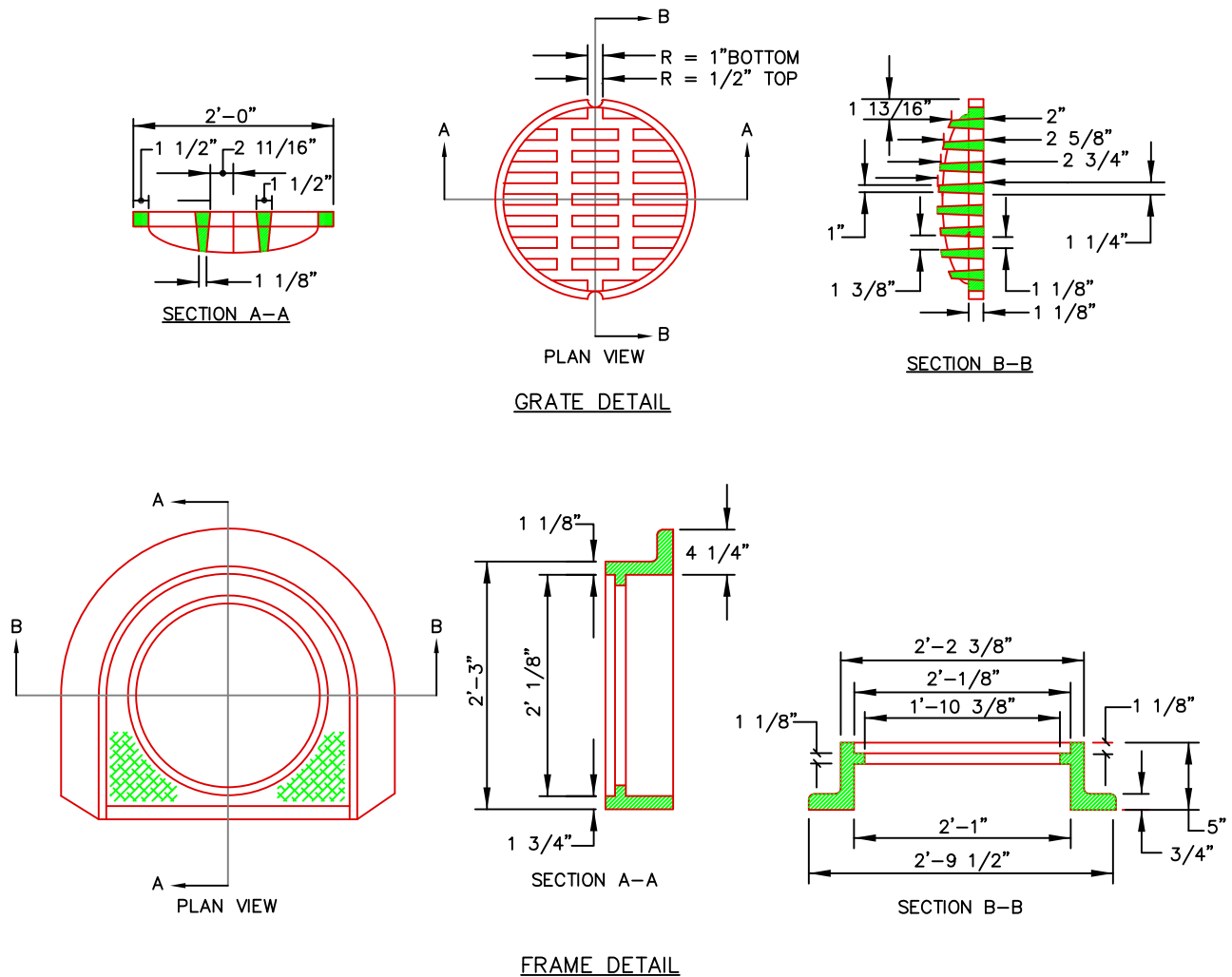
**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

PRECAST CONCRETE CATCH BASIN

FIGURE:

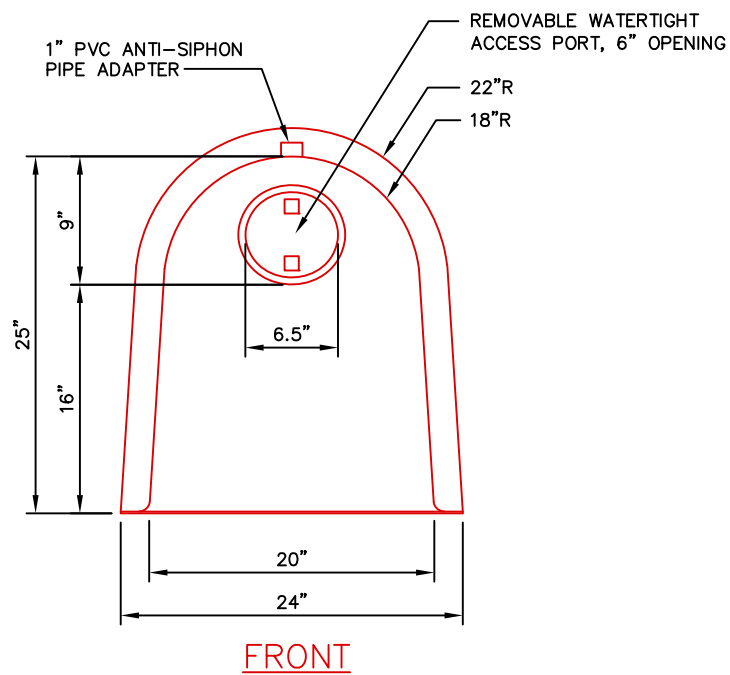
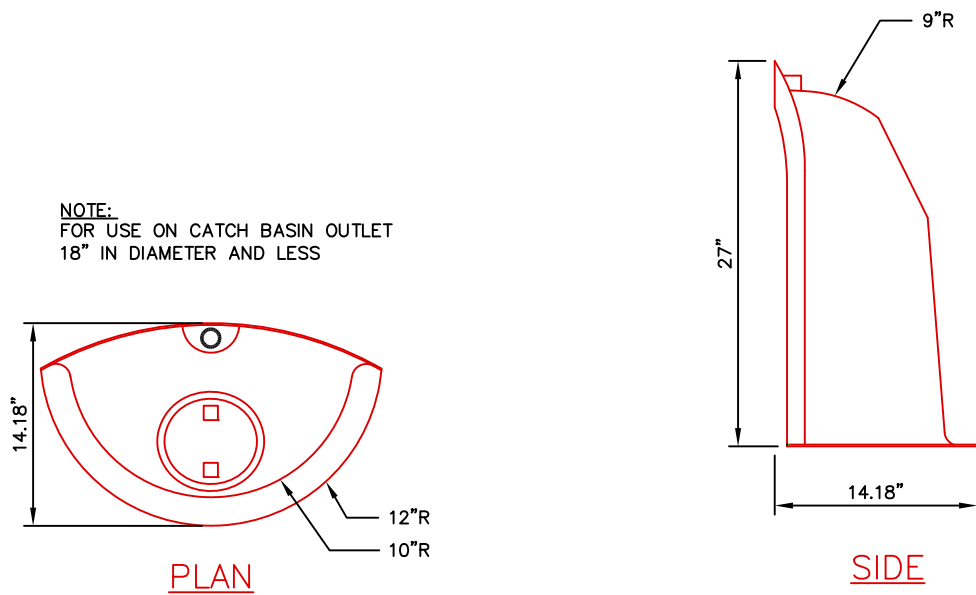
II-7

1. APPROVED CATCH BASIN FRAMES:
 - 1.1. EAST JORDAN = 7375Z
 - 1.2. NEENAH = R-3248
 - 1.3. OR APPROVED EQUAL
2. APPROVED CATCH BASIN GRATES
 - 2.1. EAST JORDAN = 2440M
 - 2.2. NEENAH = R-3248
 - 2.3. OR APPROVED EQUAL



CATCH BASIN FRAME & GRATE

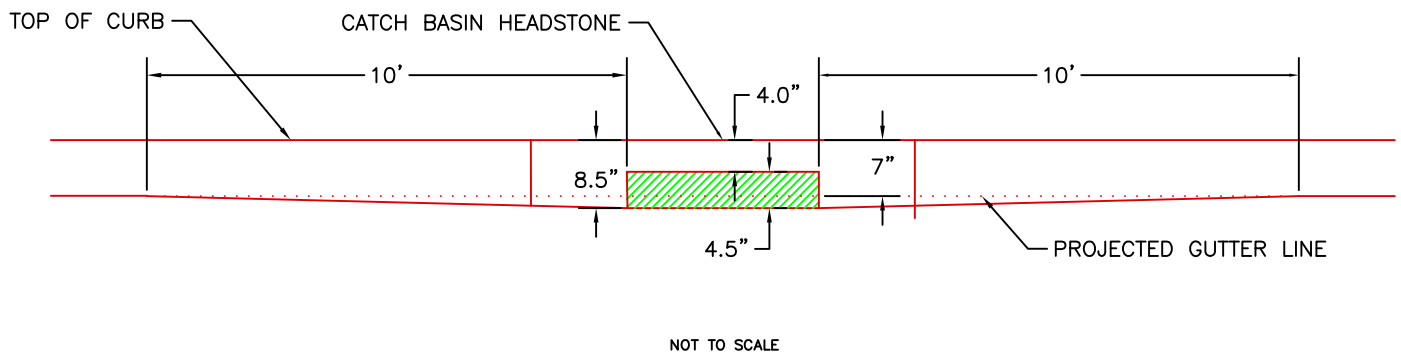
DATE: AUGUST 2009	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS SECTION II	FIGURE:
REVISED: DEC. 2021	CATCH BASIN FRAME AND GRATE		II-8



CATCH BASIN HOOD
NOT TO SCALE

DATE: MARCH 2019 REVISED:	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS SECTION II	FIGURE: II-9
CATCH BASIN HOOD			

NOTE:
DISH 10' EITHER SIDE OF HEADSTONE FOR
CATCH BASIN AT LOW POINT



DATE:
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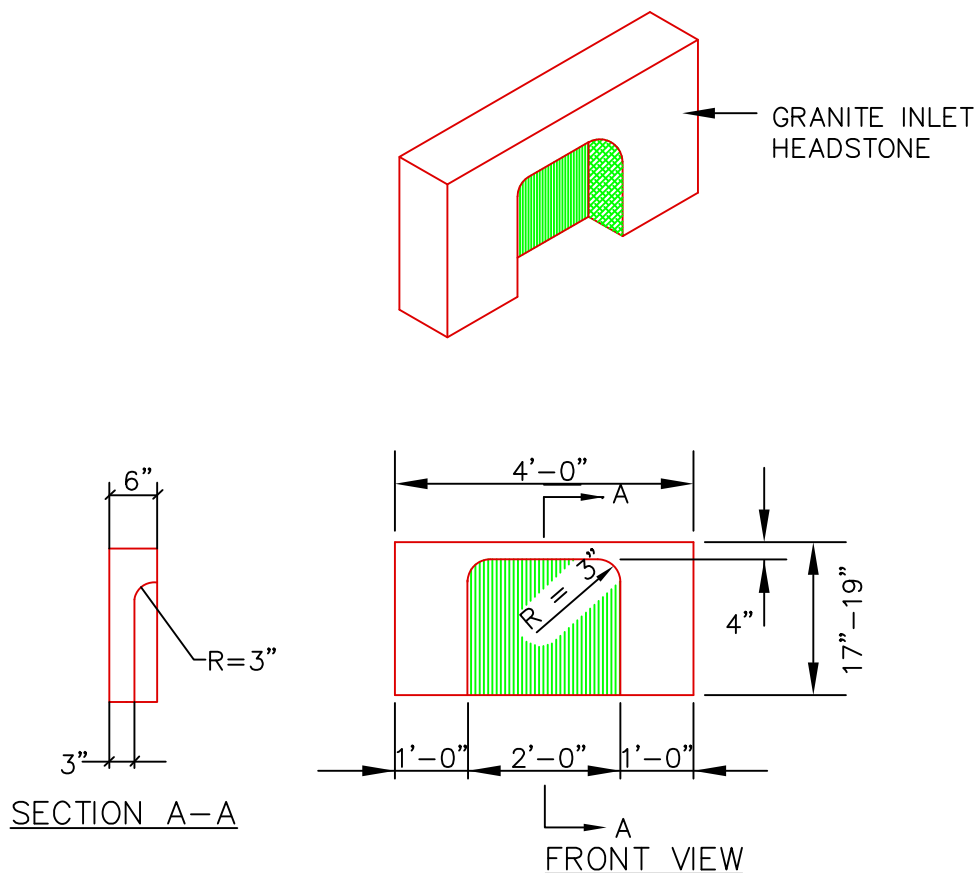
CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

**TYPICAL PAVEMENT GRADING
FOR CATCH BASIN INLETS**

FIGURE:

II-10



4' GRANITE HEADSTONE FOR CATCH BASIN INLET

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TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

4' GRANITE HEADSTONE FOR CATCH BASIN INLET

FIGURE:

II-11

DEPTH OF BITUMINOUS PAVEMENT AND AGGREGATE COURSES SHALL BE DETERMINED BY STREET CLASSIFICATION.

[illegible]

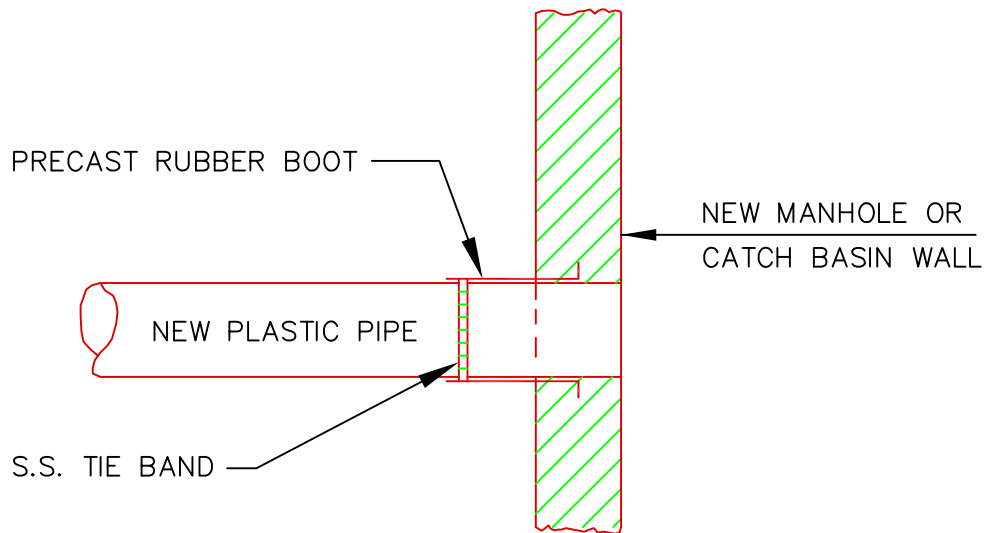
1. ALTERNATIVE CONSTRUCTION METHODS OR PAYMENT METHODS SHALL BE APPROVED IN ADVANCE BY THE CITY.
2. IN PAVED AREAS, DEPTHS OF GRAVEL AND HOT MIX ASPHALT PAVEMENT SHALL MATCH THE GREATER OF EXISTING CONDITIONS OR THE REQUIREMENTS FOR THE CORRESPONDING STREET CLASSIFICATION.
3. DIMENSION **B** SHALL BE SUFFICIENT TO ALLOW CRUSHED STONE BEDDING TO BE PLACED AND COMPACTED UNDER THE HAUNCHES OF THE PIPE; BUT IN ALL CASES DIMENSION **B** SHALL BE AT LEAST 9".
4. DIMENSION **A** IS THE MAXIMUM WIDTH ALLOWED FOR CALCULATING PAY QUANTITIES UNDER GRANULAR BORROW, CRUSHED STONE, STRUCTURAL EARTH EXCAVATION, AND STRUCTURAL ROCK EXCAVATION. DIMENSION **A** SHALL BE BASED ON PIPE DIAMETER **D**, AS SET FORTH IN THE FOLLOWING TABLE.

PIPE DIAMETER, D (INCHES)	MAX. TRENCH WIDTH, A (FEET)				
4	—	—	—	—	4.0
6					4.0
8					4.0
10					4.0
12					5.0
15					5.0
18	—	—	—	—	5.0
21					5.0
24					6.0
27					6.0
30					6.0
36	—	—	—	—	6.0
42					7.0
48					7.0

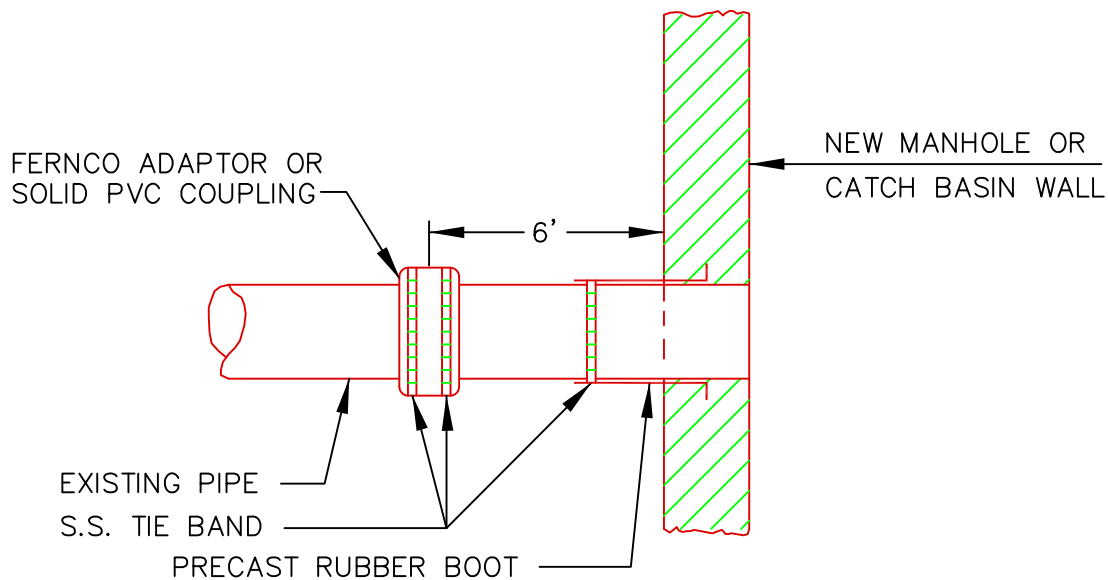
NOT TO SCALE

II-12

TYPICAL PIPE TRENCH INSTALLATION AND NOTES



METHOD 2 — NEW CONSTRUCTION



METHOD 1 — EXISTING PIPE INTO NEW STRUCTURE

PLASTIC PIPE CONNECTIONS

NOT TO SCALE

DATE:
AUGUST 2009
REVISED:

CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

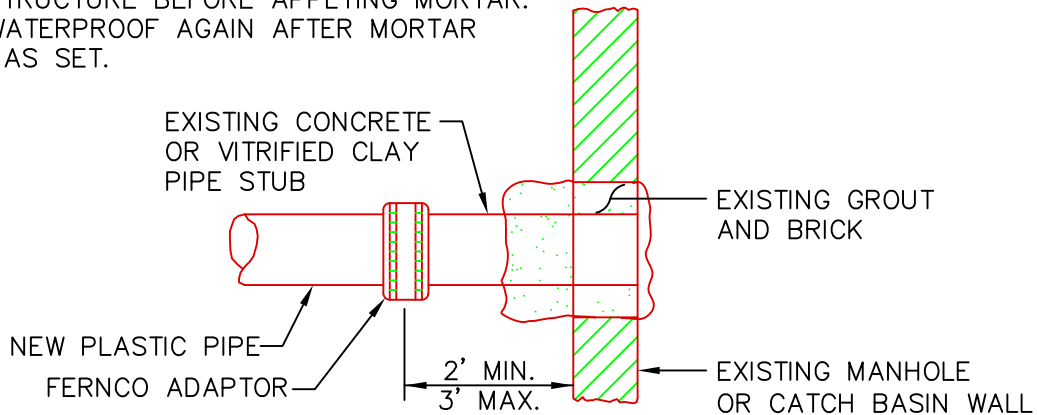
**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

II-13

PLASTIC PIPE CONNECTION METHODS 1 & 2

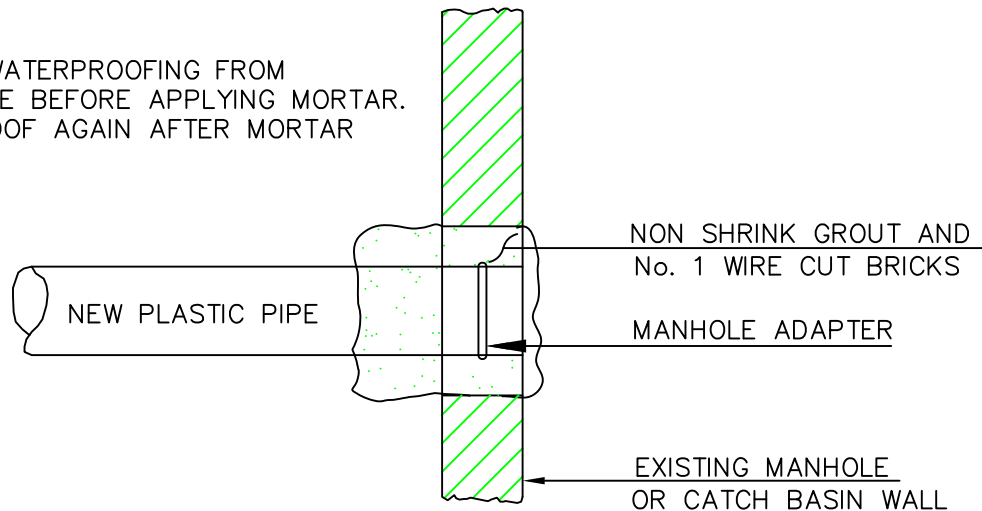
NOTE:
REMOVE WATERPROOFING FROM
STRUCTURE BEFORE APPLYING MORTAR.
WATERPROOF AGAIN AFTER MORTAR
HAS SET.



METHOD 4 – NEW PIPE TO EXISTING STRUCTURE STUB

NOTE: EXISTING MANHOLE OR CATCH BASIN SHALL BE CORE DRILLED
FOR PIPE INSTALLATION. IF PIPE DIAMETER IS SO LARGE
THAT CORE DRILLING IS PROHIBITED, THE CONTRACTOR MAY
SAW CUT THE STRUCTURE TO CREATE PIPE OPENING.
THE NEW OPENING MUST THEN BE SEALED AND WATERTIGHT
BOTH INSIDE AND OUTSIDE THE STRUCTURE.

NOTE:
REMOVE WATERPROOFING FROM
STRUCTURE BEFORE APPLYING MORTAR.
WATERPROOF AGAIN AFTER MORTAR
HAS SET.

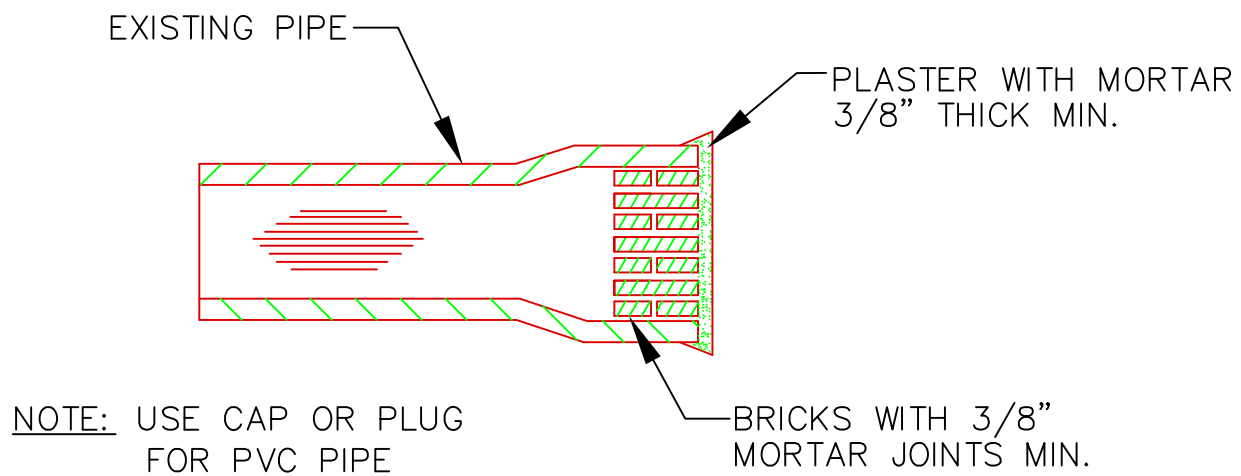


METHOD 3 – NEW PIPE INTO EXISTING STRUCTURE

PLASTIC PIPE CONNECTIONS

NOT TO SCALE

DATE: AUGUST 2009	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS SECTION II	FIGURE:
REVISED:	PLASTIC PIPE CONNECTION METHODS 3 & 4		II-14



MASONRY PLUG

NOT TO SCALE

DATE:
AUGUST 2009

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CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

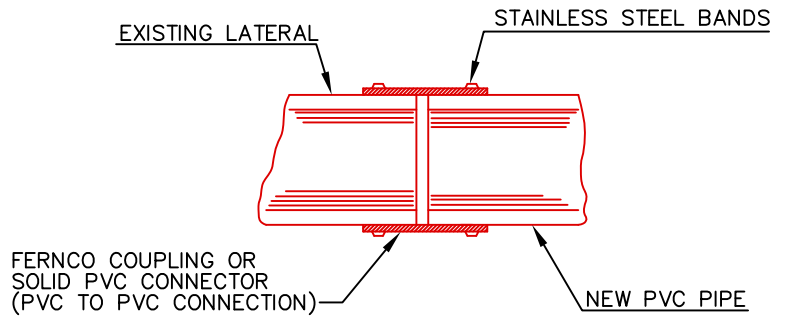
II-15

MASONRY PLUG

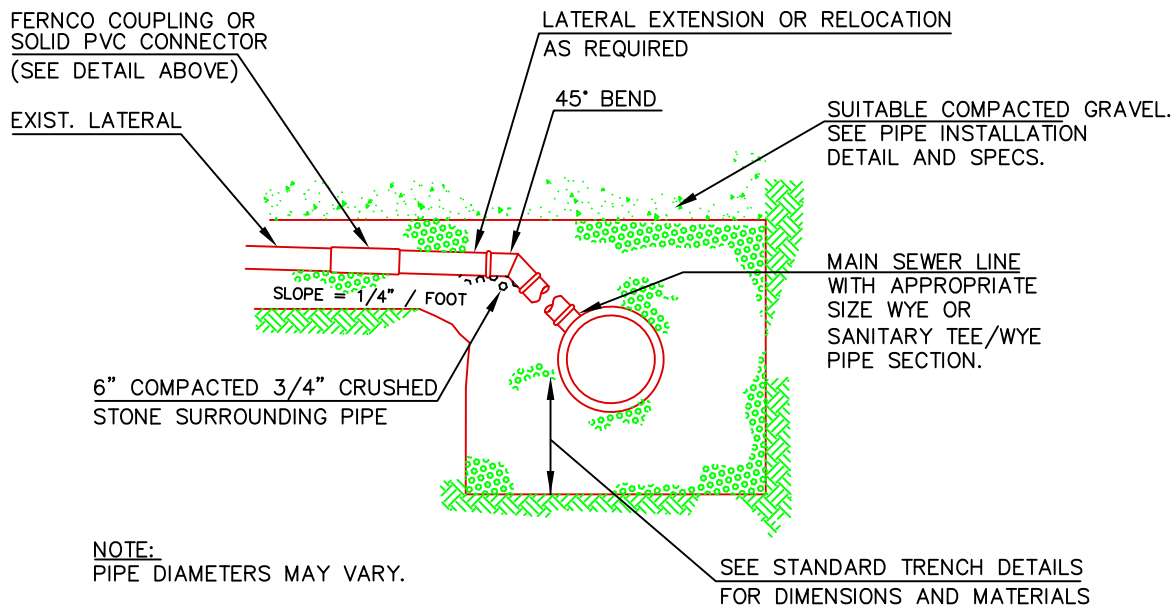
NOTE:

LOCATIONS AND ELEVATIONS OF STUBS SHOWN ON THE PLANS ARE TO BE CONSIDERED AS APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED TO SUIT FIELD CONDITIONS.

HOUSE CONNECTIONS AND CATCH BASINS CONNECTIONS TO THE MAIN LINE OF THE SEWER, SHALL CONSIST OF AN APPROPRIATE WYE BRANCH CONNECTION AS SHOWN ON THE PLANS, OR AS DIRECTED. ACTUAL WYE LOCATIONS FOR HOUSE CONNECTIONS AND CATCH BASIN CONNECTIONS SHALL BE DETERMINED DURING CONSTRUCTION. THE CONTRACTOR SHALL KEEP A COMPLETE RECORD OF WYE LOCATIONS WHICH SHALL BE GIVEN TO THE CITY OF PORTLAND UPON COMPLETION OF THE CONTRACT. ALL PVC TO PVC COUPLING SHALL BE "SOLID PVC COUPLINGS".



FERNCO COUPLING FOR REPAIR OR REPLACEMENT



NOTE:
PIPE DIAMETERS MAY VARY.

SECTION

TYPICAL EXISTING LATERAL CONNECTION

NOT TO SCALE

DATE:
DEC. 2009

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CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

II-16

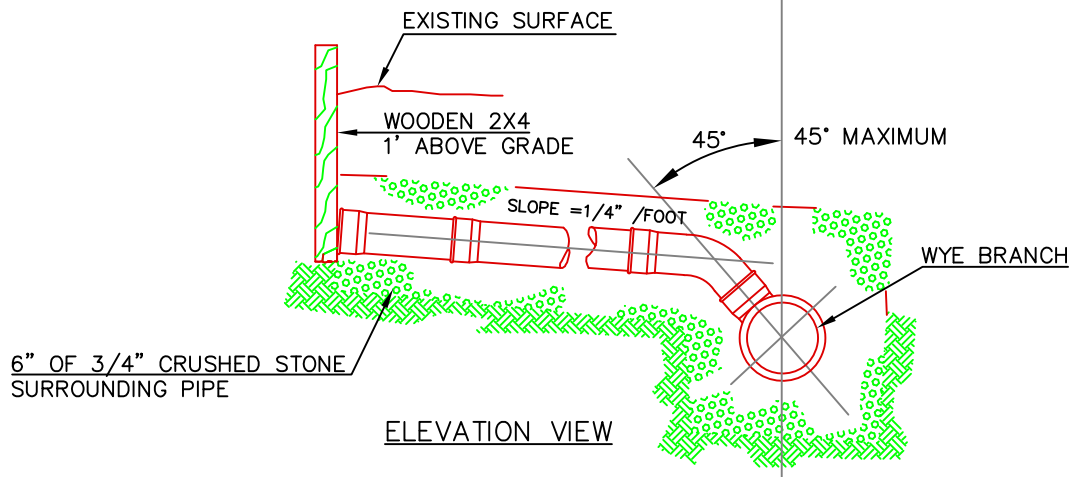
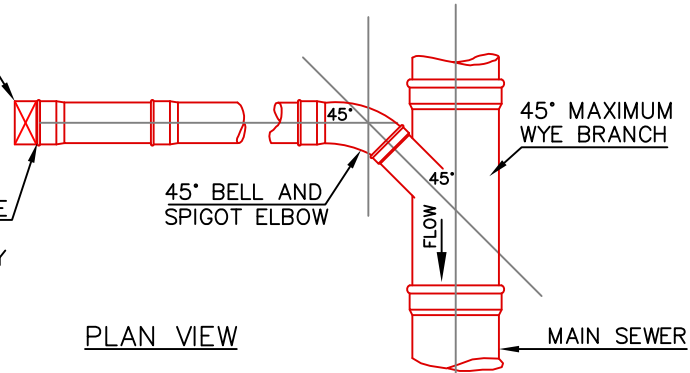
TYPICAL EXISTING LATERAL CONNECTION

NOTE:

LOCATION / WARNING TAPE SHALL BE
INSTALLED OVER CENTERLINE OF PIPE AT A
MAXIMUM OF 24 INCHES BELOW FINISH GRADE.

EXTEND WOODEN 2X4
TO 1' ABOVE GRADE TO
DELINEATE END OF STUB.
MARK 2X4 WITH THE DEPTH
FROM GRADE TO PLUG.

FOR FUTURE CONNECTION, TERMINATE
AND PLUG LATERAL AT STREETLINE.
PLUG TO BE IDENTIFIED AS SANITARY
OR STORM.



TYPICAL HOUSE LATERAL TEE/WYE CONNECTION

NOT TO SCALE

DATE:
AUGUST 2009
REVISED:

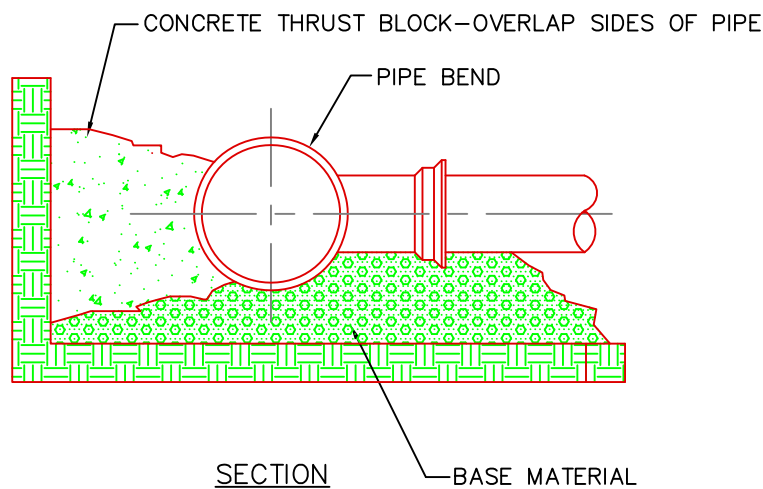
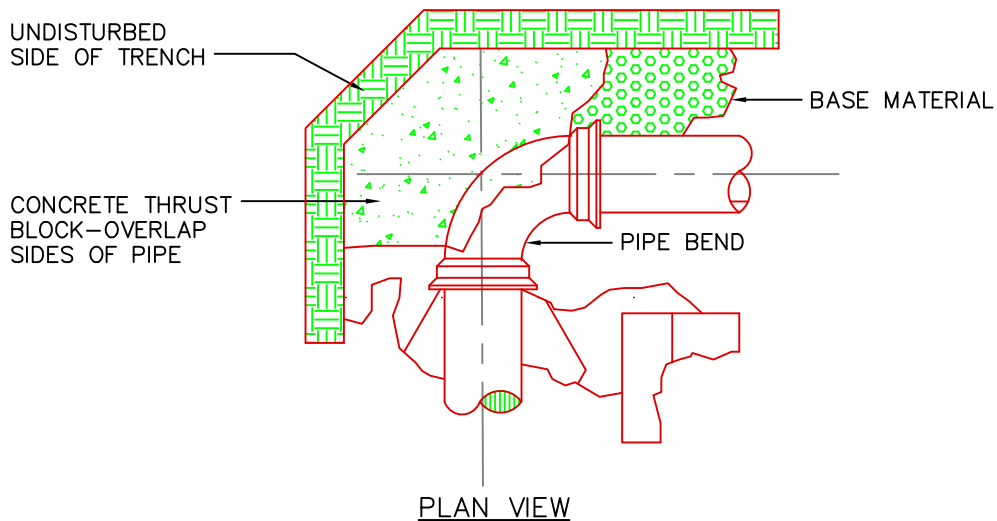
CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

II-17

TYPICAL HOUSE LATERAL TEE/WYE CONNECTION



THRUST/RETAINER SCHEDULE		
1/4 BEND	(90°)	USE POURED-IN-PLACE THRUST BLOCK w/RETAINERS
1/8 BEND	(45°)	THRUST BLOCK w/RETAINERS
1/16 BEND	(22 1/2°)	THRUST BLOCK
1/32 BEND	(11 1/4°)	THRUST BLOCK

NOTE: KEEP CONCRETE LEAR OF PIPE JOINT, NUTS AND BOLTS

FORCE MAIN — CONCRETE THRUST BLOCK PLACEMENT ON VERTICAL & HORIZONTAL BENDS

NOT TO SCALE

DATE:
AUGUST 2009

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CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

II-18

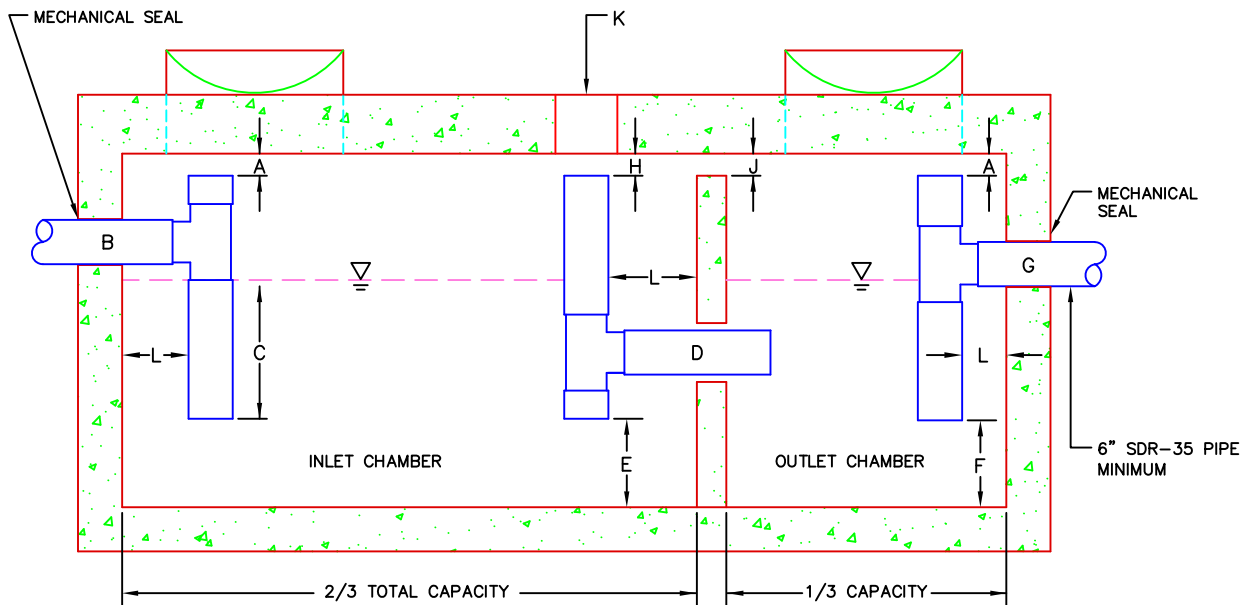
FORCE MAIN CONCRETE THRUST BLOCK PLACEMENT

1000 GALLON GREASE INTERCEPTOR:

- A) MINIMUM 6", BUT NOT LESS THAN PIPE DIAMETER.
- B) INLET PIPE INVERT TO BE 2 1/2" ABOVE LIQUID SURFACE.
- C) INLET PIPE TO TERMINATE 2/3 DEPTH OF WATER LEVEL.
- D) BAFFLE T
- E) 6" FROM FLOOR TO END OF BAFFLE PIPE.
- F) 6" FROM FLOOR TO END OF OUTLET PIPE.
- G) OUTLET PIPE NO SMALLER THAN INLET PIPE.
- H) TOP OF BAFFLE PIPE TERMINATES NO LOWER THAN BAFFLE HEIGHT.
- I) INLET CHAMBER IS $\frac{2}{3}$ TOTAL CAPACITY; OUTLET CHAMBER IS $\frac{1}{3}$ TOTAL CAPACITY.
- J) 6" MINIMUM DISTANCE FROM CEILING.
- K) MINIMUM 6" CLEANOUT.
- L) INLET AND OUTLET PIPES MUST BE SPACED SO THAT CLEAR ACCESS CAN BE MADE FROM MANHOLES.

THIS STRUCTURE MUST DISCHARGE TO A CITY OF PORTLAND STANDARD MANHOLE WITH CHANNEL AND MUST BE RATED.

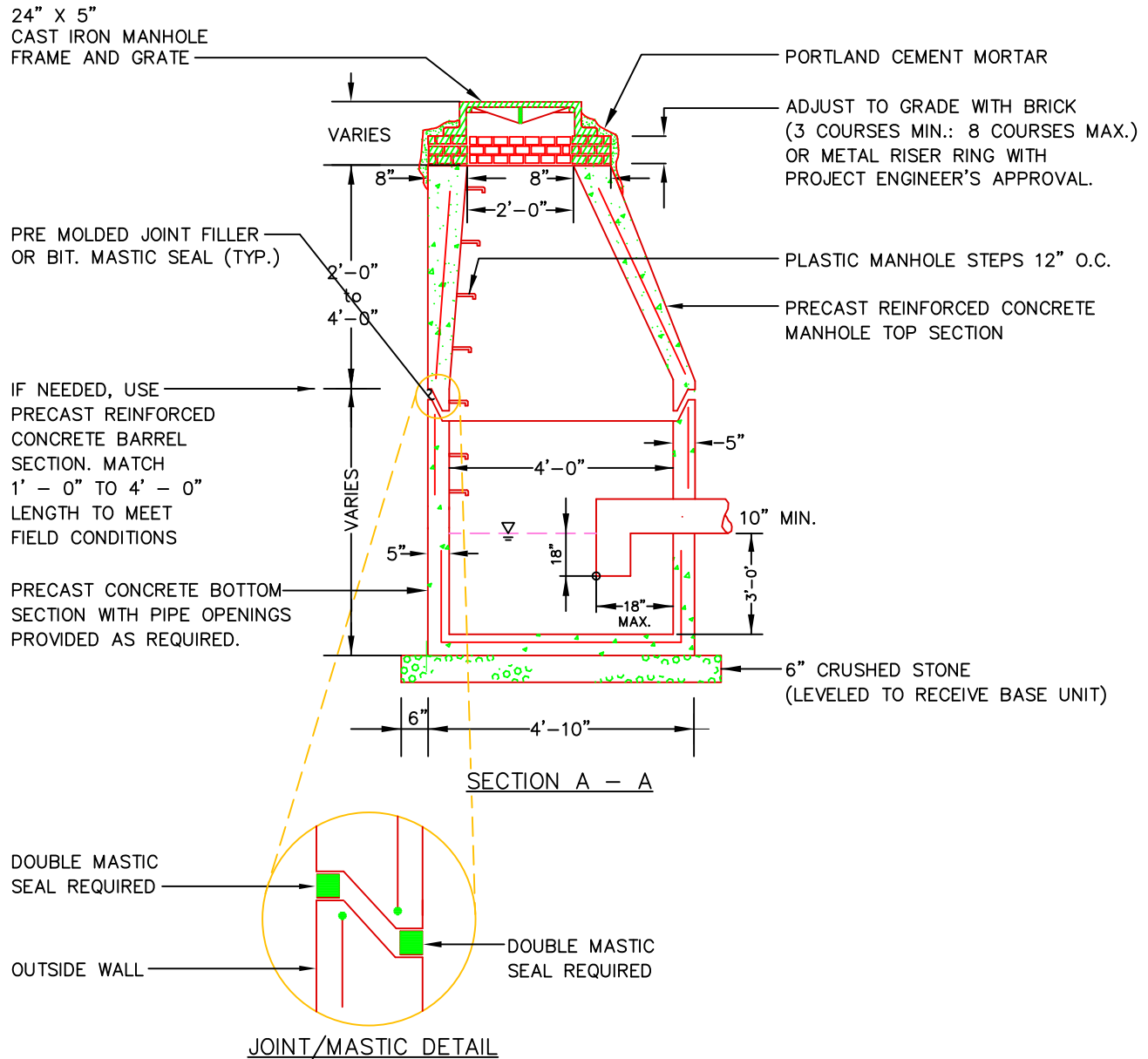
DAILY PROCESS FLOW FROM THE FACILITY WITH NO SANITARY OR OTHER EXTRANEIOUS WASTES FLOWING THROUGH IT.



1000 GALLON GREASE INTERCEPTOR

DATE: APRIL 2014 REVISED:	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS SECTION II	FIGURE: II-19
EXTERNAL GREASE TRAP DESIGN			

FOR USE IN PARTIALLY OR TOTALLY ENCLOSED PARKING GARAGES,
AUTOMOTIVE REPAIR FACILITIES OR ANY OTHER PROPOSED STRUCTURE
WHERE DEEMED APPROPRIATE BY THE CITY ENGINEER.
DISCHARGE SHALL BE TO SANITARY SEWER.



OIL / GRIT SEPARATOR

NOT TO SCALE

DATE:
FEB 2015

REVISED:
MARCH 2016

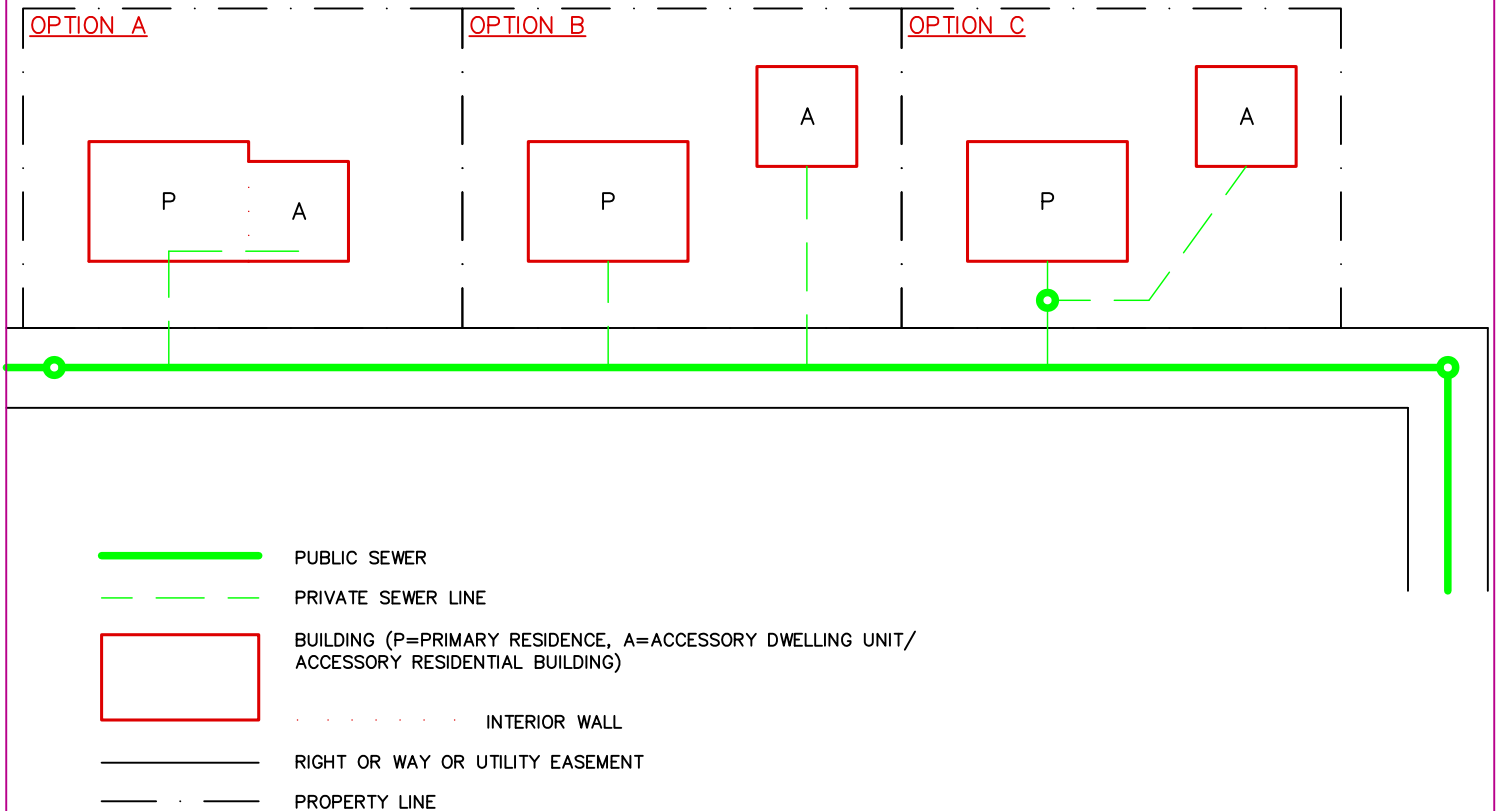
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**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

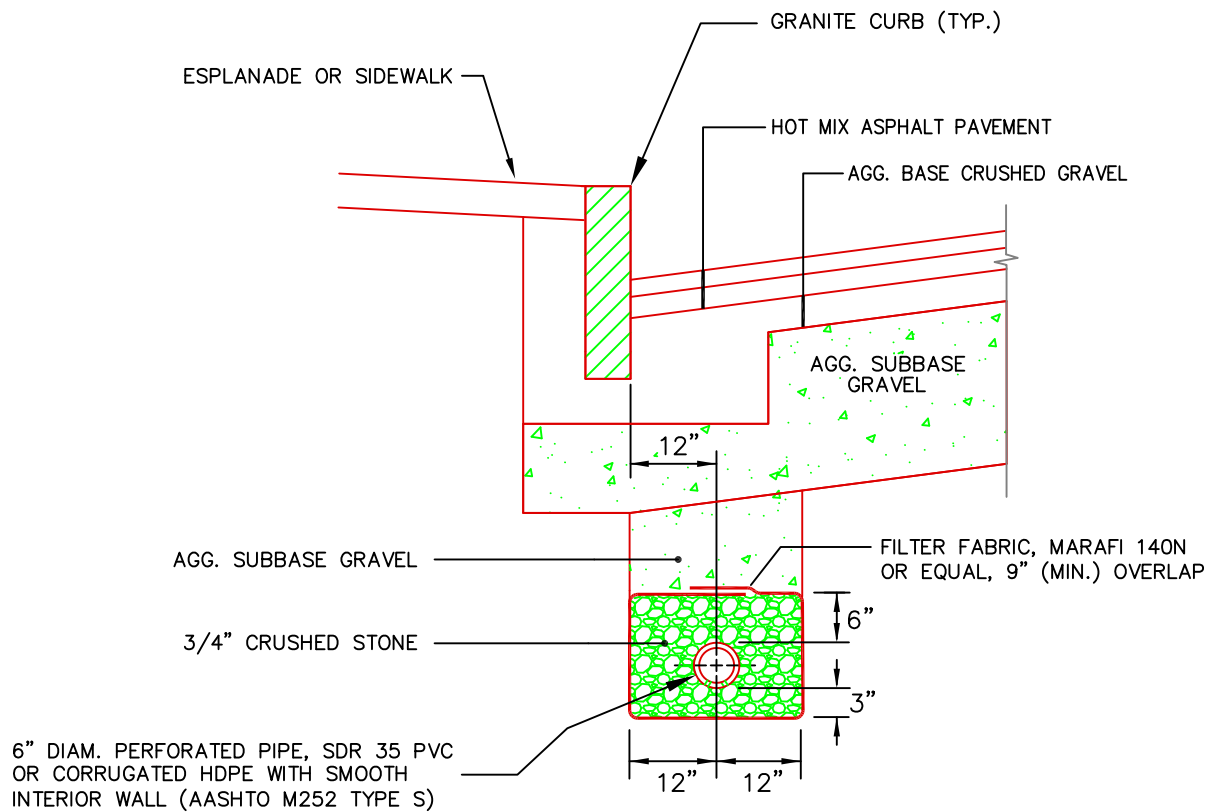
II-20

OIL / GRIT SEPARATOR



POTENTIAL SEWER LINE CONFIGURATION FOR PRIMARY RESIDENCES WITH AN ACCESSORY DWELLING UNIT
NOT TO SCALE

DATE: APRIL 2022 REVISED:	CITY OF PORTLAND, MAINE TECHNICAL STANDARDS MANUAL	SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS SECTION II	FIGURE: II-21
	SEWER LINE CONFIGURATIONS FOR PRIMARY RESIDENCES WITH AN ACCESSORY DWELLING UNIT		



NOTES

1. UNDERDRAIN PIPE INVERT ELEVATIONS SHALL BE AT LEAST 42 INCHES BELOW GUTTER GRADES.
2. PERFORATIONS IN UNDERDRAIN PIPE SHALL BE ORIENTED DOWN.

DATE:
AUGUST 2009

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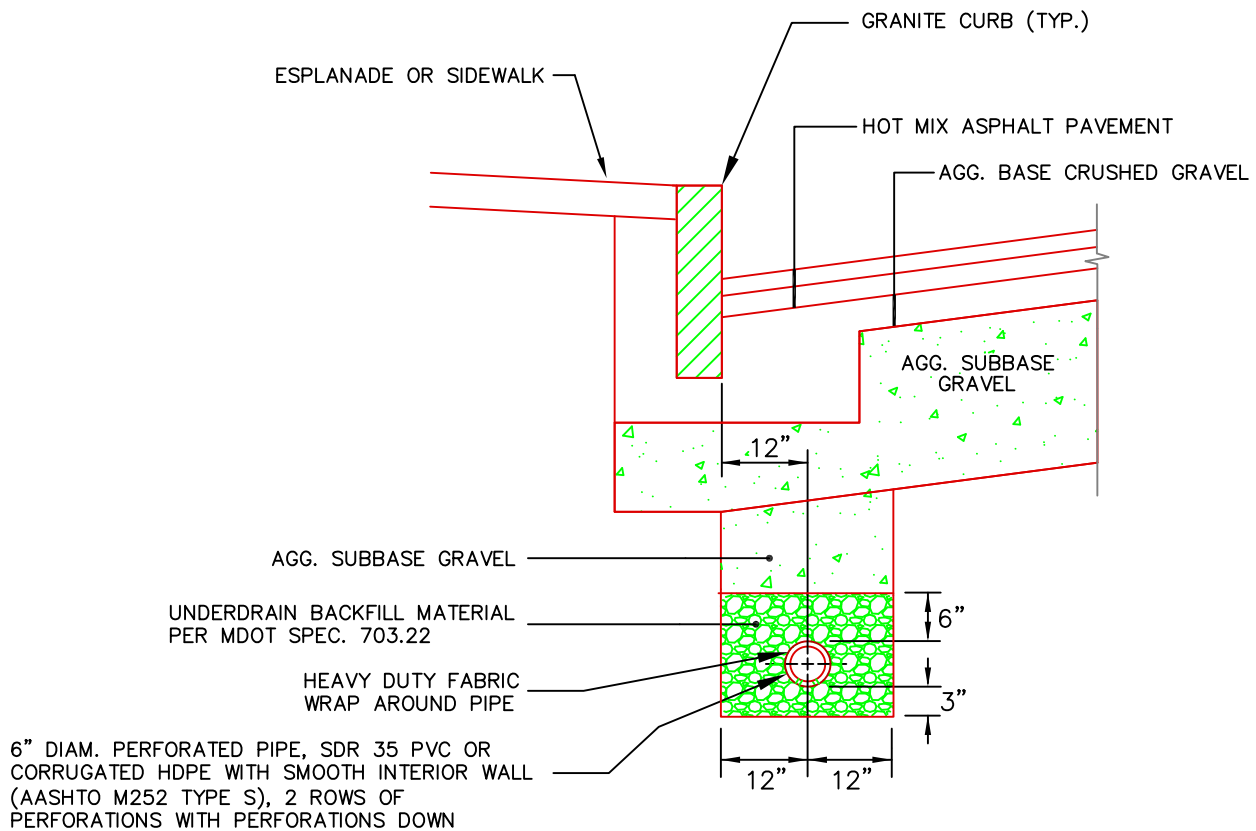
CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

FIGURE:

II-22

**TYPE "B" UNDERDRAIN INSTALLATION
ALTERNATIVE A**



NOT TO SCALE

NOTES

1. UNDERDRAIN PIPE INVERT ELEVATIONS SHALL BE AT LEAST 42 INCHES BELOW GUTTER GRADES.
2. PERFORATIONS IN UNDERDRAIN PIPE SHALL BE ORIENTED DOWN. THE PIPE SHALL BE FURNISHED WITH A HEAVY DUTY FABRIC WRAP, SUCH AS "FILTER SOCK" BY ADS.

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CITY OF PORTLAND, MAINE
TECHNICAL STANDARDS MANUAL

**SANITARY SEWER AND STORM
DRAIN DESIGN STANDARDS**
SECTION II

TYPE "B" UNDERDRAIN INSTALLATION ALTERNATIVE B

FIGURE:

II-23

4. LANDSCAPING AND LANDSCAPE PRESERVATION STANDARDS

4.1. DEFINITIONS

Feature mature tree: A tree located on privately owned property that meets at least one of the following criteria: 1.) Any tree that is on the Register of Big Trees promulgated by the Maine Department of Agriculture, Conservation & Forestry (the "Big Tree List"), 2.) Certain trees 24" inches in diameter or greater (diameter at breast height or DBH) as identified by City Arborist 3.) Rare tree specimen to include either a tree species classified as rare or endangered at either the state or federal level and/or included in the most current version of the Maine Register of Big Trees, published by the Maine Department of Conservation and/or stands of native trees that are rare or threatened as identified by City Arborist.

Rare tree specimen: A tree that is (1) of a species classified as rare or endangered at either the state or federal level and/or (2) included in the most current version of the Maine Register of Big Trees, published by the Maine Department of Conservation.

4.2. PRESERVATION OF SIGNIFICANT SITE FEATURES

The applicant shall clearly identify all significant natural features on the site, as defined in Article 14 of the Land Use Code, on the submitted boundary survey and site plan, and shall clarify the proposed measures for the preservation and protection of all such features both during and after construction.

4.3. PRESERVATION OF EXISTING VEGETATION

- 4.3.1. The applicant shall provide a tree survey performed by a licensed land surveyor, arborist, forester, or landscape architect. The tree survey shall clearly indicate forest type and the location, size and species of all existing trees 10" diameter at breast height (DBH) or greater on the site and in the right-of-way. For sites with a high density of existing trees, the survey shall identify all existing shade and ornamental trees that may have been part of a prior landscape scheme for the site and the location, average size and species of groves of trees, and of individual trees greater than 16" DBH.
- 4.3.2. Trees or groups of trees to be preserved shall be inspected and approved by the City Arborist or their designee and shall be clearly identified on the Site Plan, Subdivision Plat, Landscape Plan and Grading Plan. Where required by the reviewing authority, property deeds shall include language and plans to help ensure that current and future landowners are aware of all preservation

requirements tied to the property. ~~The grading plan shall clearly indicate any proposed grade changes within the drip line of trees designated for preservation.~~

4.3.3. Tree Preservation efforts shall include posted signs clearly identifying theing of 'Tree Protection Zones' or 'Limit of Work Zones' ~~in the form of obvious signage.~~

4.3.4. Fencing or other protective barriers and signage shall be erected outside the drip line of individual, groupings of or perimeter trees to be preserved.

- No storage of construction equipment, digging, trenching or other soil disturbance shall be permitted within the drip-line of trees to be preserved.
- Areas of trees or other vegetation to be preserved shall not be used for temporary stormwater runoff storage during construction.
- Protective barriers and signage shall remain in place until completion of the project.

During the pre-construction meeting and prior to the onset of any construction including site work, the Department of Public WorksServices or their designee shall inspect all installed protective barriers.

4.3.5. Tree preservation locations and measures to protect preserved vegetation shall be identified or noted in detail on the Landscape Plan and cross-referenced on the Site Plan, Subdivision Plat and Grading Plan.

4.3.6. Upon completion of the project, plant material that has been designated for preservation shall be subject to the maintenance and inspection requirements outlined in this section. Preserved vegetation ~~and new plantings~~ that show signs of construction damage within a one year period following construction, including but not limited to bark damage or excessive root damage, grade changes other than those originally indicated in the approved grading plan, soil compaction due to heavy equipment traversing closely, or general decline due to mechanical or natural conditions shall be rejected and must be replaced prior to the release of any defect guarantee. Any rejected tree will be subject to the following replacement requirements:

- For every existing tree rejected that is between 10" and 15" in caliper DBH, one (1) replacement tree listed on the City of Portland approved native species list shall be planted on the site.
- For every existing tree rejected that is 16" or more in caliper DBH, two (2) replacement trees listed on the City of Portland approved native species list shall be planted on the site.

- ~~For every existing tree rejected that is between 10" and 15" in caliper DBH, one (1) replacement tree listed on the City of Portland approved native species list shall be planted on the site.~~

4.3.7. The developer shall be responsible for making all contractors aware of preservation requirements prior to any construction activities. See ~~specification~~Figure IV-2 for typical tree preservation detail.

4.4. Reserved.

4.5. SITE LANDSCAPING

4.5.1. All Landscape Design

Site landscaping should ~~establish result in~~ attractive, low-maintenance outdoor spaces that incorporate site definition and screening and ~~be selected to achieve one or more of the following outcomes; promote a healthy and biodiverse urban ecosystem, further City goals around climate resiliency and mitigation, create or enhance areas of native habitat, improve stormwater treatment, and/or increase local food production.~~support biodiversity.

4.5.2. Screening and Buffers

Where required, buffer areas shall be comprised of existing trees and vegetation, new landscaping or a combination thereof to create a dense, mixed buffer incorporating both understory and tree canopy layers. While primarily of benefit from a ground level pedestrian viewpoint, such screening should also effectively provide screening when viewed from upper floors of surrounding properties, where applicable. New shrubs shall be approximately three (3) feet in mature height and shall be spaced ~~six (6) to eight (8)~~6-8 feet apart. ~~Specification~~Figure IV-3 provides an example of buffering between compatible uses.

Buffers between land uses: Buffers between contrasting land uses may incorporate earthen berms not exceeding 4:1 slope, opaque fencing ~~of high architectural quality~~, masonry wall or a combination thereof, in addition to landscape plantings. Where fencing or masonry wall is proposed as part of a buffer, less landscaping density is acceptable; however, buffers shall still include trees, shrubs and other vegetation. Figure IV-7 provides an example of

screening between different land uses.

Buffers between site components: Landscaped buffers within the site shall complement and enhance ~~and~~ structures and site amenities, provide screening between structures, and buffer undesirable views from general public areas, from existing structures and from residents of proposed units. Accessory site elements such as parking and loading areas, utility structures, dumpsters, storage areas and other hardscaped or unvegetated areas, shall be located and screened from view from public areas and adjacent properties. Screening shall be accomplished with opaque fencing of high architectural quality, masonry wall and/or dense evergreen landscaping. Where fencing or masonry wall is proposed as part of a buffer, less landscaping density is acceptable; however, buffers shall still include trees, shrubs and other vegetation. Specification Figures IV-6 and IV-7 provides an example of screening of accessory site elements.

4.5.3. Industrial and Commercial Development

In addition to other requirements of the City Code and of this section, industrial and commercial developments shall incorporate landscaping that:

- Enhances proposed buildings with foundation plantings in the vicinity of public entrances to all buildings and in areas with uninterrupted or predominantly blank facades (Illustration Figure IV-5 provides an example of interior site landscaping for commercial and industrial sites).
- Defines roadways and driveway entrances.

4.5.4. Planned Residential Unit Development (PRUDs)

Required trees to be planted and/or preserved shall separate and screen proposed buildings and separate and screen proposed recreational uses. Where cul de sacs are provided, landscaping consisting of native or adapted low maintenance vegetation shall be provided. See Illustration Figure IV-4 for typical cul de sac landscaping.

4.5.5. Parking Areas

Landscaping shall be incorporated into the development of surface parking to reduce adverse environmental and aesthetic impacts, to shade pavement to reduce heat island effect and to screen parking areas from public view. Plant materials shall be selected for appearance, durability, and tolerance to salt. Illustration Figures IV-6a and IV-6b provide examples of parking lot screening.

Landscaping that abuts areas of vehicular use shall be adequately protected and

separated from vehicles. Protection should take the form of physical or visual separation, such as be in the form of curb stops, bollards, or continuous curbing-
~~or guardrails. Protection~~Curbing and guardrails shall be designed with adequate visibility and durability in order to withstand normal snow plowing operations.

Landscaped islands shall be curbed and a minimum of eight (8) feet in width, not including curbing. The incorporation of bioretention into landscaped islands is strongly encouraged.

4.5.6. Snow Storage

Snow storage areas ~~shall not encroach on areas designated to meet minimum parking requirements but~~ may be located in landscaped areas provided that appropriate landscape materials are selected which can withstand such snow storage. Snow storage shall not be located where it would adversely impact the functionality of bioretention or other stormwater management systems.

4.5.7. Walls and Fences

Fences and walls within public view must be of high architectural quality. Chain link and wire mesh fences shall be vinyl coated, dark in color, out of direct public view and shall be complemented with landscaping.

- For residential development, chain link fence shall be a minimum of 6-gauge fence fabric.
- For commercial or industrial development chain link fence shall be 9-gauge fence fabric mounted on schedule 40 pipe posts.

~~Electrified or barbed fencing is not permitted.~~ Masonry walls shall be constructed of stone, brick or other durable and attractive materials.

-Concrete block walls are not permitted except where variety in color, design and detailing of the materials are of high architectural quality. Electrified or barbed fencing is not permitted.

4.5.8. Slope Stabilization

Stabilization of slopes between 5% and 50% shall incorporate installation of a mixture of vegetation, organic mulch and/or erosion control seed mix.

Stabilization of slopes greater than 50% must incorporate biotechnical and/or structural methods including but not limited to terracing rip rap or retaining

walls in addition to vegetation. Retaining walls, if four (4) feet in height or greater from the proposed finished grade~~bottom of the footing~~ to the top of the wall and/or if supporting a surcharge, must be designed by a licensed structural engineer and require a City of Portland Building Permit.

4.5.9. Low Impact Development (LID) Practices

It is the City's policy to encourage Low Impact Design (LID) strategies and practices to capture and infiltrate stormwater runoff. LID is the process of developing land to mimic the natural hydrologic regime. It incorporates land planning and design practices and technologies to achieve this goal. LID is also discussed in Section V of this Technical Manual.

LID strategies and practices relating to site landscaping requirements include but are not limited to bioretention, grassed filter strips, green roofs, rain gardens and vegetated swales.

4.5.10. Climate Positive Planting

Site landscaping should be selected in part to further the City's goals around mitigating the effects of a locally changing climate, with consideration given to the viability of species in a warming environment, the equitable extension of tree canopy to address the urban heat island effect, and the use of landscaping elements to reduce energy consumption.

4.6. STREET TREES

Arrangement and spacing of trees proposed in the City right of way and/or private roadway, shall be coordinated with the Portland City Arborist or their designee. If it is determined by the City Arborist that there is not adequate space or conditions for street trees in the public right of way and/or private roadway or if there is a conflict between the location of proposed street trees and the location of existing or proposed underground utilities, the required number of street trees shall be provided on private property within twenty (2019) feet of the property line along the street frontage. Tree species shall be selected according to the City of Portland recommended tree list (Figure IV-1). Trees proposed in the sidewalk shall be planted in with approved tree wells-grates, as shown in Figure IV-4a6.

4.6.1. Residential Development

Single-family residential: Single-family residential developments shall provide a minimum of two (2) street trees per unit, planted in the City right of way and/or along private roadways unless otherwise approved and spaced twenty-five (25)

to thirty-five (35) feet on center.

Multi-family residential: Multi-family residential developments shall provide a minimum of one tree per unit, planted in the City right of way and/or along private roadways unless otherwise approved and spaced thirty (30) to forty five (45) on center.

Single-family residential subdivisions: Single-family residential subdivisions shall provide a minimum of two (2) trees per lot, planted in the City right of way and/or along private roadways unless otherwise approved and spaced thirty (30) to forty-five (45) feet on center.

4.6.2. Planned Residential Unit Developments (PRUDs)

Where a manufactured housing park or subdivision is also a planned residential unit development (PRUD), the development shall provide a minimum of two (2) street trees per unit, planted within eight (8) to ten (10) 8-10 ft feet of the City right of way and/or private roadway proposed as part of the development.

4.6.3. Commercial, Industrial and Institutional Development

Commercial, industrial and institutional developments shall provide street trees thirty (30) to forty-five (45) feet apart on center in the City right of way along all street frontages unless otherwise approved.

4.6.4. Street Tree Alternatives

Section 14.6.2 of the Land Use Code states that where the applicant can demonstrate that site constraints prevent the planting of required street trees in the City right of way and/or along private roadways, the review authority may permit the following to be counted towards the street tree requirement. The alternatives to a street tree in the ROW should help achieve the objectives of a street tree and contribute to the street environment. The following specificationFigure are provided to guide the applicant; the acceptability of the alternative to a street tree shall be at the discretion of the City Arborist.

- The preferable location for new street trees that cannot be located in the ROW along the frontage of the site is on public land or facilities elsewhere in the neighborhood, or in areas of the City with minimal tree coverage. Locations may include esplanades, and sidewalks and existing empty street tree wells or planting strips, in the neighborhood, and also places such as parks, playgrounds, and other areas where the public benefit would be derived from the addition of new trees. Evidence that the planting site was unlikely to be redeveloped in the near future and that the trees would be protected and maintained ~~looked after would also be~~ are required.
- ~~The requirement for street trees may be met by incorporating measures to~~

~~enhance tree survival (such as raised planters, irrigation and structural soils) where these have been recommended and agreed by the City Arborist. The objective is to improve the likelihood of the new tree becoming established and to reduce the need for costly maintenance in the future. The cost of the agree measure(s) would be the basis for the calculation, as follows:-~~

~~$$\frac{\text{Cost of measure(s)}}{\text{Contribution currently assessed for a new street tree}} = \text{(\# of street tree equivalent)}$$~~

- Existing healthy street trees located in the ROW along the frontage of the site may be counted as street trees. Plans for protection and preservation of these trees during construction shall be included as part of the development review.
- Existing healthy trees that are six (6) inches or more in caliper, visible from the right of way and on the site within 20 (twenty) feet of the property line may be counted as street trees. Plans for the protection and preservation of these trees during construction shall be included as part of the development review.
- New street trees may be planted where visible from the right of way within 20 (twenty) feet of the property line, subject to the species being appropriate to the location and from the Recommended Tree List (Figure IV-1). Applicants should note that trees planted within the site would be subject to the Performance Guarantee ~~d~~Defect period provisions and should be documented on deed plans for future preservation.
- ~~Where the option to install other planted features is being considered, applicants will need to submit comprehensive information and document that the proposal would fully meet the ordinance requirements.~~
- Where the other alternatives are demonstrated to be ~~not in~~feasible, a contribution for each required street tree may be made into the City of Portland's Tree Fund in accordance with the table below. The contribution ~~shall~~would be used by the City to provide street trees in the right of way or in the neighborhood of the proposals site or in other areas of the City with minimal tree coverage. The contribution would be considered a "one-time" ~~i~~Infrastructure ~~C~~ontribution which is payable prior to the issuance of a building permit. ~~It should be noted that at least 85% of the Tree Fund would be allocated towards new trees and 15% towards maintenance to ensure trees get established or to replace failing trees.~~

Contribution for new street tree	\$400.00
Contribution for tree to replace "heritage" or feature mature tree	\$100.00 per inch diameter of the removed existing "heritage" or feature mature tree
Contribution where applicant plants a tree to replace "heritage" or feature mature tree	\$100.00 per inch diameter of removed existing "heritage" or feature mature tree less \$400.00

4.7. PLANT SELECTION

- 4.7.1. All trees and shrubs shall comply with the standards set forth by the American Standard for Nursery Stock (ANSI Z60.1 - 2004). These standards are available through the Department of Public ~~Works~~Services and at <http://anla.org/index.cfm?area=&page=Content&categoryID=260>
- 4.7.2. All trees and shrubs shall be nursery grown, healthy, free of disease and insect pests, and shall have a well-developed and compact root system. Plant material showing signs of a lack of proper nursery care or a lack of pruning or cultivation, or which is not true to name will be classified as collected stock regardless of its source and shall be rejected.
- 4.7.3. Proposed ~~trees~~ and shrubs installed as part of the landscaping plan shall be comprised of at least 50% native species.
- 4.7.4. The developer shall be responsible for preventing the spread of existing or the introduction of new invasive species on the site, as identified below. If, within one (1) year following construction, invasive species are identified on the site or if such species are pre-existing on the site but are determined to have spread by the City Arborist, the applicant shall be required to implement appropriate control measures prior to the release of the defect guarantee. Accepted mechanical and chemical control methods are provided by the Maine Natural Areas Program (MNAP) of the Maine Department of Conservation in their Invasive Plant Fact Sheets (available through the Department of Public Services and through the MNAP program website: <http://www.maine.gov/doc/nrimc/mnap/features/invasives.htm>).
- The following plant species are recognized as invasive species that are characteristically adaptable, aggressive, and have a high reproductive capacity.
- (1) Asiatic Bittersweet (*Celastrus orbiculata*);
 - (2) Autumn and Russian Olive (*Elaeagnus umbellata* and *Elaeagnus angustifolia*);
 - ~~(3) Black Swallowwort (*Cynanchum louiseae*);~~
 - (4) Brazilian Waterweed (*Egeria densa*);
 - (5) Common and Glossy Buckthorn (*Rhamnus cathartica* and *Frangula alnus*);

- (6) Common Reed (*Phragmites australis*);
- (7) Eurasian Milfoil (*Myriophyllum spicatum*);
- (8) Fanwort (*Cabomba caroliniana*);
- (9) Garlic Mustard (*Alliaria petiolata*);
- (10) Hydrilla
(*Hydrilla verticillata*);
- (11) Japanese Barberry (*Berberis thunbergii*);
- (12) Japanese Honeysuckle (*Lonicera japonica*);
- (13) Japanese Knotweed (*Fallopia japonica*);
- (14) Japanese Stilt Grass (*Microstegium vimineum*);
- (15) Lesser Celandine (*Ranunculus ficaria*);
- (16) Mile-a-Minute Weed (*Polygonum perfoliatum*);
- (17) Morrow and Tartarian Honeysuckle (*Lonicera morrowii* and *Lonicera tartarica*);
- (18) Multiflora/Rambler Rose (*Rosa multiflora*);
- (19) Porcelainberry (*Ampelopsis*
- (20) Milfoil (*Myriophyllum heterophyllum*);
- (21) Water Chestnut (*Trapa natans*);
- ~~-(22)~~ Norway Maple (*Acer platanoides*)
- (23) Yellow-flag Iris (*Iris pseudacorus*).

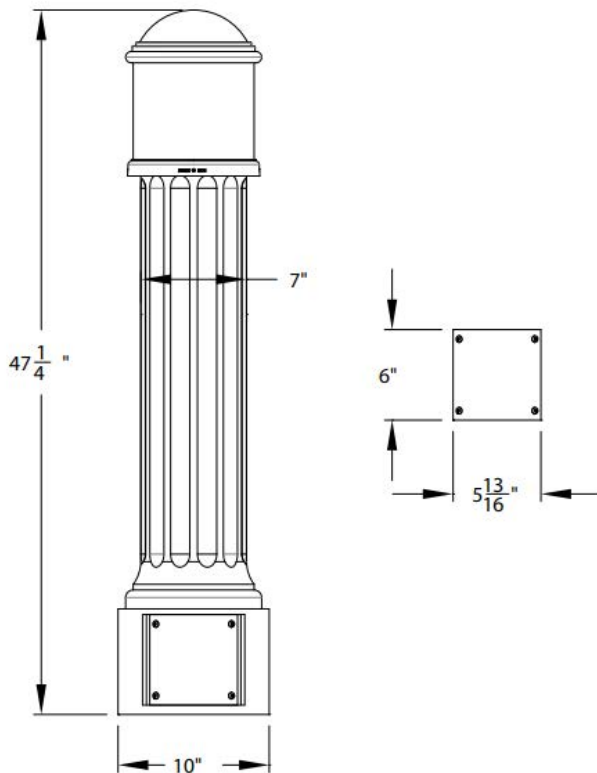
- 4.7.5. Trees selected from the Recommended Tree List, Figure IV-1 of this Section shall conform, at a minimum, to the sizes specified on the list.
- 4.7.6. All upright deciduous and evergreen shrubs shall be a minimum of 3 feet tall at mature height. All spreading evergreen and deciduous shrubs shall be a minimum of 2-2.5 feet in width at maturity.
- 4.7.7. Ground covers planted in lieu of grass shall be planted at a level of coverage equivalent to one complete growing season. Grass areas shall be planted with Kentucky Bluegrass (*Poa pratensis*), Red Fescue (*Festuca rubra*), Tall Fescue (*Festuca arundinacea*) or Perennial Ryegrass (*Lolium perenne* L.). Rolled turf, erosion reducing net or suitable vegetation ~~mulch~~ along with landscaping shall be used in swales or other areas subject to erosion. ~~Mulching material shall be a minimum of three (3) inch deep wood chip or bark mulch.~~
- 4.7.8. Mulching material shall be a minimum of three (3) inch deep wood chip or bark mulch. Inorganic mulches are not permitted.
- 4.7.9. No plantings used to satisfy City landscaping requirements shall be comprised of inorganic materials.

4.8 INSTALLATION AND MAINTENANCE OF PLANTINGS

- 4.~~8.17.10~~. Landscaping, earth moving and grading activities shall be performed according to standards accepted good planting and grading procedures and in accordance with the approved Site Plan, Subdivision Plat, Grading Plan and Landscape Plan.
- 4.~~8.27.11~~. No plant shall be moved after the bud break unless so authorized by the City Arborist or their designee. Planting periods are between April 1st and to July 1st and/or September 1st and November 1st. ~~Landscaping which cannot be installed prior to issuance of a Certificate of Occupancy shall be subject to a performance guarantee according to Article 14 of the City Land Use Code.~~
- 4.~~8.37.12~~. Tree planting and other landscaping for subdivisions that cannot be installed prior to release of the performance guarantee must be insured by a defect bond as described in Section Article 15 of the City Land Use Code.
- 4.~~8.47.13~~. All bare soil areas shall be vegetated and/or mulched prior to the issuance of a Certificate of Occupancy.
- 4.8.5. New vegetation that show signs of construction damage within a one year period following construction, including but not limited to bark damage or excessive root damage, grade changes other than those originally indicated in the approved grading plan, soil compaction due to heavy equipment traversing closely, or general decline due to mechanical or natural conditions shall be rejected and must be replaced prior to the release of any defect guarantee.

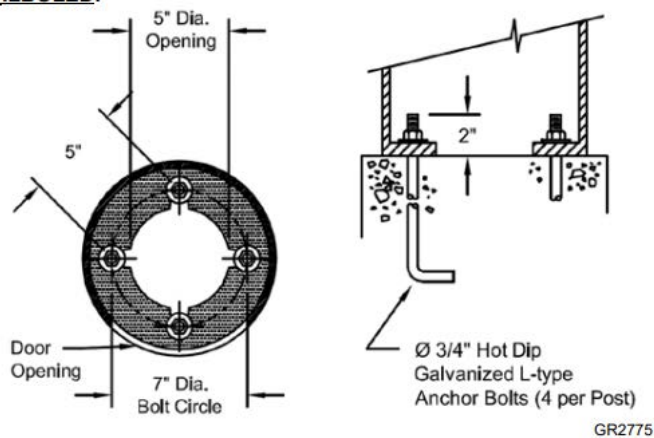


PORTLAND | me

Street & Sidewalk Lighting
BOLLARD

Maximum standard weight - 58 lbs.

Maximum weight with Direct Burial Base Option - 88 lbs.

HLBOLED:**LUMINAIRE**

Hamilton LED Series Cast Aluminum Bollard
Model: HLBOLED CA P40 30K MVOLT GL5 ACS BK
AO ABG

Mechanical Specifications

Be heavy grade A356.1 cast aluminum (aluminum with <1% copper)

Wet locations listed

One-piece casting with a removable top

All welders shall be certified per Section 5 of ANSI/AWS D1.2-90

Access door opening for anchor bolts and wiring access is 3" x 5" x 4.5"

The finish shall utilize a polyester powder coat paint to ensure maximum durability rigorous multi-stage pre-treating and painting process yields a finish that achieves a scribe creepage rating of 8 (per ASTM D1654) after over 5000 hours exposure to salt fog chamber (operated per ASTM B117) on standard BLACK.

Optical Specifications

IP65 light engine

Type 5 distribution with prismatic borosilicate glass and a smooth clear acrylic outer lens

Control Options

Field adjustable output to adjust output to luminaire – AO

Electrical Specifications

The driver shall meet the following requirements:

Certified by UL or CSA for wet locations

A factory programmable electronic driver with 0-10V dimming

LEDs shall have a minimum of 70 CRI and available in 3000K CCT

The electrical system shall be designed to meet ANSI/IEEE C62.41.2 and shall offer a 10kV/5kA surge protection, fail off.

FINISH

Black (standard)

APPLICATION

Sidewalk lighting where height is limited - underpasses, parks, piers

Can be used as a security bollard.

Spacing: To be determined by Department of Public Works per specific project

Date:
May, 2022

CITY OF PORTLAND, MAINE
TECHNICAL MANUAL

MUNICIPAL STREET
LIGHTING STANDARDS
SECTION 10

Figure:

X-3

Revised Date:

LIGHTED BOLLARD



LED Bollards

Pedestrian & Walkway Lighting

LED Bollards

Reliable Period Outdoor Lighting
for Pedestrian Areas
and Walkways



Holophane® decorative bollards provide an attractive pedestrian area solution to complement the full line of decorative posts by transitioning flawlessly from the street to pedestrian walkway. Our bollards offer robust cast aluminum construction, combined with a durable polyester powder coat finish. And now, our new LED bollards further enhances your space by providing an energy saving yet visually comfortable set of lighting solutions. The long life of our LED light engines is combined with robust construction to provide you an expected service life of 20 years or more.

The Holophane Difference

- + Lumen packages ranging from 520 to 3,070 lumens
- + Six period style form factors to compliment your architectural design
- + Three models with dedicated optics to further enhance performance and visual comfort
- + Five different optical distribution options
- + 2700K, 3000K and 4000K CCT
- + 20kV/10kA surge protection option available
- + Robust CSA rated mechanical design with IP66 optics
- + Polyester paint finish with 5,000 hour salt fog rating ensures system reliability
- + Utility-friendly design features including removable access door and optional three stage terminal block
- + Field-adjustable lumen output module to fine tune light levels
- + Optional external electrical receptacle
- + Eyebolts for chain linking bollards is also optional
- + Button style photocontrols with 3 voltage options

Optical LED Bollards

Each of the three optical LED bollards are available in multiple optical configurations to help control distribution and provide visual comfort. Options include prismatic glass refractors, specular louvers and opaque white lens.

Hamilton (HLBOLED)	Columbia (CLBOLED)	Plymouth (PLBOLED)
Optical Performance Options		
Two Aluminum louvered options + 520–1,330 lumens + White powder coat, Type V Symmetric + Anodized, semi specular, Type V Symmetric	Prismatic glass refractor + 1,260–3,000 lumens + Type III asymmetric + Type V symmetric	Opaque Lens + 1,000–2,500 lumens + No internal optic, Type V

Slotted LED Bollards

Slotted LED bollards all utilize a common optical configuration whereby light is emitted equally in all directions through an array of slots. This provides a symmetrical Type V distribution pattern.

North Yorkshire (NYBOLED)	Charleston (CHBOLED)	Wadsworth (WDBOLED)
Wide Slots + 920–2,260 lumens + No internal optic, Type V	Narrow Slots + 510–1,260 lumens + No internal optic, Type V	Wide Slots + 920–2,260 lumens + No internal optic, Type V



LED Bollards

Pedestrian & Walkway Lighting

Holophane Optical Engineering

Over a century of expertise in prismatic glass optics positions Holophane to provide customers with robust, reliable and highly efficient lighting solutions. The LED Bollards portfolio draws on that expertise to offer you multiple solutions for both your aesthetic and performance needs.



Acuity Brands Lighting, Inc.

Holophane Headquarters, 3825 Columbus Road, Granville, OH 43023

Acuity Brands Lighting Canada, Inc., 35B Minthorn Blvd., Markham, ON, L3T 7N5

Holophane, S.A. de C.V., Km. 31 Carretera Mexico-Cuautitlan 54900 Tultitlan Edo. De Mexico

Contact your local Holophane factory sales representative for application assistance, and computer-aided design and cost studies.

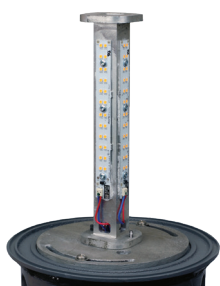
Warranty Five-year limited warranty. Full warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Visit our web site at www.holophane.com

Prismatic Glass

Louver Options

Opaque White



Energy efficient LED Engine



Each of our optical configurations include an outer acrylic lens enclosure over the internal optical design

Catalog Number	HLBOLED CA P40 30K MVOLT GL5 ACS BK ABG	
Notes		Type

HLBOLED

Hamilton LED Series:
Cast Aluminum Bollard



General Description

The Hamilton is a decorative bollard which provides a fully integrated LED solution to complement the full line of decorative posts by transitioning flawlessly from the street to pedestrian walkway.

While maintaining the period style, the electronics are engineered to provide energy-efficient lighting and minimize maintenance components. Our bollards offer superior finish through the application of a polyester powder coat finish.

Intended use: Bollard for city streetscapes, public areas and parks, higher education campuses, paths and walkways.

Mechanical Specifications

The luminaire housing shall:

- Be heavy grade A356.1 cast aluminum (aluminum with <1% copper)
- Wet locations listed
- One-piece casting with a removable top
- Optical assembly is secured inside the shaft
- All welding shall be per ANSI/AWS D1.2-90
- All welders shall be certified per Section 5 of ANSI/AWS D1.2-90
- (4) 3/4" diameter by 18" long, hot dip galvanized L-type anchors bolts are provided and are to be installed on a 10.5" bolt circle
- Access door opening for anchor bolts and wiring access is 3" x 5" x 4.5"
- Optional Field or Factory installed hot-dip galvanized direct burial base for mounting without a concrete footing

The finish shall:

- Utilize a polyester powder coat paint to ensure maximum durability.
- Rigorous multi-stage pre-treating and painting process yields a finish that achieves a scribe creepage rating of 8 (per ASTM D1654) after over 5000 hours exposure to salt fog chamber (operated per ASTM B117) on standard and RAL finish options.
- RAL (RALxxxxSDCR) paint colors are Super Durable Corrosion Resistant, 80% gloss.

Electrical Specifications

The driver shall meet the following requirements:

- Certified by UL or CSA for wet locations
- A factory programmable electronic driver with 0-10V dimming
- LEDs shall have a minimum of 70 CRI and available in 2700K, 3000K and 4000K CCT
- The electrical system shall be designed to meet ANSI/IEEE C62.41.2 and shall offer a 10kV/5kA surge protection, fail off, as standard with an optional 20kV/10kA surge protection, fail off with indicator light, option
- Optional GFI receptacle with wet-location cover, not CSA listed

Optical Specifications

- IP65 light engine
- Type 5 distribution with a smooth white acrylic outer lens
- Type 5 distribution with a either a white or semi-specular louver and a acrylic smooth white acrylic outer lens
- Type 3 or 5 distribution with prismatic borosilicate glass and a smooth clear acrylic outer lens

Control Options

The control options shall include, but not limited to, the following:

- Field adjustable output to adjust output to luminaire - AO
- Button style photocontrol

Certification and Standards

- UL 1598 - Wet Locations Safety Listing
- Suitable for ambient temperatures -40°C to 40°C

Warranty

5-year limited warranty. Complete warranty terms located at:

www.acuitybrands.com/support/warranty/terms-and-conditions

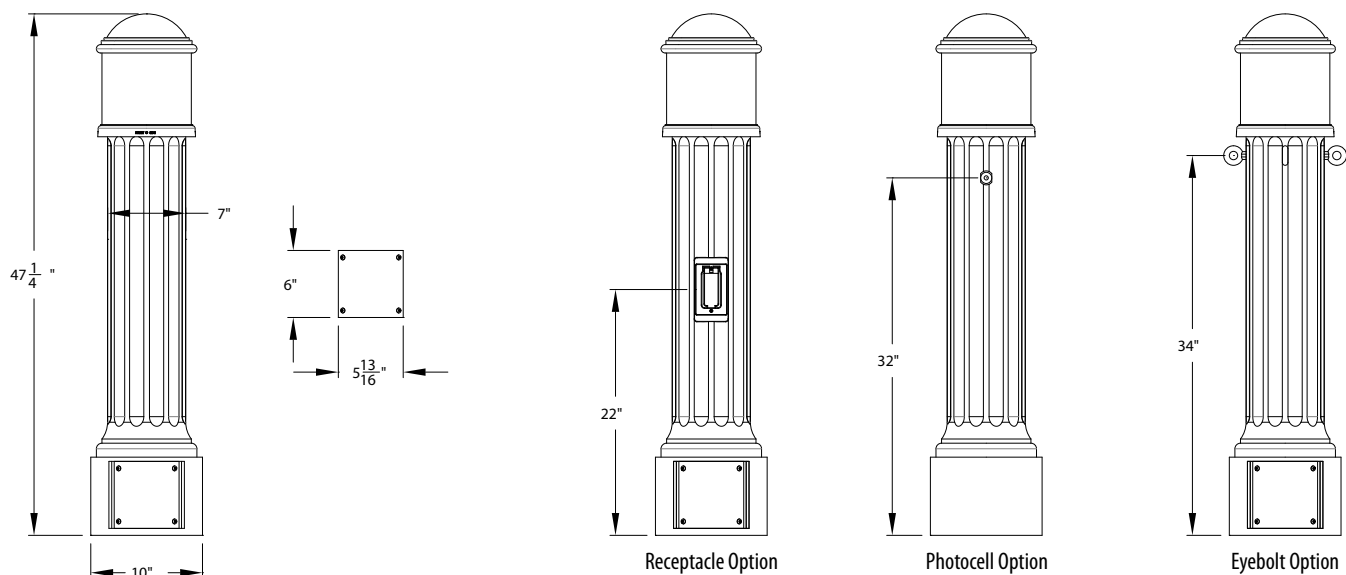
Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

Important Installation Notes:

- Factory-supplied templates must be used when setting anchor bolts. Acuity Brands Lighting will not accept claim for incorrect anchorage placement due to failure to use factory template.
- Acuity Brands Lighting is not responsible for the foundation design.



DIMENSIONAL DATA



Maximum standard weight - 58 lbs.

Maximum weight with Direct Burial Base Option - 88 lbs.

HLBOLED

Hamilton LED Series: Cast Aluminum Bollard



ORDERING INFORMATION

Example: HLBOLED CA P40 30K MVOLT GL5 ACS BK EB34B EB34D

Series	Material	LED Performance Package	Color Temperature	Voltage	Optics
HLBOLED	CA Cast Aluminum	P10 P10 Performance Package P20 P20 Performance Package P30 P30 Performance Package P40 P40 Performance Package	27K 2700K 30K 3000K 40K 4000K	MVOLT Auto-sensing voltage (120 thru 277) 50/60 HZ HVOLT Auto-sensing voltage (347-480) 50/60 HZ 120V 120V 50/60 HZ 277V 208-277V 50/60 HZ 347V 347V 50/60 HZ	GL3 Internal glass refractor, Type 3 GL5 Internal glass refractor, Type 5 LP5 Louver, painted white, Type 5 LS5 Louver, semi-specular, Type 5 NIO5 No internal reflector, Type 5

Lens	Color	Options / Controls
AWS Acrylic White Smooth Outer Lens ACS Acrylic Clear Smooth Outer Lens	BK Black BZ Bronze GH Graphite GN Green GR Grey PP Primer Paint WH White CMC Custom Match Color RALxxxxSDCR RAL Super Durable Corrosion Resistant, 80% Gloss Paint, replace xxxx with RAL number. XX Standard Finish, TBD	AO Field adjustable output device EB34A Eyebolt (for chain by others) at 34° and 0° counterclockwise from door EB34B Eyebolt (for chain by others) at 34° and 90° counterclockwise from door EB34C Eyebolt (for chain by others) at 34° and 180° counterclockwise from door EB34D Eyebolt (for chain by others) at 34° and 270° counterclockwise from door PEC1 Button style photocontrol (120V) PEC2 Button style photocontrol (208V-277V) PEC3 Button style photocontrol (347V) DBB Factory Installed direct burial base for mounting without a concrete footing FGE GFI receptacle externally mounted with wet-location cover (120V) PIHEX Security Screws - Pin in hex exterior fasteners TB 3 position terminal block 20kV 20kv/ 10kA surge

Accessories: Order as separate catalog number.	
AABB2 R1	Bolt on 24" long, 3.5" scheduled 40 hot-dip galvanized steel pipe with 2" x 8" wireway opening: attachment hardware included
AB-31-4	Anchor bolts
TMP-58	Template

Important Installation Notes:

- Factory-supplied templates must be used when setting anchor bolts. Acuity Brands Lighting will not accept claim for incorrect anchorage placement due to failure to use factory template.
- Acuity Brands Lighting is not responsible for the foundation design.

HLBOLED

Hamilton LED Series: Cast Aluminum Bollard



OPTIONS MATRIX

Mounting		Performance Package				Voltage					Optic					Lens		Options														
		P10	P20	P30	P40	MVOLT	HVOLT	120V	277V	347V	GL3	GL5	LPS	LS5	NIO5	AWS	ACS	AO	DBB	EB34A	EB34B	EB34C	EB34D	FGE	PEC1	PEC2	PEC3	PIHEX	TB	20KV		
Performance Package	P10		N	N	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	P20	N		N	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	P30	N	N		N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	P40	N	N	N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Voltage	MVOLT	Y	Y	Y	Y		N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N		Y	Y	Y	
	HVOLT	N	N	Y	Y	N		N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N		Y	Y	Y	
	120V	Y	Y	Y	Y	N	N		N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N		Y	Y	Y	
	277V	Y	Y	Y	Y	N	N	N		N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N		Y	Y	Y	
	347V	N	N		Y	N	N	N	N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N		Y	Y	Y	Y	Y	
Optic	GL3	Y	Y	Y	Y	Y	Y	Y	Y	Y		N	N	N	N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	GL5	Y	Y	Y	Y	Y	Y	Y	Y	Y	N		N	N	N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	LPS	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N			N	N		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	LS5	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N				N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	NIO5	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N		Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lens	AWS	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	Y		N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	ACS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Options	AO	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	
	DBB	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	EB34A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	EB34B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	EB34C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	
	EB34D	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	
	FGE	Y	Y	Y	Y	N	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	
	PEC1	Y	Y	Y	Y	N	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		N	N		Y	Y	Y	
	PEC2	Y	Y	Y	Y	N	N	N		N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N		N		Y	Y	Y	
	PEC3	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N			Y	Y	Y	
	PIHEX	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	
	TB	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	
	20KV	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y

LUMEN AMBIENT TEMPERATURE (LAT) MULTIPLIERS

Use the factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient Temp		Lumen Multiplier
°C	°F	P10 - P40
0	32	1.04
5	41	1.03
10	50	1.02
15	59	1.02
20	68	1.01
25	77	1.00
30	86	0.99
35	94	0.98
40	104	0.97

PROJECTED LED LUMEN MAINTENANCE

Data references the extrapolated performance projections for the platforms noted in 25°C ambient, based on 6,000 hours of IED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11). To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Lumen Maintenance - LLD (Same for all LED packages)									L70 Hrs
P10 - P40	Hours	0	25,000	36,000	50,000	60,000	75,000	100,000	
	Factor	1	0.97	0.96	0.95	0.94	0.93	0.91	> 60,000

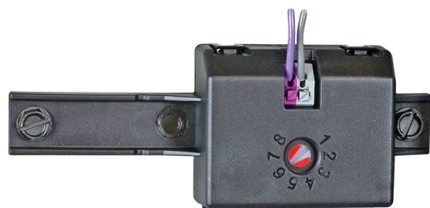
PERFORMANCE DATA

Performance Package	Distribution	Input Watts	27K (2700K CCT, 70 CRI)					30K (3000K CCT, 70 CRI)					40K (4000K CCT, 70 CRI)				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
P10	GL3 ACS	12	1,181	98	1	3	2	1,197	100	1	3	2	1,260	105	1	3	2
	GL5 ACS		1,215	101	1	3	2	1,231	103	1	3	2	1,296	108	1	3	2
	LP5 ACS		499	42	0	3	1	506	42	0	3	1	532	44	0	3	1
	LS5 ACS		490	41	0	3	1	496	41	0	3	1	522	44	0	3	1
	NIO5 AWS		945	79	0	3	1	958	80	0	3	1	1,008	84	0	3	1
P20	GL3 ACS	19	1,812	95	1	3	2	1,836	97	1	3	2	1,932	102	1	3	2
	GL5 ACS		1,864	98	1	3	2	1,889	99	1	3	2	1,988	105	1	3	2
	LP5 ACS		781	41	1	3	1	791	42	1	3	1	833	44	1	3	1
	LS5 ACS		767	40	1	3	1	777	41	1	3	1	818	43	1	3	1
	NIO5 AWS		1,479	78	1	4	1	1,499	79	1	4	1	1,577	83	1	4	1
P30	GL3 ACS	25	2,322	93	1	3	2	2,352	94	1	3	2	2,475	99	1	3	2
	GL5 ACS		2,389	96	1	4	2	2,420	97	1	4	2	2,547	102	1	4	2
	LP5 ACS		1,030	41	1	3	1	1,044	42	1	3	1	1,098	44	1	3	1
	LS5 ACS		1,011	40	1	3	1	1,025	41	1	3	1	1,078	43	1	3	1
	NIO5 AWS		1,951	78	1	4	2	1,977	79	1	4	2	2,081	83	1	4	2
P40	GL3 ACS	32	2,802	88	1	4	3	2,839	89	1	4	3	2,988	93	1	4	3
	GL5 ACS		2,883	90	1	4	3	2,921	91	1	4	3	3,074	96	1	4	3
	LP5 ACS		1,246	39	1	3	1	1,263	39	1	3	1	1,329	42	1	3	1
	LS5 ACS		1,224	38	1	3	1	1,240	39	1	3	1	1,305	41	1	3	2
	NIO5 AWS		2,361	74	1	4	2	2,392	75	1	4	2	2,517	79	1	4	2

HLBOLED

Hamilton LED Series: Cast Aluminum Bollard

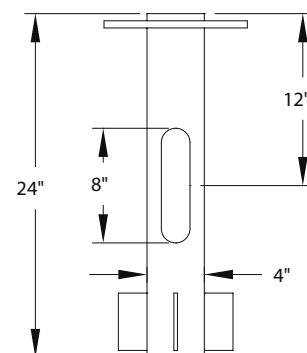
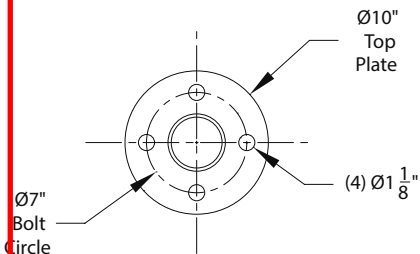
COMPONENTS & OPTIONS DATA



A0
Manual field adjustable output dimming device

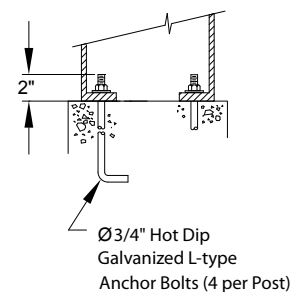
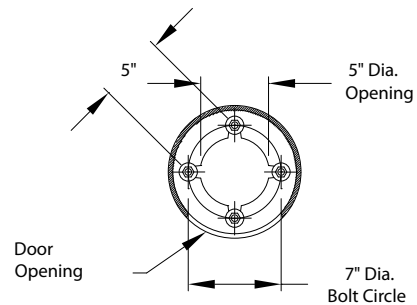


20KV
Safeguard your investment from extreme voltage spikes with our new Extreme 20kV/10kA SPD



DBB
Direct Burial Base

Weight - 30 lbs.



Base Detail

City of Portland | Department of Public Works

Christopher Branch, *Director*



To: Planning Board

From: Keith Gray, City Engineer

Date: May 6, 2022

Re: Summary of Updates to Chapter 2 of the Technical Manual

The Department of Public Works, Engineering Division, proposes to make changes to the City of Portland Technical Manual Section 1, Transportation Systems and Street Design Standards. The last time this section was updated was in 2017. The updates are significant in places, providing guidance for changes in best practices, removal of obsolete or overly complex items, and addition of a number of details. In addition, transportation study requirements have been moved to a new Section 17 for convenience of reference and shared commonality in the project approval process. These changes, in part are intended to address detail and design changes already informally adjusted by DPW to reflect current needs and practices. Further, the Department has recognized that many other best practice documents exist outside of this manual, including other City documents, and best exist separately from the Technical Manual. Items of note, changes or additions are as follows:

- Section 1 retitled as “Transportation Design Standards” to focus on specific design needs
- Moved Traffic Studies, Parking Studies, and TDM to a newly created “Section 17” for consistence
- “Sidewalks and Driveway Aprons” is now “Sidewalks and Curb Ramps” with driveway aprons in its own section
- Updated language on Americans with Disabilities Act (ADA) requirements to reflect current requirements
- Updated language on the City’s sidewalk Material Policy as per current policy requirements
- Updated language on curb extension and design approvals based on operational needs for vehicles
- New language on construction materials, pedestrian access routes, and design parameters for sidewalks
- Reduced discussion on requirements such as permitting and roadway design, with reference provided to MaineDOT Standard Specifications instead to promote consistence with City and State projects
- Parking requirements referencing the City Land Use Code for both automobiles and bicycles
- Bicycle routes and lanes design updates reference the City’s Bike Route Network Map and AASHTO design requirements for ease and consistency of reference
- Updates to City Traffic Control devices stating compliance with the Manual on Uniform Traffic Control Devices (MUTCD) and reference to the City’s Traffic Signal Policy and Guidance Manual
- The crosswalk subsection has been updated to specify that all public crosswalks shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Other updates include public improvements definition, street markings, street lighting and signage guidance. All other standards were removed and referred to the MUTCD. Crosswalk types have been combined into a single, block-based crossing marking for consistency and clarity

A list of the standard detail changes associated with Section 1 have been provided as part of this submission. Detail changes have been generally made for the following reasons:

- Consistency in numbering
- More clarity in design requirements and updates where best practices have changed
- New details provided where new requirements have been provided

In addition, the New Chapter 17, Transportation Studies includes:

- Transportation Studies section moved from Section 1, which references the location of MaineDOT's Traffic Movement Permit requirements and other requirements based on Passenger Car Equivalents (PCE's) generated by planned development projects
- Updated language to mitigation and reference to the City's Traffic Impact Fees
- Updated language on parking studies and data collection/analysis
- Updates to Transportation Demand Management (TDM) to reference emerging best practices and to provide Applicants with additional guidance for TDM Plan development

City of Portland | Department of Public WorksChristopher Branch, *Director***To:** Planning Board**From:** Nathaniel Smith, Project Engineer Water Resources**Date:** May 6, 2022**Re:** Summary of Updates to Chapter 2 of the Technical Manual

The Department of Public Works, Water Resources Division, proposes to make the following changes to the City of Portland Technical Manual Section 2 Sanitary Sewer and Storm Drain Design Standards. The last time this section was updated was in 2011. The majority of this update was a reorganization of the standards to make it more clear which standards are based for sewer systems and which are for storm drain systems. Previously standards for sewer and storm were mixed together and described by item. Now each system has its own standards for pipes, manholes and other associated parts. Other global changes include changing all references of Department of Public Services to Public Works. Specific changes and or additions are as follows.

- New sections added:
 - New language about enclosed parking, mechanical rooms, and garages not exposed to the elements shall direct surface drainage to an oil/grit separator first then to the sanitary sewer.
 - New Section providing standards for the use of force mains for sanitary sewers.
 - New section providing standards for Accessory Dwelling Units. This section was added due to the increase of applicants wanting to install ADU's.
 - New language added on how to raise manhole frames to grade.
 - New language was added to Catch Basins to provide standards and the allowance to use field inlets when outside of the street right of way.
 - New language that all catch basins are required to have a hood on the outlet pipe.
 - New section providing standards for Grease Interceptors. These standards match Portland's Fat's, Oil, and Grease Program requirements.
 - New table showing the specifications for Gravel Aggregate.
- Edited Language
 - Revised sanitary manholes text to say that steps are not required.
 - Revised the two specifications for plastic pipe.
 - Revised the requirement that sanitary pipes shall have a minimum velocity of 2 ft/sec.
 - Revised the language on when and how a building sewer can connect to the city main with the use of a coring machine and Inserta-Tee's.
 - Revised the language on how to plug abandoned sewer laterals to clarify who to contact and the manner to plug the lateral.
 - Revised storm manholes text to say that steps are not required.
 - Revised language to storm drains laterals on when and how a connection can occur using a coring machine and an Inserta-Tee.

- Revised the crushed stone pipe bedding specifications to match Maine DOT specifications for Type C crushed stone and deleted the separate different requirement for stone for pipes over 42 inches. Contractors just use the ¾" stone for all size pipes.
- Details:
 - Figure II-01 = A new table was added to list all of the details
 - Figure II-02 = Was figure 01 - Manholes - Removed the steps from the figure.
 - Figure II-03 = Changed figure from an outside drop manhole to an inside drop manhole.
 - Figure II-04 = Revised the manhole notes to give invert specifications for how large the pipes are.
 - Figure II-05 = Revised the MH frames and covers to current approved ones. The old frames and covers are no longer made.
 - Figure II-06 = No changes.
 - Figure II-07 = Was #08. Also revised to provide more detail on the catch basin detail.
 - Figure II-08 = Was #07. Revised CB frames and covers to current approved ones like MH's. The old frames and covers are no longer made.
 - Figure II-09 = Revised CB hood from the old cast iron one to a new plastic one which we have been using on city projects.
 - Figure II-10 = Rotated detail and also reduced the dish from 3" to only 1.5".
 - Figure II-11 = Rotated detail. No other changes.
 - Figure II-12 = Rotated detail. No other changes.
 - Figure II-13 through 15 = No changes.
 - Figure II-16 = Change "Y" to "WYE" in notes.
 - Figure II-17 = No changes.
 - Figure II-18 = Rotated detail. No other changes.
 - Figure II-19 = External Grease Trap – revised detail and notes to meet current text language.
 - Figure II-20 = New detail for Oil and Grit Separator.
 - Figure II-21 = New detail for Accessory Dwelling Units that match the text changes.
 - Figure II-22 and 23 = These two details were in Section 1 – Transportation (#20 & #21). These both are how to install underdrains so they asked us to put them in Section 2. The details also were rotated and no other changes were made to them.

To: Chair Stanley & Members of the Planning Board
From: Jimmy Dealaman, Planner
Date: May 6, 2022
Re: Douglass Commons Redevelopment
Project ID: PL-001888-2021; CU-001900-2022
CBL: 078 B007001; 078 C002001
Meeting Date: May 10, 2022

I. INTRODUCTION

Maine Cooperative Development Partners and the Szanton Company have submitted a Major Site Plan and Inclusionary Zoning Conditional Use applications to facilitate construction of eight new residential buildings totaling approximately 120,345 square feet of floor area and creating 120 affordable units at 43 and 91 Douglass Street (57 Douglass Street). The proposed development includes two separate phases of construction including 1) a 63-unit, five-story multifamily residential building and; 2) seven two to three-story townhome-style buildings comprising 57 units. Each phase includes associated site improvements including but not limited to parking, landscaping, and a new shared-street “woonerf” along the center of the site. The site is located in the Libbytown neighborhood and within the R-5a Residential zone.



Figure 1: Approximate Development Site

This application is being referred to the Planning Board for compliance with the City of Portland’s Land Use Code Site Plan Standards, Section 14.1 and Inclusionary Zoning Conditional Use Standards, Section 18.2.3.

The Planning and Urban Development Department mailed 101 notices advertising this meeting to property owners within 500 feet of the site. A legal advertisement ran in the April 29 and 30, 2022 editions of the *Portland Press Herald*. The Planning Board held a first workshop on March 22, 2022.

Applicants: Maine Cooperative Development Partners; The Szanton Company
Engineer: Sam Lebel, Acorn Engineering
Architects: Kaplan Thompson Architects; Archetype Architects
Landscape Architect: Seth Kimball, Aceto Landscape Architects



Figure 2: Aerial View of Site (facing north)

II. REQUIRED REVIEWS

<i>Review</i>	<i>Applicable Standards</i>
Site Plan	Section 14.6
Inclusionary Zoning Conditional Use	Section 18.2.3
Design Review	City of Portland Design Manual Section (h) Planned Residential Unit Development (PRUD)

<i>Waiver Requests</i>	<i>Applicable Standards</i>
Request: To reduce drive aisle width from 24 feet to 22 feet	Technical Manual, Section 1.14.3.: Parking lot layout shall provide a minimum drive aisle of 24 feet.

III. PROJECT DATA

Existing Zoning	R-5a Residential
Property Size	146,011 square feet (3.34 acres)
Existing Use	Vacant Lot
Proposed Use	Planned Residential Unit Development (PRUD), Multi-family housing

	<i>Existing</i>	<i>Proposed</i>	<i>Net Change</i>
Building Footprint	o	33,510 SF	+33,510 SF
Building Floor Area	o	120,345 SF	+120,345 SF
Impervious Surface Area	94,185 SF	80,382SF	-13,803 SF
Parking Spaces	o	78	+78 spaces
Bicycle Parking Spaces	o	50	+50 spaces
EV Charging Stations	o	16	+16 stations

IV. BACKGROUND

On December 16, 2019, the City Council approved the sale of the property (Resolve 10-19/20) located at 43 and 91 Douglass Street based on a recommendation from the City's Housing Committee to market the property to help meet the City's goals of constructing housing.

A. RFP for Disposition of 43 & 91 Douglass Street

In 2020, the City of Portland released an RFP to dispose of three separate City-owned properties, with the property at 43 and 91 Douglass Street being among them (Attachment 1). The criteria for consideration centered around the ability to provide high quality and age-inclusive affordable housing at-scale, and integrated with the surrounding community.

Aside from affordability requirements, the RFP requires that the development be designed in accordance with Portland's Green Building Code, and in a manner that is compatible with the pattern, scale, massing and materials of surrounding development.

The Szanton Company was selected as the winning bid, and Douglass Commons LLC entered into a purchase and sale agreement with the City on May 21, 2021 for development of this site.

B. Purchase and Sales Agreement for 43 & 91 Douglass Street

On May 21st, 2021 the applicant entered into a Purchase and Sale agreement with the City, and shortly after identified that a zoning map amendment was necessary to complete the project as presented in their bid. The Purchase and Sale Agreement (Attachment C) has been signed and both Environmental Assessments are now completed. The sale is contingent upon a number of conditions, one of which requires an 18-month due diligence period, so the transfer of the property from the City to the applicant is expected to occur no later than November of 2022.

The agreement specifies that the developer shall be responsible for the creation of a certain number of residential units, with a portion of those being deed restricted for affordability.

C. Zoning Map Amendment

On September 14th, 2021 the Planning Board recommended to the City Council a zoning map amendment application (#ZN-001640-2021) to change the existing R-5 Residential zoning to R-5a Residential to facilitate an increase in density in a transit accessible location with access to services.

On October 18, 2021 the City Council approved an amendment to the City's Zoning Map (Order 72-21/22) as recommended by the Planning Board for both parcels located at 43 and 91 Douglass Street (Attachment 2). The zoning map amendment became effective October 28th, 2021.

V. EXISTING CONDITIONS AND SURROUNDING AREA

The subject property is comprised of two vacant city-owned parcels at 91 and 43 Douglass Street (Plan 3). The property is bounded by City-owned Dougherty Field to the north, property owned by Maine Department of Transportation (MDOT) to the east and south, and to the west the site is bordered by a mix of 11 residential properties made up of four 3-Family, two 2 Family, and five single family homes built between 1850 and 1930s.

Historically, the site consisted of salt marches and wetlands until sometime prior to 1866. Until 1900 the site was used as a brick yard, with a portion of the site also containing a residential structure. The City acquired both parcels around the late 1930s through mid-1940s. In 1962, the West School was built and

used as an elementary school until being used as an adult educational facility beginning in the mid-1980s, which was eventually vacated in 2013, as the building had reportedly fallen into significant disrepair. The West School building was eventually demolished in 2016.

The site is proximate to a number of commercial uses (zoned B-2 Community Business) which are along Congress Street to the south. The surrounding area also includes the Kiwanis Community Pool on the upper portion of Dougherty Field to the north. A B-1 Neighborhood Business zone is mapped at the intersection of Douglass Street, Brighton Avenue, and St. John Street. There are also a number of commercial/industrial land use types that exist along St James Street to the north east which are zoned I-M Industrial. To the west there are approximately four blocks of mid density (R-5) residential neighborhood that becomes lower density (R-3) residential zoning heading further west, which together provide a primarily residential context. Also serving these neighborhoods, at the end of Stevens Avenue, a priority corridor identified in the City's Comprehensive Plan, is the Westgate Shopping Center (zoned B-2 Community Business), a roughly 13-minute walk from the development site.

The site is accessible to public transit and is in close proximity to Portland METRO bus routes 1, 5, 9A, and 9B, which run along Congress Street, Park Avenue, and the Fore River Parkway. The site is also 0.5 miles from the Portland Transportation Center – Amtrak Downeaster and Concord Coach Station. Further south, beyond the Portland Transportation Center is Thompson's Point, a large-scale mixed-use development including light industrial, restaurant, and venue space as well as the Portland Children's Museum.

Prior to this application, there was a recent zoning map amendment in the vicinity approved by the City Council on May 3, 2021 (Order No. 226-20/21) rezoning a property at 1217 Congress Street and adjacent parcels from a B-1 Neighborhood Business zone to a B-2 Community Business zone.

The adjacent Dougherty Field park complex at 107 Douglass Street was also recently administratively approved for site work (PL-001867-2021) involving a new basketball court and playground replacements which will have a pathway connection coordinated with the development at 57 Douglass Street.



Figure 3: Aerial View (facing West) Showing Surrounding Uses



Figure 4: Perspective Rendering Facing North (Co-op buildings on left and 5-story building on right)

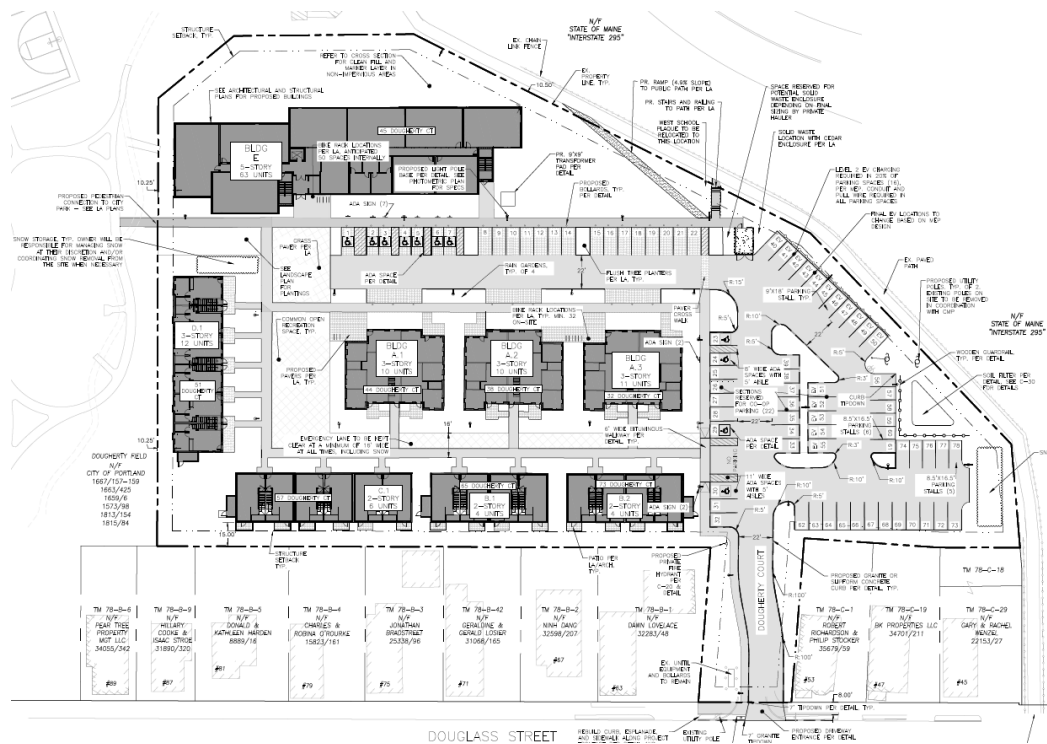


Figure 5: Overall Site Plan (Phase 1 & Phase 2 Shown)

VI. PROPOSED DEVELOPMENT

The applicant has provided an overall development plan (Plan 5) proposing a joint infill development of eight new buildings creating 120 affordable residential units combined. Maine Cooperative Development

Partners and the Szanton Company are each developing a portion of the project, and proposing a phased site plan in order for each phase to be independent of subsequent phases. Section 14.9.1 of the City's Land Use Code allows for phasing major site plans and requires that each phase of the project must demonstrate being at least 20 percent of the total development, show the entire tract/parcel, and demonstrate that each phase conforms to all applicable site plan standards in the event that subsequent phases do not go forward (e.g. providing all necessary infrastructure, landscaping, parking, etc.).

The applicant has submitted a Phase 1 and Phase 2 plan which have been reviewed by staff. The full development proposal includes a combined total of 120 residential units, 78 parking spaces, 16 EV charging stations, and 36,325 square feet of open space area which may be accomplished with either Phase 1 or Phase 2 being constructed individually in any order or concurrently. Each segmented phase of the applicant's development proposal is described below:

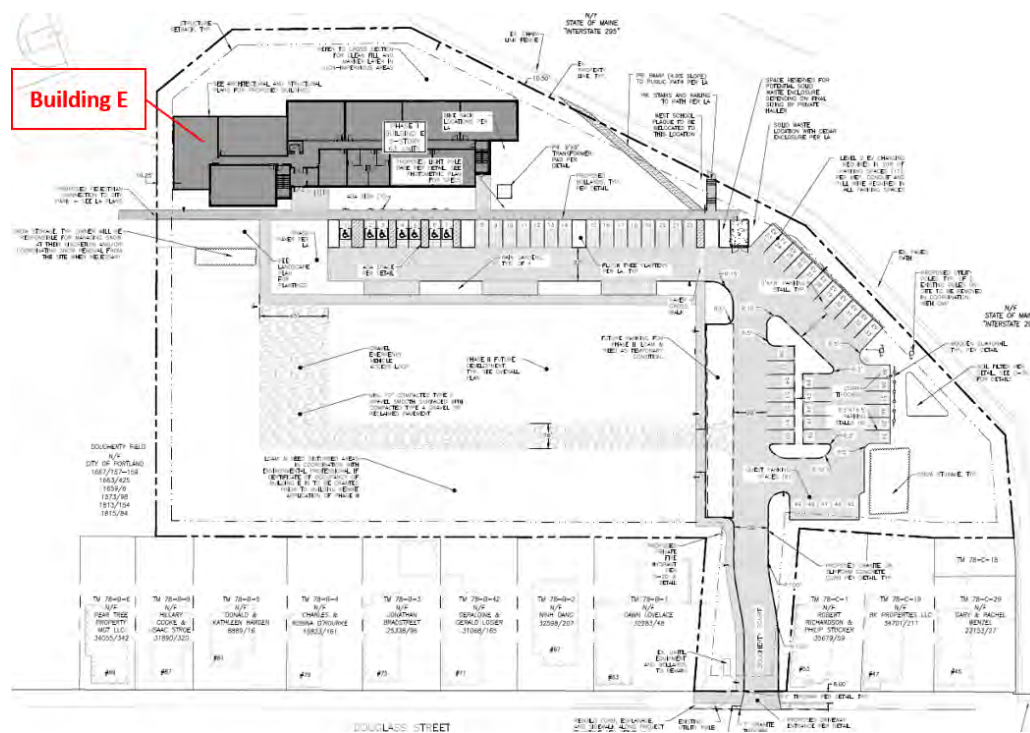


Figure 6: Phase 1 Development Plan

A. PHASE 1 – BUILDING E

Phase 1 of the proposal includes constructing a five-story apartment building (Building E) with 63 residential units (approximately 64,615 SF) toward the eastern portion of the site along the 295 interchange (Plan 6). The building will be comprised of a mix of 35 one-bedroom, 18 two-bedroom, and 10 three-bedroom rental units managed by the Szanton Company.

The proposal includes constructing a private street (“Douglass Court”) which leads into the center of the site between each phase and is intended to function as a shared-street or ‘woonerf’ to ‘encourage community gathering and prioritize the pedestrian experience.’ Phase 1 includes building a total of 56 parking spaces—including six compact spaces as well as 11 electric vehicle charging stations. Other site improvements include stormwater management by way of a soil filter, approximately 15,339 square feet of

common open recreation space, a gravel emergency vehicle access loop as well as loaming and seeding of the disturbed area should Phase 1 be constructed prior to Phase 2. Additionally, Phase 1 provides a walkway connection to adjacent Dougherty Field, with stairs/railing and a sloped walkway connecting the site to the adjacent trail system, which is managed by Portland Trails.

Phase 1 proposes 46 deed restricted workforce housing units (at or below 60% AMI) pursuant to the Inclusionary Zoning requirements (Section 18.2.3).

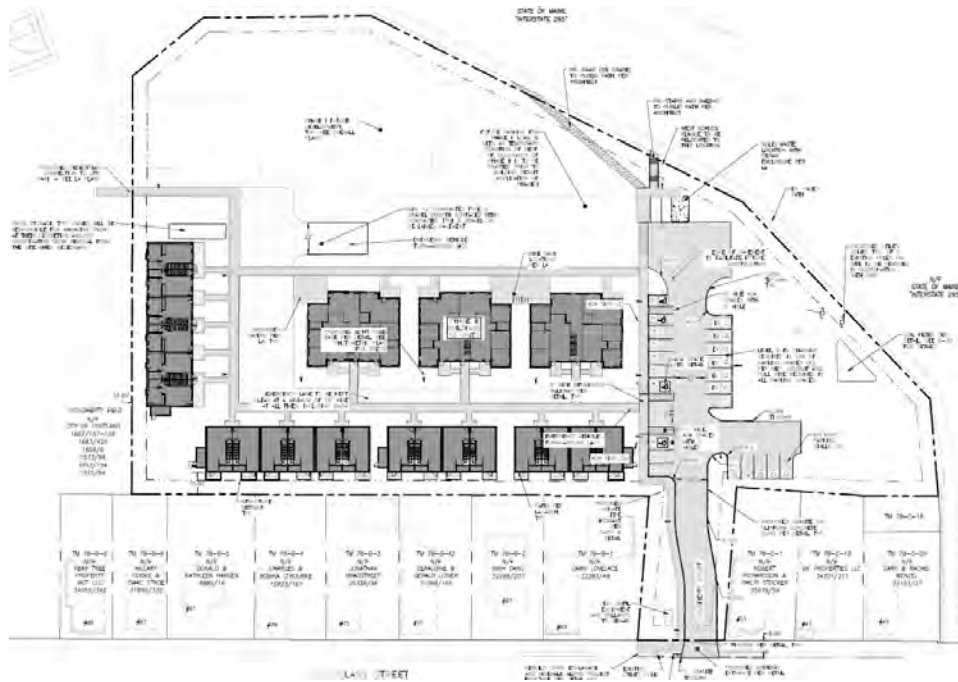


Figure 7: Phase 2 Development Plan

B. PHASE 2 – BLDGS. A1, A2, A3, B1, B2, C1, D1

Phase 2 of the proposal includes constructing a collection of seven townhome-style buildings totaling 57 residential units with approximately 55,730 square feet under a limited equity cooperative model managed by Maine Cooperative Development Partners (Plan 6a). The buildings include three new 2-story townhouses each with six units behind the existing Douglass Street houses, three 3-story courtyard flats each with 10 to 11 units at the center of the site, and one 3-story building with row houses made up of 12 units off of Dougherty Park to the north of the site. Phase 2 includes a total of 19 one-bedroom, 15 two-bedroom, and 23 three-bedroom units, 22,234 square feet of common open recreation space, and loaming and seeding of the remaining disturbed area onsite should Phase 2 be constructed prior to Phase 1. Additionally, this portion of development provides a hammerhead turnaround for emergency vehicle access in the event that Phase 1 is not yet constructed.

A six-foot pedestrian-only walkway is proposed running through the Phase 2 site leading to an open-space common area and connecting back to the shared-street portion of the site. Whichever phase commences site work first will be required to provide internal site circulation including but not limited to providing acceptable turnaround for emergency vehicle to/from the site. Phase 2 also includes providing site

improvements in order to meet site plan requirements such as providing required landscaping, stormwater management, and a total of 22 parking spaces and five EV charging stations.

Phase 2 proposes to provide 15 deed restricted workforce housing units (at or below 80% AMI) pursuant to the Inclusionary Zoning requirements (Section 18.2.3).

VII. PREVIOUS WORKSHOP – MARCH 22, 2022

The project was introduced to the Planning Board by the applicant and staff at a workshop held on March 22, 2022. The Board provided initial feedback about the design, requested parking aisle waiver, and parking requirement, which is as follows:

Design – The Board expressed general support for the design and layout of both phases. The Board asked questions about reviewing both phases under PRUD standards and if there needed to be continuity between both portions of the development. Staff responded that PRUD design standards do provide for some flexibility for each portion of the overall development because Phase 2 is being developed as a PRUD, while Phase 1 is a multi-family building, which is required to follow the PRUD standards per Table 7-B footnote 3. There should be some cohesion to the whole development overall, however, the different uses and building types may provide for variation between the two. The Board also asked if window mounted air conditioning units could be restricted and if there was sufficient storage area available to units. Some Board members expressed interest in providing occupiable outdoor ground level space, and more uniqueness between the designs of the co-op unit buildings. The Board requested the applicant revisit the cornice of the five-story apartment building in order to fit with detailing proposed on other buildings and questioned the material choices proposed on the stair towers and seeing more variety in windows to improve the fenestration.

Parking Aisle and Compact Parking Waiver – The Board generally supported a reduced parking aisle width of 22 feet. The Board supported the extent of proposed compact parking spaces provided, however since the first workshop the applicant now proposes less than 20 percent compact spaces and the waiver request has been withdrawn.

Parking Requirement – The Board were generally supportive of considering a reduced parking amount for the overall development due to the sites access to public transit but requested a parking analysis to understand the parking demand generated by the proposal. The applicant answered Board questions explaining that parking spaces would require tags and would be offered by each phase on a first come first serve basis. The Board requested more information about how parking spaces and EV charging station spaces would be provided by each individual phase. Some Board members were interested in the site providing guest parking, as well as better understanding the quality of transit options available in the vicinity of the site.

VIII. RIGHT, TITLE, & INTEREST

The owner of the property is currently the City of Portland. The applicant has entered into a Purchase and Sale Agreement with the City (Attachment C) which serves as sufficient right-title-interest documentation for the purposes of reviewing a site plan application.

The applicant's existing conditions survey (Plan 3) indicates the property has one easement present on site which was granted by Public Works in 2016 to Northern Utilities, Inc. for an anode bed (Book 33292, Page

266). The anode bed easement is currently in the process of being amended by the City's attorney to accommodate the development proposal as part of the sale of the property.

IX. FINANCIAL & TECHNICAL CAPACITY

The applicant has submitted a letter of financial capacity from each applicant's financial institutions as well as documentation from the Secretary of State stating both applicants are in good standing (Attachment G).

The applicant's representatives have also provided descriptions and examples of technical capacity demonstrating their ability to undertake the project (Attachment H).

X. ZONING ANALYSIS

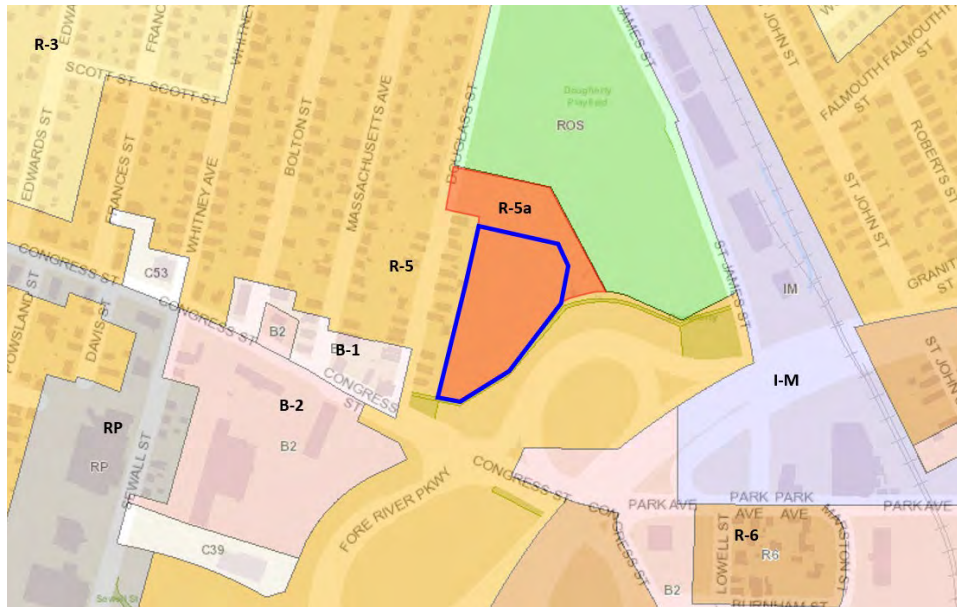


Figure 8: Zoning Map with Subject Parcel Outlined in Blue

The subject property is located in the R-5a Residential zone (Figure 8).

The proposed development proposes two uses; Phase 1 proposes a building with 63 units of housing which falls under the multifamily use and Phase 2 proposes seven buildings under a Planned Residential Unit Development (PRUD) use. According to Land Use Code Table 6-A, both multifamily and PRUD are permitted uses in the R-5a Residential zone.

Under Table 7-A of the City's Land Use Code, in the R-5a zone PRUD standards apply to multi-family development of four or more units, so the proposal is subject to Table 7-A except where superseded by Table 7-B with PRUD dimensional standards.

The project provides more than 50% of the units as low-income or workforce units for rent or for sale (See Section X below) and therefore it may utilize dimensional bonuses available to PRUD developments under Article 18 of the City's Land Use Code, which is incorporated into the zoning review. Staff analyzed the proposal and found that the project complies with all dimensional requirements for principal structures which are summarized below:

<i>R-5a Residential Zone</i>	<i>Permitted</i>	<i>PRUD Dimensional Bonus Applied¹</i>	<i>Proposed</i>
Street Frontage (min.)	50 feet	N/A	60 feet
Lot Width (min.)	60 feet	N/A	247 feet
Front Setback (min.)	25 feet	10 feet	10 feet
Rear Setback (min.)	25 feet	10 feet	10 feet
Right Side Setback (min.)	14-16 feet (varies)	10 feet	10 feet
Left Side Setback (min.)	14-16 feet (varies)	10 feet	10 feet
Stepbacks	N/A	N/A	N/A
Lot Coverage (max.)	30%	N/A	23%
Off Street Parking Spaces			69 spaces
Lot Area (min.)	2 acres	N/A	3.34 acres
Net land area per dwelling unit (min.)	1,600 sq. ft.	800 sq. ft.	1,217 sq. ft.
Units per building (max)	N/A	N/A	N/A
Average number of units per building	N/A	N/A	N/A
Structure Height	55 feet	N/A	53 feet
Building length	N/A	N/A	N/A
Bldg setback from external subdivision property lines (min.) for bldg. length 100 ft. or less	25 ft.	10 feet	10 feet
Bldg setback from external subdivision property lines (min.) for bldg. length greater than 100 ft.	35 ft.	10 feet	10 feet
Distance between detached PRUD dwelling units (min.)	N/A	N/A	N/A
Common recreation open space area (min.)	200 sq.ft./D.U	(200 sq. ft./D.U - Minimum contiguous size and setbacks do not apply and shall be set through site plan review)	280 sq. ft./D.U.

XI. CONDITIONAL USE INCLUSIONARY ZONING (IZ)

As required by Section 18.2.3 of the City's Land Use Code, the City's Inclusionary Zoning Ordinance, residential developments with ten or more units are required to provide a minimum of twenty-five percent of the dwelling units as Workforce Housing units. Alternatively, the applicant may pay a fee-in-lieu for those units.

Given the project proposes a total of 120 units, a minimum of 30 workforce housing units are required to meet the IZ requirement. The applicant proposes making 61 (51%) of the units workforce (at or below 80% AMI) and 59 (49%) as market rate.

The City's Housing Program Manager reviewed the application (Attachment 4) and determined

¹ Planned Residential Unit Developments (PRUD) developments with more than 50% of the units as low-income or workforce units for rent or for sale may utilize dimensional bonuses and changes listed under Land Use Code Section 18.2.4.B.

the proposed project would meet the minimum requirements set forth in Section 18.2.3 by creating a minimum of 13 one-bedroom, 9 two-bedroom, and 8 three- bedrooms within a minimum of 30 workforce units or pay a fee-in-lieu alternative.

Given that the project is proposing more than 50 percent of the units as workforce units for sale or rent, the project is eligible for the following dimensional bonuses and changes outlined in Section 18.2.4.B:

- Minimum lot area per dwelling unit is reduced by 50%.
 - R-5a PRUD Net land area per dwelling unit: 1,600 SF
 - R-5a PRUD Net land area per dwelling unit with Affordable Bonus: 800 SF
- Maximum number of units and maximum length of buildings do not apply but may be set through site plan review.
- Minimum building setbacks may be reduced to 10 feet.
- The PRUD may cross public rights of way provided that the right of way does not count towards minimum lot size nor towards any open space requirements.
- Minimum recreation open space area is reduced to 200 square feet per dwelling unit of common area designated for recreational purposes by the residents. Minimum contiguous size setbacks do not apply and shall be set through site plan review.
- The Planning Board's *Design Manual*, design standards, and guidelines with respect to PRUDs shall apply in full to PRUDs utilizing this subsection.

XII. SITE PLAN REVIEW 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 development is located off of Douglass Street, a local street, which connects two principal arterial roadways, Congress Street to the south and Brighton Avenue to the north. Both arterials are two priority corridors identified in the City's Comprehensive Plan.

The site is proximate to transit lines with bus routes 5, 9A, and 9B on Congress Street and the 4-line on Brighton Avenue which operate within a half mile of the site. The site has several bus stops immediately available within a block along Congress Street. The applicant indicated that these services run every half hour at peak times and every hour off-peak, and additionally that the Portland Transportation Center, a regional transit hub, is less than a half mile away and provides connections to METRO's Breeze and 1-line, as well as regional connections via the Downeaster and Concord Coach Lines (Attachment V). Based on the development's anticipated demand for using public transportation services the applicant has reached out to METRO and requested to have frequency of service increased.

The application anticipates increasing traffic by moderate levels, with 78 parking spaces proposed, and peak hour trips occurring on the weekend, primarily on Saturday with 54 peak hours trips expected.

The applicant's traffic analysis has been reviewed by the City's Consulting Traffic Engineer who finds it to be reasonable, and reports that there are no high crash locations in the vicinity. Based on the applicant's trip generation estimate he does not recommend a traffic study being required (Attachment 3). In general, the City's traffic consultant finds the egress and circulation to be acceptable

for vehicles and pedestrians and based on these findings staff do not expect the proposed development to substantially increase congestion or provide hazard to the surrounding street network.

B. Access and circulation

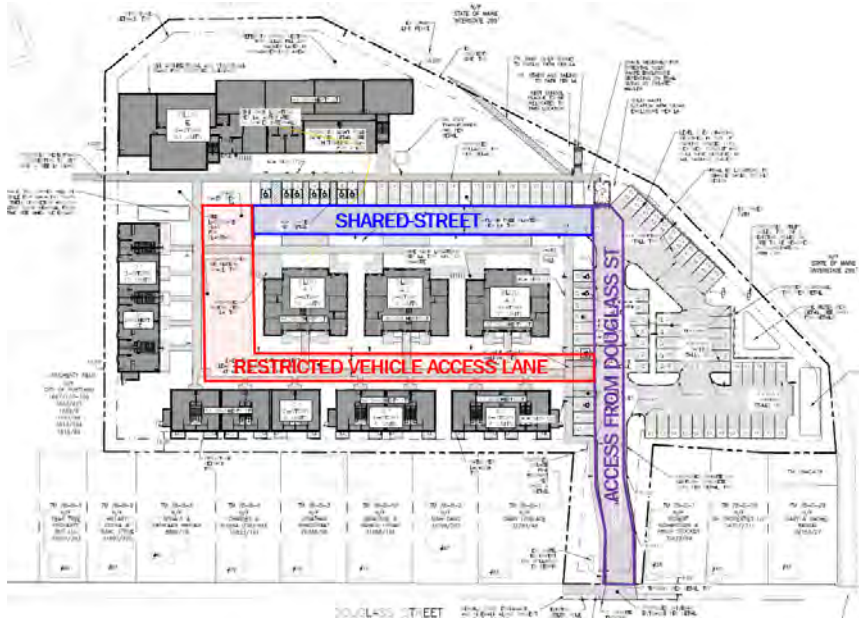


Figure 9: Overall Site Plan with Internal Circulation Highlighted

The application proposes to continue using the existing access drive entrance which will become a two-way private street, Douglass Court, for access to the site, and discontinuing egress via the existing drive to the north. New site circulation through the site includes a main drive aisle connecting to a shared street and parking areas throughout the site, as well as a restricted access lane kept clear for emergency vehicles and pedestrians which runs through the site looping back to the shared street. (Figure 9). No drive-up services or loading needs are proposed except in three flexible, non-parking areas along the courtyard flats and shared-street where residents can use as gathering space or as 5-minute unloading zone for drop-offs. The application also includes providing common open recreation areas with grass pavers, pathway connection to Dougherty Field, stair and path connection to the adjacent trail system, and bituminous pavement sidewalks throughout the site connecting to the existing sidewalk on Douglass Street for pedestrian access.

The applicant has requested one waiver relevant to the parking lot and space design:

Technical Manual Section 1.14.3 – Drive Aisle Width

The applicant is requesting to reduce the drive aisle width from the required 24 feet to 22 feet, a two foot reduction. Section 1.14.3 of the City's Technical Manual requires a minimum drive aisle width of 24 feet. The applicant has provided justification that *'based on the proposed land use and residents' tendency to become familiar with their parking spot, along with a low rate of turnover, a width of 24' is not necessary to accommodate a functional parking lot. 22' allows for a reduction in impervious area.'* Additionally, the applicant has provided turning templates as demonstration of adequate maneuvering (Plan 56 & Figure 10), and stated that the proposed 22 feet is sufficient in a residential setting and allows for less impervious area and pavement-to-pavement opening to help motorists drive slower which is consistent with the goals of a woonerf space.

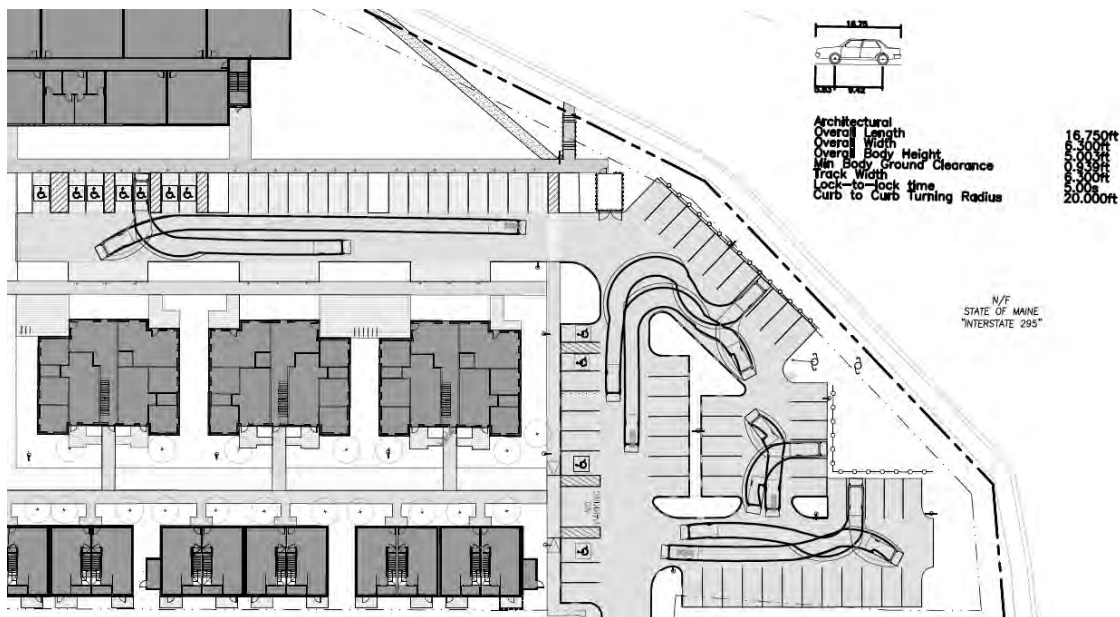


Figure 10: Automobile Turn Templates

The City's Consulting Traffic Engineer has reviewed the applicant's submitted Autoturn analysis and plan to reduce impervious area, however, more information is requested to understand what site constraints prevent expansion of the parking area to meet the 24-foot aisle width standard and why the site is unable to accommodate the wider aisle width.

With the applicant's turning analysis now received staff request the Board's feedback on the waiver for reduced parking aisle width.

C. Public transit access

Not applicable. Please see Section A above for additional information regarding public transit options available to site.

D. Parking

In general, residential units are required to provide one parking space per dwelling unit unless the project is eligible for parking requirement exceptions listed in Table 19-B of the Land Use Code. Per Table 19-B the Planning Board may establish a parking requirement that is less than one space per workforce or low-income housing unit, regardless of the size of the structure for affordable housing projects. The application includes providing 61 affordable units and 59 market rate units. In addition, for major site plans, the Planning Board shall establish the off-street parking requirement based on a parking study.

The application on the whole proposes 78 parking spaces to meet the overall demand of the proposed units — a ratio of 0.65 spaces per unit. As part of the total parking space allotment, Phase 1 includes 56 spaces (0.89 spaces per unit) and Phase 2 includes 22 spaces (0.39 spaces per unit), which the applicant believes is an appropriate amount of parking to serve each phase of the development, given that more than half of the units will be offered as affordable. As a basis for determining an adequate parking amount, the applicant has provided a parking analysis (Attachment V) calculating parking generation

based on industry parking generation rates (per Transportation Engineers (ITE) publication, Parking Generation, 5th Edition). The applicant's analysis provides a breakdown of parking demand associated with each phase of the project based on housing type which is summarized below:

ITE Parking Generation Summary – Phase I (63 Units)

LUC	Units	Rate	Weekday Peak Hour Average Parking Demand
Market Rate Mid-Rise Multi-Family	19	0.71	13.5
Affordable Housing – Income Limits	44	0.53	23.3
Total			37

Figure 11: Excerpt from Applicant's Parking Demand Calculation (Phase 1)

ITE Parking Generation Summary – Phase II (57 Units)

LUC	Units	Rate	Weekday Peak Hour Average Parking Demand
Low-Rise Multi-Family	28	0.59	16.5
Affordable Housing – Income Limits	29	0.53	15.4
Total			32

Figure 12: Excerpt from Applicant's Parking Demand Calculation (Phase 2)

ITE Parking Generation Summary – Full Site

LUC	Units	Rate	Weekday Peak Hour Average Parking Demand
Mid-Rise Multi-Family	19	0.71	13.5
Low-Rise Multi-Family	28	0.59	16.5
Affordable Housing – Income Limits	73	0.53	38.7
Total	120		69

Figure 13: Excerpt from Applicant's Parking Demand Calculation (Full Site)

The applicant's parking analysis for Phase 1 (Figure 11) anticipates an average parking demand of 37 parking spaces during the weekday peak hour and the plan proposes 56 parking spaces. The applicant's parking analysis for Phase 2 (Figure 12) anticipates an average parking demand of 32 parking spaces during the weekday peak hour and the plan proposes 22 parking spaces. Due to the unbundling of the Phase 2 co-op parking from unit ownership as well as the finding made by the applicant's engineer that transit-oriented developments (TOD) generally have approximately 44 percent fewer vehicle trips than the industry parking generation standard, the applicant believes the respective parking amounts are sufficient. Additionally, the applicant has noted the site's close proximity to multimodal transportation

services (See Section A above) as well as the site's pedestrian connections to the Dougherty Field Path and the applicant's intention to install 50 bicycle parking spaces onsite in order to exceed the required bicycle parking requirements.

The applicant's parking analysis for the full development (Figure 13) anticipates an average parking demand of 69 parking spaces during the weekday peak hour, and the overall plan provides 78 spaces to address overall demand from the combined development.

Furthermore, no off-street parking shall be required for developments within ¼ mile of fixed route transit service. If the applicant were to take advantage of this exception, they would be required to provide a TDM plan.

The City's Parking Director has recently submitted concerns to Planning staff that 78 parking spaces are insufficient for 120 residential units. The Parking Director finds that that existing residents of Douglass Street are currently using on street parking and the development will increase demand for on street parking in general and make it further challenging for residents to park during parking bans (Attachment 8).

The City's Consulting Traffic Engineer has reviewed the applicant's parking analysis and finds it to be reasonable, and estimates that the parking demand is approximately 77 spaces. The City's Consulting Traffic Engineer finds that the amount proposed is sufficient based on the proposed parking supply of 78 spaces.

Staff are seeking the Board's feedback if the amount of parking less than the required 120 spaces is supported based on the parking analysis and recommendation provided.

E. Transportation demand management (TDM)
Not Applicable.

2. Environmental Quality Standards (Section 14.6.2)

A. Preservation of significant natural features

Not applicable. The applicant has indicated that there are no significant natural features present on site.

B. Landscape preservation

The project includes removing 13 existing trees onsite — five of which are greater than 10-inch caliper but are outside the building setback area, therefore no tree replacement is required. The City Arborist continues to review the applicant's plans, and at this time has no concerns with the plan for tree removals, but has recommended the applicant consider adding curb protection around tree planter areas to enhance the chances of survival.

C. Site landscaping and buffers

The applicant has submitted Landscape/Planting (Plans 19-23) plans which include planting approximately 110 trees and 400 shrubs throughout the site. The site includes a landscaped buffer of sugar maple trees along the adjacent trail to the east. To the west of the site, at the rear of the townhouse buildings, the landscaping plan provides a landscaped buffer from the existing Douglass Street residences proposing 10 upright Armstrong maple trees, and a dense mix of evergreen trees and

other shrubs. An existing tree buffer at the rear of the existing Douglass Street properties is expected to remain to further buffer the development from the existing neighborhood.

Various other plantings and landscaping are proposed throughout the site including grass paver common areas and deciduous plantings along the main access roadway and throughout the parking lot areas.

The proposal includes screening the proposed transformer with a combination of trees and evergreen landscaping. The proposed solid waste container will be screened by a cedar fencing perimeter as well as tree planting and arborvitae landscaping.

The creation of 120 residential units requires either planting a total of 120 street trees or an acceptable alternative as recommended by the City Arborist. The current plan proposes planting 25 trees along the public trail to the north, 19 adjacent to Dougherty Park, and 33 trees within the portions of the proposed street that provide a public benefit for a total of 77 trees eligible to count toward the street tree requirement. The applicant is required to provide an alternative for the remaining 43 required trees. The applicant has agreed to contribute to the tree fund for the remaining trees, which is supported by the City's Arborist.

D. Water quality/storm water management/erosion control

The project proposes managing stormwater by a series of systems including an underdrained soil filter, proprietary rain gardens, and routing all stormwater from the site to a separated storm drain on Douglass Street. Overall, the applicant has stated that the site improvements will decrease the amount of impervious area on the site and reduce the overall runoff levels.

The applicant has submitted a Stormwater Management Report and Erosion and Sedimentation Control Report, which has been reviewed by the City's consulting civil engineer for compliance with MDEP Chapter 500 requirements as part of the City's delegated stormwater review. The City's consulting civil engineer has no concerns regarding the proposal's ability to meet stormwater standards, but recommends that the applicant provide clarifying notes on each phase's grading and utility plans demonstrating how each phase will integrate with one other depending on the order of site work. Additionally, should the development decide to provide an alternative stormwater treatment system, that any changes be reviewed by staff including review of a revised stormwater management plan, an updated and re-recorded stormwater maintenance agreement, and that the applicant provide clear documentation demonstrating the responsibilities for maintaining stormwater infrastructure by each entity. The City's consulting engineer also recommends the applicant revise the construction management plan once more information is available regarding sequencing of phases in order for each phased plan to consider the construction management requirements associated with the other phase being constructed or in operation, and to clarify what coordination is necessary between phases.

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

A. Consistency with City Master Plans

Portland's Plan 2030

Comprehensive Plan goals and policies (state and local) relevant to the proposed development are included below. The development proposal aligns with these vision statements and goals, by creating a new opportunity for an affordable, and well-connected new housing development accessible to public transit and within walking distance to a variety of services supporting the Plans goal of *Complete Neighborhoods*, and *increasing, preserving, and modifying the overall supply of housing city-wide*. In addition, the proposed project supports the City's desire to *leverage underused properties* owned by the City. The proposed development allows for maximizing development on an underutilized lot, which creates the opportunity to provide affordable homes, with access to public transit, services, and open space. Relevant Comprehensive Plan goals have been excerpted below:



Vision Statements:

- Secure - We will be committed to accessible housing and healthy food for all our residents.
- Authentic - The uniqueness and integrity of our neighborhoods will be maintained and enhanced.
- Connected - We will foster accessible linkages between where we live, work, shop, and play.
- Connected - We will enable meaningful access to the natural world and recreational opportunities as a central component of community health.

Housing: A Livable City

- Increase, preserve, and modify the overall supply of housing city-wide to meet the needs, preferences and financial capabilities of all Portland residents.
- Pursue policies to enable people who work in Portland to have the option to live in Portland.
- Reinforce existing housing tools, policies, and programs while continuing to explore emerging best practices.
- Evaluate whether current zoning allows for new development consistent with historic patterns of form, density, and/or use, as well as whether it allows for priority growth areas.
- Consider the sale of City-owned land that may be appropriate for housing development.
- Consider incentivizing affordability restrictions as part of City-owned property transactions, as well as the potential to return improved properties to the City's tax rolls.
- Create, promote, and facilitate safe, affordable, and practical housing solutions that will meet the evolving needs of Portland residents as they age.

Recreation & Open Space

- Pursue opportunities, in collaboration with partners, to create new open spaces in areas that are currently underserved.
- Pursue opportunities for new and enhanced walking and biking trails as a means of filling existing gaps and investigate paper streets, vacant land, medians, and other often overlooked areas for the potential for park linkages, trails, and other improvements to the urban landscape.
- Prioritize open space acquisition and programming toward creating linkages where there are gaps in the network, particularly between Stroudwater and the Fore River; Evergreen Cemetery and the

Presumpscot River; Portland Transportation Center and Bayside; Martin's Point and the Back Cove; and the Western Waterfront and the Fore River.

Future Land Use

- *Complete Neighborhood* – Portland's Plan recognizes that strong, complete neighborhoods are fundamental to the city's overall health. Portland's intent for its predominantly residential neighborhoods is one where all residents regardless of age, ability, or income 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, bikeable distance.
- *Connecting the Chain* – Portland's Plan recognizes that physically integrated transportation systems, utilities, and open spaces provide the structure for the city's growth, and that a well-connected system is more efficient and more resilient. An integrated transportation system allows residents to access jobs, food, healthcare, and recreation from their homes while planning for an unbroken network of open space connects neighborhoods and improves access to the outdoors.
- *One Portland* - Portland's Plan is a vision for One Portland, where the form and characteristics of neighborhoods vary, but the city functions as a cohesive whole. No one area of the city carries all the expectations for accommodating development and all areas can expect appropriate City services and amenities.

B. Public safety and fire prevention

The applicant has stated that the site has been designed to promote safe and inviting public access connections to walking trails within Dougherty Field, as well as providing adequate emergency access to new buildings via the restricted access loop road.

The proposal includes a new private hydrant to serve the buildings onsite and will be within 450 feet from the furthest structure.

The City's Fire Marshall has reviewed the application materials, and generally finds the project has incorporated the Fire Department's feedback by providing access for emergency vehicles into both phases, but requests that the applicant conduct an Autoturn analysis for Phase II in order to confirm sufficient maneuvering is available for emergency vehicles. More information will be forthcoming at the next public meeting.

C. Availability and capacity of public utilities

The applicant proposes installing a new 8 inch PVC lateral throughout the site with a doghouse manhole to accept the wastewater from each unit. In addition to the submitted utilities plan, the applicant has obtained a Wastewater Capacity Authorization from Public Works confirming capacity to manage wastewater.

Additionally, the applicant proposes retiring the existing 2 inch service line to the site and proposing to tap an 8 inch fire line as well as a 4 inch domestic line off the existing 8 inch ductile iron water main within Douglass Street, as well as a private fire hydrant will be installed to serve the buildings on site. The applicant has written the Portland Water District requesting an Ability to Serve letter to confirm adequate water is available to support the development, and this documentation should be available at the next public meeting.

4. **Site Design Standards (Section 14.6.4)**

A. Massing, ventilation, and wind impact

The massing of the proposed townhouse, rowhouses, and courtyard flats are generally consistent with the existing 2-3 story buildings found in the vicinity. Although the massing of the proposed five-story structure is sized larger than the typical of the neighborhood, the building is separated by a street and the site design provides permeability between other structures to accommodate ventilation between structures. Staff do not have concerns that the proposed structures will result in unsafe ventilation or wind impact to users of the site or adjacent public spaces.

B. Shadows

The applicant's shadow study (Plan 59) was submitted and staff do not find that the proposal will result in adverse impacts of shadows cast from the new five-story structure on the adjacent public open space areas.

C. Snow and ice loading

The applicant has indicated respective snow storage areas and stated that structures will not distribute snow and ice onto adjacent properties. Staff will continue to review the application for compliance with this standard in conjunction with reviewing the stormwater management standards above.

D. View corridors

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

The applicant has submitted an updated lighting plan (Attachment O) and lighting cut sheets. Staff have reviewed the applicant's lighting plan and associated information and find that all lighting onsite meets the requirements contained in Section 12 of the City's Technical Manual.

Based on a staff recommendation the applicant has elected to provide additional lighting on their site directed toward the adjacent Dougherty Field Path so as to provide better lighting during evening hours given the expectation that more pedestrians will begin utilizing the pathway. Although site lighting trespass from the site exceeds 0.1-foot candles at the property line, staff have determined that where site lighting crosses the property line exceeding allowable levels that it is directed toward the I295-offramp, which is considered a non-sensitive use, and therefore areas of lighting along the trail are exempted from the lighting trespass standards of Technical Manual Section 12.3.4.

G. Noise and vibration

No adverse impacts related to noise and vibration are anticipated as mechanical equipment is either screened and located away from residential properties. The applicant has stated that the HVAC system will meet the applicable state and federal emissions requirements and will also be screened and directed away from abutters.

H. Signage and wayfinding

No wayfinding signage is currently proposed, and only signage shown on plans is related to vehicular access.

I. Zoning-related design standards



Figure 14: Rendering Provided by Applicant as Viewed from Douglass St.

The proposal is subject to meeting the applicable PRUD design standards under Section (h) of the City's Design Manual. The applicant has submitted updated elevations, and renderings with an accompanying architectural narrative (Plans 30-42 & 47-54).

The project was reviewed by a design review team made up of three Planning staff which provided preliminary design comments to the applicant (Attachment 5). In response to the Planning Board's feedback at the March 22, 2022 workshop, and to address staff design review comments the applicant has provided the additional information below for the Board's reference (Attachment Y):

PHASE 1 – BLDG. E

- *“The lap siding will be cement clapboard, 9 inches to weather, the 9 inches to coincide with the mass and proportions of the building. There is a 24 inch stone base. All windows will have 4 inch trim a PVC product that can be painted. The clapboards will be painted a grey to match some of Co-Op buildings. We also picked up the sloped canopies to tie in with the Coop. The canopies are whimsical and offer the residents place to sit and identify entry. We have increased windows in the building. The natural colored siding, to resemble wood will be a Nichiha, the trims at top of building have been simplified per request of a board member. The top floor will be clad with a dark grey metal siding. The proposed roof is flat to provide future solar panels. The top floor in metal shingle helps reduce the building height. We also varied the height by running the Nichiha up beyond the building roof height.”*

PHASE 2 – BLDGS. A1, A2, A3, B1, B2, C1, D1

- *“The siding materials of the Rowhouses, Townhouses, and Community Flats include vertical cedar shiplap, reverse board-and-batten, and a traditional lap siding that varies in exposure from 4”/6”/8”, the largest of which approximates the adjacent 5-story building in width and*

color. The siding on the Rowhouses increases in scale as it rises, to add character and vibrancy. In all, there will be 3 different tones of siding, plus the natural cedar at select locations, primarily at the Community Flats and Townhouse entries.

- *Roof eave and fascia trim will include consist of 2 boards in a roughly 2:1 proportion, with the smaller board above and proud of the larger. It will match the more saturated siding tone, and approximate the roof color. Sloped canopies introduce and protect entry doors throughout the development. The primary entry to the 5-story building echoes that of the Community Flats building across the woonerf, which engages the Common.*

Units within the Townhouse and Rowhouse buildings are individually distinguished by siding color, and separated by a vertical trim element. Each grouping of adjacent entry doors is set off by columns of varying width at regular intervals to further vary the rhythm of the facades. The underside of each canopy is accentuated by cedar boards.

The roof forms are kept largely continuous and simple due to the intent of providing solar panels on all buildings in the most efficient manner. The longer stretches of roof are broken up at the corners, where the impact on solar shading will be minimal and the gable end elevations will be energized. The roof of the easternmost Rowhouse unit is kicked up in the style of the Community Flats building in order to nod to the scale of the adjacent 5-story building.”

Staff have reviewed these updates and find that the project appears to meet many of the design standards and have updated the design review memo accordingly (Attachment 6). Staff have no new comments but have again asked the applicant to consider additional opportunities to providing communal open space (patio, trellis, seating, planting, etc) and private open space (balconies, yards, decks, patios, etc.) to meet the open space design standards for the apartment building. The applicant has indicated that the site offers a multitude of open space opportunities and is in close proximity to the adjacent park, however the construction budget does not allow for balconies and other amenities have been considered at the rear of the site “the grading does not allow for door access at the back level. Furthermore, there is desire to keep that space somewhat private for the tenants since their only windows look out to this space.”

XIII. PUBLIC COMMENT

At the time this report was written Planning staff have received three written comments (PC1-3). In general feedback included concerns of an overabundance of parking, supporting repurposing parking areas for a community space such as a parklet, seeking more information about snow management operations, and concerns about past uses on the site posing geotechnical complications for future development. The Libbytown Neighborhood Association recommends a professional TDM study be conducted giving special attention to utilizing on-street parking and reducing parking onsite.

XIV. NEXT STEPS

At this time staff are specifically seeking Board feedback on the proposed design and parking aisle waiver, and if the Board supports a reduced parking requirement based on the applicant's parking analysis.

Following the workshop, the application will:

1. Continue to address staff and Board review comments
2. Prepare follow-up plan submission
3. Schedule and hold a Planning Board public hearing

XV. ATTACHMENTS**REPORT ATTACHMENTS**

1. Request for Proposals #2020-2
2. City Council Order 72-21_22
3. Consulting Traffic Engineer Comments (dated 5.5.2022)
4. Housing Program Manager Comments (dated 3.17.2022)
5. Preliminary Design Comments (dated 3.1.2022)
6. Updated Design Comments (dated 5.5.2022)
7. Consulting Civil Engineer Comments (dated 5.4.2022)
8. Parking Director Comments (dated 5.3.2022)

APPLICANT'S SUBMITTAL

- A. Douglass Commons Cover Letter
- B. Major Site Plan Checklist
- C. Douglass Commons Purchase and Sale Agreement
- D. Zoning Assessment
- E. Easements
- F. Waivers
- G. Financial Capacity
- H. Technical Capacity
- I. Conformity with Land Use Ordinance
- J. Soil Survey
- K. Stormwater Management Report
- L. Erosion & Sedimentation Control
- M. Fire Department Letter
- N. Wastewater Capacity
- O. Lighting
- P. Architectural Narrative
- Q. Utilities
- R. Construction Management Plan
- S. Solid Waste
- T. Traffic Memo
- U. Stormwater Management Law Delegated Review Application
- V. Parking Analysis and METRO Bus Route and Multimodal Map
- W. Permeable Grass Paver Manual

- X. Stormwater Maintenance Agreement
- Y. Response to Staff comments, dated 4.27.2022

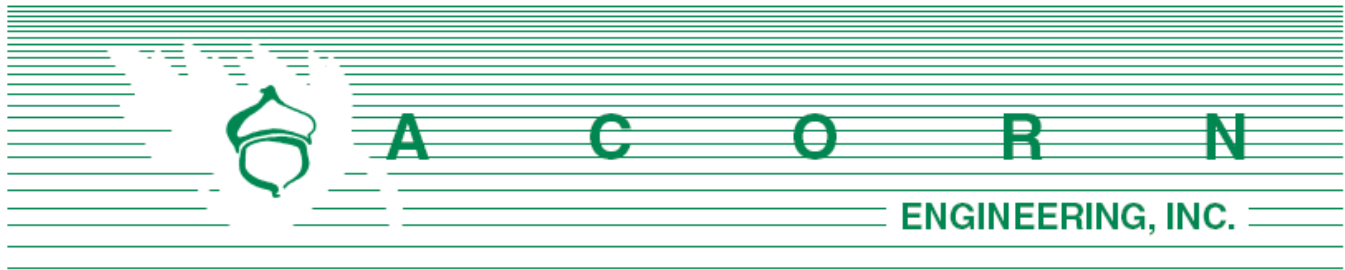
PLANS

- Plan 1. Cover Sheet & Legend
- Plan 2. General Notes
- Plan 3. Boundary & Topographic Survey
- Plan 4. Construction Management Plan
- Plan 4a. Construction Management Plan Phase I
- Plan 4b. Construction Management Plan Phase II
- Plan 5. Site Plan
- Plan 6. Interim Phase I Site Plan
- Plan 6a. Interim Phase II Site Plan
- Plan 7. Utility Plan
- Plan 8. Interim Phase I Utility Plan
- Plan 8a. Interim Phase II Utility Plan
- Plan 9. Grading & Drainage Plan
- Plan 10. Interim Phase I Grading & Drainage Plan
- Plan 10a. Interim Phase II Grading & Drainage Plan
- Plan 11. Site Details - 1
- Plan 12. Site Details - 2
- Plan 13. Utility Details - 1
- Plan 14. Utility Details - 2
- Plan 15. Drainage Details - 1
- Plan 16. Drainage Details - 2
- Plan 17. Erosion & Sedimentation Details & Control Notes
- Plan 18. Erosion & Sedimentation Details & Control Notes
- Plan 19. Landscaping Materials Plan
- Plan 19a. Landscaping Materials Plan Phase 1
- Plan 19b. Landscaping Materials Plan Phase 2
- Plan 20. Landscaping Planting Plan
- Plan 20a. Landscaping Planting Plan Phase 1
- Plan 20b. Landscaping Planting Plan Phase 2
- Plan 21. Landscaping Planting Details
- Plan 22. Landscaping Site Details - 1
- Plan 23. Landscaping Site Details - 2
- Plan 24. Community Flats Ground Floor Plan A1-A2
- Plan 25. Community Flats Ground Floor Plan A3
- Plan 26. Community Flats Second Floor Plan A1-A3
- Plan 27. Community Flats Third Floor Plan A1-A3
- Plan 28. Townhomes Floor Plans B1-B2-C1
- Plan 29. Rowhome Floor Plans D1
- Plan 30. Community Flats and Rowhome Elevations
- Plan 31. Cooperative Buildings Materials Options
- Plan 32. Site Elevations
- Plan 33. Townhome Elevations
- Plan 34. Sections A1-A3

Plan 35. Sections B-C-D
Plan 36. Cooperative Rendering 1
Plan 37. Cooperative Rendering 2
Plan 38. Cooperative Rendering 3
Plan 39. Cooperative Rendering 4
Plan 40. Cooperative Rendering 5
Plan 42. Cooperative Rendering 7
Plan 43. Five-Story Basement Plan
Plan 44. Five-Story First Floor Plan
Plan 45. Five-Story Typical Floor Plan
Plan 46. Five-Story Fifth Floor Plan
Plan 47. Five-Story Building Elevations - 1
Plan 48. Five-Story Building Elevations - 2
Plan 49. Five-Story Rendering 1
Plan 50. Five-Story Rendering 2
Plan 51. Five-Story Rendering 3
Plan 52. Five-Story Rendering 4
Plan 53. Five-Story Rendering 5
Plan 54. Five-Story Rendering 6
Plan 55. Subdivision Plat
Plan 56. Automobile Turn Templates
Plan 57. Open Space Exhibit
Plan 58. Multi-Modal Exhibit
Plan 59. Shadow Study
Plan 60. Rendering from Offsite Douglass St.
Plan 61. Rendering From Congress St
Plan 62. Rendering from I-295

PUBLIC COMMENT

PC1. Maureen Morse 1-26-2022
PC2. George Rheault 3-22-2022
PC3. George Rheault 3-22-2022



Planning Division
Attn: James Rather, Development Review Manager
City of Portland, Maine
389 Congress Street, 4th Floor
Portland, ME 04101

December 22, 2021

Subject: Major Site Plan & Subdivision Application
Douglass Commons Redevelopment

James:

On behalf of Douglass Commons, LLC and the design team, we are pleased to submit the accompanying package of materials related to the proposed redevelopment of the former West School at 43/91 Douglass Street in the Libbytown neighborhood. The 3.34-acre parcel was recently put under a Purchase & Sale agreement between the City and the developer after a competitive public RFP process. Since then, the design team has held numerous neighborhood meetings and informational sessions, as well as achieved a map amendment, extending the R-5a zoning district to include the subject parcel.

The project includes a total of 120 affordable residential units and falls under the Planned Residential Unit Development (PRUD) standards in addition to capitalizing on affordable housing incentives. The design includes a five story 63-unit building managed by the Szanton Company as well as a collection of townhome-style buildings comprising 57 units under a Co-Op model managed by Maine Cooperative Development Partners. This joint infill redevelopment will feature a phased project with each portion being seamlessly integrated into the overall development, creating a harmonious site design. A focal point of the project includes a woonerf, a European technique designed to encourage community gathering and prioritize the pedestrian experience. The project has also been coordinated with the abutting park redevelopment to provide a cohesive connection.

We are excited to submit this application to the Planning Department as it falls directly in line with the comprehensive plan by creating quality affordable housing while transforming the dilapidated infill site into an attractive, multi-generational housing community.

Sincerely,

A handwritten signature in black ink, reading 'Sam Lebel'.

Samuel J. Lebel, P.E.
Project Manager
Acorn Engineering, Inc.

The following documents and drawings will be uploaded onto the City's electronic submission site per the procedure outlined in the application:

Documents:

- Section A: Cover Letter
- Section B: Major Site Plan Application & Checklist
- Section C: Right, Title, Interest
- Section D: Zoning Assessment
- Section E: Easements
- Section F: Waiver Table
- Section G: Financial Capacity
- Section H: Technical Capacity
- Section I: Conformity with Land Use Ordinance
- Section J: Stormwater Management Report
- Section K: Erosion & Sedimentation Control Report
- Section L: Fire Department Letter
- Section M: Wastewater Capacity Letter
- Section N: Lighting
- Section O: Architectural Design Narrative
- Section P: Utility Cover
- Section Q: Construction Management Plan
- Section R: Solid Waste
- Section S: Traffic Report
- Section T: Stormwater Management Law Delegated Review Application

Drawings:

- Civil Site Plan Set, dated 12/22/21
- Architectural Plan Set, dated 12/22/21



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 ☒ NA	Project Description Cover letter with detailed project description
Yes ☒ NA	Completed Checklist (this document)
Yes ☒ NA	Evidence of Right, Title, and Interest Deeds, leases, or purchase and sales agreements
Yes ☐ NA ☒	Evidence of State or Federal Approvals Permits or letters of non-jurisdiction, if applicable
Yes ☒ NA	Zoning Assessment (see Zoning Assessment Table) Summary of compliance with use and dimensional standards of the land use code
Yes ☒ 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 ☒ 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 ☒ NA	Waiver Requests (see Waiver Table) Written request for waiver describing request and compliance with applicable waiver standards
Yes ☒ NA	Financial Capability Letter or evidence from a financial institution or third party verifying financial capacity to undertake project
Yes ☒ 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 NA ☒	Impact on Surrounding Street Systems (14-14.6.1(A)) Describe incremental volume of traffic impacts and mitigation measures. If needed
Yes ☒ 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 ☒ 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 ☒ 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 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	X	NA	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	X	NA	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	X	NA	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	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	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	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 ☒	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 ☒	Shadows (14-14.6.4(B)), if applicable Provide shadow analysis of impacts on publicly accessible open space (Technical Manual, Section 11)
Yes NA ☒	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 ☒	View Corridors (14-14.6.4(D)), if applicable Describe any protection of designated view corridors (Portland Design Manual, Appendix. 1)
Yes NA ☒	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	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 ☒	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 ☒	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	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

C. Right, Title, & Interest

Please find attached the Purchase and Sale Agreement between the City of Portland and Douglass Commons, LLC.



PURCHASE AND SALE AGREEMENT

THIS PURCHASE AND SALE AGREEMENT (this “Agreement”) is made this 21st day of May, 2021 (the “Effective Date”) by and between the CITY OF PORTLAND, a body politic and corporate located in Cumberland County, Maine, (hereinafter referred to as “Seller” or “City”), and Douglass Commons, LLC, a Maine limited liability company having a mailing address as provided below (hereinafter referred to as “Buyer”).

RECITALS

WHEREAS, the CITY is the owner of approximately 3.40 acres of land at or near 43 & 91 Douglass Street, Portland, Maine (the “Premises”) and did advertise RFP #20067 dated April 10, 2020, entitled Request for Proposals for Disposition and Development of City-Owned Property Located at 43 and 91 Douglass Street, a copy of which is attached hereto as Exhibit A and incorporated herein (the “Request for Proposals”) (the Premises is identified in the City’s tax records as CBL 078 C002 and a portion of 078 B007 together with the 60 ft. wide proposed street situated between the two parcels, as is generally depicted on the Boundary Survey dated March 1, 2021 prepared by Owen Haskell, Inc. for The Szanton Company, a copy of which is attached as Exhibit B); and

WHEREAS, Buyer submitted a proposal dated June 15, 2020 in response to the Request for Proposals, a copy of which is attached hereto as Exhibit C and incorporated herein (the “Proposal”); and

WHEREAS, Buyer desires to purchase and develop the Premises, and the City desires to convey the Premises to Buyer, subject to the terms and conditions set forth herein.

NOW THEREFORE, in consideration of the foregoing and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties, intending to be legally bound, hereby agree as follows:

1. **SALE.** City agrees to sell the Premises to Buyer, and Buyer agrees to purchase the Premises in accordance with the terms and conditions set forth in this Agreement. This Agreement is for the sale of land only.
2. **CONSIDERATION.** The purchase price for the Premises shall be Four Hundred Seventy-Five Thousand Dollars (\$475,000.00) (the “Purchase Price”), subject to the following cost adjustments and conditions:
 - a. Buyer shall deliver to the City the sum of Ten Thousand Dollars (\$10,000.00) (the “Deposit”) within 3 business days after the full execution of this Agreement, which the City shall hold in a non-interest bearing account. The Deposit shall be governed by the terms and conditions of this Agreement and shall be fully refundable until the end of the Due Diligence Period as that term is defined below.
 - b. The Buyer shall pay the remainder of the Purchase Price to the City by wire transfer (or as otherwise reasonably requested by the City) at closing.

3. TITLE AND DUE DILIGENCE.

- a. Due Diligence Period. Buyer will have from the Effective Date until 4:00 PM Eastern Time on the day that is eighteen (18) months after the Effective Date (the “Due Diligence Period”) to complete any surveys, environmental review, inspections, and title examinations, and to obtain any zone change, site plan approval, and any other permits and regulatory approvals required for the Project. Buyer may, in its sole discretion, notify the City in writing that the Buyer elects to terminate the Due Diligence Period sooner and proceed to closing. Within ten days of the Effective Date, the City shall provide copies of, or reasonable access to, all known, non-confidential City files regarding the Premises, including without limitation title files.
- b. Property Description. The legal description of the Premises contained in the deed will be a survey description based upon a survey plan that will more specifically describe the Premises. The parties acknowledge and agree that the survey attached as Exhibit B is a preliminary draft prepared by Buyer and is subject to change after review, amendment, and approval by both parties. The City will notify Buyer of any objections to the survey within 30 days after the Effective Date. Within 10 days after receipt of any such objection, the Buyer will either provide the City with a revised survey addressing City’s objections to City’s satisfaction, or notify the City that Buyer will not change the survey, in which case the City, will have the right to terminate this Agreement, return the Deposit to Buyer, and neither party shall have any further obligation to the other. Upon City’s acceptance of the survey, Buyer will provide the City with a draft legal description for the Premises, which shall be based on the survey and be subject to the City’s review and approval. The survey and description of the Premises will be prepared by the Buyer at its sole expense. The parties will work together in good faith to complete their review and approval of the survey and legal description on or before the day that is 90 days after the Effective Date.
- c. Rezoning Contingency. Buyer proposes to obtain the Portland City Council’s approval to rezone the Premises (the “Rezoning Approval”) to increase residential density for its development of the Premises as described in the Proposal (the “Project”). The Buyer will be responsible for obtaining, at its sole expense, the Rezoning Approval and any other regulatory approvals required for the Project prior to Closing. Buyer may terminate this Agreement and receive a full refund of the Deposit if the Rezoning Approval is not received.
- d. Financing Contingency. The Buyer’s obligation to close is contingent on obtaining construction and permanent financing for the Project that the Buyer, in its discretion, determines is sufficient to put the Project on a sound financial footing. That financing is anticipated to include, but not be limited to, the following: (i) for the residential rental portion of the project an allocation of Federal low-income housing tax credits (“LIHTCs”), other

financing provided by Maine State Housing Authority (“MaineHousing”) and affordable housing tax increment financing from the City including a Credit Enhancement Agreement and (ii) for the cooperative housing portion of the project permanent financing under the U.S. Department of Housing and Urban Development section 213 program and affordable housing tax increment financing from the City including a Credit Enhancement Agreement. Buyer may terminate this Agreement and receive a full refund of the Deposit if the financing contingency described above is not met during the Due Diligence Period.

- e. Title and Survey Objections. Buyer will have until the end of the Due Diligence Period to deliver to City any written objections to title, environmental, or survey matters (other than the permitted exceptions identified herein) that materially affect insurability or use. Objections not made prior to the end of the Due Diligence Period will be deemed waived; provided, however, that objections pertaining to matters of record environmental, or survey matters first appearing after the end of the Due Diligence Period may be made at any time prior to the closing.
- f. Option to Cure. In the event of a title or survey objection, City will have the option, but not the obligation, to cure the objection and will notify Buyer of its election within ten (10) business days after receipt of the objection. In the event that the City elects to cure the objection, it will have sixty (60) days from the date of the notice of election, or such other reasonable time as the parties may agree, to cure the objection. In the event that the City does not elect to cure the objection, or, having elected to cure the objection fails to timely do so to Buyer’s reasonable satisfaction, Buyer will have the option to (1) terminate this Agreement and obtain a refund of the Deposit (after which neither party will have any further obligation or liability to the other under this Agreement), (2) waive the objection and close, or (3) undertake the cure of such objection at its own expense (in which case it shall have 60 days to do so).
- g. Deed. City shall convey the Premises to Buyer at the closing in fee simple by a municipal quitclaim deed without covenant. Title shall be good and insurable title, free and clear of all encumbrances except (i) easements of record and easements described herein, including, without limitation, an easement to be reserved by, and in form and substance satisfactory to the City and Buyer, the City for access to, and maintenance, repair, and replacement of, the trail located between the Premises and the I-295 corridor; (ii) easements for utilities servicing the property, in form and substance satisfactory to the City and Buyer, including, without limitation, Utility and sewer (iii) zoning ordinances, and (iv) real estate taxes not yet due and payable. Further, Buyer acknowledges that the deed shall contain a restriction stating that in the event that the Premises or any portion thereof shall be exempt from real and personal property taxes, by transfer, conversion, or otherwise, then the then-owner of the exempt portion shall make annual payments to the City in lieu of taxes in the amount equal to

the amount of property taxes that would have been assessed on the exempt portion of the real and personal property situated on the Premises had such property remained taxable. Such restriction shall also confirm that Buyer and its successors and assigns shall possess and be vested with all rights and privileges as to abatement and appeal of valuations, rates, and the like as are accorded owners of real and personal property in Maine. The City shall provide a draft of the deed, and of any declaration of covenants and restrictions pursuant to section 11, to Buyer one month before the end of the Due Diligence Period, and the City and Buyer shall in good faith endeavor to agree on the form of the deed prior to the end of the Due Diligence Period.

- h. Existing Natural Gas Equipment and Easement. The City has informed Buyer that the City believes that all or a portion of the existing natural gas pipe and other equipment depicted on Exhibit B may be actually located outside of the easement provided by the City to Unitil. The City shall use best efforts to work with Unitil to resolve the actual location of the gas pipeline and equipment and amend the easement, if necessary, within three months of the Effective Date. If City is unable to amend the Unitil easement to Buyer's satisfaction, Buyer shall have the right to terminate this Agreement as set forth in subsection (i) below.
- i. Buyer's Right to Terminate. The Buyer may terminate this Agreement at any time during the Due Diligence Period if, in the exercise of its sole discretion, it decides to not proceed with the Project by giving written notice of termination to the City in which case the City shall return the Deposit to Buyer and neither party shall have any further obligations to the other.

4. INSPECTIONS.

- a. During the Due Diligence Period, Buyer and its employees, consultants, contractors and agents shall have the right, at Buyer's expense, to enter on the Premises at reasonable times in order to (i) inspect the same, (ii) conduct engineering studies, percolation tests, geotechnical exams, environmental assessments, and other such studies, tests, exams, and assessments, and (iii) do such other things as Buyer determines, it is sole discretion, to be required to determine the suitability of the Premises for Buyer's intended use (collectively, the "Inspections"). The City acknowledges that such Inspections may include the digging of test pits, which the City hereby approves.
- b. Buyer agrees to defend, indemnify and hold harmless the City against any mechanics liens that may arise from the activities of Buyer and its employees, consultants, contractors and agents on the Premises.
- c. Buyer shall exercise the access and inspection rights granted hereunder at its sole risk and expense, and Buyer hereby releases the City from, and

agrees to indemnify, defend, and hold the City harmless against, any and all losses, costs, claims, expenses and liabilities (including without limitation reasonable attorney fees and costs) (collectively, "Damages") suffered by the City on account of any injury to person or damage to property arising out of the exercise by Buyer of its rights hereunder, except to the extent that such Damages result from the act or omission of the City.

- d. Buyer shall cause any contractors, consultants or any other party conducting the Inspections to procure automobile insurance, if applicable, and commercial general liability insurance coverage in amounts of not less than Four Hundred Thousand Dollars (\$400,000.00) per occurrence for bodily injury, death and property damage, listing the City as an additional insured thereon, and also Workers' Compensation Insurance coverage to the extent required by law; the forms of all such insurance to be subject to City's Corporation Counsel's reasonable satisfaction.
- e. In the event that Buyer does not purchase the Premises, Buyer agrees to either return the Premises as nearly as possible to its original condition after conducting the Inspections; provided, however, the City hereby acknowledges and agrees Buyer shall have no obligation to clean-up, remove or take any other action with respect to any disturbance of any pre-existing environmental contamination on the Premises caused by such inspections, studies, tests, exams, and assessments, and that Buyer shall have no obligation to clean-up, remove or take any other action with respect to any pre-existing environmental contamination disturbed thereby.
- f. The parties hereto acknowledge and agree that it is a condition to Buyer's obligations under this Agreement that the results of the Inspections be acceptable to Buyer in its sole discretion. If the results of such due diligence are not acceptable to Buyer in its sole discretion, and if Buyer exercises its right to terminate this Agreement, and neither party shall have any further obligations or liabilities under this Agreement except as expressly set forth in this Agreement.

- 5. **REAL ESTATE TAXES, PRORATIONS AND TRANSFER TAX.** Buyer shall be liable for all real estate taxes beginning as of the start of fiscal year following the closing and continuing thereafter. Because the Property is currently owned by the City of Portland, which is exempt from real estate taxes, no taxes were assessed or will be due for any portion of the tax year during which the closing occurs, and no taxes will be prorated at the closing. Any utilities for the Property shall be prorated as of the closing. The Maine real estate transfer tax shall be paid for by Buyer in accordance with 36 M.R.S.A. § 4641-A. City is exempt from paying the transfer tax pursuant to 36 M.R.S.A. § 4641-C. The recording fee for the deed of conveyance and any expenses relating to Buyer's financing or closing shall be paid for by Buyer.
- 6. **DEFAULT AND REMEDIES.** Prior to Closing, in the event that Buyer defaults hereunder for a reason other than the default of the City, the City may terminate this Agreement and retain the Deposit, and neither party shall have any further obligation

to the other. In the event that Buyer defaults on any matters addressed in this Agreement that survive Closing, Seller may pursue all available legal and equitable remedies. In the event City defaults under this Agreement, and if Buyer is not then in default hereunder, Buyer shall have the right to pursue specific performance or terminate this Agreement and elect in substitution therefor, as its sole remedy, the right to a return of the Deposit.

7. **RISK OF LOSS.** The risk of loss or damage to the Premises by fire, eminent domain, condemnation, or otherwise, until transfer of title hereunder, is assumed by the City. The Premises is to be delivered in substantially the same condition as of the Effective Date unless otherwise stated. In the event City is not able to deliver the Premises as stated, Buyer may terminate this Agreement, obtain a return of the Deposit, and neither party shall have any further obligations or liabilities under this Agreement except as expressly set forth in this Agreement.
8. **PROPERTY SOLD "AS IS, WHERE IS."** Buyer acknowledges that Buyer has had an opportunity to inspect the Premises, and to hire professionals to do so, and that Premises will be sold "as is, where is" and "with all faults." City, and its agents, make no representations or warranties with respect to the accuracy of any statement as to boundaries or acreage, or as to any other matters contained in any description of the Premises, or as to the fitness of the Premises for a particular purpose, or as to development rights, merchantability, habitability, or as to any other matter, including without limitation, land use, zoning and subdivision issues or the environmental, mechanical, or structural condition of the Premises. Acceptance by Buyer of the Deed at closing and payment of the purchase price shall be deemed to be full performance and discharge by the City of every agreement and obligation contained herein.
9. **ENVIRONMENTAL INDEMNIFICATION.** Buyer covenants and agrees to indemnify, defend, and hold the City harmless from and against any and all claims, damages, losses, liabilities, obligations, settlement payments, penalties, assessments, citations, directives, claims, litigation, demands, defenses, judgments, costs, or expenses of any kind, including, without limitation, reasonable attorneys', consultants', and experts' fees incurred in investigating, defending, settling, or prosecuting any claim, litigation or proceeding, that may at any time be imposed upon, incurred by or asserted or awarded against Buyer or the City and relating directly or indirectly to the violation of or compliance with any federal, state, or local environmental laws, rules, or regulations governing the release, handling or storage of hazardous wastes or hazardous materials and affecting all or any portion of the Premises, except to the extent that such a claim results directly from the City's release, handling or storage of hazardous wastes or hazardous materials on the Premises. This duty to indemnify, defend, and hold harmless shall be included in a covenant in the deed and shall run with the land conveyed and be binding upon Buyer's successors, assigns, and transferees.
10. **CLOSING.** Time is of the essence in the performance of this agreement. The closing shall be held at the offices of Buyer's counsel at a date and time specified by

two weeks' written notice from Buyer to the City on or before the day that is twenty (20) months after the Effective Date (the "Closing Date"). At the Closing:

- a. The City shall execute, acknowledge and deliver to Buyer a municipal quitclaim deed conveying to Buyer good and insurable title to the Premises, free and clear of all encumbrances except as otherwise set forth herein.
- b. Buyer shall deliver the Purchase Price to the City.
- c. Each party shall deliver to the other such other documents, certificates and the like as may be required herein or as may be necessary to carry out the obligations under this Agreement.
- d. Buyer shall deliver evidence, reasonably satisfactory to City's Corporation Counsel, that the entity receiving title to the Premises is in good standing under Maine law, and that the individuals acting at Closing and executing documents on behalf of Buyer are authorized to do so.

11. BUYER'S POST CLOSING OBLIGATIONS; RIGHTS OF CITY TO REPURCHASE PROPERTY.

As set forth in the Proposal, the Project includes a rental housing project and a limited equity cooperative housing project (hereinafter referred to as the "Rental Housing Project" and the "Cooperative Housing Project," respectively). Within thirty-two (32) months of the Effective Date, Buyer shall commence construction of both the Rental Housing Project and the Cooperative Housing Project.

a. Rental Housing Project.

- i. The Rental Housing Project will consist of an apartment building including no less than 56 units, with a mixture of one-, two- and three-bedroom units. In no event shall the Rental Housing Project include fewer than 17 two-bedroom units and 10 three-bedroom units.
- ii. For a period of 99 years after the Rental Housing Project has been completed, at least 40 units in the Rental Housing Project shall be affordable to households earning less than or equal to 60% of the area median income (AMI), adjusted for family size, based on figures published annually by HUD for the Portland Metropolitan Statistical Area. If at a time in the future, HUD no longer provides these annual figures, the City will identify another similar method of determining income guidelines for affordability. For purposes of this Agreement, "affordable" means that the percentage of income a household is charged in rent and other housing expenses including utilities, shall not exceed 30% of the household's gross monthly income, except as provided below if the Project is financed with the LIHTC program. Minimum household size allowed per unit and the formula for calculating maximum allowable monthly rent is detailed on Exhibit D, which is attached hereto and made a part hereof. However, if the Rental Housing Project is financed under the Federal Low Income Housing Tax Credit (LIHTC) Program, maximum allowable rent shall

be the maximum allowable rent under the Federal LIHTC Program during the applicable time period for that Program. Upon expiration of any affordability restrictions recorded in the Cumberland County Registry of Deeds under the Federal LIHTC Program, the provisions of Exhibit D shall apply to the Rental Housing Project for the remainder of the 99-year period.

b. Cooperative Housing Project.

- i. The Cooperative Housing Project will include at least 52 units, with a mixture of one-, two-, and three-bedroom units owned by a Limited Equity Cooperative Corporation (the “Co-op”) and leased individually to the resident shareholders of the Co-op (the holding of a Co-op share and lease agreement together constituting a resident’s “cooperative interest”). In no event shall the Cooperative Housing Project include fewer than 12 two-bedroom units and 22 three-bedroom units.
- ii. Upon the issuance of a certificate of occupancy for all or a portion of the Cooperative Housing Project, or at such earlier or later time as the Buyer, in its discretion, may determine, the Buyer shall convey the Cooperative Housing Project to the Co-op organized in accordance with the Maine Cooperative Affordable Housing Ownership Act, 13 M.R.S.A. §1741-1762, as may be amended or any successor provisions thereto (the “Act”). References below to particular provisions of the Act include any successor provisions to the provisions referenced.
- iii. Rent Restrictions. For a period of 99 years after the Cooperative Housing Project has been completed, all residential units in the Cooperative Housing Project shall be affordable to households earning less than or equal to 100% of the area median income (AMI), adjusted for family size, based on figures published annually by HUD for the Portland Metropolitan Statistical Area. If, at a time in the future, HUD no longer provides these annual figures, the City will identify another similar method of determining income guidelines for affordability. For purposes of this Agreement, “affordable” means that the percentage of income a household is charged in connection with (i) its cooperative interest and other housing expenses, including utilities, shall not exceed 30% of the household’s gross monthly income or (ii) its rent and other housing expenses, including utilities, shall not exceed 30% of the household’s gross income. Minimum household size allowed per unit and the formula for calculating maximum allowable purchase price and monthly rent is detailed on Exhibit D, which is attached hereto and made a part hereof.
- iv. Income Restrictions. Except as provided below regarding the initial sale of cooperative interests, a household may only purchase a cooperative interest in a unit or if its income is not more than 100% of the AMI, adjusted for family size, as published by the U.S. Department of Housing and Urban Development (“HUD”) at the time of purchase. This income test will be used only at the time of the household’s purchase. No income test shall apply for subsequent

transfers to family members (as reasonably defined by the Co-Op Entity) or to a cooperative membership interest which is inherited or transferred upon death to a beneficiary. At the time of the initial sale of cooperative membership interests in the Co-op, up to 20% of the cooperative membership interest may be sold to households earning up to 120% AMI. All subsequent sales must be to households earning no more than 100% of AMI.

- v. The articles of organization for the Co-op shall provide that in the event the Co-op shall be dissolved, its assets will be distributed in accordance with §1754 (6) of the Act. In such dissolution, the Co-Op's assets will be used first to pay all debts and other obligations of the Co-op, then to make any distributions to members required under the Co-Op's limited equity organizational documents, then any remaining balance shall be paid to the City or, at the Buyer's option with the consent of the City not to be unreasonably withheld, to another organization permitted under §1754 (6) of the Act.

c. **Option to Repurchase All or a Portion of the Premises.**

(i) If Buyer, its successors, assigns, or transferees commences no construction of any portion of the Project to be located on the Premises within 32 months of the Effective Date, the City shall have the right, but not the obligation, to repurchase the Premises and all improvements thereon (collectively, the "Property") at the Purchase Price (the "Property Repurchase Price") plus all commercially reasonable and documented, design, development, construction, and regulatory approval expenses ("Approved Expenses") incurred by Buyer, or successors, to the date on which the City notifies Buyer, its successors or assigns, of its intent to exercise its option to repurchase the Property. The parties acknowledge and agree that the Approved Expenses are intended to include only costs incurred directly in connection with the development of the Property for documents, agreements, designs, plats, plans, approvals, and construction, the rights to which may be assigned or transferred to the City. In no event shall the **Approved** Expenses include salaries, developer fees, or the like paid by Buyer, its successors or assigns to their members, shareholders, partners, employees, or agents.

(ii) If Buyer conveys a portion of the Property (the "Co-Op Site"), which conveyance may be by creating and conveying a land condominium unit, to a separate entity (the "Co-Op Entity") for purposes of that entity developing the Cooperative Housing Project, and the Co-Op Entity fails to commence construction of the Cooperative Housing Project within 32 months of the date of this agreement or fails to complete construction of the Cooperative Housing Project within fifty (50) months of the date of this agreement, the City shall have the right, but not the obligation, to purchase the Co-Op Site and all improvements thereon for a price equal to One Hundred Thousand Dollars (\$100,000) ("Co-Op Repurchase Price") plus Approved Expenses incurred by Buyer, or successors, for purposes of developing the Co-Op Site to the date on which the City notifies Buyer, its

successors or assigns, of its intent to exercise its option to repurchase. Any conveyance of the Co-Op Site to the City will (i) be subject to any and all rights of the Rental Housing Entity (defined below) or pursuant to any condominium documents that affect or burden the Co-Op Site and (ii) include any and all rights of the Co-Op Entity over the Rental Housing Site (as defined below) or pursuant to any condominium documents.

(iii) If Buyer conveys a portion of the Property (the “Rental Housing Site”), which conveyance may be by creating and conveying a land condominium unit, to a separate entity (the “the Rental Housing Entity”) for purposes of that entity developing the Rental Housing Project, and the Rental Housing Entity fails to commence construction of the Rental Housing Project within 32 months of the date of this agreement or fails to complete construction of the Rental Housing Project within fifty (50) months of the date of this agreement, the City shall have the right, but not the obligation, to purchase the Rental Housing Site and all improvements thereon for a price equal to \$375,000 (the “Rental Housing Repurchase Price”) plus Approved Expenses incurred by Buyer, or successors, for purposes of developing the Rental Housing Site to that the date on which the Property is conveyed to the City. Any conveyance of the Rental Housing Site to the City will (i) be subject to any and all rights of the Co-Op Housing Entity (defined below) or pursuant to any condominium documents that affect or burden the Rental Housing Site and (ii) include any and all rights of the Rental Housing Entity over the Co-Op Site (as defined below) or pursuant to any condominium documents.

(iv) Any conveyance to the City pursuant to the City’s option to purchase shall be subject to all mortgages of record placed by Buyer, its successors and assigns, but only if such mortgages secure financing of the development of the Premises (the “Permitted Mortgages”). In the event that there are any Permitted Mortgages on the Property, or portion thereof, at the time City exercises its right to repurchase, the parties agree that the City shall have the option to pay the applicable Repurchase Price and Approved Expenses to the first priority mortgagee. City and its successors and assigns agrees to enter into such agreements on reasonable commercial terms as may be requested by the lenders and/or investors of Buyer, its successors and assigns, to provide such lenders or investors notice and cure rights. In furtherance, but not in limitation of the foregoing, as long as MaineHousing holds a Permitted Mortgage on the Premises, no notice given by the City to the Buyer, its successors and assigns under the City’s deed shall be valid unless and until a copy of the notice is given to MaineHousing at Maine Housing at Maine State Housing Authority, 26 Edison Drive, Augusta, Maine 04330, Attn: Legal Department. MaineHousing shall have the right, but not the obligation, to cure any default or perform any obligation under the City’s deed for thirty (30) days beyond any period during which Buyer, its successors and assigns may cure any default or perform any obligation under the City’s deed. If the City exercises any of the above right to purchase, Buyer or its successor

shall convey the Property to the City, free and clear of all encumbrances other than the Permitted Mortgages and any utility easements granted by Buyers its successors and assigns, and assign to the City all contracts, plans, and other documents related to the design, construction, and regulatory approvals for the Project. The City agrees to make reasonable modifications to the provisions regarding the City's repurchase rights to facilitate mortgage and development financing for the Project. The rights to purchase shall be assignable by the City.

(v) Buyer anticipates that the Co-Op entity will grant a mortgage on the Co-Op Site to a lender or investor to finance the purchase of the Co-Op Site and preconstruction development costs including the Co-Op's \$100,000 portion of the acquisition price, Approved Expenses and related customary and commercially reasonable financing costs (such financing is referred to as the "Pre-Development Mortgage Loan"). Buyer, for itself, its successors, and assigns, including the Co-Op Entity, agrees that it will not encumber the Co-Op Site with mortgages other than the mortgage securing Pre-Development Mortgage Loan and that such mortgage shall not exceed in the aggregate the Co-Op Pre-Development Appraised Value (as defined below) at any time prior to the closing of the full construction financing for the Cooperative Housing Project (the "Co-Op Construction Loan Closing"). Prior to the Co-Op Construction Loan Closing, notwithstanding any other provision of this Agreement, the total amount that the City is required to pay to repurchase the Co-Op Site upon exercise of its option as provided above, including Approved Expenses, shall be limited to the then-outstanding balance of the mortgage securing the Pre-Development Mortgage Loan.

The term "Co-Op Pre-Development Appraised Value" means the appraised value of the Co-Op Site as determined by an appraisal, made in accordance with all applicable professional standards, obtained by the lender making the pre-development mortgage loan to the Co-Op entity. The Co-Op entity agrees to provide a copy of that appraisal to the City prior to entering into such mortgage loan.

The provisions of this Section 11(c)(v) shall cease to apply as of the Co-Op Construction Loan Closing.

- d. For all purposes of this Section 11, construction will be deemed completed for a portion of the Project upon the issuance of a Certificate of Occupancy by the City for that portion. Upon termination of the City's option with respect to a portion of the Project, the City will, at the request of the Buyer, its successors and assigns execute and record an affidavit indicating that the City's option has terminated with respect to all or a portion of the Project. Notwithstanding anything else to the contrary in this Section 11, in the event that the City fails to give the notice exercising the City's option on or before the date that is 31 months after the Closing Date, then the City's

option shall terminate automatically without the need for further writing or recording.

- e. Notwithstanding the above provisions, if after closing, Buyer, or its successors, assigns, or transferees determines that it is not feasible to develop the Property as a rental housing project using Maine State Housing Authority financing or as a cooperative leasing/ownership structure, Buyer may develop the Property using a different financing or leasing/ownership structure so long as the unit mix and affordability criteria provided in this Agreement are satisfied. If the Buyer or its successors does so within the time periods specified, the City shall not have the right to repurchase the Property.
- f. The provisions of this Section 11 will survive closing and will be included in greater detail in the City's deed to Buyer or in a declaration of covenants, conditions and restrictions executed before or at the time of Closing, which shall be recorded in the Cumberland County Registry of Deeds.

12. ENTIRE AGREEMENT. This Agreement represents the entire and complete Agreement and understanding between the parties and supersedes any prior agreement or understanding, written or oral, between the parties with respect to the acquisition or exchange of the Property hereunder. This Agreement cannot be amended except by written instrument executed by City and Buyer.

13. NON-WAIVER. No waiver of any breach of any one or more of the conditions of this Agreement by either party shall be deemed to imply or constitute a waiver of any succeeding or other breach hereunder.

14. HEADINGS AND CAPTIONS. The headings and captions appearing herein are for the convenience of reference only and shall not in any way affect the substantive provisions hereof.

15. BINDING EFFECT. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, administrators, successors and assigns.

16. TIME. The City and Buyer each confirm and agree that each of the time periods set forth herein are essential provisions of the terms of this Agreement.

17. GOVERNING LAW. This Agreement shall be construed in all respects in accordance with, and governed by, the laws of the State of Maine. All parties hereto hereby consent to the exclusive jurisdiction of the Superior Court for the County of Cumberland in the State of Maine, for all actions, proceedings and litigation arising from or relating directly or indirectly to this Agreement or any of the obligations hereunder, and any dispute not otherwise resolved as provided herein shall be litigated solely in said Court. If any provision of this Agreement is determined to be invalid or unenforceable, it shall not affect the validity or enforcement of the remaining provisions hereof.

18. NOTICE. All notices, demands and other communications hereunder shall be in writing and shall be deemed to have been duly given on the date of service if served personally on the party to whom notice is to be given, or on the first business day after the notice is delivered to an overnight delivery service with delivery confirmation, addressed to the recipients at the addresses set forth below. Either party may change addresses for purposes of this paragraph by giving the other party notice of the new address in the manner described herein.

FOR THE CITY: City of Portland
ATTN: City Manager
389 Congress Street
Portland, ME 04101

With a copy to: The Office of the Corporation Counsel at the same address.

FOR BUYER: Douglass Commons LLC
c/o The Szanton Company
482 Congress, Suite 203
Portland, ME 04101

And to:

Maine Cooperative Development Partners, LLC
c/o Brian Eng
6 City Center, Fl. 3
Portland, ME 04101

With a copy to: John S. Kaminski
Drummond Woodsum
84 Marginal Way, Suite 600
Portland, ME 04101

19. SIGNATURES; MULTIPLE COUNTERPARTS. This Agreement may be executed in any number of counterparts and by different parties in separate counterparts. Each counterpart when so executed shall be deemed to be an original and all of which together shall constitute one and the same agreement.

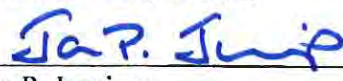
20. BROKERS. The City and Buyer each represent and warrant that they have not dealt with a real estate broker in connection with this transaction. Buyer agrees to indemnify and hold harmless City from any claims made by any broker should Buyer's representation in this paragraph be false. Subject to the limitations of liability set forth in the Maine Tort Claims Act, City agrees to indemnify and hold harmless Buyer from any claims made by any broker should City's representation in this paragraph be false. The foregoing indemnities shall include all legal fees and costs incurred in defense against any such claim, and shall survive closing.

21. RECITALS INCORPORATED BY REFERENCE. The recitals set forth above are incorporated herein by reference and made a part of this Agreement.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed on their behalf by their duly authorized offices or representatives, on the day and year first written above.


WITNESS

CITY OF PORTLAND


Jon P. Jennings
Its City Manager


WITNESS

DOUGLASS COMMONS, LLC

By: 
Printed Name: Nathan S. Szanton
Its Manager

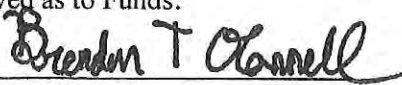
Approved as to Form:


City Corporation Counsel's Office

and

By: 
Printed Name: Brian Eng
Its Manager

Approved as to Funds:


City Finance Department

CITY of PORTLAND, MAINE
Request for Proposals for Disposition of City-Owned Property
Located at 43 & 91 Douglass Street
RFP #20067

I. NOTICE AND SPECIFICATIONS

The City of Portland, Maine seeks proposals from qualified developers for the creation of residential housing at 43 & 91 Douglass Street. The site is designated on the City of Portland Tax Assessor's Map as lot CBL 078 C002 & 078 B007.

Sealed proposals for the project, including an original, seven (7) copies, and one (1) digital copy, as specified herein, will be received by the Purchasing Office, Room 103, City Hall, 389 Congress Street, Portland, Maine 04101, until 3:15 p.m., Tuesday, June 16, 2020, at which time they will be publicly opened.

Proposals shall be submitted, and returned in sealed envelopes plainly marked on the outside "Disposition and Development of Property Located at 43 & 91 Douglass Street".

Proposals that are late, unsigned or submitted via fax will not be accepted. Proposals from individuals not registered with the Purchasing Office may be rejected; receipt of this document directly from the City of Portland indicates registration. Should a person receive this Request from a source other than the City, please contact 207-874-8654 to ensure that you are listed as a recipient for this proposal.

All questions must be submitted in writing to the Purchasing Office. These may be mailed, hand delivered, faxed to (207) 874-8652 or e-mailed to mff@portlandmaine.gov and be received no later than five (5) business days prior to the opening date. Questions received after this time will not be addressed. Any interpretation, correction, or change of this document will be made only by written addenda. Changes in any other manner will not be binding on the City and proposers should not rely on. Proposers should not have contact with any City staff with regard to this proposal unless to obtain general public information as specified in the document.

The disposal of this real estate shall be on the basis of a negotiated proposal, with the City of Portland reserving the right to refuse any and all proposals. *All proposers are advised that the property will be sold "as-is" and "where is", in its existing condition, with no warranties either expressed or implied.* The City makes no representations or warranties about of any of the information about the property set forth herein, which is provided to proposers for their convenience only. The successful proposer shall be responsible to inspect the property, or to hire its own professionals to do so. The City, and its agents, make no representations or warranties with respect to the title of the property, the accuracy of any statement as to boundaries or acreage, or as to any other matters contained in any description of the property, or as to the fitness of the property for a particular purpose, or as to development rights, merchantability, habitability, or as to any other matter, including without limitation, land use, zoning and subdivision issues or the environmental, mechanical, or structural condition of the property. The City disclaims any and all responsibility for injury to proposers, their agents or others while examining the property or at any other time. The City will not be responsible for any broker's commission.

Any and all improvements made to said property must be done in accordance with existing City Codes and Ordinances.

II. GENERAL INFORMATION

Summary of Request:

The City of Portland is committed to providing housing opportunities and has set a goal to evaluate the use of City-owned property to construct housing. As one-step in accomplishing this goal, the City of Portland will accept proposals for the development of housing on the lot located at 43 & 91 Douglass Street, which currently is a vacant lot but was the former site of the West School.

This request for proposals results from the December 16, 2019 approval by the Portland City Council (Resolve 10-19/20) on the recommendation of the Housing Committee to market the City-owned vacant property located at 43 and 91 Douglass Street.

The City of Portland uses the RFP process to ensure that public resources are utilized for maximum public benefit while accomplishing specific objectives and providing fair access to all applicants.

Site Information:

- a. Location:** 43 & 91 Douglass Street, as identified in the City of Portland Assessor's records as lot CBL 078 C002 and 078 B007, in the R-5 zone. The lot includes the former site of the West School. The site for disposition includes a portion of 91 Douglass Street, but not the entire lot (See Attachment 2).
- b. Existing Conditions:** 43 & 91 Douglass Street is located on two parcels with frontage on Douglass Street in the Libbytown neighborhood. A right-of-way bisects the two parcels. The surrounding context is predominantly residential with the majority of homes in the area being one and multi-family structures. Dougherty Play Field abuts the property to the north.
- c. Current use:** Vacant lot.
- d. General Dimensions:** 43 Douglass Street (estimated at .3981 acres), and an estimated 2.85-acre portion of 91 Douglass Street.
- e. Current Zoning:** R-5. The minimum lot size in the R-5 zone is 6,000 square feet for residential development (single-family and two-family), 9,000 square feet for a multi-plex development (three-family or more), and 2 acres for a planned residential unit development (PRUD). This parcel would allow for residential, multi-family, and PRUD development. The minimum lot area per unit in a PRUD is 3,000 square feet; the maximum units per building is 12 units. At an estimated 141,570 square feet, the maximum number of residential units that could be developed within a PRUD is 47 units. For complete zoning requirements, please refer to Chapter 14, Land

Use, of the City Code.

- f. **Rezoning:** Higher density zoning that furthers exceptional projects and other city goals as outlined in Section III may be considered. It should be noted that changes to zoning require both Planning Board and City Council approval.
- g. **Condition of the property at the time of sale:** This parcel is the location of a former city-dump, and later the West School. A natural gas line and gas company easement are located in the right-of-way and the 43 Douglass Street parcel thus precluding development over these sites. A 40' wide sewer easement is also identified in the unbuildable portion of the site.
- h. **Environmental Conditions:** A Phase II Environmental Site Assessment (ESA) has been completed to evaluate current environmental conditions. Based on findings, special soil disposal restrictions may be required. Participation in the Maine DEP Voluntary Response Action Program (VRAP) should be considered. The Phase II ESA will be available on-line.
- i. Proposers are urged to investigate water sources and utility connection requirements with the Department of Public Works.

III. CITY GOALS

The City's primary goals for the use of the property are:

1. Developments shall provide mixed income units. All units must be affordable to households earning 60% to 120% of the area median income (AMI). Currently, 60% AMI for a family of four is \$55,800 and 120% AMI for a family of four is \$111,600.

Affordable means that the percentage of income a household is charged in rent and other housing expenses including utilities, or must pay in monthly mortgage payments (including real estate taxes, mortgage insurance, condominium/HOA fees, insurance and utilities), does not exceed 30% of a household's gross income, or other amount established in city regulations that does not vary significantly from this amount.

Restrictions on the affordability of units must be in place for a minimum of 30 years for homeownership units, and the longest period allowed by law for rental units.

2. Development of mixed income homeownership or rental housing of excellent building and site design. Design principles should promote efficient use of land to create a development that is compatible with the existing pattern, scale, massing, and materials of the surrounding neighborhood. The development's buildings shall be designed to meet the City's Green Building Code.
3. Rezoning may be considered to support increase housing development opportunities or maximize the number of allowable housing units on the property.
4. Developments shall create housing options that are age inclusive.

The general terms for this real estate transaction include:

- Units must be used as the principal residence of the owner/tenant and owner/tenant shall not use the unit for the conduct of business (except for a home occupation allowed under the City of Portland zoning ordinance) or as an investment property. Units shall not be rented for short-term periods of one to thirty days.
- Property Sale Price. The City expects to receive Fair Market Value (“FMV”) for the property.
- Alternative Ownership Models. Alternative ownership models that will encourage a mixed income community with long term affordability for the maximum number of units, such as limited equity units, co-housing, cooperative, or a community land trust, may be considered in order to ensure the units affordability over time.
- Proposals must outline how they will maintain affordability.
- Other City Incentives. Other city financial incentives may be considered to support increase housing development opportunities or maximize the number of allowable housing units on the property.

IV. PROPOSED SCORING

An internal staff Committee will review proposals received, and will apply the following selection criteria in reviewing and scoring the applications.

Proposed use to achieve the City of Portland's goals

40 points

1. Market Demand - 20 points
 - a. 20 points - all units meet the City’s Goals and Terms noted in Section III
 - b. 15 points - at least 75% of the units meet the City’s Goals and Terms noted in Section III
 - c. 10 points - at least 50% of the units meet the City’s Goals and Terms noted in Section III
 - d. 0 points - project does not meet the City’s Goals and Terms noted in Section III
2. Economic diversity - 10 points
 - a. 10 points - creates housing options which promote economic diversity in the neighborhood in which the development is located
 - b. 0 points - does not promote economic diversity
3. Age Inclusive – 10 points
 - a. 10 points – creates housing which is age inclusive
 - b. 0 points – does not create housing which is age inclusive

Impact on surrounding neighborhood, including design.

25 points

1. Project Design -15 points
 - a. 15 points - the proposal is consistent with design characteristics
 - b. 10 points - the proposal is an adequate fit with neighborhood characteristics
 - c. 0 points - the design is a significant outlier
2. Amenities and unit design - 10 points
 - a. 10 points - amenities & unit design are well thought out and appropriate for residents
 - b. 5 points - amenities & unit design are adequate

- c. 0 points - amenities and unit design raise significant concerns that resident needs will not be adequately addressed

Applicant's ability to complete project, including financial feasibility, development team experience, capacity, and timeframe for completion.

35 points

1. Readiness to proceed - 15 points
 - a. 15 points - all projected sources of funding include letters of commitment or interest are projected at terms and conditions consistent with the City's prior experience with the funder
 - b. 10 points - most projected sources of funding include letters of commitment, letters of interest, or, if no letter is included, are projected at terms and conditions consistent with the City's prior experience with this funder
 - c. 0 points - one or more sources are projected on terms that are not consistent with the City's prior experience with the funder and are not documented by letter(s) from funder(s)
2. Track record of development team - 10 points
 - a. 10 points - every development team member has a successful track record with this type of project and at this scale
 - b. 8 points - all but one development team members have a successful track record with this type of project and at this scale; one development team member has relevant experience but at a smaller scale or not of this project type
 - c. 5 points - two development team members, while having relevant experience, are new to this type of project or this scale of development
 - d. 0 points - the development team does not meet the criteria above
3. Current Capacity of development team - 10 points
 - a. 10 points - development team members have exceptional depth of human and financial resources to complete this project
 - b. 8 points - development team members have the human and financial resources to complete this project
 - c. 5 points - development team has a staffing gap in a significant role and a plan to address that gap, OR there are some concerns about the financial resources of the team to move the development forward
 - d. 0 points - the development team does not meet the criteria described above

SUBMISSION INFORMATION

Interested parties are asked to submit a concept development (including preliminary drawings) and a brief description of the project, no longer than two pages, to include the number and type of units, occupants (owners/renters) to be served, special features, the impact on the neighborhood and other ways the proposal meets the primary goals of the City. A general project budget with projected funding sources, development timeline, and development team qualifications and financial capabilities is also required. This RFP does not require detailed architectural drawings or development pro formas.

Photographs and maps of the site and area are required.

- a) **Developer:** Name, address, telephone, email, fax number of the proposed owner/developer and the name(s) of an alternative contact person(s).
- b) **Proposal:** Each proposal submitted must specifically outline the proposed use of the property and any proposed rezoning requests.

- c) **Financial Feasibility:** Provide a business plan, which shall include prospective and committed sources of funding, development and operating budgets; a letter from a lending institution indicating the applicant's ability to finance the projected costs; and provide examples of prior projects that indicate the proven ability to develop a project of similar type and scale from a fiscal perspective.
- d) **Timetable:** Provide an overview of how the proposal will be implemented. Include approximate schedule for completion of each element, closing, construction start-up, substantial completion, final completion, and occupancy. Include applications for public or private financing.
- e) **Developer Capacity:** Identify the qualifications and experience of the development team for the project including a list of previously completed projects similar to the proposed project. This team may include key staff of the developer, architect, general contractor and future property management. Also, discuss the ability to complete the project including the qualifications of the development team, management plan, experience, capacity, project readiness to proceed, and timeframe for completion.
- f) **Occupancy and Management Plan:** Present a plan detailing the ownership structure (condominium, cooperative, etc.), resale restrictions and resale process, to ensure mixed income and long-term affordability.
- g) **Purchase Price:** Proposed purchase price for the property.
- h) **Copies:** Seven (7) copies, with the original so marked, and one (1) digital copy of each proposal shall be submitted.

V. SALE INFORMATION

After proposals are opened, city staff will make a recommendation to the City Council's Economic Development Committee (EDC) and the Housing Committee (HC). The EDC and HC will make a recommendation to the City Council.

VI. OTHER INFORMATION

Confidentiality: Proposals received by the City shall become a matter of public record, subject to public inspection, except to the extent, which an applicant designates in writing, proprietary data to be confidential and submits that data under separate cover, such information, may, to the extent permitted by law, be held from public inspection, as provided in applicable Maine law, including, without limitation, 5 MRS Sections 13119-A and 13119-B.

VII. LEGAL REQUIREMENTS

The contract for the disposition of the property will be executed only after review and final approval by the City Council.

VIII. RESERVATION of RIGHTS

The City of Portland reserves the right, at its sole discretion, to award as well as reject any and all proposals for the city-owned property, based on the quality and merits of the proposals received, or when it is determined to be in the public interest to do so. Furthermore, the City may extend deadlines and timeframes, as needed.

The City reserves the right to substantiate any proposer's qualifications, capability to perform, availability, past performance records, and to verify that the proposer is current in its financial obligations to the City.

The City of Portland, Maine, reserves the right to waive any informalities in proposals, to accept any proposal or portion thereof, and, to reject any and all proposals, as well as negotiate with the successful proposer(s) should it be in the best interest of the City to do so for a final purchase and sale agreement and ultimate sale of the property.

Pursuant to City procurement policy and ordinance, the City is unable to contract with businesses or individuals who are delinquent in their financial obligations to the City. These obligations may include but are not limited to real estate and personal property taxes and sewer user fees.

Proposers who are delinquent in their financial obligations to the City must do one of the following: bring the obligation current, negotiate a payment plan with the City's Treasury office, or agree to an offset, which shall be established by the contract, which shall be issued to the successful proposer

April 10, 2020

Matthew F. Fitzgerald
Purchasing Manager

Attachments:

- A. Proposal Signature
- B. Portland Assessor's Record
- C Site Map
- D Phase II ESA available online

PROPOSAL**NOTE: THIS PAGE IS TO BE COMPLETED AND RETURNED**

The UNDERSIGNED hereby declares that he/she or they are the only person(s), firm or corporation interested in this proposal as principal, which it is made without any connection with any other person(s), firm or corporation submitting a proposal for the same.

The UNDERSIGNED hereby declares that they have read and understand all conditions as outlined in the Request for Proposals, and that the proposal is made in accordance with same.

The UNDERSIGNED hereby declares that any person(s) employed by the City of Portland, Maine, who has direct or indirect personal or financial interest in this proposal or in any portion of the profits which may be derived therefrom has been identified and the interest disclosed by separate attachment. (Please include in your disclosure any interest which you know of. An example of a direct interest would be a City employee who would be paid to perform services under this proposal. An example of an indirect interest would be a City employee who is related to any officers, employees, principal or shareholders of your firm or to you. If in doubt as to status or interest, please disclose to the extent known).

The proposer acknowledges the receipt of Addenda numbered _____
If Applicable

COMPANY NAME: _____
(Individual, Partnership, Corporation, Joint Venture)

AUTHORIZED SIGNATURE: _____ DATE: _____
(Officer, Authorized Individual or Owner)

PRINT NAME & TITLE: _____

ADDRESS: _____

TELEPHONE: _____ E-MAIL: _____

FEDERAL TAX ID #: _____ DUNS #: _____

STATE OF INCORPORATION _____

(If incorporated in another State, businesses must be authorized to do business in the State of Maine.)

In your organizations preceding completed fiscal year, did the organization receive:

(1) 80 percent or more of its annual gross revenues in U.S. federal contracts, subcontracts, loans, grants, subgrants, and/or cooperative agreements; AND

(2) \$25,000,000 or more in annual gross revenues from U.S. federal contracts, subcontracts, loans, grants, subgrants, and/or cooperative agreements? ☐ Yes ☐ No

Does the public have access to information about the compensation of the executives in the organization through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (18 U.S.C. 78m(a), 78o(d) or section 6104 of the Internal Revenue Code of 1986? ☐ Yes ☐ No

NOTE: All bids must bear the handwritten signature of a duly authorized member or employee of the organization making the bid. **This sheet must be signed and returned with the application package.**

This page contains a detailed description of the Parcel ID you selected.

New Search!

Current Owner Information:

CBL	078 C002001
Land Use Type	GOVERNMENTAL
Verify legal use with Inspections Division	
Property Location	43 DOUGLASS ST
Owner Information	CITY OF PORTLAND 389 CONGRESS ST PORTLAND ME 04101
Book and Page	
Legal Description	78-C-2 DOUGLASS ST 43-53 REAR PROPOSED ST 17340SF
Rental Registration	No
Acres	0.3981

Current Assessed Valuation:

TAX ACCT NO.	10005	OWNER OF RECORD AS OF APRIL 2019
LAND VALUE	\$49,000.00	CITY OF PORTLAND
BUILDING VALUE	\$0.00	389 CONGRESS ST
MUNICIPAL TYPE	(\$49,000.00)	PORTLAND ME 04101
NET TAXABLE - REAL ESTATE	\$0.00	
TAX AMOUNT	\$0.00	

Any information concerning tax payments should be directed to the Treasury office at 874-8490 or [e-mailed](#).

This page contains a detailed description of the Parcel ID you selected.

New Search!

Current Owner Information:

CBL	078 B007001
Land Use Type	GOVERNMENTAL
Verify legal use with Inspections Division	
Property Location	91 DOUGLASS ST
Owner Information	CITY OF PORTLAND 389 CONGRESS ST PORTLAND ME 04101
Book and Page	
Legal Description	78-B-7 DOUGLASS ST 91-105 195648 SF
Rental Registration	No
Acres	4.4915

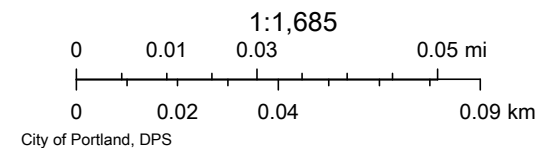
Current Assessed Valuation:

TAX ACCT NO.	10005	OWNER OF RECORD AS OF APRIL 2019
LAND VALUE	\$489,100.00	CITY OF PORTLAND
BUILDING VALUE	\$0.00	389 CONGRESS ST
MUNICIPAL TYPE	(\$489,100.00)	PORTLAND ME 04101
NET TAXABLE - REAL ESTATE	\$0.00	
TAX AMOUNT	\$0.00	

Any information concerning tax payments should be directed to the Treasury office at 874-8490 or [e-mailed](#).



 Override 1





ZONING ANALYSIS Relevant Zone(s) R5-a - PRUD

All Projects:

	Required	Proposed
Lot Size	2.0 acres	3.34 acres
Area Per Dwelling Unit	1,600 SF	1,210 SF
Minimum Street Frontage	50'	60'
Front Yard Minimum	N/A	N/A
Front Yard Maximum	10'	15'
Rear Yard	10'	10.5'
Yard Right	10'	150'
Yard Left	10'	10.25'
Side Street Setback	N/A	N/A
Step Back	N/A	N/A
Maximum Lot Coverage	N/A	N/A
Minimum Lot Coverage	N/A	N/A
Maximum Height	55'	53'
Open Space	200 S.F / D.U.	300 S.F/D.U.
Maximum Impervious Area	N/A	N/A
Pavement Setback	N/A	N/A
Floor Area Ratio	N/A	N/A
Off Street Parking Spaces	N/A	78
Loading Bays	N/A	N/A
Other 1		
Other 2		
Other 3		



ISSUED FOR	BY
SITE PLAN REVIEW	DATE
	SJL
	1/11/22

DRAWING NAME:	OPEN SPACE AREA EXHIBIT
PROJECT NAME:	DOUGLASS COMMONS
CLIENT:	THE SZANTON COMPANY, LLC 10 FREE STREET, PORTLAND, ME 04101



ACORN
ENGINEERING, INC.

65 HANOVER STREET
PORTLAND, MAINE 04104
(207) 775-2655

FILE:	1154_CIVIL
JN:	1154
SCALE:	1' : 50'
DESIGN BY:	SJL
DRAWN BY:	AWG
CHECKED BY:	WHS

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM ACORN ENGINEERING, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO ACORN ENGINEERING, INC.

DRAWING NO.
EX.

E. Summary of Written Easements

Existing easements on site as identified by Owen Haskell, Inc. include:

- o Anode Bed Easement Douglass Street at Dougherty Field by City Of Portland Public Works Department Engineering Division Dated 09/30/2016, City Plan 882/53.
- o Maine State Highway Commission Right of Way Map State Highway "295" Portland Cumberland County Federal Aid Project No. I-295-3(24)8(25) Dated May 1967.

Proposed Easements:

- o No easements are proposed as part of the 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.
Technical Manual 1.14.2	20% Compact Space allowance	We are requesting that 27% of the proposed 69 parking spaces be compact.	Due to the urban environment and tendency to drive smaller, compact cars, the parking layout has been tailored to minimize impervious area
Technical Manual 1.7.2.3	24' Drive Aisle Width	We are requesting to reduce the drive aisle width from 24' to 22'.	Based on the proposed land use and residents' tendency to become familiar with their parking spot, along with a low rate of turnover, a width of 24' is not necessary to accommodate a functional parking lot. 22' allows for a reduction in impervious area.

G. Financial Capacity

Please find attached the status of good standing from the Secretary of State for The Szanton Company and the Maine Cooperative Development Partners and letters of financial capacity from the Applicant's banks.





December 9, 2021

The City of Portland
Planning Department
389 Congress Street
Portland, ME 04101

RE: 43 & 91 Douglass Street

To Whom It May Concern:

On behalf of Bangor Savings Bank I am pleased to provide this letter in support of The Szanton Company for the above-referenced project. Based on our review of the financial elements of the proposal for the development site, we believe that that the applicant has the ability to finance projected costs and develop a project of similar type and scale from a fiscal perspective.

While this letter of support is not a commitment to lend, Bangor Savings Bank would welcome the opportunity to be a resource to The Szanton Company for financing and sponsorship of any equity awards necessary in connection with this project. Please feel free to call me with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Ronald B. Hunt". The signature is fluid and cursive, with a stylized "H" and a trailing flourish.

Ronald B Hunt
Vice President
Bangor Savings Bank - Commercial Lending
280 Fore Street, Suite 200
Portland, ME 04101
(207) 420-3967



MAINE

Department of the Secretary of State
Bureau of Corporations, Elections and Commissions

Corporate Name Search

Information Summary

[Subscriber activity report](#)

This record contains information from the CEC database and is accurate as of: Fri Jan 07 2022 11:03:33. Please print or save for your records.

Legal Name	Charter Number	Filing Type	Status
THE SZANTON COMPANY	20001684 D	BUSINESS CORPORATION	GOOD STANDING

Filing Date	Expiration Date	Jurisdiction
03/03/2000	N/A	MAINE

Other Names (A=Assumed ; F=Former)

NONE

Clerk/Registered Agent

DREW A. ANDERSON
P.O. BOX 9785
PORTLAND, ME 04104 5085

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December 13, 2021

Matthew Peters
Principal
MCDP Douglass LLC
6 City Center, Suite 300
Portland, ME 04101

RE: Douglas Commons Cooperative

To whom it may concern:

Centennial Mortgage has been engaged by MCDP Douglass LLC to secure mortgage insurance through the FHA 213 program for cooperative housing and fund a construction/permanent mortgage for Douglas Commons Cooperative, a new cooperative housing project in Portland, ME. We have reviewed a financing request, including initial plans, pro forma operating budget, the construction budget and initial market information for Douglas Commons Cooperative in Portland, ME. In addition, we have reviewed the experience of the overall development team. Based on this review, we feel that this project is an excellent candidate for financing and will conform to all the requirements to qualify for construction and permanent financing through the FHA 213 program. We feel that this is the right time and place to create a new affordable cooperative given the advantages this particular form of housing provides to its members, primarily affordable home ownership and a greater sense of community.

We have now entered the formal application stage for the FHA 213 mortgage insurance and believe that Douglas Commons Cooperative has a high likelihood of obtaining a 40-year, low interest loan for the project. Additional subordinated financing would serve to further increase that likelihood. We also believe that success at Douglas Commons Cooperative will open an entirely new avenue for affordable housing finance in the state of Maine by making the FHA 213 program finance accepted in the market.

Centennial Mortgage has substantial expertise and experience completing FHA financing transactions. We are very active in lending to cooperative housing projects throughout the country. Personally, I have been involved in cooperative housing for over 20 years, through financing and serving on the board of the National Association of Housing Cooperatives.

We encourage other funding sources to join us in supporting this innovative project and creating up to 98% leverage for future projects through this program. Please let me know should you have any questions or require any additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read 'H. Jeffers', is written over a light blue horizontal line.

Hugh Jeffers
Vice President of Originations



MAINE

Department of the Secretary of State
Bureau of Corporations, Elections and Commissions

Corporate Name Search

Information Summary

[Subscriber activity report](#)

This record contains information from the CEC database and is accurate as of: Fri Jan 07 2022 11:04:29. Please print or save for your records.

Legal Name	Charter Number	Filing Type	Status
MAINE COOPERATIVE DEVELOPMENT PARTNERS LLC	20212626DC	LIMITED LIABILITY COMPANY (DOMESTIC)	GOOD STANDING

Filing Date	Expiration Date	Jurisdiction
10/01/2020	N/A	MAINE

Other Names (A=Assumed ; F=Former)

NONE

Clerk/Registered Agent

DAVID C. PIERSON
PO BOX 15235

PORTLAND, ME 04112 5235

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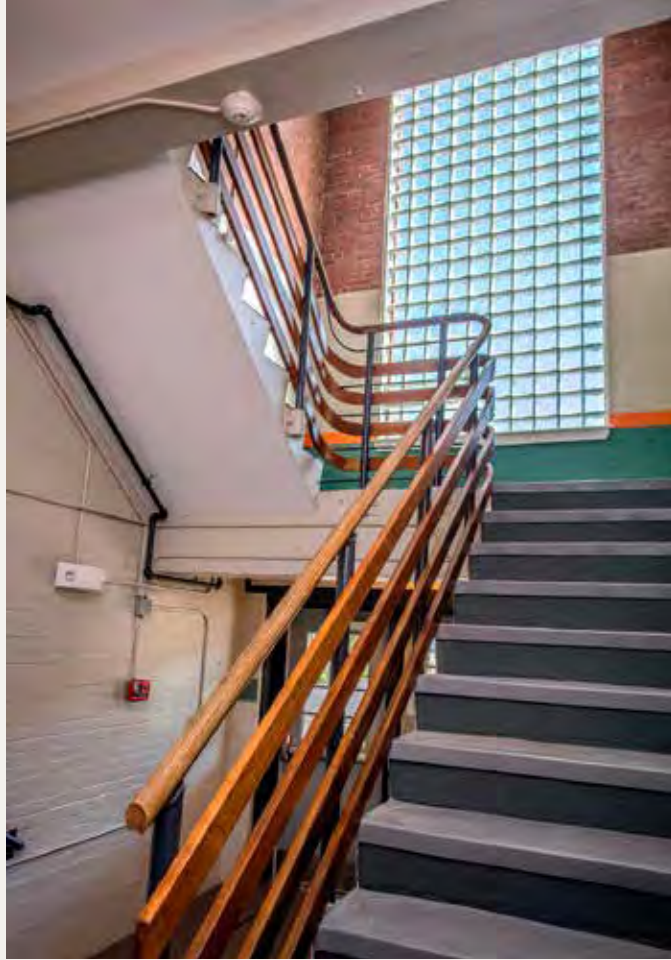
H. Technical Capacity

Please find attached descriptions and examples of technical capacity for The Szanton Company, the Maine Cooperative Development Partners, Acorn Engineering, Aceto Landscape Architects, Archetype Architects, and Credere Associates.



THE SZANTON COMPANY

an Affiliate of the Monks Companies



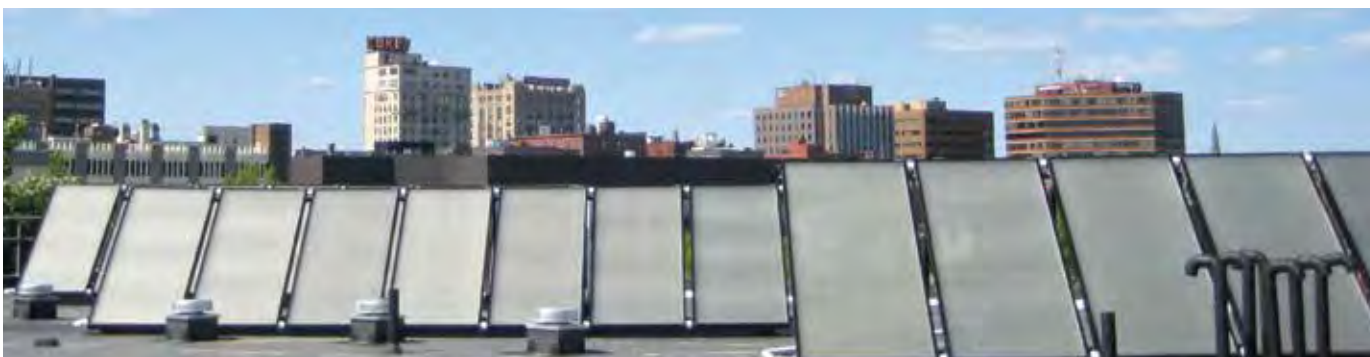
ABOUT THE SZANTON COMPANY

The Szanton Company, an affiliate of the Monks Companies, specializes in developing mixed-income rental housing in or near downtowns. We have completed eight apartment projects in Maine and New Hampshire totaling 393 units.

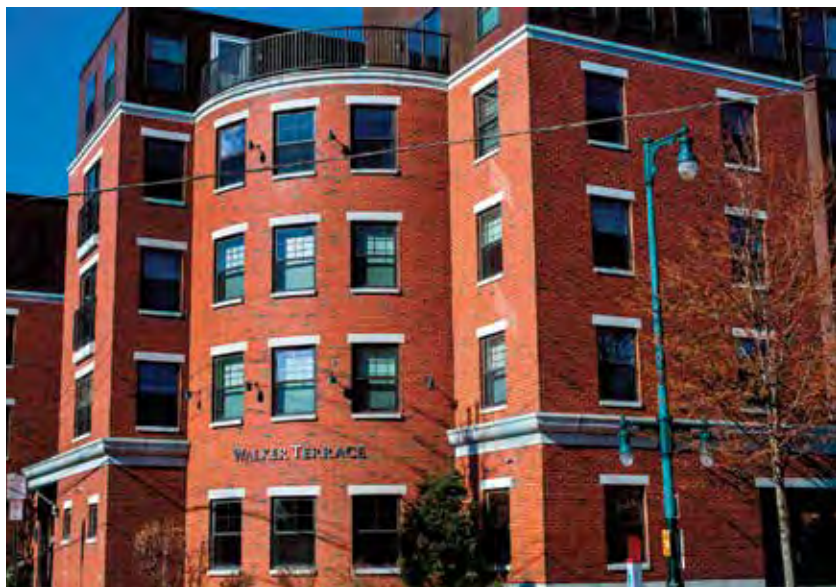
The mission of The Szanton Company is to create attractive and affordable rental housing that our residents are proud to call home. We do this by:

- Creating beautiful apartments of high quality in locations in or near downtowns, adding vitality to our cities and towns;
- Developing properties which provide a consistent, long-term return to their owners, thus ensuring their stability for residents, lenders, and neighborhoods;
- Serving people with diverse incomes;
- Creating amenities for our residents which enhance the quality of their lives;
- Incorporating environmental and energy sustainability in our properties, thereby reducing their impact on the earth's environment.

The Szanton Company is committed to long-term ownership of our apartment assets. In 2013, we founded Saco Falls Management, our property management arm, to ensure the highest standards of visual appearance and livability for our residents, neighbors, and communities.



Rooftop solar panels at 53 Danforth



PRINCIPALS & STAFF

NATHAN SZANTON, PRESIDENT

Nathan founded the company in 1996. Since then he has been responsible for developing 617 apartment units in 24 projects. As manager or principal partner in these projects, Nathan has successfully navigated the process of market research, site acquisition, design, regulatory approvals, financing, construction, and marketing.

He has committed himself to creating comfortable and affordable rental homes for residents with diverse incomes. Some of these have been adaptive reuses for underused historic buildings; others have been thoughtfully designed new construction. Nathan holds a B.A. from Harvard University and a J.D. from the University of Maine School of Law.



ROBERT C.S. MONKS, PRINCIPAL

Robert C.S. Monks is an active capital partner and also provides a deep understanding of real estate development and financing. Throughout his career he has founded, led, and grown 19 businesses in the financial services, real estate, technology and communications sectors.

In 2011, Bobby became an owner and Chairman of Spinnaker Trust, a Maine based trust company managing over \$1 billion in assets. Bobby attended Duke University and graduated from the University of Southern Maine with a Bachelor's Degree in Political Science.

Above: Walker Terrace

Left: The Mill at Saco Falls

Facing Page: The Lofts at Bates Mill

AMY CULLEN, VICE PRESIDENT AND PROJECT PARTNER

Amy joined The Szanton Company in 2006. Her responsibilities include: discovering new project locations, creating financing packages, and working with all development team members to help projects come to life.

Amy also serves as president of our sister company, Saco Falls Management, where she oversees all operations.

Prior to joining The Szanton Company, Amy was on active duty with the U.S. Army for six years, and served as a Training Program Manager for the Department of Defense in Minneapolis, MN. She holds a Bachelors of Science Degree in Accounting from Husson University.

KRISTIN MARTIN, DEVELOPMENT OFFICER

Kristin joined our company in 2013. Her responsibilities include finding and researching sites for new projects, preparing financial analyses, and evaluating development options. She coordinates with lenders, attorneys, architects, engineers, contractors and others on all aspects of The Szanton Company's development projects from concept to completion.

Prior to joining The Szanton Company as a Development Officer, Kristin worked for Saco Falls Management as an Assistant Development Officer, Property Manager and Director of Property Management. She holds a Bachelor of Health Science and a Masters of Occupational Therapy from Quinnipiac University.



ABOUT SACO FALLS MANAGEMENT

HISTORY

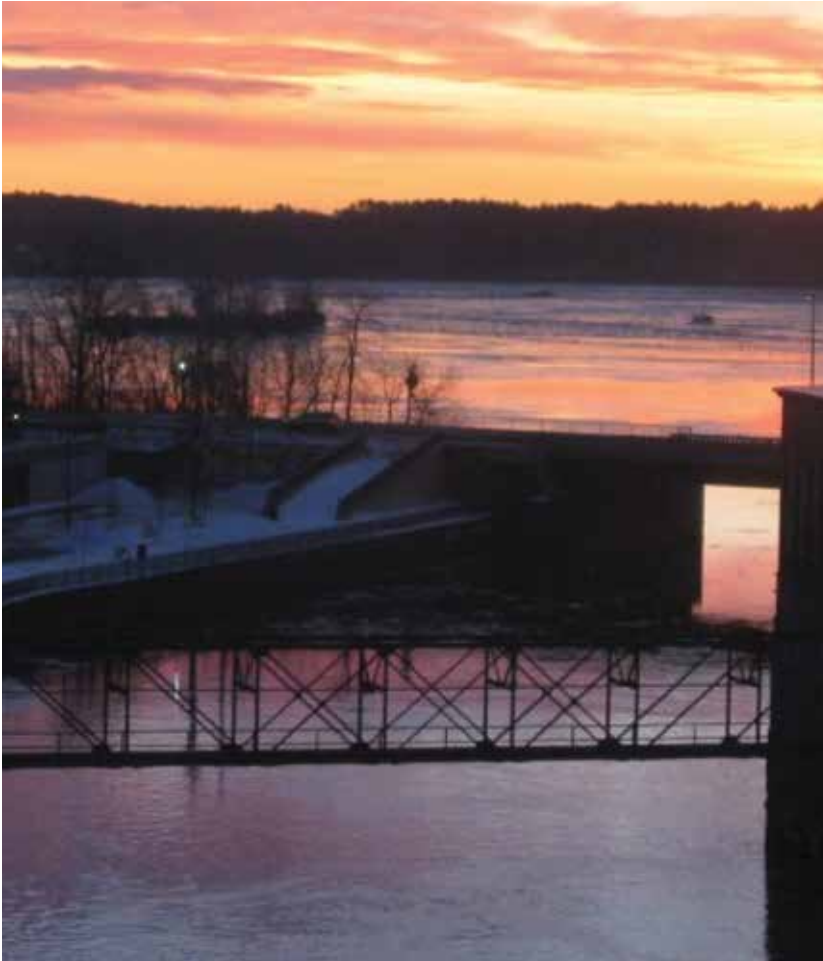
Saco Falls Management is a full-service management company formed by The Szanton Company in 2013 to manage its rental properties, both residential and retail. Since then, the physical condition of the buildings has improved, tenant satisfaction has increased, and the profitability of the properties has grown. We are committed to managing our properties for the long-term with the highest sense of responsibility to our residents, financial partners, and host communities.

OUR MISSION

Our mission is creating rental properties that exceed expectations. We are guided by the following core values: honesty, integrity, candor, high standards of quality, respect for all with whom we deal, openness to new ideas, and a culture of continuous learning and enhancement of our knowledge and skills.



Walker Terrace



View from an apartment at The Mill at Saco Falls

RESIDENT SELECTION

Saco Falls Management Company complies with all state, local, and federal laws regarding fair housing practices or occupancy and resident selection procedures. In addition to program-specific requirements, all adult applicants are screened by our management staff. To be considered for residency at one of our properties, all applicants must have:

- References from prior landlords that show a history of good tenancy. This includes paying rent on time, keeping their unit in good repair and being a good neighbor by following the community rules.
- A favorable credit report.
- An absence of criminal history. We run a criminal background check on all applicants. Any applicant with a history of public disturbances, arrests, criminal activity, listing on the sex offender registry or other law enforcement problems that may indicate behavior inconsistent with lease obligations will be denied.

CASCO TERRACE

41 STATE STREET, PORTLAND, MAINE



Above Left: Casco Terrace, after. Right: Casco Terrace, before

*Facing page: Top: Casco Terrace from State Street
Bottom: Casco Terrace interior*



**“...CITY OFFICIALS SAY THE STATE-FINANCED PROJECT IS THE
KIND OF DEVELOPMENT PORTLAND NEEDS...”** —*Portland Press Herald*

CASCO TERRACE is a 27-unit vertical addition on an existing 27-car parking garage (see before and after photos opposite). The pre-construction newspaper story below describes the project's highlights and the need it addresses in a city desperate for affordable housing.

From the *Portland Press Herald*, May 28, 2003:

“It began as one of the first parking garages in Portland, at a time when few people owned cars ...

...City officials say the state-financed project is the kind of development Portland needs to help stem suburban sprawl and provide affordable rental housing for its workforce. They also give it high marks for being attractive and practical, and making the most of an under-used lot with desirable views of the waterfront.

...‘It’s a project with a lot going for it’, said Mark Adelson, Executive Director, Portland Housing Authority.”



YEAR COMPLETED: 2004

UNITS: 27 (14 Market-Rate + 13 Income-Restricted)

ARCHITECT: Archetype, P.A.

CONSTRUCTION MANAGER: Wright-Ryan Construction

FINANCING: MaineHousing and TD Bank

THE HARTLEY BLOCK

155 LISBON STREET, LEWISTON, MAINE



Above: The Hartley Block
Left: Historic images of same location

Facing Page Top: The Hartley Block façade
Facing Page Bottom: Before construction

“WE ARE THRILLED THAT THE SZANTON COMPANY WILL BE REINFORCING OUR DOWNTOWN HISTORIC AND COMMERCIAL CORRIDOR BY BUILDING THIS IMPORTANT PROJECT.”

—Lewiston Mayor Shane Bouchard

THE HARTLEY BLOCK brings new life to a prominent 175' x 100' empty lot on downtown Lewiston's Lisbon Street. In 2004 and 2006, four connected historic buildings on Lisbon Street suffered extensive fire damage and were condemned and demolished, leaving a gaping hole in the city's most iconic street. One of the buildings was the site of the 1906 art studio of Marsden Hartley, an important early modern American painter born and raised in Lewiston.

A mixed-use, mixed-income project, The Hartley Block features 63 apartments aimed at a diversity of income groups and 4,000 sq. ft. of retail space along Lisbon Street. The project includes a fitness center, community room, children's playroom, dedicated bike storage, wi-fi and covered parking directly behind the building. The site is within easy walking distance of the public library (across the street), shops, restaurants, cafes, and two major parks.

This project adds momentum to downtown Lewiston's resurgence, including street-level public art at the entrance. Two 9-foot mosaic tile works, after Marsden Hartley paintings, animate its façade.



YEAR COMPLETED: 2019

UNITS: 63 (22 Market-Rate + 41 Income-Restricted)

ARCHITECT: Platz Associates

CONSTRUCTION MANAGER: Hebert Construction

FINANCING: MaineHousing; TD Bank; Northern New England Housing Investment Fund; City of Lewiston.

48 HAMPSHIRE

48 HAMPSHIRE STREET, AUBURN, MAINE



Located at the corner of Hampshire and Troy Streets, 48 HAMPSHIRE will aid the revitalization of downtown Auburn's important Hampshire Street corridor by bringing 53 high-quality new apartments to the neighborhood.

These will be a mixture of one, two and three-bedroom units, varying in size from 590-950 square feet. Included in the rent are heat and hot water, off-street parking, wi-fi, fitness center, community room and indoor bike storage.

48 Hampshire is located within easy walking distance of the public library, YMCA, shops, restaurants, grocery store, drugstores, and all the amenities of downtown Auburn.

The Szanton Company broke ground in March 2019 and expects to open to residents in April 2020.



Above: Rendering of completed project
Left: Same location, prior to construction

“WE ARE LOOKING FORWARD TO WATCHING YET ANOTHER MAJOR CONSTRUCTION PROJECT IN OUR DOWNTOWN TAKE SHAPE — ONE THAT WILL PROVIDE QUALITY WORKFORCE HOUSING, INJECT CAPITAL INTO OUR LOCAL ECONOMY, AND ENHANCE THE IMAGE OF AUBURN AS WE BECOME THE BEST SMALL CITY IN NEW ENGLAND”

—Auburn Mayor Jason Levesque



Above: Rendering of East elevation

PROJECTED COMPLETION: 2020

UNITS: 53 (11 Market-Rate + 42 Income-Restricted)

ARCHITECT: Platz Associates

CONSTRUCTION MANAGER: Benchmark Construction

FINANCING: MaineHousing; Boston Financial;
NBT Bank; City of Auburn.

THE FURMAN BLOCK

100 PARRIS STREET, PORTLAND, MAINE



Above: Rendering of completed project, from corner of Kennebec and Brattle Streets

Right: Before construction, Nathan Szanton and Amy Cullen on project site



“I THINK THIS IS THE NEXT BIG STEP IN CREATING A MULTI-USE NEIGHBORHOOD IN THIS PART OF BAYSIDE. IT’S PRETTY EXCITING TO GET THIS MOVING.”

—Portland City Councilor David Brenerman

THE FURMAN BLOCK is The Szanton Company’s first mixed-income project specifically for seniors, ages 55 and over. Located in the heart of Portland’s West Bayside neighborhood, it’s a short walk to Whole Foods and Trader Joe’s, small restaurants and delis, the 3.5 mile trail that loops around Back Cove and a few blocks from downtown Congress Street’s arts, business, and shopping district.

The property will feature 46 1-bedroom and five studio apartments. Some residents will have water views of Back Cove; others will enjoy views of Deering Oaks Park or Portland’s downtown. All will have abundant natural light. Included in rent are heat and hot water, a fitness center, indoor bike storage and wi-fi. The property also features a community room and coin-op laundry. The street-level commercial space, to be owned and managed by Ross Furman, will be a combination of artists’ studios and gallery space.

Repurposing an empty gravel lot at the corner of Parris and Kennebec Streets, The Furman Block contributes to the revitalization of this former industrial neighborhood.

PROJECTED COMPLETION: 2020

UNITS: 51 (11 Market-Rate + 40 Income-Restricted)

ARCHITECT: Archetype, P.A.

CONSTRUCTION MANAGER: Hebert Construction

FINANCING: MaineHousing; Northern New England Housing Investment Fund; City of Portland.



Above: Rendering of completed project, from corner of Kennebec and Parris Streets

REFERENCES

AUBURN

PETER CRICHTON

City Manager

207-333-6601, pcrichton@auburnmaine.gov

MICHAEL CHAMMINGS

Director of Economic and Community Development

207-333-6601, mchammings@auburnmaine.gov

BATH

PETER OWEN

City Manager

207-443-8330, powen@cityofbath.com

BIDDEFORD

JOHN BUBIER

Former City Manager

207-846-1515, john.bubier@gmail.com

ALAN CASAVANT

Mayor

207-284-4690, acasavant@biddefordmaine.org

GREG TANSLEY

City Planner

207-284-9115, gtansley@biddefordmaine.org

EXETER

RUSSELL DEAN

Town Manager

603-773-6102, rdean@exeternh.gov

DOUG EASTMAN

Building Code Enforcement Officer

603-773-6113, deastman@exeternh.gov

LEWISTON

ED BARRETT

City Administrator

207-513-3200, ebarrett@lewistonmaine.gov

DAVID HEDIGER

Director of Planning and Code Enforcement

207-513-3222, dhediger@lewistonmaine.gov

LINCOLN JEFFERS

Director of Economic and Community Development

207-513-3014, ljeffers@lewistonmaine.gov

PORTLAND

MARY DAVIS

Director of Housing and Community
Development Division

207-874-8711, mpd@portlandmaine.gov

JILL DUSON

City Councilor

207-878-0769, jduson@portlandmaine.gov

NICK MAVODONES

City Councilor

207-774-0257, nmm@portlandmaine.gov





Maine Cooperative Development Partners

MAINE COOPERATIVE DEVELOPMENT PARTNERS

build neighborhoods where the elements that constitute quality of life—access to green space, healthy lifestyles, community, privacy, and affordability—are not at odds with each other. Grounding principles for this work are creating equitable communities; complementing walkable neighborhoods; building healthy buildings; and celebrating beauty, art, and the natural environment. We use Limited Equity Cooperatives as a form of ownership to create options for people of all ages, backgrounds, and incomes to live in harmony with nature and their neighbors.

WE ENVISION small towns, urban neighborhoods, and suburban neighborhood centers that are walkable to daily needs and adjacent to recreational facilities, trails, and transit corridors; homes that use energy efficient construction, and shared gardens, patios, and play spaces for people to get to know and enjoy their neighbors.

WE GIVE BACK by partnering with organizations that support trails and green space, transit, local businesses, social equity, and efforts to mainstream energy efficient building and land use.



PRINCIPALS



MATTHEW PETERS has been involved in the completion of over 20 new construction, major rehab, and acquisition deals. Matt worked for eight years at Avesta Housing, one of Northern New England's largest non-profit housing developers and owners, project managing affordable housing developments, building out and overseeing the Asset Management department, and ending in an executive role overseeing the entire development and acquisitions pipeline as Vice President of Real Estate Services. In 2018 he began to consult for Housing Authorities, housing non-profits, and Community Development Finance Institutions in Maine supporting these organizations in acquisition, ground-up development, and underwriting of affordable housing properties. Matt also is the Executive Director of Freeport Housing Trust based in Freeport, Maine. He has strong working relationships with MaineHousing, Rural Development, lenders, tax credit syndicators, and other professionals in the design and construction field, holds a Masters in Urban Planning from the University of Washington, and certifications such as Spectrum's C3P and Rural Development STAR trainings and LEED Accredited Professional.



BRIAN ENG is a real estate investor who has worked on commercial projects in Florida, Connecticut, New Jersey, and Maine. He has worked as a principal on developments of over 200 units, is a principal on redeveloping the MERC site in Biddeford, and has redeveloped several smaller properties in Portland. He brings strong expertise in financials, fundraising, advocacy, and public speaking. He grew up in a co-op in New York City, and is on the board of UHAB, the entity that manages 20,000 units of cooperative housing in New York.



LIZ TRICE is a policy professional who builds multidisciplinary partnerships across real estate, economic development, entrepreneurship, and public health. Liz holds a masters degree in Public Policy & Management with a certificate in Community Planning & Development from the Muskie School at the University of Southern Maine. She has worked on multi-unit projects in Portland to obtain zone changes, lead the public engagement process with neighboring residents and businesses, apply for TIFs and grants, and direct the design of shared spaces. Her work includes award-winning research on the regulatory barriers to people living alone achieving home ownership, leading the process to redesign Bramhall Square, and working with medical and economic development institutions to develop strategic plans. Her projects to re-envision urban spaces for livability and natural ecosystems won two of three awards given by the 2019 Portland Society of Architecture's Complete City Competition. Liz trained as a cohousing developer and Passive House Design Consultant and has visited over 20 cohousing developments in the United States. She is currently the owner of PelotonLabs, a coworking space in Portland.



PROJECTS



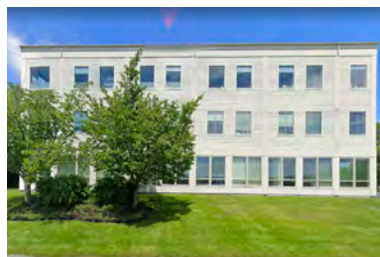
M NORTH ORLANDO—As a principal of Clay Cove Capital, Brian was the control capital partner in the ground-up development of M North in Orlando, a \$37.1M, 288-unit multifamily development in Orlando, Florida. www.mnorthorlando.com



BIDDEFORD MERC REDEVELOPMENT Brian worked with Jim Brady of Fathom Companies, to serve as master developer of city-owned land on the former Maine Energy Recovery Corp. incinerator through a public-private partnership with the City of Biddeford.



6 CITY CENTER IN PORTLAND—Brian redeveloped and retenanted a largely vacant Old Port mixed use building including executive office suites. www.sixcitycenter.com, and bringing in a law firm condo, law firm tenant, Lio Restaurant, and HE Paintbar nail salon.



1685 CONGRESS IN PORTLAND—Brian redeveloped a 50% vacant office/medical building and retenanted it including Maine Plastic Surgery Center and Maxim Healthcare. www.maineplasticsurgery.com

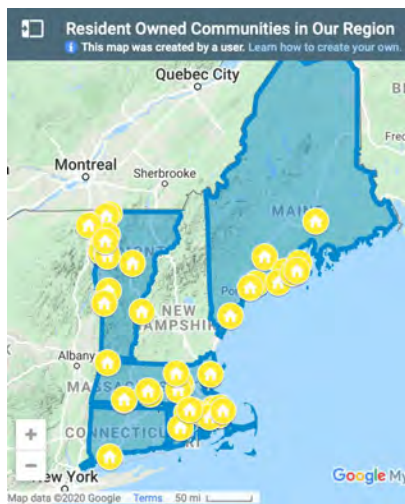


645 CONGRESS STREET—This former downtown college dormitory was converted to 55 one-bedroom and studio apartments with retail on the first floor. Liz worked for developers Shinberg and Alford on the initial concept, conducted a market analysis, developed relationships and communication with neighbors and businesses, creating a bike storage and parking plan, created a community management plan, and assisted with lease-up.



The Cooperative Development Institute (CDI) is a regional 501(c)3 non-profit founded in 1994 by co-op leaders in the Northeast. CDI's mission is to build a cooperative economy through the creation and development of successful cooperative enterprises. We are transforming ownership of our economy, so all people can meet their basic needs. CDI has 30 staff across the Northeast including six staff members in Southern Maine.

New England Resident Owned Community Projects (NEROC)



One of our primary activities is creating cooperative housing in Maine and the Northeast. When a park is for sale we help residents form a cooperative, get financing to buy the park, and learn how to run it with democratic resident control. This program gives residents control of the land beneath their homes and protects the affordability of their housing.

The Resident Owned Community (ROC) model began in NH with the NH Community Loan Fund and became a national model with the formation of ROC USA in 2008. The program has helped people in over 50 parks – comprising more than 4,800 homes — convert to resident ownership. Those communities are part of the ROC USA Network, which has helped secure over 15,000 units of affordable housing

nation-wide. CDI provides ongoing support as trainers and advisers for the ROCs and other cooperatives in the region. We assist in governance, management, financial oversight, communications, conflict resolution, compliance, and securing financing.

Charter Oaks Village Cooperative



With the support and technical assistance of the Cooperative Development Institute (CDI), the residents of Charter Oaks Village acquired the land on the 40 unit Arundel manufactured housing park on June 11, 2019 for \$1,170,000, helping to preserve the affordable housing community within it.

Charter Oaks Village joins nine other Maine manufactured housing communities supported by CDI and financed by Genesis Community Loan Fund, representing 440 homes now under resident control. The newly formed housing cooperative was a recipient of a GrowSmart Maine's honorary 2019 Smart Growth Award.

Mountainside Community Cooperative



CDI's newest Maine Cooperative is the 52-unit Mountainside Community Cooperative in Camden, Maine. Securing affordable housing in a community like Camden is increasingly challenging as housing costs escalate and its population ages. The residents of Mountainside Community purchased the community on December 11, 2019 for \$1,900,000 with financing provided by Camden National Bank, Genesis Community Loan Fund and the Local Enterprise

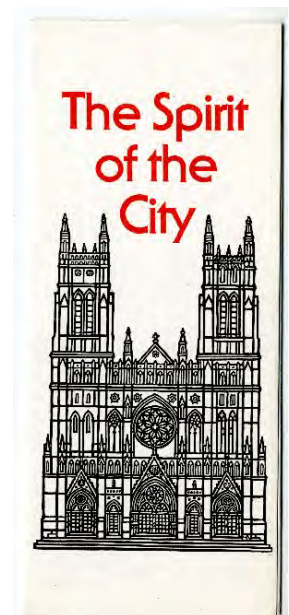
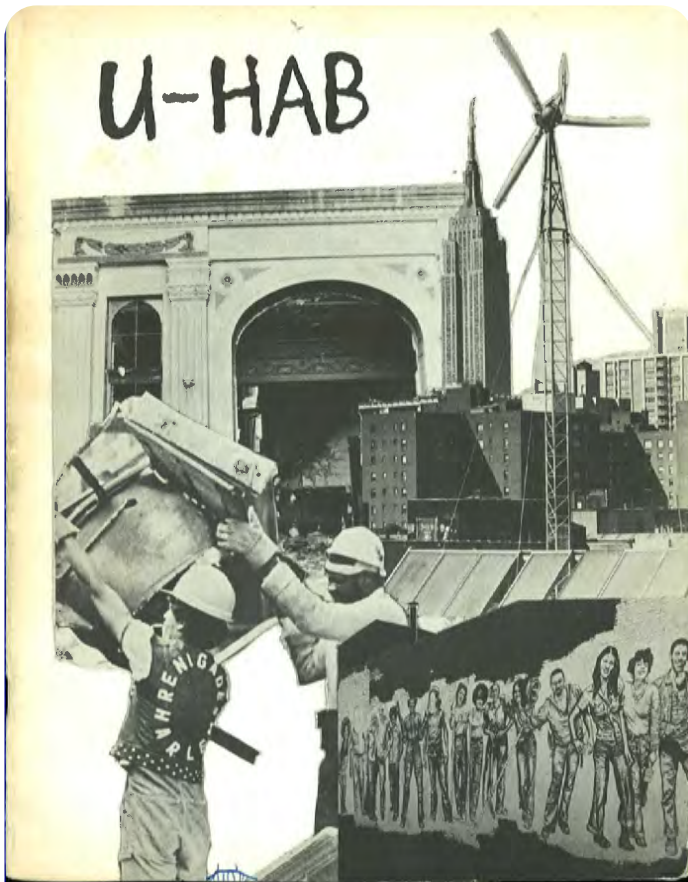
Assistance Fund. "We are so pleased to be able to help the residents of the Mountainside Community Cooperative become property owners today," said Bill Floyd, Executive Director of the Genesis Fund.

Wardtown Mobile Home Cooperative



The residents of the 60-unit Wardtown Mobile Home Cooperative voted to form the cooperative and purchase the community in May 2015, with assistance from CDI, and combined financing from Maine State Housing and The Genesis Community Loan Fund. As with all of the CDI's Resident Owned Communities (ROCs), Wardtown members continue to engage in extensive training and organizational development. As Bill Hodgkins, Cooperative Treasurer explains, "We all gained valuable new skill sets as we went through the process of establishing and financing our

cooperative...Now we have a very strong board of directors and feel very organized, to the point we are able to assist other ROC mobile home parks with advice about the process."



2019 UHAB ANNUAL REPORT

Building for Us

This year, UHAB made a considerable effort to build an archive. In doing so, the lesson we learned from decades of growth is very simple: what has always mattered most for affordable housing is community. It is the strength and support that comes from the community inside a co-op that is just as essential as the affordable housing itself.

With this in mind, UHAB is proud to offer new and expanded programs to low-income homeowners with a refined lens on our work. We have more data and research than ever on the long-term impacts of redlining policies and how communities of color have been resilient in their efforts to remain in their homes, whether in the 1970s or today. By building new affordable co-ops, strengthening tenants' rights statewide, making share loans through our HomeOwnership Lending program, and working in cooperation with our Interboro Community Land Trust partners to create the first Citywide CLT in New York City, we are actively working to dismantle the detrimental legacies of redlining and community disinvestment.

As we look toward the future, our work is expanding in several ways. We are offering more services like Co-ops Go Solar and our energy programs that are tackling the most pressing issue of our lifetime: the climate crisis. Without renewable energy and carbon reduction, low-income residents more than anyone will be affected. Most importantly, we need to recognize that it is not just low-income communities, but people of color in particular who are disproportionately affected by this crisis, just as they have been marginalized from fair and stable housing. UHAB's CDFI, HomeOwnership Lending, helps ensure that a family is not denied the opportunity to purchase because they don't have the money to be an all cash buyer. This program makes small loans where other lenders are reluctant and in this way supporting our HDFC and Mitchell Lama co-op communities in continuing to provide affordable housing.

The interest in co-ops and our work is expanding not just in New York City, but in upstate New York where residents can securely remain in their mobile homes; to New Haven, CT where the nearly 50-year old Seabury Co-op struggles to keep up with its aging infrastructure; and to Seattle, WA where a new permanently affordable co-op is being created. UHAB is excited to be assisting a new City financed co-op development program in Oakland, CA and we continue to meet with organizations and officials in other cities who are seriously considering the limited-equity model.

We have come a long way and welcome our next chapter of growth.

Sincerely,

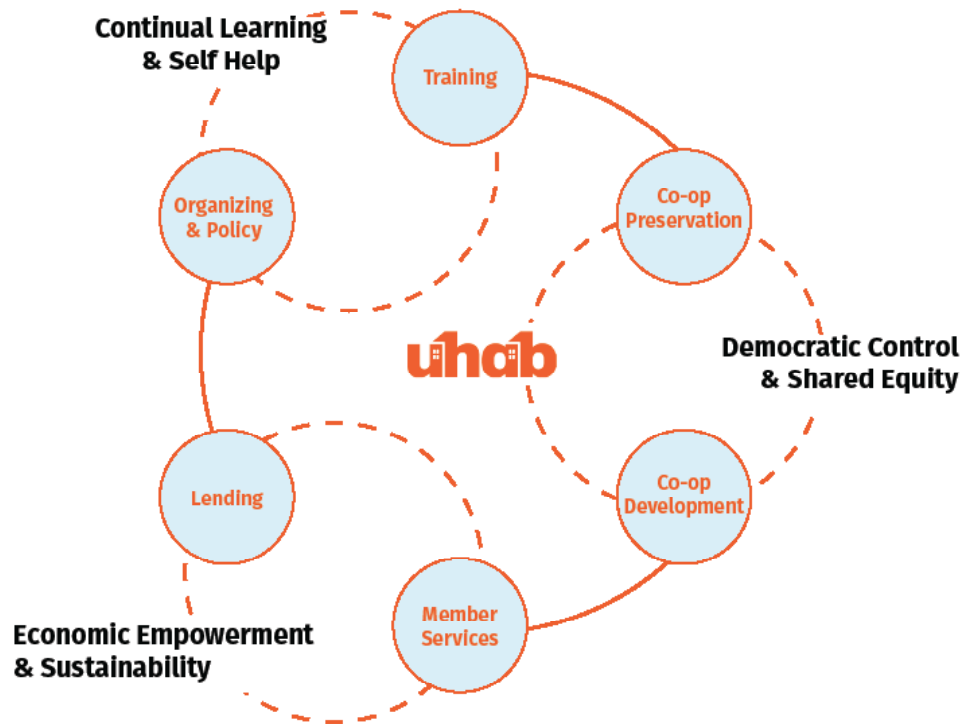
A handwritten signature in blue ink, appearing to read 'A. Reicher', with a stylized flourish at the end.

Andrew Reicher, Executive Director

Community through Cooperation

UHAB empowers low- to moderate-income residents to take control of their housing and enhance communities by creating strong tenant associations and lasting affordable co-ops.

Our Principles



I. Continual Learning & Self Help

When residents take the lead on everything from creating, managing, and preserving their own co-ops to advocating for affordable housing policy reform, this not only improves buildings and neighborhoods, but it transforms lives as well. Ongoing education and training is the key to preserving affordable housing cooperatives and strong tenant associations.

II. Democratic Residential Control & Shared Equity

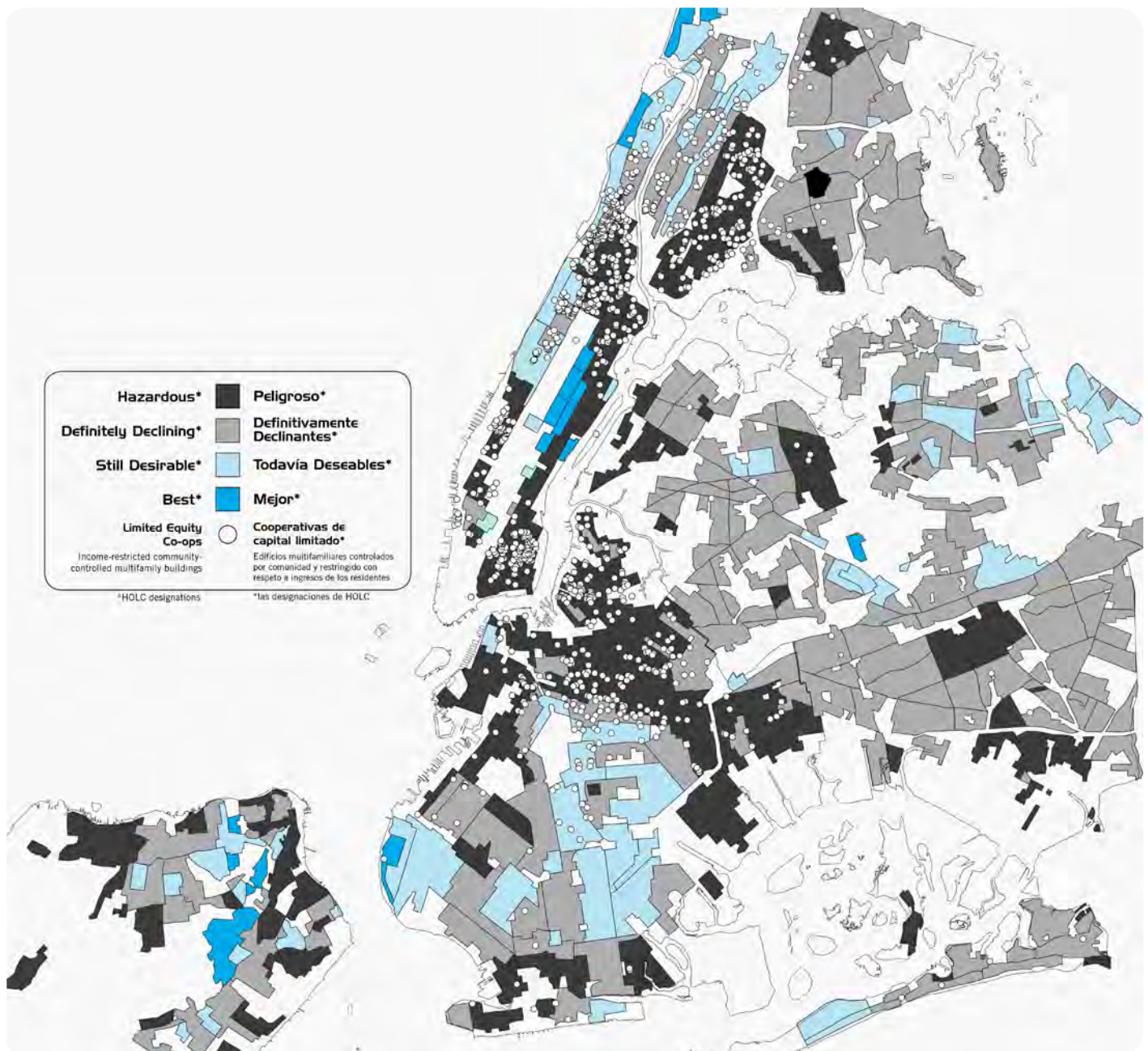
Transparent leadership and the participation of a majority of residents—each contributing unique skills and perspectives—make democratic governing and organizing possible. This collective control of housing helps prioritize a shared equity that keeps affordability manageable for future incoming residents.

III. Economic Empowerment & Sustainability

UHAB provides access to affordable, high-quality resources covering areas of energy, finance, democratic participation and education. These tools help residents maintain lower costs of living while helping to demystify financial technicalities. With support and guidance, all residents should be able to read and manage their finances, in order to make informed decisions about their operating costs.

Housing Justice is Racial Justice

This map overlays the location of modern-day HDFC co-ops with redlined neighborhoods from the 1930s. Redlining was a discriminatory housing practice that devalued neighborhoods where people of color lived and made it difficult for people of color to secure safe, affordable housing. In this map, the deepest shade of grey represents the least economically desirable neighborhoods. In the 1970s and 1980s, landlord abandonment and arson led to City foreclosure on thousands of occupied buildings in these same neighborhoods, creating the conditions for the self-help housing movement and the creation of thousands of HDFCs.



Through organizing and self-help initiatives, community-controlled housing arose as a way for low-income people and people of color to take control of their housing solutions when the government and private sector would not. Today, neighborhoods like Harlem, the South Bronx, and Central Brooklyn still struggle with the legacy of redlining; high air pollution, increased heat waves, higher poverty rates, and gentrification all threaten to displace longtime residents from neighborhoods that were once widely abandoned.

Through it all, community control remains a tool to provide New Yorkers with decent, affordable housing. HDFC co-ops are anchors in their neighborhoods, providing a safe haven to raise families and age in place. Tenant unions build power among renters and win victories like stronger rent laws.

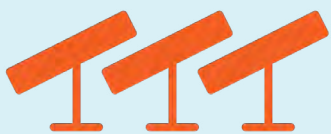


Through our work, UHAB helps people of color control, manage, and improve their homes. We know from experience that most of the low- to moderate- income residents in the buildings we serve are Black or Latinx. Our goal is to have as many people from the communities we serve reflected in our organization's leadership and programs.

Currently, around 60% of our Board and program staff are people of color, and more than half of our organization is bilingual in English and Spanish, fulfilling an essential need for our Spanish-speaking HDFC board members and residents. We provide our technical assistance, homeownership advisement, energy advisement, bookkeeping services, quarterly newsletter, and entire training curriculum in both English and Spanish.

UHAB BY THE NUMBERS: 2019

125 fair elections monitored
in practice of democratic
community control



9 HDFCs
adopted solar,
bringing the total
number to
28

3,500,000 tenants protected
under stronger rent laws



115 budgets planned to
preserve HDFCs' financial
stability & affordability



5
affordable
homeowner-
ship loans
totaling
\$242,011

203
trainings for
affordable
co-op
residents



\$9,197,000
secured in loans to
help HDFCs make
capital
improvements



Our Co-op
Preservation
team helped

15 co-ops

secure necessary
loans to avoid City
foreclosure last year.

This represents over

350 families

that were able to
retain their equity
and control of their
homes through
technical assistance
and guidance
from
UHAB staff.



To date, UHAB is the
foremost developer of
limited-equity housing
co-ops in NYC. we have

developed **over**

1,300 units of

affordable housing
with the support of a
variety of City and State
programs.



FIRM BIO



ACETO LANDSCAPE ARCHITECTS

ALA is a process-driven, landscape architecture and urban design firm committed to thoughtful, creative intervention at the intersection of environment, economics, art, and culture. ALA was founded on the notion that great design is a product of careful listening, inclusive decision-making, and unrelenting passion for enduring built spaces. We believe landscape architecture lies at the nexus of the built form and the ephemeral qualities of an ever-changing environment. ALA's team offers a unique set of skills and perspective, well-equipped to harmonize and reconcile the roles and value systems of varied design disciplines. We integrate expertise and intuition to craft powerful places, built upon a commitment to resiliency and sustainability. Our studio's passion for craft and technical savvy affords us the opportunity to collaborate across a broad geographic range and myriad project scales from intimate private spaces to large-tract master plans.

ALA was founded in 2014 by Principal, Nick Aceto. ALA has 5 employees, all of which are landscape architects, licensed in the states of Maine, Massachusetts, New York and Colorado.

PROJECT TEAM KEY PERSONNEL



NICK ACETO, PLA, ASLA

ACETO LANDSCAPE ARCHITECTS

FOUNDING PARTNER, LANDSCAPE ARCHITECT | NA@ACETOLA.COM

Nick is a licensed landscape architect and urban designer with a deep passion for the creative process. Nick believes in landscape as a framework for organizing the patterns and behaviors through which we live. From the private garden to the region, Nick has the ability to recognize and translate patterns into visual narratives which tell the unique story of a place through built form. Nick grew up in Portland, Maine where he developed a deep appreciation for the rich and varied New England landscape, from rocky shorelines of the Atlantic to the forested peaks of the Appalachians. As both a consummate urbanist and adventure-seeking outdoorsman, Nick is intrigued by the interplay between urban form, economics, wild nature, and ecology.



CAITLIN ACETO, PLA, ASLA

ACETO LANDSCAPE ARCHITECTS

FOUNDING PARTNER, LANDSCAPE ARCHITECT | CA@ACETOLA.COM

Caitlin is a licensed landscape architect in the states of Maine, New Hampshire, and Colorado, who's passion for art and design began in the Chicagoland area where she was exposed to the architectural works of Frank Lloyd Wright and Olmsted's historic planned community of Riverside. Caitlin's project experience ranges in scale from circulation and wayfinding design at Grand Canyon National Park, to security barrier conceptualization for the Thomas Jefferson Memorial, to signage programming and design. Caitlin brings a distilled clarity to design that strives to embody the contextual heritage, textural richness and cultural integrity of place.



SETH KIMBALL, PLA, ASLA

ACETO LANDSCAPE ARCHITECTS

PRINCIPAL, LANDSCAPE ARCHITECT | SK@ACETOLA.COM

Seth has been practicing Landscape Architecture for over 15 years. He has a Bachelor's degree in Landscape Architecture from the University of Massachusetts Amherst. Seth's project experience includes serving as project manager/lead designer for a master plan for the new Al Guhair University in Dubai, the Al Ain Oasis Cultural Quarter Master Plan in Abu Dhabi, institutional experience including Phillips Andover Academy, Bates College, George Stevens Academy, and Southern New Hampshire University, and a range of residential project including homes in Texas, Idaho, Montana, New York, Arizona, and several throughout the northeast. Seth joined ALA in 2018, bringing to the practice his experience in civic, institutional, and residential projects. further ALA's commitment to achieve sustainable and resilient project outcomes.



LIST OF SELECT CURRENT & ONGOING OR COMPLETED ALA PROJECTS

ALA has been fortunate to have made meaningful contributions to a vast array of projects across a wide gamut of scales over the last 5-6 years. Below is an abbreviated list of select project examples intended to provide a sense of our professional skill set, experience, and range as a design studio. We would be happy to provide more information about any of the below projects upon request.

RESIDENTIAL

DBX 11 RESIDENCE	ASPEN, CO
WHITE HORSE SPRINGS RESIDENCE	ASPEN, CO
TELLURIDE AGUIRRE ROAD RESIDENCE	TELLURIDE, CO
PRIVATE RESIDENCE	SOUTH FREEPORT, ME
SHADOW MOUNTAIN CONDOMINIUMS	ASPEN, CO
SMYTH RESIDENCE	SNOWMASS, CO

COMMERCIAL/CAMPUS

100 FORE STREET OFFICE BUILDING	PORTLAND, ME
66 STATE STREET	PORTLAND, ME
LAAM 525 LIVE-WORK	BASALT, CO
HOTEL ASPEN	ASPEN, CO
MEMORIAL PLAZA	QUANTICO, VA
CUMBERLAND CLUB SITE PLAN	PORTLAND, ME
RIVERSIDE LIVE-WORK	PORTLAND, ME
WILLITS BEND LIVE-WORK	BASALT, CO
RED HAWK ELEMENTARY SCHOOL	ERIE, CO
CSU UNDERPASS STUDY	FORT COLLINS, CO
ANDERSON RANCH ARTS CAMPUS	SNOWMASS VILLAGE, CO

HOUSING & DEVELOPMENT

SCARBOROUGH DOWNS MASTER PLAN	SCARBOROUGH, ME
THE TREE FARM	BASALT CO
66 STATE STREET	PORTLAND, ME
BLOCK 11 MASTER PLAN	BRECKENRIDGE, CO
BROKEN COMPASS BREWERY	BRECKENRIDGE, CO
RIVERBEND COMMERCIAL CENTER	TIMNATH, CO
CUMBERLAND MULTI-GEN	CUMBERLAND, ME

PUBLIC

COMMERCIAL STREET TRANS. STUDY	PORTLAND, ME
LIBBYTOWN PLAYSCAPE	PORTLAND, ME
PORTLAND DOWNTOWN SQUARE	PORTLAND, ME
BASALT POST SIGNAGE	BASALT, CO
TOWN WAYFINDING SIGNAGE	BASALT, CO
BAYSIDE ADAPTS MASTER PLAN	PORTLAND, ME
ARBANEY PARK MASTER PLAN	BASALT, CO
BASALT OUR TOWN	BASALT, CO
TIMNATH COMMUNITY PARK	TIMNATH, CO
PACTS SMART CORRIDOR STUDY	PORTLAND, ME
LIBBYTOWN VISIONING	PORTLAND, ME
BERTHOUD PARKS & OPEN SPACE PLAN	BERTHOUD, CO

REFERENCES

CAITLIN CAMERON

CITY OF PORTLAND, URBAN DESIGNER
207-874-8901
CCAMERON@PORTLANDMAINE.GOV

"In my capacity as Urban Designer for the City of Portland, I interacted with Aceto Landscape Architects (ALA) on the 100 Fore Street project where they demonstrated thoughtful and creative design strategies for a challenging urban site. Speaking from my experience working with a diversity of landscape and urban design professionals in Southern Maine, I found ALA to have an innovative approach that demonstrates a value for and understanding of the role of public space and urban landscape for the livability and resiliency of cities and towns." - Caitlin Cameron

BRUCE HYMAN

CITY OF PORTLAND, TRANSPORTATION PROGRAM MANAGER
207-874-8717
BHYMAN@PORTLANDMAINE.GOV

"Aceto Landscape Architecture's compelling graphics as part of the Portland-South Portland Smart Corridor Plan effort in 2017 enabled the public to readily visualize the benefits and trade-offs of various transportation alternatives being considered and highlighted the opportunities those alternatives could also have for placemaking, a key goal of the Plan." - Bruce Hyman

RICH CIECIUCH

PROJECT WORKSHOP
970-729-0126
RICH@PROJECT-WORKSHOP.COM

"ALA is a key design collaborator in our design build approach, helping to navigate complex approval issues, participating seamlessly in the iterative design process that succeeds best when site attribute identification and organization melds with building design concepts. They are excellent listeners and always come back with creative and unexpected solutions. Community and Neighbor impacts of any development must be carefully contemplated and negotiated to a successful outcome, and ALA has all the skills and experience to shape and illustrate how new projects relate to the existing fabric of community and neighborhoods." - Rich Ciecuch

DAN BACON

DEVELOPMENT DIRECTOR MR.HOLDINGS
207.232.5154
DBACON@MR.HOLDINGS

MARK RUDOLF

PRINCIPAL / OWNER VELLUM ARCHITECTS
970 618 1889
MARK@VELLUMAD.COM

JAY CHACE

PLANNING DIRECTOR, TOWN OF SCARBOROUGH
207-730-4042
JCHACE@SCARBOROUGHMAINE.ORG

TROY MOON

CITY OF PORTLAND SUSTAINABILITY COORDINATOR
THM@PORTLANDMAINE.GOV
207.756.8362



THE DOWNS | 510-ACRE MASTER PLAN & TOWN CENTER SCARBOROUGH ME

ALA has worked collaboratively with Gorrell Palmer Consulting Engineers along with a large team of consultants and stakeholders in developing a master plan for this 500+ acre former harness racing facility. The project was recently granted a TIF agreement based in large part on the attributes ALA visualized in their plans for the proposed Town Center which included a 4 acre community park with music venue, playground, and sport courts.

KEY STAFF SERVICES STATUS REFERENCE

Nick Aceto, Seth Kimball
Master Planning, Urban Design, Landscape Architecture, Visualization
Planned
Jay Chace, Planning Director, Town of Scarborough | Jchace@Scarboroughmaine.org

ALA worked closely with an experienced Southern Maine builder to develop a neighborhood plan which begins to challenge conventional subdivision development rules with a compact pattern and highly walkable streetscape organized around a central woodland preserve which serves as a neighborhood playscape.

Page 270



FRONTRUNNER PARK SCARBOROUGH ME

This third phase of The Downs master plan includes over 200 homes across a broad range of affordability including compact, lane-loaded single family and pocket homes as well as more than 75 apartment units and ground floor office space. The plan is organized around a series of small parks and a highly-walkable street grid.

KEY STAFF

Nick Aceto, Seth Kimball

SERVICES

Master Planning, Urban Design, Landscape Architecture, Visualization

STATUS

Permitted, Expected Construction Fall 2020

REFERENCE

Jay Chace, Planning Director, Town of Scarborough | Jchace@Scarboroughmaine.org



LAAM 525

BASALT CO

Aceto Landscape Architects worked closely with architect, owner and contractor on this urban infill development, providing creative streetscape and urban plaza design interventions. The project included 8 affordable residential units, 5,000 SF of commercial / light industrial space, parking, and integration with the town's transit system.

KEY STAFF

Caitlin Aceto, Nick Aceto

SERVICES

Landscape Architecture, Urban Design

STATUS

Under Way Summer 2020

REFERENCE

Glenn Rappaport | grappa@blackshack.net



FREEPORT LIVE-WORK

FREEPORT ME

Freeport Live-Work is a community master plan envisioned as a series of mixed-density neighborhoods including more compact, single-family pocket homes as well as mixed-use townhomes and commercial-office buildings

KEY STAFF	Nick Aceto, Caitlin Aceto
SERVICES	Landscape Architecture, Urban Design, Planning
STATUS	Planned
REFERENCE	Undisclosed



BASALT ON-CALL PLANNING

BASALT CO

ALA was tasked with the study of two parcels within the Town of Basalt Growth Management Area for feasibility of alternative 'affordable' housing development options. ALA explored options for pocket neighborhoods, compact lot scenarios, and consolidation of infrastructure as a means to offset development cost and in turn reduce home pricing.

KEY STAFF

Lisa Cowan, Caitlin Aceto

SERVICES

Landscape Architecture, Visualization

STATUS

Planning Document Complete 2016

REFERENCE

Undisclosed | Undisclosed

Blackstone Senior Living

Location: Falmouth, Maine

Completion Date: February 2018

Size: 15,000 square feet new

Program: 19 units new, 1-bedroom, and 2- bedroom apartments to Passive House performance levels; plus significant rehabilitation of 20 existing units

Cost: \$185 / sf

Scope: New Construction and rehabilitation

Reference:

Catherine Elliott

Avesta Housing

(207) 553-7780

CElliott@avestahousing.org





48 Union Wharf | Portland, ME. 04101 | tel. 207.772.6022

www.archetype-architects.com

Company Background and History

Archetype Architects has, since 1983, developed an extensive portfolio of building projects in Maine and New England. We are a commercial architectural firm specializing in business, retail and housing developments. Our areas of service include master- planning, architectural design, and interior design. Prior to 1983 David Lloyd and Bill Hopkins maintained separate practices after having begun their careers in Boston and New York, respectively.

Archetype regularly designs and completes commercial projects in a very diverse field of typologies. Everything from hospitality and multi-family residential to offices and light industrial projects is well within our purview.

Personnel:

Principals: David Lloyd
William Hopkins

Architects: David Mele
Barry Yudaken
Virginie Stanley
Katherine Detmer
James Broadbent

Architectural Associates: Michael Hutchins
Mike Coyne
Devin Cough

Architectural Interns: Maryna Nelson
Sam Berry

Interior Designer: Sally Anderson

Office Manager: Susan Geffers

Registration Status:

Maine, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, RI and US Virgin Islands

Professional Affiliations:

National Council of Architectural Registration Board
International Building Code
National Fire Protection Association

RELATED PROJECT EXPERIENCE

Archetype has provided Design Services for the following residential projects.

Project & Location	Type of Project	Client
Osprey Circle S. Portland, ME	48 Units Apartments 2 large multi-unit buildings	Kevin Bunker - Developers Collaborative (207) 766-1632 - bunker.kevin@gmail.com
Oriole Way Ellsworth, ME	50 Units Apartments 7 Buildings, Flats and Townhouses	Kevin Bunker - Developers Collaborative (207) 766-1632 - bunker.kevin@gmail.com
Webster Point Orono, ME	15 Units Condos 7 Buildings Townhouses	Kevin Bunker - Developers Collaborative (207) 766-1632 - bunker.kevin@gmail.com
Summer Street Gardiner, ME	15 Units Apartments 2 Buildings, Flats and Townhouses	Kevin Bunker - Developers Collaborative (207) 766-1632 - bunker.kevin@gmail.com
Minot Ave. Auburn, ME	36 Units Apartments 3 Buildings, Flats and Townhouses	Kevin Bunker - Developers Collaborative (207) 766-1632 - bunker.kevin@gmail.com
Maple Street Augusta, ME	29 Units Apartments 3 Buildings, Flats and Townhouses	Kevin Bunker - Developers Collaborative (207) 766-1632 - bunker.kevin@gmail.com
Deering Place Portland, ME	75 Units Apartments	Avesta Housing (207) 553-7780
Motherhouse Portland, ME	88 Units Elderly Apartments	Kevin Bunker - Developers Collaborative (207) 766-1632 - bunker.kevin@gmail.com
Fox School S. Paris, ME	12 Units Elderly Apartments	Avesta Housing (207) 553-7780
Larrabee Commons Westbrook, ME	38 Units Elderly Apartments	Christopher LaRoche – Westbrook Housing (207) 854-6805-claroche@westbrookhousing.org
Millbrook Estates Westbrook, ME	38 Units Elderly Apartments	Christopher LaRoche – Westbrook Housing (207) 854-6805-claroche@westbrookhousing.org
St. Ignatius Sanford, ME	66 Units Apartments	Kevin Bunker - Developers Collaborative (207) 766-1632 - bunker.kevin@gmail.com
Eliot Housing Eliot, ME	38 Units Elderly Apartments HUD	David Bateman - Bateman Partners, LLC (207) 772-2992-David@batemanpartnersllc.com
Carleton Street Portland, ME	37 Units Apartments	Avesta Housing (207) 553-7780
Huse School Bath, ME	58 Units Apartments	Nathan Szanton - The Szanton Company (207) 8719811- nszanton@szantoncompany.com
Hodgkins School Augusta, Me	47 Units Apartments	Amanda Bartlett - Augusta Housing amanda.bartlett@augustahousing.org
134 Washington Ave. Portland, ME	18 Units Veterans Housing	Avesta Housing (207) 553-7780

RELATED PROJECT EXPERIENCE

Archetype has provided Design Services for the following residential projects.

Project & Location	Type of Project	Client
Village Green Cumberland, ME	38 Units Apartments	David Bateman - Bateman Partners, LLC (207) 772-2992-David@batemanpartnersllc.com
Sanford Mill Sanford, ME	36 Units Apartments	Northland Enterprises, LLC Rex Bell
Danforth on High Portland, ME	30 Units Apartments	Random Orbit, Inc. Peter Bass
Hyacinth Place Westbrook, ME	37 Units Apartments	Avesta Housing (207) 553-7780
Sullivan School Apartments South Berwick, ME	34 Units Apartments	David Bateman - Bateman Partners, LLC (207) 772-2992-David@batemanpartnersllc.com
Emery School Apartments Biddeford, ME	24 Units Apartments	Avesta Housing (207) 553-7780
The Mill at Saco Falls Biddeford, ME	66 Units Apartments	The Szanton Company (207) 8719811- nszanton@szantoncompany.com
Spring Crossing Elderly Housing Westbrook, ME	34 Elderly Apartments	Christopher LaRoche – Westbrook Housing (207) 854-6805-claroche@westbrookhousing.org
53 Danforth Portland, ME	43 Units Apartments	The Szanton Company (207) 8719811- nszanton@szantoncompany.com
Walker Terrace Portland, ME	40 Units Apartments	The Szanton Company (207) 8719811- nszanton@szantoncompany.com
Casco Terrace Portland, ME	27 Units Apartments	The Szanton Company (207) 8719811- nszanton@szantoncompany.com





Page 280





Acorn Engineering, Inc. is a Portland-based civil and environmental engineering firm of nine full-time employees and four construction inspectors. Acorn's team has a diverse portfolio providing Maine with quality engineering and environmental services as well as state-wide construction administration on behalf of the Maine Department of Transportation.

A cornerstone of Acorn Engineering is the attention to quality and exceptional level of service on every project, regardless of size. Our engineers and scientists pride themselves on their extensive experience, which is backed by a broad knowledge of civil and environmental engineering practices from smaller residential projects to larger commercial projects that integrate environmental assessment and site redevelopment.

Acorn Engineering has demonstrated the ability to breakdown and synthesize widely disseminated regulations into accepted engineering practices and practical site assessment and development. As a result of Acorn's efforts, the Cumberland County Soil & Water Conservation District recently recognized Acorn as the Contractor of the Year. This was the first award associated with the nationally recognized Long Creek Restoration Project and the first time the Cumberland County Soil & Water Conservation District ever recognized an engineering firm as their Contractor of the Year.

Acorn's expertise covers the areas of: civil/site design, evaluation, development, and permitting; and construction phase services such as construction administration, construction documents, project bidding, and site inspection including erosion and sedimentation control. Acorn's experience also includes the field of environmental engineering and compliance such as: Phase I and Phase II environmental site assessments, soil and groundwater remediation planning and design; Maine's Voluntary Response Action Program (VRAP); and stormwater treatment system design and permitting.

Acorn's engineers have designed, permitted, and overseen construction on numerous single-family and multifamily residential projects including traditional subdivision designs featuring on-site sewage/septic disposal and drilled wells. Furthermore, Acorn has demonstrated extensive experience and capabilities with municipalities, the Maine Department of Transportation (MDOT), Maine Department of Environmental Protection (MDEP), soil & water conservation districts, conservation commissions, municipalities, and the private sector on environmental and site development projects as demonstrated by the following:

- Listed on Maine DEP's Pre-Qualified Vendor List for Environmental Consulting Services
- Listed on Maine DOT's Pre-Qualified Consultants for eight service areas (listed under Section I.D)
- Cumberland County Soil & Water Conservation District Contractor of the Year for work on the Long Creek Restoration Project

- **Public Works Redevelopment – Meeting House Hill**

Over the past two years, Acorn Engineering has worked in close association with the City of South Portland, neighbors, and private clients on the redevelopment of the former Public Works facility. The 6-acre site is nestled in the middle of the Meeting House Hill residential neighborhood and is currently



a mix of storage buildings, fuel fill stations, miscellaneous stockpiles, and pavement. The site will be redeveloped into a mix of multifamily townhomes and single-family dwellings comprising 38 units along with a public park and community gardens.

In addition to the environmental remediation, Voluntary Response Action Program (VRAP), and other environmental considerations given the previous land use, the project is subject to a Maine DEP stormwater management law. The redevelopment design results in a reduction in impervious area of over 50% and reduces land use intensity across the site. Though not required, several stormwater BMP's have been implemented into the site as a best practice, further attenuating and treating stormwater runoff. In addition to the significant redevelopment plan, Acorn has designed an infrastructure plan to separate the storm and sewer mains. This will include installing 400 feet of new storm drain along the existing O'Neil Street right-of-way and 700 feet of new storm drain along the proposed O'Neil Street right-of-way extension. Overall, this effort will reduce the effects of combined sewer overflows (CSO) into Casco Bay which occur due to wet-weather events and the wastewater treatment plant's inability to provide capacity for both storm and sanitary sewer flows.

As part of this project, Acorn held a multitude of meetings with the City including the assistant City manager, the former Mayor, the entire planning division, and the chief engineer of Public Works. Furthermore, Acorn has collaborated with department heads of the Fire, Parks, Public Works, and Water Resource departments to ensure a feasible and ideal project for all parties. As a result, the process was truly a collaborative effort with a number of stakeholders weighing in on the design.

- **Munjoy Heights**

Acorn provided civil/site engineering and permitting for the design of Munjoy Heights – a six townhome, 29-unit development on the steep slopes of Munjoy Hill in the City of Portland. Acorn designed and developed construction drawings for the sanitary sewers, storm drains, water mains, driveways and pedestrian circulation, retaining wall locations, building locations, and drainage infrastructure to be built in compliance with City standards.



A key component to the project was coordinating with the City on the future combined sewer separation project and the site's overall stormwater management. Additionally, discussions with neighbors and stakeholders were paramount in the project's success.

The innovative urban infill project compliments the Munjoy Hill neighborhood with a communal design and plentiful native landscaping that replaced invasive species which previously dominated the eroding banks prior to the development. The \$22 million project features a courtyard, terraced landscaping, a Portland Trails-maintained path that connects the redevelopment to the existing trail system, and low impact development (LID) techniques that meet MDEP Chapter 500 regulations. The stormwater management includes an underdrained sand filter and chambers that detain and treat stormwater on site in tandem with strategically placed rain gardens.

The project required extensive coordination and collaboration between the client, City of Portland, Portland Trails, the structural engineer, the architect, and the contractor to successfully complete the project with the first “woonerf” in the state and maintaining the existing public walking path through the property.

- **200 Valley St**

Working with Avesta Housing, Acorn Engineering provided civil engineering and permitting for Avesta's 60-unit project in the St. John Valley neighborhood. This urban infill project replaces the existing single-family house and abutting vacant lots into new affordable housing opportunities with two levels of covered parking, amenities, and a rebuilt project frontage with new sidewalks, street trees, and bicycle hitches.



As part of the project, Acorn developed a transportation and parking analysis to ensure that the provided parking will adequately serve the redevelopment. Furthermore, the design team identified and implemented multiple strategies to encourage residents to efficiently utilize the many modes of transportation available on the Portland peninsula.

- **Little Dolphin Drive & Jocelyn Place**

In collaboration with the South Portland Housing Authority and Risbara Holdings, Acorn provided civil engineering design and permitting of a multi-use subdivision at the end of Little Dolphin Drive in Scarborough. Proposed uses include a two-story office building and a three-story 60-unit senior housing facility with associated parking and landscaped areas.



In addition to a voluntary neighborhood meeting, the project went through a 3-step master plan phase with the Town of Scarborough in which the project was collaborated on with Planning Staff, the Planning Board, and neighbors.

The project is subject to Maine DEP and US Army Corps permits. To adequately treat stormwater on the site, Acorn has designed multiple stormwater BMPs meeting Maine DEP Chapter 500 regulations resulting in a low impact design.

- **89 Anderson Street**

In collaboration with Redfern properties and the East Bayside neighborhood, Acorn developed the civil/site engineering design of a mixed use 53-unit redevelopment of an existing under-utilized, urban infill lot in the East Bayside neighborhood. Acorn's scope of services included in the initial phase applying for and obtaining a zone change and



conducting Phase I and Phase II Environmental Site Assessments to evaluate potential environmental contamination at the site.

After conducting the environmental remediation efforts, Acorn developed the site layout and design of sanitary sewers, storm drains, water mains, site driveway, retaining wall locations, building locations, parking lot design, building drainage structures, utility connections and landscaping plan (with a landscape architecture subconsultant) to meet the City of Portland Technical Standards. Acorn also integrated sidewalk and improvements associated with the project into the City's Anderson Street ByWay project. Furthermore, the project team worked with a non-profit organization, the Telling Room, to provide public art along the Fox Street streetcape in lieu of traditional fencing.

Overall, the project established an important mixed use building on a prominent corner lot adjacent to Kennedy Park which contains popular recreation space. The building houses a restaurant and the Gear Hub bicycle school on the first floor with residential apartments above which encourages an active street presence with housing, goods, and services that help tie the neighborhood together and keep eyes on the street.

- **667 Congress Street – The Hiawatha**

The \$28 million project included the civil/site engineering design for the 8-story, first floor retail and 139-unit apartment building on Congress Street in Portland. Vehicle parking is served by two levels with separate access from Vernon and Avon St. The project featured building and site design in an historic district adjacent to Longfellow Square.

Services included, but is not limited to, permitting with the City of Portland, layout and design of sanitary sewers, storm drains, water mains, pedestrian and vehicle entrances, building locations, parking lot design, and parking garage grading and drainage. Acorn provided significant coordination between the Architect, Structural Engineer, Geotechnical Engineer, Construction Management Company, Owner, and the City.





CREDERE

ASSOCIATES, LLC

Brownfield Assessment & Cleanup

Credere specializes in redevelopment planning, engineering, and environmental sciences with a goal of providing services that positively impact the community, economy, and environment using Smart Growth principles. Credere is SBA certified 8(a); DOT certified DBE in ME, NH and MA; and Self-Certified EDWOSB/WOSB.

The word “credere” means “to believe” in Italian. Credere is also an acronym for community revitalization, economic development, environmental remediation, and engineering. It was very important to Theresa and Rip Patten when naming the company that the name communicates something more than crediting the owners. The name should embody the company mission: what the company believes, what it aspires to do for its clients, and the means through which it can be achieved. To us, Credere is the perfect name. We believe that we can use our engineering education and our knowledge of environmental remediation to help our clients achieve community revitalization by successful completion of redevelopment projects. It is our small way to make the world a little better. Credere works with planning commissions, municipalities, economic development boards, private developers, and local and federal government agencies to overcome environmental issues that are hindering the redevelopment process.

Credere’s mission is to provide services that positively impact the community, economy, and environment that our clients and employees work, live and play.

Credere has extensive experience in completing long-term, sustainable Brownfields Programs and private redevelopment projects, which use smart growth principles. The projects include various tasks, such as, environmental assessment, re-use planning and remediation and redevelopment engineering.



**Marada Adams School – 48 Moody Street,
Portland, Maine**

The 1.5-acre Marada Adams Community School was used as an educational facility from 1958 until 2006, when the school was closed and the property was vacated. Historically, the property contained a complex of buildings occupied by the Portland Railroad Company and a trolley railroad crossed the middle of the site. During the late 1800s, a portion

of the property was also used as the Burgess, Forbes & Company White Lead & Color Works facility (a can and hand grenade manufacturer). Credere performed a Phase I assessment at the property in anticipation of a transfer of ownership from the City of Portland to a private non-profit affordable housing developer, AVESTA Housing. Following the sale of the property, Credere performed Phase II activities to investigate potential hazardous building materials and contaminated soil. Based on the Phase II data, the developer was able to anticipate concerns with worker and future residential exposure, and waste soil disposal. Credere helped the development team minimize the financial and logistical impact of these issues through the re-design of the site layout, enrollment in the Maine DEP VRAP program, and attainment of a \$200,000 Brownfields cleanup grant. Between 2012 and 2013, Credere oversaw the remediation of hazardous building materials, contaminated soils, and the redevelopment of this site into 16 units of affordable homeownership housing, a public greenway and a playground. The project transformed an underutilized Brownfields site located in an otherwise vibrant neighborhood and returned it to the community.



**Thornton Heights Commons – 611 Main Street,
South Portland, Maine**

The South Portland Housing Authority acquired the former St. John parish church, rectory (i.e. a residence for clergy), and a church school in Thornton Heights or South Portland, Maine. The buildings on the 1.81-acre site were severely dilapidated and contained substantial hazardous

building materials including lead, asbestos, and PCBs, and soil was contaminated from lead paint around all of the Site buildings. Credere performed several phases of environmental investigation, geotechnical investigation, assisted the housing authority in obtaining a \$500,000 EPA Brownfields cleanup grant, and cleanup and redevelopment planning. In 2020, Credere oversaw the solicitation of bids from cleanup contractors and subsequently implemented the abatement and remediation of the site, demolition of the Site buildings, and preparation of the site for redevelopment. The project is currently moving to construction of a 46,000 square foot four-story mixed-use affordable housing projected that will include parking for seventy vehicles,

a 10,000 s.f. community open space, and three new single-family house lots. The building will consist of 42 apartments on the three upper floors, a community space, and 7,000 s.f. of commercial space on the ground floor.

State Street School – 261 Center Street, Brewer, Maine

The State Street School was a 6,630-square foot two-story building that was constructed in 1948. The Site building was operated as an elementary school from 1948 until June 2011 and was vacant thereafter. Based on assessment work completed at the Site by Credere and others, asbestos, lead, and universal and/or hazardous waste were considered to be contaminants of concern. Credere assisted the City in remediation planning and environmental clean activities, which included abatement and removal of asbestos; universal, special, and hazardous waste; and lead-based paint building debris in accordance with the Maine DEP VRAP. To support the redevelopment of the Site, Credere completed a geotechnical engineering evaluation and provided recommendations for the design and construction of the 48-unit Community Housing of Maine (CHOM) affordable housing development. This was the first multi-family passive building in ME and in New England, and at the time, was the largest passive housing building anywhere in the country. As part of this work, Credere conducted a subsurface exploration program, which included laboratory testing, evaluating subsurface conditions, and completing geotechnical engineering analyses including settlement and bearing capacity calculations and limited stability assessment of proposed excavations.

I. Conformity with Land Use Ordinance

The following outline is made in accordance with the City of Portland Code of Ordinances, Chapter 14 Land Use, Article V Section 14-526.

OVERVIEW

The proposed mixed-use residential buildings have been designed to conform to City standards where possible, as well as improve upon existing non-conformities. This project conforms with the majority of the applicable standards of Portland's Land Use Ordinance Section 14-526 as demonstrated in the following narrative.

(a) Transportation Standards

1. Impact on Surrounding Street Systems:

The site is located along Douglass Street. It is classified as a local street according to the City of Portland Federal Street Classification map. A moderate traffic increase is expected for this project due to the change in use of the property. Congestion or worsening of the intersections is not anticipated.

2. Access and Circulation:

a. Site Access and Circulation:

This project conforms with the design standards of Section 14-526 as demonstrated in the following standards:

- (i) The development will provide safe access and internal circulation for both pedestrians, vehicles and emergency vehicles as seen on the Site Plan.
- (ii) The proposed parking areas can be accessed from the existing access drive from Douglass Street.
- (iii) The site does not feature drive up services as mentioned in this requirement.

b. Loading and Servicing:

- (i) There are no anticipated loading and servicing needs. The site is access

c. Sidewalks:

- (i) Bituminous pavement sidewalks are proposed throughout the site, as seen on the Site Plan, to connect the existing sidewalk on Douglass Street to the site for pedestrian access.
- (ii) The existing sidewalks that will be disturbed during construction and utility



activities at the entrance to the site are proposed to be rebuilt in conformance with City standards.

3. Public Transit Access:

- a. Not applicable.
- b. Not applicable.
- c. Not applicable.

4. Parking:

a. Location and Required Number of Vehicle Parking Spaces:

- (i) The proposed project will provide 78 parking spaces which is anticipated to meet the requirements of the proposed uses within the new buildings.
- (ii) Not applicable.
- (iii) The project is within a quarter mile of a transit facility and therefore is not technically required to provide any parking; however, at a ratio of 0.65 spaces per unit, the project team feels this proposal is appropriate. Please see the Parking Report for more information.
- (iv) The parking space and aisle dimensions are in conformance with the Technical Standards with the exception of a waiver request to reduce the drive aisle width from 24' to 22' given the residential use and low turnover rate. Please refer to the Site Plan for more information.
- (v) The driveway and parking areas will be constructed of bituminous pavement which will drain water without eroding.

b. Location and Required Number of Bicycle Parking Spaces:

- (i) A minimum of 50 bicycle spaces are proposed for the 120 residential units. Please refer to the Landscape Plan for more information.

c. Motorcycles and Scooter Parking:

- (i) There are no areas specifically designated for motorcycles or scooters at this time; however, parking is available through the on-site parking stalls.

d. Snow Storage:

- (i) Snow storage area is provided on the south and north ends of the site. The Owner will be responsible for managing snow at their discretion and/or coordinating snow removal from the site when necessary.



(ii) Not applicable.

5. Transportation Demand Management (TDM):

- a. Not applicable.
- b. Not applicable.
- c. Not applicable.

(b) Environmental Quality Standards

1. Preservation of Significant Natural Features:

- a. Not applicable.
- b. Not applicable.

2. Landscaping and Landscaping Preservation:

a. Landscape Preservation.

- (i) There are 18 existing trees on site, all of which will be removed for construction activities.
- (ii) There are 5 trees 10 inches DBH or greater within the property.
- (iii) It is not anticipated that the project will necessitate any tree protection.
- (iv) A waiver is not requested.
- (v) Not applicable.

b. Site Landscaping.

(i) Landscaped Buffers:

- a. The solid waste location will be located adjacent to the parking lot on the east side of the development. The proposed transformer and solid waste container are anticipated to be screened by a decorative fencing, screening, or landscape plantings.
- b. Landscaping has been incorporated into the site design as such. Please refer to the Landscape/Planting plan.
- c. Not applicable.



d. Not applicable.

(ii) Parking Lot Landscaping:

- a. The proposed development will include one (1) tree and three (3) shrubs for every five (5) parking spaces within landscaped islands to screen shade and break up parking.
- b. A landscape island is provided to ensure uninterrupted parking will not exceed forty (40) parking spaces.
- c. Parking landscape islands will be curbed and a minimum of seven (7) feet in width.
- d. Not applicable.

(iii) Street Trees:

- a. Not applicable
- b. Not applicable

3. Water Quality, Stormwater Management and Erosion Control:

a. Stormwater

- (i) The site drainage will not be directed to flow or pond onto adjacent lots. The runoff created from the site will be collected and directed to the MS4 within Douglass Street. Impervious area on the site will be decreased, reducing overall runoff from the site.
 - (ii) Provisions will be in place to ensure stormwater from the development will not exceed the pre-development flows.
 - (iii) The runoff from the site into the public way will not increase from the pre-development condition.
 - (iv) The runoff to the MS4 is anticipated to be of an increase, but is anticipated to be easily accommodated in the existing 60 inch storm drain within Douglass Street. When looking at all analysis points, the cumulative runoff from the site will be reduced.
- b. A site-specific Stormwater Management Plan has been developed for the project to show compliance with Section 5 of the Technical Manual, including the basic standards of MEDEP Chapter 500. Please refer to sections J and K, the Erosion & Sedimentation Control and Stormwater Management Plans, respectively, for more information.



- c. The project is not located in a watershed of an urban impaired stream as listed by the MEDEP.
- d. Not applicable.
- e. The development is not anticipated to pose a contamination risk to groundwater during or after construction. The project will be serviced by a public wastewater system.
- f. The development will provide for adequate and sanitary disposal of sewage in accordance with Section 2 of the Technical Manual.

(c) Public Infrastructure and Community Safety Standards

1. Consistency with City Master Plans:
 - a. The project has been designed to be consistent with the City's Zoning Ordinance and off-site infrastructure.
 - b. The site plan will enhance and blend with the surrounding land and paved walking trails compared to its existing condition.
2. Public Safety and Fire Prevention:
 - a. The site has been designed to promote safe and inviting public access including connections to walking trails within Douglass Park.
 - b. Adequate emergency access has been provided. Fire trucks and ambulance will be able to access all of the site and buildings through a loop road.
 - c. The project will include a proposed private hydrant to serve the buildings on site and will be within 450 feet of the furthest structure.
3. Availability and Adequate Capacity of Public Utilities:
 - a. Ability to Serve letters have been sent to the respective companies. Responses are forthcoming.
 - b. The electrical service will be wired underground via a new pad-mounted transformer as shown on the Utility Plan.
 - c. The new sewer and stormwater infrastructure will meet the provisions of the Technical Manual.
 - d. The project will be served by connection to the public sewer system within Douglass Street.



- e. The sanitary sewer collection system meets all applicable sections of the Technical Manual. The stormwater management system is designed to meet the standards of Chapter 500.
- f. A space allocated for solid waste storage can be seen on the Site Plan (C-10). The solid waste containers will be fully enclosed and screened from the public view.

(d) Site Design Standards

1. Massing, Ventilation and Wind Impact:
 - a. Please refer to Section O, Architectural Design Narrative.
 - b. Please refer to Section O, Architectural Design Narrative.
 - c. Please refer to Section O, Architectural Design Narrative.
2. Shadows:
 - a. Not applicable.
3. Snow and Ice Loading:
 - a. The structure will not distribute snow and ice onto adjacent properties.
4. View Corridors:
 - a. Please refer to Section O, Architectural Design Narrative.
5. Historic Resources:
 - a. The development is not located in a historic district, historic landscape district or City designated landmark.
 - b. The development is not located adjacent to designated landmarks, historic district, or historic landscape district.
 - c. There are no known archaeological resources on the site.
6. Exterior Lighting:
 - a. Site Lighting.
 - (i) Exterior lighting will be designed to meet the requirements of Section 12 of the Technical Manual.



- (ii) The proposed buildings on site will employ house-side shielding to prevent adjacent residential properties from being adversely affected by exterior lighting.
 - b. Architectural and Specialty Lighting.
 - (i) No architectural or specialty lighting is proposed.
 - (ii) No up-lighting is proposed.
 - c. Street Lighting.
 - (i) No new street-lights are proposed.
7. Noise and Vibration:
- a. The HVAC system will meet the applicable state and federal emissions requirements and will also be screened and directed away from abutters.
8. Signage and Wayfinding:
- a. All street and wayfinding signage shall meet the requirements of the Manual on Uniform Traffic Devices (MUTCD) and Division 22 of the City Code.
 - (i) The project is not located in a historic district or subject to Article IX.
 - (ii) Signage will only be related to vehicular access.
 - (iii) All street and wayfinding signage shall meet the requirements of the Manual on Uniform Traffic Devices (MUTCD) and Division 22 of the City Code.
9. Zoning Related Design Standards:
- a. The project has been designed to meet the standards set forth in the R-5A zone. Please refer to the Site Plan for more information on the Space & Bulk Standards.





United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

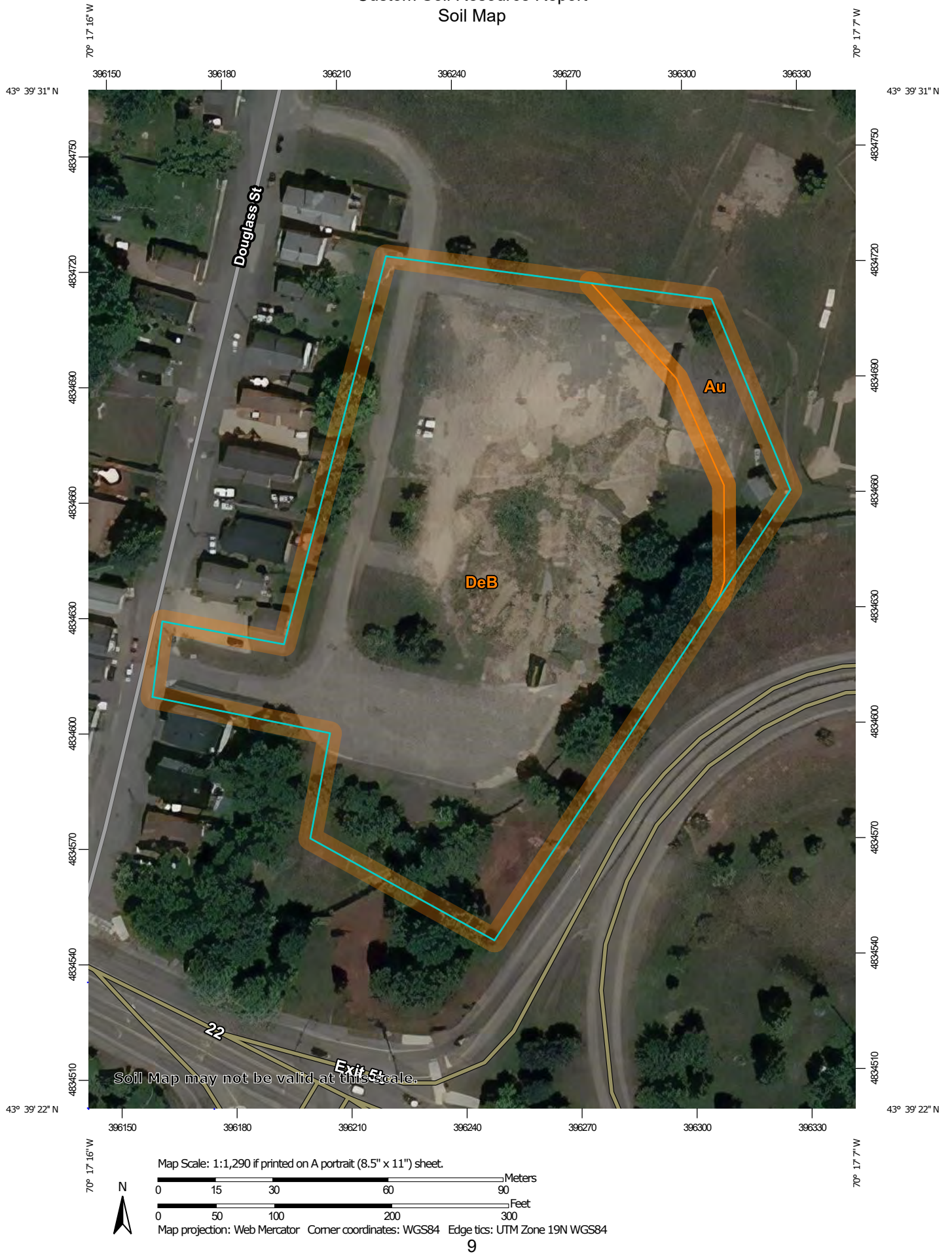
A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Cumberland County and Part of Oxford County, Maine



November 4, 2021

Custom Soil Resource Report
Soil Map



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Au	Au Gres loamy sand	0.3	7.8%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	3.7	92.2%
Totals for Area of Interest		4.0	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

Au—Au Gres loamy sand

Map Unit Setting

National map unit symbol: blgr
Elevation: 200 to 1,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Au gres and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Au Gres

Setting

Landform: Outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits derived from granite and gneiss

Typical profile

H1 - 0 to 10 inches: loamy sand
H2 - 10 to 32 inches: loamy sand
H3 - 32 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

DeB—Deerfield loamy fine sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2xfg9

Elevation: 0 to 1,190 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Deerfield and similar soils: 85 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerfield

Setting

Landform: Kame terraces, outwash plains, outwash terraces, outwash deltas

Landform position (three-dimensional): Tread

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Parent material: Sandy outwash derived from granite, gneiss, and/or quartzite

Typical profile

Ap - 0 to 9 inches: loamy fine sand

Bw - 9 to 25 inches: loamy fine sand

BC - 25 to 33 inches: fine sand

Cg - 33 to 60 inches: sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: Very 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: About 15 to 37 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Sodium adsorption ratio, maximum: 11.0

Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

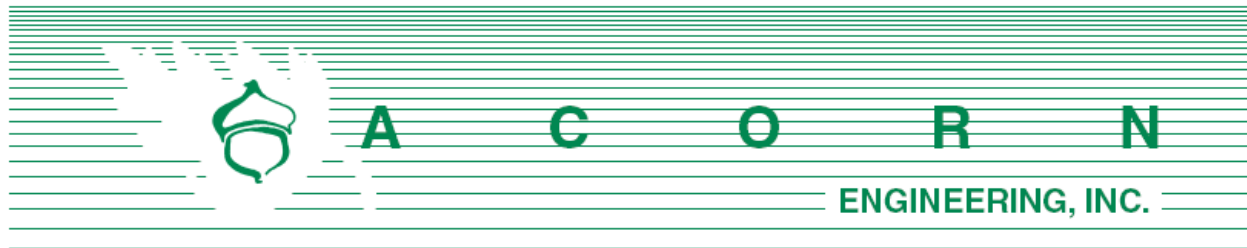
Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A

Ecological site: F144AY027MA - Moist Sandy Outwash

Hydric soil rating: No



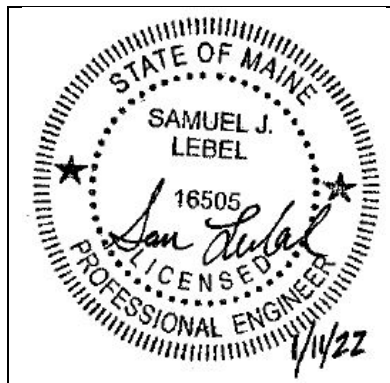
STORMWATER MANAGEMENT **REPORT**

Prepared For:

**Douglass Commons, LLC.
57 Douglass Street
Portland, Maine 04101**

Prepared By:

**Acorn Engineering, Inc.
PO Box 3372
Portland, Maine 04104**



January 2022



INTRODUCTION

Acorn Engineering, Inc. has been retained by Douglass Commons, LLC. to provide civil engineering services for the proposed redevelopment of 57 Douglass Street located within the R-5A Zoning District in Portland, Maine. The 3.34-acre parcel was previously the site of a school building and is now vacant. The built-out site will consist of eight stand-alone buildings comprising 120 residential units, the majority of which will be deed-restricted for affordability.

A stormwater analysis was prepared to demonstrate that the project will meet the following requirements of the City of Portland (the City):

- City of Portland Land Use Ordinance Chapter 14, Article V. Site Plan Section 14-523. Required Approvals and Applicability (F) Level III Site Plan Review.
- City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and Maine DEP Chapter 500 Stormwater Management General (Redevelopment) Standards.

The property consists of approximately 3.34 acres of land in Portland's Libbytown neighborhood. The site is currently composed of approximately 2.16 acres impervious area. The proposed project will decrease the impervious area by approximately 0.36 acres to 1.90 acres. The project will result in redevelopment of non-roof impervious area greater than 5,000 SF and therefore will be required to provide treatment for a portion of the site.

EXISTING CONDITIONS

The proposed project site is located at 57 Douglass Street. A Boundary & Topographic Survey has been prepared by Owen Haskell, Inc., dated March 1, 2021.

The existing property is covered by approximately 65% impervious surfaces, whereupon a school and its associated infrastructure was formerly located. The existing site is vacant and has moderate slopes within the center of the site that form a plateau, grading down to perimeter. The site is split into three subcatchments, two larger and one smaller. Subcatchment 1 drains the gently sloping northerly portion of the site and a small section of the existing access driveway to the MS4 within Douglass Street. Subcatchment 2 drains the southerly portion of the site to a basin shared with the off-site drainage of residences and the western flanks of I-295, which were also modeled. Subcatchment 3 is a small section of the eastern part of the site that drains to the playing fields east and north of the site.

The project team is not aware of the presence of any existing significant natural features located on the site. Given the urban setting and existing impervious surfaces, a field inventory of significant natural features was not undertaken. The project is not located within a watershed classified as an Urban Impaired Stream.



PROPOSED DEVELOPMENT

The project features the development of a planned residential unit development (PRUD) and generally follows the principles of cluster subdivision planning where infrastructure is denser and more efficient and as a result, greater uninterrupted open space opportunities are available. The site will consist of eight separate residential buildings with a total of 120 dwelling units. Each building will be served with associated parking and utilities. Pedestrian access to the site will be provided along the access drive from Douglass Street and through paved foot paths from Dougherty Park. The development will be served by Portland Water District, Department of Public Works (sewer/storm), Unitil (natural gas), CMP (electric), Charter (cable), and Fairpoint (telephone).

The site has been graded to slope with the existing topography while providing for appropriate slopes in the parking lot. The slopes on the outside of the parking areas that are not part of a stormwater system will be appropriately stabilized per the specifications in the plans and are anticipated to be heavily landscaped for further slope protection and buffering. The majority of the site's runoff, including 100% of the new impervious area, will be collected via a storm drain system and directed to the Douglass Street Municipal Separated Storm Sewer System (MS4).

The proposed project will decrease the site's impervious area by approximately 0.36 acres, but will include redevelopment of non-roof impervious area greater than 5,000 square feet, triggering the City's water quality treatment requirement. Water quality treatment will be provided by collecting the runoff on over 75% of the parking lot area and allowing it to flow to a vegetated underdrained soil filter (VUSF) system and proprietary high-flow rain gardens for treatment prior to discharging into the MS4 within Douglass Street. The project has been designed to meet and exceed the Chapter 500 General Standards.

BASIC STANDARDS – EROSION & SEDIMENTATION CONTROL

The development shall provide erosion and sedimentation control, inspection and maintenance, and housekeeping standards as specified in the attached Exhibit K: Erosion and Sedimentation Control Report. Grading and construction activity will not impede or otherwise alter drainageways to have an unreasonable adverse impact on an adjacent downgradient parcels.

GENERAL STANDARDS - WATER QUALITY

When analyzing the Maine DEP Redevelopment Standards and the associated ranked impacts, the project results in a negative number and therefore treatment is not required per State law. However, the development will provide water quality treatment for no less than 50% of the non-roof redeveloped impervious area, consistent with the City of Portland's technical manual. Water quality treatment will be provided using an under-drained soil filter system and proprietary high-flow media rain gardens, which are approved systems per Appendix B of the Maine Stormwater BMP Manual. Filtration BMPs have been shown to be very effective at removing a wide range of pollutants from stormwater runoff. The rain gardens are based off a Focal Point system manufactured by ACF Environmental, but may be substituted at the time of construction for an approved



equal such as a Filterra manufactured by Contech. The footprint of the filter media is 20 square feet and has an infiltration rate of 100 inches per hour. Above the media, the garden will allow for 6 inches of ponding before overflowing into an overflow beehive grate which bypasses the filter media. Given the site is reducing the net peak flow leaving the site and is discharging to a 60" MS4 that freely flows to a major river segment, storage tanks are not being proposed below the rain gardens. From a stormwater perspective, the focus is on providing water quality treatment given the watershed's discharge and conveyance system are not overburdened.

The treatment of the impervious areas are as follows:

Table 1 – Impervious Area Treatment Table				
Existing Impervious Area (SF)	Total Proposed Impervious Area (SF)	Non-Roof Redeveloped Impervious Area (SF)	Proposed Non-Roof Impervious Area with Treatment (SF)	Treated Non-Roof Redeveloped Area
94,185	78,656	43,757	23,370	53%

As shown above, the project anticipates meeting the required treatment for new impervious and developed surfaces with the soil filter BMPs.

Filter Area Sizing

A calculation for filter area is necessary to meet the requirements below the surface of the VUSF. As defined in the Volume III: BMPs Technical Design Manual, Chapter 7, the surface area of the filter shall be no less than the sum of 5% of the tributary impervious area and 2% of the tributary vegetated area. The filter area is calculated by the following formula:

$$[(\text{Imp. SF} \times 0.05) + (\text{Veg. SF} \times 0.02)] = \text{Filter Area (SF)}$$

Table 2 – Total Filter Surface Area, displays the proposed USSF sizing requirements, actual size and the percentage of required area.

Table 2 – Total Filter Surface Area		
	Required Filter Area (SF)	Actual Filter Area (SF)
VUSF 1	465	465

As shown above, the project anticipates meeting and exceeding the required treatment for 50% of the redeveloped impervious surfaces.

Water Quality Volume

In accordance with the Volume III: BMPs Technical Design Manual, a water quality volume of 1.0 inches times the tributary impervious area plus 0.4 inches times the tributary vegetated area is required to be treated by the VUSF. The required water quality volume is calculated by the following formula:

$$\left(\frac{\text{Imp. SF} \times 1.0''}{12''/1'} \right) + \left(\frac{\text{Veg. SF} \times 0.4''}{12''/1'} \right) = \text{Treatment Volume (CF)}$$

Table 3 – Water Quality Volume				
	Tributary Impervious Area (SF)	Tributary Pervious Area (SF)	Water Quality Volume Required (CF)	System Storage Volume Provided (CF)
VUSF 1	8,274	2,578	775	1,052

As seen above, the provide water quality volume above the soil filter and below the overflow grate exceeds the requirement. Values from the HydroCAD calculations are attached to this report to demonstrate compliance with this standard.

As shown above, the project anticipates meeting and exceeding the required treatment for new impervious surfaces using the VUSF and proprietary high-flow media rain gardens.

FLOODING STANDARD – WATER QUANTITY

The proposed project was modeled using HydroCAD to verify that the post-development conditions do not exceed the pre-development conditions. A 24-hour SCS Type III storm distribution for the 2, 10, and 25-year storm events were used. The corresponding rainfall amounts for these storms are 3.10", 4.60", and 5.80" respectively.

Time of Concentration (Tc)

The times of concentration for subcatchments in both the pre and post conditions were calculated by entering the flow path with the associated ground cover and slopes. HydroCAD then calculated the Tc's and incorporated the total Tc for each subcatchment into the model. When the calculated Tc was less than six minutes (0.1 hours), a direct entry of six minutes was used as advised by the TR-55 model. Consistent with previous submissions and best practices, the sheet flow length for any Tc path was capped at 100 feet.

Curve Number (CN)

Within the pre-development model, the vegetated areas were considered grass cover in fair or good condition, depending on the area. as demonstrated by aerial images and site visits. The post development landscaped areas were given a good rating all within the A hydrologic soil group. This is assumption is reinforced given the aggressive landscape plan which will feature more porous conditions that are appropriately mulched along with future extensive root systems and canopy cover that will exist once the landscaping has matured.



HydroCAD Adjustments

A simulation water quality outlet (vertical orifice) is modeled to mimic the minimum 24-hour release time through the soil filter media. This is completed by adjusting the rainfall amount in HydroCAD until the inflow volume is equal to or greater than the calculated water quality volume. The storm events are modeled as type III, 24-hour storm events in HydroCAD.

Pre-development Calculations

The site consists of gravel and grassed areas in the predevelopment condition. For the purposes of this analysis, the land has been divided into three sub-catchments. Subcatchment 1 drains the gently sloping northerly portion of the site and a small section of the existing access driveway, terminating in the storm drains and MS4 within Douglass Street (POI #1). Subcatchment 2 drains the southerly portion of the site to a basin shared with the off-site drainage of residences and the western flanks of I-295, which were also modeled. The slopes are in the 5-10% range. There is an existing culvert under the State's paved pathway that divides I-295 land with the proposed site, that facilitates flow from the grassed basin to the Site under the pathway. This low point was modeled as POI #2. Subcatchment 3 is a small section of the eastern part of the site with 2-5% slopes that drains to the playing fields east and north of the site which was modeled as POI #3.

Peak flow rates for the pre-development storm events are as follows:

Table 5 – Pre-Development Peak Stormwater Flows			
Drainage Area	2-Year Storm Event (cfs)	10-Year Storm Event (cfs)	25-Year Storm Event (cfs)
POI #1	3.2	5.4	7.3
POI #2	0.4	1.8	3.5
POI #3	0.7	1.5	2.1

Post-development Calculations

In the post development condition, over 95% of runoff from the site will be collected in stormwater infrastructure and piped to the MS4 within Douglass Street. The proposed project will decrease the site's impervious area by approximately 0.36 acres. Water quality treatment will be provided by collecting the runoff on over 75% of the parking lot area and allowing it to flow to an under-drained soil filter system and proprietary high-flow media rain gardens for treatment prior to discharging into the combined sewer within Douglass Street.

The post-development calculations include changes to the land use, and the compensation provided by the VUSF, rain gardens, and associated engineered orifices. The following table represents comparison of pre- development and post-development condition peak runoff rates for the proposed development and tributary areas.



Table 6 – Post-Development Peak Stormwater Flows			
Drainage Area	2-Year Storm Event (cfs)	10-Year Storm Event (cfs)	25-Year Storm Event (cfs)
POI #1	3.8	7.7	11.0
POI #2	0	0.1	0.3
POI #3	0	0	0

Table 7 – Comparison of Peak Flows						
Drainage Area	2-Year Storm Event (cfs)		10-Year Storm Event (cfs)		25-Year Storm Event (cfs)	
	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>
POI #1	3.2	3.8	5.4	7.7	7.3	11.0
POI #2	0.4	0	1.8	0.1	3.5	0.3
POI #3	0.7	0	1.5	0	2.1	0
POI #4 (Total Peak Discharge)	4.3	3.8	8.7	7.8	12.9	11.3

As shown in Tables 6 and 7, the net impact of the post development peak flows will remain below the predevelopment levels. A post-development watershed map developed for this project can be viewed in Attachment B, and a copy of the HydroCAD calculations is included within Attachment C of this report.

SOILS

Onsite soil information is sourced from the *Soil Conservation Service Medium Intensity Soil Survey for Cumberland County consistent with the USDA Soil Survey*.

The area within and surrounding the project includes soils types listed in the table below.

Table 8 – Hydrologic Soil Group	
Soils Type	HSG
Deerfield Loamy Fine Sand, 3-8% slopes	A

The HSG for the soils, listed above, show soils having a high infiltration rate (low runoff potential). These consist mainly of deep, well drained sands, with a high rate of water transmission.

Conclusion

The proposed development was designed to meet the requirements implemented by the MDEP under the Stormwater Management Statute (38 M.R.S.A. § 420-D) as well as the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards. The proposed project as designed is not anticipated to cause flooding or erosion problems within the subject site, abutters' sites, nor within the right-of-way.



Attachments

Attachment A: Pre-Development Watershed Map

Attachment B: Post-Development Watershed Map

Attachment C: Non-Roof Redevelopment Impervious Area Exhibit

Attachment D: HydroCAD Calculations

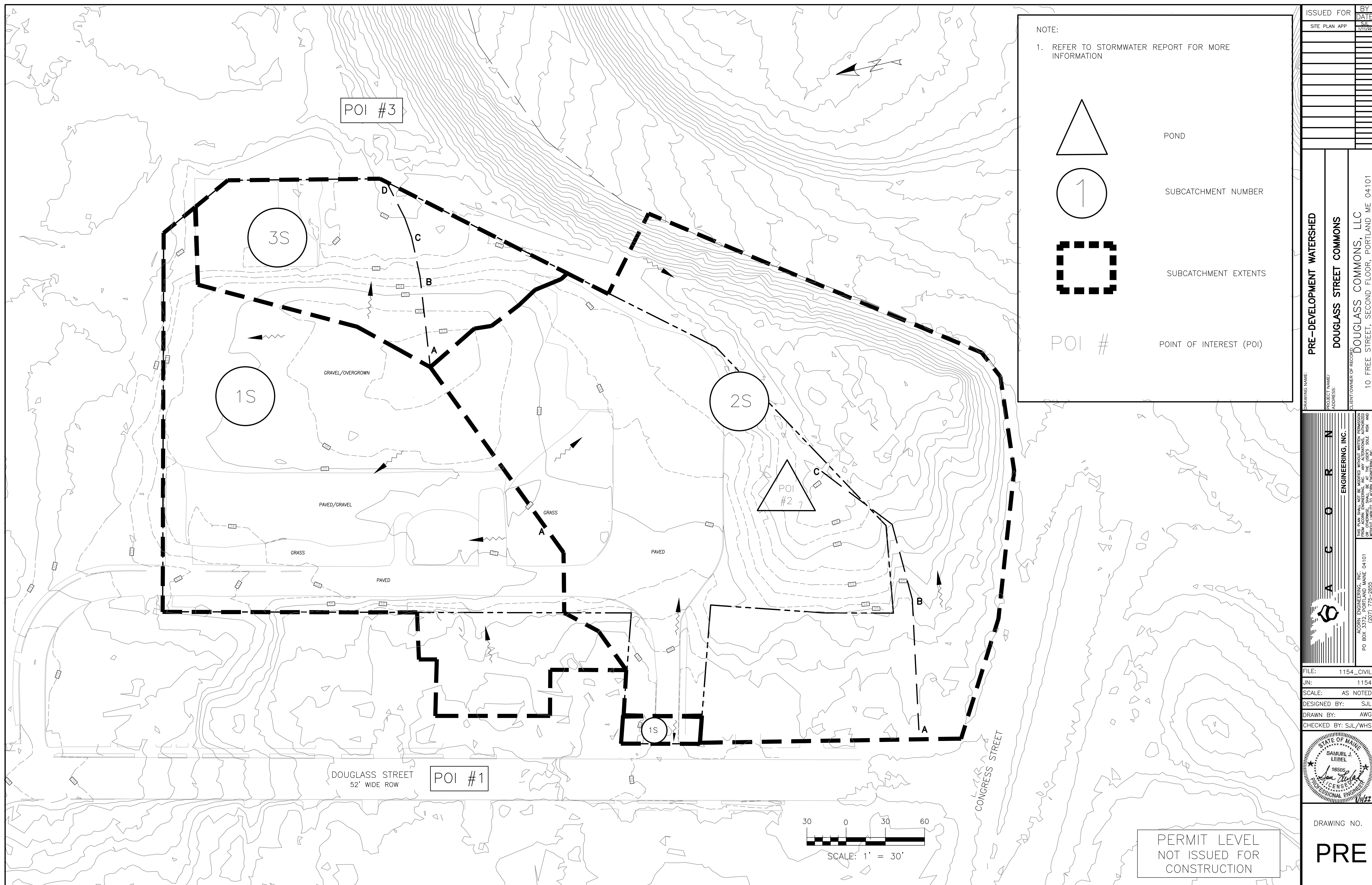
Attachment E: Soil Survey



Attachment A

Pre-Development Watershed Map

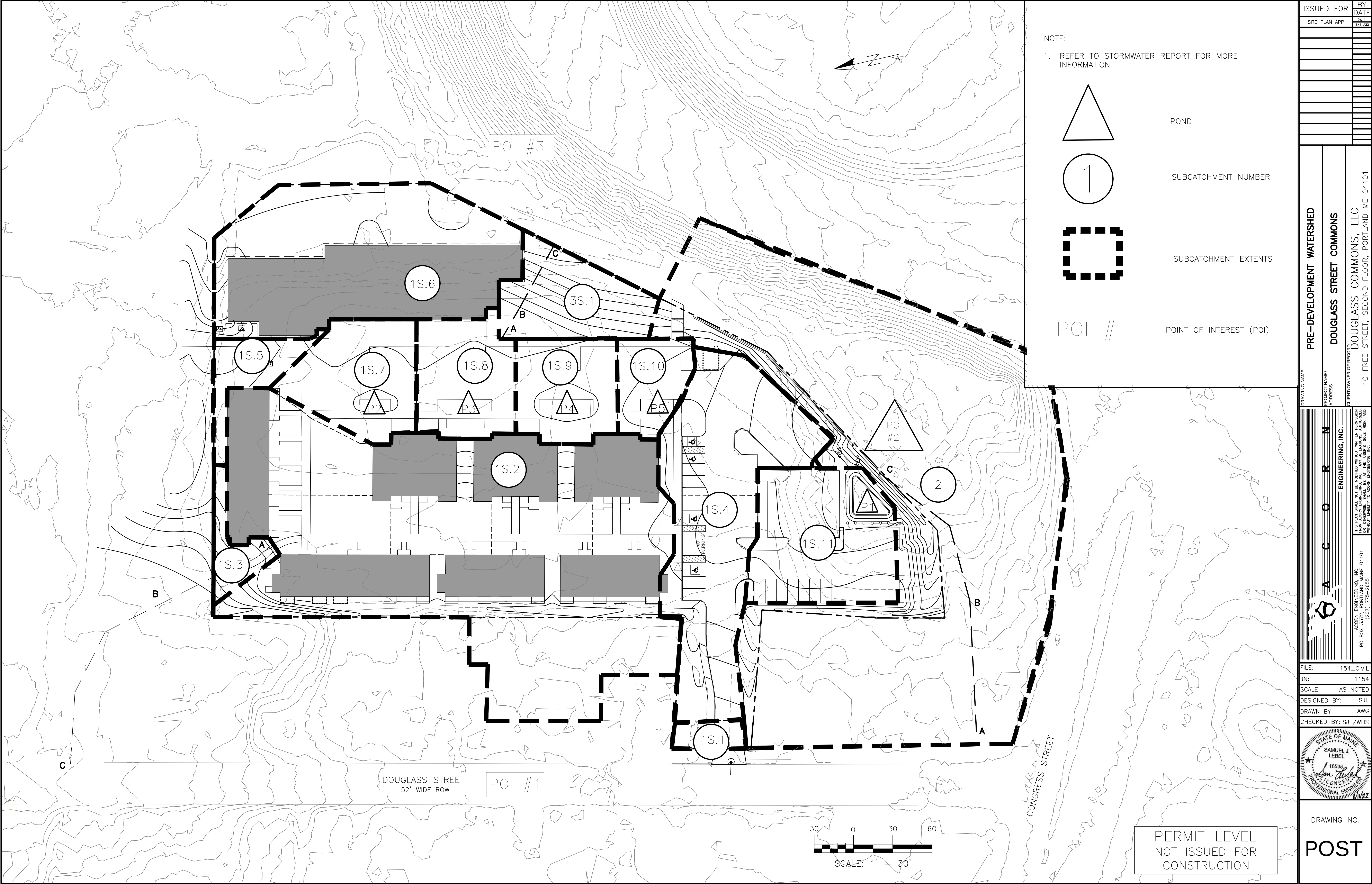




Attachment B

Post-Development Watershed Map





ISSUED FOR		BY
SITE PLAN APP		DATE
		1/11/23
PRE-DEVELOPMENT WATERSHED		
DOUGLASS STREET COMMONS		
DOUGLASS COMMONS, LLC		
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101		
DRAWING NAME:		
PROJECT NAME/ ADDRESS:		
CLIENT/OWNER OF RECORD:		
ACORN ENGINEERING, INC.		
PO BOX 3372, PORTLAND MAINE 04101		
(207) 753-2555		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION OF ACORN ENGINEERING, INC. OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO ACORN ENGINEERING, INC.		
FILE: 1154_CIVIL		
JN: 1154		
SCALE: AS NOTED		
DESIGNED BY: SJL		
DRAWN BY: AWG		
CHECKED BY: SJL/WH		
STATE OF MAINE SAMUEL J. LEBEL 16505 Professional Engineer 1/1/22		
DRAWING NO.		
POST		

Attachment C

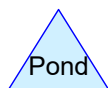
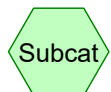
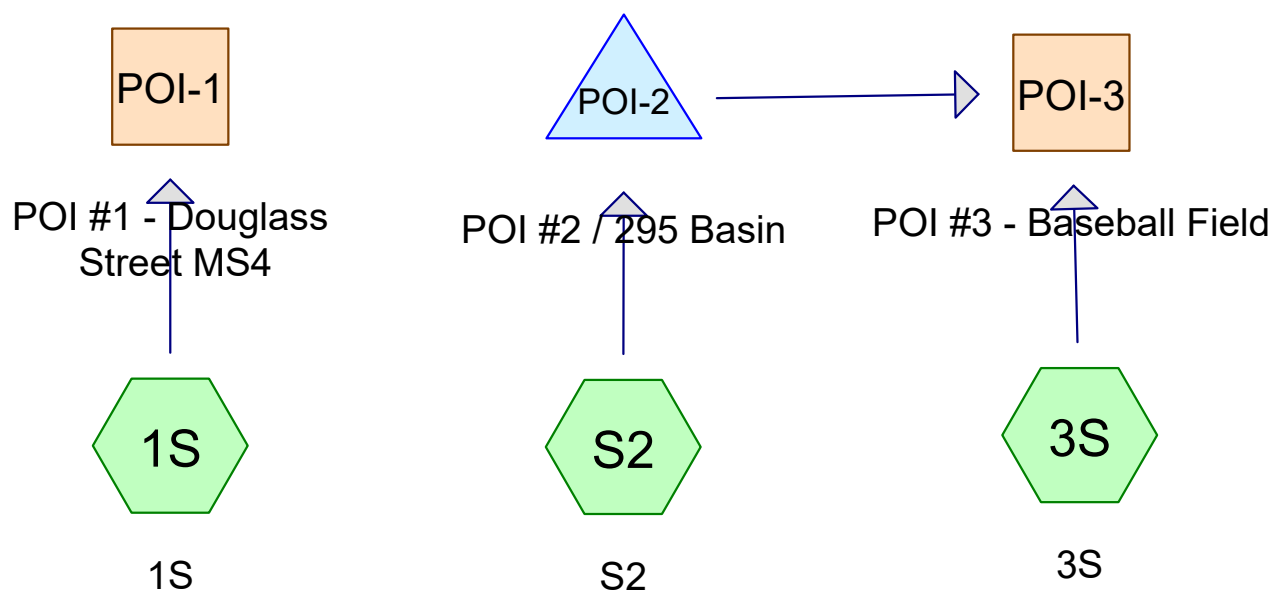
Non-Roof Redevelopment Impervious Area Exhibit



Attachment D

HydroCAD Calculations





Routing Diagram for Pre Development 1.11
 Prepared by HP, Printed 1/20/2022
 HydroCAD® 10.00-24 s/n 00620 © 2018 HydroCAD Software Solutions LLC

Pre Development 1.11

Prepared by HP

HydroCAD® 10.00-24 s/n 00620 © 2018 HydroCAD Software Solutions LLC

Printed 1/20/2022

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.204	77	1/8 acre lots, 65% imp, HSG A (1S)
1.085	49	50-75% Grass cover, Fair, HSG A (1S, 3S, S2)
0.571	96	Gravel (S2)
0.636	96	Gravel surface (1S)
0.353	96	Gravel surface, HSG A (3S)
0.072	98	Paved walking path (S2)
0.496	98	Pavement / Roof (1S)
0.321	98	Single family roofs and driveways (S2)
1.212	32	Woods/grass comb., Good, HSG A (S2)
4.951	70	TOTAL AREA

Pre Development 1.11

Prepared by HP

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.855	HSG A	1S, 3S, S2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.096	Other	1S, S2
4.951		TOTAL AREA

Pre Development 1.11

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.204	0.000	0.000	0.000	0.000	0.204	1/8 acre lots, 65% imp	1 S
1.085	0.000	0.000	0.000	0.000	1.085	50-75% Grass cover, Fair	1 S, 3 S, S 2
0.000	0.000	0.000	0.000	0.571	0.571	Gravel	S 2
0.353	0.000	0.000	0.000	0.636	0.990	Gravel surface	1 S, 3 S
0.000	0.000	0.000	0.000	0.072	0.072	Paved walking path	S 2
0.000	0.000	0.000	0.000	0.496	0.496	Pavement / Roof	1 S
0.000	0.000	0.000	0.000	0.321	0.321	Single family roofs and driveways	S 2
1.212	0.000	0.000	0.000	0.000	1.212	Woods/grass comb., Good	S 2
2.855	0.000	0.000	0.000	2.096	4.951	TOTAL AREA	

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Type III 24-hr 2-year Rainfall=3.10"

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Page 5

Time span=1.00-36.00 hrs, dt=0.10 hrs, 351 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: 1S

Runoff Area=68,602 sf 39.93% Impervious Runoff Depth=1.83"
Tc=6.0 min CN=87 Runoff=3.16 cfs 0.240 af

Subcatchment3S: 3S

Runoff Area=24,703 sf 0.00% Impervious Runoff Depth=1.20"
Tc=6.0 min CN=78 Runoff=0.73 cfs 0.057 af

SubcatchmentS2: S2

Runoff Area=122,360 sf 14.00% Impervious Runoff Depth=0.31"
Flow Length=233' Tc=16.0 min CN=58 Runoff=0.38 cfs 0.072 af

Reach POI-1: POI #1 - Douglass Street MS4

Inflow=3.16 cfs 0.240 af
Outflow=3.16 cfs 0.240 af

Reach POI-3: POI #3 - Baseball Field

Inflow=0.73 cfs 0.057 af
Outflow=0.73 cfs 0.057 af

Pond POI-2: POI #2 / 295 Basin

Peak Elev=27.00' Storage=1,609 cf Inflow=0.38 cfs 0.072 af
Discarded=0.05 cfs 0.061 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.061 af

Total Runoff Area = 4.951 ac Runoff Volume = 0.368 af Average Runoff Depth = 0.89"
79.36% Pervious = 3.929 ac 20.64% Impervious = 1.022 ac

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Type III 24-hr 2-year Rainfall=3.10"

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Page 6

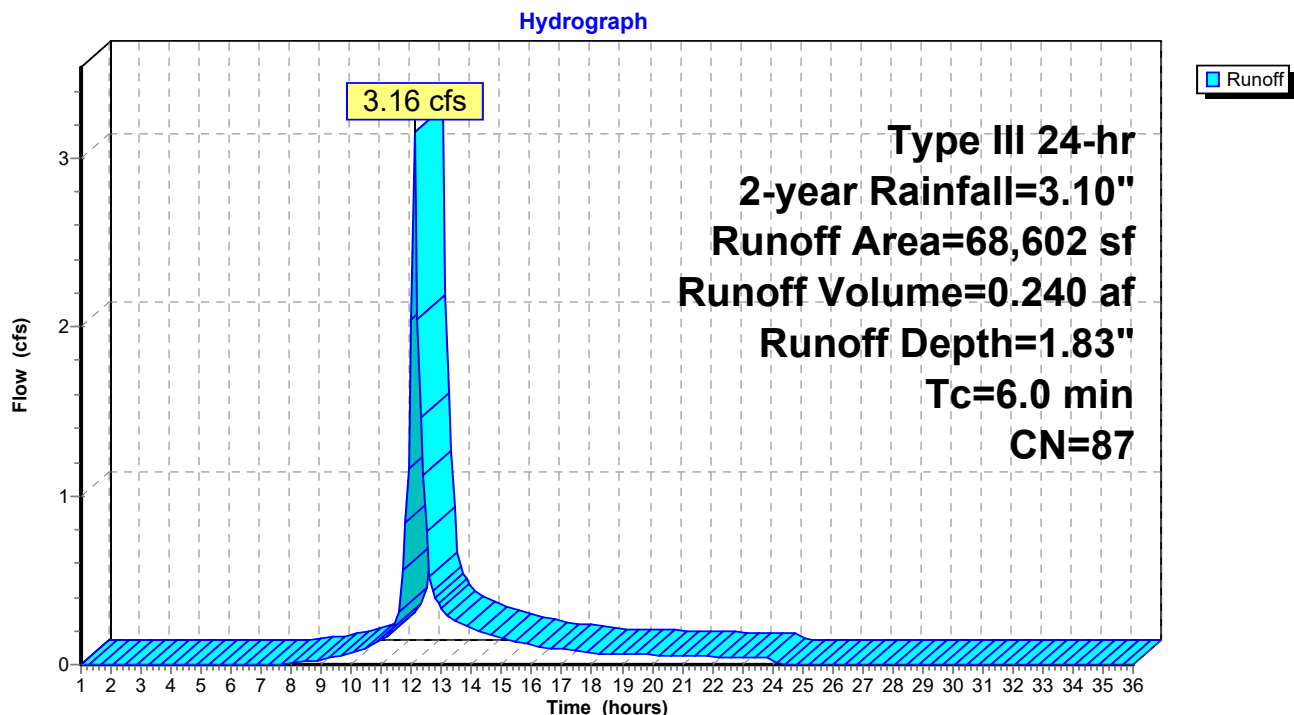
Summary for Subcatchment 1S: 1S

Runoff = 3.16 cfs @ 12.10 hrs, Volume= 0.240 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	21,601	98	Pavement / Roof
*	27,720	96	Gravel surface
	10,373	49	50-75% Grass cover, Fair, HSG A
	8,908	77	1/8 acre lots, 65% imp, HSG A
	68,602	87	Weighted Average
	41,211		60.07% Pervious Area
	27,391		39.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: 1S

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Type III 24-hr 2-year Rainfall=3.10"

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Page 7

Summary for Subcatchment 3S: 3S

Runoff = 0.73 cfs @ 12.11 hrs, Volume= 0.057 af, Depth= 1.20"

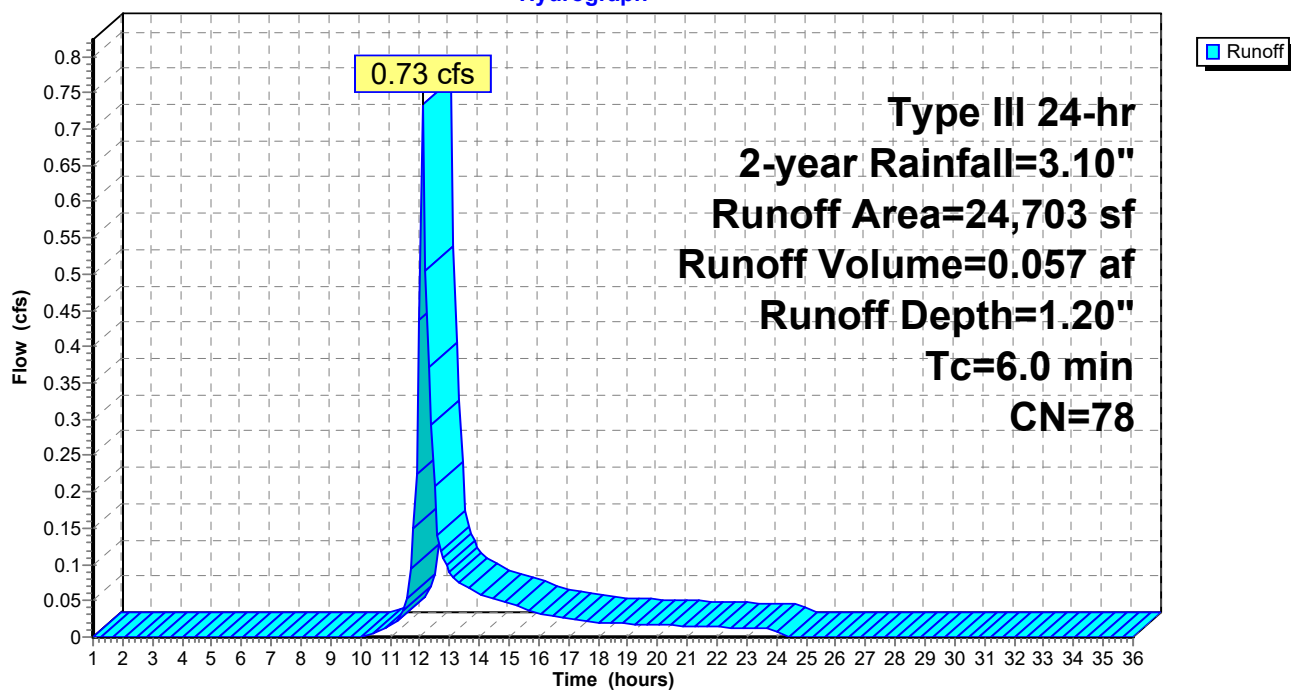
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
15,393	96	Gravel surface, HSG A
9,310	49	50-75% Grass cover, Fair, HSG A
24,703	78	Weighted Average
24,703		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: 3S

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 8

Summary for Subcatchment S2: S2

Runoff = 0.38 cfs @ 12.44 hrs, Volume= 0.072 af, Depth= 0.31"

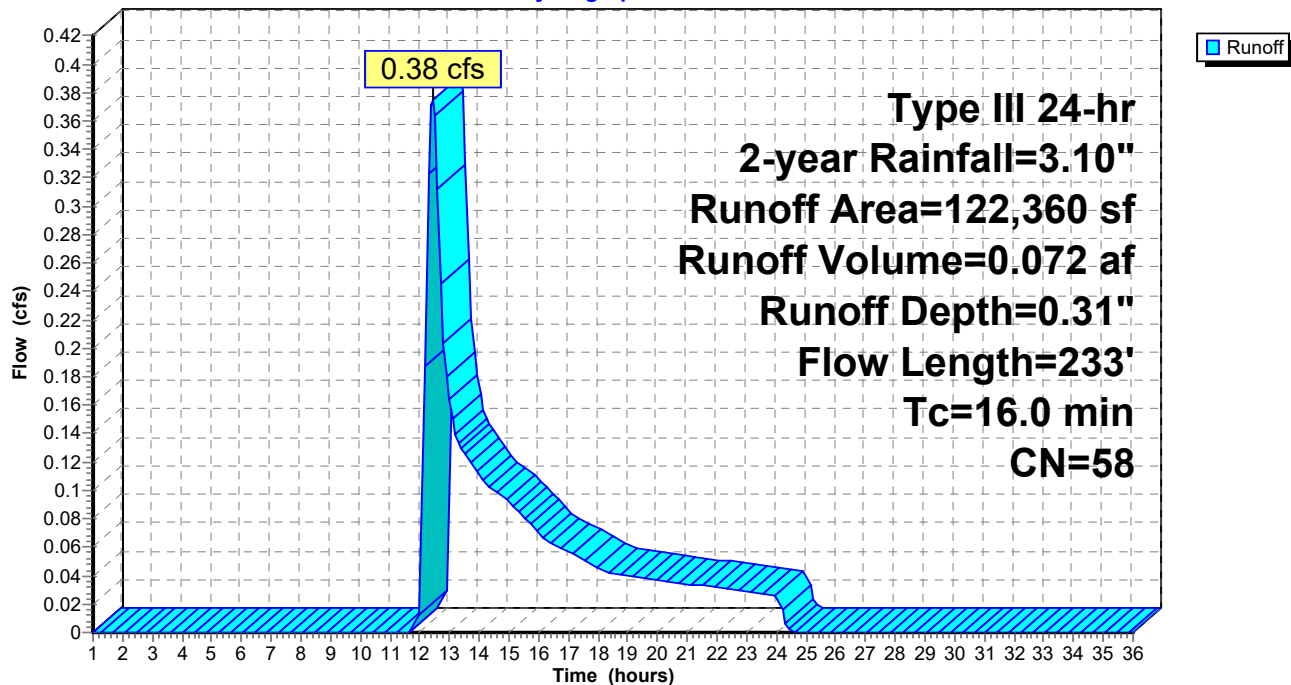
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	13,972	98	Single family roofs and driveways
*	3,155	98	Paved walking path
	52,792	32	Woods/grass comb., Good, HSG A
*	24,853	96	Gravel
	27,588	49	50-75% Grass cover, Fair, HSG A
	122,360	58	Weighted Average
	105,233		86.00% Pervious Area
	17,127		14.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C (capped 100' sheet flow) Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment S2: S2

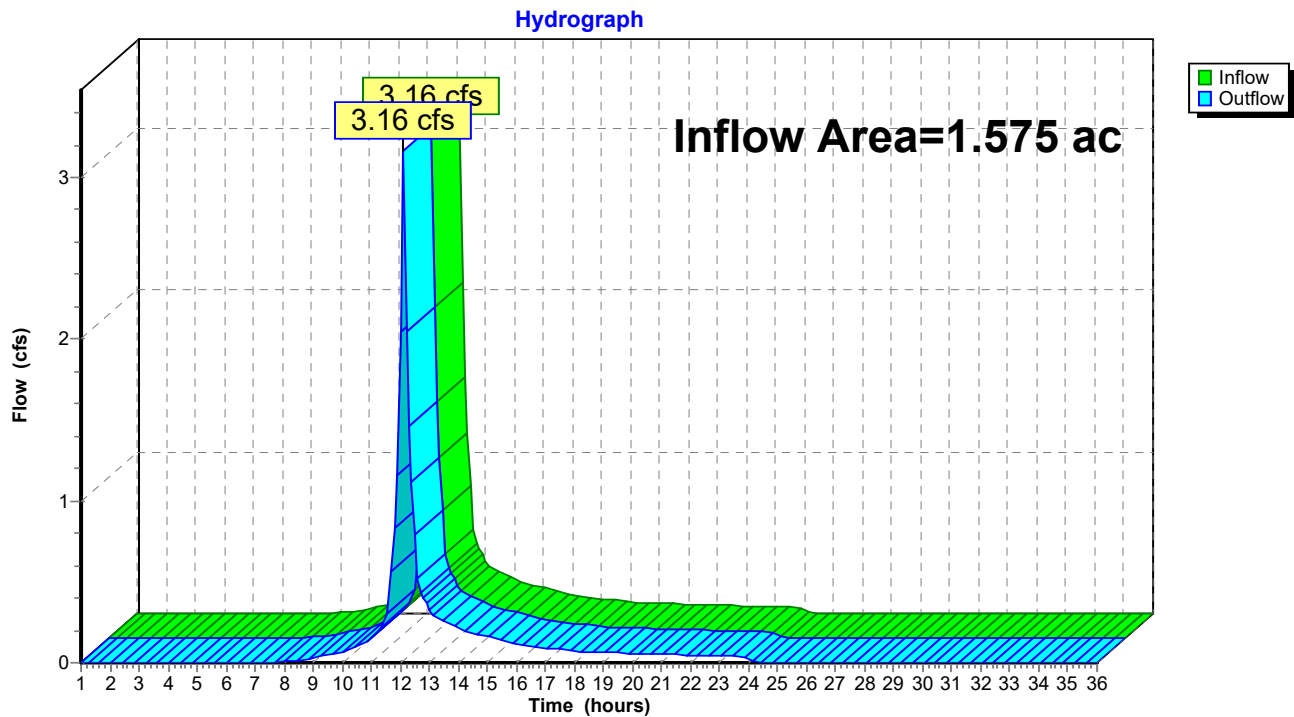
Hydrograph



Summary for Reach POI-1: POI #1 - Douglass Street MS4

Inflow Area = 1.575 ac, 39.93% Impervious, Inflow Depth = 1.83" for 2-year event
Inflow = 3.16 cfs @ 12.10 hrs, Volume= 0.240 af
Outflow = 3.16 cfs @ 12.10 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.0 min

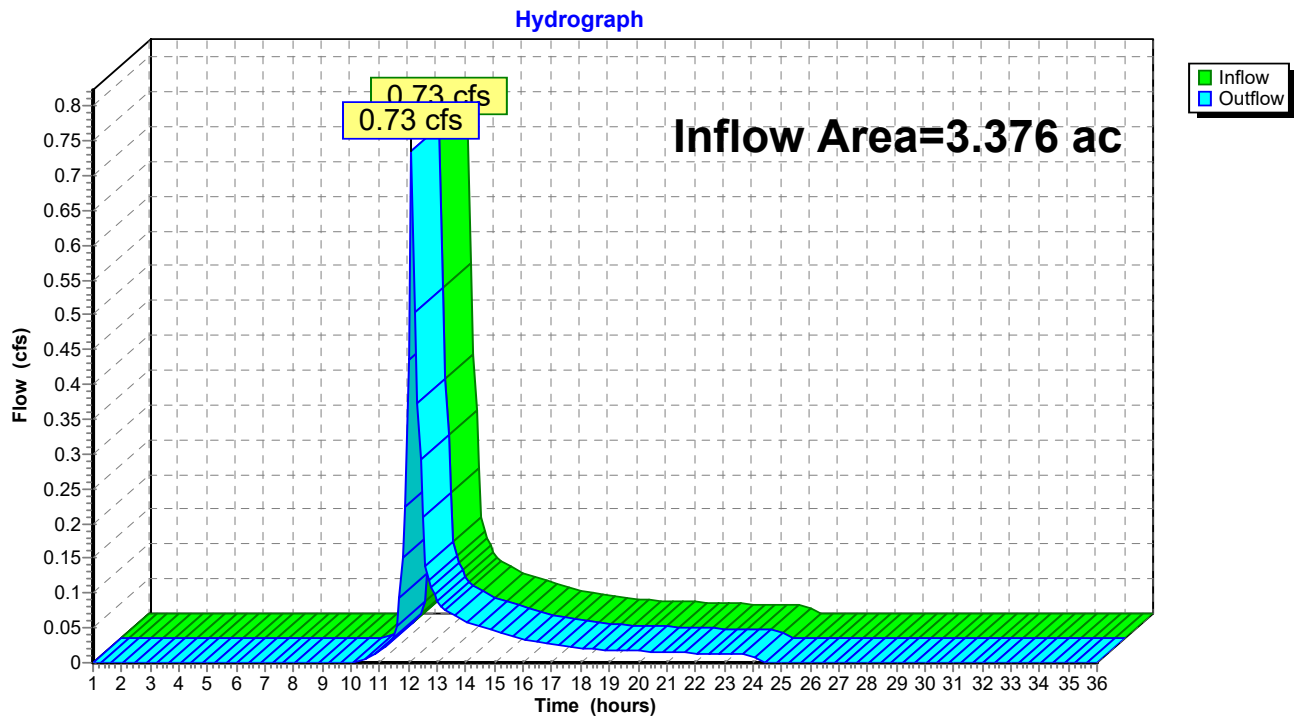
Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-1: POI #1 - Douglass Street MS4

Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 3.376 ac, 11.65% Impervious, Inflow Depth = 0.20" for 2-year event
Inflow = 0.73 cfs @ 12.11 hrs, Volume= 0.057 af
Outflow = 0.73 cfs @ 12.11 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-3: POI #3 - Baseball Field

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Type III 24-hr 2-year Rainfall=3.10"

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Page 11

Summary for Pond POI-2: POI #2 / 295 Basin

Inflow Area = 2.809 ac, 14.00% Impervious, Inflow Depth = 0.31" for 2-year event
 Inflow = 0.38 cfs @ 12.44 hrs, Volume= 0.072 af
 Outflow = 0.05 cfs @ 17.91 hrs, Volume= 0.061 af, Atten= 88%, Lag= 328.3 min
 Discarded = 0.05 cfs @ 17.91 hrs, Volume= 0.061 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
 Peak Elev= 27.00' @ 17.91 hrs Surf.Area= 4,488 sf Storage= 1,609 cf

Plug-Flow detention time= 445.4 min calculated for 0.061 af (85% of inflow)
 Center-of-Mass det. time= 381.4 min (1,328.8 - 947.4)

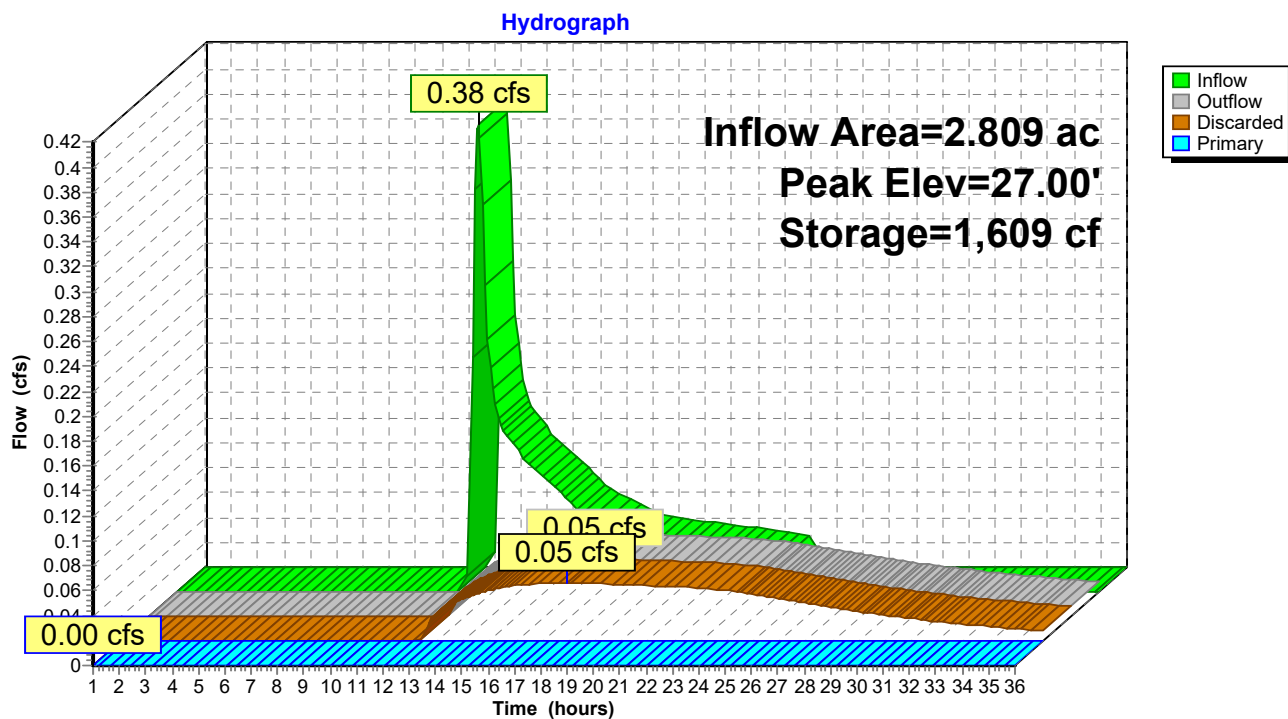
Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	274,731 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	12,191	8,333	9,934
29.00	18,000	15,096	25,030
30.00	32,600	25,300	50,330
33.00	41,943	111,815	162,144
35.00	70,644	112,587	274,731

Device	Routing	Invert	Outlet Devices
#1	Primary	32.40'	20.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	26.60'	0.800 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.05 cfs @ 17.91 hrs HW=27.00' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POI-2: POI #2 / 295 Basin



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Type III 24-hr 10-year Rainfall=4.60"

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Page 13

Time span=1.00-36.00 hrs, dt=0.10 hrs, 351 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: 1S

Runoff Area=68,602 sf 39.93% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=87 Runoff=5.43 cfs 0.419 af

Subcatchment3S: 3S

Runoff Area=24,703 sf 0.00% Impervious Runoff Depth=2.38"
Tc=6.0 min CN=78 Runoff=1.48 cfs 0.112 af

SubcatchmentS2: S2

Runoff Area=122,360 sf 14.00% Impervious Runoff Depth=0.96"
Flow Length=233' Tc=16.0 min CN=58 Runoff=1.84 cfs 0.224 af

Reach POI-1: POI #1 - Douglass Street MS4

Inflow=5.43 cfs 0.419 af
Outflow=5.43 cfs 0.419 af

Reach POI-3: POI #3 - Baseball Field

Inflow=1.48 cfs 0.112 af
Outflow=1.48 cfs 0.112 af

Pond POI-2: POI #2 / 295 Basin

Peak Elev=27.59' Storage=5,560 cf Inflow=1.84 cfs 0.224 af
Discarded=0.13 cfs 0.192 af Primary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.192 af

Total Runoff Area = 4.951 ac Runoff Volume = 0.755 af Average Runoff Depth = 1.83"
79.36% Pervious = 3.929 ac 20.64% Impervious = 1.022 ac

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Type III 24-hr 10-year Rainfall=4.60"

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Page 14

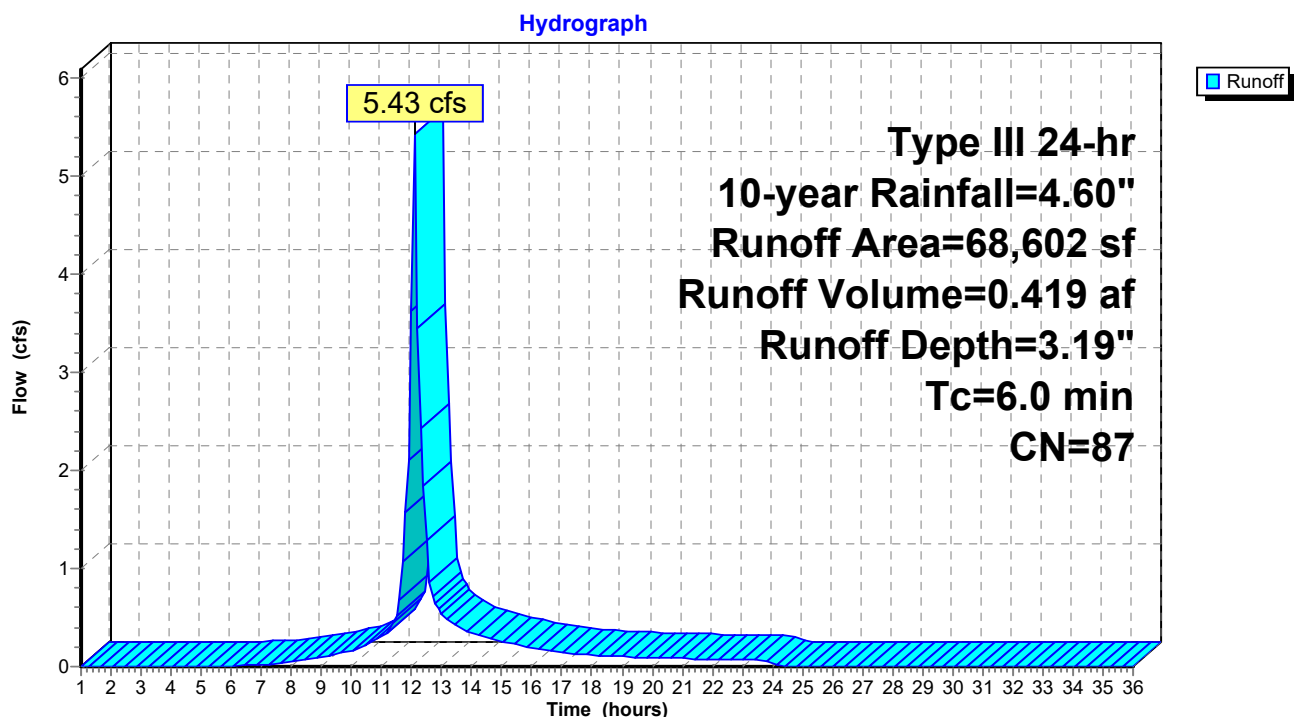
Summary for Subcatchment 1S: 1S

Runoff = 5.43 cfs @ 12.10 hrs, Volume= 0.419 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	21,601	98	Pavement / Roof
*	27,720	96	Gravel surface
	10,373	49	50-75% Grass cover, Fair, HSG A
	8,908	77	1/8 acre lots, 65% imp, HSG A
	68,602	87	Weighted Average
	41,211		60.07% Pervious Area
	27,391		39.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: 1S

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Type III 24-hr 10-year Rainfall=4.60"

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Page 15

Summary for Subcatchment 3S: 3S

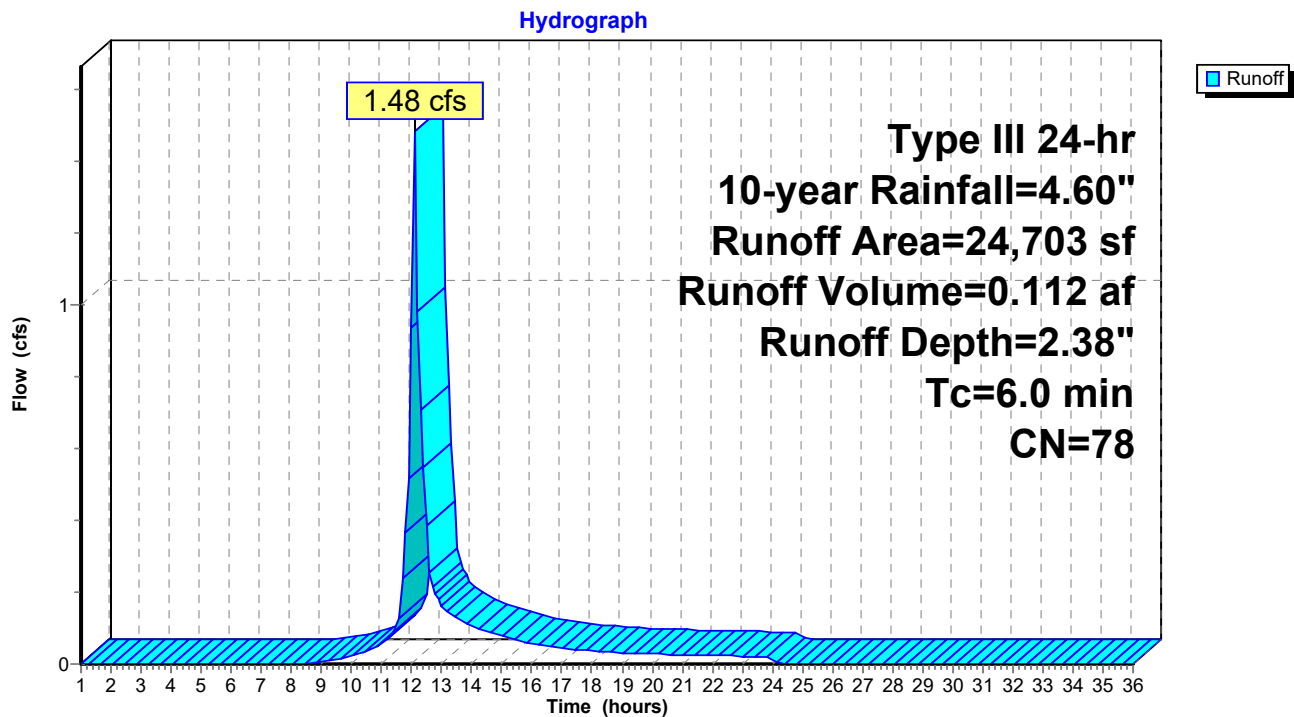
Runoff = 1.48 cfs @ 12.10 hrs, Volume= 0.112 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
15,393	96	Gravel surface, HSG A
9,310	49	50-75% Grass cover, Fair, HSG A
24,703	78	Weighted Average
24,703		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: 3S



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Type III 24-hr 10-year Rainfall=4.60"

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Page 16

Summary for Subcatchment S2: S2

Runoff = 1.84 cfs @ 12.29 hrs, Volume= 0.224 af, Depth= 0.96"

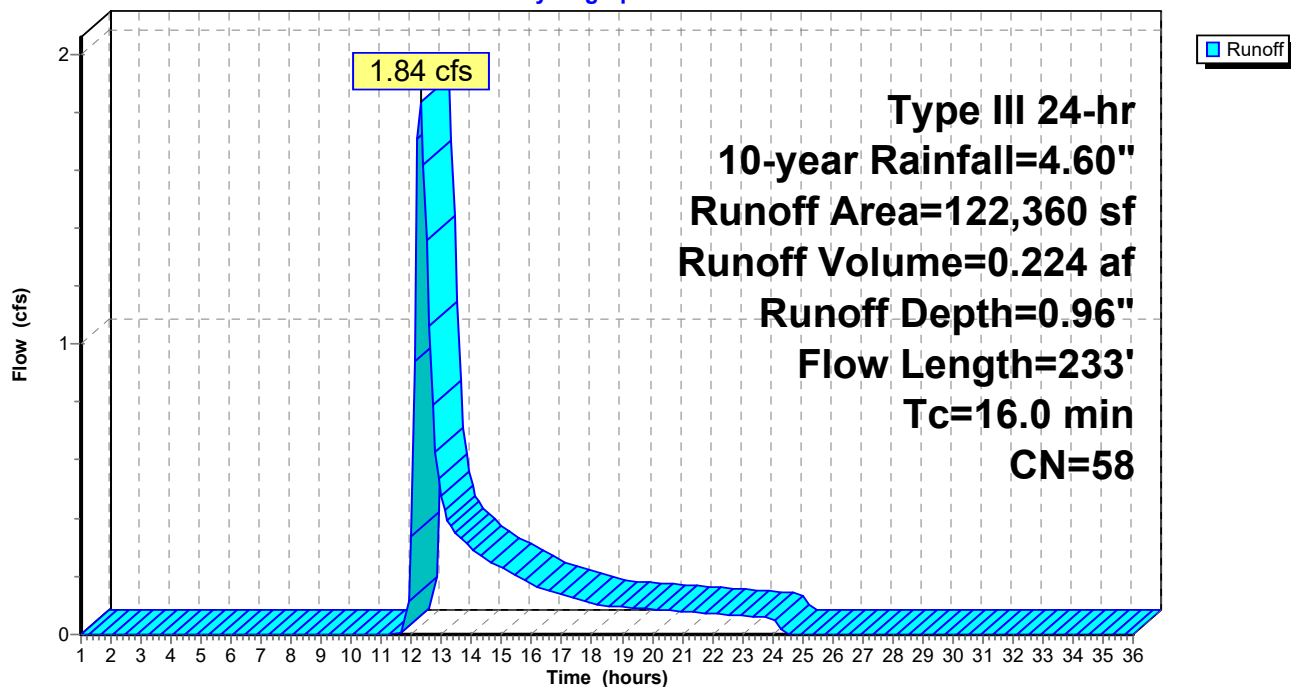
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	13,972	98	Single family roofs and driveways
*	3,155	98	Paved walking path
	52,792	32	Woods/grass comb., Good, HSG A
*	24,853	96	Gravel
	27,588	49	50-75% Grass cover, Fair, HSG A
	122,360	58	Weighted Average
	105,233		86.00% Pervious Area
	17,127		14.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C (capped 100' sheet flow) Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment S2: S2

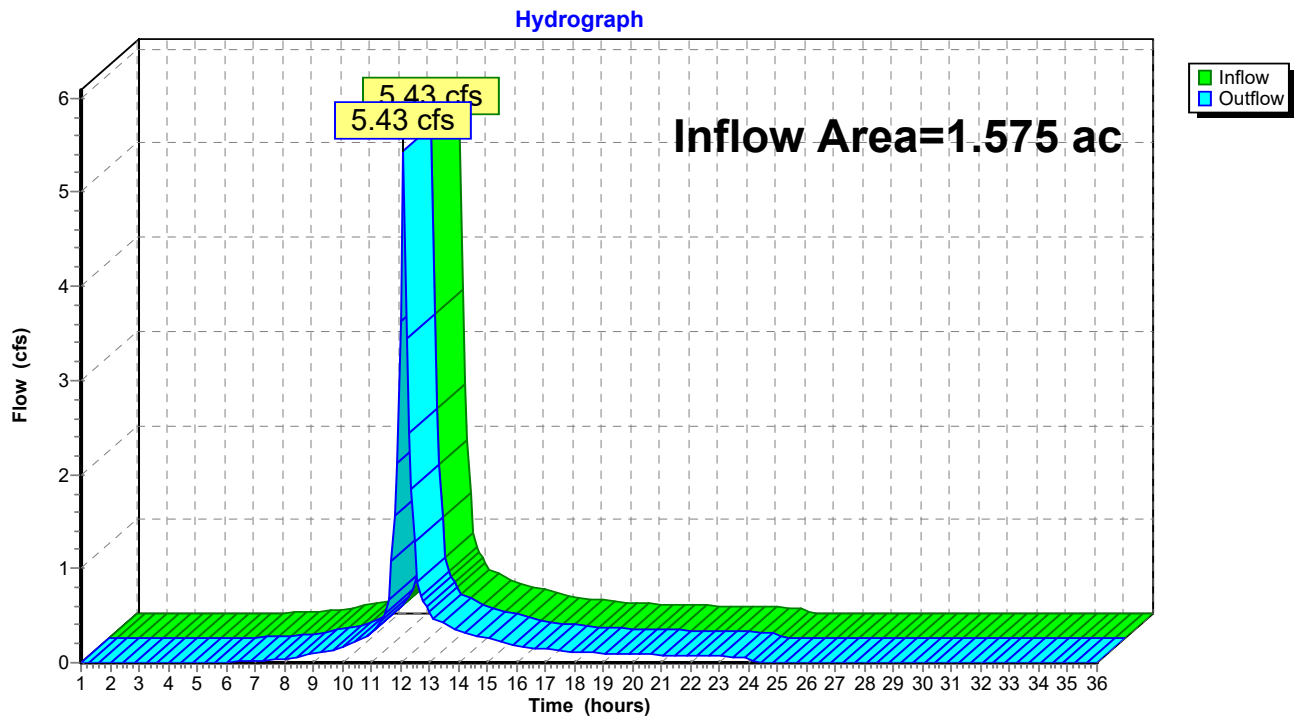
Hydrograph



Summary for Reach POI-1: POI #1 - Douglass Street MS4

Inflow Area = 1.575 ac, 39.93% Impervious, Inflow Depth = 3.19" for 10-year event
Inflow = 5.43 cfs @ 12.10 hrs, Volume= 0.419 af
Outflow = 5.43 cfs @ 12.10 hrs, Volume= 0.419 af, Atten= 0%, Lag= 0.0 min

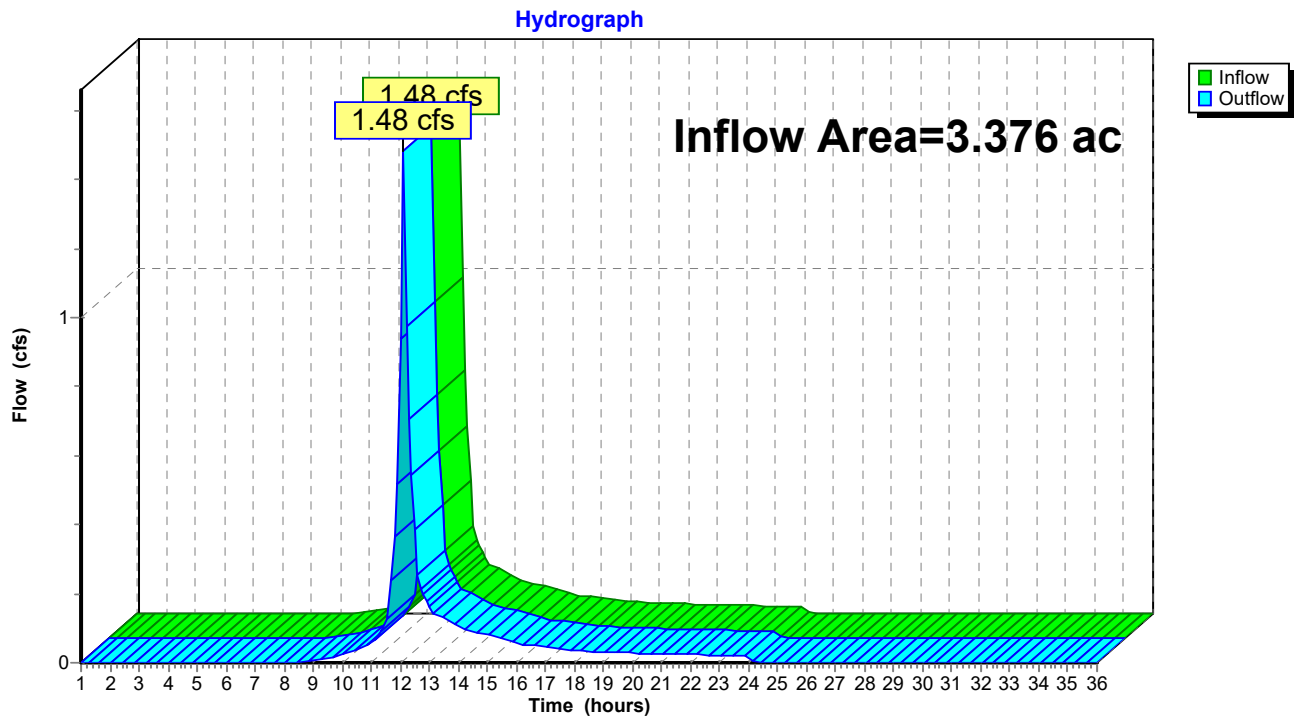
Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-1: POI #1 - Douglass Street MS4

Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 3.376 ac, 11.65% Impervious, Inflow Depth = 0.40" for 10-year event
Inflow = 1.48 cfs @ 12.10 hrs, Volume= 0.112 af
Outflow = 1.48 cfs @ 12.10 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-3: POI #3 - Baseball Field

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Type III 24-hr 10-year Rainfall=4.60"

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Page 19

Summary for Pond POI-2: POI #2 / 295 Basin

Inflow Area = 2.809 ac, 14.00% Impervious, Inflow Depth = 0.96" for 10-year event
 Inflow = 1.84 cfs @ 12.29 hrs, Volume= 0.224 af
 Outflow = 0.13 cfs @ 17.22 hrs, Volume= 0.192 af, Atten= 93%, Lag= 296.0 min
 Discarded = 0.13 cfs @ 17.22 hrs, Volume= 0.192 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Peak Elev= 27.59' @ 17.22 hrs Surf.Area= 9,006 sf Storage= 5,560 cf

Plug-Flow detention time= 513.4 min calculated for 0.192 af (86% of inflow)

Center-of-Mass det. time= 448.5 min (1,346.9 - 898.3)

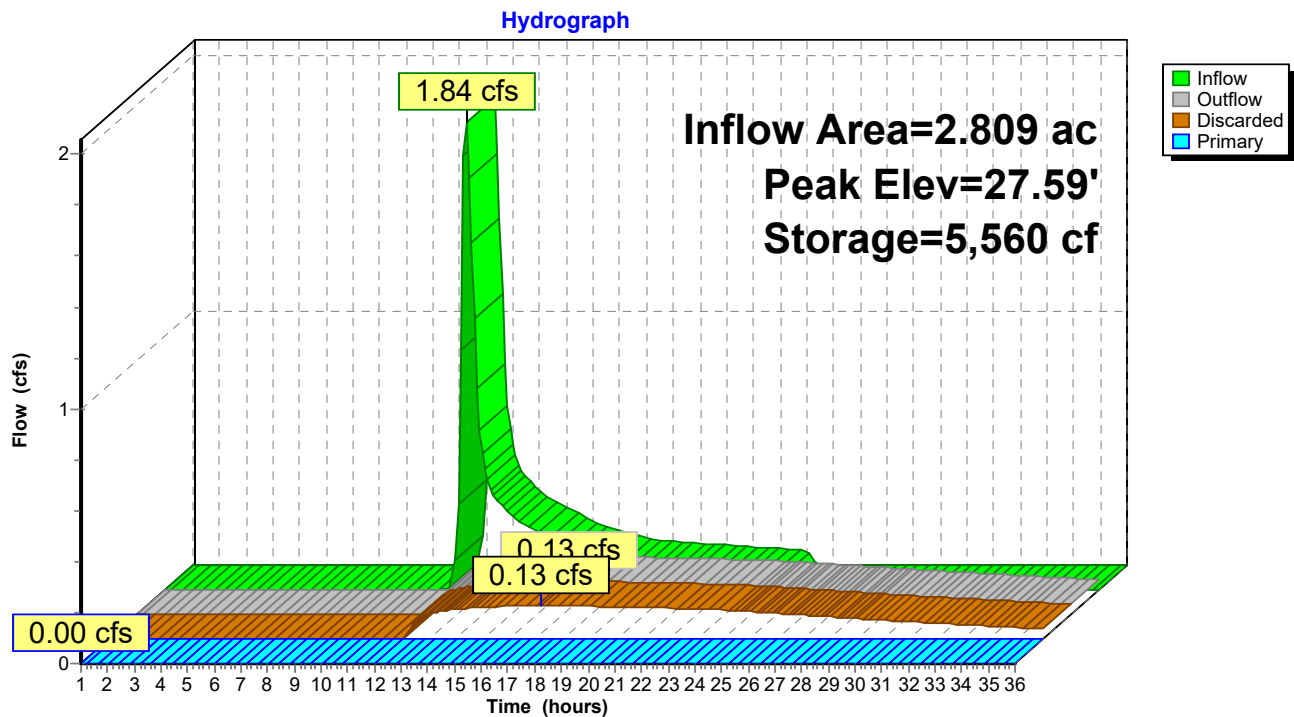
Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	274,731 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	12,191	8,333	9,934
29.00	18,000	15,096	25,030
30.00	32,600	25,300	50,330
33.00	41,943	111,815	162,144
35.00	70,644	112,587	274,731

Device	Routing	Invert	Outlet Devices
#1	Primary	32.40'	20.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	26.60'	0.800 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.13 cfs @ 17.22 hrs HW=27.59' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.13 cfs)**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POI-2: POI #2 / 295 Basin



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Type III 24-hr 25-year Rainfall=5.80"

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Page 21

Time span=1.00-36.00 hrs, dt=0.10 hrs, 351 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: 1S

Runoff Area=68,602 sf 39.93% Impervious Runoff Depth=4.33"
Tc=6.0 min CN=87 Runoff=7.26 cfs 0.568 af

Subcatchment3S: 3S

Runoff Area=24,703 sf 0.00% Impervious Runoff Depth=3.40"
Tc=6.0 min CN=78 Runoff=2.12 cfs 0.161 af

SubcatchmentS2: S2

Runoff Area=122,360 sf 14.00% Impervious Runoff Depth=1.63"
Flow Length=233' Tc=16.0 min CN=58 Runoff=3.47 cfs 0.382 af

Reach POI-1: POI #1 - Douglass Street MS4

Inflow=7.26 cfs 0.568 af
Outflow=7.26 cfs 0.568 af

Reach POI-3: POI #3 - Baseball Field

Inflow=2.12 cfs 0.161 af
Outflow=2.12 cfs 0.161 af

Pond POI-2: POI #2 / 295 Basin

Peak Elev=28.03' Storage=10,289 cf Inflow=3.47 cfs 0.382 af
Discarded=0.19 cfs 0.308 af Primary=0.00 cfs 0.000 af Outflow=0.19 cfs 0.308 af

Total Runoff Area = 4.951 ac Runoff Volume = 1.111 af Average Runoff Depth = 2.69"
79.36% Pervious = 3.929 ac 20.64% Impervious = 1.022 ac

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Type III 24-hr 25-year Rainfall=5.80"

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Page 22

Summary for Subcatchment 1S: 1S

Runoff = 7.26 cfs @ 12.10 hrs, Volume= 0.568 af, Depth= 4.33"

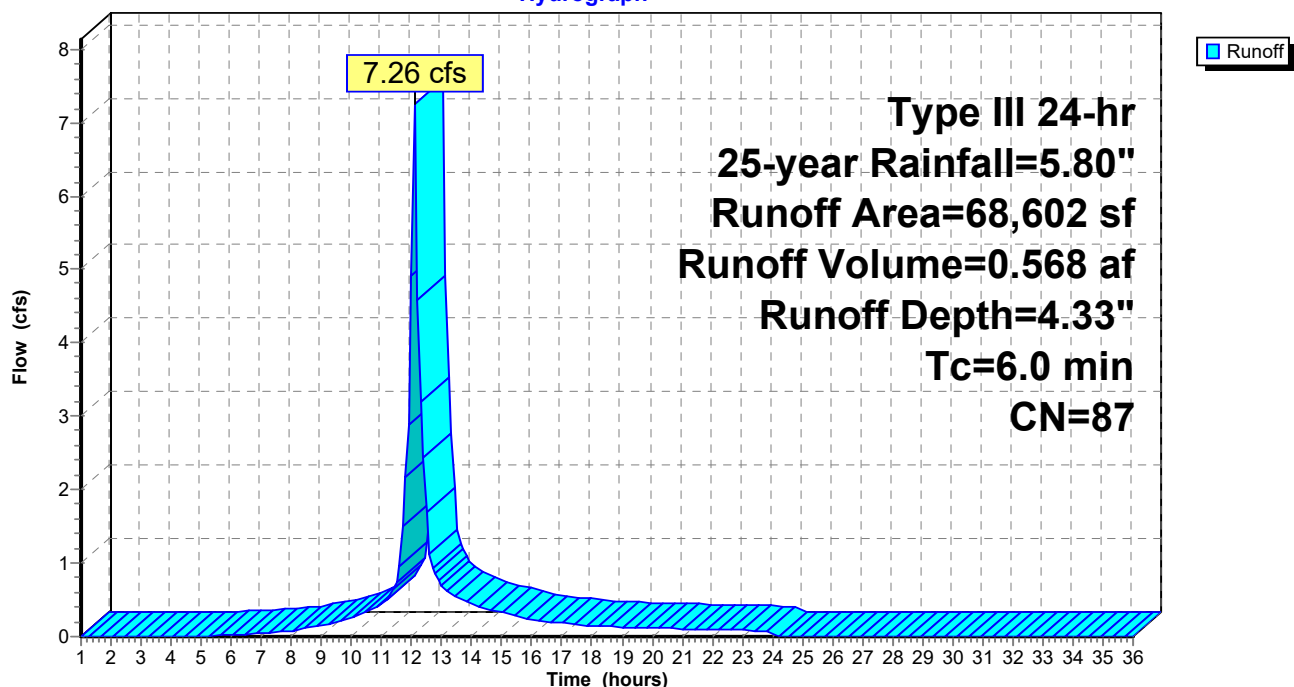
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	21,601	98	Pavement / Roof
*	27,720	96	Gravel surface
	10,373	49	50-75% Grass cover, Fair, HSG A
	8,908	77	1/8 acre lots, 65% imp, HSG A
	68,602	87	Weighted Average
	41,211		60.07% Pervious Area
	27,391		39.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: 1S

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 23

Summary for Subcatchment 3S: 3S

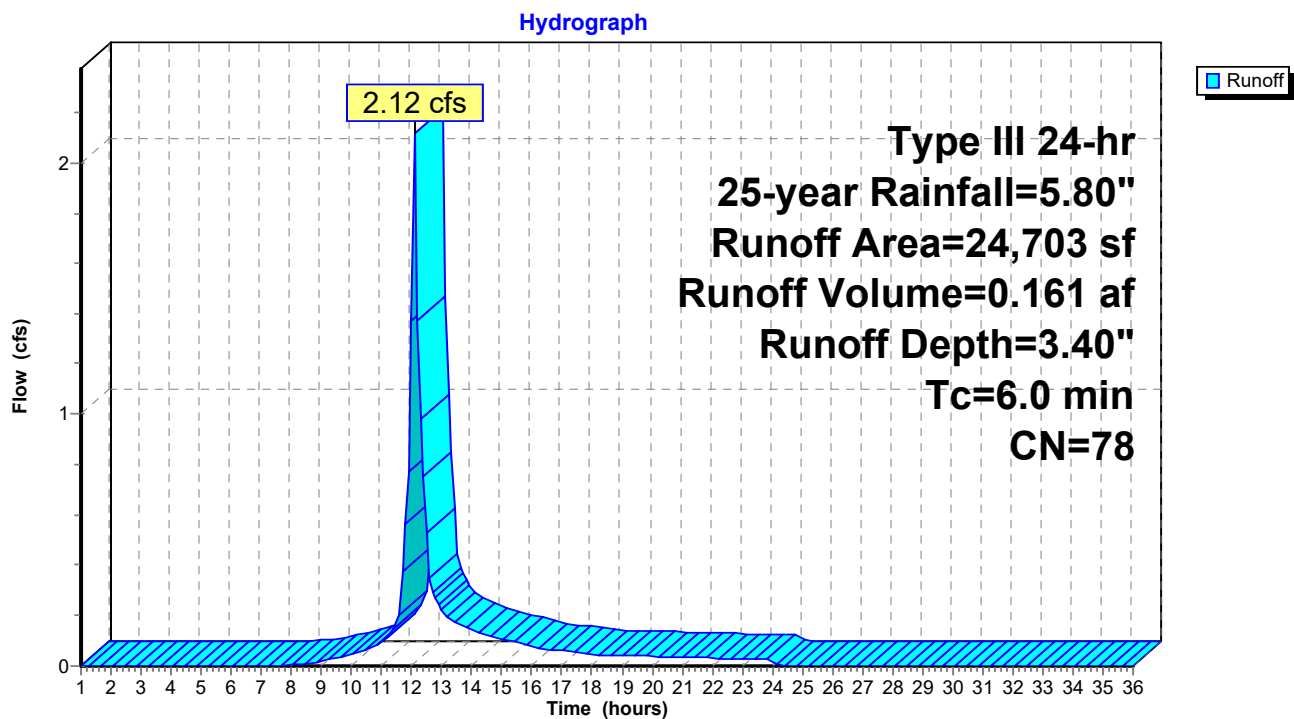
Runoff = 2.12 cfs @ 12.10 hrs, Volume= 0.161 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
15,393	96	Gravel surface, HSG A
9,310	49	50-75% Grass cover, Fair, HSG A
24,703	78	Weighted Average
24,703		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: 3S



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Type III 24-hr 25-year Rainfall=5.80"

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Page 24

Summary for Subcatchment S2: S2

Runoff = 3.47 cfs @ 12.25 hrs, Volume= 0.382 af, Depth= 1.63"

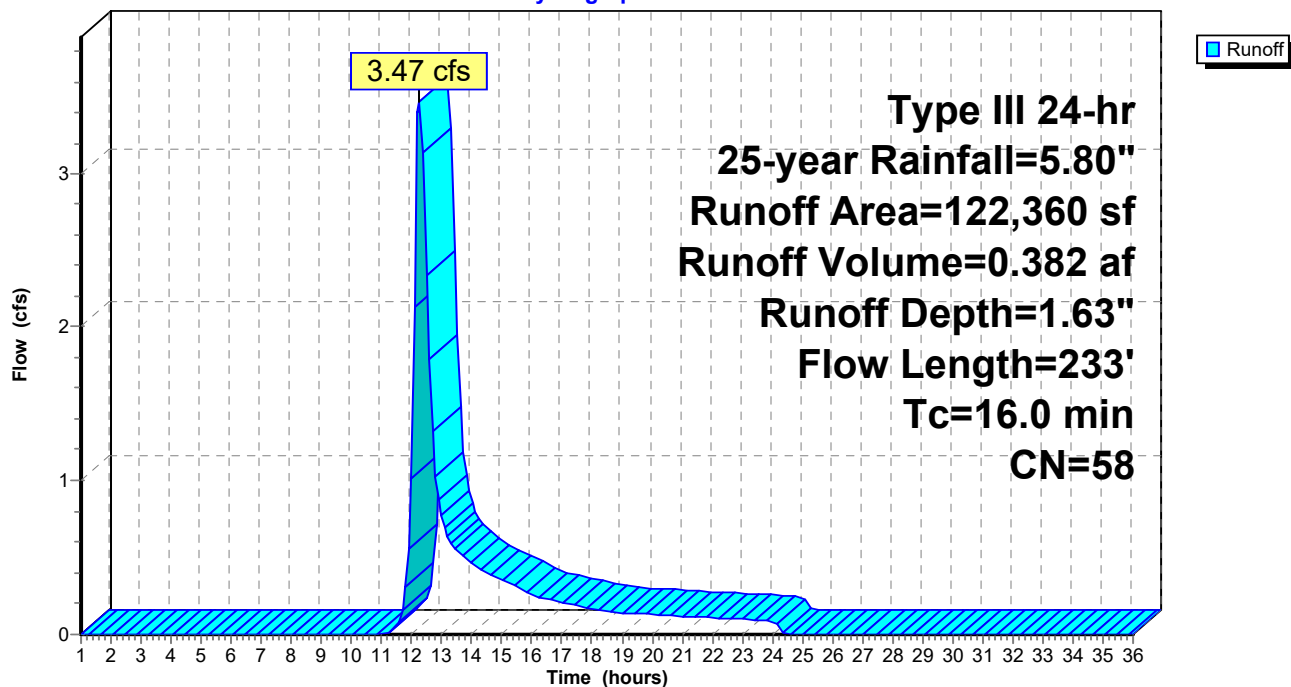
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	13,972	98	Single family roofs and driveways
*	3,155	98	Paved walking path
	52,792	32	Woods/grass comb., Good, HSG A
*	24,853	96	Gravel
	27,588	49	50-75% Grass cover, Fair, HSG A
	122,360	58	Weighted Average
	105,233		86.00% Pervious Area
	17,127		14.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C (capped 100' sheet flow) Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment S2: S2

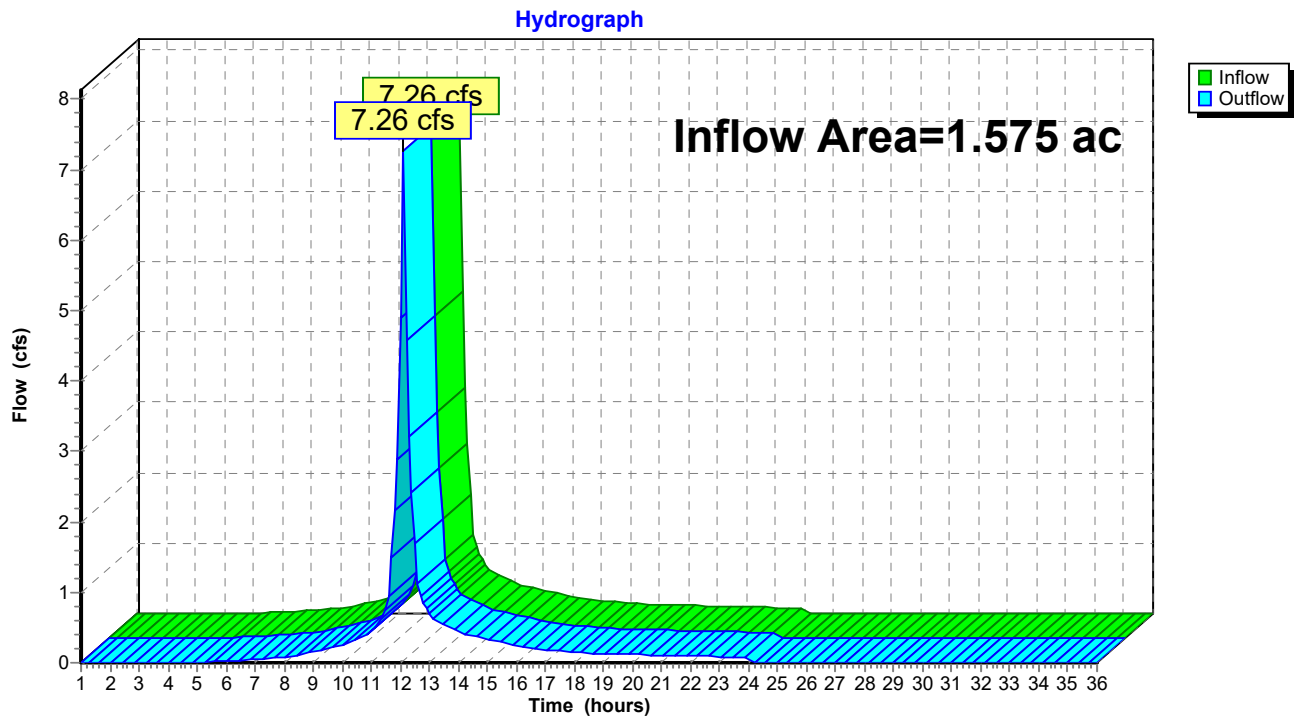
Hydrograph



Summary for Reach POI-1: POI #1 - Douglass Street MS4

Inflow Area = 1.575 ac, 39.93% Impervious, Inflow Depth = 4.33" for 25-year event
Inflow = 7.26 cfs @ 12.10 hrs, Volume= 0.568 af
Outflow = 7.26 cfs @ 12.10 hrs, Volume= 0.568 af, Atten= 0%, Lag= 0.0 min

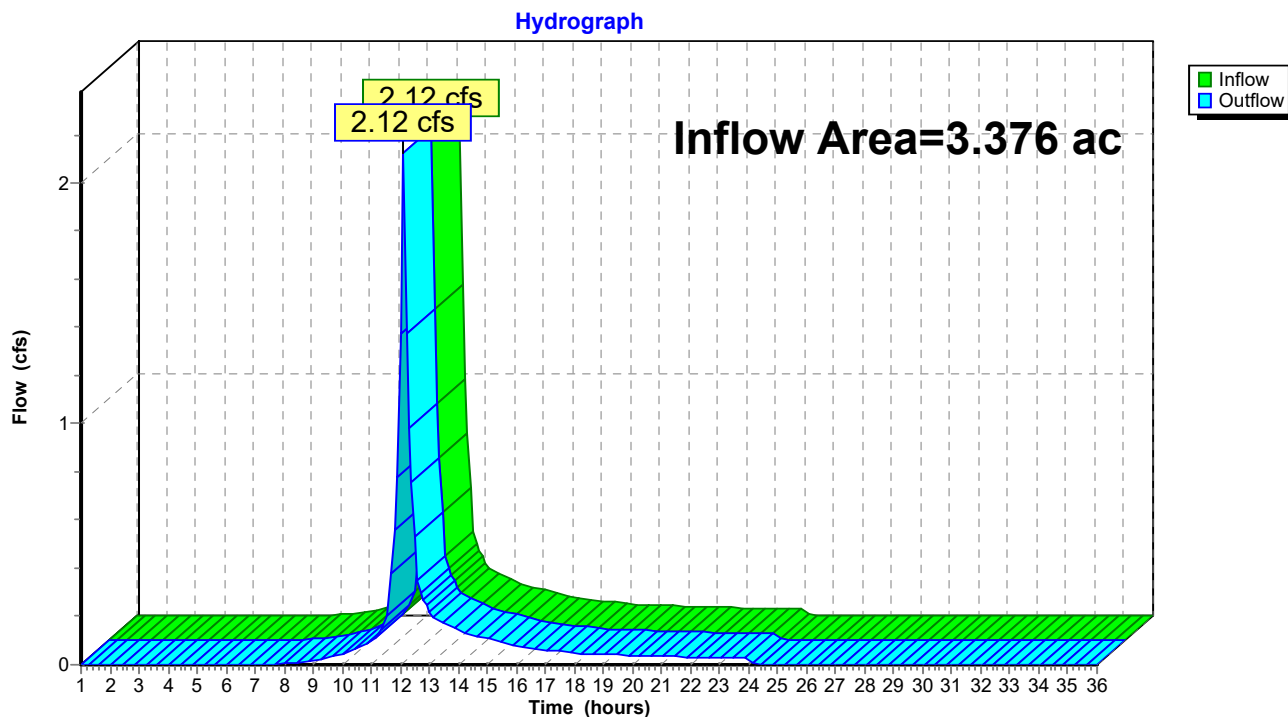
Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-1: POI #1 - Douglass Street MS4

Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 3.376 ac, 11.65% Impervious, Inflow Depth = 0.57" for 25-year event
Inflow = 2.12 cfs @ 12.10 hrs, Volume= 0.161 af
Outflow = 2.12 cfs @ 12.10 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-3: POI #3 - Baseball Field

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Type III 24-hr 25-year Rainfall=5.80"

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Page 27

Summary for Pond POI-2: POI #2 / 295 Basin

Inflow Area = 2.809 ac, 14.00% Impervious, Inflow Depth = 1.63" for 25-year event
 Inflow = 3.47 cfs @ 12.25 hrs, Volume= 0.382 af
 Outflow = 0.19 cfs @ 17.36 hrs, Volume= 0.308 af, Atten= 94%, Lag= 306.6 min
 Discarded = 0.19 cfs @ 17.36 hrs, Volume= 0.308 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
 Peak Elev= 28.03' @ 17.36 hrs Surf.Area= 12,359 sf Storage= 10,289 cf

Plug-Flow detention time= 575.0 min calculated for 0.307 af (80% of inflow)
 Center-of-Mass det. time= 495.9 min (1,375.8 - 879.9)

Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	274,731 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

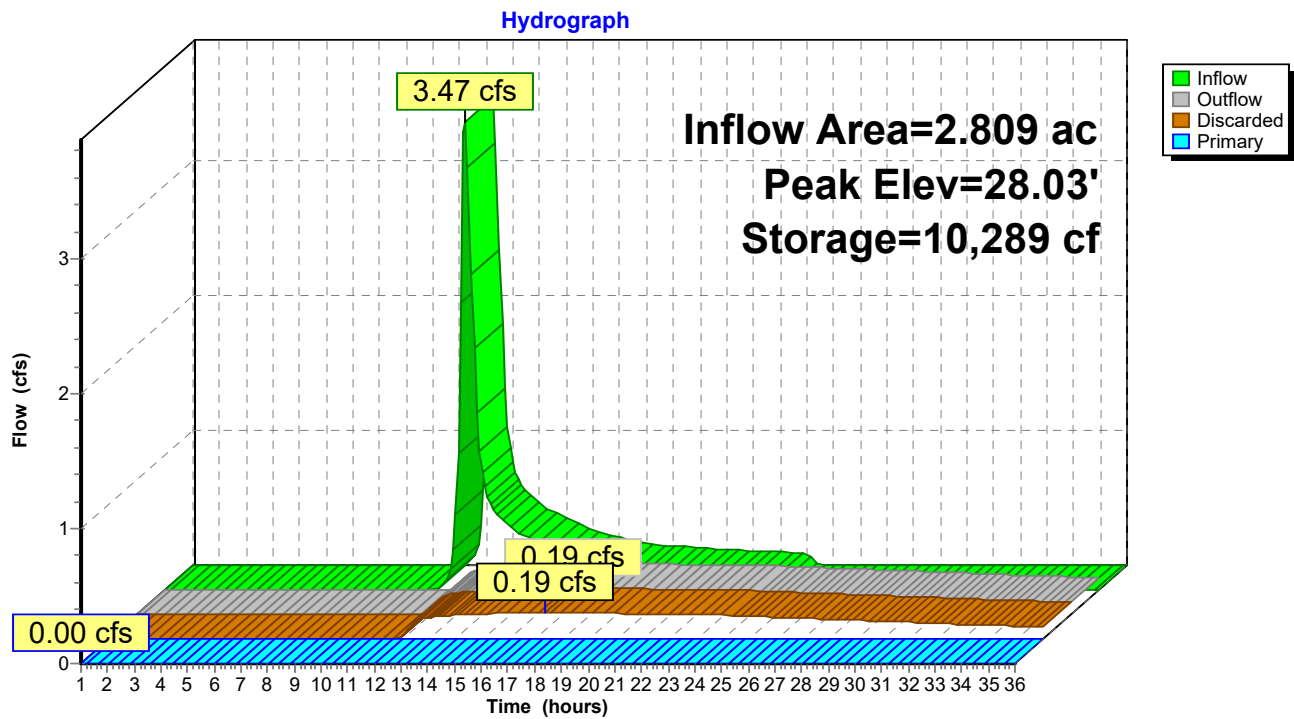
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	12,191	8,333	9,934
29.00	18,000	15,096	25,030
30.00	32,600	25,300	50,330
33.00	41,943	111,815	162,144
35.00	70,644	112,587	274,731

Device	Routing	Invert	Outlet Devices
#1	Primary	32.40'	20.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	26.60'	0.800 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.19 cfs @ 17.36 hrs HW=28.03' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POI-2: POI #2 / 295 Basin



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Type III 24-hr WQ Rainfall=1.00"

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Page 29

Time span=1.00-36.00 hrs, dt=0.10 hrs, 351 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: 1S

Runoff Area=68,602 sf 39.93% Impervious Runoff Depth=0.22"
Tc=6.0 min CN=87 Runoff=0.33 cfs 0.029 af

Subcatchment3S: 3S

Runoff Area=24,703 sf 0.00% Impervious Runoff Depth=0.06"
Tc=6.0 min CN=78 Runoff=0.01 cfs 0.003 af

SubcatchmentS2: S2

Runoff Area=122,360 sf 14.00% Impervious Runoff Depth=0.00"
Flow Length=233' Tc=16.0 min CN=58 Runoff=0.00 cfs 0.000 af

Reach POI-1: POI #1 - Douglass Street MS4

Inflow=0.33 cfs 0.029 af
Outflow=0.33 cfs 0.029 af

Reach POI-3: POI #3 - Baseball Field

Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Pond POI-2: POI #2 / 295 Basin

Peak Elev=26.30' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 4.951 ac Runoff Volume = 0.032 af Average Runoff Depth = 0.08"
79.36% Pervious = 3.929 ac 20.64% Impervious = 1.022 ac

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Type III 24-hr WQ Rainfall=1.00"

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Page 30

Summary for Subcatchment 1S: 1S

Runoff = 0.33 cfs @ 12.12 hrs, Volume= 0.029 af, Depth= 0.22"

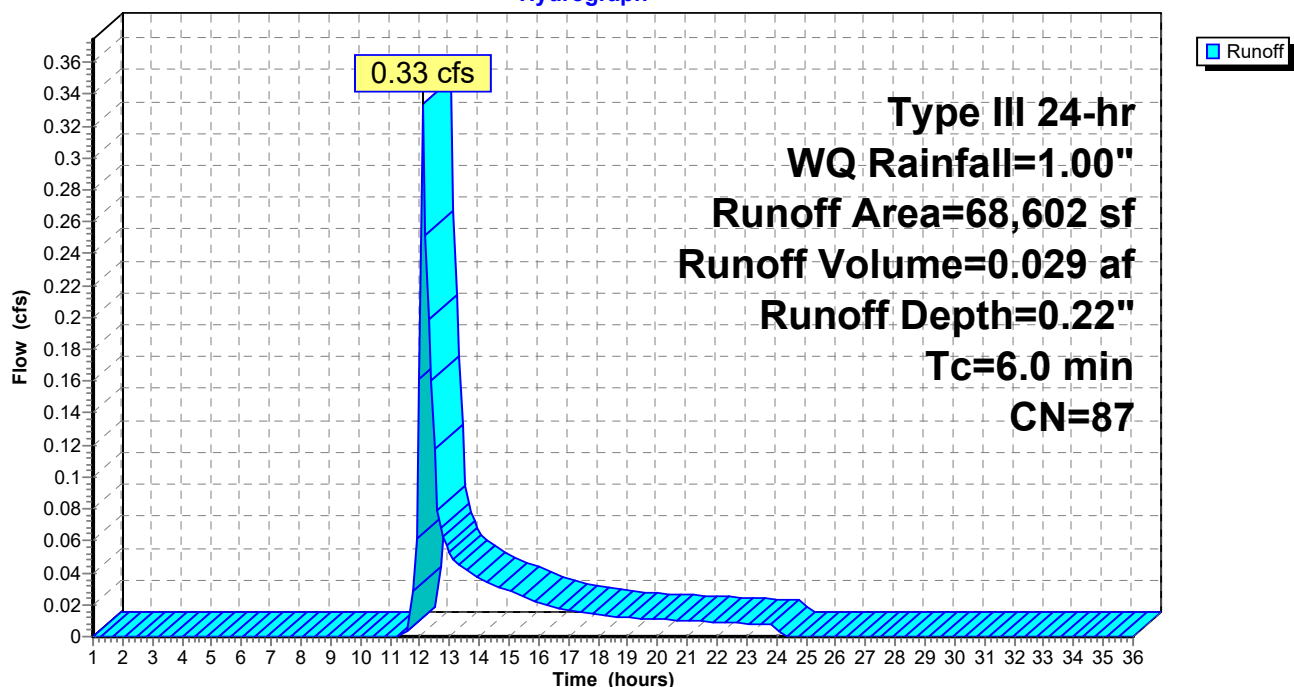
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	21,601	98	Pavement / Roof
*	27,720	96	Gravel surface
	10,373	49	50-75% Grass cover, Fair, HSG A
	8,908	77	1/8 acre lots, 65% imp, HSG A
	68,602	87	Weighted Average
	41,211		60.07% Pervious Area
	27,391		39.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: 1S

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Type III 24-hr WQ Rainfall=1.00"

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Page 31

Summary for Subcatchment 3S: 3S

Runoff = 0.01 cfs @ 12.40 hrs, Volume= 0.003 af, Depth= 0.06"

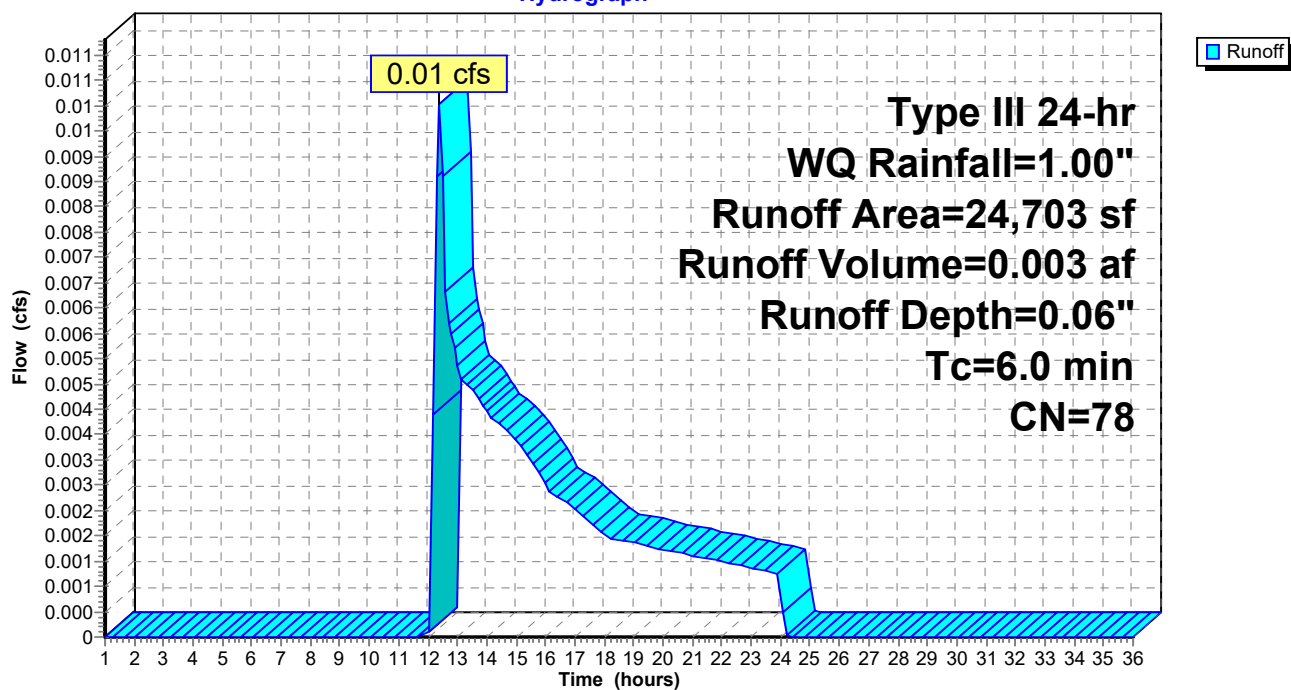
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
15,393	96	Gravel surface, HSG A
9,310	49	50-75% Grass cover, Fair, HSG A
24,703	78	Weighted Average
24,703		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: 3S

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 32

Summary for Subcatchment S2: S2

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

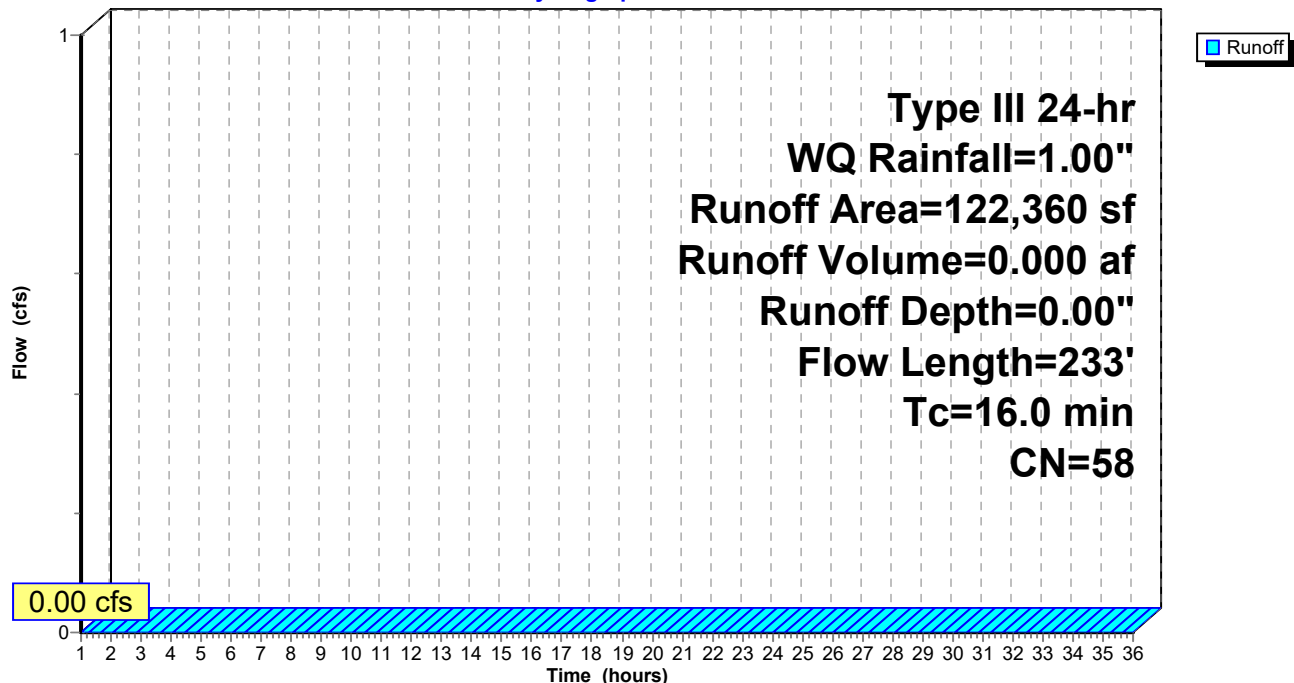
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	13,972	98	Single family roofs and driveways
*	3,155	98	Paved walking path
	52,792	32	Woods/grass comb., Good, HSG A
*	24,853	96	Gravel
	27,588	49	50-75% Grass cover, Fair, HSG A
	122,360	58	Weighted Average
	105,233		86.00% Pervious Area
	17,127		14.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C (capped 100' sheet flow) Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment S2: S2

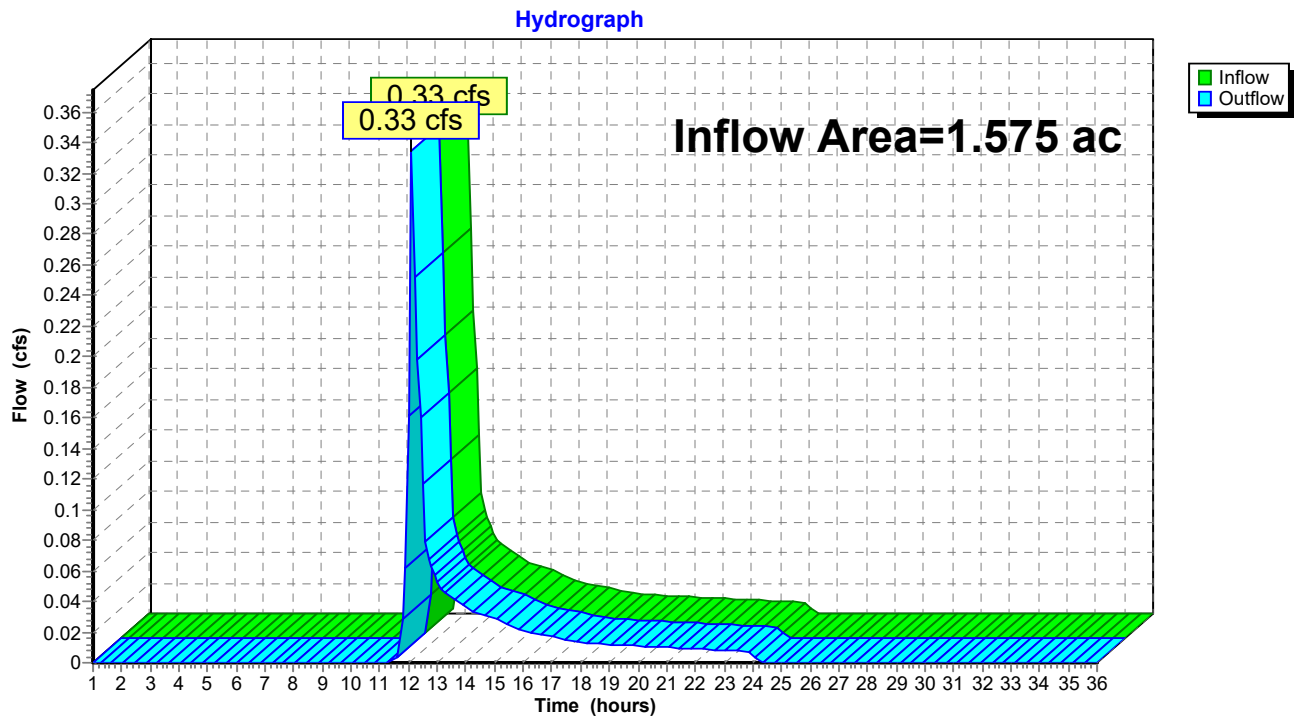
Hydrograph



Summary for Reach POI-1: POI #1 - Douglass Street MS4

Inflow Area = 1.575 ac, 39.93% Impervious, Inflow Depth = 0.22" for WQ event
Inflow = 0.33 cfs @ 12.12 hrs, Volume= 0.029 af
Outflow = 0.33 cfs @ 12.12 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

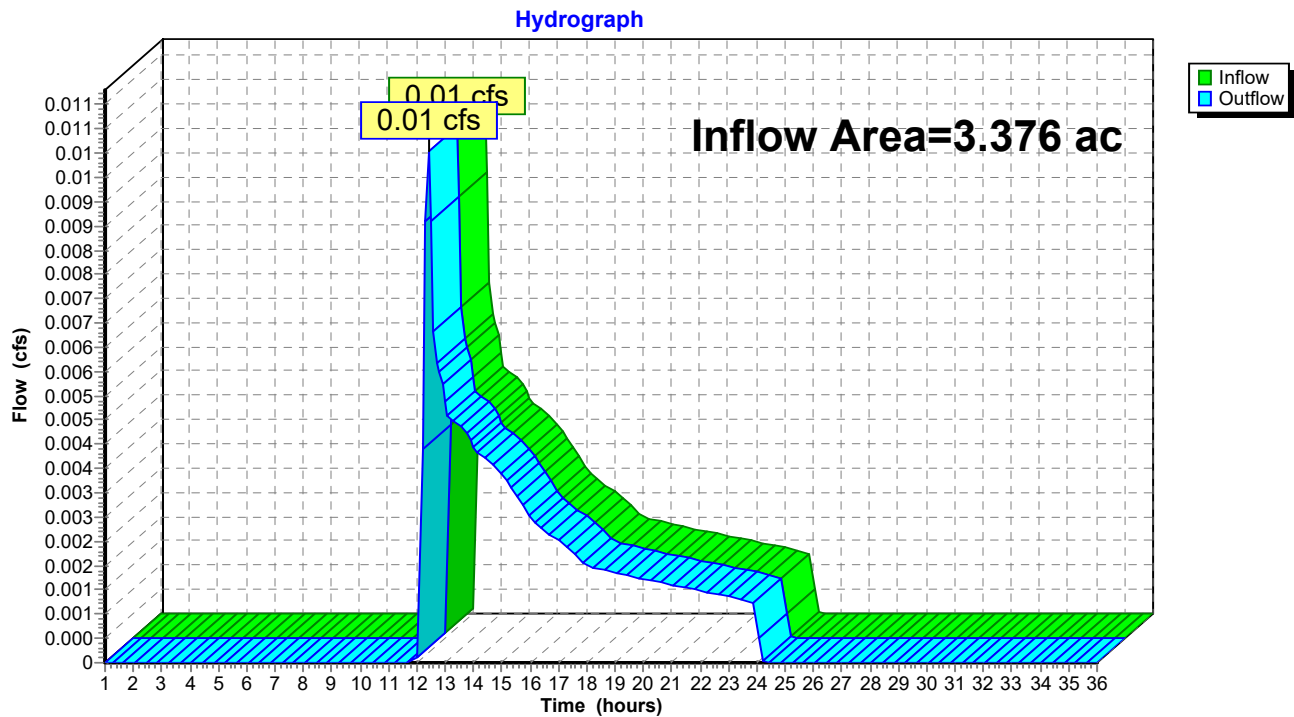
Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-1: POI #1 - Douglass Street MS4

Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 3.376 ac, 11.65% Impervious, Inflow Depth = 0.01" for WQ event
Inflow = 0.01 cfs @ 12.40 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 12.40 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-3: POI #3 - Baseball Field

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Type III 24-hr WQ Rainfall=1.00"

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Page 35

Summary for Pond POI-2: POI #2 / 295 Basin

Inflow Area = 2.809 ac, 14.00% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Peak Elev= 26.30' @ 1.00 hrs Surf.Area= 100 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no inflow)

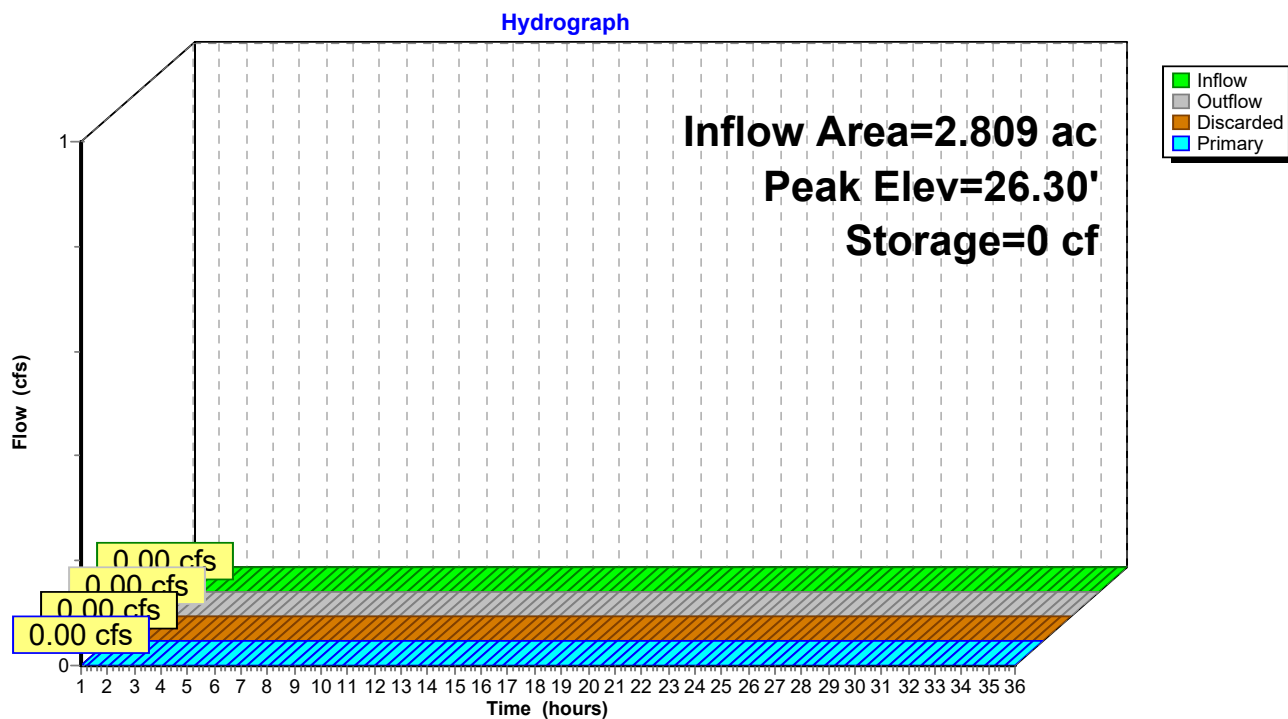
Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	274,731 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

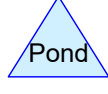
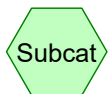
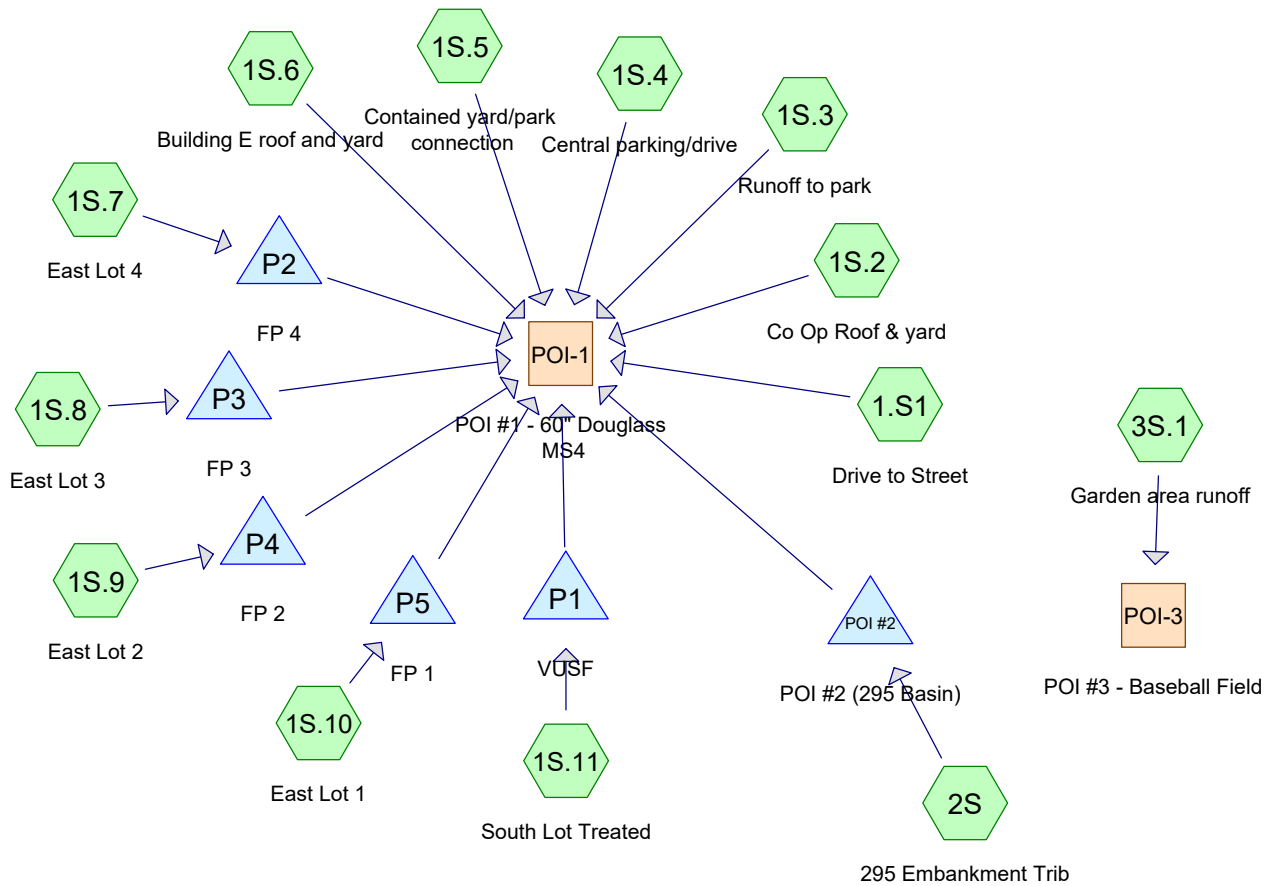
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	12,191	8,333	9,934
29.00	18,000	15,096	25,030
30.00	32,600	25,300	50,330
33.00	41,943	111,815	162,144
35.00	70,644	112,587	274,731

Device	Routing	Invert	Outlet Devices
#1	Primary	32.40'	20.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	26.60'	0.800 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**2=Exfiltration** (Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POI-2: POI #2 / 295 Basin





Routing Diagram for Post Development 1.13 FINAL
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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.210	77	1/8 acre lots, 65% imp, HSG A (1S.2)
1.112	39	>75% Grass cover, Good, HSG A (1.S1, 1S.10, 1S.2, 1S.3, 1S.5, 1S.6, 1S.7, 1S.8, 1S.9, 2S)
0.309	30	Brush, Good, HSG A (1S.11, 1S.4, 3S.1)
0.126	98	Homes/driveways (2S)
0.072	98	Path (2S)
0.364	98	Paved parking (1S.11, 1S.7, 1S.8)
0.110	98	Paved parking, patio, sidewalk (1S.9)
0.428	98	Pavement (1.S1, 1S.10, 1S.4)
0.485	98	Roofs (1S.2)
0.005	98	Stairs (2S)
1.212	32	Woods/grass comb., Good, HSG A (2S)
0.014	98	patios (1S.2)
0.120	98	pavers (1S.2)
0.275	98	roof (1S.6)
0.108	98	sidewalks (1S.2, 1S.5)
4.952	63	TOTAL AREA

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.842	HSG A	1.S1, 1S.10, 1S.11, 1S.2, 1S.3, 1S.4, 1S.5, 1S.6, 1S.7, 1S.8, 1S.9, 2S, 3S.1
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.110	Other	1.S1, 1S.10, 1S.11, 1S.2, 1S.4, 1S.5, 1S.6, 1S.7, 1S.8, 1S.9, 2S
4.952		TOTAL AREA

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.210	0.000	0.000	0.000	0.000	0.210	1/8 acre lots, 65% imp	1S.2
1.112	0.000	0.000	0.000	0.000	1.112	>75% Grass cover, Good	1S.1, 1S.1 0, 1S.2, 1S.3, 1S.5, 1S.6, 1S.7, 1S.8, 1S.9, 2S
0.309	0.000	0.000	0.000	0.000	0.309	Brush, Good	1S.1 1, 1S.4, 3S.1
0.000	0.000	0.000	0.000	0.126	0.126	Homes/driveways	2S
0.000	0.000	0.000	0.000	0.072	0.072	Path	2S
0.000	0.000	0.000	0.000	0.364	0.364	Paved parking	1S.1 1, 1S.7, 1S.8
0.000	0.000	0.000	0.000	0.110	0.110	Paved parking, patio, sidewalk	1S.9
0.000	0.000	0.000	0.000	0.428	0.428	Pavement	1S.1, 1S.1 0, 1S.4
0.000	0.000	0.000	0.000	0.485	0.485	Roofs	1S.2
0.000	0.000	0.000	0.000	0.005	0.005	Stairs	2S
1.212	0.000	0.000	0.000	0.000	1.212	Woods/grass comb., Good	2S
0.000	0.000	0.000	0.000	0.014	0.014	patios	1S.2
0.000	0.000	0.000	0.000	0.120	0.120	pavers	1S.2
0.000	0.000	0.000	0.000	0.275	0.275	roof	1S.6
0.000	0.000	0.000	0.000	0.108	0.108	sidewalks	1S.2, 1S.5

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Page 5

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.842	0.000	0.000	0.000	2.110	4.952	TOTAL AREA	

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Page 6

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	P1	27.00	26.75	60.0	0.0042	0.010	12.0	0.0	0.0
2	P2	32.35	32.00	70.0	0.0050	0.010	10.0	0.0	0.0
3	P3	31.90	31.50	70.0	0.0057	0.010	10.0	0.0	0.0
4	P4	31.40	31.00	70.0	0.0057	0.010	10.0	0.0	0.0
5	P5	30.90	30.53	75.0	0.0049	0.010	10.0	0.0	0.0
6	POI #2	26.60	26.51	16.0	0.0056	0.012	12.0	0.0	0.0

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Type III 24-hr 2-year Rainfall=3.10"

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Page 7

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S.1: Drive to Street	Runoff Area=1,131 sf 55.00% Impervious Runoff Depth=0.82" Tc=6.0 min CN=71 Runoff=0.02 cfs 0.002 af
Subcatchment 1S.10: East Lot 1	Runoff Area=3,754 sf 84.98% Impervious Runoff Depth=1.99" Tc=6.0 min CN=89 Runoff=0.20 cfs 0.014 af
Subcatchment 1S.11: South Lot Treated	Runoff Area=10,852 sf 76.24% Impervious Runoff Depth=1.46" Tc=6.0 min CN=82 Runoff=0.42 cfs 0.030 af
Subcatchment 1S.2: Co Op Roof & yard	Runoff Area=56,422 sf 65.80% Impervious Runoff Depth=1.20" Tc=6.0 min CN=78 Runoff=1.78 cfs 0.130 af
Subcatchment 1S.3: Runoff to park	Runoff Area=2,081 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=264' Tc=9.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.4: Central parking/drive	Runoff Area=19,043 sf 77.98% Impervious Runoff Depth=1.53" Tc=6.0 min CN=83 Runoff=0.78 cfs 0.056 af
Subcatchment 1S.5: Contained yard/park	Runoff Area=3,023 sf 16.84% Impervious Runoff Depth=0.09" Tc=6.0 min CN=49 Runoff=0.00 cfs 0.001 af
Subcatchment 1S.6: Building E roof and	Runoff Area=22,599 sf 53.10% Impervious Runoff Depth=0.77" Tc=6.0 min CN=70 Runoff=0.41 cfs 0.033 af
Subcatchment 1S.7: East Lot 4	Runoff Area=7,618 sf 53.01% Impervious Runoff Depth=0.77" Tc=6.0 min CN=70 Runoff=0.14 cfs 0.011 af
Subcatchment 1S.8: East Lot 3	Runoff Area=6,694 sf 52.99% Impervious Runoff Depth=0.77" Tc=6.0 min CN=70 Runoff=0.12 cfs 0.010 af
Subcatchment 1S.9: East Lot 2	Runoff Area=5,956 sf 80.74% Impervious Runoff Depth=1.83" Tc=6.0 min CN=87 Runoff=0.29 cfs 0.021 af
Subcatchment 2S: 295 Embankment Trib	Runoff Area=69,848 sf 12.70% Impervious Runoff Depth=0.00" Flow Length=233' Tc=16.0 min CN=41 Runoff=0.00 cfs 0.000 af
Subcatchment 3S.1: Garden area runoff	Runoff Area=6,670 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=82' Tc=6.9 min CN=30 Runoff=0.00 cfs 0.000 af
Reach POI-1: POI #1 - 60" Douglass MS4	Inflow=3.76 cfs 0.286 af Outflow=3.76 cfs 0.286 af
Reach POI-3: POI #3 - Baseball Field	Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond P1: VUSF	Peak Elev=30.91' Storage=530 cf Inflow=0.42 cfs 0.030 af Discarded=0.04 cfs 0.022 af Primary=0.01 cfs 0.009 af Outflow=0.06 cfs 0.030 af

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Page 8

Pond P2: FP 4

Peak Elev=35.95' Storage=0 cf Inflow=0.14 cfs 0.011 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0050 '/' Outflow=0.14 cfs 0.011 af

Pond P3: FP 3

Peak Elev=36.10' Storage=0 cf Inflow=0.12 cfs 0.010 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.12 cfs 0.010 af

Pond P4: FP 2

Peak Elev=35.90' Storage=0 cf Inflow=0.29 cfs 0.021 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.29 cfs 0.021 af

Pond P5: FP 1

Peak Elev=35.70' Storage=0 cf Inflow=0.20 cfs 0.014 af
10.0" Round Culvert n=0.010 L=75.0' S=0.0049 '/' Outflow=0.20 cfs 0.014 af

Pond POI #2: POI #2 (295 Basin)

Peak Elev=26.36' Storage=20 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 4.952 ac Runoff Volume = 0.308 af Average Runoff Depth = 0.75"
54.64% Pervious = 2.706 ac 45.36% Impervious = 2.246 ac

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Type III 24-hr 2-year Rainfall=3.10"

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Page 9

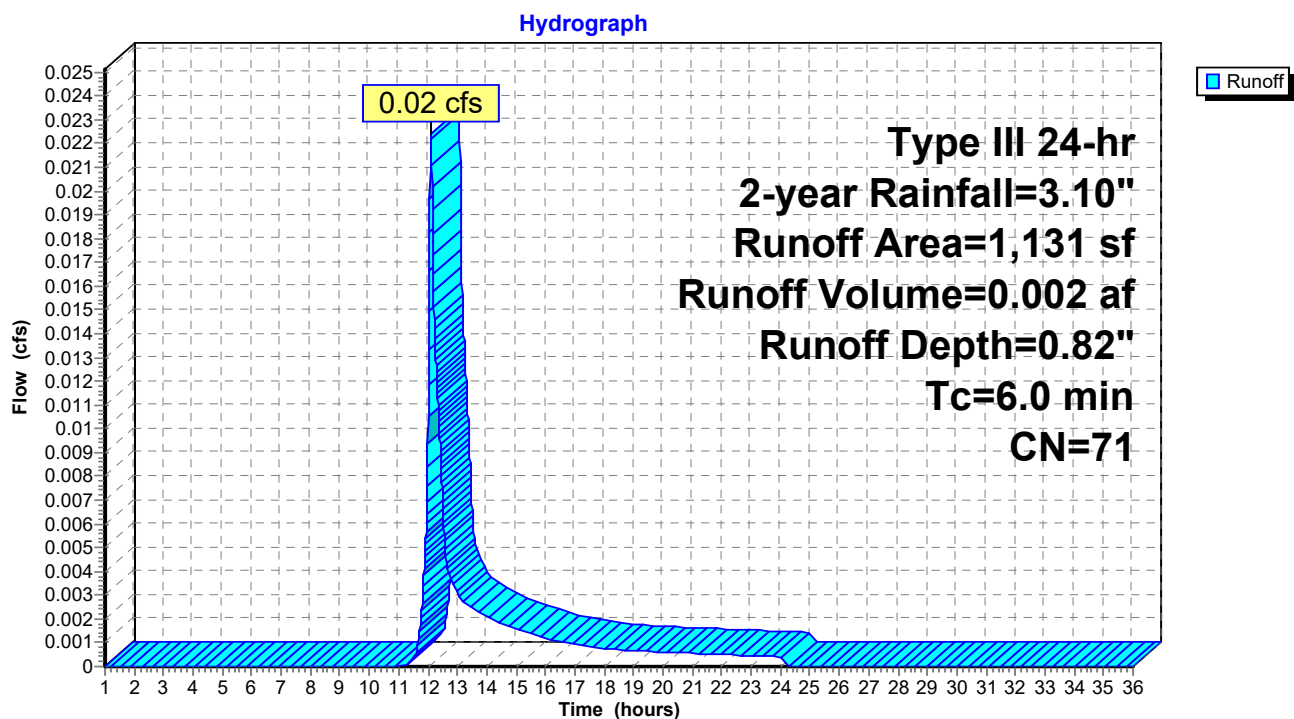
Summary for Subcatchment 1.S1: Drive to Street

Runoff = 0.02 cfs @ 12.10 hrs, Volume= 0.002 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	622	98	Pavement
	509	39	>75% Grass cover, Good, HSG A
	1,131	71	Weighted Average
	509		45.00% Pervious Area
	622		55.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1.S1: Drive to Street

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Type III 24-hr 2-year Rainfall=3.10"

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Page 10

Summary for Subcatchment 1S.10: East Lot 1

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 1.99"

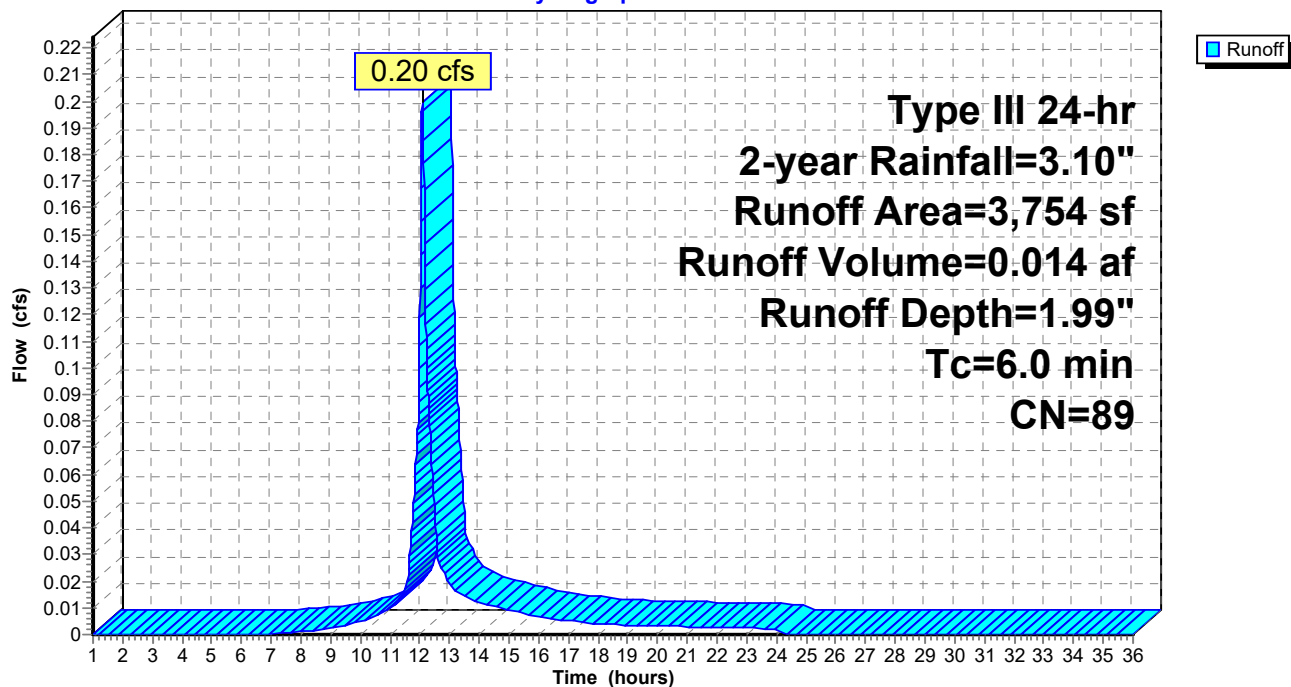
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	3,190	98	Pavement
	564	39	>75% Grass cover, Good, HSG A
	3,754	89	Weighted Average
	564		15.02% Pervious Area
	3,190		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.10: East Lot 1

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 11

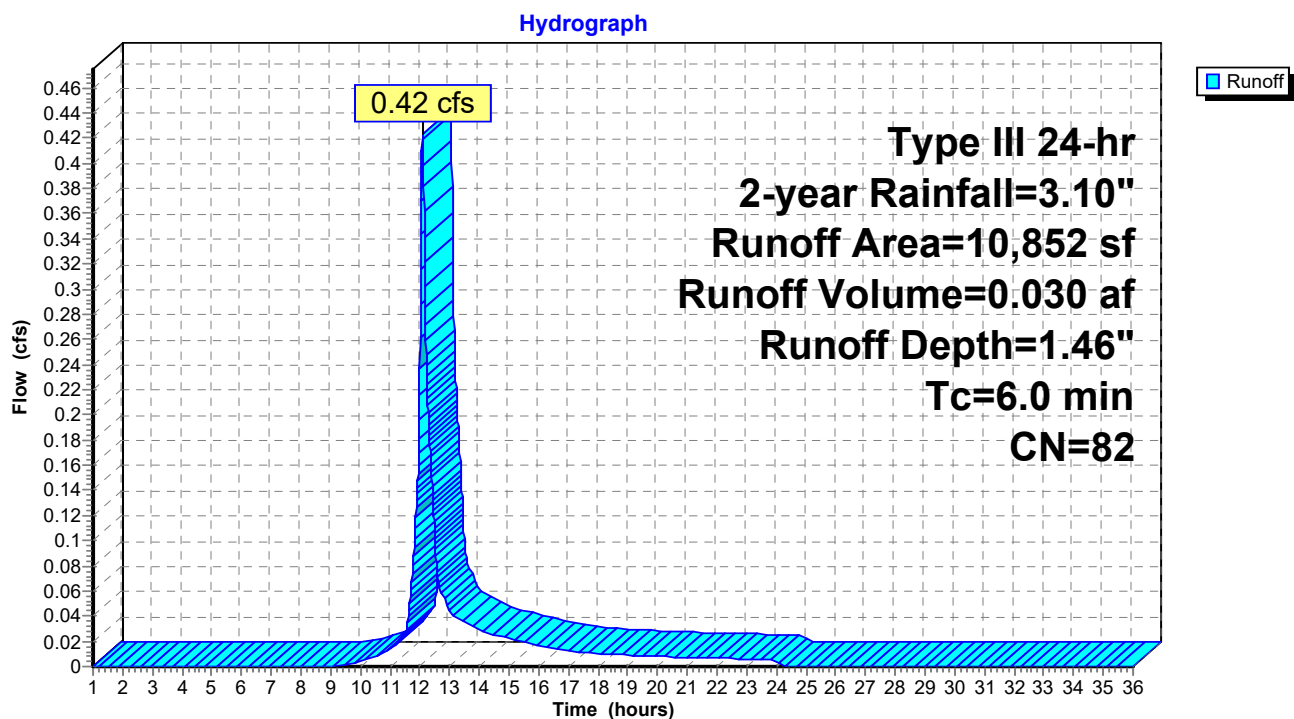
Summary for Subcatchment 1S.11: South Lot Treated

Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	8,274	98	Paved parking
	2,578	30	Brush, Good, HSG A
	10,852	82	Weighted Average
	2,578		23.76% Pervious Area
	8,274		76.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.11: South Lot Treated

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Type III 24-hr 2-year Rainfall=3.10"

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Page 12

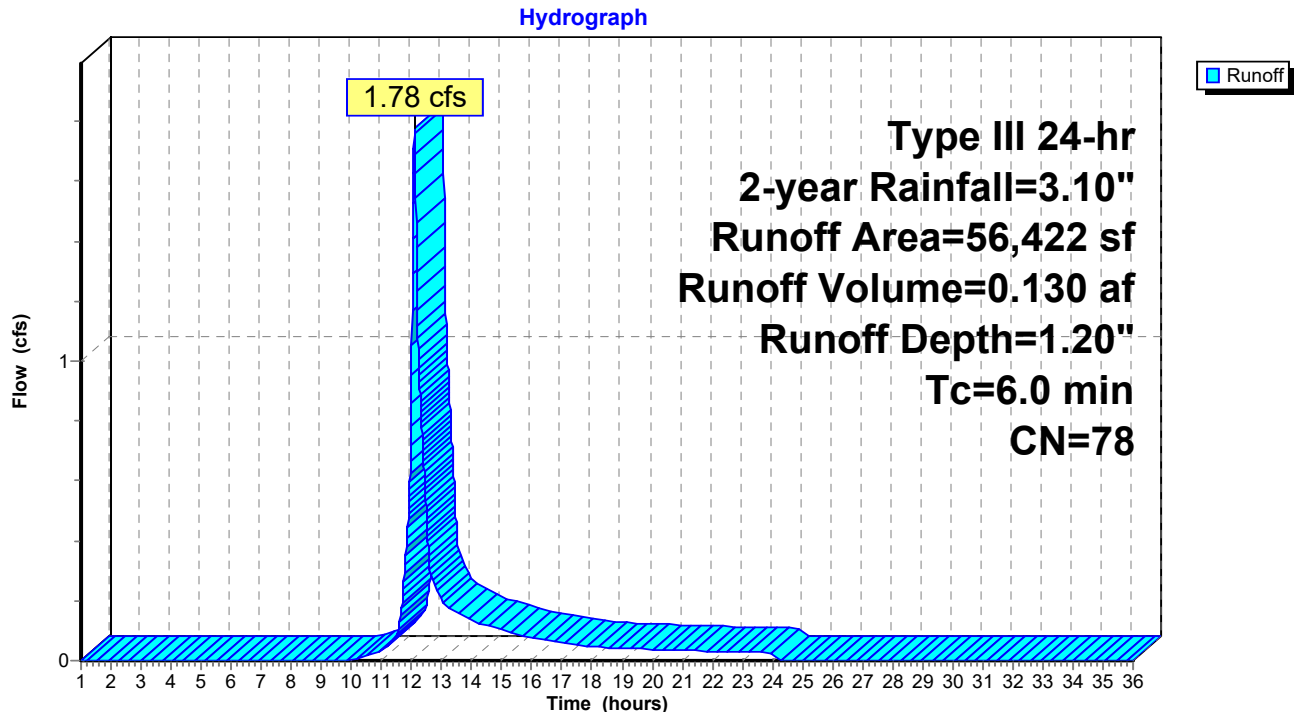
Summary for Subcatchment 1S.2: Co Op Roof & yard

Runoff = 1.78 cfs @ 12.09 hrs, Volume= 0.130 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	5,239	98	pavers
	16,100	39	>75% Grass cover, Good, HSG A
*	21,137	98	Roofs
*	4,191	98	sidewalks
*	618	98	patios
	9,137	77	1/8 acre lots, 65% imp, HSG A
	56,422	78	Weighted Average
	19,298		34.20% Pervious Area
	37,124		65.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.2: Co Op Roof & yard

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Type III 24-hr 2-year Rainfall=3.10"

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Page 13

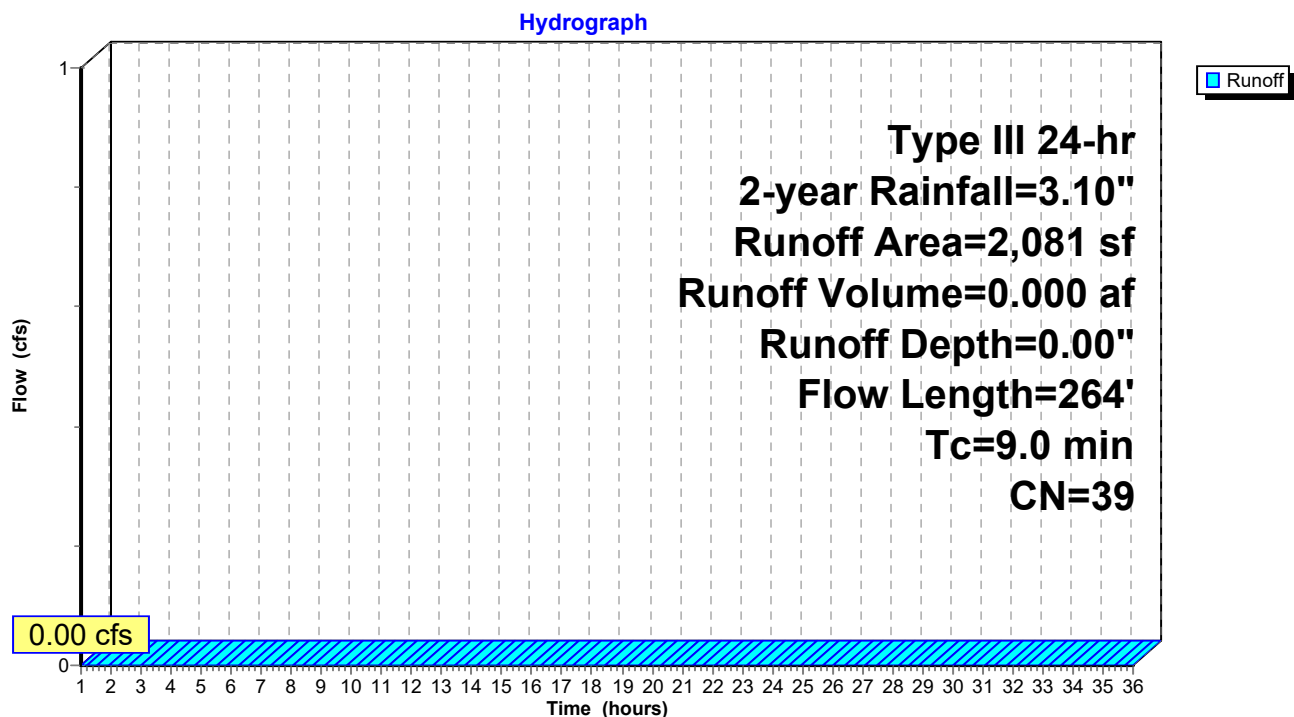
Summary for Subcatchment 1S.3: Runoff to park

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,081	39	>75% Grass cover, Good, HSG A
2,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.0600	0.27		Sheet Flow, A to B Grass: Short n= 0.150 P2= 3.27"
2.8	164	0.0200	0.99		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
9.0	264	Total			

Subcatchment 1S.3: Runoff to park

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Type III 24-hr 2-year Rainfall=3.10"

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Page 14

Summary for Subcatchment 1S.4: Central parking/drive

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 1.53"

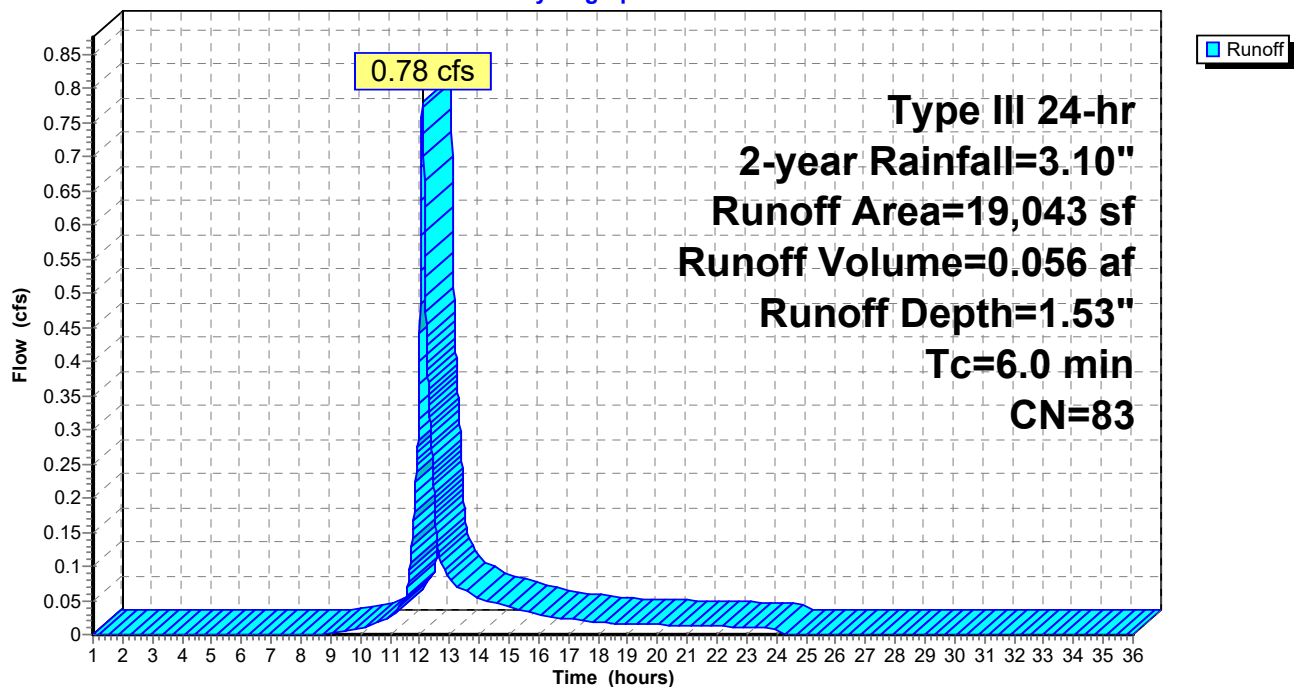
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	14,850	98	Pavement
	4,193	30	Brush, Good, HSG A
	19,043	83	Weighted Average
	4,193		22.02% Pervious Area
	14,850		77.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.4: Central parking/drive

Hydrograph



Summary for Subcatchment 1S.5: Contained yard/park connection

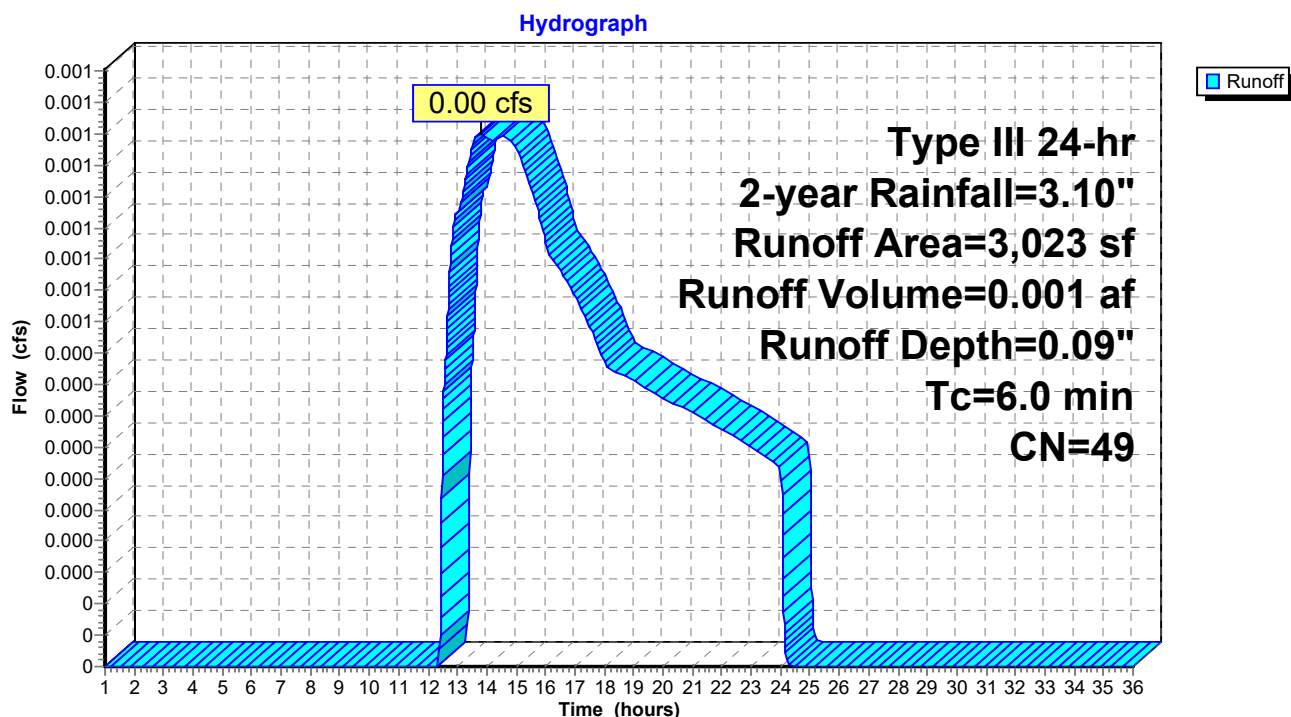
Runoff = 0.00 cfs @ 13.78 hrs, Volume= 0.001 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,514	39	>75% Grass cover, Good, HSG A
* 509	98	sidewalks
3,023	49	Weighted Average
2,514		83.16% Pervious Area
509		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.5: Contained yard/park connection



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Type III 24-hr 2-year Rainfall=3.10"

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Page 16

Summary for Subcatchment 1S.6: Building E roof and yard

Runoff = 0.41 cfs @ 12.10 hrs, Volume= 0.033 af, Depth= 0.77"

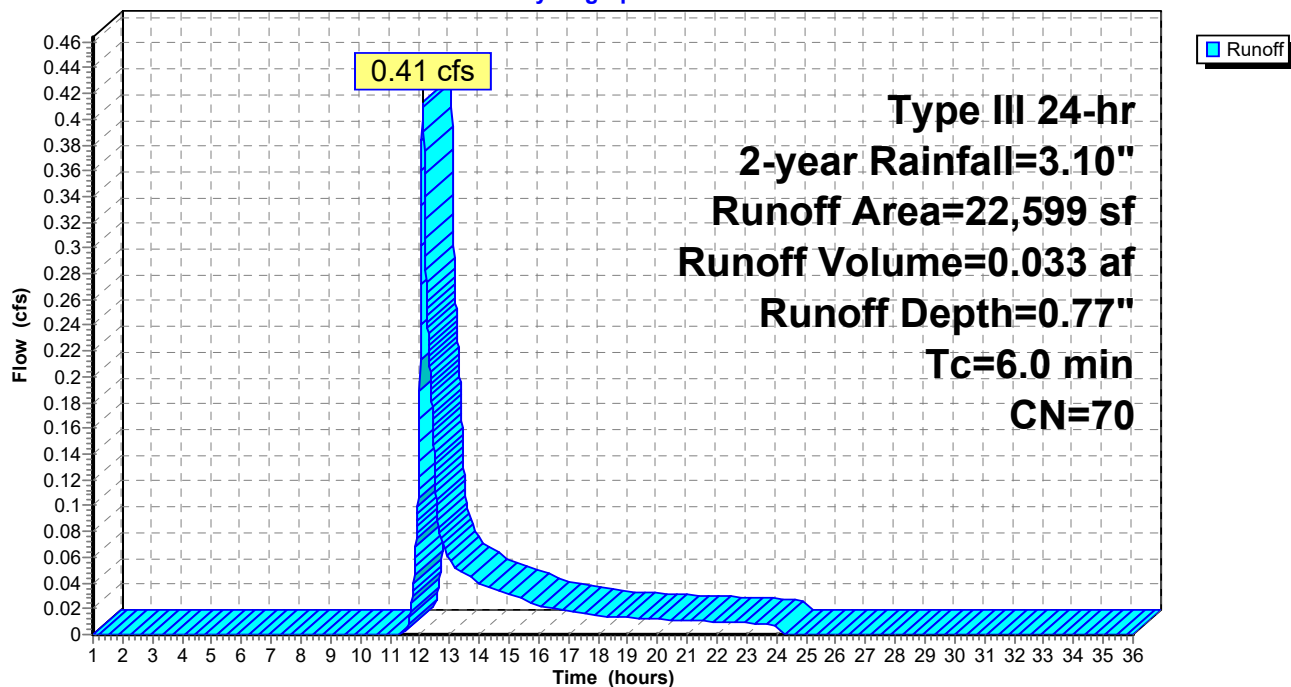
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	10,599	39	>75% Grass cover, Good, HSG A
*	12,000	98	roof
	22,599	70	Weighted Average
	10,599		46.90% Pervious Area
	12,000		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.6: Building E roof and yard

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 17

Summary for Subcatchment 1S.7: East Lot 4

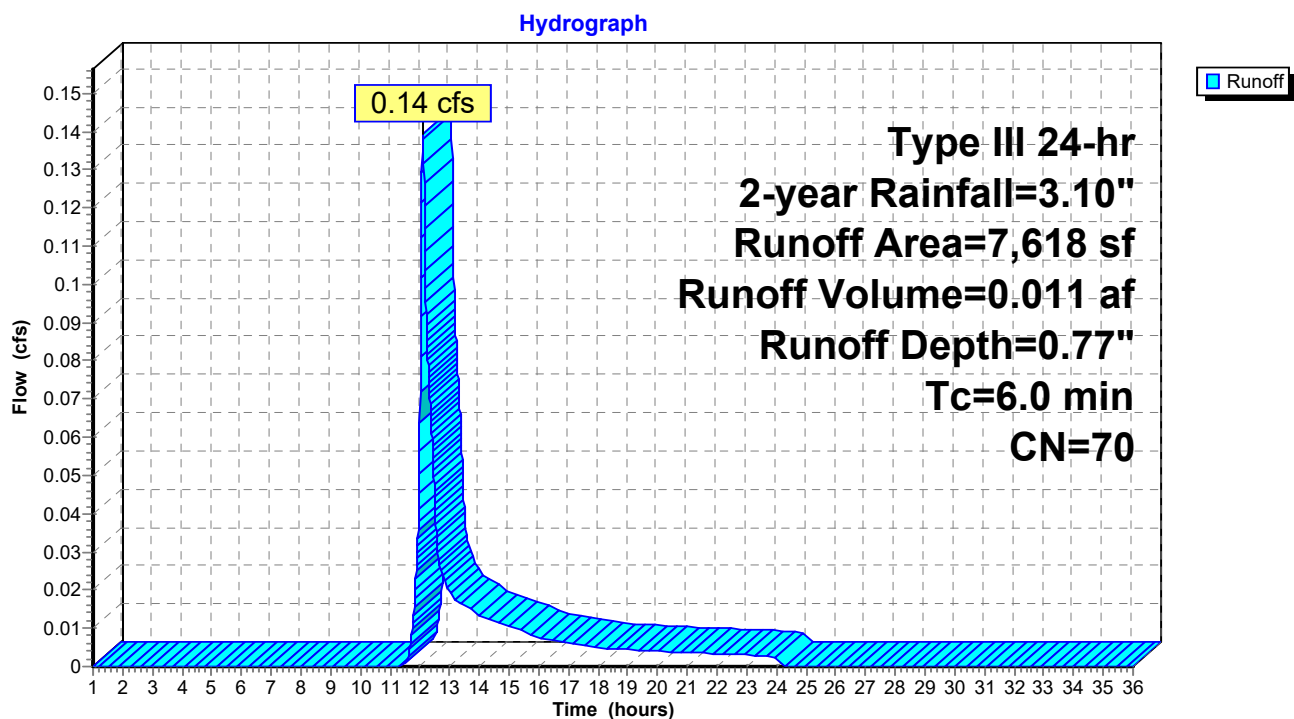
Runoff = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	4,038	98	Paved parking
	3,580	39	>75% Grass cover, Good, HSG A
	7,618	70	Weighted Average
	3,580		46.99% Pervious Area
	4,038		53.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.7: East Lot 4



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Page 18

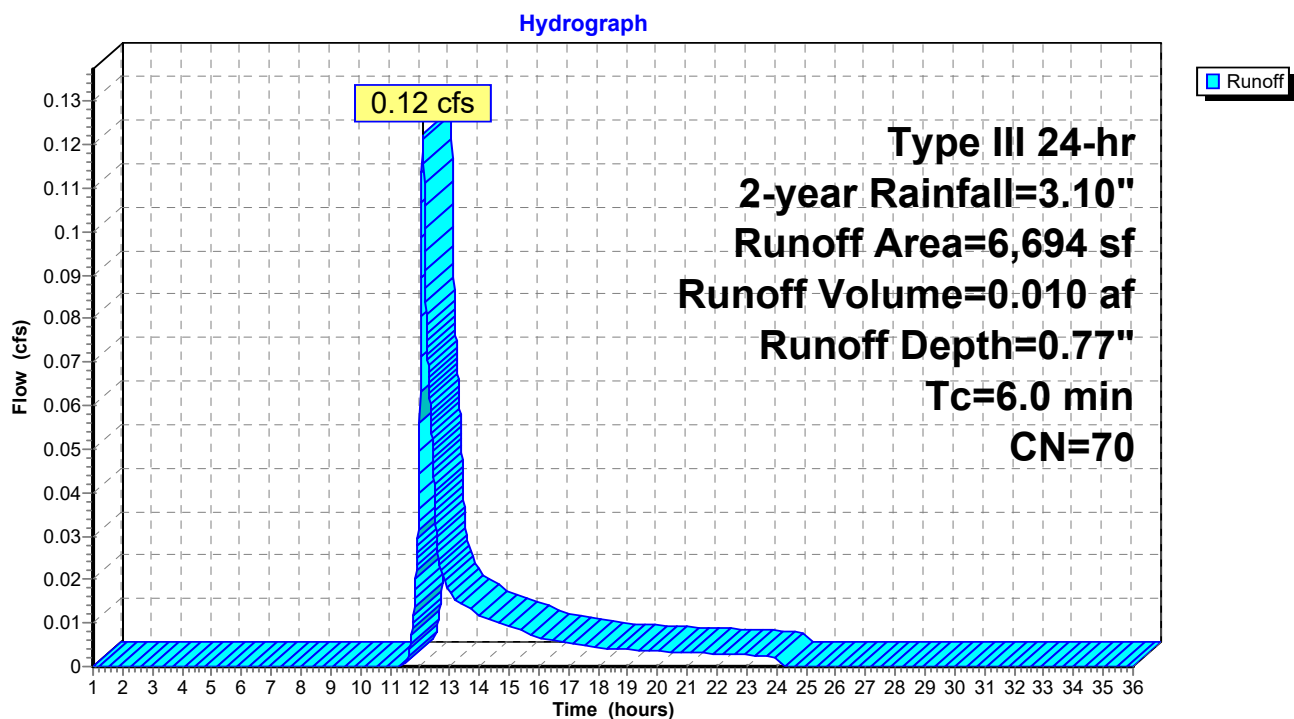
Summary for Subcatchment 1S.8: East Lot 3

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	3,547	98	Paved parking
	3,147	39	>75% Grass cover, Good, HSG A
	6,694	70	Weighted Average
	3,147		47.01% Pervious Area
	3,547		52.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.8: East Lot 3

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Type III 24-hr 2-year Rainfall=3.10"

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Page 19

Summary for Subcatchment 1S.9: East Lot 2

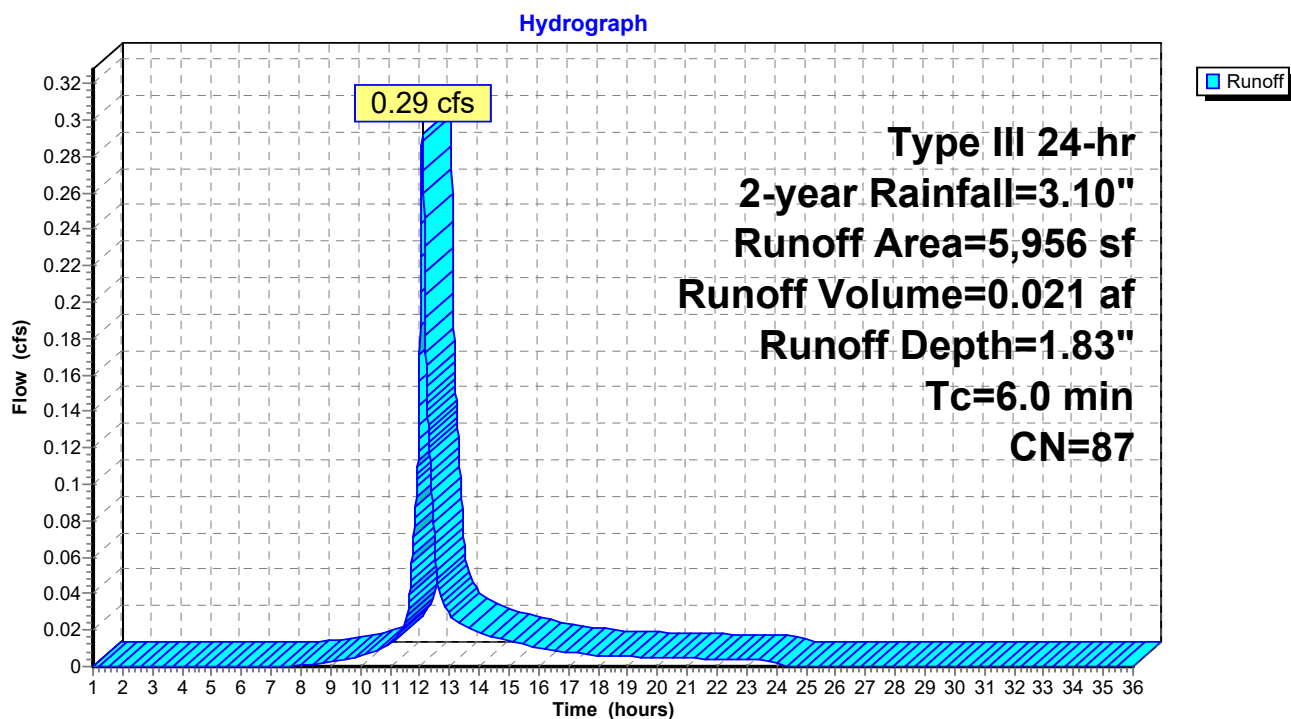
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	4,809	98	Paved parking, patio, sidewalk
	1,147	39	>75% Grass cover, Good, HSG A
	5,956	87	Weighted Average
	1,147		19.26% Pervious Area
	4,809		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.9: East Lot 2



Summary for Subcatchment 2S: 295 Embankment Trib

Runoff = 0.00 cfs @ 23.91 hrs, Volume= 0.000 af, Depth= 0.00"

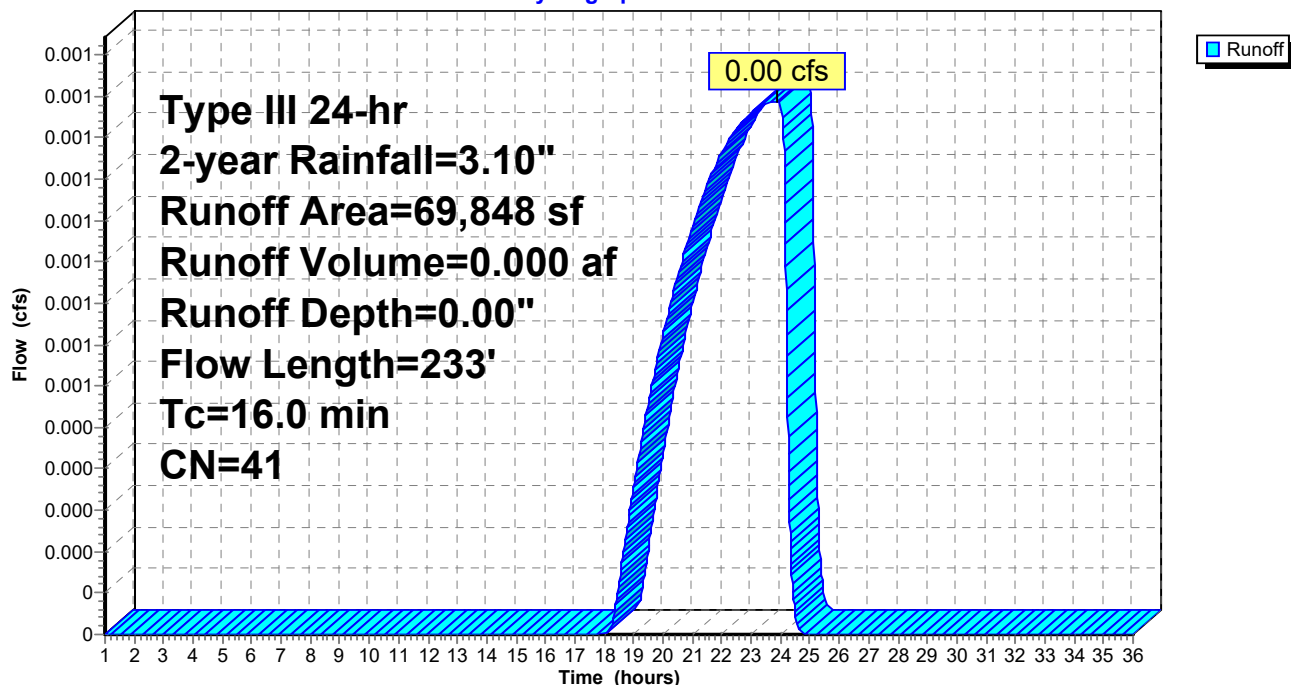
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	8,183	39	>75% Grass cover, Good, HSG A
*	230	98	Stairs
*	3,155	98	Path
*	5,488	98	Homes/driveways
	52,792	32	Woods/grass comb., Good, HSG A
	69,848	41	Weighted Average
	60,975		87.30% Pervious Area
	8,873		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment 2S: 295 Embankment Trib

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 21

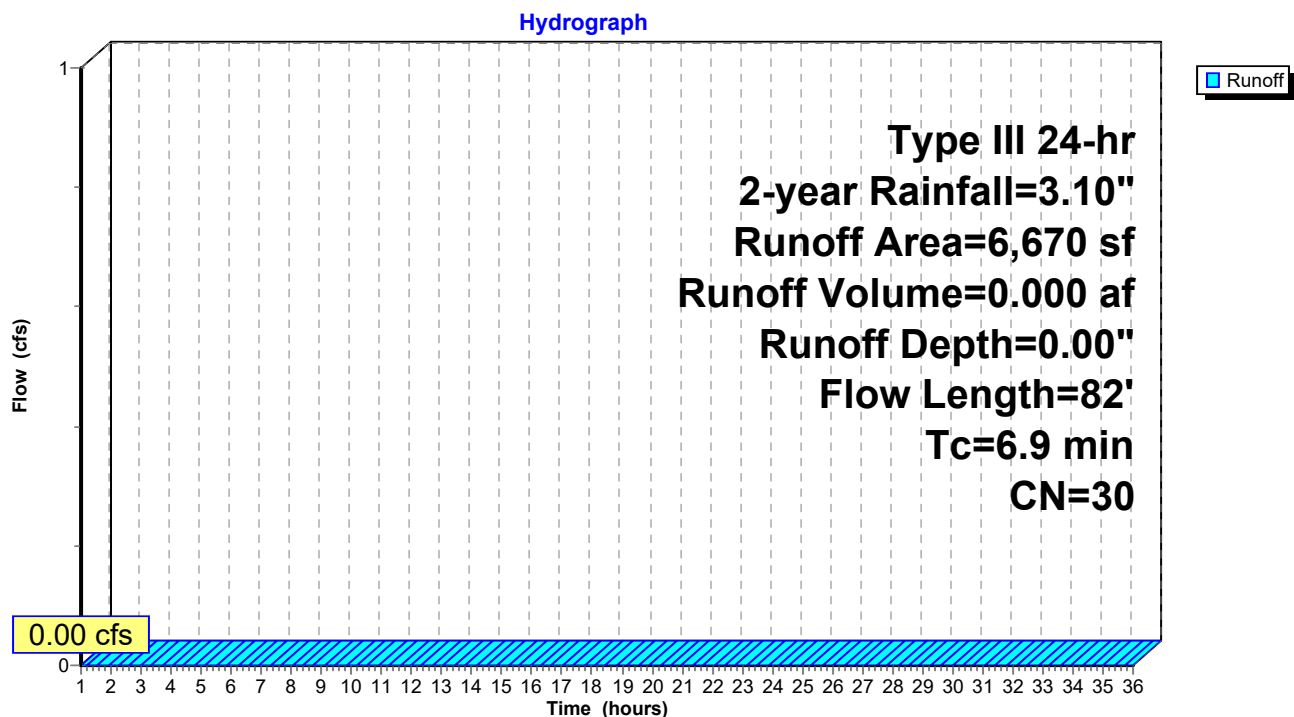
Summary for Subcatchment 3S.1: Garden area runoff

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
6,670	30	Brush, Good, HSG A
6,670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	28	0.3330	0.28		Sheet Flow, A to B
					Grass: Dense n= 0.240 P2= 3.27"
5.2	54	0.0700	0.17		Sheet Flow, B to C
					Grass: Dense n= 0.240 P2= 3.27"
6.9	82	Total			

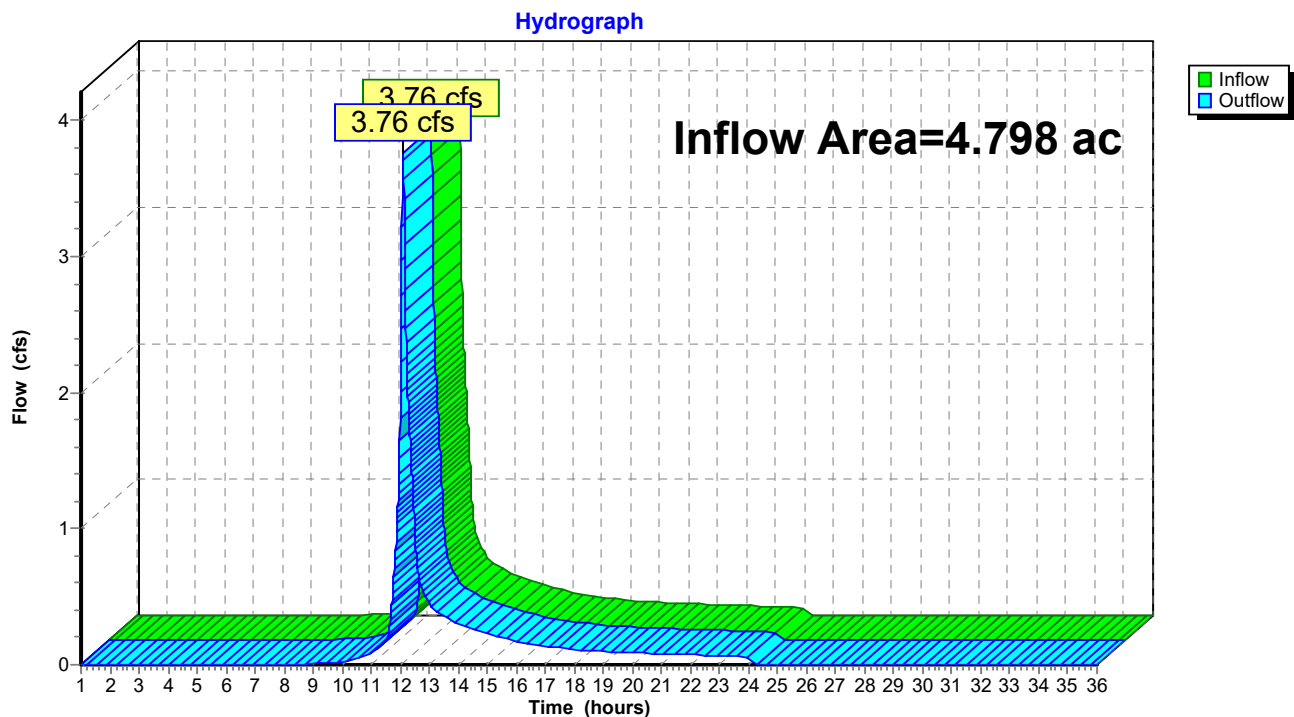
Subcatchment 3S.1: Garden area runoff

Summary for Reach POI-1: POI #1 - 60" Douglass MS4

Inflow Area = 4.798 ac, 46.81% Impervious, Inflow Depth = 0.71" for 2-year event
 Inflow = 3.76 cfs @ 12.09 hrs, Volume= 0.286 af
 Outflow = 3.76 cfs @ 12.09 hrs, Volume= 0.286 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-1: POI #1 - 60" Douglass MS4

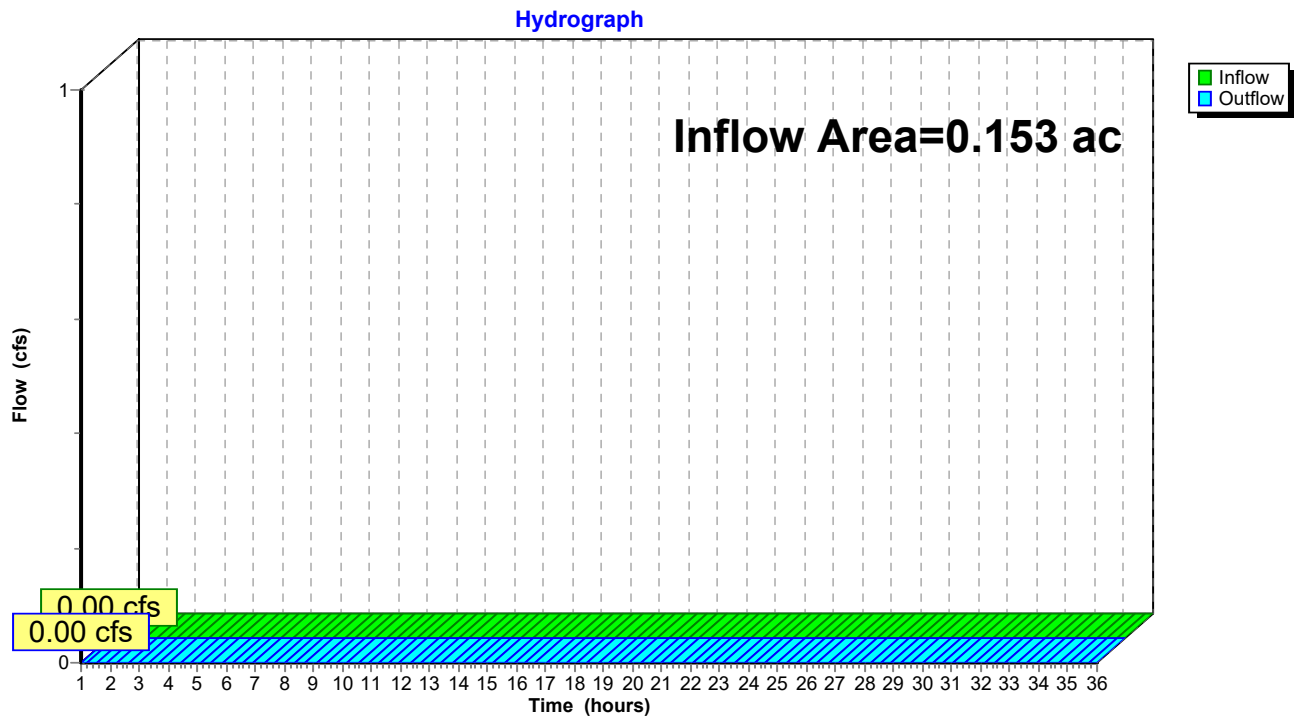


Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 0.153 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-3: POI #3 - Baseball Field



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Page 24

Summary for Pond P1: VUSF

Inflow Area = 0.249 ac, 76.24% Impervious, Inflow Depth = 1.46" for 2-year event
 Inflow = 0.42 cfs @ 12.09 hrs, Volume= 0.030 af
 Outflow = 0.06 cfs @ 12.76 hrs, Volume= 0.030 af, Atten= 87%, Lag= 39.9 min
 Discarded = 0.04 cfs @ 12.76 hrs, Volume= 0.022 af
 Primary = 0.01 cfs @ 12.76 hrs, Volume= 0.009 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 30.91' @ 12.76 hrs Surf.Area= 1,889 sf Storage= 530 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 171.8 min (1,009.6 - 837.8)

Volume	Invert	Avail.Storage	Storage Description
#1	30.75'	1,899 cf	Ponding (Prismatic) Listed below (Recalc)
#2	29.25'	69 cf	Filter Media/Loam (Prismatic) Listed below (Recalc)
			687 cf Overall x 10.0% Voids
#3	28.92'	30 cf	Transition Gravel (Prismatic) Listed below (Recalc)
			151 cf Overall x 20.0% Voids
#4	27.00'	349 cf	Crushed Stone (Prismatic) Listed below (Recalc)
			879 cf Overall - 6 cf Embedded = 873 cf x 40.0% Voids
#5	27.10'	5 cf	4.0" Round Pipe Storage x 2 Inside #4
			L= 30.0' S= 0.0005 '/'
			6 cf Overall - 0.2" Wall Thickness = 5 cf
		2,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.75	465	0	0
32.25	945	1,058	1,058
33.00	1,300	842	1,899

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.25	458	0	0
30.75	458	687	687

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.92	458	0	0
29.25	458	151	151

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.00	458	0	0
28.92	458	879	879

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Type III 24-hr 2-year Rainfall=3.10"

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Page 25

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	12.0" Round Culvert L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 26.75' S= 0.0042 '/' Cc= 0.600 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	27.10'	0.5" Vert. Soil Filter Media Drawdown Effect C= 0.600
#3	Device 1	32.35'	24.0" Horiz. Beehive Outlet C= 0.600 Limited to weir flow at low heads
#4	Discarded	27.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 12.76 hrs HW=30.91' (Free Discharge)

↳ **4=Exfiltration** (Exfiltration Controls 0.04 cfs)

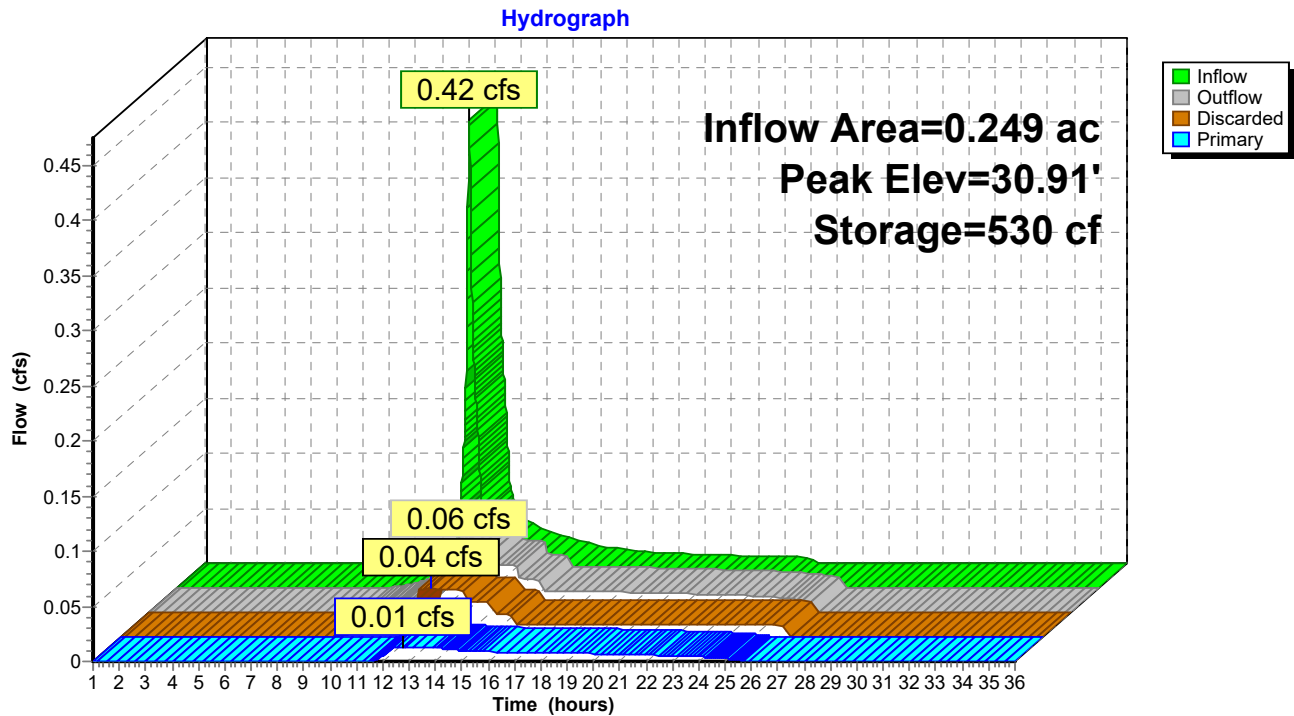
Primary OutFlow Max=0.01 cfs @ 12.76 hrs HW=30.91' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Passes 0.01 cfs of 3.67 cfs potential flow)

↳ **2=Soil Filter Media Drawdown Effect** (Orifice Controls 0.01 cfs @ 9.37 fps)

↳ **3=Beehive Outlet** (Controls 0.00 cfs)

Pond P1: VUSF



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Type III 24-hr 2-year Rainfall=3.10"

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Page 26

Summary for Pond P2: FP 4

Inflow Area = 0.175 ac, 53.01% Impervious, Inflow Depth = 0.77" for 2-year event
 Inflow = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af
 Outflow = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.95' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (878.2 - 878.2)

Volume	Invert	Avail.Storage	Storage Description
#1	35.95'	14 cf	4.00'W x 5.00'L x 3.60'H Media/Stone 72 cf Overall x 20.0% Voids
#2	35.95'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		52 cf	Total Available Storage

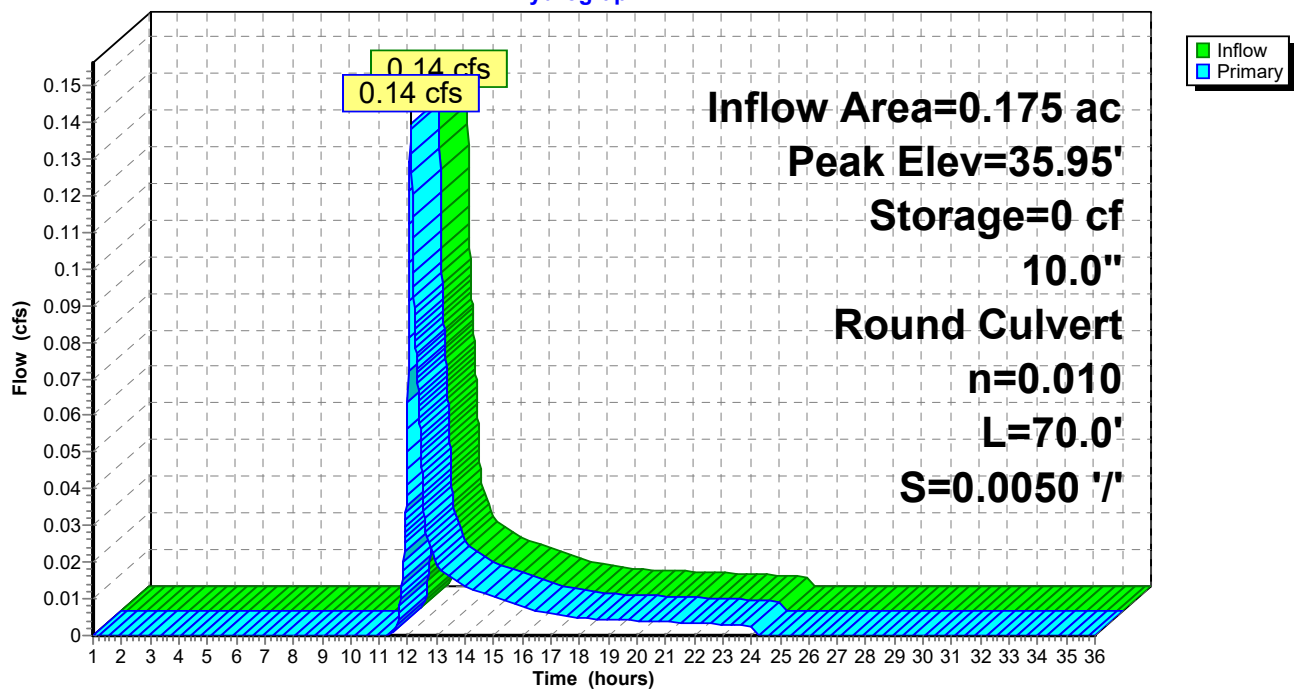
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.95	20	0	0
36.95	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	32.35'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 32.35' / 32.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=35.95' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.51 cfs potential flow)

Pond P2: FP 4

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 28

Summary for Pond P3: FP 3

Inflow Area = 0.154 ac, 52.99% Impervious, Inflow Depth = 0.77" for 2-year event
 Inflow = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af
 Outflow = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 36.10' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (878.2 - 878.2)

Volume	Invert	Avail.Storage	Storage Description
#1	36.10'	21 cf	5.00'W x 5.00'L x 4.20'H Media/Stone 105 cf Overall x 20.0% Voids
#2	36.10'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		66 cf	Total Available Storage

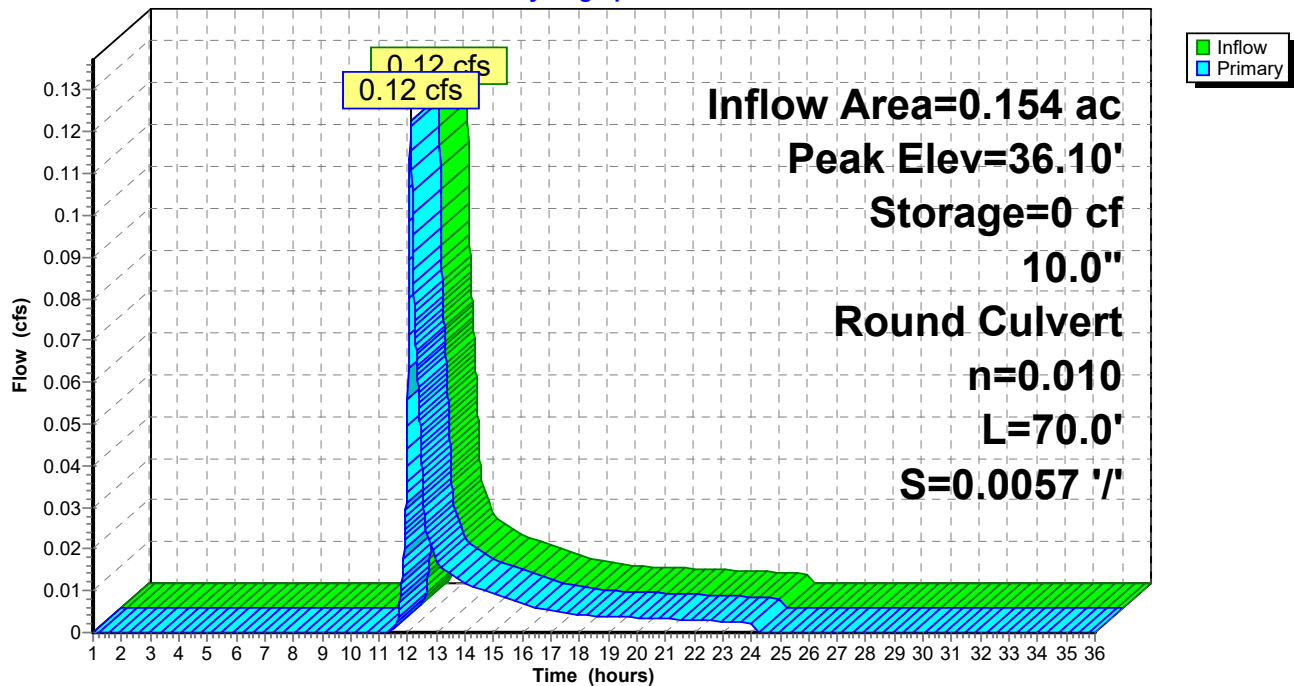
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.10	25	0	0
37.10	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.90'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.90' / 31.50' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=36.10' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.83 cfs potential flow)

Pond P3: FP 3

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 30

Summary for Pond P4: FP 2

Inflow Area = 0.137 ac, 80.74% Impervious, Inflow Depth = 1.83" for 2-year event
 Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af
 Outflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.90' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	23 cf	5.00'W x 5.00'L x 4.50'H Media/Stone 113 cf Overall x 20.0% Voids
#2	35.90'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		67 cf	Total Available Storage

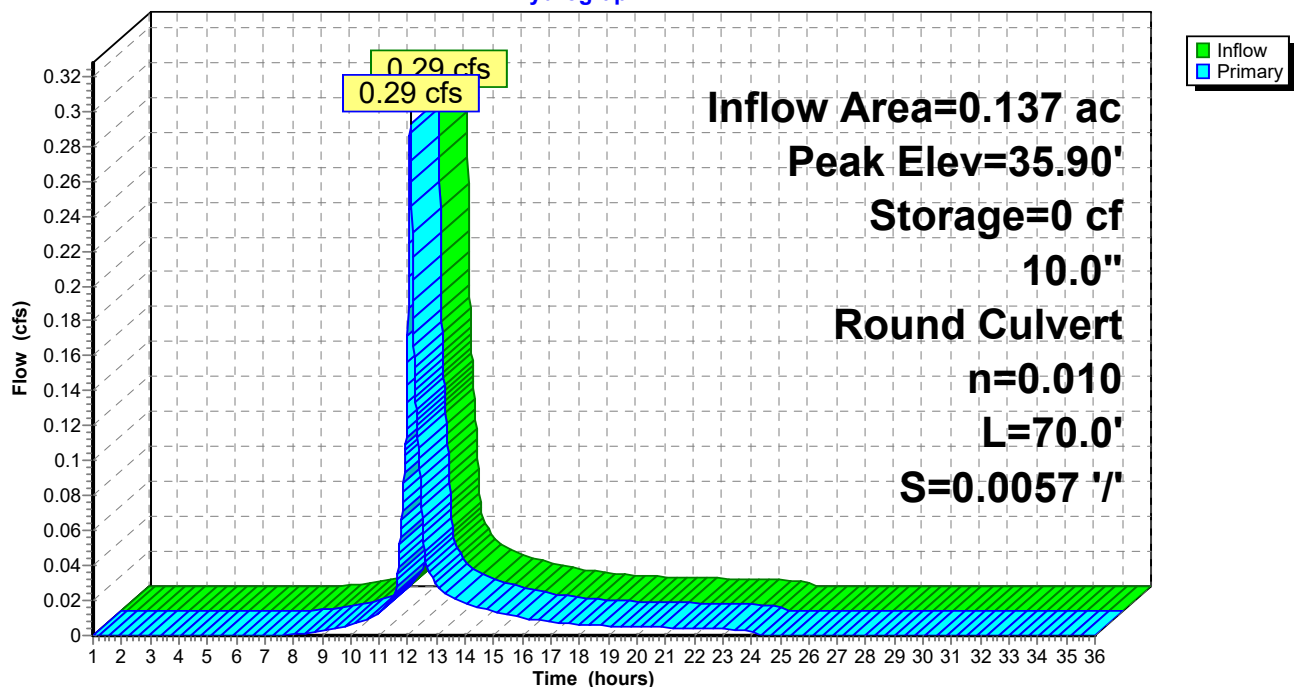
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.90	25	0	0
36.90	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.40'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.40' / 31.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.90' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.98 cfs potential flow)

Pond P4: FP 2

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 32

Summary for Pond P5: FP 1

Inflow Area = 0.086 ac, 84.98% Impervious, Inflow Depth = 1.99" for 2-year event
 Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af
 Outflow = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.70' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.70'	19 cf	4.00'W x 5.00'L x 4.80'H Media/Stone 96 cf Overall x 20.0% Voids
#2	35.70'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		57 cf	Total Available Storage

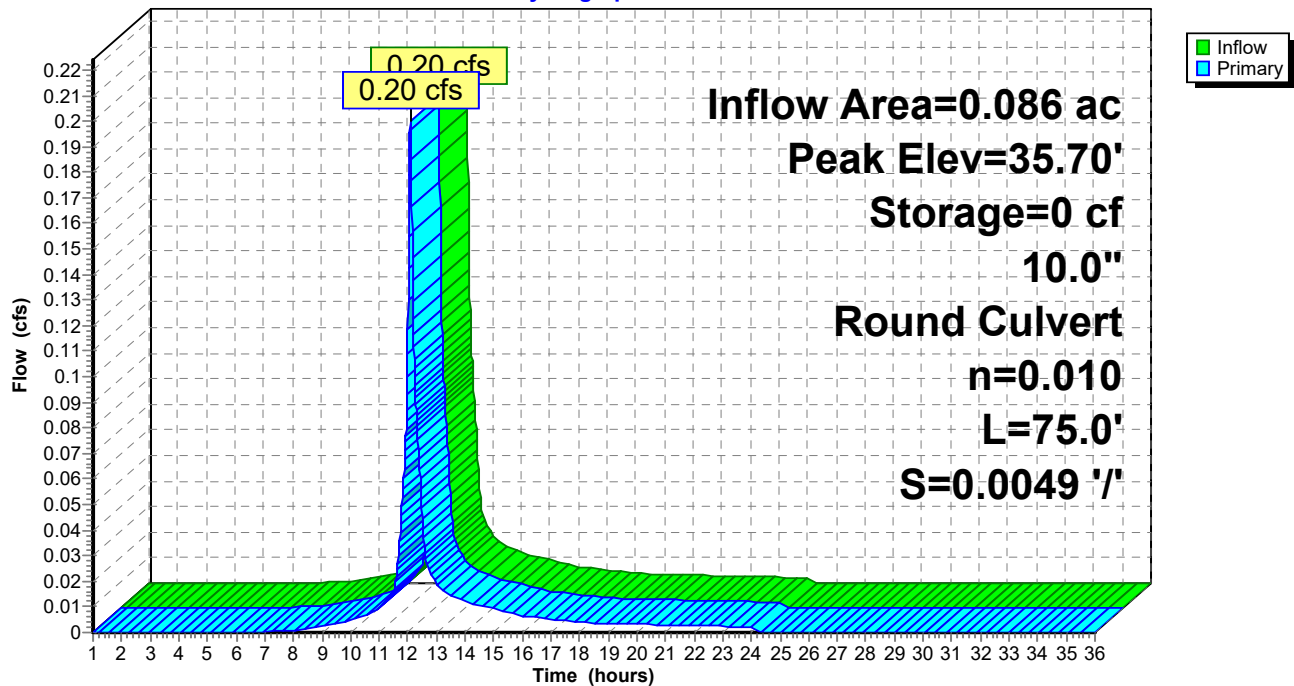
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.70	20	0	0
36.70	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	30.90'	10.0" Round Culvert L= 75.0' Ke= 1.000 Inlet / Outlet Invert= 30.90' / 30.53' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.70' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 4.12 cfs potential flow)

Pond P5: FP 1

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Type III 24-hr 2-year Rainfall=3.10"

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Page 34

Summary for Pond POI #2: POI #2 (295 Basin)

Inflow Area = 1.603 ac, 12.70% Impervious, Inflow Depth = 0.00" for 2-year event
 Inflow = 0.00 cfs @ 23.91 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 26.36' @ 24.90 hrs Surf.Area= 505 sf Storage= 20 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	105,037 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

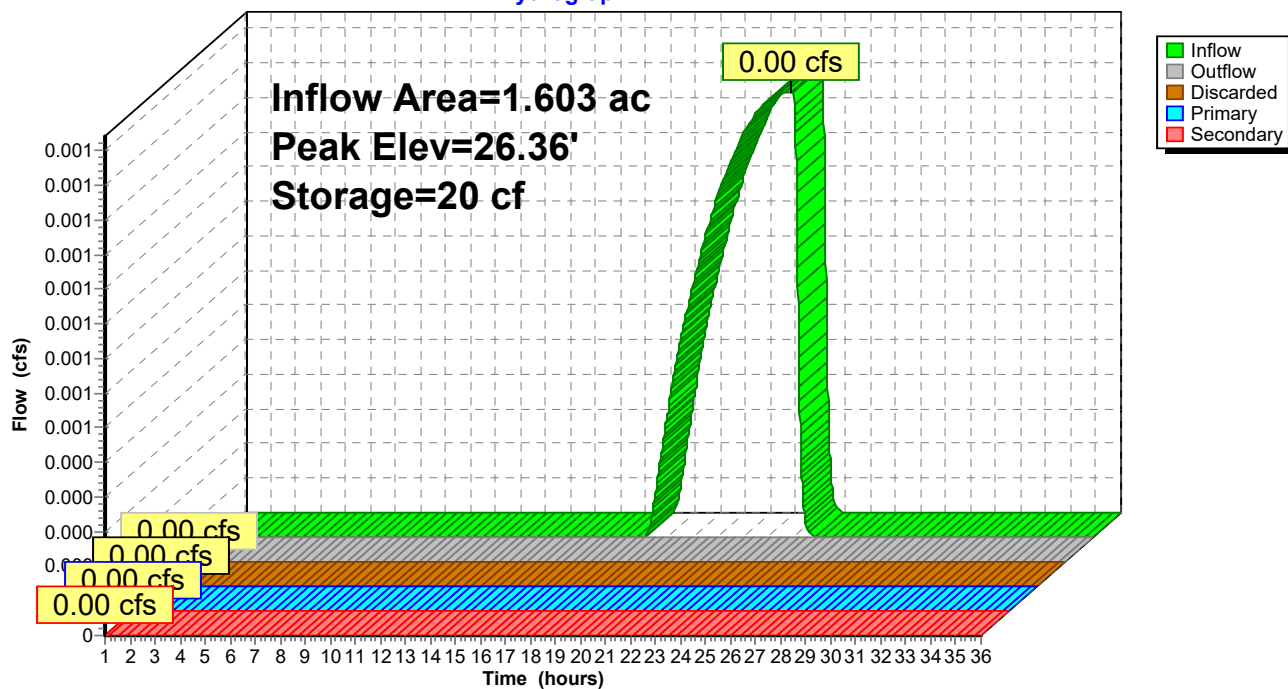
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	10,120	7,298	8,899
29.00	14,131	12,126	21,024
30.00	17,326	15,729	36,753
32.00	24,023	41,349	78,102
33.00	29,847	26,935	105,037

Device	Routing	Invert	Outlet Devices
#1	Primary	26.60'	12.0" Round Culvert L= 16.0' Ke= 0.600 Inlet / Outlet Invert= 26.60' / 26.51' S= 0.0056 ' S= 0.0056 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	32.40'	20.0' long x 15.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	26.60'	1.000 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**3=Exfiltration** (Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**2=Overflow** (Controls 0.00 cfs)

Pond POI #2: POI #2 (295 Basin)

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 36

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S.1: Drive to Street	Runoff Area=1,131 sf 55.00% Impervious Runoff Depth=1.82" Tc=6.0 min CN=71 Runoff=0.05 cfs 0.004 af
Subcatchment 1S.10: East Lot 1	Runoff Area=3,754 sf 84.98% Impervious Runoff Depth=3.39" Tc=6.0 min CN=89 Runoff=0.33 cfs 0.024 af
Subcatchment 1S.11: South Lot Treated	Runoff Area=10,852 sf 76.24% Impervious Runoff Depth=2.72" Tc=6.0 min CN=82 Runoff=0.80 cfs 0.057 af
Subcatchment 1S.2: Co Op Roof & yard	Runoff Area=56,422 sf 65.80% Impervious Runoff Depth=2.38" Tc=6.0 min CN=78 Runoff=3.61 cfs 0.256 af
Subcatchment 1S.3: Runoff to park	Runoff Area=2,081 sf 0.00% Impervious Runoff Depth=0.13" Flow Length=264' Tc=9.0 min CN=39 Runoff=0.00 cfs 0.001 af
Subcatchment 1S.4: Central parking/drive	Runoff Area=19,043 sf 77.98% Impervious Runoff Depth=2.81" Tc=6.0 min CN=83 Runoff=1.44 cfs 0.103 af
Subcatchment 1S.5: Contained yard/park	Runoff Area=3,023 sf 16.84% Impervious Runoff Depth=0.49" Tc=6.0 min CN=49 Runoff=0.02 cfs 0.003 af
Subcatchment 1S.6: Building E roof and	Runoff Area=22,599 sf 53.10% Impervious Runoff Depth=1.74" Tc=6.0 min CN=70 Runoff=1.03 cfs 0.075 af
Subcatchment 1S.7: East Lot 4	Runoff Area=7,618 sf 53.01% Impervious Runoff Depth=1.74" Tc=6.0 min CN=70 Runoff=0.35 cfs 0.025 af
Subcatchment 1S.8: East Lot 3	Runoff Area=6,694 sf 52.99% Impervious Runoff Depth=1.74" Tc=6.0 min CN=70 Runoff=0.31 cfs 0.022 af
Subcatchment 1S.9: East Lot 2	Runoff Area=5,956 sf 80.74% Impervious Runoff Depth=3.19" Tc=6.0 min CN=87 Runoff=0.50 cfs 0.036 af
Subcatchment 2S: 295 Embankment Trib	Runoff Area=69,848 sf 12.70% Impervious Runoff Depth=0.18" Flow Length=233' Tc=16.0 min CN=41 Runoff=0.05 cfs 0.025 af
Subcatchment 3S.1: Garden area runoff	Runoff Area=6,670 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=82' Tc=6.9 min CN=30 Runoff=0.00 cfs 0.000 af
Reach POI-1: POI #1 - 60" Douglass MS4	Inflow=7.65 cfs 0.573 af Outflow=7.65 cfs 0.573 af
Reach POI-3: POI #3 - Baseball Field	Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond P1: VUSF	Peak Elev=31.87' Storage=1,177 cf Inflow=0.80 cfs 0.057 af Discarded=0.05 cfs 0.043 af Primary=0.01 cfs 0.014 af Outflow=0.07 cfs 0.057 af

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Type III 24-hr 10-year Rainfall=4.60"

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Page 37

Pond P2: FP 4

Peak Elev=35.95' Storage=0 cf Inflow=0.35 cfs 0.025 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0050 ' ' Outflow=0.35 cfs 0.025 af

Pond P3: FP 3

Peak Elev=36.10' Storage=0 cf Inflow=0.31 cfs 0.022 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 ' ' Outflow=0.31 cfs 0.022 af

Pond P4: FP 2

Peak Elev=35.90' Storage=0 cf Inflow=0.50 cfs 0.036 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 ' ' Outflow=0.50 cfs 0.036 af

Pond P5: FP 1

Peak Elev=35.70' Storage=0 cf Inflow=0.33 cfs 0.024 af
10.0" Round Culvert n=0.010 L=75.0' S=0.0049 ' ' Outflow=0.33 cfs 0.024 af

Pond POI #2: POI #2 (295 Basin)

Peak Elev=26.67' Storage=464 cf Inflow=0.05 cfs 0.025 af
Discarded=0.01 cfs 0.008 af Primary=0.01 cfs 0.009 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.017 af

Total Runoff Area = 4.952 ac Runoff Volume = 0.631 af Average Runoff Depth = 1.53"
54.64% Pervious = 2.706 ac 45.36% Impervious = 2.246 ac

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Type III 24-hr 10-year Rainfall=4.60"

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Page 38

Summary for Subcatchment 1.S1: Drive to Street

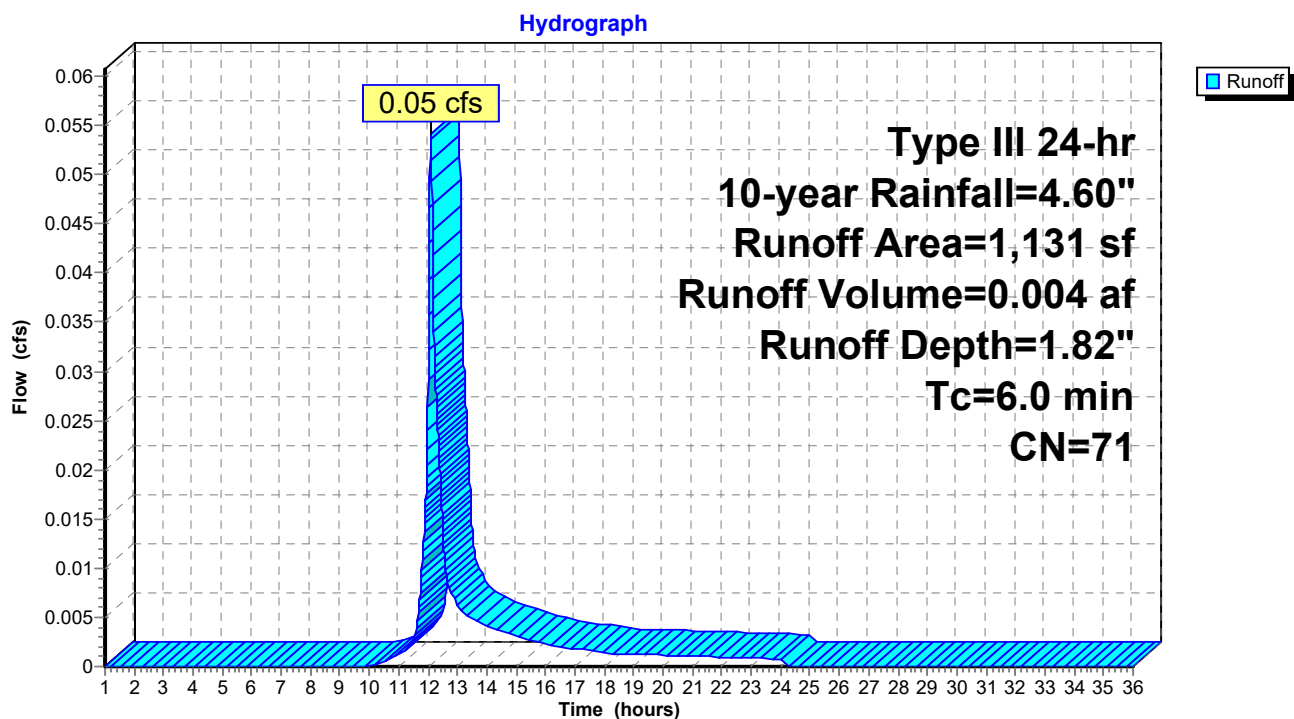
Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	622	98	Pavement
	509	39	>75% Grass cover, Good, HSG A
	1,131	71	Weighted Average
	509		45.00% Pervious Area
	622		55.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1.S1: Drive to Street



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Type III 24-hr 10-year Rainfall=4.60"

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Page 39

Summary for Subcatchment 1S.10: East Lot 1

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 3.39"

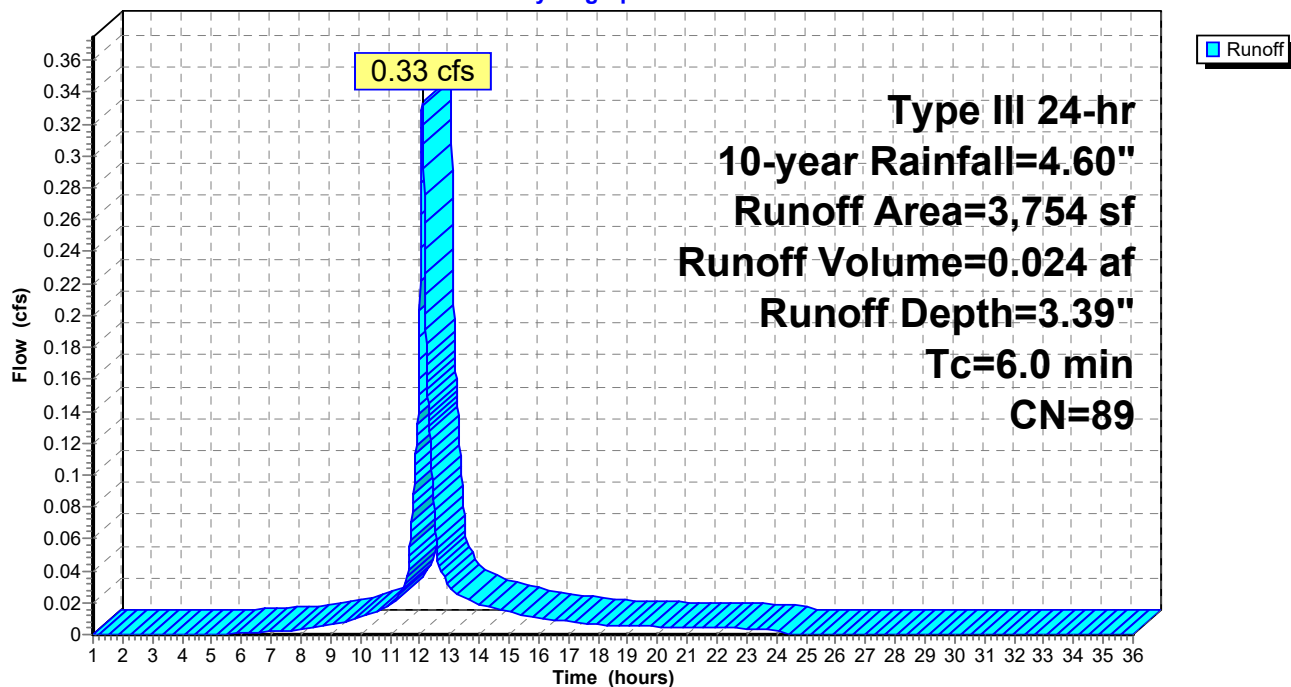
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	3,190	98	Pavement
	564	39	>75% Grass cover, Good, HSG A
	3,754	89	Weighted Average
	564		15.02% Pervious Area
	3,190		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.10: East Lot 1

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Type III 24-hr 10-year Rainfall=4.60"

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Page 40

Summary for Subcatchment 1S.11: South Lot Treated

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.057 af, Depth= 2.72"

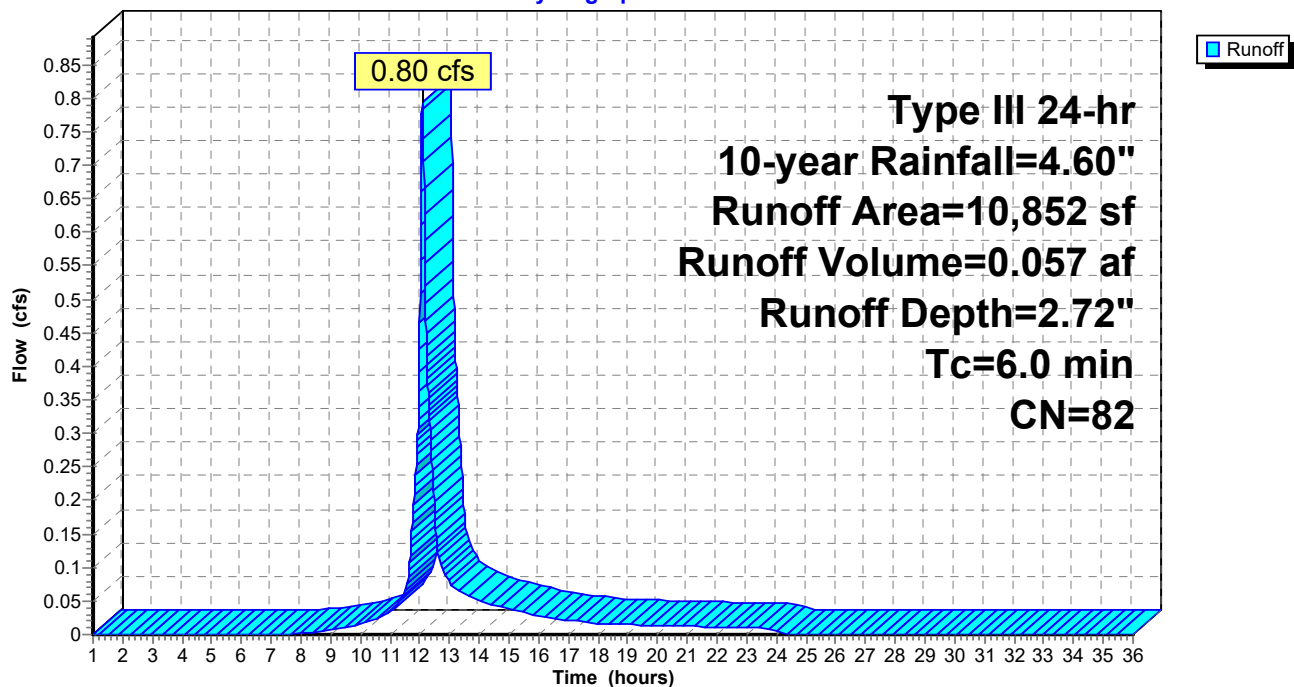
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	8,274	98	Paved parking
	2,578	30	Brush, Good, HSG A
	10,852	82	Weighted Average
	2,578		23.76% Pervious Area
	8,274		76.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.11: South Lot Treated

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Type III 24-hr 10-year Rainfall=4.60"

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Page 41

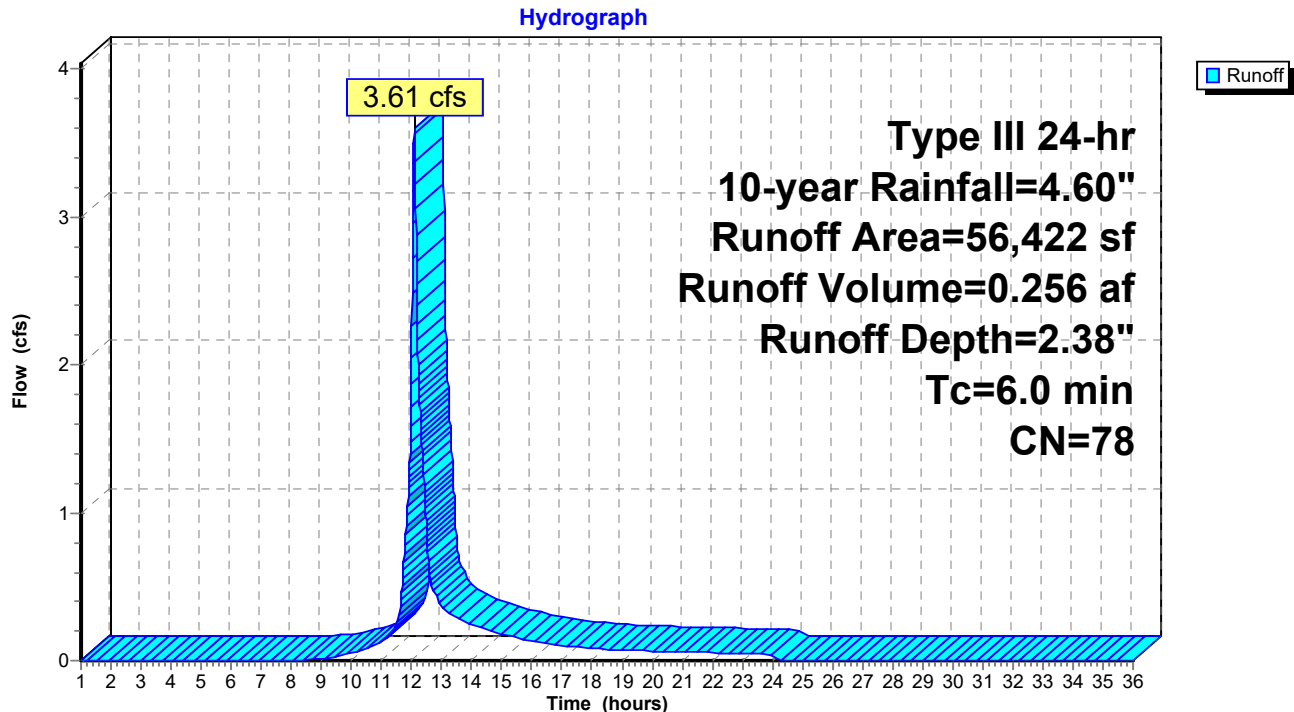
Summary for Subcatchment 1S.2: Co Op Roof & yard

Runoff = 3.61 cfs @ 12.09 hrs, Volume= 0.256 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	5,239	98	pavers
	16,100	39	>75% Grass cover, Good, HSG A
*	21,137	98	Roofs
*	4,191	98	sidewalks
*	618	98	patios
	9,137	77	1/8 acre lots, 65% imp, HSG A
	56,422	78	Weighted Average
	19,298		34.20% Pervious Area
	37,124		65.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.2: Co Op Roof & yard

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Type III 24-hr 10-year Rainfall=4.60"

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Page 42

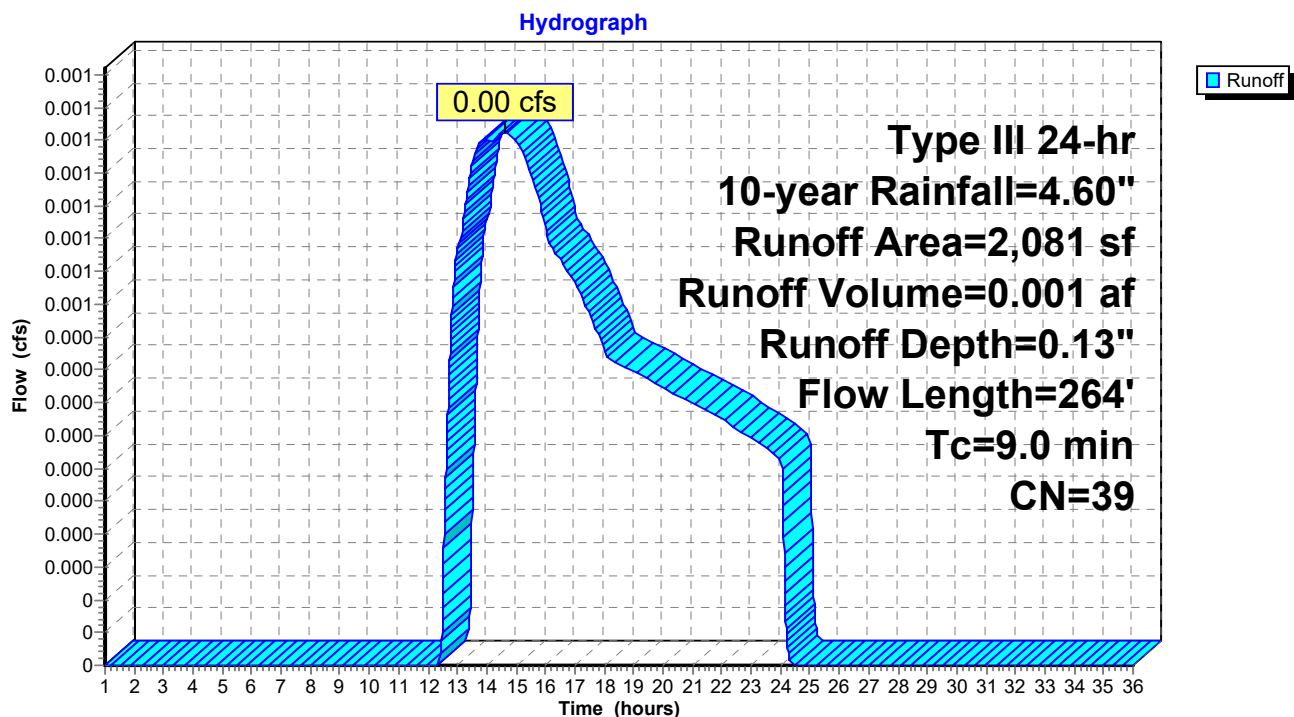
Summary for Subcatchment 1S.3: Runoff to park

Runoff = 0.00 cfs @ 14.63 hrs, Volume= 0.001 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,081	39	>75% Grass cover, Good, HSG A
2,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.0600	0.27		Sheet Flow, A to B Grass: Short n= 0.150 P2= 3.27"
2.8	164	0.0200	0.99		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
9.0	264	Total			

Subcatchment 1S.3: Runoff to park

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Type III 24-hr 10-year Rainfall=4.60"

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Page 43

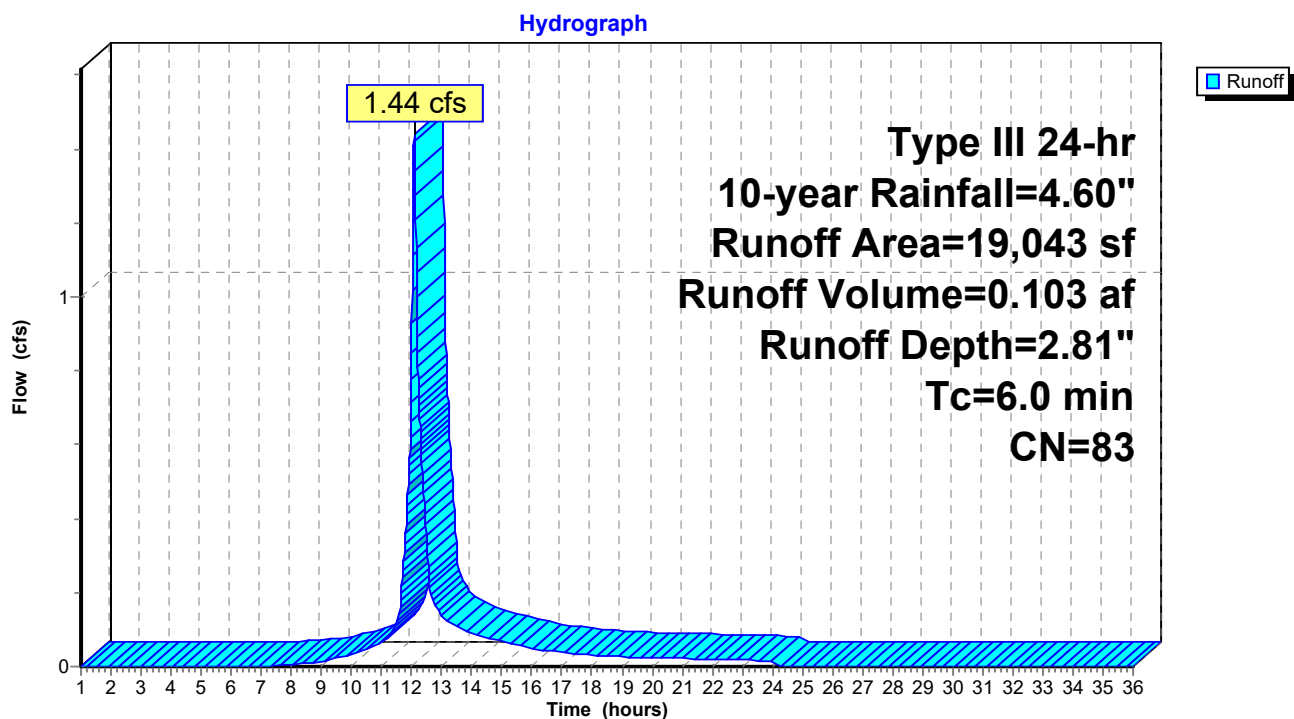
Summary for Subcatchment 1S.4: Central parking/drive

Runoff = 1.44 cfs @ 12.09 hrs, Volume= 0.103 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	14,850	98	Pavement
	4,193	30	Brush, Good, HSG A
	19,043	83	Weighted Average
	4,193		22.02% Pervious Area
	14,850		77.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.4: Central parking/drive

Summary for Subcatchment 1S.5: Contained yard/park connection

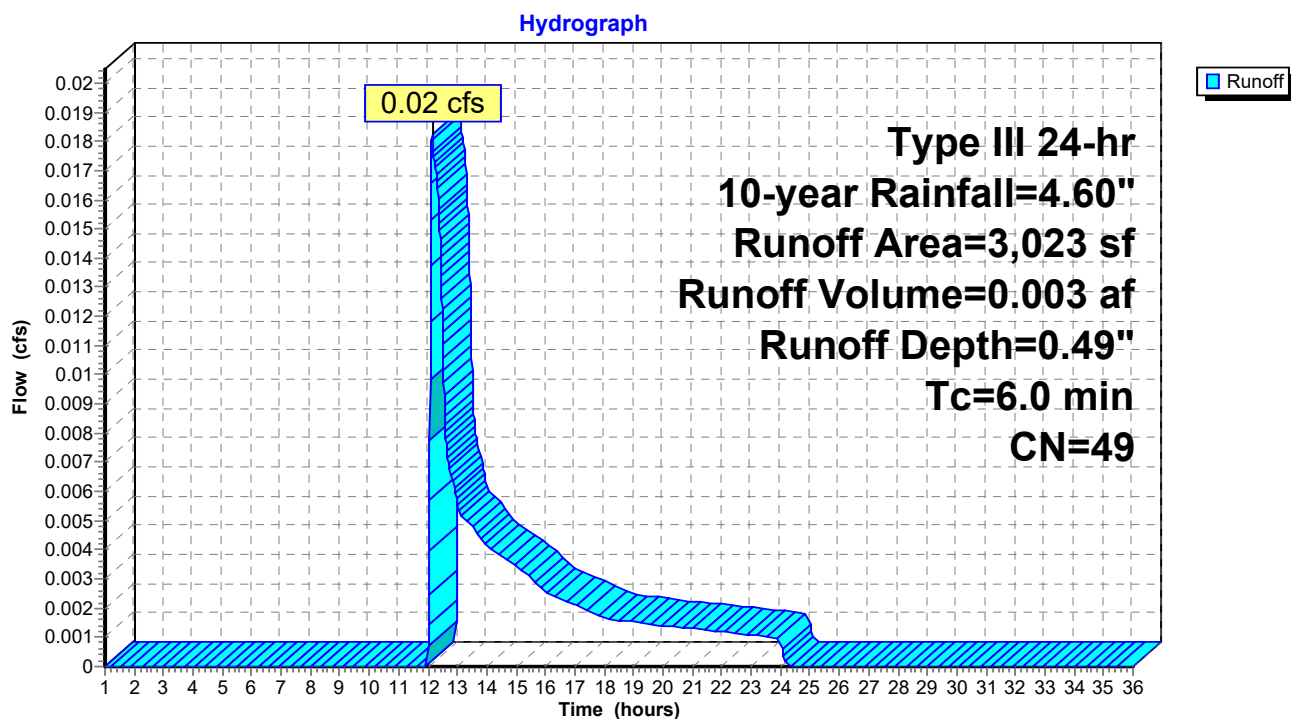
Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,514	39	>75% Grass cover, Good, HSG A
* 509	98	sidewalks
3,023	49	Weighted Average
2,514		83.16% Pervious Area
509		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.5: Contained yard/park connection



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Type III 24-hr 10-year Rainfall=4.60"

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Page 45

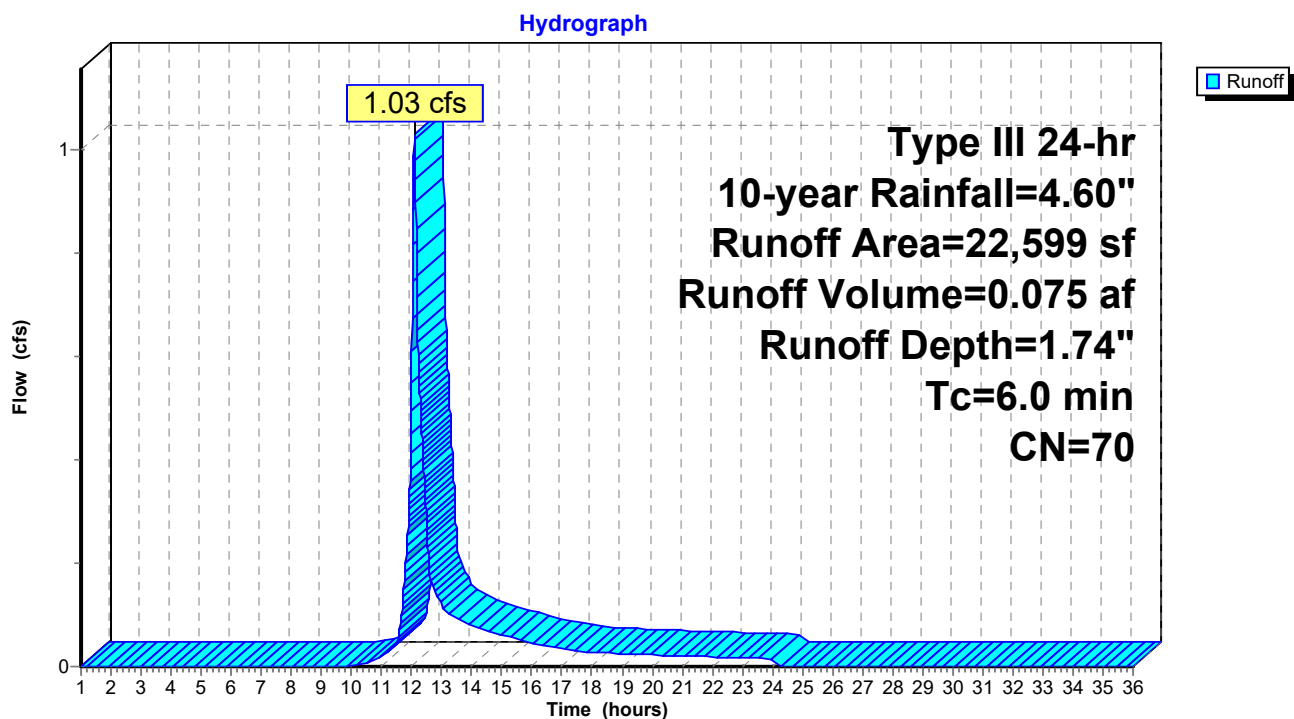
Summary for Subcatchment 1S.6: Building E roof and yard

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
10,599	39	>75% Grass cover, Good, HSG A
* 12,000	98	roof
22,599	70	Weighted Average
10,599		46.90% Pervious Area
12,000		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.6: Building E roof and yard

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Type III 24-hr 10-year Rainfall=4.60"

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Page 46

Summary for Subcatchment 1S.7: East Lot 4

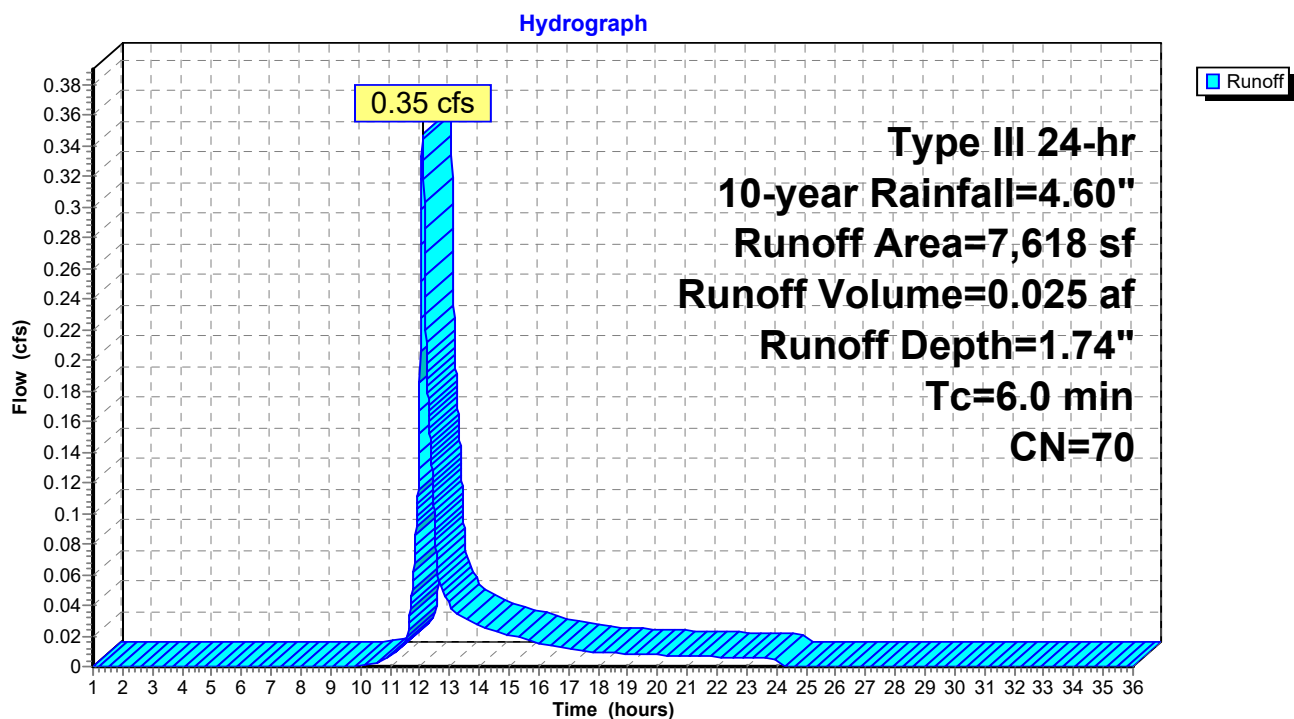
Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	4,038	98	Paved parking
	3,580	39	>75% Grass cover, Good, HSG A
	7,618	70	Weighted Average
	3,580		46.99% Pervious Area
	4,038		53.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.7: East Lot 4



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Type III 24-hr 10-year Rainfall=4.60"

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Page 47

Summary for Subcatchment 1S.8: East Lot 3

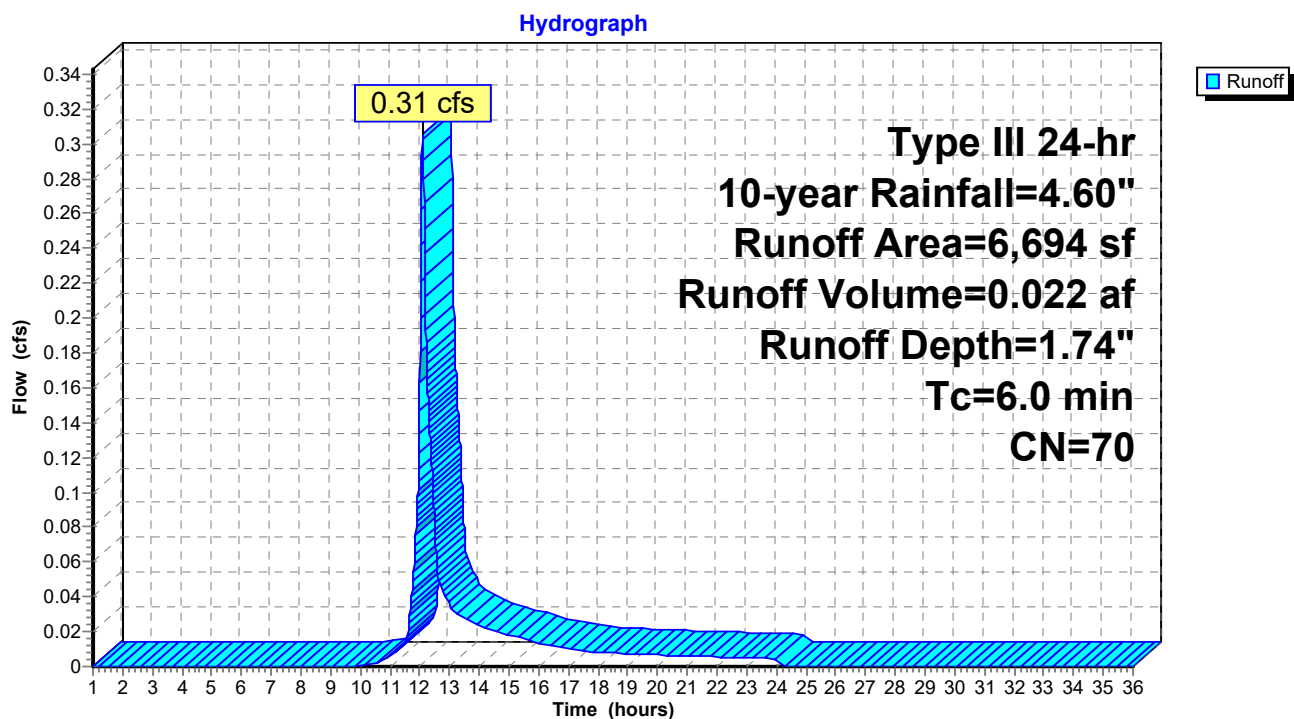
Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	3,547	98	Paved parking
	3,147	39	>75% Grass cover, Good, HSG A
	6,694	70	Weighted Average
	3,147		47.01% Pervious Area
	3,547		52.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.8: East Lot 3



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Type III 24-hr 10-year Rainfall=4.60"

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Page 48

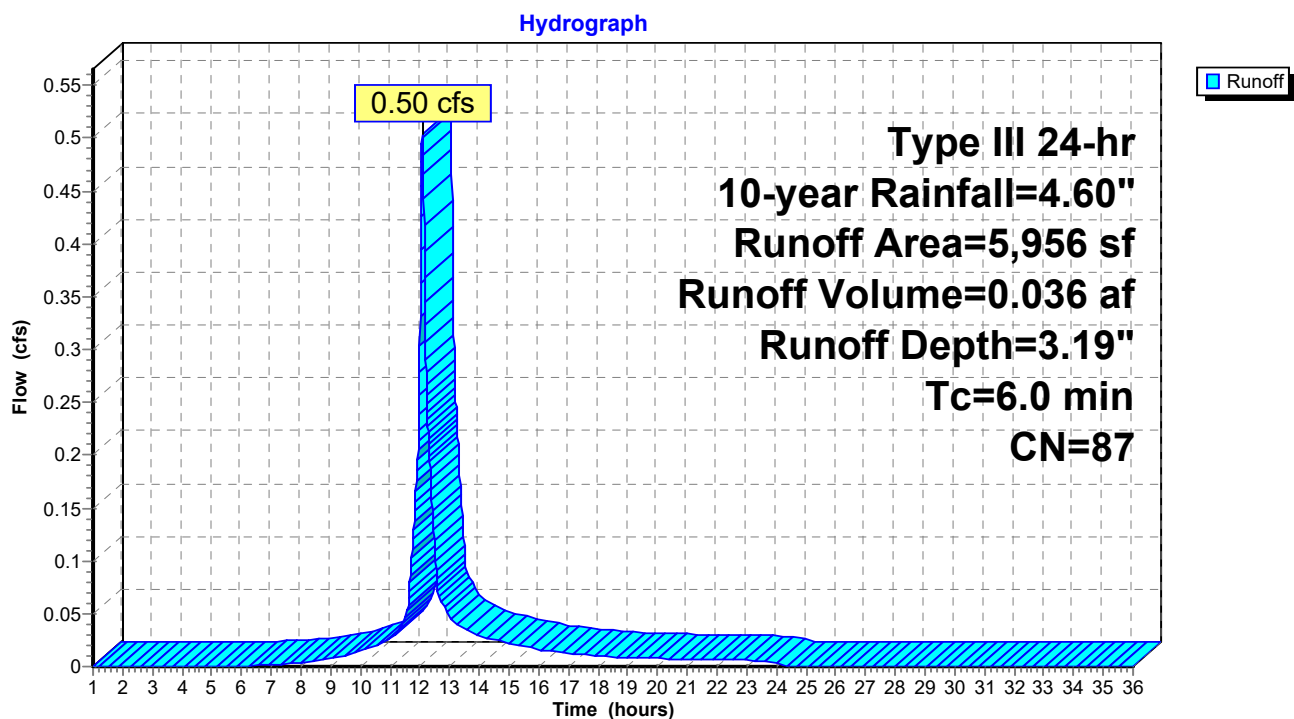
Summary for Subcatchment 1S.9: East Lot 2

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	4,809	98	Paved parking, patio, sidewalk
	1,147	39	>75% Grass cover, Good, HSG A
	5,956	87	Weighted Average
	1,147		19.26% Pervious Area
	4,809		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.9: East Lot 2

Summary for Subcatchment 2S: 295 Embankment Trib

Runoff = 0.05 cfs @ 12.65 hrs, Volume= 0.025 af, Depth= 0.18"

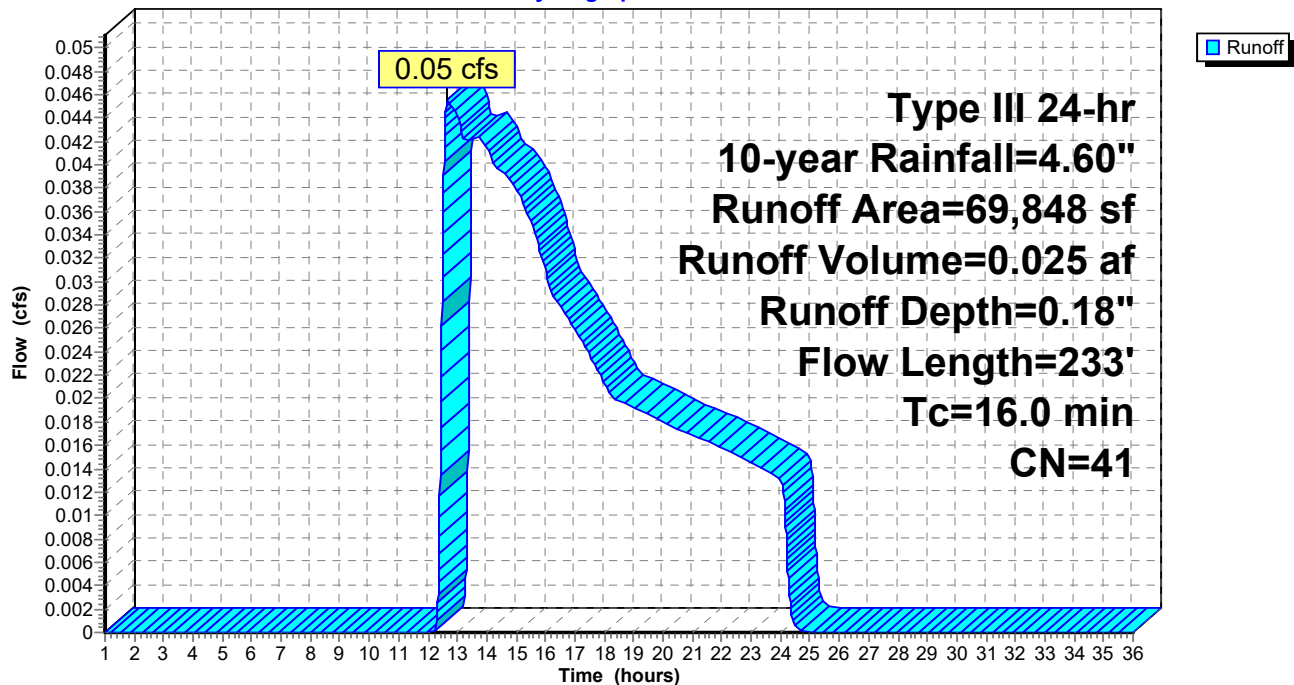
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
8,183	39	>75% Grass cover, Good, HSG A
* 230	98	Stairs
* 3,155	98	Path
* 5,488	98	Homes/driveways
52,792	32	Woods/grass comb., Good, HSG A
69,848	41	Weighted Average
60,975		87.30% Pervious Area
8,873		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment 2S: 295 Embankment Trib

Hydrograph



Summary for Subcatchment 3S.1: Garden area runoff

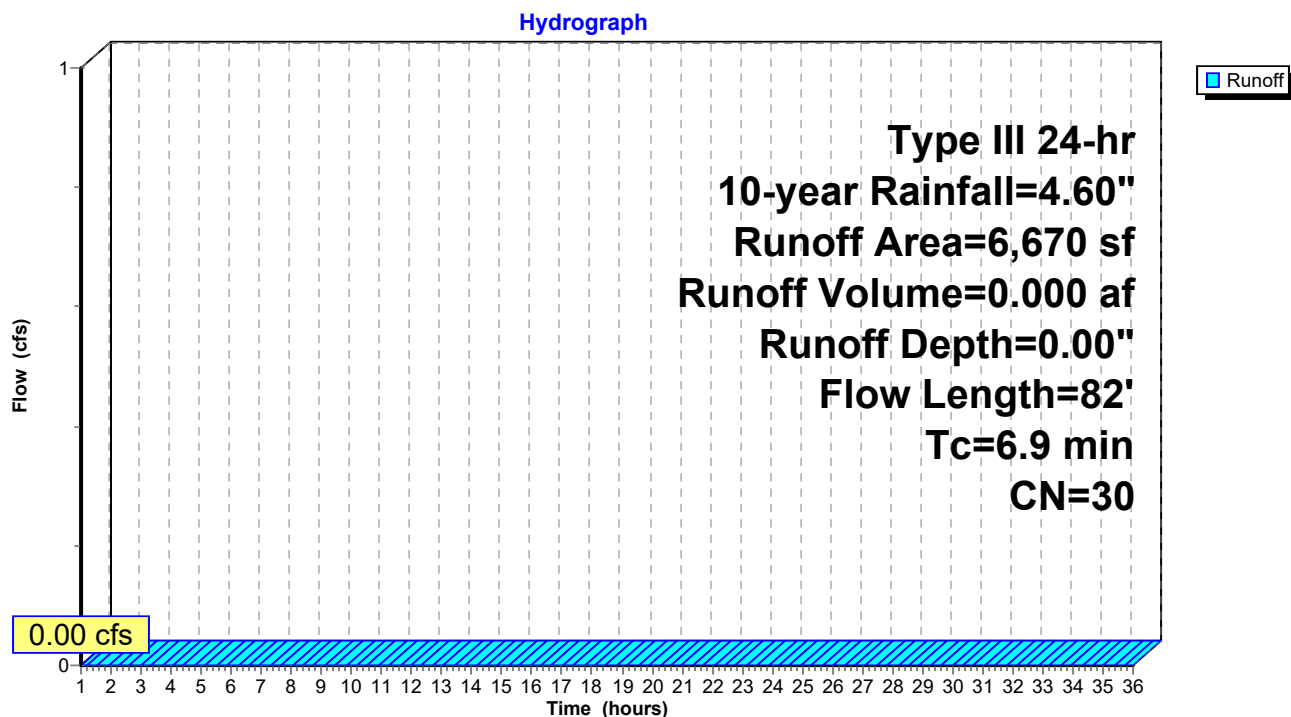
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
6,670	30	Brush, Good, HSG A
6,670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	28	0.3330	0.28		Sheet Flow, A to B
					Grass: Dense n= 0.240 P2= 3.27"
5.2	54	0.0700	0.17		Sheet Flow, B to C
					Grass: Dense n= 0.240 P2= 3.27"
6.9	82	Total			

Subcatchment 3S.1: Garden area runoff

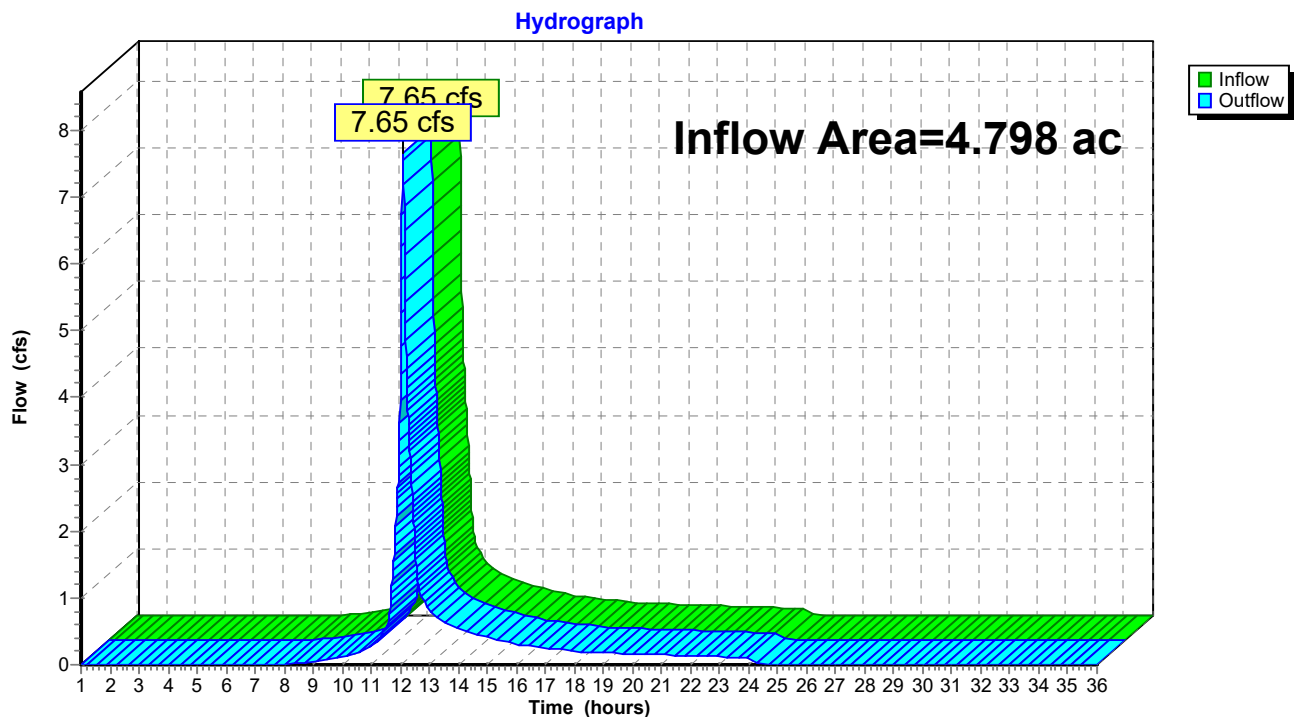


Summary for Reach POI-1: POI #1 - 60" Douglass MS4

Inflow Area = 4.798 ac, 46.81% Impervious, Inflow Depth = 1.43" for 10-year event
 Inflow = 7.65 cfs @ 12.09 hrs, Volume= 0.573 af
 Outflow = 7.65 cfs @ 12.09 hrs, Volume= 0.573 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-1: POI #1 - 60" Douglass MS4

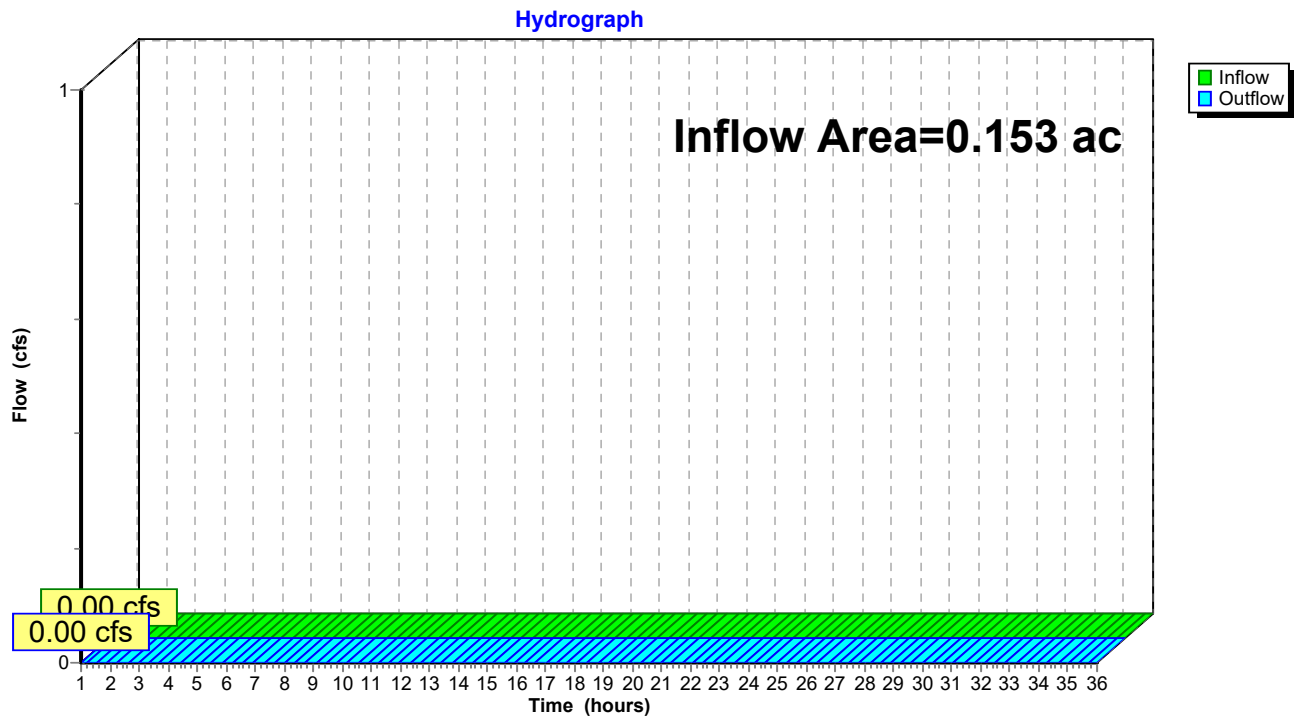


Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 0.153 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-3: POI #3 - Baseball Field



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Type III 24-hr 10-year Rainfall=4.60"

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Page 53

Summary for Pond P1: VUSF

Inflow Area = 0.249 ac, 76.24% Impervious, Inflow Depth = 2.72" for 10-year event
 Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.057 af
 Outflow = 0.07 cfs @ 13.29 hrs, Volume= 0.057 af, Atten= 92%, Lag= 72.1 min
 Discarded = 0.05 cfs @ 13.29 hrs, Volume= 0.043 af
 Primary = 0.01 cfs @ 13.29 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 31.87' @ 13.29 hrs Surf.Area= 2,198 sf Storage= 1,177 cf

Plug-Flow detention time= 220.8 min calculated for 0.057 af (100% of inflow)

Center-of-Mass det. time= 220.8 min (1,040.6 - 819.8)

Volume	Invert	Avail.Storage	Storage Description
#1	30.75'	1,899 cf	Ponding (Prismatic) Listed below (Recalc)
#2	29.25'	69 cf	Filter Media/Loam (Prismatic) Listed below (Recalc)
			687 cf Overall x 10.0% Voids
#3	28.92'	30 cf	Transition Gravel (Prismatic) Listed below (Recalc)
			151 cf Overall x 20.0% Voids
#4	27.00'	349 cf	Crushed Stone (Prismatic) Listed below (Recalc)
			879 cf Overall - 6 cf Embedded = 873 cf x 40.0% Voids
#5	27.10'	5 cf	4.0" Round Pipe Storage x 2 Inside #4
			L= 30.0' S= 0.0005 '/'
			6 cf Overall - 0.2" Wall Thickness = 5 cf
		2,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.75	465	0	0
32.25	945	1,058	1,058
33.00	1,300	842	1,899

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.25	458	0	0
30.75	458	687	687

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.92	458	0	0
29.25	458	151	151

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.00	458	0	0
28.92	458	879	879

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Type III 24-hr 10-year Rainfall=4.60"

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Page 54

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	12.0" Round Culvert L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 26.75' S= 0.0042 ' / ' Cc= 0.600 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	27.10'	0.5" Vert. Soil Filter Media Drawdown Effect C= 0.600
#3	Device 1	32.35'	24.0" Horiz. Beehive Outlet C= 0.600 Limited to weir flow at low heads
#4	Discarded	27.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.05 cfs @ 13.29 hrs HW=31.87' (Free Discharge)

↳ **4=Exfiltration** (Exfiltration Controls 0.05 cfs)

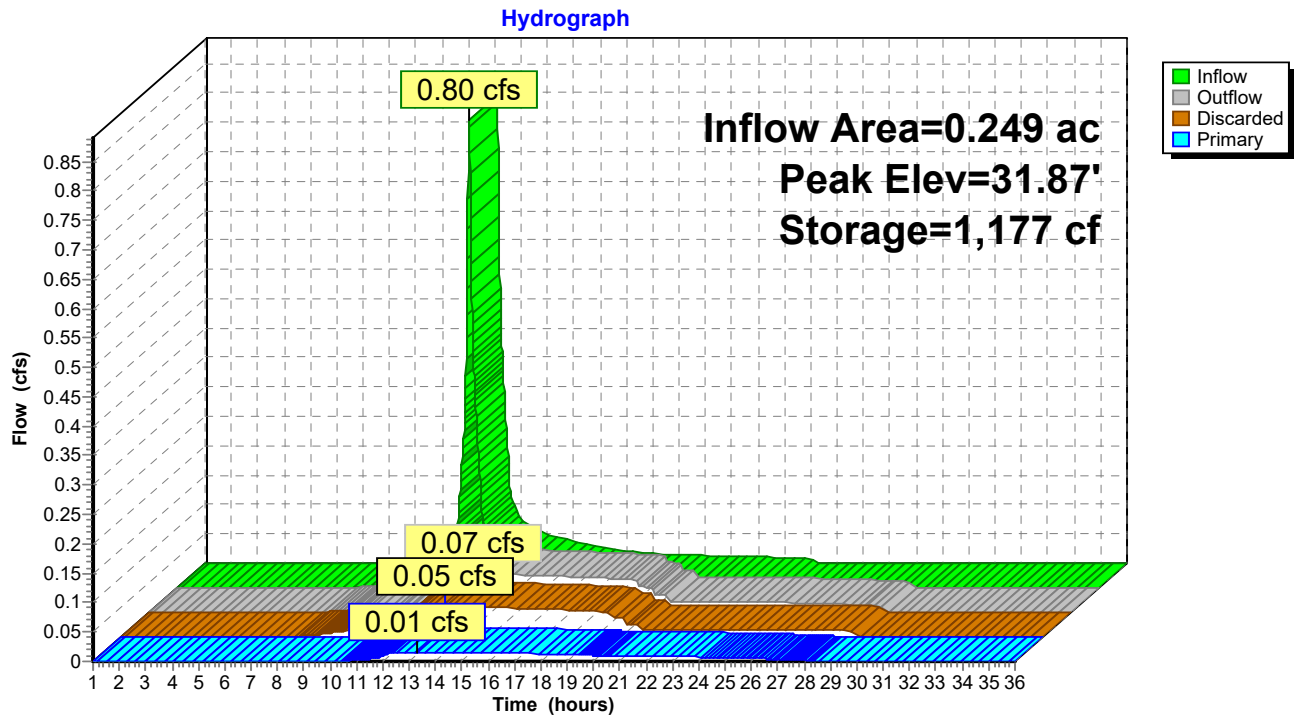
Primary OutFlow Max=0.01 cfs @ 13.29 hrs HW=31.87' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Passes 0.01 cfs of 4.16 cfs potential flow)

↳ **2=Soil Filter Media Drawdown Effect** (Orifice Controls 0.01 cfs @ 10.50 fps)

↳ **3=Beehive Outlet** (Controls 0.00 cfs)

Pond P1: VUSF



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Type III 24-hr 10-year Rainfall=4.60"

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Page 55

Summary for Pond P2: FP 4

Inflow Area = 0.175 ac, 53.01% Impervious, Inflow Depth = 1.74" for 10-year event
 Inflow = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af
 Outflow = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.95' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.95'	14 cf	4.00'W x 5.00'L x 3.60'H Media/Stone 72 cf Overall x 20.0% Voids
#2	35.95'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		52 cf	Total Available Storage

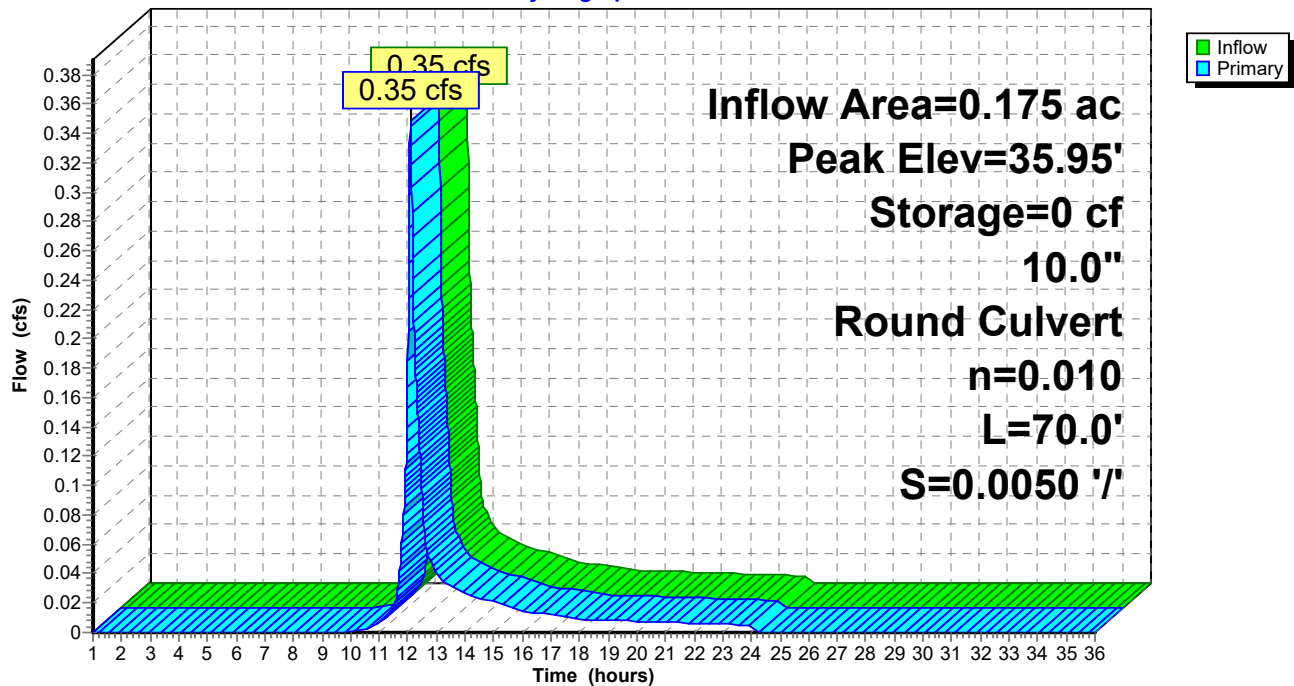
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.95	20	0	0
36.95	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	32.35'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 32.35' / 32.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.95' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.51 cfs potential flow)

Pond P2: FP 4

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 57

Summary for Pond P3: FP 3

Inflow Area = 0.154 ac, 52.99% Impervious, Inflow Depth = 1.74" for 10-year event
 Inflow = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af
 Outflow = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 36.10' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	36.10'	21 cf	5.00'W x 5.00'L x 4.20'H Media/Stone 105 cf Overall x 20.0% Voids
#2	36.10'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		66 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.10	25	0	0
37.10	64	45	45

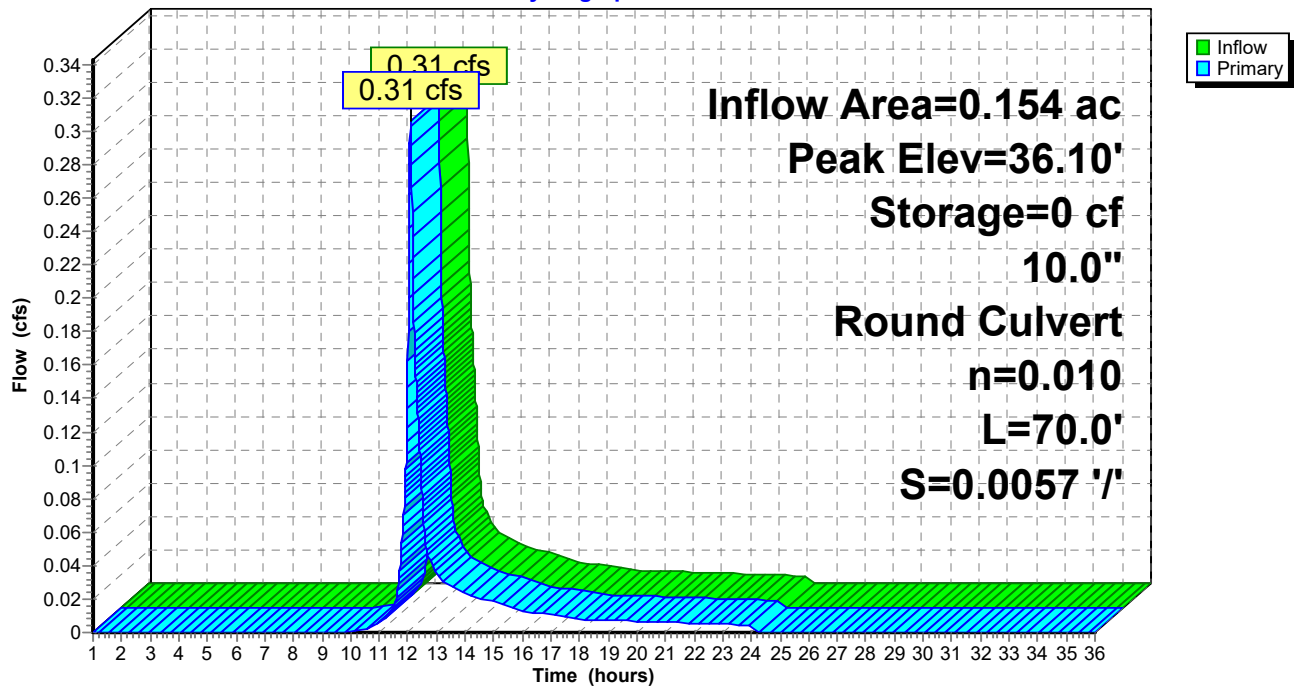
Device	Routing	Invert	Outlet Devices
#1	Primary	31.90'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.90' / 31.50' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=36.10' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.83 cfs potential flow)

Pond P3: FP 3

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 59

Summary for Pond P4: FP 2

Inflow Area = 0.137 ac, 80.74% Impervious, Inflow Depth = 3.19" for 10-year event
 Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af
 Outflow = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.90' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	23 cf	5.00'W x 5.00'L x 4.50'H Media/Stone 113 cf Overall x 20.0% Voids
#2	35.90'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		67 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.90	25	0	0
36.90	64	45	45

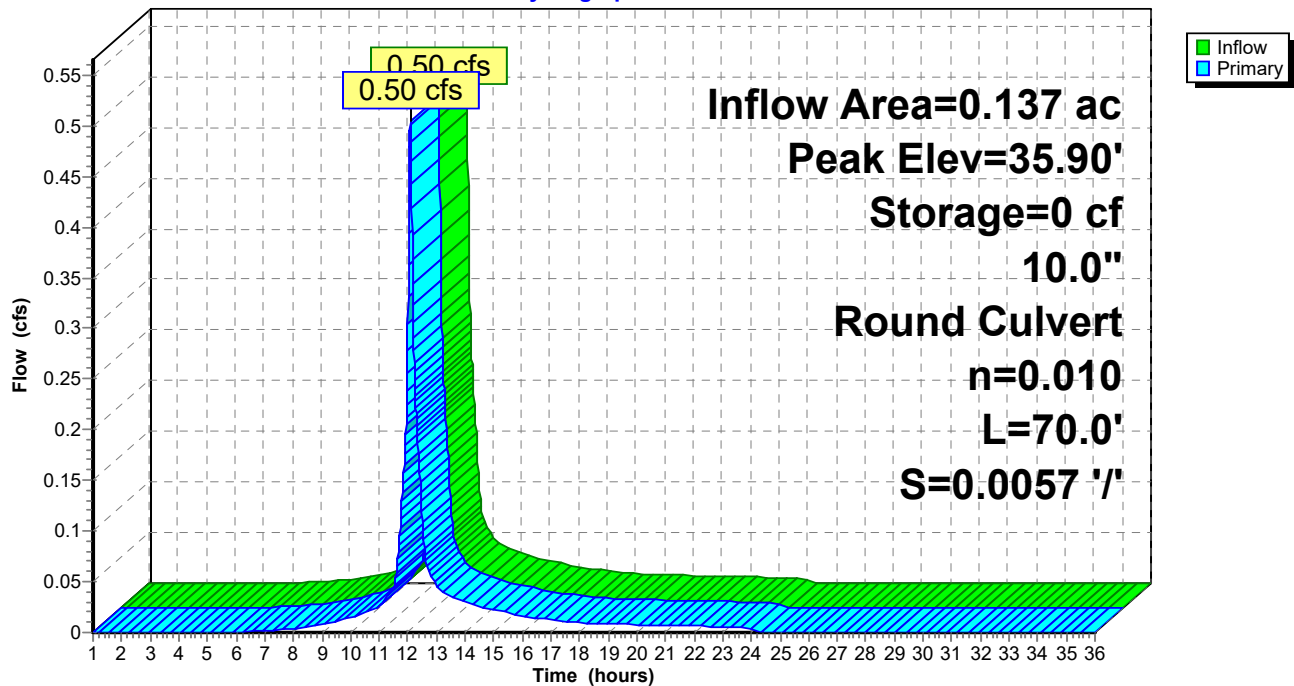
Device	Routing	Invert	Outlet Devices
#1	Primary	31.40'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.40' / 31.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.90' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.98 cfs potential flow)

Pond P4: FP 2

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 61

Summary for Pond P5: FP 1

Inflow Area = 0.086 ac, 84.98% Impervious, Inflow Depth = 3.39" for 10-year event
 Inflow = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af
 Outflow = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.70' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (797.3 - 797.3)

Volume	Invert	Avail.Storage	Storage Description
#1	35.70'	19 cf	4.00'W x 5.00'L x 4.80'H Media/Stone 96 cf Overall x 20.0% Voids
#2	35.70'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		57 cf	Total Available Storage

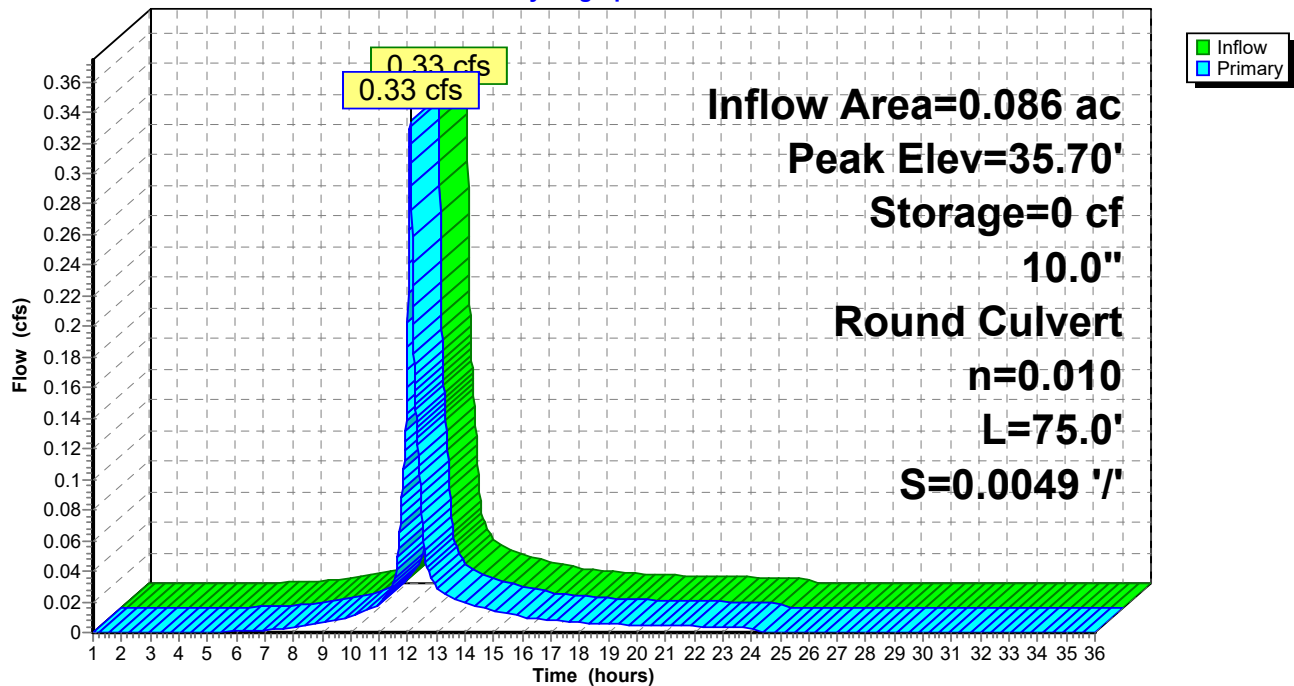
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.70	20	0	0
36.70	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	30.90'	10.0" Round Culvert L= 75.0' Ke= 1.000 Inlet / Outlet Invert= 30.90' / 30.53' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.70' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 4.12 cfs potential flow)

Pond P5: FP 1

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 63

Summary for Pond POI #2: POI #2 (295 Basin)

Inflow Area = 1.603 ac, 12.70% Impervious, Inflow Depth = 0.18" for 10-year event
 Inflow = 0.05 cfs @ 12.65 hrs, Volume= 0.025 af
 Outflow = 0.02 cfs @ 17.23 hrs, Volume= 0.017 af, Atten= 45%, Lag= 274.8 min
 Discarded = 0.01 cfs @ 17.23 hrs, Volume= 0.008 af
 Primary = 0.01 cfs @ 17.23 hrs, Volume= 0.009 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 26.67' @ 17.23 hrs Surf.Area= 2,411 sf Storage= 464 cf

Plug-Flow detention time= 310.4 min calculated for 0.017 af (71% of inflow)

Center-of-Mass det. time= 201.5 min (1,221.1 - 1,019.6)

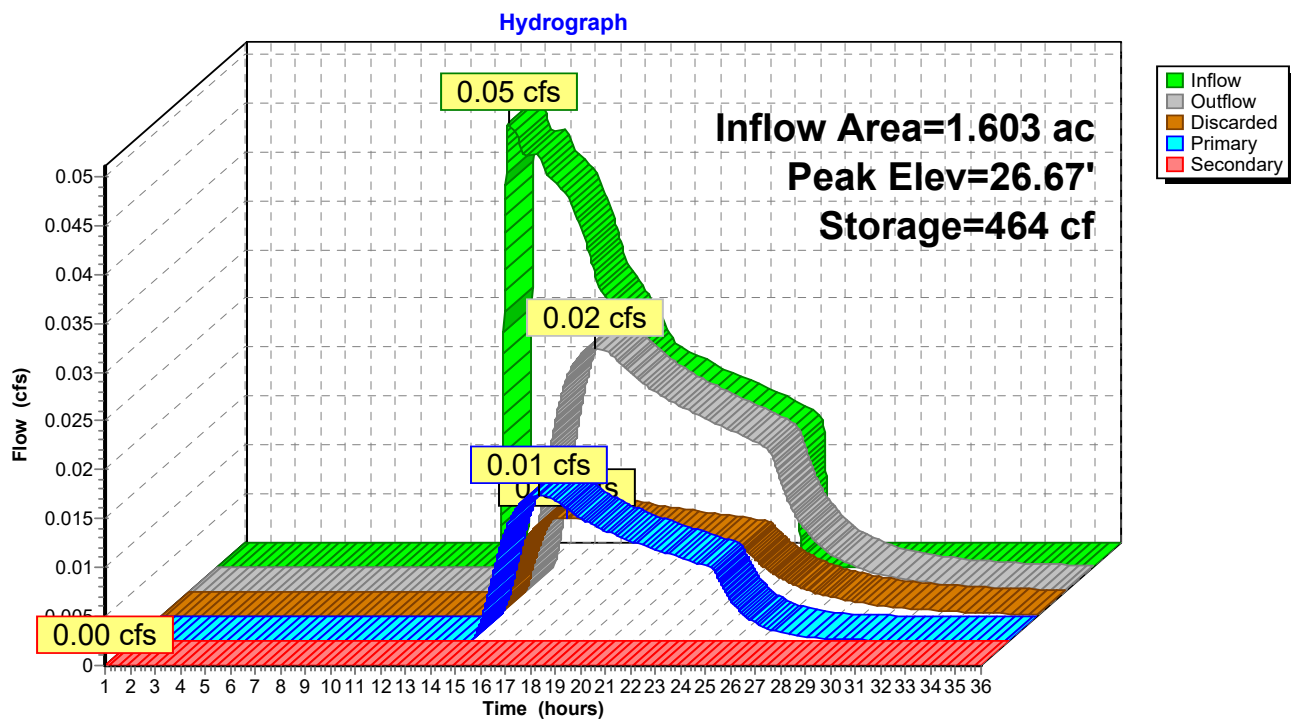
Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	105,037 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	10,120	7,298	8,899
29.00	14,131	12,126	21,024
30.00	17,326	15,729	36,753
32.00	24,023	41,349	78,102
33.00	29,847	26,935	105,037

Device	Routing	Invert	Outlet Devices
#1	Primary	26.60'	12.0" Round Culvert L= 16.0' Ke= 0.600 Inlet / Outlet Invert= 26.60' / 26.51' S= 0.0056 ' S= 0.0056 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	32.40'	20.0' long x 15.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	26.60'	1.000 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.01 cfs @ 17.23 hrs HW=26.67' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.01 cfs @ 17.23 hrs HW=26.67' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.01 cfs @ 0.95 fps)**Secondary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**2=Overflow** (Controls 0.00 cfs)

Pond POI #2: POI #2 (295 Basin)



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Type III 24-hr 25-year Rainfall=5.80"

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Page 65

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S.1: Drive to Street	Runoff Area=1,131 sf 55.00% Impervious Runoff Depth=2.74" Tc=6.0 min CN=71 Runoff=0.08 cfs 0.006 af
Subcatchment 1S.10: East Lot 1	Runoff Area=3,754 sf 84.98% Impervious Runoff Depth=4.54" Tc=6.0 min CN=89 Runoff=0.44 cfs 0.033 af
Subcatchment 1S.11: South Lot Treated	Runoff Area=10,852 sf 76.24% Impervious Runoff Depth=3.80" Tc=6.0 min CN=82 Runoff=1.10 cfs 0.079 af
Subcatchment 1S.2: Co Op Roof & yard	Runoff Area=56,422 sf 65.80% Impervious Runoff Depth=3.40" Tc=6.0 min CN=78 Runoff=5.17 cfs 0.367 af
Subcatchment 1S.3: Runoff to park	Runoff Area=2,081 sf 0.00% Impervious Runoff Depth=0.39" Flow Length=264' Tc=9.0 min CN=39 Runoff=0.01 cfs 0.002 af
Subcatchment 1S.4: Central parking/drive	Runoff Area=19,043 sf 77.98% Impervious Runoff Depth=3.91" Tc=6.0 min CN=83 Runoff=1.98 cfs 0.142 af
Subcatchment 1S.5: Contained yard/park	Runoff Area=3,023 sf 16.84% Impervious Runoff Depth=0.98" Tc=6.0 min CN=49 Runoff=0.06 cfs 0.006 af
Subcatchment 1S.6: Building E roof and	Runoff Area=22,599 sf 53.10% Impervious Runoff Depth=2.65" Tc=6.0 min CN=70 Runoff=1.60 cfs 0.114 af
Subcatchment 1S.7: East Lot 4	Runoff Area=7,618 sf 53.01% Impervious Runoff Depth=2.65" Tc=6.0 min CN=70 Runoff=0.54 cfs 0.039 af
Subcatchment 1S.8: East Lot 3	Runoff Area=6,694 sf 52.99% Impervious Runoff Depth=2.65" Tc=6.0 min CN=70 Runoff=0.47 cfs 0.034 af
Subcatchment 1S.9: East Lot 2	Runoff Area=5,956 sf 80.74% Impervious Runoff Depth=4.33" Tc=6.0 min CN=87 Runoff=0.68 cfs 0.049 af
Subcatchment 2S: 295 Embankment Trib	Runoff Area=69,848 sf 12.70% Impervious Runoff Depth=0.49" Flow Length=233' Tc=16.0 min CN=41 Runoff=0.31 cfs 0.066 af
Subcatchment 3S.1: Garden area runoff	Runoff Area=6,670 sf 0.00% Impervious Runoff Depth=0.05" Flow Length=82' Tc=6.9 min CN=30 Runoff=0.00 cfs 0.001 af
Reach POI-1: POI #1 - 60" Douglass MS4	Inflow=11.03 cfs 0.854 af Outflow=11.03 cfs 0.854 af
Reach POI-3: POI #3 - Baseball Field	Inflow=0.00 cfs 0.001 af Outflow=0.00 cfs 0.001 af
Pond P1: VUSF	Peak Elev=32.38' Storage=1,639 cf Inflow=1.10 cfs 0.079 af Discarded=0.06 cfs 0.057 af Primary=0.13 cfs 0.022 af Outflow=0.18 cfs 0.079 af

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Page 66

Pond P2: FP 4

Peak Elev=35.95' Storage=0 cf Inflow=0.54 cfs 0.039 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0050 '/' Outflow=0.54 cfs 0.039 af

Pond P3: FP 3

Peak Elev=36.10' Storage=0 cf Inflow=0.47 cfs 0.034 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.47 cfs 0.034 af

Pond P4: FP 2

Peak Elev=35.90' Storage=0 cf Inflow=0.68 cfs 0.049 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.68 cfs 0.049 af

Pond P5: FP 1

Peak Elev=35.70' Storage=0 cf Inflow=0.44 cfs 0.033 af
10.0" Round Culvert n=0.010 L=75.0' S=0.0049 '/' Outflow=0.44 cfs 0.033 af

Pond POI #2: POI #2 (295 Basin)

Peak Elev=26.76' Storage=709 cf Inflow=0.31 cfs 0.066 af
Discarded=0.02 cfs 0.018 af Primary=0.08 cfs 0.041 af Secondary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.059 af

Total Runoff Area = 4.952 ac Runoff Volume = 0.937 af Average Runoff Depth = 2.27"
54.64% Pervious = 2.706 ac 45.36% Impervious = 2.246 ac

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Type III 24-hr 25-year Rainfall=5.80"

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Page 67

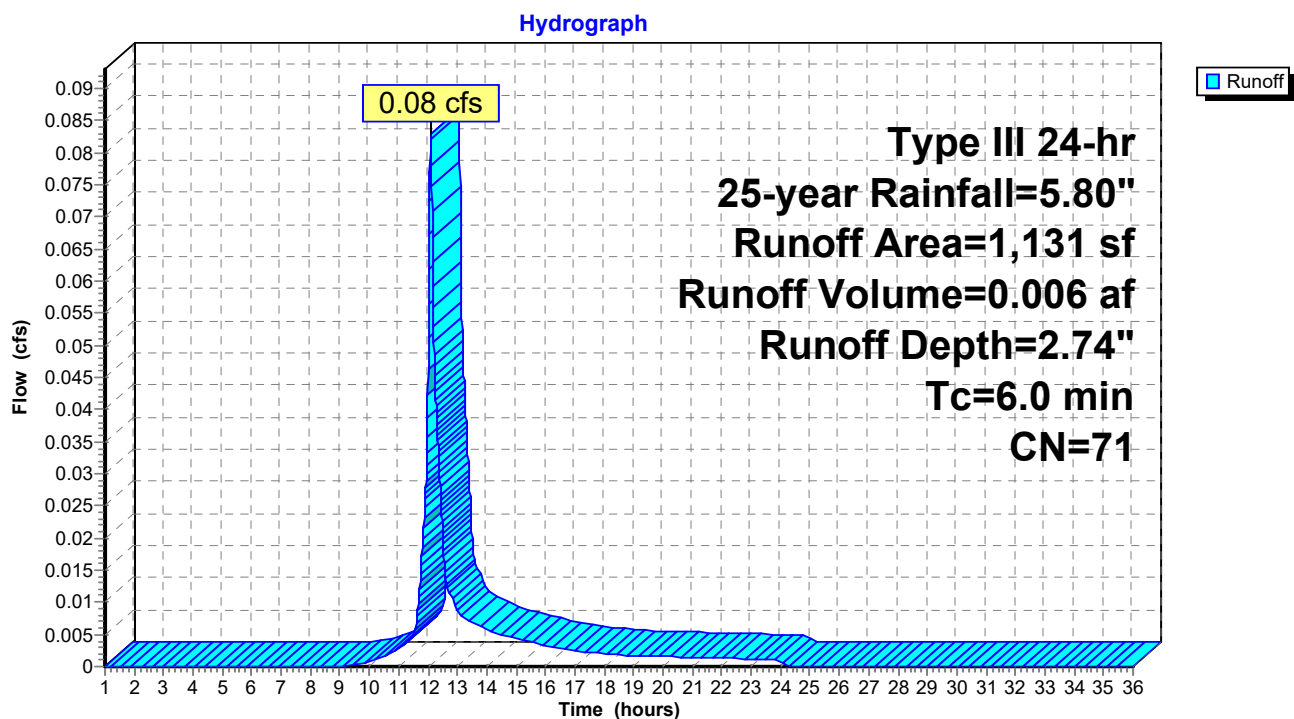
Summary for Subcatchment 1.S1: Drive to Street

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	622	98	Pavement
	509	39	>75% Grass cover, Good, HSG A
	1,131	71	Weighted Average
	509		45.00% Pervious Area
	622		55.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1.S1: Drive to Street

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Type III 24-hr 25-year Rainfall=5.80"

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Page 68

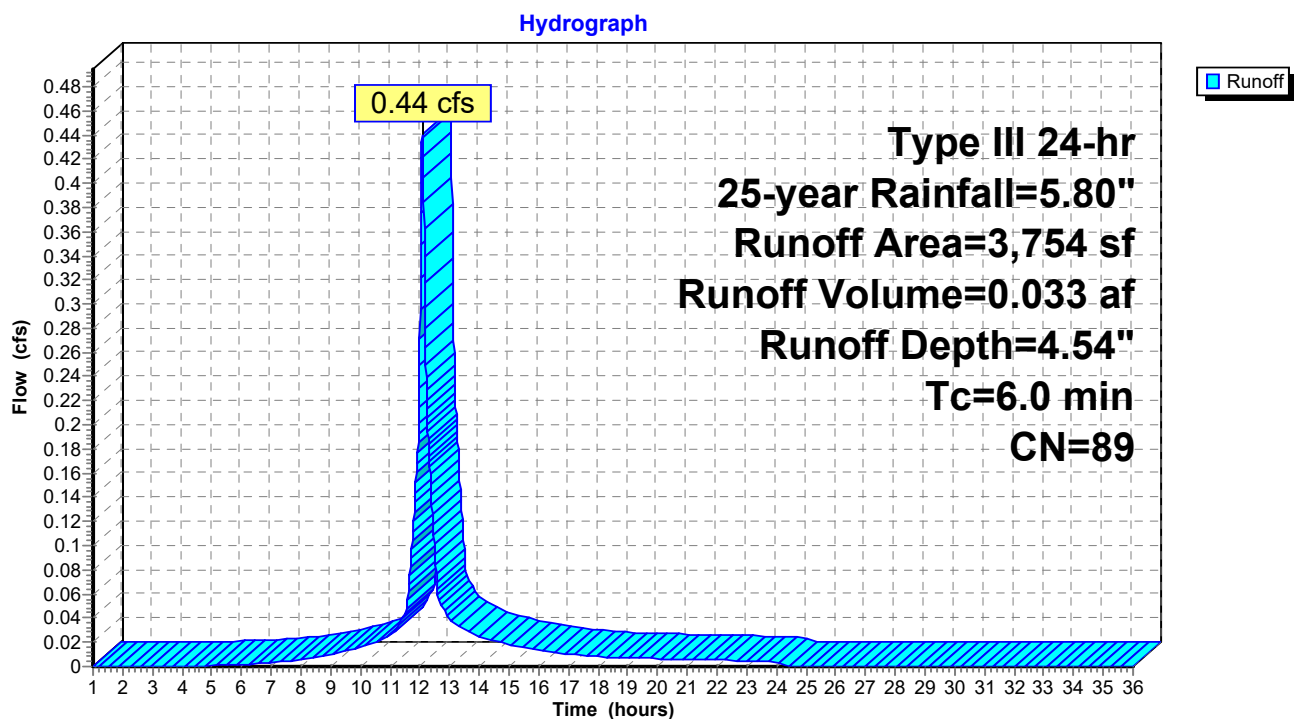
Summary for Subcatchment 1S.10: East Lot 1

Runoff = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	3,190	98	Pavement
	564	39	>75% Grass cover, Good, HSG A
	3,754	89	Weighted Average
	564		15.02% Pervious Area
	3,190		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.10: East Lot 1

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Type III 24-hr 25-year Rainfall=5.80"

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Page 69

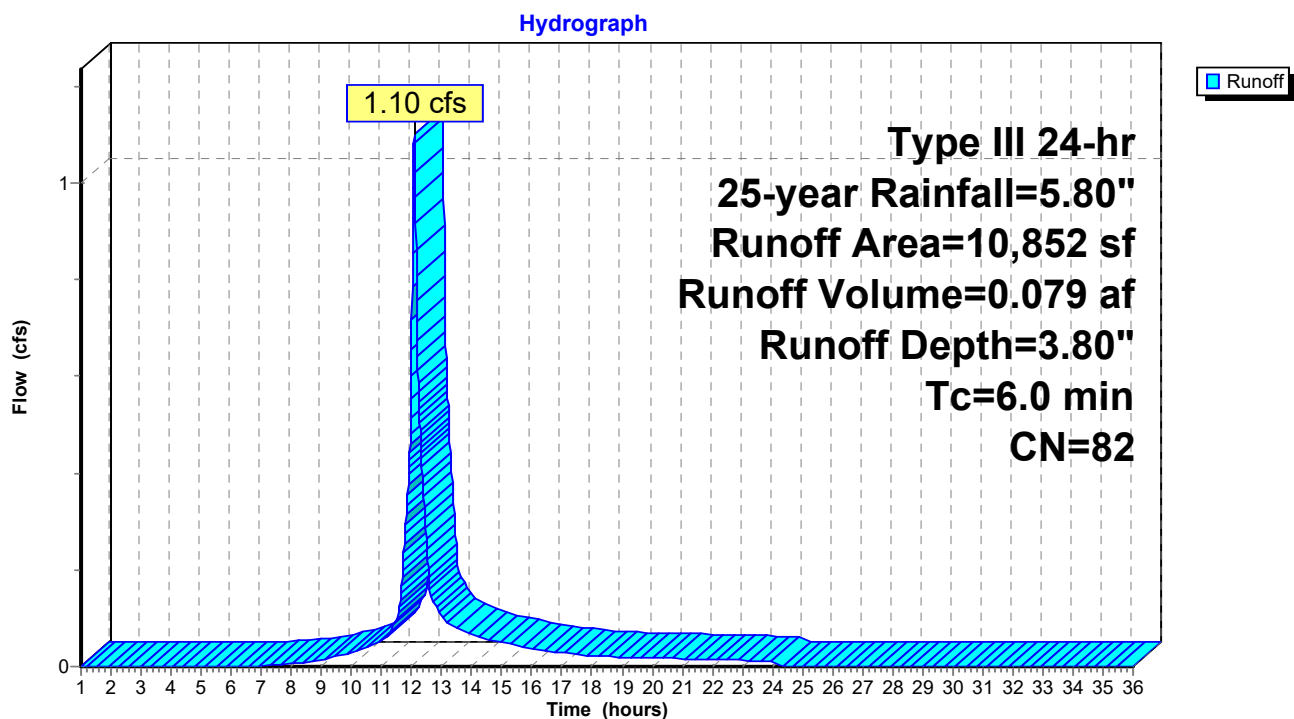
Summary for Subcatchment 1S.11: South Lot Treated

Runoff = 1.10 cfs @ 12.09 hrs, Volume= 0.079 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	8,274	98	Paved parking
	2,578	30	Brush, Good, HSG A
	10,852	82	Weighted Average
	2,578		23.76% Pervious Area
	8,274		76.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.11: South Lot Treated

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Type III 24-hr 25-year Rainfall=5.80"

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Page 70

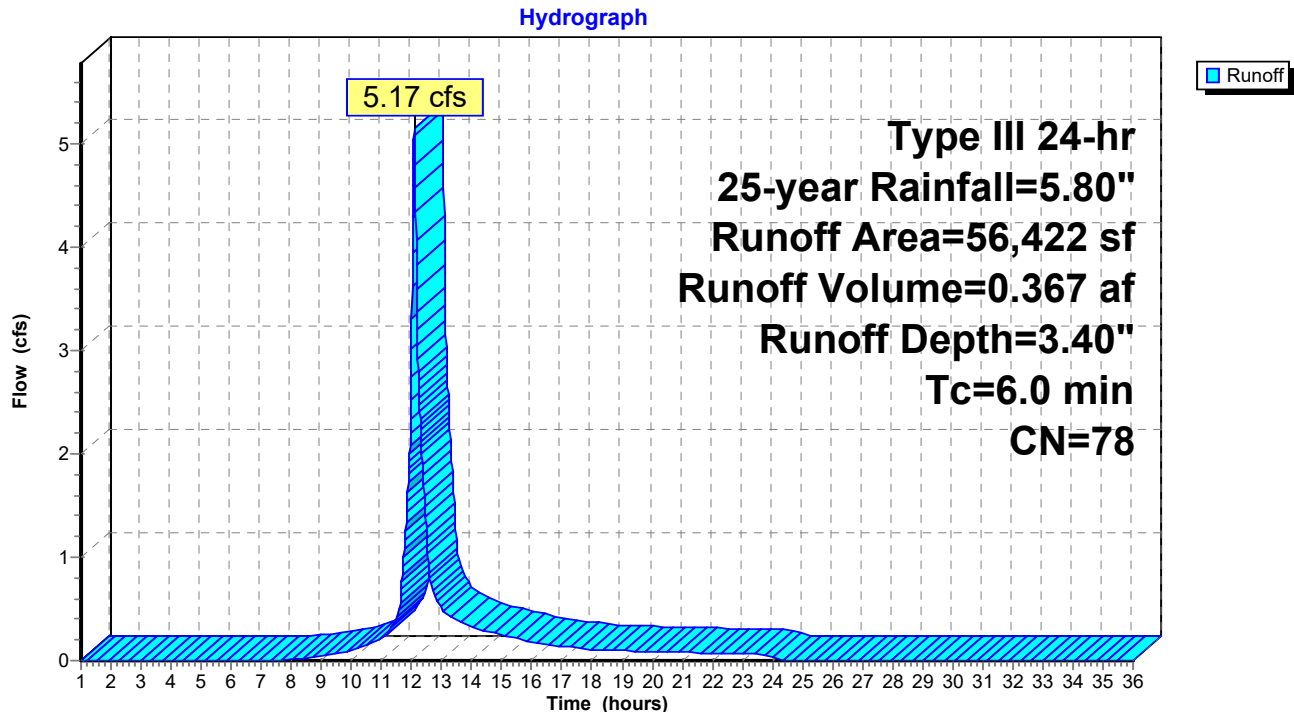
Summary for Subcatchment 1S.2: Co Op Roof & yard

Runoff = 5.17 cfs @ 12.09 hrs, Volume= 0.367 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	5,239	98	pavers
	16,100	39	>75% Grass cover, Good, HSG A
*	21,137	98	Roofs
*	4,191	98	sidewalks
*	618	98	patios
	9,137	77	1/8 acre lots, 65% imp, HSG A
	56,422	78	Weighted Average
	19,298		34.20% Pervious Area
	37,124		65.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.2: Co Op Roof & yard

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Type III 24-hr 25-year Rainfall=5.80"

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Page 71

Summary for Subcatchment 1S.3: Runoff to park

Runoff = 0.01 cfs @ 12.41 hrs, Volume= 0.002 af, Depth= 0.39"

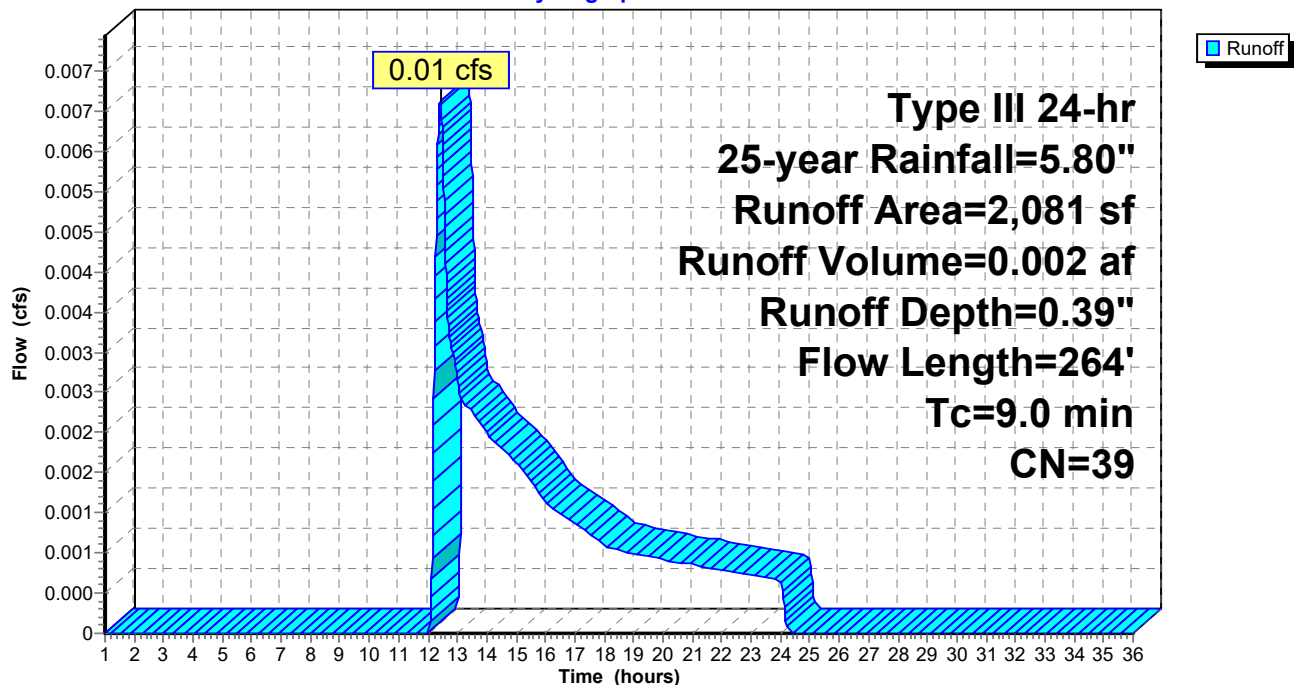
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
2,081	39	>75% Grass cover, Good, HSG A
2,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.0600	0.27		Sheet Flow, A to B Grass: Short n= 0.150 P2= 3.27"
2.8	164	0.0200	0.99		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
9.0	264	Total			

Subcatchment 1S.3: Runoff to park

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 72

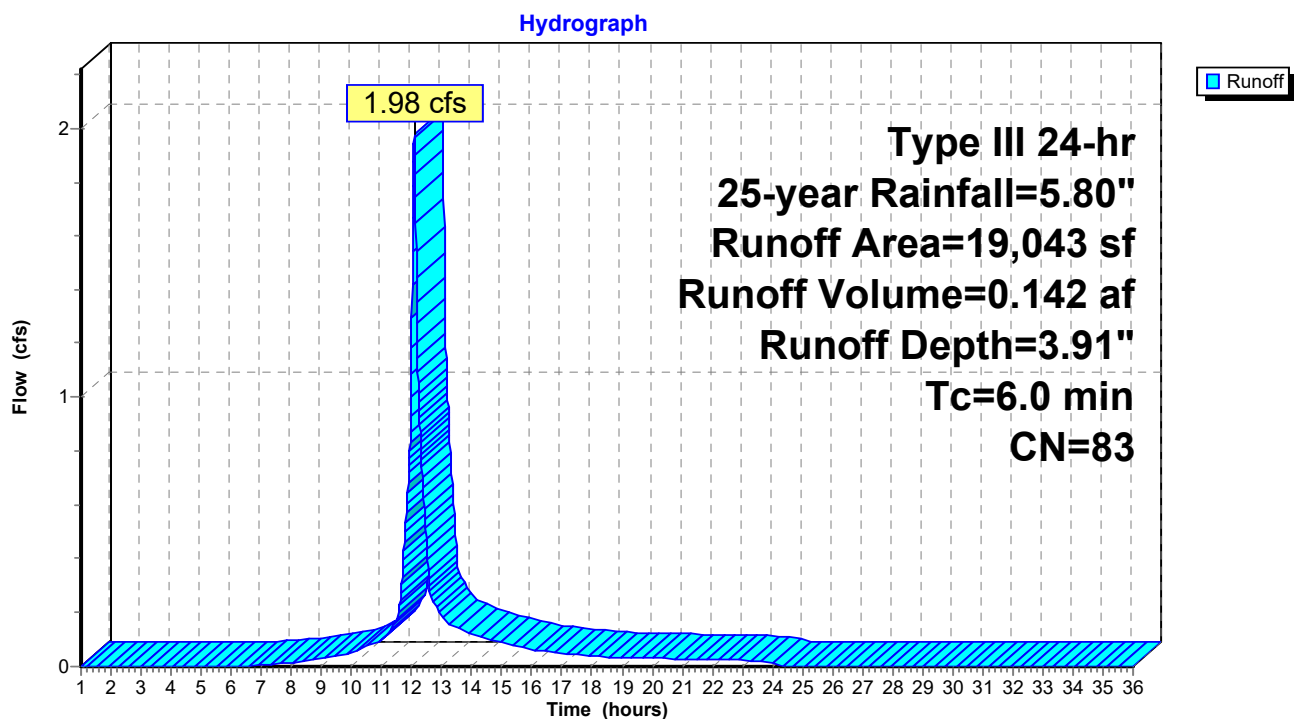
Summary for Subcatchment 1S.4: Central parking/drive

Runoff = 1.98 cfs @ 12.09 hrs, Volume= 0.142 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	14,850	98	Pavement
	4,193	30	Brush, Good, HSG A
	19,043	83	Weighted Average
	4,193		22.02% Pervious Area
	14,850		77.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.4: Central parking/drive

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Type III 24-hr 25-year Rainfall=5.80"

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Page 73

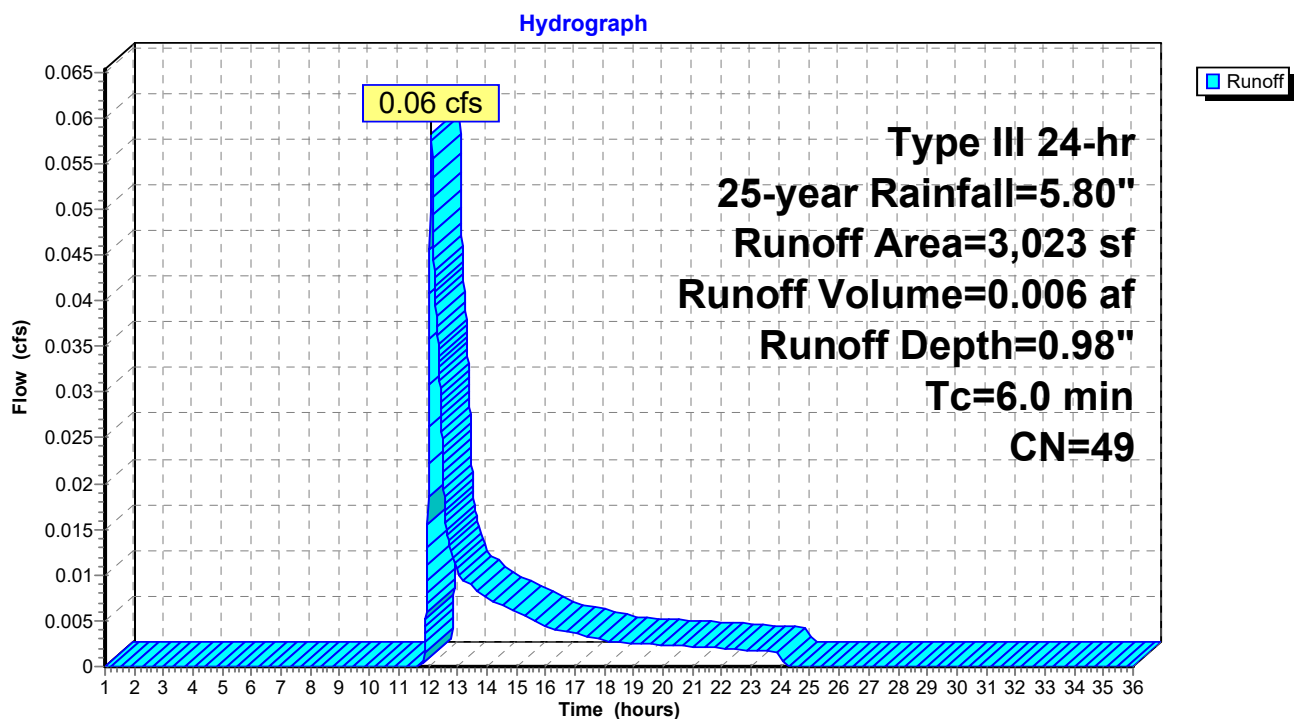
Summary for Subcatchment 1S.5: Contained yard/park connection

Runoff = 0.06 cfs @ 12.11 hrs, Volume= 0.006 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
2,514	39	>75% Grass cover, Good, HSG A
* 509	98	sidewalks
3,023	49	Weighted Average
2,514		83.16% Pervious Area
509		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.5: Contained yard/park connection

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Type III 24-hr 25-year Rainfall=5.80"

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Page 74

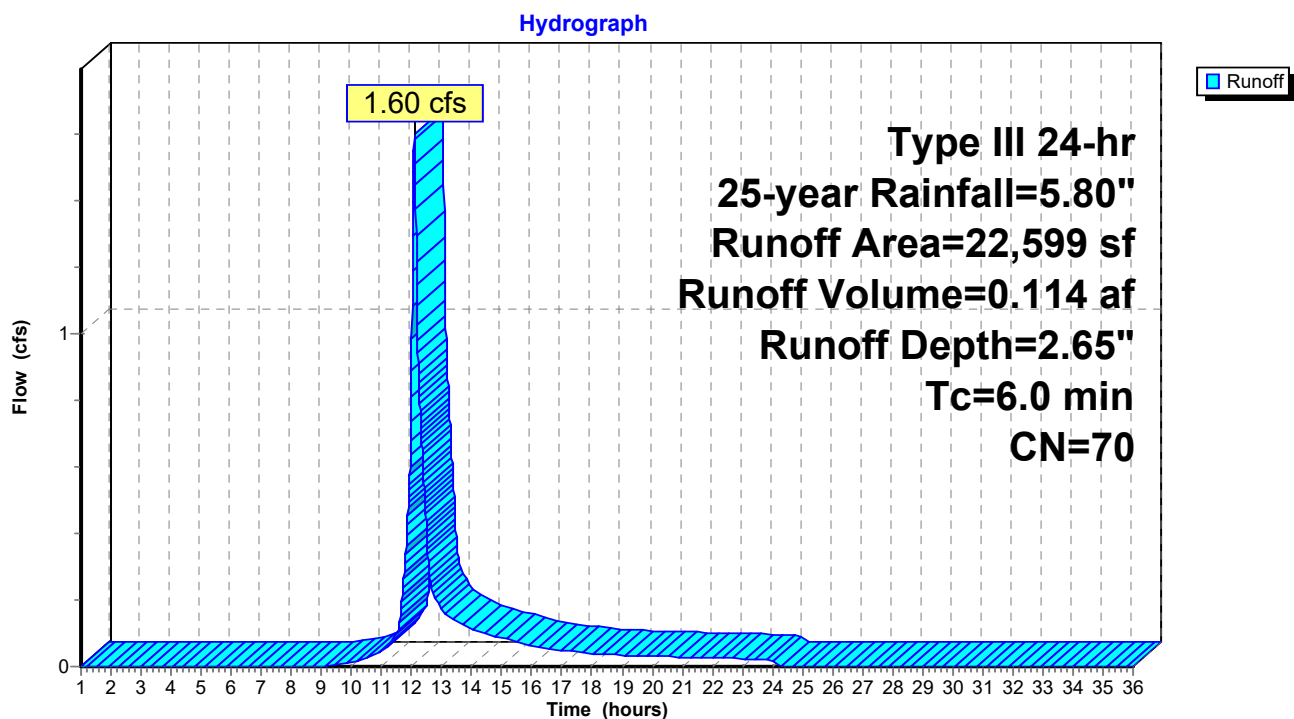
Summary for Subcatchment 1S.6: Building E roof and yard

Runoff = 1.60 cfs @ 12.09 hrs, Volume= 0.114 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
10,599	39	>75% Grass cover, Good, HSG A
* 12,000	98	roof
22,599	70	Weighted Average
10,599		46.90% Pervious Area
12,000		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.6: Building E roof and yard

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Type III 24-hr 25-year Rainfall=5.80"

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Page 75

Summary for Subcatchment 1S.7: East Lot 4

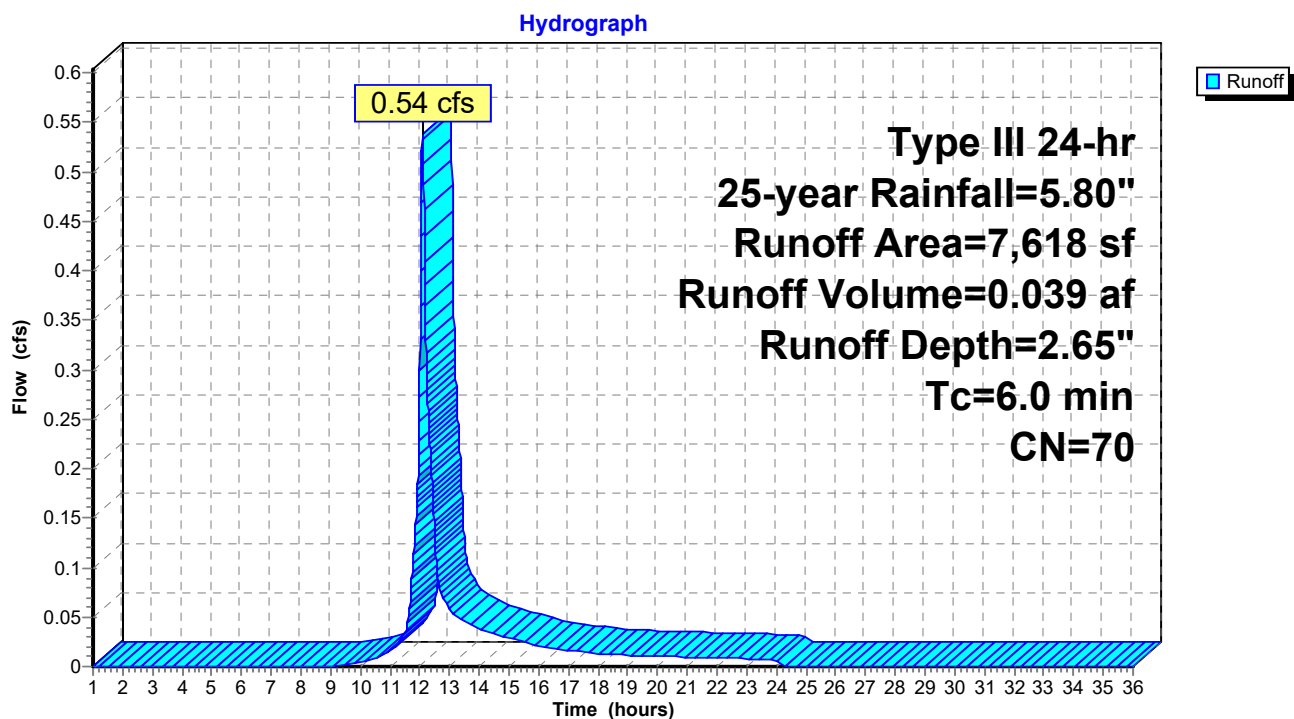
Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	4,038	98	Paved parking
	3,580	39	>75% Grass cover, Good, HSG A
	7,618	70	Weighted Average
	3,580		46.99% Pervious Area
	4,038		53.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.7: East Lot 4



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Type III 24-hr 25-year Rainfall=5.80"

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Page 76

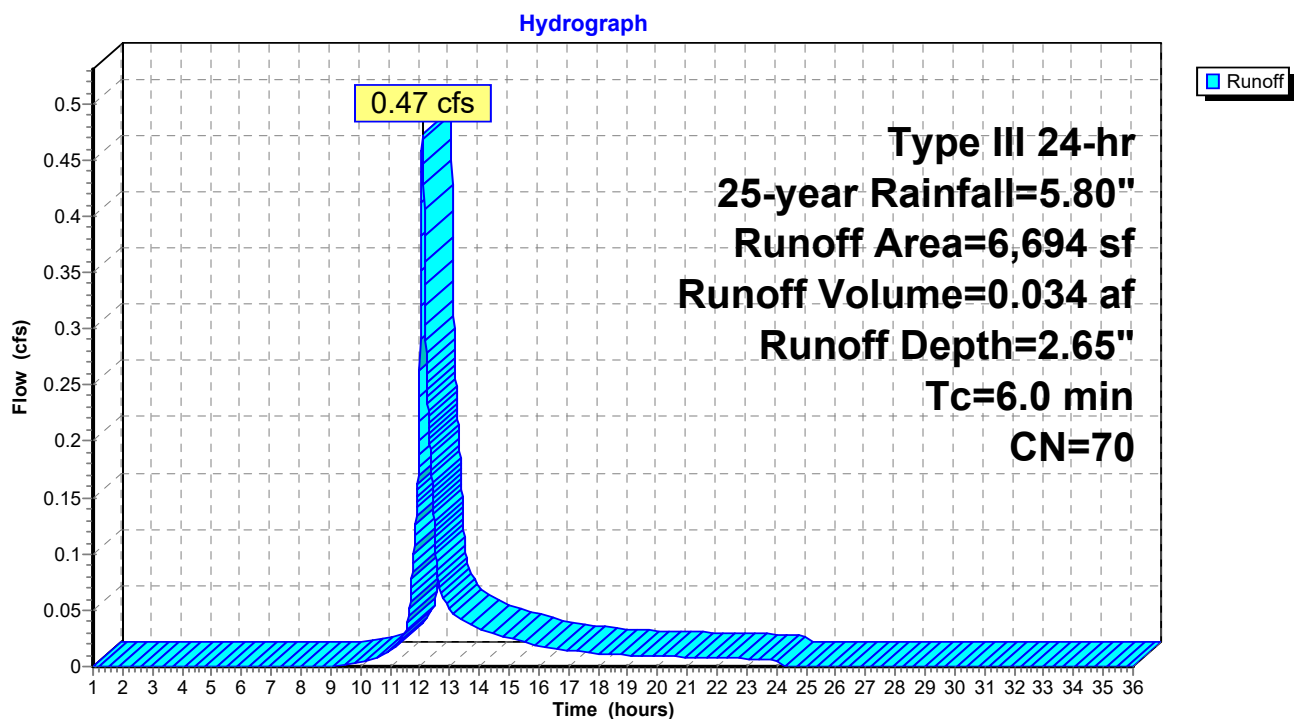
Summary for Subcatchment 1S.8: East Lot 3

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	3,547	98	Paved parking
	3,147	39	>75% Grass cover, Good, HSG A
	6,694	70	Weighted Average
	3,147		47.01% Pervious Area
	3,547		52.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.8: East Lot 3

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Type III 24-hr 25-year Rainfall=5.80"

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Page 77

Summary for Subcatchment 1S.9: East Lot 2

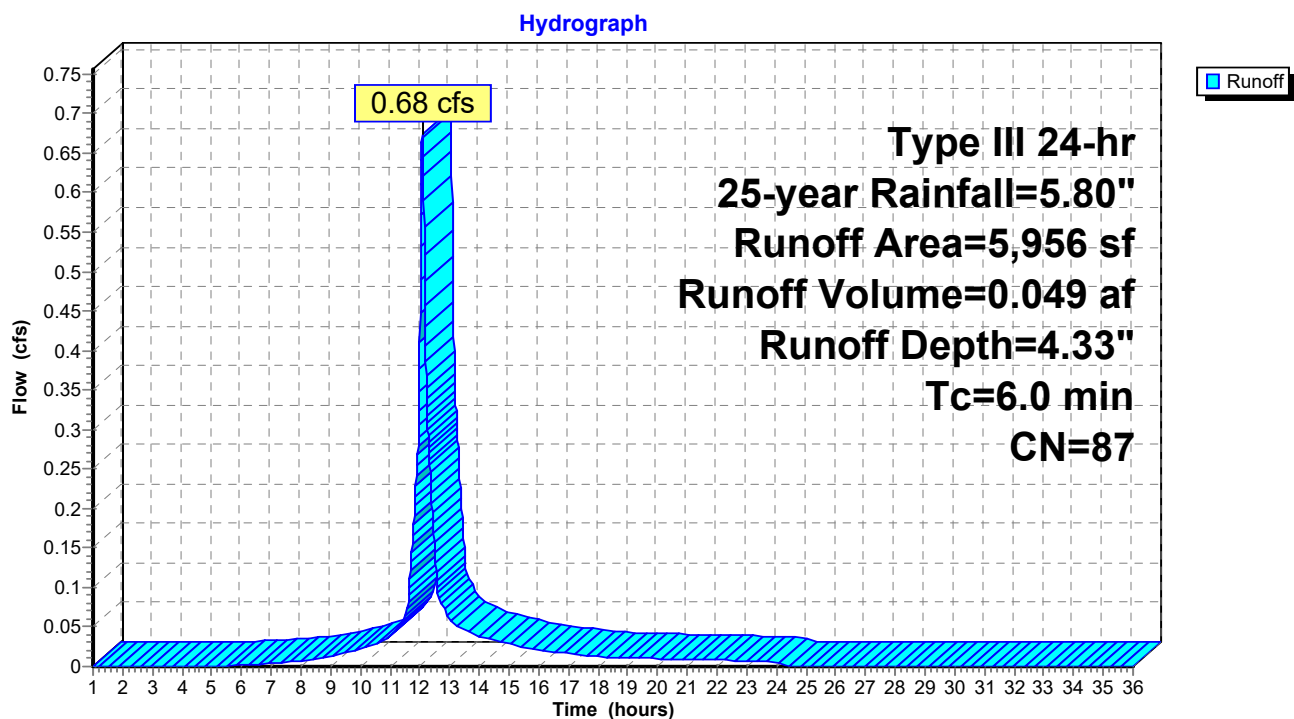
Runoff = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	4,809	98	Paved parking, patio, sidewalk
	1,147	39	>75% Grass cover, Good, HSG A
	5,956	87	Weighted Average
	1,147		19.26% Pervious Area
	4,809		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.9: East Lot 2



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Type III 24-hr 25-year Rainfall=5.80"

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Page 78

Summary for Subcatchment 2S: 295 Embankment Trib

Runoff = 0.31 cfs @ 12.47 hrs, Volume= 0.066 af, Depth= 0.49"

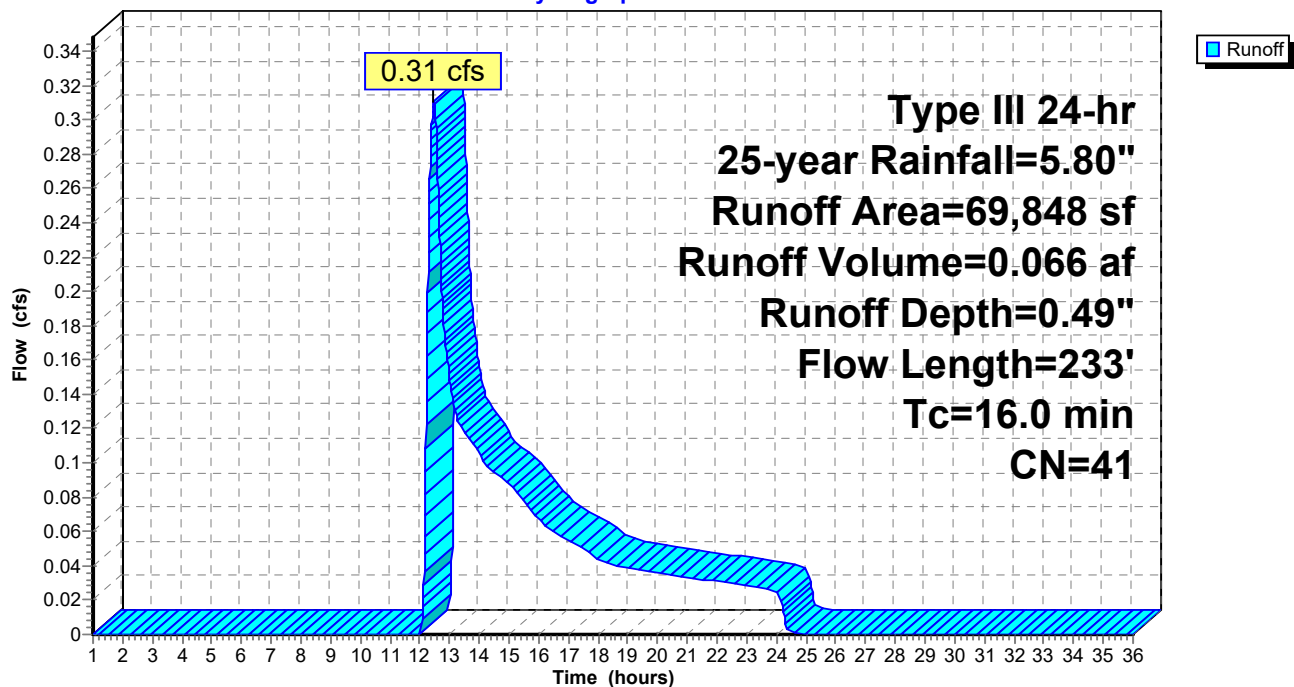
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
8,183	39	>75% Grass cover, Good, HSG A
* 230	98	Stairs
* 3,155	98	Path
* 5,488	98	Homes/driveways
52,792	32	Woods/grass comb., Good, HSG A
69,848	41	Weighted Average
60,975		87.30% Pervious Area
8,873		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment 2S: 295 Embankment Trib

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 79

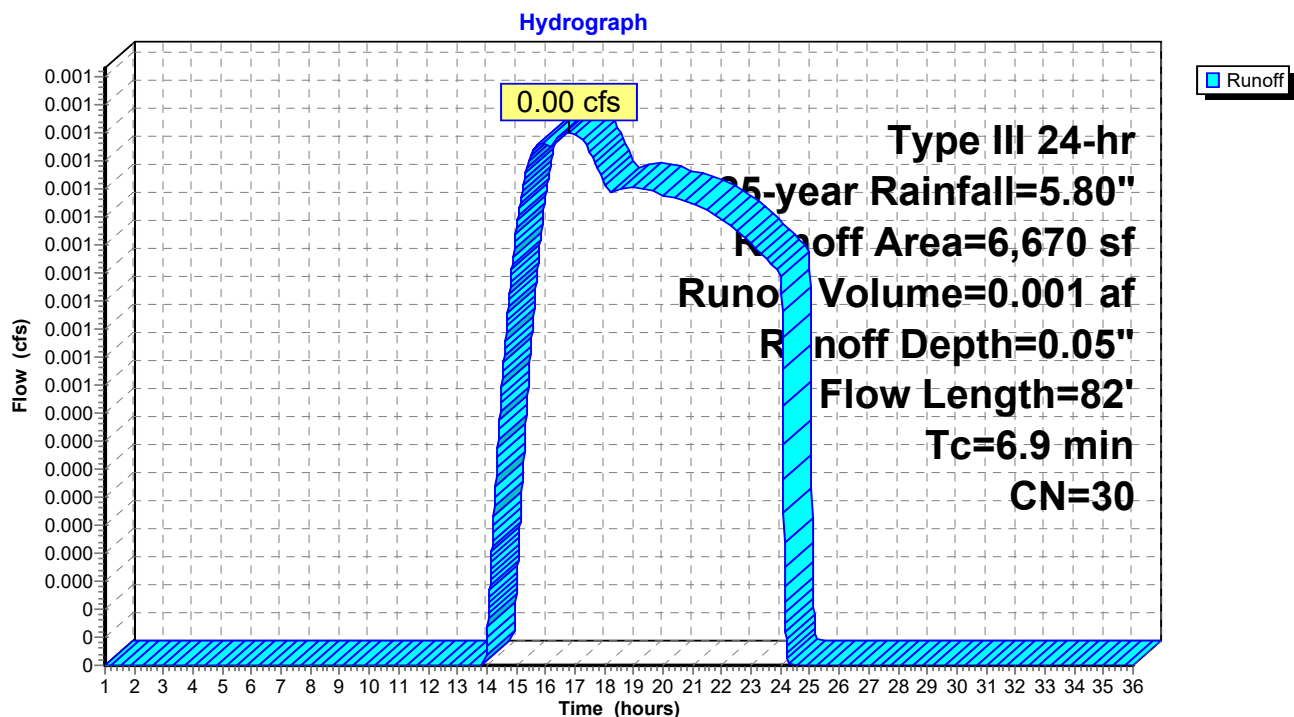
Summary for Subcatchment 3S.1: Garden area runoff

Runoff = 0.00 cfs @ 16.80 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
6,670	30	Brush, Good, HSG A
6,670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	28	0.3330	0.28		Sheet Flow, A to B Grass: Dense n= 0.240 P2= 3.27"
5.2	54	0.0700	0.17		Sheet Flow, B to C Grass: Dense n= 0.240 P2= 3.27"
6.9	82	Total			

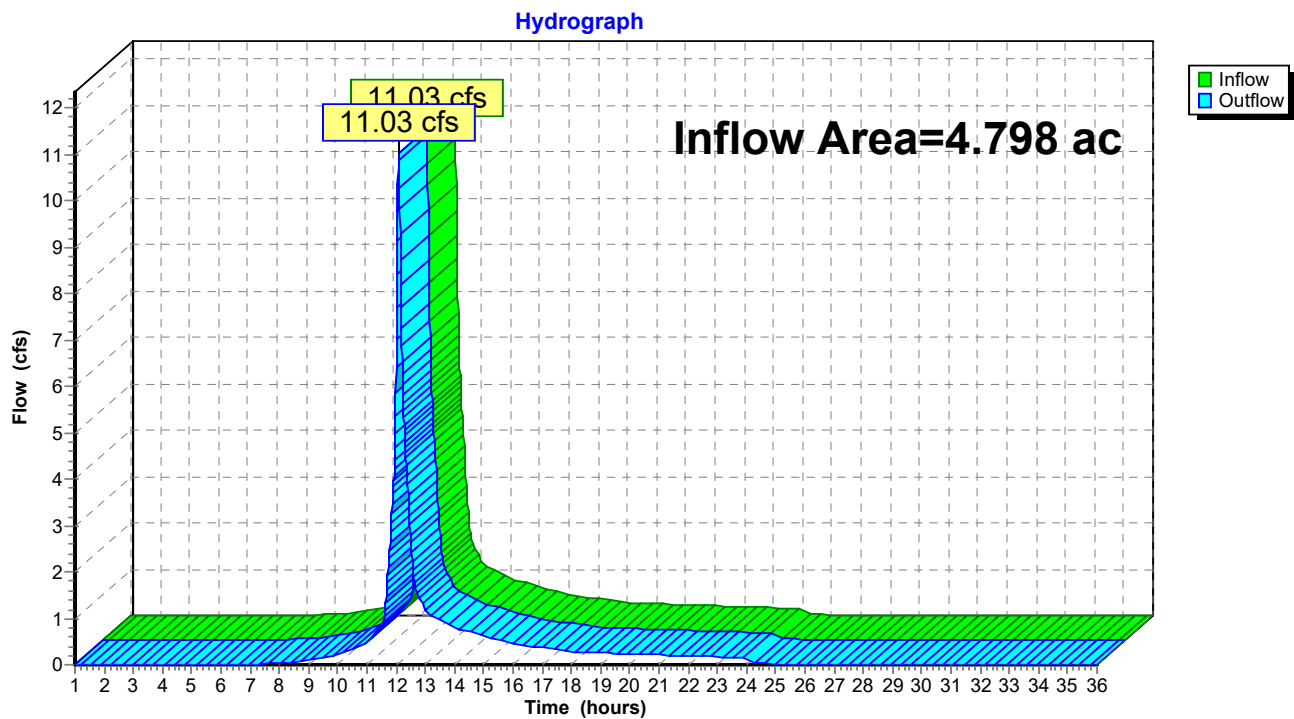
Subcatchment 3S.1: Garden area runoff

Summary for Reach POI-1: POI #1 - 60" Douglass MS4

Inflow Area = 4.798 ac, 46.81% Impervious, Inflow Depth = 2.14" for 25-year event
 Inflow = 11.03 cfs @ 12.09 hrs, Volume= 0.854 af
 Outflow = 11.03 cfs @ 12.09 hrs, Volume= 0.854 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-1: POI #1 - 60" Douglass MS4

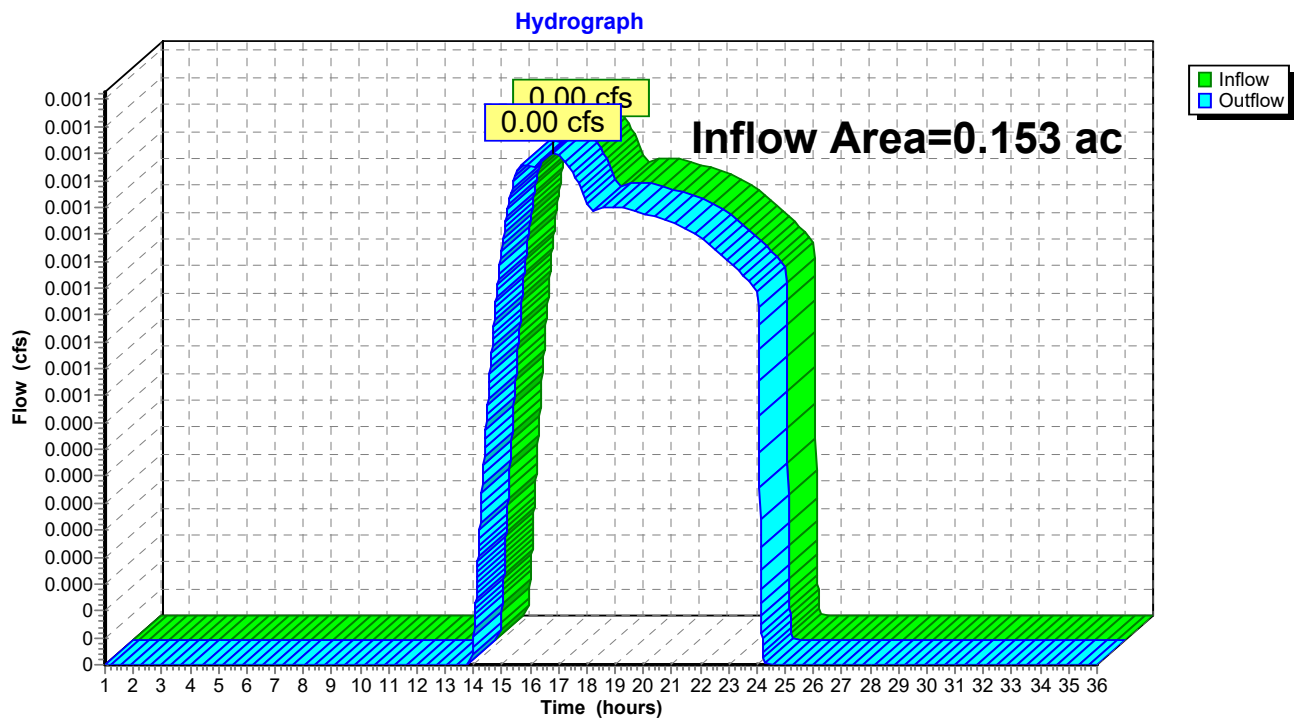


Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 0.153 ac, 0.00% Impervious, Inflow Depth = 0.05" for 25-year event
 Inflow = 0.00 cfs @ 16.80 hrs, Volume= 0.001 af
 Outflow = 0.00 cfs @ 16.80 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-3: POI #3 - Baseball Field



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Type III 24-hr 25-year Rainfall=5.80"

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Page 82

Summary for Pond P1: VUSF

Inflow Area = 0.249 ac, 76.24% Impervious, Inflow Depth = 3.80" for 25-year event
 Inflow = 1.10 cfs @ 12.09 hrs, Volume= 0.079 af
 Outflow = 0.18 cfs @ 12.57 hrs, Volume= 0.079 af, Atten= 83%, Lag= 28.8 min
 Discarded = 0.06 cfs @ 12.57 hrs, Volume= 0.057 af
 Primary = 0.13 cfs @ 12.57 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.38' @ 12.57 hrs Surf.Area= 2,381 sf Storage= 1,639 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 254.7 min (1,064.9 - 810.3)

Volume	Invert	Avail.Storage	Storage Description
#1	30.75'	1,899 cf	Ponding (Prismatic) Listed below (Recalc)
#2	29.25'	69 cf	Filter Media/Loam (Prismatic) Listed below (Recalc) 687 cf Overall x 10.0% Voids
#3	28.92'	30 cf	Transition Gravel (Prismatic) Listed below (Recalc) 151 cf Overall x 20.0% Voids
#4	27.00'	349 cf	Crushed Stone (Prismatic) Listed below (Recalc) 879 cf Overall - 6 cf Embedded = 873 cf x 40.0% Voids
#5	27.10'	5 cf	4.0" Round Pipe Storage x 2 Inside #4 L= 30.0' S= 0.0005 '/' 6 cf Overall - 0.2" Wall Thickness = 5 cf
		2,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.75	465	0	0
32.25	945	1,058	1,058
33.00	1,300	842	1,899

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.25	458	0	0
30.75	458	687	687

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.92	458	0	0
29.25	458	151	151

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.00	458	0	0
28.92	458	879	879

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Type III 24-hr 25-year Rainfall=5.80"

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Page 83

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	12.0" Round Culvert L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 26.75' S= 0.0042 '/' Cc= 0.600 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	27.10'	0.5" Vert. Soil Filter Media Drawdown Effect C= 0.600
#3	Device 1	32.35'	24.0" Horiz. Beehive Outlet C= 0.600 Limited to weir flow at low heads
#4	Discarded	27.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.06 cfs @ 12.57 hrs HW=32.38' (Free Discharge)

↳ **4=Exfiltration** (Exfiltration Controls 0.06 cfs)

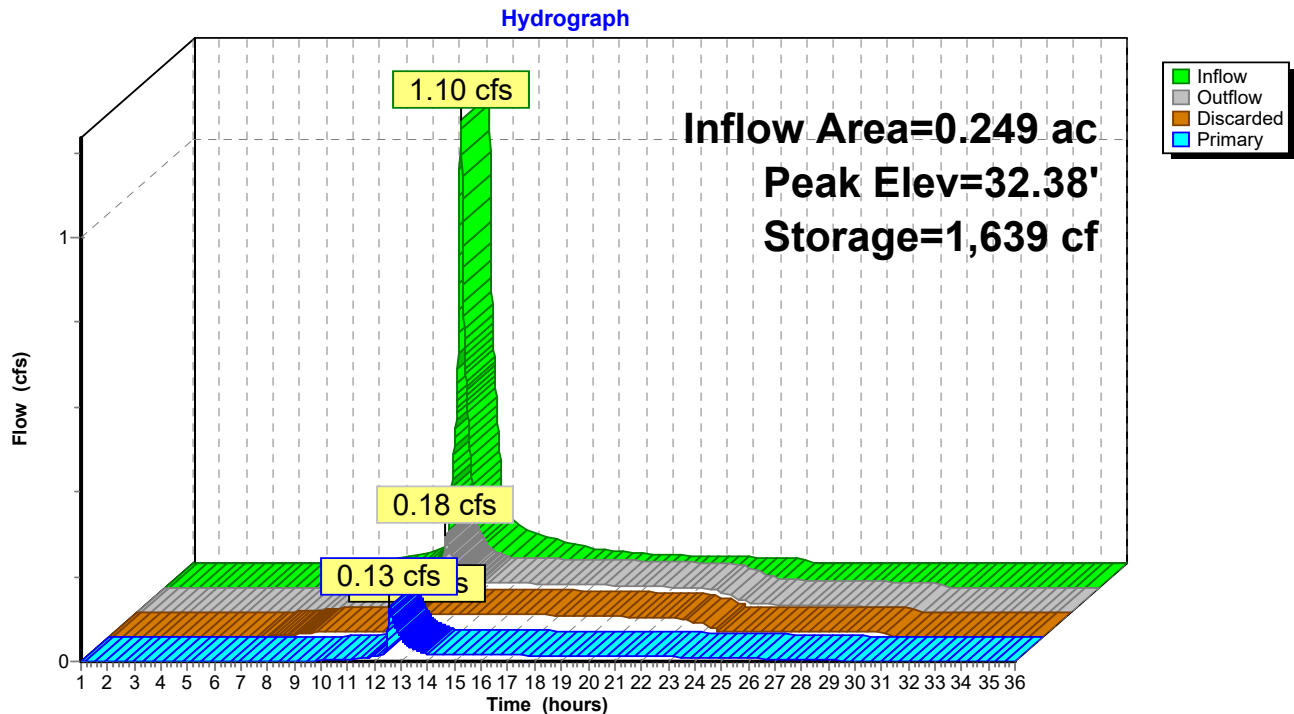
Primary OutFlow Max=0.13 cfs @ 12.57 hrs HW=32.38' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Passes 0.13 cfs of 4.40 cfs potential flow)

↳ **2=Soil Filter Media Drawdown Effect** (Orifice Controls 0.02 cfs @ 11.04 fps)

↳ **3=Beehive Outlet** (Weir Controls 0.11 cfs @ 0.58 fps)

Pond P1: VUSF



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Type III 24-hr 25-year Rainfall=5.80"

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Page 84

Summary for Pond P2: FP 4

Inflow Area = 0.175 ac, 53.01% Impervious, Inflow Depth = 2.65" for 25-year event
 Inflow = 0.54 cfs @ 12.09 hrs, Volume= 0.039 af
 Outflow = 0.54 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.54 cfs @ 12.09 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.95' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.95'	14 cf	4.00'W x 5.00'L x 3.60'H Media/Stone 72 cf Overall x 20.0% Voids
#2	35.95'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		52 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.95	20	0	0
36.95	56	38	38

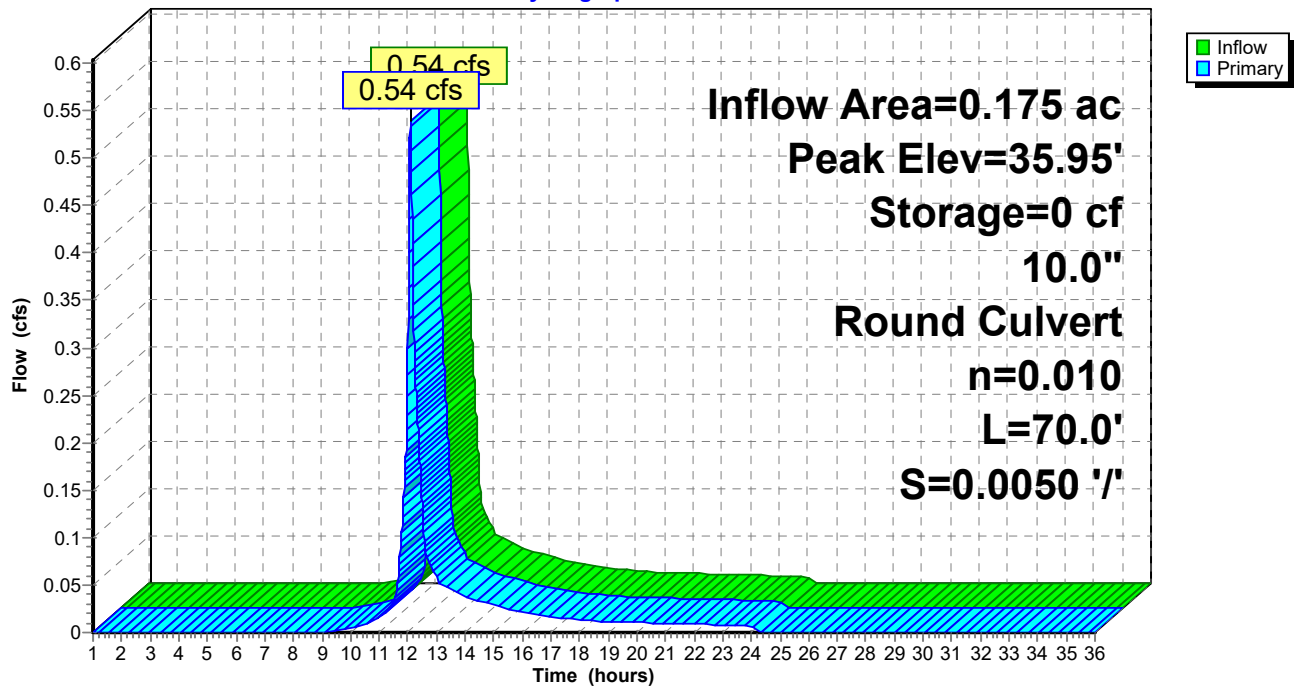
Device	Routing	Invert	Outlet Devices
#1	Primary	32.35'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 32.35' / 32.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.95' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.51 cfs potential flow)

Pond P2: FP 4

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 86

Summary for Pond P3: FP 3

Inflow Area = 0.154 ac, 52.99% Impervious, Inflow Depth = 2.65" for 25-year event
 Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af
 Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 36.10' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (839.9 - 839.9)

Volume	Invert	Avail.Storage	Storage Description
#1	36.10'	21 cf	5.00'W x 5.00'L x 4.20'H Media/Stone 105 cf Overall x 20.0% Voids
#2	36.10'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		66 cf	Total Available Storage

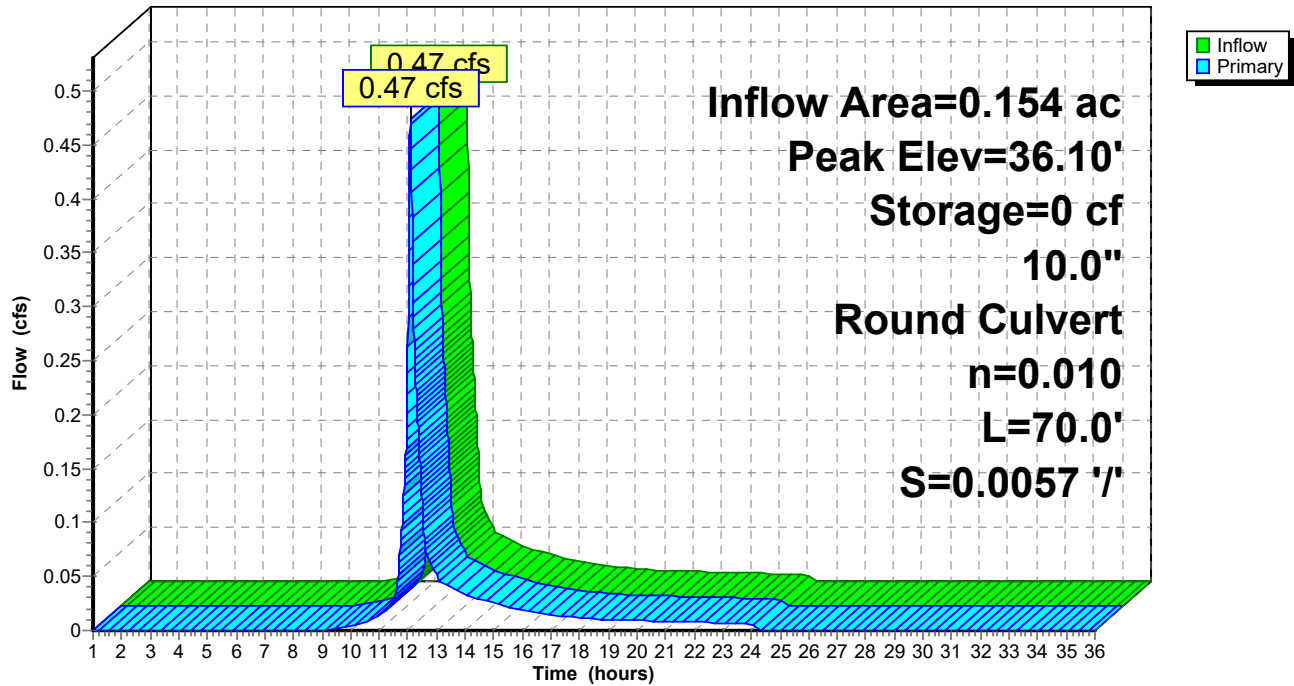
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.10	25	0	0
37.10	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.90'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.90' / 31.50' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=36.10' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.83 cfs potential flow)

Pond P3: FP 3

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 88

Summary for Pond P4: FP 2

Inflow Area = 0.137 ac, 80.74% Impervious, Inflow Depth = 4.33" for 25-year event
 Inflow = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af
 Outflow = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.90' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (795.9 - 795.9)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	23 cf	5.00'W x 5.00'L x 4.50'H Media/Stone 113 cf Overall x 20.0% Voids
#2	35.90'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		67 cf	Total Available Storage

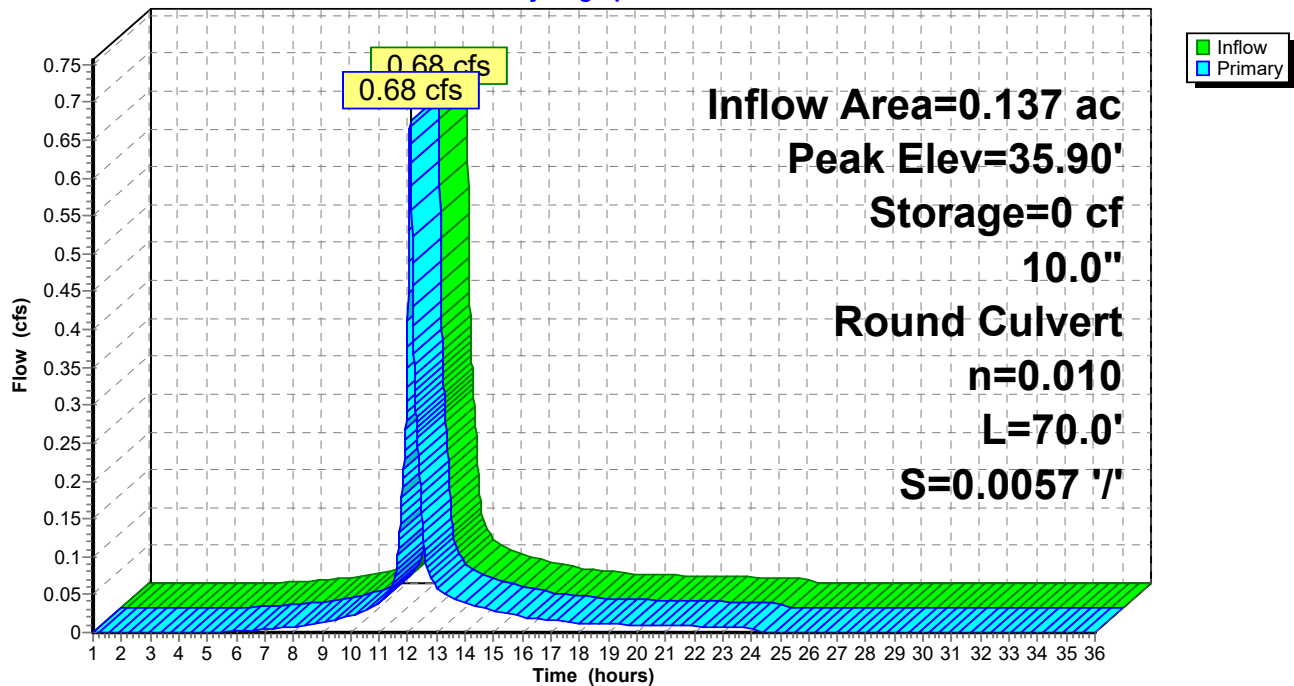
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.90	25	0	0
36.90	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.40'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.40' / 31.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.90' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.98 cfs potential flow)

Pond P4: FP 2

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 90

Summary for Pond P5: FP 1

Inflow Area = 0.086 ac, 84.98% Impervious, Inflow Depth = 4.54" for 25-year event
 Inflow = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af
 Outflow = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.70' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (789.3 - 789.3)

Volume	Invert	Avail.Storage	Storage Description
#1	35.70'	19 cf	4.00'W x 5.00'L x 4.80'H Media/Stone 96 cf Overall x 20.0% Voids
#2	35.70'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		57 cf	Total Available Storage

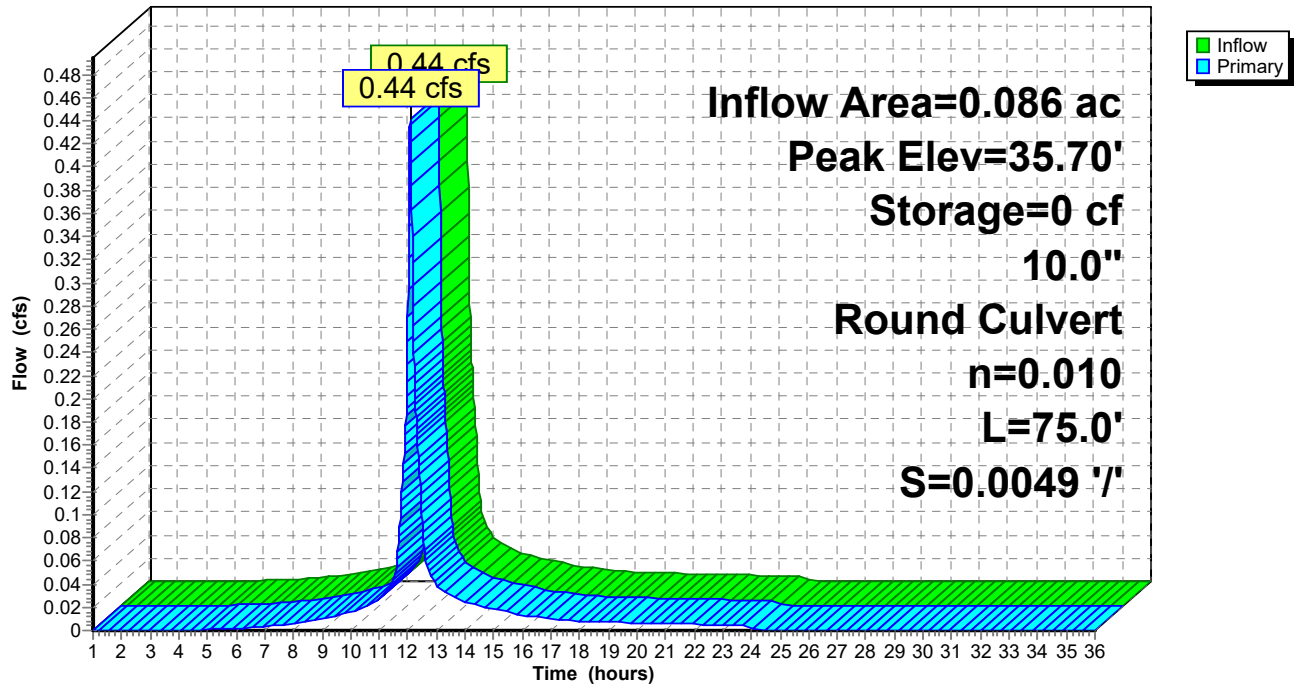
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.70	20	0	0
36.70	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	30.90'	10.0" Round Culvert L= 75.0' Ke= 1.000 Inlet / Outlet Invert= 30.90' / 30.53' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=35.70' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 4.12 cfs potential flow)

Pond P5: FP 1

Hydrograph



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Page 92

Summary for Pond POI #2: POI #2 (295 Basin)

Inflow Area = 1.603 ac, 12.70% Impervious, Inflow Depth = 0.49" for 25-year event
 Inflow = 0.31 cfs @ 12.47 hrs, Volume= 0.066 af
 Outflow = 0.10 cfs @ 14.06 hrs, Volume= 0.059 af, Atten= 67%, Lag= 95.5 min
 Discarded = 0.02 cfs @ 14.06 hrs, Volume= 0.018 af
 Primary = 0.08 cfs @ 14.06 hrs, Volume= 0.041 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 26.76' @ 14.06 hrs Surf.Area= 2,978 sf Storage= 709 cf

Plug-Flow detention time= 154.2 min calculated for 0.059 af (89% of inflow)
 Center-of-Mass det. time= 105.0 min (1,063.5 - 958.5)

Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	105,037 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	10,120	7,298	8,899
29.00	14,131	12,126	21,024
30.00	17,326	15,729	36,753
32.00	24,023	41,349	78,102
33.00	29,847	26,935	105,037

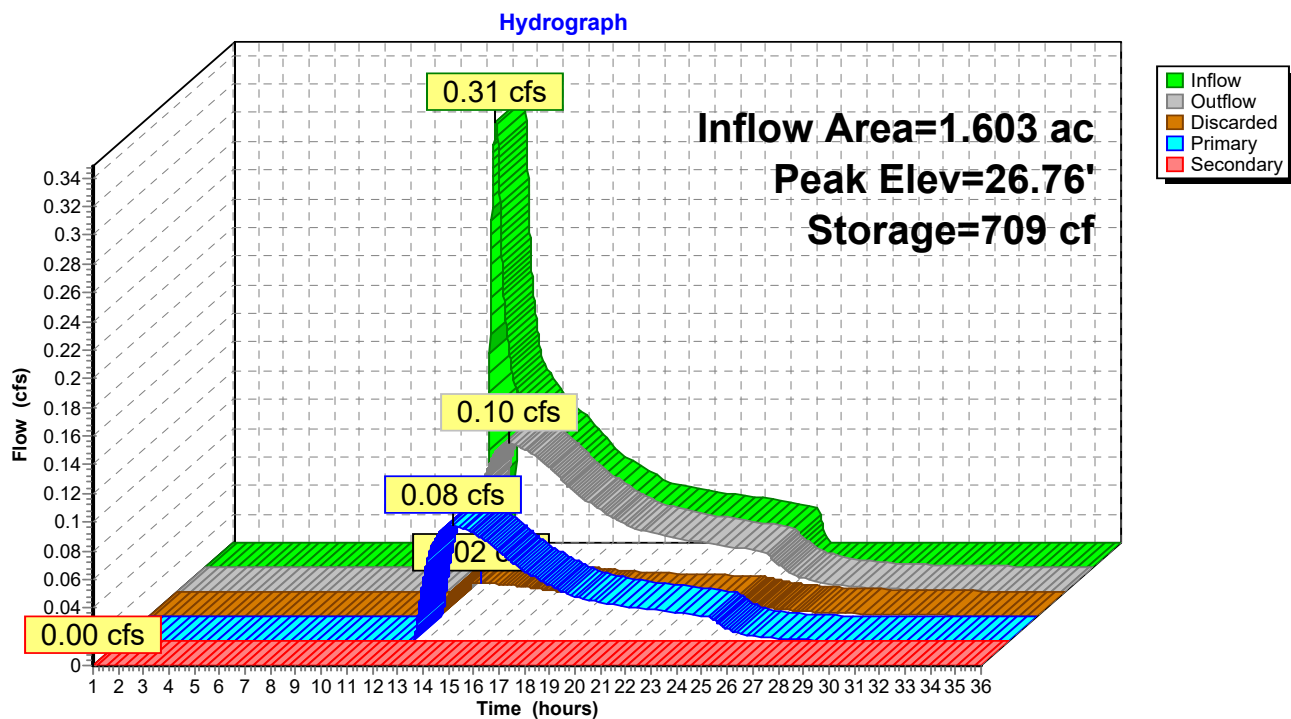
Device	Routing	Invert	Outlet Devices
#1	Primary	26.60'	12.0" Round Culvert L= 16.0' Ke= 0.600 Inlet / Outlet Invert= 26.60' / 26.51' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	32.40'	20.0' long x 15.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	26.60'	1.000 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.02 cfs @ 14.06 hrs HW=26.76' (Free Discharge)
 ↳ **3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.08 cfs @ 14.06 hrs HW=26.76' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Barrel Controls 0.08 cfs @ 1.50 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)
 ↳ **2=Overflow** (Controls 0.00 cfs)

Pond POI #2: POI #2 (295 Basin)



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Type III 24-hr WQ Rainfall=1.00"

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Page 94

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S.1: Drive to Street	Runoff Area=1,131 sf 55.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=71 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.10: East Lot 1	Runoff Area=3,754 sf 84.98% Impervious Runoff Depth=0.28" Tc=6.0 min CN=89 Runoff=0.03 cfs 0.002 af
Subcatchment 1S.11: South Lot Treated	Runoff Area=10,852 sf 76.24% Impervious Runoff Depth=0.11" Tc=6.0 min CN=82 Runoff=0.02 cfs 0.002 af
Subcatchment 1S.2: Co Op Roof & yard	Runoff Area=56,422 sf 65.80% Impervious Runoff Depth=0.06" Tc=6.0 min CN=78 Runoff=0.02 cfs 0.006 af
Subcatchment 1S.3: Runoff to park	Runoff Area=2,081 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=264' Tc=9.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.4: Central parking/drive	Runoff Area=19,043 sf 77.98% Impervious Runoff Depth=0.13" Tc=6.0 min CN=83 Runoff=0.04 cfs 0.005 af
Subcatchment 1S.5: Contained yard/park	Runoff Area=3,023 sf 16.84% Impervious Runoff Depth=0.00" Tc=6.0 min CN=49 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.6: Building E roof and	Runoff Area=22,599 sf 53.10% Impervious Runoff Depth=0.00" Tc=6.0 min CN=70 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.7: East Lot 4	Runoff Area=7,618 sf 53.01% Impervious Runoff Depth=0.00" Tc=6.0 min CN=70 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.8: East Lot 3	Runoff Area=6,694 sf 52.99% Impervious Runoff Depth=0.00" Tc=6.0 min CN=70 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.9: East Lot 2	Runoff Area=5,956 sf 80.74% Impervious Runoff Depth=0.22" Tc=6.0 min CN=87 Runoff=0.03 cfs 0.003 af
Subcatchment 2S: 295 Embankment Trib	Runoff Area=69,848 sf 12.70% Impervious Runoff Depth=0.00" Flow Length=233' Tc=16.0 min CN=41 Runoff=0.00 cfs 0.000 af
Subcatchment 3S.1: Garden area runoff	Runoff Area=6,670 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=82' Tc=6.9 min CN=30 Runoff=0.00 cfs 0.000 af
Reach POI-1: POI #1 - 60" Douglass MS4	Inflow=0.10 cfs 0.016 af Outflow=0.10 cfs 0.016 af
Reach POI-3: POI #3 - Baseball Field	Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond P1: VUSF	Peak Elev=27.03' Storage=5 cf Inflow=0.02 cfs 0.002 af Discarded=0.01 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.002 af

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Page 95

Pond P2: FP 4

Peak Elev=35.95' Storage=0 cf Inflow=0.00 cfs 0.000 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0050 '/' Outflow=0.00 cfs 0.000 af

Pond P3: FP 3

Peak Elev=36.10' Storage=0 cf Inflow=0.00 cfs 0.000 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.00 cfs 0.000 af

Pond P4: FP 2

Peak Elev=35.90' Storage=0 cf Inflow=0.03 cfs 0.003 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.03 cfs 0.003 af

Pond P5: FP 1

Peak Elev=35.70' Storage=0 cf Inflow=0.03 cfs 0.002 af
10.0" Round Culvert n=0.010 L=75.0' S=0.0049 '/' Outflow=0.03 cfs 0.002 af

Pond POI #2: POI #2 (295 Basin)

Peak Elev=26.30' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 4.952 ac Runoff Volume = 0.018 af Average Runoff Depth = 0.04"
54.64% Pervious = 2.706 ac 45.36% Impervious = 2.246 ac

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Type III 24-hr WQ Rainfall=1.00"

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Page 96

Summary for Subcatchment 1.S1: Drive to Street

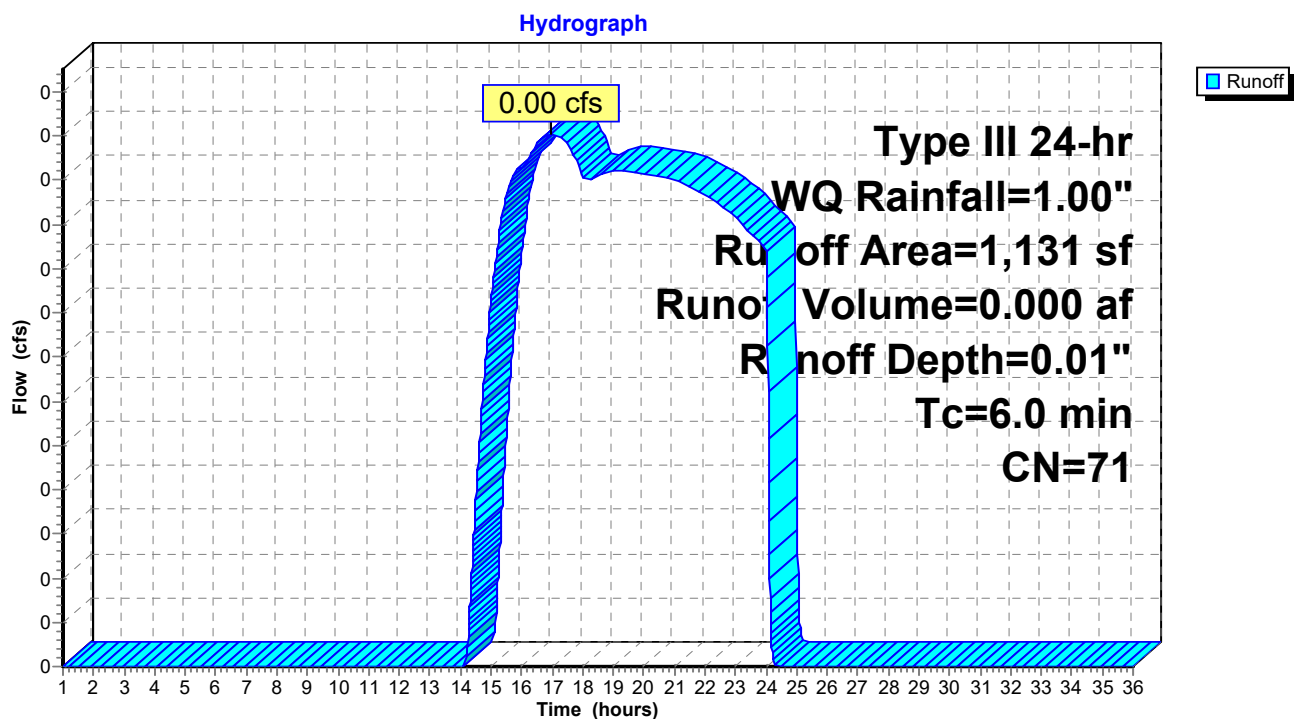
Runoff = 0.00 cfs @ 16.98 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	622	98	Pavement
	509	39	>75% Grass cover, Good, HSG A
	1,131	71	Weighted Average
	509		45.00% Pervious Area
	622		55.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1.S1: Drive to Street



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Type III 24-hr WQ Rainfall=1.00"

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Page 97

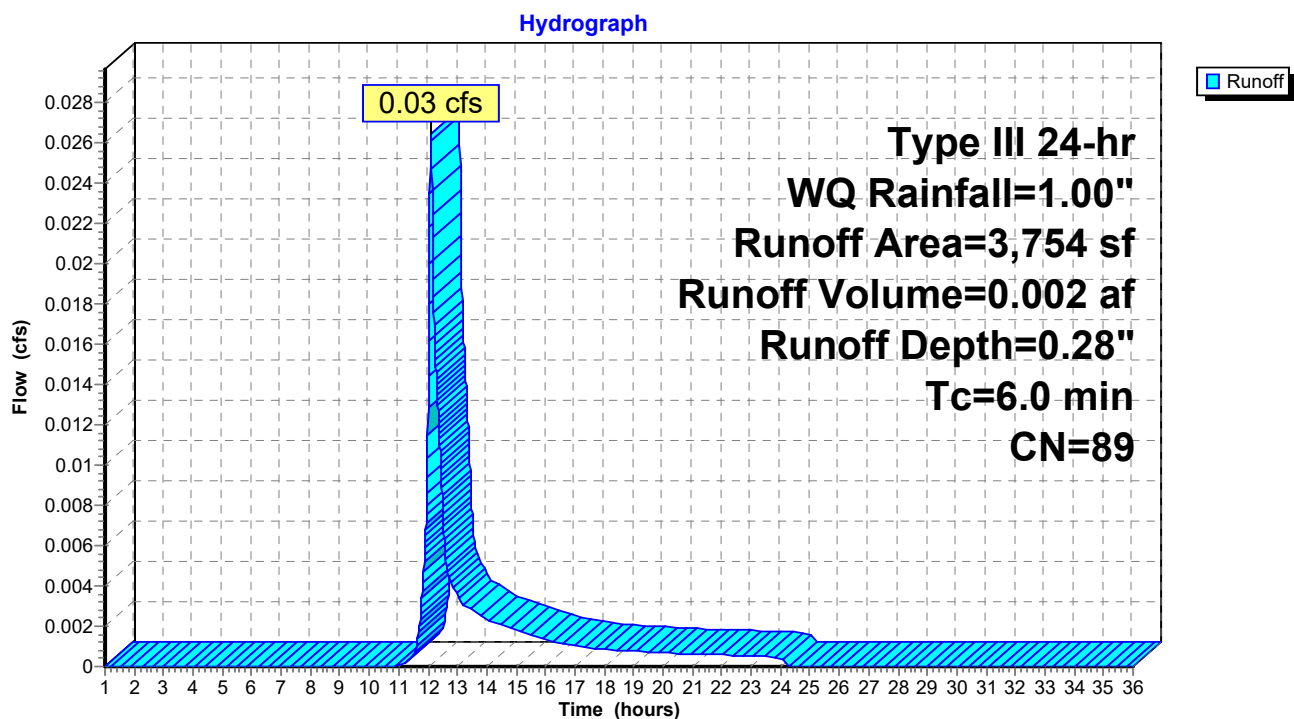
Summary for Subcatchment 1S.10: East Lot 1

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	3,190	98	Pavement
	564	39	>75% Grass cover, Good, HSG A
	3,754	89	Weighted Average
	564		15.02% Pervious Area
	3,190		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.10: East Lot 1

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Type III 24-hr WQ Rainfall=1.00"

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Page 98

Summary for Subcatchment 1S.11: South Lot Treated

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af, Depth= 0.11"

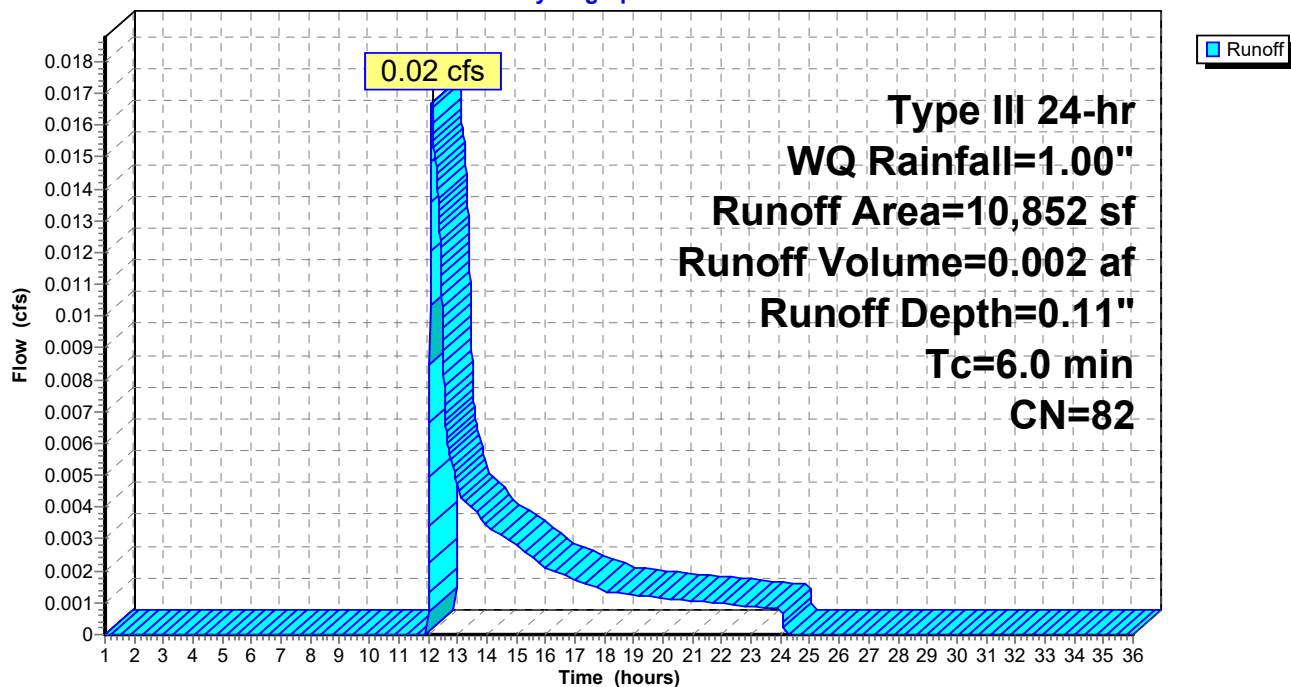
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	8,274	98	Paved parking
	2,578	30	Brush, Good, HSG A
	10,852	82	Weighted Average
	2,578		23.76% Pervious Area
	8,274		76.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.11: South Lot Treated

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Type III 24-hr WQ Rainfall=1.00"

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Page 99

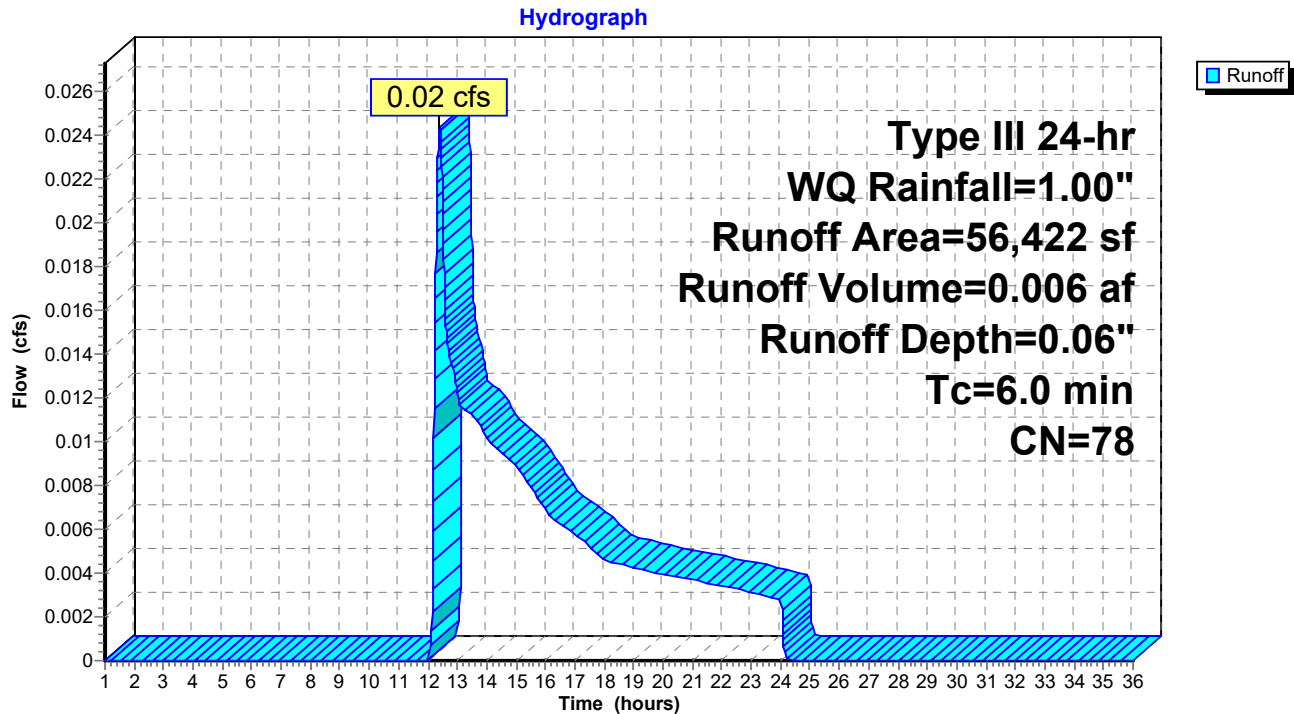
Summary for Subcatchment 1S.2: Co Op Roof & yard

Runoff = 0.02 cfs @ 12.39 hrs, Volume= 0.006 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	5,239	98	pavers
	16,100	39	>75% Grass cover, Good, HSG A
*	21,137	98	Roofs
*	4,191	98	sidewalks
*	618	98	patios
	9,137	77	1/8 acre lots, 65% imp, HSG A
	56,422	78	Weighted Average
	19,298		34.20% Pervious Area
	37,124		65.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.2: Co Op Roof & yard

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Type III 24-hr WQ Rainfall=1.00"

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Page 100

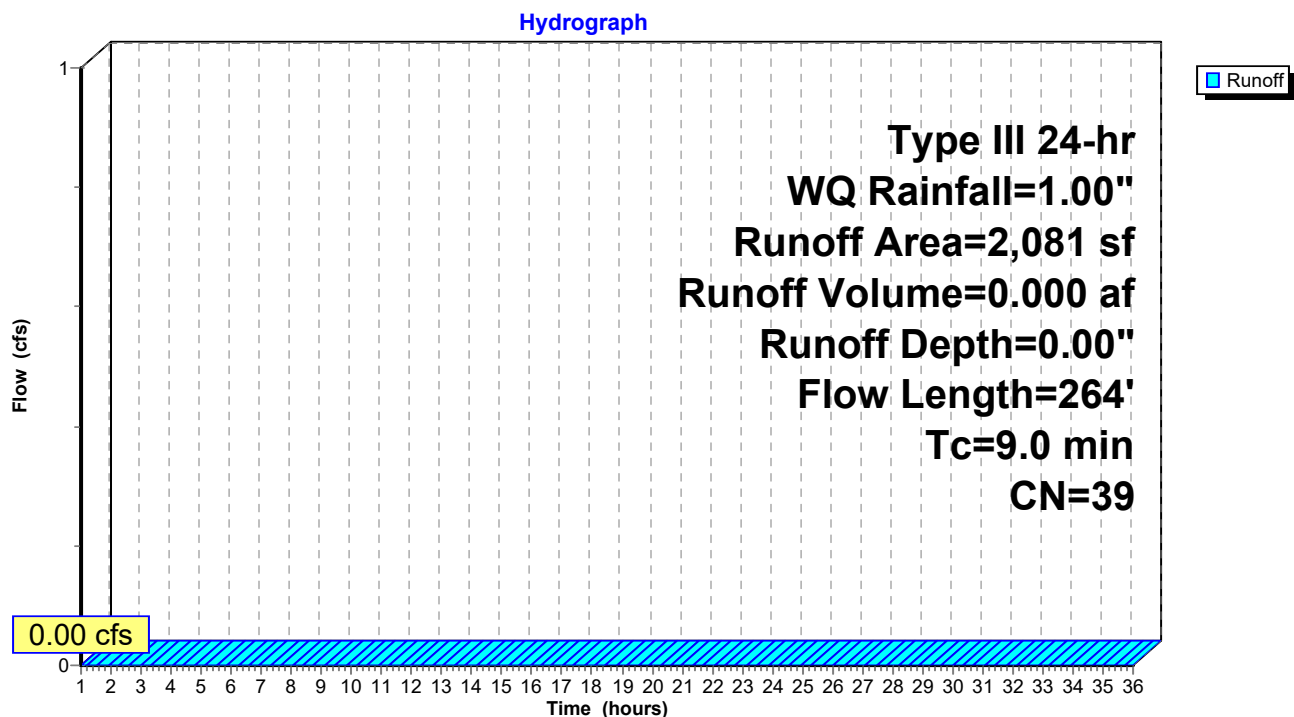
Summary for Subcatchment 1S.3: Runoff to park

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
2,081	39	>75% Grass cover, Good, HSG A
2,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.0600	0.27		Sheet Flow, A to B Grass: Short n= 0.150 P2= 3.27"
2.8	164	0.0200	0.99		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
9.0	264	Total			

Subcatchment 1S.3: Runoff to park

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Page 101

Summary for Subcatchment 1S.4: Central parking/drive

Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.005 af, Depth= 0.13"

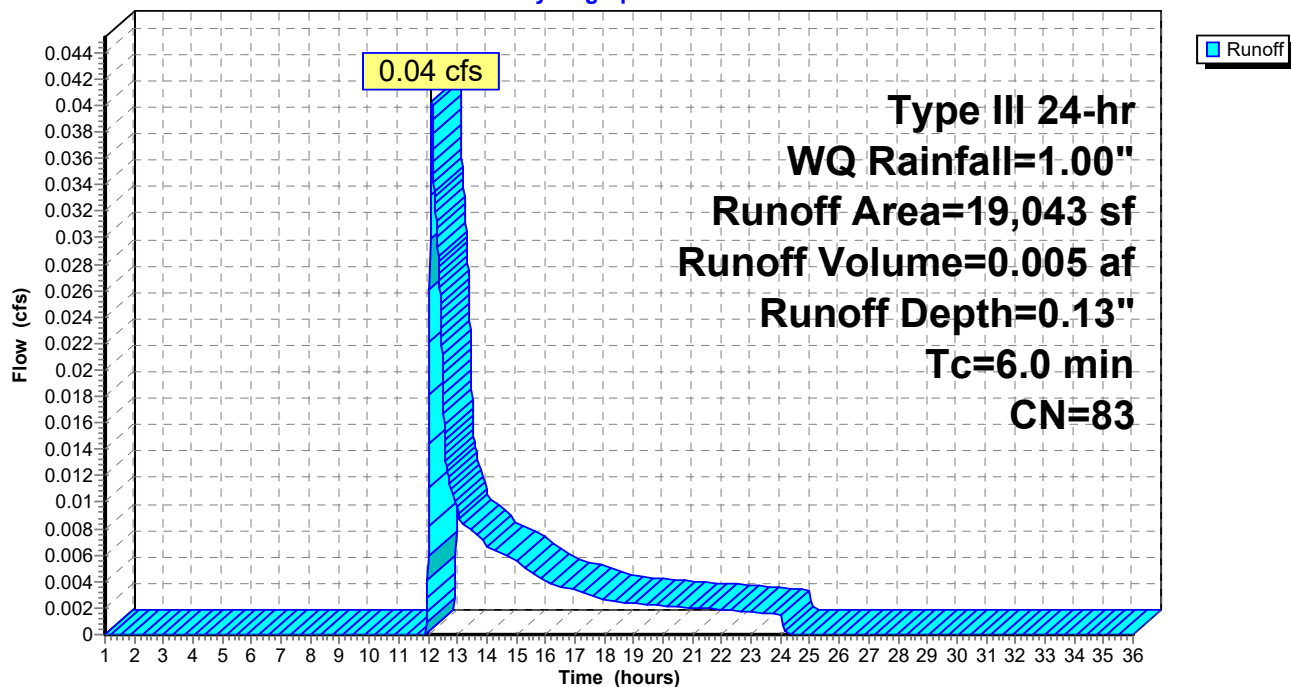
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	14,850	98	Pavement
	4,193	30	Brush, Good, HSG A
	19,043	83	Weighted Average
	4,193		22.02% Pervious Area
	14,850		77.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.4: Central parking/drive

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Type III 24-hr WQ Rainfall=1.00"

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Page 102

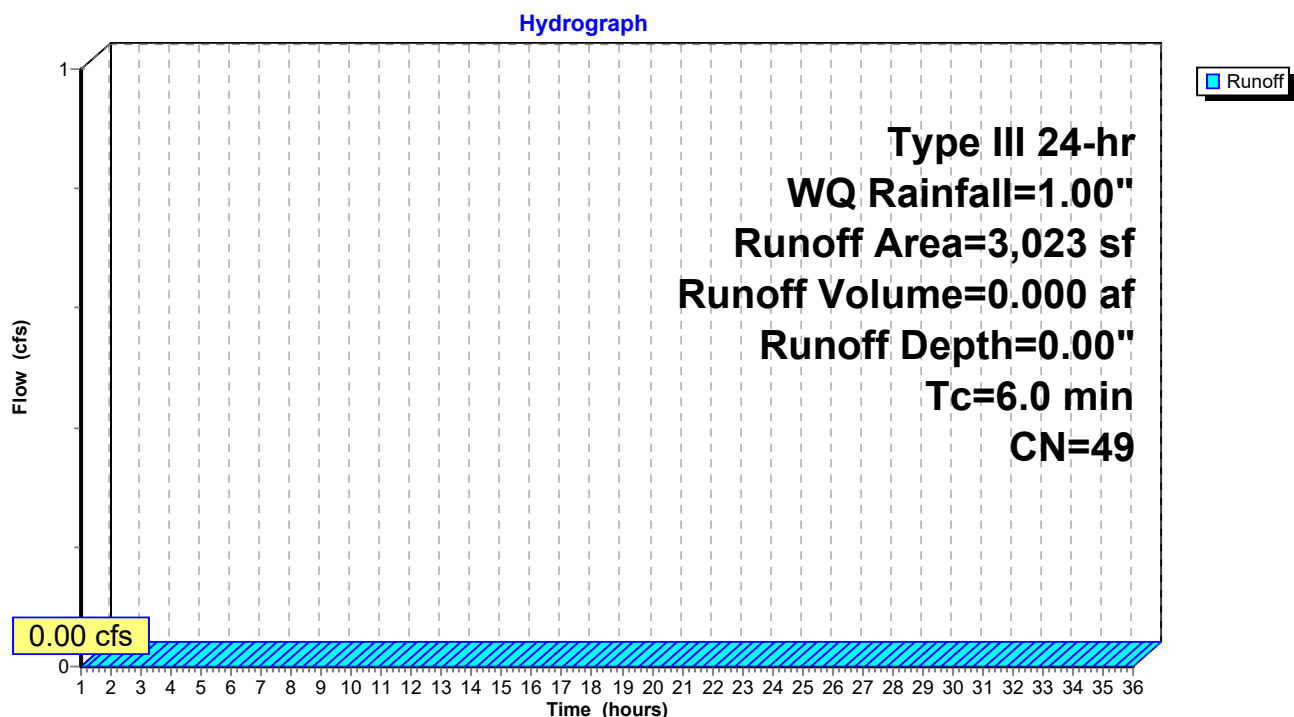
Summary for Subcatchment 1S.5: Contained yard/park connection

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
2,514	39	>75% Grass cover, Good, HSG A
* 509	98	sidewalks
3,023	49	Weighted Average
2,514		83.16% Pervious Area
509		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.5: Contained yard/park connection

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Type III 24-hr WQ Rainfall=1.00"

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Page 103

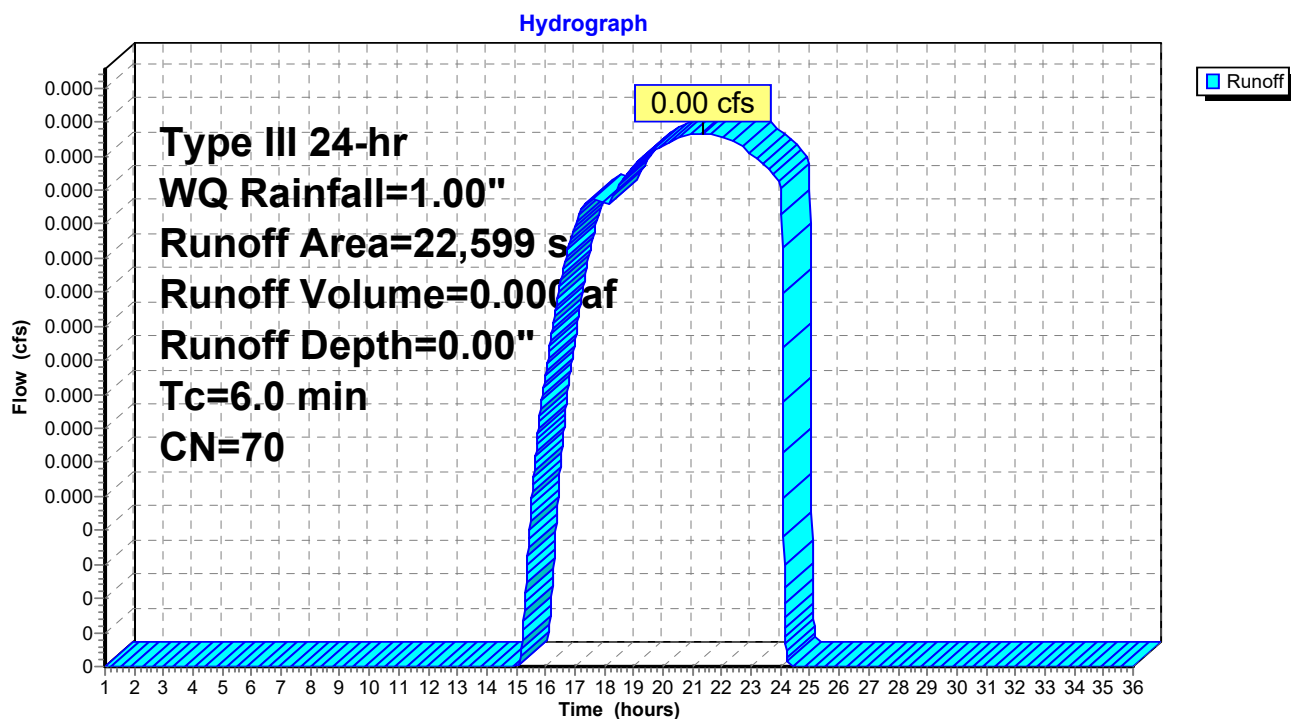
Summary for Subcatchment 1S.6: Building E roof and yard

Runoff = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
	10,599	39	>75% Grass cover, Good, HSG A
*	12,000	98	roof
	22,599	70	Weighted Average
	10,599		46.90% Pervious Area
	12,000		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.6: Building E roof and yard

Summary for Subcatchment 1S.8: East Lot 3

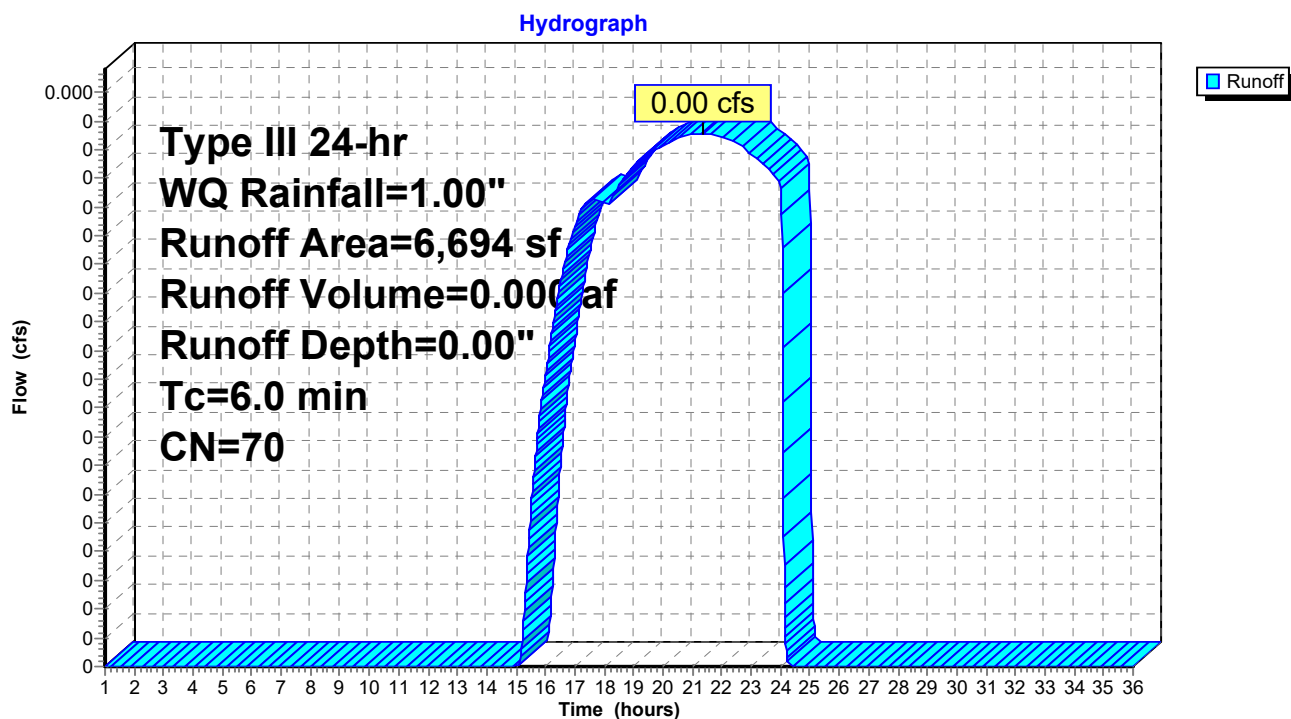
Runoff = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	3,547	98	Paved parking
	3,147	39	>75% Grass cover, Good, HSG A
	6,694	70	Weighted Average
	3,147		47.01% Pervious Area
	3,547		52.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.8: East Lot 3



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Type III 24-hr WQ Rainfall=1.00"

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Page 106

Summary for Subcatchment 1S.9: East Lot 2

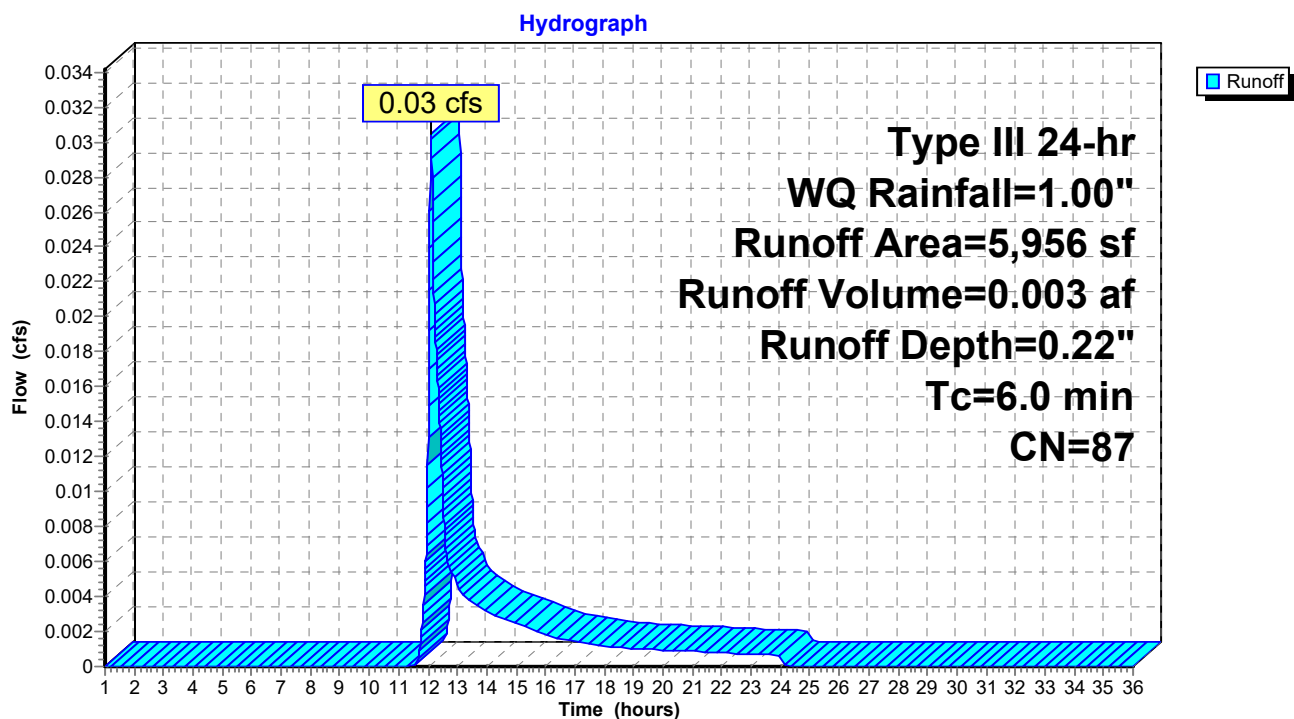
Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	4,809	98	Paved parking, patio, sidewalk
	1,147	39	>75% Grass cover, Good, HSG A
	5,956	87	Weighted Average
	1,147		19.26% Pervious Area
	4,809		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.9: East Lot 2



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Type III 24-hr WQ Rainfall=1.00"

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Page 107

Summary for Subcatchment 2S: 295 Embankment Trib

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

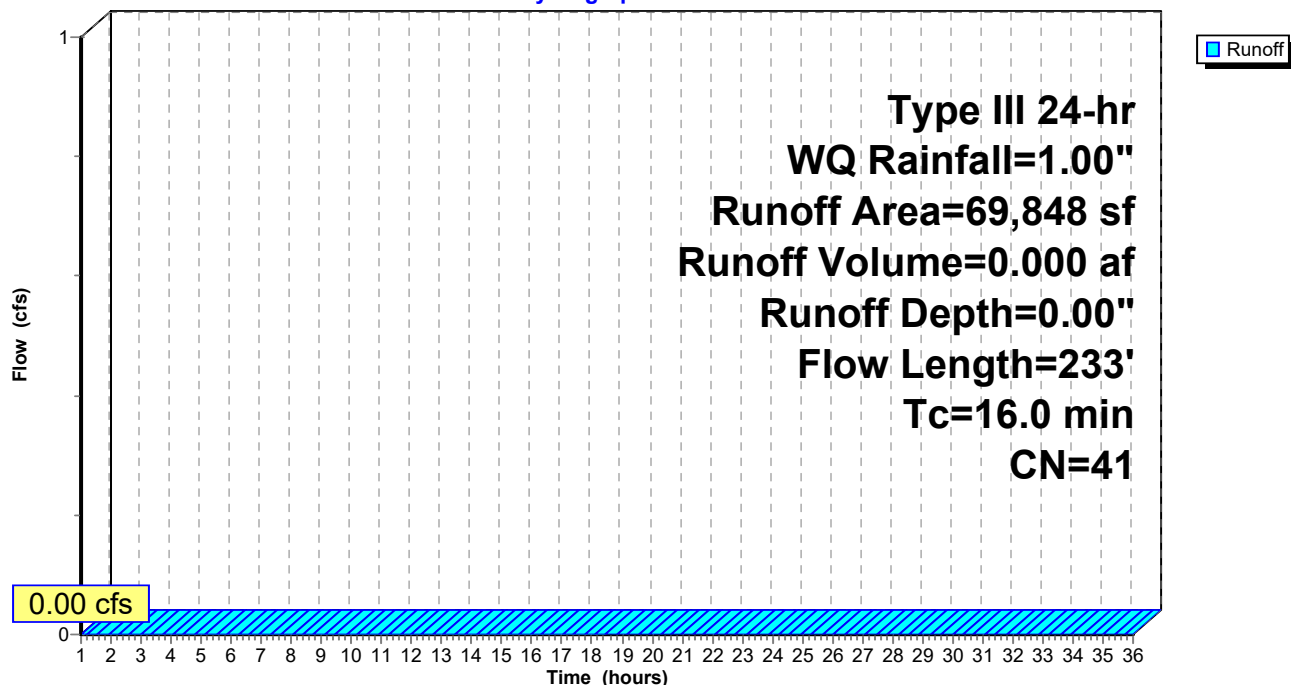
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
8,183	39	>75% Grass cover, Good, HSG A
* 230	98	Stairs
* 3,155	98	Path
* 5,488	98	Homes/driveways
52,792	32	Woods/grass comb., Good, HSG A
69,848	41	Weighted Average
60,975		87.30% Pervious Area
8,873		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment 2S: 295 Embankment Trib

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 108

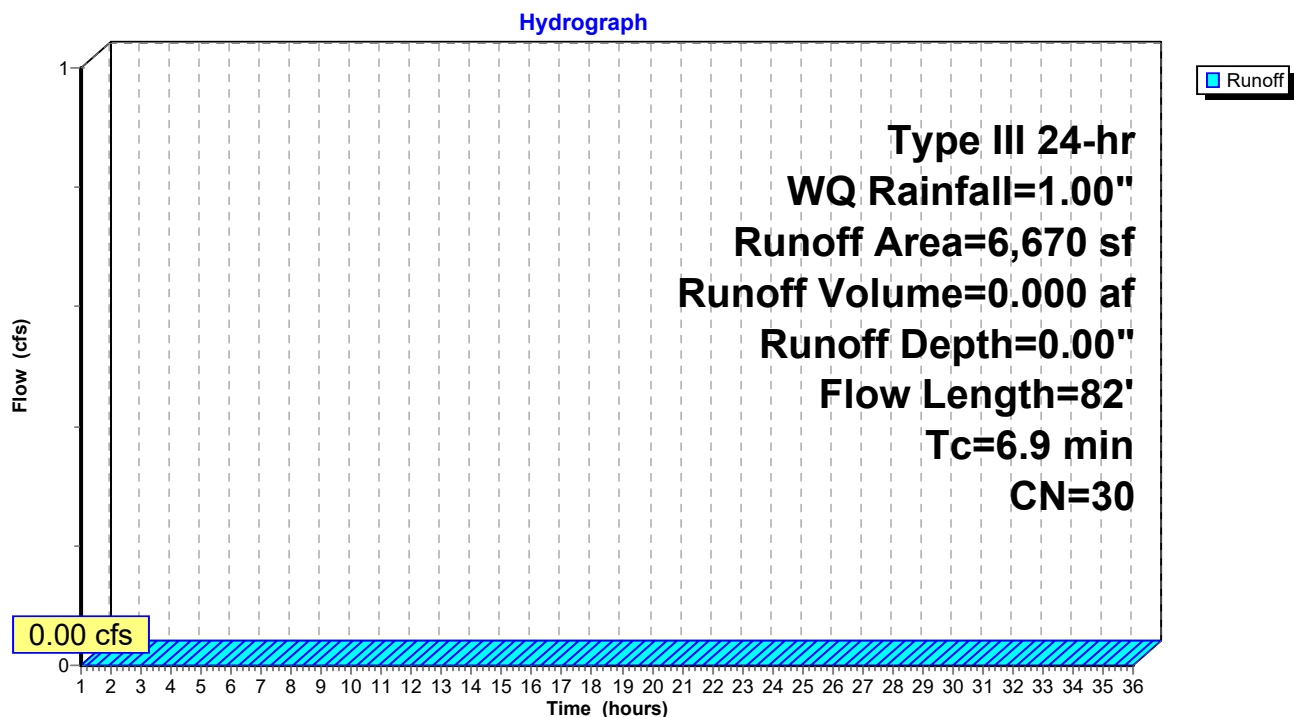
Summary for Subcatchment 3S.1: Garden area runoff

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
6,670	30	Brush, Good, HSG A
6,670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	28	0.3330	0.28		Sheet Flow, A to B
					Grass: Dense n= 0.240 P2= 3.27"
5.2	54	0.0700	0.17		Sheet Flow, B to C
					Grass: Dense n= 0.240 P2= 3.27"
6.9	82	Total			

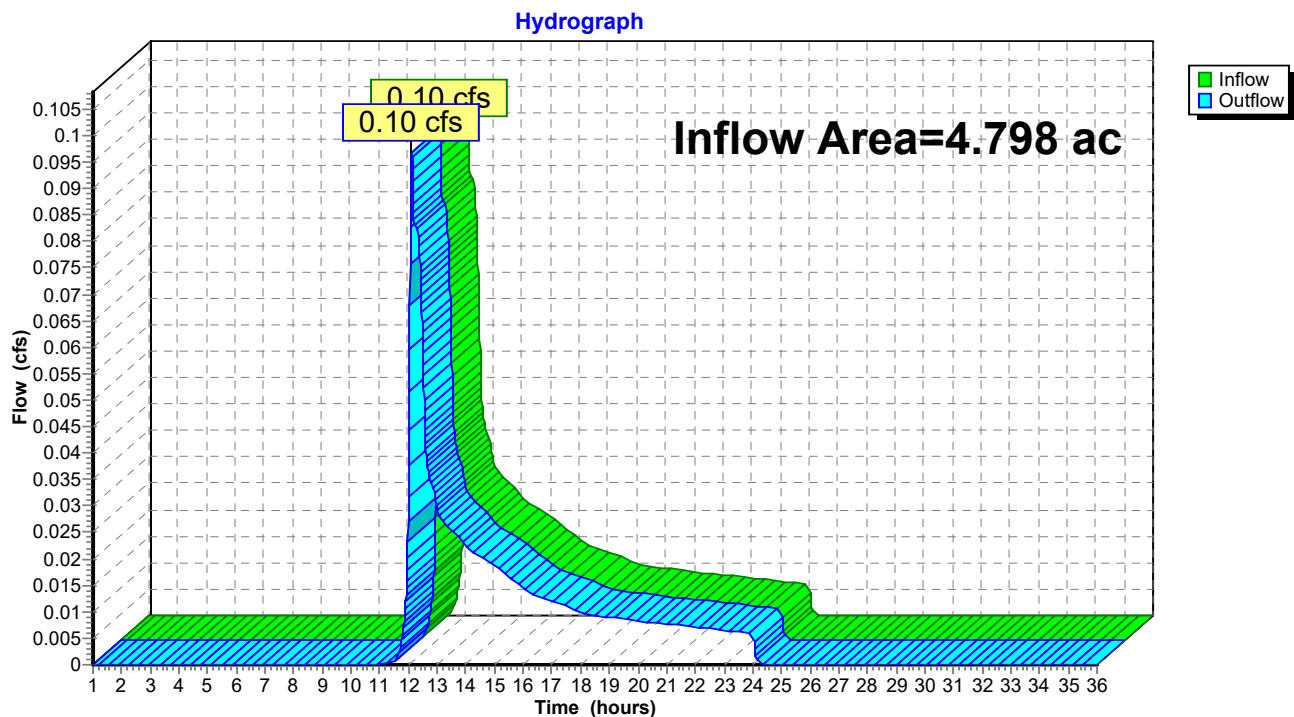
Subcatchment 3S.1: Garden area runoff

Summary for Reach POI-1: POI #1 - 60" Douglass MS4

Inflow Area = 4.798 ac, 46.81% Impervious, Inflow Depth = 0.04" for WQ event
 Inflow = 0.10 cfs @ 12.11 hrs, Volume= 0.016 af
 Outflow = 0.10 cfs @ 12.11 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-1: POI #1 - 60" Douglass MS4

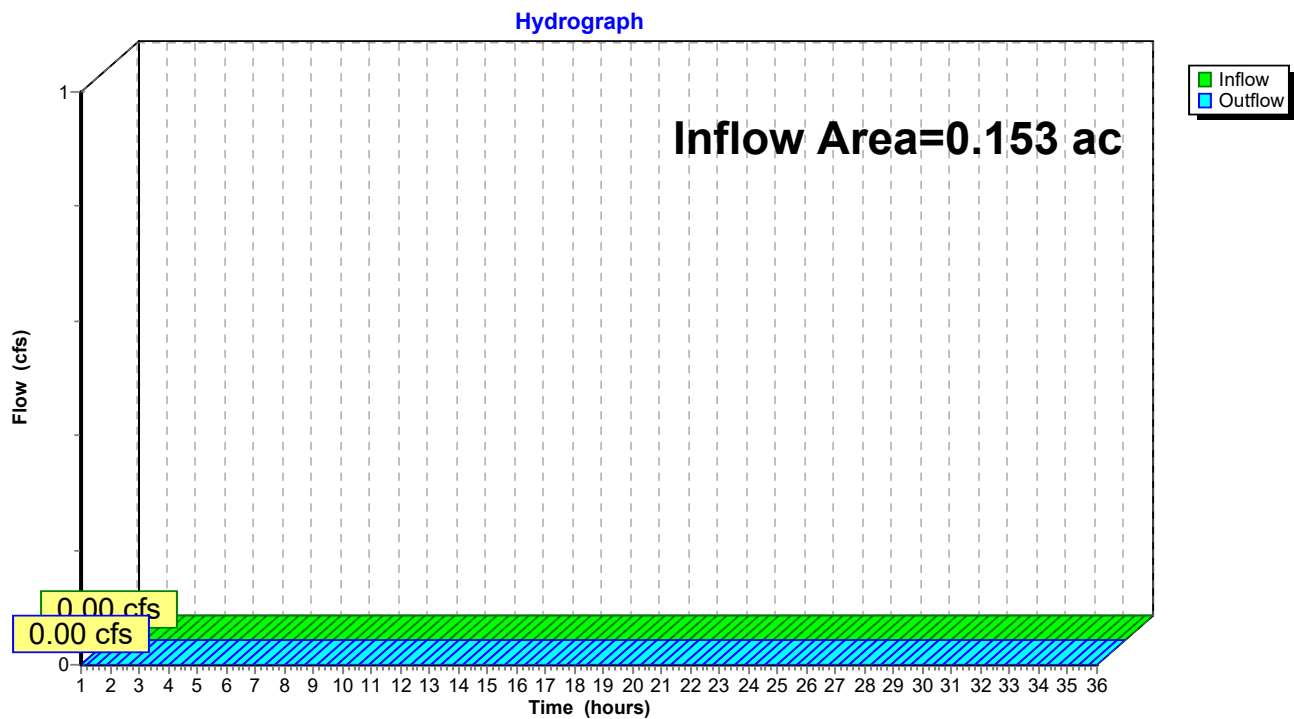


Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 0.153 ac, 0.00% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-3: POI #3 - Baseball Field



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Page 111

Summary for Pond P1: VUSF

Inflow Area = 0.249 ac, 76.24% Impervious, Inflow Depth = 0.11" for WQ event
 Inflow = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af
 Outflow = 0.01 cfs @ 12.10 hrs, Volume= 0.002 af, Atten= 37%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 12.10 hrs, Volume= 0.002 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 27.03' @ 12.47 hrs Surf.Area= 458 sf Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 1.5 min (929.5 - 928.0)

Volume	Invert	Avail.Storage	Storage Description
#1	30.75'	1,899 cf	Ponding (Prismatic) Listed below (Recalc)
#2	29.25'	69 cf	Filter Media/Loam (Prismatic) Listed below (Recalc)
			687 cf Overall x 10.0% Voids
#3	28.92'	30 cf	Transition Gravel (Prismatic) Listed below (Recalc)
			151 cf Overall x 20.0% Voids
#4	27.00'	349 cf	Crushed Stone (Prismatic) Listed below (Recalc)
			879 cf Overall - 6 cf Embedded = 873 cf x 40.0% Voids
#5	27.10'	5 cf	4.0" Round Pipe Storage x 2 Inside #4
			L= 30.0' S= 0.0005 '/'
			6 cf Overall - 0.2" Wall Thickness = 5 cf
		2,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.75	465	0	0
32.25	945	1,058	1,058
33.00	1,300	842	1,899

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.25	458	0	0
30.75	458	687	687

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.92	458	0	0
29.25	458	151	151

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.00	458	0	0
28.92	458	879	879

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Type III 24-hr WQ Rainfall=1.00"

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Page 112

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	12.0" Round Culvert L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 26.75' S= 0.0042 ' / ' Cc= 0.600 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	27.10'	0.5" Vert. Soil Filter Media Drawdown Effect C= 0.600
#3	Device 1	32.35'	24.0" Horiz. Beehive Outlet C= 0.600 Limited to weir flow at low heads
#4	Discarded	27.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 12.10 hrs HW=27.00' (Free Discharge)

↳ **4=Exfiltration** (Exfiltration Controls 0.01 cfs)

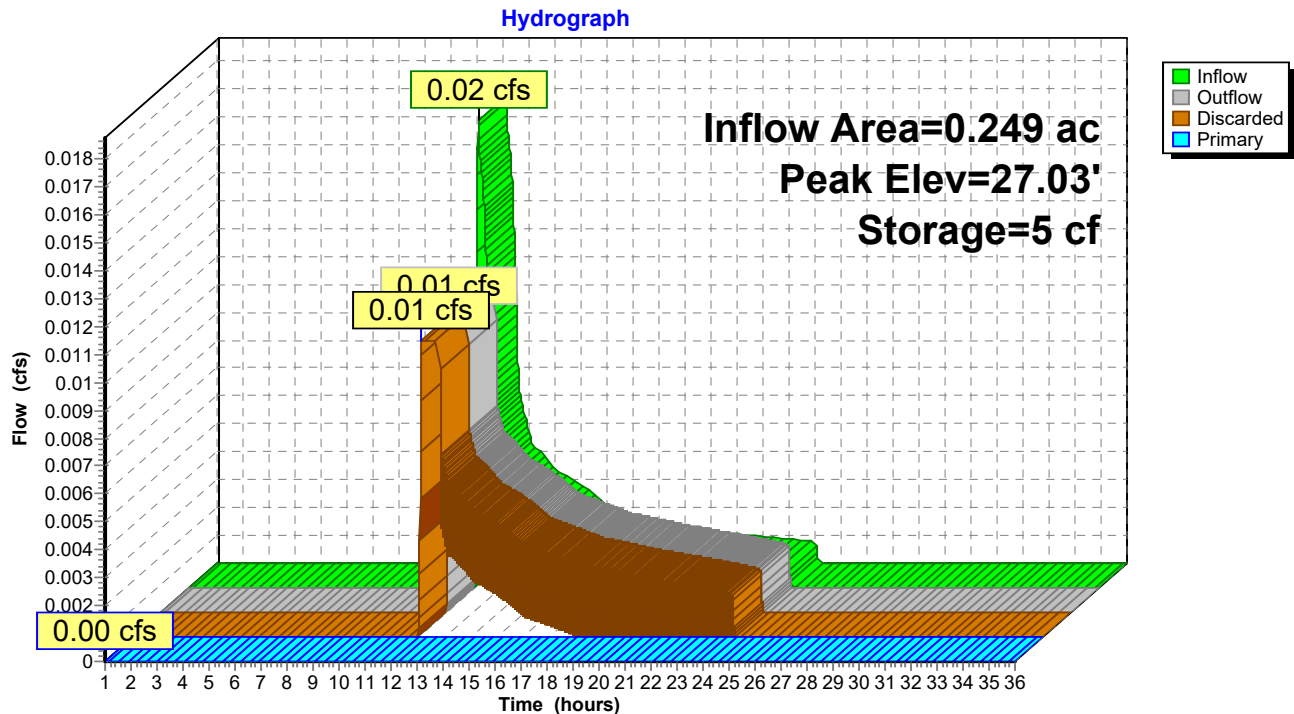
Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=27.00' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Controls 0.00 cfs)

↳ **2=Soil Filter Media Drawdown Effect** (Controls 0.00 cfs)

↳ **3=Beehive Outlet** (Controls 0.00 cfs)

Pond P1: VUSF



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Type III 24-hr WQ Rainfall=1.00"

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Page 113

Summary for Pond P2: FP 4

Inflow Area = 0.175 ac, 53.01% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.95' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (1,203.6 - 1,203.6)

Volume	Invert	Avail.Storage	Storage Description
#1	35.95'	14 cf	4.00'W x 5.00'L x 3.60'H Media/Stone 72 cf Overall x 20.0% Voids
#2	35.95'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		52 cf	Total Available Storage

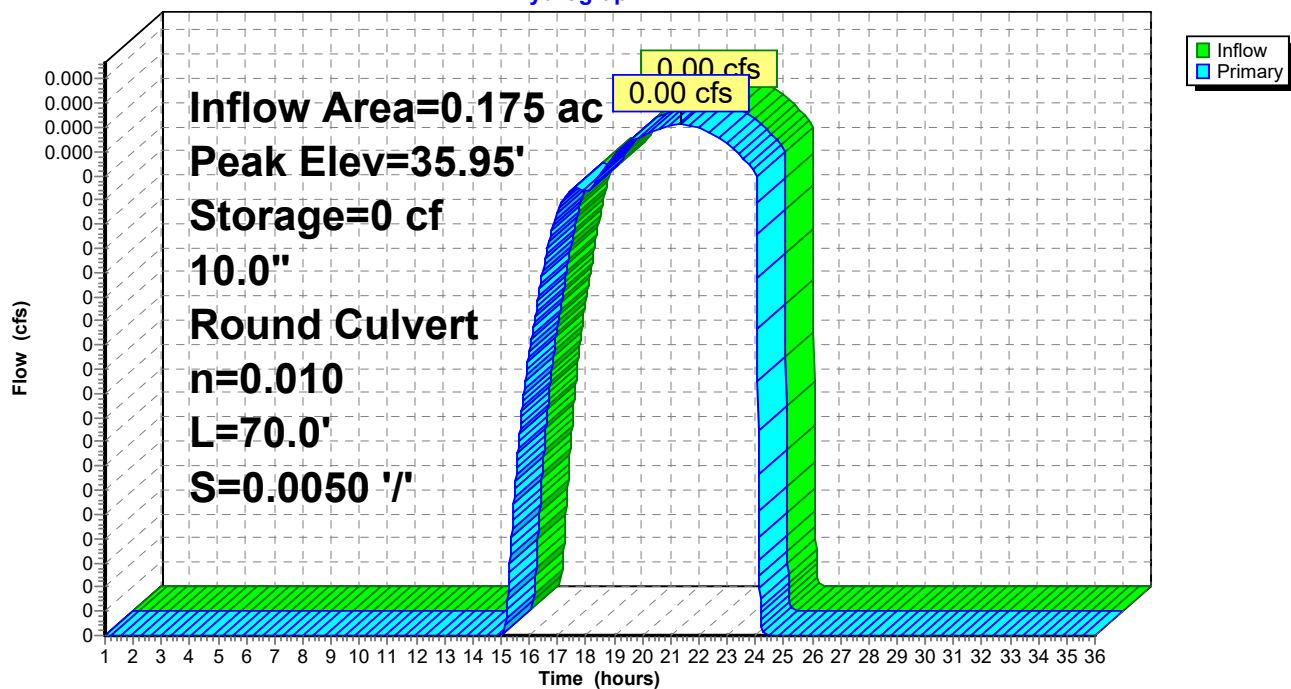
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.95	20	0	0
36.95	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	32.35'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 32.35' / 32.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 21.34 hrs HW=35.95' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.51 cfs potential flow)

Pond P2: FP 4

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 115

Summary for Pond P3: FP 3

Inflow Area = 0.154 ac, 52.99% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 36.10' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.0 min (1,203.6 - 1,203.6)

Volume	Invert	Avail.Storage	Storage Description
#1	36.10'	21 cf	5.00'W x 5.00'L x 4.20'H Media/Stone 105 cf Overall x 20.0% Voids
#2	36.10'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		66 cf	Total Available Storage

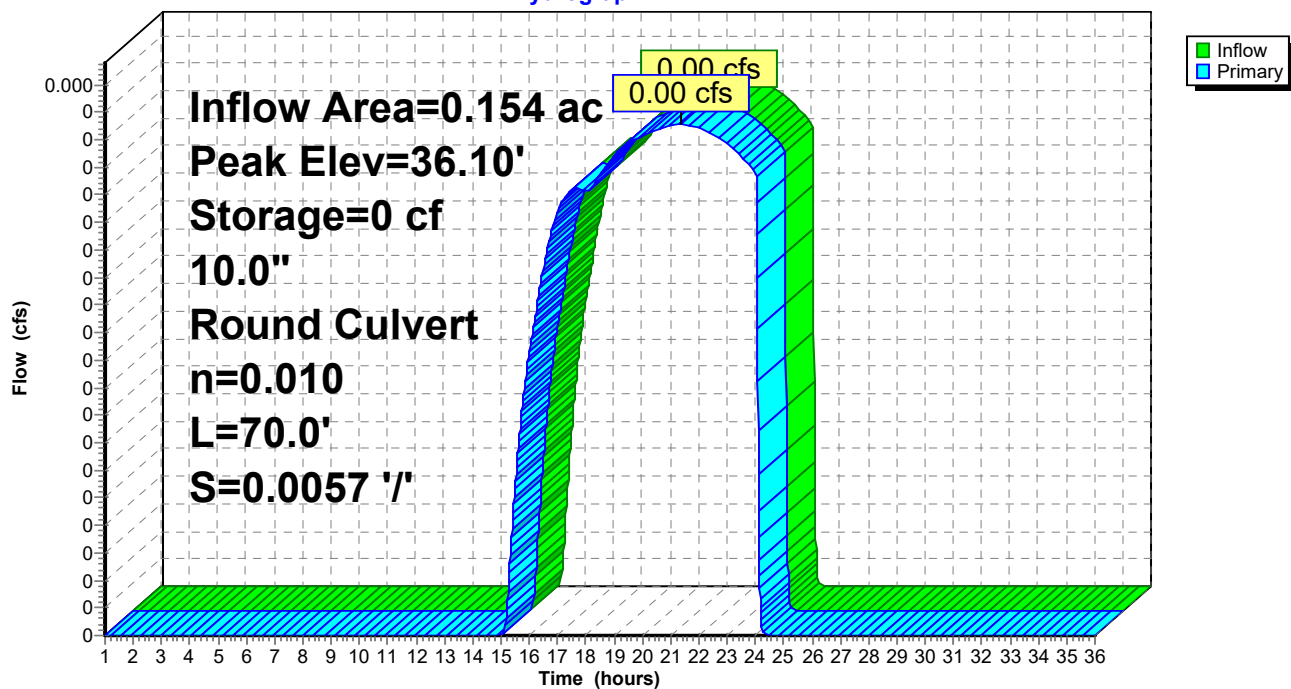
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.10	25	0	0
37.10	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.90'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.90' / 31.50' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 21.34 hrs HW=36.10' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Passes 0.00 cfs of 3.83 cfs potential flow)

Pond P3: FP 3

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 117

Summary for Pond P4: FP 2

Inflow Area = 0.137 ac, 80.74% Impervious, Inflow Depth = 0.22" for WQ event
 Inflow = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af
 Outflow = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.90' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	23 cf	5.00'W x 5.00'L x 4.50'H Media/Stone 113 cf Overall x 20.0% Voids
#2	35.90'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		67 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.90	25	0	0
36.90	64	45	45

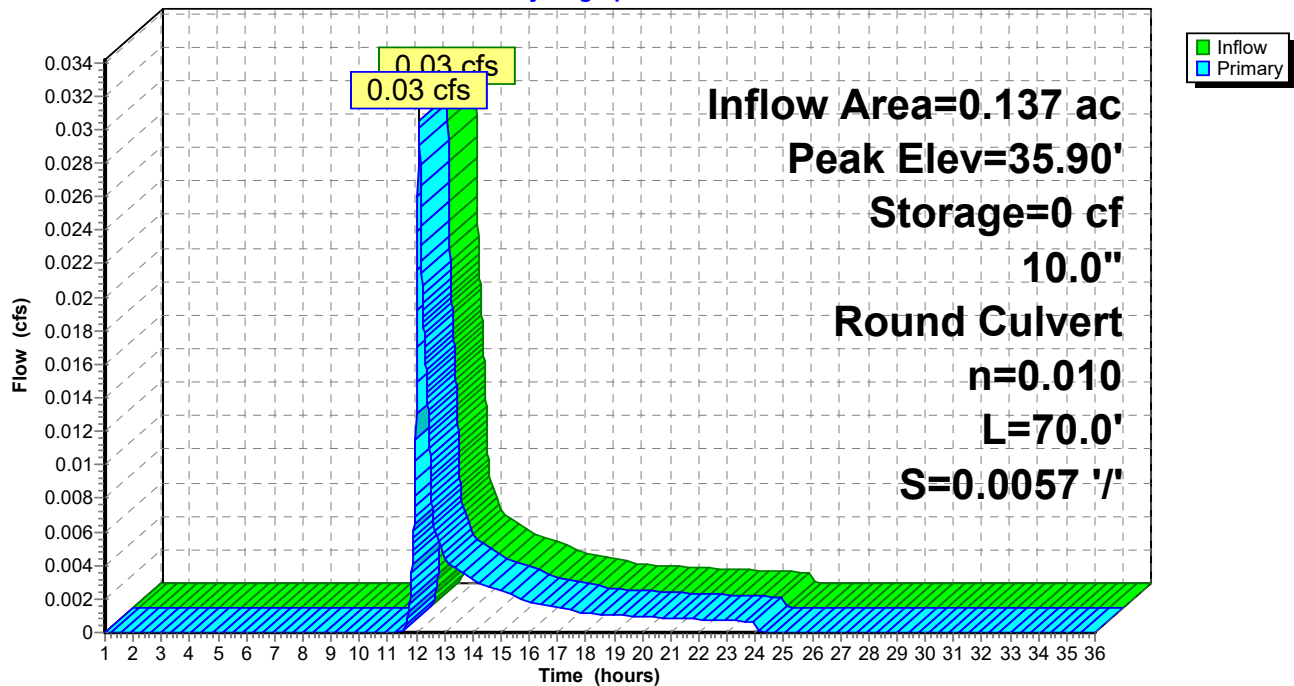
Device	Routing	Invert	Outlet Devices
#1	Primary	31.40'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.40' / 31.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=35.90' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.98 cfs potential flow)

Pond P4: FP 2

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Page 119

Summary for Pond P5: FP 1

Inflow Area = 0.086 ac, 84.98% Impervious, Inflow Depth = 0.28" for WQ event
 Inflow = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af
 Outflow = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 35.70' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.0 min (869.9 - 869.9)

Volume	Invert	Avail.Storage	Storage Description
#1	35.70'	19 cf	4.00'W x 5.00'L x 4.80'H Media/Stone 96 cf Overall x 20.0% Voids
#2	35.70'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		57 cf	Total Available Storage

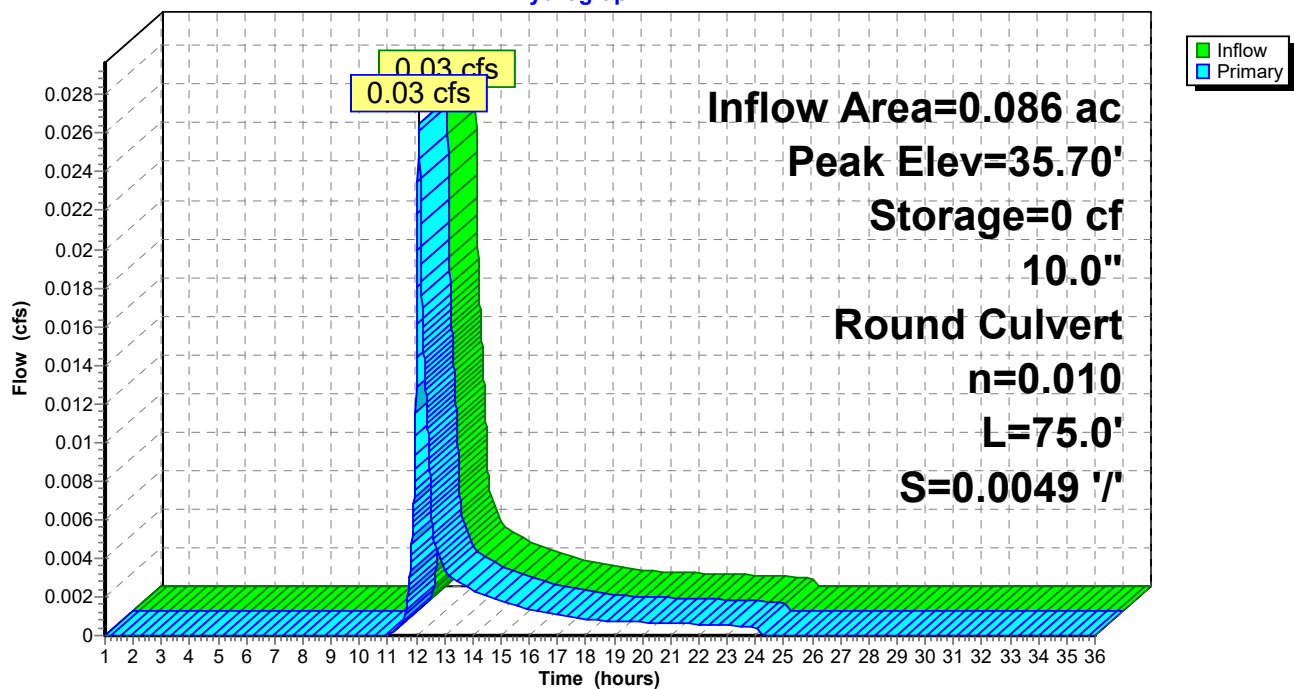
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.70	20	0	0
36.70	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	30.90'	10.0" Round Culvert L= 75.0' Ke= 1.000 Inlet / Outlet Invert= 30.90' / 30.53' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=35.70' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Passes 0.00 cfs of 4.12 cfs potential flow)

Pond P5: FP 1

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 121

Summary for Pond POI #2: POI #2 (295 Basin)

Inflow Area = 1.603 ac, 12.70% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 26.30' @ 1.00 hrs Surf.Area= 100 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no inflow)

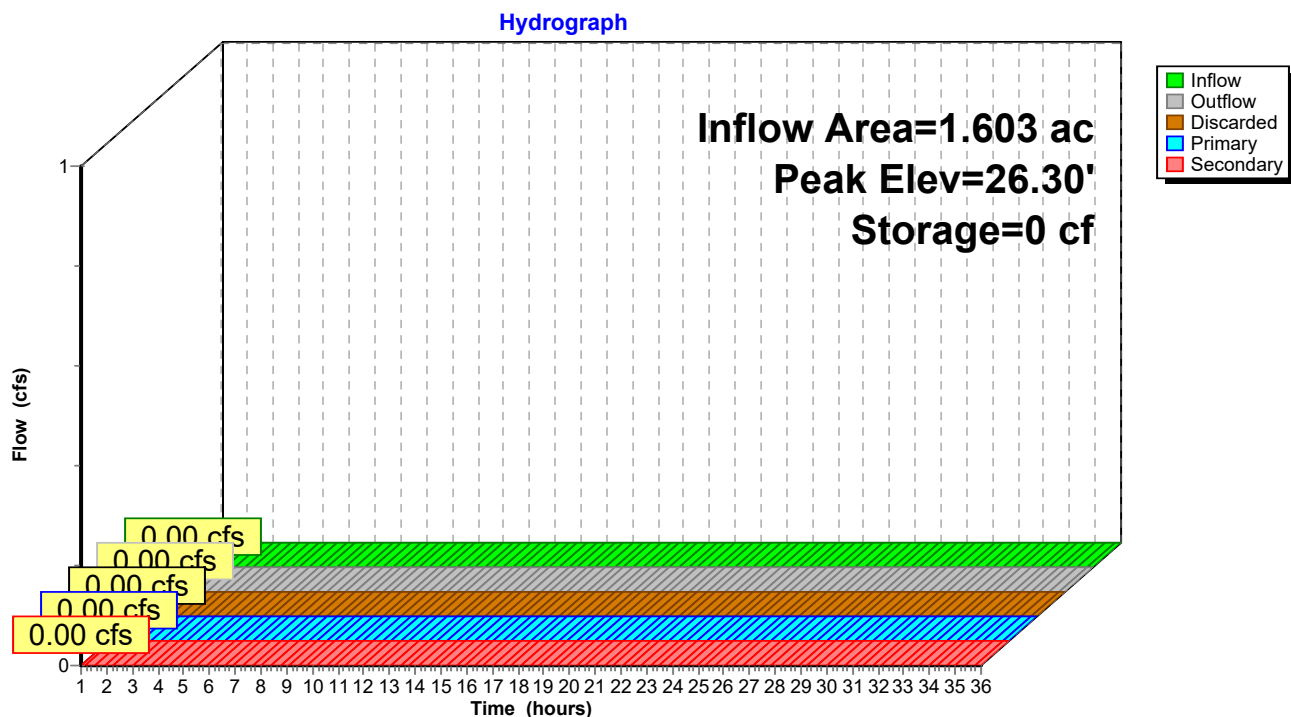
Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	105,037 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	10,120	7,298	8,899
29.00	14,131	12,126	21,024
30.00	17,326	15,729	36,753
32.00	24,023	41,349	78,102
33.00	29,847	26,935	105,037

Device	Routing	Invert	Outlet Devices
#1	Primary	26.60'	12.0" Round Culvert L= 16.0' Ke= 0.600 Inlet / Outlet Invert= 26.60' / 26.51' S= 0.0056 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	32.40'	20.0' long x 15.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	26.60'	1.000 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**3=Exfiltration** (Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**2=Overflow** (Controls 0.00 cfs)

Pond POI #2: POI #2 (295 Basin)



Attachment E

Soil Survey





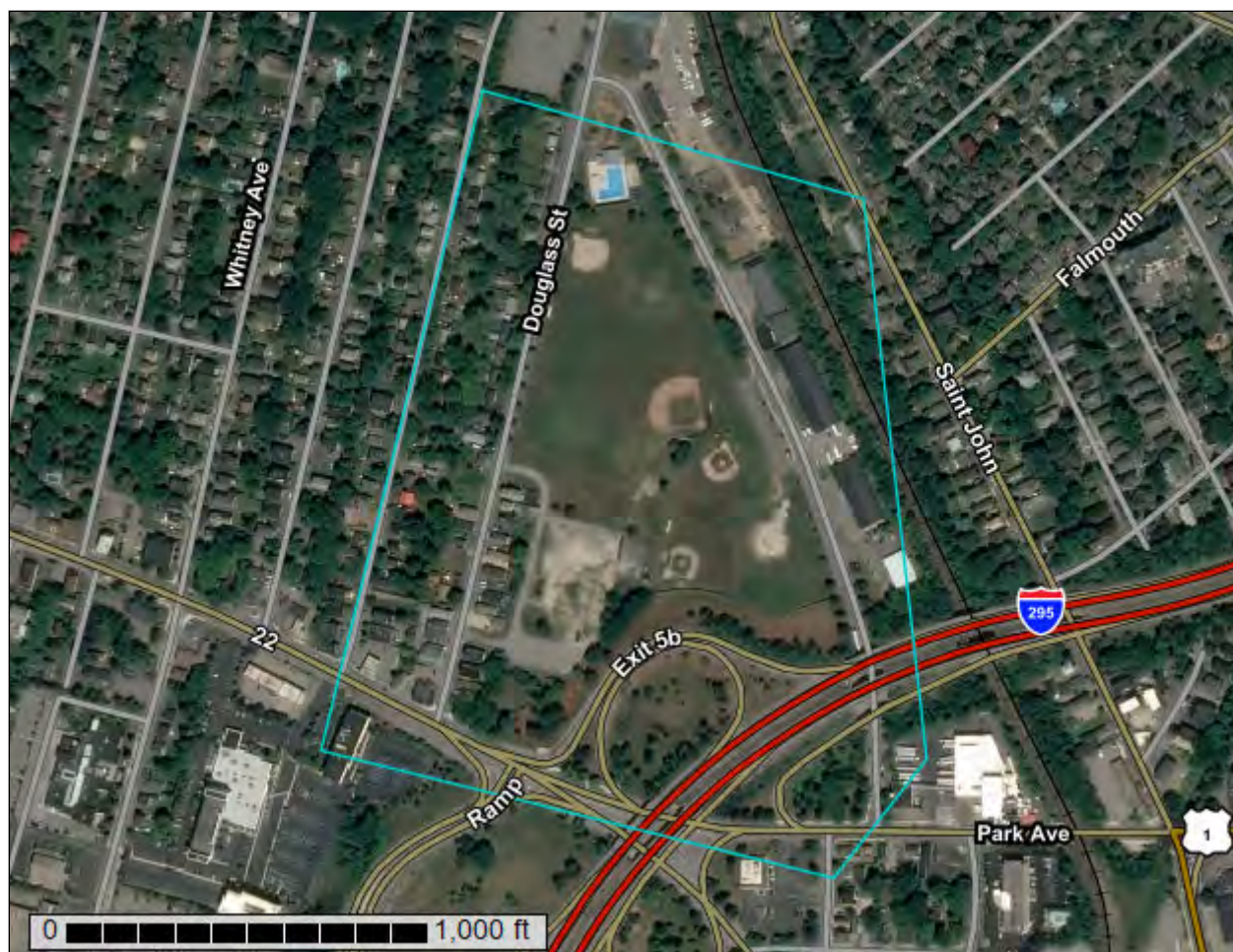
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
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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



December 16, 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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Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Cumberland County and Part of Oxford County, Maine.....	13
Au—Au Gres loamy sand.....	13
BgC2—Nicholville very fine sandy loam, 8 to 15 percent slopes.....	14
DeB—Deerfield loamy fine sand, 3 to 8 percent slopes.....	15
Wa—Walpole fine sandy loam.....	16
WmB—Windsor loamy sand, 0 to 8 percent slopes.....	17
References	19

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

Custom Soil Resource Report

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 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 18, Aug 31, 2021

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
Au	Au Gres loamy sand	32.1	53.4%
BgC2	Nicholville very fine sandy loam, 8 to 15 percent slopes	0.1	0.2%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	16.9	28.1%
Wa	Walpole fine sandy loam	1.3	2.2%
WmB	Windsor loamy sand, 0 to 8 percent slopes	9.7	16.1%
Totals for Area of Interest		60.2	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

Au—Au Gres loamy sand

Map Unit Setting

National map unit symbol: blgr
Elevation: 200 to 1,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Au gres and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Au Gres

Setting

Landform: Outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits derived from granite and gneiss

Typical profile

H1 - 0 to 10 inches: loamy sand
H2 - 10 to 32 inches: loamy sand
H3 - 32 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

BgC2—Nicholville very fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2yig6
Elevation: 20 to 2,300 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Nicholville and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nicholville

Setting

Landform: Lakebeds (relict), eskers
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-silty glaciomarine deposits

Typical profile

Ap - 0 to 7 inches: very fine sandy loam
Bs - 7 to 19 inches: very fine sandy loam
BC - 19 to 30 inches: very fine sandy loam
C - 30 to 65 inches: loamy very fine sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

DeB—Deerfield loamy fine sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2xfg9

Elevation: 0 to 1,190 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Deerfield and similar soils: 85 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerfield

Setting

Landform: Kame terraces, outwash plains, outwash terraces, outwash deltas

Landform position (three-dimensional): Tread

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Parent material: Sandy outwash derived from granite, gneiss, and/or quartzite

Typical profile

Ap - 0 to 9 inches: loamy fine sand

Bw - 9 to 25 inches: loamy fine sand

BC - 25 to 33 inches: fine sand

Cg - 33 to 60 inches: sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: Very 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: About 15 to 37 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Sodium adsorption ratio, maximum: 11.0

Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A

Ecological site: F144AY027MA - Moist Sandy Outwash

Hydric soil rating: No

Wa—Walpole fine sandy loam

Map Unit Setting

National map unit symbol: blk7
Elevation: 0 to 540 feet
Mean annual precipitation: 48 to 49 inches
Mean annual air temperature: 45 to 46 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Walpole and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Walpole

Setting

Landform: Outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 20 inches: fine sandy loam
H3 - 20 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144BY303ME - Acidic Swamp
Hydric soil rating: Yes

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

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: Outwash terraces, deltas, outwash plains, dunes

Landform position (three-dimensional): Tread, riser

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 supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144BY601ME - Dry Sand

Hydric soil rating: No

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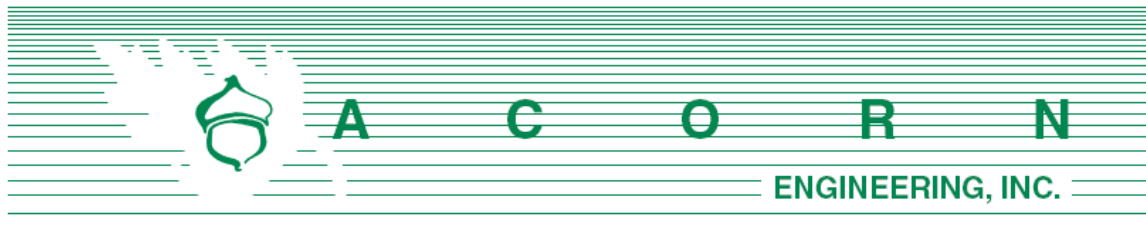
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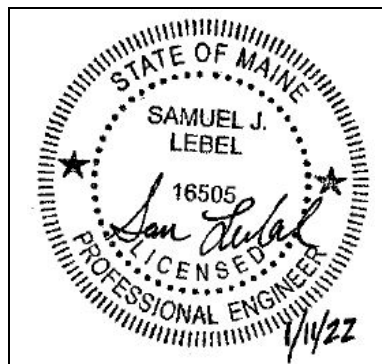
K. EROSION & SEDIMENTATION **CONTROL REPORT**

Prepared For:

**Douglass Commons, LLC.
43 & 91 Douglass Street
Portland, Maine 04101**

Prepared By:

**Acorn Engineering, Inc.
65 Hanover Street
Portland, Maine 04101**



January 2022

INTRODUCTION

Acorn Engineering, Inc. has been retained by Douglass Commons, LLC. to provide civil engineering services for the proposed redevelopment of 57 Douglass Street located within the R-5a Zoning District in Portland, Maine. The 3.34-acre parcel was previously the site of a school building and is now vacant. The built-out site will consist of eight stand-alone buildings of 120 residential dwelling units.

The following Erosion and Sedimentation Control Report was developed in accordance with the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and the Maine DEP Chapter 500 Stormwater Management Appendix A and B (1), Amended August 12, 2015. This narrative also meets the standards required in the Maine DEP's Erosion & Sediment Control BMP's Manual, revised in 2016.

1.0 EXISTING CONDITIONS

The proposed project site is located off an access road from Douglass Street adjacent to Douglass Park and Interstate 295. A Boundary & Topographic Survey has been prepared by Owen Haskell, Inc., dated March 1, 2021.

The property is in the R-5A Residential Zone. Abutting Uses include:

- North Douglass Park
- West Residential
- South/East Route 295

The site is currently vacant and was once occupied by the West School. The site in its existing condition is split a ridge middle of the property that drains water in roughly two directions, to the north and south. A small portion of the site drains to the playing fields to the east. The adjacent I-295 corridor basin contributes run-off to the site through an existing culvert. The grades on-site are mostly gentle in the 1 to 5% range with some steeper slopes of 10-15% on the edges of the property in the east and south .

1.1 Existing Soils

Onsite soil information includes the following:

- Soil Conservation Service Medium Intensity Soil Survey for Cumberland County
- United States Department of Agriculture Web Soil Survey

Given the soils information, listed above, no onsite wastewater is proposed; the applicant does not intend to perform a more intense hydric soil boundary delineation because the waiver requirements set forth in the City of Portland Technical Manual – Section 7 – Soil Survey, Rev. 6/17/11 are met.



The area within and surrounding the project includes soil types listed in the table below. The susceptibility of soils to erosion is indicated on a relative “K” scale of values over a range of 0.02 to 0.69. Higher “K” values indicate more erodible soils.

Table 1 - “K” Value		
Soils Type	Subsurface	Substratum
Au Gres Loamy Sand	.15	.15
Deerfield Loamy Fine Sand	.20	.20

The soil “K” value for the soil, listed above, shows a low susceptibility to erosion, as derived from the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County. Although the soil “K” value shows a low susceptibility to erosion, implementation of the proposed Erosion & Sedimentation Measures by the contractor will be important to limit erosion during large storm events.

1.2 Existing Erosion Problems

There are no signs of erosion.

1.3 Critical Areas

There are no critical areas that require special attention during construction.

1.4 Protected Natural Resource

The client is not aware of the presence of any existing significant natural features located on the site as listed in Section 14-526 (b) 1. of the Land Use Code. The project is not located within a watershed classified as an Urban Impaired Stream by the Maine DEP.

1.5 Previous Construction Activity (5 years)

Acorn Engineering, Inc. is not aware of any construction related activities within the project limits within the past 5 years. The West School was demolished on-site within the last few years.

1.6 Timber Harvesting

Acorn Engineering, Inc. is not aware of any timber harvesting within the past five years.



2.0 EROSION CONTROL MEASURES AND SITE STABILIZATION

As part of the site development, the following temporary and permanent erosion and sedimentation control devices shall be implemented. Devices shall be installed as described in this report or within the plan set. See the Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices for further reference.

2.1 Temporary Erosion Control Measures

The following temporary erosion and sedimentation control measures are planned for the project's construction period:

2.1.1 Crushed stone stabilized construction entrances shall be placed at all access points to the project site where there are disturbed areas. The following specifications shall be followed at a minimum:

- Stone size shall be 2-3 inches, or reclaimed or recycled concrete equivalent.
- The thickness of the entrance stone layer shall be no less than 6 inches.
- The entrance shall not be less than 20 feet wide, however not less than the full width of points where ingress or egress occurs. The length shall not be less than 50 feet in length.
- Geotextile fabric (woven or non-woven) shall be placed over the entire entrance area.
- The entrance/exit shall be maintained to the extent that it will prevent the tracking of sediment onto public road ways.

2.1.2 Siltation fence or erosion control berm shall be installed down gradient of any disturbed areas to trap runoff borne sediments until permanent stabilization is achieved. The silt fence or erosion control berm shall be installed per the details provided in the plan set and inspected before and immediately after each rainfall and at least daily during prolonged rainfall. Repairs shall be made if there are any signs of erosion or sedimentation below the fence line or berm. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind the fence or berm, the barrier shall be replaced with a stone check dam.

2.1.3 Hay mulch including hydro seeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulch placed between April 15th and November 1st on slopes of less than 15 percent shall be covered by fabric netting and anchored with staples in accordance with the manufacturer's recommendation. Mulch placed between November 1st and April 15th on slopes equal to or steeper than 8 percent and equal to or flatter than 2:1 shall use mats or fabric netting and anchored with staples in accordance with the manufacturer's recommendation.

2.1.4 At any time of the year, all slopes greater than 3:1 shall be stabilized with Double Net Erosion Control Blanket Bionet SC150BN by North American



Green or Approved Equal, or Erosion Control Mix Slope Protection as detailed within the plans.

- 2.1.5 Douglass Street shall be swept to control mud and dust from the construction site as necessary. Add additional stone to the stabilized construction entrance to minimize the tracking of material off the site and onto the surrounding roadways.
- 2.1.6 During demolition, clearing and grubbing operations, stone check dams shall be installed at any areas of concentrated flow. The maximum height of the check dam shall not exceed 2 feet. The center of the check dam shall be 6 inches below the outer edges of the dam. The contractor shall mulch the side slopes and install stone check dams for all newly excavated ditch lines within 24 hours of their creation.
- 2.1.7 Silt fence stake spacing shall not exceed 6 feet unless the fence is supported with 14-gauge wire in which case the maximum spacing shall not exceed 10 feet. The silt fence shall be “toed” into the ground.
- 2.1.8 Storm drain inlet protection shall be provided to storm drains using any of the following: hay bale drop inlet structures, silt fence drop inlet sediment filter, gravel and wire mesh drop inlet sediment filter, or curb inlet sediment filter. Barriers shall be inspected after every rainfall event and repaired as necessary. Sediments shall be removed when accumulation has reached $\frac{1}{2}$ the design height.
- 2.1.9 Dust control shall be accomplished using any of the following: water, calcium chloride, stone, or an approved MDEP product. Dust control shall be applied as needed to accomplish dust control.
- 2.1.10 Temporary loam, seed, and mulching shall be used in areas where no other erosion control measure is used. Application rates for seeding are provided at the end of this report.
- 2.1.11 Stockpiles shall be stabilized within 7 days of formation unless a scheduled rain event occurs prior to the 7-day window, in which case the stockpile shall be stabilized prior to the rain event. Methods of stabilization shall be mulch, erosion control mix, or erosion control blankets/mats. Silt fence or a wood waste compost filter berm shall be placed downhill of any soil stockpile location.
- 2.1.12 For disturbance between November 1 and April 15, please refer to winter stabilization plan in this report and the Maine Erosion and Sediment Control BMP manual for further information.
- 2.1.13 It is of the utmost importance that stormwater runoff and potential sediment from the construction site be diverted around the proposed underdrains until the trench is backfilled.



2.2 Permanent Erosion Control Measures

The following permanent erosion control measures are intended for post disturbance areas of the project.

2.2.1 All disturbed areas during construction, not subject to other proposed conditions, shall receive a minimum 4" of loam, limed, and mulched. Erosion control blankets or mats shall be placed over the mulch in areas noted in paragraph 4.1 of this report.

2.2.2 All stormwater devices shall be installed, and tributary areas stabilized prior receiving stormwater.

2.2.3 Refer to the Maine Erosion and Sediment Control BMP manual for additional information.

3.0 EROSION AND SEDIMENTATION CONTROL PLAN

3.1 The Construction Management & Erosion Control Plan is included within the plan set.

4.0 DETAILS AND SPECIFICATIONS

4.1 Erosion & Sedimentation Control Details and Specifications are included in the plan set.

5.0 STABILIZATION PLAN FOR WINTER CONSTRUCTION

Winter Construction consists of earthwork disturbance between the dates of November 1 and April 15. If a construction site is not stabilized with pavement, a road gravel base, 75% mature vegetation cover or riprap by November 15, then the site shall be protected with over-winter stabilization. Any area not stabilized with pavement, vegetation, mulching, erosion control mix, erosion control mats, riprap, or gravel base on a road shall be considered open.

The contractor shall limit the work area to areas that work will occur in during the subsequent 15 days and so that it can be mulched one day prior to a snow event. The contractor shall stabilize work areas prior to opening additional work areas to minimize areas without erosion control measures.

The following measures shall be implemented during winter construction periods:

5.1 Sediment Barriers

During frozen conditions, sediment barriers may consist of erosion control mix berms or any other recognized sediment barriers as frozen soil prevents the proper installation of hay bales or silt fences.



5.2 Mulching

All areas shall be considered to be denuded until seeded and mulched. Hay and straw mulch shall be applied at a rate of 150 lb. per 1,000 square feet or 3 tons/acre (twice the normal accepted rate of 75-lbs./1,000 s.f. or 1.5 tons/acre) and shall be properly anchored. Erosion control mix must be applied with a minimum 4-inch thickness. Mulch shall not be spread on top of snow. The snow shall be removed down to a one-inch depth or less prior to application. After each day of final grading, the area shall be properly stabilized with anchored hay or straw or erosion control matting. An area shall be considered to have been stabilized when exposed surfaces have been either mulched or adequately anchored so that ground surface is not visible through the mulch. Between the dates of November 1 and April 15, all mulch shall be anchored by either mulch netting, tracking or wood cellulose fiber. The cover will be considered sufficient when the ground surface is not visible through the mulch. After November 1st, mulch and anchoring of all exposed soil shall occur at the end of each final grading workday.

5.3 Soil Stockpiling

Stockpiles of soil or subsoil shall be mulched for over winter protection with hay or straw at twice the normal rate or with a four-inch layer of erosion control mix. This shall be done within 24 hours of stocking and re-established prior to any rainfall or snowfall.

5.4 Seeding

Between the dates of October 15th and April 1st, loam or seed shall not be required. During periods of above freezing temperatures finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until the final treatment can be applied. If the date is after November 1st and if the exposed area has not been loamed, final grading with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched.

Dormant seeding may be placed prior to the placement of mulch or erosion control blankets. If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5 lbs./1,000 s.f. All areas seeded during the winter shall be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 75% catch) shall be revegetated by replacing loam, seed and mulch. If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.



5.5 Over winter stabilization of disturbed soils

By September 15th, all disturbed soils on areas having a slope less than 15% shall be seeded and mulched. If the disturbed areas are not stabilized by this date, then one of the following actions shall be taken to stabilize the soil for late fall and winter:

- Stabilize the soil with temporary vegetation – By October 1st, seed the disturbed soil with winter rye at a seeding rate of 3lbs per 1,000 s.f., lightly mulch the seeded soil with hay or straw at 75 lbs per 1,000 s.f., and anchor the mulch with plastic netting. Monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or fails to cover at least 75% of the disturbed soil before November 1st, then mulch the area for over-winter protection.
- Stabilize the soil with sod – Stabilize the disturbed soil with properly installed sod by October 1st. Proper installation includes pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.
- Stabilize the soil with mulch – By November 15th, mulch the disturbed soil by spreading hay or straw at a rate of at least 150 lbs per 1,000 s.f. on the area so that no soil is visible through the mulch. Immediately after applying the mulch, anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

5.6 Over winter stabilization of disturbed slopes

All stone-covered slopes shall be constructed and stabilized by November 15th. All slopes to be vegetated shall be seeded and mulched by September 1st. A slope is considered a grade greater than 15%. If a slope to be vegetated is not stabilized by September 1st, then one of the following action shall be taken to stabilize the slope for late fall and winter:

- Stabilize the soil with temporary vegetation and erosion control mats – By October 1st the disturbed slope shall be seeded with winter rye at a seeding rate of 3 lbs per 1,000 s.f. and then install erosion control mats or anchored mulch over the seeding. If the rye fails to grow at least three inches or fails to cover at least 75% of the slope by November 1st, then the contractor shall cover the slope with a layer of erosion control mix or with stone riprap.
- Stabilize the soil with sod – The disturbed slope shall be stabilized with properly installed sod by October 1st. Proper installation includes the contractor pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. The contractor shall not use late-season sod installation to stabilize slopes having a grade greater than 3H:1V or having groundwater seeps on the slope face.



- Stabilize the soil with erosion control mix – Erosion control mix shall be properly installed by November 15th. The contractor shall not use erosion control mix to stabilize slopes having grades greater than 2H:1V or having groundwater seeps on the slope face.
- Stabilize the soil with stone riprap – Place a layer of stone riprap on the slope by November 15th. A registered professional engineer shall be hired to determine the stone size needed for stability on the slope and to design a filter layer for underneath the riprap.

6.0 INSPECTION AND MAINTENANCE

A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct periodic visual inspections of installed erosion control measures. The frequency of inspection shall occur at least once every two weeks, as well as after a “storm event”. A “storm event” shall consist 0.5 inches of rain within a 24-hour period. The following Erosion and Sediment Control - Best Management Practices (BMP's) shall inspected in the manner as described.

6.1 Sediment Barriers

Hay bale barriers, silt fences and filter berms shall be inspected and repaired for the following if there are any signs of erosion or sedimentation below them. If there are signs of undercutting at the center or the edges of the barrier, or impounding of large volumes of water behind them, sediment barriers shall be replaced with a temporary check dam. Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits should be removed when deposits reach approximately one-half the height of the barrier. Filter berms should be reshaped as needed. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.

6.2 Stabilized Stone Construction Entrances

The exit shall be maintained in a condition that will prevent tracking of sediment onto public rights-of-way. When the control pad becomes ineffective, the stone shall be removed along with the collected soil material and redistributed on site in a stable manner. The entrance should then be reconstructed. The contractor shall sweep or wash pavement at exits, which have experienced mud-tracking on to the pavement or traveled way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches, or waterways.

6.3 Mulched Areas



All mulches must be inspected periodically, in particular after rainstorms, to check for rill erosion. If less than 90% of the soil surface is covered by mulch, additional mulch shall be immediately applied. Nets must be inspected after rain events for dislocation or failure. If washouts or breakage occur, re-install the nets as necessary after repairing damage to the slope. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface. Repair as needed.

6.4 Dust Control

When temporary dust control measures are used, repetitive treatment shall be applied as needed to accomplish control.

6.5 Stormwater Appurtenances

All underdrains, storm drains, and catch basins need to be operating effectively and free of debris.

6.6 Erosion and Sedimentation Control Inspections:

Acorn Engineering has personnel qualified to conduct Erosion and Sedimentation Control Inspections. For further information, contact:

Contact: Will Savage, PE
Telephone: (207) 775-2655

Qualifications:

- Maine Professional Engineering License #11419
- Maine DEP - Certified in Maintenance & Inspection of Stormwater BMP's Cert #14
- Certified Erosion, Sediment and Storm Water Inspector (CESSWI) Cert #0293
- Certified Professional in Erosion and Sediment Control (CPESC) Cert. #4620

The Contractor has sole responsibility for complying with the Erosion and Sedimentation Report/Plan, including control of fugitive dust. The Contractor shall be responsible for any monetary penalties resulting from failure to comply with these standards.



7.0 IMPLEMENTATION SCHEDULE

The following implementation sequence is intended to maximize the effectiveness of the above described erosion control measures. Contractors should avoid overexposing disturbed areas and limit the amount of stabilization area.

1. Install a stabilized construction entrance in all locations where construction traffic will enter and exit the site.
2. Install perimeter silt fence or erosion control berm.
3. Install all other erosion control devices as necessary throughout the remainder of this schedule.
4. Commence installation of drainage infrastructure.
5. Prioritize the downhill side to contain runoff within the site while providing an engineered outlet to the municipal storm drain system within Douglass Street.
6. Commence earthwork operations, associated with the parking lot construction.
7. Commence installation of utilities.
8. Continue earthwork and grading to subgrade as necessary for construction.
9. Complete installation of drainage infrastructure, as well as other utility work.
10. Complete remaining earthwork operations.
11. Install sub-base and base gravels in paved areas.
12. Install paving, curbing and brickwork.
13. Loam, lime, fertilize, seed and mulch disturbed areas and complete all landscaping.
14. Once the site is stabilized and mulching of landscape areas is complete, remove all temporary erosion control measures.
15. Touch up areas without a vigorous catch of grass with loam and seed.
16. Complete site signage and striping.
17. Execute proper maintenance of all temporary and permanent erosion control measures throughout the project.

The above implementation sequence should be generally followed by the site contractor. However, the contractor may construct several items simultaneously. The contractor shall submit to the owner a schedule of the completion of the work. If the contractor is to commence the construction of more than one item above, they shall limit the amount of exposed areas to those areas in which work is expected to be undertaken during the following 30 days.

The contractor shall re-vegetate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 7 days of final grading or before a storm event. The contractor shall incorporate planned inlets and drainage systems as early as possible into the construction phase.

8.0 CONCLUSION

The above erosion control narrative is intended to minimize the development impact by implementing temporary and permanent erosion control measures. The contractor shall also refer to the Maine Erosion and Sediment Control BMP manual for additional information.



9.0 ATTACHMENTS

- Temporary Seeding Plan



TEMPORARY SEEDING PLAN

Site Preparation

The seeded areas shall be feasibly graded out to provide the use of equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. If necessary, the site may require additional temporary erosion control measures outlined in the Erosion Control report.

Seedbed Preparation

Fertilizer shall be applied to the site at a rate of 13.8 pounds per 1,000 square feet. The composition of the fertilizer shall be 10-10-10 (N-P₂O₅-K₂O) or equivalent.

Limestone shall be applied to the site at a rate of 138 pounds per 1,000 square feet.

Seeding

The composition and amount of temporary seed applied to a site shall be determined by the following table:

Seed	Pounds / 1,000 S.F.	Recommended Seeding Dates
Winter Rye	2.57	Aug-15 to Oct-1
Oats	1.84	Apr-1 to Jul-1 Aug-15 to Sep-15
Annual Ryegrass	0.92	Apr-1 to Jul-1
Sudangrass	0.92	May-15 to Aug-15
Perennial	0.92	Aug-15 to Sep-15

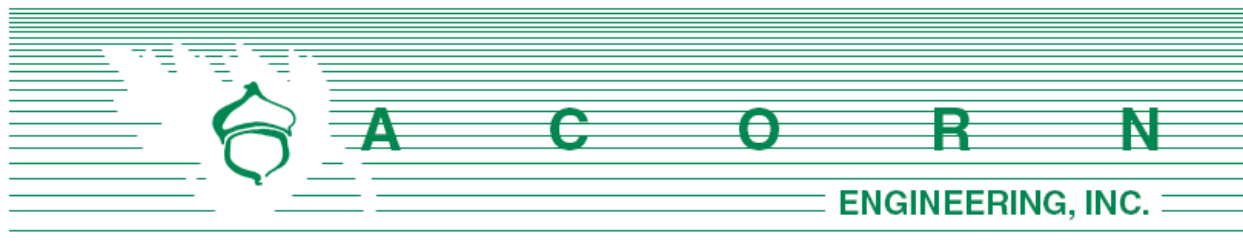
Mulching

Mulch shall be applied at a rate of 70 lbs – 90 lbs per 1,000 square feet. The mulch shall be installed at a minimum depth of 4 inches. The seeded area shall be mulched immediately after seed is applied. Mulching during the winter season shall be double the normal amount.

Conclusion

Please refer to the Maine Erosion and Sediment Control BMP manual for additional information pertaining to temporary seeding and mulching.





Chief Keith Gautreau
 City of Portland Fire Department
 380 Congress St.
 Portland, ME 04101

January 21, 2022

Subject: 57 Douglass St Redevelopment – Fire Department Checklist
 Section L of Application

On behalf of Douglass Commons, LLC, the design team is pleased to respond to the Portland Fire Department Site Review Checklist.

1. Name, address, telephone number of applicant

Douglass Commons, LLC.
 10 Free Street, 3rd Floor
 Portland, Maine 04101
 (207) 805-3578

2. Name, address, telephone number of architect

Kaplan Thompson
 102 Exchange Street
 Portland, ME 04101
 (207) 842-2888

Archetype PA
 48 Union Wharf
 Portland, ME 04101
 (207) 772-6022

3. Proposed uses of any structures [NFPA and IBC classification]

NFPA: Apartment Building IBC: B / R-2

4. Square footage of all structures, including decks [total and per story]

Existing Building		
1 st Floor	0	sf
Total	0	sf

Kaplan Thompson:

Proposed Building A (3)		
Ground	2,497	sf
2 nd Floor	2,582	sf
3 rd Floor	2,582	sf
Total	7,661	sf

Proposed Building B (2)		
Ground	2,124	sf
2 nd Floor	1,952	sf
Total	4,076	sf

Proposed Building C (1)		
Ground	3,186	sf
2 nd Floor	2,928	sf
Total	6,114	sf

Proposed Building D (1)		
Ground	3,186	sf
2 nd Floor	3,186	sf
3 rd Floor	2,928	sf
Total	9,300	sf

Archetype PA:

Proposed Building – E		
Ground	12,000	sf
1st Floor	12,000	sf
2 nd Floor	12,000	sf
3 rd Floor	12,000	sf
4 th Floor	12,000	sf
5 th Floor	12,000	sf
Total	72,000	sf

5. Elevation of all structures

The proposed building heights are consistent with the R5-a PRUD Zoning maximum allowance of 55':

A: 35'; B: 25'; C: 25'; D: 35'; E: 53'



6. Proposed fire protection of all structures

Building E will be serviced by a 6" sprinkler system while A, B, C, and D will be serviced with a 4" sprinkler line. Fire flows and requirements for system storage or booster pumping are subject to the fire professional design which will be performed prior the request for a building permit.

7. Hydrant locations

An existing hydrant is located at the corner of Congress and Douglass Streets, approximately 170' from the entrance to the site access road. The site anticipates the addition of a new hydrant within the development located 450' from the furthest proposed structure. Hydrant flow data from the Portland Water District once received may be made available to the Fire Department upon request.

8. Water main size and location

The redevelopment will be serviced by the existing 8" Ductile Iron water main within Douglass Street.

9. Access to all structures [min. 2 sides]

Access to the structures are provided through an access driveway and corridors with ample room for maneuvering through the site.

10. Code summaries will be provided by the Architects upon request.

NFPA 1 – Chapter 18 Fire Department Access and Water Supply

18.2 Fire Department Access:

The project site is located behind a densely developed area with open areas on three other sides, and is accessed by a driveway. The following pavement street width is currently available:

- Douglass Street: 52 feet
- Access Driveway: 22 feet

Per NFPA 1 – Chapter 18.2.3.2.2.1, all first story floors shall be located not more than 450 feet from a Fire Department access road.



City of Portland Technical Manual – Section 3 Public Safety

3.4.1 Every dead-end roadway more than one hundred fifty (150') feet in length shall provide a turnaround at the closed end. Turnarounds shall be designed to facilitate future street connectivity and shall always be designed to the right (refer to Figure I-5).

Response: Not applicable

3.4.2 Where possible, developments shall provide access for Fire Department vehicles to at least two sides of all structures. Access may be from streets, access roads, emergency access lanes, or parking areas.

Response: As depicted on the site plan, the proposed building layout provides a minimum of two access points to all of the structures.

3.4.3 Building setbacks, where required by zoning, shall be adequate to allow for emergency vehicle access and related emergency response activities and shall be evaluated based on the following factors:

- *Building Height.*
- *Building Occupancy.*
- *Construction Type.*
- *Impediments to the Structures.*
- *Safety Features Provided.*

Response: The proposed development layout has contemplated emergency access conditions and provides for safe and efficient access along a circuitous route through the site for emergency vehicles.

3.4.4. Fire Dept. access roads shall extend to within 50' of an exterior door providing access to the interior of the structure.

Response: The building will be provided with exterior doors that will be within 50' of a Fire Department access route.

3.4.5. Site access shall provide a minimum of nine (9) feet clearance height to accommodate ambulance access.

Response: The proposed site maintains the required clearance height of nine feet in all cases.

3.4.6. Elevators shall be sized to accommodate an 80 x 24-inch stretcher.

Response: The proposed elevator will meet this requirement.



3.4.7. All structures are required to display the assigned street number. Numbers shall be clearly visible from the public right of way.

Response: The applicant is currently working with the City's Public Works Division to assign street addresses and numbering to meet City Standards.

Thank you for your review. Please let me know if you have any additional questions or comments.

Sincerely,



Sam Lebel, P.E.
Project Manager
Acorn Engineering, Inc.



M. Calculation of Wastewater Flowrate for 43 & 91 Douglass Redevelopment

The proposed project will include the redevelopment of a site that was formerly occupied by a school. The lot is proposed to be redeveloped with one (1) five-story building consisting of 63 residential units and a further seven (7) buildings consisting of 57 residential units.. Based upon Section 4 of the Maine Subsurface Wastewater Disposal Rules, the project anticipates the following daily flows:

Estimate of Design Flows			
Classification of Water Demand	Number of Units	Gallons per Day per Unit	Total Gallons per Day
<i>Existing</i>			
<i>Proposed</i>			
Multiple family dwelling unit (1-bedroom)	48	120	5,760
Multiple family dwelling unit (2-bedroom)	40	180	7,200
Multiple family dwelling unit (3-bedroom)	32	270	8,640
Total Existing			0
Total Proposed			21,600
Net Change			+21,600 GPD
*Values based on STATE OF MAINE: SUBSURFACE WASTEWATER DISPOSAL RULES, most recent edition			



CITY OF PORTLAND WASTEWATER CAPACITY APPLICATION

Portland Dept. of Public Works -
Water Resources
212 Canco Road
Portland, Maine 04103



Bradley Roland, P.E.
Water Resources Division
Department of Public Works
212 Canco Road
Portland, ME 04103

Date: 1/11/22

1. Please, Submit Utility, Site, and Locus Plans.

Site Address: 57 Douglass Street

Chart Block Lot Number: 078 B007001

Proposed Use: Residential
Previous Use: School
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.
Douglass Street (8" SS)

Site Category
Commercial (see part 4 below)
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: TBD Phone: 207-874-8719
Owner/Developer Name: Douglass Commons, LLC.
Owner/Developer Address: 10 Free Street, 3rd Floor, Portland, ME 04101
Phone: (207) 805-3578 Fax: E-mail: cszanton@szantoncompany.com
Engineering Consultant Name: Acorn Engineering
Engineering Consultant Address: 65 Hanover Street, Portland, ME 04010
Phone: 207-775-2655 Fax: E-mail: slebel@acorn-engineering.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: +21,600 GPD
Peaking Factor/ Peak Times: Diurnal
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)
Handbook of Subsurface Wastewater Disposal in Maine

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

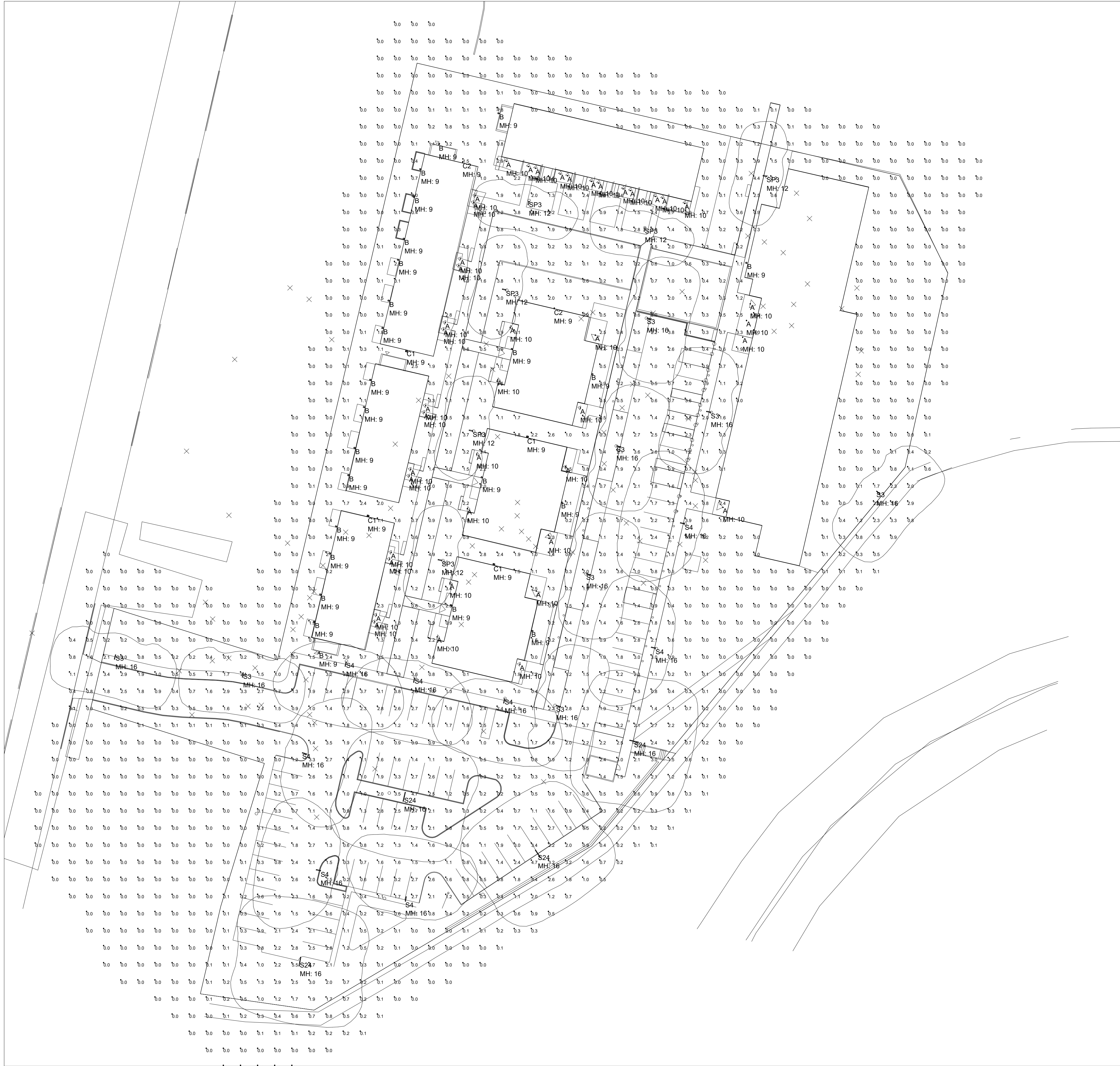
Estimated Industrial Process Wastewater Flows Generated: N/A GPD
Do you currently hold Federal or State discharge permits? Yes No
Is the process wastewater termed categorical under CFR 40? Yes No
OSHA Standard Industrial Code (SIC): _____ (<http://www.osha.gov/oshstats/sicser.html>)
Peaking Factor/Peak 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.

N. Lighting

Please find attached the cut sheets and photometric plans for the proposed site lighting.



- NOTES:
- 1) EXACT MOUNTING DETAILS TO BE DETERMINED AT JOBSITE BY OTHERS.
 - 2) CALCULATIONS MAY or MAY NOT SHOW THE EFFECT OF SHADOWING CAUSED BY BUILDINGS AND OBJECTS WITHIN THE CALCULATED SPACE OR IN THE SITE AREA.
 - 3) READINGS SHOWN ARE INITIAL HORIZONTAL FOOTCANDLES ON A FLAT SITE WITHOUT REFLECTIONS OR OBSTRUCTIONS UNLESS OTHERWISE INDICATED.
 - 4) THIS CALCULATION IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO SWANEY LIGHTING ASSOCIATES AND STANDARD ASSUMPTIONS OF THE SPACE AND/OR SITE.
 - 5) CONFORMANCE TO CODES AND OTHER LOCAL REQUIREMENTS AS DETERMINED BY THE AHJ ARE THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.
 - 6) THIS LAYOUT DRAWING MUST BE COORDINATED WITH THE SITE LOCATION FOR CORRECT FIXTURE ORIENTATION.
 - 7) DOCUMENTS PRINTED OR PLOTTED FROM ELECTRONIC FILES MAY APPEAR AT OTHER THAN THE DESIRED OR ASSUMED GRAPHIC SCALES. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO VERIFY THAT THE PRINTED OR PLOTTED-TO-SCALE DRAWING IS PRINTED TO SCALE.

Calculation Summary					
Label	Avg	Max	Min	Avg/Min	Max/Min
SITE	0.77	5.5	0.0	N.A.	N.A.

Luminaire Schedule (note fixture catalogue numbers are not complete)							
Type	Qty	Lumens	LLF	Watts	BUG Rating	Mounting Ht (FT)	Description
A	42	1051	0.900	14.906	B1-U0-G1	10	P810015-030-30
B	24	311	0.900	9.32	B0-U0-G0	9	P5634 prorated
C1	4	1805	0.900	14.9	B0-U0-G1	9	GEO1-24L-15-3K7-3-UNV-DBT
C2	2	1718	0.900	14.9	B0-U0-G1	9	GEO1-24L-15-3K7-4-UNV-DBT
S24	4	4297	0.900	45.9	B1-U0-G1	16	TWIN - K4X-T4-MO-5030
S3	8	3863	0.900	46.1	B1-U0-G1	16	K4X-T3-MO-5030
S4	8	4297	0.900	45.9	B1-U0-G1	16	K4X-T4-MO-5030
SP3	6	2563	0.900	32.7	B1-U0-G0	12	MK4-T3-MO-3030

LED Flush Mount EdgeLit

Surface mounted • Wet location listed



Description:

EVERLUME Edgelit technology provides a large glare free, bright, and evenly illuminated surface for a variety of applications for both residential and commercial settings. Offering a very slim profile, the LED Edgelit flush mount is available in three sizes. The 7" fixture gives 1056 lumens (delivered), 90CRI and is 3000K. The integrated driver does not recess into junction box, allowing for easy install in 4" octagonal, 4" round PVC and 4-1/2" ceiling pan junction boxes. This fixture is wet location listed and offers a 50,000 hour LED life.

Specifications:

- White (-030) (painted)
- Polycarbonate Construction
- Frosted Polycarbonate lens
- 7 " EVERLUME Edgelit flush mount with LED technology 3,000K, 90 CRI, 1056 lumens (delivered)
- Simple installation to steel mounting plate
- Light weight non-conductive polycarbonate luminaire construction
- Polycarbonate diffuser controls glare and provides an evenly illuminated surface
- Integrated DC LED power supply capable of flicker-free dimming to 10% brightness with many Triac/Forward Phase dimmers
- Can be installed to 4" octagonal j-box, 4x1/2" round shallow j-box, 4" round PVC j-box and single gang switch boxes
- Can be mounted on ceiling or wall
- Suitable for use in clothes closets when installed in accordance with the NEC 410.16 spacing requirements.
- Suitable for use in IC or Non-IC applications
- Dimmable to 10% brightness (See Dimming Notes)
- Fixture covers a standard 4" octagonal recessed outlet box
- Mounting mounting plate for outlet box included
- 6" of wire supplied
- Complies with "Americans with Disabilities Act" - ADA
- ENERGY STAR® qualified
- Meets California Title 24 JA8-2016

Performance:

Number of Modules	1
Input Power	15w
Input Voltage	120 V
Input Frequency	60 Hz
Lumens/LPW (Source)	
Lumens/LPW (Delivered)	1056/70.4 (LM-79)
CCT	3000 K
CRI	90 CRI
Life (hours)	54,000 (L70/TM-21)
FCC	FCC Part 15 Class B
Min. Start Temp	-30 °C
Max. Operating Temp	30 °C
Warranty	5 Year Warranty
Labels	cCSAus Wet location listed
	ENERGY STAR® qualified
	Meets California Title 24 JA8-2016

P810015-030-30

Images:



Dimensions:

Diameter: 7"
Length: 7"
Height: 1-1/16"

Lens
Width: 6.03"
Length: 6.03"
Height: 0.039"

LED Flush Mount EdgeLit

Surface mounted • Wet location listed



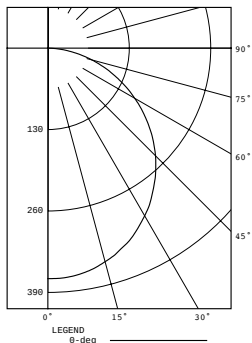
Photometrics:

P810015-030-30

ELECTRICAL DATA	P810015-030-30
Input Voltage	120 V
Input Frequency	60 Hz
Input Current	0.128 A
Input Power	15
Power Factor	0.968
THD	<20%
FCC	FCC Part 15 Class B
Operating Temperature	-30 °C to 30 °C
Dimming	Yes*
Over-voltage, over-current, short-circuit protected	
*See Dimming Notes for more information	

P810015-030-30

LED Light Engine: 3000K 90
System Wattage: 15
Fixture delivered lumens: 1051
Fixture Efficacy: 70
Spacing Criteria: 1.25



CANDELA DISTRIBUTION		
DEG	CANDELA	LUMENS
0	368	
5	367	35
15	353	100
25	327	151
35	289	181
45	243	187
55	189	169
65	131	130
75	73	77
85	20	22
90	0	

ZONAL ZONE	LUMEN LUMENS	SUMMARY %FIXT
0-30	285	27.1
0-40	466	44.3
0-60	822	78.2
0-90	1051	100.0
90-180	0	0.0
0-180	1051	100.0

Test 18.01777 Test Date 12/10/18

P810015-030-30

Dimming Notes:

P810015 is designed to be compatible with many Triac/Forward Phase or ELV/Reverse Phase controls.

The following is a partial list of known compatible dimmer controls.

Dimming Controls

Idevices_IDEV009

Leviton_LPI06-1LZ

Leviton_6672

Lutron_NTEVL-300

Lutron_DVELV-300P

Lutron_Caseta_Wireless

Lutron_AYCL-153P

Lutron_TGCL-153-PH-WH

Dimming capabilities will vary depending on the dimmer control, load, and circuit installation. Always refer to dimmer manufacturer instructions or a controls specialist for specific requirements.

Dimmer control brand names where identified above are trade names or registered trademarks of each respective company.

One-Light Wall Sconce W/HAL AC LED Module

Wall mounted • Wet location listed



Description:

Modern geometric outdoor LED sconces are designed to complement a range of residential and commercial architectural styles. ADA compliant. 9w LED is 3000K, 90+ CRI in a Black cast aluminum shade. Dark Sky compliant.

Specifications:

- Black (-31) (powder coat paint)
- Cast aluminum Construction
- Black cast aluminum shade, White acrylic Diffuser
- LED Module is replaceable (part # 93054049)
- Modern geometric outdoor LED sconces.
- Designed to complement a range of residential and commercial architectural styles.
- Dark Sky compliant.
- 623 lumens 69.2 lumens/watt per module (source)
- 3000K color temperature, 90+ CRI.
- Dimmable to 10% brightness (See Dimming Notes)
- Unit covers a standard 4" octagonal recessed outlet box
- Mounting strap for outlet box included
- 6" of wire supplied
- Complies with "Americans with Disabilities Act" - ADA
- ENERGY STAR® qualified
- Meets California Title 24 high efficacy requirements for outdoor use only

Performance:

Number of Modules	1
Input Power	9w
Input Voltage	120 V
Input Frequency	60 Hz
Lumens/LPW (Delivered)	388/49.7 (LM-79)
CCT	3000 K
CRI	90+
Life (hours)	60,000 (L70/TM-21)
FCC	Meets FCC Title 47, Part 15 Class B
Min. Start Temp	-30 °C
Max. Operating Temp	30 °C
Warranty	5 year warranty
Labels	cCSAus Wet location listed
	ENERGY STAR® qualified
	Meets California Title 24 high efficacy requirements for outdoor use only

P5634-3130K9

Images:



Dimensions:

Width: 5-1/4"
Depth: 4"
Height: 4-3/4"
H/CTR: 2-3/8"

Glass
Width: 4-1/16"
Length: 5-3/16"
Height: 4-11/16"
Glass 2
Width: 2-7/8"
Length: 2-7/8"
Height: 0-11/16"

P5634-3130K9**Dimming Notes:**

P5634 is designed to be compatible with many ELV/Reverse Phase controls.

The following is a partial list of known compatible dimmer controls.

Dimming Controls

Lutron Nova T NTELV-300

Lutron Verti VTELV-600

Lutron Ariadni AYCL-153P

Lutron Diva DVCL-153P

Lutron Maestro MAELV-600

Lutron spacer/system SPSELV-600

Leviton Renoir II AWRMG-EAW

Dimming capabilities will vary depending on the dimmer control, load, and circuit installation.
Always refer to dimmer manufacturer instructions or a controls specialist for specific requirements.

Dimmer control brand names where identified above are trade names or registered trademarks of each respective company.

FEATURES

- Integral Motion Sensor
- Staggered twin mounting
- ANSI C136.31-2010 4G Rated
- IES Type II, III and IV distributions
- 3000K , 4000K, 5000K CCT
- Integral thermal protection



3000K and warmer CCTs only

See Certification Specifications

SPECIFICATIONS

CONSTRUCTION

- Housing shroud is made of fabricated 5052-H32 aluminum alloy with a rear mounting interface that is made of fabricated 304 stainless steel
- Housing mounting interface is a stamped silicone gasket
- Luminaire housing is free of any visible heat fins, hardware or fasteners
- Bracketry and hardware is made of stainless steel
- Base is made of cast aluminum #356 alloy and heat treated to a T-6 condition
- Shaft is extruded aluminum 6061 alloy and heat treated to a T-6 condition
- Anchor bolts are hot dip galvanized steel. Eight galvanized hex nuts and flat washers, and a bolt circle template are provided. Anchor bolt for poles are 3/4" x 24" x 3"
- Luminaire finish consist of a five stage pretreatment regimen with a polymer primer sealer, oven dry off, and top coated with a thermoset super TGIC polyester powder coat finish
- Luminaire finish meets the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance

LED/OPTICS

- LEDs are mounted to a metal printed circuit board assembly (MCPCB) with a uniform conformal coating over the panel surface and electrical features
- Optical lenses is made of clear injection molded PMMA acrylic
- Each MCPCB and optic are sealed to an extruded 6063-T6 aluminum alloy heat spreader and sealed with a continuous one piece injection molded silicone rubber gasket. IP66

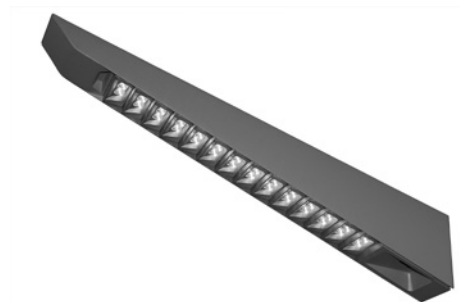
LED/OPTICS (CONTINUED)

- Patent Pending design of optical array is independently shielding each LED optic across the length of the aperture
- Optical surfaces are painted white unless the optional fixture finish (FO) or matte black finish (MO) is selected
- Optional matte black finish optics (MO) are required to meet UO classification with zero percent uplight
- Optional fixture finish optical surfaces (FO) do not exceed BUG ratings of the standard white finish and will be greater than or equal to the delivered lumens of the optional matte black optical surface finish (MO)

INSTALLATION

- Integral pole mount luminaires require assembly of fixture(s) to the pole, mounting hardware, anchor bolts and anchor bolt template is included. See page 6 for additional considerations specific to the integral pole
- Tenon mount luminaires require assembly of fixture(s) to the tenon adapter, mounting hardware is included. Tenon adapter secures to the tenon with eight 5/16-18 stainless steel set screws
- Side mount luminaires are supplied with hardware compatible with AAL mountings.
- Twin mounted staggered height fixtures are configured separately
- Service access to the optical array and driver assembly is via a tool-less internal latch and have an audible click.
- Optical array has to hang freely in an open service position for inspection of internal wire connections. Once in service position, the optical array is able to be removed for service by lifting the assembly up off the rear hinge and disconnecting the wiring plugs.
- Driver assembly is mounted to a prewired internal tray with quick disconnects for removal

KICK™



Kick Small

RELATED PRODUCTS

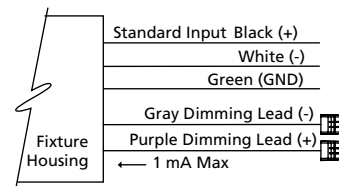
[K5](#)

[KM5](#)

[K6](#)

ELECTRICAL

- Drivers are in direct contact with the aluminum housing across the entire surface area of the widest face for maximum thermal transfer
- Luminaires have integral surge protection that is U.L. recognized and have a surge current rating of 10,000 Amps using the industry standard 8/20uSec wave and surge rating of 372J. Surge protection device is wired in series
- Drivers are U.L. recognized
- Drivers are not compatible with current sourcing dimmers, consult factory for current list of known compatible dimming systems approved dimmers include Lutron Diva AVTV, Lutron Nova NFTV and NTFTV
- Luminaire are capable of operating at 100% brightness in a 40°C environment. Both driver and optical array have integral thermal protection that will dim the luminaire upon detection of temperatures in excess of 85°C
- Luminaires not configured with a control system or ANSI C136 receptacle option are provided with 0-10 purple and gray dimming leads



continued on page 3

KEY DATA	
LUMEN RANGE	3,820–7,691
WATTAGE RANGE	46–64
EFFICACY RANGE (LPW)	79–120
WEIGHT	15 lbs 6.8 kg
EPA	1.03

DATE: 1/11/22	LOCATION:
TYPE:	PROJECT:
CATALOG #:	

ORDERING GUIDE

Example: K41-T2-FO-5040-MCPCR-SF-347-PS412-125-SBC-BLT

CATALOG #

Model (4" wide luminaire)	Optics (Distribution)	Optics Finish	Light Engine ¹	Control
K41 Single Fixture	T2 IES Type II	WO Standard White Finish	5030 3000K CCT, CRI 70, 46 Watts	MCPCR Multi-Channel 7-Pin Photocell Receptacle
K42 Two Fixtures 180° Apart	T3 IES Type III	FO Optics in Fixture Finish	5040 4000K CCT, CRI 70, 46 Watts	WIR wiScape Connectivity Ready
K43 Three Fixtures 90° Apart	T4 IES Type IV	MO Optics in Matte Black Finish	5050 5000K CCT, CRI 70, 46 Watts	WIRSC wiScape + Motion Sensor
K44 Four Fixtures 90° Apart			7030 3000K CCT, CRI 70, 64 Watts	SCP Motion Sensor + Photocell ²
			7040 4000K CCT, CRI 70, 64 Watts	SWP SiteSync Pre-commissioned ³
			7050 5000K CCT, CRI 70, 64 Watts	SWF SiteSync Field Commission ³
				SWPM SiteSync Pre-commissioned + Motion Sensor ³
				SWFM SiteSync Field Commission + Sensor ³
				SCPREMOTE Handheld Commissioning Tool ²
				SWUSB SiteSync loaded on USB flash drive (Windows® operating system only ⁴
				SWTAB SiteSync Window® based Tablet ⁴
				SWBRG SiteSync Wireless Bridge Node ⁴
				SW7PR SiteSync 7 Pin on fixture module On/Off/Dim, Daylight Sensor 120-480VAC

Fuse (may choose one)	Voltage	Mounting	Mounting Options	Fixture Finish
SF 120, 277, 347 Volt Input	120-277V 120-277V	Integral Pole	Twin mount at staggered heights	Standard Color
DF 208, 240, 480 Volt Input	347 347V	PS410-125 10' Luminaire Height	Mounting holes for a fixture at 180°, K41...PS4... only, may choose one	BLS Black Gloss Smooth
	480 480V	PS412-125 12' Luminaire Height		BLT Black Matte Textured
		PS414-125 14' Luminaire Height	TS8 8' from bottom	DBS Dark Bronze Gloss Smooth
		PS416-125 16' Luminaire Height	TS10 10' from bottom	DBT Dark Bronze Matte Textured
		PS418-125 18' Luminaire Height	TS12 12' from bottom	GTT Graphite Matte Texture
		PS420-125 20' Luminaire Height	TS14 14' from bottom	LGS Light Grey Gloss Smooth
		Tenon Mount	TS16 16' from bottom	LGT Light Grey Matte Textured
		TA23 Slips over a 2 3/8" / 60mm Ø x 4" / 102mm tall tenon	TS18 18' from bottom	PSS Platinum Silver Gloss Smooth
		Side Mount	Base Options	VGT Verde Green Matte Textured
		SMK Mounts to the side of a square pole, K41 only	SBC Standard Base Cover	WHS White Gloss Smooth
		Wall Mount	Pole Accessories(may choose one)	WHT White Matte Textured
		WMK K41 only	GFI GFCI receptacle, 24" from top of pole	CC Custom Color ⁵
			RBC Duplex receptacle box with clear cover, wiring device(s) not included	

Notes:

- 595nm monochromatic amber and or custom lumen package available by request
- Handheld commissioning tool is required to separately configure or adjust any number of SCP sensors
- Specify group and zone at time of order. See www.hubbellighting.com/sitesync for more details. Order at least one SiteSync interface accessory SWUSB or SWTAB. Each option contains SiteSync License, GUI, and Bridge Node
- When ordering with SiteSync, one of the following interface options must be chosen and ordered separately. Each option contains the SiteSync License, GUI and Bridge Node
- Consult factory for custom color, marine and corrosive finish

SPECIFICATIONS (CONTINUED)

MODEL	HEIGHT OVERALL	POLE	SHAFT SECTION	WT	MAXIMUM ALLOWABLE EPA (MPH)							
					85	90	100	110	120	130	140	150
K4X-PS410-125	10' 7.5" / 3.24m	10'	4" SQ x .125"	28 lbs	15.4	13.5	10.4	8.1	6.4	5.0	4.0	3.1
K4X-PS412-125	12' 7.5" / 3.85m	12'	4" SQ x .125"45	32 lbs	11.8	10.2	7.6	5.7	4.3	3.2	2.3	1.6
K4X-PS414-125	14' 7.5" / 4.46m	14'	4" SQ x .125"	37 lbs	9.1	7.7	5.5	3.9	2.6	1.7	0.95	0.33
K4X-PS416-125	16' 7.5" / 5.07m	16'	4" SQ x .125"	42 lbs	6.9	5.7	3.8	2.3	1.3	0.46	-	-
K4X-PS418-125	18' 7.5" / 5.68m	18'	4" SQ x .125"	48 lbs	4.9	3.9	2.2	0.95	0.01	-	-	-
K4X-PS420-125	20' 7.5" / 6.29m	20'	4" SQ x .125"	53 lbs	3.2	2.2	0.75	-	-	-	-	-

* - Consult factory for thicker shaft profiles and or custom heights not shown above.

CONTROLS

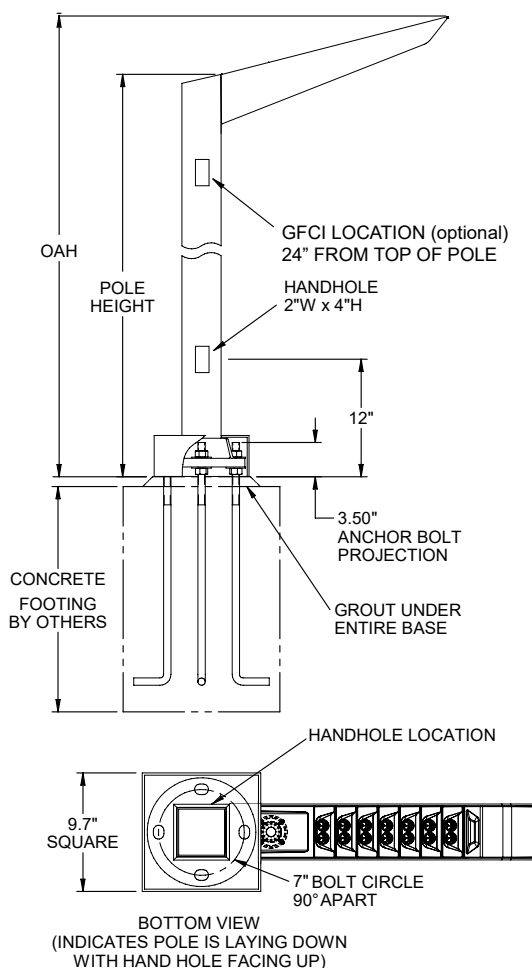
- Wireless enabled fixtures shall support bi-directional radio frequency (RF) communications utilizing IEEE 802.15.4 operating in the 2.4GHZ ISM band.
- Up to 1000' wireless range may be reduced by physical obstructions between lighting fixtures.
- Motion Sensor shall use passive infrared (PIR) sensing technology that reacts to changes in infrared energy (moving body heat) within the coverage area. Careful consideration must be given to obstructions that may block the sensor's line of sight.
- Factory default settings for SCP option shall be:
 - High mode: 10V
 - Low mode: 1V
 - Ramp-up rate: disabled
 - Fade-down rate: disabled
 - Photocell: Off
 - Sensitivity: Full
 - Time Delay: Fade to low: 5 minutes
 - Time Delay: Fade to off: 1 hour

CERTIFICATIONS

- Luminaire is listed with UL for outdoor, wet location use, UL1598, UL 8750 and Canadian CSA Std. C22.2 no.250
- ANSI C136.31-2010 4G Vibration tested and compliant
- IEC 66262 Mechanical Impact Code IK10
- IDA approved, 3000K and warmer CCTs only
- This product qualifies as a "designated country construction material" per FAR 52.225-11 Buy American-Construction Materials under Trade Agreements effective 6/06/2020. [See Buy American Solutions](#)

WARRANTY

- See [HLI Standard Warranty](#) for additional information



DELIVERED LUMENS

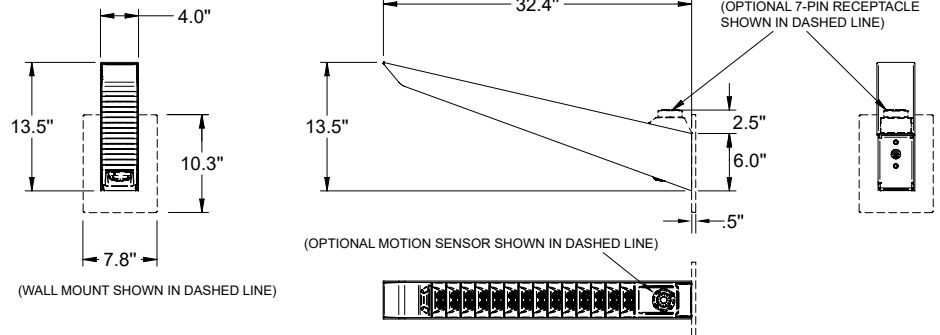
System Watts	Optical Finish	Distribution	Ordering Code	3000K 70CRI					4000K 70CRI					5000K 70CRI				
				Lumen	Bug Rating			Efficacy (Lm/W)	Lumen	Bug Rating			Efficacy (Lm/W)	Lumen	Bug Rating			Efficacy (Lm/W)
					B	U	G			B	U	G			B	U	G	
46	Standard White	Type 2	T2	4999	1	2	1	108	5234	2	2	1	114	5239	1	2	1	113
		Type 3	T3	4895	1	2	1	106	5125	1	2	1	112	5130	1	2	1	111
		Type 4	T4	5207	1	2	1	113	5451	1	2	1	118	5456	1	2	1	118
	Fixture Match	Type 2	T2-FO	3820	1	2	1	83	4010	2	2	1	87	4003	1	2	1	87
		Type 3	T3-FO	3863	1	2	1	84	4044	1	2	1	88	4048	1	2	1	88
		Type 4	T4-FO	4297	1	2	1	93	4524	1	2	1	98	4503	1	2	1	98
	Matte Black	Type 2	T2-MO	3820	1	0	1	83	4000	1	0	1	87	4003	1	0	1	87
		Type 3	T3-MO	3863	1	0	1	84	4045	1	0	1	88	4048	1	0	1	88
		Type 4	T4-MO	4297	1	0	1	93	4499	1	0	1	98	4503	1	0	1	98
64	Standard White	Type 2	T2	6536	2	2	2	102	6775	2	2	2	106	6932	2	2	2	108
		Type 3	T3	6554	1	2	1	102	6795	1	2	1	106	6952	1	2	1	108
		Type 4	T4	7250	2	2	1	113	7516	2	2	2	117	7691	2	2	2	120
	Fixture Match	Type 2	T2-FO	5292	2	2	2	83	5486	2	2	2	85	5614	2	2	2	87
		Type 3	T3-FO	5456	1	2	1	79	5646	1	2	1	82	5788	1	2	1	84
		Type 4	T4-FO	5780	2	2	1	90	5992	2	2	2	94	6131	2	2	2	96
	Matte Black	Type 2	T2-MO	5281	1	0	1	83	5475	2	0	1	86	5602	2	0	1	88
		Type 3	T3-MO	5442	1	0	1	85	5656	1	0	1	88	5773	1	0	1	90
		Type 4	T4-MO	5767	2	0	1	90	5979	2	0	1	93	6117	2	0	1	96

DIMENSIONS

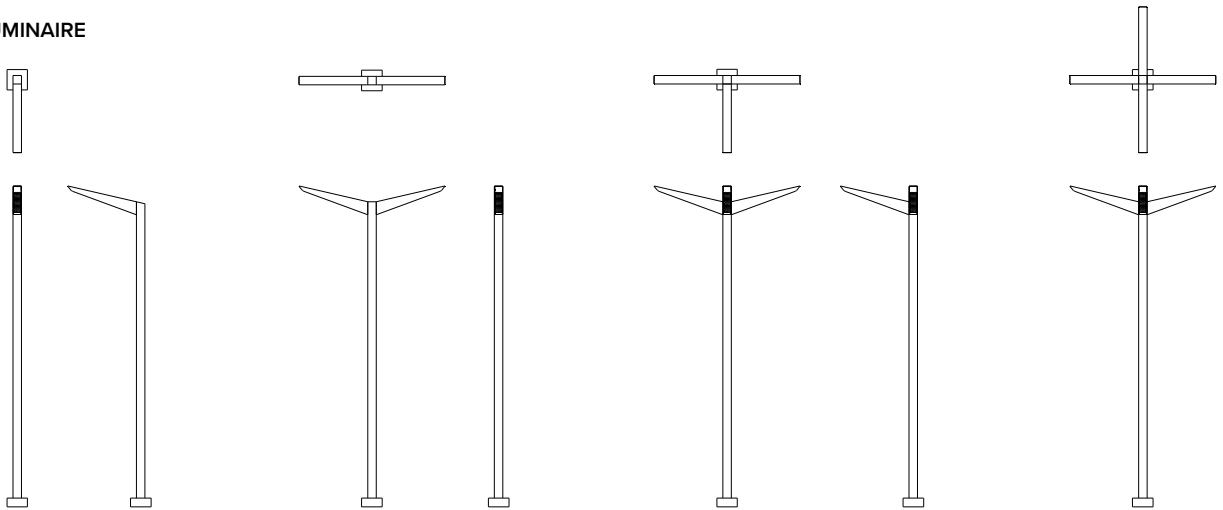
SIDE MOUNTED LUMINAIRE

Mounts to the side of 4"/102mm square pole.

MODEL	K41-...-SMK
OVERALL HEIGHT	13.5" / 343mm
OVERALL LENGTH	32.4" / 823mm
OVERALL WIDTH	4" / 102mm
WEIGHT	15 lbs.
EPA	1.03



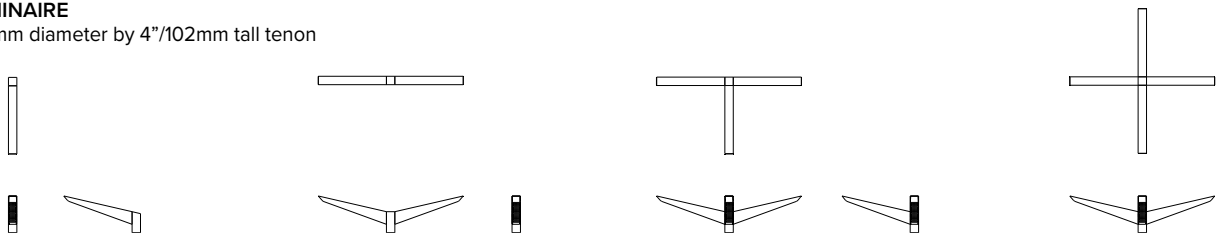
INTEGRAL POLE LUMINAIRE



MODEL	K41-...-PS4XX-125	K42-...-PS4XX-125	K43-...-PS4XX-125	K44-...-PS4XX-125
OVERALL LENGTH	36.4" / 925MM	10" / 254MM	36.4" / 925MM	68.9" / 1750MM
OVERALL WIDTH	10" / 254MM	68.9" / 1750MM	68.9" / 1750MM	68.9" / 1750MM
WEIGHT	15 LBS.	30 LBS.	45 LBS.	60 LBS.
EPA*	1.03	2.06	2.61	2.61

TENON MOUNT LUMINAIRE

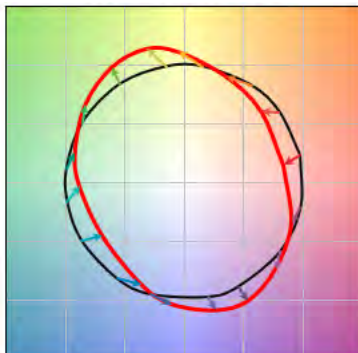
Slips over a 2 3/8"/60mm diameter by 4"/102mm tall tenon



MODEL	K41-...-TA23	K42-...-TA23	K43-...-TA23	K44-...-TA23
OVERALL HEIGHT	17.5" / 445MM	17.5" / 445MM	17.5" / 445MM	17.5" / 445MM
OVERALL LENGTH	36.4" / 925MM	10" / 254MM	36.4" / 925MM	68.9" / 1750MM
OVERALL WIDTH	4" / 102MM	68.9" / 1750MM	68.9" / 1750MM	68.9" / 1750MM
WEIGHT	18.5 LBS.	33.5 LBS.	48.5 LBS.	63.5 LBS.
EPA*	1.33	2.42	2.61	2.61

TM-30 DATA

COLOR VECTOR GRAPHIC

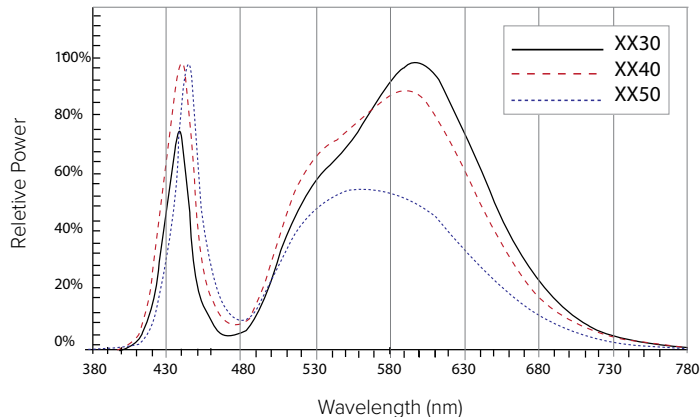


— Reference Illuminant — Test Source

TEST SOURCE

VALUE	ORDERING CODE		
	XX30	XX40	XX50
Rf	69	69	71
Rg	99	99	98
CCT(K)	3122	3852	5020
Duv	0.001	0.0004	0.0005
CIE Ra	74	73	74

SPECTRAL POWER DISTRIBUTION COMPARISON



ELECTRICAL CHARACTERISTICS

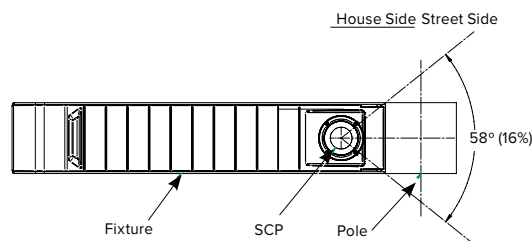
ORDERING CODE	LED CURRENT (MA)	SYSTEM WATTAGE (W)	INPUT				MIN. POWER FACTOR	MAX THD (%)	DIMMING RANGE (V)	SOURCE/ SINK CURRENT (MA)	INRUSH CURRENT PEAK								
			AMPS AC								HZ	(A)				T@50% (MS)			
			120	277	347	480						120	277	347	480	120	277	347	480
50XX	500	46	0.4	0.17	0.1	0.10	50/60	>0.9	20	0-10	1	15	32	41	63	50	155		
70XX	700	64	0.5	0.23	0.2	0.13													

TM-21 LIFETIME CALCULATION (500MA)

LUMEN PACKAGE	AMBIENT ENVIRONMENT °C	PROJECTED LUMEN MAINTENANCE (KHRS)					REPORTED L70
		25	50	60 (TM-21)	75	100	
2,500	25	98%	95%	94%	92%	90%	>60Khrs.
	40	98%	96%	95%	93%	91%	

SENSOR DETECTION RANGE

		SENSOR MOUNTING HEIGHT							RATIO
		8'	10'	12'	14'	16'	18'	20'	
COVERAGE DIAMETER	SCP	20'	25'	30'	35'	40'	45'	50'	1:2.5
	WIRSC	16'	20'	24'	28'	32'	36'	40'	1:2



FEATURES

- Integral Motion Sensor
- Staggered twin mounting
- ANSI C136.31-2010 4G Rated
- IES Type II, III and IV distributions
- 3000K , 4000K, 5000K CCT
- Integral thermal protection



3000K and warmer CCTs only

See Certification Specifications

SPECIFICATIONS

CONSTRUCTION

- Housing shroud is made of fabricated 5052-H32 aluminum alloy with a rear mounting interface that is made of fabricated 304 stainless steel
- Housing mounting interface is a stamped silicone gasket
- Luminaire housing is free of any visible heat fins, hardware or fasteners
- Bracketry and hardware is made of stainless steel
- Base is made of cast aluminum #356 alloy and heat treated to a T-6 condition
- Shaft is extruded aluminum 6061 alloy and heat treated to a T-6 condition
- Anchor bolts are hot dip galvanized steel. Eight galvanized hex nuts and flat washers, and a bolt circle template are provided. Anchor bolt for poles are 3/4" x 24" x 3"
- Luminaire finish consist of a five stage pretreatment regimen with a polymer primer sealer, oven dry off, and top coated with a thermoset super TGIC polyester powder coat finish
- Luminaire finish meets the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance

LED/OPTICS

- LEDs are mounted to a metal printed circuit board assembly (MCPCB) with a uniform conformal coating over the panel surface and electrical features
- Optical lenses is made of clear injection molded PMMA acrylic
- Each MCPCB and optic are sealed to an extruded 6063-T6 aluminum alloy heat spreader and sealed with a continuous one piece injection molded silicone rubber gasket. IP66

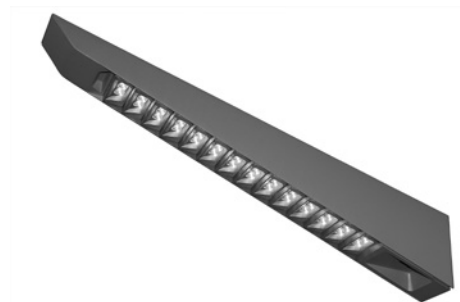
LED/OPTICS (CONTINUED)

- Patent Pending design of optical array is independently shielding each LED optic across the length of the aperture
- Optical surfaces are painted white unless the optional fixture finish (FO) or matte black finish (MO) is selected
- Optional matte black finish optics (MO) are required to meet UO classification with zero percent uplight
- Optional fixture finish optical surfaces (FO) do not exceed BUG ratings of the standard white finish and will be greater than or equal to the delivered lumens of the optional matte black optical surface finish (MO)

INSTALLATION

- Integral pole mount luminaires require assembly of fixture(s) to the pole, mounting hardware, anchor bolts and anchor bolt template is included. See page 6 for additional considerations specific to the integral pole
- Tenon mount luminaires require assembly of fixture(s) to the tenon adapter, mounting hardware is included. Tenon adapter secures to the tenon with eight 5/16-18 stainless steel set screws
- Side mount luminaires are supplied with hardware compatible with AAL mountings.
- Twin mounted staggered height fixtures are configured separately
- Service access to the optical array and driver assembly is via a tool-less internal latch and have an audible click.
- Optical array has to hang freely in an open service position for inspection of internal wire connections. Once in service position, the optical array is able to be removed for service by lifting the assembly up off the rear hinge and disconnecting the wiring plugs.
- Driver assembly is mounted to a prewired internal tray with quick disconnects for removal

KICK™



Mini Small

RELATED PRODUCTS

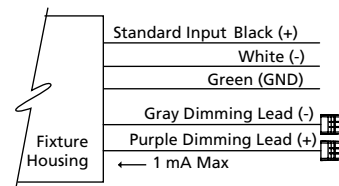
[ØK5](#)

[ØKM5](#)

[ØK86](#)

ELECTRICAL

- Drivers are in direct contact with the aluminum housing across the entire surface area of the widest face for maximum thermal transfer
- Luminaires have integral surge protection that is U.L. recognized and have a surge current rating of 10,000 Amps using the industry standard 8/20uSec wave and surge rating of 372J. Surge protection device is wired in series
- Drivers are U.L. recognized
- Drivers are not compatible with current sourcing dimmers, consult factory for current list of known compatible dimming systems approved dimmers include Lutron Diva AVTV, Lutron Nova NFTV and NTFTV
- Luminaire are capable of operating at 100% brightness in a 40°C environment. Both driver and optical array have integral thermal protection that will dim the luminaire upon detection of temperatures in excess of 85°C
- Luminaires not configured with a control system or ANSI C136 receptacle option are provided with 0-10 purple and gray dimming leads



continued on page 3

KEY DATA	
LUMEN RANGE	1,9090–3,576
WATTAGE RANGE	24–33
EFFICACY RANGE (LPW)	77–115
WEIGHT	8.95 lbs 4.05 kg
EPA	0.56

DATE: 1/11/22	LOCATION:
TYPE:	PROJECT:
CATALOG #:	

ORDERING GUIDE

Example: KM41-T2-FO-2050-MCPCR-SF-347-PS412-125-SBC-BLT

CATALOG #	
-----------	--

Model (4" wide luminaire)	Optics (Distribution)	Optics Finish	Light Engine ¹	Control
KM41 Single Fixture	T2 IES Type II	WO Standard White Finish	2030 3000K CCT, CRI 70, 24 Watts	MCPCR Multi-Channel 7-Pin Photocell Receptacle
KM42 Two Fixtures 180° Apart	T3 IES Type III	FO Optics in Fixture Finish	2040 4000K CCT, CRI 70, 24 Watts	SCP Motion Sensor + Photocell ²
KM43 Three Fixtures 90° Apart	T4 IES Type IV	MO Optics in Matte Black Finish	2050 5000K CCT, CRI 70, 24 Watts	SWPM SiteSync Pre-commissioned + Motion Sensor ³
KM44 Four Fixtures 90° Apart			3030 3000K CCT, CRI 70, 33 Watts	SCPREMOTE Handheld Commissioning Tool ²
			3040 4000K CCT, CRI 70, 33 Watts	
			3050 5000K CCT, CRI 70, 33 Watts	

Fuse (may choose one)	Voltage	Mounting	Mounting Options	Fixture Finish
SF 120, 277, 347 Volt Input	120-277V 120-277V	<u>Integral Pole</u>	<u>Twin mount at staggered heights</u>	<u>Standard Color</u>
DF 208, 240, 480 Volt Input	347 347 VAC input	Square Straight Aluminum, 10.5" Ø Bolt Circle	Mounting holes for a fixture at 180°, KM41-...PS4... only, may choose one	BLS Black Gloss Smooth
	480 480 VAC input	PS410-125 10' Luminaire Height	TS8 8' from bottom	BLT Black Matte Textured
		PS412-125 12' Luminaire Height	TS10 10' from bottom	DBS Dark Bronze Gloss Smooth
		PS414-125 14' Luminaire Height	TS12 12' from bottom	DBT Dark Bronze Matte Textured
		PS416-125 16' Luminaire Height	TS14 14' from bottom	GTT Graphite Matte Texture
		PS418-125 18' Luminaire Height	TS16 16' from bottom	LGS Light Grey Gloss Smooth
		PS420-125 20' Luminaire Height	TS18 18' from bottom	LGT Light Grey Matte Textured
		<u>Tenon Mount</u>	<u>Base Options</u>	PSS Platinum Silver Gloss Smooth
		TA23 Slips over a 2 3/8" / 60mm Ø x 4" / 102mm tall tenon	SBC Standard Base Cover	VGT Verde Green Matte Textured
		<u>Side Mount</u>	<u>Pole Accessories(may choose one)</u>	WHS White Gloss Smooth
		SMK Mounts to the side of a square pole, KM41 only	GFI GFCI receptacle, 24" from top of pole	WHT White Matte Textured
		<u>Wall Mount</u>	RBC Duplex receptacle box with clear cover, wiring device(s) not included	CC Custom Color ⁴
		WMK KM41 only		

Notes:

- 595nm monochromatic amber and or custom lumen package available by request
- Handheld commissioning tool is required to separately configure or adjust any number of SCP sensors
- Specify group and zone at time of order. See www.hubbellighting.com/sitesync for more details. Order at least one SiteSync interface accessory SWUSB or SWTAB. Each option contains SiteSync License, GUI, and Bridge Node
- Consult factory for custom color, marine and corrosive finish

SPECIFICATIONS (CONTINUED)

MODEL	HEIGHT OVERALL	POLE	SHAFT SECTION	WT	MAXIMUM ALLOWABLE EPA (MPH)							
					85	90	100	110	120	130	140	150
KM4X-PS410-125	10' 7.5" / 3.24m	10'	4" SQ x .125"	28 lbs	15.4	13.5	10.4	8.1	6.4	5.0	4.0	3.1
KM4X-PS412-125	12' 7.5" / 3.85m	12'	4" SQ x .125"45	32 lbs	11.8	10.2	7.6	5.7	4.3	3.2	2.3	1.6
KM4X-PS414-125	14' 7.5" / 4.46m	14'	4" SQ x .125"	37 lbs	9.1	7.7	5.5	3.9	2.6	1.7	0.95	0.33
KM4X-PS416-125	16' 7.5" / 5.07m	16'	4" SQ x .125"	42 lbs	6.9	5.7	3.8	2.3	1.3	0.46	-	-
KM4X-PS418-125	18' 7.5" / 5.68m	18'	4" SQ x .125"	48 lbs	4.9	3.9	2.2	0.95	0.01	-	-	-
KM4X-PS420-125	20' 7.5" / 6.29m	20'	4" SQ x .125"	53 lbs	3.2	2.2	0.75	-	-	-	-	-

* - Consult factory for thicker shaft profiles and or custom heights not shown above.

CONTROLS

- Wireless enabled fixtures shall support bi-directional radio frequency (RF) communications utilizing IEEE 802.15.4 operating in the 2.4GHZ ISM band.
- Up to 1000' wireless range may be reduced by physical obstructions between lighting fixtures.
- Motion Sensor shall use passive infrared (PIR) sensing technology that reacts to changes in infrared energy (moving body heat) within the coverage area. Careful consideration must be given to obstructions that may block the sensor's line of sight.
- Factory default settings for SCP option shall be:
 - High mode: 10V
 - Low mode: 1V
 - Ramp-up rate: disabled
 - Fade-down rate: disabled
 - Photocell: Off
 - Sensitivity: Full
 - Time Delay: Fade to low: 5 minutes
 - Time Delay: Fade to off: 1 hour

CERTIFICATIONS

- Luminaire is listed with UL for outdoor, wet location use, UL1598, UL 8750 and Canadian CSA Std. C22.2 no.250
- ANSI C136.31-2010 4G Vibration tested and compliant
- IEC 66262 Mechanical Impact Code IK10
- IDA approved, 3000K and warmer CCTs only
- This product qualifies as a "designated country construction material" per FAR 52.225-11 Buy American-Construction Materials under Trade Agreements effective 6/06/2020. [See Buy American Solutions](#)

WARRANTY

- See [HLI Standard Warranty](#) for additional information

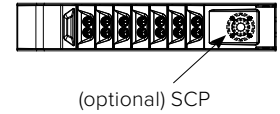
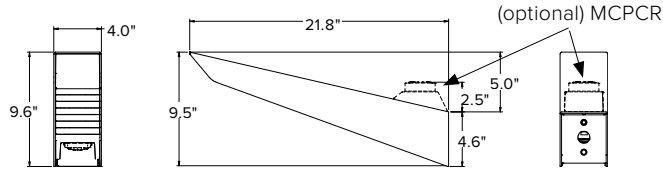
DELIVERED LUMENS

System Watts	Optical Finish	Distribution	Ordering Code	3000K 70CRI					4000K 70CRI					5000K 70CRI				
				Lumen	Bug Rating			Efficacy (Lm/W)	Lumen	Bug Rating			Efficacy (Lm/W)	Lumen	Bug Rating			Efficacy (Lm/W)
					B	U	G			B	U	G			B	U	G	
24	Standard White	Type 2	T2	2507	1	2	1	106	2613	1	2	1	111	2647	1	2	1	112
		Type 3	T3	2447	1	1	1	104	2555	1	1	1	108	2589	1	1	1	110
		Type 4	T4	2561	1	1	1	109	2670	1	1	1	113	2704	1	1	1	115
	Fixture Match	Type 2	T2-FO	1909	1	2	1	81	2058	1	2	1	87	2015	1	2	1	85
		Type 3	T3-FO	1930	1	1	1	82	2061	1	1	1	87	2038	1	1	1	86
		Type 4	T4-FO	2174	1	1	1	92	2343	1	1	1	99	2295	1	1	1	97
	Matte Black	Type 2	T2-MO	1909	1	0	0	81	2058	1	0	0	87	2015	1	0	0	85
		Type 3	T3-MO	1930	1	0	0	82	2081	1	0	0	88	2038	1	0	0	86
		Type 4	T4-MO	2174	1	0	0	92	2343	1	0	0	99	2295	1	0	0	97
33	Standard White	Type 2	T2	3315	1	2	1	101	3455	1	2	1	105	3500	1	2	1	106
		Type 3	T3	3242	1	2	1	99	3379	1	2	1	103	3423	1	2	1	104
		Type 4	T4	3387	1	1	1	103	3530	1	1	1	107	3576	1	1	1	109
	Fixture Match	Type 2	T2-FO	2535	1	2	1	77	2716	1	2	1	83	2676	1	2	1	81
		Type 3	T3-FO	2563	1	2	1	78	2746	1	2	1	83	2706	1	2	1	82
		Type 4	T4-FO	2886	1	1	1	88	3093	1	1	1	94	3047	1	1	1	93
	Matte Black	Type 2	T2-MO	2535	1	0	1	77	2716	1	0	1	83	2676	1	0	1	81
		Type 3	T3-MO	2563	1	0	0	78	2746	1	0	0	83	2706	1	0	0	82
		Type 4	T4-MO	2886	1	0	1	88	3093	1	0	1	94	3047	1	0	1	93

DIMENSIONS

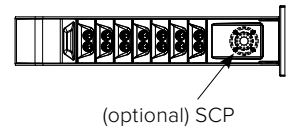
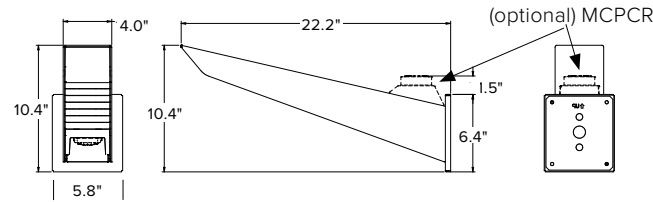
SIDE MOUNTED LUMINAIRE (S)

MODEL	KM4X-...-SMK
OVERALL HEIGHT	9.6" / 244mm
OVERALL LENGTH	21.8" / 554mm
OVERALL WIDTH	4" / 102mm
WEIGHT	8.95 lbs.
EPA	0.56

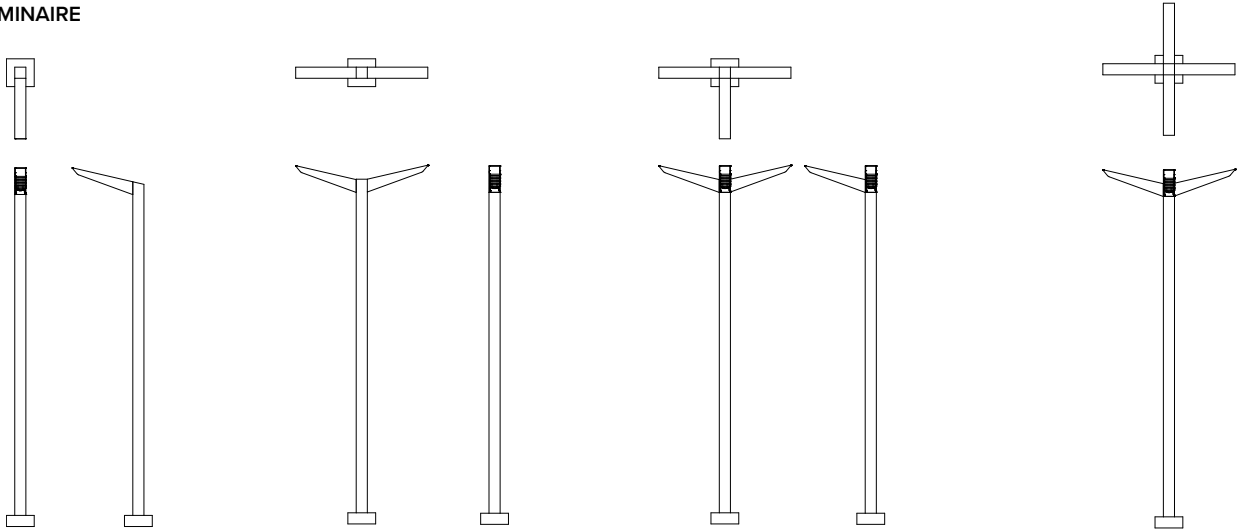


WALL MOUNTED LUMINAIRE (S)

MODEL	KM41-...-WMK
OVERALL HEIGHT	10.4" / 264mm
OVERALL LENGTH	22.2" / 564mm
OVERALL WIDTH	5.8" / 147mm
WEIGHT	10 lbs.



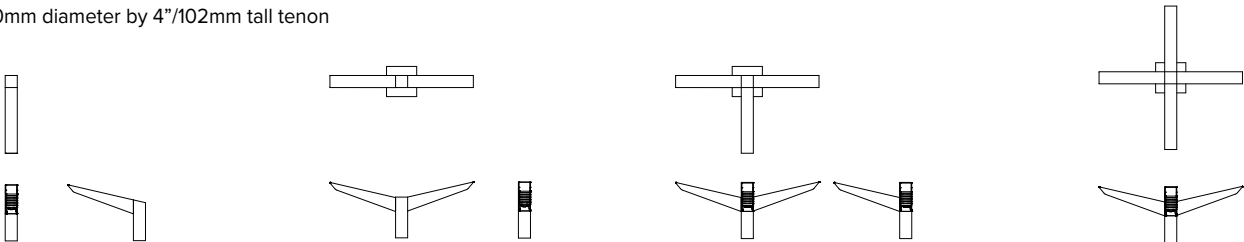
INTEGRAL POLE LUMINAIRE



MODEL	KM41-...-PS4XX-125	KM42-...-PS4XX-125	KM43-...-PS4XX-125	KM44-...-PS4XX-125
OVERALL LENGTH	25.8" / 655MM	10" / 254MM	25.8" / 655MM	47.5" / 1206MM
OVERALL WIDTH	10" / 254MM	47.5" / 1206MM	47.5" / 1206MM	47.5" / 1206MM
WEIGHT	8.95 LBS.	8.95 LBS.	8.95 LBS.	8.95 LBS.
EPA*	0.56	1.12	1.44	1.44

TENON MOUNT LUMINAIRE

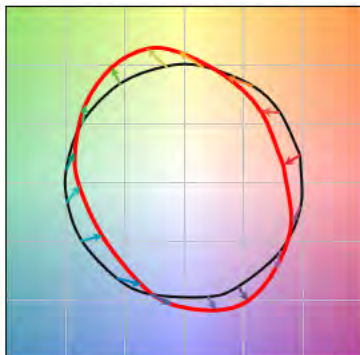
Slips over a 2 3/8"/60mm diameter by 4"/102mm tall tenon



MODEL	KM41-...-TA23	KM42-...-TA23	KM43-...-TA23	KM44-...-TA23
OVERALL HEIGHT	13.5" / 343MM	13.5" / 343MM	13.5" / 343MM	13.5" / 343MM
OVERALL LENGTH	25.8" / 655MM	10" / 254MM	25.8" / 655MM	47.5" / 1206MM
OVERALL WIDTH	4" / 102MM	47.5" / 1206MM	47.5" / 1206MM	47.5" / 1206MM
WEIGHT	8.95 LBS.	8.95 LBS.	8.95 LBS.	8.95 LBS.
EPA*	0.87	1.44	1.62	1.62

TM-30 DATA

COLOR VECTOR GRAPHIC

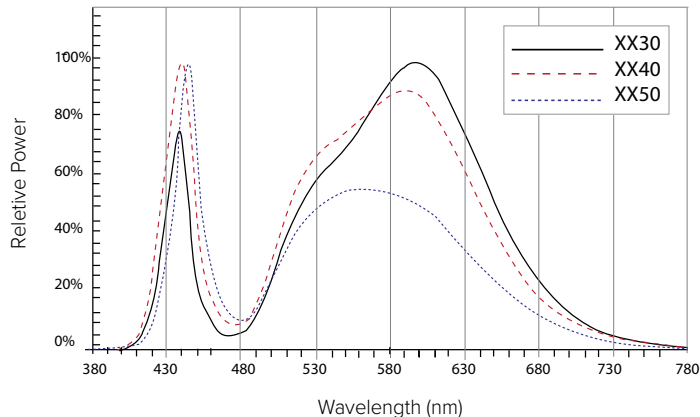


— Reference Illuminant — Test Source

TEST SOURCE

VALUE	ORDERING CODE		
	XX30	XX40	XX50
Rf	69	69	71
Rg	99	99	98
CCT(K)	3122	3852	5020
Duv	0.001	0.0004	0.0005
CIE Ra	74	73	74

SPECTRAL POWER DISTRIBUTION COMPARISON



ELECTRICAL CHARACTERISTICS

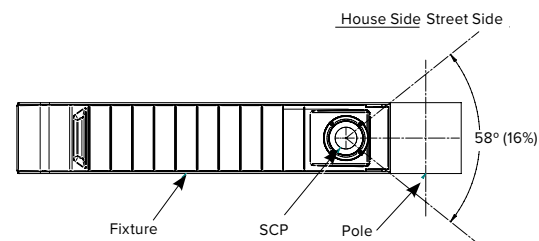
ORDERING CODE	LED CURRENT (MA)	SYSTEM WATTAGE (W)	LINE INPUT		INPUT		MIN. POWER FACTOR	MAX THD (%)	MIN. POWER	INRUSH CURRENT PEAK				DIMMING	
					AMPS AC					(A)		T@50% (MS)		DIMMING RANGE (V)	SOURCE/ SINK CURRENT (MA)
			VAC	HZ	120	277				120	277	120	277		
20XX	500	24	120-277	50/60	0.2	0.1	>0.9	20		65	100	0-10	1		
30XX	700	33	120-277		0.3	0.1									

TM-21 LIFETIME CALCULATION (500MA)

AMBIENT ENVIRONMENT °C	PROJECTED LUMEN MAINTENANCE (KHRS)					REPORTED L70
	25	50	60 (TM-21)	75	100	
25	98%	95%	94%	93%	90%	>60Khrs.
40	98%	96%	95%	93%	90%	

SENSOR DETECTION RANGE

		SENSOR MOUNTING HEIGHT										RATIO	
		8'	10'	12'	14'	16'	18'	20'	25'	30'	35'		40'
COVERAGE DIAMETER	SCP	20'	25'	30'	35'	40'	45'	50'	62.5'	75'	87.5'	100'	1:2.5



O. Architectural Design Narrative

Please find attached the design narrative completed by Kaplan Thompson & Archetype PA.



January 6, 2022

DOUGLASS COMMONS

Architectural Narrative

We are proposing three different building types on the site in addition to the five-story building to the east. The two-story Townhouses are arranged along the western property line behind the current residential neighborhood. Three-story Rowhouses line the northern edge, while the three-story Community Flats buildings occupy the central portion of the site. The intent is to gradually increase the scale of the buildings from west to east as you move through the site, keeping the shortest buildings closer to Douglass Street and the existing two-to-three-story homes.

Our approach to the roof form of the height-limited Community Flats building is to develop a series of low-pitched roof planes that undulate across the facade of the buildings and are occasionally tipped down to denote the entrances below. This undulating roof form carries across the site from building to building, which establishes a language that is reflected in the Townhouses and Rowhouses where roofs are occasionally tipped up to highlight corners and connections. The Townhouse entrances are highlighted by a simple entry canopy that matches the pitch of the larger Community Flats buildings. The Rowhouse has a more elaborate series of similarly pitched entrance canopies that dance along the facade to individualize the unit entries as well as to help reduce the scale of the overall building.

We intend to use common siding materials and alter their installation methods to help break up the facades by a change in texture, spacing, and orientation. There are shared cladding materials between buildings that reinforce their connection and establish the rhythm of textural and material changes at the unit entrances. We've also altered the heights of the windows at various locations in reference to the undulating roof forms.

The Community Flats buildings provide exterior deck spaces on the upper levels which add visual interest and provide a recessed area for a specific cladding treatment. The entry spaces are clad with a locally sourced natural Eastern White Cedar in locations where the building is experienced in close proximity.

The building's architectural design details, along with the careful attention to landscape design and public circulation spaces will provide a welcoming and interactive neighborhood experience for this unique site.



Phil Kaplan

Maine Licensed Architect, AIA

Kaplan Thompson Architects



ARCHETYPE ARCHITECTS

DOUGLASS COMMONS

ARCHITECTURE NARRATIVE

Although we are a campus-like setting, we feel strongly that all buildings do not need to be similar and there are many existing instances of campuses where unique architectural moments are what strengthen it. At the same time, we do believe there are color and material choices that do, in fact, relate the buildings but because the building type is quite different from those of Kaplan Thompson, we feel it is appropriate for it to carry its own language.

In response to the comments from city staff, we have increased the size of the windows on the stair element.

As for the material choices on our building, we believe it is crucial to our design to have the contrasting, yet complimentary materials. Because of the affordable aspect of the project, the phenolic application has to be limited to only a portion of the massing, but the design would also suffer if it were made more similar to the rest of the material choices. The colors of the remaining materials have been adjusted so they are more complimentary to the wood-look.

We have incorporated a stone base with clapboard and a building cap with metal shingle that has a well-established cornice helping to emphasize the base, middle and top of the building and allowing the phenolic elements to differentiate appropriately. The metal shingle also creates more interest in the façade as it changes with the lighting.

Finally, we have established a porch as an inviting feature to the building both visually and functionally.

Respectfully submitted,
David Lloyd

P. Utilities

The proposed project will include installation of multiple utility services to the proposed buildings.

Water:

The existing 2" service line to the site will be retired in accordance with Portland Water District standards. It is proposed to tap an 8" fire line as well as a 4" domestic line off the existing 8" ductile iron water main within Douglass Street. The 4" domestic line that will serve the site will require a meter pit. Both lines will run through an aboveground testable double-check backflow preventer. Additionally, a private fire hydrant will be installed to serve the buildings on site. Ability to serve confirmation will be submitted upon receipt.

Sewer:

A new 8" PVC lateral will be installed throughout the site in conjunction with a doghouse manhole to accept the wastewater from each unit.

Stormwater:

Overall, the impervious area will decrease by approximately 0.36 acres, effectively lowering the peak runoff on the site. The project will include redevelopment of non-roof impervious areas greater than 5,000 sf, triggering the City's water quality treatment requirement. Water quality treatment will be provided by allowing it to flow from a portion of the parking lot to an under-drained soil filter system and engineered rain gardens prior to discharging into the MS4 within Douglass Street. Please refer to the Grading & Drainage plans as well as the Stormwater Management Report for more information.

Electric/Communications:

Three-phase power is currently supplied cross-country to the site from Congress Street. It is proposed to replace the existing poles on site and with underground primaries to six (6) transformers on the site, some of which will be single-phase along with one 3-phase transformer to serve the 5-story building. New conduits are proposed for telephone, fiber, and cable that will run down from the existing utility pole on Douglass Street. See the Sheet C-20, Utility Plan, for more information.

Gas:

An existing gas main traverses the site and it is proposed tap this service to serve the 5-story building. See Sheet C-20, Utility Plan, for more information.

Ability to serve letters have been sent out to the respective utility companies in accordance with the City of Portland Code of Ordinances Chapter 14 Land Use, Section 14-527(g)(7). Responses from the utility companies are forthcoming.



Q. Construction Management Plan

Project Address:

57 Douglass Street

Project Description:

The proposed project includes the construction of eight stand-alone residential buildings to be occupied by 120 units. The project will include the construction of parking lots and stormwater management features.

Project Team Summary:

Owner:	Douglass Commons, LLC.
Owner's Representative:	TBD
General Contractor:	TBD
Civil & Environmental Engineer:	Acorn Engineering, Inc.
Architect:	Archetype & Kaplan Thompson Architects
Structural Engineer:	Structural Integrity Consulting Engineers
Geotechnical Engineer:	Summit Geoengineering Services

The Owner/GC and all subcontractors will work with the City of Portland and adjacent landowners to minimize any project impacts.

The GC will remain responsible for enforcement of all compliance with 1) all contract plans and specifications in their scope of work and 2) all site working conditions and safety requirements, day and night, for both persons and property, in each case for the duration of their work. These include OSHA, NIOSH, U.S. EPA, local ordinance and any other applicable governmental regulations. Both the Owner/GC and any subcontractors will remain responsible for safeguarding the general public.

The GC shall review all permits and conditions associated with the project. Refer to the Civil/Site Plan Set, Sheet C-03 Construction Management Plan for visual representation of the measures to be taken during construction.

The following outline has been developed in accordance with the City of Portland Construction Management Plan General Template and shall be referenced by the GC during construction.

A. Construction Management Principles

The control of noise, vibrations, ground movement, truck traffic, and other construction related factors will be of utmost importance. Care shall be taken to minimize these effects in the best interest of neighbors and the general public. GC to ensure that work hours conform to the City of Portland's Ordinance.

B. Development Review of Construction Management Plan

Logistics and safety program shall be submitted at or prior to the preconstruction



meeting by the GC with all pertinent information required by the Maine Department of Transportation's Traffic Control Plan Standard Specification 652.3.3.

C. Performance Guarantees, Inspection Fees, Preconstruction Meeting, and Permits

Guarantees and fees will be paid at the time of the respective application. Sections 14-530 and 13-532 will be complied with all necessary permits will be obtained prior to work.

1. Street Opening and Street Occupancy Permits:

Required permits regarding street opening and occupancy will be obtained from the Department of Public Works. The requests shall conform to the approved Construction Management Plan.

2. Blasting:

Although not anticipated, if blasting occurs, it shall conform to Article VIII. In Chapter 14 of the City Code and Section 3.7 in the City's Technical Manual.

3. Building Code:

Employ the best practices, as applicable, of Chapter 33 Safeguards During Construction, from the 2009 International Building Code.

D. Construction Administration and Communication

The Contractor will work closely with adjacent abutters, businesses, and all parties informed, as far in advance as possible, of scheduled work, particularly work anticipated to cause significant noise, vibrations, or dust. Communication in order to comply with all agreements, ordinances, and special permits will be of the utmost importance. Contractor and Subcontractor contact information shall be posted somewhere along the project's street frontage. Additional signage necessary for communication shall be provided but will be temporary and removed upon completion of the project.

E. Construction Schedule

The GC shall submit a construction timeline at or prior to the preconstruction meeting. Construction may occur during the daytime hours as defined in Section 17-18. Construction Activities for Building permit and City Code Section 25-129, Noise, dust and debris. Between September 1 and May 31, the following year, no person shall engage in construction activities generating noise exceeding 50 decibels, between the hours of 7 pm and 7 am of the following day within 500 feet of any buildings. From June 1 to August 31, construction activity may continue until 8 pm. No construction activity shall begin before 8 am on a Saturday, Sunday, or legal holiday. Extended hours or night work may be requested for special circumstances and street utility work if needed. These requests will be subject to approval by the Public Works Authority.



Deliveries will be scheduled between 7 am and 5 pm.

The estimated timeframe of the proposed project is outlined below:

<u>Project Start Date:</u>	Spring 2023
<u>Project End Date:</u>	Summer 2024

A more detailed work schedule shall be provided by the GC at or before the pre-construction meeting with the City.

F. Security

1. The Construction Management Plan, Sheet C-03, depicts all proposed fencing and other barriers, with the intent of separating pedestrian and vehicle circulation from the construction site. Construction entrances per detail shall be installed.
2. Structures undergoing construction, alteration, or demolition operations, including those in underground locations, shall comply with NFPA 1 Chapter 16. *Safeguarding Construction, Alteration, and Demolition Operations.*
3. Fire Safety Program: Prior to construction, an overall construction and demolition fire safety program shall be developed. Essential items to be emphasized include the following:
 - o Good Housekeeping
 - o On-site security
 - o Installation of new fire protection systems as construction progresses
 - o Preservation of existing systems during demolition
 - o Organization and training of an on-site fire brigade
 - o Development of a pre-fire plan with the local fire department
 - o Rapid communication
 - o Consideration of special hazards resulting from previous occupancies
 - o Protection of existing structures and equipment from exposure fires resulting from construction, alteration, and demolition operations.
4. Blasting, if required, shall conform with all measures of 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.
5. Temporary security lighting shall be shown on the Construction Management Plan, and all fixtures shall be full cutoffs.

G. Construction Permitting and Traffic Control Plans

1. Construction Activity in Public Streets

Construction activity in the public right-of-way shall be compliant with Chapter 25 Article VII of the City Code. At no time will it be permissible for construction



activity including delivery vehicle to close or block streets or affect public safety access without prior notice and approval of the Department of Public Works.

2. Sewer and Stormwater

Sewer and stormwater system connections are controlled by Chapters 24 and 32 of the City code of Ordinance. Required permits for new connections and/or abandonment of existing connections are available through the Street Opening Clerk at the Department of Public Works. Rules and Regulations for these utility systems are available through the City Engineer's office of the Department of Public Works and in Section II of the Technical Manual.

3. Traffic Control Plans

Construction activity that impacts the existing public street system must be controlled to protect the safety of the construction workers and all modes of the traveling public. The contractor shall submit a satisfactory "Maintenance of Traffic" (MOT) plan prior to any street opening permit approval. This document shall contain all pertinent information from the Maine Department of Transportation's Traffic Control Plan Standard Specification 652.3.3.

The MOT will address the work required for utility connections in Douglass Street. Traffic will be channelized utilizing drums and cones. Proper signage will be installed prior to the through work zone. Alternating traffic will be controlled with flaggers. Trenches will be patched with pavement daily.

The MOT plan shall provide for the safe passage of the public through or along the construction work zone. It may be permissible to close a portion of Douglass Street during utility connections and/or detour a mode of traffic when absolutely necessary for safety. All requests shall be subject to City approval. MOT plans shall employ the appropriate techniques and devices as called for in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). In addition:

- Construction speed signing may be used as needed to slow traffic.
- Traffic Control signs shall not be placed where they would create any obstructions to bicycles or pedestrians.
- Flaggers will be utilized when necessary.

All existing modes of travel in the work zone area shall be accommodated if impacted by the activity. The safe passage of pedestrians, bicyclists, transit providers, and motorists are of equal importance when planning and laying out the work zone; no pre-existing travel mode may be eliminated without the express approval of the Department of Public Works. The MOT should also address on-street parking impacts, including deliveries and parking for adjoining businesses and property owners, analysis of roadway capacity or diversion capacity if street closure or change to roadway capacity is required, and coordination with other on-going or future construction or utility projects in the vicinity.



- Traffic control bicycle and pedestrian facilities or routes through work zones shall be maintained until the bicycle and pedestrian facilities or routes are ready for safe operation. Traffic control will not be removed to allow auto travel at the expense of bicycle and pedestrians.
- Barrier systems utilized to separate the construction activity from the public street and /or sidewalk shall not inhibit sight distances, particularly for visibility of pedestrians and bicyclists.
- ADA compliance in all capacities shall be maintained.

Use of public parking spaces or the blockage of any portion of sidewalk for the purpose of construction activity shall require an occupancy permit and appropriate fee as assessed by the Department of Public Works.

H. Site Management and Controls

1. Regular trash and debris shall be managed appropriately, and its removal shall comply with all local, state, and federal regulations.
2. Street cleaning and sweeping shall be followed as outlined in the erosion and sedimentation control notes and report. Damage to the street shall be avoided and shall be the responsibility of the contractor.
3. Dust shall be controlled and shall comply with Section 25-129 and the erosion and sedimentation control notes, plan, and details.
4. Noise shall be controlled and shall comply with Section 17-18 and Section 25-129.
5. Rodent Control shall be provided, if applicable, by a professional exterminator and shall be consistent with Chapter 22 of the City Code.
6. Snow and Ice Removal shall be provided. Pursuant to Section 25-173, the Contractor shall ensure a safe means of travel within the work zone by the following steps:
 - a. Snow/ice removal or commence automatically from 1" or greater of snow or ice
 - b. Remove snow as needed within the work zone, including parking spaces. Driveways and site lines shall not be blocked by piles of snow.
 - c. Clear all walks and ramps within the work zone
 - d. Sand or salt as needed
 - e. Clear all basin or drainage to help snow melt
 - f. The above steps shall be carried out Sunday-Saturday including holidays.

I. Erosion & Sedimentation Control

1. The Contractor shall install all erosion and sedimentation controls as depicted on the approved Construction Management Plan, C-03, and the approved erosion and sedimentation control report, prior to the pre-construction meeting for inspection



- by the City. The Contractor shall regularly inspect the control measures, no less than weekly and after storm events (0.5" or more in 24 hours). Additionally, temporary or permanent stormwater management systems shall be inspected and maintained to ensure working order. The Contractor shall document all inspection activities and corrective actions and be prepared to provide these documents for inspection by the City, Maine Department of Environmental Protection (MDEP) or the U.S. Environmental Protection Agency (EPA) upon request.
2. Due to the existing, sparse landscaping on site, no protection during construction will be necessary.
 3. Stored materials shall be identified and avoid being located under/near trees.

J. Construction Staging Area

1. The Contractor shall submit a plan with locations depicted for the location of material staging areas, the location of on-site temporary construction trailers, the location of on-site truck delivery holding areas, the location of on-site truck washing stations, masonry mixing stations, the general location of the construction security fence and the general location of temporary construction dumpsters. This plan shall be submitted at or prior to the pre-construction meeting. Any open storage areas shall be shown on the plan.
2. Delivery Truck Holding Areas On-Site: The majority of materials delivered to the site will be scheduled such that they are able to be off-loaded immediately. On days when the construction activities require multiple truck deliveries, these deliveries will be carefully scheduled so that there is always adequate on-site area for the holding of trucks until they can be unloaded. Once at the site all vehicles will be brought within the fence line and will make every attempt to avoid queuing on public streets. If, for any reason, on-site holding of trucks is not feasible, an off-site location must be designated and shown on the submitted plan referenced above in J.1.
3. All deliveries for materials shall comply with the City's noise requirements.

K. Parking During Construction

1. Adequate parking for construction workers shall be provided on site or arrangements for off-street parking at an off-site location shall be provided.
2. Truck Routes and Volumes: The following quantities are estimated as part of the reconstruction:
 - Gravel & Stone – 3,640 CY. Earthwork subcontractor(s) pit to project site.
 - Hot Mix Asphalt – 460 Tons. Paving subcontractor pit to project site.



L. Dewatering Plans

1. A basic dewatering plan for any construction work is required and shall be submitted by the Contractor. The plan must cover construction sites where groundwater is not expected but the impact of rainwater may require dewatering. The plan must include operating procedures, equipment to be used, including filters, erosion and sediment control measures, or other methods of removing sediment from approved discharges.
2. For construction work that will require frequent dewatering of groundwater from site, a dewatering plan must be prepared by the Contractor and approved by the Department of Public Works. Groundwater and/or soil testing may be required to determine course of action if treatment is necessary. Approval for all discharges to City infrastructure is required. The proposed plan must address the following:
 - Project duration, discharge location, storage equipment on-site, dewatering schematic, and emergency contact.
 - General requirements include trained staff on-site for all approve discharges and required site log for documentation of all discharges.
 - Storage and/or treatment process should include proper settling time and maintain proper use of filtering medium as required.
 - Contingency/maintenance plan for all dewatering equipment devices and filtration mediums.

Any water that is removed from an excavation must be pumped from a perforated device buried in crush stone prior discharge and/or prior to storage and treatment. There will be no discharge allowed during precipitation events.

M. Special Measures as Necessary

No special measures are necessary for the proposed reconstruction.

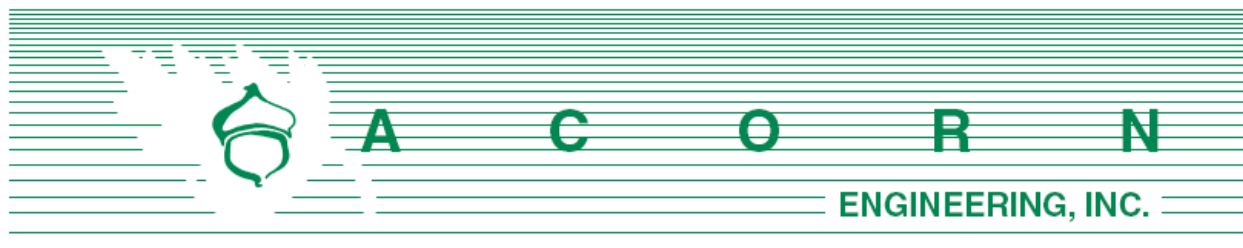


R. Solid Waste Disposal

The property management company or Owner shall be responsible for locating the solid waste and recyclable material to the space allocated for solid waste storage as noted on the Site Plan (C-10).

The solid waste containers will be fully enclosed and screened from the public view.





T. Traffic Memo

Traffic Memo

The proposed 120-unit development is located at 57 Douglass Street and provides 79 parking spaces throughout the site via the paved parking and woonerf area. Pedestrian access to the site is provided with a connection to the Douglass St sidewalk. The site will be connected to the Portland Trails Network (Dougherty Field Path) by providing a hardscaped walking path to the east of the site for residents, additionally further pedestrian routes are provided as the internal sidewalk will connect to the public sidewalk along Douglass Street. Further multimodal transportation opportunities exist with multiple Metro Bus Lines making stops in proximity of the site along Congress Street. This will offer site users with a variety of transportation options other than standard vehicular travel. Also given the site's proximity to the Portland peninsula, we expect bicycle travel to be another major form of transportation for site users.

The trip generation for the proposed project has been estimated using the Institute of Transportation Engineers (ITE) "Trip Generation" 10th Edition publication. The land uses utilized in the calculations consists of residential low and mid-rise apartments, as well as a private K-12 school to model the previous and proposed trip generation produced from the site. Please note that this analysis slightly overestimates the total trip generation as 74 of the dwelling units will be workforce housing. Although the ITE has not yet published trip generation values for affordable housing, it's our understanding that these rates are forthcoming, consistent with the ITE parking generation for affordable housing that was recently added to the latest parking publication (Parking Generation 5th Edition). The parking generation for market rate vs affordable housing features a factor of 1.3. Based upon this factor, as well as demonstrated built affordable housing in the Greater Portland area, the following trip generation numbers are determined to be inflated to an extent due to lack of industry standard trip generation rates for affordable housing.

Trip Generation

Trip generation is based upon tables presented in the tenth edition of the Institute of Transportation's Engineers "TRIP GENERATION" manual. The following trip rates were applied:

Existing Land-Use #536: Private School

Weekday AM Peak Hour (Street)	= 0.80 trips/unit
Weekday PM Peak Hour (Street)	= 0.17 trips/unit
Weekday AM Peak Hour (Generator)	= 0.81 trips/unit
Weekday PM Peak Hour (Generator)	= 0.58 trips/unit

Proposed Land-Use #220: Multi-family Housing (Low-Rise)

Weekday AM Peak Hour (Street)	= 0.46 trips/unit
Weekday PM Peak Hour (Street)	= 0.56 trips/unit
Weekday AM Peak Hour (Generator)	= 0.56 trips/unit
Weekday PM Peak Hour (Generator)	= 0.67 trips/unit
Saturday Peak Hour (Generator)	= 0.70 trips/unit
Sunday Peak Hour (Generator)	= 0.67 trips/unit

Proposed Land-Use #221: Multi-family Housing (Mid-Rise)

Weekday AM Peak Hour (Street)	= 0.36 trips/unit
Weekday PM Peak Hour (Street)	= 0.44 trips/unit
Weekday AM Peak Hour (Generator)	= 0.32 trips/unit
Weekday PM Peak Hour (Generator)	= 0.41 trips/unit
Saturday Peak Hour (Generator)	= 0.44 trips/unit
Sunday Peak Hour (Generator)	= 0.39 trips/unit

Table 1, below, provides a summary of the trip generation for the proposed development. This analysis also accounts for the estimated trip generation for the former school system that existed on site within the last 10 years. It was assumed that an average of 38 students attended the “West Program” school, based upon a Bangor Daily News article that stated the 2014 enrollment and capacity.

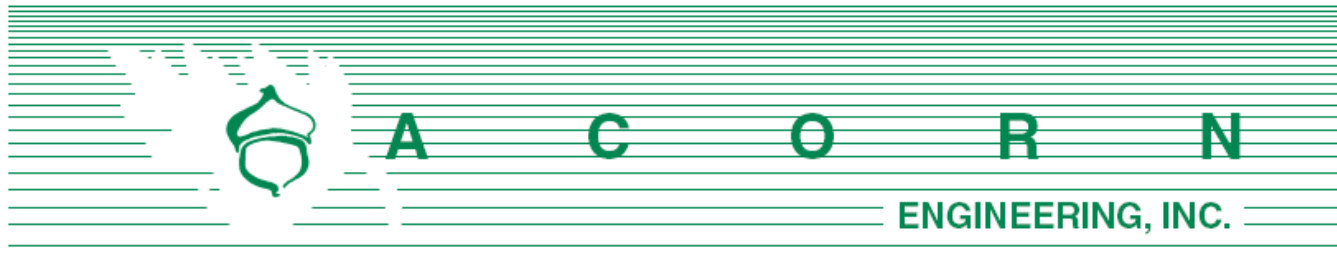
Table 1 – Peak Hour Trip Generation		
	Peak Hour PCE Trip Generation	Net Peak Hour PCE Trip Generation¹
AM Peak Hour (Street)	42 trips	12 trips
PM Peak Hour (Street)	52 trips	46 trips
AM Peak Hour (Generator)	40 trips	9 trips
PM Peak Hour (Generator)	50 trips	28 trips
Saturday Peak Hour (Generator)	54 trips	54 trips
Sunday Peak Hour (Generator)	48 trips	48 trips
¹ Accounts for trip credits from prior site use		



Crash Data

Crash data was obtained from MaineDOT for the most recent available three-year period (2018 to 2021). As seen in the appendix, there have been six crashes on Douglass Street and two crashes at the intersection of Douglass and Brighton Ave. Of the eight crashes recorded, only one of them resulted in an injury and this occurred at the intersection of Douglass and Brighton Ave. The seven other crashes were side swipes or rear ends and were property damage only. The intersection of Douglass and Brighton Ave allows left and right hand turns from both roads and is mediated by a stop sign at the end of Douglass. The intersection of Douglass and Congress does not have any reported crashes in the specified time window and has a curbed median in the middle of Congress Street to prohibit left-hand turns. Based on the relative minor nature of reported crashes and existing intersection conditions, the project's generated trips will not exacerbate an existing issue.





Maine Department of Environmental Protection
City of Portland, Maine

January 20, 2022

Subject: Delegated Review: Stormwater Management Permit
57 Douglass St. Redevelopment – Portland, Maine

To Whom It May Concern:

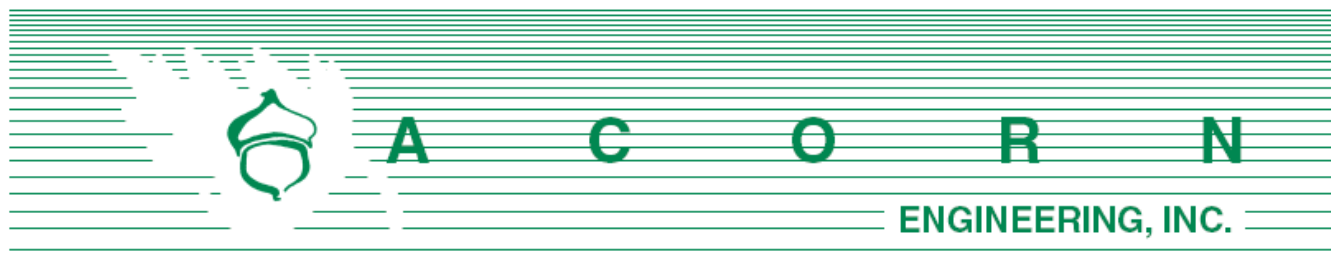
Acorn Engineering, Inc. has been retained by Douglass Commons, LLC. to provide civil engineering services for the proposed redevelopment of 57 Douglass Street located within the R-5A Zoning District in Portland, Maine. The 3.34-acre parcel was previously the site of a school building and is now vacant. The built-out site will consist of eight stand-alone buildings comprising 120 residential units, the majority of which will be deed-restricted for affordability. On behalf of our client, we are pleased to submit a Stormwater Management Permit application for this beneficial redevelopment subject to Delegated Review by the City of Portland. Concurrently, the project is anticipated to undergo a Major Site Plan/ review subject to approval from the Portland Planning Board.

The existing property is covered by approximately 65% or 2.16 acres of impervious surfaces, whereupon a school and its associated infrastructure was formerly located. The proposed redevelopment includes reducing the overall impervious by approximately 0.36 acres to a total of 1.90 acres. In addition to net reduction in runoff and pollutant loading, there are stormwater treatment systems provided to improve the current state of the site, including an under drained soil filter, proprietary rain gardens, and the routing of all stormwater from the site to the separated storm drain within Douglass Street. Lastly, the weighted average of land use and pollutant ranking decreases from the existing to the proposed condition.

We look forward to your review of this project. If you have any questions regarding these materials or the completeness of the application materials, please do not hesitate to contact us.

Sincerely,

Samuel J. Lebel, P.E.
Project Manager
Acorn Engineering, Inc.



The following documents are included as part of this application.

Documents:

1. Stormwater Management Law Permit Application
2. Fee Worksheet
3. Notice of Intent to File
4. Certificate of Good Standing
5. Title, Right, or Interest
6. Photos of the Project Site
7. Basic Standards Submissions (Erosion & Sedimentation Control Report)
8. General Standards Submissions (Stormwater Management Report)

**DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RESOURCES**

Stormwater Application Form

FOR DEP USE

L- _____

ATS# _____

FEES PAID _____

DATE RECEIVED _____

PLEASE TYPE OR PRINT IN INK

This application is for (Check the one that applies):		☒ New application		☐ Amendment	
1. Name of Applicant:	Douglass Commons, LLC		5. Name of Agent:	Sam Lebel	
2. Applicant's Mailing Address:	10 Free St, 2nd Floor Portland, ME 04101		6. Agent's Mailing Address:	65 Hanover St., Portland, ME 04101	
3. Applicant's Phone #:	207-805-3578		7. Agent's Phone #:	207-775-2655	
4. Email address (REQUIRED-license will be sent via email:	cszanton@szantoncompany.com		8. E-mail address (REQUIRED-license will be sent via email	slebel@acorn-engineering.com	
9. Location of Project: (Road, Street, Rt.#)	57 Douglass Ave.		10. Town:	Portland	
			11. County:	Cumberland	
12. Type of Direct Watershed: (Check all that apply)	☐ Lake not most at risk ☐ Lake most at risk ☐ Lake most at risk, severely blooming ☐ River, stream or brook ☐ Urban impaired stream ☐ Freshwater wetland ☐ Coastal wetland ☐ Wellhead of public water supply		13. Amount of Disturbed Area:	Total Amt.= <u>3.13</u> acres	
			14. Amount of Developed Area:	☒ 1 or more acres, but less than 5 acres ☐ 5 acres or more Total Amt.= <u>2.86</u> acres	
			15. Amount of Impervious Area:	☐ less than 20,000 sq. ft. ☐ 20,000 sq. ft. to 1 acre ☒ 1 to 3 acres ☐ 3 or more acres Total Amount of Impervious Acres =	
16. Applicable Standards: (Check all that apply)	☐ Stormwater PBR ☒ Basic standards ☒ General standards: BMP ☐ General standards: phosphorus ☐ Flooding standard ☐ Urban impaired stream standards ☐ Other: _____		17. Type of Stormwater Control:	☐ Vegetative (e.g. buffers) ☒ Structural (e.g. underdrained filters, ponds, infiltration structures)	
18. Exceptions &/or Waivers Requested:	BMP Standards ▼		Urban impaired stream standard ▼		Flooding Standard ▼
	☐ Pretreatment measures ☐ Discharge to ocean/major river segment ☐ Linear portion of project ☐ Utility corridor ☒ Redevelopment		☐ Developed area not landscaped or impervious ☐ Redevelopment		☐ Discharge to ocean/major river segment ☐ Insignificant increase in peak flow
19. Proposed Start Date and Brief Project Description:	The proposed project includes the redevelopment of the existing Portland Public Works garage into a 8-story mixed use building. With 171 proposed residential units and 7,600 SF of retail units (4 units).				
20. Size of Lot or Parcel:	☐ _____ sq. ft., or	☒ <u>3.34</u> acres	UTM Easting:	2920817.53	UTM Northing: 300346.97
21. Title, Right or Interest:	☐ own ☐ lease ☐ purchase option ☒ written agreement				
22. Deed Reference Numbers:	Book#: xxx	Page: xxx	24. Map and Lot Numbers:		Map #: 78 Lot #: C2 B7
23. DEP Staff Previously Contacted:		25. Project started prior to application?	☐ Yes ☒ No	Completed?	☐ Yes ☐ No

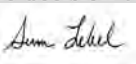
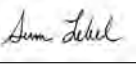
SIGNATURES / CERTIFICATIONS ON PAGE 2

26. Resubmission of Application?	☐ Yes → ☒ No	If yes, previous application #		Previous project manager:	
27. Written Notice of Violation?	☐ Yes → ☒ No	If yes, name of DEP enforcement staff involved:			
28. Detailed Directions to the Project Site:		From I-295N, take exit 5B, merge onto Congress St., first right on Douglass Street, and first right is access driveway.			
29. Stormwater Permit by Rule Submissions ▼		30. Stormwater Application Submissions ▼			
☐ This form (including signature page) ☐ Fee ☐ Topographic Map ☐ Plan or Drawing ☐ Photos of Area		☒ This form (including signature page) ☒ Fee ☒ Proof of title, right or interest ☒ Certificate of good standing (if applicable) ☒ Photos of Area ☐ Copy of Public Notice		☐ Professional & Notice Certification ☒ Basic standards submissions ☒ General standards submissions ☐ Flooding standard submissions ☐ Other standard submissions ☐ Compensation Fee (if required)	
31. FEES, Amount Enclosed:		DELEGATED REVIEW - FEE THROUGH CSS PORTAL			
Does the agent have an interest in the project? If yes, what is the interest?: ☐ Yes → ☒ No					

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 E-mailing the decision to the electronic address located on the front page of this application (see #4 for the applicant and #9 for the agent."	
Signed: 	Title: Project Manager Date: 1.20.2022
Notice of Intent to Comply with Maine Construction General Permit	With this Stormwater Law application form and my signature below, 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. Signed:  Date: 1.20.2022

NOTE: If a Notice of Intent is required, you must file a Notice of Termination (attached as Form G) within 20 days of completing permanent stabilization of the project site.

ADDITIONAL SIGNATURES/CERTIFICATIONS

The person responsible for preparing this application and/or attaching pertinent site and design information hereto, by signing below, certifies that the application for stormwater approval is complete and accurate to the best of his/her knowledge.

Signature: Sam Lebel

Name (print): Sam Lebel, PE

Date: 1.20.2022

Re/Cert/Lic No: _____

Engineer X

Geologist _____

Soil Scientist _____

Land Surveyor _____

Site Evaluator _____

Active Member of the Maine Bar _____

Professional Landscape Architect _____

Fee Worksheet

Use this form to help determine the permit fee. The fee is based upon the amount of disturbed area associated with the project. **THE EXAMPLE BELOW IS NOT BASED ON CURRENT FEES.** To determine current stormwater licensing fees, please visit the Department's website at: <http://www.maine.gov/dep/permits/>

NOTE: Ditches, swales, ditch turn-outs, level spreaders, and similar Best Management Practices (BMPs) used solely to convey or discharge water to a vegetated buffer are not considered, by themselves, to constitute structural BMPs, provided that the applicant assumes that all water quality treatment takes place in the buffer. If any treatment is assumed within the BMPs used to convey water to the buffer, they are treated as structural BMPs for the purposes of determining the applicable fee (and review period). "Disturbed area" and "impervious area" are defined in Chapter 500, Section 2(F) and (L).

Example (a): If solely vegetative control measures are used (e.g. buffers), using an example fee of \$250.00* for up to one acre of disturbed area, plus \$125.00† for each additional whole acre of disturbed area, the total fee is calculated as shown below.

Project will create 2.34 acres of disturbed area.

$$\text{Fee} = \$250.00 + [\$125.00 \times (1)] = \$375.00$$

Your fee:

Current fee from fee schedule plus [1/2 current fee times # additional whole acres] equals application fee
 \$ _____ + [\$ _____ X (____)] = \$ _____

Example (b): If any structural control measures are used (e.g. underdrained filters, ponds, infiltration systems), using an example fee of \$500.00 for up to one acre of disturbed area, plus \$250.00 for each additional whole acre of disturbed area, the total fee is calculated as shown below.

Project will create 2.34 acres of disturbed area.

$$\text{Fee} = \$500.00 + [\$250.00 \times (1)]. \text{ Fee} = \$750.00.$$

Your fee:

Current fee from fee schedule plus [1/2 current fee times # additional whole acres] equals application fee
 \$ 500 + [\$ 250 X (1)] = \$ 750

* The total fee for the first acre of disturbed area is obtained by combining the processing and licensing fees contained in the current fee schedule.

† The fee for each additional whole acre of disturbed area is one-half the combined processing and licensing fee.

Public Notice: Notice of Intent to File

Please take notice that

Douglass Commons, LLC 10 Free St. 2nd Floor, Portland ME, 04101

(Name, Address and Phone # of Applicant)

phone: (207) 805-3578

is intending to file a Stormwater Law permit application with the Maine Department of Environmental Protection pursuant to the provisions of 38 M.R.S.A. § 420-D on or about January 15, 2022

(anticipated filing date)

This application is for

The proposed redevelopment of a vacant lot to 8 buildings of 120 residential units.

(description of the project)

43/91 Douglass Ave., Portland, ME 04101 (Former West School)

(project location)

A request for a public hearing or a request that the Board of Environmental Protection assume jurisdiction over this application 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. A public hearing may or may not be held at the discretion of the Commissioner or Board of Environmental Protection. 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 Environmental Protection's office in Portland, Augusta or Bangor) (circle one) during normal working hours. A copy of the application may also be seen at the municipal

offices in Portland, Maine.
(town)

Written public comments may be sent to the regional office in Portland, Augusta, or Bangor where the application is filed for public inspection.

MDEP, Central Maine Regional Office, 17 State House Station, Augusta, Maine 04333
MDEP, Southern Maine Regional Office, 312 Canco Road, Portland, Maine 04103
MDEP, Eastern Maine Regional Office, 106 Hogan Road, Bangor, Maine 04401

4. Certificate of Good Standing

Please see the attached Certificate of Good Standing from the Department of the Secretary of State for Douglass Commons, LLC.





MAINE

Department of the Secretary of State
Bureau of Corporations, Elections and Commissions

Corporate Name Search

Information Summary

[Subscriber activity report](#)

This record contains information from the CEC database and is accurate as of: Wed Jan 12 2022 11:34:21. Please print or save for your records.

Legal Name	Charter Number	Filing Type	Status
DOUGLASS COMMONS, LLC	20217618DC	LIMITED LIABILITY COMPANY (DOMESTIC)	GOOD STANDING

Filing Date	Expiration Date	Jurisdiction
03/03/2021	N/A	MAINE

Other Names (A=Assumed ; F=Former)

NONE

Clerk/Registered Agent

AMY CULLEN
C/O THE SZANTON COMPANY
482 CONGRESS ST STE 203
PORTLAND, ME 04101

[Back to previous screen](#)

[New Search](#)

Click on a link to obtain additional information.

List of Filings

[View list of filings](#)

Obtain additional information:

Certificate of Existence [\(more info\)](#)

Short Form without amendments (\$30.00)	Long Form with amendments (\$30.00)
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You will need Adobe Acrobat version 3.0 or higher in order to view PDF files.
If you encounter problems, visit the [troubleshooting page](#).



If you encounter technical difficulties while using these services, please contact the [Webmaster](#). If you are unable to find the information you need through the resources provided on this web site, please contact the Bureau's Reporting and Information Section at 207-624-7752 or [e-mail](#) or visit

5. Title, Right or Interest

Please see attached for purchase agreements.



PURCHASE AND SALE AGREEMENT

THIS PURCHASE AND SALE AGREEMENT (this “Agreement”) is made this 21st day of May, 2021 (the “Effective Date”) by and between the CITY OF PORTLAND, a body politic and corporate located in Cumberland County, Maine, (hereinafter referred to as “Seller” or “City”), and Douglass Commons, LLC, a Maine limited liability company having a mailing address as provided below (hereinafter referred to as “Buyer”).

RECITALS

WHEREAS, the CITY is the owner of approximately 3.40 acres of land at or near 43 & 91 Douglass Street, Portland, Maine (the “Premises”) and did advertise RFP #20067 dated April 10, 2020, entitled Request for Proposals for Disposition and Development of City-Owned Property Located at 43 and 91 Douglass Street, a copy of which is attached hereto as Exhibit A and incorporated herein (the “Request for Proposals”) (the Premises is identified in the City’s tax records as CBL 078 C002 and a portion of 078 B007 together with the 60 ft. wide proposed street situated between the two parcels, as is generally depicted on the Boundary Survey dated March 1, 2021 prepared by Owen Haskell, Inc. for The Szanton Company, a copy of which is attached as Exhibit B); and

WHEREAS, Buyer submitted a proposal dated June 15, 2020 in response to the Request for Proposals, a copy of which is attached hereto as Exhibit C and incorporated herein (the “Proposal”); and

WHEREAS, Buyer desires to purchase and develop the Premises, and the City desires to convey the Premises to Buyer, subject to the terms and conditions set forth herein.

NOW THEREFORE, in consideration of the foregoing and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties, intending to be legally bound, hereby agree as follows:

1. **SALE.** City agrees to sell the Premises to Buyer, and Buyer agrees to purchase the Premises in accordance with the terms and conditions set forth in this Agreement. This Agreement is for the sale of land only.
2. **CONSIDERATION.** The purchase price for the Premises shall be Four Hundred Seventy-Five Thousand Dollars (\$475,000.00) (the “Purchase Price”), subject to the following cost adjustments and conditions:
 - a. Buyer shall deliver to the City the sum of Ten Thousand Dollars (\$10,000.00) (the “Deposit”) within 3 business days after the full execution of this Agreement, which the City shall hold in a non-interest bearing account. The Deposit shall be governed by the terms and conditions of this Agreement and shall be fully refundable until the end of the Due Diligence Period as that term is defined below.
 - b. The Buyer shall pay the remainder of the Purchase Price to the City by wire transfer (or as otherwise reasonably requested by the City) at closing.

3. TITLE AND DUE DILIGENCE.

- a. Due Diligence Period. Buyer will have from the Effective Date until 4:00 PM Eastern Time on the day that is eighteen (18) months after the Effective Date (the “Due Diligence Period”) to complete any surveys, environmental review, inspections, and title examinations, and to obtain any zone change, site plan approval, and any other permits and regulatory approvals required for the Project. Buyer may, in its sole discretion, notify the City in writing that the Buyer elects to terminate the Due Diligence Period sooner and proceed to closing. Within ten days of the Effective Date, the City shall provide copies of, or reasonable access to, all known, non-confidential City files regarding the Premises, including without limitation title files.
- b. Property Description. The legal description of the Premises contained in the deed will be a survey description based upon a survey plan that will more specifically describe the Premises. The parties acknowledge and agree that the survey attached as Exhibit B is a preliminary draft prepared by Buyer and is subject to change after review, amendment, and approval by both parties. The City will notify Buyer of any objections to the survey within 30 days after the Effective Date. Within 10 days after receipt of any such objection, the Buyer will either provide the City with a revised survey addressing City’s objections to City’s satisfaction, or notify the City that Buyer will not change the survey, in which case the City, will have the right to terminate this Agreement, return the Deposit to Buyer, and neither party shall have any further obligation to the other. Upon City’s acceptance of the survey, Buyer will provide the City with a draft legal description for the Premises, which shall be based on the survey and be subject to the City’s review and approval. The survey and description of the Premises will be prepared by the Buyer at its sole expense. The parties will work together in good faith to complete their review and approval of the survey and legal description on or before the day that is 90 days after the Effective Date.
- c. Rezoning Contingency. Buyer proposes to obtain the Portland City Council’s approval to rezone the Premises (the “Rezoning Approval”) to increase residential density for its development of the Premises as described in the Proposal (the “Project”). The Buyer will be responsible for obtaining, at its sole expense, the Rezoning Approval and any other regulatory approvals required for the Project prior to Closing. Buyer may terminate this Agreement and receive a full refund of the Deposit if the Rezoning Approval is not received.
- d. Financing Contingency. The Buyer’s obligation to close is contingent on obtaining construction and permanent financing for the Project that the Buyer, in its discretion, determines is sufficient to put the Project on a sound financial footing. That financing is anticipated to include, but not be limited to, the following: (i) for the residential rental portion of the project an allocation of Federal low-income housing tax credits (“LIHTCs”), other

financing provided by Maine State Housing Authority (“MaineHousing”) and affordable housing tax increment financing from the City including a Credit Enhancement Agreement and (ii) for the cooperative housing portion of the project permanent financing under the U.S. Department of Housing and Urban Development section 213 program and affordable housing tax increment financing from the City including a Credit Enhancement Agreement. Buyer may terminate this Agreement and receive a full refund of the Deposit if the financing contingency described above is not met during the Due Diligence Period.

- e. Title and Survey Objections. Buyer will have until the end of the Due Diligence Period to deliver to City any written objections to title, environmental, or survey matters (other than the permitted exceptions identified herein) that materially affect insurability or use. Objections not made prior to the end of the Due Diligence Period will be deemed waived; provided, however, that objections pertaining to matters of record environmental, or survey matters first appearing after the end of the Due Diligence Period may be made at any time prior to the closing.
- f. Option to Cure. In the event of a title or survey objection, City will have the option, but not the obligation, to cure the objection and will notify Buyer of its election within ten (10) business days after receipt of the objection. In the event that the City elects to cure the objection, it will have sixty (60) days from the date of the notice of election, or such other reasonable time as the parties may agree, to cure the objection. In the event that the City does not elect to cure the objection, or, having elected to cure the objection fails to timely do so to Buyer’s reasonable satisfaction, Buyer will have the option to (1) terminate this Agreement and obtain a refund of the Deposit (after which neither party will have any further obligation or liability to the other under this Agreement), (2) waive the objection and close, or (3) undertake the cure of such objection at its own expense (in which case it shall have 60 days to do so).
- g. Deed. City shall convey the Premises to Buyer at the closing in fee simple by a municipal quitclaim deed without covenant. Title shall be good and insurable title, free and clear of all encumbrances except (i) easements of record and easements described herein, including, without limitation, an easement to be reserved by, and in form and substance satisfactory to the City and Buyer, the City for access to, and maintenance, repair, and replacement of, the trail located between the Premises and the I-295 corridor; (ii) easements for utilities servicing the property, in form and substance satisfactory to the City and Buyer, including, without limitation, Utility and sewer (iii) zoning ordinances, and (iv) real estate taxes not yet due and payable. Further, Buyer acknowledges that the deed shall contain a restriction stating that in the event that the Premises or any portion thereof shall be exempt from real and personal property taxes, by transfer, conversion, or otherwise, then the then-owner of the exempt portion shall make annual payments to the City in lieu of taxes in the amount equal to

the amount of property taxes that would have been assessed on the exempt portion of the real and personal property situated on the Premises had such property remained taxable. Such restriction shall also confirm that Buyer and its successors and assigns shall possess and be vested with all rights and privileges as to abatement and appeal of valuations, rates, and the like as are accorded owners of real and personal property in Maine. The City shall provide a draft of the deed, and of any declaration of covenants and restrictions pursuant to section 11, to Buyer one month before the end of the Due Diligence Period, and the City and Buyer shall in good faith endeavor to agree on the form of the deed prior to the end of the Due Diligence Period.

- h. Existing Natural Gas Equipment and Easement. The City has informed Buyer that the City believes that all or a portion of the existing natural gas pipe and other equipment depicted on Exhibit B may be actually located outside of the easement provided by the City to Unitil. The City shall use best efforts to work with Unitil to resolve the actual location of the gas pipeline and equipment and amend the easement, if necessary, within three months of the Effective Date. If City is unable to amend the Unitil easement to Buyer's satisfaction, Buyer shall have the right to terminate this Agreement as set forth in subsection (i) below.
- i. Buyer's Right to Terminate. The Buyer may terminate this Agreement at any time during the Due Diligence Period if, in the exercise of its sole discretion, it decides to not proceed with the Project by giving written notice of termination to the City in which case the City shall return the Deposit to Buyer and neither party shall have any further obligations to the other.

4. INSPECTIONS.

- a. During the Due Diligence Period, Buyer and its employees, consultants, contractors and agents shall have the right, at Buyer's expense, to enter on the Premises at reasonable times in order to (i) inspect the same, (ii) conduct engineering studies, percolation tests, geotechnical exams, environmental assessments, and other such studies, tests, exams, and assessments, and (iii) do such other things as Buyer determines, it is sole discretion, to be required to determine the suitability of the Premises for Buyer's intended use (collectively, the "Inspections"). The City acknowledges that such Inspections may include the digging of test pits, which the City hereby approves.
- b. Buyer agrees to defend, indemnify and hold harmless the City against any mechanics liens that may arise from the activities of Buyer and its employees, consultants, contractors and agents on the Premises.
- c. Buyer shall exercise the access and inspection rights granted hereunder at its sole risk and expense, and Buyer hereby releases the City from, and

agrees to indemnify, defend, and hold the City harmless against, any and all losses, costs, claims, expenses and liabilities (including without limitation reasonable attorney fees and costs) (collectively, "Damages") suffered by the City on account of any injury to person or damage to property arising out of the exercise by Buyer of its rights hereunder, except to the extent that such Damages result from the act or omission of the City.

- d. Buyer shall cause any contractors, consultants or any other party conducting the Inspections to procure automobile insurance, if applicable, and commercial general liability insurance coverage in amounts of not less than Four Hundred Thousand Dollars (\$400,000.00) per occurrence for bodily injury, death and property damage, listing the City as an additional insured thereon, and also Workers' Compensation Insurance coverage to the extent required by law; the forms of all such insurance to be subject to City's Corporation Counsel's reasonable satisfaction.
- e. In the event that Buyer does not purchase the Premises, Buyer agrees to either return the Premises as nearly as possible to its original condition after conducting the Inspections; provided, however, the City hereby acknowledges and agrees Buyer shall have no obligation to clean-up, remove or take any other action with respect to any disturbance of any pre-existing environmental contamination on the Premises caused by such inspections, studies, tests, exams, and assessments, and that Buyer shall have no obligation to clean-up, remove or take any other action with respect to any pre-existing environmental contamination disturbed thereby.
- f. The parties hereto acknowledge and agree that it is a condition to Buyer's obligations under this Agreement that the results of the Inspections be acceptable to Buyer in its sole discretion. If the results of such due diligence are not acceptable to Buyer in its sole discretion, and if Buyer exercises its right to terminate this Agreement, and neither party shall have any further obligations or liabilities under this Agreement except as expressly set forth in this Agreement.

- 5. **REAL ESTATE TAXES, PRORATIONS AND TRANSFER TAX.** Buyer shall be liable for all real estate taxes beginning as of the start of fiscal year following the closing and continuing thereafter. Because the Property is currently owned by the City of Portland, which is exempt from real estate taxes, no taxes were assessed or will be due for any portion of the tax year during which the closing occurs, and no taxes will be prorated at the closing. Any utilities for the Property shall be prorated as of the closing. The Maine real estate transfer tax shall be paid for by Buyer in accordance with 36 M.R.S.A. § 4641-A. City is exempt from paying the transfer tax pursuant to 36 M.R.S.A. § 4641-C. The recording fee for the deed of conveyance and any expenses relating to Buyer's financing or closing shall be paid for by Buyer.
- 6. **DEFAULT AND REMEDIES.** Prior to Closing, in the event that Buyer defaults hereunder for a reason other than the default of the City, the City may terminate this Agreement and retain the Deposit, and neither party shall have any further obligation

to the other. In the event that Buyer defaults on any matters addressed in this Agreement that survive Closing, Seller may pursue all available legal and equitable remedies. In the event City defaults under this Agreement, and if Buyer is not then in default hereunder, Buyer shall have the right to pursue specific performance or terminate this Agreement and elect in substitution therefor, as its sole remedy, the right to a return of the Deposit.

7. **RISK OF LOSS.** The risk of loss or damage to the Premises by fire, eminent domain, condemnation, or otherwise, until transfer of title hereunder, is assumed by the City. The Premises is to be delivered in substantially the same condition as of the Effective Date unless otherwise stated. In the event City is not able to deliver the Premises as stated, Buyer may terminate this Agreement, obtain a return of the Deposit, and neither party shall have any further obligations or liabilities under this Agreement except as expressly set forth in this Agreement.
8. **PROPERTY SOLD "AS IS, WHERE IS."** Buyer acknowledges that Buyer has had an opportunity to inspect the Premises, and to hire professionals to do so, and that Premises will be sold "as is, where is" and "with all faults." City, and its agents, make no representations or warranties with respect to the accuracy of any statement as to boundaries or acreage, or as to any other matters contained in any description of the Premises, or as to the fitness of the Premises for a particular purpose, or as to development rights, merchantability, habitability, or as to any other matter, including without limitation, land use, zoning and subdivision issues or the environmental, mechanical, or structural condition of the Premises. Acceptance by Buyer of the Deed at closing and payment of the purchase price shall be deemed to be full performance and discharge by the City of every agreement and obligation contained herein.
9. **ENVIRONMENTAL INDEMNIFICATION.** Buyer covenants and agrees to indemnify, defend, and hold the City harmless from and against any and all claims, damages, losses, liabilities, obligations, settlement payments, penalties, assessments, citations, directives, claims, litigation, demands, defenses, judgments, costs, or expenses of any kind, including, without limitation, reasonable attorneys', consultants', and experts' fees incurred in investigating, defending, settling, or prosecuting any claim, litigation or proceeding, that may at any time be imposed upon, incurred by or asserted or awarded against Buyer or the City and relating directly or indirectly to the violation of or compliance with any federal, state, or local environmental laws, rules, or regulations governing the release, handling or storage of hazardous wastes or hazardous materials and affecting all or any portion of the Premises, except to the extent that such a claim results directly from the City's release, handling or storage of hazardous wastes or hazardous materials on the Premises. This duty to indemnify, defend, and hold harmless shall be included in a covenant in the deed and shall run with the land conveyed and be binding upon Buyer's successors, assigns, and transferees.
10. **CLOSING.** Time is of the essence in the performance of this agreement. The closing shall be held at the offices of Buyer's counsel at a date and time specified by

two weeks' written notice from Buyer to the City on or before the day that is twenty (20) months after the Effective Date (the "Closing Date"). At the Closing:

- a. The City shall execute, acknowledge and deliver to Buyer a municipal quitclaim deed conveying to Buyer good and insurable title to the Premises, free and clear of all encumbrances except as otherwise set forth herein.
- b. Buyer shall deliver the Purchase Price to the City.
- c. Each party shall deliver to the other such other documents, certificates and the like as may be required herein or as may be necessary to carry out the obligations under this Agreement.
- d. Buyer shall deliver evidence, reasonably satisfactory to City's Corporation Counsel, that the entity receiving title to the Premises is in good standing under Maine law, and that the individuals acting at Closing and executing documents on behalf of Buyer are authorized to do so.

11. BUYER'S POST CLOSING OBLIGATIONS; RIGHTS OF CITY TO REPURCHASE PROPERTY.

As set forth in the Proposal, the Project includes a rental housing project and a limited equity cooperative housing project (hereinafter referred to as the "Rental Housing Project" and the "Cooperative Housing Project," respectively). Within thirty-two (32) months of the Effective Date, Buyer shall commence construction of both the Rental Housing Project and the Cooperative Housing Project.

a. Rental Housing Project.

- i. The Rental Housing Project will consist of an apartment building including no less than 56 units, with a mixture of one-, two- and three-bedroom units. In no event shall the Rental Housing Project include fewer than 17 two-bedroom units and 10 three-bedroom units.
- ii. For a period of 99 years after the Rental Housing Project has been completed, at least 40 units in the Rental Housing Project shall be affordable to households earning less than or equal to 60% of the area median income (AMI), adjusted for family size, based on figures published annually by HUD for the Portland Metropolitan Statistical Area. If at a time in the future, HUD no longer provides these annual figures, the City will identify another similar method of determining income guidelines for affordability. For purposes of this Agreement, "affordable" means that the percentage of income a household is charged in rent and other housing expenses including utilities, shall not exceed 30% of the household's gross monthly income, except as provided below if the Project is financed with the LIHTC program. Minimum household size allowed per unit and the formula for calculating maximum allowable monthly rent is detailed on Exhibit D, which is attached hereto and made a part hereof. However, if the Rental Housing Project is financed under the Federal Low Income Housing Tax Credit (LIHTC) Program, maximum allowable rent shall

be the maximum allowable rent under the Federal LIHTC Program during the applicable time period for that Program. Upon expiration of any affordability restrictions recorded in the Cumberland County Registry of Deeds under the Federal LIHTC Program, the provisions of Exhibit D shall apply to the Rental Housing Project for the remainder of the 99-year period.

b. Cooperative Housing Project.

- i. The Cooperative Housing Project will include at least 52 units, with a mixture of one-, two-, and three-bedroom units owned by a Limited Equity Cooperative Corporation (the “Co-op”) and leased individually to the resident shareholders of the Co-op (the holding of a Co-op share and lease agreement together constituting a resident’s “cooperative interest”). In no event shall the Cooperative Housing Project include fewer than 12 two-bedroom units and 22 three-bedroom units.
- ii. Upon the issuance of a certificate of occupancy for all or a portion of the Cooperative Housing Project, or at such earlier or later time as the Buyer, in its discretion, may determine, the Buyer shall convey the Cooperative Housing Project to the Co-op organized in accordance with the Maine Cooperative Affordable Housing Ownership Act, 13 M.R.S.A. §1741-1762, as may be amended or any successor provisions thereto (the “Act”). References below to particular provisions of the Act include any successor provisions to the provisions referenced.
- iii. Rent Restrictions. For a period of 99 years after the Cooperative Housing Project has been completed, all residential units in the Cooperative Housing Project shall be affordable to households earning less than or equal to 100% of the area median income (AMI), adjusted for family size, based on figures published annually by HUD for the Portland Metropolitan Statistical Area. If, at a time in the future, HUD no longer provides these annual figures, the City will identify another similar method of determining income guidelines for affordability. For purposes of this Agreement, “affordable” means that the percentage of income a household is charged in connection with (i) its cooperative interest and other housing expenses, including utilities, shall not exceed 30% of the household’s gross monthly income or (ii) its rent and other housing expenses, including utilities, shall not exceed 30% of the household’s gross income. Minimum household size allowed per unit and the formula for calculating maximum allowable purchase price and monthly rent is detailed on Exhibit D, which is attached hereto and made a part hereof.
- iv. Income Restrictions. Except as provided below regarding the initial sale of cooperative interests, a household may only purchase a cooperative interest in a unit or if its income is not more than 100% of the AMI, adjusted for family size, as published by the U.S. Department of Housing and Urban Development (“HUD”) at the time of purchase. This income test will be used only at the time of the household’s purchase. No income test shall apply for subsequent

transfers to family members (as reasonably defined by the Co-Op Entity) or to a cooperative membership interest which is inherited or transferred upon death to a beneficiary. At the time of the initial sale of cooperative membership interests in the Co-op, up to 20% of the cooperative membership interest may be sold to households earning up to 120% AMI. All subsequent sales must be to households earning no more than 100% of AMI.

- v. The articles of organization for the Co-op shall provide that in the event the Co-op shall be dissolved, its assets will be distributed in accordance with §1754 (6) of the Act. In such dissolution, the Co-Op's assets will be used first to pay all debts and other obligations of the Co-op, then to make any distributions to members required under the Co-Op's limited equity organizational documents, then any remaining balance shall be paid to the City or, at the Buyer's option with the consent of the City not to be unreasonably withheld, to another organization permitted under §1754 (6) of the Act.

c. **Option to Repurchase All or a Portion of the Premises.**

(i) If Buyer, its successors, assigns, or transferees commences no construction of any portion of the Project to be located on the Premises within 32 months of the Effective Date, the City shall have the right, but not the obligation, to repurchase the Premises and all improvements thereon (collectively, the "Property") at the Purchase Price (the "Property Repurchase Price") plus all commercially reasonable and documented, design, development, construction, and regulatory approval expenses ("Approved Expenses") incurred by Buyer, or successors, to the date on which the City notifies Buyer, its successors or assigns, of its intent to exercise its option to repurchase the Property. The parties acknowledge and agree that the Approved Expenses are intended to include only costs incurred directly in connection with the development of the Property for documents, agreements, designs, plats, plans, approvals, and construction, the rights to which may be assigned or transferred to the City. In no event shall the **Approved** Expenses include salaries, developer fees, or the like paid by Buyer, its successors or assigns to their members, shareholders, partners, employees, or agents.

(ii) If Buyer conveys a portion of the Property (the "Co-Op Site"), which conveyance may be by creating and conveying a land condominium unit, to a separate entity (the "Co-Op Entity") for purposes of that entity developing the Cooperative Housing Project, and the Co-Op Entity fails to commence construction of the Cooperative Housing Project within 32 months of the date of this agreement or fails to complete construction of the Cooperative Housing Project within fifty (50) months of the date of this agreement, the City shall have the right, but not the obligation, to purchase the Co-Op Site and all improvements thereon for a price equal to One Hundred Thousand Dollars (\$100,000) ("Co-Op Repurchase Price") plus Approved Expenses incurred by Buyer, or successors, for purposes of developing the Co-Op Site to the date on which the City notifies Buyer, its

successors or assigns, of its intent to exercise its option to repurchase. Any conveyance of the Co-Op Site to the City will (i) be subject to any and all rights of the Rental Housing Entity (defined below) or pursuant to any condominium documents that affect or burden the Co-Op Site and (ii) include any and all rights of the Co-Op Entity over the Rental Housing Site (as defined below) or pursuant to any condominium documents.

(iii) If Buyer conveys a portion of the Property (the “Rental Housing Site”), which conveyance may be by creating and conveying a land condominium unit, to a separate entity (the “the Rental Housing Entity”) for purposes of that entity developing the Rental Housing Project, and the Rental Housing Entity fails to commence construction of the Rental Housing Project within 32 months of the date of this agreement or fails to complete construction of the Rental Housing Project within fifty (50) months of the date of this agreement, the City shall have the right, but not the obligation, to purchase the Rental Housing Site and all improvements thereon for a price equal to \$375,000 (the “Rental Housing Repurchase Price”) plus Approved Expenses incurred by Buyer, or successors, for purposes of developing the Rental Housing Site to that the date on which the Property is conveyed to the City. Any conveyance of the Rental Housing Site to the City will (i) be subject to any and all rights of the Co-Op Housing Entity (defined below) or pursuant to any condominium documents that affect or burden the Rental Housing Site and (ii) include any and all rights of the Rental Housing Entity over the Co-Op Site (as defined below) or pursuant to any condominium documents.

(iv) Any conveyance to the City pursuant to the City’s option to purchase shall be subject to all mortgages of record placed by Buyer, its successors and assigns, but only if such mortgages secure financing of the development of the Premises (the “Permitted Mortgages”). In the event that there are any Permitted Mortgages on the Property, or portion thereof, at the time City exercises its right to repurchase, the parties agree that the City shall have the option to pay the applicable Repurchase Price and Approved Expenses to the first priority mortgagee. City and its successors and assigns agrees to enter into such agreements on reasonable commercial terms as may be requested by the lenders and/or investors of Buyer, its successors and assigns, to provide such lenders or investors notice and cure rights. In furtherance, but not in limitation of the foregoing, as long as MaineHousing holds a Permitted Mortgage on the Premises, no notice given by the City to the Buyer, its successors and assigns under the City’s deed shall be valid unless and until a copy of the notice is given to MaineHousing at Maine Housing at Maine State Housing Authority, 26 Edison Drive, Augusta, Maine 04330, Attn: Legal Department. MaineHousing shall have the right, but not the obligation, to cure any default or perform any obligation under the City’s deed for thirty (30) days beyond any period during which Buyer, its successors and assigns may cure any default or perform any obligation under the City’s deed. If the City exercises any of the above right to purchase, Buyer or its successor

shall convey the Property to the City, free and clear of all encumbrances other than the Permitted Mortgages and any utility easements granted by Buyers its successors and assigns, and assign to the City all contracts, plans, and other documents related to the design, construction, and regulatory approvals for the Project. The City agrees to make reasonable modifications to the provisions regarding the City's repurchase rights to facilitate mortgage and development financing for the Project. The rights to purchase shall be assignable by the City.

(v) Buyer anticipates that the Co-Op entity will grant a mortgage on the Co-Op Site to a lender or investor to finance the purchase of the Co-Op Site and preconstruction development costs including the Co-Op's \$100,000 portion of the acquisition price, Approved Expenses and related customary and commercially reasonable financing costs (such financing is referred to as the "Pre-Development Mortgage Loan"). Buyer, for itself, its successors, and assigns, including the Co-Op Entity, agrees that it will not encumber the Co-Op Site with mortgages other than the mortgage securing Pre-Development Mortgage Loan and that such mortgage shall not exceed in the aggregate the Co-Op Pre-Development Appraised Value (as defined below) at any time prior to the closing of the full construction financing for the Cooperative Housing Project (the "Co-Op Construction Loan Closing"). Prior to the Co-Op Construction Loan Closing, notwithstanding any other provision of this Agreement, the total amount that the City is required to pay to repurchase the Co-Op Site upon exercise of its option as provided above, including Approved Expenses, shall be limited to the then-outstanding balance of the mortgage securing the Pre-Development Mortgage Loan.

The term "Co-Op Pre-Development Appraised Value" means the appraised value of the Co-Op Site as determined by an appraisal, made in accordance with all applicable professional standards, obtained by the lender making the pre-development mortgage loan to the Co-Op entity. The Co-Op entity agrees to provide a copy of that appraisal to the City prior to entering into such mortgage loan.

The provisions of this Section 11(c)(v) shall cease to apply as of the Co-Op Construction Loan Closing.

- d. For all purposes of this Section 11, construction will be deemed completed for a portion of the Project upon the issuance of a Certificate of Occupancy by the City for that portion. Upon termination of the City's option with respect to a portion of the Project, the City will, at the request of the Buyer, its successors and assigns execute and record an affidavit indicating that the City's option has terminated with respect to all or a portion of the Project. Notwithstanding anything else to the contrary in this Section 11, in the event that the City fails to give the notice exercising the City's option on or before the date that is 31 months after the Closing Date, then the City's

option shall terminate automatically without the need for further writing or recording.

- e. Notwithstanding the above provisions, if after closing, Buyer, or its successors, assigns, or transferees determines that it is not feasible to develop the Property as a rental housing project using Maine State Housing Authority financing or as a cooperative leasing/ownership structure, Buyer may develop the Property using a different financing or leasing/ownership structure so long as the unit mix and affordability criteria provided in this Agreement are satisfied. If the Buyer or its successors does so within the time periods specified, the City shall not have the right to repurchase the Property.
- f. The provisions of this Section 11 will survive closing and will be included in greater detail in the City's deed to Buyer or in a declaration of covenants, conditions and restrictions executed before or at the time of Closing, which shall be recorded in the Cumberland County Registry of Deeds.

12. ENTIRE AGREEMENT. This Agreement represents the entire and complete Agreement and understanding between the parties and supersedes any prior agreement or understanding, written or oral, between the parties with respect to the acquisition or exchange of the Property hereunder. This Agreement cannot be amended except by written instrument executed by City and Buyer.

13. NON-WAIVER. No waiver of any breach of any one or more of the conditions of this Agreement by either party shall be deemed to imply or constitute a waiver of any succeeding or other breach hereunder.

14. HEADINGS AND CAPTIONS. The headings and captions appearing herein are for the convenience of reference only and shall not in any way affect the substantive provisions hereof.

15. BINDING EFFECT. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, administrators, successors and assigns.

16. TIME. The City and Buyer each confirm and agree that each of the time periods set forth herein are essential provisions of the terms of this Agreement.

17. GOVERNING LAW. This Agreement shall be construed in all respects in accordance with, and governed by, the laws of the State of Maine. All parties hereto hereby consent to the exclusive jurisdiction of the Superior Court for the County of Cumberland in the State of Maine, for all actions, proceedings and litigation arising from or relating directly or indirectly to this Agreement or any of the obligations hereunder, and any dispute not otherwise resolved as provided herein shall be litigated solely in said Court. If any provision of this Agreement is determined to be invalid or unenforceable, it shall not affect the validity or enforcement of the remaining provisions hereof.

18. NOTICE. All notices, demands and other communications hereunder shall be in writing and shall be deemed to have been duly given on the date of service if served personally on the party to whom notice is to be given, or on the first business day after the notice is delivered to an overnight delivery service with delivery confirmation, addressed to the recipients at the addresses set forth below. Either party may change addresses for purposes of this paragraph by giving the other party notice of the new address in the manner described herein.

FOR THE CITY: City of Portland
ATTN: City Manager
389 Congress Street
Portland, ME 04101

With a copy to: The Office of the Corporation Counsel at the same address.

FOR BUYER: Douglass Commons LLC
c/o The Szanton Company
482 Congress, Suite 203
Portland, ME 04101

And to:

Maine Cooperative Development Partners, LLC
c/o Brian Eng
6 City Center, Fl. 3
Portland, ME 04101

With a copy to: John S. Kaminski
Drummond Woodsum
84 Marginal Way, Suite 600
Portland, ME 04101

19. SIGNATURES; MULTIPLE COUNTERPARTS. This Agreement may be executed in any number of counterparts and by different parties in separate counterparts. Each counterpart when so executed shall be deemed to be an original and all of which together shall constitute one and the same agreement.

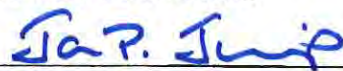
20. BROKERS. The City and Buyer each represent and warrant that they have not dealt with a real estate broker in connection with this transaction. Buyer agrees to indemnify and hold harmless City from any claims made by any broker should Buyer's representation in this paragraph be false. Subject to the limitations of liability set forth in the Maine Tort Claims Act, City agrees to indemnify and hold harmless Buyer from any claims made by any broker should City's representation in this paragraph be false. The foregoing indemnities shall include all legal fees and costs incurred in defense against any such claim, and shall survive closing.

21. RECITALS INCORPORATED BY REFERENCE. The recitals set forth above are incorporated herein by reference and made a part of this Agreement.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed on their behalf by their duly authorized offices or representatives, on the day and year first written above.


WITNESS

CITY OF PORTLAND


Jon P. Jennings
Its City Manager


WITNESS

DOUGLASS COMMONS, LLC

By: 
Printed Name: Nathan S. Szanton
Its Manager

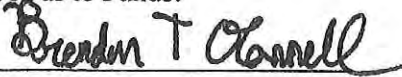
Approved as to Form:


City Corporation Counsel's Office

and

By: 
Printed Name: Brian Eng
Its Manager

Approved as to Funds:


City Finance Department

6. Photos of the Existing Site





Figure 1. Facing approx. north from access driveway.



Figure 2. Facing approx. northeast on site.





Figure 3. Facing approx. southeast on the site.



Figure 4. Facing south on the site.





Figure 5. *Until equipment at access driveway entrance, looking east.*



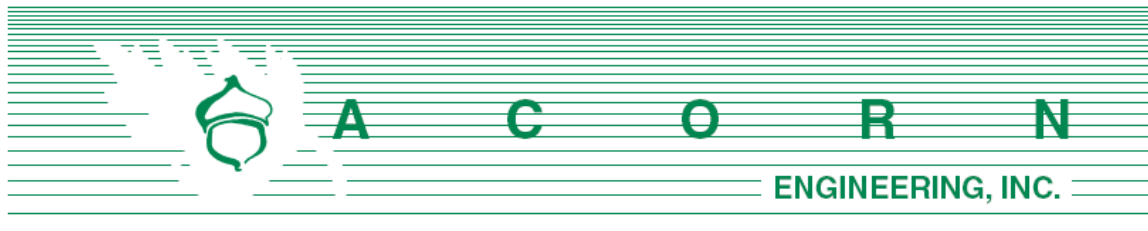
Figure 6. *Facing west towards access driveway in existing parking lot.*



7. Basic Standards Submissions

Please see the attached document, Erosion and Sedimentation Control Plan, developed in accordance with the Basic Standards submission requirements.





K. EROSION & SEDIMENTATION **CONTROL REPORT**

Prepared For:

**Douglass Commons, LLC.
43 & 91 Douglass Street
Portland, Maine 04101**

Prepared By:

**Acorn Engineering, Inc.
65 Hanover Street
Portland, Maine 04101**



January 2022

INTRODUCTION

Acorn Engineering, Inc. has been retained by Douglass Commons, LLC. to provide civil engineering services for the proposed redevelopment of 57 Douglass Street located within the R-5a Zoning District in Portland, Maine. The 3.34-acre parcel was previously the site of a school building and is now vacant. The built-out site will consist of eight stand-alone buildings of 120 residential dwelling units.

The following Erosion and Sedimentation Control Report was developed in accordance with the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and the Maine DEP Chapter 500 Stormwater Management Appendix A and B (1), Amended August 12, 2015. This narrative also meets the standards required in the Maine DEP's Erosion & Sediment Control BMP's Manual, revised in 2016.

1.0 EXISTING CONDITIONS

The proposed project site is located off an access road from Douglass Street adjacent to Douglass Park and Interstate 295. A Boundary & Topographic Survey has been prepared by Owen Haskell, Inc., dated March 1, 2021.

The property is in the R-5A Residential Zone. Abutting Uses include:

- North Douglass Park
- West Residential
- South/East Route 295

The site is currently vacant and was once occupied by the West School. The site in its existing condition is split a ridge middle of the property that drains water in roughly two directions, to the north and south. A small portion of the site drains to the playing fields to the east. The adjacent I-295 corridor basin contributes run-off to the site through an existing culvert. The grades on-site are mostly gentle in the 1 to 5% range with some steeper slopes of 10-15% on the edges of the property in the east and south .

1.1 Existing Soils

Onsite soil information includes the following:

- Soil Conservation Service Medium Intensity Soil Survey for Cumberland County
- United States Department of Agriculture Web Soil Survey

Given the soils information, listed above, no onsite wastewater is proposed; the applicant does not intend to perform a more intense hydric soil boundary delineation because the waiver requirements set forth in the City of Portland Technical Manual – Section 7 – Soil Survey, Rev. 6/17/11 are met.



The area within and surrounding the project includes soil types listed in the table below. The susceptibility of soils to erosion is indicated on a relative “K” scale of values over a range of 0.02 to 0.69. Higher “K” values indicate more erodible soils.

Table 1 - “K” Value		
Soils Type	Subsurface	Substratum
Au Gres Loamy Sand	.15	.15
Deerfield Loamy Fine Sand	.20	.20

The soil “K” value for the soil, listed above, shows a low susceptibility to erosion, as derived from the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County. Although the soil “K” value shows a low susceptibility to erosion, implementation of the proposed Erosion & Sedimentation Measures by the contractor will be important to limit erosion during large storm events.

1.2 Existing Erosion Problems

There are no signs of erosion.

1.3 Critical Areas

There are no critical areas that require special attention during construction.

1.4 Protected Natural Resource

The client is not aware of the presence of any existing significant natural features located on the site as listed in Section 14-526 (b) 1. of the Land Use Code. The project is not located within a watershed classified as an Urban Impaired Stream by the Maine DEP.

1.5 Previous Construction Activity (5 years)

Acorn Engineering, Inc. is not aware of any construction related activities within the project limits within the past 5 years. The West School was demolished on-site within the last few years.

1.6 Timber Harvesting

Acorn Engineering, Inc. is not aware of any timber harvesting within the past five years.



2.0 EROSION CONTROL MEASURES AND SITE STABILIZATION

As part of the site development, the following temporary and permanent erosion and sedimentation control devices shall be implemented. Devices shall be installed as described in this report or within the plan set. See the Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices for further reference.

2.1 Temporary Erosion Control Measures

The following temporary erosion and sedimentation control measures are planned for the project's construction period:

2.1.1 Crushed stone stabilized construction entrances shall be placed at all access points to the project site where there are disturbed areas. The following specifications shall be followed at a minimum:

- Stone size shall be 2-3 inches, or reclaimed or recycled concrete equivalent.
- The thickness of the entrance stone layer shall be no less than 6 inches.
- The entrance shall not be less than 20 feet wide, however not less than the full width of points where ingress or egress occurs. The length shall not be less than 50 feet in length.
- Geotextile fabric (woven or non-woven) shall be placed over the entire entrance area.
- The entrance/exit shall be maintained to the extent that it will prevent the tracking of sediment onto public road ways.

2.1.2 Siltation fence or erosion control berm shall be installed down gradient of any disturbed areas to trap runoff borne sediments until permanent stabilization is achieved. The silt fence or erosion control berm shall be installed per the details provided in the plan set and inspected before and immediately after each rainfall and at least daily during prolonged rainfall. Repairs shall be made if there are any signs of erosion or sedimentation below the fence line or berm. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind the fence or berm, the barrier shall be replaced with a stone check dam.

2.1.3 Hay mulch including hydro seeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulch placed between April 15th and November 1st on slopes of less than 15 percent shall be covered by fabric netting and anchored with staples in accordance with the manufacturer's recommendation. Mulch placed between November 1st and April 15th on slopes equal to or steeper than 8 percent and equal to or flatter than 2:1 shall use mats or fabric netting and anchored with staples in accordance with the manufacturer's recommendation.

2.1.4 At any time of the year, all slopes greater than 3:1 shall be stabilized with Double Net Erosion Control Blanket Bionet SC150BN by North American



Green or Approved Equal, or Erosion Control Mix Slope Protection as detailed within the plans.

- 2.1.5 Douglass Street shall be swept to control mud and dust from the construction site as necessary. Add additional stone to the stabilized construction entrance to minimize the tracking of material off the site and onto the surrounding roadways.
- 2.1.6 During demolition, clearing and grubbing operations, stone check dams shall be installed at any areas of concentrated flow. The maximum height of the check dam shall not exceed 2 feet. The center of the check dam shall be 6 inches below the outer edges of the dam. The contractor shall mulch the side slopes and install stone check dams for all newly excavated ditch lines within 24 hours of their creation.
- 2.1.7 Silt fence stake spacing shall not exceed 6 feet unless the fence is supported with 14-gauge wire in which case the maximum spacing shall not exceed 10 feet. The silt fence shall be “toed” into the ground.
- 2.1.8 Storm drain inlet protection shall be provided to storm drains using any of the following: hay bale drop inlet structures, silt fence drop inlet sediment filter, gravel and wire mesh drop inlet sediment filter, or curb inlet sediment filter. Barriers shall be inspected after every rainfall event and repaired as necessary. Sediments shall be removed when accumulation has reached $\frac{1}{2}$ the design height.
- 2.1.9 Dust control shall be accomplished using any of the following: water, calcium chloride, stone, or an approved MDEP product. Dust control shall be applied as needed to accomplish dust control.
- 2.1.10 Temporary loam, seed, and mulching shall be used in areas where no other erosion control measure is used. Application rates for seeding are provided at the end of this report.
- 2.1.11 Stockpiles shall be stabilized within 7 days of formation unless a scheduled rain event occurs prior to the 7-day window, in which case the stockpile shall be stabilized prior to the rain event. Methods of stabilization shall be mulch, erosion control mix, or erosion control blankets/mats. Silt fence or a wood waste compost filter berm shall be placed downhill of any soil stockpile location.
- 2.1.12 For disturbance between November 1 and April 15, please refer to winter stabilization plan in this report and the Maine Erosion and Sediment Control BMP manual for further information.
- 2.1.13 It is of the utmost importance that stormwater runoff and potential sediment from the construction site be diverted around the proposed underdrains until the trench is backfilled.



2.2 Permanent Erosion Control Measures

The following permanent erosion control measures are intended for post disturbance areas of the project.

2.2.1 All disturbed areas during construction, not subject to other proposed conditions, shall receive a minimum 4" of loam, limed, and mulched. Erosion control blankets or mats shall be placed over the mulch in areas noted in paragraph 4.1 of this report.

2.2.2 All stormwater devices shall be installed, and tributary areas stabilized prior receiving stormwater.

2.2.3 Refer to the Maine Erosion and Sediment Control BMP manual for additional information.

3.0 EROSION AND SEDIMENTATION CONTROL PLAN

3.1 The Construction Management & Erosion Control Plan is included within the plan set.

4.0 DETAILS AND SPECIFICATIONS

4.1 Erosion & Sedimentation Control Details and Specifications are included in the plan set.

5.0 STABILIZATION PLAN FOR WINTER CONSTRUCTION

Winter Construction consists of earthwork disturbance between the dates of November 1 and April 15. If a construction site is not stabilized with pavement, a road gravel base, 75% mature vegetation cover or riprap by November 15, then the site shall be protected with over-winter stabilization. Any area not stabilized with pavement, vegetation, mulching, erosion control mix, erosion control mats, riprap, or gravel base on a road shall be considered open.

The contractor shall limit the work area to areas that work will occur in during the subsequent 15 days and so that it can be mulched one day prior to a snow event. The contractor shall stabilize work areas prior to opening additional work areas to minimize areas without erosion control measures.

The following measures shall be implemented during winter construction periods:

5.1 Sediment Barriers

During frozen conditions, sediment barriers may consist of erosion control mix berms or any other recognized sediment barriers as frozen soil prevents the proper installation of hay bales or silt fences.



5.2 Mulching

All areas shall be considered to be denuded until seeded and mulched. Hay and straw mulch shall be applied at a rate of 150 lb. per 1,000 square feet or 3 tons/acre (twice the normal accepted rate of 75-lbs./1,000 s.f. or 1.5 tons/acre) and shall be properly anchored. Erosion control mix must be applied with a minimum 4-inch thickness. Mulch shall not be spread on top of snow. The snow shall be removed down to a one-inch depth or less prior to application. After each day of final grading, the area shall be properly stabilized with anchored hay or straw or erosion control matting. An area shall be considered to have been stabilized when exposed surfaces have been either mulched or adequately anchored so that ground surface is not visible through the mulch. Between the dates of November 1 and April 15, all mulch shall be anchored by either mulch netting, tracking or wood cellulose fiber. The cover will be considered sufficient when the ground surface is not visible through the mulch. After November 1st, mulch and anchoring of all exposed soil shall occur at the end of each final grading workday.

5.3 Soil Stockpiling

Stockpiles of soil or subsoil shall be mulched for over winter protection with hay or straw at twice the normal rate or with a four-inch layer of erosion control mix. This shall be done within 24 hours of stocking and re-established prior to any rainfall or snowfall.

5.4 Seeding

Between the dates of October 15th and April 1st, loam or seed shall not be required. During periods of above freezing temperatures finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until the final treatment can be applied. If the date is after November 1st and if the exposed area has not been loamed, final grading with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched.

Dormant seeding may be placed prior to the placement of mulch or erosion control blankets. If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5 lbs./1,000 s.f. All areas seeded during the winter shall be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 75% catch) shall be revegetated by replacing loam, seed and mulch. If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.



5.5 Over winter stabilization of disturbed soils

By September 15th, all disturbed soils on areas having a slope less than 15% shall be seeded and mulched. If the disturbed areas are not stabilized by this date, then one of the following actions shall be taken to stabilize the soil for late fall and winter:

- Stabilize the soil with temporary vegetation – By October 1st, seed the disturbed soil with winter rye at a seeding rate of 3lbs per 1,000 s.f., lightly mulch the seeded soil with hay or straw at 75 lbs per 1,000 s.f., and anchor the mulch with plastic netting. Monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or fails to cover at least 75% of the disturbed soil before November 1st, then mulch the area for over-winter protection.
- Stabilize the soil with sod – Stabilize the disturbed soil with properly installed sod by October 1st. Proper installation includes pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.
- Stabilize the soil with mulch – By November 15th, mulch the disturbed soil by spreading hay or straw at a rate of at least 150 lbs per 1,000 s.f. on the area so that no soil is visible through the mulch. Immediately after applying the mulch, anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

5.6 Over winter stabilization of disturbed slopes

All stone-covered slopes shall be constructed and stabilized by November 15th. All slopes to be vegetated shall be seeded and mulched by September 1st. A slope is considered a grade greater than 15%. If a slope to be vegetated is not stabilized by September 1st, then one of the following action shall be taken to stabilize the slope for late fall and winter:

- Stabilize the soil with temporary vegetation and erosion control mats – By October 1st the disturbed slope shall be seeded with winter rye at a seeding rate of 3 lbs per 1,000 s.f. and then install erosion control mats or anchored mulch over the seeding. If the rye fails to grow at least three inches or fails to cover at least 75% of the slope by November 1st, then the contractor shall cover the slope with a layer of erosion control mix or with stone riprap.
- Stabilize the soil with sod – The disturbed slope shall be stabilized with properly installed sod by October 1st. Proper installation includes the contractor pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. The contractor shall not use late-season sod installation to stabilize slopes having a grade greater than 3H:1V or having groundwater seeps on the slope face.



- Stabilize the soil with erosion control mix – Erosion control mix shall be properly installed by November 15th. The contractor shall not use erosion control mix to stabilize slopes having grades greater than 2H:1V or having groundwater seeps on the slope face.
- Stabilize the soil with stone riprap – Place a layer of stone riprap on the slope by November 15th. A registered professional engineer shall be hired to determine the stone size needed for stability on the slope and to design a filter layer for underneath the riprap.

6.0 INSPECTION AND MAINTENANCE

A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct periodic visual inspections of installed erosion control measures. The frequency of inspection shall occur at least once every two weeks, as well as after a “storm event”. A “storm event” shall consist 0.5 inches of rain within a 24-hour period. The following Erosion and Sediment Control - Best Management Practices (BMP's) shall inspected in the manner as described.

6.1 Sediment Barriers

Hay bale barriers, silt fences and filter berms shall be inspected and repaired for the following if there are any signs of erosion or sedimentation below them. If there are signs of undercutting at the center or the edges of the barrier, or impounding of large volumes of water behind them, sediment barriers shall be replaced with a temporary check dam. Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits should be removed when deposits reach approximately one-half the height of the barrier. Filter berms should be reshaped as needed. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.

6.2 Stabilized Stone Construction Entrances

The exit shall be maintained in a condition that will prevent tracking of sediment onto public rights-of-way. When the control pad becomes ineffective, the stone shall be removed along with the collected soil material and redistributed on site in a stable manner. The entrance should then be reconstructed. The contractor shall sweep or wash pavement at exits, which have experienced mud-tracking on to the pavement or traveled way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches, or waterways.

6.3 Mulched Areas



All mulches must be inspected periodically, in particular after rainstorms, to check for rill erosion. If less than 90% of the soil surface is covered by mulch, additional mulch shall be immediately applied. Nets must be inspected after rain events for dislocation or failure. If washouts or breakage occur, re-install the nets as necessary after repairing damage to the slope. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface. Repair as needed.

6.4 Dust Control

When temporary dust control measures are used, repetitive treatment shall be applied as needed to accomplish control.

6.5 Stormwater Appurtenances

All underdrains, storm drains, and catch basins need to be operating effectively and free of debris.

6.6 Erosion and Sedimentation Control Inspections:

Acorn Engineering has personnel qualified to conduct Erosion and Sedimentation Control Inspections. For further information, contact:

Contact: Will Savage, PE
Telephone: (207) 775-2655

Qualifications:

- Maine Professional Engineering License #11419
- Maine DEP - Certified in Maintenance & Inspection of Stormwater BMP's Cert #14
- Certified Erosion, Sediment and Storm Water Inspector (CESSWI) Cert #0293
- Certified Professional in Erosion and Sediment Control (CPESC) Cert. #4620

The Contractor has sole responsibility for complying with the Erosion and Sedimentation Report/Plan, including control of fugitive dust. The Contractor shall be responsible for any monetary penalties resulting from failure to comply with these standards.



7.0 IMPLEMENTATION SCHEDULE

The following implementation sequence is intended to maximize the effectiveness of the above described erosion control measures. Contractors should avoid overexposing disturbed areas and limit the amount of stabilization area.

1. Install a stabilized construction entrance in all locations where construction traffic will enter and exit the site.
2. Install perimeter silt fence or erosion control berm.
3. Install all other erosion control devices as necessary throughout the remainder of this schedule.
4. Commence installation of drainage infrastructure.
5. Prioritize the downhill side to contain runoff within the site while providing an engineered outlet to the municipal storm drain system within Douglass Street.
6. Commence earthwork operations, associated with the parking lot construction.
7. Commence installation of utilities.
8. Continue earthwork and grading to subgrade as necessary for construction.
9. Complete installation of drainage infrastructure, as well as other utility work.
10. Complete remaining earthwork operations.
11. Install sub-base and base gravels in paved areas.
12. Install paving, curbing and brickwork.
13. Loam, lime, fertilize, seed and mulch disturbed areas and complete all landscaping.
14. Once the site is stabilized and mulching of landscape areas is complete, remove all temporary erosion control measures.
15. Touch up areas without a vigorous catch of grass with loam and seed.
16. Complete site signage and striping.
17. Execute proper maintenance of all temporary and permanent erosion control measures throughout the project.

The above implementation sequence should be generally followed by the site contractor. However, the contractor may construct several items simultaneously. The contractor shall submit to the owner a schedule of the completion of the work. If the contractor is to commence the construction of more than one item above, they shall limit the amount of exposed areas to those areas in which work is expected to be undertaken during the following 30 days.

The contractor shall re-vegetate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 7 days of final grading or before a storm event. The contractor shall incorporate planned inlets and drainage systems as early as possible into the construction phase.

8.0 CONCLUSION

The above erosion control narrative is intended to minimize the development impact by implementing temporary and permanent erosion control measures. The contractor shall also refer to the Maine Erosion and Sediment Control BMP manual for additional information.



9.0 ATTACHMENTS

- Temporary Seeding Plan



TEMPORARY SEEDING PLAN

Site Preparation

The seeded areas shall be feasibly graded out to provide the use of equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. If necessary, the site may require additional temporary erosion control measures outlined in the Erosion Control report.

Seedbed Preparation

Fertilizer shall be applied to the site at a rate of 13.8 pounds per 1,000 square feet. The composition of the fertilizer shall be 10-10-10 (N-P₂O₅-K₂O) or equivalent.

Limestone shall be applied to the site at a rate of 138 pounds per 1,000 square feet.

Seeding

The composition and amount of temporary seed applied to a site shall be determined by the following table:

Seed	Pounds / 1,000 S.F.	Recommended Seeding Dates
Winter Rye	2.57	Aug-15 to Oct-1
Oats	1.84	Apr-1 to Jul-1 Aug-15 to Sep-15
Annual Ryegrass	0.92	Apr-1 to Jul-1
Sudangrass	0.92	May-15 to Aug-15
Perennial	0.92	Aug-15 to Sep-15

Mulching

Mulch shall be applied at a rate of 70 lbs – 90 lbs per 1,000 square feet. The mulch shall be installed at a minimum depth of 4 inches. The seeded area shall be mulched immediately after seed is applied. Mulching during the winter season shall be double the normal amount.

Conclusion

Please refer to the Maine Erosion and Sediment Control BMP manual for additional information pertaining to temporary seeding and mulching.



8. General Standards Submissions

The following Stormwater Management Report and corresponding attachments have been developed in accordance with the General Standards submission requirements.



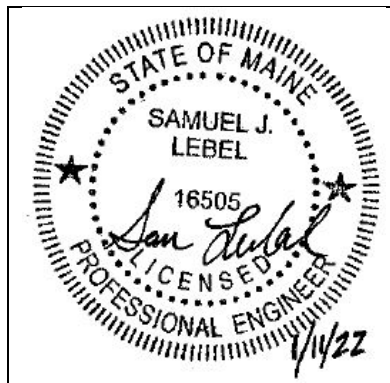
STORMWATER MANAGEMENT **REPORT**

Prepared For:

**Douglass Commons, LLC.
57 Douglass Street
Portland, Maine 04101**

Prepared By:

**Acorn Engineering, Inc.
PO Box 3372
Portland, Maine 04104**



January 2022



INTRODUCTION

Acorn Engineering, Inc. has been retained by Douglass Commons, LLC. to provide civil engineering services for the proposed redevelopment of 57 Douglass Street located within the R-5A Zoning District in Portland, Maine. The 3.34-acre parcel was previously the site of a school building and is now vacant. The built-out site will consist of eight stand-alone buildings comprising 120 residential units, the majority of which will be deed-restricted for affordability.

A stormwater analysis was prepared to demonstrate that the project will meet the following requirements of the City of Portland (the City):

- City of Portland Land Use Ordinance Chapter 14, Article V. Site Plan Section 14-523. Required Approvals and Applicability (F) Level III Site Plan Review.
- City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and Maine DEP Chapter 500 Stormwater Management General (Redevelopment) Standards.

The property consists of approximately 3.34 acres of land in Portland's Libbytown neighborhood. The site is currently composed of approximately 2.16 acres impervious area. The proposed project will decrease the impervious area by approximately 0.36 acres to 1.90 acres. The project will result in redevelopment of non-roof impervious area greater than 5,000 SF and therefore will be required to provide treatment for a portion of the site.

EXISTING CONDITIONS

The proposed project site is located at 57 Douglass Street. A Boundary & Topographic Survey has been prepared by Owen Haskell, Inc., dated March 1, 2021.

The existing property is covered by approximately 65% impervious surfaces, whereupon a school and its associated infrastructure was formerly located. The existing site is vacant and has moderate slopes within the center of the site that form a plateau, grading down to perimeter. The site is split into three subcatchments, two larger and one smaller. Subcatchment 1 drains the gently sloping northerly portion of the site and a small section of the existing access driveway to the MS4 within Douglass Street. Subcatchment 2 drains the southerly portion of the site to a basin shared with the off-site drainage of residences and the western flanks of I-295, which were also modeled. Subcatchment 3 is a small section of the eastern part of the site that drains to the playing fields east and north of the site.

The project team is not aware of the presence of any existing significant natural features located on the site. Given the urban setting and existing impervious surfaces, a field inventory of significant natural features was not undertaken. The project is not located within a watershed classified as an Urban Impaired Stream.



PROPOSED DEVELOPMENT

The project features the development of a planned residential unit development (PRUD) and generally follows the principles of cluster subdivision planning where infrastructure is denser and more efficient and as a result, greater uninterrupted open space opportunities are available. The site will consist of eight separate residential buildings with a total of 120 dwelling units. Each building will be served with associated parking and utilities. Pedestrian access to the site will be provided along the access drive from Douglass Street and through paved foot paths from Dougherty Park. The development will be served by Portland Water District, Department of Public Works (sewer/storm), Unitil (natural gas), CMP (electric), Charter (cable), and Fairpoint (telephone).

The site has been graded to slope with the existing topography while providing for appropriate slopes in the parking lot. The slopes on the outside of the parking areas that are not part of a stormwater system will be appropriately stabilized per the specifications in the plans and are anticipated to be heavily landscaped for further slope protection and buffering. The majority of the site's runoff, including 100% of the new impervious area, will be collected via a storm drain system and directed to the Douglass Street Municipal Separated Storm Sewer System (MS4).

The proposed project will decrease the site's impervious area by approximately 0.36 acres, but will include redevelopment of non-roof impervious area greater than 5,000 square feet, triggering the City's water quality treatment requirement. Water quality treatment will be provided by collecting the runoff on over 75% of the parking lot area and allowing it to flow to a vegetated underdrained soil filter (VUSF) system and proprietary high-flow rain gardens for treatment prior to discharging into the MS4 within Douglass Street. The project has been designed to meet and exceed the Chapter 500 General Standards.

BASIC STANDARDS – EROSION & SEDIMENTATION CONTROL

The development shall provide erosion and sedimentation control, inspection and maintenance, and housekeeping standards as specified in the attached Exhibit K: Erosion and Sedimentation Control Report. Grading and construction activity will not impede or otherwise alter drainageways to have an unreasonable adverse impact on an adjacent downgradient parcels.

GENERAL STANDARDS - WATER QUALITY

When analyzing the Maine DEP Redevelopment Standards and the associated ranked impacts, the project results in a negative number and therefore treatment is not required per State law. However, the development will provide water quality treatment for no less than 50% of the non-roof redeveloped impervious area, consistent with the City of Portland's technical manual. Water quality treatment will be provided using an under-drained soil filter system and proprietary high-flow media rain gardens, which are approved systems per Appendix B of the Maine Stormwater BMP Manual. Filtration BMPs have been shown to be very effective at removing a wide range of pollutants from stormwater runoff. The rain gardens are based off a Focal Point system manufactured by ACF Environmental, but may be substituted at the time of construction for an approved



equal such as a Filterra manufactured by Contech. The footprint of the filter media is 20 square feet and has an infiltration rate of 100 inches per hour. Above the media, the garden will allow for 6 inches of ponding before overflowing into an overflow beehive grate which bypasses the filter media. Given the site is reducing the net peak flow leaving the site and is discharging to a 60" MS4 that freely flows to a major river segment, storage tanks are not being proposed below the rain gardens. From a stormwater perspective, the focus is on providing water quality treatment given the watershed's discharge and conveyance system are not overburdened.

The treatment of the impervious areas are as follows:

Table 1 – Impervious Area Treatment Table				
Existing Impervious Area (SF)	Total Proposed Impervious Area (SF)	Non-Roof Redeveloped Impervious Area (SF)	Proposed Non-Roof Impervious Area with Treatment (SF)	Treated Non-Roof Redeveloped Area
94,185	78,656	43,757	23,370	53%

As shown above, the project anticipates meeting the required treatment for new impervious and developed surfaces with the soil filter BMPs.

Filter Area Sizing

A calculation for filter area is necessary to meet the requirements below the surface of the VUSF. As defined in the Volume III: BMPs Technical Design Manual, Chapter 7, the surface area of the filter shall be no less than the sum of 5% of the tributary impervious area and 2% of the tributary vegetated area. The filter area is calculated by the following formula:

$$[(\text{Imp. SF} \times 0.05) + (\text{Veg. SF} \times 0.02)] = \text{Filter Area (SF)}$$

Table 2 – Total Filter Surface Area, displays the proposed USSF sizing requirements, actual size and the percentage of required area.

Table 2 – Total Filter Surface Area		
	Required Filter Area (SF)	Actual Filter Area (SF)
VUSF 1	465	465

As shown above, the project anticipates meeting and exceeding the required treatment for 50% of the redeveloped impervious surfaces.

Water Quality Volume

In accordance with the Volume III: BMPs Technical Design Manual, a water quality volume of 1.0 inches times the tributary impervious area plus 0.4 inches times the tributary vegetated area is required to be treated by the VUSF. The required water quality volume is calculated by the following formula:

$$\left(\frac{\text{Imp. SF} \times 1.0''}{12''/1'} \right) + \left(\frac{\text{Veg. SF} \times 0.4''}{12''/1'} \right) = \text{Treatment Volume (CF)}$$

Table 3 – Water Quality Volume				
	Tributary Impervious Area (SF)	Tributary Pervious Area (SF)	Water Quality Volume Required (CF)	System Storage Volume Provided (CF)
VUSF 1	8,274	2,578	775	1,052

As seen above, the provide water quality volume above the soil filter and below the overflow grate exceeds the requirement. Values from the HydroCAD calculations are attached to this report to demonstrate compliance with this standard.

As shown above, the project anticipates meeting and exceeding the required treatment for new impervious surfaces using the VUSF and proprietary high-flow media rain gardens.

FLOODING STANDARD – WATER QUANTITY

The proposed project was modeled using HydroCAD to verify that the post-development conditions do not exceed the pre-development conditions. A 24-hour SCS Type III storm distribution for the 2, 10, and 25-year storm events were used. The corresponding rainfall amounts for these storms are 3.10", 4.60", and 5.80" respectively.

Time of Concentration (Tc)

The times of concentration for subcatchments in both the pre and post conditions were calculated by entering the flow path with the associated ground cover and slopes. HydroCAD then calculated the Tc's and incorporated the total Tc for each subcatchment into the model. When the calculated Tc was less than six minutes (0.1 hours), a direct entry of six minutes was used as advised by the TR-55 model. Consistent with previous submissions and best practices, the sheet flow length for any Tc path was capped at 100 feet.

Curve Number (CN)

Within the pre-development model, the vegetated areas were considered grass cover in fair or good condition, depending on the area. as demonstrated by aerial images and site visits. The post development landscaped areas were given a good rating all within the A hydrologic soil group. This is assumption is reinforced given the aggressive landscape plan which will feature more porous conditions that are appropriately mulched along with future extensive root systems and canopy cover that will exist once the landscaping has matured.



HydroCAD Adjustments

A simulation water quality outlet (vertical orifice) is modeled to mimic the minimum 24-hour release time through the soil filter media. This is completed by adjusting the rainfall amount in HydroCAD until the inflow volume is equal to or greater than the calculated water quality volume. The storm events are modeled as type III, 24-hour storm events in HydroCAD.

Pre-development Calculations

The site consists of gravel and grassed areas in the predevelopment condition. For the purposes of this analysis, the land has been divided into three sub-catchments. Subcatchment 1 drains the gently sloping northerly portion of the site and a small section of the existing access driveway, terminating in the storm drains and MS4 within Douglass Street (POI #1). Subcatchment 2 drains the southerly portion of the site to a basin shared with the off-site drainage of residences and the western flanks of I-295, which were also modeled. The slopes are in the 5-10% range. There is an existing culvert under the State's paved pathway that divides I-295 land with the proposed site, that facilitates flow from the grassed basin to the Site under the pathway. This low point was modeled as POI #2. Subcatchment 3 is a small section of the eastern part of the site with 2-5% slopes that drains to the playing fields east and north of the site which was modeled as POI #3.

Peak flow rates for the pre-development storm events are as follows:

Table 5 – Pre-Development Peak Stormwater Flows			
Drainage Area	2-Year Storm Event (cfs)	10-Year Storm Event (cfs)	25-Year Storm Event (cfs)
POI #1	3.2	5.4	7.3
POI #2	0.4	1.8	3.5
POI #3	0.7	1.5	2.1

Post-development Calculations

In the post development condition, over 95% of runoff from the site will be collected in stormwater infrastructure and piped to the MS4 within Douglass Street. The proposed project will decrease the site's impervious area by approximately 0.36 acres. Water quality treatment will be provided by collecting the runoff on over 75% of the parking lot area and allowing it to flow to an under-drained soil filter system and proprietary high-flow media rain gardens for treatment prior to discharging into the combined sewer within Douglass Street.

The post-development calculations include changes to the land use, and the compensation provided by the VUSF, rain gardens, and associated engineered orifices. The following table represents comparison of pre- development and post-development condition peak runoff rates for the proposed development and tributary areas.



Table 6 – Post-Development Peak Stormwater Flows			
Drainage Area	2-Year Storm Event (cfs)	10-Year Storm Event (cfs)	25-Year Storm Event (cfs)
POI #1	3.8	7.7	11.0
POI #2	0	0.1	0.3
POI #3	0	0	0

Table 7 – Comparison of Peak Flows						
Drainage Area	2-Year Storm Event (cfs)		10-Year Storm Event (cfs)		25-Year Storm Event (cfs)	
	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>
POI #1	3.2	3.8	5.4	7.7	7.3	11.0
POI #2	0.4	0	1.8	0.1	3.5	0.3
POI #3	0.7	0	1.5	0	2.1	0
POI #4 (Total Peak Discharge)	4.3	3.8	8.7	7.8	12.9	11.3

As shown in Tables 6 and 7, the net impact of the post development peak flows will remain below the predevelopment levels. A post-development watershed map developed for this project can be viewed in Attachment B, and a copy of the HydroCAD calculations is included within Attachment C of this report.

SOILS

Onsite soil information is sourced from the *Soil Conservation Service Medium Intensity Soil Survey for Cumberland County consistent with the USDA Soil Survey*.

The area within and surrounding the project includes soils types listed in the table below.

Table 8 – Hydrologic Soil Group	
Soils Type	HSG
Deerfield Loamy Fine Sand, 3-8% slopes	A

The HSG for the soils, listed above, show soils having a high infiltration rate (low runoff potential). These consist mainly of deep, well drained sands, with a high rate of water transmission.

Conclusion

The proposed development was designed to meet the requirements implemented by the MDEP under the Stormwater Management Statute (38 M.R.S.A. § 420-D) as well as the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards. The proposed project as designed is not anticipated to cause flooding or erosion problems within the subject site, abutters' sites, nor within the right-of-way.



Attachments

Attachment A: Pre-Development Watershed Map

Attachment B: Post-Development Watershed Map

Attachment C: Redevelopment Pollutant Ranking Exhibit

Attachment D: HydroCAD Calculations

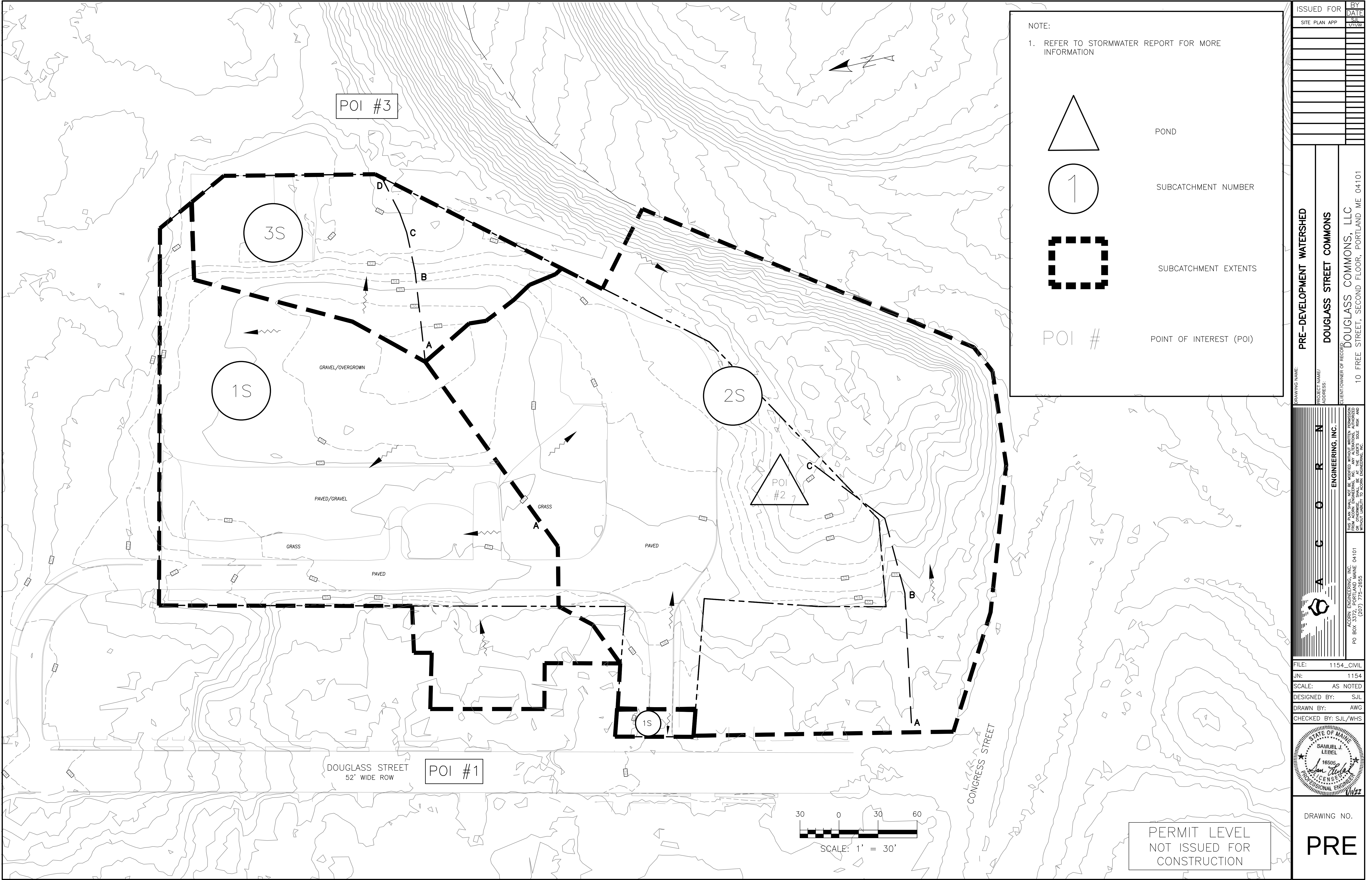
Attachment E: Soil Survey



Attachment A

Pre-Development Watershed Map

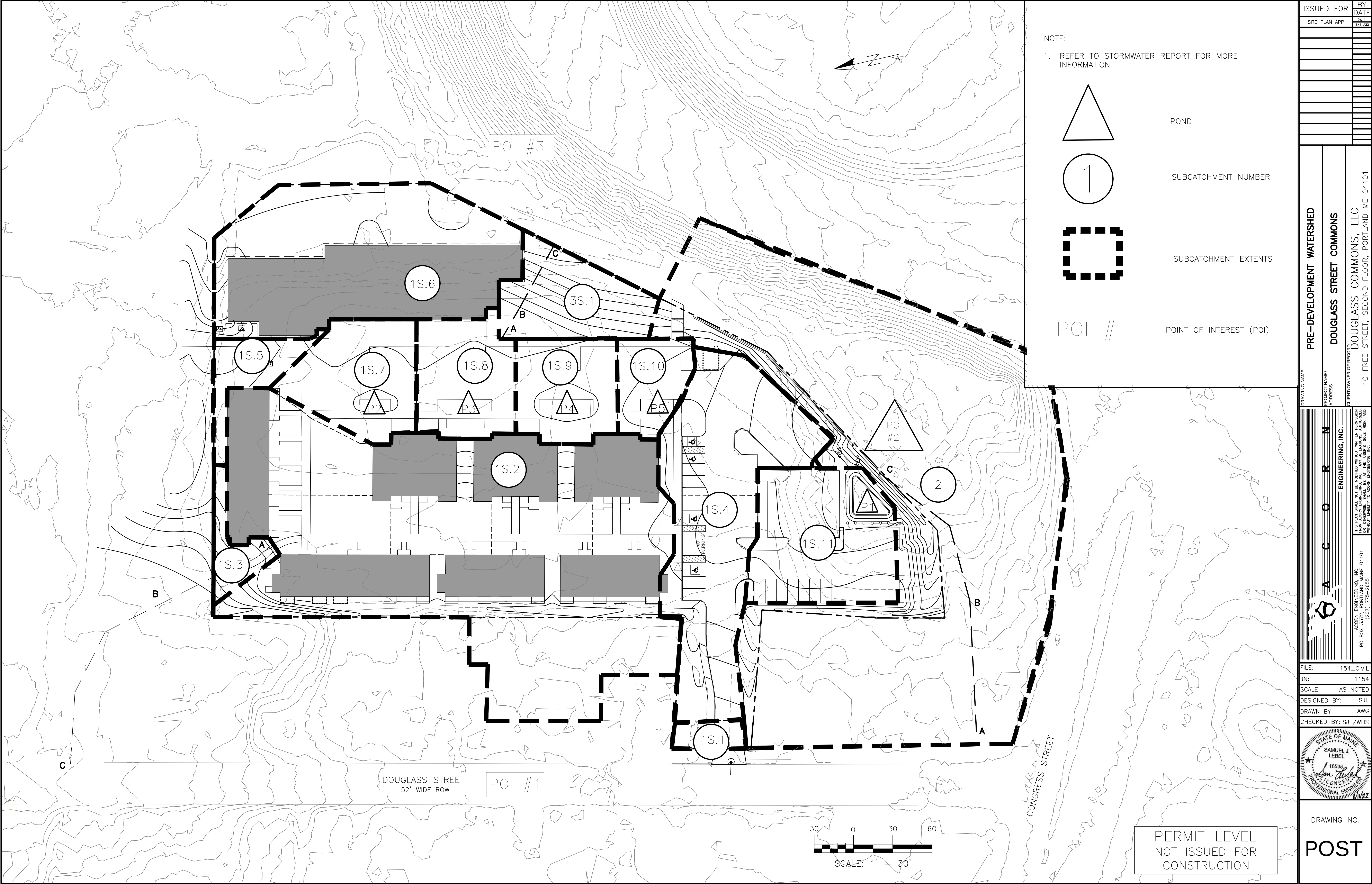




Attachment B

Post-Development Watershed Map



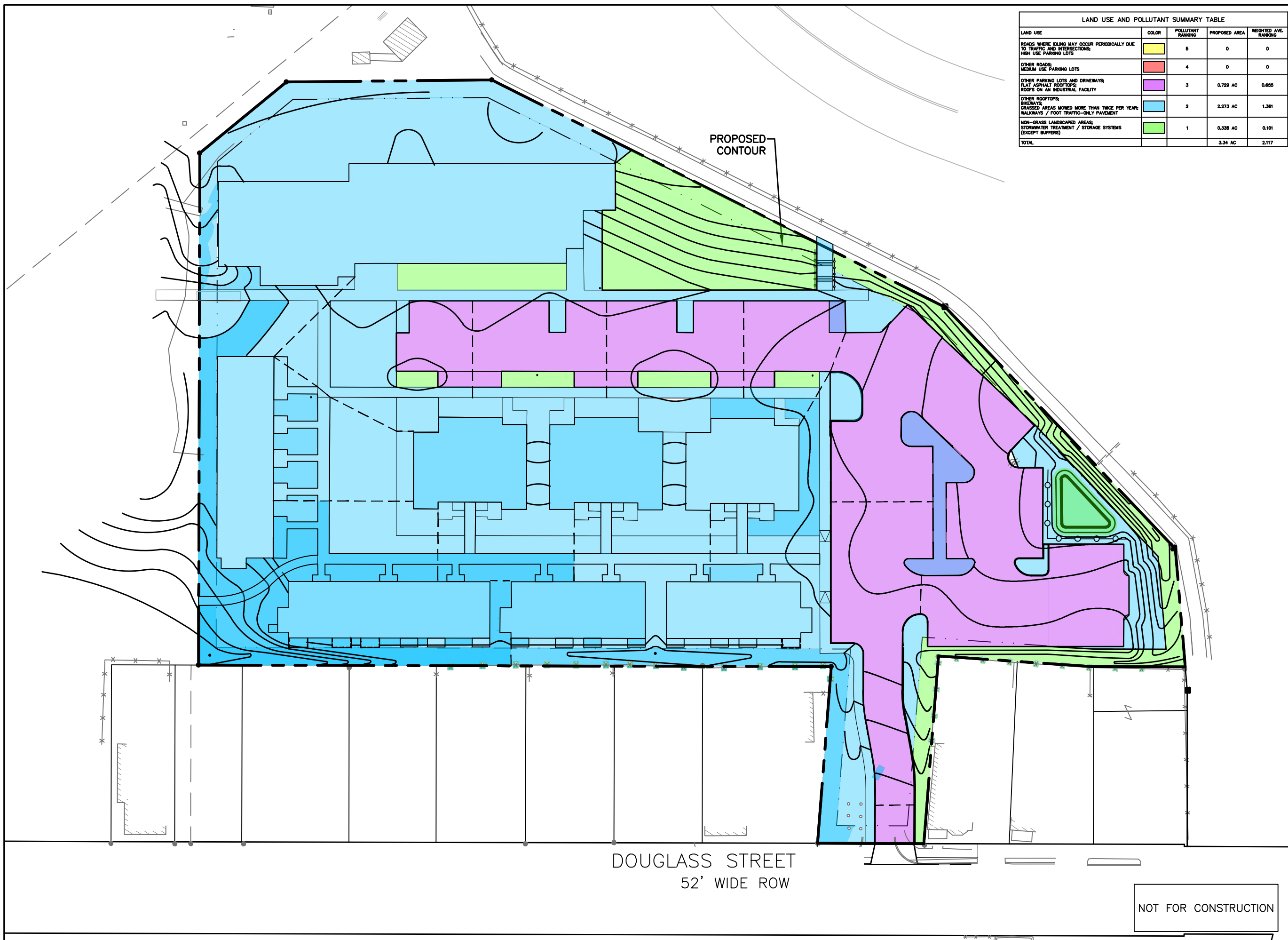


ISSUED FOR		BY
SITE PLAN APP		DATE
		1/21/22
PRE-DEVELOPMENT WATERSHED		
DOUGLASS STREET COMMONS		
DOUGLASS COMMONS, LLC		
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101		
DRAWING NAME:		
PROJECT NAME/ ADDRESS:		
CLIENT/OWNER OF RECORD:		
ACORN ENGINEERING, INC.		
PO BOX 3372, PORTLAND MAINE 04101		
(207) 753-2553		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION OF ACORN ENGINEERING, INC. OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO ACORN ENGINEERING, INC.		
FILE: 1154_CIVIL		
JN: 1154		
SCALE: AS NOTED		
DESIGNED BY: SJL		
DRAWN BY: AWG		
CHECKED BY: SJL/WH		
DRAWING NO.		
POST		

Attachment C

Redevelopment Pollutant Ranking Exhibit



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FILE:	1154_CIVIL
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SCALE:	NTS
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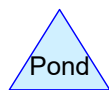
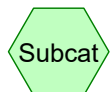
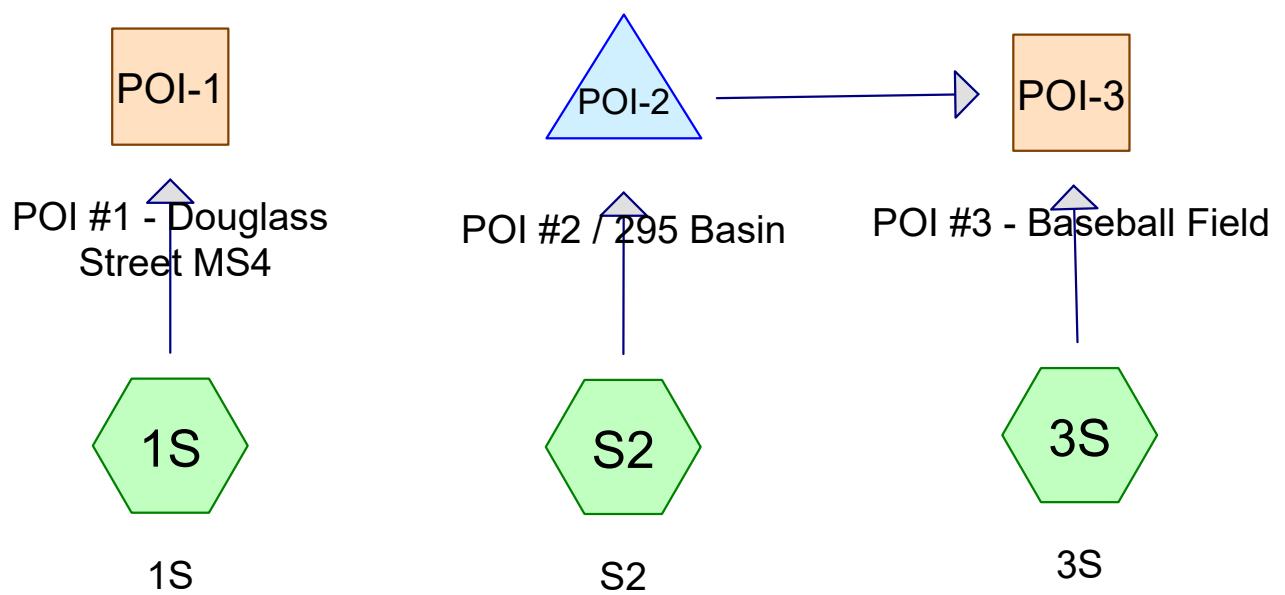
THIS PLAN SHALL NOT BE
MODIFIED WITHOUT WRITTEN

DRAWING NO.

Attachment D

HydroCAD Calculations





Routing Diagram for Pre Development 1.11
 Prepared by HP, Printed 1/20/2022
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Pre Development 1.11

Prepared by HP

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.204	77	1/8 acre lots, 65% imp, HSG A (1S)
1.085	49	50-75% Grass cover, Fair, HSG A (1S, 3S, S2)
0.571	96	Gravel (S2)
0.636	96	Gravel surface (1S)
0.353	96	Gravel surface, HSG A (3S)
0.072	98	Paved walking path (S2)
0.496	98	Pavement / Roof (1S)
0.321	98	Single family roofs and driveways (S2)
1.212	32	Woods/grass comb., Good, HSG A (S2)
4.951	70	TOTAL AREA

Pre Development 1.11

Prepared by HP

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.855	HSG A	1S, 3S, S2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.096	Other	1S, S2
4.951		TOTAL AREA

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.204	0.000	0.000	0.000	0.000	0.204	1/8 acre lots, 65% imp	1 S
1.085	0.000	0.000	0.000	0.000	1.085	50-75% Grass cover, Fair	1 S, 3 S, S 2
0.000	0.000	0.000	0.000	0.571	0.571	Gravel	S 2
0.353	0.000	0.000	0.000	0.636	0.990	Gravel surface	1 S, 3 S
0.000	0.000	0.000	0.000	0.072	0.072	Paved walking path	S 2
0.000	0.000	0.000	0.000	0.496	0.496	Pavement / Roof	1 S
0.000	0.000	0.000	0.000	0.321	0.321	Single family roofs and driveways	S 2
1.212	0.000	0.000	0.000	0.000	1.212	Woods/grass comb., Good	S 2
2.855	0.000	0.000	0.000	2.096	4.951	TOTAL AREA	

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Type III 24-hr 2-year Rainfall=3.10"

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Page 5

Time span=1.00-36.00 hrs, dt=0.10 hrs, 351 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: 1S

Runoff Area=68,602 sf 39.93% Impervious Runoff Depth=1.83"
Tc=6.0 min CN=87 Runoff=3.16 cfs 0.240 af

Subcatchment3S: 3S

Runoff Area=24,703 sf 0.00% Impervious Runoff Depth=1.20"
Tc=6.0 min CN=78 Runoff=0.73 cfs 0.057 af

SubcatchmentS2: S2

Runoff Area=122,360 sf 14.00% Impervious Runoff Depth=0.31"
Flow Length=233' Tc=16.0 min CN=58 Runoff=0.38 cfs 0.072 af

Reach POI-1: POI #1 - Douglass Street MS4

Inflow=3.16 cfs 0.240 af
Outflow=3.16 cfs 0.240 af

Reach POI-3: POI #3 - Baseball Field

Inflow=0.73 cfs 0.057 af
Outflow=0.73 cfs 0.057 af

Pond POI-2: POI #2 / 295 Basin

Peak Elev=27.00' Storage=1,609 cf Inflow=0.38 cfs 0.072 af
Discarded=0.05 cfs 0.061 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.061 af

Total Runoff Area = 4.951 ac Runoff Volume = 0.368 af Average Runoff Depth = 0.89"
79.36% Pervious = 3.929 ac 20.64% Impervious = 1.022 ac

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Type III 24-hr 2-year Rainfall=3.10"

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Page 6

Summary for Subcatchment 1S: 1S

Runoff = 3.16 cfs @ 12.10 hrs, Volume= 0.240 af, Depth= 1.83"

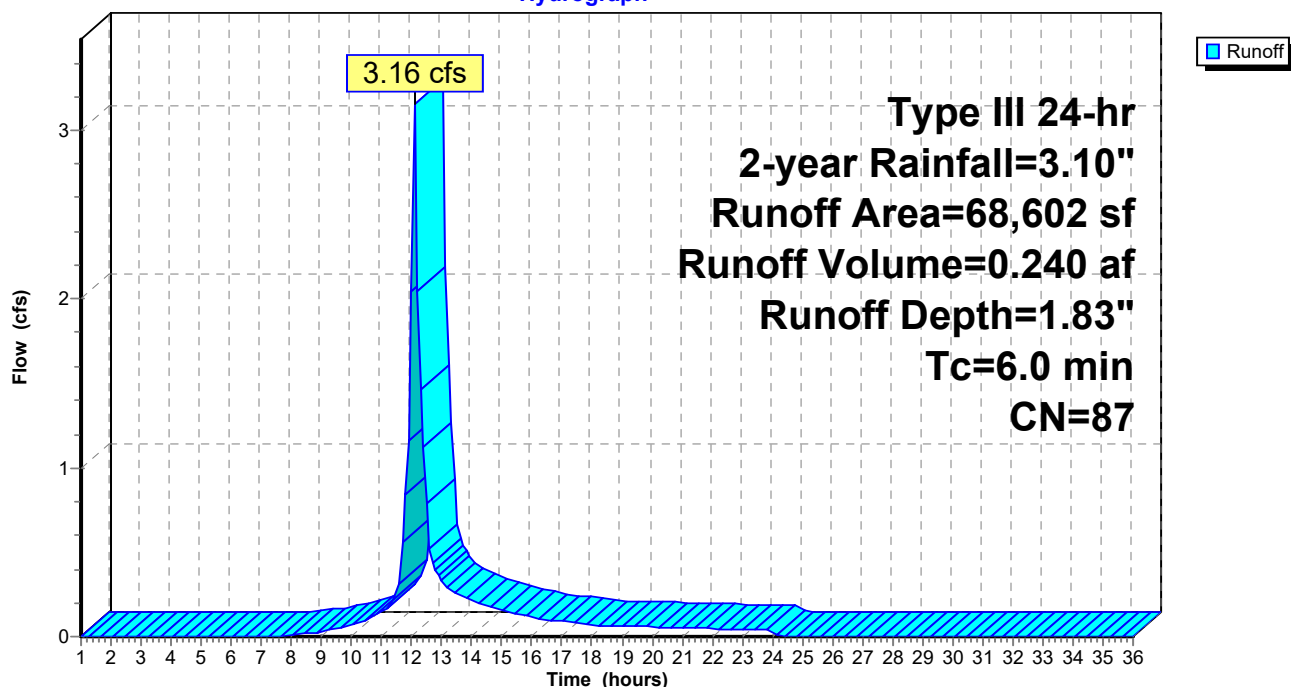
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	21,601	98	Pavement / Roof
*	27,720	96	Gravel surface
	10,373	49	50-75% Grass cover, Fair, HSG A
	8,908	77	1/8 acre lots, 65% imp, HSG A
	68,602	87	Weighted Average
	41,211		60.07% Pervious Area
	27,391		39.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: 1S

Hydrograph



Pre Development 1.11

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Type III 24-hr 2-year Rainfall=3.10"

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Page 7

Summary for Subcatchment 3S: 3S

Runoff = 0.73 cfs @ 12.11 hrs, Volume= 0.057 af, Depth= 1.20"

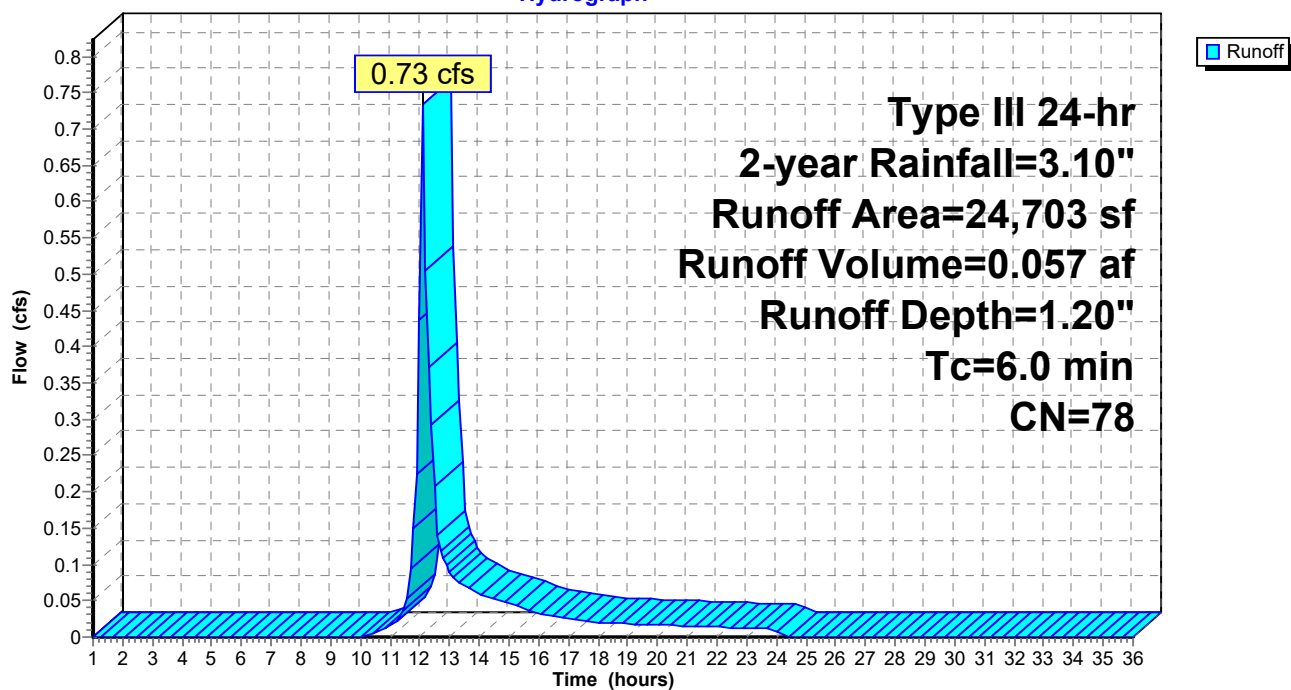
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
15,393	96	Gravel surface, HSG A
9,310	49	50-75% Grass cover, Fair, HSG A
24,703	78	Weighted Average
24,703		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: 3S

Hydrograph



Pre Development 1.11

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Type III 24-hr 2-year Rainfall=3.10"

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Page 8

Summary for Subcatchment S2: S2

Runoff = 0.38 cfs @ 12.44 hrs, Volume= 0.072 af, Depth= 0.31"

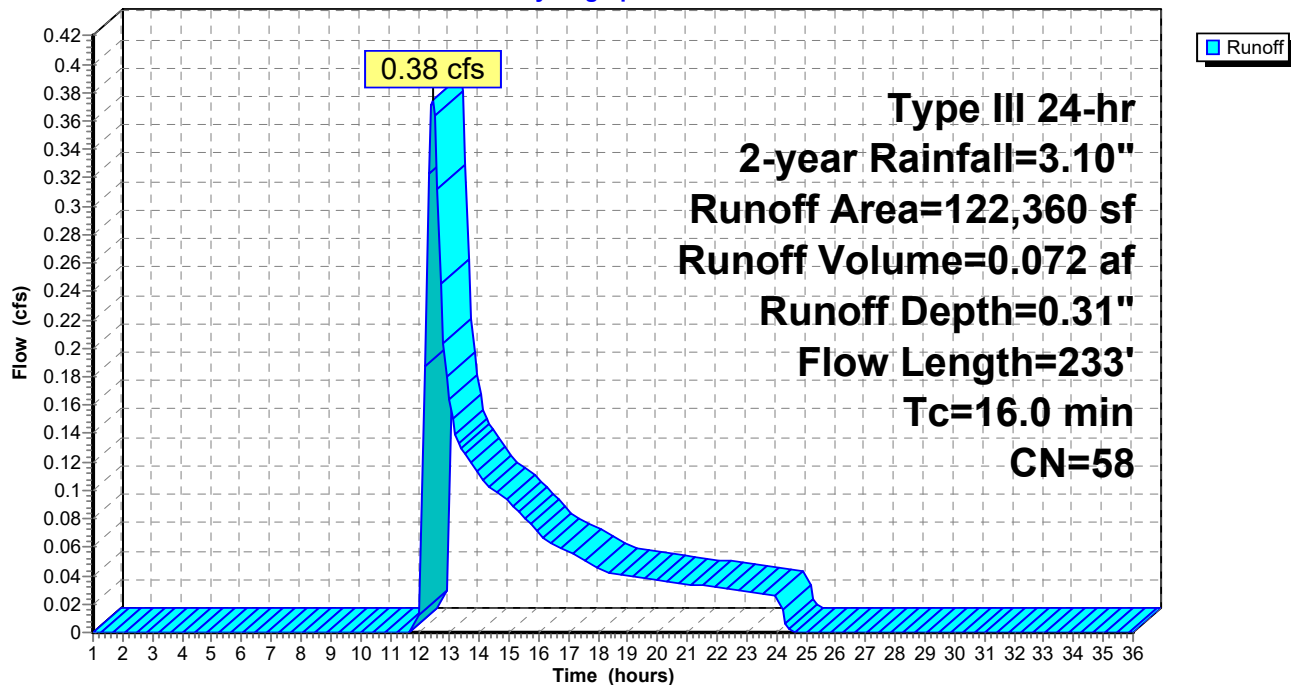
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	13,972	98	Single family roofs and driveways
*	3,155	98	Paved walking path
	52,792	32	Woods/grass comb., Good, HSG A
*	24,853	96	Gravel
	27,588	49	50-75% Grass cover, Fair, HSG A
	122,360	58	Weighted Average
	105,233		86.00% Pervious Area
	17,127		14.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C (capped 100' sheet flow) Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment S2: S2

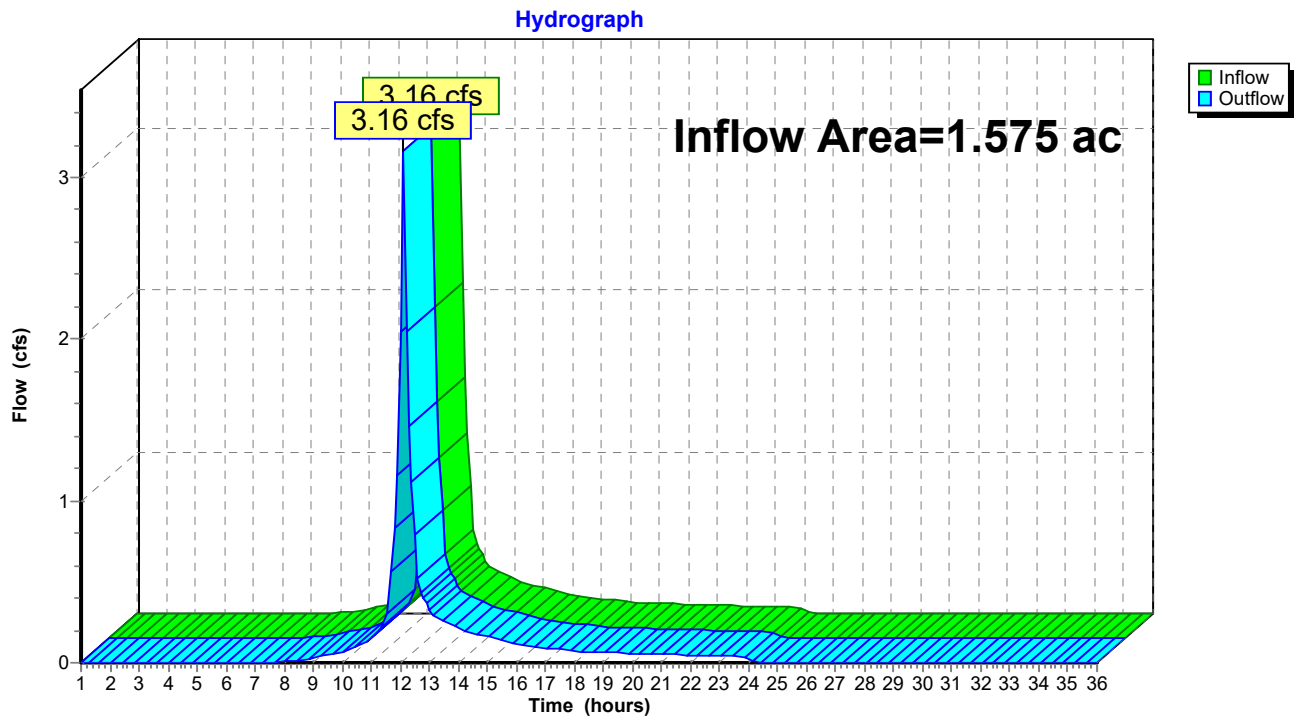
Hydrograph



Summary for Reach POI-1: POI #1 - Douglass Street MS4

Inflow Area = 1.575 ac, 39.93% Impervious, Inflow Depth = 1.83" for 2-year event
Inflow = 3.16 cfs @ 12.10 hrs, Volume= 0.240 af
Outflow = 3.16 cfs @ 12.10 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.0 min

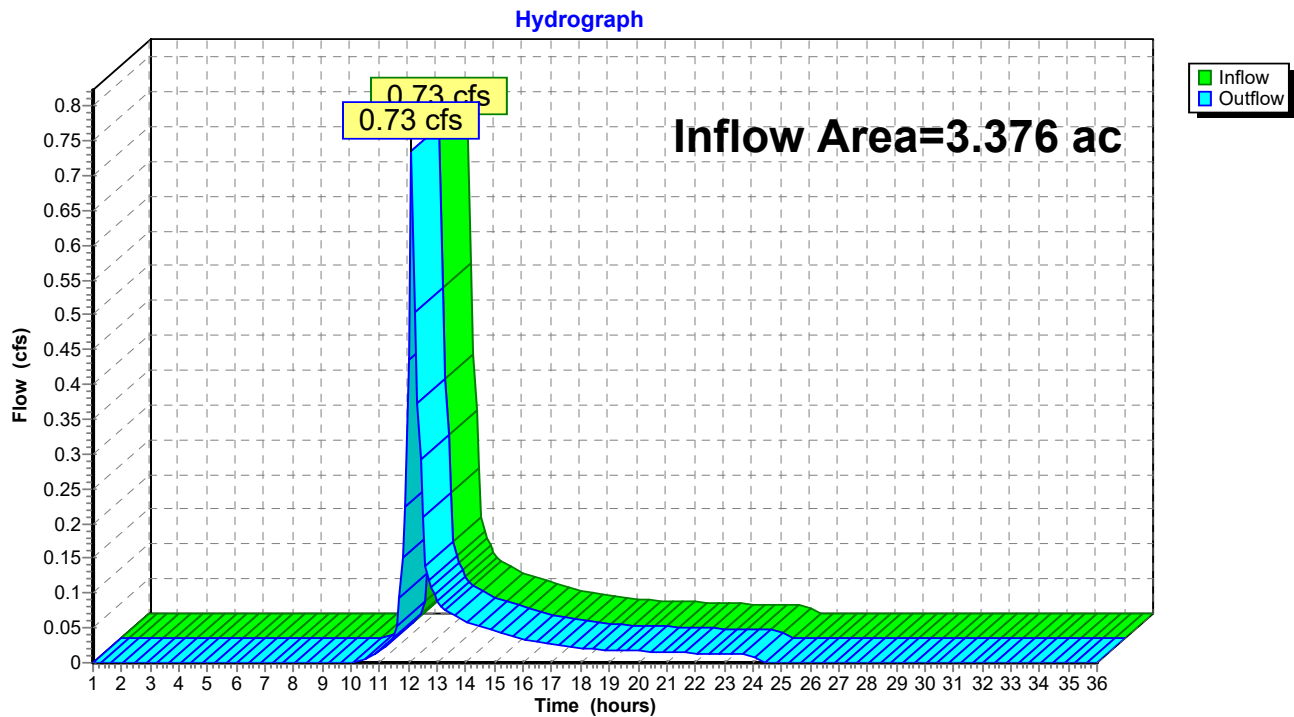
Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-1: POI #1 - Douglass Street MS4

Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 3.376 ac, 11.65% Impervious, Inflow Depth = 0.20" for 2-year event
Inflow = 0.73 cfs @ 12.11 hrs, Volume= 0.057 af
Outflow = 0.73 cfs @ 12.11 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-3: POI #3 - Baseball Field

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Type III 24-hr 2-year Rainfall=3.10"

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Page 11

Summary for Pond POI-2: POI #2 / 295 Basin

Inflow Area = 2.809 ac, 14.00% Impervious, Inflow Depth = 0.31" for 2-year event
 Inflow = 0.38 cfs @ 12.44 hrs, Volume= 0.072 af
 Outflow = 0.05 cfs @ 17.91 hrs, Volume= 0.061 af, Atten= 88%, Lag= 328.3 min
 Discarded = 0.05 cfs @ 17.91 hrs, Volume= 0.061 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
 Peak Elev= 27.00' @ 17.91 hrs Surf.Area= 4,488 sf Storage= 1,609 cf

Plug-Flow detention time= 445.4 min calculated for 0.061 af (85% of inflow)
 Center-of-Mass det. time= 381.4 min (1,328.8 - 947.4)

Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	274,731 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

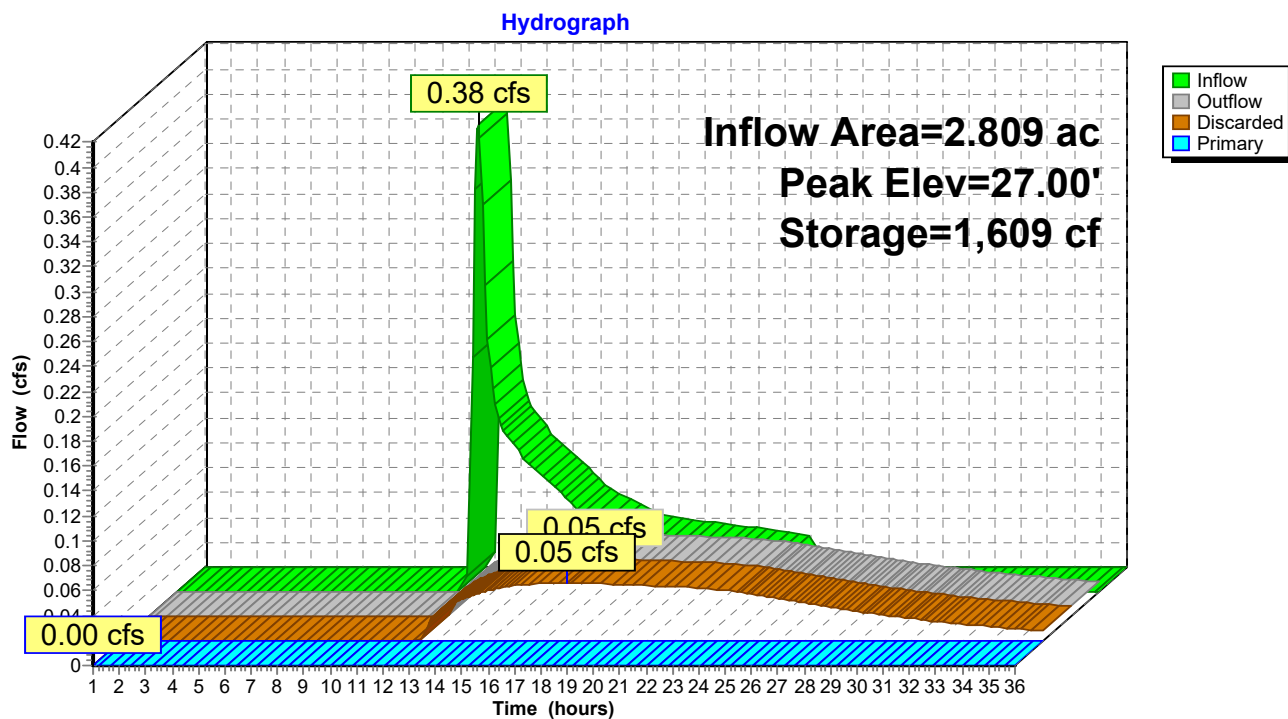
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	12,191	8,333	9,934
29.00	18,000	15,096	25,030
30.00	32,600	25,300	50,330
33.00	41,943	111,815	162,144
35.00	70,644	112,587	274,731

Device	Routing	Invert	Outlet Devices
#1	Primary	32.40'	20.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	26.60'	0.800 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.05 cfs @ 17.91 hrs HW=27.00' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)
 ↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POI-2: POI #2 / 295 Basin



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Type III 24-hr 10-year Rainfall=4.60"

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Page 13

Time span=1.00-36.00 hrs, dt=0.10 hrs, 351 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: 1S

Runoff Area=68,602 sf 39.93% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=87 Runoff=5.43 cfs 0.419 af

Subcatchment3S: 3S

Runoff Area=24,703 sf 0.00% Impervious Runoff Depth=2.38"
Tc=6.0 min CN=78 Runoff=1.48 cfs 0.112 af

SubcatchmentS2: S2

Runoff Area=122,360 sf 14.00% Impervious Runoff Depth=0.96"
Flow Length=233' Tc=16.0 min CN=58 Runoff=1.84 cfs 0.224 af

Reach POI-1: POI #1 - Douglass Street MS4

Inflow=5.43 cfs 0.419 af
Outflow=5.43 cfs 0.419 af

Reach POI-3: POI #3 - Baseball Field

Inflow=1.48 cfs 0.112 af
Outflow=1.48 cfs 0.112 af

Pond POI-2: POI #2 / 295 Basin

Peak Elev=27.59' Storage=5,560 cf Inflow=1.84 cfs 0.224 af
Discarded=0.13 cfs 0.192 af Primary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.192 af

Total Runoff Area = 4.951 ac Runoff Volume = 0.755 af Average Runoff Depth = 1.83"
79.36% Pervious = 3.929 ac 20.64% Impervious = 1.022 ac

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Type III 24-hr 10-year Rainfall=4.60"

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Page 14

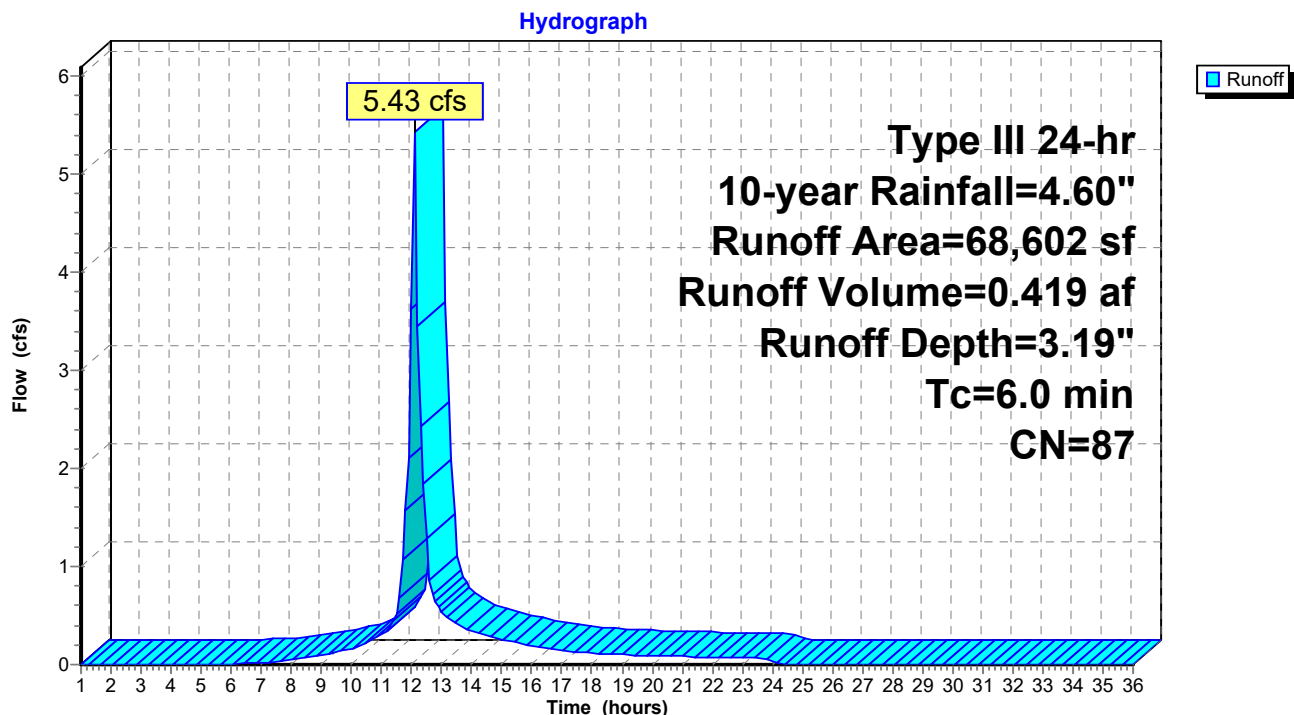
Summary for Subcatchment 1S: 1S

Runoff = 5.43 cfs @ 12.10 hrs, Volume= 0.419 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	21,601	98	Pavement / Roof
*	27,720	96	Gravel surface
	10,373	49	50-75% Grass cover, Fair, HSG A
	8,908	77	1/8 acre lots, 65% imp, HSG A
	68,602	87	Weighted Average
	41,211		60.07% Pervious Area
	27,391		39.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: 1S

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Type III 24-hr 10-year Rainfall=4.60"

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Page 15

Summary for Subcatchment 3S: 3S

Runoff = 1.48 cfs @ 12.10 hrs, Volume= 0.112 af, Depth= 2.38"

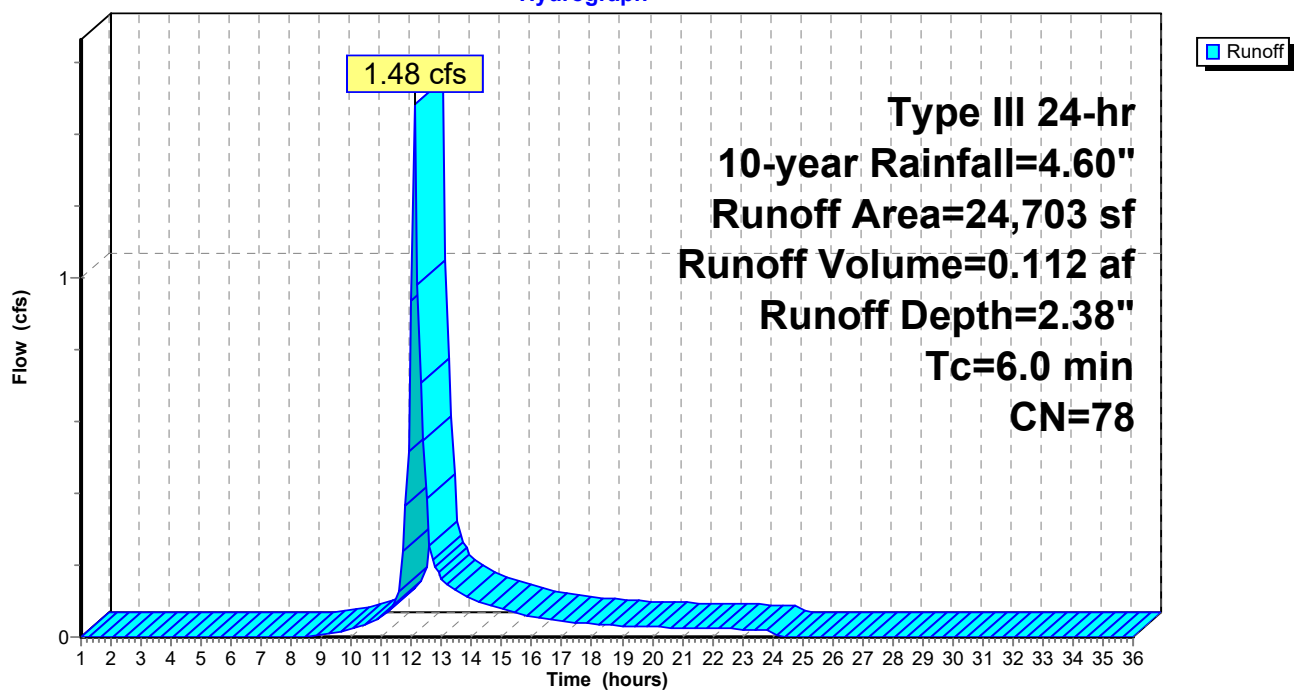
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
15,393	96	Gravel surface, HSG A
9,310	49	50-75% Grass cover, Fair, HSG A
24,703	78	Weighted Average
24,703		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: 3S

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 16

Summary for Subcatchment S2: S2

Runoff = 1.84 cfs @ 12.29 hrs, Volume= 0.224 af, Depth= 0.96"

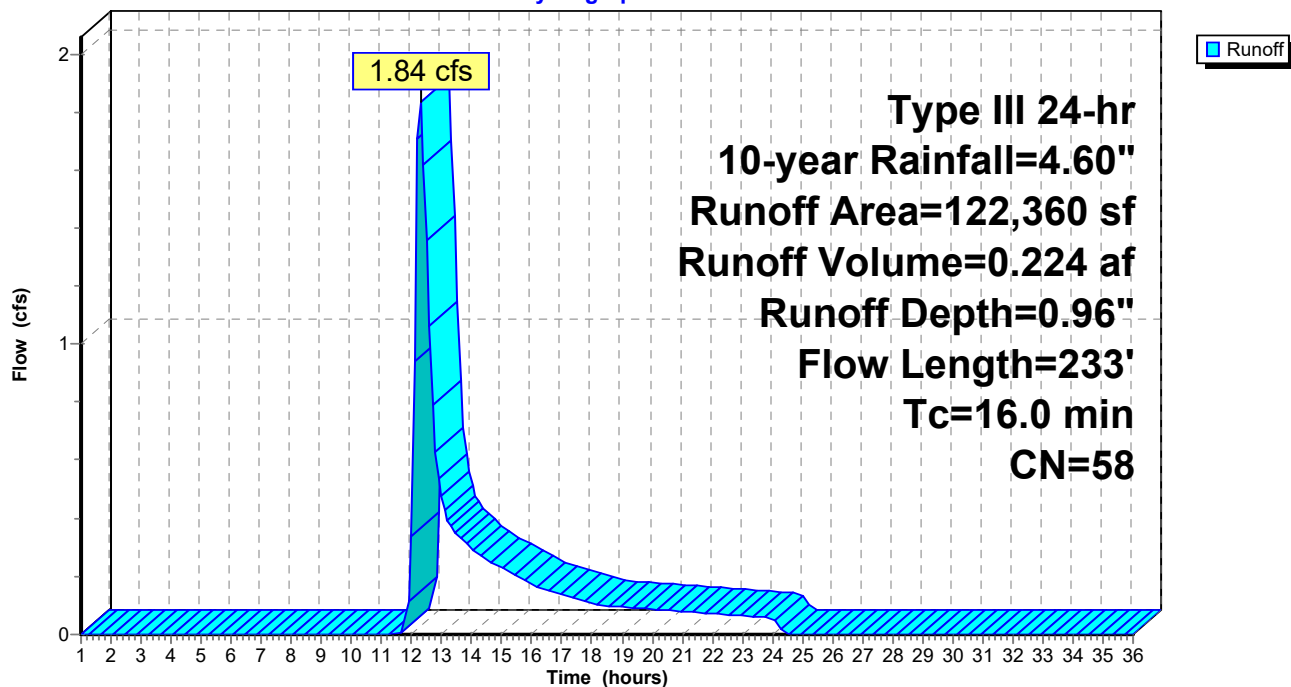
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	13,972	98	Single family roofs and driveways
*	3,155	98	Paved walking path
	52,792	32	Woods/grass comb., Good, HSG A
*	24,853	96	Gravel
	27,588	49	50-75% Grass cover, Fair, HSG A
	122,360	58	Weighted Average
	105,233		86.00% Pervious Area
	17,127		14.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C (capped 100' sheet flow) Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment S2: S2

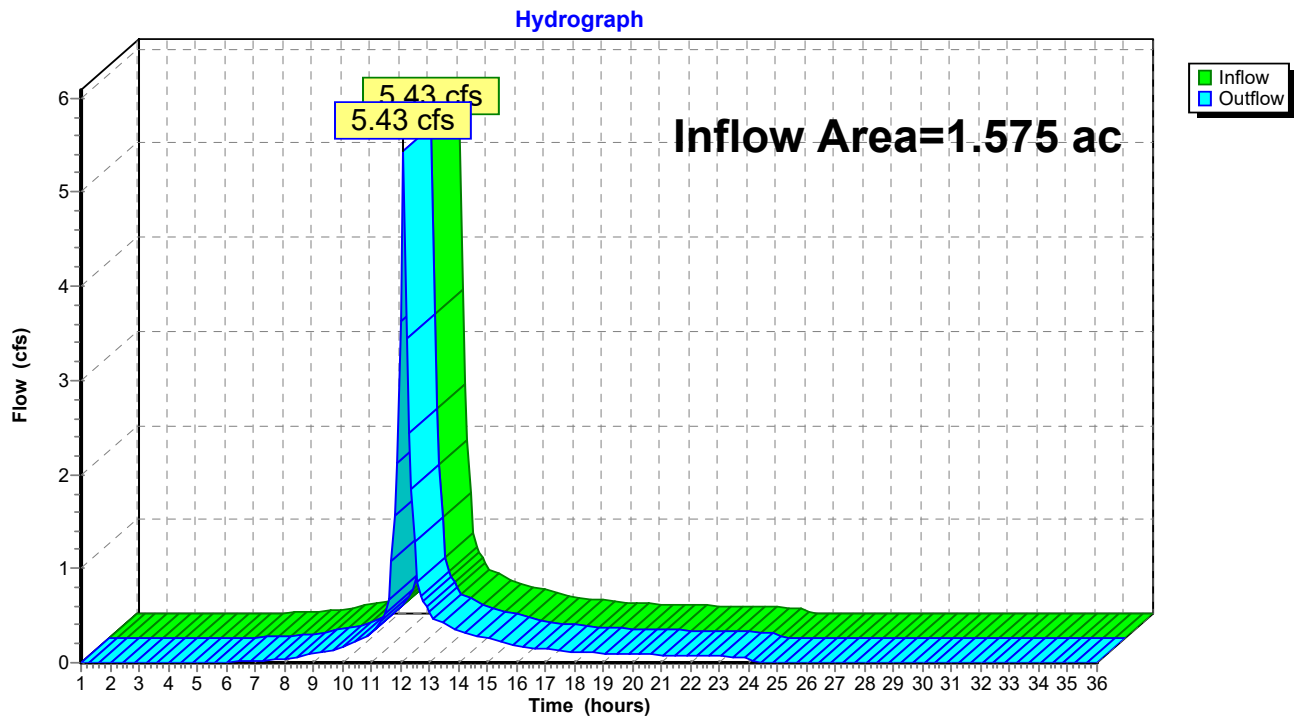
Hydrograph



Summary for Reach POI-1: POI #1 - Douglass Street MS4

Inflow Area = 1.575 ac, 39.93% Impervious, Inflow Depth = 3.19" for 10-year event
Inflow = 5.43 cfs @ 12.10 hrs, Volume= 0.419 af
Outflow = 5.43 cfs @ 12.10 hrs, Volume= 0.419 af, Atten= 0%, Lag= 0.0 min

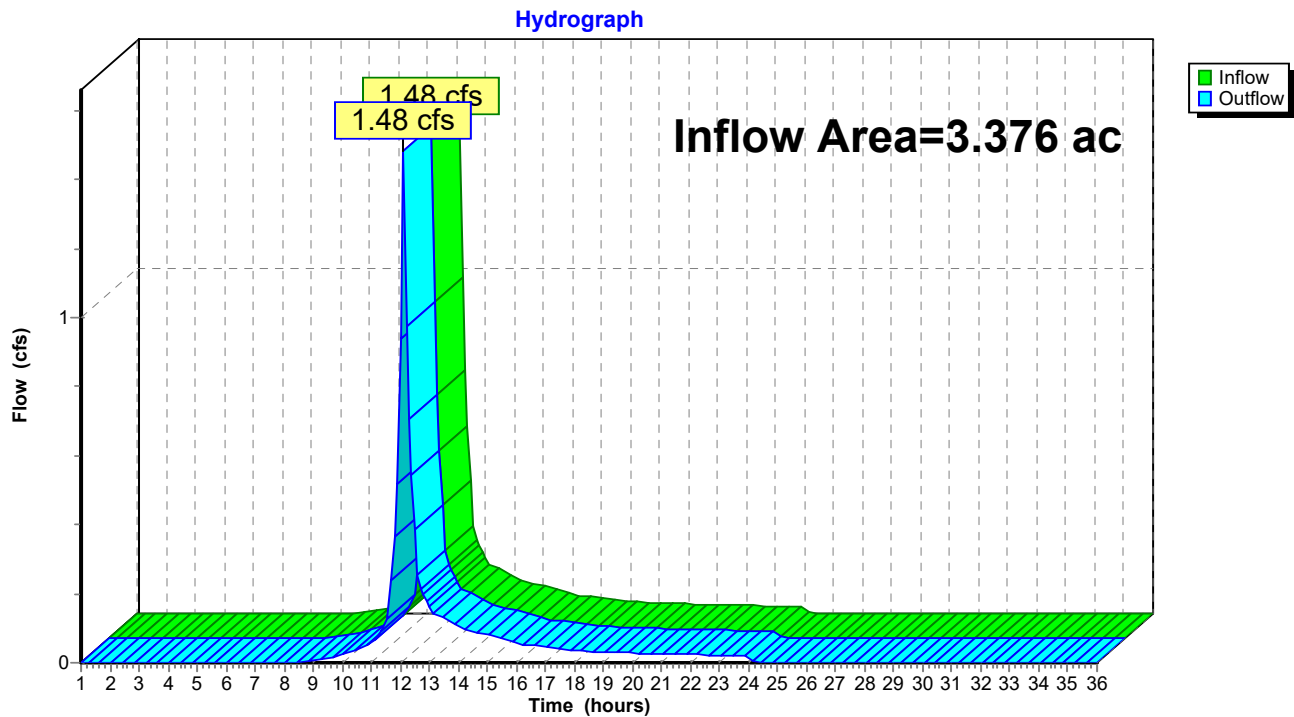
Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-1: POI #1 - Douglass Street MS4

Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 3.376 ac, 11.65% Impervious, Inflow Depth = 0.40" for 10-year event
Inflow = 1.48 cfs @ 12.10 hrs, Volume= 0.112 af
Outflow = 1.48 cfs @ 12.10 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-3: POI #3 - Baseball Field

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Type III 24-hr 10-year Rainfall=4.60"

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Page 19

Summary for Pond POI-2: POI #2 / 295 Basin

Inflow Area = 2.809 ac, 14.00% Impervious, Inflow Depth = 0.96" for 10-year event
 Inflow = 1.84 cfs @ 12.29 hrs, Volume= 0.224 af
 Outflow = 0.13 cfs @ 17.22 hrs, Volume= 0.192 af, Atten= 93%, Lag= 296.0 min
 Discarded = 0.13 cfs @ 17.22 hrs, Volume= 0.192 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
 Peak Elev= 27.59' @ 17.22 hrs Surf.Area= 9,006 sf Storage= 5,560 cf

Plug-Flow detention time= 513.4 min calculated for 0.192 af (86% of inflow)
 Center-of-Mass det. time= 448.5 min (1,346.9 - 898.3)

Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	274,731 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

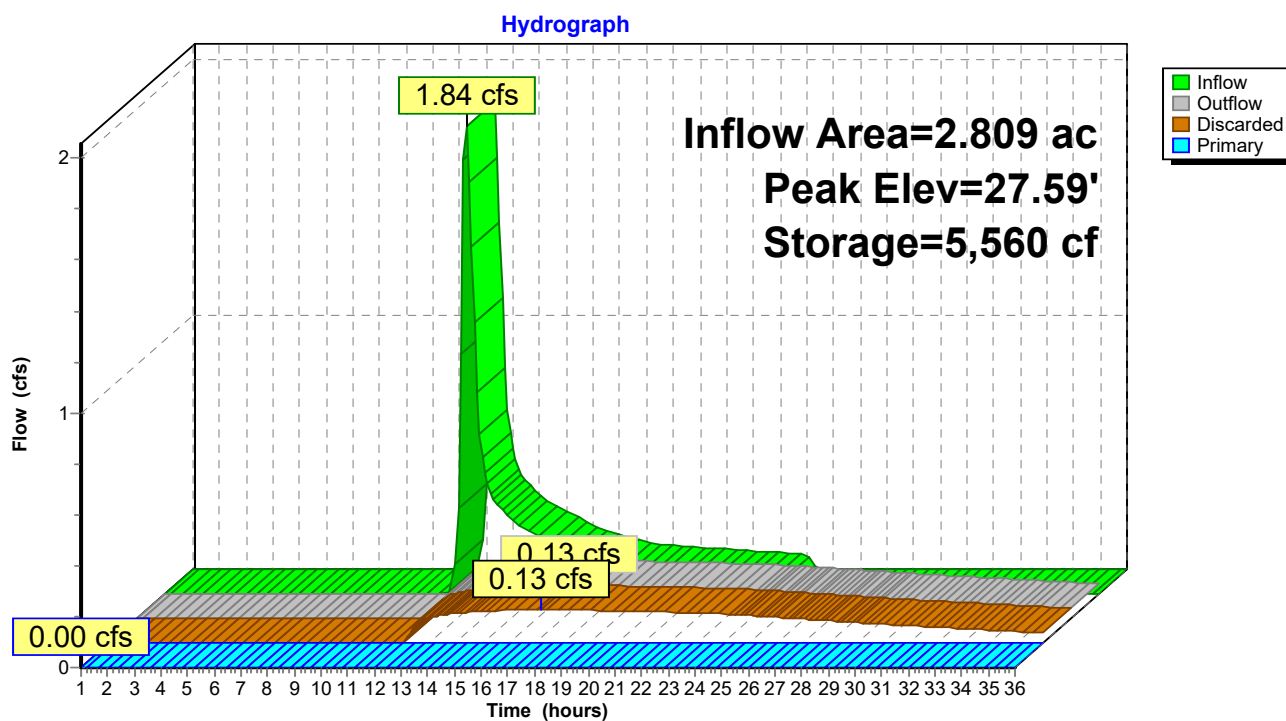
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	12,191	8,333	9,934
29.00	18,000	15,096	25,030
30.00	32,600	25,300	50,330
33.00	41,943	111,815	162,144
35.00	70,644	112,587	274,731

Device	Routing	Invert	Outlet Devices
#1	Primary	32.40'	20.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	26.60'	0.800 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.13 cfs @ 17.22 hrs HW=27.59' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POI-2: POI #2 / 295 Basin



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Type III 24-hr 25-year Rainfall=5.80"

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Page 21

Time span=1.00-36.00 hrs, dt=0.10 hrs, 351 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: 1S

Runoff Area=68,602 sf 39.93% Impervious Runoff Depth=4.33"
Tc=6.0 min CN=87 Runoff=7.26 cfs 0.568 af

Subcatchment3S: 3S

Runoff Area=24,703 sf 0.00% Impervious Runoff Depth=3.40"
Tc=6.0 min CN=78 Runoff=2.12 cfs 0.161 af

SubcatchmentS2: S2

Runoff Area=122,360 sf 14.00% Impervious Runoff Depth=1.63"
Flow Length=233' Tc=16.0 min CN=58 Runoff=3.47 cfs 0.382 af

Reach POI-1: POI #1 - Douglass Street MS4

Inflow=7.26 cfs 0.568 af
Outflow=7.26 cfs 0.568 af

Reach POI-3: POI #3 - Baseball Field

Inflow=2.12 cfs 0.161 af
Outflow=2.12 cfs 0.161 af

Pond POI-2: POI #2 / 295 Basin

Peak Elev=28.03' Storage=10,289 cf Inflow=3.47 cfs 0.382 af
Discarded=0.19 cfs 0.308 af Primary=0.00 cfs 0.000 af Outflow=0.19 cfs 0.308 af

Total Runoff Area = 4.951 ac Runoff Volume = 1.111 af Average Runoff Depth = 2.69"
79.36% Pervious = 3.929 ac 20.64% Impervious = 1.022 ac

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Type III 24-hr 25-year Rainfall=5.80"

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Page 22

Summary for Subcatchment 1S: 1S

Runoff = 7.26 cfs @ 12.10 hrs, Volume= 0.568 af, Depth= 4.33"

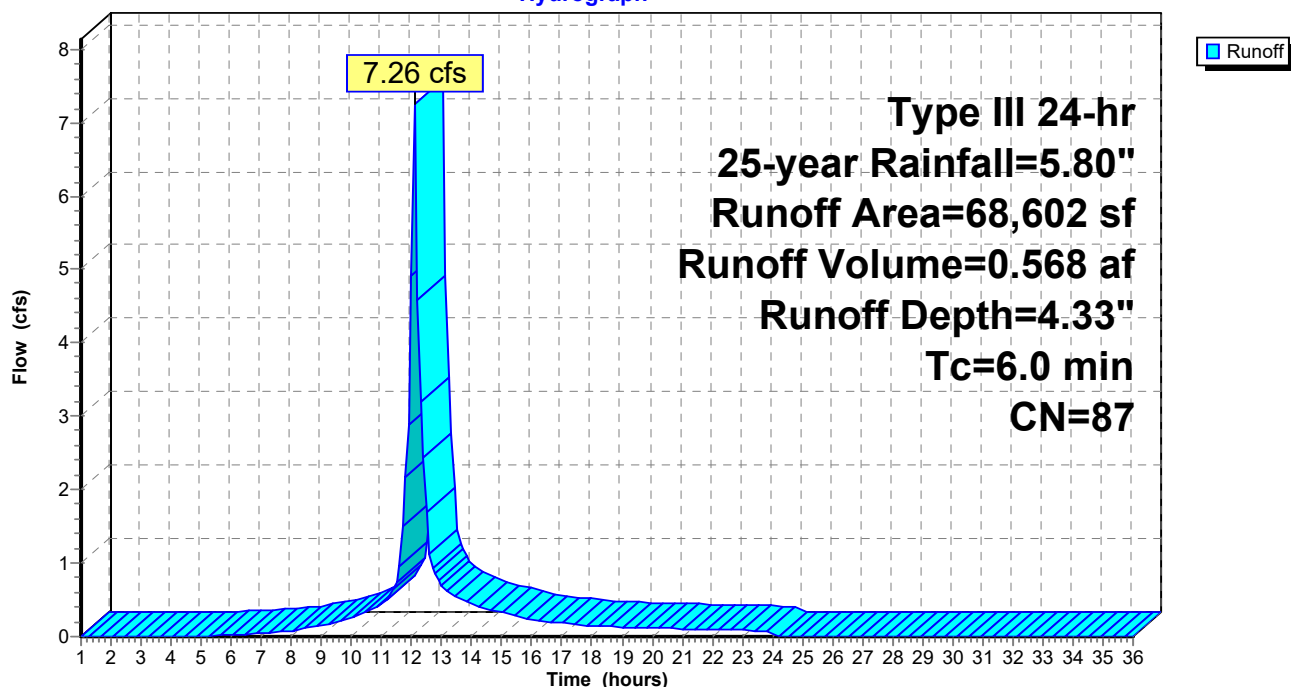
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	21,601	98	Pavement / Roof
*	27,720	96	Gravel surface
	10,373	49	50-75% Grass cover, Fair, HSG A
	8,908	77	1/8 acre lots, 65% imp, HSG A
	68,602	87	Weighted Average
	41,211		60.07% Pervious Area
	27,391		39.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: 1S

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 23

Summary for Subcatchment 3S: 3S

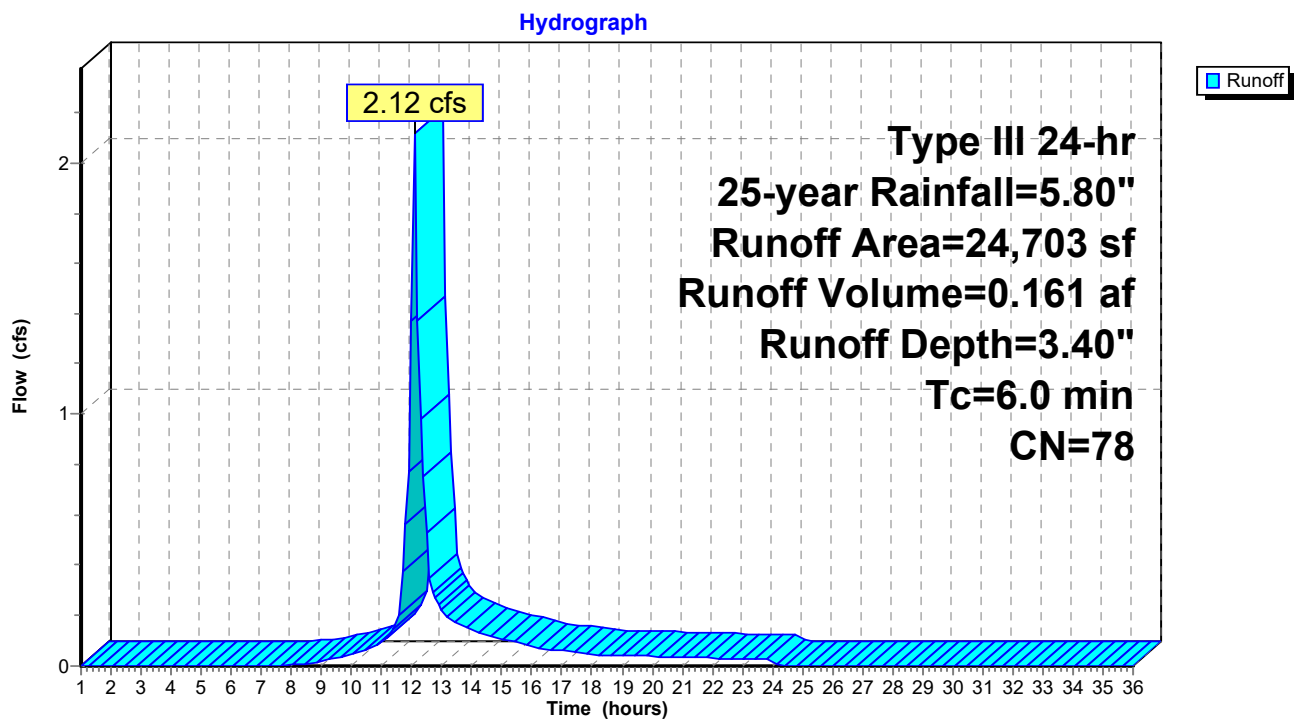
Runoff = 2.12 cfs @ 12.10 hrs, Volume= 0.161 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
15,393	96	Gravel surface, HSG A
9,310	49	50-75% Grass cover, Fair, HSG A
24,703	78	Weighted Average
24,703		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: 3S



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Type III 24-hr 25-year Rainfall=5.80"

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Page 24

Summary for Subcatchment S2: S2

Runoff = 3.47 cfs @ 12.25 hrs, Volume= 0.382 af, Depth= 1.63"

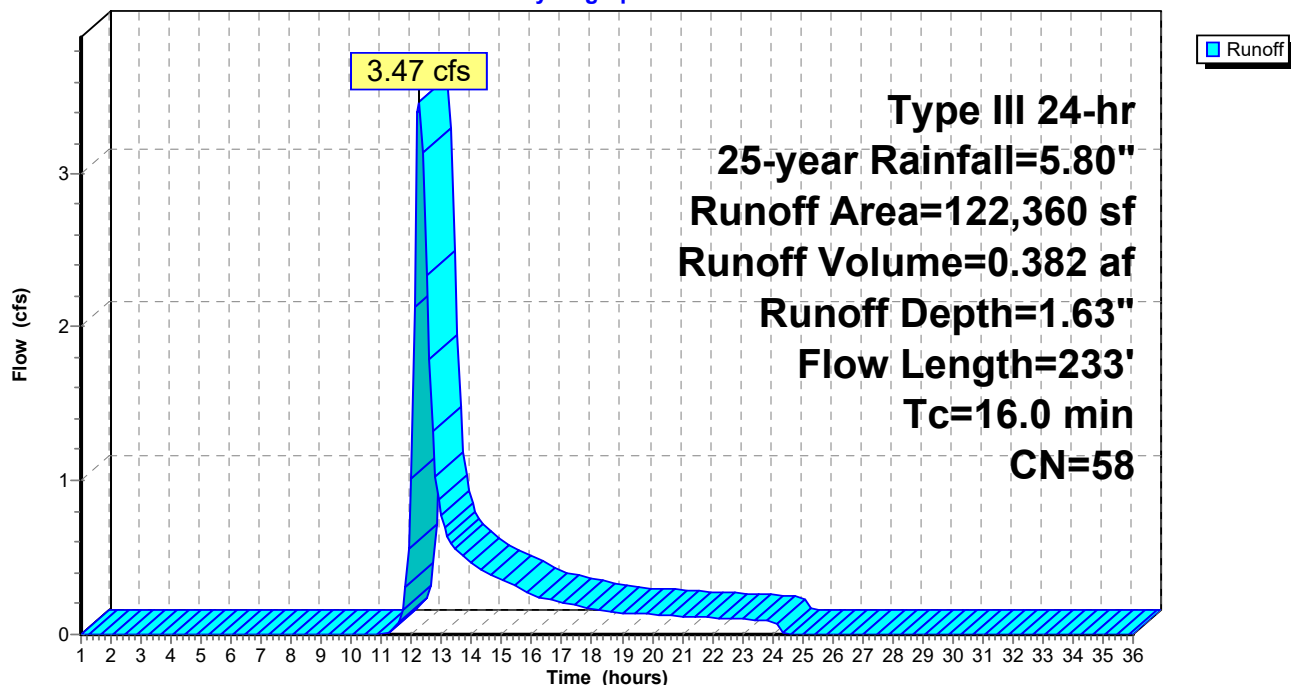
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	13,972	98	Single family roofs and driveways
*	3,155	98	Paved walking path
	52,792	32	Woods/grass comb., Good, HSG A
*	24,853	96	Gravel
	27,588	49	50-75% Grass cover, Fair, HSG A
	122,360	58	Weighted Average
	105,233		86.00% Pervious Area
	17,127		14.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C (capped 100' sheet flow) Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment S2: S2

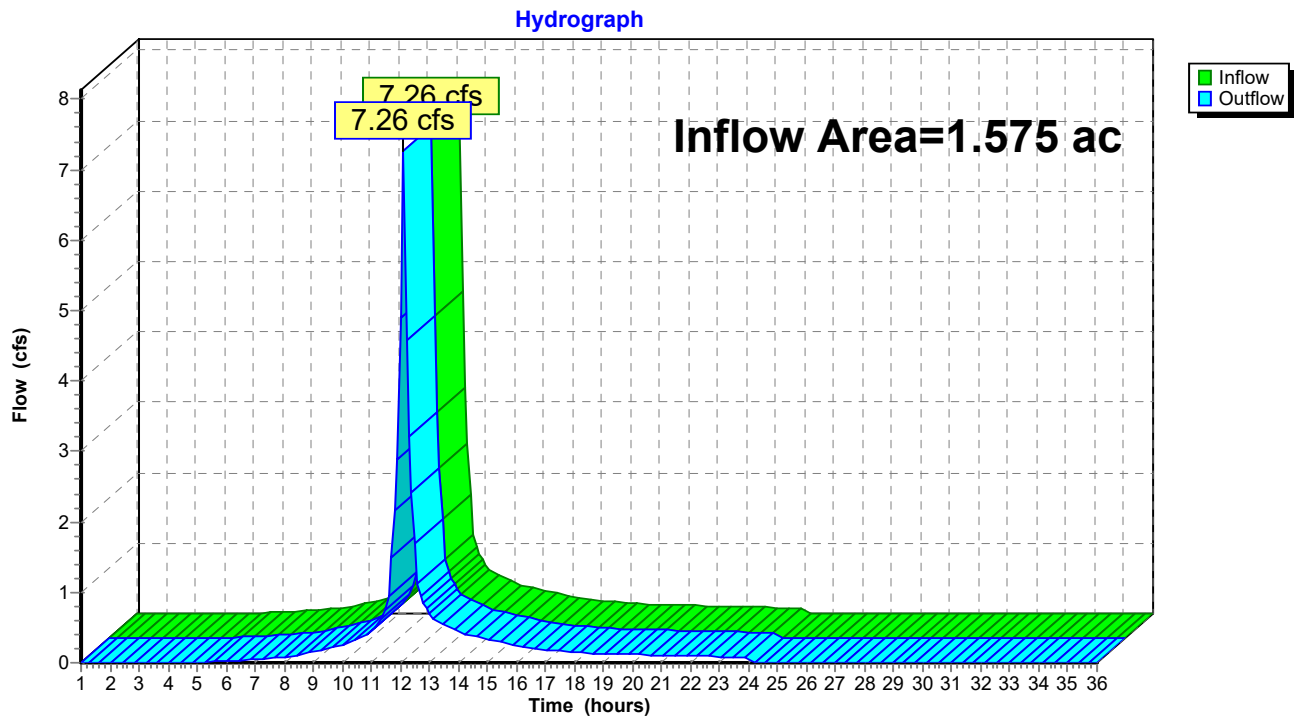
Hydrograph



Summary for Reach POI-1: POI #1 - Douglass Street MS4

Inflow Area = 1.575 ac, 39.93% Impervious, Inflow Depth = 4.33" for 25-year event
Inflow = 7.26 cfs @ 12.10 hrs, Volume= 0.568 af
Outflow = 7.26 cfs @ 12.10 hrs, Volume= 0.568 af, Atten= 0%, Lag= 0.0 min

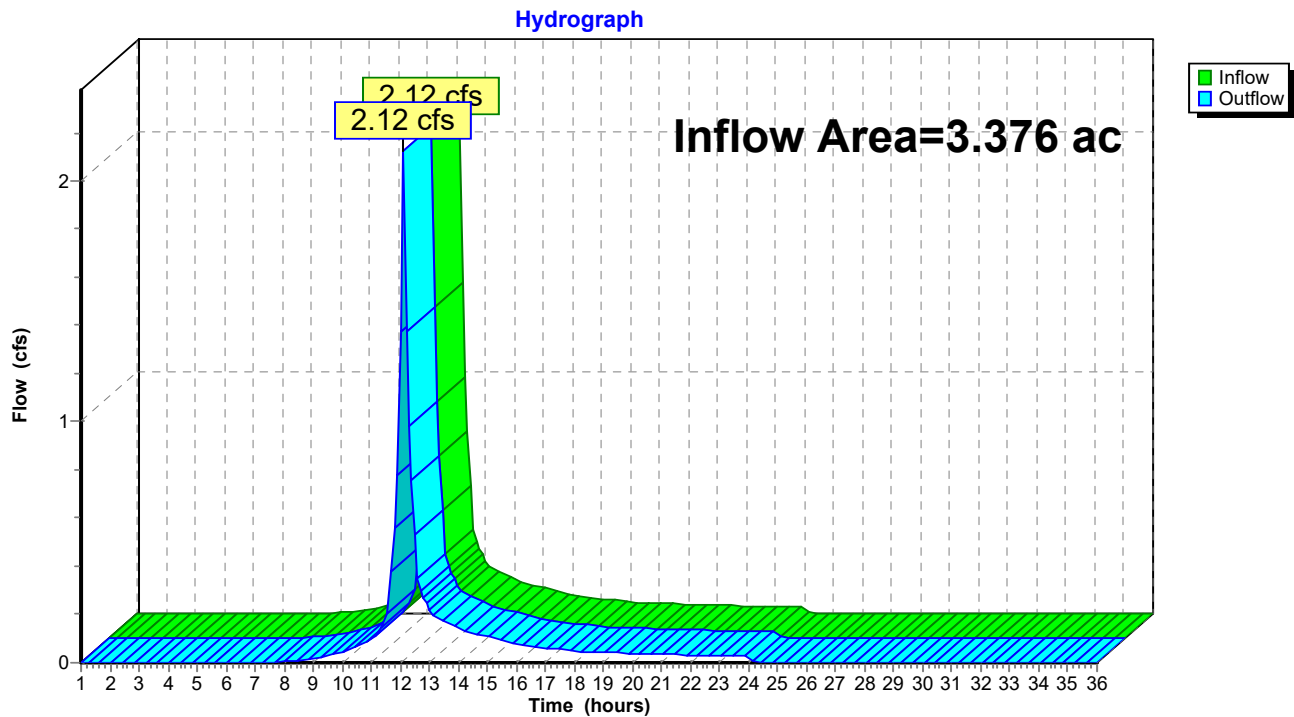
Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-1: POI #1 - Douglass Street MS4

Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 3.376 ac, 11.65% Impervious, Inflow Depth = 0.57" for 25-year event
Inflow = 2.12 cfs @ 12.10 hrs, Volume= 0.161 af
Outflow = 2.12 cfs @ 12.10 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-3: POI #3 - Baseball Field

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Type III 24-hr 25-year Rainfall=5.80"

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Page 27

Summary for Pond POI-2: POI #2 / 295 Basin

Inflow Area = 2.809 ac, 14.00% Impervious, Inflow Depth = 1.63" for 25-year event
 Inflow = 3.47 cfs @ 12.25 hrs, Volume= 0.382 af
 Outflow = 0.19 cfs @ 17.36 hrs, Volume= 0.308 af, Atten= 94%, Lag= 306.6 min
 Discarded = 0.19 cfs @ 17.36 hrs, Volume= 0.308 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
 Peak Elev= 28.03' @ 17.36 hrs Surf.Area= 12,359 sf Storage= 10,289 cf

Plug-Flow detention time= 575.0 min calculated for 0.307 af (80% of inflow)
 Center-of-Mass det. time= 495.9 min (1,375.8 - 879.9)

Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	274,731 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

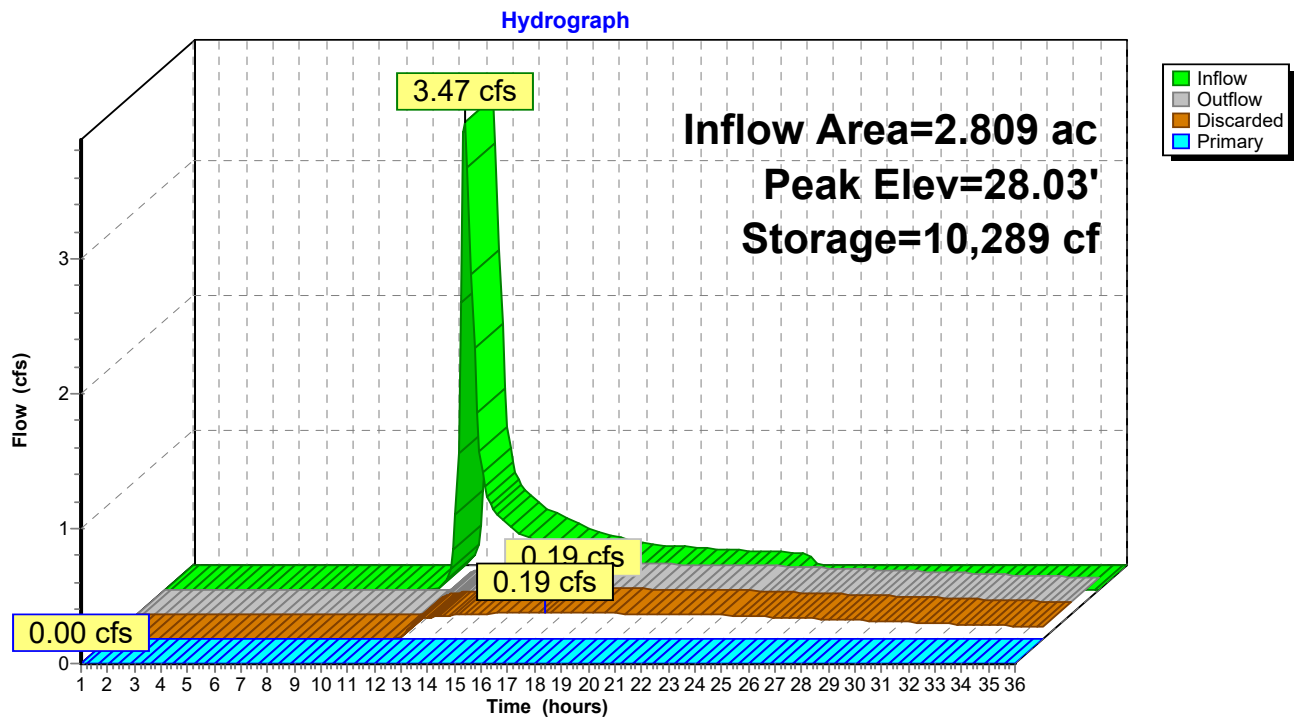
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	12,191	8,333	9,934
29.00	18,000	15,096	25,030
30.00	32,600	25,300	50,330
33.00	41,943	111,815	162,144
35.00	70,644	112,587	274,731

Device	Routing	Invert	Outlet Devices
#1	Primary	32.40'	20.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	26.60'	0.800 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.19 cfs @ 17.36 hrs HW=28.03' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POI-2: POI #2 / 295 Basin



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Type III 24-hr WQ Rainfall=1.00"

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Page 29

Time span=1.00-36.00 hrs, dt=0.10 hrs, 351 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: 1S

Runoff Area=68,602 sf 39.93% Impervious Runoff Depth=0.22"
Tc=6.0 min CN=87 Runoff=0.33 cfs 0.029 af

Subcatchment3S: 3S

Runoff Area=24,703 sf 0.00% Impervious Runoff Depth=0.06"
Tc=6.0 min CN=78 Runoff=0.01 cfs 0.003 af

SubcatchmentS2: S2

Runoff Area=122,360 sf 14.00% Impervious Runoff Depth=0.00"
Flow Length=233' Tc=16.0 min CN=58 Runoff=0.00 cfs 0.000 af

Reach POI-1: POI #1 - Douglass Street MS4

Inflow=0.33 cfs 0.029 af
Outflow=0.33 cfs 0.029 af

Reach POI-3: POI #3 - Baseball Field

Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Pond POI-2: POI #2 / 295 Basin

Peak Elev=26.30' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 4.951 ac Runoff Volume = 0.032 af Average Runoff Depth = 0.08"
79.36% Pervious = 3.929 ac 20.64% Impervious = 1.022 ac

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Type III 24-hr WQ Rainfall=1.00"

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Page 30

Summary for Subcatchment 1S: 1S

Runoff = 0.33 cfs @ 12.12 hrs, Volume= 0.029 af, Depth= 0.22"

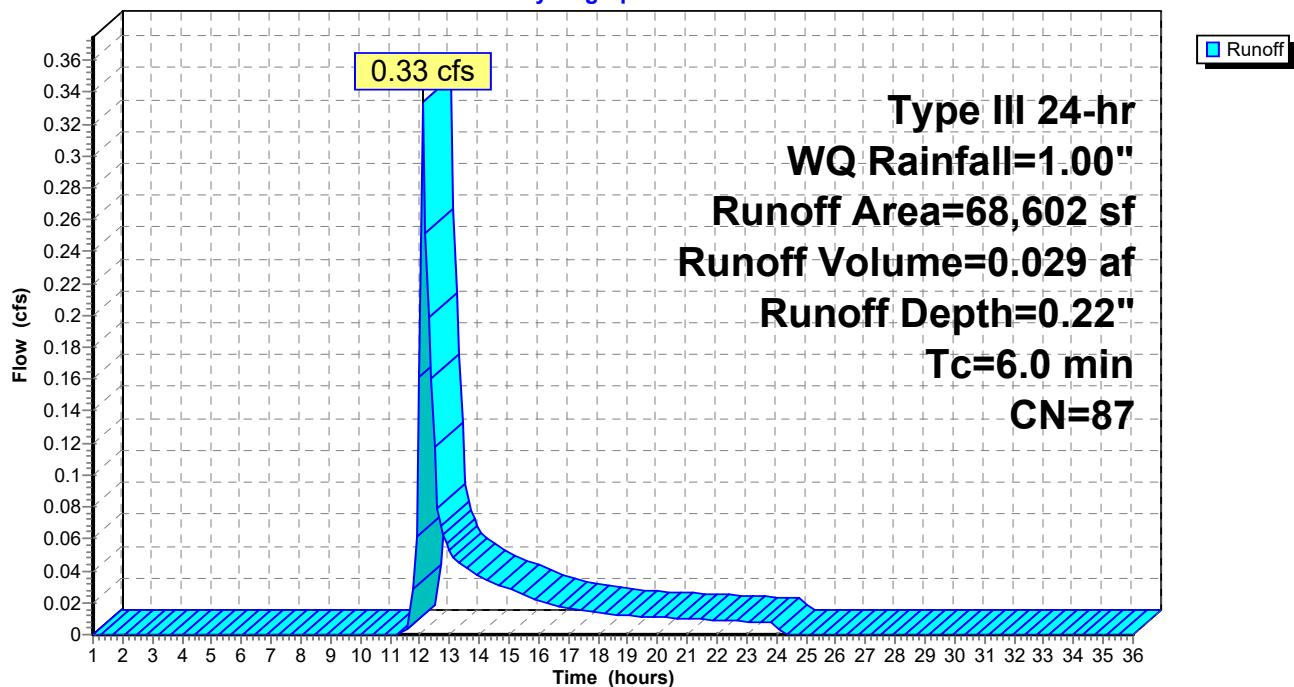
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	21,601	98	Pavement / Roof
*	27,720	96	Gravel surface
	10,373	49	50-75% Grass cover, Fair, HSG A
	8,908	77	1/8 acre lots, 65% imp, HSG A
	68,602	87	Weighted Average
	41,211		60.07% Pervious Area
	27,391		39.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: 1S

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 31

Summary for Subcatchment 3S: 3S

Runoff = 0.01 cfs @ 12.40 hrs, Volume= 0.003 af, Depth= 0.06"

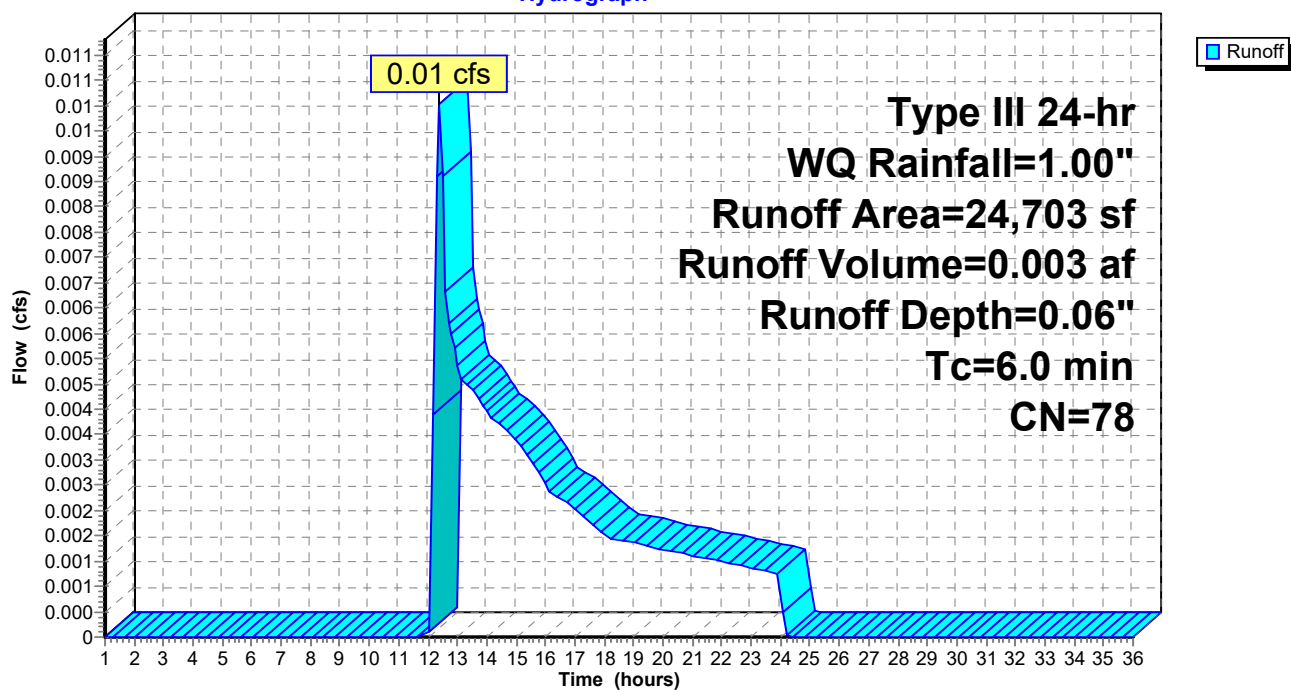
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
15,393	96	Gravel surface, HSG A
9,310	49	50-75% Grass cover, Fair, HSG A
24,703	78	Weighted Average
24,703		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: 3S

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 32

Summary for Subcatchment S2: S2

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

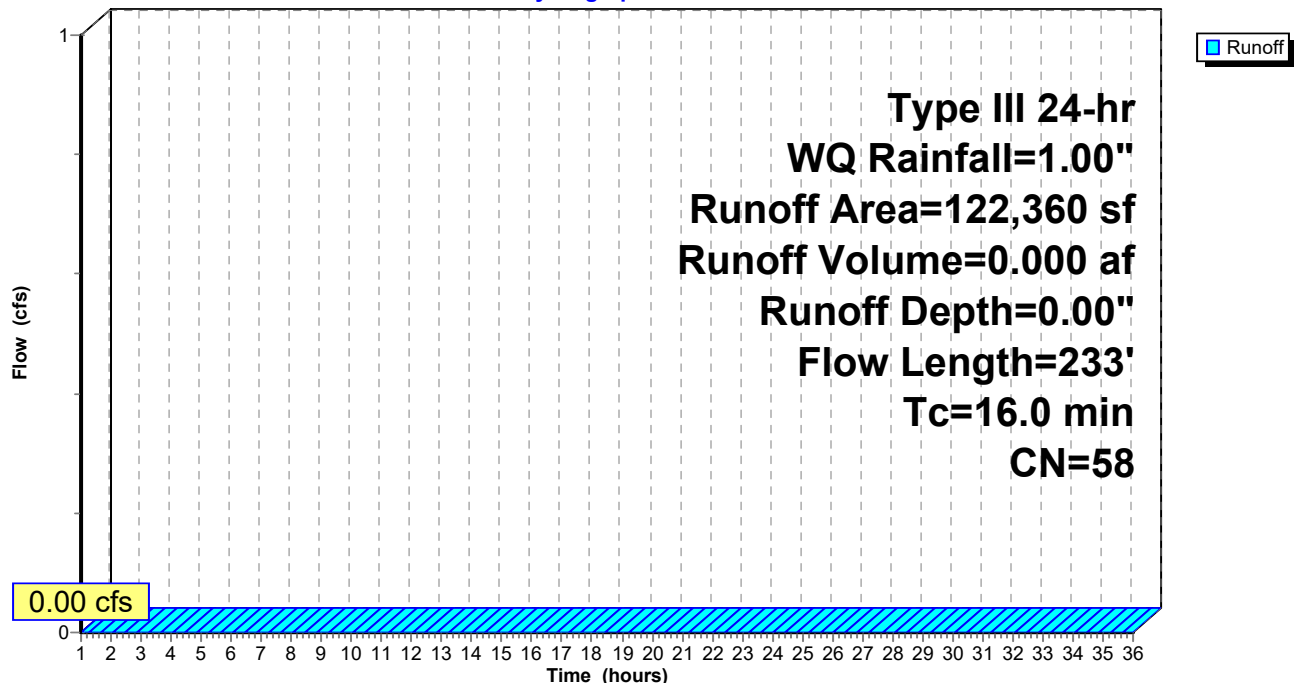
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	13,972	98	Single family roofs and driveways
*	3,155	98	Paved walking path
	52,792	32	Woods/grass comb., Good, HSG A
*	24,853	96	Gravel
	27,588	49	50-75% Grass cover, Fair, HSG A
	122,360	58	Weighted Average
	105,233		86.00% Pervious Area
	17,127		14.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C (capped 100' sheet flow) Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment S2: S2

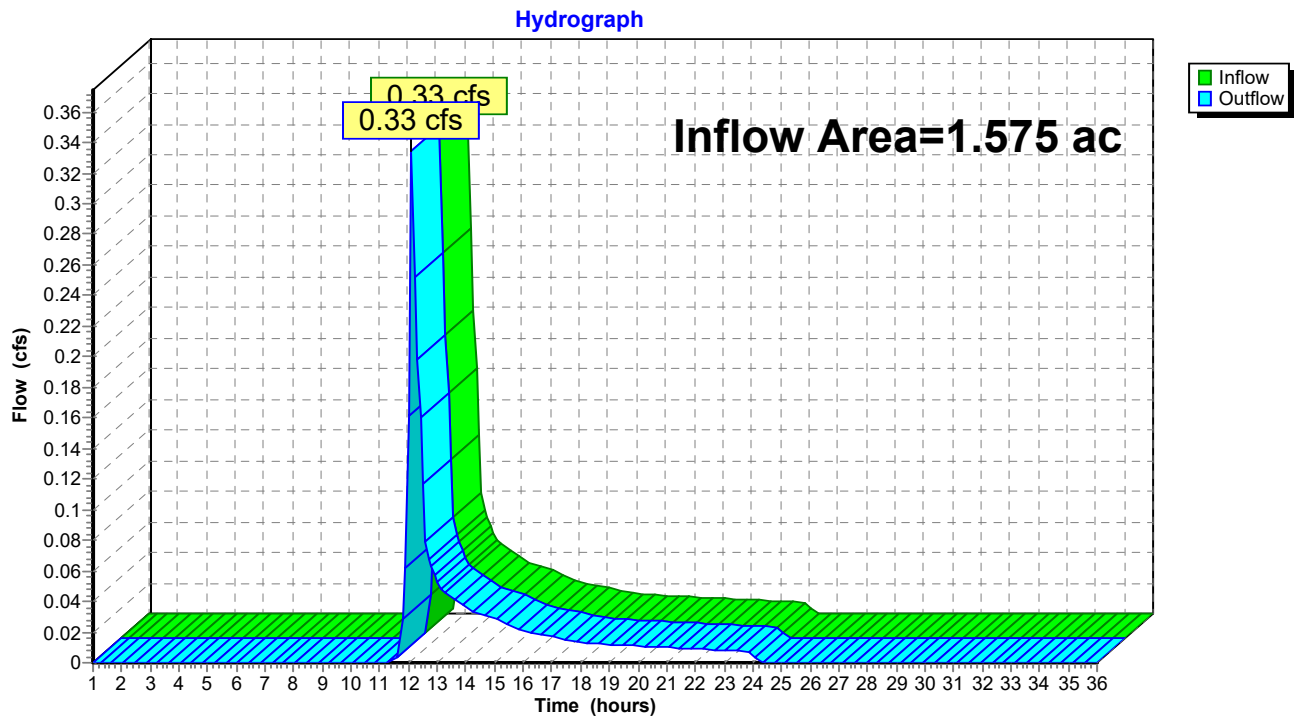
Hydrograph



Summary for Reach POI-1: POI #1 - Douglass Street MS4

Inflow Area = 1.575 ac, 39.93% Impervious, Inflow Depth = 0.22" for WQ event
Inflow = 0.33 cfs @ 12.12 hrs, Volume= 0.029 af
Outflow = 0.33 cfs @ 12.12 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

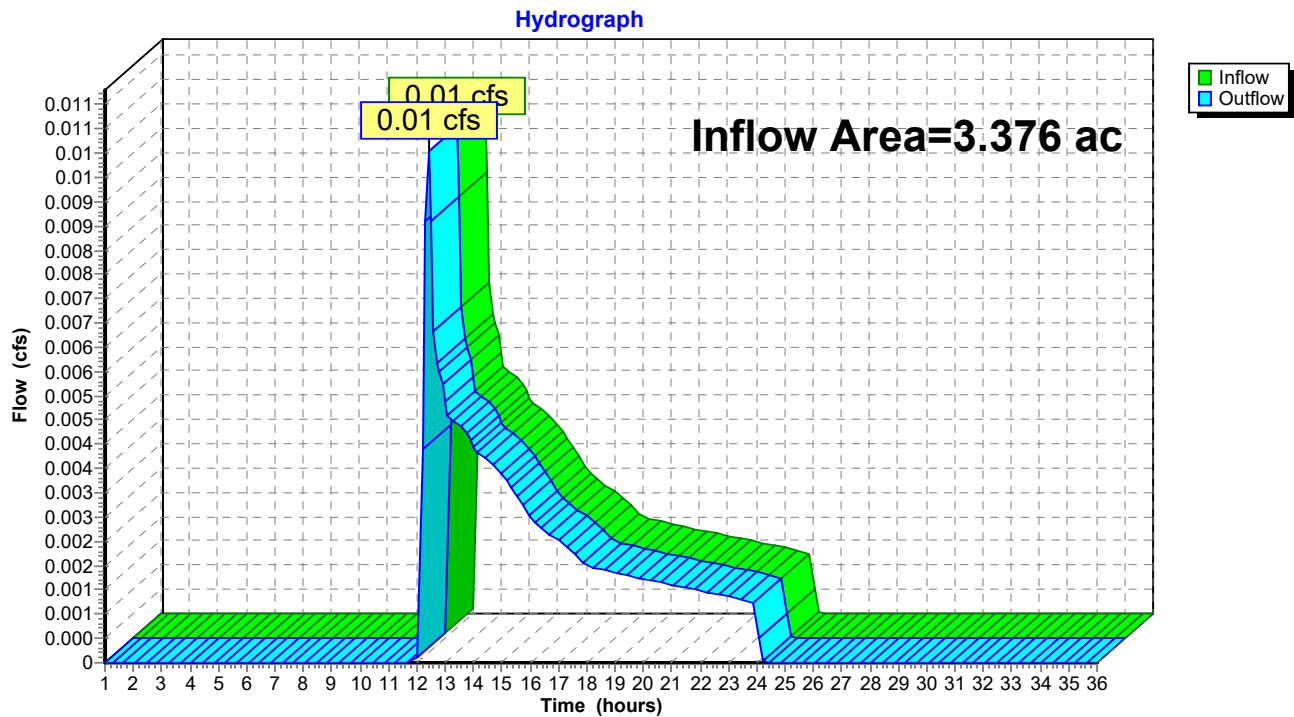
Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-1: POI #1 - Douglass Street MS4

Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 3.376 ac, 11.65% Impervious, Inflow Depth = 0.01" for WQ event
Inflow = 0.01 cfs @ 12.40 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 12.40 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs

Reach POI-3: POI #3 - Baseball Field

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Type III 24-hr WQ Rainfall=1.00"

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Page 35

Summary for Pond POI-2: POI #2 / 295 Basin

Inflow Area = 2.809 ac, 14.00% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.10 hrs
 Peak Elev= 26.30' @ 1.00 hrs Surf.Area= 100 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	274,731 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

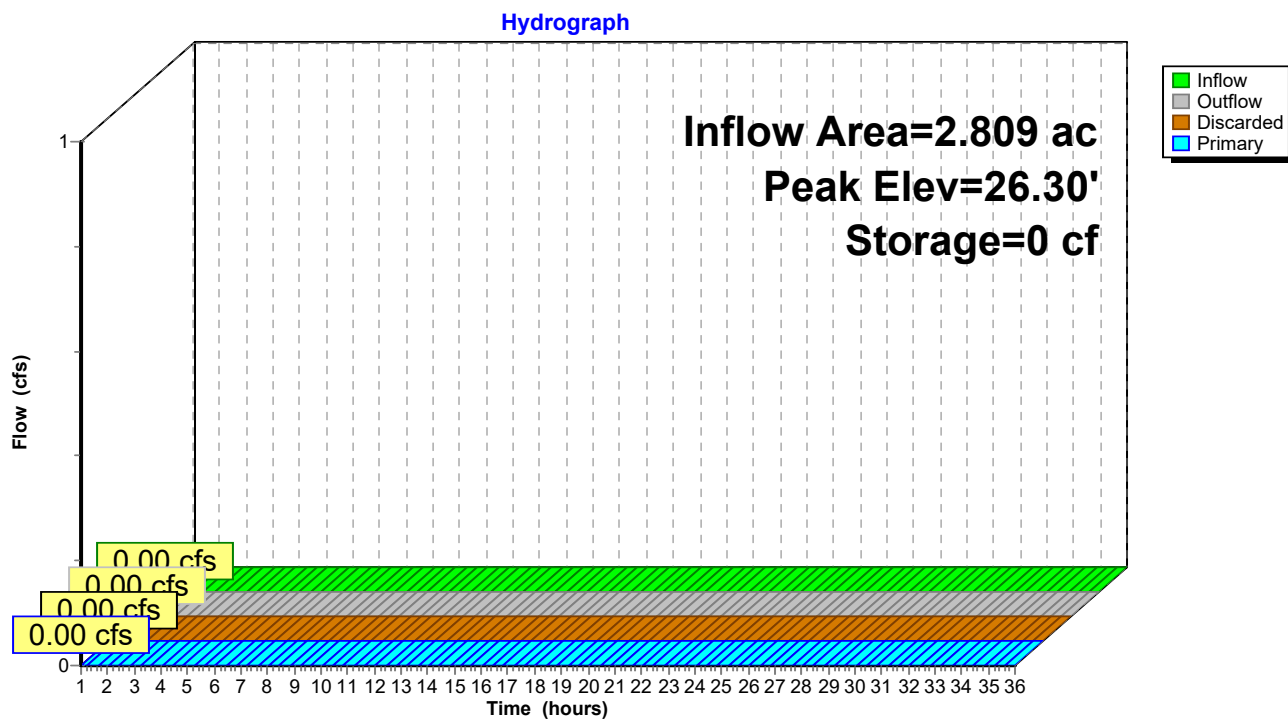
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	12,191	8,333	9,934
29.00	18,000	15,096	25,030
30.00	32,600	25,300	50,330
33.00	41,943	111,815	162,144
35.00	70,644	112,587	274,731

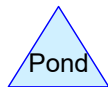
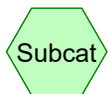
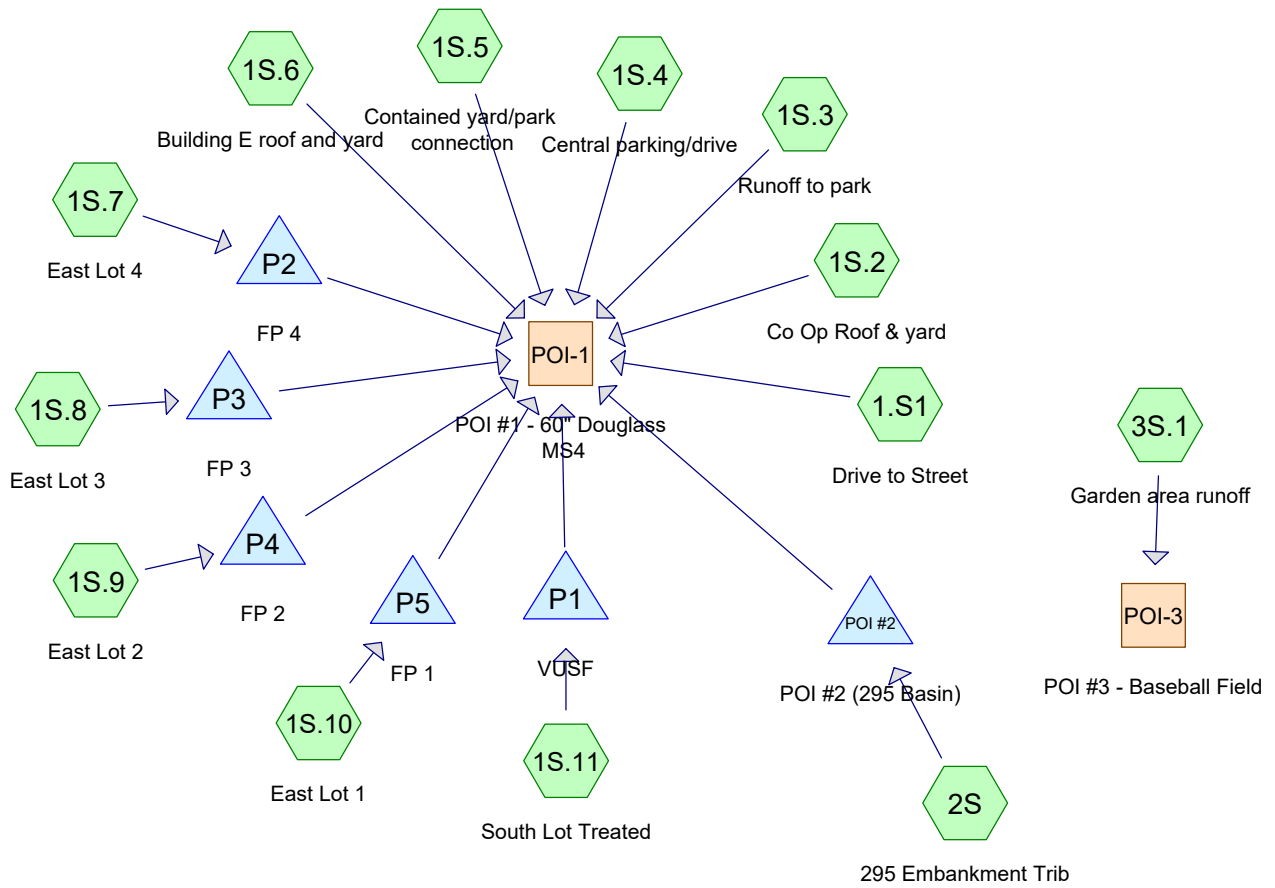
Device	Routing	Invert	Outlet Devices
#1	Primary	32.40'	20.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	26.60'	0.800 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)
 ↑ **2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond POI-2: POI #2 / 295 Basin





Routing Diagram for Post Development 1.13 FINAL
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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.210	77	1/8 acre lots, 65% imp, HSG A (1S.2)
1.112	39	>75% Grass cover, Good, HSG A (1.S1, 1S.10, 1S.2, 1S.3, 1S.5, 1S.6, 1S.7, 1S.8, 1S.9, 2S)
0.309	30	Brush, Good, HSG A (1S.11, 1S.4, 3S.1)
0.126	98	Homes/driveways (2S)
0.072	98	Path (2S)
0.364	98	Paved parking (1S.11, 1S.7, 1S.8)
0.110	98	Paved parking, patio, sidewalk (1S.9)
0.428	98	Pavement (1.S1, 1S.10, 1S.4)
0.485	98	Roofs (1S.2)
0.005	98	Stairs (2S)
1.212	32	Woods/grass comb., Good, HSG A (2S)
0.014	98	patios (1S.2)
0.120	98	pavers (1S.2)
0.275	98	roof (1S.6)
0.108	98	sidewalks (1S.2, 1S.5)
4.952	63	TOTAL AREA

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.842	HSG A	1.S1, 1S.10, 1S.11, 1S.2, 1S.3, 1S.4, 1S.5, 1S.6, 1S.7, 1S.8, 1S.9, 2S, 3S.1
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.110	Other	1.S1, 1S.10, 1S.11, 1S.2, 1S.4, 1S.5, 1S.6, 1S.7, 1S.8, 1S.9, 2S
4.952		TOTAL AREA

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.210	0.000	0.000	0.000	0.000	0.210	1/8 acre lots, 65% imp	1S.2
1.112	0.000	0.000	0.000	0.000	1.112	>75% Grass cover, Good	1S.1, 1S.1 0, 1S.2, 1S.3, 1S.5, 1S.6, 1S.7, 1S.8, 1S.9, 2S
0.309	0.000	0.000	0.000	0.000	0.309	Brush, Good	1S.1 1, 1S.4, 3S.1
0.000	0.000	0.000	0.000	0.126	0.126	Homes/driveways	2S
0.000	0.000	0.000	0.000	0.072	0.072	Path	2S
0.000	0.000	0.000	0.000	0.364	0.364	Paved parking	1S.1 1, 1S.7, 1S.8
0.000	0.000	0.000	0.000	0.110	0.110	Paved parking, patio, sidewalk	1S.9
0.000	0.000	0.000	0.000	0.428	0.428	Pavement	1S.1, 1S.1 0, 1S.4
0.000	0.000	0.000	0.000	0.485	0.485	Roofs	1S.2
0.000	0.000	0.000	0.000	0.005	0.005	Stairs	2S
1.212	0.000	0.000	0.000	0.000	1.212	Woods/grass comb., Good	2S
0.000	0.000	0.000	0.000	0.014	0.014	patios	1S.2
0.000	0.000	0.000	0.000	0.120	0.120	pavers	1S.2
0.000	0.000	0.000	0.000	0.275	0.275	roof	1S.6
0.000	0.000	0.000	0.000	0.108	0.108	sidewalks	1S.2, 1S.5

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Page 5

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.842	0.000	0.000	0.000	2.110	4.952	TOTAL AREA	

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Page 6

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	P1	27.00	26.75	60.0	0.0042	0.010	12.0	0.0	0.0
2	P2	32.35	32.00	70.0	0.0050	0.010	10.0	0.0	0.0
3	P3	31.90	31.50	70.0	0.0057	0.010	10.0	0.0	0.0
4	P4	31.40	31.00	70.0	0.0057	0.010	10.0	0.0	0.0
5	P5	30.90	30.53	75.0	0.0049	0.010	10.0	0.0	0.0
6	POI #2	26.60	26.51	16.0	0.0056	0.012	12.0	0.0	0.0

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Type III 24-hr 2-year Rainfall=3.10"

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Page 7

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S.1: Drive to Street	Runoff Area=1,131 sf 55.00% Impervious Runoff Depth=0.82" Tc=6.0 min CN=71 Runoff=0.02 cfs 0.002 af
Subcatchment 1S.10: East Lot 1	Runoff Area=3,754 sf 84.98% Impervious Runoff Depth=1.99" Tc=6.0 min CN=89 Runoff=0.20 cfs 0.014 af
Subcatchment 1S.11: South Lot Treated	Runoff Area=10,852 sf 76.24% Impervious Runoff Depth=1.46" Tc=6.0 min CN=82 Runoff=0.42 cfs 0.030 af
Subcatchment 1S.2: Co Op Roof & yard	Runoff Area=56,422 sf 65.80% Impervious Runoff Depth=1.20" Tc=6.0 min CN=78 Runoff=1.78 cfs 0.130 af
Subcatchment 1S.3: Runoff to park	Runoff Area=2,081 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=264' Tc=9.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.4: Central parking/drive	Runoff Area=19,043 sf 77.98% Impervious Runoff Depth=1.53" Tc=6.0 min CN=83 Runoff=0.78 cfs 0.056 af
Subcatchment 1S.5: Contained yard/park	Runoff Area=3,023 sf 16.84% Impervious Runoff Depth=0.09" Tc=6.0 min CN=49 Runoff=0.00 cfs 0.001 af
Subcatchment 1S.6: Building E roof and	Runoff Area=22,599 sf 53.10% Impervious Runoff Depth=0.77" Tc=6.0 min CN=70 Runoff=0.41 cfs 0.033 af
Subcatchment 1S.7: East Lot 4	Runoff Area=7,618 sf 53.01% Impervious Runoff Depth=0.77" Tc=6.0 min CN=70 Runoff=0.14 cfs 0.011 af
Subcatchment 1S.8: East Lot 3	Runoff Area=6,694 sf 52.99% Impervious Runoff Depth=0.77" Tc=6.0 min CN=70 Runoff=0.12 cfs 0.010 af
Subcatchment 1S.9: East Lot 2	Runoff Area=5,956 sf 80.74% Impervious Runoff Depth=1.83" Tc=6.0 min CN=87 Runoff=0.29 cfs 0.021 af
Subcatchment 2S: 295 Embankment Trib	Runoff Area=69,848 sf 12.70% Impervious Runoff Depth=0.00" Flow Length=233' Tc=16.0 min CN=41 Runoff=0.00 cfs 0.000 af
Subcatchment 3S.1: Garden area runoff	Runoff Area=6,670 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=82' Tc=6.9 min CN=30 Runoff=0.00 cfs 0.000 af
Reach POI-1: POI #1 - 60" Douglass MS4	Inflow=3.76 cfs 0.286 af Outflow=3.76 cfs 0.286 af
Reach POI-3: POI #3 - Baseball Field	Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond P1: VUSF	Peak Elev=30.91' Storage=530 cf Inflow=0.42 cfs 0.030 af Discarded=0.04 cfs 0.022 af Primary=0.01 cfs 0.009 af Outflow=0.06 cfs 0.030 af

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Page 8

Pond P2: FP 4

Peak Elev=35.95' Storage=0 cf Inflow=0.14 cfs 0.011 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0050 '/' Outflow=0.14 cfs 0.011 af

Pond P3: FP 3

Peak Elev=36.10' Storage=0 cf Inflow=0.12 cfs 0.010 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.12 cfs 0.010 af

Pond P4: FP 2

Peak Elev=35.90' Storage=0 cf Inflow=0.29 cfs 0.021 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.29 cfs 0.021 af

Pond P5: FP 1

Peak Elev=35.70' Storage=0 cf Inflow=0.20 cfs 0.014 af
10.0" Round Culvert n=0.010 L=75.0' S=0.0049 '/' Outflow=0.20 cfs 0.014 af

Pond POI #2: POI #2 (295 Basin)

Peak Elev=26.36' Storage=20 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 4.952 ac Runoff Volume = 0.308 af Average Runoff Depth = 0.75"
54.64% Pervious = 2.706 ac 45.36% Impervious = 2.246 ac

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Type III 24-hr 2-year Rainfall=3.10"

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Page 9

Summary for Subcatchment 1.S1: Drive to Street

Runoff = 0.02 cfs @ 12.10 hrs, Volume= 0.002 af, Depth= 0.82"

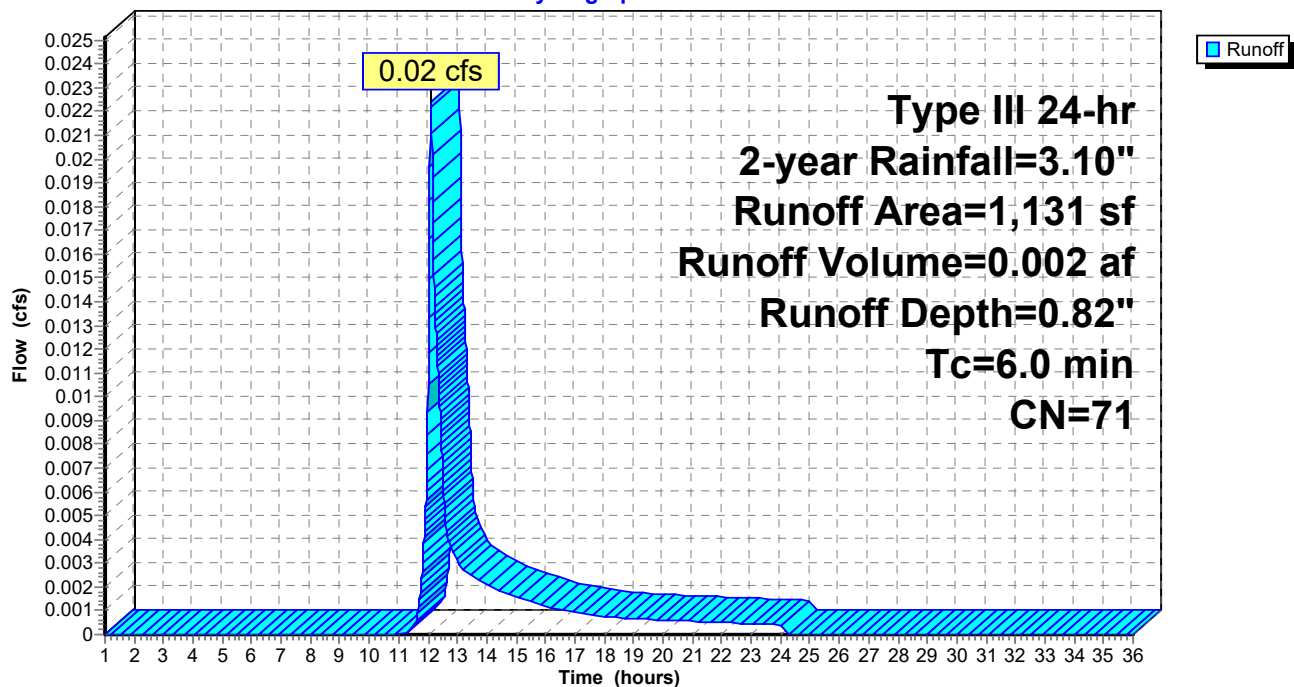
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	622	98	Pavement
	509	39	>75% Grass cover, Good, HSG A
	1,131	71	Weighted Average
	509		45.00% Pervious Area
	622		55.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1.S1: Drive to Street

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Type III 24-hr 2-year Rainfall=3.10"

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Page 10

Summary for Subcatchment 1S.10: East Lot 1

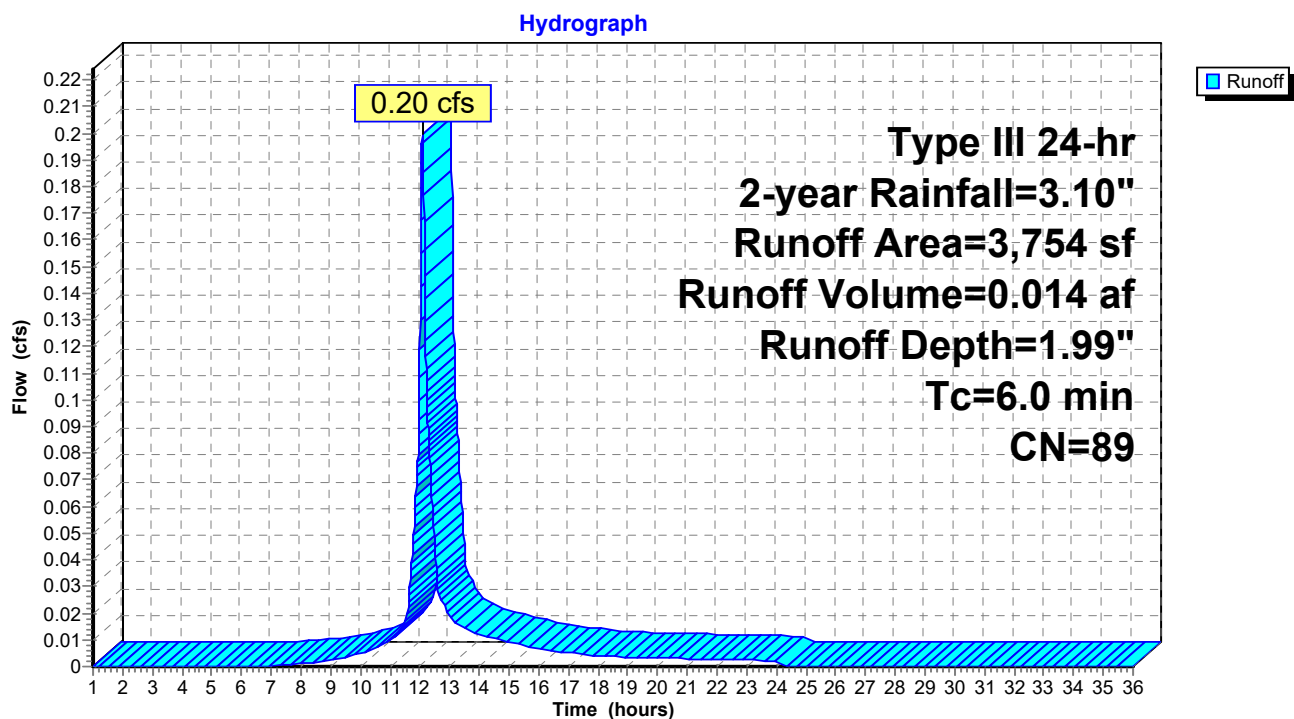
Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	3,190	98	Pavement
	564	39	>75% Grass cover, Good, HSG A
	3,754	89	Weighted Average
	564		15.02% Pervious Area
	3,190		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.10: East Lot 1



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Type III 24-hr 2-year Rainfall=3.10"

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Page 11

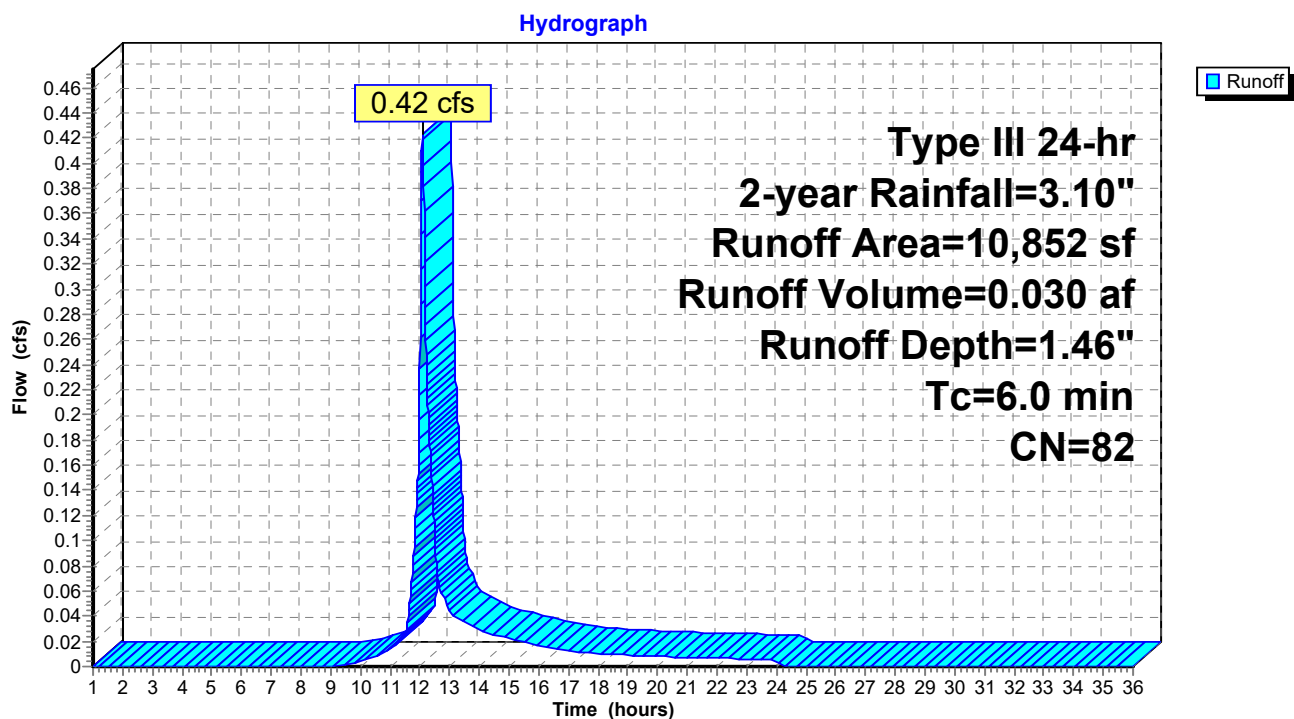
Summary for Subcatchment 1S.11: South Lot Treated

Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	8,274	98	Paved parking
	2,578	30	Brush, Good, HSG A
	10,852	82	Weighted Average
	2,578		23.76% Pervious Area
	8,274		76.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.11: South Lot Treated

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Type III 24-hr 2-year Rainfall=3.10"

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Page 12

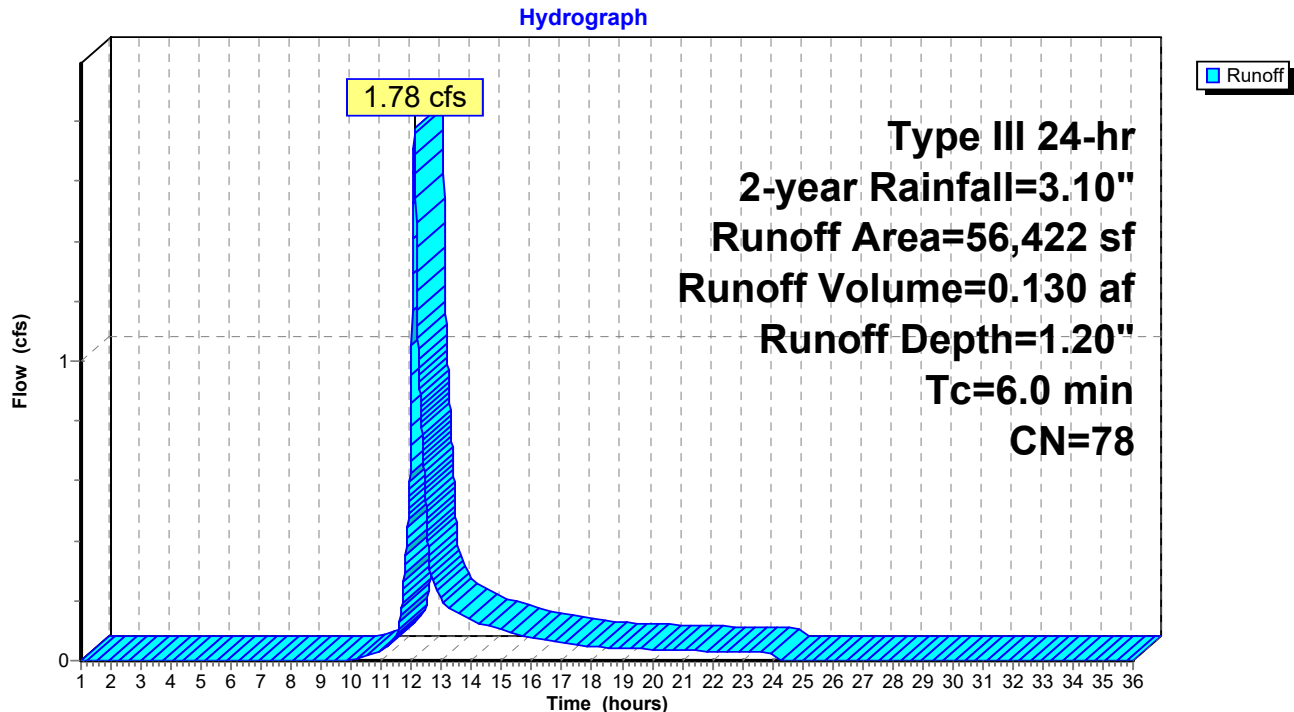
Summary for Subcatchment 1S.2: Co Op Roof & yard

Runoff = 1.78 cfs @ 12.09 hrs, Volume= 0.130 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	5,239	98	pavers
	16,100	39	>75% Grass cover, Good, HSG A
*	21,137	98	Roofs
*	4,191	98	sidewalks
*	618	98	patios
	9,137	77	1/8 acre lots, 65% imp, HSG A
	56,422	78	Weighted Average
	19,298		34.20% Pervious Area
	37,124		65.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.2: Co Op Roof & yard

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Type III 24-hr 2-year Rainfall=3.10"

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Page 13

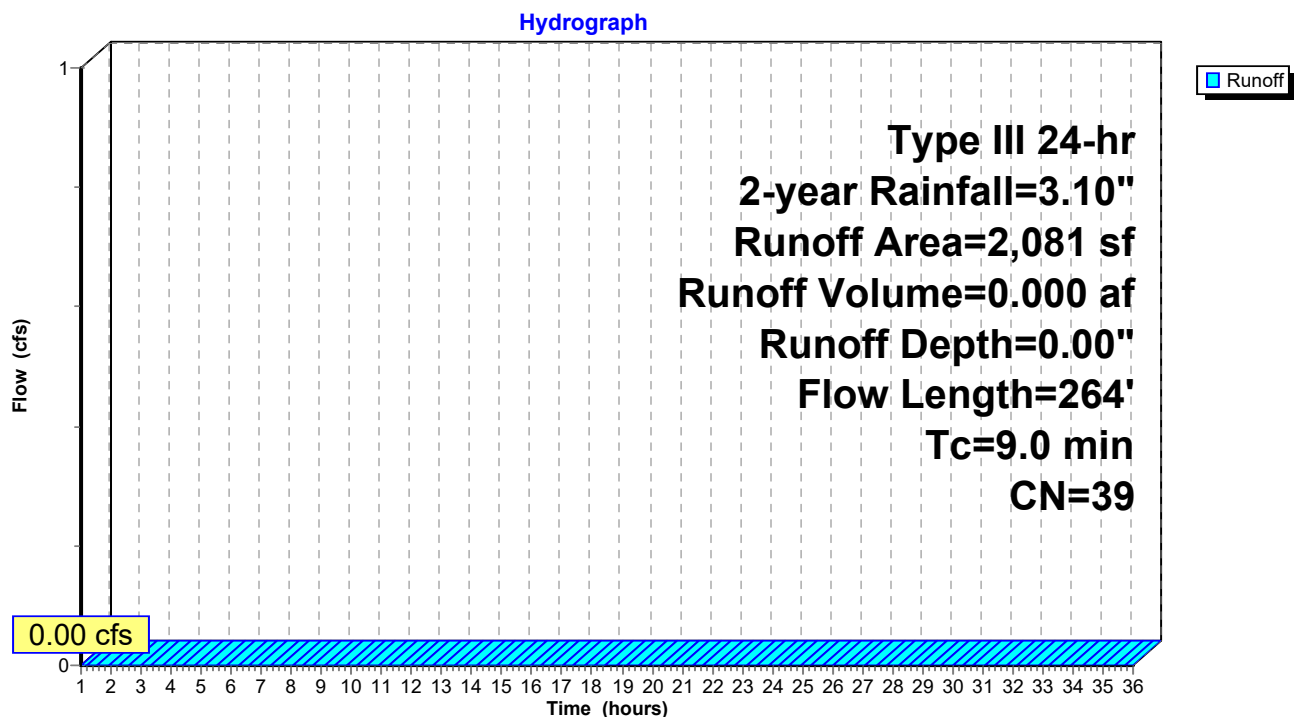
Summary for Subcatchment 1S.3: Runoff to park

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,081	39	>75% Grass cover, Good, HSG A
2,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.0600	0.27		Sheet Flow, A to B Grass: Short n= 0.150 P2= 3.27"
2.8	164	0.0200	0.99		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
9.0	264	Total			

Subcatchment 1S.3: Runoff to park

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Type III 24-hr 2-year Rainfall=3.10"

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Page 14

Summary for Subcatchment 1S.4: Central parking/drive

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 1.53"

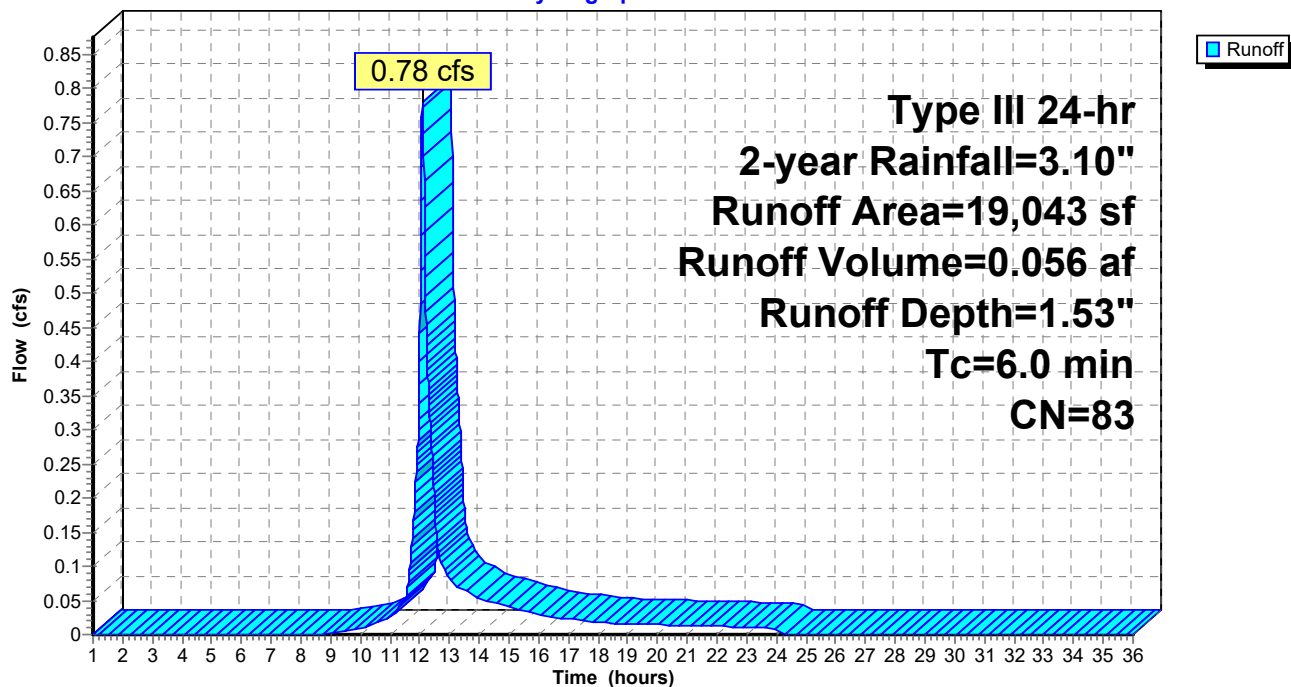
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	14,850	98	Pavement
	4,193	30	Brush, Good, HSG A
	19,043	83	Weighted Average
	4,193		22.02% Pervious Area
	14,850		77.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.4: Central parking/drive

Hydrograph



Summary for Subcatchment 1S.5: Contained yard/park connection

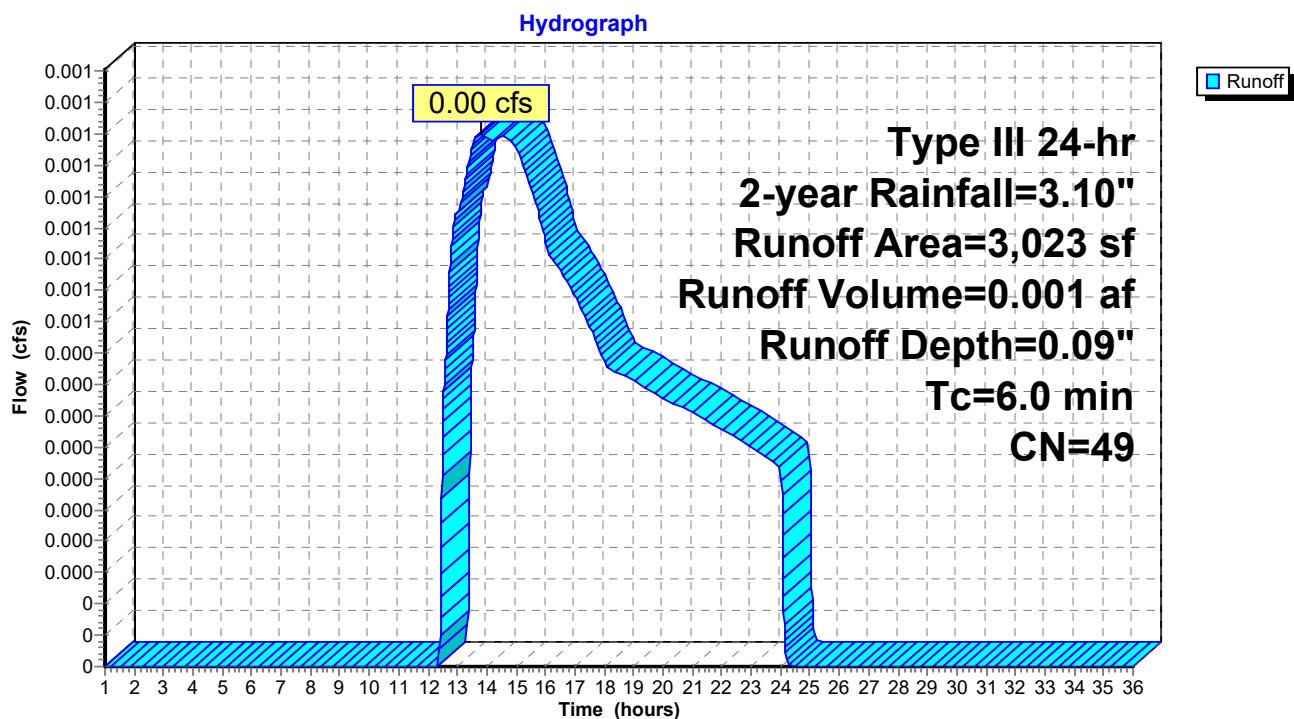
Runoff = 0.00 cfs @ 13.78 hrs, Volume= 0.001 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
2,514	39	>75% Grass cover, Good, HSG A
* 509	98	sidewalks
3,023	49	Weighted Average
2,514		83.16% Pervious Area
509		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.5: Contained yard/park connection



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Type III 24-hr 2-year Rainfall=3.10"

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Page 16

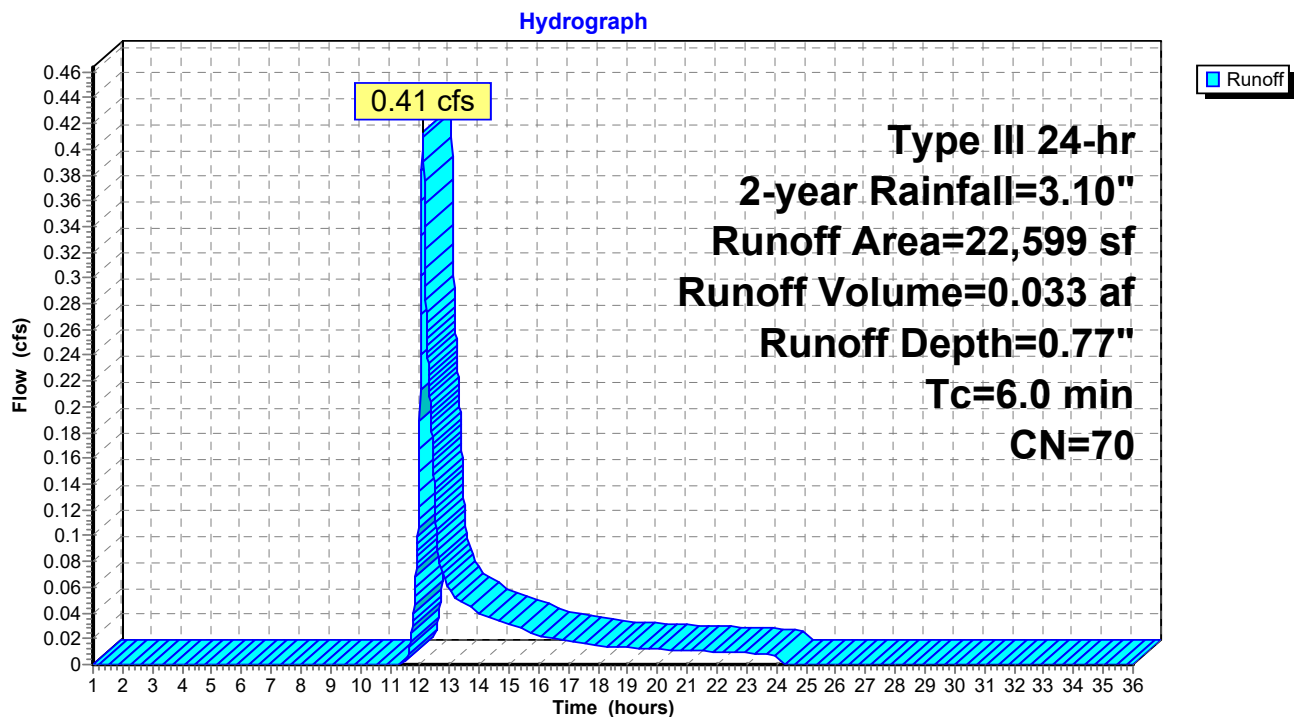
Summary for Subcatchment 1S.6: Building E roof and yard

Runoff = 0.41 cfs @ 12.10 hrs, Volume= 0.033 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
	10,599	39	>75% Grass cover, Good, HSG A
*	12,000	98	roof
	22,599	70	Weighted Average
	10,599		46.90% Pervious Area
	12,000		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.6: Building E roof and yard

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Type III 24-hr 2-year Rainfall=3.10"

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Page 17

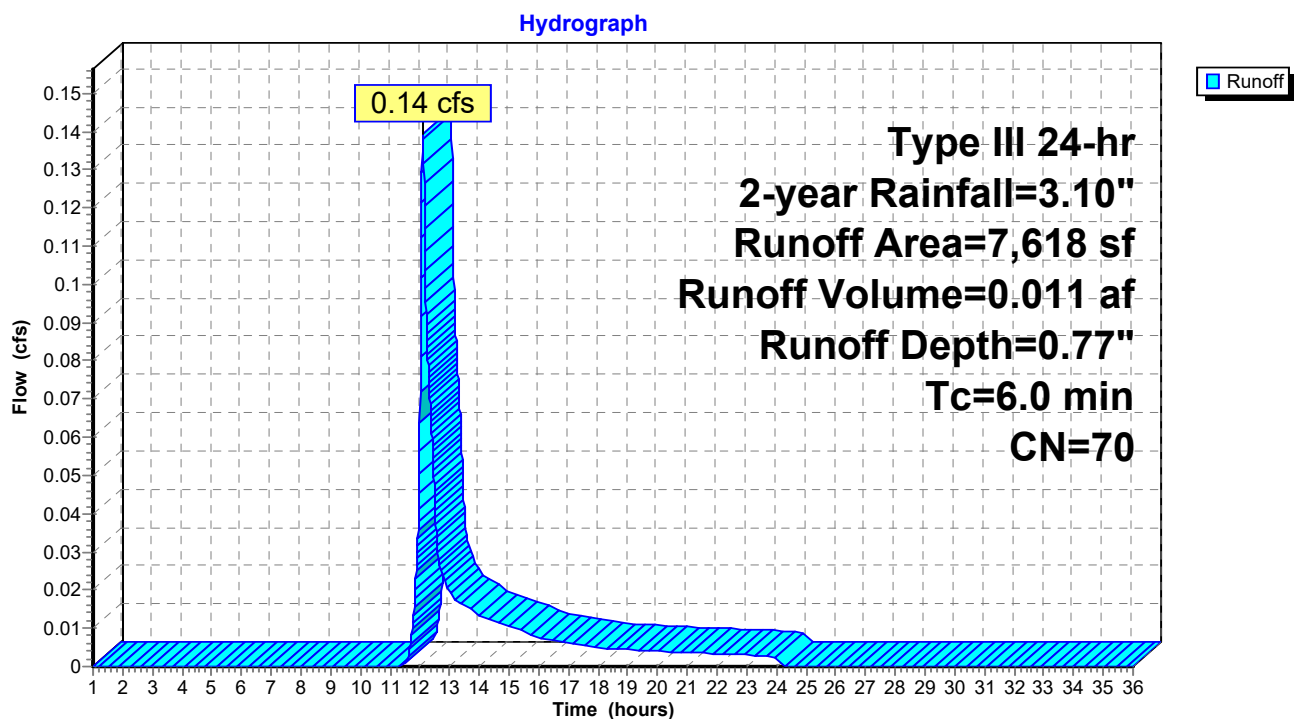
Summary for Subcatchment 1S.7: East Lot 4

Runoff = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	4,038	98	Paved parking
	3,580	39	>75% Grass cover, Good, HSG A
	7,618	70	Weighted Average
	3,580		46.99% Pervious Area
	4,038		53.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.7: East Lot 4

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Type III 24-hr 2-year Rainfall=3.10"

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Page 18

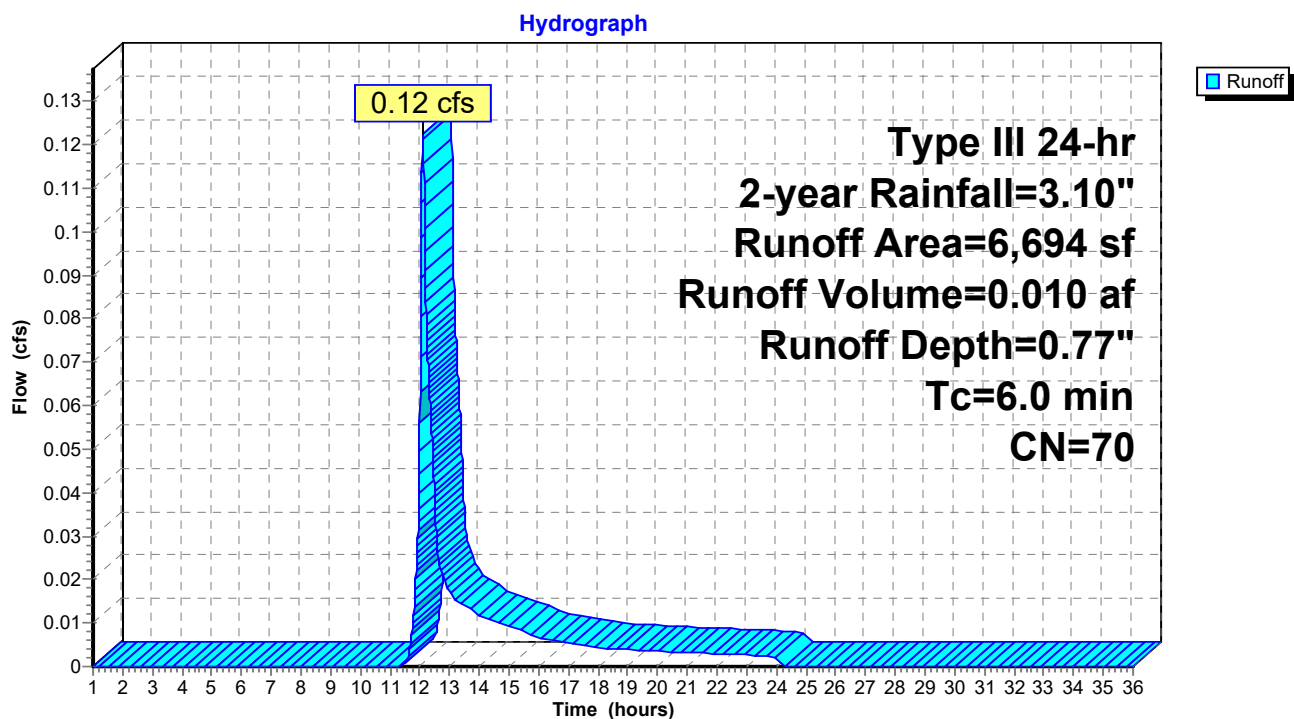
Summary for Subcatchment 1S.8: East Lot 3

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	3,547	98	Paved parking
	3,147	39	>75% Grass cover, Good, HSG A
	6,694	70	Weighted Average
	3,147		47.01% Pervious Area
	3,547		52.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.8: East Lot 3

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Type III 24-hr 2-year Rainfall=3.10"

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Page 19

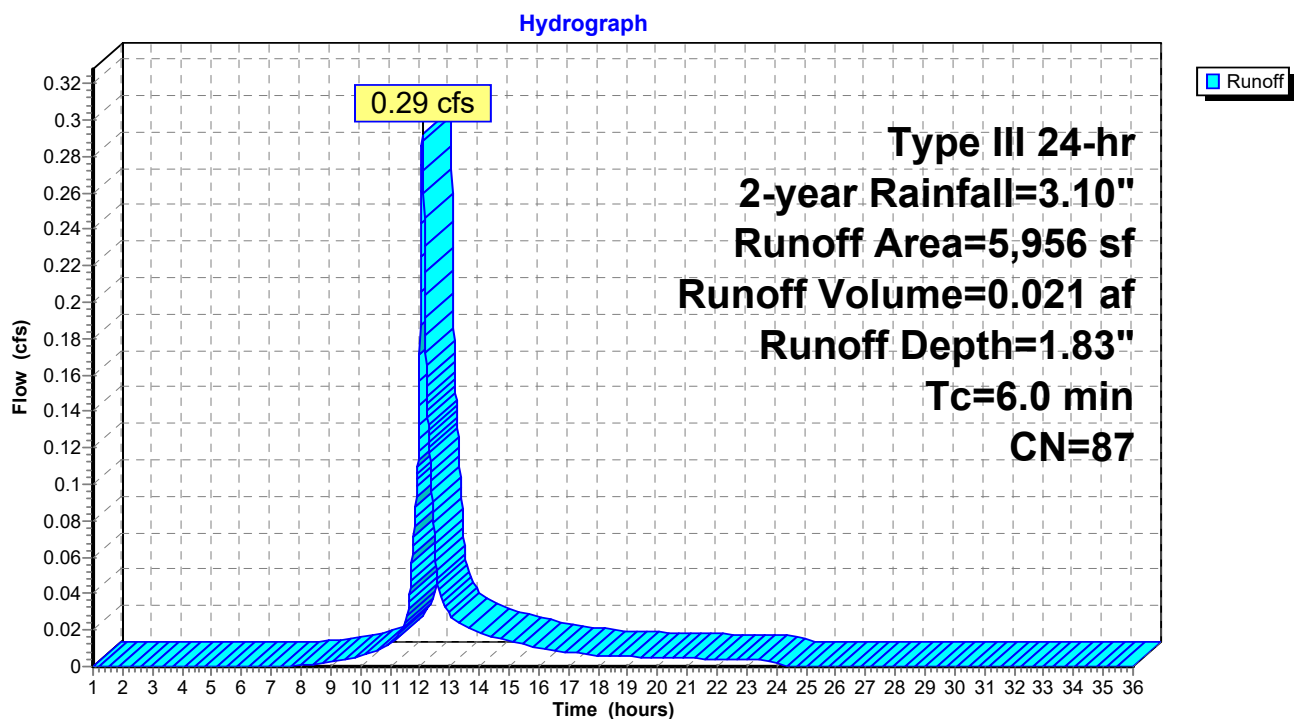
Summary for Subcatchment 1S.9: East Lot 2

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

	Area (sf)	CN	Description
*	4,809	98	Paved parking, patio, sidewalk
	1,147	39	>75% Grass cover, Good, HSG A
	5,956	87	Weighted Average
	1,147		19.26% Pervious Area
	4,809		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.9: East Lot 2

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Type III 24-hr 2-year Rainfall=3.10"

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Page 20

Summary for Subcatchment 2S: 295 Embankment Trib

Runoff = 0.00 cfs @ 23.91 hrs, Volume= 0.000 af, Depth= 0.00"

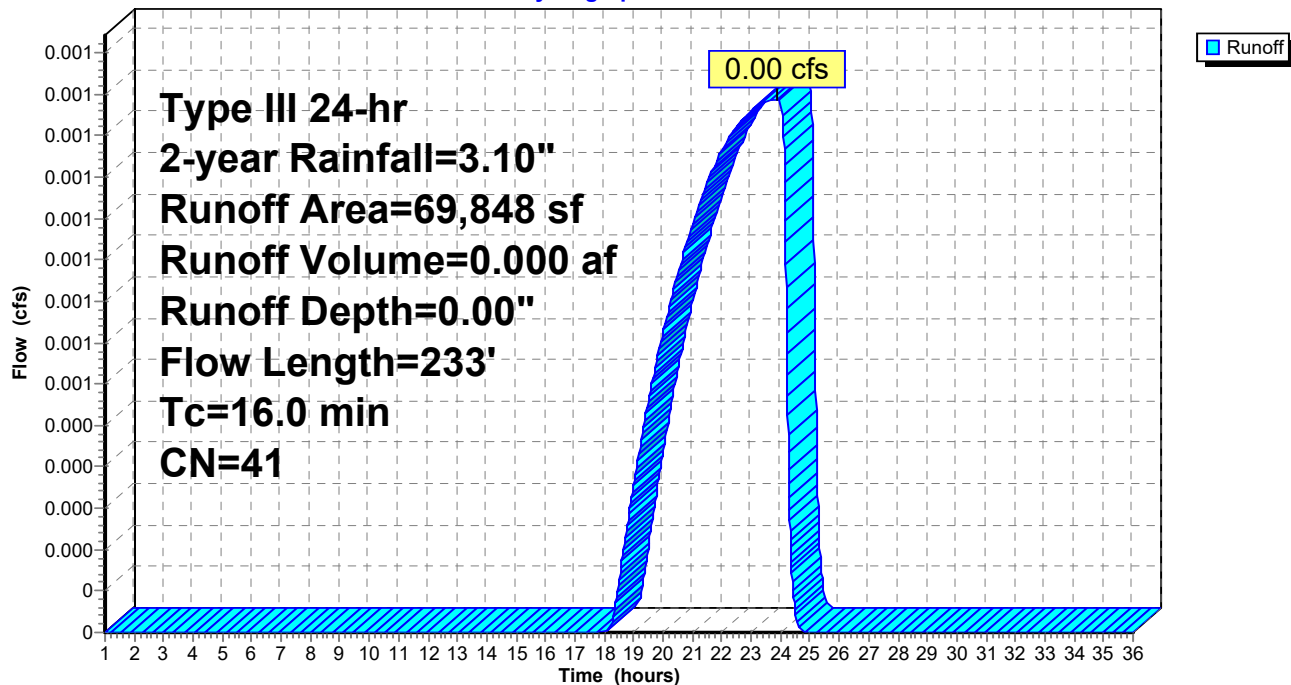
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
8,183	39	>75% Grass cover, Good, HSG A
* 230	98	Stairs
* 3,155	98	Path
* 5,488	98	Homes/driveways
52,792	32	Woods/grass comb., Good, HSG A
69,848	41	Weighted Average
60,975		87.30% Pervious Area
8,873		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment 2S: 295 Embankment Trib

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 21

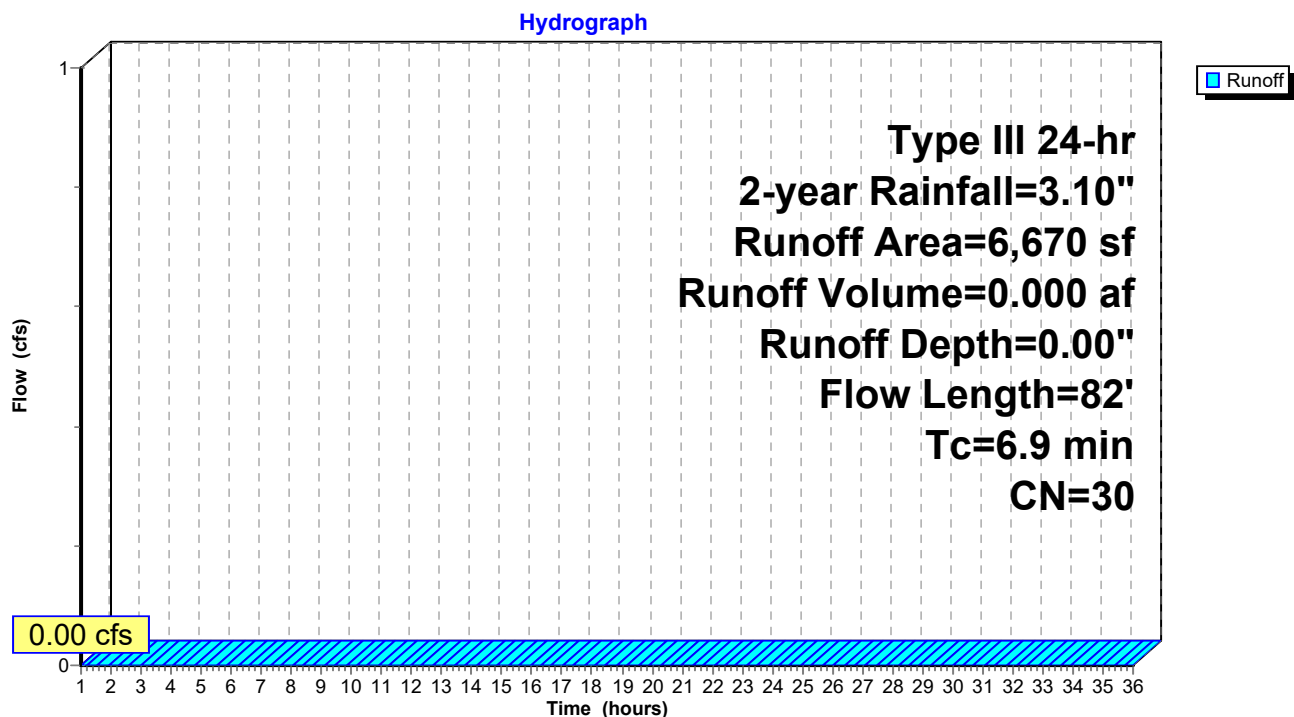
Summary for Subcatchment 3S.1: Garden area runoff

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.10"

Area (sf)	CN	Description
6,670	30	Brush, Good, HSG A
6,670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	28	0.3330	0.28		Sheet Flow, A to B
					Grass: Dense n= 0.240 P2= 3.27"
5.2	54	0.0700	0.17		Sheet Flow, B to C
					Grass: Dense n= 0.240 P2= 3.27"
6.9	82	Total			

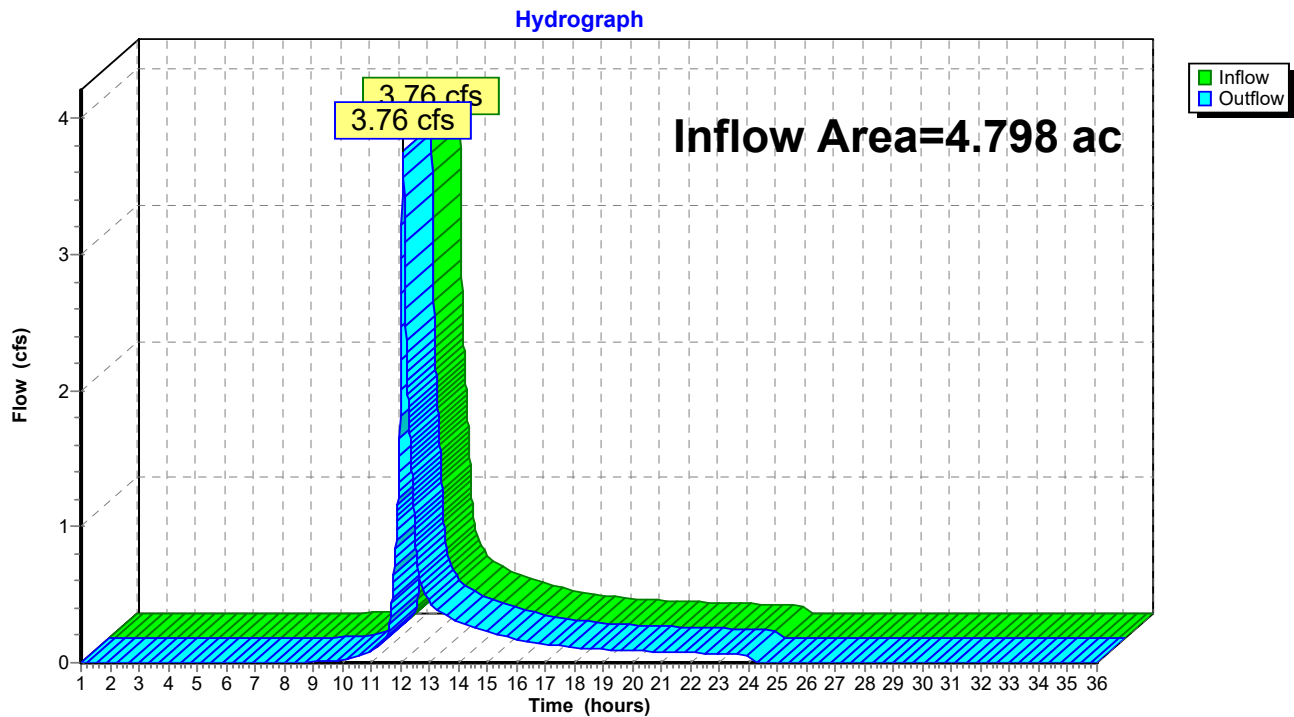
Subcatchment 3S.1: Garden area runoff

Summary for Reach POI-1: POI #1 - 60" Douglass MS4

Inflow Area = 4.798 ac, 46.81% Impervious, Inflow Depth = 0.71" for 2-year event
 Inflow = 3.76 cfs @ 12.09 hrs, Volume= 0.286 af
 Outflow = 3.76 cfs @ 12.09 hrs, Volume= 0.286 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-1: POI #1 - 60" Douglass MS4

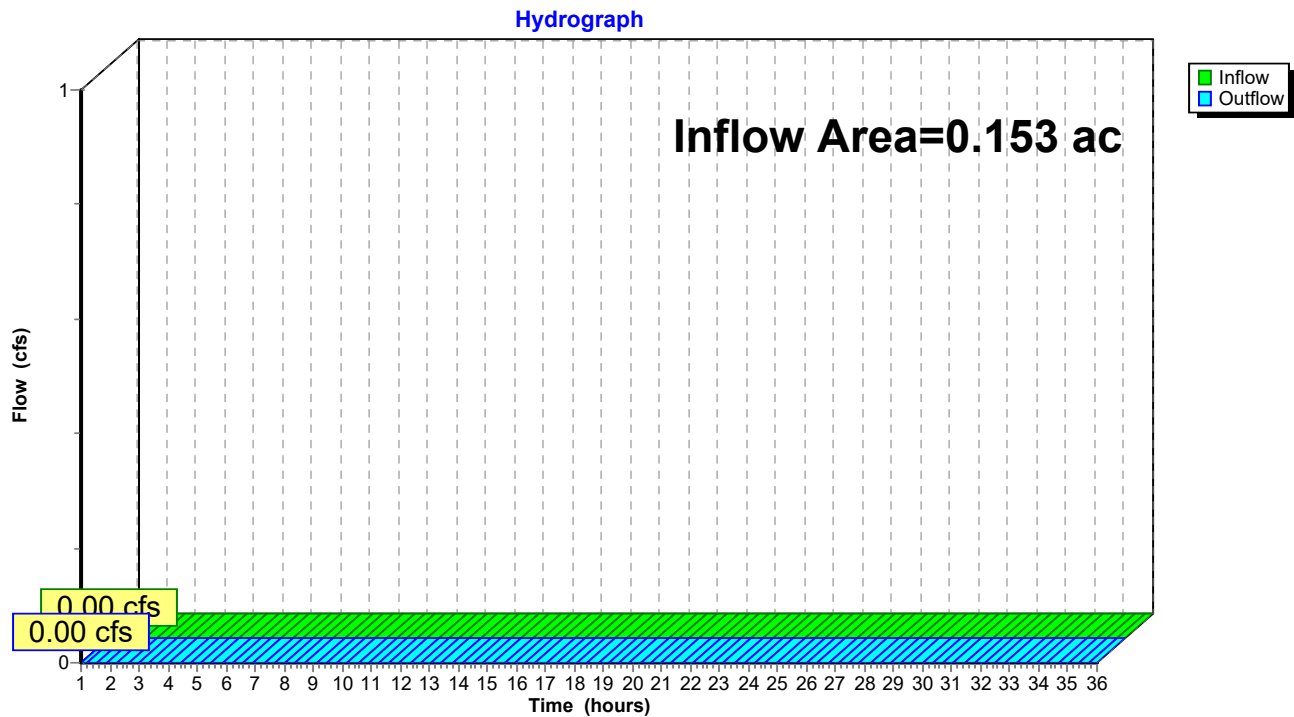


Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 0.153 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-3: POI #3 - Baseball Field



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Page 24

Summary for Pond P1: VUSF

Inflow Area = 0.249 ac, 76.24% Impervious, Inflow Depth = 1.46" for 2-year event
 Inflow = 0.42 cfs @ 12.09 hrs, Volume= 0.030 af
 Outflow = 0.06 cfs @ 12.76 hrs, Volume= 0.030 af, Atten= 87%, Lag= 39.9 min
 Discarded = 0.04 cfs @ 12.76 hrs, Volume= 0.022 af
 Primary = 0.01 cfs @ 12.76 hrs, Volume= 0.009 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 30.91' @ 12.76 hrs Surf.Area= 1,889 sf Storage= 530 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 171.8 min (1,009.6 - 837.8)

Volume	Invert	Avail.Storage	Storage Description
#1	30.75'	1,899 cf	Ponding (Prismatic) Listed below (Recalc)
#2	29.25'	69 cf	Filter Media/Loam (Prismatic) Listed below (Recalc) 687 cf Overall x 10.0% Voids
#3	28.92'	30 cf	Transition Gravel (Prismatic) Listed below (Recalc) 151 cf Overall x 20.0% Voids
#4	27.00'	349 cf	Crushed Stone (Prismatic) Listed below (Recalc) 879 cf Overall - 6 cf Embedded = 873 cf x 40.0% Voids
#5	27.10'	5 cf	4.0" Round Pipe Storage x 2 Inside #4 L= 30.0' S= 0.0005 '/' 6 cf Overall - 0.2" Wall Thickness = 5 cf
		2,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.75	465	0	0
32.25	945	1,058	1,058
33.00	1,300	842	1,899

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.25	458	0	0
30.75	458	687	687

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.92	458	0	0
29.25	458	151	151

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.00	458	0	0
28.92	458	879	879

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Type III 24-hr 2-year Rainfall=3.10"

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Page 25

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	12.0" Round Culvert L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 26.75' S= 0.0042 '/' Cc= 0.600 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	27.10'	0.5" Vert. Soil Filter Media Drawdown Effect C= 0.600
#3	Device 1	32.35'	24.0" Horiz. Beehive Outlet C= 0.600 Limited to weir flow at low heads
#4	Discarded	27.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.04 cfs @ 12.76 hrs HW=30.91' (Free Discharge)

↳ **4=Exfiltration** (Exfiltration Controls 0.04 cfs)

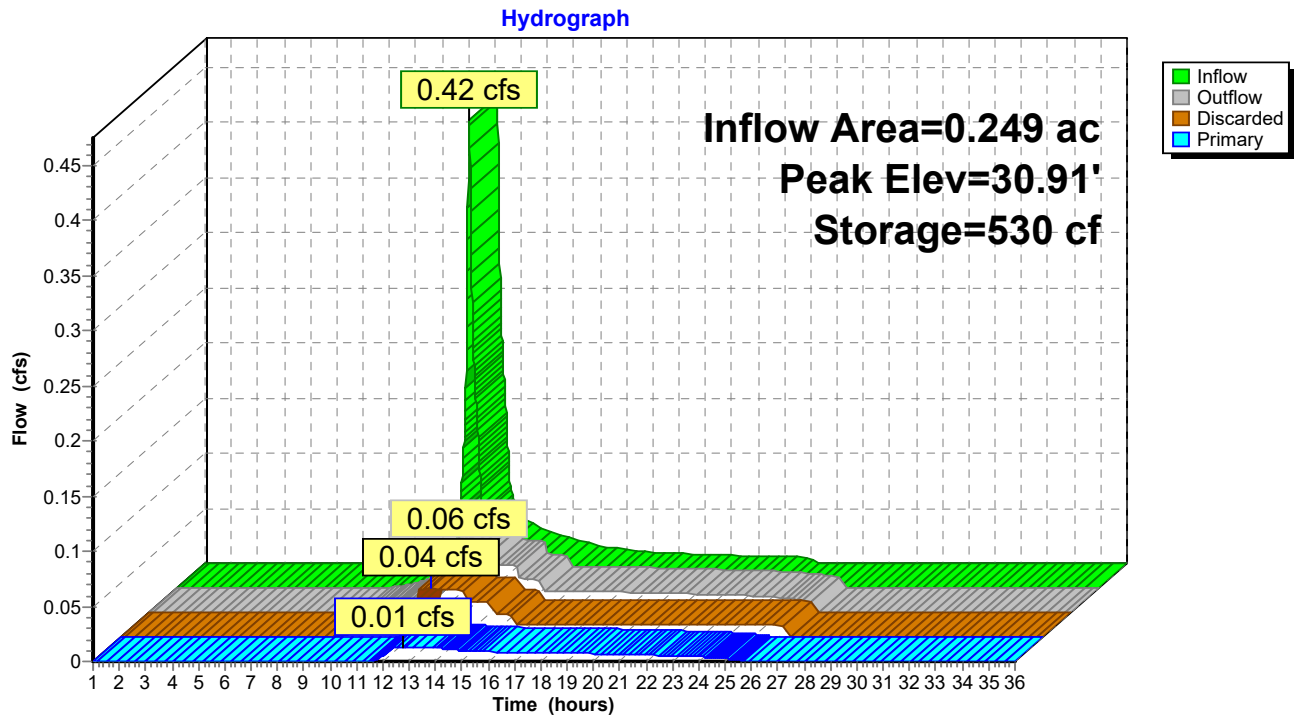
Primary OutFlow Max=0.01 cfs @ 12.76 hrs HW=30.91' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Passes 0.01 cfs of 3.67 cfs potential flow)

↳ **2=Soil Filter Media Drawdown Effect** (Orifice Controls 0.01 cfs @ 9.37 fps)

↳ **3=Beehive Outlet** (Controls 0.00 cfs)

Pond P1: VUSF



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Type III 24-hr 2-year Rainfall=3.10"

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Page 26

Summary for Pond P2: FP 4

Inflow Area = 0.175 ac, 53.01% Impervious, Inflow Depth = 0.77" for 2-year event
 Inflow = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af
 Outflow = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.14 cfs @ 12.10 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.95' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (878.2 - 878.2)

Volume	Invert	Avail.Storage	Storage Description
#1	35.95'	14 cf	4.00'W x 5.00'L x 3.60'H Media/Stone 72 cf Overall x 20.0% Voids
#2	35.95'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		52 cf	Total Available Storage

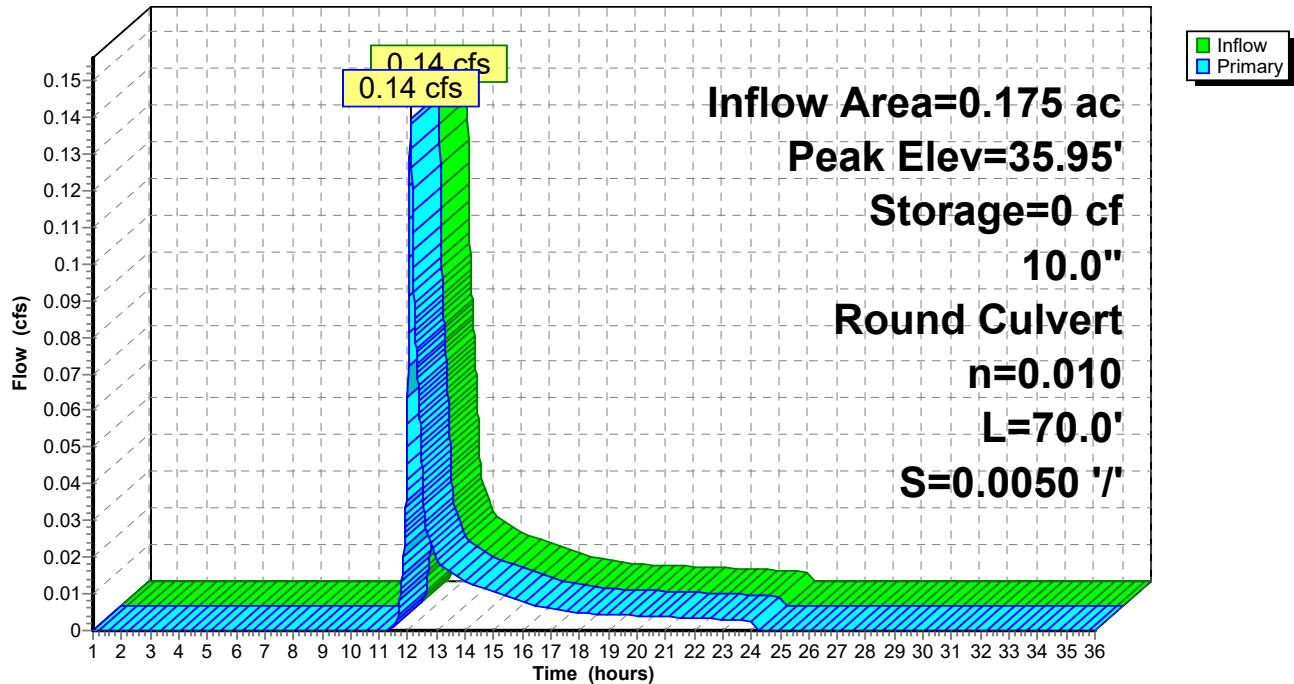
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.95	20	0	0
36.95	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	32.35'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 32.35' / 32.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=35.95' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.51 cfs potential flow)

Pond P2: FP 4

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 28

Summary for Pond P3: FP 3

Inflow Area = 0.154 ac, 52.99% Impervious, Inflow Depth = 0.77" for 2-year event
 Inflow = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af
 Outflow = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 36.10' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (878.2 - 878.2)

Volume	Invert	Avail.Storage	Storage Description
#1	36.10'	21 cf	5.00'W x 5.00'L x 4.20'H Media/Stone 105 cf Overall x 20.0% Voids
#2	36.10'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		66 cf	Total Available Storage

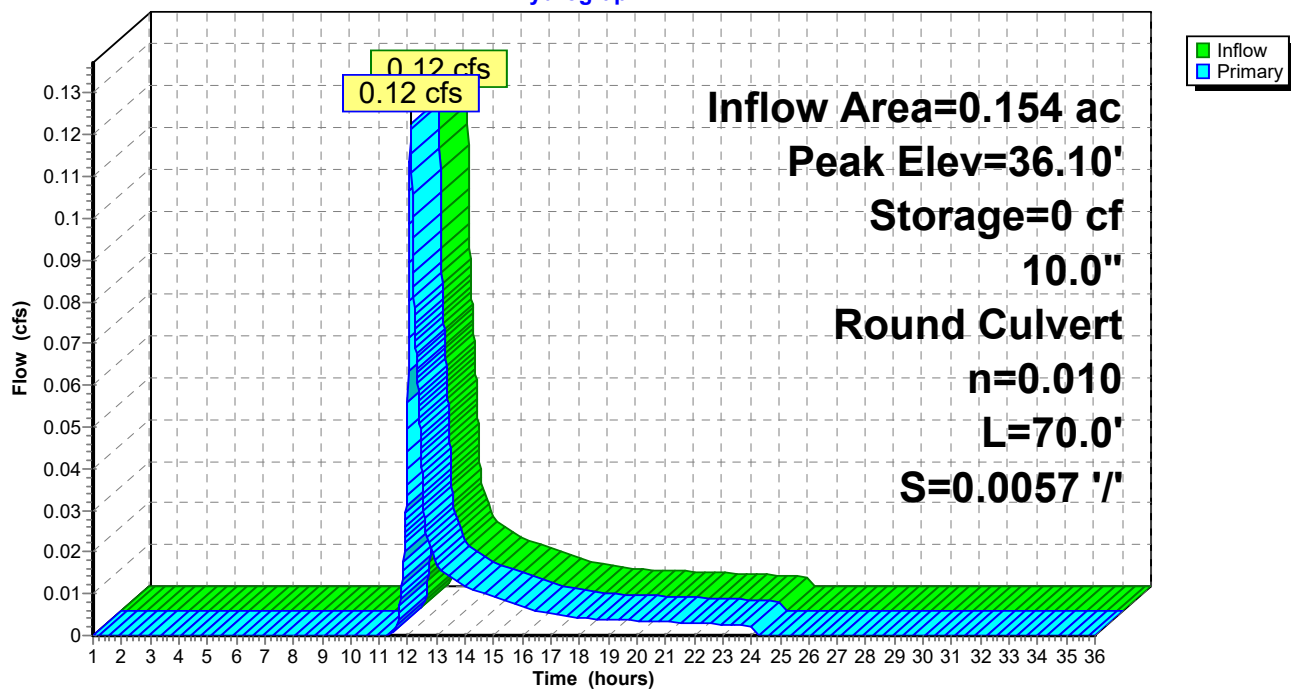
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.10	25	0	0
37.10	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.90'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.90' / 31.50' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=36.10' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.83 cfs potential flow)

Pond P3: FP 3

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 30

Summary for Pond P4: FP 2

Inflow Area = 0.137 ac, 80.74% Impervious, Inflow Depth = 1.83" for 2-year event
 Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af
 Outflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.90' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	23 cf	5.00'W x 5.00'L x 4.50'H Media/Stone 113 cf Overall x 20.0% Voids
#2	35.90'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		67 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.90	25	0	0
36.90	64	45	45

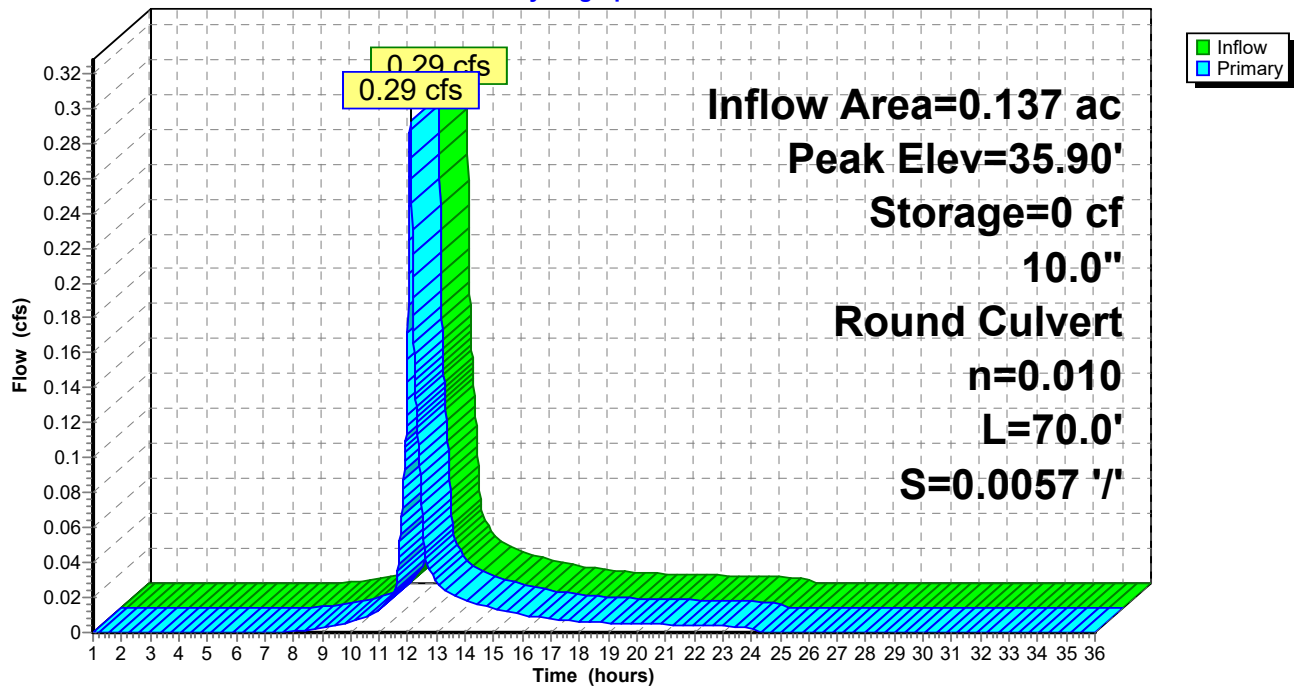
Device	Routing	Invert	Outlet Devices
#1	Primary	31.40'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.40' / 31.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.90' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.98 cfs potential flow)

Pond P4: FP 2

Hydrograph



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Page 32

Summary for Pond P5: FP 1

Inflow Area = 0.086 ac, 84.98% Impervious, Inflow Depth = 1.99" for 2-year event
 Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af
 Outflow = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.70' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.70'	19 cf	4.00'W x 5.00'L x 4.80'H Media/Stone 96 cf Overall x 20.0% Voids
#2	35.70'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		57 cf	Total Available Storage

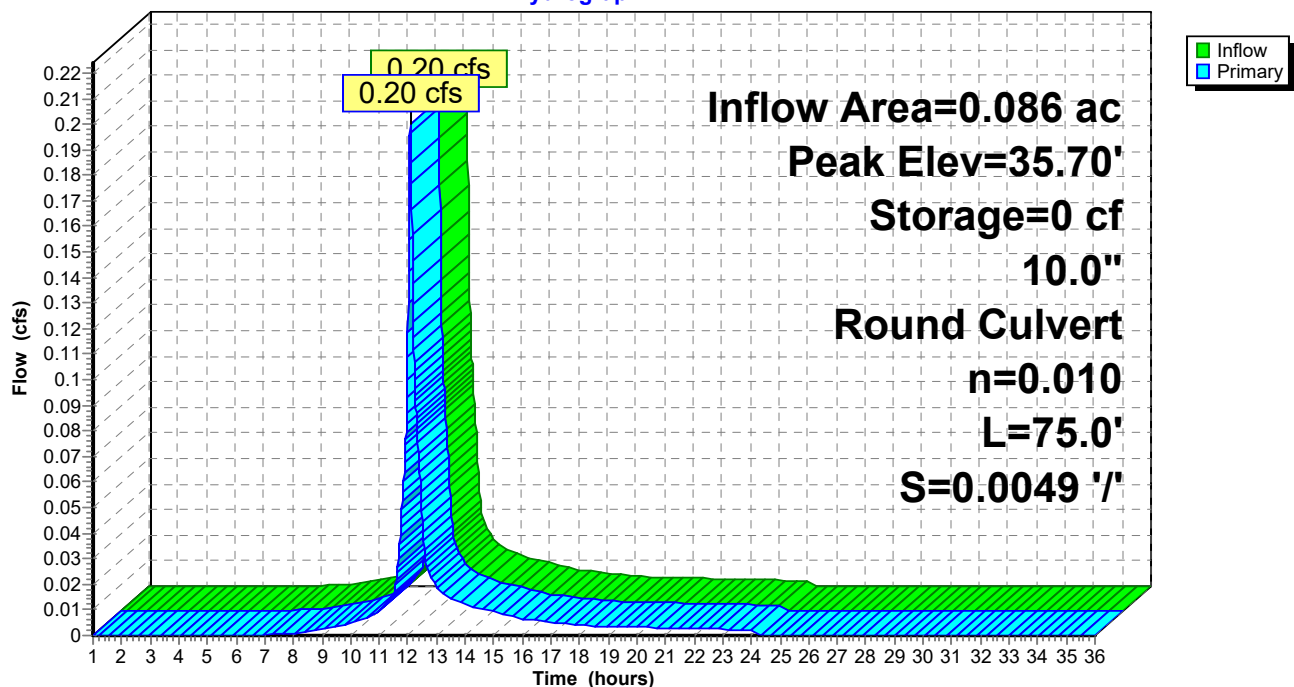
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.70	20	0	0
36.70	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	30.90'	10.0" Round Culvert L= 75.0' Ke= 1.000 Inlet / Outlet Invert= 30.90' / 30.53' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.70' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 4.12 cfs potential flow)

Pond P5: FP 1

Hydrograph



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Type III 24-hr 2-year Rainfall=3.10"

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Page 34

Summary for Pond POI #2: POI #2 (295 Basin)

Inflow Area = 1.603 ac, 12.70% Impervious, Inflow Depth = 0.00" for 2-year event
 Inflow = 0.00 cfs @ 23.91 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 26.36' @ 24.90 hrs Surf.Area= 505 sf Storage= 20 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	105,037 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	10,120	7,298	8,899
29.00	14,131	12,126	21,024
30.00	17,326	15,729	36,753
32.00	24,023	41,349	78,102
33.00	29,847	26,935	105,037

Device	Routing	Invert	Outlet Devices
#1	Primary	26.60'	12.0" Round Culvert L= 16.0' Ke= 0.600 Inlet / Outlet Invert= 26.60' / 26.51' S= 0.0056 ' S= 0.0056 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	32.40'	20.0' long x 15.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	26.60'	1.000 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

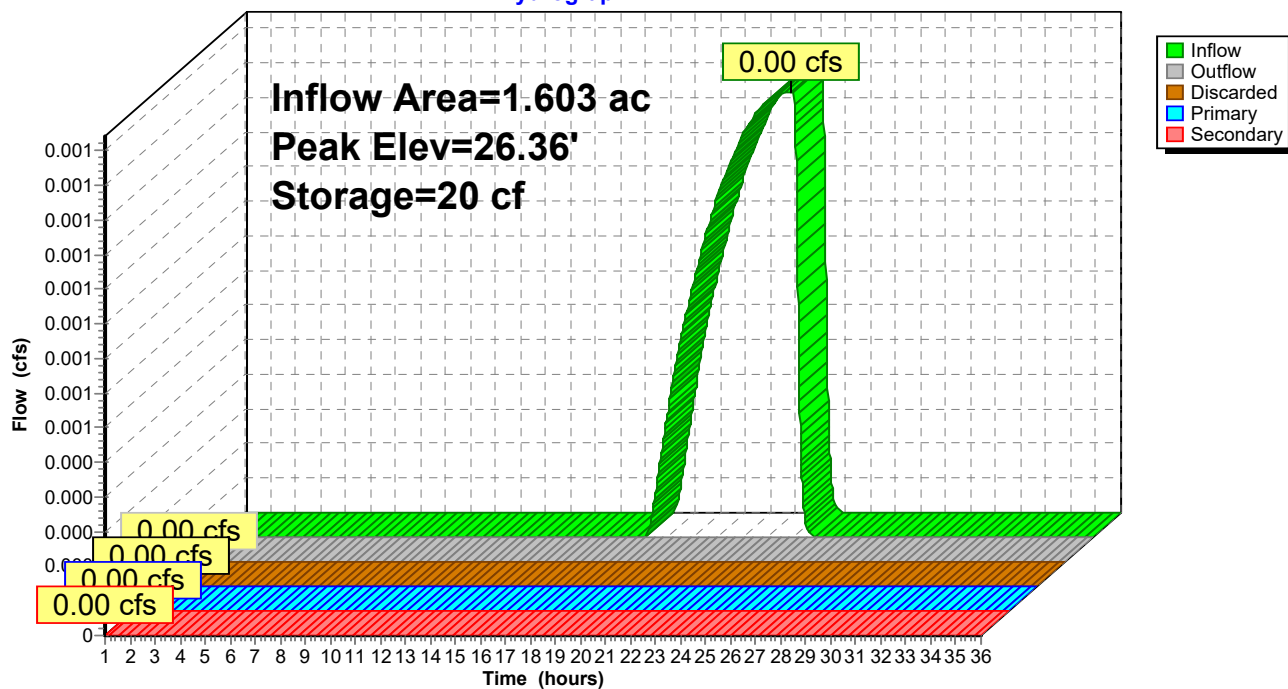
Discarded OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)
 ↳ **3=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)
 ↳ **2=Overflow** (Controls 0.00 cfs)

Pond POI #2: POI #2 (295 Basin)

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Type III 24-hr 10-year Rainfall=4.60"

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Page 36

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S.1: Drive to Street	Runoff Area=1,131 sf 55.00% Impervious Runoff Depth=1.82" Tc=6.0 min CN=71 Runoff=0.05 cfs 0.004 af
Subcatchment 1S.10: East Lot 1	Runoff Area=3,754 sf 84.98% Impervious Runoff Depth=3.39" Tc=6.0 min CN=89 Runoff=0.33 cfs 0.024 af
Subcatchment 1S.11: South Lot Treated	Runoff Area=10,852 sf 76.24% Impervious Runoff Depth=2.72" Tc=6.0 min CN=82 Runoff=0.80 cfs 0.057 af
Subcatchment 1S.2: Co Op Roof & yard	Runoff Area=56,422 sf 65.80% Impervious Runoff Depth=2.38" Tc=6.0 min CN=78 Runoff=3.61 cfs 0.256 af
Subcatchment 1S.3: Runoff to park	Runoff Area=2,081 sf 0.00% Impervious Runoff Depth=0.13" Flow Length=264' Tc=9.0 min CN=39 Runoff=0.00 cfs 0.001 af
Subcatchment 1S.4: Central parking/drive	Runoff Area=19,043 sf 77.98% Impervious Runoff Depth=2.81" Tc=6.0 min CN=83 Runoff=1.44 cfs 0.103 af
Subcatchment 1S.5: Contained yard/park	Runoff Area=3,023 sf 16.84% Impervious Runoff Depth=0.49" Tc=6.0 min CN=49 Runoff=0.02 cfs 0.003 af
Subcatchment 1S.6: Building E roof and	Runoff Area=22,599 sf 53.10% Impervious Runoff Depth=1.74" Tc=6.0 min CN=70 Runoff=1.03 cfs 0.075 af
Subcatchment 1S.7: East Lot 4	Runoff Area=7,618 sf 53.01% Impervious Runoff Depth=1.74" Tc=6.0 min CN=70 Runoff=0.35 cfs 0.025 af
Subcatchment 1S.8: East Lot 3	Runoff Area=6,694 sf 52.99% Impervious Runoff Depth=1.74" Tc=6.0 min CN=70 Runoff=0.31 cfs 0.022 af
Subcatchment 1S.9: East Lot 2	Runoff Area=5,956 sf 80.74% Impervious Runoff Depth=3.19" Tc=6.0 min CN=87 Runoff=0.50 cfs 0.036 af
Subcatchment 2S: 295 Embankment Trib	Runoff Area=69,848 sf 12.70% Impervious Runoff Depth=0.18" Flow Length=233' Tc=16.0 min CN=41 Runoff=0.05 cfs 0.025 af
Subcatchment 3S.1: Garden area runoff	Runoff Area=6,670 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=82' Tc=6.9 min CN=30 Runoff=0.00 cfs 0.000 af
Reach POI-1: POI #1 - 60" Douglass MS4	Inflow=7.65 cfs 0.573 af Outflow=7.65 cfs 0.573 af
Reach POI-3: POI #3 - Baseball Field	Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond P1: VUSF	Peak Elev=31.87' Storage=1,177 cf Inflow=0.80 cfs 0.057 af Discarded=0.05 cfs 0.043 af Primary=0.01 cfs 0.014 af Outflow=0.07 cfs 0.057 af

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Type III 24-hr 10-year Rainfall=4.60"

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Page 37

Pond P2: FP 4

Peak Elev=35.95' Storage=0 cf Inflow=0.35 cfs 0.025 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0050 '/' Outflow=0.35 cfs 0.025 af

Pond P3: FP 3

Peak Elev=36.10' Storage=0 cf Inflow=0.31 cfs 0.022 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.31 cfs 0.022 af

Pond P4: FP 2

Peak Elev=35.90' Storage=0 cf Inflow=0.50 cfs 0.036 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.50 cfs 0.036 af

Pond P5: FP 1

Peak Elev=35.70' Storage=0 cf Inflow=0.33 cfs 0.024 af
10.0" Round Culvert n=0.010 L=75.0' S=0.0049 '/' Outflow=0.33 cfs 0.024 af

Pond POI #2: POI #2 (295 Basin)

Peak Elev=26.67' Storage=464 cf Inflow=0.05 cfs 0.025 af
Discarded=0.01 cfs 0.008 af Primary=0.01 cfs 0.009 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.017 af

Total Runoff Area = 4.952 ac Runoff Volume = 0.631 af Average Runoff Depth = 1.53"
54.64% Pervious = 2.706 ac 45.36% Impervious = 2.246 ac

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Type III 24-hr 10-year Rainfall=4.60"

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Page 38

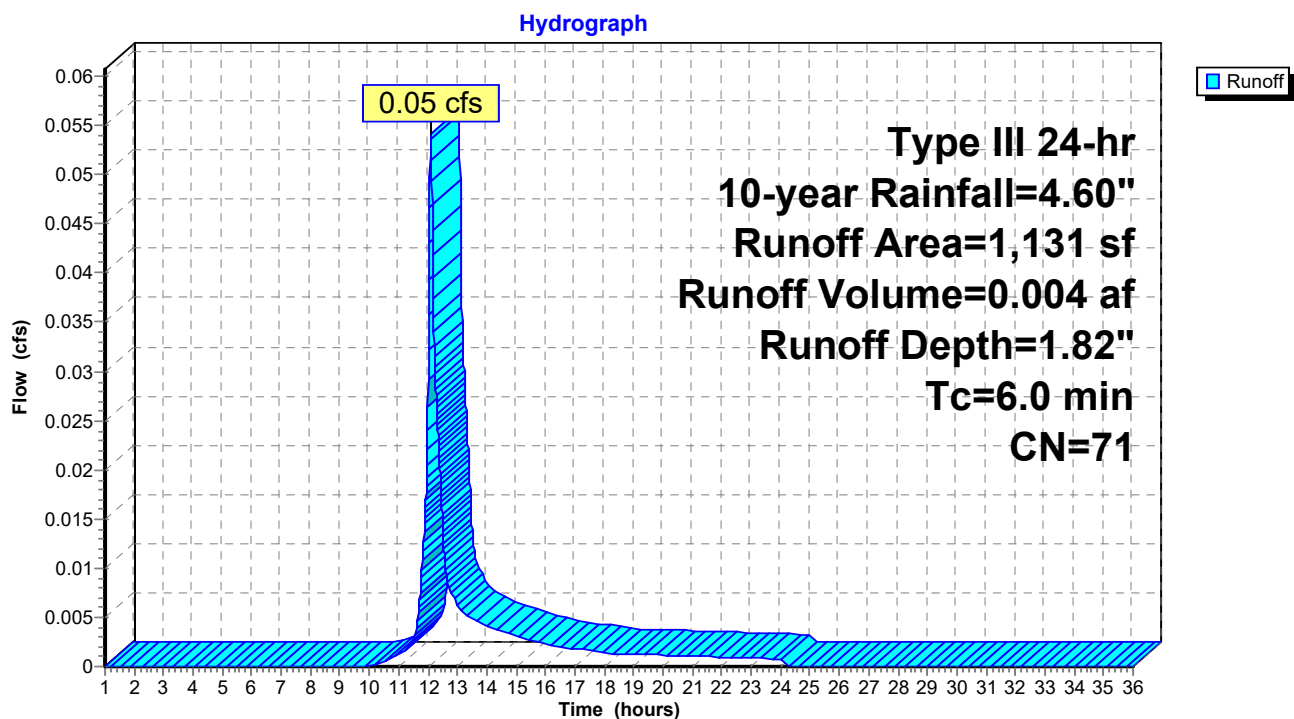
Summary for Subcatchment 1.S1: Drive to Street

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	622	98	Pavement
	509	39	>75% Grass cover, Good, HSG A
	1,131	71	Weighted Average
	509		45.00% Pervious Area
	622		55.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1.S1: Drive to Street

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Type III 24-hr 10-year Rainfall=4.60"

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Page 39

Summary for Subcatchment 1S.10: East Lot 1

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 3.39"

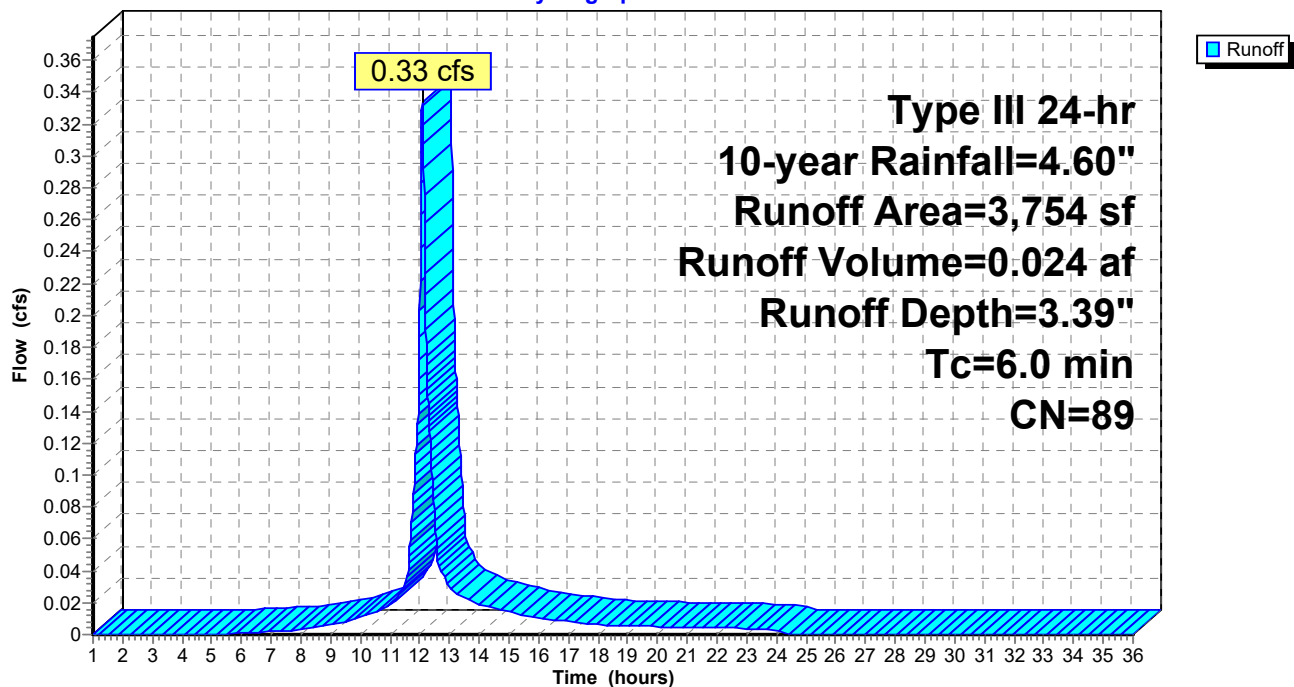
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	3,190	98	Pavement
	564	39	>75% Grass cover, Good, HSG A
	3,754	89	Weighted Average
	564		15.02% Pervious Area
	3,190		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.10: East Lot 1

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Type III 24-hr 10-year Rainfall=4.60"

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Page 40

Summary for Subcatchment 1S.11: South Lot Treated

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.057 af, Depth= 2.72"

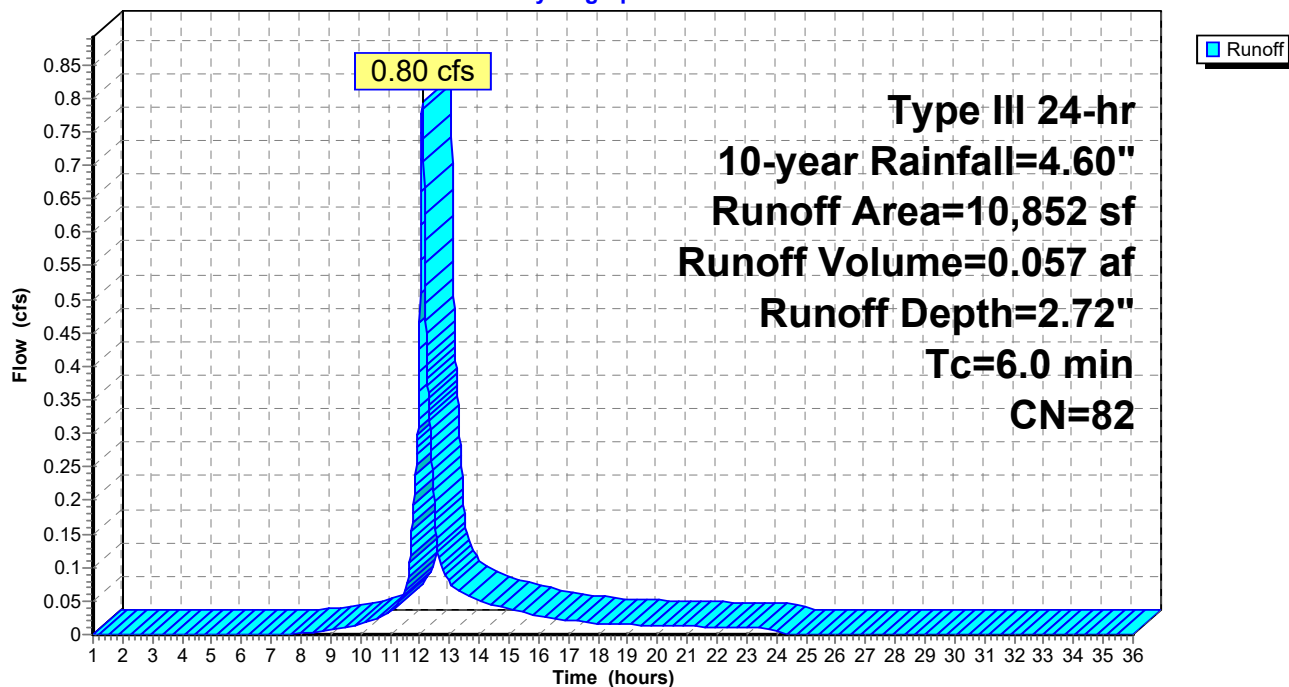
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	8,274	98	Paved parking
	2,578	30	Brush, Good, HSG A
	10,852	82	Weighted Average
	2,578		23.76% Pervious Area
	8,274		76.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.11: South Lot Treated

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 41

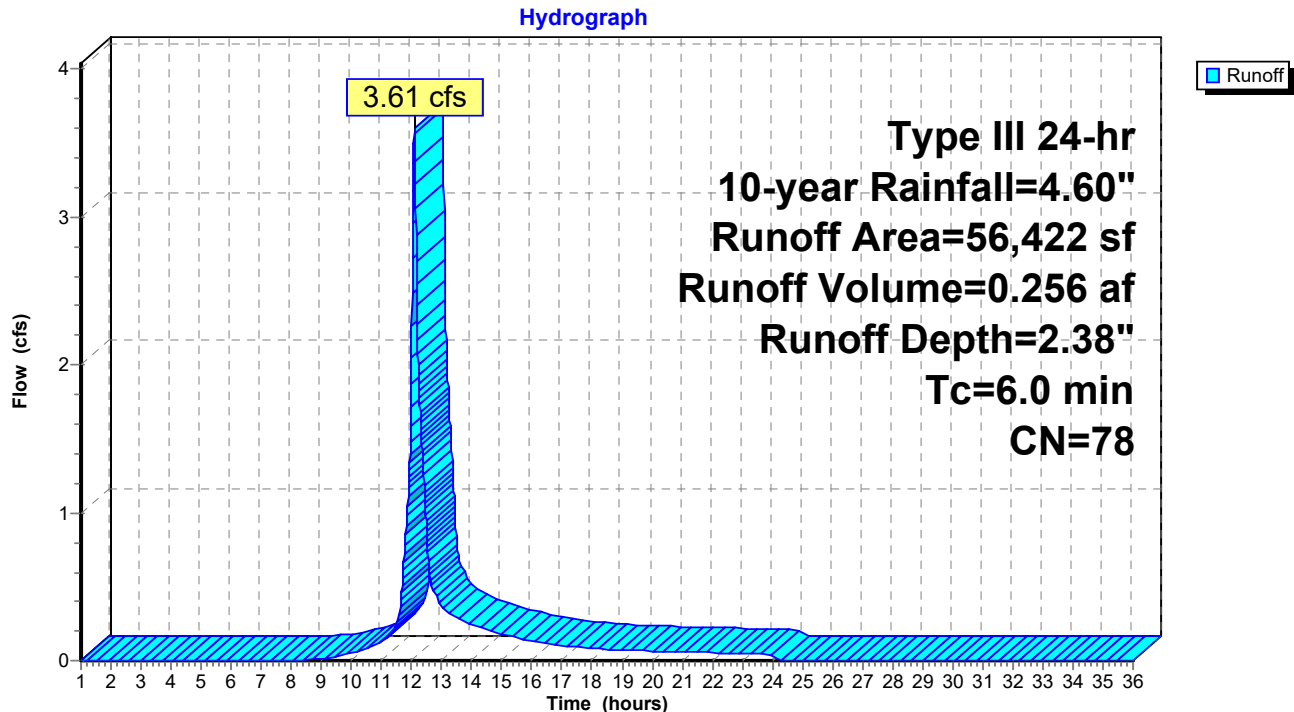
Summary for Subcatchment 1S.2: Co Op Roof & yard

Runoff = 3.61 cfs @ 12.09 hrs, Volume= 0.256 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	5,239	98	pavers
	16,100	39	>75% Grass cover, Good, HSG A
*	21,137	98	Roofs
*	4,191	98	sidewalks
*	618	98	patios
	9,137	77	1/8 acre lots, 65% imp, HSG A
	56,422	78	Weighted Average
	19,298		34.20% Pervious Area
	37,124		65.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.2: Co Op Roof & yard

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Type III 24-hr 10-year Rainfall=4.60"

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Page 42

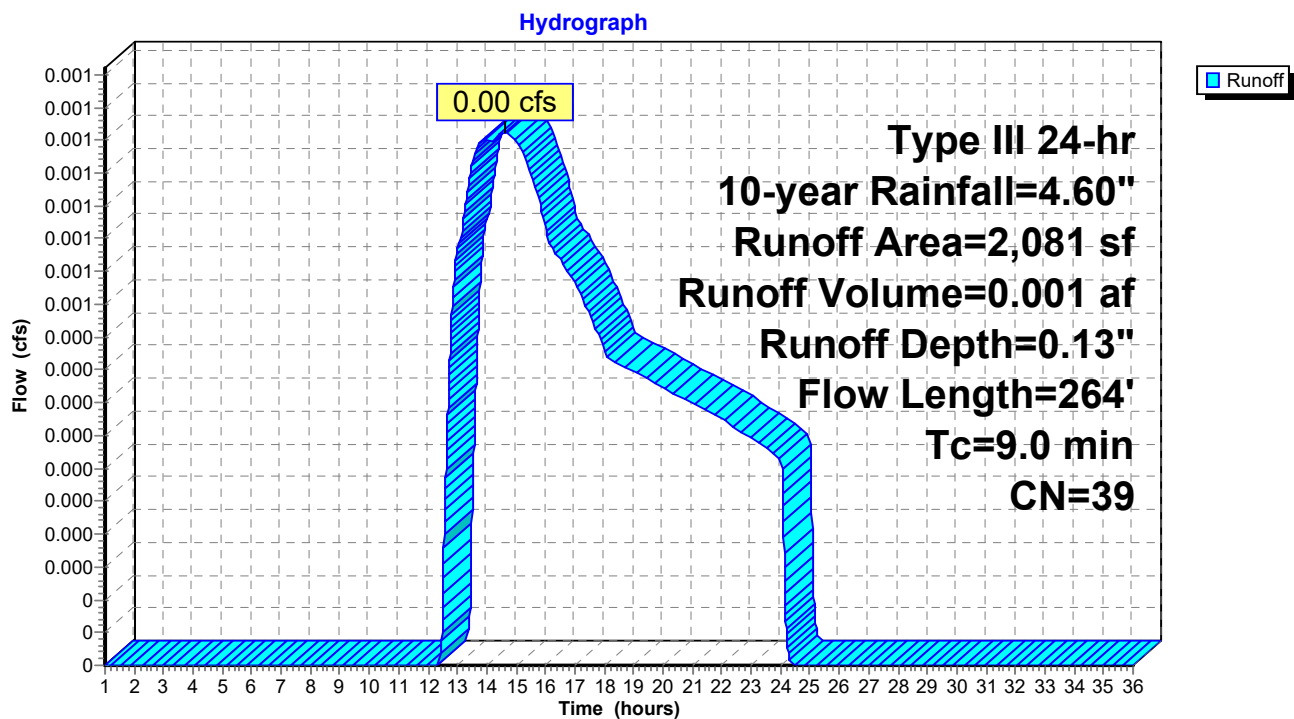
Summary for Subcatchment 1S.3: Runoff to park

Runoff = 0.00 cfs @ 14.63 hrs, Volume= 0.001 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,081	39	>75% Grass cover, Good, HSG A
2,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.0600	0.27		Sheet Flow, A to B Grass: Short n= 0.150 P2= 3.27"
2.8	164	0.0200	0.99		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
9.0	264	Total			

Subcatchment 1S.3: Runoff to park

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Type III 24-hr 10-year Rainfall=4.60"

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Page 43

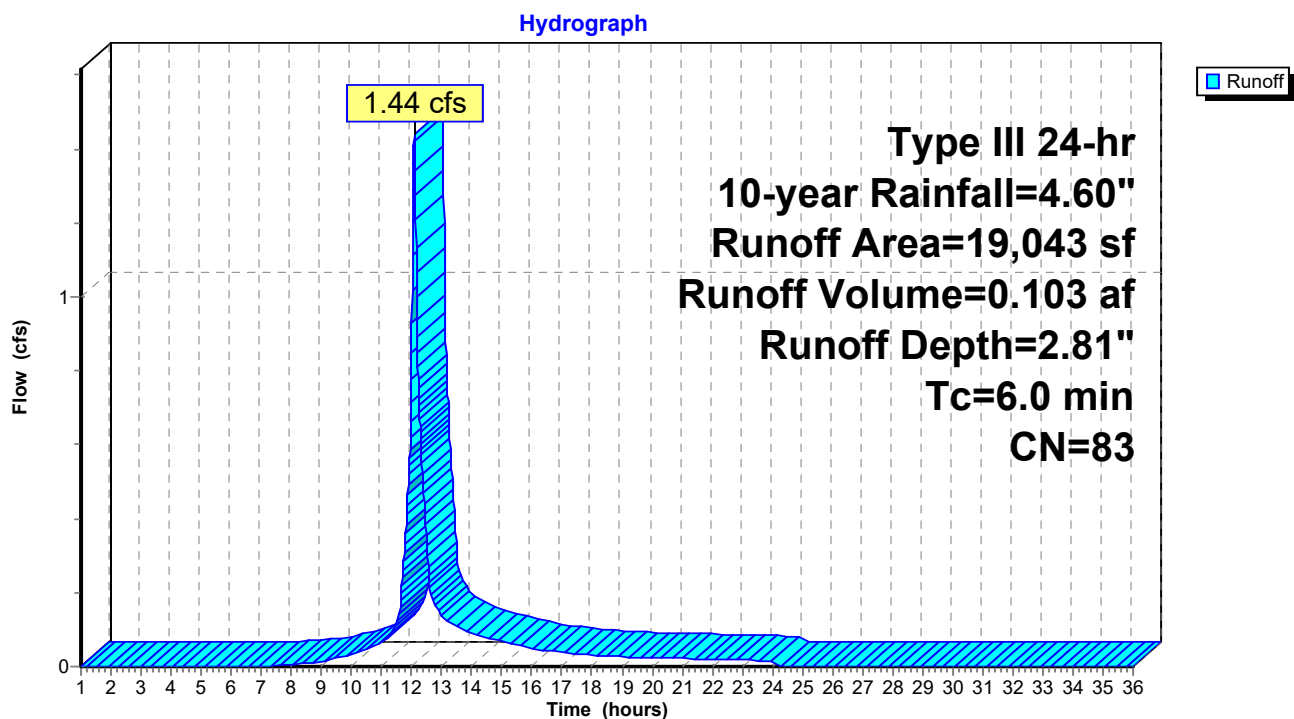
Summary for Subcatchment 1S.4: Central parking/drive

Runoff = 1.44 cfs @ 12.09 hrs, Volume= 0.103 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	14,850	98	Pavement
	4,193	30	Brush, Good, HSG A
	19,043	83	Weighted Average
	4,193		22.02% Pervious Area
	14,850		77.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.4: Central parking/drive

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Type III 24-hr 10-year Rainfall=4.60"

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Page 44

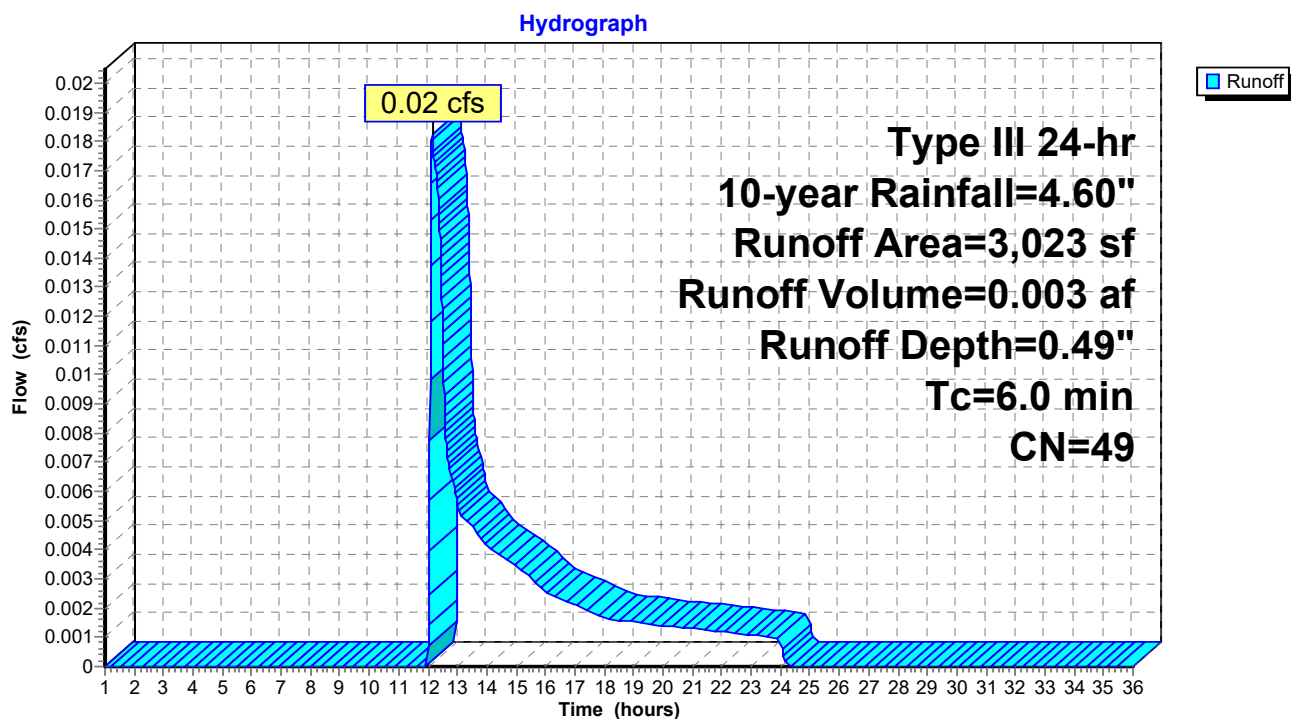
Summary for Subcatchment 1S.5: Contained yard/park connection

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
2,514	39	>75% Grass cover, Good, HSG A
* 509	98	sidewalks
3,023	49	Weighted Average
2,514		83.16% Pervious Area
509		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.5: Contained yard/park connection

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Type III 24-hr 10-year Rainfall=4.60"

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Page 45

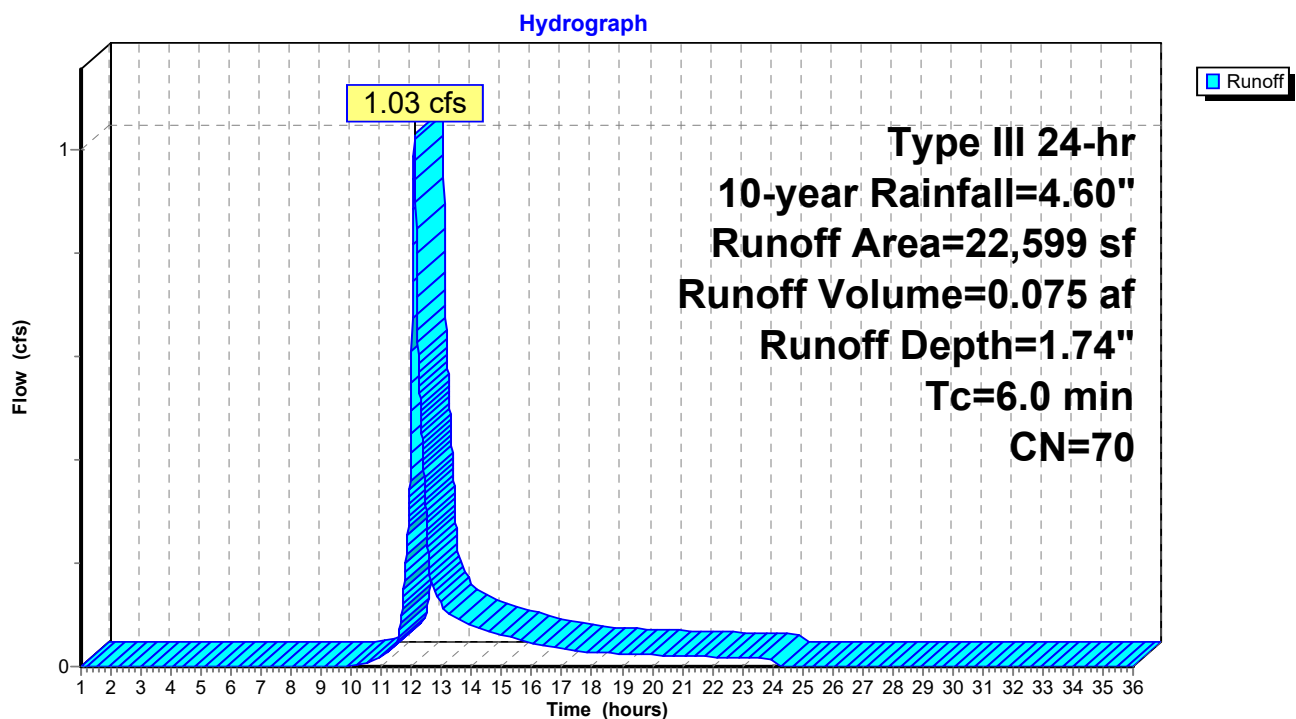
Summary for Subcatchment 1S.6: Building E roof and yard

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
10,599	39	>75% Grass cover, Good, HSG A
* 12,000	98	roof
22,599	70	Weighted Average
10,599		46.90% Pervious Area
12,000		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.6: Building E roof and yard

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Type III 24-hr 10-year Rainfall=4.60"

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Page 46

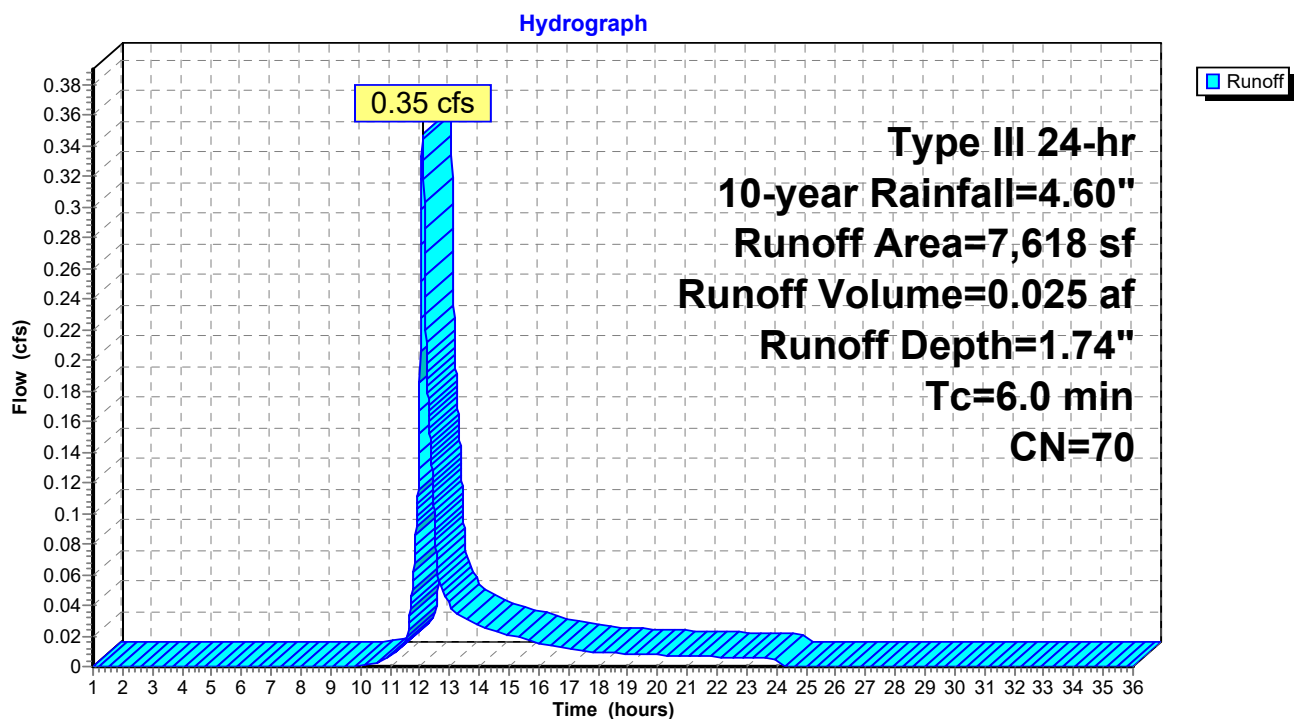
Summary for Subcatchment 1S.7: East Lot 4

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	4,038	98	Paved parking
	3,580	39	>75% Grass cover, Good, HSG A
	7,618	70	Weighted Average
	3,580		46.99% Pervious Area
	4,038		53.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.7: East Lot 4

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Type III 24-hr 10-year Rainfall=4.60"

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Page 47

Summary for Subcatchment 1S.8: East Lot 3

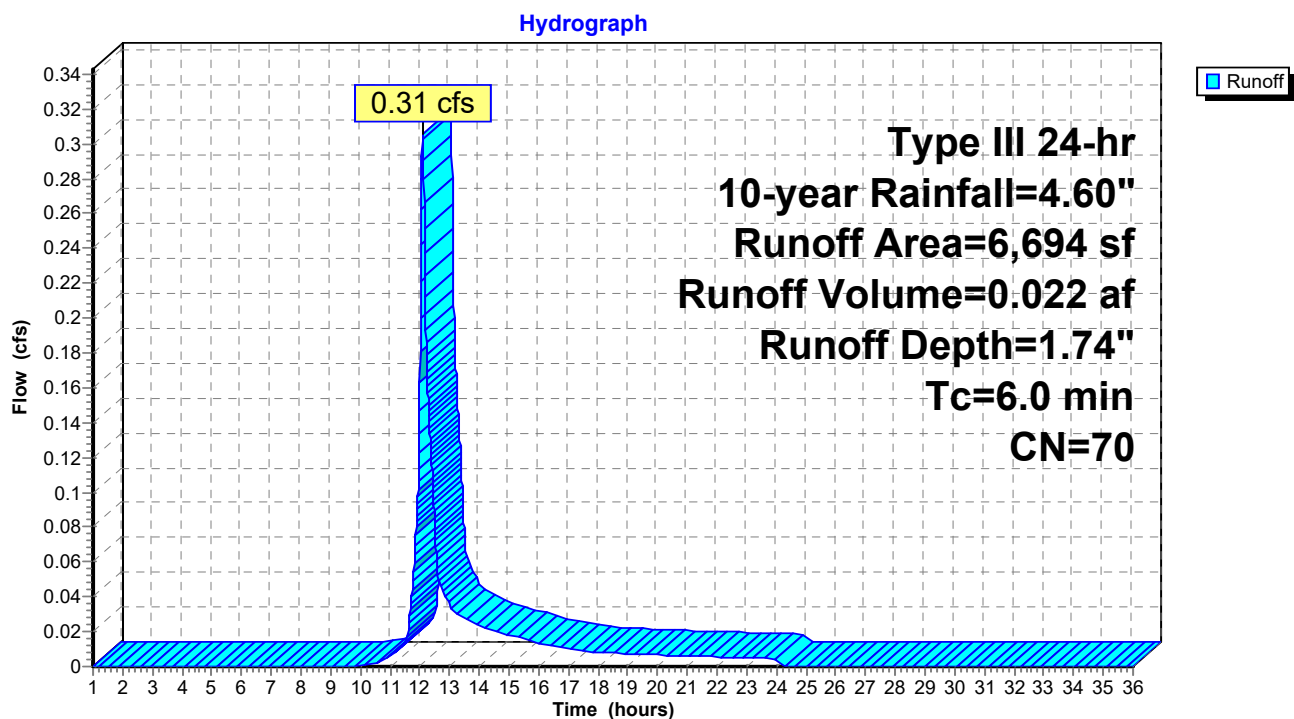
Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	3,547	98	Paved parking
	3,147	39	>75% Grass cover, Good, HSG A
	6,694	70	Weighted Average
	3,147		47.01% Pervious Area
	3,547		52.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.8: East Lot 3



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Page 48

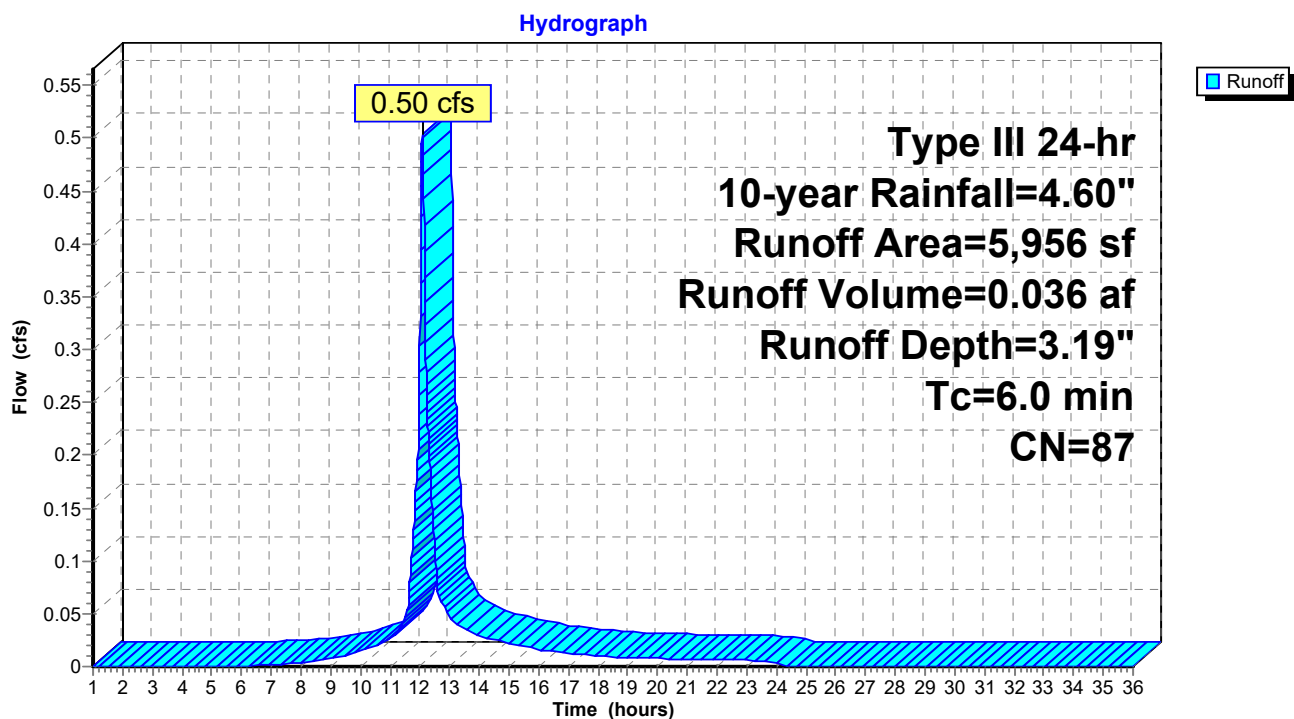
Summary for Subcatchment 1S.9: East Lot 2

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

	Area (sf)	CN	Description
*	4,809	98	Paved parking, patio, sidewalk
	1,147	39	>75% Grass cover, Good, HSG A
	5,956	87	Weighted Average
	1,147		19.26% Pervious Area
	4,809		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.9: East Lot 2

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Type III 24-hr 10-year Rainfall=4.60"

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Page 49

Summary for Subcatchment 2S: 295 Embankment Trib

Runoff = 0.05 cfs @ 12.65 hrs, Volume= 0.025 af, Depth= 0.18"

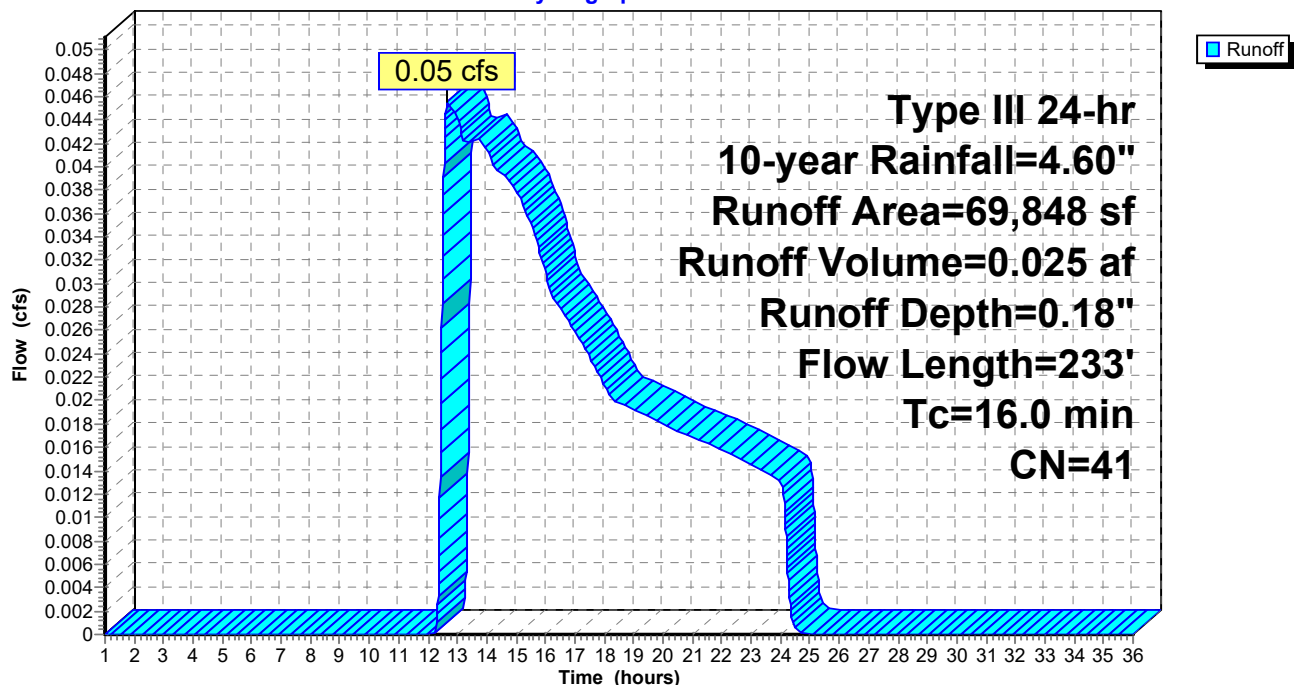
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
8,183	39	>75% Grass cover, Good, HSG A
* 230	98	Stairs
* 3,155	98	Path
* 5,488	98	Homes/driveways
52,792	32	Woods/grass comb., Good, HSG A
69,848	41	Weighted Average
60,975		87.30% Pervious Area
8,873		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment 2S: 295 Embankment Trib

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 50

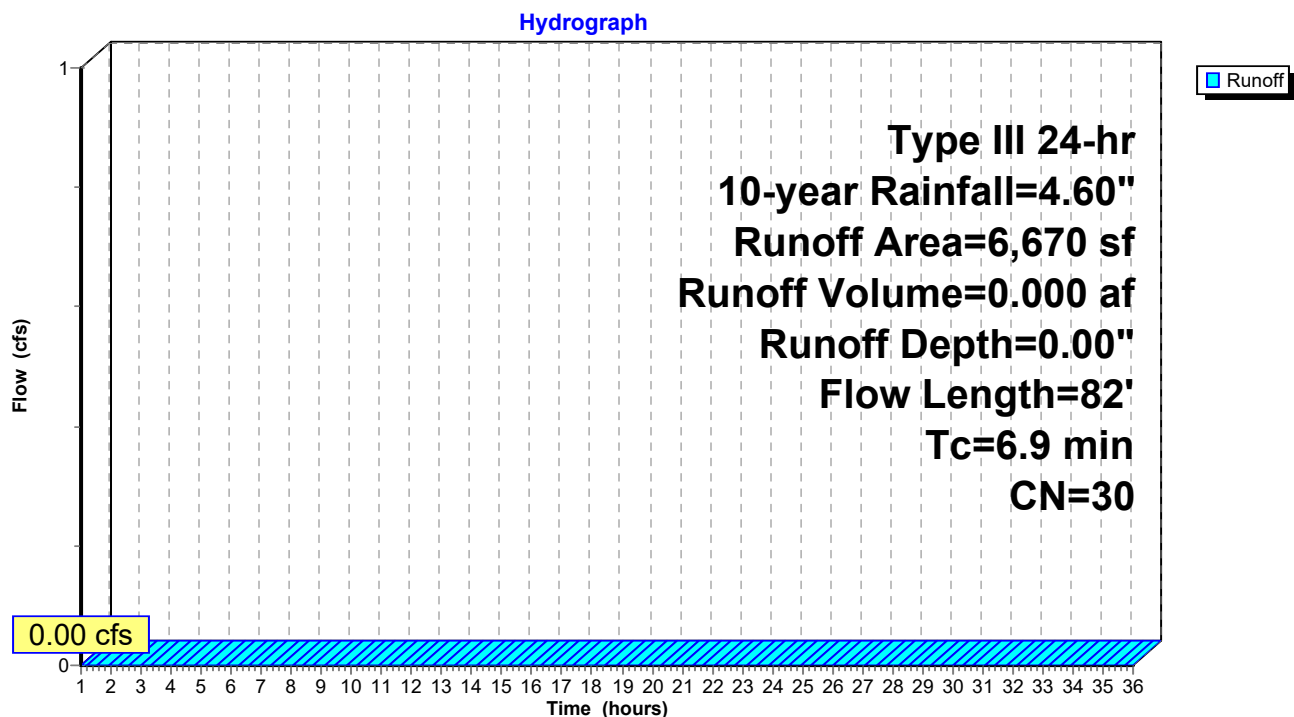
Summary for Subcatchment 3S.1: Garden area runoff

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.60"

Area (sf)	CN	Description
6,670	30	Brush, Good, HSG A
6,670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	28	0.3330	0.28		Sheet Flow, A to B
					Grass: Dense n= 0.240 P2= 3.27"
5.2	54	0.0700	0.17		Sheet Flow, B to C
					Grass: Dense n= 0.240 P2= 3.27"
6.9	82	Total			

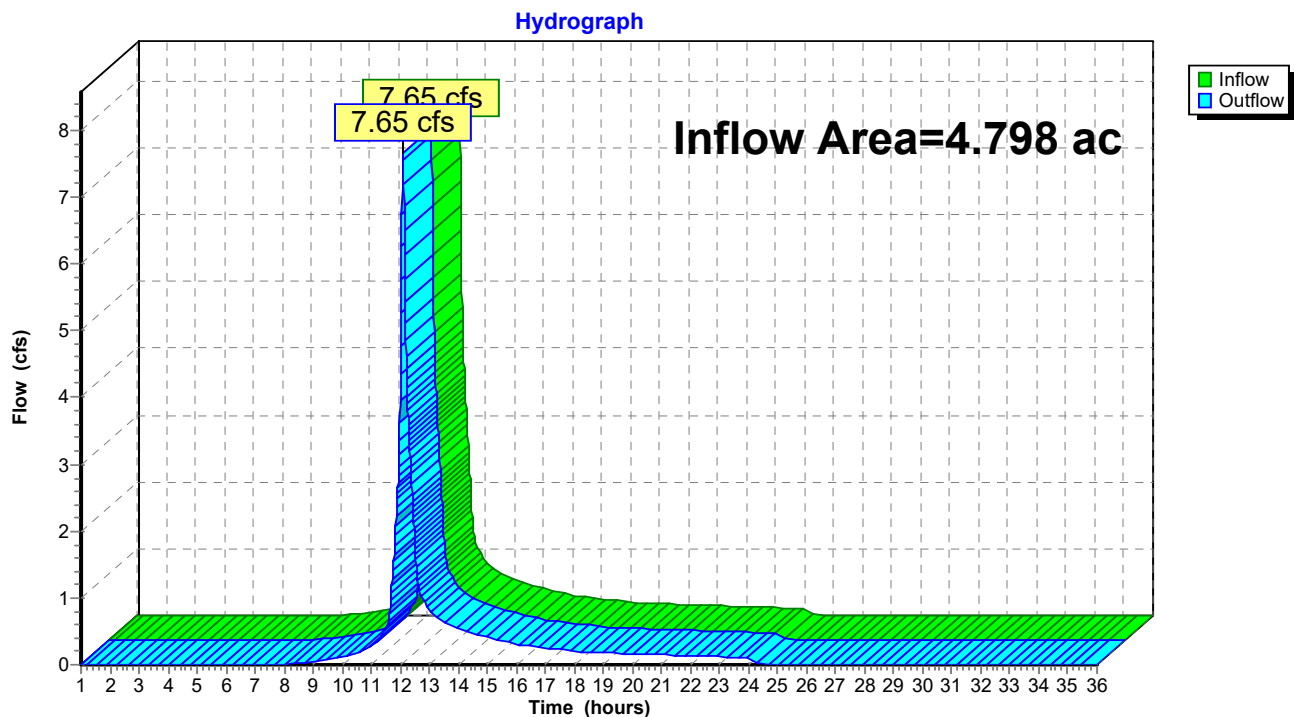
Subcatchment 3S.1: Garden area runoff

Summary for Reach POI-1: POI #1 - 60" Douglass MS4

Inflow Area = 4.798 ac, 46.81% Impervious, Inflow Depth = 1.43" for 10-year event
 Inflow = 7.65 cfs @ 12.09 hrs, Volume= 0.573 af
 Outflow = 7.65 cfs @ 12.09 hrs, Volume= 0.573 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-1: POI #1 - 60" Douglass MS4

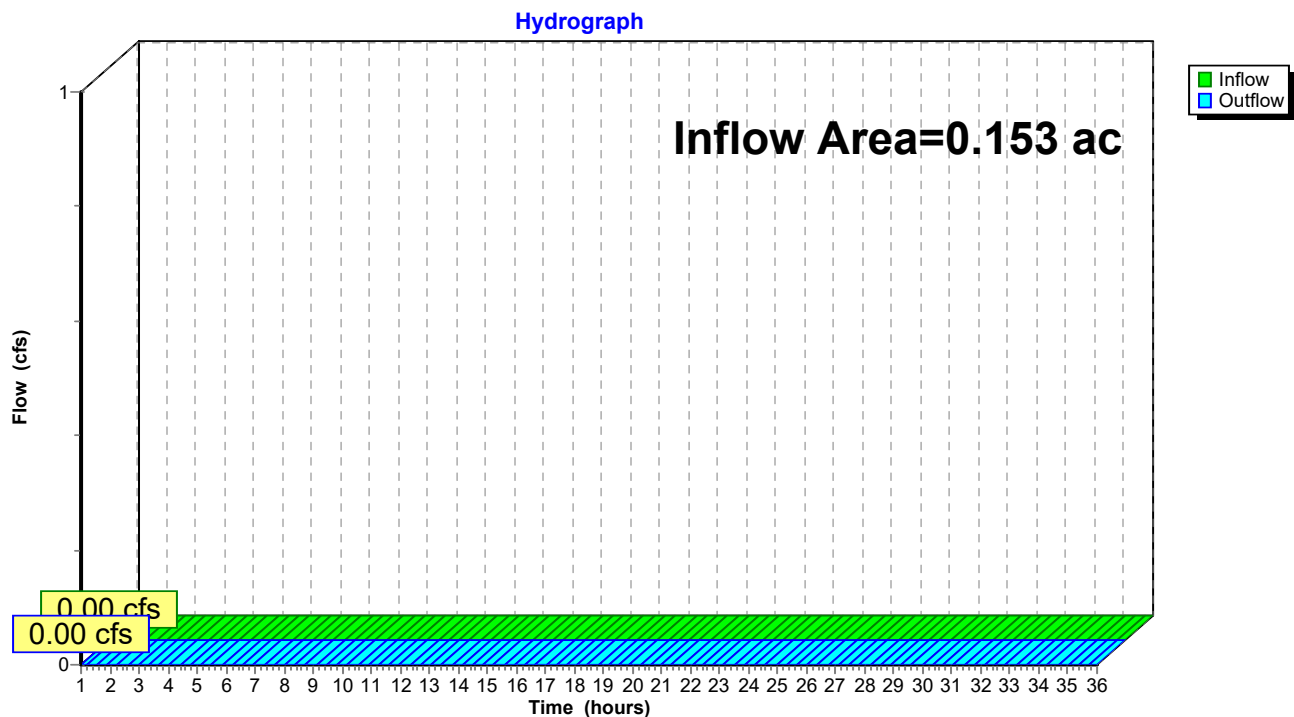


Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 0.153 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-3: POI #3 - Baseball Field



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Type III 24-hr 10-year Rainfall=4.60"

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Page 53

Summary for Pond P1: VUSF

Inflow Area = 0.249 ac, 76.24% Impervious, Inflow Depth = 2.72" for 10-year event
 Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.057 af
 Outflow = 0.07 cfs @ 13.29 hrs, Volume= 0.057 af, Atten= 92%, Lag= 72.1 min
 Discarded = 0.05 cfs @ 13.29 hrs, Volume= 0.043 af
 Primary = 0.01 cfs @ 13.29 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 31.87' @ 13.29 hrs Surf.Area= 2,198 sf Storage= 1,177 cf

Plug-Flow detention time= 220.8 min calculated for 0.057 af (100% of inflow)

Center-of-Mass det. time= 220.8 min (1,040.6 - 819.8)

Volume	Invert	Avail.Storage	Storage Description
#1	30.75'	1,899 cf	Ponding (Prismatic) Listed below (Recalc)
#2	29.25'	69 cf	Filter Media/Loam (Prismatic) Listed below (Recalc)
			687 cf Overall x 10.0% Voids
#3	28.92'	30 cf	Transition Gravel (Prismatic) Listed below (Recalc)
			151 cf Overall x 20.0% Voids
#4	27.00'	349 cf	Crushed Stone (Prismatic) Listed below (Recalc)
			879 cf Overall - 6 cf Embedded = 873 cf x 40.0% Voids
#5	27.10'	5 cf	4.0" Round Pipe Storage x 2 Inside #4
			L= 30.0' S= 0.0005 '/'
			6 cf Overall - 0.2" Wall Thickness = 5 cf
		2,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.75	465	0	0
32.25	945	1,058	1,058
33.00	1,300	842	1,899

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.25	458	0	0
30.75	458	687	687

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.92	458	0	0
29.25	458	151	151

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.00	458	0	0
28.92	458	879	879

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Type III 24-hr 10-year Rainfall=4.60"

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Page 54

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	12.0" Round Culvert L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 26.75' S= 0.0042 ' / ' Cc= 0.600 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	27.10'	0.5" Vert. Soil Filter Media Drawdown Effect C= 0.600
#3	Device 1	32.35'	24.0" Horiz. Beehive Outlet C= 0.600 Limited to weir flow at low heads
#4	Discarded	27.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.05 cfs @ 13.29 hrs HW=31.87' (Free Discharge)

↳ **4=Exfiltration** (Exfiltration Controls 0.05 cfs)

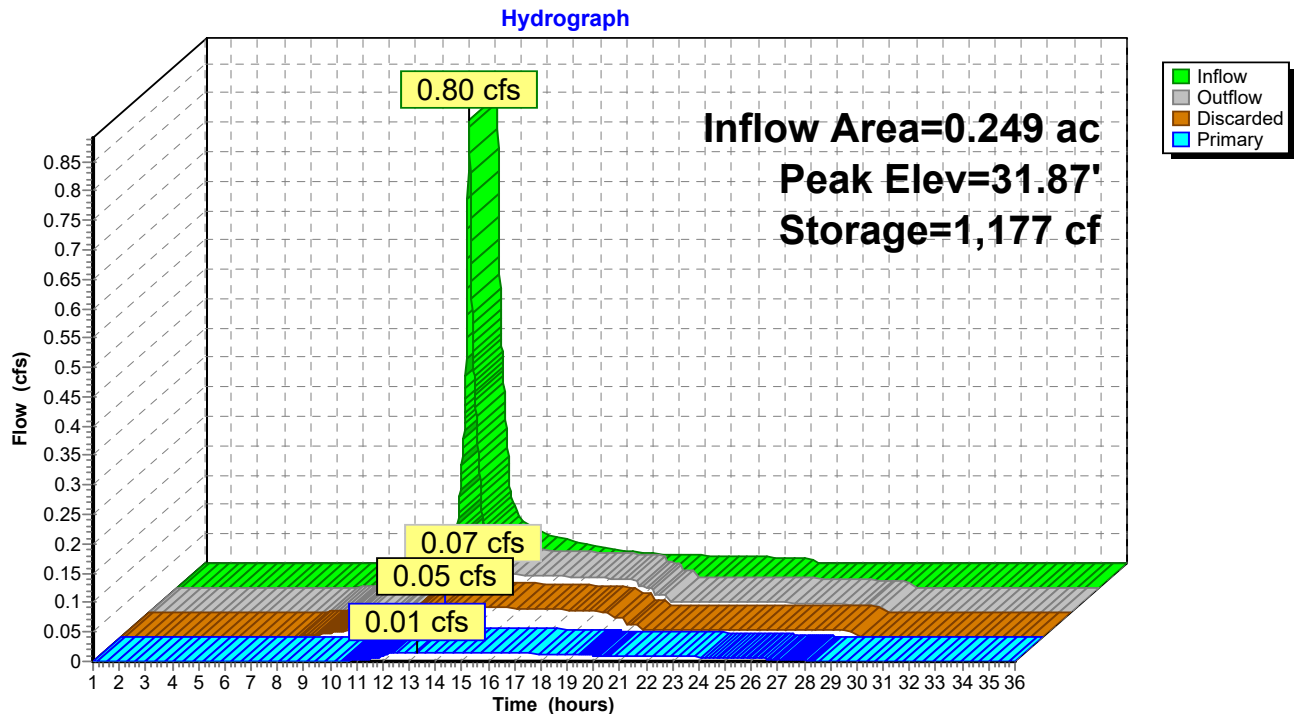
Primary OutFlow Max=0.01 cfs @ 13.29 hrs HW=31.87' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Passes 0.01 cfs of 4.16 cfs potential flow)

↳ **2=Soil Filter Media Drawdown Effect** (Orifice Controls 0.01 cfs @ 10.50 fps)

↳ **3=Beehive Outlet** (Controls 0.00 cfs)

Pond P1: VUSF



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Type III 24-hr 10-year Rainfall=4.60"

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Page 55

Summary for Pond P2: FP 4

Inflow Area = 0.175 ac, 53.01% Impervious, Inflow Depth = 1.74" for 10-year event
 Inflow = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af
 Outflow = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.95' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.95'	14 cf	4.00'W x 5.00'L x 3.60'H Media/Stone 72 cf Overall x 20.0% Voids
#2	35.95'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		52 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.95	20	0	0
36.95	56	38	38

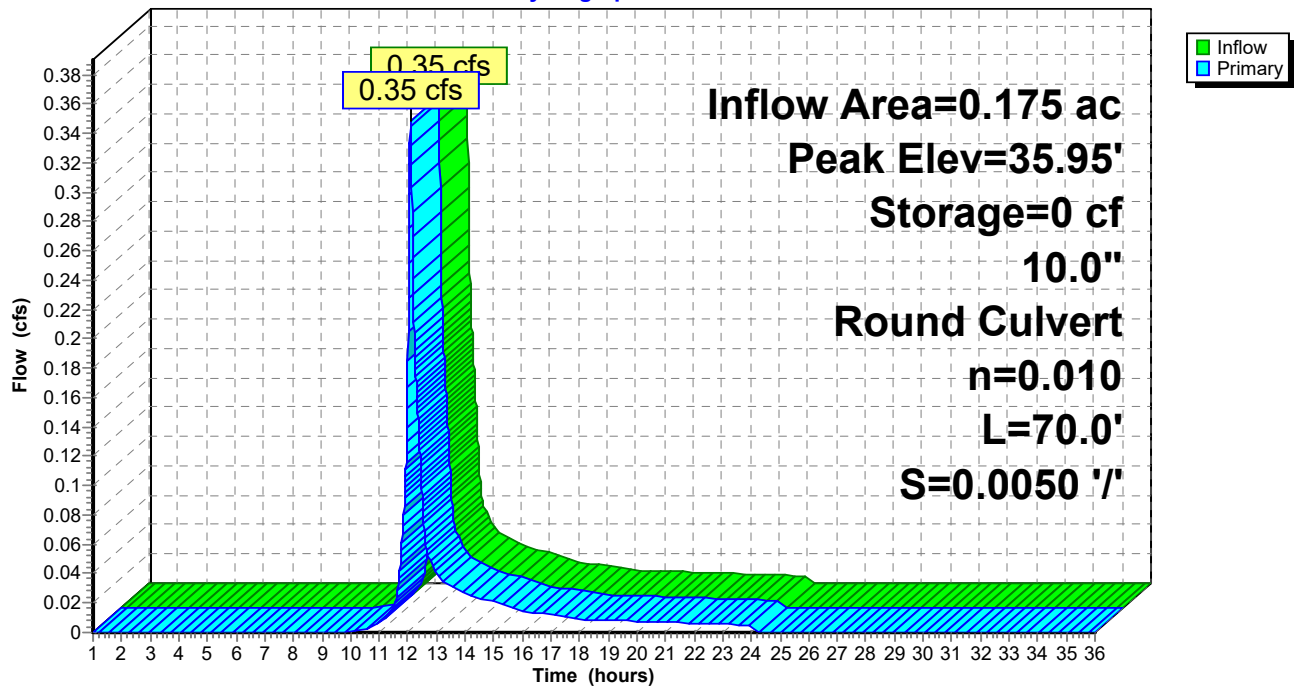
Device	Routing	Invert	Outlet Devices
#1	Primary	32.35'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 32.35' / 32.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.95' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.51 cfs potential flow)

Pond P2: FP 4

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 57

Summary for Pond P3: FP 3

Inflow Area = 0.154 ac, 52.99% Impervious, Inflow Depth = 1.74" for 10-year event
 Inflow = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af
 Outflow = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 36.10' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	36.10'	21 cf	5.00'W x 5.00'L x 4.20'H Media/Stone 105 cf Overall x 20.0% Voids
#2	36.10'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		66 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.10	25	0	0
37.10	64	45	45

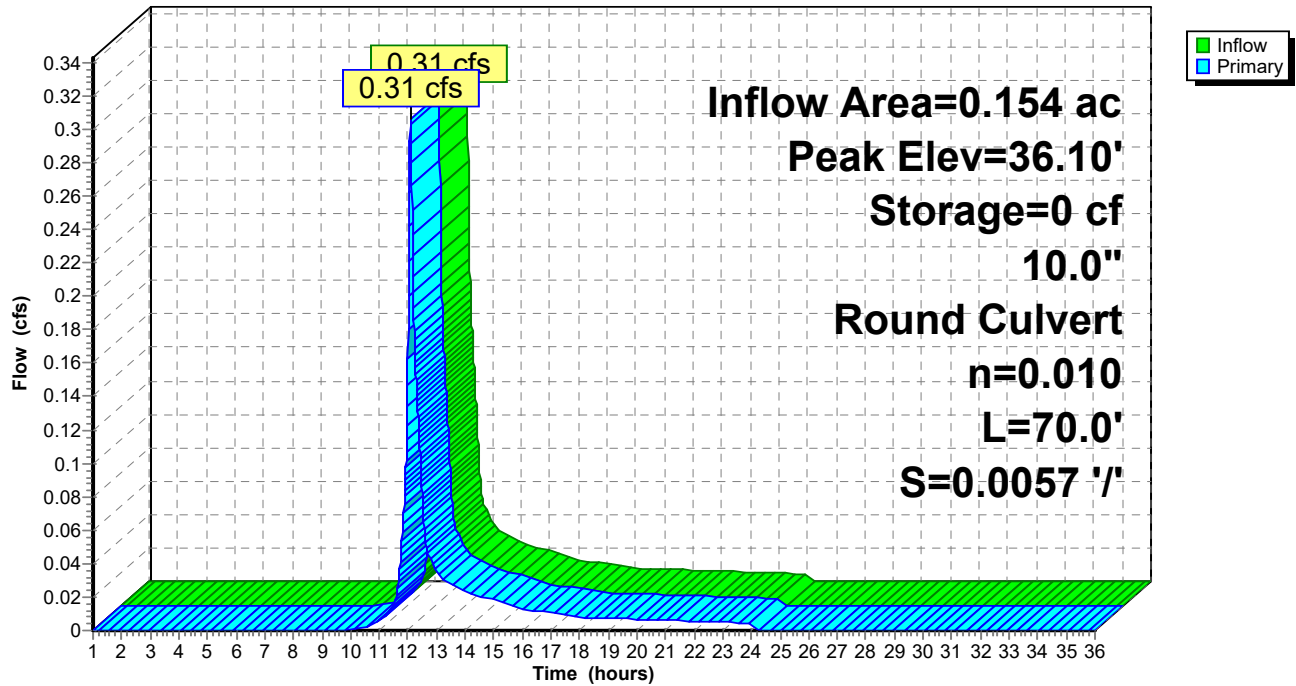
Device	Routing	Invert	Outlet Devices
#1	Primary	31.90'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.90' / 31.50' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=36.10' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.83 cfs potential flow)

Pond P3: FP 3

Hydrograph



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Page 59

Summary for Pond P4: FP 2

Inflow Area = 0.137 ac, 80.74% Impervious, Inflow Depth = 3.19" for 10-year event
 Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af
 Outflow = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.90' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	23 cf	5.00'W x 5.00'L x 4.50'H Media/Stone 113 cf Overall x 20.0% Voids
#2	35.90'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		67 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.90	25	0	0
36.90	64	45	45

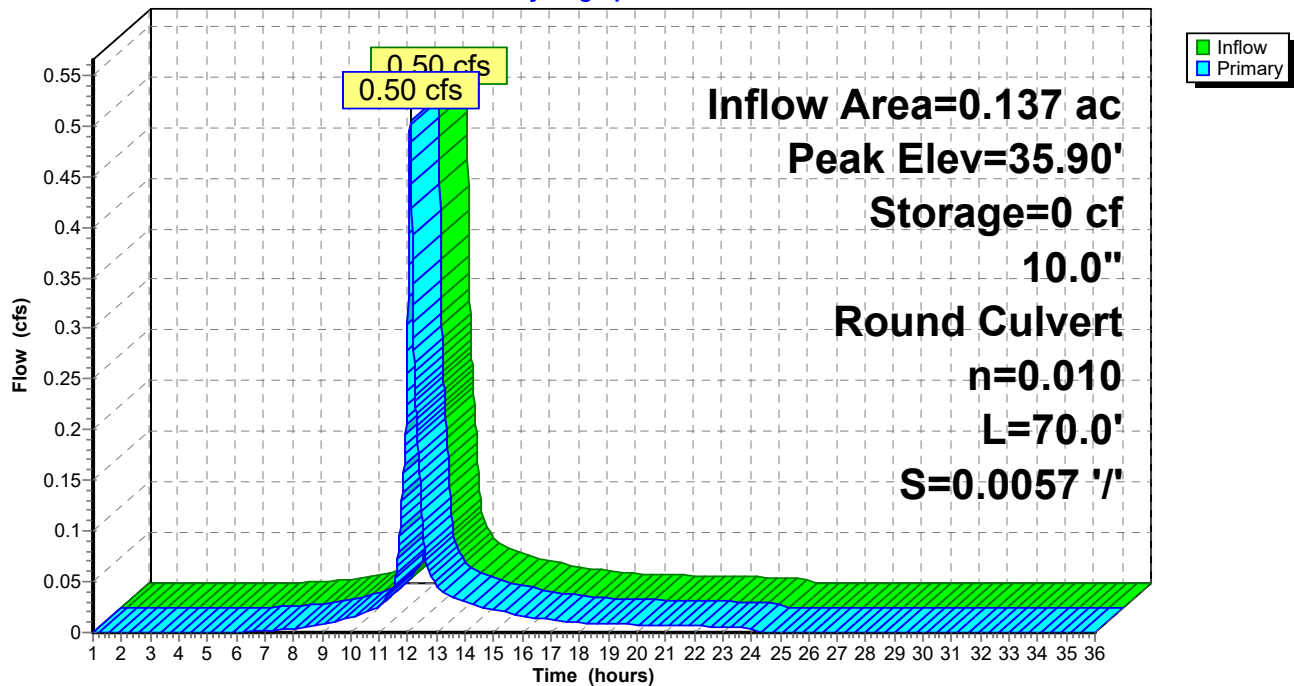
Device	Routing	Invert	Outlet Devices
#1	Primary	31.40'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.40' / 31.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.90' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.98 cfs potential flow)

Pond P4: FP 2

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 61

Summary for Pond P5: FP 1

Inflow Area = 0.086 ac, 84.98% Impervious, Inflow Depth = 3.39" for 10-year event
 Inflow = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af
 Outflow = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.33 cfs @ 12.09 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.70' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (797.3 - 797.3)

Volume	Invert	Avail.Storage	Storage Description
#1	35.70'	19 cf	4.00'W x 5.00'L x 4.80'H Media/Stone 96 cf Overall x 20.0% Voids
#2	35.70'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		57 cf	Total Available Storage

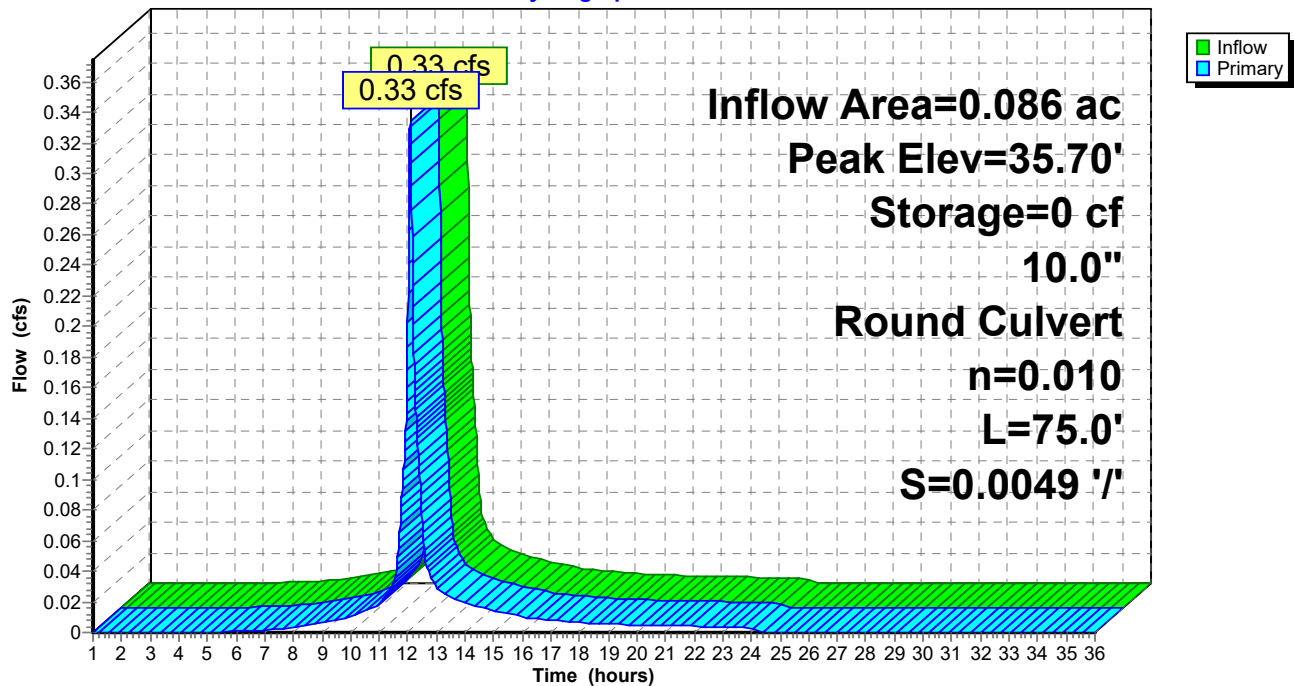
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.70	20	0	0
36.70	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	30.90'	10.0" Round Culvert L= 75.0' Ke= 1.000 Inlet / Outlet Invert= 30.90' / 30.53' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.70' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 4.12 cfs potential flow)

Pond P5: FP 1

Hydrograph



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Type III 24-hr 10-year Rainfall=4.60"

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Page 63

Summary for Pond POI #2: POI #2 (295 Basin)

Inflow Area = 1.603 ac, 12.70% Impervious, Inflow Depth = 0.18" for 10-year event
 Inflow = 0.05 cfs @ 12.65 hrs, Volume= 0.025 af
 Outflow = 0.02 cfs @ 17.23 hrs, Volume= 0.017 af, Atten= 45%, Lag= 274.8 min
 Discarded = 0.01 cfs @ 17.23 hrs, Volume= 0.008 af
 Primary = 0.01 cfs @ 17.23 hrs, Volume= 0.009 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 26.67' @ 17.23 hrs Surf.Area= 2,411 sf Storage= 464 cf

Plug-Flow detention time= 310.4 min calculated for 0.017 af (71% of inflow)

Center-of-Mass det. time= 201.5 min (1,221.1 - 1,019.6)

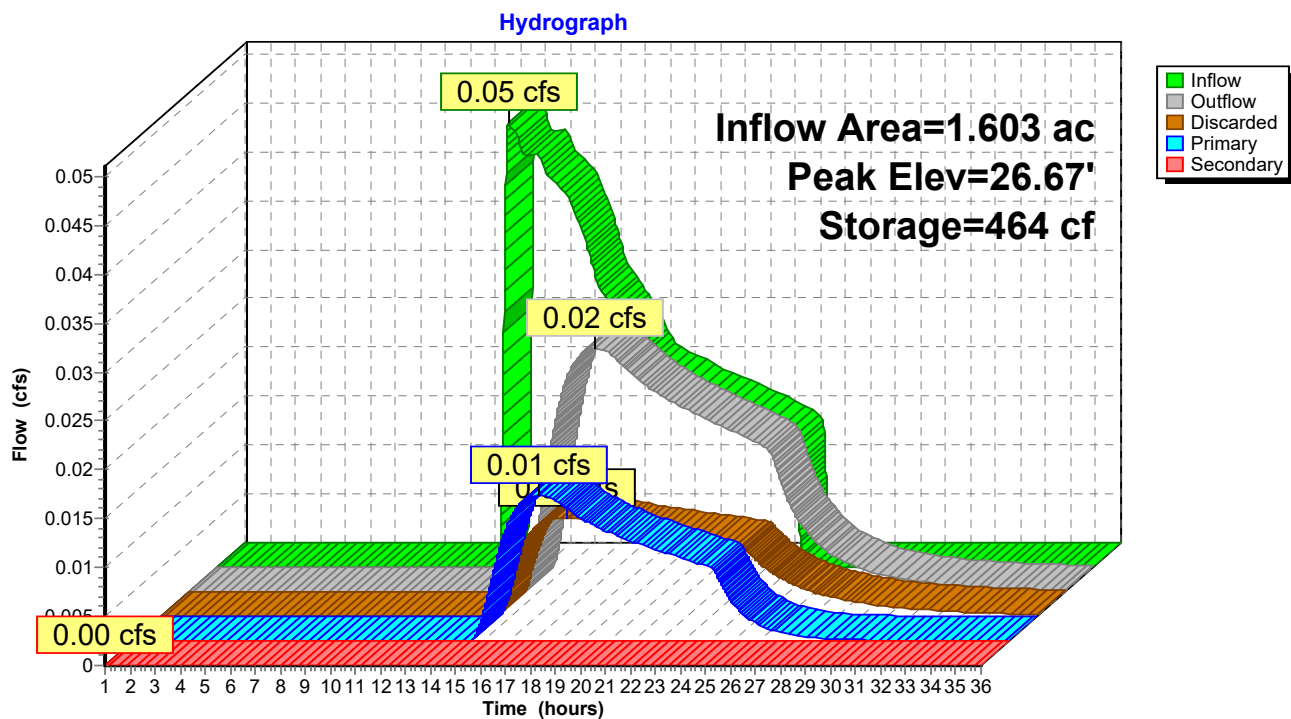
Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	105,037 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	10,120	7,298	8,899
29.00	14,131	12,126	21,024
30.00	17,326	15,729	36,753
32.00	24,023	41,349	78,102
33.00	29,847	26,935	105,037

Device	Routing	Invert	Outlet Devices
#1	Primary	26.60'	12.0" Round Culvert L= 16.0' Ke= 0.600 Inlet / Outlet Invert= 26.60' / 26.51' S= 0.0056 ' S= 0.0056 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	32.40'	20.0' long x 15.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	26.60'	1.000 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.01 cfs @ 17.23 hrs HW=26.67' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.01 cfs @ 17.23 hrs HW=26.67' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.01 cfs @ 0.95 fps)**Secondary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**2=Overflow** (Controls 0.00 cfs)

Pond POI #2: POI #2 (295 Basin)



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Type III 24-hr 25-year Rainfall=5.80"

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Page 65

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S.1: Drive to Street	Runoff Area=1,131 sf 55.00% Impervious Runoff Depth=2.74" Tc=6.0 min CN=71 Runoff=0.08 cfs 0.006 af
Subcatchment 1S.10: East Lot 1	Runoff Area=3,754 sf 84.98% Impervious Runoff Depth=4.54" Tc=6.0 min CN=89 Runoff=0.44 cfs 0.033 af
Subcatchment 1S.11: South Lot Treated	Runoff Area=10,852 sf 76.24% Impervious Runoff Depth=3.80" Tc=6.0 min CN=82 Runoff=1.10 cfs 0.079 af
Subcatchment 1S.2: Co Op Roof & yard	Runoff Area=56,422 sf 65.80% Impervious Runoff Depth=3.40" Tc=6.0 min CN=78 Runoff=5.17 cfs 0.367 af
Subcatchment 1S.3: Runoff to park	Runoff Area=2,081 sf 0.00% Impervious Runoff Depth=0.39" Flow Length=264' Tc=9.0 min CN=39 Runoff=0.01 cfs 0.002 af
Subcatchment 1S.4: Central parking/drive	Runoff Area=19,043 sf 77.98% Impervious Runoff Depth=3.91" Tc=6.0 min CN=83 Runoff=1.98 cfs 0.142 af
Subcatchment 1S.5: Contained yard/park	Runoff Area=3,023 sf 16.84% Impervious Runoff Depth=0.98" Tc=6.0 min CN=49 Runoff=0.06 cfs 0.006 af
Subcatchment 1S.6: Building E roof and	Runoff Area=22,599 sf 53.10% Impervious Runoff Depth=2.65" Tc=6.0 min CN=70 Runoff=1.60 cfs 0.114 af
Subcatchment 1S.7: East Lot 4	Runoff Area=7,618 sf 53.01% Impervious Runoff Depth=2.65" Tc=6.0 min CN=70 Runoff=0.54 cfs 0.039 af
Subcatchment 1S.8: East Lot 3	Runoff Area=6,694 sf 52.99% Impervious Runoff Depth=2.65" Tc=6.0 min CN=70 Runoff=0.47 cfs 0.034 af
Subcatchment 1S.9: East Lot 2	Runoff Area=5,956 sf 80.74% Impervious Runoff Depth=4.33" Tc=6.0 min CN=87 Runoff=0.68 cfs 0.049 af
Subcatchment 2S: 295 Embankment Trib	Runoff Area=69,848 sf 12.70% Impervious Runoff Depth=0.49" Flow Length=233' Tc=16.0 min CN=41 Runoff=0.31 cfs 0.066 af
Subcatchment 3S.1: Garden area runoff	Runoff Area=6,670 sf 0.00% Impervious Runoff Depth=0.05" Flow Length=82' Tc=6.9 min CN=30 Runoff=0.00 cfs 0.001 af
Reach POI-1: POI #1 - 60" Douglass MS4	Inflow=11.03 cfs 0.854 af Outflow=11.03 cfs 0.854 af
Reach POI-3: POI #3 - Baseball Field	Inflow=0.00 cfs 0.001 af Outflow=0.00 cfs 0.001 af
Pond P1: VUSF	Peak Elev=32.38' Storage=1,639 cf Inflow=1.10 cfs 0.079 af Discarded=0.06 cfs 0.057 af Primary=0.13 cfs 0.022 af Outflow=0.18 cfs 0.079 af

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Page 66

Pond P2: FP 4

Peak Elev=35.95' Storage=0 cf Inflow=0.54 cfs 0.039 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0050 '/' Outflow=0.54 cfs 0.039 af

Pond P3: FP 3

Peak Elev=36.10' Storage=0 cf Inflow=0.47 cfs 0.034 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.47 cfs 0.034 af

Pond P4: FP 2

Peak Elev=35.90' Storage=0 cf Inflow=0.68 cfs 0.049 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.68 cfs 0.049 af

Pond P5: FP 1

Peak Elev=35.70' Storage=0 cf Inflow=0.44 cfs 0.033 af
10.0" Round Culvert n=0.010 L=75.0' S=0.0049 '/' Outflow=0.44 cfs 0.033 af

Pond POI #2: POI #2 (295 Basin)

Peak Elev=26.76' Storage=709 cf Inflow=0.31 cfs 0.066 af
Discarded=0.02 cfs 0.018 af Primary=0.08 cfs 0.041 af Secondary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.059 af

Total Runoff Area = 4.952 ac Runoff Volume = 0.937 af Average Runoff Depth = 2.27"
54.64% Pervious = 2.706 ac 45.36% Impervious = 2.246 ac

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Type III 24-hr 25-year Rainfall=5.80"

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Page 67

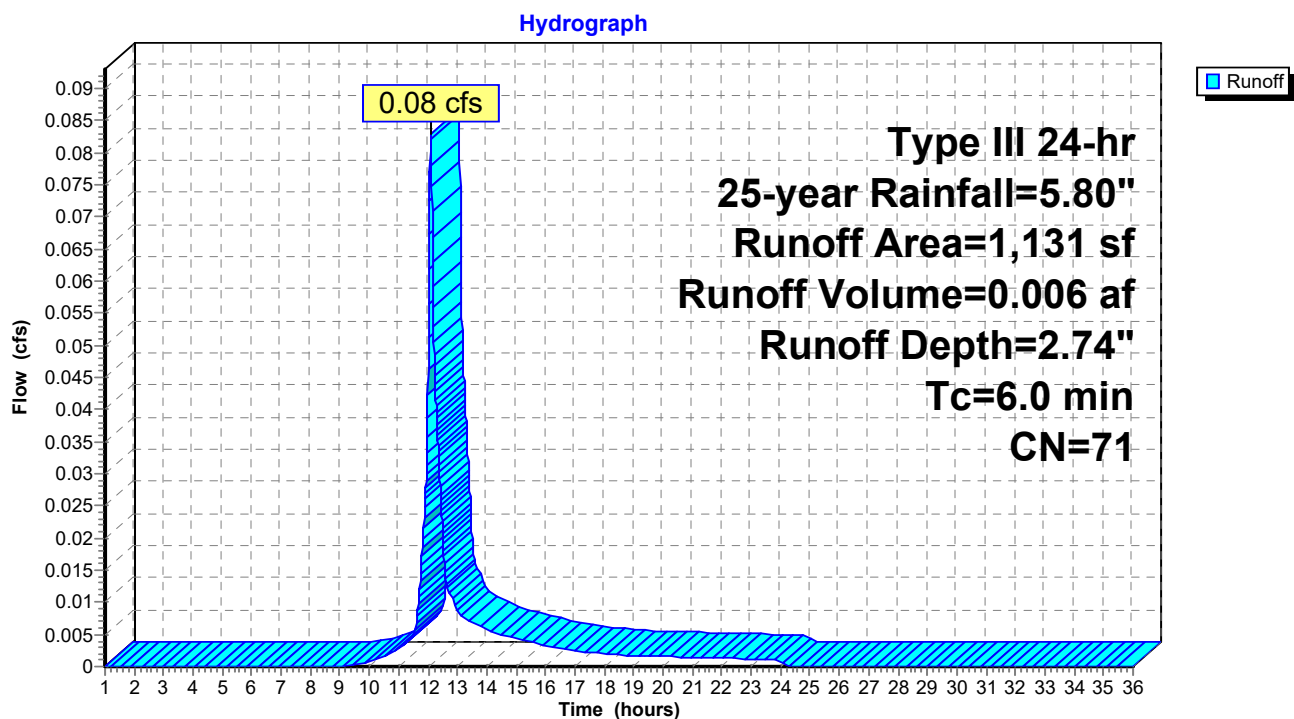
Summary for Subcatchment 1.S1: Drive to Street

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	622	98	Pavement
	509	39	>75% Grass cover, Good, HSG A
	1,131	71	Weighted Average
	509		45.00% Pervious Area
	622		55.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1.S1: Drive to Street

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Type III 24-hr 25-year Rainfall=5.80"

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Page 68

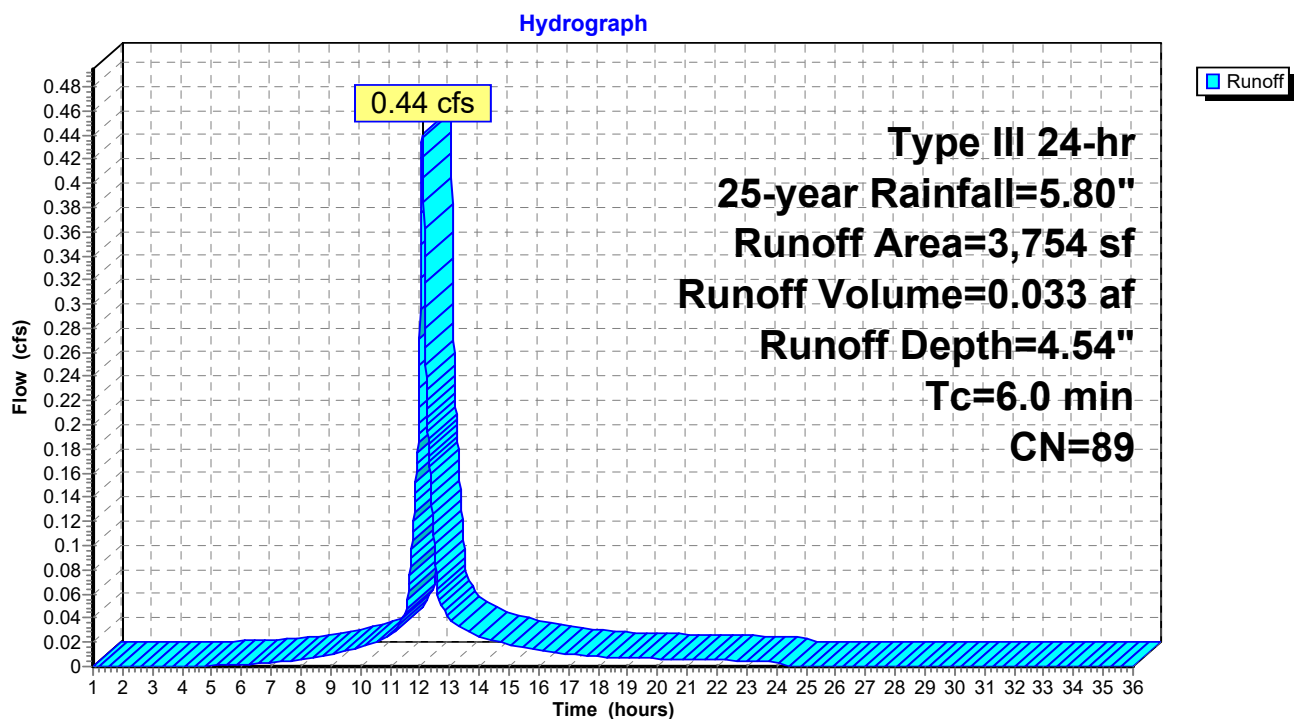
Summary for Subcatchment 1S.10: East Lot 1

Runoff = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	3,190	98	Pavement
	564	39	>75% Grass cover, Good, HSG A
	3,754	89	Weighted Average
	564		15.02% Pervious Area
	3,190		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.10: East Lot 1

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Type III 24-hr 25-year Rainfall=5.80"

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Page 69

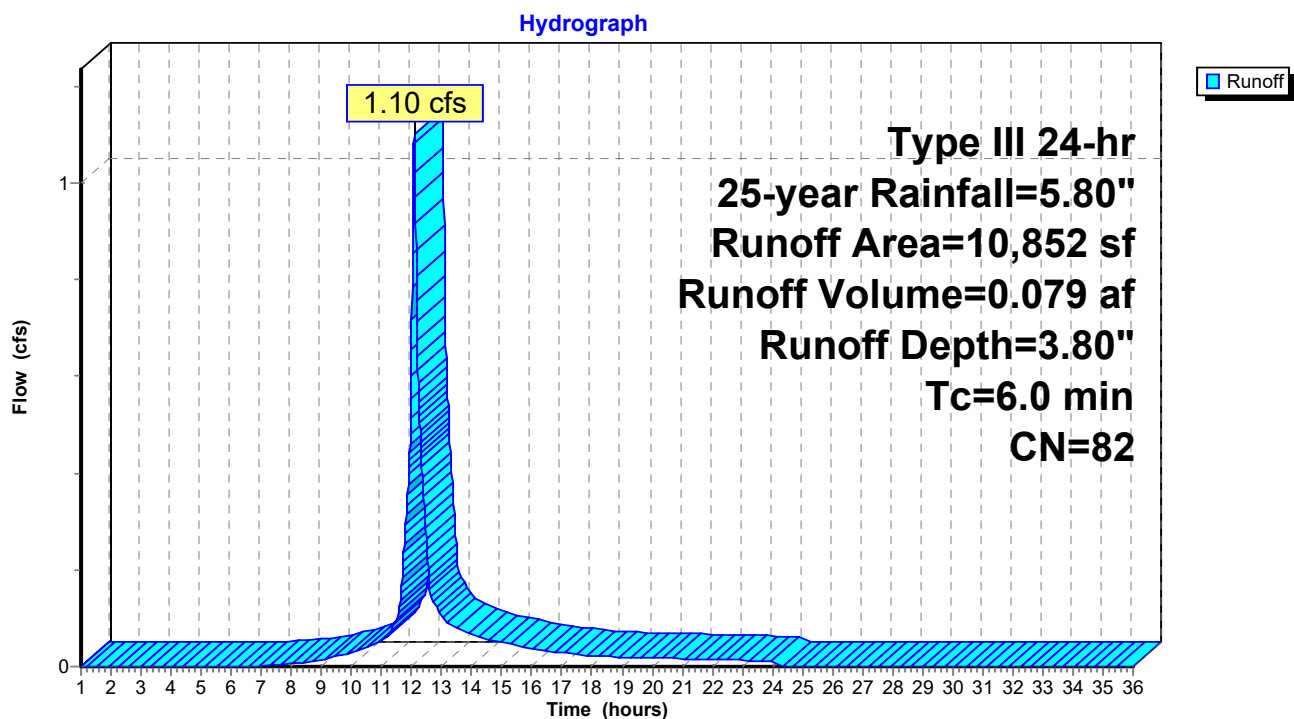
Summary for Subcatchment 1S.11: South Lot Treated

Runoff = 1.10 cfs @ 12.09 hrs, Volume= 0.079 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	8,274	98	Paved parking
	2,578	30	Brush, Good, HSG A
	10,852	82	Weighted Average
	2,578		23.76% Pervious Area
	8,274		76.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.11: South Lot Treated

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Type III 24-hr 25-year Rainfall=5.80"

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Page 70

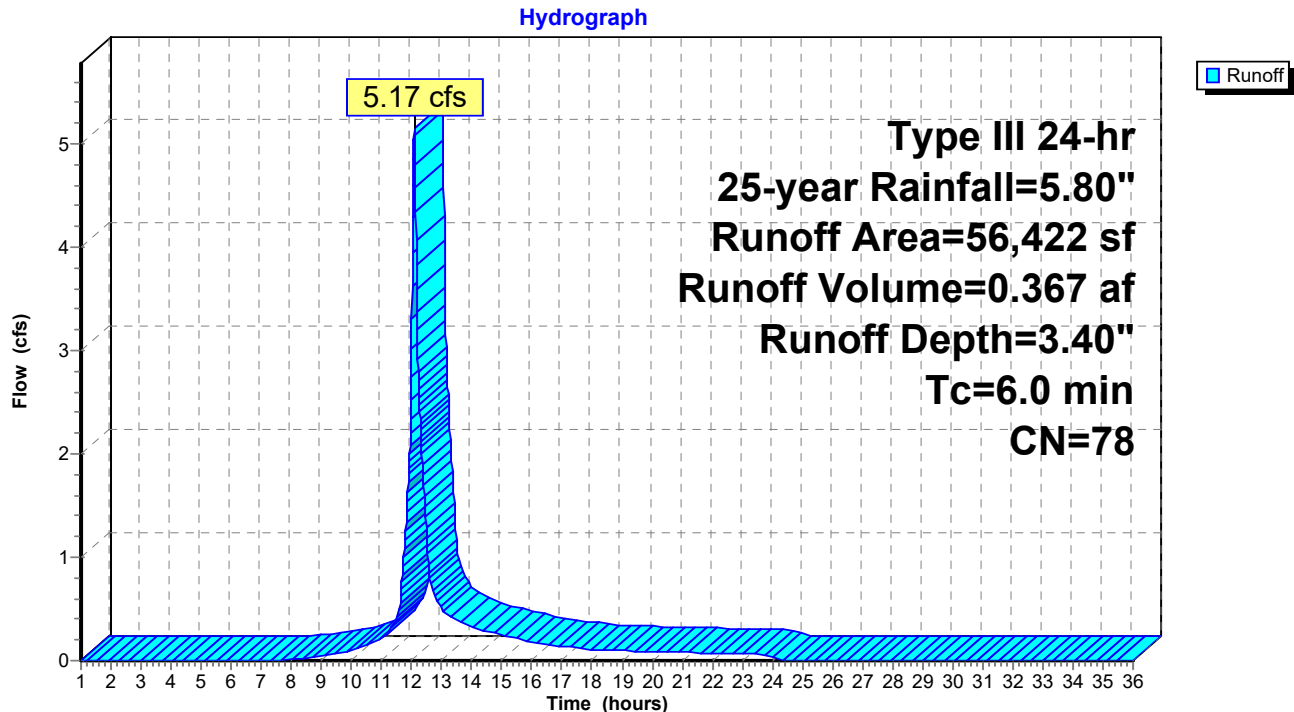
Summary for Subcatchment 1S.2: Co Op Roof & yard

Runoff = 5.17 cfs @ 12.09 hrs, Volume= 0.367 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	5,239	98	pavers
	16,100	39	>75% Grass cover, Good, HSG A
*	21,137	98	Roofs
*	4,191	98	sidewalks
*	618	98	patios
	9,137	77	1/8 acre lots, 65% imp, HSG A
	56,422	78	Weighted Average
	19,298		34.20% Pervious Area
	37,124		65.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.2: Co Op Roof & yard

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Type III 24-hr 25-year Rainfall=5.80"

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Page 71

Summary for Subcatchment 1S.3: Runoff to park

Runoff = 0.01 cfs @ 12.41 hrs, Volume= 0.002 af, Depth= 0.39"

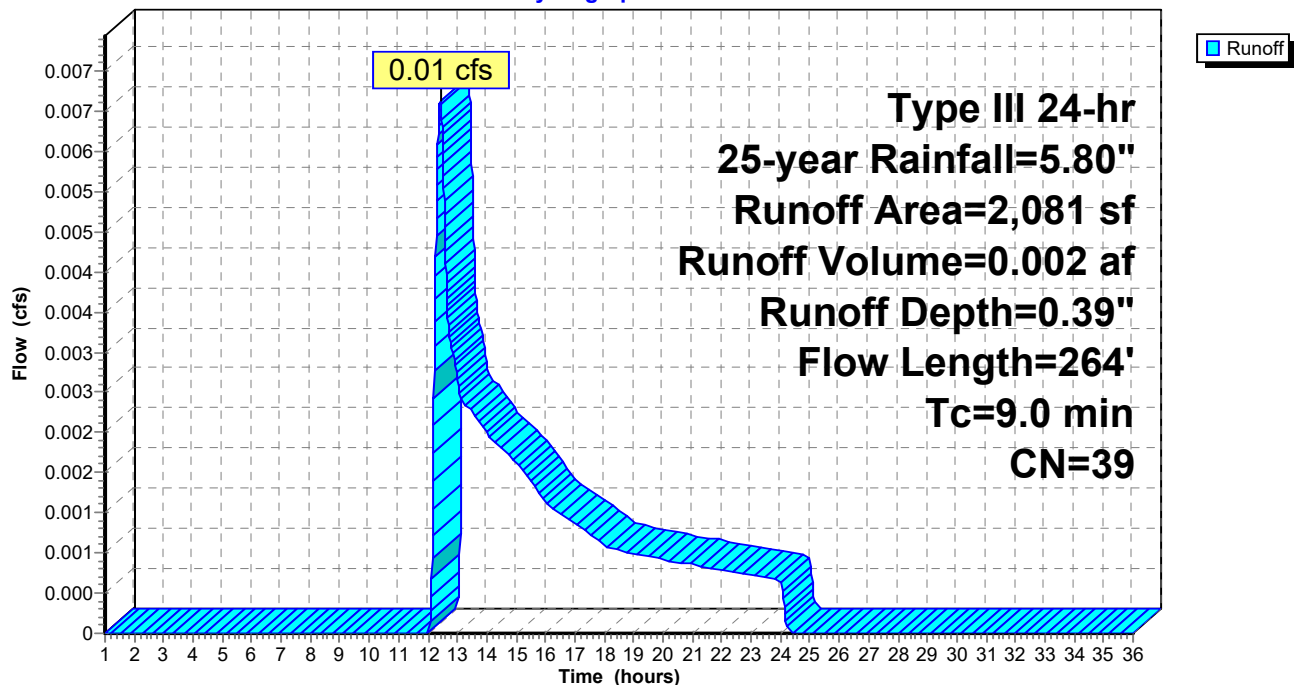
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
2,081	39	>75% Grass cover, Good, HSG A
2,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.0600	0.27		Sheet Flow, A to B Grass: Short n= 0.150 P2= 3.27"
2.8	164	0.0200	0.99		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
9.0	264	Total			

Subcatchment 1S.3: Runoff to park

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 72

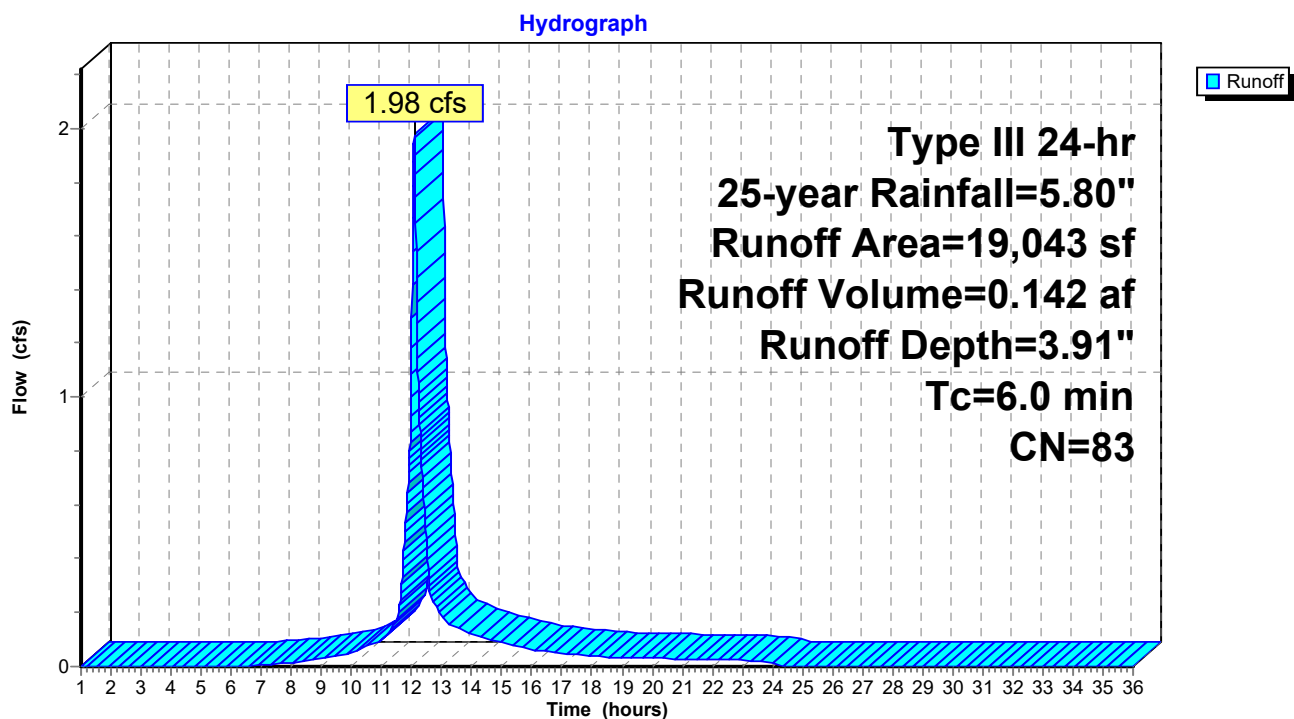
Summary for Subcatchment 1S.4: Central parking/drive

Runoff = 1.98 cfs @ 12.09 hrs, Volume= 0.142 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	14,850	98	Pavement
	4,193	30	Brush, Good, HSG A
	19,043	83	Weighted Average
	4,193		22.02% Pervious Area
	14,850		77.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.4: Central parking/drive

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Type III 24-hr 25-year Rainfall=5.80"

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Page 73

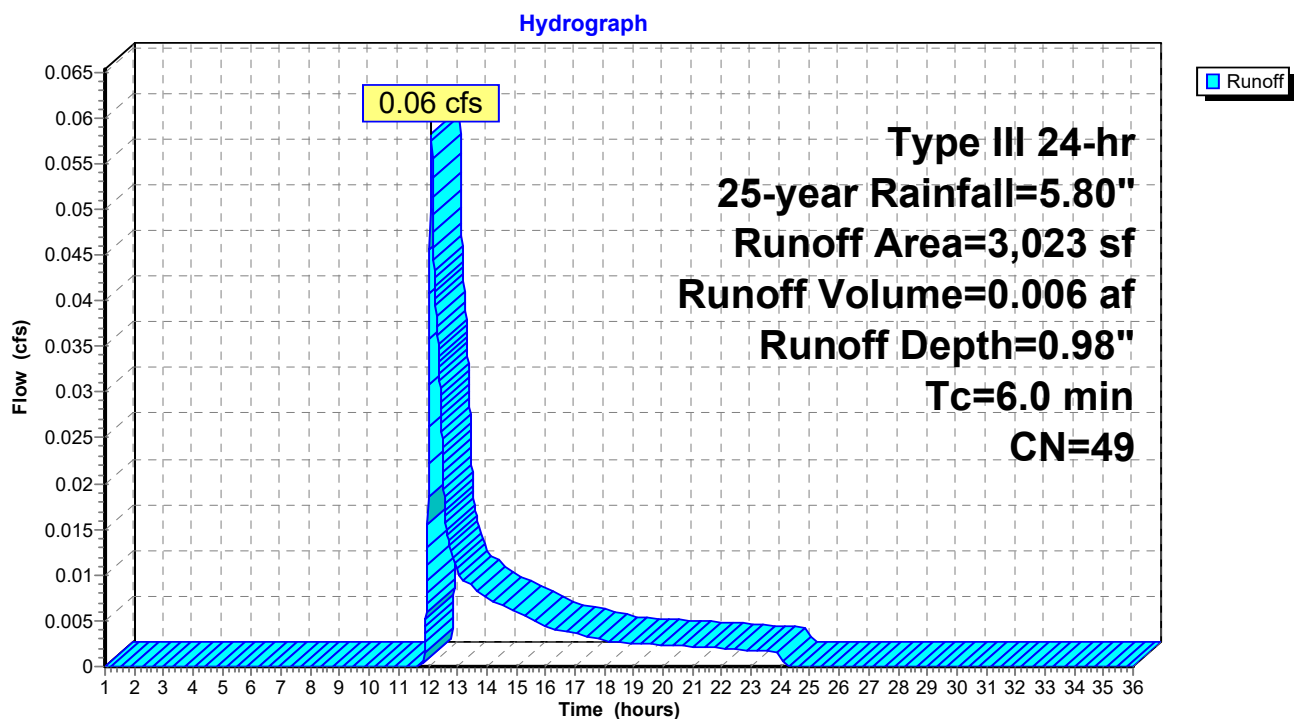
Summary for Subcatchment 1S.5: Contained yard/park connection

Runoff = 0.06 cfs @ 12.11 hrs, Volume= 0.006 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
2,514	39	>75% Grass cover, Good, HSG A
* 509	98	sidewalks
3,023	49	Weighted Average
2,514		83.16% Pervious Area
509		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.5: Contained yard/park connection

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Type III 24-hr 25-year Rainfall=5.80"

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Page 74

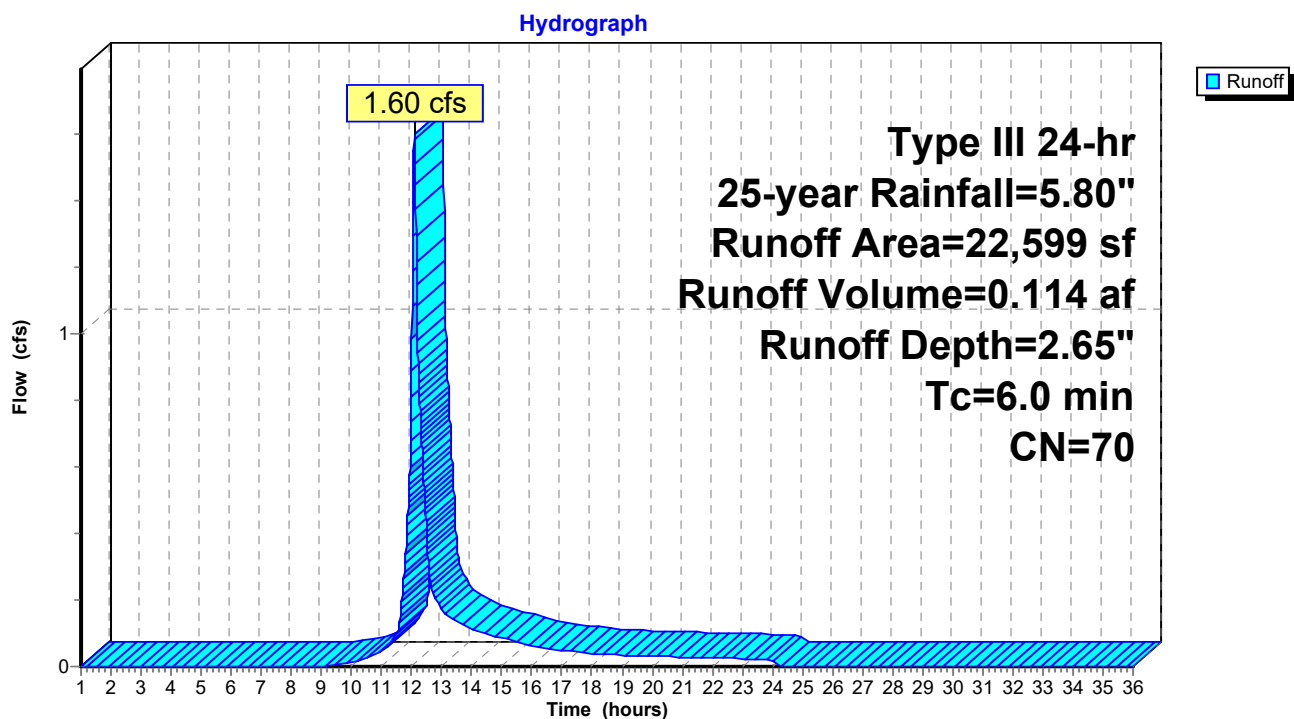
Summary for Subcatchment 1S.6: Building E roof and yard

Runoff = 1.60 cfs @ 12.09 hrs, Volume= 0.114 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
10,599	39	>75% Grass cover, Good, HSG A
* 12,000	98	roof
22,599	70	Weighted Average
10,599		46.90% Pervious Area
12,000		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.6: Building E roof and yard

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Type III 24-hr 25-year Rainfall=5.80"

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Page 75

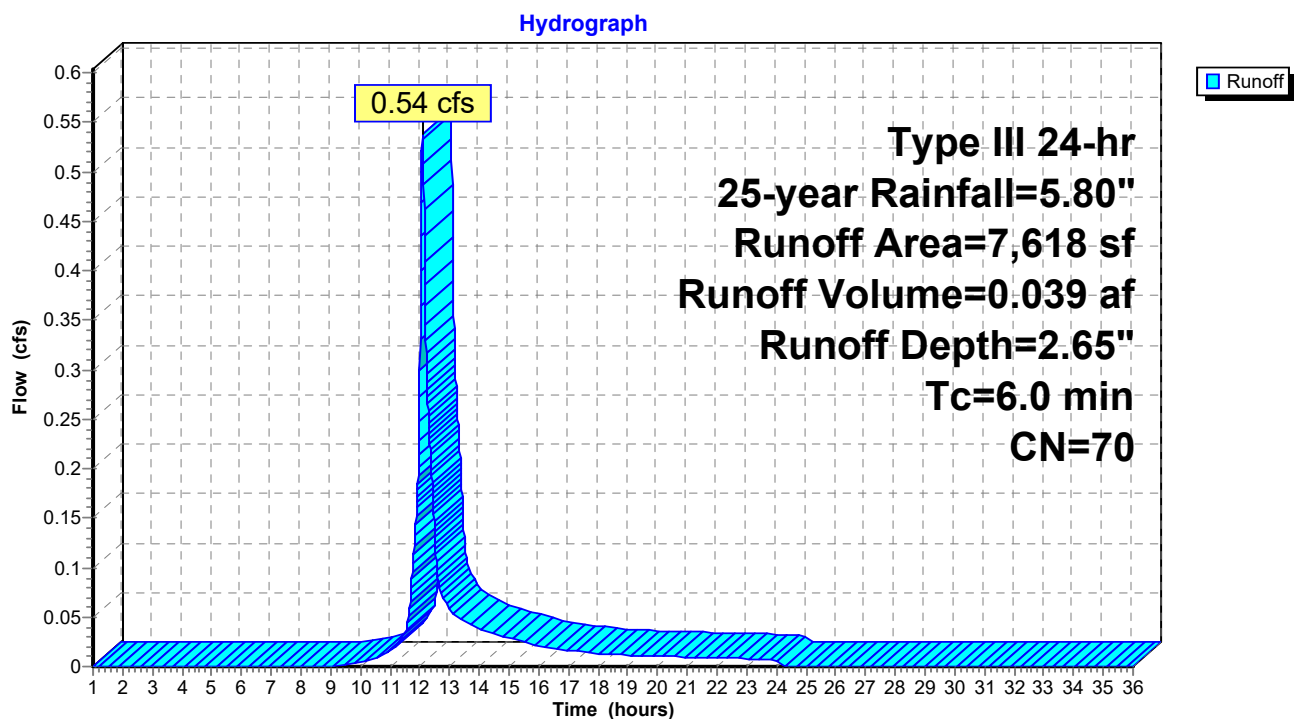
Summary for Subcatchment 1S.7: East Lot 4

Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	4,038	98	Paved parking
	3,580	39	>75% Grass cover, Good, HSG A
	7,618	70	Weighted Average
	3,580		46.99% Pervious Area
	4,038		53.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.7: East Lot 4

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Type III 24-hr 25-year Rainfall=5.80"

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Page 76

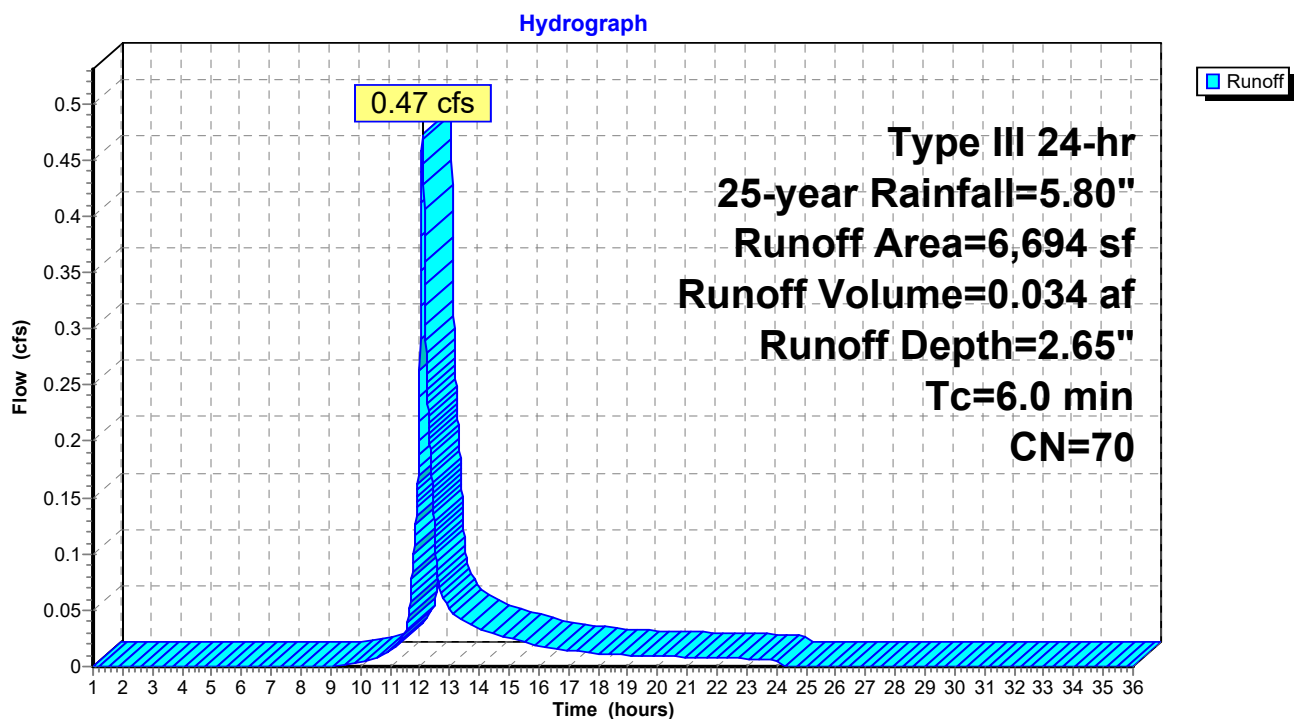
Summary for Subcatchment 1S.8: East Lot 3

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	3,547	98	Paved parking
	3,147	39	>75% Grass cover, Good, HSG A
	6,694	70	Weighted Average
	3,147		47.01% Pervious Area
	3,547		52.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.8: East Lot 3

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Type III 24-hr 25-year Rainfall=5.80"

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Page 77

Summary for Subcatchment 1S.9: East Lot 2

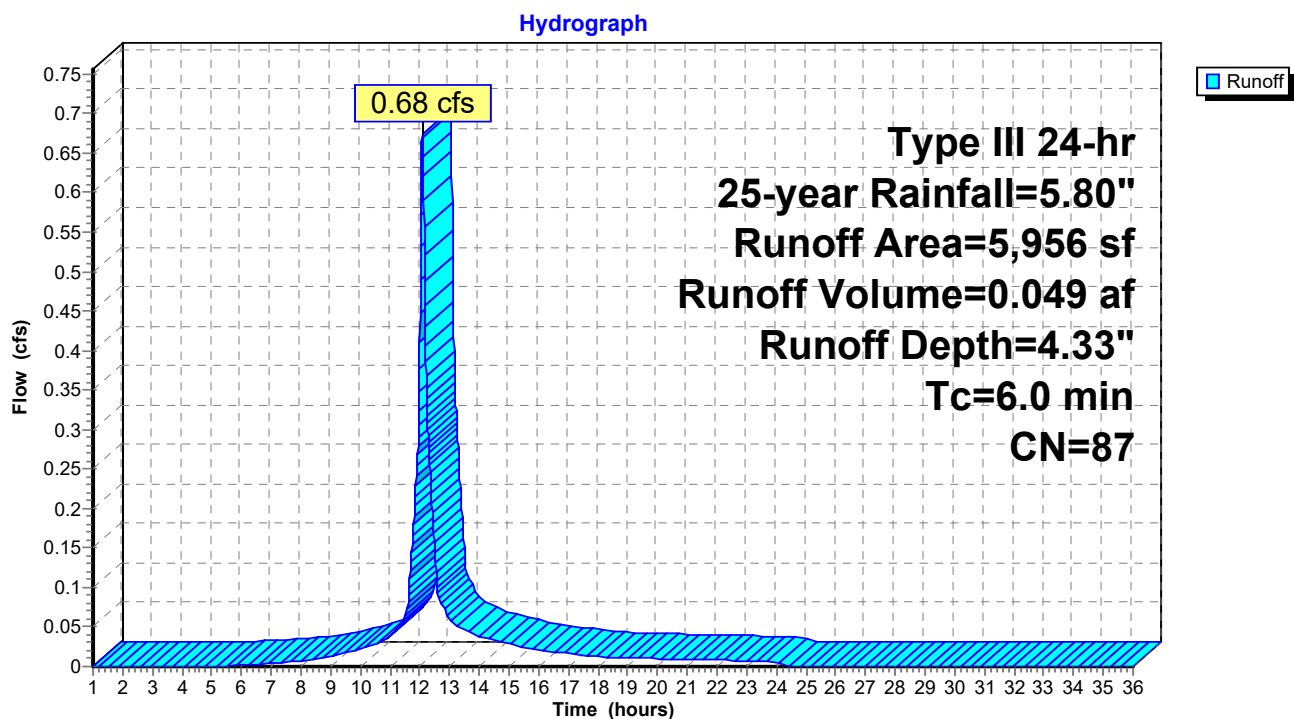
Runoff = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
*	4,809	98	Paved parking, patio, sidewalk
	1,147	39	>75% Grass cover, Good, HSG A
	5,956	87	Weighted Average
	1,147		19.26% Pervious Area
	4,809		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.9: East Lot 2



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Type III 24-hr 25-year Rainfall=5.80"

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Page 78

Summary for Subcatchment 2S: 295 Embankment Trib

Runoff = 0.31 cfs @ 12.47 hrs, Volume= 0.066 af, Depth= 0.49"

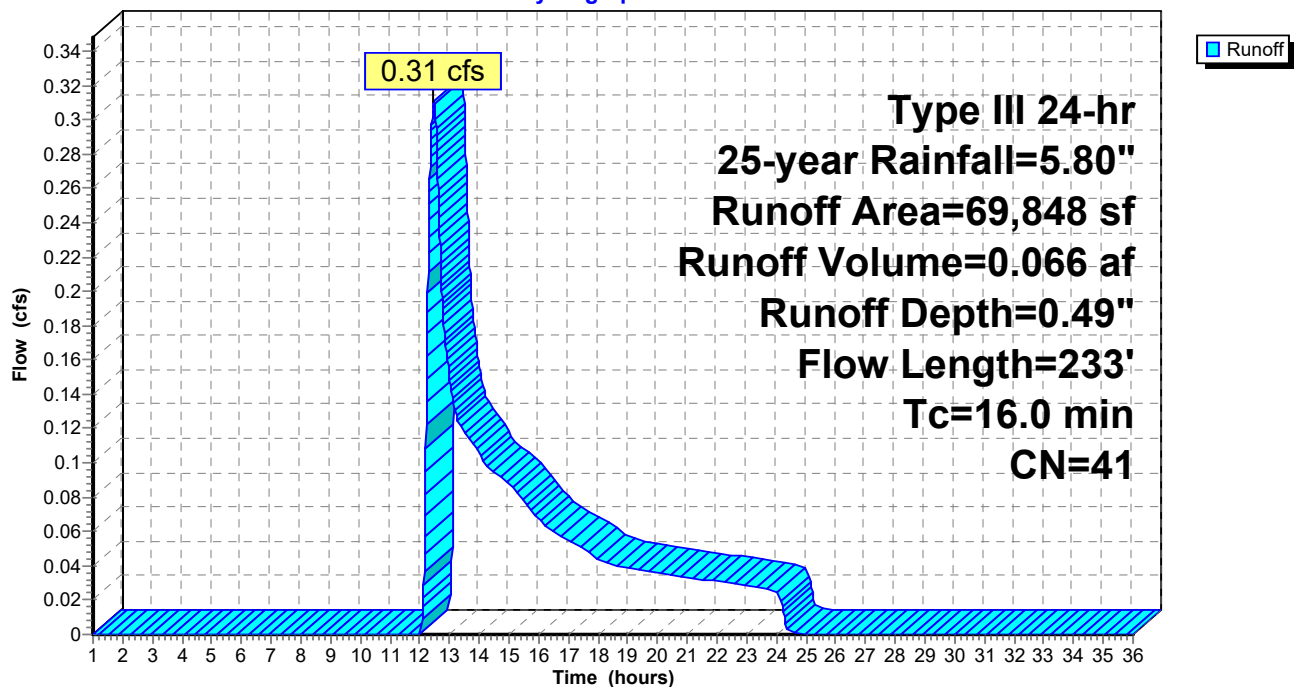
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
8,183	39	>75% Grass cover, Good, HSG A
* 230	98	Stairs
* 3,155	98	Path
* 5,488	98	Homes/driveways
52,792	32	Woods/grass comb., Good, HSG A
69,848	41	Weighted Average
60,975		87.30% Pervious Area
8,873		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment 2S: 295 Embankment Trib

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 79

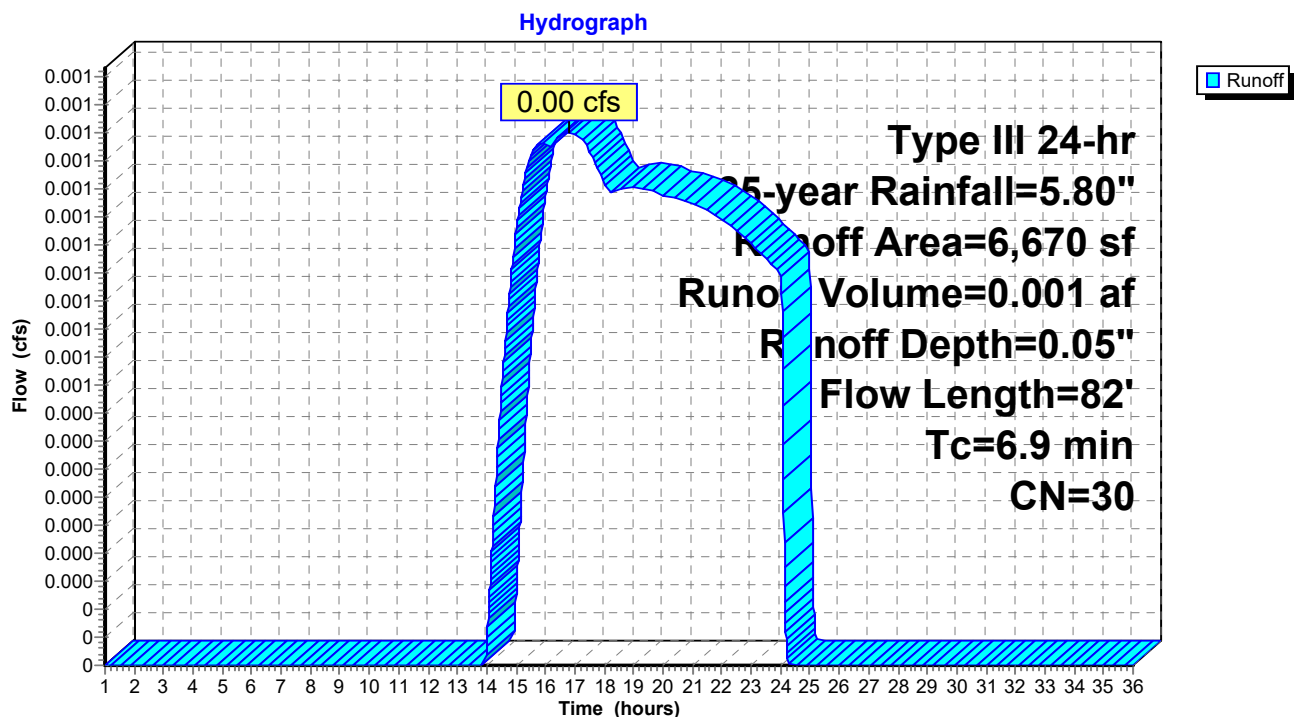
Summary for Subcatchment 3S.1: Garden area runoff

Runoff = 0.00 cfs @ 16.80 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

Area (sf)	CN	Description
6,670	30	Brush, Good, HSG A
6,670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	28	0.3330	0.28		Sheet Flow, A to B Grass: Dense n= 0.240 P2= 3.27"
5.2	54	0.0700	0.17		Sheet Flow, B to C Grass: Dense n= 0.240 P2= 3.27"
6.9	82	Total			

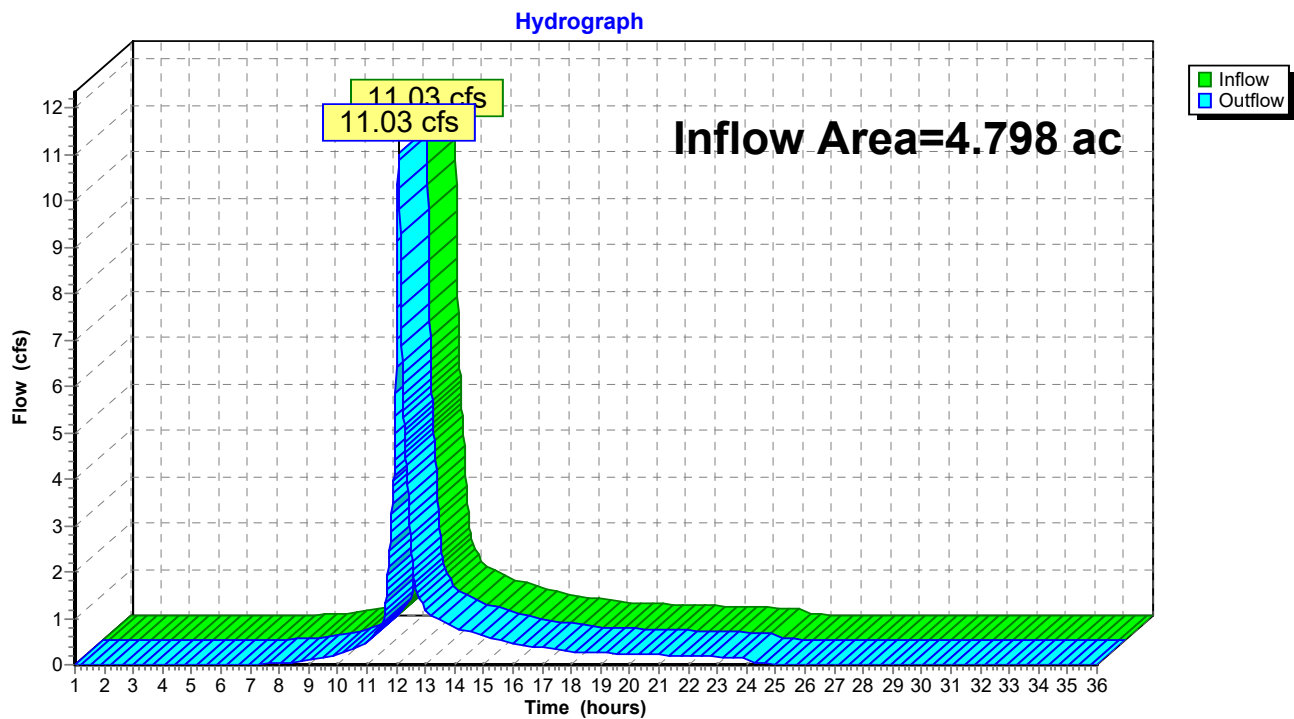
Subcatchment 3S.1: Garden area runoff

Summary for Reach POI-1: POI #1 - 60" Douglass MS4

Inflow Area = 4.798 ac, 46.81% Impervious, Inflow Depth = 2.14" for 25-year event
 Inflow = 11.03 cfs @ 12.09 hrs, Volume= 0.854 af
 Outflow = 11.03 cfs @ 12.09 hrs, Volume= 0.854 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-1: POI #1 - 60" Douglass MS4

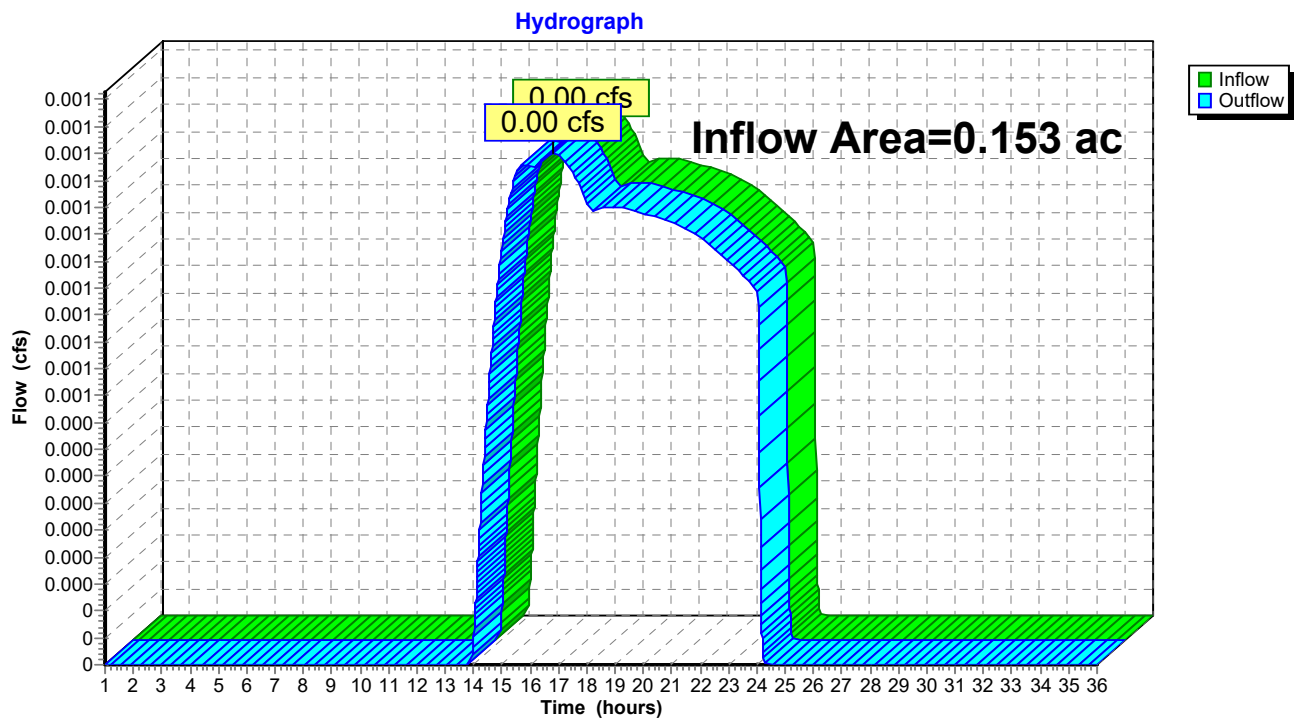


Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 0.153 ac, 0.00% Impervious, Inflow Depth = 0.05" for 25-year event
 Inflow = 0.00 cfs @ 16.80 hrs, Volume= 0.001 af
 Outflow = 0.00 cfs @ 16.80 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-3: POI #3 - Baseball Field



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Page 82

Summary for Pond P1: VUSF

Inflow Area = 0.249 ac, 76.24% Impervious, Inflow Depth = 3.80" for 25-year event
 Inflow = 1.10 cfs @ 12.09 hrs, Volume= 0.079 af
 Outflow = 0.18 cfs @ 12.57 hrs, Volume= 0.079 af, Atten= 83%, Lag= 28.8 min
 Discarded = 0.06 cfs @ 12.57 hrs, Volume= 0.057 af
 Primary = 0.13 cfs @ 12.57 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 32.38' @ 12.57 hrs Surf.Area= 2,381 sf Storage= 1,639 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 254.7 min (1,064.9 - 810.3)

Volume	Invert	Avail.Storage	Storage Description
#1	30.75'	1,899 cf	Ponding (Prismatic) Listed below (Recalc)
#2	29.25'	69 cf	Filter Media/Loam (Prismatic) Listed below (Recalc) 687 cf Overall x 10.0% Voids
#3	28.92'	30 cf	Transition Gravel (Prismatic) Listed below (Recalc) 151 cf Overall x 20.0% Voids
#4	27.00'	349 cf	Crushed Stone (Prismatic) Listed below (Recalc) 879 cf Overall - 6 cf Embedded = 873 cf x 40.0% Voids
#5	27.10'	5 cf	4.0" Round Pipe Storage x 2 Inside #4 L= 30.0' S= 0.0005 '/ 6 cf Overall - 0.2" Wall Thickness = 5 cf
		2,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.75	465	0	0
32.25	945	1,058	1,058
33.00	1,300	842	1,899

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.25	458	0	0
30.75	458	687	687

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.92	458	0	0
29.25	458	151	151

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.00	458	0	0
28.92	458	879	879

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Type III 24-hr 25-year Rainfall=5.80"

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Page 83

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	12.0" Round Culvert L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 26.75' S= 0.0042 ' / ' Cc= 0.600 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	27.10'	0.5" Vert. Soil Filter Media Drawdown Effect C= 0.600
#3	Device 1	32.35'	24.0" Horiz. Beehive Outlet C= 0.600 Limited to weir flow at low heads
#4	Discarded	27.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.06 cfs @ 12.57 hrs HW=32.38' (Free Discharge)

↳ **4=Exfiltration** (Exfiltration Controls 0.06 cfs)

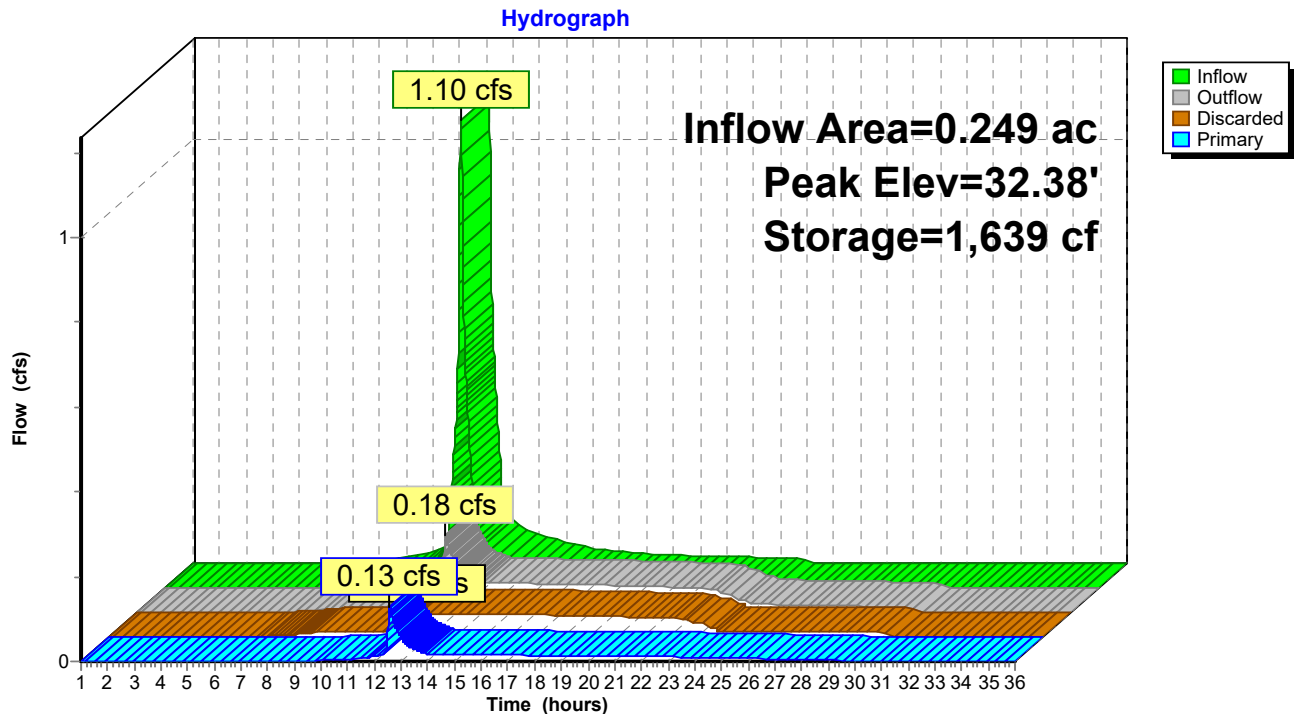
Primary OutFlow Max=0.13 cfs @ 12.57 hrs HW=32.38' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Passes 0.13 cfs of 4.40 cfs potential flow)

↳ **2=Soil Filter Media Drawdown Effect** (Orifice Controls 0.02 cfs @ 11.04 fps)

↳ **3=Beehive Outlet** (Weir Controls 0.11 cfs @ 0.58 fps)

Pond P1: VUSF



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Type III 24-hr 25-year Rainfall=5.80"

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Page 84

Summary for Pond P2: FP 4

Inflow Area = 0.175 ac, 53.01% Impervious, Inflow Depth = 2.65" for 25-year event
 Inflow = 0.54 cfs @ 12.09 hrs, Volume= 0.039 af
 Outflow = 0.54 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.54 cfs @ 12.09 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.95' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.95'	14 cf	4.00'W x 5.00'L x 3.60'H Media/Stone 72 cf Overall x 20.0% Voids
#2	35.95'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		52 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.95	20	0	0
36.95	56	38	38

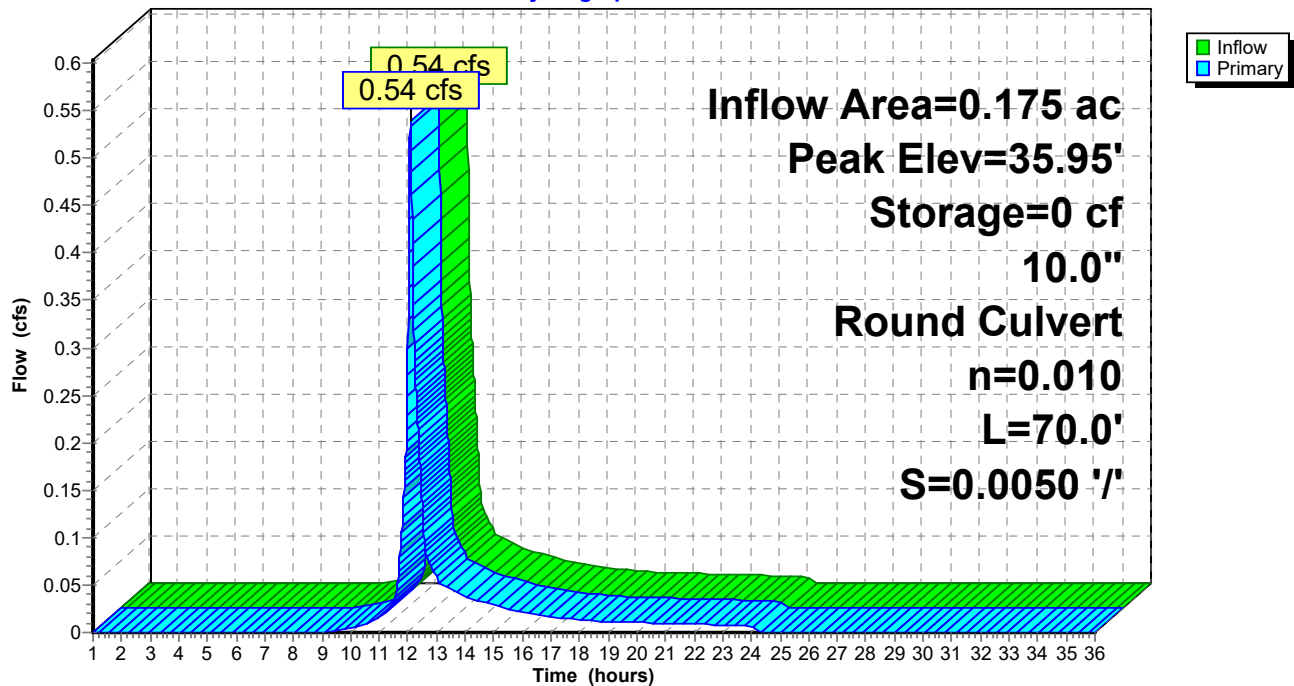
Device	Routing	Invert	Outlet Devices
#1	Primary	32.35'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 32.35' / 32.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.95' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.51 cfs potential flow)

Pond P2: FP 4

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 86

Summary for Pond P3: FP 3

Inflow Area = 0.154 ac, 52.99% Impervious, Inflow Depth = 2.65" for 25-year event
 Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af
 Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.47 cfs @ 12.09 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 36.10' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (839.9 - 839.9)

Volume	Invert	Avail.Storage	Storage Description
#1	36.10'	21 cf	5.00'W x 5.00'L x 4.20'H Media/Stone 105 cf Overall x 20.0% Voids
#2	36.10'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		66 cf	Total Available Storage

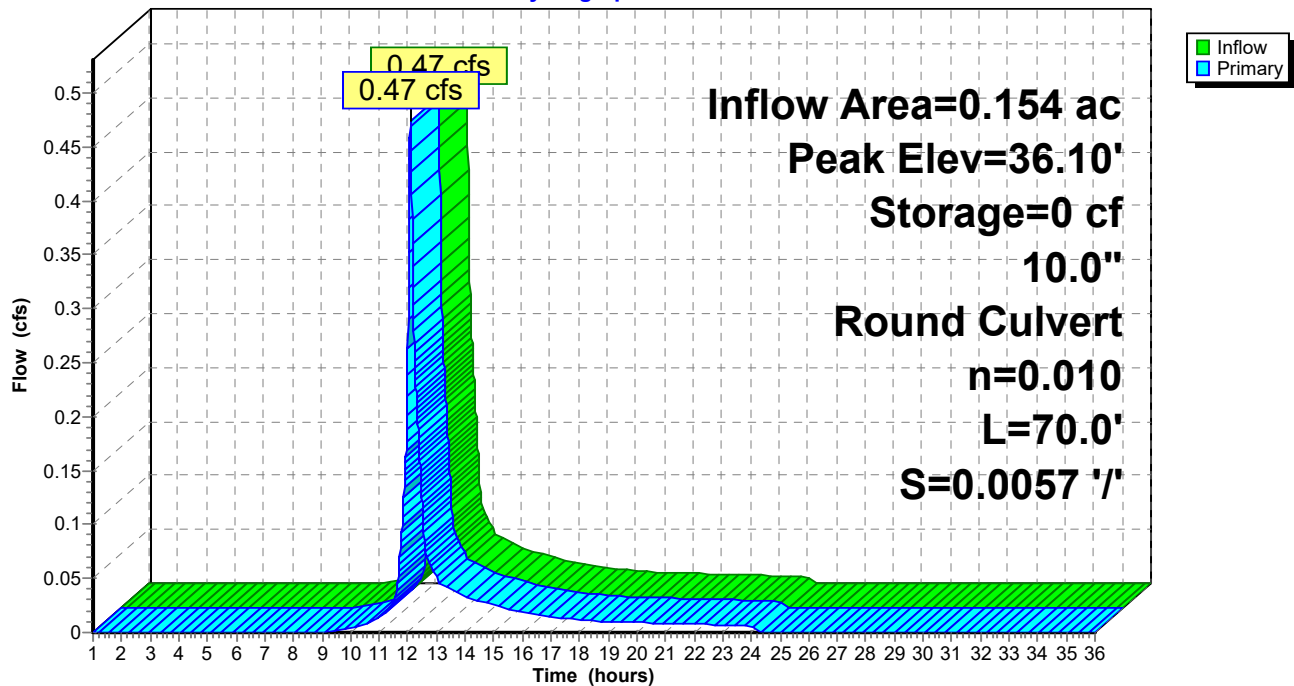
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.10	25	0	0
37.10	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.90'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.90' / 31.50' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=36.10' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.83 cfs potential flow)

Pond P3: FP 3

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 88

Summary for Pond P4: FP 2

Inflow Area = 0.137 ac, 80.74% Impervious, Inflow Depth = 4.33" for 25-year event
 Inflow = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af
 Outflow = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.90' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (795.9 - 795.9)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	23 cf	5.00'W x 5.00'L x 4.50'H Media/Stone 113 cf Overall x 20.0% Voids
#2	35.90'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		67 cf	Total Available Storage

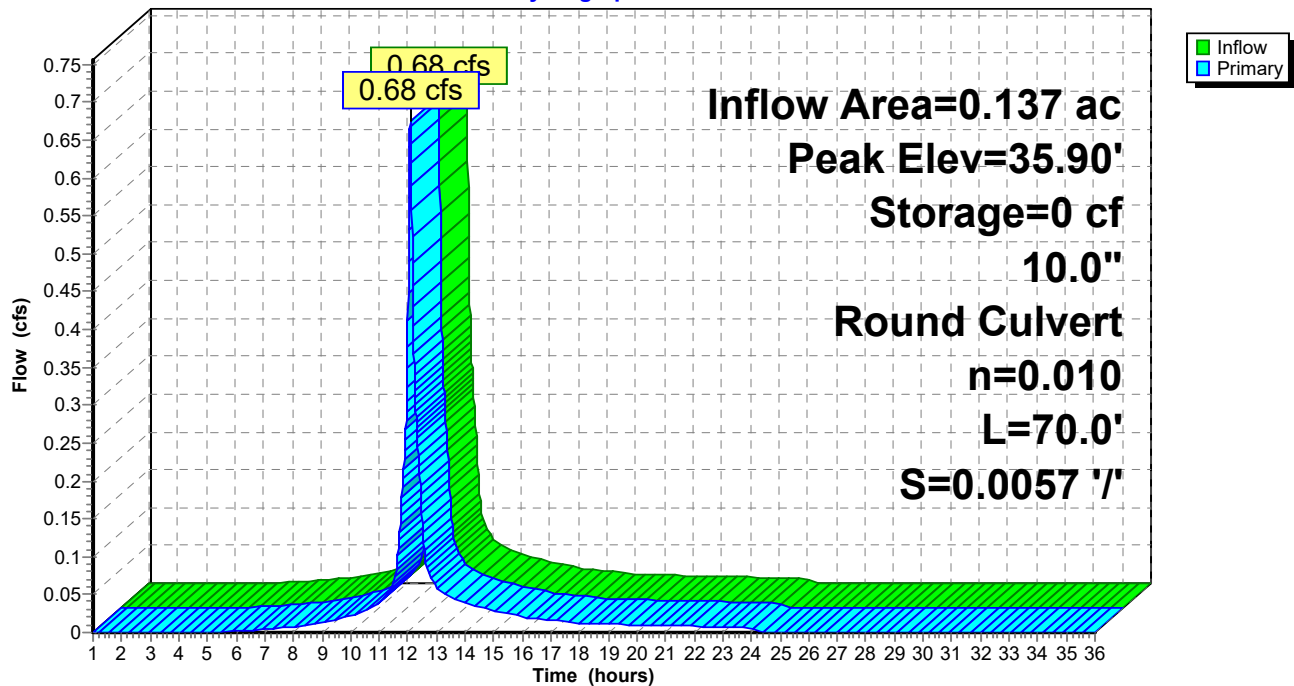
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.90	25	0	0
36.90	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.40'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.40' / 31.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=35.90' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.98 cfs potential flow)

Pond P4: FP 2

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 90

Summary for Pond P5: FP 1

Inflow Area = 0.086 ac, 84.98% Impervious, Inflow Depth = 4.54" for 25-year event
 Inflow = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af
 Outflow = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.44 cfs @ 12.08 hrs, Volume= 0.033 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.70' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (789.3 - 789.3)

Volume	Invert	Avail.Storage	Storage Description
#1	35.70'	19 cf	4.00'W x 5.00'L x 4.80'H Media/Stone 96 cf Overall x 20.0% Voids
#2	35.70'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		57 cf	Total Available Storage

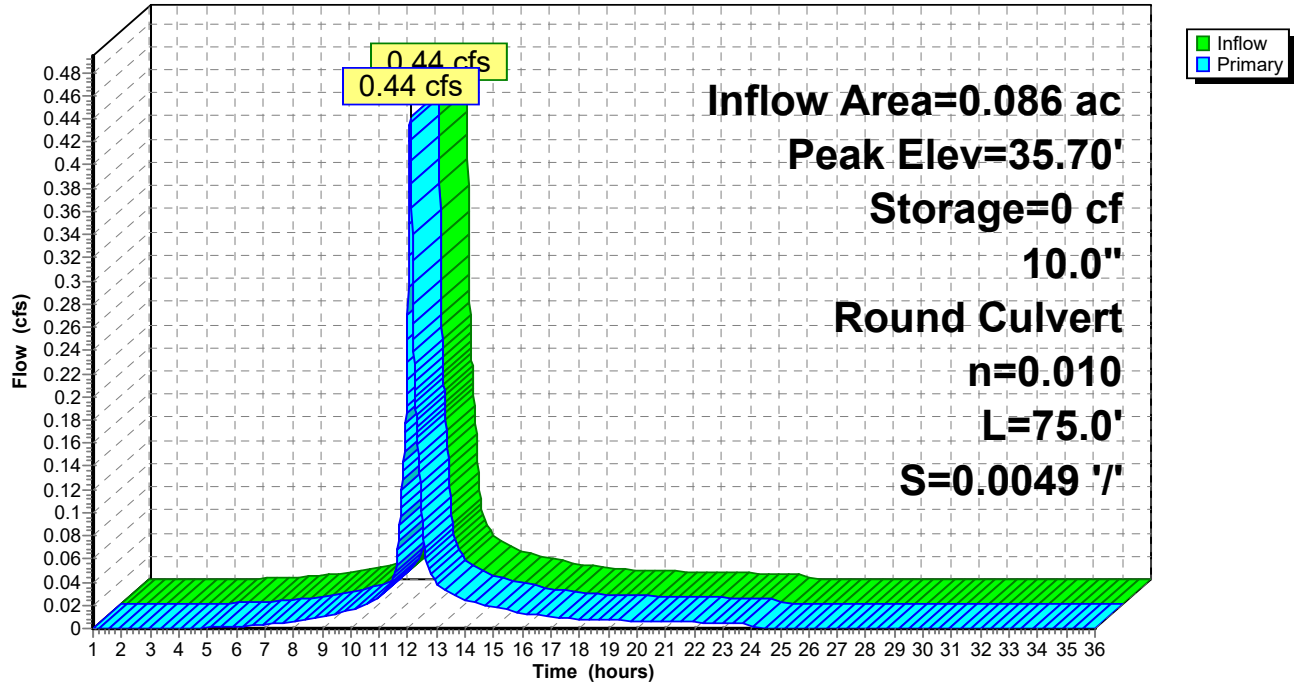
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.70	20	0	0
36.70	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	30.90'	10.0" Round Culvert L= 75.0' Ke= 1.000 Inlet / Outlet Invert= 30.90' / 30.53' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=35.70' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 4.12 cfs potential flow)

Pond P5: FP 1

Hydrograph



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Type III 24-hr 25-year Rainfall=5.80"

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Page 92

Summary for Pond POI #2: POI #2 (295 Basin)

Inflow Area = 1.603 ac, 12.70% Impervious, Inflow Depth = 0.49" for 25-year event
 Inflow = 0.31 cfs @ 12.47 hrs, Volume= 0.066 af
 Outflow = 0.10 cfs @ 14.06 hrs, Volume= 0.059 af, Atten= 67%, Lag= 95.5 min
 Discarded = 0.02 cfs @ 14.06 hrs, Volume= 0.018 af
 Primary = 0.08 cfs @ 14.06 hrs, Volume= 0.041 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 26.76' @ 14.06 hrs Surf.Area= 2,978 sf Storage= 709 cf

Plug-Flow detention time= 154.2 min calculated for 0.059 af (89% of inflow)

Center-of-Mass det. time= 105.0 min (1,063.5 - 958.5)

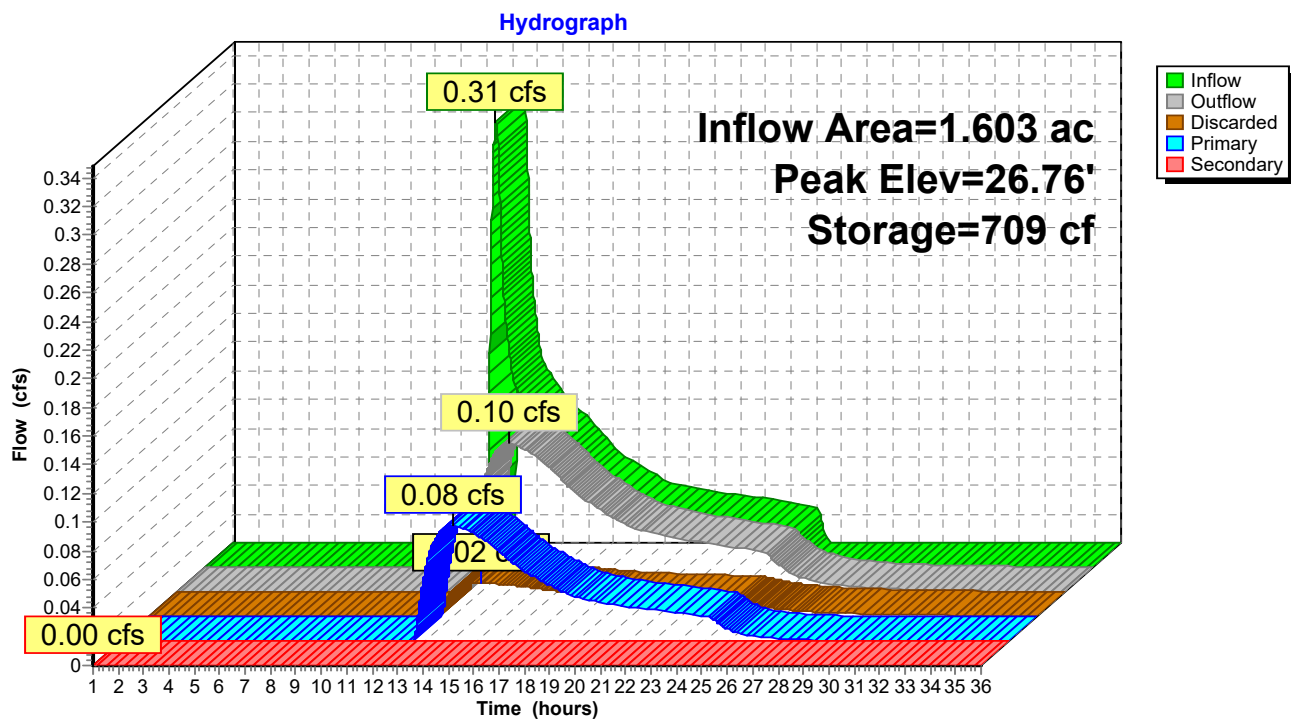
Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	105,037 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	10,120	7,298	8,899
29.00	14,131	12,126	21,024
30.00	17,326	15,729	36,753
32.00	24,023	41,349	78,102
33.00	29,847	26,935	105,037

Device	Routing	Invert	Outlet Devices
#1	Primary	26.60'	12.0" Round Culvert L= 16.0' Ke= 0.600 Inlet / Outlet Invert= 26.60' / 26.51' S= 0.0056 ' S= 0.0056 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	32.40'	20.0' long x 15.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	26.60'	1.000 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.02 cfs @ 14.06 hrs HW=26.76' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.02 cfs)**Primary OutFlow** Max=0.08 cfs @ 14.06 hrs HW=26.76' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.08 cfs @ 1.50 fps)**Secondary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**2=Overflow** (Controls 0.00 cfs)

Pond POI #2: POI #2 (295 Basin)



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Type III 24-hr WQ Rainfall=1.00"

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Page 94

Time span=1.00-36.00 hrs, dt=0.01 hrs, 3501 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S.1: Drive to Street	Runoff Area=1,131 sf 55.00% Impervious Runoff Depth=0.01" Tc=6.0 min CN=71 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.10: East Lot 1	Runoff Area=3,754 sf 84.98% Impervious Runoff Depth=0.28" Tc=6.0 min CN=89 Runoff=0.03 cfs 0.002 af
Subcatchment 1S.11: South Lot Treated	Runoff Area=10,852 sf 76.24% Impervious Runoff Depth=0.11" Tc=6.0 min CN=82 Runoff=0.02 cfs 0.002 af
Subcatchment 1S.2: Co Op Roof & yard	Runoff Area=56,422 sf 65.80% Impervious Runoff Depth=0.06" Tc=6.0 min CN=78 Runoff=0.02 cfs 0.006 af
Subcatchment 1S.3: Runoff to park	Runoff Area=2,081 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=264' Tc=9.0 min CN=39 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.4: Central parking/drive	Runoff Area=19,043 sf 77.98% Impervious Runoff Depth=0.13" Tc=6.0 min CN=83 Runoff=0.04 cfs 0.005 af
Subcatchment 1S.5: Contained yard/park	Runoff Area=3,023 sf 16.84% Impervious Runoff Depth=0.00" Tc=6.0 min CN=49 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.6: Building E roof and	Runoff Area=22,599 sf 53.10% Impervious Runoff Depth=0.00" Tc=6.0 min CN=70 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.7: East Lot 4	Runoff Area=7,618 sf 53.01% Impervious Runoff Depth=0.00" Tc=6.0 min CN=70 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.8: East Lot 3	Runoff Area=6,694 sf 52.99% Impervious Runoff Depth=0.00" Tc=6.0 min CN=70 Runoff=0.00 cfs 0.000 af
Subcatchment 1S.9: East Lot 2	Runoff Area=5,956 sf 80.74% Impervious Runoff Depth=0.22" Tc=6.0 min CN=87 Runoff=0.03 cfs 0.003 af
Subcatchment 2S: 295 Embankment Trib	Runoff Area=69,848 sf 12.70% Impervious Runoff Depth=0.00" Flow Length=233' Tc=16.0 min CN=41 Runoff=0.00 cfs 0.000 af
Subcatchment 3S.1: Garden area runoff	Runoff Area=6,670 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=82' Tc=6.9 min CN=30 Runoff=0.00 cfs 0.000 af
Reach POI-1: POI #1 - 60" Douglass MS4	Inflow=0.10 cfs 0.016 af Outflow=0.10 cfs 0.016 af
Reach POI-3: POI #3 - Baseball Field	Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond P1: VUSF	Peak Elev=27.03' Storage=5 cf Inflow=0.02 cfs 0.002 af Discarded=0.01 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.002 af

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Type III 24-hr WQ Rainfall=1.00"

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Page 95

Pond P2: FP 4

Peak Elev=35.95' Storage=0 cf Inflow=0.00 cfs 0.000 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0050 '/' Outflow=0.00 cfs 0.000 af

Pond P3: FP 3

Peak Elev=36.10' Storage=0 cf Inflow=0.00 cfs 0.000 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.00 cfs 0.000 af

Pond P4: FP 2

Peak Elev=35.90' Storage=0 cf Inflow=0.03 cfs 0.003 af
10.0" Round Culvert n=0.010 L=70.0' S=0.0057 '/' Outflow=0.03 cfs 0.003 af

Pond P5: FP 1

Peak Elev=35.70' Storage=0 cf Inflow=0.03 cfs 0.002 af
10.0" Round Culvert n=0.010 L=75.0' S=0.0049 '/' Outflow=0.03 cfs 0.002 af

Pond POI #2: POI #2 (295 Basin)

Peak Elev=26.30' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 4.952 ac Runoff Volume = 0.018 af Average Runoff Depth = 0.04"
54.64% Pervious = 2.706 ac 45.36% Impervious = 2.246 ac

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Type III 24-hr WQ Rainfall=1.00"

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Page 96

Summary for Subcatchment 1.S1: Drive to Street

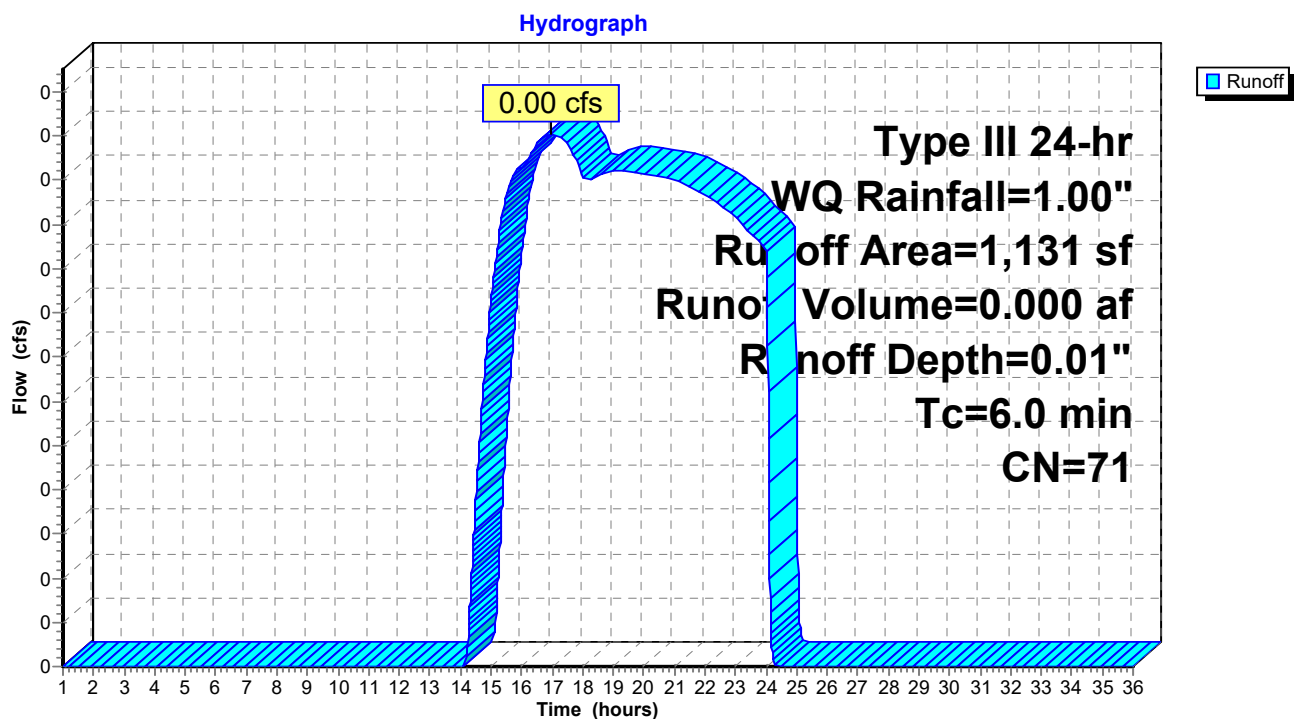
Runoff = 0.00 cfs @ 16.98 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	622	98	Pavement
	509	39	>75% Grass cover, Good, HSG A
	1,131	71	Weighted Average
	509		45.00% Pervious Area
	622		55.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1.S1: Drive to Street



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Type III 24-hr WQ Rainfall=1.00"

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Page 97

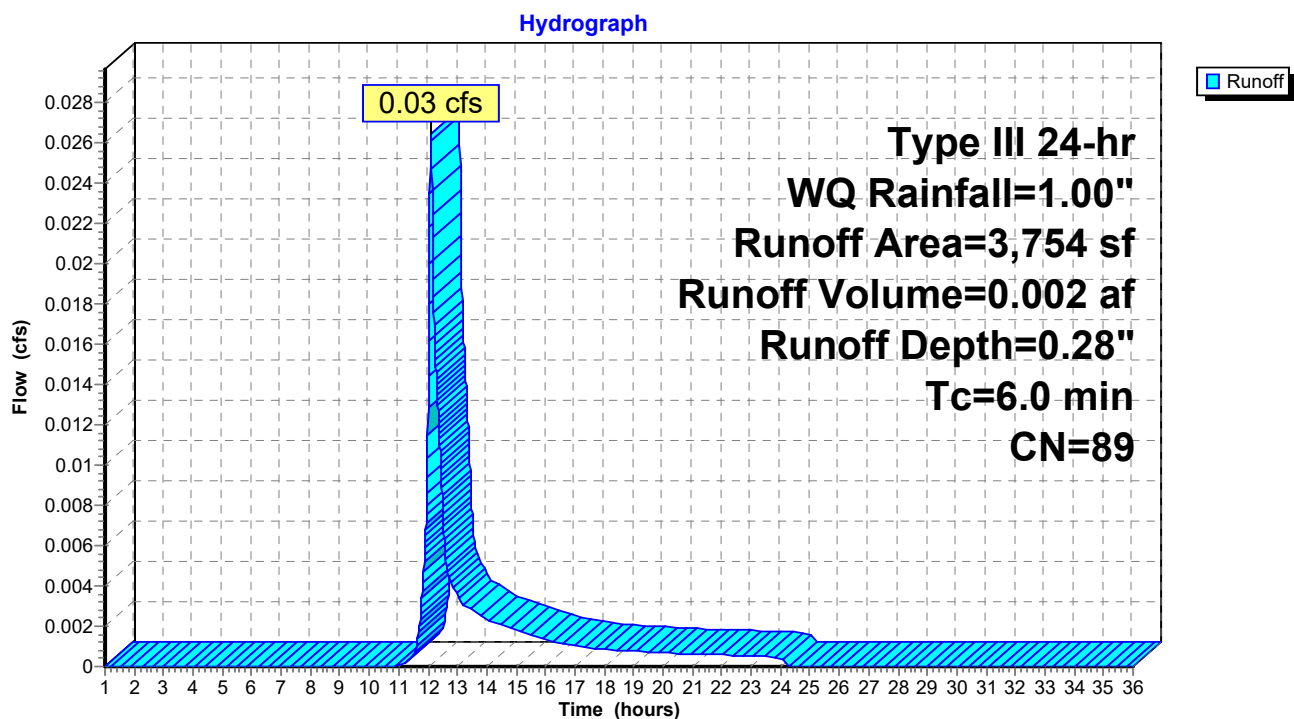
Summary for Subcatchment 1S.10: East Lot 1

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	3,190	98	Pavement
	564	39	>75% Grass cover, Good, HSG A
	3,754	89	Weighted Average
	564		15.02% Pervious Area
	3,190		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.10: East Lot 1

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Type III 24-hr WQ Rainfall=1.00"

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Page 98

Summary for Subcatchment 1S.11: South Lot Treated

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af, Depth= 0.11"

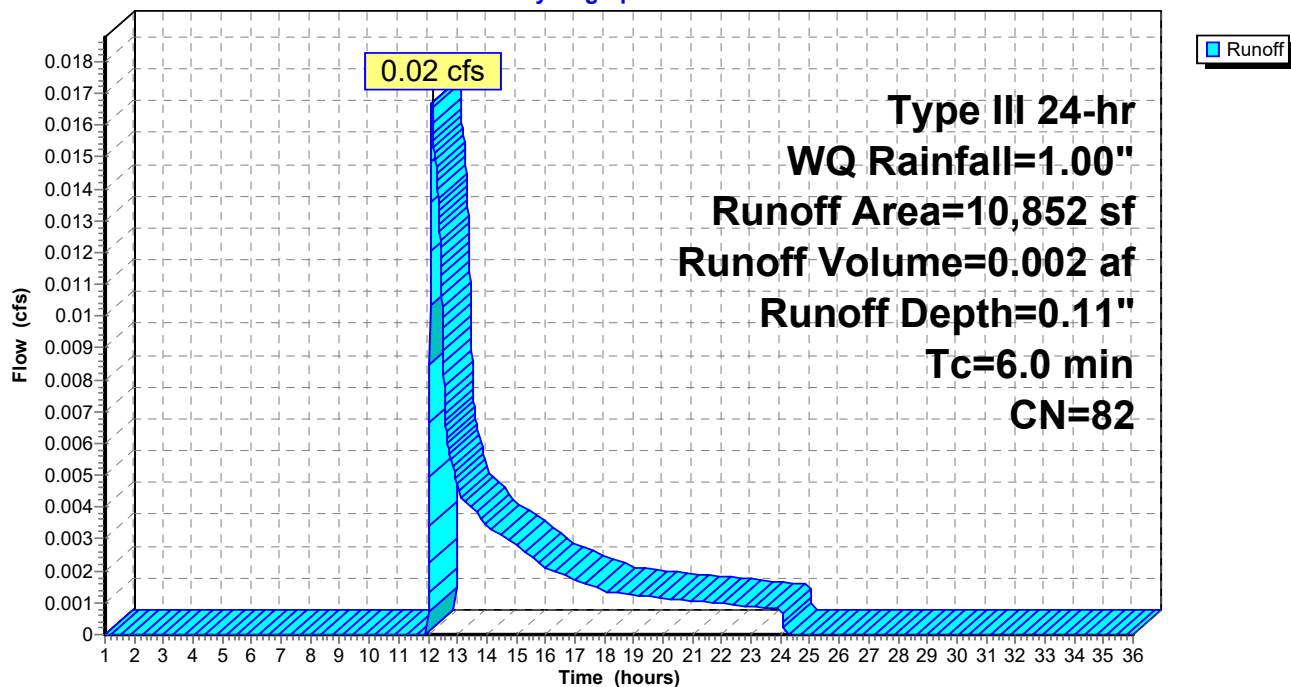
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	8,274	98	Paved parking
	2,578	30	Brush, Good, HSG A
	10,852	82	Weighted Average
	2,578		23.76% Pervious Area
	8,274		76.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.11: South Lot Treated

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 99

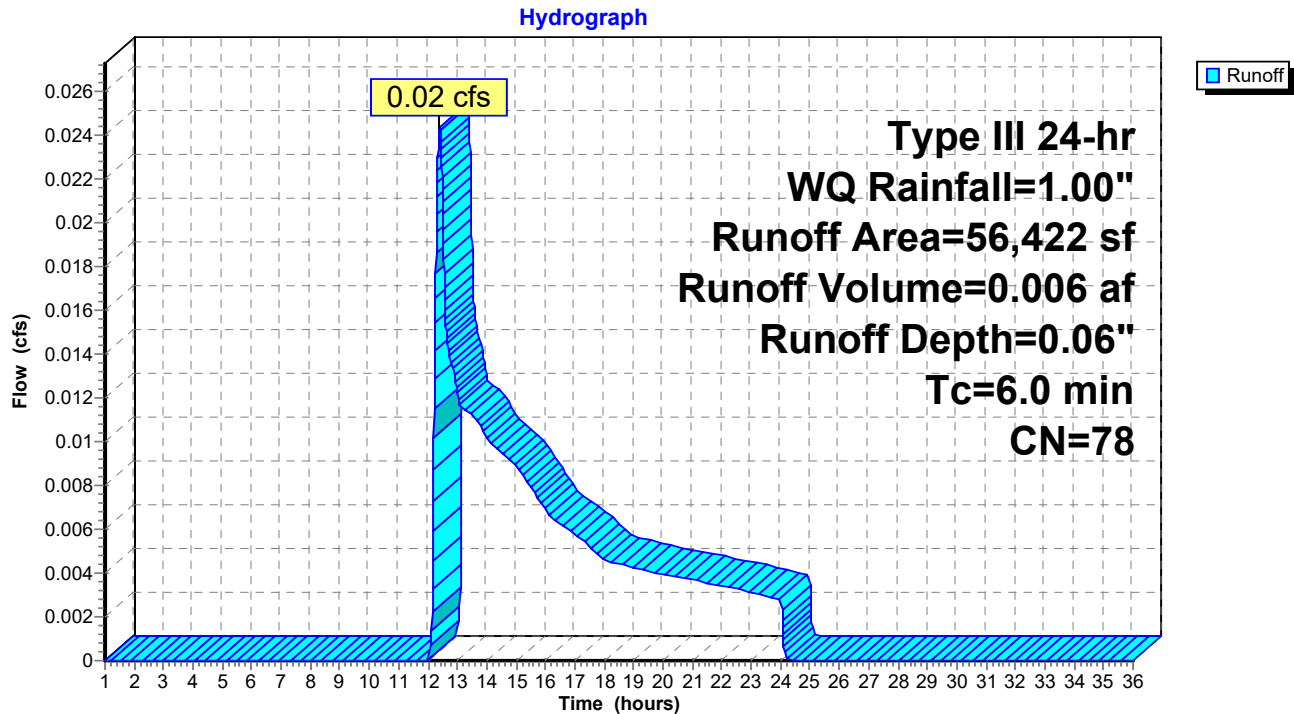
Summary for Subcatchment 1S.2: Co Op Roof & yard

Runoff = 0.02 cfs @ 12.39 hrs, Volume= 0.006 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	5,239	98	pavers
	16,100	39	>75% Grass cover, Good, HSG A
*	21,137	98	Roofs
*	4,191	98	sidewalks
*	618	98	patios
	9,137	77	1/8 acre lots, 65% imp, HSG A
	56,422	78	Weighted Average
	19,298		34.20% Pervious Area
	37,124		65.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.2: Co Op Roof & yard

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Type III 24-hr WQ Rainfall=1.00"

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Page 100

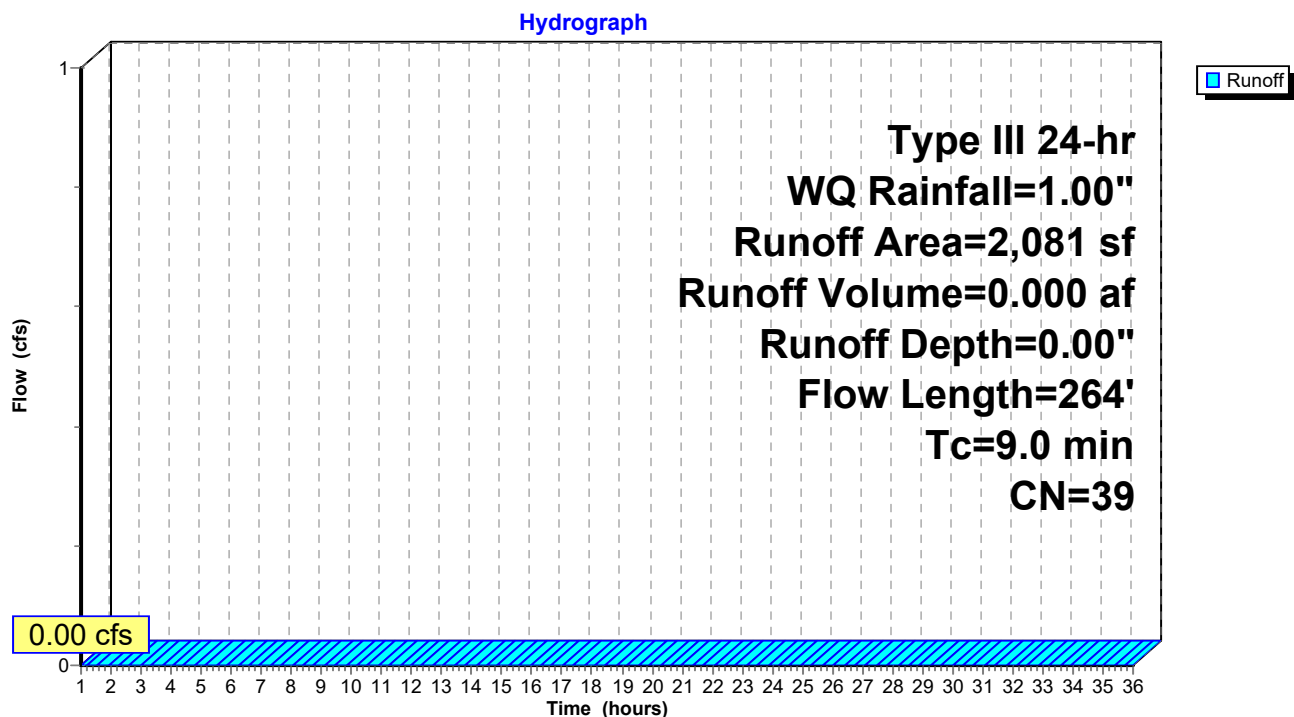
Summary for Subcatchment 1S.3: Runoff to park

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
2,081	39	>75% Grass cover, Good, HSG A
2,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.0600	0.27		Sheet Flow, A to B Grass: Short n= 0.150 P2= 3.27"
2.8	164	0.0200	0.99		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
9.0	264	Total			

Subcatchment 1S.3: Runoff to park

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Type III 24-hr WQ Rainfall=1.00"

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Page 101

Summary for Subcatchment 1S.4: Central parking/drive

Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.005 af, Depth= 0.13"

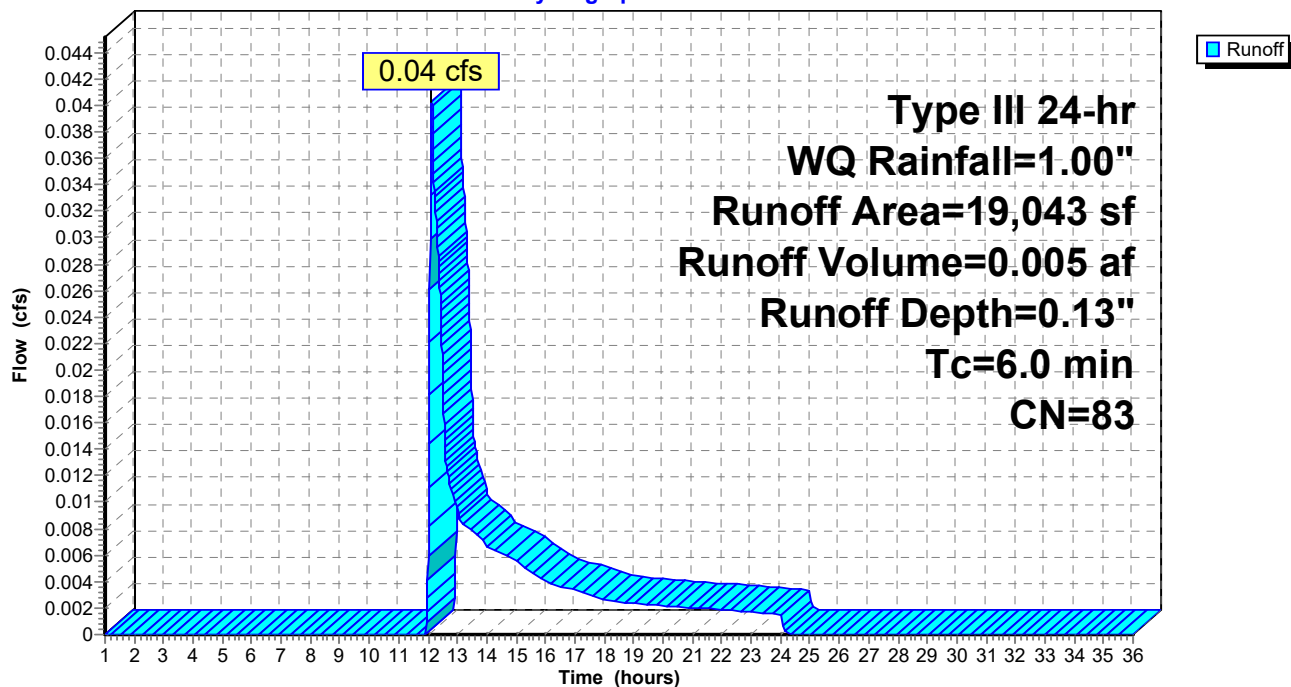
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	14,850	98	Pavement
	4,193	30	Brush, Good, HSG A
	19,043	83	Weighted Average
	4,193		22.02% Pervious Area
	14,850		77.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.4: Central parking/drive

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Type III 24-hr WQ Rainfall=1.00"

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Page 102

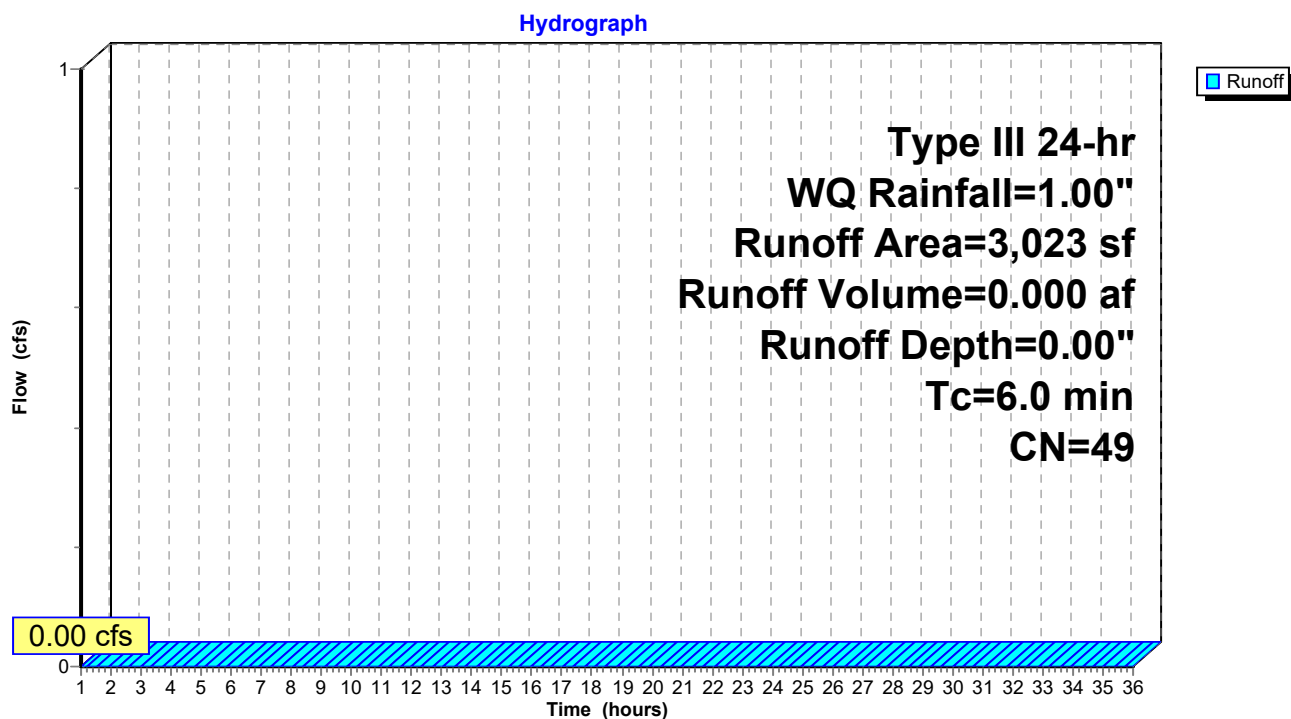
Summary for Subcatchment 1S.5: Contained yard/park connection

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
2,514	39	>75% Grass cover, Good, HSG A
* 509	98	sidewalks
3,023	49	Weighted Average
2,514		83.16% Pervious Area
509		16.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.5: Contained yard/park connection

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Type III 24-hr WQ Rainfall=1.00"

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Page 103

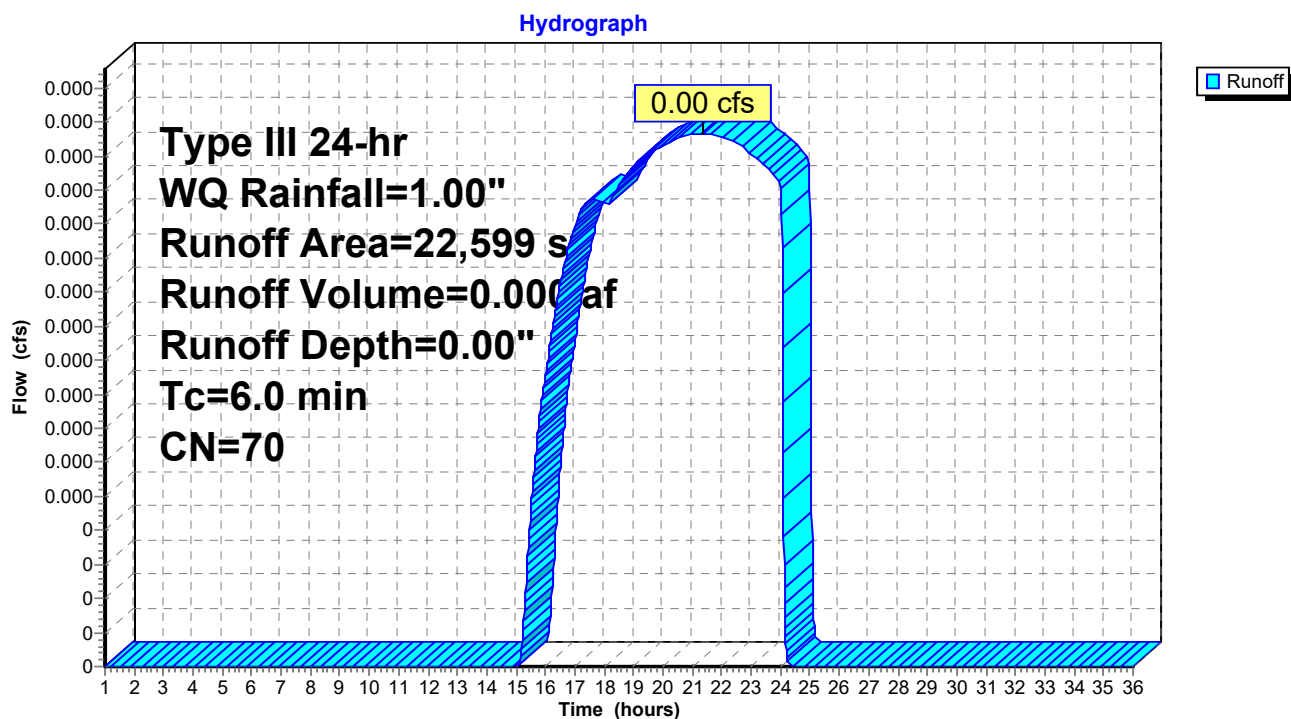
Summary for Subcatchment 1S.6: Building E roof and yard

Runoff = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
	10,599	39	>75% Grass cover, Good, HSG A
*	12,000	98	roof
	22,599	70	Weighted Average
	10,599		46.90% Pervious Area
	12,000		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S.6: Building E roof and yard

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Type III 24-hr WQ Rainfall=1.00"

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Page 105

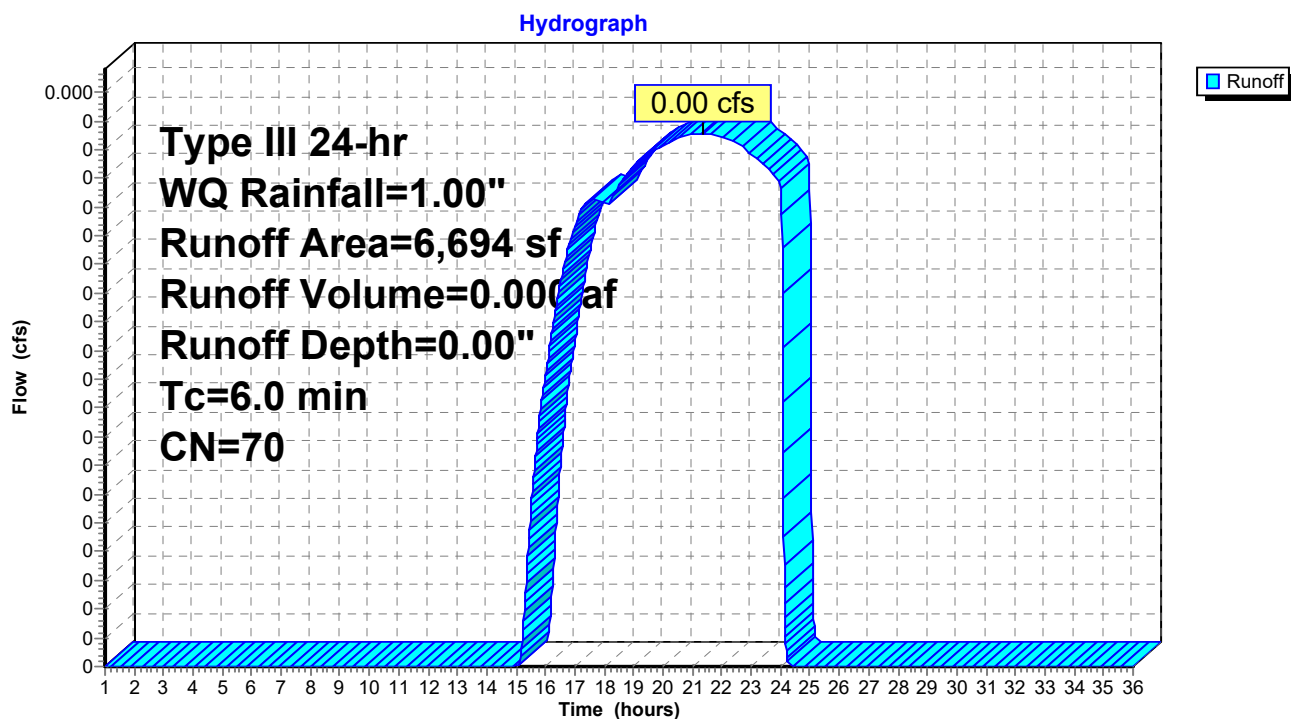
Summary for Subcatchment 1S.8: East Lot 3

Runoff = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	3,547	98	Paved parking
	3,147	39	>75% Grass cover, Good, HSG A
	6,694	70	Weighted Average
	3,147		47.01% Pervious Area
	3,547		52.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.8: East Lot 3

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Type III 24-hr WQ Rainfall=1.00"

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Page 106

Summary for Subcatchment 1S.9: East Lot 2

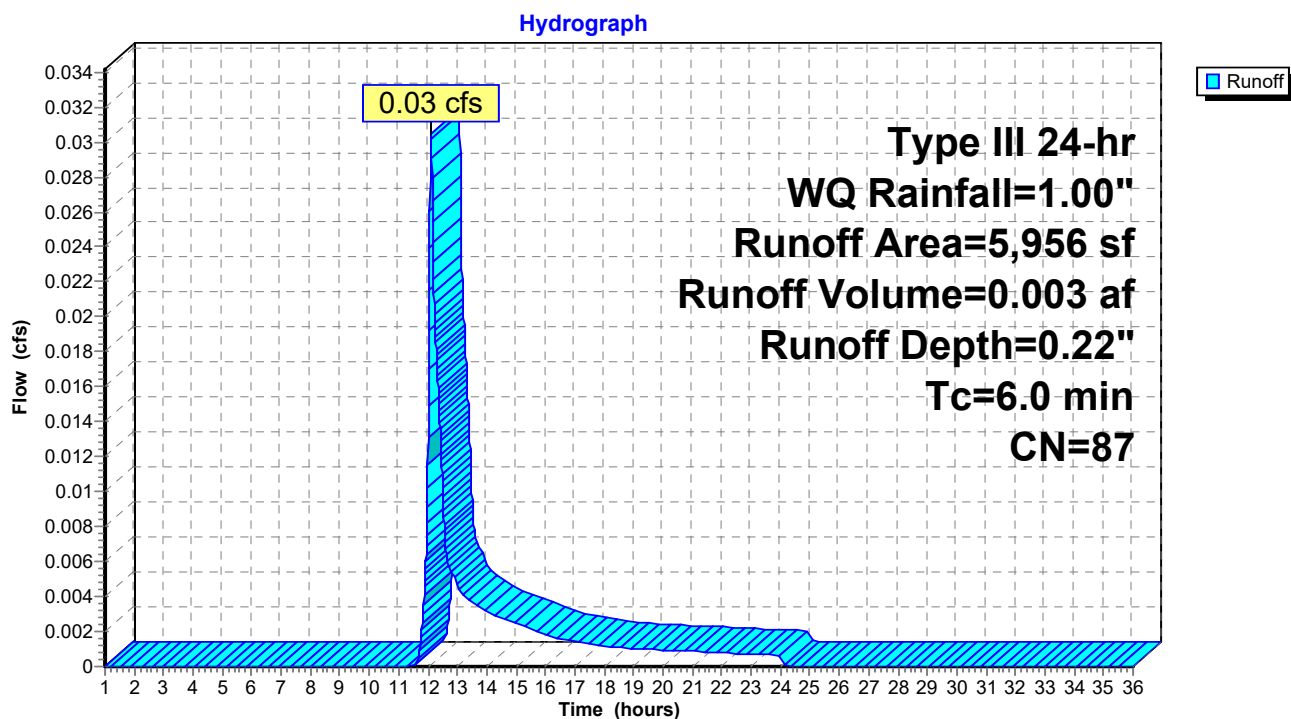
Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

	Area (sf)	CN	Description
*	4,809	98	Paved parking, patio, sidewalk
	1,147	39	>75% Grass cover, Good, HSG A
	5,956	87	Weighted Average
	1,147		19.26% Pervious Area
	4,809		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, TR 55 .1 hour

Subcatchment 1S.9: East Lot 2



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Type III 24-hr WQ Rainfall=1.00"

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Page 107

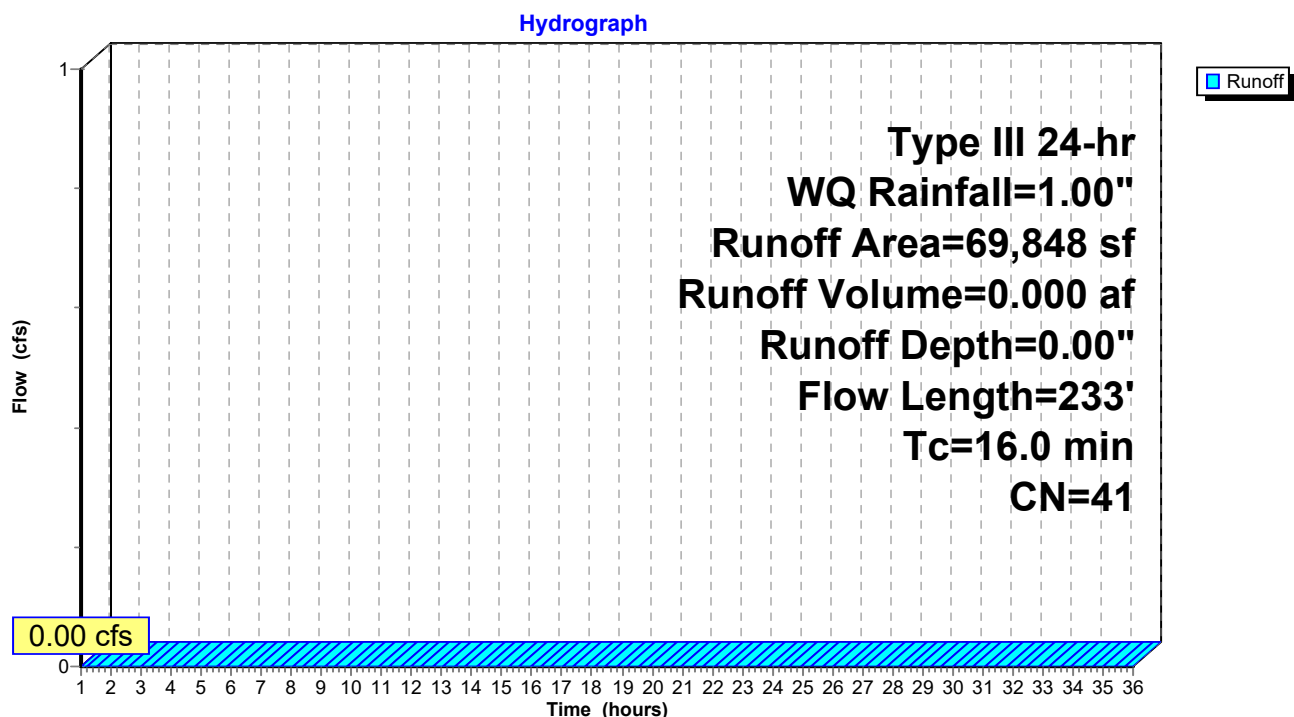
Summary for Subcatchment 2S: 295 Embankment Trib

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
8,183	39	>75% Grass cover, Good, HSG A
* 230	98	Stairs
* 3,155	98	Path
* 5,488	98	Homes/driveways
52,792	32	Woods/grass comb., Good, HSG A
69,848	41	Weighted Average
60,975		87.30% Pervious Area
8,873		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0500	0.11		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.27"
1.3	133	0.0600	1.71		Shallow Concentrated Flow, B to C Short Grass Pasture Kv= 7.0 fps
16.0	233	Total			

Subcatchment 2S: 295 Embankment Trib

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Page 108

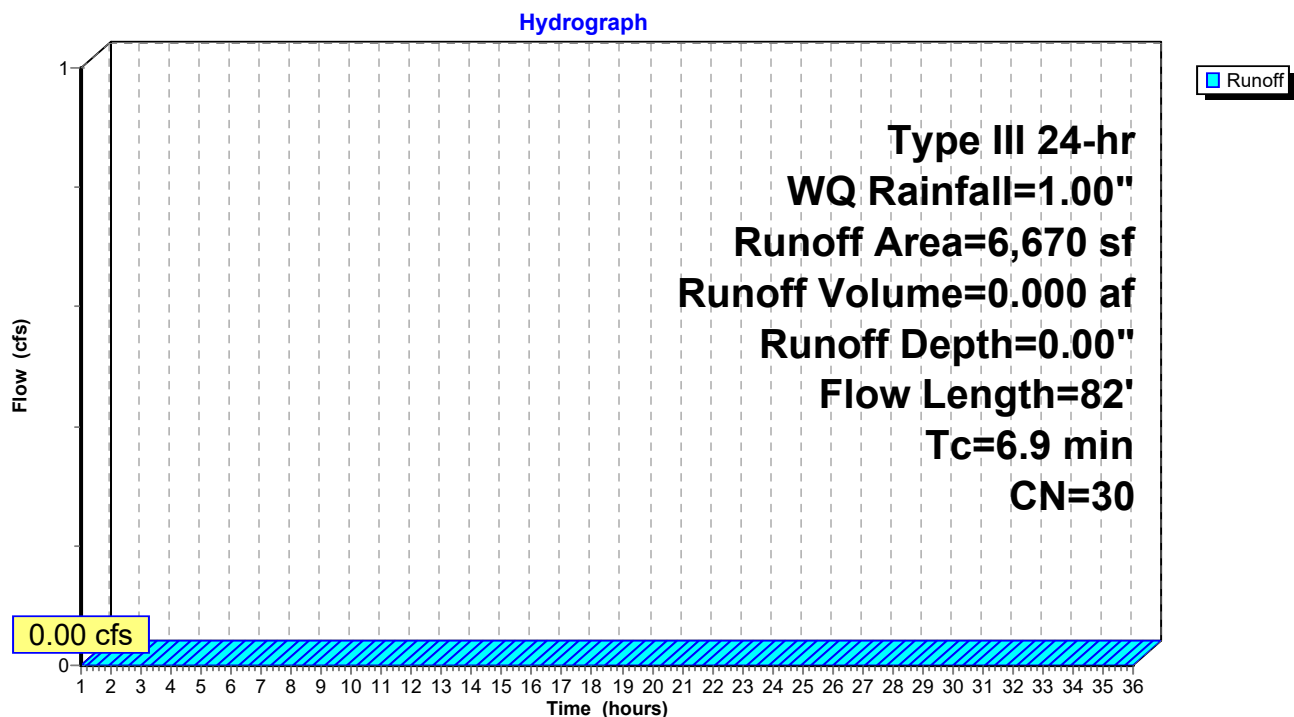
Summary for Subcatchment 3S.1: Garden area runoff

Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr WQ Rainfall=1.00"

Area (sf)	CN	Description
6,670	30	Brush, Good, HSG A
6,670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	28	0.3330	0.28		Sheet Flow, A to B
					Grass: Dense n= 0.240 P2= 3.27"
5.2	54	0.0700	0.17		Sheet Flow, B to C
					Grass: Dense n= 0.240 P2= 3.27"
6.9	82	Total			

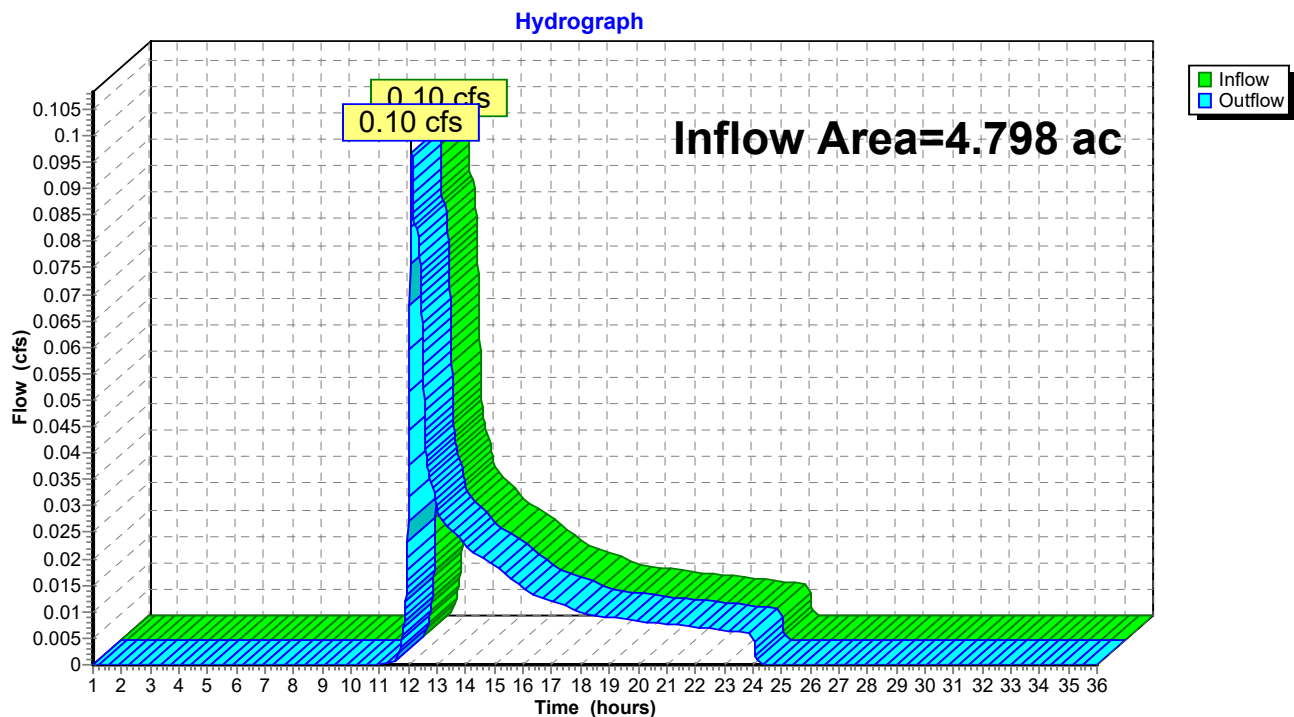
Subcatchment 3S.1: Garden area runoff

Summary for Reach POI-1: POI #1 - 60" Douglass MS4

Inflow Area = 4.798 ac, 46.81% Impervious, Inflow Depth = 0.04" for WQ event
 Inflow = 0.10 cfs @ 12.11 hrs, Volume= 0.016 af
 Outflow = 0.10 cfs @ 12.11 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-1: POI #1 - 60" Douglass MS4

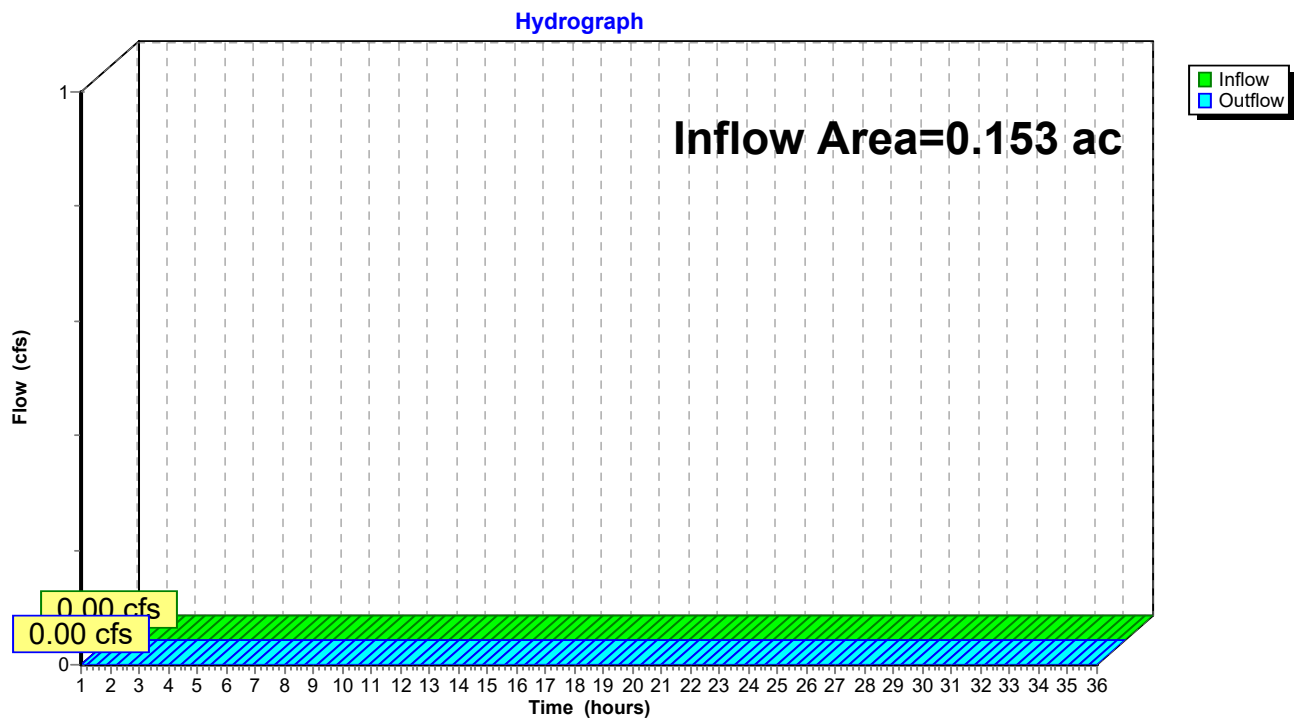


Summary for Reach POI-3: POI #3 - Baseball Field

Inflow Area = 0.153 ac, 0.00% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Reach POI-3: POI #3 - Baseball Field



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Page 111

Summary for Pond P1: VUSF

Inflow Area = 0.249 ac, 76.24% Impervious, Inflow Depth = 0.11" for WQ event
 Inflow = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af
 Outflow = 0.01 cfs @ 12.10 hrs, Volume= 0.002 af, Atten= 37%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 12.10 hrs, Volume= 0.002 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 27.03' @ 12.47 hrs Surf.Area= 458 sf Storage= 5 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 1.5 min (929.5 - 928.0)

Volume	Invert	Avail.Storage	Storage Description
#1	30.75'	1,899 cf	Ponding (Prismatic) Listed below (Recalc)
#2	29.25'	69 cf	Filter Media/Loam (Prismatic) Listed below (Recalc)
			687 cf Overall x 10.0% Voids
#3	28.92'	30 cf	Transition Gravel (Prismatic) Listed below (Recalc)
			151 cf Overall x 20.0% Voids
#4	27.00'	349 cf	Crushed Stone (Prismatic) Listed below (Recalc)
			879 cf Overall - 6 cf Embedded = 873 cf x 40.0% Voids
#5	27.10'	5 cf	4.0" Round Pipe Storage x 2 Inside #4
			L= 30.0' S= 0.0005 'f
			6 cf Overall - 0.2" Wall Thickness = 5 cf
		2,353 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.75	465	0	0
32.25	945	1,058	1,058
33.00	1,300	842	1,899

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.25	458	0	0
30.75	458	687	687

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
28.92	458	0	0
29.25	458	151	151

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
27.00	458	0	0
28.92	458	879	879

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Type III 24-hr WQ Rainfall=1.00"

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Page 112

Device	Routing	Invert	Outlet Devices
#1	Primary	27.00'	12.0" Round Culvert L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 27.00' / 26.75' S= 0.0042 '/' Cc= 0.600 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	27.10'	0.5" Vert. Soil Filter Media Drawdown Effect C= 0.600
#3	Device 1	32.35'	24.0" Horiz. Beehive Outlet C= 0.600 Limited to weir flow at low heads
#4	Discarded	27.00'	1.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 12.10 hrs HW=27.00' (Free Discharge)

↳ **4=Exfiltration** (Exfiltration Controls 0.01 cfs)

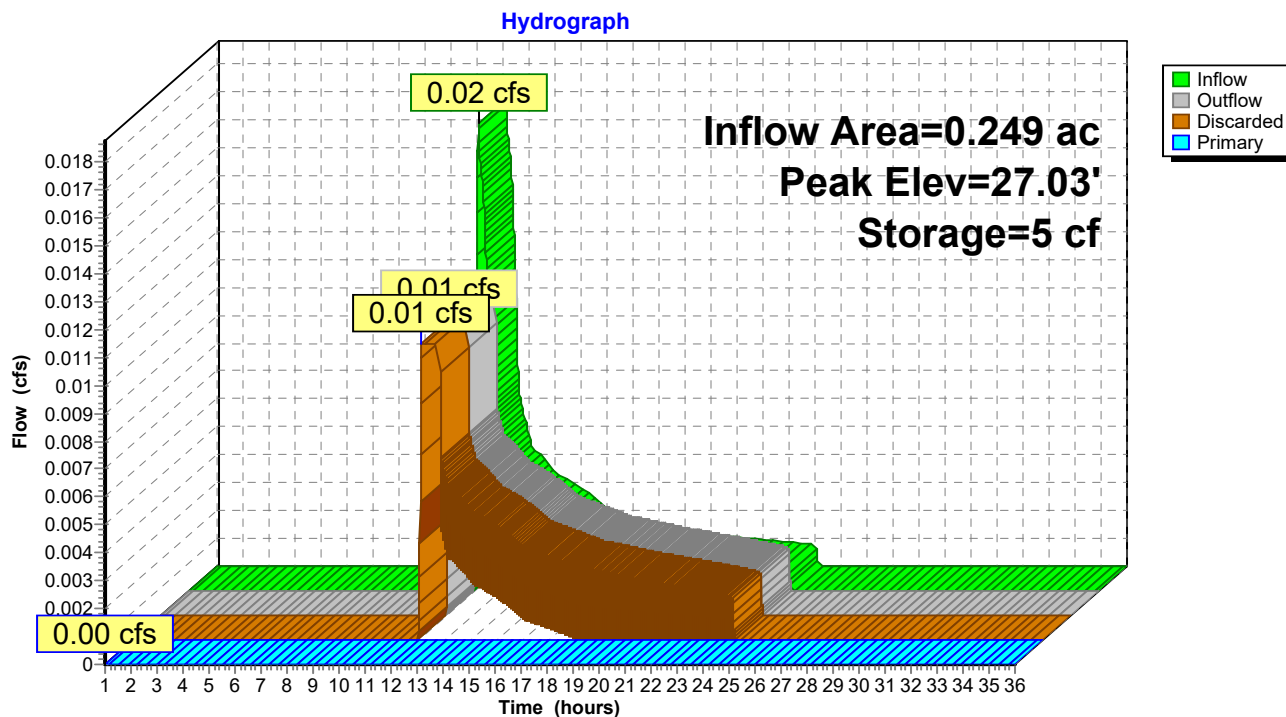
Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=27.00' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Controls 0.00 cfs)

↳ **2=Soil Filter Media Drawdown Effect** (Controls 0.00 cfs)

↳ **3=Beehive Outlet** (Controls 0.00 cfs)

Pond P1: VUSF



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Type III 24-hr WQ Rainfall=1.00"

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Page 113

Summary for Pond P2: FP 4

Inflow Area = 0.175 ac, 53.01% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.95' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (1,203.6 - 1,203.6)

Volume	Invert	Avail.Storage	Storage Description
#1	35.95'	14 cf	4.00'W x 5.00'L x 3.60'H Media/Stone 72 cf Overall x 20.0% Voids
#2	35.95'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		52 cf	Total Available Storage

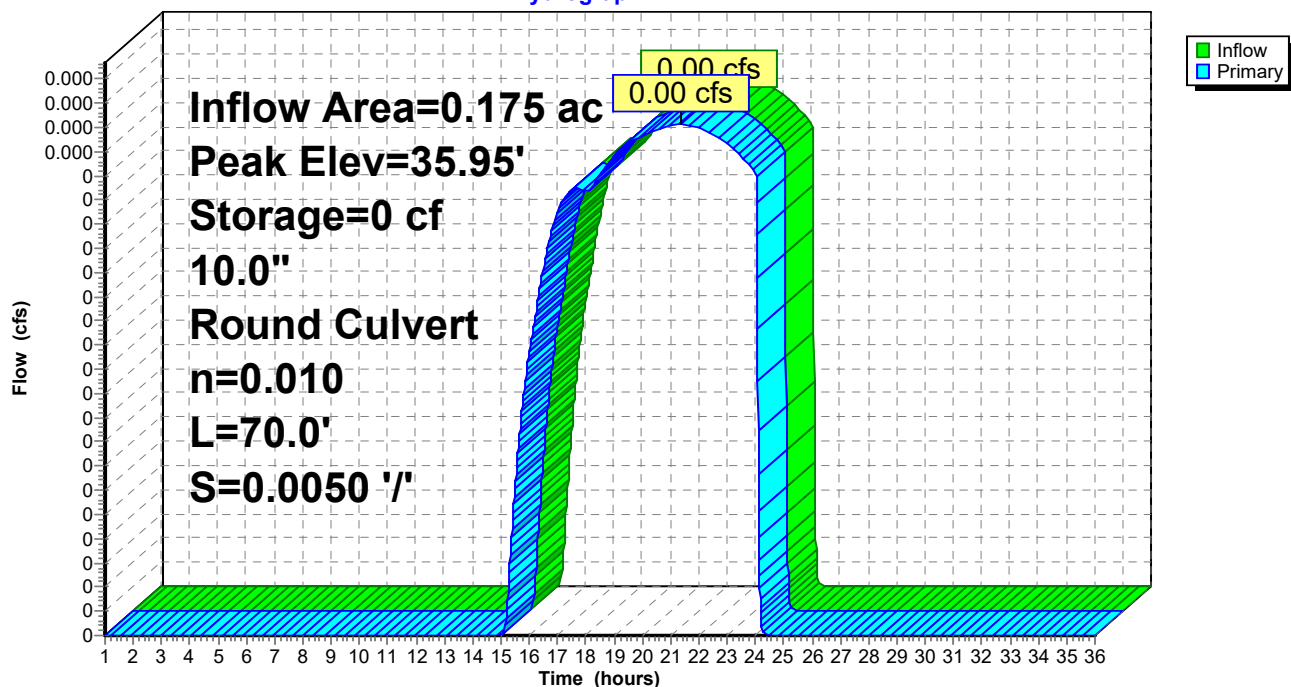
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.95	20	0	0
36.95	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	32.35'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 32.35' / 32.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 21.34 hrs HW=35.95' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.51 cfs potential flow)

Pond P2: FP 4

Hydrograph



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Type III 24-hr WQ Rainfall=1.00"

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Page 115

Summary for Pond P3: FP 3

Inflow Area = 0.154 ac, 52.99% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 21.34 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 36.10' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (1,203.6 - 1,203.6)

Volume	Invert	Avail.Storage	Storage Description
#1	36.10'	21 cf	5.00'W x 5.00'L x 4.20'H Media/Stone 105 cf Overall x 20.0% Voids
#2	36.10'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		66 cf	Total Available Storage

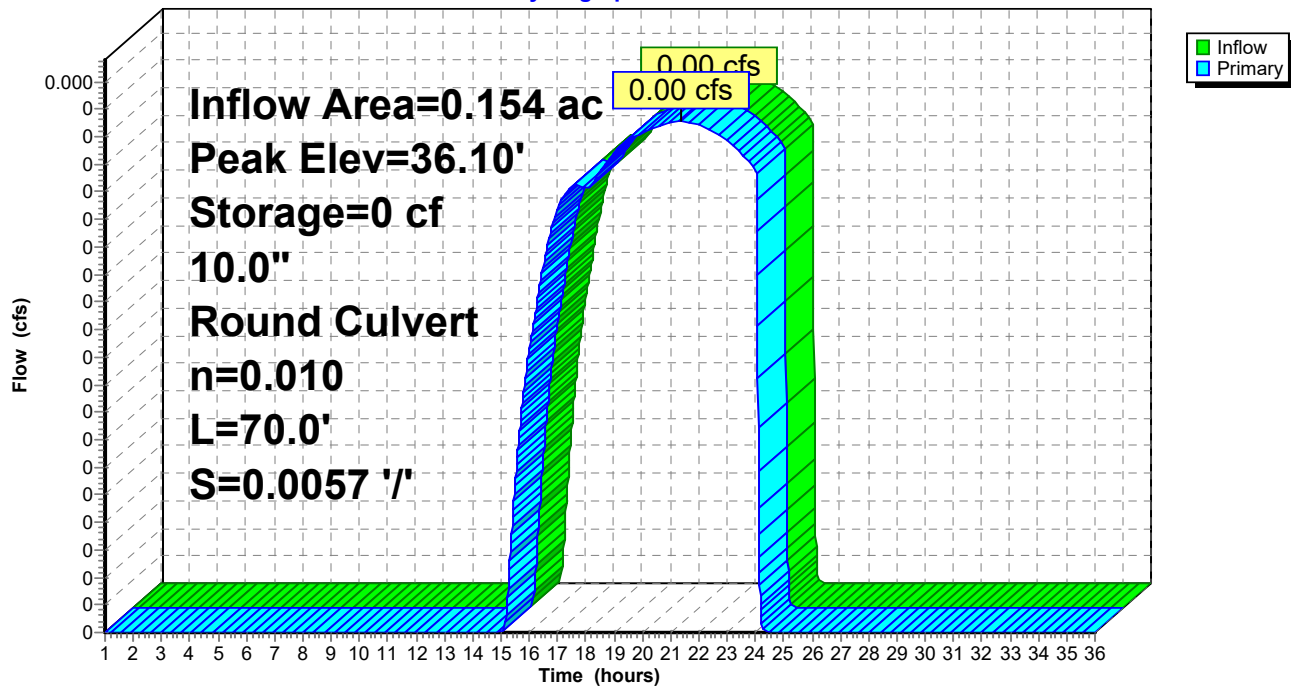
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.10	25	0	0
37.10	64	45	45

Device	Routing	Invert	Outlet Devices
#1	Primary	31.90'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.90' / 31.50' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 21.34 hrs HW=36.10' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 3.83 cfs potential flow)

Pond P3: FP 3

Hydrograph



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Page 117

Summary for Pond P4: FP 2

Inflow Area = 0.137 ac, 80.74% Impervious, Inflow Depth = 0.22" for WQ event
 Inflow = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af
 Outflow = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.90' @ 1.00 hrs Surf.Area= 50 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	23 cf	5.00'W x 5.00'L x 4.50'H Media/Stone 113 cf Overall x 20.0% Voids
#2	35.90'	45 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		67 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.90	25	0	0
36.90	64	45	45

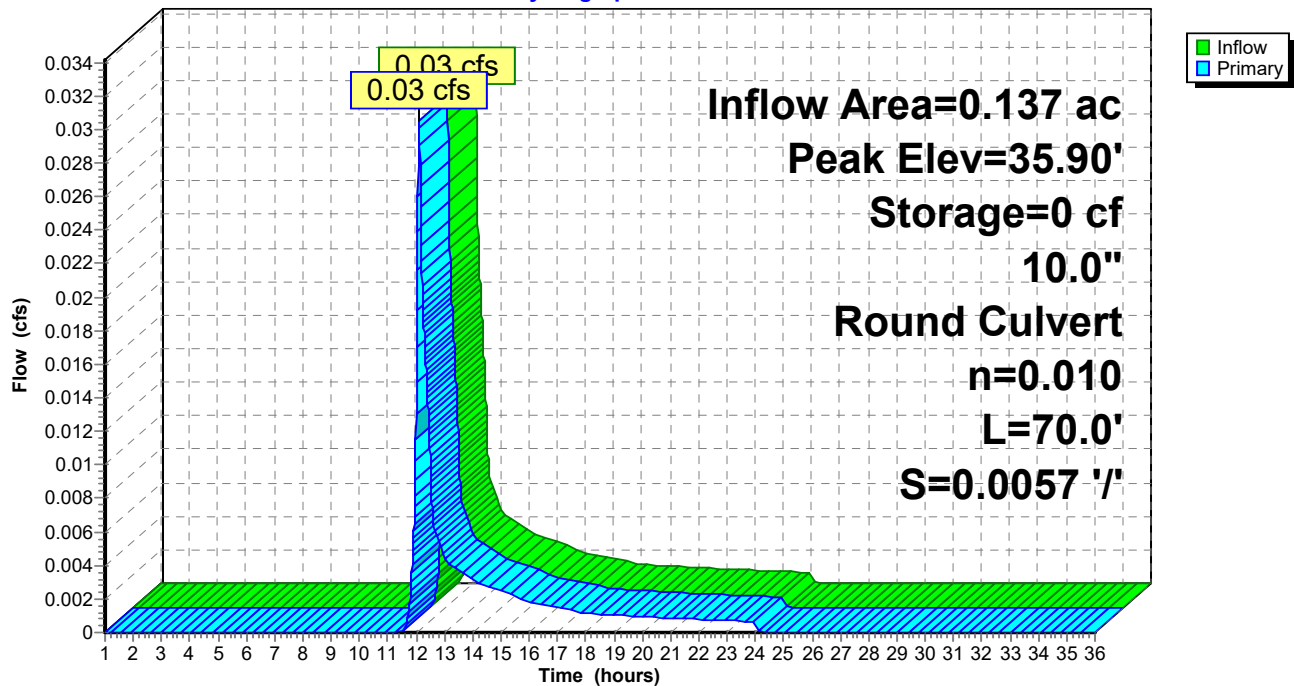
Device	Routing	Invert	Outlet Devices
#1	Primary	31.40'	10.0" Round Culvert L= 70.0' Ke= 1.000 Inlet / Outlet Invert= 31.40' / 31.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=35.90' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Passes 0.00 cfs of 3.98 cfs potential flow)

Pond P4: FP 2

Hydrograph



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Page 119

Summary for Pond P5: FP 1

Inflow Area = 0.086 ac, 84.98% Impervious, Inflow Depth = 0.28" for WQ event
 Inflow = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af
 Outflow = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 35.70' @ 1.00 hrs Surf.Area= 40 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (869.9 - 869.9)

Volume	Invert	Avail.Storage	Storage Description
#1	35.70'	19 cf	4.00'W x 5.00'L x 4.80'H Media/Stone 96 cf Overall x 20.0% Voids
#2	35.70'	38 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		57 cf	Total Available Storage

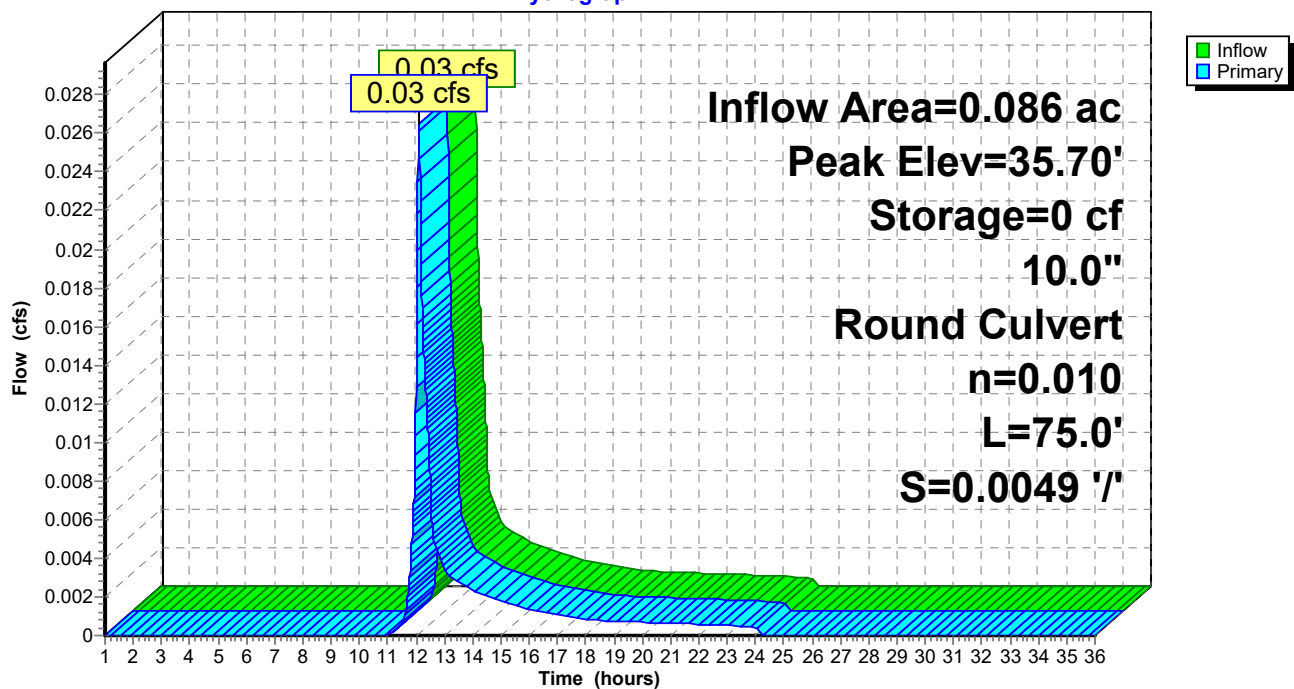
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.70	20	0	0
36.70	56	38	38

Device	Routing	Invert	Outlet Devices
#1	Primary	30.90'	10.0" Round Culvert L= 75.0' Ke= 1.000 Inlet / Outlet Invert= 30.90' / 30.53' S= 0.0049 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=35.70' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Passes 0.00 cfs of 4.12 cfs potential flow)

Pond P5: FP 1

Hydrograph



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Page 121

Summary for Pond POI #2: POI #2 (295 Basin)

Inflow Area = 1.603 ac, 12.70% Impervious, Inflow Depth = 0.00" for WQ event
 Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.01 hrs

Peak Elev= 26.30' @ 1.00 hrs Surf.Area= 100 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no inflow)

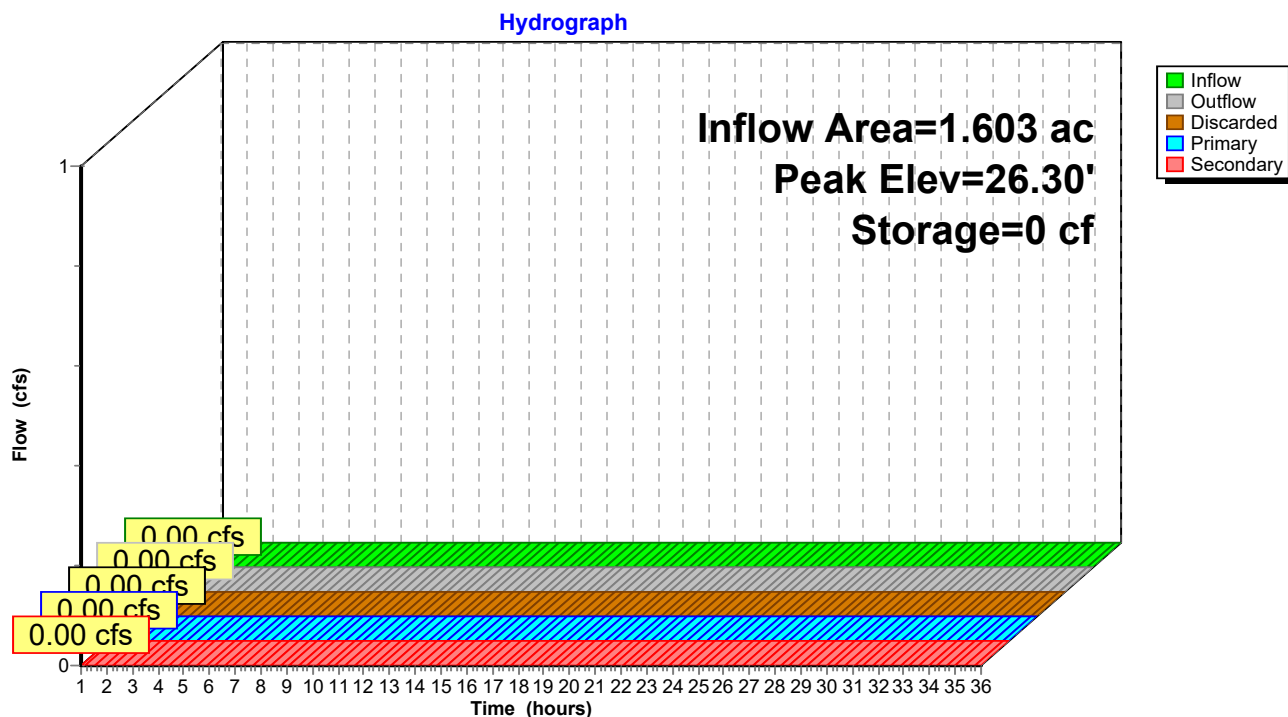
Volume	Invert	Avail.Storage	Storage Description
#1	26.30'	105,037 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
26.30	100	0	0
27.00	4,475	1,601	1,601
28.00	10,120	7,298	8,899
29.00	14,131	12,126	21,024
30.00	17,326	15,729	36,753
32.00	24,023	41,349	78,102
33.00	29,847	26,935	105,037

Device	Routing	Invert	Outlet Devices
#1	Primary	26.60'	12.0" Round Culvert L= 16.0' Ke= 0.600 Inlet / Outlet Invert= 26.60' / 26.51' S= 0.0056 ' S= 0.0056 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	32.40'	20.0' long x 15.0' breadth Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Discarded	26.60'	1.000 in/hr Exfiltration over Surface area above 26.60' Excluded Surface area = 1,975 sf

Discarded OutFlow Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**3=Exfiltration** (Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=26.30' (Free Discharge)↑**2=Overflow** (Controls 0.00 cfs)

Pond POI #2: POI #2 (295 Basin)



Attachment E

Soil Survey



Custom Soil Resource Report Soil Map



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 18, Aug 31, 2021

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
Au	Au Gres loamy sand	32.1	53.4%
BgC2	Nicholville very fine sandy loam, 8 to 15 percent slopes	0.1	0.2%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	16.9	28.1%
Wa	Walpole fine sandy loam	1.3	2.2%
WmB	Windsor loamy sand, 0 to 8 percent slopes	9.7	16.1%
Totals for Area of Interest		60.2	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.

Parking Analysis

Dougherty Commons Portland, Maine

Introduction

The project proposes 120 dwelling units within eight buildings at Dougherty Commons, the former West School in the Libbytown neighborhood. With the project triggering a major site plan, the Planning Board shall establish the off-street parking requirement based on a parking study per Table 19-B of the Zoning Ordinance.

Definitions

The parking generation for the project has been calculated using the Institute of Transportation Engineers (ITE) publication, *Parking Generation*, 5th Edition. The following Land Use Codes (LUC) were used to model the parking generation from the redevelopment:

- The cooperative buildings were modeled as LUC 220 (Multifamily Housing – Low-Rise). This LUC is defined as “Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and with one or two levels (floors) of residence.” The setting/location category is considered Dense Multi-Use Urban (less than a half mile to rail transit).
- The 5-story building was modeled as LUC 221 (Multifamily Housing – Mid-Rise). This LUC is defined as “Mid-Rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 levels (floors).” The setting/location category is considered Dense Multi-Use Urban (less than a half mile to rail transit).
- For the affordable portions of the project, LUC 223 (Affordable Housing – Income Limits) was used to develop a weighted average generation for the 61% of the development that will be deed restricted for affordability based upon the tenants’ income.

Parking Generation

In accordance with Table 19-B of the City’s Code, a parking analysis has been prepared to project the parking requirement for the site. As such, this analysis estimates the peak parking demand using the industry standard ITE Parking Generation Manual (5th Edition).

The number of dwelling units of the development (120) was used to determine the parking rates, with (73) of the dwellings units designated to be priced below market rate.

The following table summarizes the ITE parking generation for the site. Please refer to the attached excerpts from the ITE manual for the peak parking rates.



ITE Parking Generation Summary – Full Site

LUC	Units	Rate	Weekday Peak Hour Average Parking Demand
Mid-Rise Multi-Family	19	0.71	13.5
Low-Rise Multi-Family	28	0.59	16.5
Affordable Housing – Income Limits	73	0.53	38.7
Total	120		69

As seen in the above table, using the industry standard parking generation rates and based upon the floor plans developed thus far, the project anticipates a total of 69 required parking spaces at the peak hour of parking demand. The plan for the development provides for 78 possible parking spaces with 56 spaces reserved for the apartment building and 22 reserved for the cooperative buildings.

ITE Parking Generation Summary – Phase I (63 Units)

LUC	Units	Rate	Weekday Peak Hour Average Parking Demand
Market Rate Mid-Rise Multi-Family	19	0.71	13.5
Affordable Housing – Income Limits	44	0.53	23.3
Total			37

As seen in the above table, using the industry standard parking generation rates and based upon the floor plans developed thus far, the project anticipates a total of 37 required parking spaces at the peak hour of parking demand. The plan for the development provides for 56 possible parking spaces, with the additional spaces provided for guest parking.

ITE Parking Generation Summary – Phase II (57 Units)

LUC	Units	Rate	Weekday Peak Hour Average Parking Demand
Low-Rise Multi-Family	28	0.59	16.5
Affordable Housing – Income Limits	29	0.53	15.4
Total			32



As seen in the above table, using the industry standard parking generation rates and based upon the floor plans developed thus far, the project anticipates a total of 32 required parking spaces at the peak hour of parking demand. The plan for the development provides for 22 possible parking spaces.

It should be noted that a specific land use category does not exist for the cooperative housing model. Based on the experience of our clients with similar urban housing projects, parking demand is typically less than what is predicted by the industry standard models. This is reinforced by the Co-Op unbundling parking from ownership and also by research conducted at urban “Transit-Oriented Developments” around the country found 44% fewer vehicle trips than ITE estimates.

Source: *Cervano, Robert, et al. “Vehicle Trip Reduction Impacts of Transit-Oriented Housing” University of South Florida.*

<https://digitalcommons.usf.edu/cgi/viewcontent.cgi?article=1216&context=jpt>

Given this project is a transit oriented development (TOD), the development team feels the proposed parking count is sufficient, in each phase and overall, for the proposed land use and the site’s physical location. The following sections demonstrate why this project represents a TOD.

Adjacent On Street Parking

On-street parking is available on Douglass Street except during local sporting events. Although the study above does not rely on on-street parking to supplement the parking count, at most times of the week, on-street parking is generally available for both tenants and guests.

Unbundling Rent and Parking Fees

As an incentive to reduce parking demand, the cooperative housing applicant proposes to unbundle rent and parking. Parking spaces will be rented at competitive market rates, and not discounted significantly for tenants. This strategy has been shown to effectively reduce demand as tenants usually opt for alternative modes of travel or simply choose not to buy parking when parking spaces are charged as a separate fee.

Bicycle Parking

The applicant proposes abundant bicycle parking both internally, in a storage room specifically for bicycles within the apartment building, and externally on a multitude of bike hoops congregated in three locations throughout the development. In total, at least 50 bicycle parking spaces will be provided, far exceeding the 40% of parking required per City Ordinance.

METRO Bus Service Access / Portland Transportation Center

Transit stops for the Route 9 bus are currently located on either side of Congress Street and is located 150 ft. away from the Dougherty Field Path. Information on the METRO’s bus routes and schedule will be posted throughout the buildings and A map of the Route 9A/B transit map has been attached to this report. The Portland Transportation Center is a 0.4 mile walk from the development. This transportation hub features connections to regional and long-distance bus networks as well as the Amtrak Downeaster train. Overall, this site is extremely well-positioned to offer multimodal transportation opportunities to residents.

Pedestrian Access

Dougherty Field Path will connect the development to Congress and St. James St, which leads to the system of well-maintained and accessible public sidewalks. This network connects the site with the many proximate businesses and services in the area. Additional lighting has also been provided as part of the plan to make this segment of the trail a more attractive option for accessing the surrounding options during nighttime.

Conclusion

Given the project is a TOD, provides 78 off-street parking spaces vs the 120 units, and is slated primarily for affordability, this parking analysis serves to demonstrate the project's parking adequacy. Several transportation demand management (TDM) strategies have been implemented and while the project has not prepared a formal TDM, it should be noted the zoning code specifically allows for transit proximate development to forego parking: *"No off-street parking shall be required within ¼ mile of fixed route transit service. New uses or changes of use of more than 10,000 SF taking advantage of this exception shall be required to provide a Transportation Demand Management Plan if they use this provision in lieu of parking requirements."* Not only do several bus stops exist within a quarter mile of the site, but the Transportation Center is less than a half mile from the site. Given the overall 0.65 parking ratio provided and the many multimodal opportunities, it is our professional opinion that the 78 proposed parking spaces are sufficient for the development.

ATTACHMENTS

- A. METRO Bus Route #9 and Schedule
- B. Multimodal Transportation Map



METRO ROUTE 9A

Effective Date: November 14, 2021

METRO ROUTE 9B



MONDAY THROUGH FRIDAY

NORTH DEERING VIA STEVENS AVENUE

City Hall	Westgate	Morrill's Corner	Washington Auburn	Summit Allen	Allen's Corner	Washington Veranda	City Hall
A	B	C	D	S	E	F	A
5:35	5:44	5:54	6:10	X	6:14	6:22	6:30
6:05	6:15	6:25	6:40	X	6:44	6:52	7:00
6:30	6:42	6:52	7:08	X	7:13	7:21	7:30
X	X	X	X	X	X	7:30*	7:40*
X	7:03*	7:13*	7:25*	X	7:30*	7:40*	7:50*
7:00	7:13	7:23	7:35	X	7:40	7:50	8:00
X	7:18*	7:29*	7:40*	7:46*	X	7:56*	8:08*
7:30	7:43	7:53	8:08	X	8:13	8:21	8:30
7:40*	7:53*	8:03*	8:18*	X	8:23*	8:31*	8:40*
7:50*	8:03*	Trip ends at DHS 8:10		X	X	X	X
8:00	8:14	8:24	8:38	X	8:43	8:51	9:00
8:08*	8:22*	Trip ends at DHS 8:29		X	X	X	X
8:30	8:44	8:54	9:08	X	9:13	9:21	9:30
9:30	9:42	9:52	10:08	X	10:13	10:21	10:30
10:30	10:42	10:52	11:08	X	11:13	11:21	11:28
11:30	11:43	11:53	12:12	X	12:17	12:25	12:35
12:35	12:48	12:58	1:15	X	1:20	1:28	1:35
1:35	1:47	1:57	2:17	X	2:22	2:30	2:40
2:05	2:17	2:27	2:47	X	2:52	3:00	3:10
2:40	2:52	3:02	3:21	X	3:26	3:35	3:45
X	2:57*	3:07*	3:26*	3:31*	X	3:40*	3:50*
3:10	3:22	3:32	3:51	X	3:56	4:05	4:15
3:45	3:58	4:08	4:26	X	4:31	4:40	4:50
4:15	4:29	4:39	4:57	X	5:02	5:12	5:25
4:50	5:04	5:14	5:31	X	5:36	5:45	5:55
5:25	5:39	5:49	6:06	X	6:11	6:20	6:30
5:55	6:10	6:20	6:35	X	6:40	6:48	6:55
6:30	6:43	6:53	7:10	X	7:14	7:22	7:30
7:30	7:42	7:52	8:08	X	8:12	8:20	8:30
8:30	8:42	8:52	9:08	X	9:12	9:20	9:30
9:30	9:40	9:50	10:08	X	10:12	10:20	10:25

*Trips operate on school days only. On early release days, trips will operate one hour early

SATURDAY

NORTH DEERING VIA STEVENS AVENUE

City Hall	Westgate	Morrill's Corner	Washington Auburn	Allen's Corner	Washington Veranda	City Hall
A	B	C	D	E	F	A
7:30	7:45	7:55	8:10	8:15	8:23	8:30
8:30	8:45	8:55	9:10	9:15	9:23	9:30
9:30	9:45	9:55	10:10	10:15	10:23	10:30
10:30	10:45	10:55	11:10	11:15	11:23	11:30
11:30	11:45	11:55	12:10	12:15	12:23	12:30
12:30	12:45	12:55	1:10	1:15	1:23	1:30
1:30	1:45	1:55	2:10	2:15	2:23	2:30
2:30	2:45	2:55	3:10	3:15	3:23	3:30
3:30	3:45	3:55	4:10	4:14	4:22	4:30
4:30	4:45	4:55	5:10	5:14	5:22	5:30
5:30	5:45	5:55	6:10	6:14	6:22	6:30
6:30	6:45	6:55	7:10	7:14	7:22	7:30
7:30	7:45	7:52	8:08	8:12	8:20	8:30
8:30	8:45	8:52	9:08	9:12	9:20	9:30
9:30	9:45	9:53	10:08	10:12	10:20	10:25

SUNDAY

NORTH DEERING VIA STEVENS AVENUE

City Hall	Westgate	Morrill's Corner	Washington Auburn	Allen's Corner	Washington Veranda	City Hall
A	B	C	D	E	F	A
8:30	8:45	8:55	9:10	9:15	9:23	9:30
9:30	9:45	9:55	10:10	10:15	10:23	10:30
10:30	10:45	10:55	11:10	11:15	11:23	11:30
11:30	11:45	11:55	12:10	12:15	12:23	12:30
12:30	12:45	12:55	1:10	1:15	1:23	1:30
1:30	1:45	1:55	2:10	2:15	2:23	2:30
2:30	2:45	2:55	3:10	3:15	3:23	3:30
3:30	3:45	3:55	4:08	4:12	4:20	4:25

SUNDAY

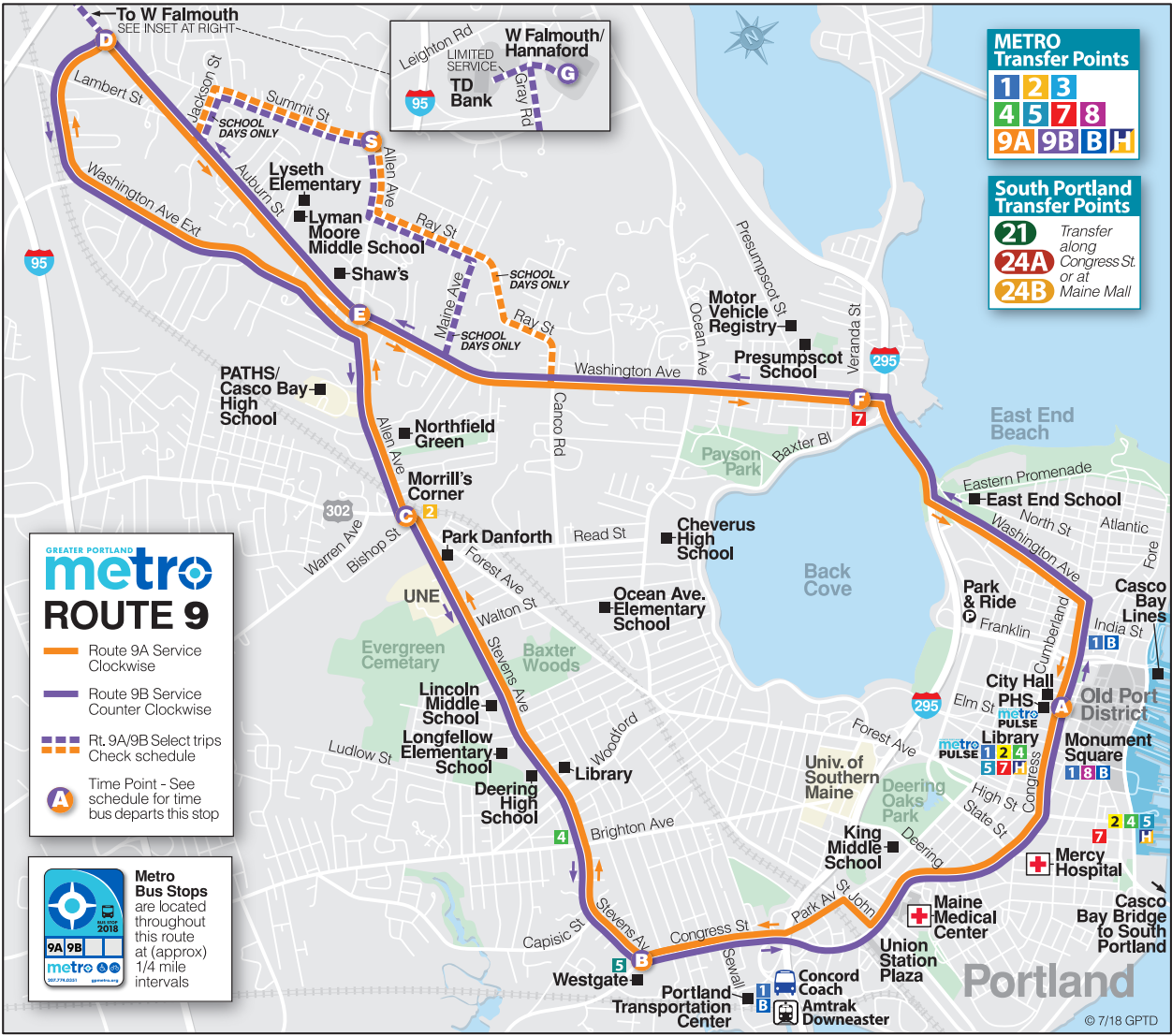
NORTH DEERING VIA WASHINGTON AVE

Monument Square	Washington Veranda	Allen's Corner	W. Falmouth Hannaford	Morrill's Corner	Westgate	Monument Square
A	F	E	G	C	B	A
9:10	9:18	9:25	9:35	9:48	9:57	10:10
10:10	10:18	10:25	10:35	10:48	10:57	11:10
11:10	11:18	11:25	11:35	11:48	11:57	12:10
12:10	12:18	12:25	12:35	12:48	12:57	1:10
1:10	1:18	1:25	1:35	1:48	1:57	2:10
2:10	2:18	2:25	2:35	2:48	2:57	3:10
3:10	3:18	3:25	3:35	3:48	3:57	4:10
4:10	4:18	4:25	4:35	4:48	4:57	5:10

SATURDAY

NORTH DEERING VIA WASHINGTON AVE

Monument Square	Washington Veranda	Allen's Corner	W. Falmouth Hannaford	Morrill's Corner	Westgate	Monument Square
A	F	E	G	C	B	A
8:10	8:18	8:25	8:35	8:48	8:57	9:10
9:10	9:18	9:25	9:35	9:48	9:57	10:10
10:10	10:18	10:25	10:35	10:48	10:57	11:10
11:10	11:18	11:25	11:35	11:48	11:57	12:10
12:10	12:18	12:25	12:35	12:48	12:57	1:10
1:10	1:18	1:25	1:35	1:48	1:57	2:10
2:10	2:18	2:25	2:35	2:48	2:57	3:10
3:10	3:18	3:25	3:35	3:48	3:57	4:10
4:10	4:18	4:25	4:35	4:48	4:57	5:10
5:10	5:18	5:25	5:35	5:48	5:57	6:10
6:10	6:18	6:25	6:35	6:48	6:57	7:10
7:10	7:18	7:25	7:35	7:48	7:57	8:10
8:10	8:18	8:25	8:35	8:42	8:47	9:00



Routes and schedules subject to change.



Land Use: 220 Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and with one or two levels (floors) of residence. Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), and affordable housing (Land Use 223) are related land uses.

Time of Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand (1) on a weekday (10 study sites) and a Saturday (11 study sites) in a general urban/suburban setting and (2) on a weekday (three study sites) and a Saturday (three study sites) in a dense multi-use urban setting.

Hour Beginning	Percent of Peak Parking Demand			
	General Urban/Suburban		Dense Multi-Use Urban	
	Weekday	Saturday	Weekday	Saturday
12:00–4:00 a.m.	100	93	86	100
5:00 a.m.	97	100	100	94
6:00 a.m.	90	98	94	91
7:00 a.m.	77	96	81	85
8:00 a.m.	56	92	58	79
9:00 a.m.	45	80	56	76
10:00 a.m.	40	78	53	71
11:00 a.m.	37	71	58	74
12:00 p.m.	36	68	56	68
1:00 p.m.	36	66	53	68
2:00 p.m.	37	65	47	68
3:00 p.m.	43	68	56	56
4:00 p.m.	45	70	53	59
5:00 p.m.	55	73	61	53
6:00 p.m.	66	77	81	50
7:00 p.m.	73	81	67	56
8:00 p.m.	77	82	61	65
9:00 p.m.	86	86	64	74
10:00 p.m.	92	87	75	85
11:00 p.m.	97	92	86	91

Additional Data

In prior editions of *Parking Generation*, the low-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of parking demand data found no clear differences in parking demand between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

The average parking supply ratios for the study sites with parking supply information are shown in the table below.

Setting	Proximity to Rail Transit	Parking Supply Ratio	
		Per Dwelling Unit	Per Bedroom
Dense Multi-Use Urban	Within ½ mile of rail transit	0.6 (12 sites)	0.4 (10 sites)
	Not within ½ mile of rail transit	0.9 (18 sites)	0.6 (18 sites)
General Urban/Suburban	Within ½ mile of rail transit	1.5 (10 sites)	0.9 (10 sites)
	Not within ½ mile of rail transit	1.7 (52 sites)	1.0 (52 sites)

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Colorado, District of Columbia, Maryland, Massachusetts, Oregon, Pennsylvania, Texas, Washington, and Wisconsin.

It is expected that the number of bedrooms and number of residents are likely correlated to the parking demand generated by a residential site. Parking studies of multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e. number of units by number of bedrooms at the site complex). Future parking studies should also indicate the number of levels contained in the residential building.

Source Numbers

72, 124, 152, 154, 209, 215, 216, 216, 219, 255, 257, 314, 414, 419, 432, 437, 505, 512, 533, 535, 536, 537, 544, 545, 577, 578, 579, 580, 584, 585, 587

Multifamily Housing (Low-Rise) (220)

Peak Period Parking Demand vs: Dwelling Units

On a: Weekday (Monday - Friday)

Setting/Location: Dense Multi-Use Urban (< 1/2 mile to rail transit)

Peak Period of Parking Demand: 11:00 p.m. - 6:00 a.m.

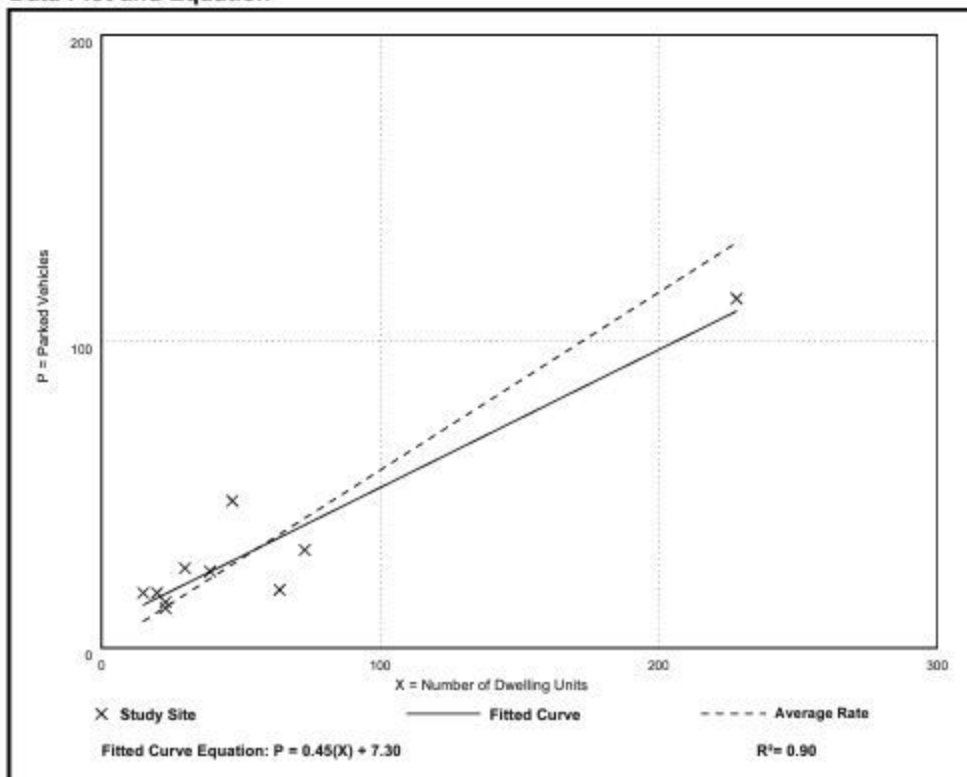
Number of Studies: 10

Avg. Num. of Dwelling Units: 56

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.58	0.30 - 1.20	0.54 / 1.08	***	0.23 (40%)

Data Plot and Equation



Land Use: 221 Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and with between three and 10 levels (floors) of residence. Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), and affordable housing (Land Use 223) are related land uses.

Time of Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a weekday (one general urban/suburban study site), a Saturday (two general urban/suburban study sites), and a Sunday (one dense multi-use urban study site).

Hour Beginning	Percent of Peak Parking Demand		
	Weekday	Saturday	Sunday
12:00–4:00 a.m.	100	100	100
5:00 a.m.	94	99	—
6:00 a.m.	83	97	—
7:00 a.m.	71	95	—
8:00 a.m.	61	88	—
9:00 a.m.	55	83	—
10:00 a.m.	54	75	—
11:00 a.m.	53	71	—
12:00 p.m.	50	68	—
1:00 p.m.	49	66	33
2:00 p.m.	49	70	40
3:00 p.m.	50	69	27
4:00 p.m.	58	72	13
5:00 p.m.	64	74	33
6:00 p.m.	67	74	60
7:00 p.m.	70	73	67
8:00 p.m.	76	75	47
9:00 p.m.	83	78	53
10:00 p.m.	90	82	73
11:00 p.m.	93	88	93

Additional Data

In prior editions of *Parking Generation*, the mid-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of parking demand data found no clear differences in parking demand between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

The average parking supply ratios for the study sites with parking supply information are shown in the table below.

		Parking Supply Ratio	
Setting	Proximity to Rail Transit	Per Dwelling Unit	Per Bedroom
Center City Core	Within ½ mile of rail transit	1.1 (15 sites)	1.0 (12 sites)
Dense Multi-Use Urban	Within ½ mile of rail transit	1.2 (39 sites)	0.9 (34 sites)
	Not within ½ mile of rail transit	1.2 (65 sites)	0.8 (56 sites)
General Urban/Suburban	Within ½ mile of rail transit	1.5 (25 sites)	0.8 (12 sites)
	Not within ½ mile of rail transit	1.7 (62 sites)	1.0 (39 sites)

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Colorado, District of Columbia, Maryland, Massachusetts, New Jersey, New York, Oregon, Virginia, Washington, and Wisconsin.

It is expected that the number of bedrooms and number of residents are likely correlated to the parking demand generated by a residential site. Parking studies of multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex). Future parking studies should also indicate the number of levels contained in the residential building.

Source Numbers

21, 209, 247, 255, 277, 401, 402, 419, 505, 512, 522, 533, 535, 536, 537, 538, 545, 546, 547, 575, 576, 577, 579, 580, 581, 583, 584, 585, 587

Multifamily Housing (Mid-Rise) (221)

Peak Period Parking Demand vs: Dwelling Units

On a: Weekday (Monday - Friday)

Setting/Location: Dense Multi-Use Urban (< 1/2 mile to rail transit)

Peak Period of Parking Demand: 10:00 p.m. - 5:00 a.m.

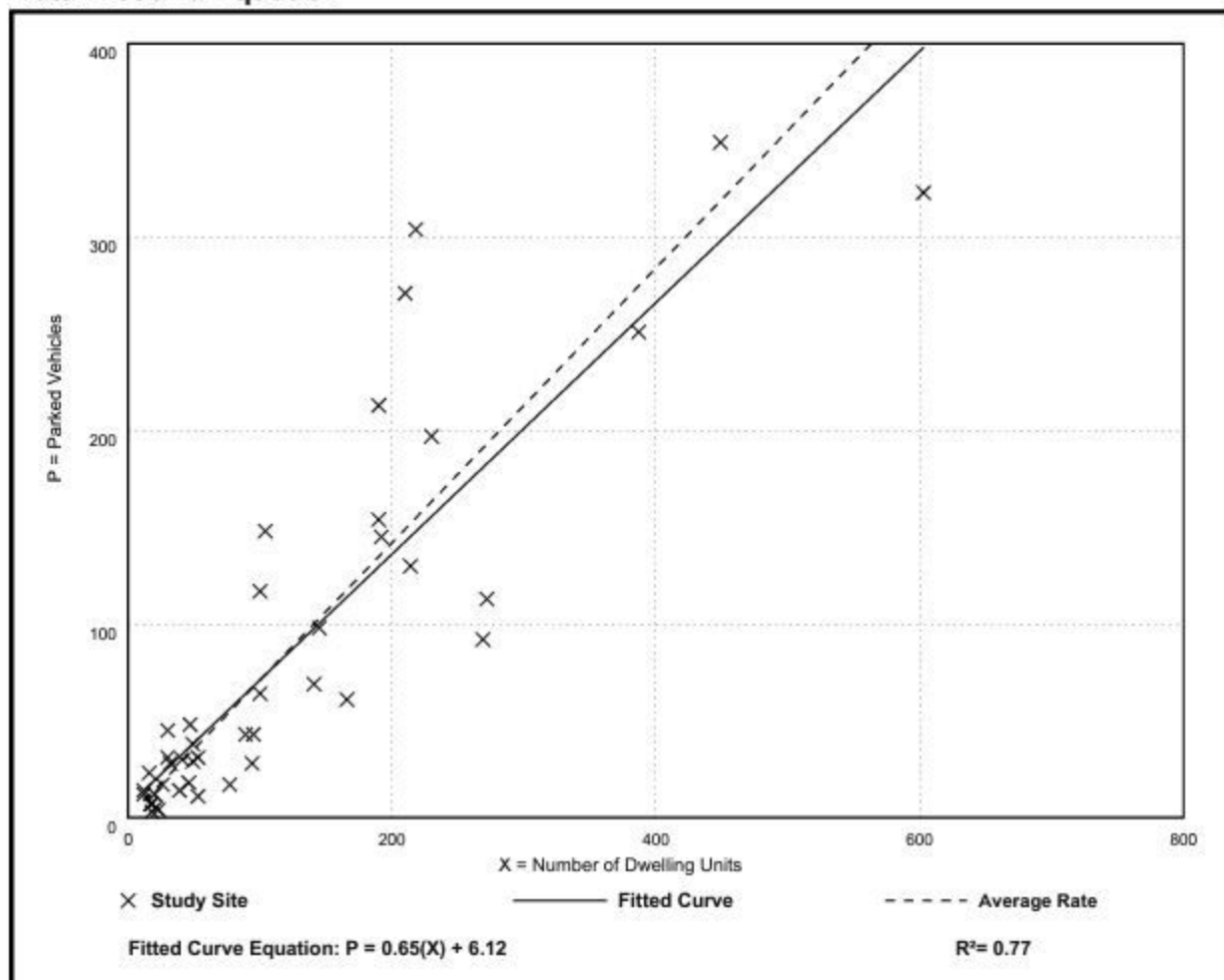
Number of Studies: 43

Avg. Num. of Dwelling Units: 121

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.71	0.17 - 1.50	0.47 / 1.17	0.61 - 0.81	0.32 (45%)

Data Plot and Equation



Land Use: 223 Affordable Housing

Description

Affordable housing includes all multifamily housing that is rented at below market rate to households that include at least one employed member. Eligibility to live in affordable housing can be a function of limited household income and resident age. Multifamily housing (low-rise) (Land Use 220), multifamily housing (mid-rise) (Land Use 221), and multifamily housing (high-rise) (Land Use 222) are related land uses.

Additional Data

For the majority of study sites in this land use code, 100 percent of the dwelling units are considered affordable. For residential study sites that provide a mix of market value and affordable units, the study sites with at least 75 percent of the dwelling units designated as affordable are also included in this land use database.

Separate data plots and statistics are presented for subsets of the affordable housing database: sites with income limitations for its tenants, sites with minimum age thresholds for its tenants (i.e., senior housing), and sites comprised entirely of single-room-only units.

The average parking supply ratios for the study sites with parking supply information are as follows:

- In a general urban/suburban setting, 1.3 spaces per dwelling unit (28 sites) and 0.7 spaces per bedroom (9 sites)
- In a dense multi-use urban setting, 0.6 spaces per dwelling unit (28 sites) and 0.3 spaces per bedroom (26 sites)
- In a center city core setting, 0.3 spaces per dwelling unit (6 sites) and 0.3 spaces per bedroom (6 sites)

The sites were surveyed in the 1990s and the 2010s in California, Connecticut, District of Columbia, Maryland, Massachusetts, New Jersey, and Oregon.

It is expected that the number of bedrooms and number of residents are likely correlated to the parking demand generated by a residential site. Parking studies of multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex). Future parking studies should also indicate the number of levels contained in the residential building.

Source Numbers

314, 514, 533, 535, 536, 537, 539, 541, 579, 582, 585, 586

Affordable Housing - Income Limits (223)

Peak Period Parking Demand vs: Dwelling Units

On a: Weekday (Monday - Friday)

Setting/Location: Dense Multi-Use Urban

Peak Period of Parking Demand: 10:00 p.m. - 5:00 a.m.

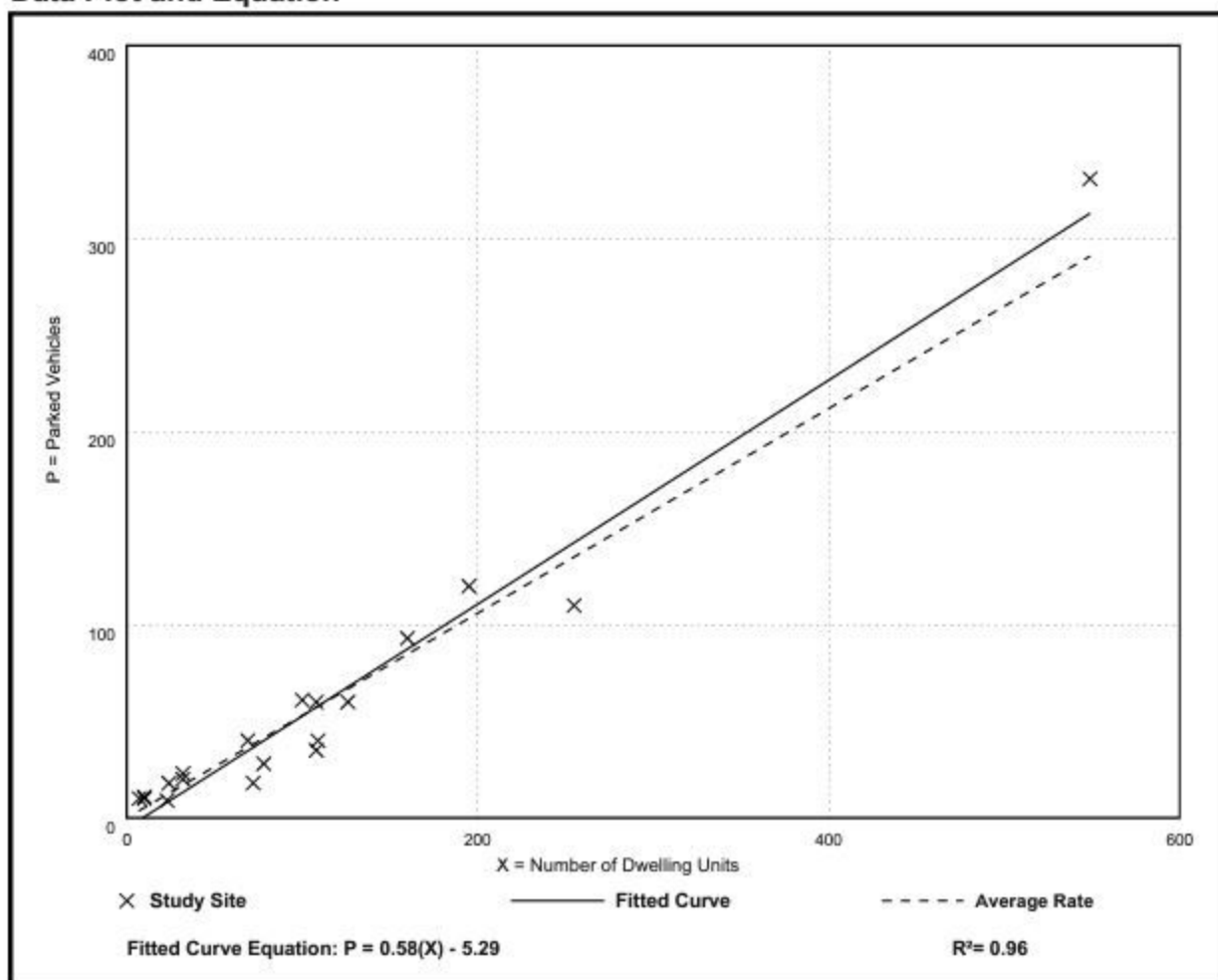
Number of Studies: 19

Avg. Num. of Dwelling Units: 109

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.53	0.25 - 1.43	0.46 / 1.00	***	0.14 (26%)

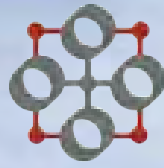
Data Plot and Equation





GRASSPAVE²

BY INVISIBLE STRUCTURES™



GRAVELPAVE²

BY INVISIBLE STRUCTURES™



Introduction

History of Porous Paving

Pebbles, cobblestones, and wood decking structures have been used since the dawn of civilization to reinforce where we walk and the roads we use. Little did we realize that these methods had benefits over the modern trends of sealing up the ground with asphalt and concrete. Porous, permeable or pervious paving—whatever you prefer—became a method for addressing stormwater issues in the early 20th century. Concrete turfblock for grass paving began in the mid-1940s and plastic versions were invented in the late '70s and early '80s. Great advancements have occurred in pervious concrete, pervious asphalt, and other permeable surfaces. We introduced Grasspave² in 1982, improving upon these earlier concepts. In 1993, Gravelpave² was unveiled, the only product specifically developed for gravel porous paving. Fast forward to this millennium, and Grasspave² and Gravelpave² are considered by most, the finest porous pavers developed.

Infiltration

Porous paving allows rainwater to percolate through the pavement's surface and back into the ground (infiltrating), where the water is cleaned and returned to ground water supplies. Porous paving improves upon impermeable surfaces, such as concrete or asphalt, which do not allow for this natural filtration. Rain collects airborne and surface pollutants such as sediment, brake dust, chemicals, vehicle exhaust, oil, salts, fertilizers, bacteria, and animal waste. On impermeable surfaces the polluted rainwater runoff (non-point source pollution) is collected, concentrated, and discharged to downstream

waters such as streams, reservoirs, and lakes—our drinking water. This runoff also harms vegetation and wildlife with increased water volumes, velocities, and higher temperatures. The Grasspave² and Gravelpave² systems protect against this dangerous runoff by processing and cleaning the water, thus safeguarding the natural water cycle.

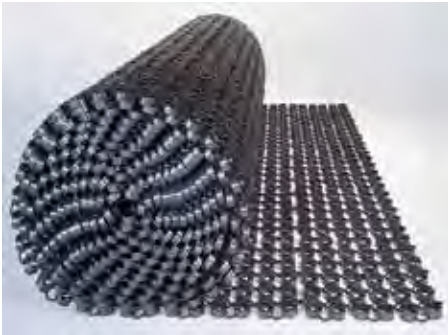
State of the Earth

Invisible Structures, Inc. has developed an entire line of products to address stormwater and environmental concerns. Rainstore³, Slopetame², Draincore², and Beachrings² can work in addition to, or in conjunction with, Grasspave² and Gravelpave² to provide your site, home, or office with stormwater and environmental enhancements. Our products can store and collect rain, provide erosion and sediment control, efficiently convey and deliver water, and protect natural areas.

Advanced Technology

The Grasspave² and Gravelpave² systems are based on a simple, but impressive technology—a series of rings (cylinders) connected on a flexible grid system. The cylinders are engineered to withstand significant structural loads and the grid provides stability, flexibility, and continuity for large areas. The grid system also has the unique ability to be rolled up for easy shipping, handling and installation.

This engineered design allows for any street-legal vehicle (and sometimes larger) to park or drive on our Grasspave² or Gravelpave² surfaces. The point load pressure is transferred from the top of the ring, through the fill material and cylinders, to the engineered base course.



Grasspave² large rolls and Gravelpave² large rolls (not shown) install quickly and conform to the contours of the ground.



Wallace Residence, Savannah, GA—Gravelpave² creates a wheelchair-accessible surface by stabilizing gravel and supporting tire pressure. 7% dry cement was mixed with gravel before filling rings. Cover photo: Westin Kierland Resort and Spa, Scottsdale, Arizona—Grasspave² fire lane and Gravelpave² fire lane (concrete widening).



Pentagon Remote Delivery Facility, Arlington, VA—Grasspave² was selected for the helicopter landing pads (the four grass squares in center) on the largest “green roof” east of the Mississippi.

The ring and grid structure is 92 percent void space allowing for the healthiest root zone for grass (in Grasspave²) and more decorative gravel (in Gravelpave²) for some of the most attractive paved surfaces around. Less plastic means more natural looking surfaces. This technology also makes for better runoff coefficients and better percolation rates.

Exceptional Compressive Strength

When installed to specifications, Grasspave² and Gravelpave² will support 15,940 psi – well over the 120 psi highest truck tire pressure allowed on public highways. This is a safety factor of 132 times.

15,940 psi Conversions

- 2.29 million pounds per sq ft
- 109,906 kPa
- 11.2 million kg/m²
- 20.6 million pounds per sq yard

Vehicle Loading Examples:

- Auto tires: 40 psi
- Truck tires: 110 psi
- DC-10 tires: 250 psi
- F-16 tires: 350 psi
- Fire truck with outriggers: 78psi

(An 85,000 lb. truck distributed to four outrigger pads is equal to 21,250 lbs. for each outrigger pad with 12" × 18" surface contact with Grasspave².)

All these vehicles are well within our 15,940 psi capability. With a sturdy base course design, our rings will easily perform under all conditions. It's also a good design practice to strengthen

concrete sidewalks and curbing that will be mounted by fire trucks.

CSI 32 12 43 Flexible Porous Pavers

In 1997 The Construction Specifiers Institute (CSI) came out with a generalized listing (02795) for all porous paving products. However, since performance and application is varied even in the

porous paving industry, the 2004 CSI MasterFormat™ has adopted a new number 32 12 43 *Flexible Porous Paving*, to recognize that Grasspave² and Gravelpave² are in a class by themselves.

Best Management Practice

Porous paving is recognized as a Best Management Practice (BMP) by the Environmental Protection Agency, the Center for Watershed Protection, the U.S. Army Corp of Engineers, and countless other federal, state, regional and local authorities. In addition, Grasspave² and Gravelpave² are often mentioned by name, as the product of choice for many of these agencies.

Applications

Stormwater Management

The Grasspave² and Gravelpave² systems can easily handle storm water from an intense storm dropping three inches of rain in less than thirty minutes! In one square meter (40" × 40") there are 144 rings, two inches in diameter by one inch high. With one inch of fill in the rings and a standard road base of sandy gravel six inches thick, our porous systems will percolate



The University of South Alabama, Mobile used Gravelpave² in parking aisles and Grasspave² in the spaces.



Bowditch Point Regional Park, Fort Myers Beach, Florida—Gravelpave² parking bays blend in with the natural surroundings.



The Lincoln Hills Club, Lincoln, California—This amphitheater's grass is reinforced with Grasspave² to prevent compaction, and provide a stable, attractive surface for visitors.

approximately 1/2 inch of rain per hour! A seven-inch section can store 2.4 inches of water (about 20 percent void after compaction). Alternatively, hard surfaces, such as asphalt and concrete, shed 95 percent of storm water.

Aesthetics

As a designer, engineer, contractor, or homeowner, you can be sure Grasspave² and Gravelpave² can deliver a more beautiful surface and add a unique look to a site. Grass simply looks better than asphalt and decorative gravel has been used for centuries in landscaping. Space constraints can be dealt with by combining the beauty of grass or gravel with the utility of paving.

Trees and other vegetation not only survive, they thrive with Grasspave² and Gravelpave². Porous paving has the ability to deliver water, oxygen and carbon dioxide through the cross section—all essential to root survival. Concrete and asphalt suffocate and starve the root zones of water and air. With Grasspave² and Gravelpave², you can now design in as many trees and plants as your site will allow. Grasspave² and Gravelpave² prevent compaction while allowing for ample amounts of water and air. Cars can then drive and park below tree canopies. Saving existing, mature trees is also possible with our products—our structures can come within inches of the mature tree trunk without damage. Our mats have the ability to flex with the tree root growth that would otherwise damage and crack hard surfaces.

Environmental Benefits

Grasspave² and Gravelpave² not only protect the environment, they enhance it. All of our products are made from 100 percent recycled plastic—plastic that goes into improving the environment and not into a landfill. Through bioremediation, porous pavers have the ability to clean pollutants (heavy metals, 96–99 percent; suspended solids, 95 percent; phosphorous, 65 percent; nitrogen, 82 percent, hydrocarbons, up to 100 percent) out of stormwater. Our products also reduce erosion and soil migration, reduce site disturbance, and contribute to airborne dust capture and retention.

Cooling the atmosphere and reducing the “urban heat island effect” (cities being up to 10 degrees hotter than undeveloped land) are added benefits of Grasspave² and Gravelpave². Both products can mitigate these increased temperatures. In addition, Grasspave² promotes the conversion of carbon dioxide (greenhouse gas) into oxygen and has an “air-conditioning effect.”

Driveways

Environmental, economic, and aesthetic enhancements are drawing homeowners and designers to use Grasspave² and Gravelpave² in driveways. Most residential driveways are good candidates for our porous duo because of the reduced speed and limited frequency of traffic. Our products can add beauty to residential and commercial driveways.

Parking Lots

Parking for churches and synagogues, stadiums, arenas, and overflow at shopping centers, campuses, parks and more are ideal for Grasspave² and Gravelpave². These sites generally support large numbers of vehicles but only on periodic basis. Stormwater management and green space can be combined with parking, reducing maintenance, real estate, and development costs. A great design idea is combining durable Gravelpave² drive aisles with attractive Grasspave² parking bays.

Pedestrian, Horse Trails and Bicycle Paths

Garden paths, greenhouse aisles, sidewalks, park paths, and wilderness trails paved with Grasspave²/Gravelpave² provide a stable surface for strollers, bicycles, wheelchairs, and horses. There are no puddles or mud and traction is very good. Tree roots break up hard surface sidewalks, but our mats flex to accommodate such shifts and gradient changes. Plus, with the high proportion of air, roots are discouraged from moving upward. Mountain bikers will not be able to tear up paths reinforced with Grasspave²/Gravelpave². Our products can resist the destructive forces of mountain bikes, allowing your trails to be reopened to bikes.

Fire Lanes

By far, the most common application for Grasspave² and Gravelpave² installations is for fire lanes. Our long and established history of providing safe, well-constructed fire lanes began in 1982 with our first installation in Snowmass, Colorado, near Aspen Ski Resort. Since then, we have firmly established credibility for this application. Tests have been conducted by several fire departments in Aurora, Colorado and Irvine, California. Nearly every major U.S. metropolitan area has accepted and used Grasspave² in a fire lane. You will most likely find a fire lane installation in your area.



All fire fighting vehicles can safely navigate even a wet Grasspave² or Gravelpave² surface. In a 1983 test this 100-foot ladder truck was lifted off the Grasspave² by rear outriggers, and no ruts were caused by either outriggers or tires. The ladder was extended, rotated, and loaded with no depressions in the road surface.

Apartment complex, Concordville, Pennsylvania—Several overflow Gravelpave² parking lots encompass the majority of the perimeter area on the west and south sides of the property. Grasspave² (not shown) is installed on site in two grass fire lanes.



Grasspave² Installation—Mats can be rolled out in minutes!

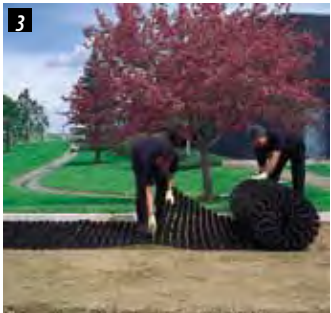
~35m² (~400 sf) per man hour! – For all steps shown below.



Place and compact sand and gravel base course.



Apply Hydrogrow mixture.



Roll out Grasspave².



Fill rings with clean sharp concrete sand.



Hydroseed or lay sod.



Roll sod with heavy roller.



Ready for use after two mowing cycles.



Use a regular lawn mower for maintenance. Do not aerate!

The Grasspave² porous pavement system is comprised of a sandy gravel base course, Hydrogrow soil amendment/fertilizer mixture, the Grasspave² ring and grid structure, sharp concrete sand, and grass seed or sod.

Grasspave² Installation Procedures

This installation section is only intended as an overview. Please review our Grasspave² Technical Specifications (available at www.invisiblestructures.com or call 800-233-1510) for comprehensive installation instructions.

Excavate a space for the base course as determined by site soils and loading requirements. Place and compact sandy gravel which should be a mixture of clean sharp sand and gravel varying in size but not exceeding 3/4 of an inch. To check porosity, use a hose to see that water flows into the base and drains away. Add subsurface drainage as necessary to low spots or locations with poor draining soils. Install irrigation lines and sprinkler heads if necessary.

Apply the Hydrogrow mixture that is included free with your order. Hydrogrow is a specialized soil amendment and fertilizer mixture designed exclusively for our Grasspave² system.

Roll out Grasspave², aligning the side hole fasteners over the side pegs. The warmth of the sun will relax the plastic so it lays flat. Cut the grid between rings using pruning shears. Incorporate the cut pieces in other areas, as needed, keeping the distance between the rings uniform.

Fill rings with clean sharp concrete sand (AASHTO M6 or ASTM C-33) using large rakes and brooms so that the tops of the rings show when done. USGA Greens mix is also acceptable.

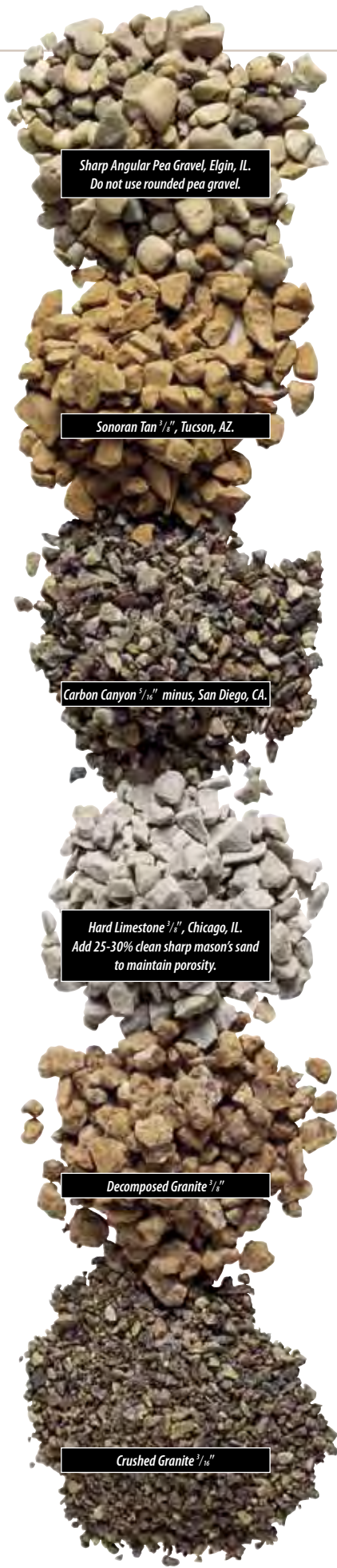
Lay turf over the rings. On warm days, wet the sand first to lower sand temperature and provide moisture for grass roots. Seeding and hydromulching is also an accepted vegetating method at this stage. Repeated hydromulching/seeding may be necessary.

Roll sod with heavy roller to eliminate air pockets and make sure roots are in contact with the sand fill. Water lawn as usual according to climatic requirements.

Whether the area has been seeded or sodded, wait to drive on grass until two mowings have been completed, by which time the root system will be established and the sod pieces locked into place. In an emergency such as the need for fire truck access, grass may be driven on immediately after installation.

Use a regular lawn mower for maintenance. There should be no paver parts protruding through the surface that would damage mowers. Do not aerate!





Place and compact sand and gravel road base.



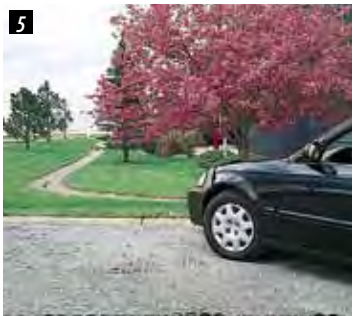
Roll out Gravelpave2, aligning the snap fit fasteners.



Secure mats with anchors provided (size and type may vary).



Fill rings with clean gravel.



Compact gravel with vibrator roller or flat plate compactor (not shown).

Gravelpave2 Installation—

Gravelpave2 Size/Shape Fill Requirements

You will need 1 1/4" of gravel fill, compacted. Be careful to order enough for the compaction process and choose a gravel size that will nest well into the rings. We have found that 3/8" uniformly sized crushed stone and sometimes 3/8" with limited small sharp screenings (#40 to #100 screen) works well. We DO NOT recommend pea gravel, even though it is often very attractive. Pea gravel will migrate out of the rings. A visit to your local quarry is suggested. We have found that some geological areas of the United States have limited types of sharp gravel available. It has been necessary to import gravel from a neighboring state, but remember the amounts are relatively small—the top one-and-a-quarter inch of the cross section. Gravel should be as free of fines as possible. To maintain porosity, avoid soft stone materials with low durability that will break easily.

Other Fill Materials for Gravelpave2

Please ask our staff for assistance with this category since it is use-specific and often experimental. Ground rubber, crushed glass, crushed brick, and many other materials can be useful as attractive fill materials for various applications. Thermoset (epoxy, polyurethane, etc.) binders may be cost prohibitive for most projects, but offer unique design possibilities, including clarity, color enhancement (wet look), flexibility, and durability.

Our technical support staff will assist with selection of gravel sources. The photographic samples shown on this page will help you narrow your gravel choices. Should you have questions concerning the selection, please submit a small sample for approval prior to specifying or securing the materials.

Mats can be rolled out in minutes!

Gravelpave2 Installation Procedure

This installation section is only intended as an overview. Please review our Gravelpave2 Technical Specifications (available at www.invisiblestructures.com or call 800-233-1510) for comprehensive installation instructions.

Prepare sandy gravel base course to a depth as determined by a soils engineer. Compact with a vibrating plate compactor or use a heavy motorized roller for large jobs. To test porosity, water with a hose and check to see that water drains readily through the base course before installing the Gravelpave2 mats.

Roll out mats with the grain (in the same direction) so that the snap fit fasteners can be used with neighboring mats. To fit around boxes and curbs, cut the grid between the rings with pruning shears and scissors or a small portable electric hand saw.

Fasten the mats together using the snap fit fasteners that are molded into the product inserting the prongs into the rectangular openings. Tuck the fabric underneath the fasteners to keep joints closed. A quarter-inch nut driver head (6 mm) fits nicely over the fastener to compress the pieces together. A piece of lumber placed under the Gravelpave2 mat will provide stability to aid in fastening.

Supplied anchors must be used to secure the mats to the base. Hammer anchors with washers at a rate of one anchor per six rings in both directions. Use extra anchors around the perimeter of the Gravelpave2 install and in high traffic areas. Reciprocating hammers can be used to speed up the

anchoring process. Anchors should be placed inside the rings as close to the center as possible. Begin anchoring from one corner in a radial pattern.

Gradually place gravel fill (see suggested fill material on facing page) into rings by using a front-end loader and shaking out the fill as the machine drives forward. Carefully lower the bucket when empty and back up while dragging it *above* the rings to smooth out the gravel, finishing with a stiff broom. Wheel barrow and shovel works well for small jobs. Contractor tip—you can store excess material for future maintenance, top dressing as may be necessary. Use rakes and/or push brooms to distribute the gravel fill to a level slightly above rings so that compacting the fill will not uncover the rings.

Use a vibrating plate compactor or large driving roller again to compact the gravel fill. Additional gravel may be necessary to finish filling the rings. Compact again until the material appears solid in the rings. Wetting the gravel may help it to interlock.

Drive on the installation when finished. If car tires make a pattern, there may be too much gravel or it may need additional compaction. It is expected that tops of the rings may be visible. If sides of the rings show, then add more fill material and repeat the compaction process.



Golf Industry

Gravelpave² and Grasspave² golf cart paths give the look of a natural path through trees, along fairways, and around greens. The flush surface requires no trimming or edging. Traction is excellent with Gravelpave² and Grasspave² traction is slightly better than grass. Grasspave² and Gravelpave² can enhance your golf cart staging area, pedestrian traffic area, parking lot, road shoulder, and maintenance yard.

Automobile Dealership Displays

Car dealerships have discovered that Grasspave² and Gravelpave² are perfect for automobile display areas. Dealerships now have an option when it comes to adding paved areas for car transport and display. Dealerships like the “soft” attractive look grass and decorative gravel provide.

Utility and Maintenance Vehicle Access

Providing your site with important utilitarian functions without compromising beauty is simple. Grasspave² and Gravelpave² can incorporate a structural road without interrupting your landscaping. No obtrusive concrete or asphalt access roads are necessary to get to window washing areas, pump stations, microwave towers, tanks, or electrical boxes.

Unique Applications

Our mats are installed in some unique and interesting places: Helicopter landing pads, race car display areas, outdoor amphitheater seating, under picnic tables, under concrete pavers (support), airplane display and transport, cemetery marker reinforcement, eave drip lines and more. Installations are not limited to traditional paved areas.

Grasspave² Characteristics

Ring and Grid Structure

Grasspave² is by most accounts the best flexible grass paver made today. Its unique ring and grid structure allow for flexibility, stability, and exceptional grass growth. With 92 percent void space for healthy roots and 100 percent grass coverage, Grasspave² is the industry’s preeminent choice. Our installations are hard to find because they are invisible! With so little plastic near the crown of the grass, the blades of grass are not smashed by product. Root development is not interrupted from spreading laterally. The rings are strong and rigid, keeping grass root systems protected from harm. The roots grow directly downward, deep into the sandy gravel base course.

Large Rolls

Our patented systems have a shipping, handling and installation advantage as well—large rolls. Our standard roll size (model 2020) covers 431 sq. ft. (40 m²) and weighs 192 pounds (87 kg). Other roll sizes are available. Installers of our products have

repeatedly commented that they enjoy the easy installation. Rolling out Grasspave² is similar to rolling out carpeting and coverage is fast and efficient. The mat system can be easily cut to fit around trees, irrigation, curbing, or other terrain. The rolls have snap-fit connectors to attach to adjacent rolls, making one unified, contiguous system. This unified mat system adds stability and continuity in design. Grasspave² can just as easily be snapped to Gravelpave² to add stability and product variation.

Hydrogrow

Another reason Grasspave² is the industry leader is the addition of Hydrogrow soil amendment, which is supplied with your order. Hydrogrow is engineered to help grass grow in our sand based root zone. The results are amazing and our Grasspave² areas often look healthier than surrounding turf. By using this special mixture in the sand, porosity will be maintained, turf will be attractive, and aeration will not be necessary.

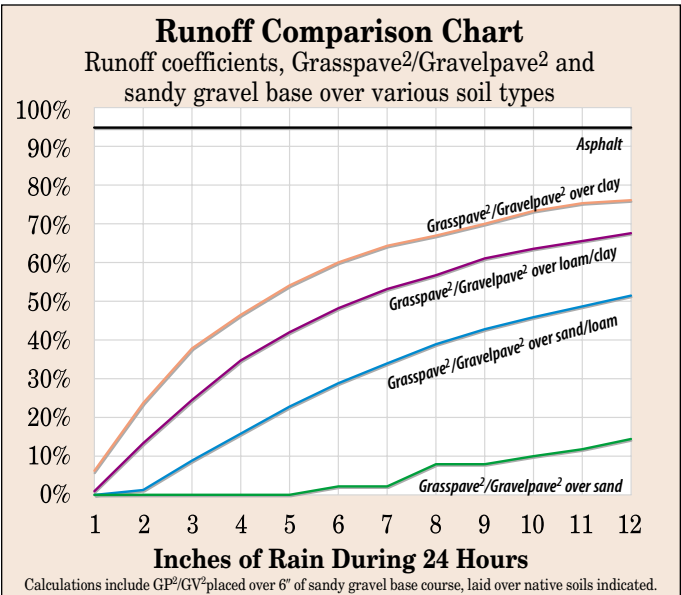
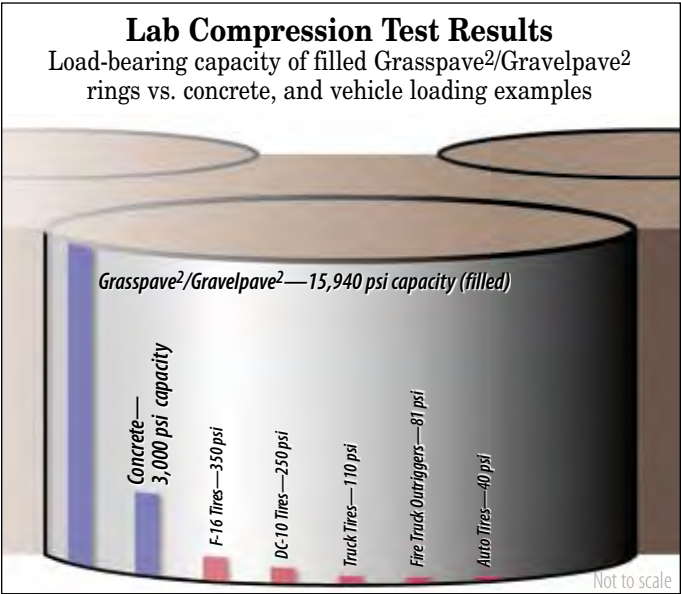
Sand Fill

Grasspave² is the only grass paver on the market specifying sand as part of its cross section. Sand is the best medium to provide water and air to the roots and still provide high compressive strength. The United States

Golf Association uses sand for every USGA golf course and nearly every professional and collegiate turf athletic field uses a sand cross section as well. Topsoil (or other organics fill material) in the rings will eventually compact and damage the root zone. Sand negates the need for mechanical aeration, which can damage Grasspave² and other grass pavers.

Strength When Installed

When installed over a thick base course and compacted to 95 percent modified Proctor, sand-filled rings can support 5,700 pounds per square inch (psi) without deflection or compromise to safety. The cylinder is the strongest shape to support compressive loads because it has no corners. Supporting heavy loads with the rings allows us to use less plastic in the product creating a 92 percent void area for root development, combined with strength! Less plastic means a lower cost for you.



Fort Shantok State Park, The Mohegan Tribe, Uncasville, CT—Low-maintenance parking lot stable for cars, strollers, and wheelchairs. This lot is plowed in the winter.

Traffic Frequency

Grass as a surface material can withstand from two to six (varies with grass species and environmental conditions) trips daily over the same spot. This suggests that most parking applications we pave with asphalt today could be paved with Grasspave² instead. Vehicles can remain parked on grass for extended periods of time, provided some relief can be given for a few days for the grass to recover.

Lifespan

Grasspave² has a projected lifespan of 60 years. Compared to asphalt with a lifespan of 15 years; and concrete with a lifespan of 25 years, Grasspave² will save you money on replacement costs.

Irrigation

Grass needs water and you may need to have irrigation installed. Grasspave² has a sand based root zone which usually requires slightly more water than a normal topsoil or organic root zone. If golf courses in your area use irrigation systems, you probably should in your Grassapave² installation.

Gravelpave² Characteristics

Fabric, Ring and Grid

When we developed Gravelpave² in 1993, our goal was to provide designers a second option for a porous pavement that can tolerate high frequency and low-speed traffic. By molding our ring and grid structure onto a non-woven polyester filter fabric, we were able to create a new product that contains gravel and prevents particle migration and rutting.

Gravelpave² is the only system specifically designed for aggregate containment porous paving. The cylinders displace the load onto an engineered base course and hold the decorative gravel in place. The fabric keeps the top-dress gravel from compacting into the road base, acts as a weed and vegetation barrier, and suppresses dust.

Traditional pavements, including gravel roads, are designed to shed water and keep it away from the pavement's cross-section. Gravelpave² is designed to do the opposite—welcoming water down through the system. Plus, Gravelpave² will not rut, wash-board, or puddle like traditional gravel roads.

Snap-Fit Fasteners

Designed into Gravelpave² is a snap-fit fastener, a two-pronged arrow that fits into a rectangular slot. Simply push the slot over the prongs to easily snap together panels of Grasspave². To take them apart, just squeeze the prongs together and lift off the slot.

Should the fasteners of one mat not align over the distance of another mat, then anchor pins (or eight inch ring shank nails and large washers) can be used to secure the mats along the seam. Forcing the alignment can cause the mats to ripple and not lay down evenly.

Traffic Frequency

Gravelpave² has no limits on frequency or duration of traffic on the system. Park or drive as often as you like on Gravelpave². However, speeds should be kept at or below about 20 mph (30 km/h).

Durability

Grasspave² and Gravelpave² are made from flexible High Density Polyethylene (HDPE) plastic with UV inhibitors, which withstands repeated freeze-thaw cycles and continuous subzero temperatures without cracking. HDPE resists aggressive chemicals such as road salts, motor oils and fuels.

HDPE is highly abrasion-resistant and is unaffected by extremes in pH. A well-maintained Gravelpave² installation will last 25 years in most climates.

Aesthetics

Part of what draws many designers to use Gravelpave² is the ability to have an area maintain a natural look. Many times native soils or gravel can be used as fill material, complementing surrounding areas. Gravelpave² is available in four standard colors—black, tan, gray, and terra cotta (custom colors are available at additional cost). Ring colors are intended to blend with the gravel color so they will be less visible should some portion of the rings show.

A small amount of excess stone fill should be left above the top of the rings to provide visual cover and additional UV protection. This excess will migrate, but usually not very far.

Size and Shape Requirements for Gravel Fill

You will need one and a quarter inch (3.2 cm) of gravel fill, before compaction. After compaction the gravel should be only be slightly higher than the rings (1/8 inch, 3 mm above). The following criteria for gravel fill will make the most of the systems performance:

- Hard—resistant to breaking, crushing or crumbling
- Sharp and angular (do not use rounded pea gravel)
- Clean, washed (free of fines)
- Size 3/16 to 3/8 inch (5 mm to 1 cm)

Other fill material may be used in certain situations, but may be considered use-specific or experimental. Please consult with our technical support staff regarding fill material not meeting the above criteria or for installations requiring “binders.”



Available colors include:
Tan, Black, Pewter Grey, Terra
Cotta.

Invisible Structures—Standard Product Roll Sizes											
		Width		Length		Diameter		Area		Weight	
Model		m	ft	m	ft	m	ft	m ²	ft ²	kg	lbs
1010		1	3.3	10	32.8	0.5	1.7	10	108	22	48
2020		2	6.6	20	65.6	0.8	2.7	40	430	87	192
Rolls can be installed manually (2 people advised). Rolls apply to Grasspave ² , Gravelpave ² , Draincore ² , and Slopetame ² .											



Denver Tech Center Corporate Client, CO—Curving Grasspave² firelanes around both buildings lends opportunity for private outdoor lounge area for employees who can also enjoy the garden view from their office windows.

Dust Suppression

Dirt and gravel roads have the potential to kick up dust and dirt when traversed. Many communities have regulations limiting or eliminating gravel surfaces from new construction. Rest assured, if you design a Gravelpave² surface you will be getting a virtually dust-free surface. The clean and washed fill material required to fill the rings will not have any more dust than an asphalt-paved surface. Gravelpave²'s geotextile fabric will prevent the dust-sized particles contained within the base material (existing gravel surface or dirt), from being displaced by moving tire or wind forces.

Industry Advantages

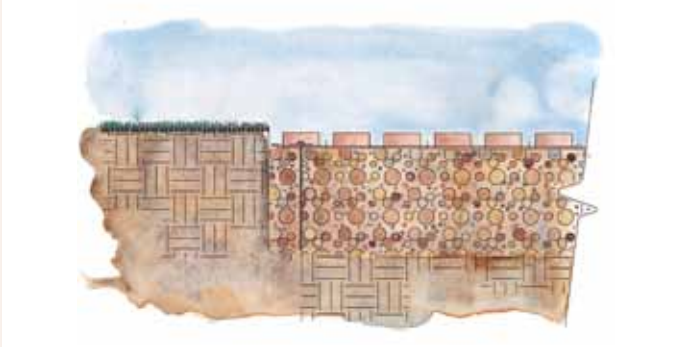
Economic Advantages

Whether you are an engineer, architect, landscape architect, contractor or homeowner you will be concerned with the cost of your project. Grasspave² and Gravelpave² will save you money. Our products will save on design costs, installation costs, component materials, maintenance/operations expenses and lifecycle costs. We can find a way to reduce your site expenses with our porous pavers.

When designing, you may be able to eliminate or reduce stormwater filters, detention basins, conveyance lines, modifying grading requirements, or many other "necessities" associated with asphalt or concrete. A great deal of your stormwater mitigation plan can be built into Grasspave² and Gravelpave².

Installers have been astounded by the speed and efficiency for which large areas can be accommodated by our large rolls. Unrolling our mats, snap fitting, and cutting is easy and requires no special machinery. Please view our technical specifications (from www.invisiblestructures.com, call 800-233-1510, or available through our partner network) for the installation procedure. A brief installation overview is also on pages 8 and 10).

Compacted sandy gravel road base placed above compacted subgrade, 95% modified Proctor density. Gravelpave² rolls are laid, pinned, and filled with clean, sharp gravel.



In addition to cost savings in the design phase, you may be able to eliminate other components during installation such as root protection for trees, grates, manholes, curbing, and tree and vegetation removal costs.



Oakdale Nature Preserve, Freeport, Illinois—Gravelpave² reduces erosion and rutting in this ADA accessible trail.

Maintenance and operations costs are significantly reduced over asphalt and concrete surfaces. A. (Andy) E. Lindsey, Director of Grounds Maintenance, University of South Alabama, in his written analysis dated February 18, 1999, compared the cost of our porous systems to asphalt pavement using historical data from university records. The conclusion was a \$56,000 savings over 20 years, by using Grasspave² and Gravelpave².

Our products can save you the most money by combining your surfaces' uses into one area. Multiple surface use means savings on real estate, design costs, maintenance, insurance and more. You can have a fire lane that doubles as "green space" for employees or visitors, combine a parking lot with a bio-swale and stormwater mitigation system, and expand your lawn into the driveway. The Grasspave² and Gravelpave² installations at NRG Stadium, Houston, Texas, pull quadruple

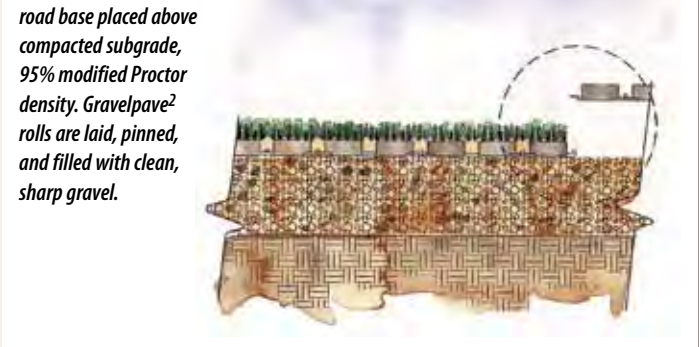
duty, providing over seven acres of parking, stormwater mitigation, required "green space," and an outdoor festival site which generate additional income.

As mentioned above, Grasspave² and Gravelpave² have a longer lifespan than asphalt. Compound the above savings with the longer lifespan, and you can have a lifecycle cost which can save thousand of dollars on even moderately sized installations.

Competitive Advantages

Our porous pavers have advantages over impervious surfaces, but we are proud to compete with any other plastic porous pavers manufactured. Our products are the strongest on the market—15,940 psi installed to specification (2.29 million lbs./ft²; 109,906 kPa; 11.2 million kg/m²; 20.6 million lbs./yd²). Grasspave² and Gravelpave² have

For Grasspave²:
Compacted sandy gravel road base placed above compacted subgrade, 95% modified Proctor density. Grasspave² rolls are laid, pinned, and filled with clean, sharp gravel.



NRG Stadium (formerly Reliant Stadium / The Astrodome), Houston, TX—30,800 m² (317,000 sq ft) of grass porous paving. Provides parking, stormwater management, and a cool-multipurpose surface for festivals and events.

92 percent void space for the best root development and grass coverage (Grasspave²) and the most volume available for desired fill (Gravelpave²). Most other plastic pavers come in rigid unit blocks, which are cumbersome to install and difficult to cut and shape. Grasspave² and Gravelpave² rolls are considered the favorite to work with by installers, for the flexibility, continuity, and speed of installations. Grasspave² is the only product on the market specifying sand infill for the grass roots. Sand is recommended as the infill of choice for grass pavers by Professor Bruce K. Ferguson, Univ. of Georgia, author of the book, “Porous Pavements.”

Competing Technologies

Porous paving technology has made great strides not only in flexible plastic pavers but in other areas as well. Permeable asphalt, permeable concrete, interlocking unit blocks, reinforcement mats, and concrete grid pavements, have all improved and advanced to meet the growing demand for environmentally friendly technologies. It is Invisible Structures’ firm belief that you should use porous paving, even if it is not our product line, whenever possible. The more you use these technologies, the better accepted they become: If you have to pave, porous pave!

Invisible Structures also contends that while these competing technologies have their place, in most instances, our Grasspave² and Gravelpave² systems outperform, last longer, require less maintenance, look better, and are easier to install. Check with our technical specialists at 800-233-1510 for the latest data.

Designing for Grasspave² and Gravelpave²

Design for Use

There is an area in your development, site, or home that will most likely benefit from Grasspave² and Gravelpave². We advise that you take a look at proper use patterns, site conditions, and other specifications to get full advantage and long life out of our products. *Invisible Structures, 800-233-1510, is available for preliminary design assistance and consultation. Please note that other porous paving systems are NOT interchangeable with Grasspave² or Gravelpave², consult our technical specifications for full installation instructions.*

Considerations for Design:

- High use, low speed, and unlimited traffic volume is optimal for Gravelpave²
- Low to moderate use, low speed, with recovery time is perfect for Grasspave² or Gravelpave²



Vancouver City Works Yard, Vancouver, British Columbia—main staff parking lot, done in Gravelpave².



Fire lane, San Mateo, CA—Many native grasses and other attractive vegetation can be grown in Grasspave².

- Keep the porous paving area free of sediment and erosion from adjacent areas as they can cause drainage and aesthetic issues. Extra care should be taking for use in swales or berms.
- Slope should be considered. Grasspave² and Gravelpave² perform the best for all vehicles when the slope is no greater than 8 percent. Light vehicles (golf carts), bicycles, and pedestrian areas can have up to a 20 percent slope. Grasspave² in fire lanes should not exceed five percent (consult your local fire departments).
- Check the permeability of existing underlying soils. Percolation rates should be .64 cm to 1.3 cm of water per hour (EPA guidelines).
- The water table should be about three feet (approx. 1 m) below base course in most instances.
- Bedrock should not be closer than two feet (0.6 m) below base course.
- Avoid use of Grasspave² and Gravelpave² in areas where high speed acceleration or braking and turning occur. Examples are entrances and exits to parking lots that connect to higher speed roads.

If your site varies from these conditions, please consult ISI directly, 800-233-1510, as some conditions can be overcome with design and component adjustments.

Base Course Design

Calculating the depth and composition of materials for the base course incorporates the same design criteria as for other pavements:

- Load-bearing capacity of native (or fill) subsoil,
- Plasticity or impact of moisture on strength and longevity,
- Frostheave potential, and
- Traffic load, frequency and/or duration.

Sample Base Course Depths

Please consult with a soils engineer for site-specific base requirements. Generally, the depth that is used under asphalt will be the requirement under

Grasspave²/Gravelpave². Golf carts and pedestrian traffic may require nothing over sandy gravel soils, and just two to four inches of base course (5–10 cm) over very weak soils. Cars usually need a six- to eight-inch base course (15–20 cm). Buses, trucks, and fire engines can easily require eight to 12 inches (20–30 cm) or more. The use of geotextiles, below the base is not required, but will prevent integration with subsoils and is strongly advised in areas of clay or silt soils and frost heave. *Do not use 100 percent limestone base as limestone will compact and become impervious—If limestone must be used, mix with 25–30 percent sand (AASHTO M6 or equal).*



Garden of the Gods Park, Colorado Springs, CO—Horse and pedestrian trail stabilization to prevent ruts previously as deep as three feet. Horse traffic contributes to loose soil erosion without Gravelpave². Terra Cotta rings were used to match existing sandstone soils.

Bedding Sand Not Necessary

Do not use a sand setting base with our products. Unlike concrete pavers, bricks, and other rigid pavers—our Grasspave² and Gravelpave² are flexible and do not require sand to level.

Edge Protection

For aesthetic and maintenance considerations, you may want to design in a durable edging material to separate our porous pavers from adjacent areas of turf or to simply delineate a fire lane or path. With Gravelpave², an edging can prevent vegetation from encroaching onto the system and can prevent the gravel fill from migrating at the edge. Steel, aluminum, wood, brick, or concrete are all acceptable edging materials. Keep the edging flush or slightly higher than the porous paver grade.

Maintenance and Operation

Grasspave² Maintenance

Irrigation is required in dry climates. Any popular pop-up system can be used. Simply cut out rings to reveal the irrigation head. If golf courses in your area use irrigation systems, you probably should in your Grasspave² installation. Be careful not to over-water as this will encourage shallow root development.

Fertilize once a year with an NPK slow-release fertilizer that contains trace elements. There are many brands on the market. Do not aerate! You'll end up with product damage. When installed using sand in the rings, there will not be a compaction problem. Be careful not to use clay-based sods in pedestrian or vehicular traffic

areas—use sandy soil sod, or seed and mulch. There seems to be no problem with sod selection for fire lanes. If the Grasspave² area has just been seeded or sodded, drive on it only in an emergency.

Gravelpave² Maintenance

Potholes will only appear if the base course has not been compacted properly before laying the rings or if the base material is allowed to mix into clay soils below (use nonwoven fabric to keep separate). Should this occur, remove a section by vacuuming the gravel from the rings, unfasten the snap fit fastener, bring the base course to the proper grade and compaction, put the Gravelpave² square back in place, anchor, and fill to the top of the rings. Seasonally check the rings in high-traffic areas and entrance lanes for lower levels of fill and replace by sweeping gravel from other areas to bring it level again. Leaves should be raked or vacuumed and not allowed to decay. Organic matter will stimulate weed growth and reduce porosity. To attack any occasional weeds that may locate within the Gravelpave² installation, simply spray them with a weed killer (such as Roundup™) and remove them when dead.

Cold Climates Concerns

Porous pavement thaws faster than conventional pavements because it allows melted water to flow directly through the pavement, increasing the temperature in the cross-section

Grasspave² and Gravelpave² are made from flexible High Density Polyethylene (HDPE) plastic with UV inhibitors, which withstands repeated freeze-thaw cycles and continuous subzero temperatures without cracking.



Private Residence, Houston, TX—Grasspave² supported grass sections in this custom home driveway.



Grand Canyon Trust, Flagstaff, AZ—Thirty-car employee parking lot after several years of snow removal and excellent maintenance. Spaces are defined with concrete bumpers.

Fire departments usually require you to plow snow that is over three inches deep. (7.5 cm). Consult with your local fire department for their guidelines.

Educate your snow removal crew to take care not to have the plow blade make contact with the Grasspave² or Gravelpave² systems. Experienced snowplow drivers can leave a thin layer of snow on the systems or they can attach skids (¾ inch—2 cm) to the bottom of the blades.

Sales and Technical Support Partners

Invisible Structures, Inc. welcomes the opportunity to review designs and answer technical questions. Design details, technical specifications, white papers, and other support material may be downloaded from our web site. See a comprehensive list of project profiles and case studies at www.invisiblestructures.com

In addition to the high-quality, professional, experienced staff at our main headquarters in Colorado, we have excellent partners representing their geographical areas. They are prepared to assist you locally, at all levels, with your project needs. Please contact us or check our web site for your partner name and information.

Contact Information

Invisible Structures, Inc.
303-233-8383
www.invisiblestructures.com
email: sales@invisiblestructures.com

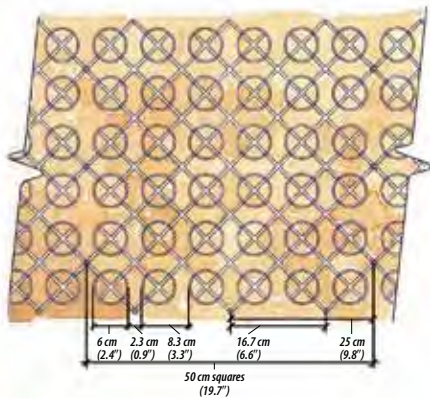
Grasspave² and Gravelpave² Patent No. 5,250,340
Held by William Bohnhoff, ASLA.
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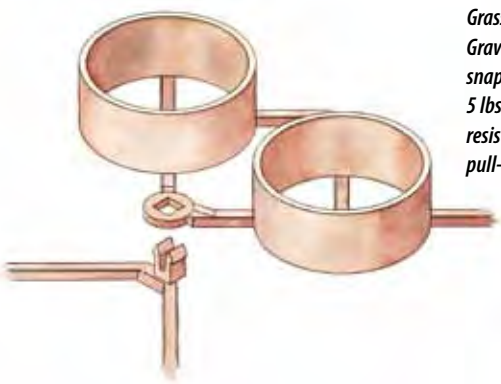
Grasspave² is used as a cool, stable surface for picnic tables at a community pool.



City of White Rock Operations , White Rock, British Columbia—Gravelpave² is used in the main drive aisle of the works yard and Grasspave² is used for the parking bays.



Gravelpave²: Available in several roll sizes.
Squares weigh 1.97 kg (4.34 lb) each.
Colors: Cashew Brown, Black, Pewter Grey, Terra Cotta.
Resin: HDPE.
Strength: 1120 kg/cm² (15,940 psi)



Grasspave² and Gravelpave²: Reusable snap connector requires 5 lbs to connect and resists 70 lbs of pull-apart force.



Glendale Community College, Glendale, Arizona—The Gravelpave² fire lane (foreground) and Grasspave² fire lane (background) complement the surroundings at the Glendale campus.

Quick Reference Guide for Grasspave² and Gravelpave²

	 GRASSPAVE² BY INVISIBLE STRUCTURES™	 GRAVELPAVE² BY INVISIBLE STRUCTURES™
Description	Connectable ring and grid system	Connectable ring, grid, and integrated fabric
Also Included	Hydrogrow polymer—exclusively for Grasspave ²	Geotextile fabric molded to grid (exclusive to Gravelpave ²) and anchors
Available in Large, Flexible Rolls	Yes, various sizes—see roll chart page 14	Yes, various sizes—see roll chart page 14
Colors	Black	Black, gray, tan, terra cotta, custom colors extra
Components Needed for System	Base course, sand, labor, sod or seed (irrigation is recommended)	Base course, 1 1/4" (3.2cm) of 3/16" to 3/8" decorative gravel, and labor
Traffic	Low speed, light to moderate	Low speed, unlimited use
Compressive System Strength	Filled: 15,940 psi (2.29 million per sq ft / 109,906 kPa)	Filled: 15,940 psi (2.29 million pounds per sq ft / 109,906 kPa)
Life Span	60 years	25 years
Recommended Maximum Slope	5% fire lanes, 8% car/light truck, 15-20% golf carts, pedestrian use, and trails	5% fire lanes, 8% car/light truck, 15-20% golf carts, pedestrian use, and trails
Stormwater Storage	Yes	Yes
Clean Pollutants through Bioremediation	Excellent	Good
Air-Conditioning Effect	Yes	No
Heat Island Mitigation	Yes—Albedo Number .40	Yes, with light colored gravel fill—Albedo .16
Reduces Runoff and Non-Point Source Pollution	Yes	Yes
Recycled Content	100% recycled HDPE plastic	100% recycled HDPE plastic with recycled remnant fabric
Erosion Control	Yes	Yes
Airborne Dust Capture and Retention	Excellent	Good
Promotes and Retains Tree Growth	Yes	Yes
Recharges Groundwater	Yes	Yes



INVISIBLE
STRUCTURES™

303-233-8383

sales@invisiblestructures.com

www.invisiblestructures.com



Gravelpave² and Grasspave² Patent No. 5,250,340
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Grasspave2
Maintenance Guide
for
Owners and Maintenance Staff

by

Invisible
Structures, Inc.

1600 Jackson Street, Suite 310
Golden, Colorado 80401
Ph: 800-233-1510
Fax: 800-233-1522
www.invisiblestructures.com

Grasspave² - Maintenance Guide

Regular maintenance is required to maximize traffic on grass paved areas with minimum wear and tear problems. The following maintenance and repair information, compiled from more than a decade of client experience with Grassrings and Grasspave², will enable staff to keep your grass paved areas healthy and beautiful all year long.

For more information about basic maintenance, or for answers to questions about a unique site, call Invisible Structures, Inc., toll free, at 1-800-233-1510.

Normal Maintenance

Grasspave² paved areas require basically the same care as other turf areas. Mow, irrigate, and fertilize as necessary for selected grass species for a healthy turf. As levels and frequency of traffic increase, greater stress is placed on the turf, which requires careful observation and response by maintenance staff. Recommended fertilizers and micronutrients:

- **N,P,K Fertilizers** - for other fertilizer applications, use fertilizers best for grass species used. As traffic frequency increases, the need for additional nitrogen increase in order to make the grass GROW faster and replace damaged blades quickly. Take care to use fertilizers that do not have poor materials such as clay as "fillers." The best fertilizers are:

- slow release (temperature activated)
- liquid concentrates (through irrigation system)

- **Micronutrients** - apply fertilizer supplemented with micronutrients, such as Humate, once a year. Or, apply the micronutrient in a separate application.
- **Other Chemicals** - apply water, herbicide, and insecticides as needed in response to site specific needs/problems.

Aeration

IMPORTANT!! DO NOT AERATE

GRASSPAVE² INSTALLATIONS!

Aeration is a treatment for compaction problems, associated with poor percolation.

Grasspave² paved areas do not need aeration because, if properly installed, compaction will not occur. Aeration equipment will damage the Grasspave² structure and could prevent its long term function.

If compaction and poor water penetration problems arise, they can be due to filling rings with organic soils. (Many sod farms grow sod in high organic soils, such as peat.) When these soils dry out, there can be severe shrinking. The use of dry fertilizers with clay as a "filler" material (sometimes as much as 70% of the bag contents) can also contribute to compaction and poor water penetration. Organics (silt, clay, peat) can effectively seal off the surface of the grass paved areas, preventing entry of air and water to the roots.

Poor percolation can also be a result of chemical change to soils of ionic charges that might increase water repellency of soils. Solutions include treatment with products or chemicals such as wetting agents (diluted detergents), gypsum, etc. Your local County Extension agent can be an excellent source for advice on local conditions.

Antifreeze Spills - See Oil/Antifreeze Spills

Grasspave² - Maintenance Guide

Bare Spots - Causes and Solutions

It is important to determine the cause of bare spots in order to select the most appropriate solution. Some possible causes and solutions:

(Cause / Solution)

- *Incorrect sod (sod grown in peat, silt, or clay) for high traffic areas*

Totally replace with sand grown sod and rings, for low traffic areas; amend soil with chemicals such as detergents and gypsum and add sand to cracks for low traffic areas, and reseed as needed.

- *Poor quality seed*
Reseed with fresh source.
- *Erosion*
Intercept source of water and redirect to reduce impact.
- *Lack of nutrient*
Increase water and fertilizer.
- *Shade*
Reduce shade cover or change grass to more shade tolerant species.
- *High traffic*
Increase fertilization and water, and / or reduce traffic frequency by limiting or alternating zones of access.

Bare Spots--Repair

1. Fill rings uniformly with clean sand (concrete sand is preferable) to the top of all rings. When seeding, lightly rake to disturb and loosen surface.
2. Moisten area with a diluted detergent solution to break the soil's surface tension.
3. Topdress small bare areas with a mixture of sand and grass seed that either matches the installed grass species or changes the species for an environmental response (such as a shade mix).
4. Mulch with a layer of cellulose (paper)

placed over the topdressing mix to speed germination and prevent surface erosion by irrigation or rainfall. Commercial mulch materials should have a fine texture, such as those used for hydromulching. If visually acceptable, thin strips of newspaper (per office shredders) can be used very effectively as mulch.

5. Inject Hydrogrow. Hydrogrow's advantage is that it is able to store moisture and dissolved nutrients within the root zone, making them directly available to plant roots. Check local dealers or equipment rental sources for machines (such as Olathe) to inject dry polymers by compressed air into existing installations.

Irrigation

Regular irrigation is necessary for grass subjected to the stress of daily traffic, even in areas with "historically high average rainfall." The combination of daily traffic and even a week of without rainfall can quickly destroy a quality grass paved area. Repaired areas also usually require supplemental water to establish grass.

The irrigation system can be a hose and sprinkler, a simple manual valve system, or an automatic pop-up system as appropriate for the owner's maintenance program and budget. Automatic irrigation systems are low in labor costs, provide quick response to usage, conserve water, and allow for easy and rapid fertilizer applications. Standard large diameter spray heads will keep the irrigation cost per square foot to a minimum. Manual systems have higher labor and water costs, and variable response to water needs.

Buried low-pressure porous pipe irrigation systems have also been used with success. This type of irrigation can work during daylight hours without wasteful spray damaging people or objects above the ground. However, grass leaves do not receive cleansing from water falling from above.

Grasspave² - Maintenance Guide

Oil/Antifreeze Spills

Small Spills - Naturally occurring micro-organisms in turf can break down oil and "clean" spills prior to their reaching the water table below. Thus, turf is capable of accepting oil drippings without harm to grass plants. Small amounts of diluted detergent (dishwashing concentrates) applied to minor spills will also help to reduce oil particles to manageable size and speed recovery.

Large Spills - Large oil or antifreeze spills will effectively sterilize affected soils for years and prevent growth of most vegetation. Thus, affected soil, base course, rings, and grass should be replaced and soil disposed of according to local codes relating to hazardous materials.

To create a uniform edge for repair, use a sod cutter or circular saw with masonry blade to cut the upper 2" of soil and Grasspave² structure. Be sure to wear appropriate eye and body protection when cutting into rings, soil, and gravel. The disturbed base can be dug by shovel or backhoe depending on the size of the area. Replace materials per Grasspave² Installation Guide .

Rings--Repair When Exposed

When properly installed, Grasspave² units are protected from damaging ultraviolet (UV) rays, which make plastics brittle, because they lie just below the soil surface. When impressions of the rings are visible as creases in grass blades (during the growing season), or when actual rings are visible to the eye, immediately cover the exposed rings with sand topdressing to a depth of between 1/8" to 1/4" above the top of the rings. This is easily done by spreader equipment or with a shovel and rake.

Ruts

The appearance of ruts in grass paving is a sign of improper installation. Possible errors

include:

1. Improper depth of base, or inadequate compaction
2. "Topsoil" placed between base and Grasspave²
3. More than 1/2" of soil above top of rings

Contact the original contractor to repair and re-install to specifications.

Shade

As trees mature in the landscape, grass paved areas (especially those carrying daily traffic) can experience a loss of grass vigor due to increased levels of shade. Some grasses are more tolerant of shade than others and may have to be seeded into the affected area.

This can be done without removing the existing grass because a shade tolerant mix will overcome a weaker grass. For a more rapid and complete conversion, however, an application of a short-term herbicide such as Roundup can be applied according to manufacturer's recommendations in preparation for reseeding. Use reseeding steps in "Bare Spots--Repair" described on Page 3.

Grass paved areas not subject to daily traffic (such as firelanes) will probably not show any stress from shading.

Snow Removal

Grasspave² paved areas can be easily plowed of snow using standard truck-mounted snow plow blades with small skids on the corners to keep the bottom of the blade off grass surface by approximately 1". This minimizes surface skinning. This apparatus should be used regardless of the pavement surface type.

The Grasspave² paved area surface should be at, or slightly below, that of adjacent hard surfaces to avoid gouging. Grass plants are dormant in the winter and damage to grass blades will be replaced with new growth in the spring. Damage to grass crowns can be

Grasspave² - Maintenance Guide

repaired by topdressing as described in "Bare Spot--Repair" on Page 3.

Avoid long-term pileup of snow on grass paved surfaces to minimize possible damage from snow mold and other related diseases. Snow melts from grass areas at about the same rate as that of asphalt.

Thatch Removal

Over time, most grass installations, including Grasspave² areas, will develop layers of thatch--usually defined as old leafless stems of grass, or layers of grass clipping in various state of decomposition. Thatch is a problem because it can prevent percolation and, if allowed to build layers over 1/2" in depth above rings, can allow compaction to take place above the Grasspave² structure. This layer of thatch must be removed for the long-term health of turf.

Different grasses require different techniques for thatch removal. The two most common methods are:

- Use of spring tines on rotary mower blades (best for buildup from clippings)
- Use of sod cutter, set to shallow depth to skim tops of rings (best for air/ waterborne soil deposits over long term)

Depending on the depth of thatch removed and the condition of grass crowns remaining, it may be necessary to topdress and reseed. (See "Bare Spots--Repair," page 3.)

Utilities--Subsurface Access

Subsurface utilities can be installed or repaired by cutting the Grasspave² structure and turf with a sod cutter (set to depth below the Grasspave²), pulling/rolling up the section, and setting it aside. To reinstall Grasspave², rebuild the base as in a new installation (See Grasspave² Installation Guide) and replace the Grasspave² and turf. Be sure to compact the base course material to 95% Proctor (3 to 4 passes with vibrating roller).

In the case of a broken water or gas line below Grasspave² paved areas, use a standard backhoe for rapid and easy emergency access. Reinstall following instructions for a new installation. If necessary, new Grasspave² units can be delivered by UPS Next Day anywhere in the country. The finish grade of base course (usually Finish Grade Less 1 Inch) can be used for temporary access until Grasspave² and grass are ready to complete the finish surface.

Grasspave² - Maintenance Guide

Grasspave² Normal Maintenance Checklist

Function

Frequency

Aeration

NEVER AERATE GRASSPAVE² PAVED AREA

Fertilizing

As appropriate for selected grass species.

Herbicides/Insecticides

As needed, following manufacturer's instructions.

Irrigation

As appropriate for selected grass species and rainfall amounts in area.

Micronutrients

Apply 1 time year (or every 6 month growing season in warm climate areas).

Mowing

As appropriate for selected grass species.

Thatch Removal

Remove when reaches 1/2" in depth above rings.

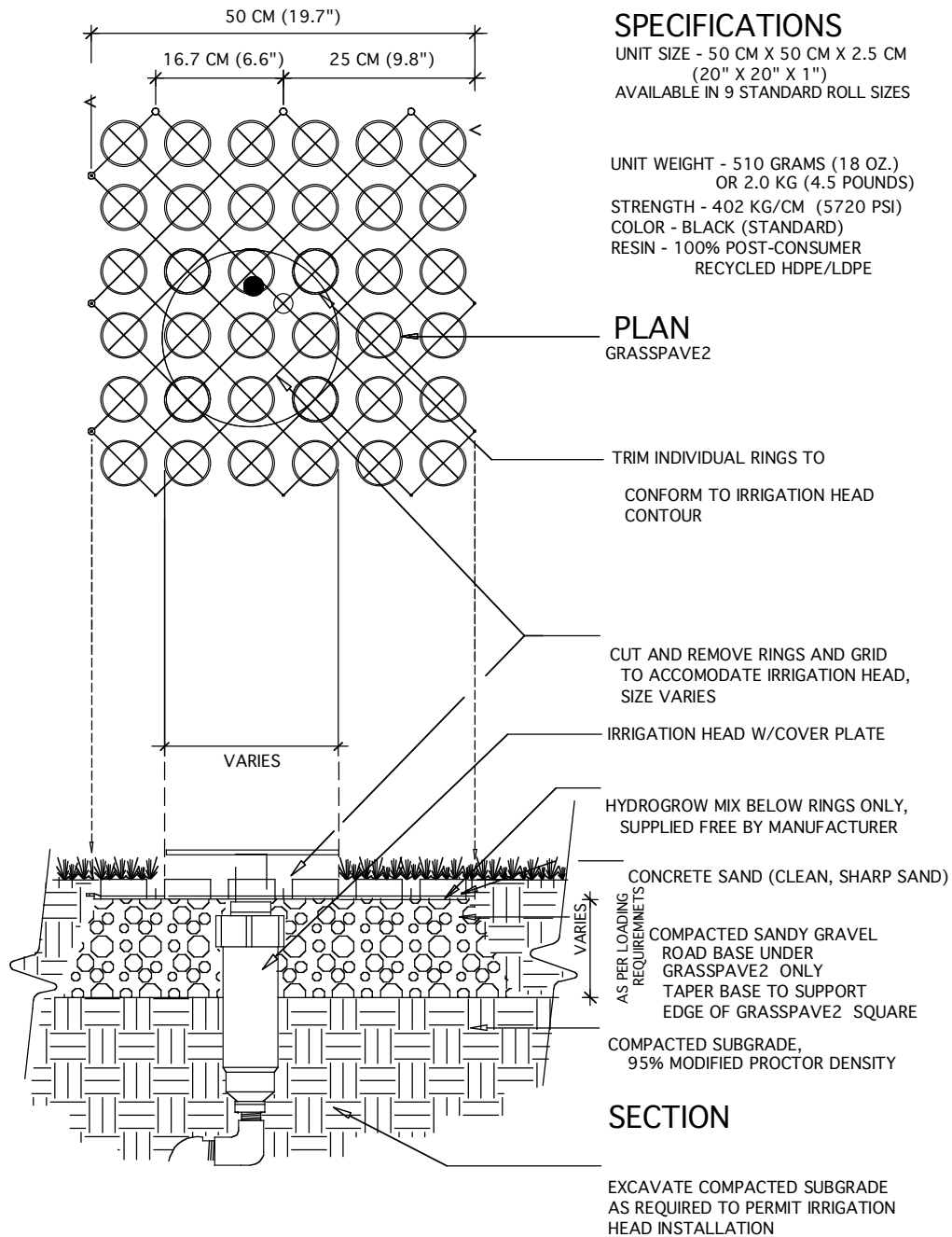
1. Ensure that sandy gravel base is porous.
 - Run hose on base to make sure water flows into base.
 - If area has a low spot which collects water, provide subsurface drainage to remove excess water.
2. Apply Hydrogrow Soil Polymer to base.
 - Apply Hydrogrow Soil Polymer over the area by hand, or small fertilizer spreader, at a rate of 10 lbs per 1000 sf for use with sod, or seeding.

Warning - do not place any form of topsoil between sandy gravel base and Grasspave² unit!
3. Place Grasspave² units over base, use posts and rings to interlock. Cut with pruning shears or knife if needed.
 - Place Grasspave² units (with rings up) directly over the sandy gravel base. Use the posts and rings provided to connect the units.
 - If required, use pruning shears or sharp knife to cut web between rings to shape units. "U" shaped pins are not required, but can be used to secure unit to base if there is a slope or rapid speed and stopping involved.
4. Fill Grasspave² units with grass -
 - If seeding - fill mat area with clean sharp sand (washed concrete sand) to top of rings, broom to barely expose top of ring. Do not use "topsoil" to fill rings. Apply seed and mulch via hydroseeder, or similar. Topdress with concrete sand to depth of 1/4" thick max., 4 to 6 weeks after seeding, to cover tops of rings.
 - If sodding use thin (.5 inch, or 13 mm) sod - fill mat area with clean sharp sand (washed concrete sand) to top of rings (1 inch, or 25 mm), then place thin sod over sand with tight joints per normal installation. Do not use "topsoil" to fill rings.
 - If sodding with thin sod, fill rings with sand to allow sod soil to cover top of rings by 0.25"-0.5" (6 - 13 mm).
5. Irrigate, fertilize and maintain turf per normal lawn. Protect from traffic until turf root system is well established.

Grasspave² Installation Procedure

GRASSPAVE2 W/ IRRIGATION HEADS

CHOOSE THIS PRODUCT FOR REINFORCING IRRIGATION HEADS



NOT TO SCALE

1

1 OF 1



Invisible Structures, Inc.
GP2Irrig04.dwg



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V4.1

Cold Weather Performance of Grasspave2 and Gravelpave2

Grasspave2 and Gravelpave2 have many advantages for use in cold climates over hard surface impermeable pavements, such as asphalt and concrete.

Porous Paving is more resistant to freezing. Damp underlying soils hold heat beneath the paved surface (Backstrom 2000). Porous pavement exhibits increased speed in thawing compared to conventional pavements, due to the ability of melted water to flow directly through the pavement, increasing the temperature in the cross-section (2003, "N.E.M.O.").

Grasspave2 and Gravelpave2 are made from flexible, High Density Polyethylene (HDPE) plastic with UV inhibitors, which withstands repeated freeze-thaw cycles and continuous subzero temperatures without cracking. HDPE resists aggressive chemicals such as road salts, motor oils and fuels. HDPE is highly abrasion-resistant and is unaffected by extremes in pH (Eastpoint Oltean Co & Plastic Pipe Institute).

The expansion and contraction of the HDPE in Grasspave2 and Gravelpave2 caused by temperature variations will not affect the performance of the systems. Flexibility in the snap fitting connectors and in the connecting grid, absorb the thermal expansion/contraction due to temperature fluctuations. Since, Grasspave2 and Gravelpave2 are only 6% plastic per volume (of the top 1.25" section), with a coefficient of expansion of 0.00007 [HDPE] (Eastpoint Oltean Co.), these products will not experience any noticeable expansion.

A proper base course material, 3/4 inch minus sandy gravel (25 to 35% void space), will also absorb much of the expansion due to temperature fluctuations, relieving most upward forces. Unlike concrete and asphalt, Grasspave2 and Gravelpave2 can flex and move with the remaining vertical forces imposed by expanding base course and subsoils. The flexible ring and grid structures were engineered to conform to natural undulations and variation in the site contours. This property also applies to shifting in the subsoils and base course due to freeze-thaw cycles.

Quicker thaw times and resistance to freezing, via porous paving, result in less de-icing chemicals and less plowing compared to impermeable hard surfaces. All season maintenance is also reduced with Grasspave2 and Gravelpave2.

In cold climates, Grasspave2 and Gravelpave2 have lifespans of 60 and 25 years, respectively, whereas impermeable asphalt and concrete have projected lifespans of 8 to 15 and 18 to 25 years, respectively.

Backstrom M. 2000. "Ground Temperature in Porous Pavement during Freezing and Thawing." *Journal of Transportation Engineering – ASCE* 126(5) (September – October): 375-381.

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"Thermal Expansion and Contraction in Plastics Piping Systems, PPI TR-21/2001" Plastic Pipe Institute.

<http://www.plasticsusa.com/hdpe.html>, plasticsusa.com is published by Eastpoint Oltean Co
http://nemo.uconn.edu/reducing_runoff/questions.htm is published by the University of Connecticut

Snow Removal from Grasspave²

Since 1982, most of our product sales have been to projects with secondary firelanes that cities required be kept free from depths of snow (usually 2 to 3" max) for emergency access. Over 1000 firelanes have been installed with our grass paver products - with at least half in regions subject to snowfall.

We have given all of the clients, contractors, and city agencies the same guidelines for removal of snow from our surfaces - use skids on the corners of snowplow blades.

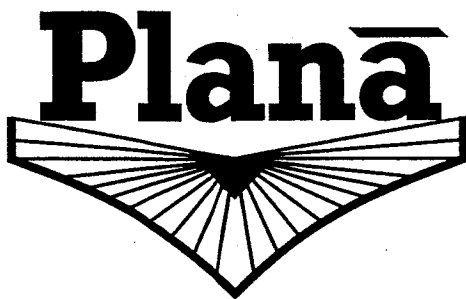
Westfarms Mall in Farmington, Connecticut installed 6 acres of our Grasspave² system for parking purposes, primarily used during the Christmas season. The grass looks beautiful after the first 3 years of use. They use skid rollers on dump truck mounted plows and have sustained no substantial damage due to plowing.

The idea to use skid plates was given to us by our very first client - the Snowmass Club, in Snowmass Colorado after they plowed snow 95 days during their first winter of 1982-83. Installed in October, days before snow fell, the 6,000 sf of 6 foot wide grass paved shoulders of the asphalt firelane / cart and pedestrian path had both horizontal and vertical curves in abundance.

Only 4% of the grass pavement was lost the first winter - and the plow did not have skids! They told us how to avoid damage in the future and suggest the skids to all future clients - which we have done. We never had additional requests for replacement product from the Snowmass Club again. Most of the pavement remains in place today except for areas lost to new tennis courts and pathways.

Another means to remove snow is the snowblower - most of which have a height adjustment capability to avoid direct blade contact with the surface. Tractor mounted brooms could be used with extreme care, but are not recommended as the potential for severe damage to the grass plant's crown is too high.

Please call us with any specific questions or concerns. Thank you.



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For Evaluation Only

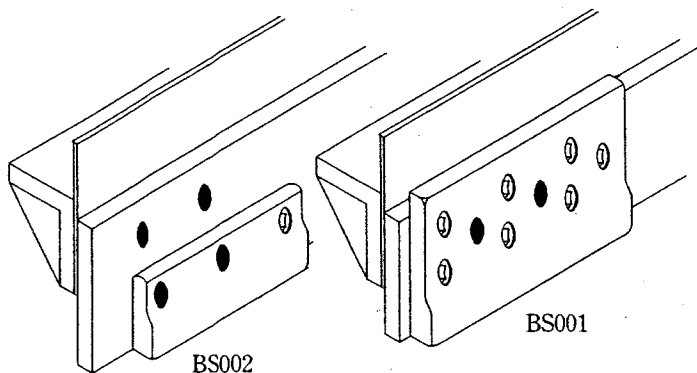
DESIGNED FOR MILES OF HASSLE FREE PLOWING!

Your complete line of **TUNGSTEN CARBIDE** enhanced wear parts for every make and model of snow plow. When TUNGSTEN CARBIDE is properly fitted to your specific requirements it is **"THE HARDEST STUFF ON EARTH"**

!!We put the WEAR in WEAR PARTS!!

!!WE DON'T MAKE BLADES, WE MAKE YOUR BLADES LAST LONGER!!

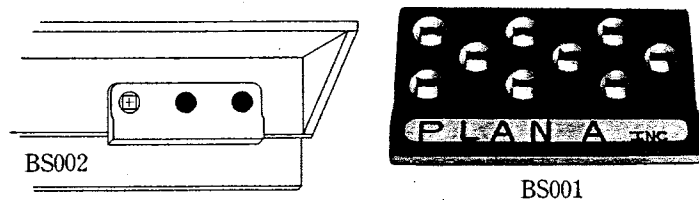
BOLT ON BLADE PROTECTORS



The discharge end of a snowplow takes a much larger load than does the rest of the plow. Therefore, blades almost always wear out there first. With a little **help** at the discharge end, your blades can go many miles farther.

- Double row of tungsten carbide inserts permanently brazed in the bottom.
- As much carbide as 2 feet of carbide inserted blade.
- Cast work hardening manganese steel frame.
- 2 Sizes: 9-1/2" x 5-1/2" and 8" x 3".
- Bolt pattern fits Standard. Hwy Punched 7/8" x 5" or 3/4" x 6" blades.

ALSO GREAT FOR PROTECTING YOUR MOLDBOARD



**CARBIDE OUTLASTS STEEL 20
TO 30 TIMES LONGER!!**

SNOW PLOW SHOES

Plana, Inc. manufactures tungsten carbide tough shoes for virtually every make and model of snowplow.

- Increase blade life up to 30%.
- Improve plow frame weight distribution.
- Protect moldboards when blades are worn.

For miles of hassle free plowing, use Plana's carbide tough mushroom, sled, and rollover type snowplow shoes.

FRINK ROLLOVER: FR001



MUSHROOM SHOE: MS001



SLED AND SOLID TYPE PLOW SHOES OF ALL KINDS AND VARIETIES



To insure proper fit, please have the following information available when you order:

1. Hole size
2. Bracket thickness
3. Distance from top of shoe to hole center
4. Bracket spacing

CALL US: 1-800-243-2769
FAX: 909-386-5850 *Sign*

INVISIBLE STRUCTURES JOB REFERENCES

GRASSPAVE2 PROJECTS

Massachusetts:

Parcel 6 Taunton Housing, CWC Builders, Xquisite Landscaping **Fire Lane**
Applewood Condos, 120 Russett Lane, Boxborough, MA—Parking—2003
Bass Pro Shop Patriot Place, Foxboro, MA 7,000 SF 2007
Belmont High School, 350 Prospect St., Belmont, MA—Payton Constr. Co—2004
Black Rock Golf Course Clubhouse, 99 Old Ward St/Hingham, MA 781.740.1292—J. Read Corp.,Hingham/Harvey—781.740.9225—Parking—2004
Chatham Light house, 31 Main St., Chatham, MA— Parking—2003
French Wing Addition to Conservation Center, Concord, NH—Parking—2003
Hampton Inn, Route 24 & 44, Raynham, MA— Parking—2004
Harvard Univ., Cambridge, MA—Various locations for Emergency & **Fire Lane**—2002
Hillside School, 402 Robin St., Marlboro, MA— Parking—2003
Northside Senior Housing, 17 Antonelli Circle, Dennis, MA—9K SF—**Fire Lane**-Hydroseed —2005 (GC: Austin Ross Corp/Fall River, MA—Brandon Scott 401.474.5177, Installer: Central Nursery, Johnston, RI—401.942.7511
Sisters of St Joseph College, 637 Cambridge St., Brighton, MA—Patriot Site, Inc—2003
U.S. EPA New England Regional Office, Chelmsford, MA— Walkways—2003
Weston Elementary School, Alphabet Lane, Weston, MA—Alexandra Constr—2003
Wychmere Harbor Beach& Tennis Club, 23 Snow Inn Rd, Harwichport, MA/508.432.1000 ValetParking—2003 + 2005 (25K sf) Owner: Snow Inn, Thompson Corp, Cambridge, MA—Dee Campbell, 617.876.8800—Installer for Snow Inn-Wayne (508.221.0906)
Xavierian High School, Clapboard St.,Westwood, MA—Maverick Constr. Mgt—2004

Rhode Island:

Bradley School Sidewalk & Parking, S. Kingston, RI—2003
Village at Mt. Hope Parking area, Johnston, RI—2003
St. George's School, 372 Purgatory Rd, Middletown. **Fire lane**.
Jenks Woods Apartments, 25 Flat St., Cumberland. **Fire lane**
Providence VA Medical Center, 830 Chalkstone Ave, Providence. **Fire lane**
Westview Nursing Home, 239 Legrif Ave, West Warwick, Access road
Swan Point Cemetery, 585 Blackstone Blvd, Providence, Access road
Cox Cable hub station, 1081 Douglas Ave, Providence, **Fire lane**
URI football stadium under the sideline bench area

New Jersey:

Super Walmart, 1300 US Highway 22, Phillipsburg, NJ
Deutch Bank, 40 Kingsbridge Rd., Piscataway, NJ
NJ Public Health Lab, 28 West State St., Trenton, NJ
Kennedy Health Care Rehab Center, 535 Egg Harbor Rd., Sewell Township, NJ
Montclair State University, 25 East Normal Ave., Montclair, NJ
Harrison State Park, 1 Monument Dr., Princeton, NJ
Centenary College, 400 Jefferson St., Hackettstown, NJ

New York:

Pratt Institute, 200 Willoughby Ave., Brooklyn, NY
Renaissance Technologies, 600 Route 25A, Setauket, NY
Glimmerglass State Park, Cooperstown NY 80,000 SF parking lot 2013

New Hampshire

Super Walmart North Conway 26,000 SF On Outside of Parking Lot

Exhibit 1

Stormwater Inspection & Maintenance Plan

STORMWATER DRAINAGE SYSTEM MAINTENANCE AGREEMENT

IN CONSIDERATION OF the site plan and subdivision approval granted by the Planning Board of the City of Portland to the proposed Dougherty Commons development located on Douglass Street in Portland, Maine and contains the following parcels as identified on the City's Tax Assessor's Map: (Map, Block, Lot, 78-C-2, 78-B-7). The site shown on the Subdivision Plat yet to be recorded in the Cumberland County Registry of Deeds. Douglass Commons, LLC, a Maine Limited liability company with a principal place of business in Portland, Maine, and having a mailing address of 10 Free Street, Portland, Maine 04101, the owner of the Premises, does hereby agree, for itself, its successors and assigns (the "Owner"), as follows:

Maintenance Agreement

Owner, 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 underdrained subsurface soil filter, catch basins, storm drain pipes, and underdrain pipes (hereinafter collectively referred to as the "stormwater system") as shown on the Grading & Drainage Plan attached hereto as Exhibit B and in strict compliance with the approved Stormwater Inspection & Maintenance Plan and Stormwater Maintenance and Inspection Log, dated April, 2021, copies attached as Exhibit A and C respectively and the annual inspection and reporting requirements of Chapter 32 of the Portland City Code.

Owner further agrees, at its own cost, to keep a Stormwater Maintenance and Inspection Log in the forms attached as Exhibit C. Such log shall be made available for inspection by the City of Portland upon reasonable notice and request.

This agreement is for the benefit of the City of Portland and all persons in lawful possession of the Premises and abutters thereto. The 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, including but not limited to the porous pavement, catch basins, storm drain pipes, underdrain pipes, and other drainage structures thereon 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 not confer upon the City of Portland or any other person the right to utilize said stormwater system for public use or for the development of any other property. Except as may be required to comply with the terms of this Agreement, Owner shall bear no financial responsibility by virtue of this Agreement for enlarging the capacity of said system.

This Agreement shall also not be construed to allow any change or deviation from the requirements of the subdivision and/or site plan most recently and formally approved by the Planning Board 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 shall 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 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 Works 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 lien 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 or residential units and mailed by certified mail, return receipt requested or ordinary mail or both to the owner of record as shown on the tax rolls 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.

[SIGNATURES ON FOLLOWING PAGE]

Dated at Portland, Maine this ____ day of _____, 2021.

Douglass Commons, LLC

STATE OF MAINE
CUMBERLAND, ss.

Carl Szanton, Owner

Date: _____

Personally appeared the above-named _____, _____ of _____ and
acknowledged the foregoing instrument to be his/her free act and deed in his/her said capacity.

Before me,

Notary Public/Attorney at Law

Print name: _____

Exhibit 1: Stormwater Inspection & Maintenance Plan

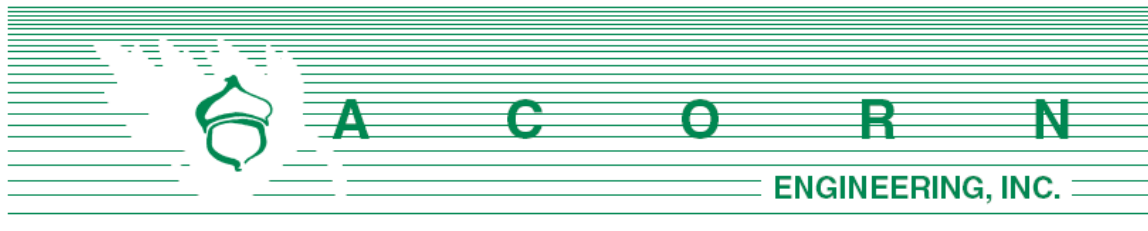
Exhibit 2: Stormwater Infrastructure Exhibit

Exhibit 3: Form 4 Maintenance and Inspection Log

Exhibit 4: FocalPoint Operations & Maintenance Document

Exhibit 2

Stormwater Infrastructure Plan



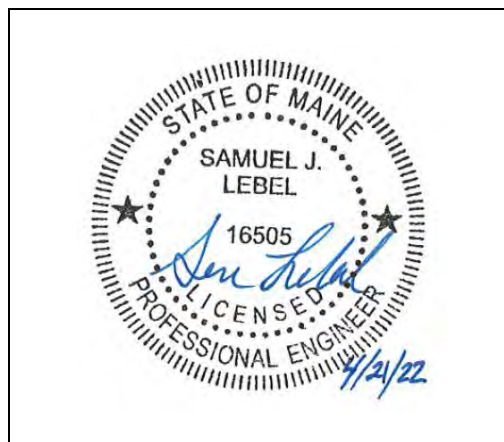
POST CONSTRUCTION - STORMWATER INSPECTION & MAINTENANCE PLAN

Prepared For:

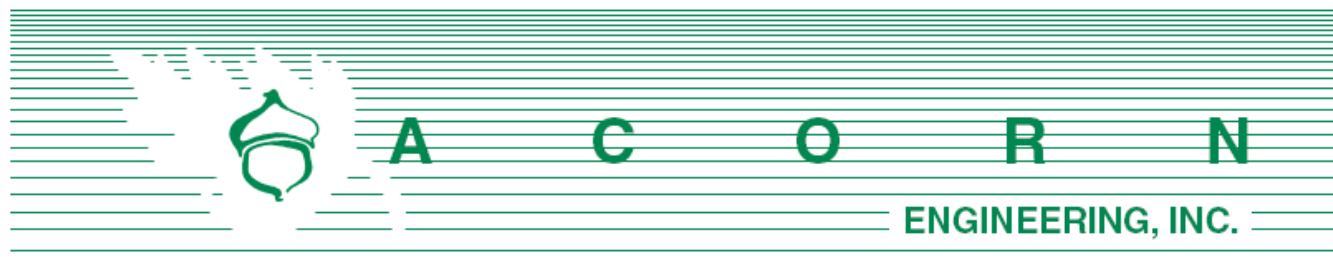
**Douglass Commons, LLC.
57 Douglass Street
Portland, Maine 04101**

Prepared By:

**Acorn Engineering, Inc.
65 Hanover Street
Portland, Maine 04101**



April 2021



RESPONSIBLE PARTY

The owner, Douglass Commons, LLC. and/or their successor shall be responsible for contracting with a qualified stormwater professional to implement the Inspection and Maintenance Plan. The qualified stormwater professional shall maintain a stormwater log (report) summarizing inspections, maintenance, and corrective action taken. The Qualified Stormwater Professional shall annually submit the Stormwater Log to the Department of Public Services prior to June 30th.

The following is an example of a qualified stormwater professional that the owner may contract through.

Organization: Will Savage, PE
Acorn Engineering, Inc
Portland, Maine

Phone: (207) 775-2655

Qualifications:

- Maine Professional Engineering License #11419
- Maine DEP - Certified in Maintenance & Inspection of Stormwater BMP's Cert #14
- Certified Erosion, Sediment and Storm Water Inspector (CESSWI) Cert #0293
- Certified Professional in Erosion and Sediment Control (CPESC) Cert. #4620

The inspection and maintenance criteria is based upon the Maine DEP - Stormwater Management for Maine, Volume III: BMPs Technical Design Manual. Refer to the Grading and Drainage Plan for the location of the BMPs

PURPOSE

This Inspection and Maintenance Plan has been individually tailored to this parcel's stormwater infrastructure, site characteristics, and their respective opportunities and limitations related to reducing the pollutant load on the receiving watershed. The maintenance of a parcel's impervious surfaces and stormwater infrastructure is critical to extending the long-term performance and effectiveness of Best Management Practices (BMPs). The Inspection and Maintenance Plan represents the parcel's minimum activities to meet the permit requirements. The parcel shall still be subject to any applicable Civil Site Plans, Permit Applications, Erosion and Sedimentation Control Plans Reports, Stormwater Management Plans, Inspection and Maintenance Manuals, and all Municipal, State, and Federal rules.

The applicant shall be responsible for retaining post construction and maintenance documents for at least 5 years. The Department of Environmental Protection's 5-year recertification will apply to this permit.

OPERATION AND MAINTENANCE ACTIVITY

Sweeping:

Annual sweeping of the driveways and parking areas following the snow melt for accumulated winter sand, if necessary. Appropriately dispose of all collected material.

Catch Basins:

Catch basins shall be inspected to confirm that the structure is operating properly.

- Inspect the presence of accumulated sediment or debris any sediment shall be removed. The equipment shall meet the following minimum specifications; power jet and water source for washing down the storm drain, vacuum attachment for catch basin cleaning, and a liquid handling method to dewater the material.
- Sediment shall be removed when accumulation is within 6 inches of the outfall pipe invert. Legally dispose of accumulated sediment and debris from the bottom of the basin, inlet grates, and inflow channels to the basin.
- If the basin outlet is designed with a hood to trap floatable materials (e.g. Snout), check to ensure watertight seal is working.
- Appropriately dispose of all collected material.

Vegetated Underdrained Soil Filter (VUSF):

The maintenance of the VUSF shall be in accordance with the following activities identified below and the most recent version of the Maine DEP Volume III BMPs Technical Design Manual Chapter 7.1 – Grassed Underdrained Soil Filters.

- The soil filter shall be inspected after every major storm within the first year to ensure the filter area is draining within a 48-hour period and no less than a 24-hour period, and that the grass is establishing. Thereafter, the filter should be inspected at least once every six months to ensure that it is draining within a 48-hour period following a one-inch storm or greater.
- Soil filter modification shall occur if the filter bed is draining in less than 24 hours. The top six inches of the filter shall be replaced with six inches of loam, per the most recent Maine DEP specification. Soil filter replacement shall be replaced with fresh material on a yearly basis.
- The filter area shall not be fertilized unless it is absolutely necessary to facilitate vegetative growth.
- Weeding to limit growth of plants besides the grass will likely be necessary.
- If desired, mowing shall only occur by a handheld weed-wacker or push mower and should be mowed no more than two times per growing season to maintain grass heights of no less than six inches. Riding lawnmowers will not be permitted or accessible.
- Maintaining a healthy cover of grass will minimize clogging with fine sediments. If ponding exceeds 48 hours, the top of the filter bed should be rototilled to reestablish the soil's filtration capacity.
- The top several inches of the filter can be replaced with fresh material if water is ponding for more than 72 hours, or the basin can be rototilled, seeded and mulched. Once the filter is mature, adding new material (a 1-inch to 2-inch cover of mature compost) can compensate for subsidence.



- Ensure that all inlets and outlets within the flow splitter drain manhole are clear and functioning
- The sediment forebays should be inspected to ensure that the entire surface area is covered by riprap. Sediment may need be removed annually depending on sand application and the upstream catch basin's effectiveness at trapping sediment in the deep sumps.
- Snow storage shall not occur over the Vegetated Underdrained Soil Filter.

Focal Points:

The maintenance for the FocalPoints shall be in accordance with the attached "FocalPoint Operations & Maintenance" document. Additionally, the downstream catch basins and drainage manholes shall be inspected to confirm the structures are operation properly.

- Dig out silt (if any) and mulch and remove trash and foreign items.
- After removal of mulch and debris, measure distance from the top of the FocalPoint HPMBs engineered media soil to the flow line elevation of the adjacent overflow conveyance. If this distance is greater than that specified on the plans (typ. 6") add media (not topsoil or other) to recharge to the distance specified.
- Mulch should be replaced with aged, double shredded hardwood mulch with fines removed.
- The plant should be replaced if dead or dying. If the plant is alive, prune as necessary to encourage growth in the correct directions.
- Overflow rim should be checked after each plowing season to ensure the device is intact and in and full functional. The grate should remain clear of debris at all times.
- Any signs of rill erosion should be corrected and potentially stabilized with river stone if necessary.
- Snow storage shall not occur over the Focal Points.

Vegetated Areas and Embankments:

Inspect all landscaped and or vegetated slopes and embankments on an annual basis. Vegetated areas with bare areas or sparse growth (<90% coverage) shall be revegetated. Mulch shall be applied to landscaped areas, as necessary. Dead or decaying landscaping (ground cover, shrubs, trees etc.) shall be replanted in accordance with the approved Landscape Plan by Aceto Landscape Architects.

INSPECTION AND MAINTENANCE TABLE

Inspection and Maintenance Frequency	Spring or Yearly	Summer	Fall
Sweeping/Sand Removal	X		
Catch Basins	X		X
Vegetated Areas & Slopes	X	X	
Focal Points	X	X	
Vegetated Underdrained Soil Filters	X	X	

In the above chart, it is assumed the certified stormwater professional will inspect each item in the spring. Inspections outside of the spring visits can likely be conducted by the property manager.



Exhibit 3

BMP Inspection Logs

FORM 4**Non-Residential Stormwater Credits: Annual Inspection of BMPs and structural stormwater controls**

Site Information		
Address:	57 Douglass Street, Portland, ME	04101
	Street Address	Zip Code
Parcel ID (Chart, Block, Lot # + 3-digit ID):	78-C-2 & 78-B-7	
Contact Information		
Owner (must be owner, lessee or buyer)		
Name:	Carl Szanton	
	Last	First M.I.
Business Name (if Applicable):	Douglass Commons, LLC.	
Mailing Address:	10 Free Street	
	Street Address	Apartment/Unit #
	Portland, ME 04101	
	City	State Zip Code
Phone #:	() -	E-mail Address: cszanton@szantoncompany.com
Agent/Representative		
Name:	Sam Lebel	
	Last	First M.I.
Mailing Address:	65 Hanover Street, P.O. Box 3372	
	Street Address	Apartment/Unit #
	Portland ME 04101	
	City	State Zip Code
Phone #:	207) 478 4327	E-mail Address: slebel@acorn-engineering.com
Inspector		
Name:		
	Last	First M.I.
Business Name (if Applicable):		
Mailing Address:		
	Street Address	Apartment/Unit #
	City	State Zip Code
Phone #:	() -	E-mail Address:

Certifying Statements (to be completed by credit holder or representative)

By checking the boxes below, the owner (or the applicant on behalf of the owner) certifies that the following statements regarding the maintenance of the property's stormwater management system, as well as the adherence to the approved maintenance and inspection plan, are true.

- ☐ Stormwater facilities and the features of the site that contribute to their efficacy (such as drainage swales, culverts, site grade, etc.) have not been altered since approval of the most recent credit application.
- ☐ Stormwater facilities have been maintained in accordance with the approved maintenance and inspection plan (if applicable)

Applicant Signature

I hereby certify that I am the owner of record of the named property, or that the owner of record has authorized me to submit this application on his or her behalf. I agree to conform to all applicable laws of the City of Portland. In addition, I understand that the City of Portland Department of Public Services has the authority to enter and inspect all areas that pertain to this application at any reasonable hour to verify that the information contained in this form is accurate.

Signature: _____ Date: _____

Inspection Results (to be completed by the Inspector)

- ☐ **FAIL** (Select if any one item on the attached Inspection Report is coded "No")

Note: if a failing inspection is submitted by June 30, the owner will have until the following July 31 to submit a passing inspection report in order to continue credits. If a subsequent failing inspection report or no inspection report is submitted by July 31, credits will be discontinued.

- ☐ **PASS**

Professional Certification and Signature (to be completed by Inspector)

As a duly qualified third party inspector, I attest that a thorough inspection has been completed for all applicable BMPs and structural stormwater controls associated with this site. I further certify that all of the information contained in this inspection report has been completed truthfully.

Signature: _____ Date: _____

Professional Identification (License #, if applicable):

INSPECTION REPORT			
General Information			
Inspection Date: _____		Days since last precipitation: _____	
Inspection duration: _____		Quantity of last precipitation (in): _____	
Weather: _____		Storm event: _____	
Nearby natural resources		☐ Yes	☐ No ☒ NA
Copy of ESC plan		☐ Yes	☐ No ☒ NA
MEDEP Permit # (if applicable)			
Notes:			
BMP's/Structural Controls			
Type	# On Site	Type	# On Site
Vegetated Area	_____	Detention & Retention Facility	_____
Stormwater Channel	_____	Runoff Infiltration Facility	_____
Culvert	_____	Other: Underdrain Soil Filter	1
Catch Basin System	1	Other: Focal Points	4
Roadway/Surface Parking	_____	Other: _____	_____
Buffer	_____	Other: _____	_____
Notes:			
Vegetated Areas			
Condition of slopes and embankment is good		☐ Yes ☐ No ☐ NA	
No bare areas (< 90% covered) with sparse growth		☐ Yes ☐ No ☐ NA	
Armored areas have no rill erosion or the flow diverted to onsite areas can withstand concentrated flows		☐ Yes ☐ No ☐ NA	
Notes:			

Stormwater Channels	
Condition of ditches, swales, & other stormwater channels good	☐ Yes ☐ No ☐ NA
No obstructions, accumulated sediments or debris	☐ Yes ☐ No ☐ NA
Vegetated growth and woody vegetation controlled	☐ Yes ☐ No ☐ NA
Erosion of any ditch lining repaired	☐ Yes ☐ No ☐ NA
Vegetated ditches have been mowed	☐ Yes ☐ No ☐ NA
Woody vegetation growing through riprap has been removed	☐ Yes ☐ No ☐ NA
Riprap has been replaced where underlying filter fabric or underdrain gravel is showing or where stones have dislodged	☐ Yes ☐ No ☐ NA
Notes:	
Culverts	
Accumulated sediments and debris at the inlet, outlet, and within the conduit have been removed	☐ Yes ☐ No ☐ NA
Erosion damage at the inlet and outlet have been repaired	☐ Yes ☐ No ☐ NA
Notes:	
Catch Basin Systems	
Accumulated sediments from inflow channels and pipes between basins have been removed and legally disposed of	☐ Yes ☐ No ☐ NA
Debris and/or oils have been removed from any baffle or grease trap	☐ Yes ☐ No ☐ NA
Notes:	
Roadway and Parking Surfaces	
Accumulated sand in parking lots and along roadways has been cleared	☐ Yes ☐ No ☐ NA
Pavement is swept to help remove sediment	☐ Yes ☐ No ☐ NA
Road shoulders and excess sand have been graded	☐ Yes ☐ No ☐ NA
Gravel roads and road shoulders have been graded	☐ Yes ☐ No ☐ NA
Stormwater is not impeded by accumulations of material or false ditches	☐ Yes ☐ No ☐ NA
Notes:	

Buffers	
Treatment buffers have been inspected for evidence of erosion, concentrated flow, or encroachment by development	☐ Yes ☐ No ☐ NA
Buffer vegetation has been managed per requirements of all deed restrictions and/or maintenance agreements	☐ Yes ☐ No ☐ NA
Vegetation in all non-wooded buffers has been mowed no shorter than 6 inches and less than three times per year	☐ Yes ☐ No ☐ NA
The sown-slope of all spreaders and turn-outs for erosion have been inspected and repaired	☐ Yes ☐ No ☐ NA
Sediment has been cleaned from all spreader bays or turnout pools	☐ Yes ☐ No ☐ NA
Notes:	
Stormwater Detention and Retention Facilities	
Embankments have been inspected for settlement, slope erosion, internal piping, and downstream swamping	☐ Yes ☐ No ☐ NA
Embankments have been mowed to control woody vegetation	☐ Yes ☐ No ☐ NA
The outlet control structure has been inspected for broken seals, obstructed orifices, and plugged trash racks	☐ Yes ☐ No ☐ NA
Sediment and debris within the control structure have been removed and legally disposed of	☐ Yes ☐ No ☐ NA
Any damage to the trash racks or debris guards has been repaired	☐ Yes ☐ No ☐ NA
Vegetated spillways have been mowed to control woody vegetation and replace any dislodged stone in riprap spillways	☐ Yes ☐ No ☐ NA
Accumulated sediments within the impoundment and forebay have been removed and legally disposed of	☐ Yes ☐ No ☐ NA
Notes:	
Proprietary Treatment Devices	
A third party has been contracted with for the removal of accumulated sediments, oils, and debris within the device and replacement of any absorptive filters, or work is scheduled to be performed in-house	☐ Yes ☐ No ☐ NA
Maintenance has been performed in accordance with manufacturer's specifications and guidelines	☐ Yes ☐ No ☐ NA
Notes:	

Runoff Infiltration Facilities	
Any pretreatment measures that collected sediment and hydrocarbons entering an infiltration system have been inspected and cleaned out	☐ Yes ☐ No ☐ NA
Accumulated sediments within the infiltration area have been removed and legally disposed of	☐ Yes ☐ No ☐ NA
The infiltration system has been renewed if it fails to drain within 72 hours after a rainfall of one-half inch or more	☐ Yes ☐ No ☐ NA
The soil of vegetated infiltration basins has been tilled and replanted	☐ Yes ☐ No ☐ NA
Rock-lined basins or stone-filled trenches have been reconstructed by removing stones, replacing underlying filter fabric, and tiling or removing the underlying wall	☐ Yes ☐ No ☐ NA
Notes:	
Photos Comprehensive photos with captions, as applicable, must be submitted in conjunction with this form.	
Other Inspection Notes Corrective action needed not specified above ☐ Yes ☐ No ☐ NA Follow up required ☐ Yes ☐ No ☐ NA Verbal notification provided to responsible party ☐ Yes ☐ No ☐ NA Verbal notification contact: _____	
Notes:	

Exhibit 4

FocalPoint Operations & Maintenance Document



FocalPoint

BIOFILTRATION SYSTEMS

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS)

Operations & Maintenance



GENERAL DESCRIPTION

The following general specifications describe the general operations and maintenance requirements for the FocalPoint® High Performance Modular Biofiltration System (HPMBS). The system utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The treatment system is a fully equipped, modular, constructed in place system designed to treat contaminated runoff.

Stormwater enters the FocalPoint® HPMBS, is filtered by the High Flow Biofiltration Media and passes through to the underdrain/storage system where the treated water is detained, retained or infiltrated to sub-soils, prior to discharge to the storm sewer system of any remaining flow.

Higher flows bypass the FocalPoint® HPMBS via a downstream inlet or other overflow conveyance. Maintenance is a simple, inexpensive and safe operation that does not require confined space entry, pumping or vacuum equipment, or specialized tools. Properly trained landscape personnel can effectively maintain FocalPoint® HPMBS by following instructions in this manual.



BASIC OPERATIONS

FocalPoint® is a modular, high performance biofiltration system that often works in tandem with other integrated management practices (IMP). Contaminated stormwater runoff enters the biofiltration bed through a conveyance swale, planter box, or directly through a curb cut or false inlet. Energy is dissipated by a rock or vegetative dissipation device and is absorbed by a 3-inch layer of aged, double shredded hardwood mulch, with fines removed, (when specified) on the surface of the biofiltration media.

As the water passes through the mulch layer, most of the larger sediment particles and heavy metals are removed through sedimentation and chemical reactions with the organic material in the mulch. Water passes through the biofiltration media where the finer particles are removed and numerous chemical reactions take place to immobilize and capture pollutants in the soil media.

The cleansed water passes into the underdrain/storage system and remaining flows are directed to a storm sewer system or other appropriate discharge point. Once the pollutants are in the soil, bacteria begin to break down and metabolize the materials and the plants begin to uptake and metabolize the pollutants. Some pollutants such as heavy metals, which are chemically bound to organic particles in the mulch, are released over time as the organic matter decomposes to release the metals to the feeder roots of the plants and the cells of the bacteria in the soil where they remain and are recycled. Other pollutants such as phosphorus are chemically bound to the soil particles and released slowly back to the plants and bacteria and used in their metabolic processes. Nitrogen goes through a variety of very complex biochemical processes where it can ultimately end up in the plant/bacteria biomass, turned to nitrogen gas or dissolves back into the water column as nitrates depending on soil temperature, pH and the availability of oxygen. The pollutants ultimately are retained in the mulch, soil and biomass with some passing out of the system into the air or back into the water.

DESIGN AND INSTALLATION

Each project presents different scopes for the use of FocalPoint® HPMBS. To ensure the safe and specified function of this stormwater BMP, Convergent Water Technologies and/or its Value Added Resellers (VAR) review each application before supply. Information and design assistance is available to the design engineer during the planning process. Correct FocalPoint® sizing is essential to optimum performance. The engineer shall submit calculations for approval by the local jurisdiction when required. The contractor and/or VAR is responsible for the correct installation of FocalPoint® HPMBS units as described in approved plans. A comprehensive installation manual is available at www.convergentwater.com.





MAINTENANCE

Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons for maintenance include:

- Avoid legal challenges from your jurisdiction's maintenance enforcement program.
- Prolong the lifespan of your FocalPoint® HPMBS.
- Avoid costly repairs.
- Help reduce pollutant loads leaving your property.

Simple maintenance of the FocalPoint® HPMBS is required to continue effective pollutant removal from stormwater runoff before any discharge into downstream waters. This procedure will also extend the longevity of the living biofiltration system. The unit will recycle and accumulate pollutants within the biomass, but may also be subjected to other materials entering the surface of the system. This may include trash, silt and leaves etc. which will be contained above the mulch and/or biofiltration media layer. Too much silt may inhibit the FocalPoint's® HPMBS flow rate, which is a primary reason for system maintenance. Removal of accumulated silt/sediment and/or replacement of the mulch layer (when specified), is an important activity that prevents over accumulation of such silt/sediment.

When to Maintain?

Convergent Water Technologies and/or its VAR includes a 1-year maintenance plan with each system purchased. Annual included maintenance consists of two (2) scheduled maintenance visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated for full operation. Full operation is defined as when the site is appropriately stabilized, the unit is installed and activated (by VAR), i.e., when mulch (if specified) and plantings are added.

Activation should be avoided until the site is fully stabilized (full landscaping, grass cover, final paving and street sweeping completed). Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands. The fall visit helps the system by removing excessive leaf litter.

A first inspection to determine if maintenance is necessary should be performed at least twice annually after storm events of greater than (1) one inch total depth (subject to regional climate). Please refer to the maintenance checklist for specific conditions that indicate if maintenance is necessary.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required. Regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency.



Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the VAR/Maintenance contractor and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the VAR/Maintenance contractor of any damage to the plant(s), which constitute(s) an integral part of the biofiltration technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance of the FocalPoint® HPMBs to the VAR/Maintenance contractor (i.e. no pruning or fertilizing).

EXCLUSION OF SERVICES

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant(s) in the FocalPoint® HPMBs.

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the VAR/Maintenance contractor maintenance contract. Should a major contamination event occur, the Owner must block off the outlet pipe of the FocalPoint® (where the cleaned runoff drains to, such as drop-inlet) and block off the point where water enters of the FocalPoint® HPMBs. The VAR/Maintenance contractor should be informed immediately.

MAINTENANCE VISIT SUMMARY

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of FocalPoint® HPMBs and surrounding area
2. Removal of debris, trash and mulch
3. Mulch replacement
4. Plant health evaluation (including measurements) and pruning or replacement as necessary
5. Clean area around FocalPoint® HPMBs
6. Complete paperwork, including date stamped photos of the tasks listed above.

MAINTENANCE TOOLS, SAFETY EQUIPMENT AND SUPPLIES

Ideal tools include: camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working in close proximity to traffic and also safety hats and shoes.



Inspection of FocalPoint® HPMBS and surrounding area

Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

☐ Standing Water	yes no	☐ Damage to HPMBS System	yes no
☐ Is Bypass Inlet Clear?	yes no	☐ to Overflow conveyance	yes no

Removal of Silt / Sediment / Clay

Dig out silt (if any) and mulch and remove trash & foreign items.

☐ Silt / Clay Found?	yes no	☐ Leaves?	yes no
☐ Cups / Bags Found?	yes no	☐ Volume of material removed _____	(volume or weight)

Removal of debris, trash and mulch

After removal of mulch and debris, measure distance from the top of the FocalPoint® HPMBS engineered media soil to the flow line elevation of the adjacent overflow conveyance. If this distance is greater than that specified on the plans (typ. 6" - 12"), add media (not top soil or other) to recharge to the distance specified.

☐ Distance to media surface to flow line of overflow conveyance (inches) _____
☐ # of Buckets of Media Added _____

Mulch Replacement

Most maintenance visits require only replacement mulch (if utilized) which must be, aged, double shredded hardwood mulch with fines removed. For smaller projects, one cubic foot of mulch will cover four square feet of biofiltration bed, and for larger projects, one cubic yard of mulch will cover 108 square feet of biofiltration bed. Some visits may require additional FocalPoint® HPMBS engineered soil media available from the VAR/Contractor.

☐ Add double shredded, aged hardwood mulch which has been screened to remove fines, evenly across the entire biofiltration media bed to a depth of 3".
☐ Clean accumulated sediment from energy dissipation system at the inlet to the FocalPoint® HPMBS to allow for entry of trash during a storm event.

Plant health evaluation and pruning or replacement as necessary

Examine the plant's health and replace if dead or dying.
Prune as necessary to encourage growth in the correct directions

☐ Height above Grate (feet) _____	☐ Health	alive dead
☐ Width at Widest point (feet) _____	☐ Damage to Plant	yes no

Clean area around FocalPoint® HPMBS

☐ Clean area around unit and remove all refuse to be disposed of appropriately.
--

Complete paperwork

☐ Deliver Maintenance Report and photographs as appropriate.
☐ Some jurisdictions may require submission of maintenance reports in accordance with approvals.
☐ It is the responsibility of the Owner to comply with local regulations.



FocalPoint Warranty

Seller warrants goods sold hereunder against defects in materials and workmanship only, for a period of (1) year from date the Seller activates the system into service. Seller makes no other warranties, express or implied.

Seller's liability hereunder shall be conditioned upon the Buyer's installation, maintenance, and service of the goods in strict compliance with the written instructions and specifications provided by the Seller. Any deviation from Seller's instructions and specifications or any abuse or neglect shall void warranties.

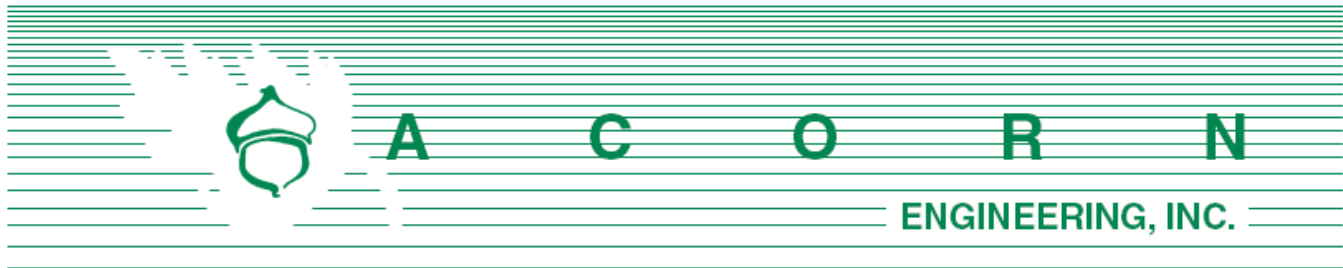
In the event of any claim upon Seller's warranty, the burden shall be upon the Buyer to prove strict compliance with all instructions and specifications provided by the Seller.

Seller's liability hereunder shall be limited only to the cost or replacement of the goods. Buyer agrees that Seller shall not be liable for any consequential losses arising from the purchase, installation, and/or use of the goods.



Maintenance Checklist

Element	Problem	What To Check	Should Exist	Action
Inlet	Excessive sediment or trash accumulation	Accumulation of sediment or trash impair free flow of water into FocalPoint	Inlet free of obstructions allowing free flow into FocalPoint System	Sediments or trash should be removed
Mulch Cover	Trash and floatable debris accumulation	Excessive trash or debris accumulation.	Minimal trash or other debris on mulch cover	Trash and debris should be removed and mulch cover raked level. Ensure that bark nugget
Mulch Cover	Ponding of water on mulch cover	Ponding in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils	Stormwater should drain freely and evenly over mulch cover.	Contact VAR for advice.
Plants	Plants not growing, or in poor condition	Soil/mulch too wet, evidence of spill. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact VAR for advice.
Plants	Plant growth excessive	Plants should be appropriate to the species and location of FocalPoint		Trim/prune plants in accordance with typical landscaping and



Department of Planning & Development
 Attn: Jimmy Dealaman
 City of Portland, Maine
 389 Congress Street, 4th Floor
 Portland, ME 04101

April 27, 2022

Subject: Comment Response Letter
 Dougherty Commons Redevelopment

On behalf of Douglass Commons, LLC, we are pleased to respond to the comments that we received dated April 1st, 2022. To facilitate the review, comments are provided below in italics followed by each team's responder in a designated color.

Acorn Engineering (Sam Lebel, PE) *Civil Engineer*
Aceto Landscape Architects (Seth Kimball, RLA) *Landscape Architect*
Development Team (Szanton Co. & MCDP)

General

Comment – *Show building footprints of adjacent buildings on Douglass Street. Show full extent of trail on site plan that connects to Douglass Street. Retitle 'Master Site Plan' to 'Overall Site Plan'. Please submit a construction management plan/drawing for each phase, which can be amended by staff once a contractor is selected. The applicant shall demarcate site improvements for each phase and clearly identify which party is responsible.*

Response – Please refer to updated plans for the adjacent property building footprints, the full extent of the trail, relabeled plan title blocks, and a construction management plan for each phase of development on Sheets C-05, 06. On these plans, the site improvements and assigned responsibilities for each phase are demarcated.

Access & Circulation

Comment – *Planning Board members supported improving transit options around the site, and that a parking reduction could be more supported if providing better quality of transit options.*

Response – There are several transit lines within a half mile of the site already. The 5, 9A, and 9B buses all have stops within a block on Congress. Within a half mile on Brighton is the 4-line. These services run every half hour at peak times and every hour off-peak. Additionally, the Portland Transportation Center, a regional transit hub, is less than a half mile away. From this location there is service on METRO's Breeze and 1-line, as well as regional connections via the Downeaster and Concord Coach Lines. The development team agrees that transit service could be improved on the lines throughout the region; METRO is a far cry from the 15-minute headway

times modern transit service needs to deliver to communities. In addition to alerting METRO of the coming development, the team has asked to have the service increased. METRO has indicated this is a high-priority corridor for service.

Comment – *To support the applicant’s reduced parking request and effort to encourage residents and guests to utilize alternative modes of transportation to and from the site, Public Works recommends that the applicant ensure the route to nearest METRO stops is accessible and safe. Public works finds the sidewalk & ramp conditions are acceptable but recommends the applicant add street lighting at two locations: 1) the corner of Douglass and Congress (nearest the trail entrance) and 2) in front of 1189 Congress, at the bus stop. Public Works recommends the applicant add a pole-mounted cobra head light at each of these locations, consistent with the City’s lighting standards and existing street lighting.*

Response – Both of the recommended locations for additional offsite lighting improvements are not along the project frontage. Furthermore, the development team reached out to Portland Trails to ask about site lighting along the Dougherty path location, and the response from Portland Trails’ Jaime Parker was that “.....there is a lot of ambient light already, and the lack of lighting is not the weak link in that trail....”.

In addition to this feedback, the development team conducted a site visit and documented the existing lighting near the Congress Street intersection and the path. There appears to be adequate lighting at the intersection and in the vicinity of the METRO stop, but the path itself is nearly pitch black. Because of this, the development team has committed to better illuminating this pathway and as such, the plans have been adjusted to add lighting opposite of two proposed light poles along with an additional light pole behind the 5-story building to further light the trail. Please refer to the attached pictures demonstrating the adequate lighting along the public sidewalks and the lack of lighting along the path.

Comment – *Staff recommend exploring a pedestrian ramp connection instead of a stair connection (see rough mock-up in blue below) to the multi-use trail in order to accommodate bicyclists and handicapped users accessing the trail to/from the site. A stone dust or gravel path may be possible instead of hardscape surface.*

Response – A sloped walkway has been added to the plan. The walkway is less than a 5% slope to provide universal accessibility.

Comment – *Please incorporate the attached concrete sidewalk and driveway details for improvements at the site’s entrance*

Response – We have incorporated these details. As allowed in the residential driveway detail, Note 3, we are electing to utilize 7’ tipdowns and flares in lieu of “bugs” given the proposal for 78 parking spaces.

Comment – *What is the frequency of trash pick-up and when does this occur?*

Response – Based on our experience operating other similar projects, solid waste collection will be required 2 to 4 times weekly. Our solid waste contractors will adjust its collection schedule as needed.



Comment – Clarify if bollards are proposed at both ends of the emergency vehicle access lane. Bollards are shown in rendering (see orange arrow below), but not shown on the plan. As indicated by Fire Marshal during preliminary review of the project, any bollards proposed restricting vehicle access should be removable and not susceptible to icing issues during the wintertime. Please clarify what is proposed to restrict vehicle access down emergency vehicle lane, add to plan and provide detail accordingly.

Response – There are no bollards located at the end of the woonerf. Renderings by Archetype have been updated to properly portray the site elements. The end of the travelled way will be demarcated by a change of materials.

Comment – Clarify how the area (shown with blue arrow below) functions exactly. If intended for loading and drop-off, how is that being managed (e.g. special signage, etc.)

Response – The area shown in blue is a flexible, non-parking area that residents can use as gathering space. It may also be utilized as a 5-minute unloading zone for drop-offs by mail carriers or groceries by residents. Signage will reflect that.

Comment – To justify waiving the 24 feet parking aisle, staff are requesting clarification on what elements necessitate modifying the city standard. Provide additional narrative to justify the design decisions and benefits for narrower parking aisle at each of the following locations: a) shared street drive aisle and b) parking areas drive aisle. In addition, staff request that the applicant provide turning templates for vehicles circulating into these areas to show there are no conflicts.

Response – In our experience a 22-foot-wide parking aisle in the lot is sufficient in residential settings where the users have familiarity with the layout of the parking lot, coupled with minimal turnover. We do not believe that parking standards should be a “one-size-fits-all approach”. 24’ drive aisles are much more appropriate in commercial settings where there are unfamiliar drivers and high turnover. Additionally, reduction of the drive aisle to 22’ allows for less impervious area and less of an overall sense of pavement-to-pavement opening prompting motorists to drive slower. The same principles apply to the “woonerf”.

Furthermore, specific constraints include existing gas and electrical infrastructure, elevation challenges when matching back into the abutting land, and the desire to incorporate landscape islands and vegetation within the parking field to break up parking and providing shading. Please refer to the turning templates, submitted with this response letter, that demonstrate the design vehicle, comparable to a 2020 Chevrolet Tahoe, can adequately maneuver throughout the site and parking field.

Comment – The applicant must provide additional justification (e.g. site constraints, etc.) explaining why additional number of compact parking spaces are needed and why the city standard should be modified in this case

Response – The number of compact spaces has been reduced to 11 spaces, or 14% of the total parking spaces. A waiver is no longer be requested for this standard.

Parking



Comment – *Planning Board members raised questions about the site providing guest parking onsite. Staff recommend that the proposal include the future 10 additional parking spaces as part of the proposed parking. Phase I and Phase II developers should coordinate on the inclusion of the additional parking spaces but staff recommend the proposal consider providing this area as guest parking.*

Response – For the full buildout, we have incorporated the additional 10 parking spaces as a permanent condition for a total of 78 spaces. Guests may park on the street or in a parking space assigned to a resident associated with the person they're visiting, consistent with other similar multifamily projects.

Comment – *Per Table 19-B “Categorical Exceptions to Off-Street Parking Minimums”, the applicant must submit a parking study/analysis, which justifies the amount/adequacy of parking supply proposed for the development. The parking analysis should take into account each phase of development specifically and should include the 10 additional spaces as part of the full parking supply proposed.*

Response – Please refer to the Parking Analysis submitted with this response letter which utilizes ITE 5th Generation Rates for their respective land use codes.

Comment – *Label respective co-op parking spaces/areas and apartment parking spaces/areas, respectively.*

Response – Labels have been added to parking spaces on C-10, C-11, and C-12 to show usage of the separate developments and guest parking accordingly.

Comment – *Clarify how many compact spaces and EV spaces are proposed for each phase of development? When each phase is built out how many compact and EV spaces are proposed in each portion's respective parking area? On each phased plan (as well as overall site plan), show parking areas providing the required Level 2 EV charging to 20 percent of parking spaces as well as future EV readiness (served by sufficient conduit, etc.)*

Response – Refer to Site Plans C-10, C-11, and C-12 for an overall and phased breakdown of compact and EV designated parking spaces. The EV layout and allocation will be subject to change as the project moves towards construction and final electrical design is carried out.

Comment – *Staff note that bicycle racks are shown on landscaping plan, please also show on each phased site plan and overall site plan.*

Response – See Site Plans C-10, C-11, and C-12 for bicycle rack locations and notes.

Comment – *Please confirm that landscaping located within the north snow storage area can withstand snow pile that's proposed. Staff recommend adding note to plan that “Owner will be responsible for managing snow at their discretion and/or coordinating snow removal from the site when necessary.” to show the plan complying with standard.*

Response – Native plant material has been selected for salt tolerance and durability. A note has been added accordingly to Site Plans C-10, C-11, and C-12 that “owner will be responsible for managing snow at their discretion and/or coordinating snow removal from the site when necessary”.



Preservation of Significant Natural Features

Comment – *Please confirm that there are no significant natural features on site*

Response – There are no significant natural features on site.

Landscape Preservation

Comment – *Show on plan where 13 existing trees will be removed from site, noting if under/over 10 DBH*

Response – See Sheet C-03 for the locations of trees on site to be removed. There are approximately five trees on site to be removed with greater than 10 DBH, none of which are in the structure setbacks subject to preservation standards.

Comment – *Detail for erosion control berm was provided but berm is not shown on plan. Please show erosion control measure for each phase on construction management plan or grading plan.*

Response – Please refer to the construction management plans for erosion control measures called out downgradient of any soil disturbance. The berm is typically an option along with silt fence or silt sock as an erosion control perimeter barrier.

Site Landscaping & Buffers

Comment – *Per Site Plan standards screen existing transformer at driveway entrance (from view from public sidewalks, streets and adjacent properties) by dense evergreen landscaping, fencing, architectural screening products, masonry walls, building walls, or a combination thereof.*

Response – Screening of the natural gas regulator will be provided using plant material. ALA has updated plantings plans to reflect this request.

Comment – *Staff counted 72 trees planted that provide a public benefit and count towards meeting the street tree requirement. Please propose a street tree alternative (Per Section 4.6.4. of the City's Technical Manual) for the remaining 48 trees required. The City Arborist is supportive of a contribution into tree fund given the amount of trees and other landscaping planted onsite. If seeking a contribution to the City's Tree Fund please submit a written request.*

Response – Ownership will be contributing to the tree fund for the remaining required trees.

Comment – *Please provide a landscape plan for each of the phases, so each phase can be reviewed with the landscaping standards. Each phase should clearly mark the extent of landscaping they are required to provide at time of construction.*

Response – Landscape plans have been provided for each phase that clearly mark the extent of the landscaping required at time of construction.

Comment – *Given that landscape is a key component of the project; please confirm that plant*



material will survive and be durable/protected during the winter season (i.e. able to endure resulting snow banks from plowing, icing salt, etc) including the following areas:

How will landscape paver areas be maintained during winter conditions? How durable is the material dealing with snowplows crossing the common area? Please provide case studies, cut sheet, as available, to show the common green space area will survive.

Response – Native plant material will be selected for salt tolerance and durability. Additionally, the owner will conduct an annual site walk to discuss winter operations with the maintenance contractor, including discussion of equipment proposed for use such as brine applicator to make a pre-storm application of a brine solution, which has been shown to minimize the overall amount of salt needed. We have included with this submission a document outlining the grass paver specifications and maintenance.

Comment – *Per Section 4.5.5 of the City's Technical Manual landscaping that abuts vehicular use shall be adequately protected and separated from vehicles. The planting/rain garden areas along the woonerf do not appear to provide landscape protection. Please show protection in the form of curb stops, continuous curbing, etc., which should be designed with adequate visibility and durability to withstand normal snow plowing operations. (Ex. City Arborist suggests molded concrete or other curbing type) If the proposal can sufficiently demonstrate that snow and ice removal operations will not adversely impact landscaping a written waiver request may be submitted to staff for review.*

Response – The flush condition allows for snowplows to completely remove snow from this area, rather than stacking dirty, salty snow around the trees. Plowing stakes will be provided to indicate tree and planting locations during winter months and be removed in the spring. Proper native plant material will be selected for salt tolerance and durability.

Additionally, the owners will conduct an annual site walk to discuss winter operations with the maintenance contractor, including discussion of equipment proposed for use such as brine applicator to make a pre-storm application of a brine solution, which has been shown to minimize the overall amount of salt needed.

Regular inspection of cutting edges on plows and equipment will be conducted to make sure they are sharp, which has also been shown to reduce the overall need for salt.

Maintenance crews will be instructed to use chemical deicing products judiciously, applying it only where and when needed for safety to protect the trees and the woonerf materials.

Comment – *Clarify materials. Landscape materials plans shows the main driving route as asphalt and rendering shows stone cobble. Please reconcile materials proposed are consistent throughout plans set.*

Response – We have adjusted the renderings to correctly depict the drive lane as pavement, while the parking spaces are pavers.

Comment – *At the last Planning Board meeting one of the public comments described an old memorial plaque from the previous school, which staff suggest could be incorporated as a place making feature if able to preserve. Please clarify if plaque is on the site.*



Response – The boulder & plaque will be relocated at the base of the proposed steps at the Dougherty Trail trailhead as an element that introduces and memorializes the history of the site.

Water Quality, Stormwater Management, & Erosion Control

Comment – Consider adding permeable paver for walkways areas too. Permeable will allow for more infiltration (using less salt to clear walkways)

Response – Thank you for the feedback, we will continue to consider opportunities for this condition; however given the walkways' proximity to buildings and basements, it is generally not ideal to infiltrate water without a robust base/underdrain system. At this time, we are meeting the stormwater standards as shown.

Comment – Confirm that the plastic grid system used for grassed common area is capable of withstanding emergency vehicles without damaging underlying irrigation system, etc. Please also provide spec or cutsheet

Response – Documentation and case studies demonstrating the plastic grid system used for grassed common areas can withstand emergency vehicles without damaging the underlying irrigation system.

Comment – Submit a draft stormwater maintenance agreement which should clarify that snow storage will not occur over any stormwater systems, and sand or salt application will not impact paver system, etc.

Response – A stormwater maintenance agreement has been included in this package that clarifies snow storage will not occur over the stormwater systems and that sand or salt will not impact the paver system.

Public safety and fire prevention

Comment – Please contact Portland Trails (Contact: Jaime Parker jaime@trails.org) and obtain a recommendation for necessary improvements to address the Crime Prevention Through Environmental Design (CPTED) standards along adjacent trail. At this time, staff believe the applicant should consider integrating lampposts or lighted bollards to enhance safety and promote usage of the trail system as it is expedited to be heavily traveled to access public transit. Given that the proposal is proposing less parking and is being presented as a transit-oriented development, the trail should be integrated to the extent possible as a primary transit route for the development. Improvements along the trail should incorporate Portland Trail's feedback. Below is an approximate distance that staff recommend for adding trail lighting (see image). Given that a waiver will be needed for lighting trespass past property line, please submit written request. In general, staff are supportive of a lighting trespass waiver to promote public safety





Response – As noted previously, the development team reached out to Portland Trails to ask about site lighting along the Dougherty path location, and the response from Portland Trails’ Jaime Parker was that “.....there is a lot of ambient light already, and the lack of lighting is not the weak link in that trail....”. Based upon an independent site visit, the development team has committed to better illuminating this pathway and as such, the plans have been adjusted to add lighting opposite of two proposed light poles along with an additional light pole behind the 5-story building to further light the trail.

Comment – *Please provide more information about how emergency access lane will be keep it clear during winter.*

Response – The emergency lane will be plowed and kept clear during winter months. ALA has provided additional information regarding the plowing logistics and required skid plates needed for plows to remove snow from grass pavers and walkway. In addition, a maintenance plan will be provided to the selected maintenance crew to assure proper snow removal techniques.

Public Utilities

Comment – *Please confirm how waste/dumpster will be managed between the two sites and that the one shared area will accommodate both developments and sized correctly.*

Response – One area will accommodate the trash and recycling areas for both developments. The trash enclosure will include dumpsters are used by both the co-op housing and the apartment housing. One company will service this joint account. Sizing and pickup frequency will be determined by the solid removal company and adjusted according to demand.

Comment – *Please confirm that storage containers for recyclable materials shall be separated from trash containers*

Response – Correct, separate bins will be demarcated for recycling.

Comment – *Does Unitil have any work scheduled at the site. Please check with Until that there aren’t any improvements as part of their multiyear improvement plan for the site.*

Response – Until does not have any improvements scheduled at the site or on Douglass Street as part of their multi-year improvement plans.



Site Design

Comment – *Please describe any proposed HVAC system or mechanicals on site. Staff continue to look into the question raised at the last Planning Board meeting regarding the topic of window mounted air conditioning units. More information will be shared soon.*

Response – As developers of affordable housing, we feel that our residents should have the right to cool their homes, despite the fact that Maine Housing neither requires nor provides additional financing for built-in air conditioning. With construction costs skyrocketing, we are not able to include central air conditioning in our construction plan for the apartment building. If window units were to be disallowed, residents, many of whom are already on fixed incomes, would be forced to purchase more-expensive, less-effective floor units. We feel a responsibility to advocate on behalf of our future tenants to ensure that we prioritize the physical comfort of low-income residents over the aesthetic comfort of onlookers in the summer months. At our existing properties with window units, we mandate the window units are removed from mid-October to mid-May.

Comment – *Section 11 of the Technical Manual requires a preliminary shadow analysis for Building E's proximity to the adjacent park, future playground and basketball court. Per Section 11.3 of the Technical Manual the applicant is required to submit a preliminary shadow analysis in order to determine if additional shadow analysis is required.*

Response – A shadow study has been provided with submission of this response letter.

Comment – *At the recent workshop, the Board questioned if there was sufficient storage area provided in the residential units. Please provide any additional information regarding the areas of storage available to tenants/owners.*

Response – Both the apartment and co-op housing are creating the Maine Housing-required amount of storage. This includes ample storage in units, but not separate storage lockers.

Comment – *One of the Board members expressed concerns with the cornice on the apartment building, having concerns the cornice didn't line up with the detailing on the rest of the building or tie well to other buildings. In addition, the board expressed a desire to see modifications to the stair tower of Building E. Please incorporate this feedback as your team revisits the design materials, and consider making the cornice smaller and taking a closer look at the fenestration on the stair tower and material choices.*

Response – The architects have corrected these issues. Please see new renderings.

Comment – *One Board member expressed interest in seeing more variety in windows. Please consider this feedback as your team revisits the design materials.*

Response – The architects have corrected these issues. Please see new renderings.

Comment – *At the recent workshop, during the discussion on the roof line of the co-op buildings, it was mentioned that the project may install solar in the future which influenced the current design. If solar systems are anticipated for building rooftops please show on plans (ensuring it complies*



with Section 6.4.16 of the City's Land Use Code).

Response – Solar has been added to the plans co-op building rooftops and will comply with Section 6.4.16.

Comment – As part of feedback heard from the Planning Board at the last workshop, staff remind the applicant to explore additional outdoor communal space for the apartment building.

Response – We are not planning outdoor communal space outside the apartment building due to the ample amount of indoor and outdoor communal space planned on site already and existing in the surrounding Dougherty Fields, playground, skate park, pool, and Libbytown Community Garden adjacent to the site. We feel this area would better be served as an informal, passive green space.

Exterior Lighting

Comment – Please confirm that pole lighting fixtures (K41 & K42) provided are full cutoff. Section 12.3.6 of the City's Technical Manual requires fixtures to be full cutoff or shielded. The proposed pole lighting cutsheets appears as though they may emit light above a horizontal plane. Please revisit.

Response – The Luminaire schedule on the Photometrics plan shows the BUG rating for the fixtures. All of the fixtures have a rating of U=0 or no uplight. BUG (BUG = Back-Uplight-Glare) is the rating system that has replaced the terms “full cutoff” and “cutoff”.

Comment – It appears that a potential stone dust path is proposed on the site plan. Please eliminate from plan if not proposed or provide site lighting at this location (see red highlight in image below)

Response – The pathway has been removed from the plan as the majority of foot traffic will occur near the center of the site where a link between the development and the center of the new park is proposed.



Comment – Below areas (see image) at the center are main areas integrated into the site. To promote natural surveillance/visibility/safety please revisit by providing 0.2fc of minimal site lighting at these locations. The area indicated below to the right may also require site lighting if it (or another location) becomes used for outdoor communal space for Building E.



Response – Adjacent these areas are residential bedrooms and spillover lighting into bedrooms is a concern. Motion lights will be provided for safety at these locations.



Comment – Provide at least 0.2fc of lighting in parking areas highlighted below

Response – The lighting plan has been adjusted to provide .02fc in parking areas.



Zoning

Comment – Once submitted, add note to Phase 1 and Phase 2 landscape plans that grass will be provided, should the other phase not be constructed, so that each plan clearly reflect the total open space being provided.

Response – Please refer to the various Site Plans (C-10, 11, 12) which note that should either Phase seek an occupancy permit prior to the opposing phase applying for a building permit, the disturbed area shall be loamed and seeded.



Engineering Review

Comment – *The Applicant is coordinating with utilities and will provide ability to serve confirmation upon receipt.*

Response – Ability to serve letters received thus far have been provided with this submission. Any remaining letters will be forwarded upon receipt.

Comment – *The proposed grading plan includes work that will be located off of the property. The Construction Management Plan that shows the location of sediment barrier and other erosion control measures does not include these off-site areas. The plan should reflect the entire construction area, and it is also suggested that erosion control be shown on the grading plan to ensure that the entire site will be protected.*

Response – The Construction Management Plans have been revised to reflect the entire construction area and provide for erosion control measures to be extended into the park where construction and soil disturbance will be occurring.

Comment – *The project design for rain gardens is based around the Focal Point proprietary system that is an approved Maine DEP stormwater BMP. The stormwater management plan includes a note that this system may be substituted at the time of construction for an “approved equal such as a Filterra.” If the Applicant chooses to change the type of stormwater management system, that change will need to be resubmitted to the City of Portland. Design calculations, maintenance requirements, and the associated Stormwater Maintenance Agreement would need to be changed to reflect the final selected stormwater treatment system.*

Response – The design for the rain gardens are the ACF Focal Point proprietary systems; however, subsurface tanks are not proposed below the systems because they are not necessary to meet the Flooding standard. Furthermore, the infiltration rate of 100 in/hour does not limit flow-thru, therefore, the HydroCAD will be unaffected should the Contractor decide to proceed with an approved equal (Filterra bioswale).

Although the approved equal will inherently have very similar qualities including operations and maintenance, should an approved equal be selected, the pertinent documents will be updated and resubmitted to the City.

Comment – *Per the Maine DEP proprietary stormwater BMP requirements, the Applicant should provide confirmation from the manufacturer that the system has been designed per their standards.*

Response – We will provide confirmation from the manufacturer of Focal Points that they have been designed per the standards required on this site once received. The design features their typical section detail which has been used on several sites around the City.

Comment – *A stormwater maintenance agreement will be required.*

Response – A stormwater maintenance agreement has been provided with this submission package.



Comment – *I would suggest showing their proposed tree plantings on a plan with their proposed utilities to ensure that there are no conflicts. This has fairly detailed plans for both, and it appears that there may be some overlap.*

Response – We have overlayed the landscaping plan on the utility plan and have coordinated with the landscape architect to ensure that there will be no conflict between plantings and utility runs, resulting in removal of two trees.

Comment – *The Applicant should confirm whether below-grade vaults may be necessary near their underground electric connections at the utility poles. It may not be required with the proposed configuration, but just wanted to mention based on my own experience lately where we have had to fit some fairly large vaults in to make the above to below-grade transition.*

Response – We will continue to coordinate with CMP; however, because the primary run to the 3-phase padmount transformer is less than 300', vaults are likely not necessary. The Co-Op housing will be serviced by single-phase power in which junction boxes are shown.

Design Review

Comment – *Applicant to provide additional 3-dimensional views from outside the property from Dougherty Field, Congress Street and Douglass Street.*

Response – Additional 3-D views have been developed by ALA and submitted with this letter.

Comment – *Applicant to address potential future parking expansion with an interim solution to include additional tree plantings or other screen planting to help buffer property from State of Maine Interstate 295 adjacent use.*

Response – The additional parking has now been altered to permanent parking.

Comment – *Applicant to consider additional opportunities for communal open space at Apartment building, potentially at basement level with door access from shared Laundry Room to an outdoor amenity (ie patio, trellis, seating, planting etc.) that is easily accessible for residents.*

Response – This has been considered; however, the grading does not allow for door access at the back level. Furthermore, there is desire to keep that space somewhat private for the tenants since their only windows look out to this space.

Comment – *Applicant to consider addition of site lighting to distinguish all property entry points, specifically at proposed pedestrian walkways & stairs connections to Dougherty Field and Path.*

Response – Additional lighting has been implemented into the site and building designs as requested.

Comment – *Applicant to consider additional opportunities for private open space for residents (ie. balconies) at Apartment building.*

Response – While balconies are desirable amenities, in order to finance this affordable housing



project, the construction budget does not allow for this specific amenity. However, given the location of the site and its adjacency to a public park, we are pleased to offer a multitude of open space opportunities to the future residents.

Please refer to the attached letters from the project architects for remaining responses to the design review comments. Please let us know if you have any additional questions or comments.

Sincerely,



Sam Lebel, P.E.
Project Manager
Acorn Engineering, Inc.



April 26th, 2022

Department of Planning & Development
Attn: James Rather, Development Review Manager
City of Portland, Maine
389 Congress Street, 4th Floor
Portland, ME 04101

Re: Comment Response Letter
Dougherty Commons Redevelopment
57 Douglass Street

On behalf of Douglass Commons, LLC, we are pleased to respond to the comments that we received dated April 1st, 2022. This letter focuses on the architectural components of the project which were designed by Kaplan Thompson Architects, specifically the Townhouses, Rowhouses, and Community Flats.

Comment: Architectural character: Applicant to provide clarification on materiality of lap siding, cornice and trim detailing for all housing types. Physical materials are encouraged to understand durability of proposed exterior finishes. To promote a strong cohesive identity of the proposed neighborhood character, a reduction in material types is recommended as well as color scheme continuity between Phase 1 & Complete Master Plan build-out buildings. Applicant to increase window fenestrations that face open space and parking lots to allow for greater visibility and natural light, specifically at Apartment building south façade at interior stairwell, Courtyard Flats A.1 & A.3, Townhouses B.2 & C.1, Rowhouses D.

Response: The siding materials of the Rowhouses, Townhouses, and Community Flats include vertical cedar shiplap, reverse board-and-batten, and a traditional lap siding that varies in exposure from 4"/6"/8", the largest of which approximates the adjacent 5-story building in width and color. The siding on the Rowhouses increases in scale as it rises, to add character and vibrancy. In all, there will be 3 different tones of siding, plus the natural cedar at select locations, primarily at the Community Flats and Townhouse entries.

Comment: Height, scale, and massing: Because the building contains more than 2 units, the project must provide variation in roof and façade character through changes in façade setback, roof configuration, and projecting or recessed building elements. Applicant shall provide additional variation (ie. vestibule / shared porch recessed, façade projections, or cable roof configurations) in façade and/or roof form for building lengths greater than forty (40) feet, specifically the Apartments west façade, Rowhouse D.1 south façade, Townhouse B.1, B.2 & C.1 east façade.

Response: Roof eave and fascia trim will include consist of 2 boards in a roughly 2:1 proportion, with the smaller board above and proud of the larger. It will match the more saturated siding tone, and approximate the roof color.



Sloped canopies introduce and protect entry doors throughout the development. The primary entry to the 5-story building echoes that of the Community Flats building across the woonerf, which engages the Common.

Units within the Townhouse and Rowhouse buildings are individually distinguished by siding color, and separated by a vertical trim element. Each grouping of adjacent entry doors is set off by columns of varying width at regular intervals to further vary the rhythm of the facades. The underside of each canopy is accentuated by cedar boards.

The roof forms are kept largely continuous and simple due to the intent of providing solar panels on all buildings in the most efficient manner. The longer stretches of roof are broken up at the corners, where the impact on solar shading will be minimal and the gable end elevations will be energized. The roof of the easternmost Rowhouse unit is kicked up in the style of the Community Flats building in order to nod to the scale of the adjacent 5-story building.

Thank you for your review. Please let us know if you have any additional questions or comments.



Phil Kaplan, Principal

Kaplan Thompson Architects



A R C H E T Y P E

April 26, 2022

Department of Planning & Development
Attn: James Rather, Development Review Manager City of Portland, Maine
389 Congress Street, 4th Floor
Portland, ME 04101

Re: Comment Response Letter

Dougherty Commons Redevelopment
57 Douglass Street

On behalf of Douglass Commons, LLC, we are pleased to respond to the comments that we received dated April 1st, 2022. This letter focuses on the architectural components of the project which were designed by Archetype Architect.

Comment: Applicant to provide clarification on materiality of lap siding, cornice and trim detailing for all housing types. Physical materials are encouraged to understand durability of proposed exterior finishes. To promote a strong cohesive identity of the proposed neighborhood character, a reduction in material types is recommended as well as color scheme continuity between Phase 1 & Complete Master Plan build-out buildings. Applicant to increase window fenestrations that face open space and parking lots to allow for greater visibility and natural light, specifically at Apartment building south façade at interior stairwell, Courtyard Flats A.1 & A.3, Townhouses B.2 & C.1, Rowhouses D.

Response: The lap siding will be cement clapboard, 9 inches to weather, the 9 inches to coincide with the mass and proportions of the building. There is a 24 inch stone base. All windows will have 4 inch trim a PVC product that can be painted. The clapboards will be painted a grey to match some of Co-Op buildings. We also picked up the sloped canopies to tie in with the Coop. The canopies are whimsical and offer the residents place to sit and identify entry. We have increased windows in the building. The natural colored siding, to resemble wood will be a Nichiha, the trims at top of building have been simplified per request of a board member. The top floor will be clad with a dark grey metal siding. The proposed roof is flat to provide future solar panels. The top floor in metal shingle helps reduce the building height. We also varied the height by running the Nichiha up beyond the building roof height.

Sincerely,



David Lloyd
Maine Licensed Architect
Archetype Architects









Att. 1

PROJECT TEAM

EXISTING

UNDERDRAIN
 GREEN SPACE
 UTILITY PAVEMENT CUTS
 STRIPING
 SEDIMENTATION BARRIER
 EDGE OF EX. PAVEMENT
 CURB
 SIGN
 LAMP OR LIGHT POLE
 UTILITY POLE
 GUY WIRE
 WATER VALVE
 FIRE HYDRANT
 SEWER MANHOLE
 CATCH BASIN
 DRAIN MANHOLE
 UNDERGROUND ELECTRIC LINE
 UNDERGROUND WATER LINE
 MINOR CONTOURS (1 FT)
 MAJOR CONTOURS (5 FT)
 GAS LINE
 STORM DRAIN LINE
 SEWER LINE
 EXISTING/PROPOSED BUILDING
 AND ELECTRICAL/TELEPHONE/CABLE
 PROPERTY LINE
 SETBACKS
 GRADE BREAK

The diagram shows a DNA molecule with several labels and a shaded box. At the top, there is a label "UGG" above a horizontal line. Below this, there are two labels "1°W" above two horizontal lines. Further down, there are two labels "131" and "130" to the right of two horizontal lines. Below these, there are two labels ">" above two horizontal lines. Then, there are two labels "S" above two horizontal lines. Below the "S" labels, there is a shaded gray box. At the bottom, there are several horizontal lines, some of which are dashed or have other markings.

C-01	COVER SHEET & LEGEND
C-02	GENERAL NOTES
EX	BOUNDARY & TOPOGRAPHIC SURVEY — BY OWE
C-03	CONSTRUCTION MANAGEMENT PLAN
C-10	SITE PLAN — OVERALL
C-11	SITE PLAN — PHASE I
C-12	SITE PLAN — PHASE II
C-20	UTILITY PLAN — MASTER
C-21	UTILITY PLAN — PHASE I
C-22	UTILITY PLAN — PHASE II
C-30	GRADING & DRAINAGE PLAN — MASTER
C-31	GRADING & DRAINAGE PLAN — PHASE 1
C-32	GRADING & DRAINAGE PLAN — PHASE II
C-40	SITE DETAILS — 1
C-41	SITE DETAILS — 2
C-42	UTILITY DETAILS — 1
C-43	UTILITY DETAILS — 2
C-44	DRAINAGE DETAILS — 1
C-45	DRAINAGE DETAILS — 2
C-46	EROSION AND SEDIMENTATION CONTROL NOTES
C-47	EROSION AND SEDIMENTATION CONTROL DETAILS

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48 UNION WHARF
PORTLAND, MAINE 04101
CONTACT: DAVID LLOYD, R.A.
(207) 772-6022



OWEN HASKELL, INC
FALMOUTH, MAINE
CONTACT: JOHN C. SCHWANDA, P.L.S.
(207) 774-0424



ACORN ENGINEERING, INC.
65 HANOVER STREET
PORTLAND, MAINE 04101
CONTACT: SAM LEBEL, P.E.
(207) 775-2655



TRILLIUM ENGINEERING GROUP
189 MAIN STREET SUITE 200
YARMOUTH, MAINE 04096
CONTACT: TONY DUMAIS, P.E.
(207) 307-0872



SUMMIT GEOENGINEERING SERVICES
LEWISTON, MAINE
CONTACT: BILL PETERLEIN, P.E.
(207) 318-7761



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565 CONGRESS STREET, SUITE 310
PORTLAND, MAINE 04101
CONTACT: SETH KIMBALL, R.L.A.
(207) 221-3390



BENNETT ENGINEERING, INC.
7 BENNETT ROAD
FREEPORT, MAINE 04032
CONTACT: WILL BENNETT, P.E.
(207) 865-9475

CENTRAL MAINE
POWER

DEPARTMENT OF PUBLIC WORKS (DPW) 250 CANCO ROAD PORTLAND, MAINE 04103 CONTACT: BRAD ROLAND, P.E. 207-474-8834	EROSION & SEDIMENTATION PORTLAND, MAINE 04103 CONTACT: JAMIE COUGH 207-474-8834	CENTRAL MAINE POWER COMPANY 162 CANCO ROAD PORTLAND, MAINE 04103 CONTACT: JAMIE COUGH 207-474-8834
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PORTLAND WATER DISTRICT
225 DOUGLASS STREET
PO BOX 3553
PORTLAND, MAINE 04104
ATTN: MEANS DIVISION
(207) 774-5961



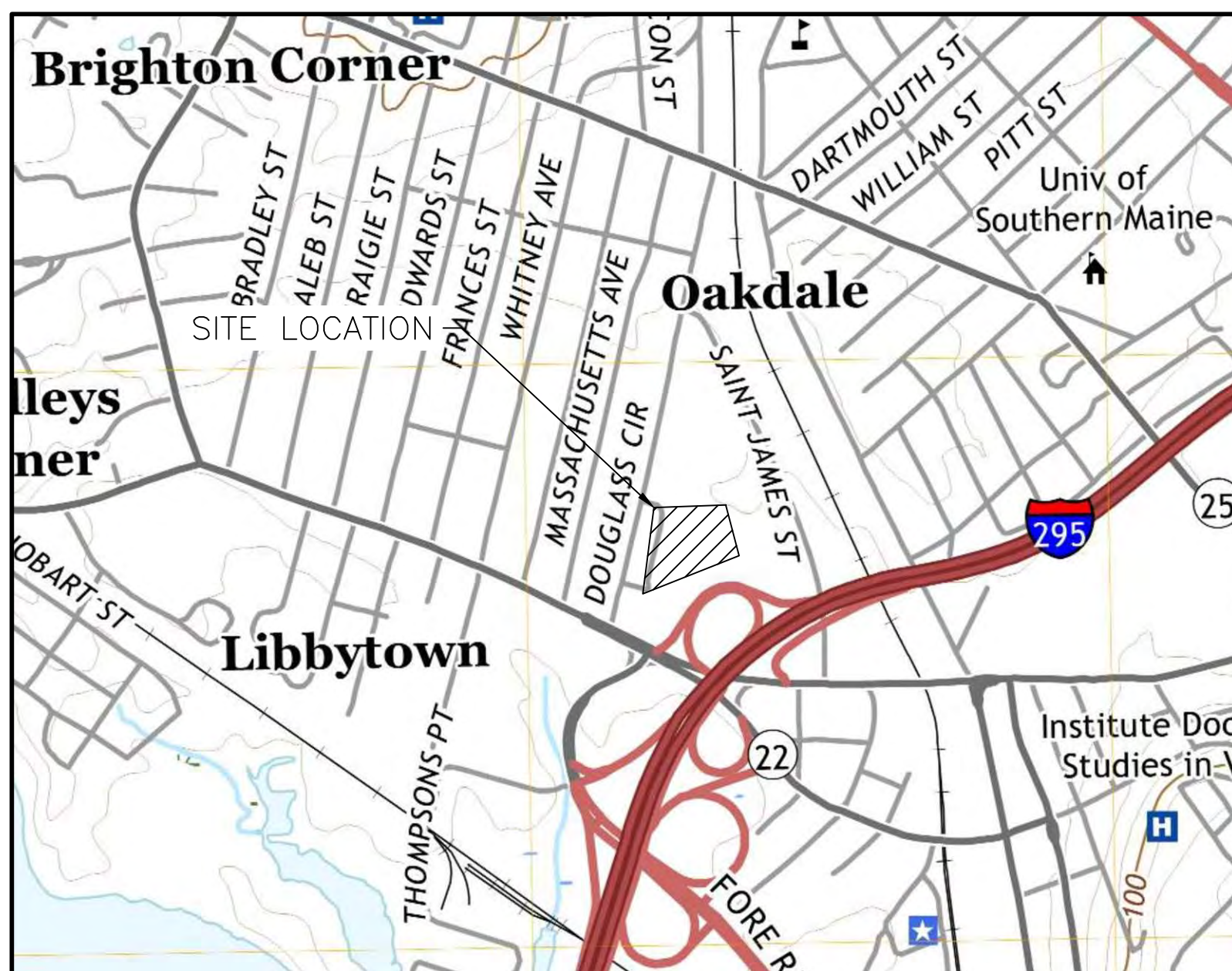
CENTRAL MAINE POWER COMPANY (CMP)
162 CANCO ROAD
PORTLAND, MAINE 04103
CONTACT: JAMIE COUGH
1-207-825-2682 DETAILS



CONSOLIDATED COMMUNICATIONS
(FORMERLY FAIRPOINT)
45 FOREST AVENUE
PORTLAND, MAINE 04101
CONTACT: PAT MORRISON
(207) 745-9363



SPECTRUM CABLE
118 JOHNSON ROAD
PORTLAND, MAINE, 04102
CONTACT: MARK PELLETIER
(877) 546-0962

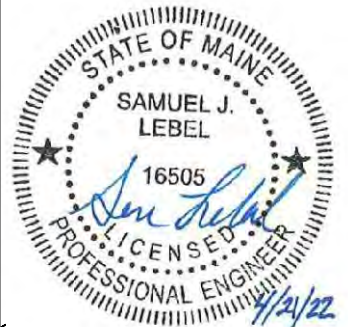
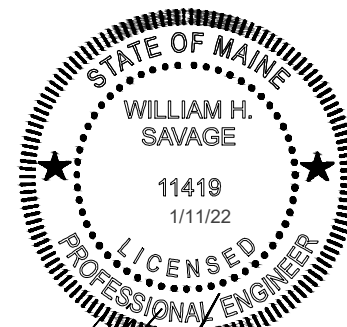


VICINITY MAP
NTS

PARTIAL LIST OF ABBREVIATIONS AND THEIR CORRESPONDING MEANING. PLEASE
CONTACT THE ENGINEER FOR ANY CLARIFICATION

APPROX.	APPROXIMATE
BC	BOTTOM OF CURB
BMP	BEST MANAGEMENT PRACTICE
BOT.	BOTTOM
CB	CATCH BASIN
CF	CUBIC FOOT
CIP	CAST IN PLACE
CL	CENTERLINE
CM	CONSTRUCTION MANAGER
CMP	CENTRAL MAINE POWER
CONC.	CONCRETE
CPP	CORRUGATED PLASTIC PIPE
CY	CUBIC YARD
DIP	DUCTILE IRON PIPE
DIA.	DIAMETER
DIM.	DIMENSION
EA.	EACH
ELEC.	ELECTRICAL
ELEV.	ELEVATION
EQUIV.	EQUIVALENT
EST.	ESTIMATE
EEMP.	ENVIRONMENTAL MEDIA MANAGEMENT PLAN
EX.	EXISTING
FFE	FINISH FLOOR ELEVATION
FT.	FEET
GAL.	GALVANIZED
ID	INNER DIAMETER
IN.	INCH
INV.	INVERT
L	LENGTH
MAX.	MAXIMUM
MDOT	MAINE DEPARTMENT OF TRANSPORTATION
M.E.P	MECHANICAL, ELECTRICAL, PLUMBING DESIGNER
MFG.	MANUFACTURED
MH	MANHOLE
MIN.	MINIMUM
O.C.	ON CENTER
OD	OUTSIDE DIAMETER
OHE/T/C	OVERHEAD ELECTRIC/TELEPHONE/CABLE
PC	PRECAST
PE	PROFESSIONAL ENGINEER
PL	PROPERTY LINE
PLS	PROFESSIONAL LAND SURVEYOR
PROP.	PROPOSED
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
PWD	PORTLAND WATER DISTRICT
R	RADIUS
RD	ROOF DRAIN
RET.	RETAINING
ROW	RIGHT OF WAY
S	SLOPE
SD	STORM DRAIN
SDR	STANDARD DIMENSION RATIO
SF	SQUARE FEET
SMH	SEWER MANHOLE
SPEC.	SPECIFICATION
TC	TOP OF CURB
TW	TOP OF WALL
TYP.	TYPICAL
UD	UNDERDRAIN
UGE	UNDERGROUND ELECTRIC
VIF	VERIFY IN FIELD

PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION



DRAWING NO.

C-01

1. THE CONTRACTOR SHALL CALL THE APPROPRIATE UTILITY COMPANIES AND DIG SAFE AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION FOR UTILITIES. OTHERWISE IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE LOCATION OF UNDERGROUND UTILITIES AND LOCATE ANY POTENTIAL CONFLICTS WITH THE APPROVED PLANS PRIOR TO CONSTRUCTION.

- CIVIL SITE NOTES:

- SPECIAL INSPECTION NOTES

- IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION.

- LAYOUT NOTES:

- ## PERMITTING NOTES

- GRADING AND DRAINAGE NOTES:

- EROSION CONTROL NOTES:

- UTILITY NOTES:

- DEMOLITION NOTES:

1. THE FOLLOWING ITEMS ARE TYPICAL OF MATERIAL WHICH MAY BE ON SITE:
 - ROCK AND CONCRETE FOUNDATIONS
 - CONCRETE SLABS
 - BITUMINOUS ASPHALT PAVEMENT
 - CONCRETE PADS AND BLOCKS
 - FENCE POST AND FENCING
 - UNDERGROUND UTILITY LINES
 - ABOVE AND OR BELOW FUEL OIL AND PROPANE GAS TANKS
 - STORM DRAIN PIPES AND APPURTENANCE STRUCTURES
 - OTHER TRASH & MISCELLANEOUS SOLID WASTES
2. THE CONTRACTOR IS ADVISED TO VISIT THE SITE TO CONFIRM DEMOLITION ITEMS SINCE THE LIST IS NOT INCLUSIVE OF THE SITE CONDITIONS WHICH MAY BE ENCOUNTERED
3. ALL DISPOSAL OF DEMOLITION DEBRIS OR WASTE SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, & FEDERAL REGULATIONS. CONTRACTORS SHALL PROVIDE OWNER WITH APPROPRIATE "BILLS OF LADING" DEMONSTRATING PROPER DISPOSAL OF ALL MATERIALS.
4. CONTRACTOR TO REFER TO PHASE 1 ENVIRONMENTAL SITE ASSESSMENT BY CREDERE ASSOCIATES, INC. AND PHASE 2 ENVIRONMENTAL ASSESSMENT BY WOODARD AND CURRAN.
5. CONTRACTOR TO REFER TO AND ABIDE BY VRAP DOCUMENTS PREPARED BY CREDERE ASSOCIATES.

GENERAL NOTES

DOUGLASS STREET COMMONS

RD: DOUGLASS COMMONS, LLC

10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

DRAWING NAME:

PROJECT NAME/
ADDRESS:

CLIENT/OWNER OF

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM ACCORN ENGINEERING, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO ACCORN ENGINEERING, INC.

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(207) 775-2655

FILE: 1154_CIVIL

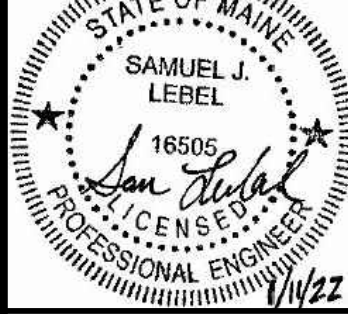
JN: 1154

SCALE: AS NOTED

DESIGNED BY	SEE
DRAWN BY	AWO

CHECKED BY: S.II /WHS

TE OF A

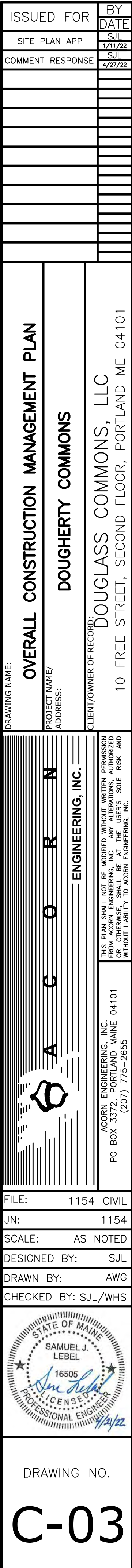


DRAWING NO.

PERMIT LEVEL
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CONSTRUCTION

C-02

1. EXISTING ASPHALT TO BE REMOVED SHALL BE STRIPPED AND PROPERLY DISPOSED OF OFFSITE.
2. ALL DISPOSAL OF DEMOLITION DEBRIS OR WASTE SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, & FEDERAL REGULATIONS. CONTRACTOR SHALL PROVIDE OWNER WITH APPROPRIATE "BILLS OF LADING" TO DEMONSTRATE PROPER DISPOSAL OF ALL DEBRIS.
3. SITE DEMOLITION SHALL NOT OCCUR UNTIL PROPER ABATEMENT PROCEDURES HAVE OCCURRED. ABATEMENT, IF NECESSARY, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. THE CONTRACTOR SHALL CALL THE APPROPRIATE UTILITY COMPANIES AND DIG SAFE AT LEAST 72 HOURS PRIOR TO EXCAVATION TO REQUEST EXACT FIELD LOCATION FOR UTILITIES. OTHERWISE IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIND THE LOCATION OF ALL UTILITIES OF UNDERGROUND UTILITIES AND LOCATE POTENTIAL CONFLICT WITH THE APPROVED PLANS PRIOR TO CONSTRUCTION.
5. ALL CONSTRUCTION SIGNAGE IS TEMPORARY AND WILL BE REMOVED AT PROJECT COMPLETION. FINAL SIGNAGE ADDRESSING AND PLACEMENT LOCATION TO BE ACCEPTED BY THE CITY.
6. SEEDING BARRIERS SHALL BE INSTALLED TO PROTECT ALL EXISTING PROPERTY LINES, DOWN GRADAGE OF THE PROPOSED PROJECT WORK PER DETAIL; FENCES ARE OFFSET OF THE PROPERTY LINES AS SHOWN ON THE PLAN FOR CLARITY PURPOSES AND DO NOT NECESSARILY DEPICT THE PHYSICAL LOCATION.
7. CONTRACTOR SHALL PLACE CATCH BASIN INLET PROTECTION ON CATCH BASINS AND FIELD INLETS DOWN-GRADAGE OF ALL NON-STABILIZED AREAS.
8. DEMOLITION PLAN IS NOT INCLUSIVE OF ALL EXISTING ITEMS TO BE REMOVED AS PART OF SITE CONSTRUCTION INCLUDING BUT NOT LIMITED TO LANDSCAPING, UTILITIES, WORK WITHIN THE ROW, ETC. ALL DEMOLITION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF PORTLAND REGULATIONS.
9. CONTRACTOR TO BE RESPONSIBLE FOR PROVIDING OFF-SITE PARKING TO EMPLOYEES; ON-SITE PARKING WILL NOT BE PROVIDED OR GUARANTEED.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR SNOW REMOVAL ALONG CONSTRUCTION FENCE AND GATE.



1. EXISTING ASPHALT TO BE REMOVED SHALL BE STRIPPED AND PROPERLY DISPOSED OF OFFSITE.
2. ALL DISPOSAL OF DEMOLITION DEBRIS OR WASTE SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, & FEDERAL REGULATIONS. CONTRACTOR SHALL PROVIDE OWNER WITH APPROPRIATE "BILLS OF LADING" TO DEMONSTRATE PROPER DISPOSAL OF ALL MATERIALS.
3. SITE DEMOLITION SHALL NOT OCCUR UNTIL PROPER ABATEMENT PROCEDURES HAVE OCCURRED. ABATEMENT, IF NECESSARY, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. THE CONTRACTOR SHALL CALL THE APPROPRIATE UTILITY COMPANIES AND DIG SAFE AT LEAST 72 HOURS PRIOR TO EXCAVATION TO REQUEST EXACT FIELD LOCATION FOR UTILITIES. OTHERWISE IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, DEPT. OF UNDERGROUND UTILITIES AND LOCATE POTENTIAL CONFLICT WITH THE APPROVED PLANS PRIOR TO CONSTRUCTION.
5. ALL CONSTRUCTION SIGNAGE IS TEMPORARY AND WILL BE REMOVED AT PROJECT COMPLETION. FINAL SIGNAGE WORDING AND PLACEMENT LOCATION TO BE ACCEPTED BY THE CITY.
6. SETBACK MARKERS SHALL BE PLACED FROM THE PROPERTY LINES, DOWN GRADIENT OF THE PROPERTY, AT THE PROPOSED PROJECT WORK PER DETAIL; FENCES ARE OFFSET OF THE PROPERTY LINES AS SHOWN ON THE PLAN FOR CLARITY PURPOSES AND DO NOT NECESSARILY DEPICT THE PHYSICAL LOCATION.
7. CONTRACTOR SHALL PLACE CATCH BASIN INLET PROTECTION ON CATCH BASINS AND FIELD INLETS DOWN-GRADIENT OF ALL NON-STABILIZED SURFACES DETAIL.
8. DEMOLITION PLAN IS INCLUSIVE OF ALL EXISTING ITEMS TO BE REMOVED AS PART OF SITE CONSTRUCTION INCLUDING BUT NOT LIMITED TO LANDSCAPING, UTILITIES, WORK WITHIN THE ROW, ETC. ALL DEMOLITION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF PORTLAND REGULATIONS.
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10. CONTRACTOR SHALL BE RESPONSIBLE FOR SNOW REMOVAL ALONG CONSTRUCTION FENCE AND GATE.



PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION

[illegible]

AWING NAME: INTERIM PHASE | CONSTRUCTION MANAGEMENT PLAN

DOUGHERTY COMMONS

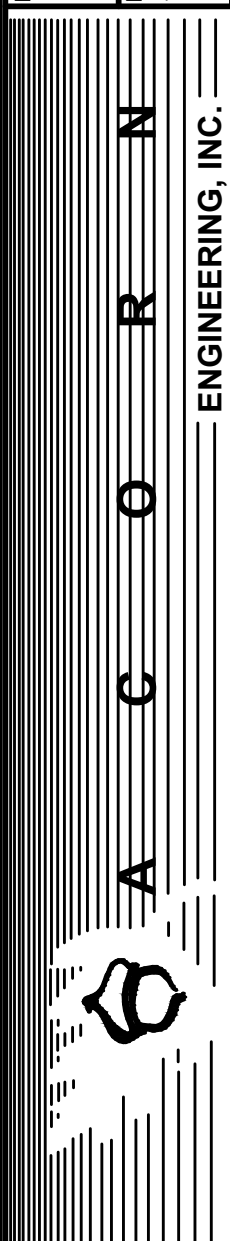
RD: DOUGLASS COMMONS, LLC

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-----	------

SCALE: AS NOTED

DESIGNED BY: SJL

DRAWN BY: AWG

CHECKED BY: SJL/WHS



DRAWING NO.

C-04

1. EXISTING ASPHALT TO BE REMOVED SHALL BE STRIPPED AND PROPERLY DISPOSED OF OFFSITE.
2. ALL DISPOSAL OF DEMOLITION DEBRIS OR WASTE SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, & FEDERAL REGULATIONS. CONTRACTOR SHALL PROVIDE OWNER WITH APPROPRIATE "BILLS OF LADING" TO DEMONSTRATE PROPER DISPOSAL OF WASTE.
3. SITE DEMOLITION SHALL NOT OCCUR UNTIL PROPER ABATEMENT PROCEDURES HAVE OCCURRED. ABATEMENT, IF NECESSARY, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. THE CONTRACTOR SHALL CALL THE APPROPRIATE UTILITY COMPANIES AND DIG SAFE AT LEAST 72 HOURS PRIOR TO EXCAVATION TO REQUEST EXACT FIELD LOCATION FOR UTILITIES. OTHERWISE IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO IDENTIFY THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES AND LOCATE POTENTIAL CONFLICT WITH THE APPROVED PLANS PRIOR TO CONSTRUCTION.
5. ALL CONSTRUCTION SIGNAGE IS TEMPORARY AND SHALL BE MAINTAINED AT PROJECT COMPLETION. FINAL SIGNAGE DEDICATION AND PLACEMENT LOCATION SHALL BE ACCEPTED BY THE CITY.
6. SEEDING BARRIERS SHALL BE PLACED DIRECTLY ON EXCAVATED AREAS. REMOVE ALL SIDE PROPERTY LINES, DOWN GRADIENT OF THE PROPOSED PROJECT WORK PER DETAIL; FENCES ARE OFFSET OF THE PROPERTY LINES AS SHOWN ON THE PLAN FOR CLARITY PURPOSES AND DO NOT NECESSARILY DEPICT THE PHYSICAL LOCATION.
7. CONTRACTOR SHALL PROVIDE CATCH BASIN INLET PROTECTION ON CATCH BASINS AND FIELD INLETS DOWN-GRADIENT OF ALL NON-STABILIZED SURFACES. PER DETAIL.
8. DEMOLITION PLAN IS NOT INCLUDING ALL EXISTING ITEMS TO BE REMOVED AS PART OF SITE CONSTRUCTION INCLUDING BUT NOT LIMITED TO LANDSCAPING, UTILITIES, WORK WITHIN THE ROW, ETC. ALL DEMOLITION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF PORTLAND REGULATIONS.
9. CONTRACTOR TO BE RESPONSIBLE FOR PROVIDING OFF-SITE PARKING TO EMPLOYEES; ON-SITE PARKING WILL NOT BE PROVIDED OR GUARANTEED.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR SNOW REMOVAL ALONG CONSTRUCTION FENCE AND GATE.



PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION

[illegible]

DRAWING NAME: INTERIM PHASE II CONSTRUCTION MANAGEMENT PLAN
PROJECT NAME/ DOUGHERTY COMMONS
ADDRESS: DOUGLASS COMMONS, LLC
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101
CLIENT/OWNER OF RECORD:

	ACORN ENGINEERING INC. PO BOX 3372, PORTLAND, MAINE 04101 (207) 775-2855	A C O R N ENGINEERING, INC.	THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM ACORN ENGINEERING, INC. ANY ALTERATIONS, AUTHORIZED OR UNAUTHORIZED, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO ACORN ENGINEERING, INC.
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FILE:	1154_CIVIL
JN:	1154
SCALE:	AS NOTED
DESIGNED BY:	SJL
DRAWN BY:	AWG
CHECKED BY:	SJL/WHs



DRAWING NO.
C-05

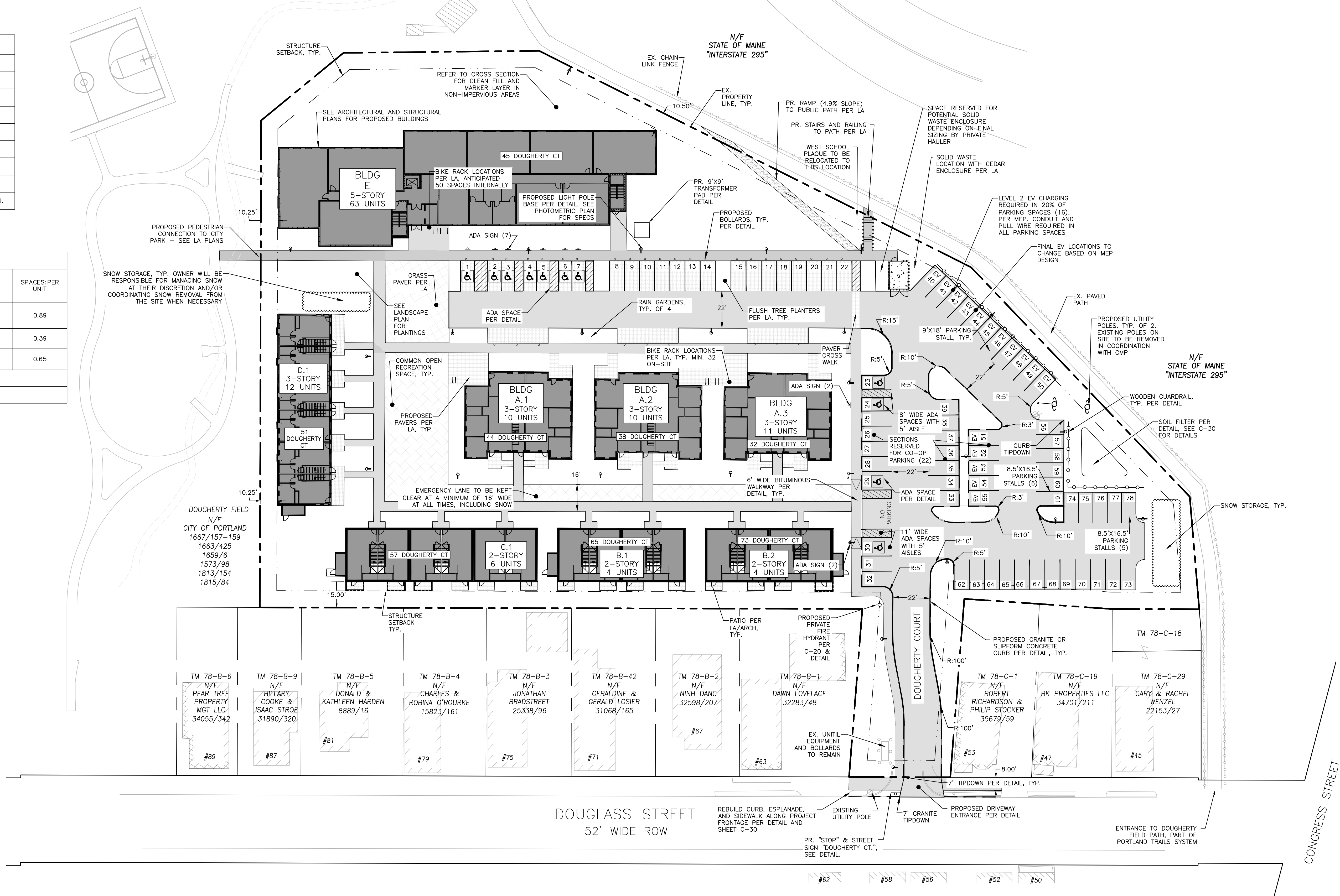
1. ALL VERTICAL GRANITE CURB TO BE REPLACED SHALL BE REBUILT TO CITY OF PORTLAND STANDARD.
2. ALL PAVEMENT STRIPING AND MARKINGS SHALL COMPLY TO CITY OF PORTLAND STANDARDS.
3. ANY ASPHALT TO BE REMOVED SHALL BE STRIPPED AND PROPERLY DISPOSED OF OFFSITE.
4. CURB TO BE REMOVED, STOCKPILED AND RESET IN ACCORDANCE WITH DETAIL. BROKEN CURB SHALL BE PROPERLY DISPOSED OF AND SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
5. ALL RAMPS TO CONFORM TO ADA GUIDELINES. SLOPE SHALL NOT EXCEED 1 INCH PER FOOT.
6. SITE SIGNAGE TO COMPLY WITH MUTCD STANDARDS. CONTRACTOR TO COORDINATE AND INSTALL.
7. FOLLOWING COMPLETION OF CONSTRUCTION, THE OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND MANAGEMENT OF DRIVEWAYS, SITE LIGHTING, TRASH REMOVAL AND SNOW REMOVAL.

SPACE AND BULK STANDARDS		
R-5A PRUD ZONE	REQUIRED	PROVIDED
MINIMUM LOT SIZE	2.00 AC	3.34 AC
MINIMUM STREET FRONTAGE	50'	60'
FRONT YARD SETBACK	10'	15'
SIDE YARD SETBACK	10'	10.25'
REAR YARD SETBACK	10'	10.5'
MAXIMUM BUILDING HEIGHT	55'	53'
MAX. # OF DWELLING UNITS ON PROPERTY	182	120
COMMON RECREATION OPEN SPACE	200 SF / D.U.	300 SF / D.U.

AREA	PARKING SPACES	UNIT COUNT	EV CHARGING (20%)	COMPACT SPACES (#56-61) (\$74-78)	SPACES/PER UNIT
5-STORY (#1-22, #40-50, #56-78)	56	63	11	11	0.89
2 & 3-STORIES (#23-#39, #51-#55)	22	57	5	0	0.39
TOTAL	78	120	16	11	0.65

* ALL SPACES 9'X18' UNLESS OTHERWISE NOTED

** OFF-STREET PARKING REQUIREMENTS WAIVED PER SEC. 14-332.2.b

[illegible]

OVERALL SITE PLAN
DOUGHERTY COMMONS

DRAWING NAME:

PROJECT NAME/

WINNER OF RECORD: DOUGLASS COMMONS, LLC
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

R N

BE MODIFIED WITHOUT WRITTEN PERMISSION OF THE USER'S SOLE REPRESENTATIVE AT THE USER'S SOLE RISK. CORN ENGINEERING, INC.

ACORN ENGINEERING, INC.
PO BOX 3372, PORTLAND MAINE 04101
(207) 775-2655

FILE:	1154_CIVIL
JN:	1154
SCALE:	AS NOTED
DESIGNED BY:	SJL
DRAWN BY:	AWG
CHECKED BY:	SJL/WHs



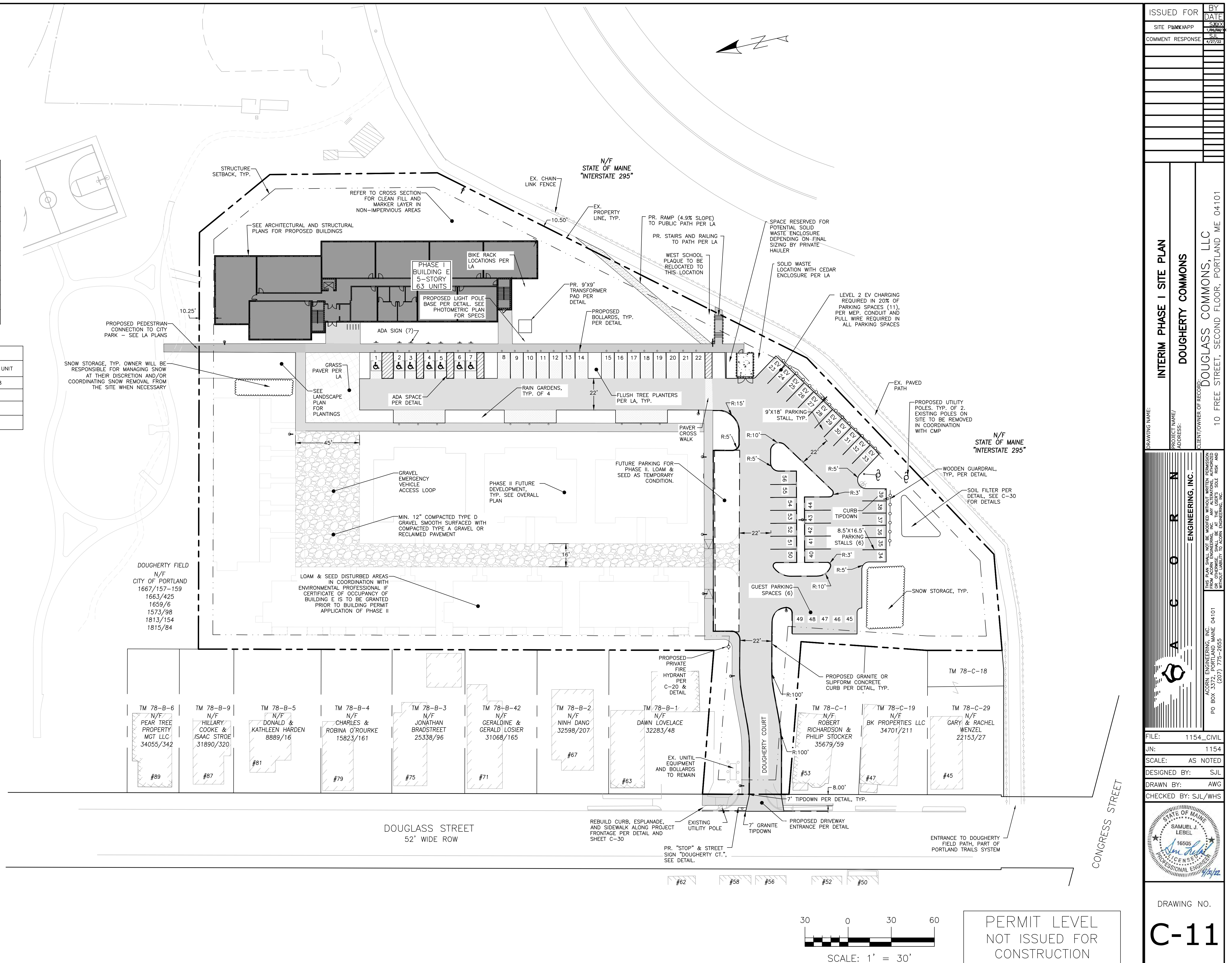
DRAWING NO.

C-10

1. ALL BRICK SIDEWALK AND VERTICAL GRANITE CURB TO BE REPLACED SHALL BE REBUILT TO CITY OF PORTLAND STANDARD.
2. ALL PAVEMENT STRIPING AND MARKINGS SHALL COMPLY TO CITY OF PORTLAND STANDARDS.
3. ANY ASPHALT TO BE REMOVED SHALL BE STRIPPED AND PROPERLY DISPOSED OF OFFSITE.
4. CURE TO BE REMOVED, STOCKPILED AND RESET IN ACCORDANCE WITH DETAIL. BROKEN CURB SHALL BE PROPERLY DISPOSED OF AND SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
5. ALL RAMPS TO CONFORM TO ADA GUIDELINES. SLOPE SHALL NOT EXCEED 1 INCH PER FOOT.
6. ALL SITE SIGNAGE TO COMPLY WITH MUTCD STANDARDS. CONTRACTOR TO COORDINATE AND INSTALL.
7. UPON COMPLETION OF CONSTRUCTION, THE OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND MANAGEMENT OF DRIVEWAYS, SITE LIGHTING, TRASH REMOVAL AND SNOW REMOVAL.

SPACE AND BULK STANDARDS		
R5A ZONE	REQUIRED	PROVIDED
MINIMUM LOT SIZE	2.00 AC	3.34 AC
MINIMUM STREET FRONTAGE	50'	60'
FRONT YARD SETBACK	10'	215'
SIDE YARD SETBACK	10'	10.25'
REAR YARD SETBACK	10'	10.5'
MAXIMUM BUILDING HEIGHT	55'	53'
MAX. # OF DWELLING UNITS ON PROPERTY	182	63
COMMON RECREATION OPEN SPACE	200 SF / D.U.	256 SF / D.U.
** R5A PRUD STANDARDS		

PARKING TABLE				
AREA	PARKING SPACES	UNIT COUNT	EV CHARGING (20%)	SPACES/UNIT
5-STORY	56	63	12	0.88
COMPACT (#34-39)	6	—	—	—
* ALL SPACES 9'X18' UNLESS OTHERWISE NOTED				
** OFF-STREET PARKING REQUIREMENTS WAIVED PER SEC. 14-332.2.b				

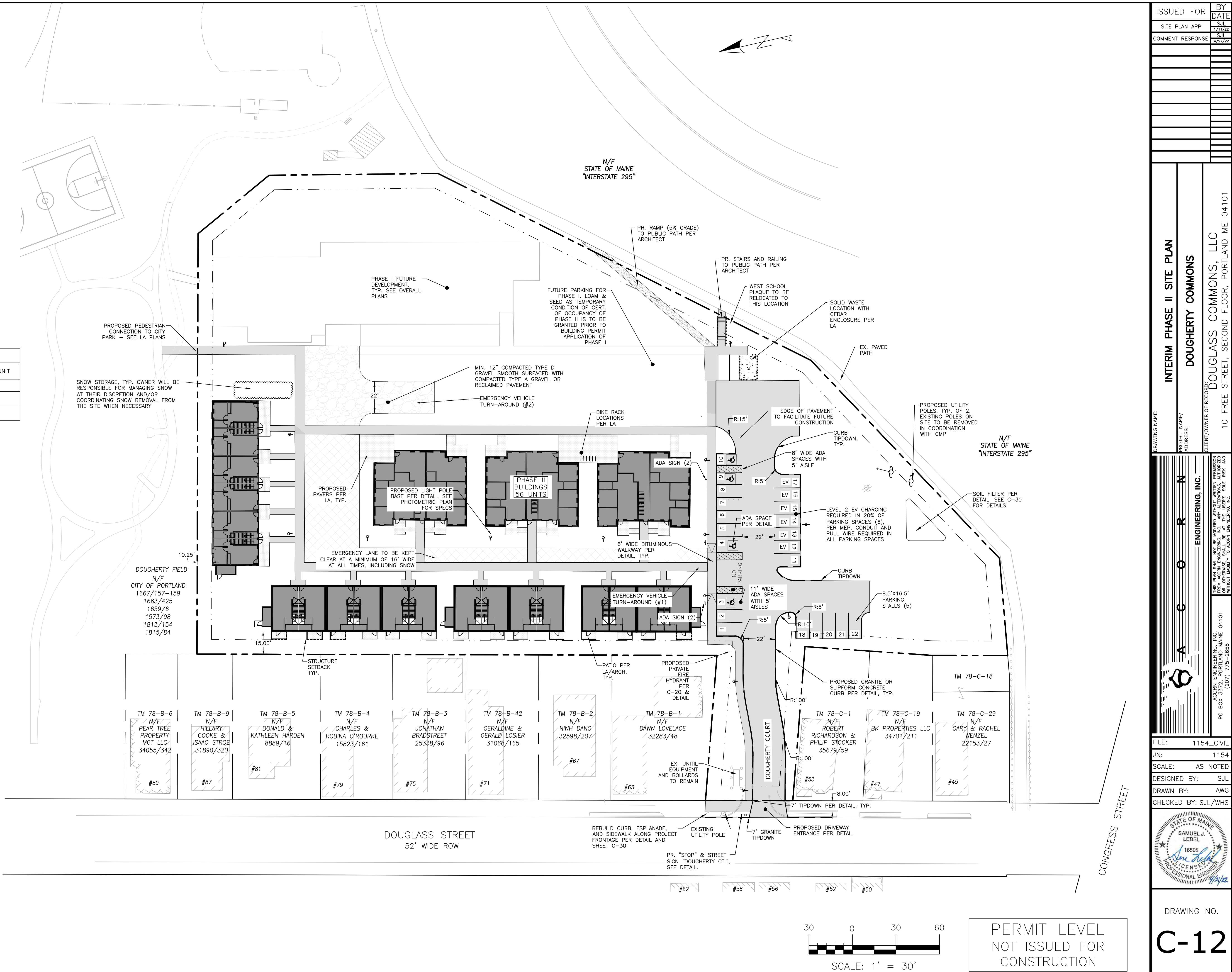


GENERAL NOTES:

1. ALL BRICK SIDEWALK AND VERTICAL GRANITE CURB TO BE REPLACED SHALL BE REBUILT TO CITY OF PORTLAND STANDARD.
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SPACE AND BULK STANDARDS		
R5A ZONE	REQUIRED	PROVIDED
MINIMUM LOT SIZE	2.00 AC	3.34 AC
MINIMUM STREET FRONTAGE	50'	60'
FRONT YARD SETBACK	10'	15'
SIDE YARD SETBACK	10'	10.25'
REAR YARD SETBACK	10'	10.5'
MAXIMUM BUILDING HEIGHT	55'	35'
MAX. # OF DWELLING UNITS ON PROPERTY	182	57
COMMON RECREATION OPEN SPACE	200 SF / D.U.	390 SF / D.U.
** R5A PRUD STANDARDS		

PARKING TABLE				
AREA	PARKING SPACES	UNIT COUNT	EV CHARGING (20%)	SPACES:UNIT
COOPERATIVE BUILDINGS	22	56	5	0.39
* ALL SPACES 9'X18' UNLESS OTHERWISE NOTED				
** OFF-STREET PARKING REQUIREMENTS WAIVED PER SEC. 14-332.2.b				



ISSUED FOR: SITE PLAN APP
BY: SJL
DATE: 1/11/23

COMMENT RESPONSE:
BY: SJL
DATE: 4/27/23

INTERIM PHASE II SITE PLAN
DOUGHERTY COMMONS

PROJECT NAME/ ADDRESS:
DOUGLASS COMMONS, LLC
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

CLIENT/OWNER OF RECORD:
DOUGHERTY COMMONS

ACORN ENGINEERING, INC.
PO BOX 3372, PORTLAND MAINE 04101
(207) 775-2555

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION OF THE ENGINEER. ANY CHANGES SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO ACORN ENGINEERING, INC.

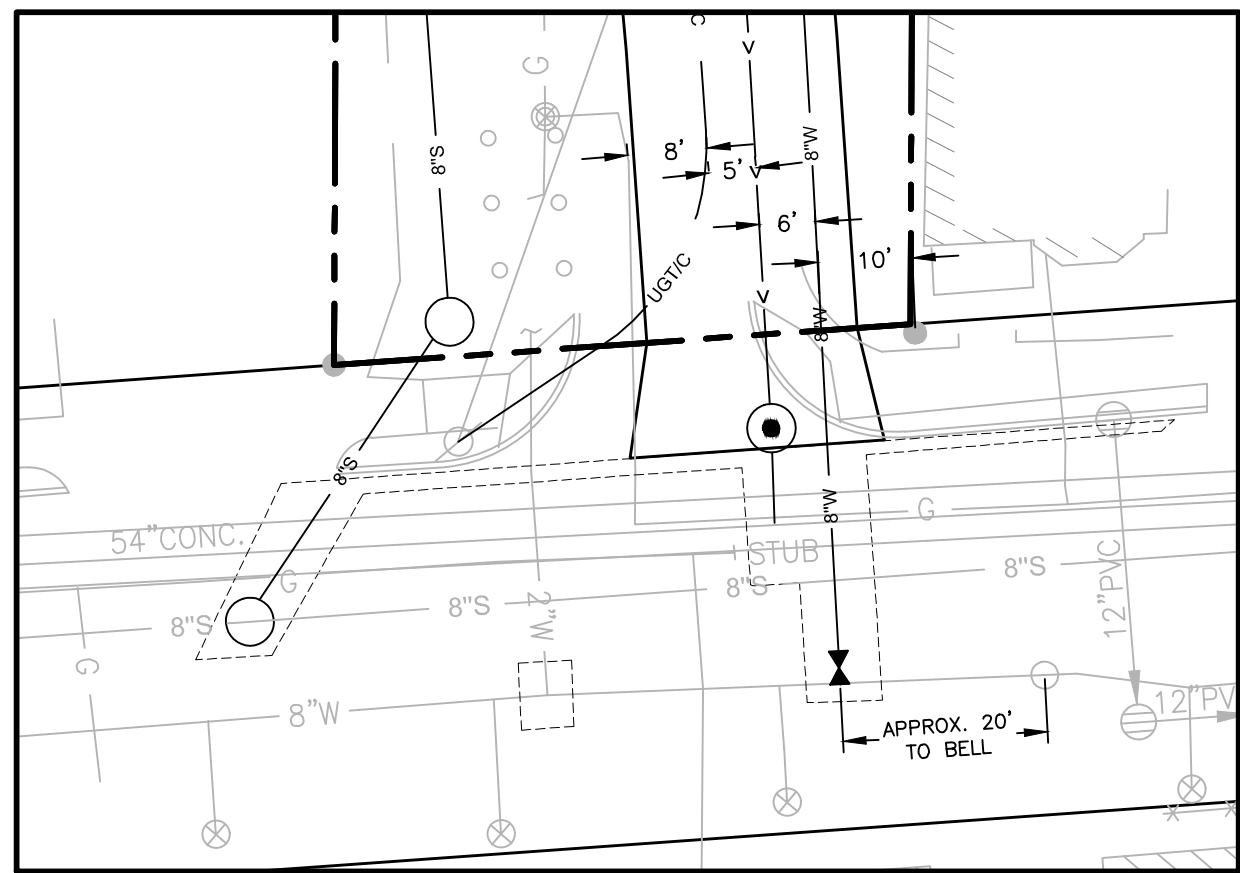
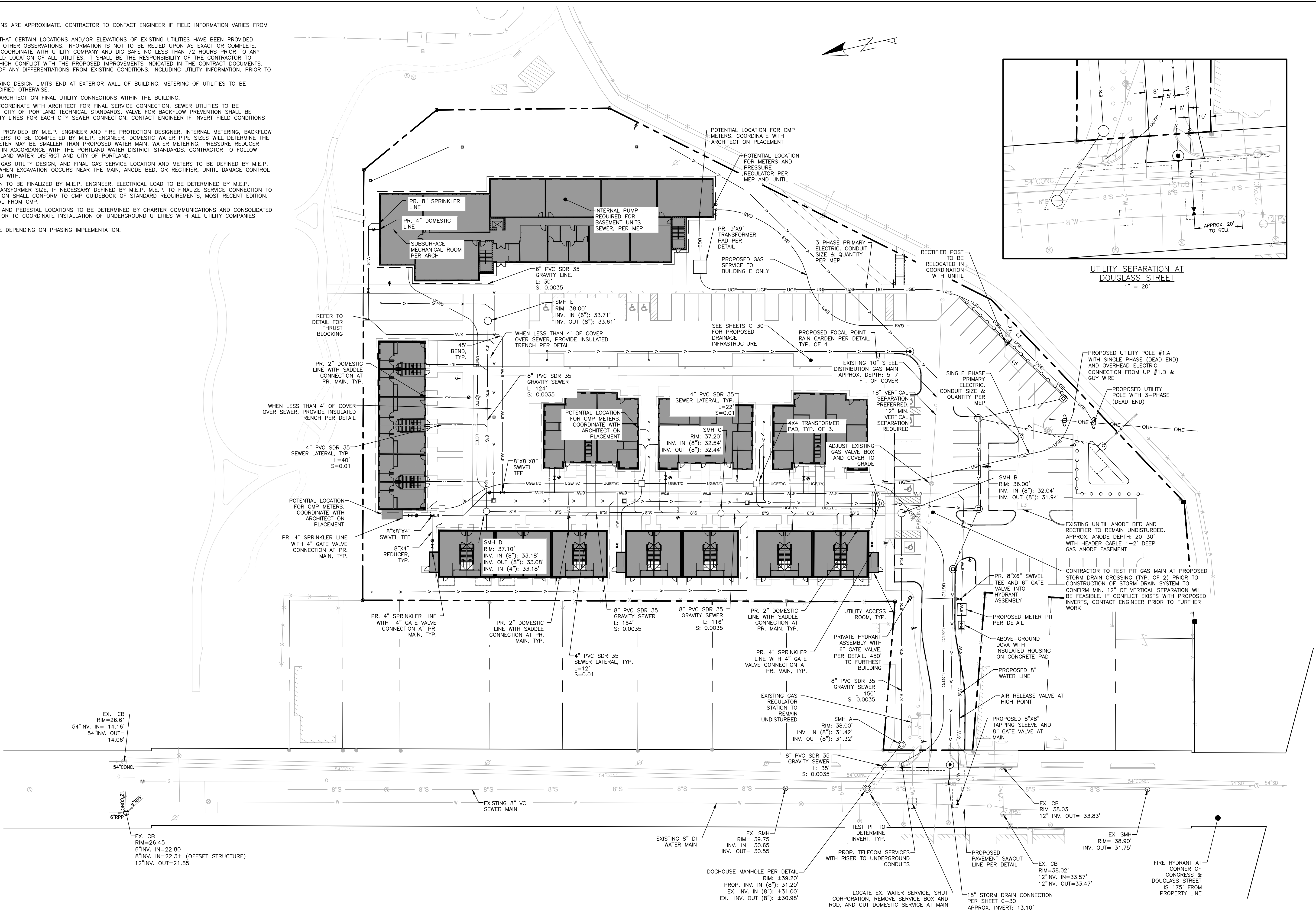
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JN: 1154
SCALE: AS NOTED
DESIGNED BY: SJL
DRAWN BY: AWG
CHECKED BY: SJL/WH

STATE OF MAINE
SAMUEL J. LEBEL
16505
PROFESSIONAL ENGINEER
LICENSE # 17442

DRAWING NO.
C-12

Page 869

- GENERAL NOTES:
1. LOCATION OF PROPOSED CONNECTIONS ARE APPROXIMATE. CONTRACTOR TO CONTACT ENGINEER IF FIELD INFORMATION VARIES FROM INFORMATION ON PLANS.
 2. CONTRACTOR IS TO BE CAUTIONED THAT CERTAIN LOCATIONS AND/OR ELEVATIONS OF EXISTING UTILITIES HAVE BEEN PROVIDED THROUGH UTILITY COORDINATION OR OTHER OBSERVATIONS. INFORMATION IS NOT TO BE RELIED UPON AS EXACT OR COMPLETE. CONTRACTOR TO FIELD VERIFY AND COORDINATE WITH UTILITY COMPANY AND DIG SAFE NO LESS THAN 72 HOURS PRIOR TO ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF ALL UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS INDICATED IN THE CONTRACT DOCUMENTS. CONTRACTOR TO NOTIFY ENGINEER OF ANY DIFFERENTIATIONS FROM EXISTING CONDITIONS, INCLUDING UTILITY INFORMATION, PRIOR TO ANY CHANGES.
 3. FOR ALL UTILITIES, ACORN ENGINEERING DESIGN LIMITS END AT EXTERIOR WALL OF BUILDING. METERING OF UTILITIES TO BE COMPLETED BY M.E.P. UNLESS SPECIFIED OTHERWISE.
 4. CONTRACTOR TO COORDINATE WITH ARCHITECT ON FINAL UTILITY CONNECTIONS WITHIN THE BUILDING.
 5. SEWER UTILITIES: CONTRACTOR TO COORDINATE WITH ARCHITECT FOR FINAL SERVICE CONNECTION. SEWER UTILITIES TO BE CONSTRUCTED IN ACCORDANCE WITH CITY OF PORTLAND TECHNICAL STANDARDS. VALVE FOR BACKFLOW PREVENTION SHALL BE INSTALLED WITHIN THE PROPERTY LINES FOR EACH CITY SEWER CONNECTION. CONTACT ENGINEER IF INVERT FIELD CONDITIONS VARY FROM DESIGN.
 6. WATER UTILITIES: FINAL PIPE SIZING PROVIDED BY M.E.P. ENGINEER AND FIRE PROTECTION DESIGNER. INTERNAL METERING, BACKFLOW PREVENTION, AND PRESSURE REDUCERS TO BE COMPLETED BY M.E.P. ENGINEER. DOMESTIC WATER PIPE SIZES WILL DETERMINE THE FINAL WATER METERING OPTIONS. METER MAY BE SMALLER THAN PROPOSED WATER MAIN. WATER METERING, PRESSURE REDUCER AND BACKFLOW PREVENTION TO BE IN ACCORDANCE WITH THE PORTLAND WATER DISTRICT STANDARDS. CONTRACTOR TO FOLLOW METERING GUIDELINES OF THE PORTLAND WATER DISTRICT AND CITY OF PORTLAND.
 7. GAS UTILITIES: PROJECT GAS LOAD, GAS UTILITY DESIGN, AND FINAL GAS SERVICE LOCATION AND METERS TO BE DEFINED BY M.E.P. AND IN ACCORDANCE WITH UNTIL. WHEN EXCAVATION OCCURS NEAR THE MAIN, ANODE BED, OR RECTIFIER, UNTIL DAMAGE CONTROL DEPARTMENT SHALL BE COORDINATED WITH.
 8. ELECTRIC UTILITIES: ELECTRIC DESIGN TO BE FINALIZED BY M.E.P. ENGINEER. ELECTRICAL LOAD TO BE DETERMINED BY M.E.P. ENGINEER. METER LOCATION AND TRANSFORMER SIZE, IF NECESSARY DEFINED BY M.E.P. M.E.P. TO FINALIZE SERVICE CONNECTION TO BUILDING. ALL ELECTRIC CONSTRUCTION SHALL CONFORM TO CMP GUIDEBOOK OF STANDARD REQUIREMENTS, MOST RECENT EDITION. DESIGN SUBJECT TO FINAL APPROVAL FROM CMP.
 9. CABLE AND TELEPHONE PULLBOXES AND PEDESTAL LOCATIONS TO BE DETERMINED BY CHARTER COMMUNICATIONS AND CONSOLIDATED PRIOR TO CONSTRUCTION. CONTRACTOR TO COORDINATE INSTALLATION OF UNDERGROUND UTILITIES WITH ALL UTILITY COMPANIES INVOLVED.
 10. UTILITY LAYOUT SUBJECT TO CHANGE DEPENDING ON PHASING IMPLEMENTATION.



PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION

ISSUED FOR	BY
SITE PLAN APP	SJL
COMMENT RESPONSE	SJL

DATE
1/11/23
4/21/23

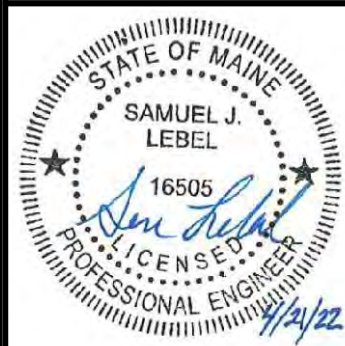
PROJECT NAME/ ADDRESS:	CLIENT/OWNER OF RECORD:
DOUGHERTY COMMONS	DOUGLASS COMMONS, LLC
	10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

ACORN ENGINEERING, INC. ENGINEERING, INC.

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION OF THE ENGINEER. ANY CHANGES SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO ACORN ENGINEERING, INC.

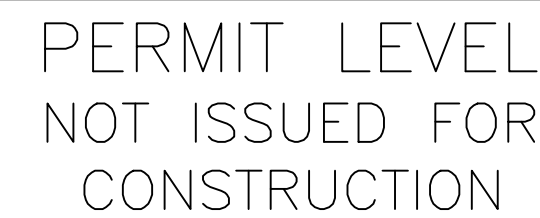
PO BOX 3372, PORTLAND MAINE 04101 (207) 775-2555

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JN:	1154
SCALE:	AS NOTED
DESIGNED BY:	SJL
DRAWN BY:	AWG
CHECKED BY:	SJL/WHs



DRAWING NO.
C-20

1. LOCATION OF PROPOSED CONNECTIONS ARE APPROXIMATE. CONTRACTOR TO CONTACT ENGINEER IF FIELD INFORMATION VARIES FROM INFORMATION ON PLANS.
2. CONTRACTOR IS TO BE CAUTIONED THAT CERTAIN LOCATIONS AND/OR ELEVATIONS OF EXISTING UTILITIES HAVE BEEN PROVIDED THROUGH UTILITY COORDINATION OR OTHER OBSERVATIONS. INFORMATION IS NOT TO BE RELIED UPON AS EXACT OR COMPLETE. CONTRACTOR IS TO VERIFY AND COORDINATE WITH UTILITY COMPANY AND DIG SAFE NO LESS THAN 72 HOURS PRIOR TO ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF ALL UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS INDICATED IN THE CONTRACT DOCUMENTS. CONTRACTOR IS TO NOTIFY ENGINEER OF ANY DIFFERENTIATIONS FROM EXISTING CONDITIONS, INCLUDING UTILITY INFORMATION, PRIOR TO ANY CHANGES.
3. FOR ALL UTILITIES, ACORN ENGINEERING DESIGN LIMITS END AT EXTERIOR WALL OF BUILDING. METERING OF UTILITIES TO BE COMPLETED BY M.E.P. UNLESS SPECIFIED OTHERWISE.
4. CONTRACTOR TO COORDINATE WITH ARCHITECT ON FINAL UTILITY CONNECTIONS WITHIN THE BUILDING.
5. **SEWER UTILITIES:** CONTRACTOR TO COORDINATE WITH ARCHITECT FOR FINAL SERVICE CONNECTION. SEWER UTILITIES TO BE CONSTRUCTED IN ACCORDANCE WITH CITY OF PORTLAND TECHNICAL STANDARDS. VALVE FOR BACKFLOW PREVENTION SHALL BE INSTALLED WITHIN THE PROPERTY LINES FOR EACH CITY SEWER CONNECTION. CONTACT ENGINEER IF INVERT FIELD CONDITIONS VARY FROM DESIGN.
6. **WATER UTILITIES:** FINAL PIPE SIZING PROVIDED BY M.E.P. ENGINEER AND FIRE PROTECTION DESIGNER. INTERNAL METERING, BACKFLOW PREVENTION, AND PRESSURE REDUCERS TO BE COMPLETED BY M.E.P. ENGINEER. DOMESTIC WATER PIPE SIZES WILL DETERMINE THE FINAL WATER METERING OPTIONS. METER MAY BE SMALLER THAN PROPOSED WATER MAIN. WATER METERING, PRESSURE REDUCER AND BACKFLOW PREVENTION TO BE COMPLETED BY M.E.P. ENGINEER WITH THEIR PORTLAND WATER DISTRICT STANDARDS. CONTRACTOR TO FOLLOW METERING GUIDELINES OF THE PORTLAND WATER DISTRICT AND CITY OF PORTLAND.
7. **GAS UTILITIES:** PROJECT GAS LOAD, GAS UTILITY DESIGN, AND FINAL GAS SERVICE LOCATION AND METERS TO BE DEFINED BY M.E.P. AND IN ACCORDANCE WITH UNTIL. WHEN EXCAVATION OCCURS NEAR THE MAIN, ANODE BED, OR RECTIFIER, UNTIL DAMAGE CONTROL MEASUREMENT SHALL BE COMPLETED BY M.E.P. ENGINEER.
8. **ELECTRIC UTILITIES:** ELECTRIC DESIGN TO BE FINALIZED BY M.E.P. ENGINEER. ELECTRICAL LOAD TO BE DETERMINED BY M.E.P. ENGINEER. METER LOCATION AND TRANSFORMER SIZE, IF NECESSARY DEFINED BY M.E.P. M.E.P. TO FINALIZE SERVICE CONNECTION TO BUILDING. ALL ELECTRIC CONSTRUCTION SHALL CONFORM TO CMP GUIDEBOOK OF STANDARD REQUIREMENTS, MOST RECENT EDITION. DESIGN SUBJECT TO FINAL APPROVAL FROM CMP.
9. CABLE AND TELEPHONE PULLBOXS AND PEDESTAL CONNECTIONS TO BE DETERMINED BY CHARTER COMMUNICATIONS AND CONSOLIDATED TELEPHONE CONSTRUCTION. CONTRACTOR TO COORDINATE INSTALLATION OF UNDERGROUND UTILITIES WITH ALL UTILITY COMPANIES INVOLVED.
10. UTILITY LAUNCH SUBJECT TO CHANGE DEPENDING ON PHASING IMPLEMENTATION.



1. LOCATION OF PROPOSED CONNECTIONS ARE APPROXIMATE. CONTRACTOR TO CONTACT ENGINEER IF FIELD INFORMATION VARIES FROM INFORMATION ON PLANS.
2. CONTRACTOR IS TO BE CAUTIONED THAT CERTAIN LOCATIONS AND/OR ELEVATIONS OF EXISTING UTILITIES HAVE BEEN PROVIDED THROUGHOUT UTILITY COORDINATION OR OTHER OBSERVATIONS. INFORMATION IS NOT TO BE RELIED UPON AS EXACT OR COMPLETE. CONTRACTOR IS TO FIELD VERIFY AND COORDINATE WITH UTILITY COMPANY AND DIG SAFE NO LESS THAN 72 HOURS PRIOR TO ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF ALL UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS INDICATED IN THE CONTRACT DOCUMENTS. CONTRACTOR TO NOTIFY ENGINEER OF ANY DIFFERENTIATIONS FROM EXISTING CONDITIONS, INCLUDING UTILITY INFORMATION, PRIOR TO ANY CHANGES.
3. FOR ALL UTILITIES, ACORN ENGINEERING DESIGN LIMITS END AT EXTERIOR WALL OF BUILDING. METERING OF UTILITIES TO BE COMPLETED BY M.E.P. UNLESS SPECIFIED OTHERWISE.
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7. **GAS UTILITIES:** PROJECT GAS LOAD, GAS UTILITY DESIGN, AND FINAL GAS SERVICE LOCATION AND METERS TO BE DEFINED BY M.E.P. AND IN ACCORDANCE WITH UNTIL, WHEN EXCAVATION OCCURS NEAR THE MAIN, ANODE BED, OR RECTIFIER, UNTIL DAMAGE CONTROL DEPARTMENT SHALL BE COORDINATED WITH.
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9. CABLE AND TELEPHONE PULLBOXES AND PEDESTAL LOCATIONS TO BE DETERMINED BY CHARTER COMMUNICATIONS AND CONSOLIDATED PRIOR TO CONSTRUCTION. CONTRACTOR TO COORDINATE INSTALLATION OF UNDERGROUND UTILITIES WITH ALL UTILITY COMPANIES INVOLVED.
10. UTILITY LAID/UP SUBJECT TO CHANGE DEPENDING ON PHASING IMPLEMENTATION.



PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION

DRAWING NO.
C-22

- GENERAL NOTES:
1. ALL WORK WITHIN THE CITY STREET RIGHT OF WAY SHALL MEET CITY OF PORTLAND TECHNICAL MANUAL STANDARDS.
 2. DESIGN OF TEMPORARY SOIL RESTRAINT MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR IF NECESSARY FOR CONSTRUCTION.
 3. CONTRACTOR SHALL ENSURE THAT UNDERDRAINS ARE CONSTRUCTED WITH POSITIVE OUTLET TO PROPOSED CONNECTIONS.
 4. CATCH BASIN INLET PROTECTION TO BE INSTALLED WITHIN ANY STRUCTURES DOWNGRADIANT OF ACTIVE CONSTRUCTION.
 5. SEDIMENTATION BARRIERS ARE TO BE INSTALLED DOWNGRADIANT OF ALL ACTIVE CONSTRUCTION WORK PER DETAIL. BARRIERS TO NOT EXTEND PAST PROPERTY LINES; BARRIERS SHOWN OFFSET FROM PROPERTY LINES ON PLANS FOR VISUAL PURPOSES ONLY.

STRUCTURE TABLE			
NAME	RIM	INV. IN / PIPE (SIZE)	INV. OUT / PIPE (SIZE)
CB-1	36.50'	25.55' (15")	25.45' (15")
CB-2	35.15'	25.90' (12") 27.65' (12")	25.80' (15")
CB-3	35.15'	26.70' (12") 26.30' (12") 29.70' (12")	26.20' (12")
CB-4	33.69'		30.00' (12")
CB-5	32.35'	27.40' (12") 27.20' (4")	27.10' (12")
CB-6	36.00'	28.30' (12")	28.30' (12")
DB-1	35.70'	31.00' (10")	30.90' (10")
DB-2	35.90'	31.50' (10")	31.40' (10")
DB-3	36.10'	32.00' (10")	31.90' (10")
DB-4	36.04'		32.35' (10")
DMH-1	38.70'	24.80' (15")	20.00' (15")
DMH-2	31.85'	27.60' (8")	27.40' (10")
DMH-3	36.75'	30.50' (10") 26.58' (10")	26.58' (12")
FB-1	37.00'	29.35' (10") 29.40' (8")	29.25' (12")
FB-2	37.00'	30.35' (10")	30.25' (10")
FB-3	37.10'	31.35' (10") 31.35' (4")	31.25' (10")

FB = 2'X2' CONCRETE "F" BASIN
DB = 12" DIAMETER INLINE PVC DRAIN BASIN

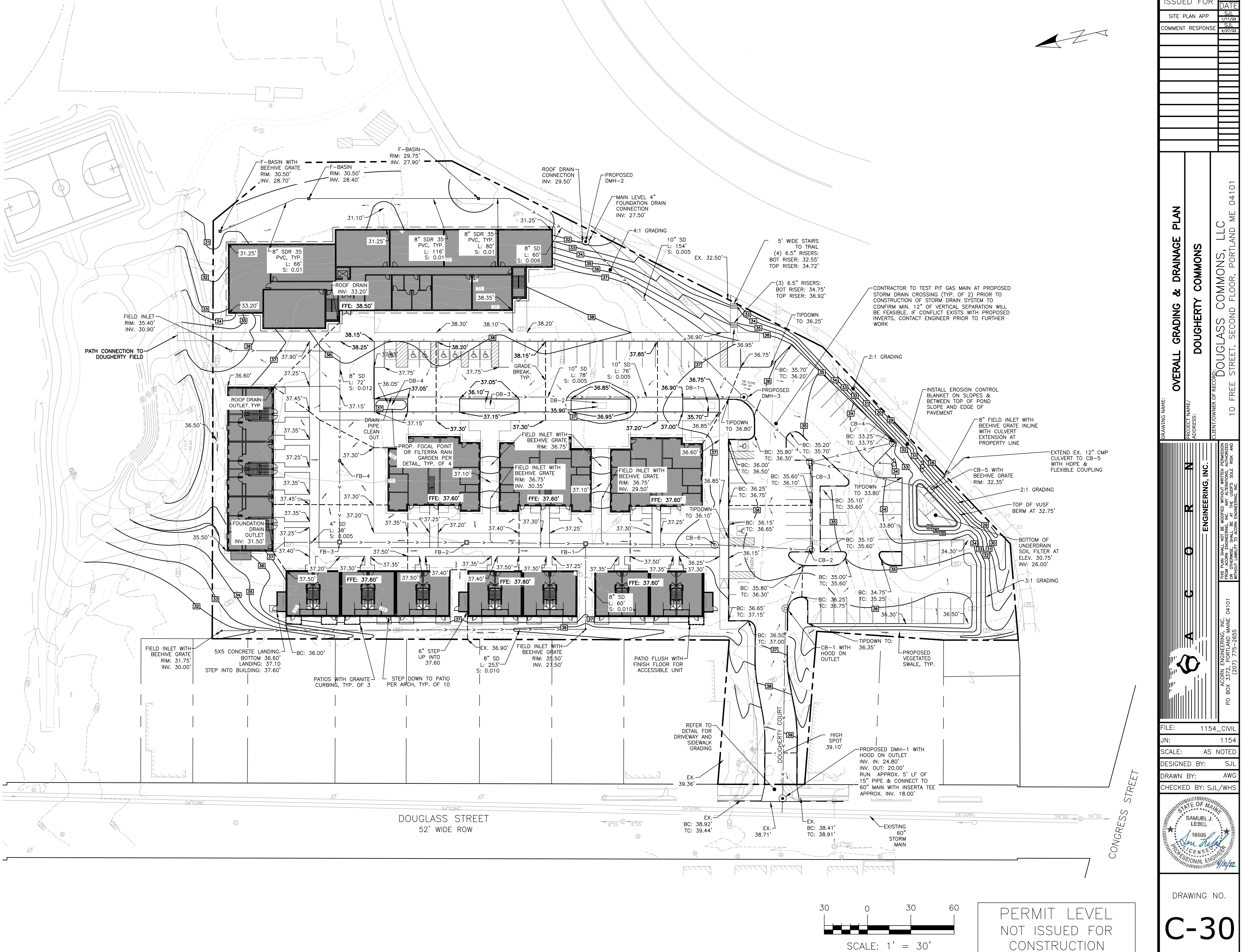
AVERAGE GRADES AND BUILDING HEIGHT - E 5-STORY	
NORTH CORNER ELEVATION	31.25'
EAST CORNER ELEVATION	31.25'
SOUTH CORNER ELEVATION	38.35'
WEST CORNER ELEVATION	33.20'
AVERAGE GRADE PLANE	33.50'
ELEVATION AT ROOF	86.50'
BUILDING HEIGHT	53.05'

AVERAGE GRADES AND BUILDING HEIGHT - A 1-3	
NORTH CORNER ELEVATION	37.60'
EAST CORNER ELEVATION	37.60'
SOUTH CORNER ELEVATION	37.60'
WEST CORNER ELEVATION	37.60'
AVERAGE GRADE PLANE	37.60'
ELEVATION AT ROOF	70.93'
BUILDING HEIGHT	33.33'

AVERAGE GRADES AND BUILDING HEIGHT - B 1-2	
NORTH CORNER ELEVATION	37.60'
EAST CORNER ELEVATION	37.60'
SOUTH CORNER ELEVATION	37.60'
WEST CORNER ELEVATION	37.60'
AVERAGE GRADE PLANE	37.60'
ELEVATION AT ROOF	62.60'
BUILDING HEIGHT	25.00'

AVERAGE GRADES AND BUILDING HEIGHT - C-1	
NORTH CORNER ELEVATION	36.10'
EAST CORNER ELEVATION	37.50'
SOUTH CORNER ELEVATION	37.60'
WEST CORNER ELEVATION	37.60'
AVERAGE GRADE PLANE	37.20'
ELEVATION AT ROOF	62.60'
BUILDING HEIGHT	25.40'

AVERAGE GRADES AND BUILDING HEIGHT - D-1	
NORTH CORNER ELEVATION	35.50'
EAST CORNER ELEVATION	36.60'
SOUTH CORNER ELEVATION	37.60'
WEST CORNER ELEVATION	37.50'
AVERAGE GRADE PLANE	36.80'
ELEVATION AT ROOF	70.93"
BUILDING HEIGHT	34.13'



ISSUED FOR
SITE PLAN APP
COMMENT RESPONSE

BY
DATE
1/11/23
1/27/23

OVERALL GRADING & DRAINAGE PLAN
DOUGHERTY COMMONS

PROJECT NAME/
ADDRESS:
DOUGLASS COMMONS, LLC
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

DRAWING NAME:
ENGINEERING, INC.

FILE: 1154_CIVIL
JN: 1154
SCALE: AS NOTED
DESIGNED BY: SJL
DRAWN BY: AWG
CHECKED BY: SJL/WHs

STATE OF MAINE
SAMUEL J. LEBEL
16805
PROFESSIONAL ENGINEER
1/14/22

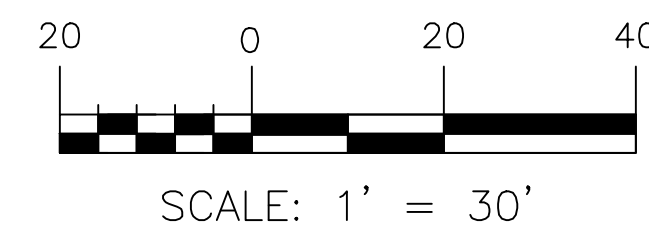
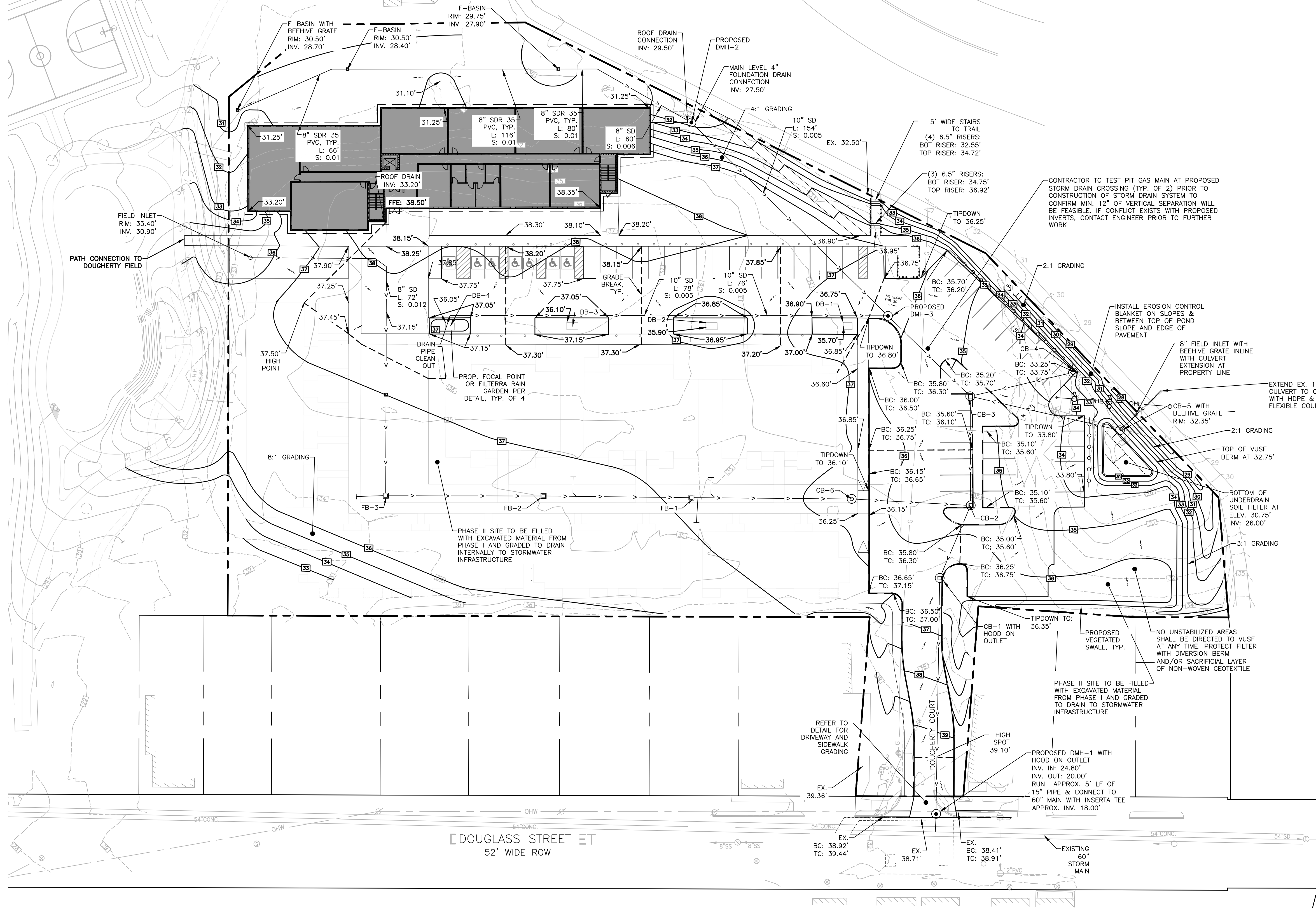
DRAWING NO.
C-30

Page 873

30 0 30 60
SCALE: 1' = 30'

1. ALL WORK WITHIN THE CITY STREET RIGHT OF WAY SHALL MEET CITY OF PORTLAND TECHNICAL MANUAL STANDARDS.
2. DESIGN OF TEMPORARY SOIL RESTRAINT MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR IF NECESSARY FOR CONSTRUCTION.
3. CONTRACTOR SHALL ENSURE THAT UNDERDRAINS ARE CONSTRUCTED WITH POSITIVE OUTLET TO PROPOSED CONNECTIONS.
4. CATCH BASIN INLET PROTECTION TO BE INSTALLED WITHIN ANY STRUCTURES DOWNDRAINAGE OF ACTIVE CONSTRUCTION.
5. SEDIMENTATION BARRIERS ARE TO BE INSTALLED DOWNDRAINAGE OF ALL ACTIVE CONSTRUCTION WORK AREAS TO NOT EXTEND PAST PROPERTY LINES; BARRIERS SHOWN OFFSET FROM PROPERTY LINES ON PLANS FOR VISUAL PURPOSES ONLY.

AVERAGE GRADES AND BUILDING HEIGHT - E 5-STORY	
NORTH CORNER ELEVATION	31.25'
EAST CORNER ELEVATION	31.25'
SOUTH CORNER ELEVATION	38.35'
WEST CORNER ELEVATION	33.20'
AVERAGE GRADE PLANE	33.50'
ELEVATION AT ROOF	86.50'
BUILDING HEIGHT	53.05'



PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION

ISSUED FOR	BY
	DATE
SITE PLAN APP	SJL
	1/11/22
COMMENT RESPONSE	SJL
	4/27/22

NAME/ : DOUGHERTY COMMONS

OWNER OF RECORD: DOUGLASS COMMONS, LLC
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101



A C O **R N**
ENGINEERING, INC.

ACORN ENGINEERING, INC.
P.O. BOX 3372, PORTLAND MAINE 04101
(207) 775-2655

E:	1154_CIVIL
:	1154
AL:	AS NOTED
SIGNED BY:	SJL
AWN BY:	AWG
HECKED BY:	SJL/WHS



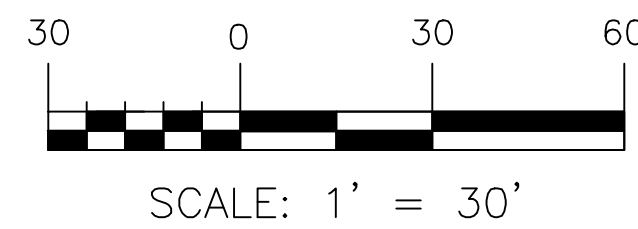
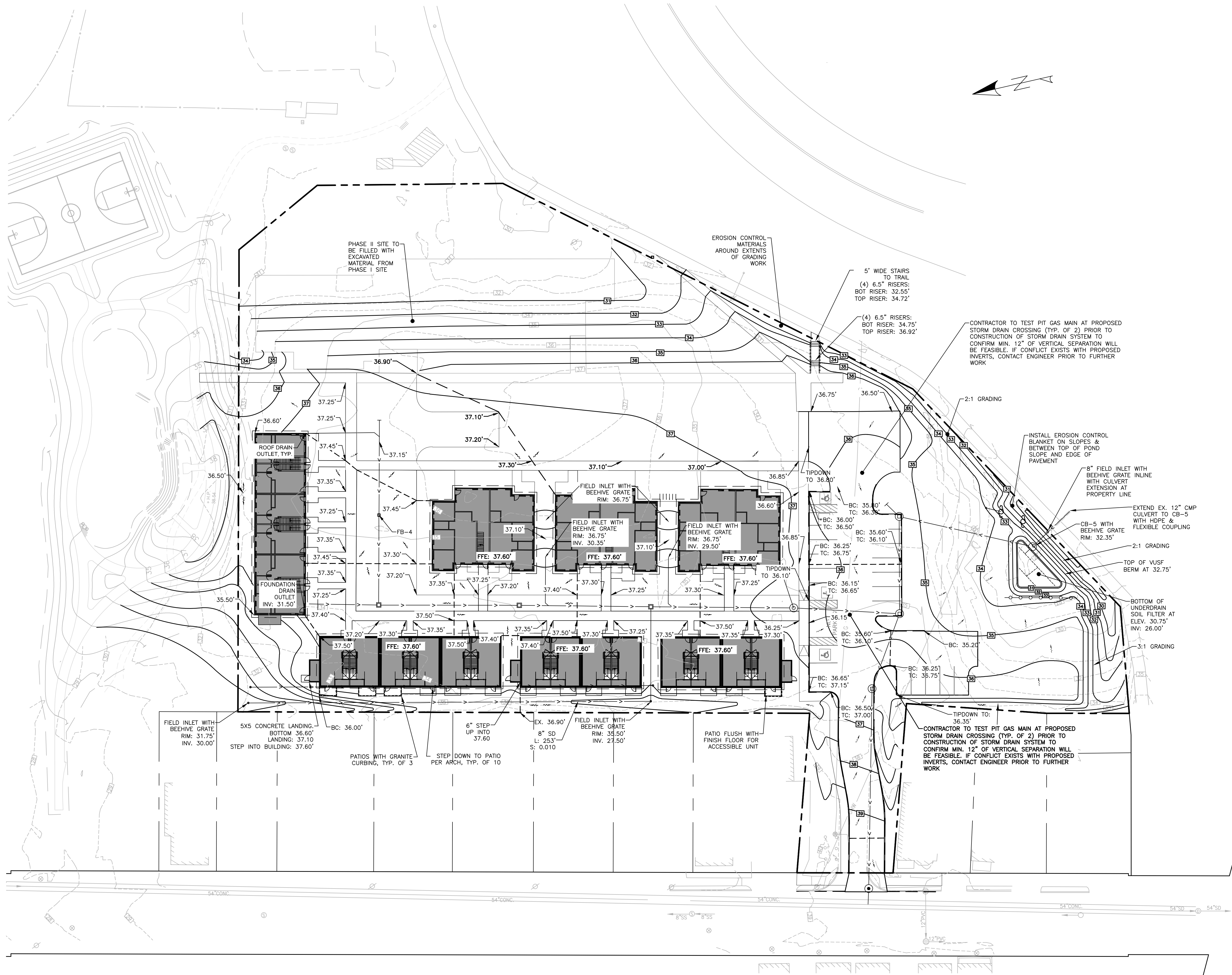
DRAWING NO.

C-31

1. ALL WORK WITHIN THE CITY STREET RIGHT OF WAY SHALL MEET CITY OF PORTLAND TECHNICAL MANUAL STANDARDS.
2. DESIGN OF TEMPORARY SLOPE RESTRAINT MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR IF NECESSARY FOR CONSTRUCTION.
3. CONTRACTOR SHALL ENSURE THAT UNDERDRAINS ARE CONSTRUCTED WITH POSITIVE OUTLET TO PROPOSED CONNECTIONS.
4. CATCH BASIN INLET PROTECTION TO BE INSTALLED WITHIN ANY STRUCTURES DOWNGRADIENT OF ACTIVE CONSTRUCTION.
5. SEDIMENTATION BARRIERS ARE TO BE INSTALLED DOWNGRADIENT OF ALL ACTIVE CONSTRUCTION WORK PER DETAIL. BARRIERS TO NOT EXTEND PAST PROPERTY LINES. BARRIERS SHOWN OFFER FROM PROPERTY LINES ON PLANS FOR VISUAL PURPOSES ONLY.

AVERAGE GRADES AND BUILDING HEIGHT – A 1-3		AVERAGE GRADES AND BUILDING HEIGHT – B 1-2	
NORTH CORNER ELEVATION	37.60'	NORTH CORNER ELEVATION	37.60'
EAST CORNER ELEVATION	37.60'	EAST CORNER ELEVATION	37.60'
SOUTH CORNER ELEVATION	37.60'	SOUTH CORNER ELEVATION	37.60'
WEST CORNER ELEVATION	37.60'	WEST CORNER ELEVATION	37.60'
AVERAGE GRADE PLANE	37.60	AVERAGE GRADE PLANE	37.60
ELEVATION AT ROOF	70.93'	ELEVATION AT ROOF	62.60'
BUILDING HEIGHT	33.33'	BUILDING HEIGHT	25.00'

AVERAGE GRADES AND BUILDING HEIGHT — C-1		AVERAGE GRADES AND BUILDING HEIGHT — D-1	
NORTH CORNER ELEVATION	36.10'	NORTH CORNER ELEVATION	35.50'
EAST CORNER ELEVATION	37.50'	EAST CORNER ELEVATION	36.60'
SOUTH CORNER ELEVATION	37.60'	SOUTH CORNER ELEVATION	37.60'
WEST CORNER ELEVATION	37.60'	WEST CORNER ELEVATION	37.50'
AVERAGE GRADE PLANE	37.20	AVERAGE GRADE PLANE	36.80'
ELEVATION AT ROOF	62.60'	ELEVATION AT ROOF	70.93"
BUILDING HEIGHT	25.40'	BUILDING HEIGHT	34.13'



PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION

ISSUED FOR	BY
	DATE
SITE PLAN APP	SJL 1/11/22
COMMENT RESPONSE	SJL 4/27/22

NAME: _____
INTERIM GRADING & DRAINAGE PLAN PHASE II
 NAME/ : _____
DOUGHERTY COMMONS

OWNER OF RECORD:
DOUGLASS COMMONS, LLC
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

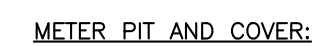
R N
ENGINEERING INC.

ACORN ENGINEERING, INC.
PO BOX 3372, PORTLAND MAINE 04101
(207) 775-2655

FILE:	1154_CIVIL
JN:	1154
SCALE:	AS NOTED
DESIGNED BY:	SJL
DRAWN BY:	AWG
CHECKED BY:	SJL/WHs



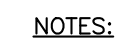
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C-32



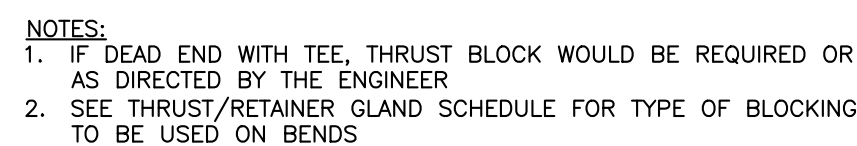
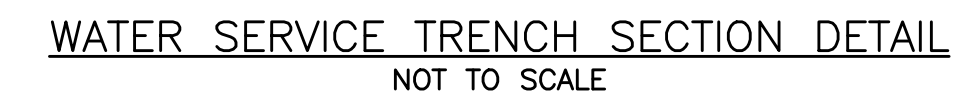
1. SPECIAL APPROVAL BY PWD IS REQUIRED FOR ALL PROPOSED METER VAULT INSTALLATIONS. PROPOSED CONFIGURATION SHALL BE SUBMITTED FOR PWD REVIEW PRIOR TO CONSTRUCTION.
2. METER VAULT SHALL BE CONSTRUCTED ON PRIVATE PROPERTY BETWEEN 10' AND 20' FROM THE PROPERTY LINE UNLESS OTHERWISE APPROVED BY PWD.
3. THE METER PIT SHALL BE MADE OF PRECAST CONCRETE OF SUFFICIENT SIZE TO PROVIDE 5.5' MINIMUM GROUND COVER FORM FINISHED GRADE TO THE TOP OF THE SERVICE PIPE.
4. ALL PIPE JOINTS BETWEEN THE SERVICE VALVE AND THE METER SHALL BE RESTRAINED.
5. TESTABLE BACKFLOW PREVENTION DEVICES MAY NOT BE INSTALLED WITHIN METER PITS.
6. ALL SEAMS BETWEEN CONCRETE SECTIONS SHALL BE SEALED WITH MASTIC JOINT. ALL OPENINGS IN THE CONCRETE FOR SERVICE PIPING SHALL BE SEALED WITH A MODULAR GASKET (GASKET) OF SIMILAR SIZE.
7. ENTRY COVER SHALL BE CAST IRON OR STEEL AND SHALL BE EITHER PERMANENTLY LABELED "WATER" OR HAVE NO LABEL. STEEL PLATE MATERIAL SHALL BE COATED WITH A RUST INHIBITOR PAINT.
8. IF NOT ON PAVED SURFACES, A 48" X 60" X 6" WOOD LATCH MAY BE USED.
9. WALL-MOUNTED LADDER RUNGS ARE NOT TO BE INSTALLED WITHIN METER PIT.
10. CUSTOMER SHALL ENSURE THE METER VAULT AND COVER ARE PROPERLY RATED FOR THE SERVICE PIPE.
11. RESTRAINED FLANGE COUPLING ADAPTER SHALL BE FORD (MODEL RF4D) OR ROMAC (MODEL RFCA) UNLESS OTHERWISE APPROVED BY PWD.

METER INSTALLATION:

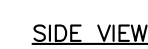
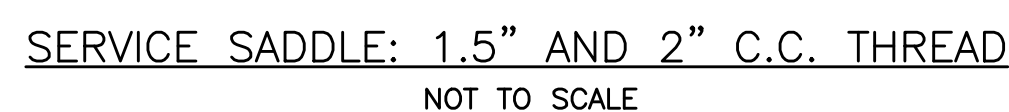
12. ONLY PWD PERSONNEL ARE AUTHORIZED TO INSTALL WATER METERS. PWD PERSONNEL ARE ADDITIONALLY AUTHORIZED TO OPERATE METER VALVES AS NEEDED FOR INSTALLATION AND MAINTENANCE.
13. PWD WILL SUPPLY THE WATER METER. ALL OTHER FITTINGS SHALL BE SUPPLIED AND INSTALLED BY CUSTOMER.
14. METER LAYING LENGTH SHOULD BE CONFIRMED WITH PWD PRIOR TO SETTING PIPE. PWD MAY REQUIRE THAT A FLANGED METER SPOOL PIECE BE INSTALLED PRIOR TO METER SET TO ENSURE PROPER SPACING. IF SO, THE METER SPOOL SHALL BE PROVIDED BY CUSTOMER. PWD WILL BE AVAILABLE FOR FIELD SERVICE, 225 DOUGLASS STREET, PORTLAND DURING NORMAL BUSINESS HOURS.



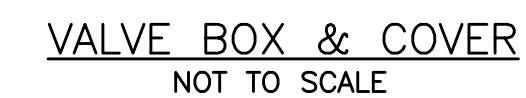
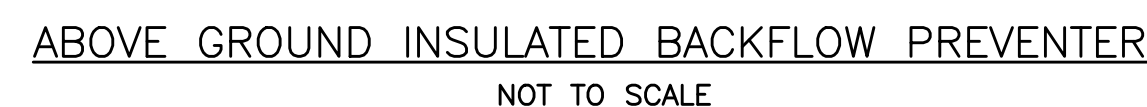
1. THE WATER TRENCH SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PORTLAND WATER DISTRICT STANDARD DETAILS & SPECIFICATIONS.
2. IF LESS THAN 5'-6" OF COVER IS POSSIBLE ADD TWO LAYERS OF 2-INCH "BLUE DOW" RIGID INSULATION.



THRUST BLOCKING: REGULAR BEND
NOT TO SCALE

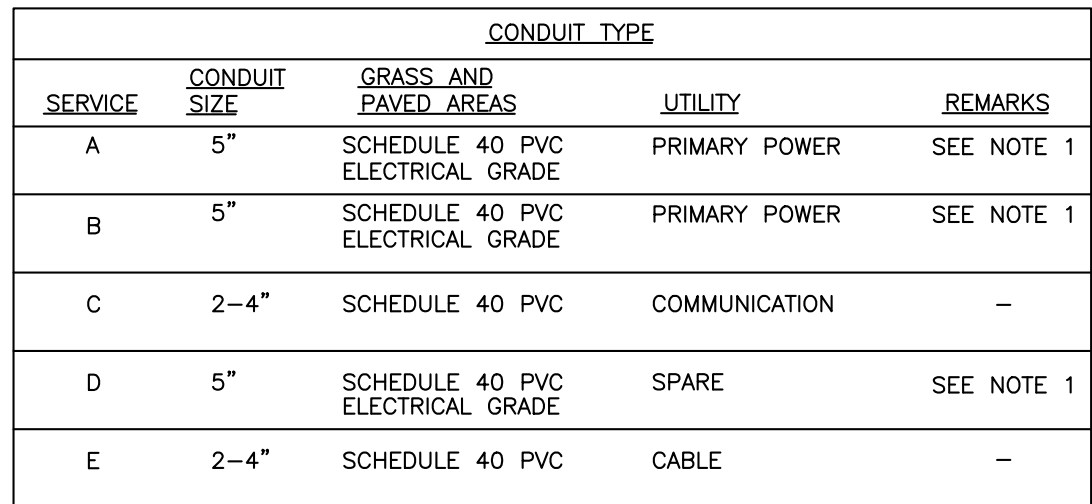


TAPPING SLEEVE AND VALVE
NOT TO SCALE



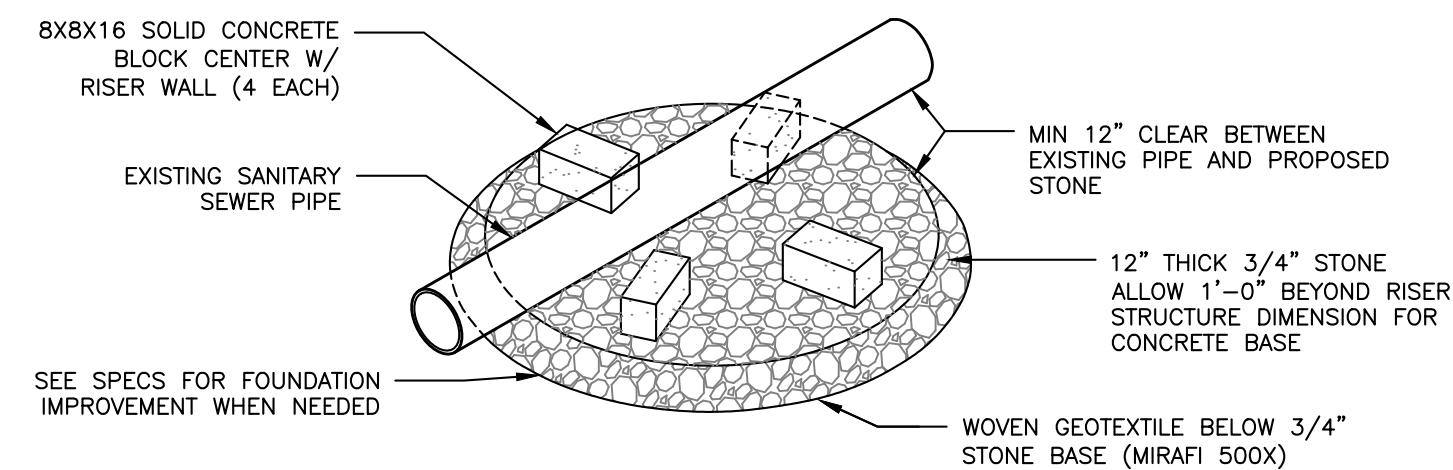
PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION

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1. ONE CONDUIT CAPPED FOR SPARE, PROVIDE GALVANIZED STEEL LONG SWEEP AT RISER POLE AND EXTEND GALVANIZED CONDUIT TO 10" ABOVE GRADE AT POLE WITH STAND-OFF BRACKETS.
2. MINIMUM SEPARATION OF 24 INCHES BETWEEN PRIMARY CABLE/CONDUIT AND GAS LINES SHALL BE MAINTAINED.
3. CONDUITS WITHIN THE CITY RIGHT-OF-WAY SHALL BE ENCASED IN CONCRETE.
4. FINAL SIZE OF CONDUITS TO BE SPECIFIED BY MEP, ELECTRICIAN, OR DESIGN/BUILD ELECTRICAL CONTRACTOR.

NOT TO SCALE

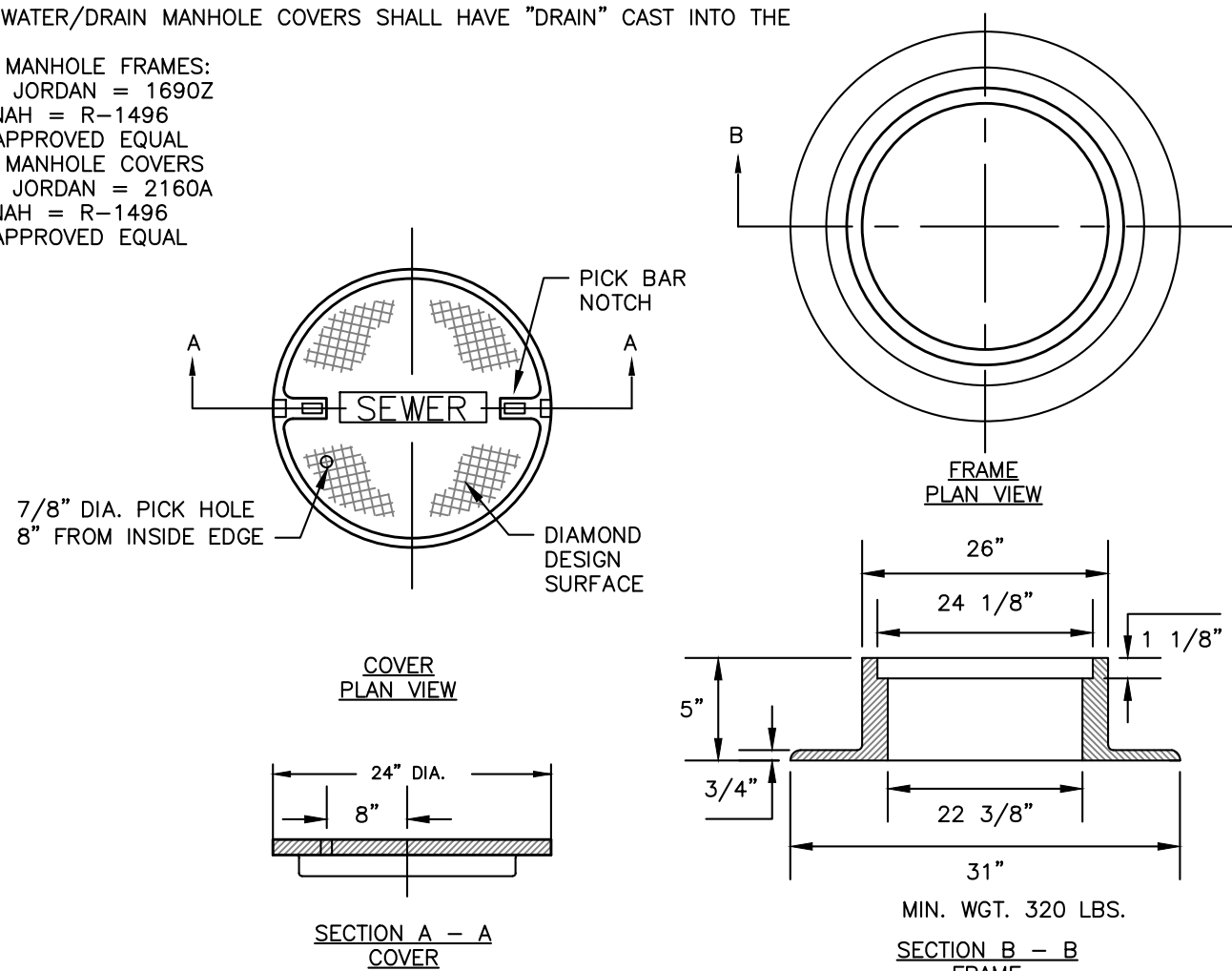


BASE ISOMETRIC VIEW

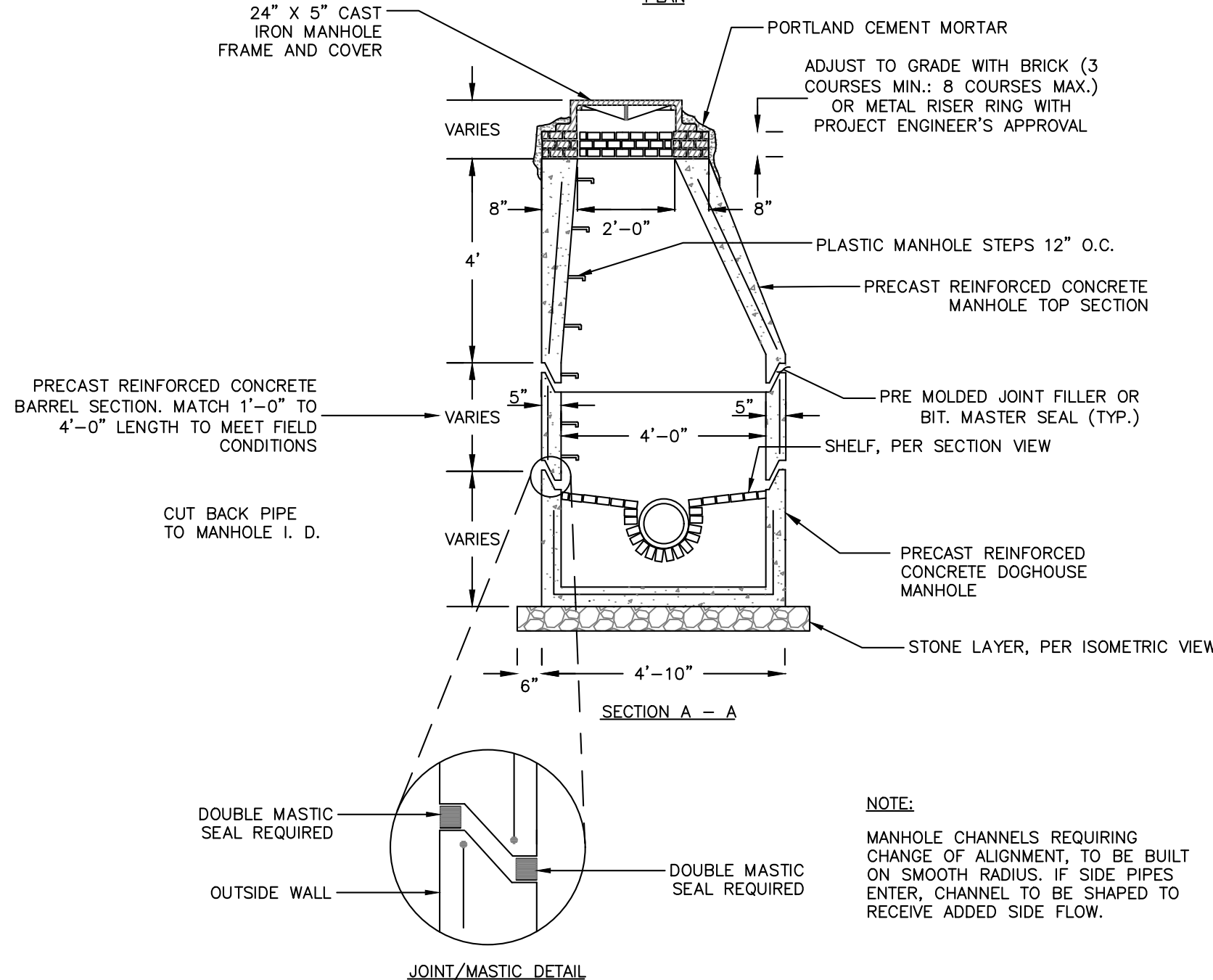
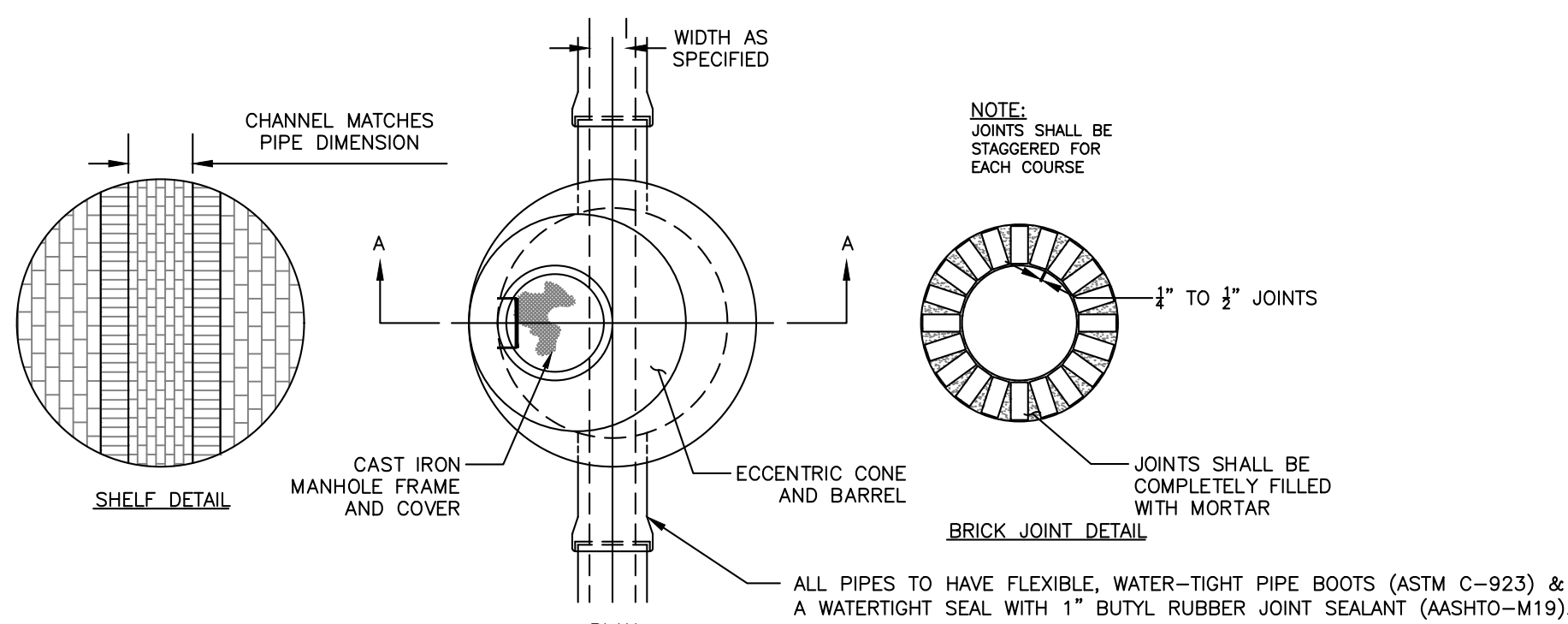


NOT TO SCALE

1. ALL MANHOLE COVERS SHALL BE SOLID AND SHALL HAVE ONE 7/8" DIAMETER DRILLED PIG HOLE, LOCATED 8" FROM THE CENTER OF THE COVER.
2. ALL STORMWATER/DRAIN MANHOLE COVERS SHALL BE 24" x 5".
3. ALL SANITARY MANHOLE COVERS AND SHALL HAVE "SEWER" CAST INTO THE COVER.
4. ALL STORMWATER/DRAIN MANHOLE COVERS SHALL HAVE "DRAIN" CAST INTO THE COVER.
5. APPROVED MANHOLE FRAMES:
 - 5.1. EAST JORDAN = 1690Z
 - 5.2. NEENAH = R-1496
 - 5.3. OR APPROVED EQUAL
6. APPROVED MANHOLE COVERS
 - 6.1. EAST JORDAN = 2160A
 - 6.2. NEENAH = F-1496
 - 6.3. OR APPROVED EQUAL



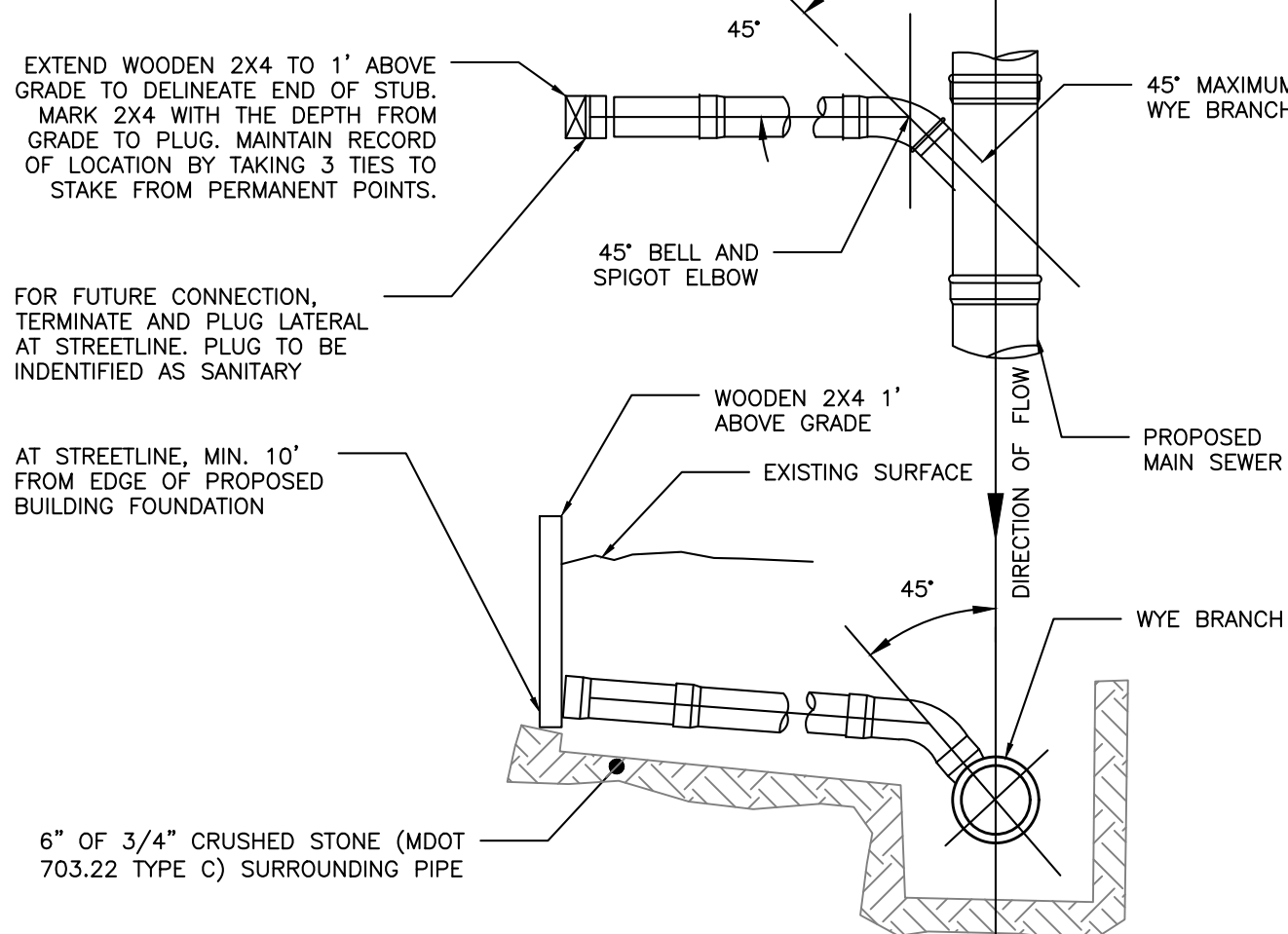
NOT TO SCALE



1. UNLESS OTHERWISE SPECIFIED, CONCRETE SHALL BE 4000 PSI @28 DAYS.
2. RECONSTRUCT INTERIOR MANHOLE INVERT AS NECESSARY TO ACCOMMODATE NEW PIPE.
3. THIS DETAIL IS INTENDED TO PROVIDE ADDITIONAL INFORMATION TO THE CONTRACTOR IN REGARDS TO THE CONSTRUCTION OF THE MANHOLE FOR THE EXISTING SANITARY SEWER SYSTEM.
4. MANHOLES MAY BE CONSTRUCTED OF PRECAST REINFORCED CONCRETE, OR CAST IN PLACE.
5. PRECAST REINFORCED CONE BARREL MANHOLE STRUCTURE PER ASTM SPEC. C-478.
6. ALL MANHOLE RISERS SHALL BE EITHER 24" OR APPROVAL EQUAL.
7. ALL SANITARY MANHOLES SHALL HAVE A WATERPROOFING COATING APPLIED TO THE EXTERIOR SURFACE.
8. CASTINGS SHALL CONFORM TO ASTM DESIGNATION A48-CLASS 35.

NOT TO SCALE

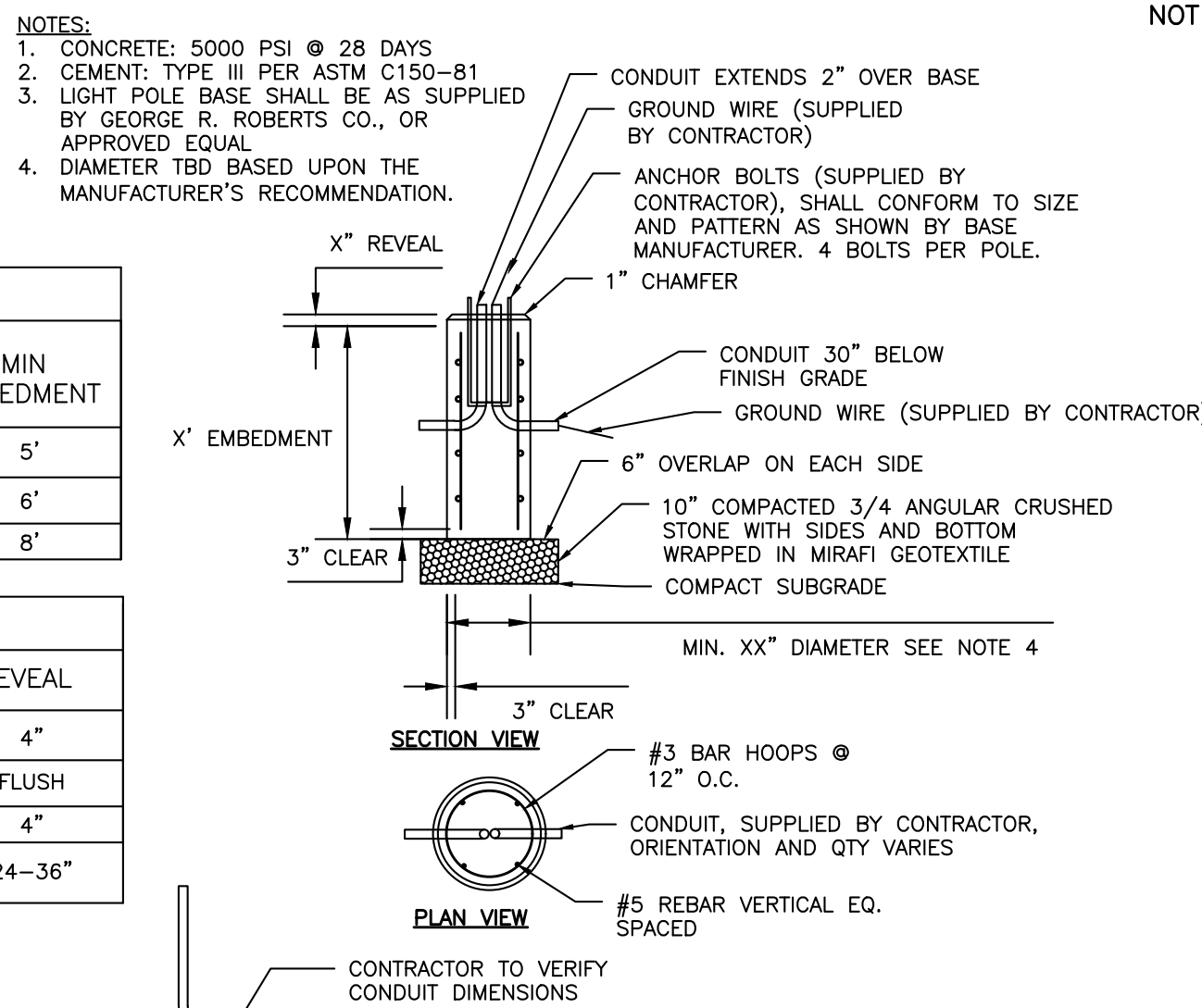
1. LOCATION WITH WARNING TAPE SHALL BE INSTALLED OVER CENTERLINE OF PIPE AT A MAXIMUM OF 24 INCHES BELOW FINISH GRADE.
2. SITE CONTRACTOR TO COORDINATE CONNECTION OF SEWER LATERAL TO STRUCTURE PLUMBING WITH ARCHITECTURAL CONTRACTOR.
3. CONNECTION OF PROPOSED SEWER LATERAL TO STRUCTURE PLUMBING SHOULD INCORPORATE USE OF SIMILAR PIPE MATERIALS. IN THE CASE OF DISSIMILAR PIPES BEING USED, A FERNCO FLEXIBLE COUPLING SHALL BE USED.



NOT TO SCALE

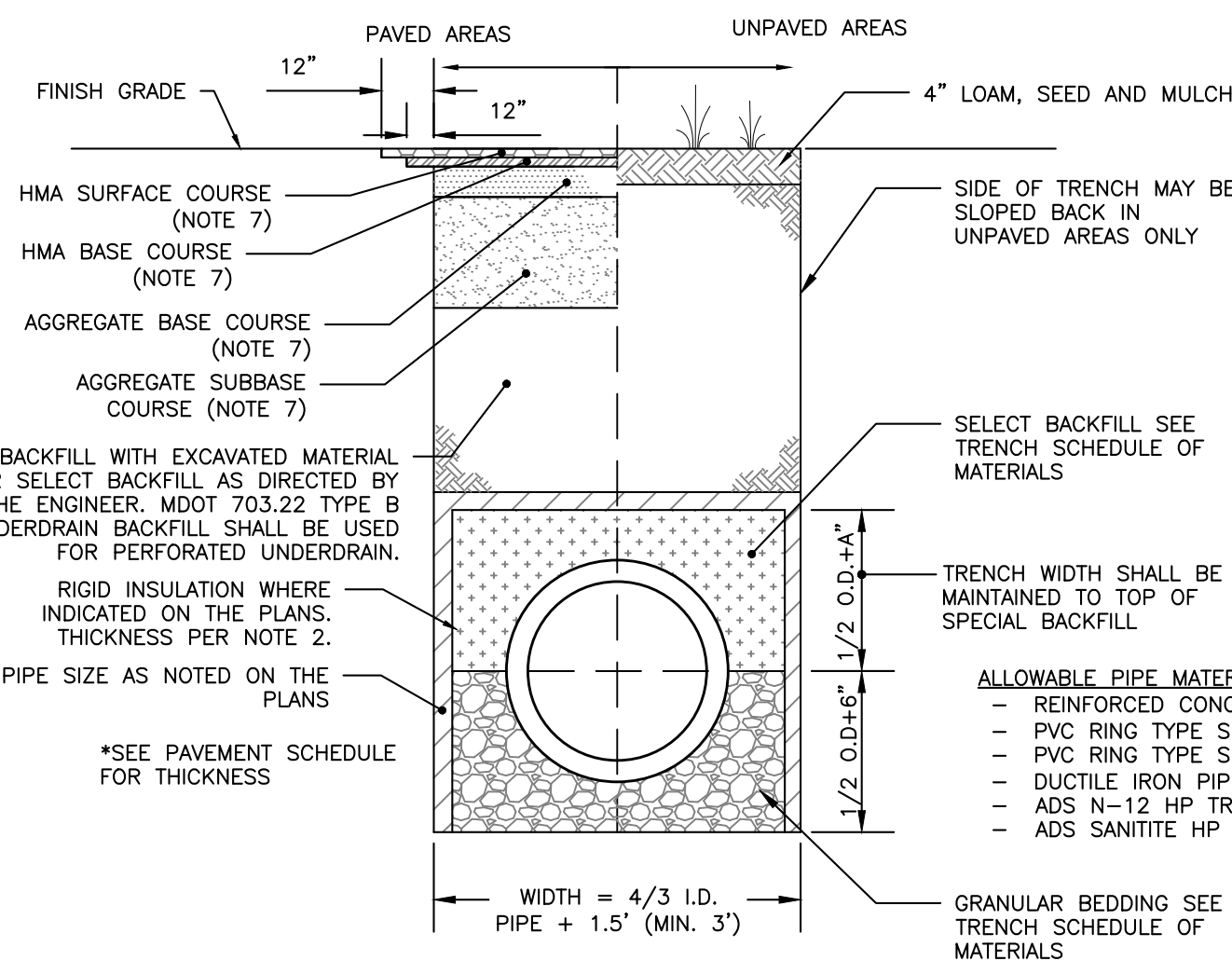
SCHEDULE		
HEIGHT OF POLE	MIN DIAMETER	MIN EMBEDMENT
<20'	1.5'	5'
20'–40'	2'	6'
>40'	3'	8'

REVEALS	
APPLICATIONS	REVEAL
STREET/SIDEWALK	4"
OTHER PED HARDSCAPE	FLUSH
PEDESTRIAN LAWN/MULCH	4"
PARKING AREAS (OPEN TRAFFIC)	24-36"



NOT TO SCALE

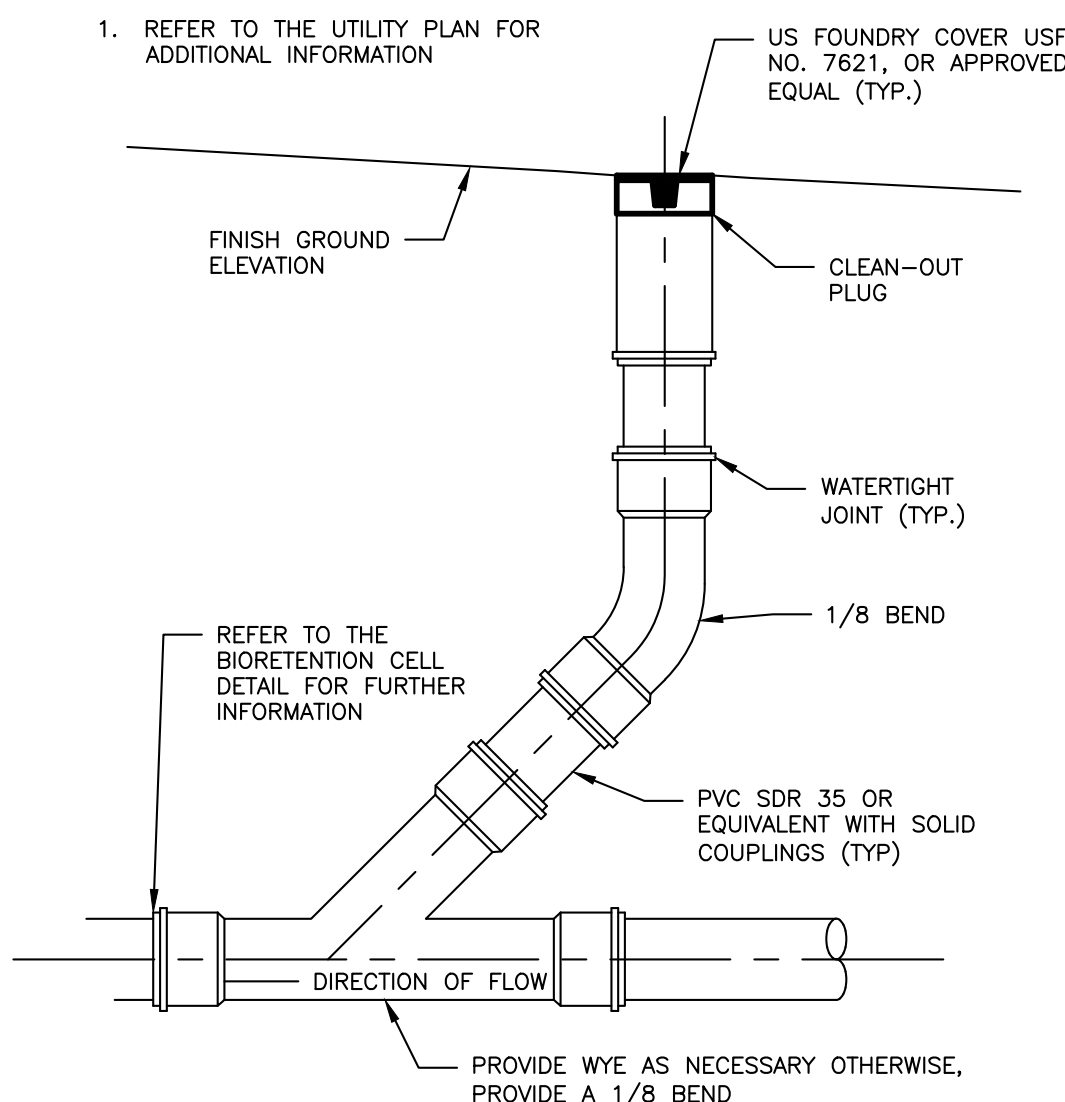
1. BRACING AND SHEETING OR OTHER TRENCH PROTECTION TO BE PROVIDED TO MEET APPLICABLE STATE AND O.S.H.A. SAFETY STANDARDS. ALL SUCH TRENCH PROTECTION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
2. FORM BRACING SHALL BE PROVIDED BETWEEN 2' AND 4' SHALL INCLUDE 4" OF RIGID INSULATION COVER BETWEEN 3' AND 4' SHALL INCLUDE 2" RIGID INSULATION, OTHER UTILITIES, ADD 2" OF RIGID INSULATION FOR EACH FOOT ABOVE MINIMUM DEPTH.
3. INSTALL WARNING TAPE DIRECTLY ABOVE UTILITIES AT THE TOP OF SUBGRADE.
4. MINIMUM COVER
 - 4.1 2'-0" - STORM DRAIN
 - 4.2 5'-0" - SEWER
5. NO TREES SHALL BE PLANTED WITHIN 5' OF A SEWER PIPE OR SERVICE
6. THIS DETAIL SHALL BE APPLIED ONLY TO DRAINAGE PIPE TRENCHES OUTSIDE OF THE CITY OF PORTLAND ROW.
7. THICKNESS AS NOTED BY PLANTING DETAILS
8. ALL PROPOSED TREES PLANTED WITHIN 10' OF A STORM OR SEWER PIPE SHALL BE PLANTED AT A DEPTH NO GREATER THAN 3'
9. A DRAINABLE LANDSCAPE FABRIC SHALL CREATE A ROOT BARRIER AROUND THE PIPES. CONTRACTOR SHALL COORDINATE WITH THE LANDSCAPE ARCHITECT'S DRAWINGS.



SCHEDULE OF MATERIALS		
TYPE OF PIPE	GRANULAR BEDDING	SELECT BACKFILL
CMP DUCTILE IRON RCP	MDOT 703.22 TYPE C 3/4" B UD BACKFILL	MDOT 703.22 TYPE B UD BACKFILL
PVC/HDPE	MDOT 703.22 TYPE C 3/4" CRUSHED STONE	MDOT 703.22 TYPE B UD BACKFILL
CMP	MDOT 703.22 TYPE C 3/4" CRUSHED STONE	MDOT 703.22 TYPE C 3/4" CRUSHED STONE

- REINFORCED CONCRETE PIPE (RCP) MIN. STRENGTH OF CLASS III
- PVC RING TYPE SEWER (SDR 35) OR EQUIVALENT, MIN PS-46 RATING
- PVC RING TYPE SEWER PIPE MEETING ASTM F 789
- DUCTILE IRON PIPE (DIP)
- ADS N-12 HP TRIPLE-WALL MIN PS-46 RATING
- ADS SANITITE HP MIN. PS-46

GRANULAR BEDDING SEE
TRENCH SCHEDULE OF
MATERIALS

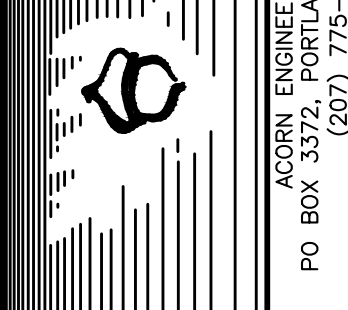


NOT TO SCALE

[illegible]

DRAWING NAME:

**K R
ENGINEERING, INC.**



FILE:	1154_CIVIL
JN:	1154
SCALE:	AS NOTED
DESIGNED BY:	SJL
DRAWN BY:	AWGW
CHECKED BY:	SJL/WHSS

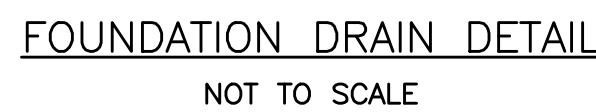


DRAWING NO.

PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION

C-43

1. REFER TO THE BUILDING ARCHITECTS PLANS FOR THE BUILDING FOUNDATION, BACKFILL, ROOF DRAIN, SIDEWALK AND OTHER DETAILS.
2. PERFORATIONS IN UNDERDRAIN PIPE SHALL BE ORIENTED DOWN.
3. SMALL STONE GRIP EDGE IN A LOCATIONS SUBJECT TO ROOF RUNOFF, WIDTH SHALL BE A MIN. 12" BEYOND THE PROJECTION OF THE ROOF EAVE.
4. FOUNDATION WALL FOOTINGS SHALL BE CONSTRUCTED TO A MIN. DEPTH OF 4 FT BELOW ADJACENT FINISH GRADE. REFER TO STRUCTURAL ENGINEERS PLANS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
5. IF FOUNDATION DRAIN DRAUGHTS, INSTALL DRAINAGE SOLUTIONS ANIMAL GUARD #4 EXTERNAL PVC OR CORRUGATED PLASTIC PIPE, OR INDUSTRY APPROVED EQUAL.



1. ALL CONCRETE TO HAVE A MIN. OF 4,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
2. DESIGN LOAD FOR H=20 WHEEL LOAD.
3. CATCH BASIN TO CONFORM TO ASTM=C478 SPECIFICATIONS.
4. REINFORCE TO 0.12 IN SQ./LF.
5. JOINTS SEALED WITH BUTYL RUBBER.
6. POLYPROPYLENE STEPS 12" O.C.
7. CASCO TRAPS SHALL BE PROVIDED ON ALL OUTLETS 24" OR MORE.
8. ALL PIPES TO HAVE A WATERTIGHT SEAL.
9. STRUCTURE TO BE APPLIED WITH DAMP PROOF COATING



1. INSTALL CATCH BASIN HOODS IN ALL CATCH BASINS WITH A 12" OR 15" OUTLET PIPE.
2. PREFERRED STYLE DESIGNED TO ELIMINATE CEMENTING OF THE TRAP.
3. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR INSTALLATION REQUIREMENTS



1. ALL CONCRETE TO HAVE A MIN. OF 4,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
2. DESIGN LOAD FOR H-20 WHEEL LOAD.
3. CATCH BASIN TO CONFORM TO ASTM-C478 SPECIFICATIONS.
4. REINFORCE TO 0.15 IN SQ./LF. JOINTS SEaled WITH JOINT FLEX GASKET OR EQUIV.
5. POLYPROPYLENE STRIPS 12" O.C.
6. EXTERIOR WATERPROOFING.
7. CASCAS TRAP SHALL BE PROVIDED ON ALL PIPES.
8. ALL CATCH BASINS AND MANHOLES SHALL MEET THE APPLICABLE CITY OF PORTLAND - SECTION 2 SANITARY AND STORM DRAIN DESIGN STANDARDS.
9. ALL CATCH BASINS SHALL BE MIN. 12" ON CENTER, STARTING FROM THE TOP OF THE MANHOLE FRAME AND SHALL BE FORGED ALUMINUM OR COPOLYMER POLYPROPYLENE STEPS



1. REFER TO GRADING AND DRAINAGE PLANS FOR FIELD INLET LOCATIONS.
2. CONTRACTOR TO CONFIRM NO CONFLICT WITH OTHER FLOOR DRAINS OR PIPING SYSTEMS.
3. EACH FIELD INLET RIM SHALL BE DEPRESSED 1" FROM FINISH FLOOR GROUND ELEVATION.



1. TYPE "A" FRAMES ARE TO HAVE 3 FLANGES.
2. TYPE "B" FRAMES ARE TO HAVE 4 FLANGES.
3. THE WORD "GUTTER" IS TO BE MOLDED INTO THE BACK FLANGE - TYPE "B" ONLY.
4. FRAMES AND GRATES ARE TO BE GRAY CAST IRON OR DUCTILE IRON CONFORMING TO AASHTO M306.
5. DIMENSIONS ARE NOMINAL.



ALL CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 4000 lbs. PER SQ. INCH AT THE END OF 28 DAYS, UNLESS OTHERWISE NOTED.

MANHOLES MAY BE CONSTRUCTED OF PRECAST REINFORCED CONCRETE, OR CAST IN PLACE.

PRECAST REINFORCED CONE BARREL MANUFACTURED PER ASTM SPEC. C-478.

ALL STORM AND SEWER MANHOLE COVERS SHALL BE SOLD AND SHALL HAVE ONE ¾" DIAMETER DRILLED PICK HOLE LOCATED 8" FROM THE CENTER OF THE COVER.

ALL SANITARY MANHOLE COVERS SHALL HAVE "SEWER" CAST INTO THE COVER. ALL STORMWATER/DRAIN MANHOLE COVERS SHALL HAVE "DRAIN" CAST INTO THE COVER.

ALL MANHOLE RISERS SHALL BE ETHERIDGE 24" OR APPROVAL EQUAL.

SEWER BRICK SHALL CONFORM TO ASTM SPEC. DESIGNATE ON C-32-63, GRADE MA AND SA.

ALL SANITARY MANHOLES SHALL HAVE A WATERPROOFING COATING APPLIED TO THE EXTERIOR SURFACE.

CATCH BASIN FRAMES FOR TYPE A4 CATCH BASIN CURB INLETS SHALL BE ETHERIDGE DR5A OR APPROVED EQUAL.

CASTINGS SHALL CONFORM TO ASTM DESIGNATION A48-CLASS 35.

EXISTING MANHOLES, CATCH BASINS, FRAMES, AND COVERS SHALL BE SALVAGED BY THE CONTRACTOR, AND SHALL REMAIN THE PROPERTY OF THE CITY OF PORTLAND.

ALL CATCH BASIN OUTLETS SHALL BE INSTALLED WITH A CASCO TRAP PER DETAIL.

NOTES

[illegible]

DRAINAGE DETAILS

DOUGHERTY COMMONS

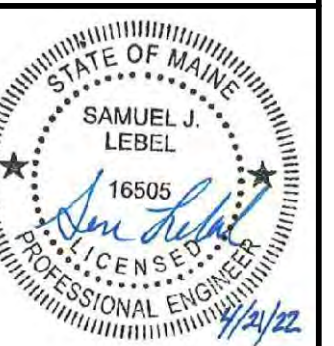
DOUGLASS COMMONS, LLC
110 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

10

PROJECT NAME/
ADDRESS:

ACORN ENGINEERING, INC.
PO BOX 3372, PORTLAND MAINE 04101
(207) 775-2655

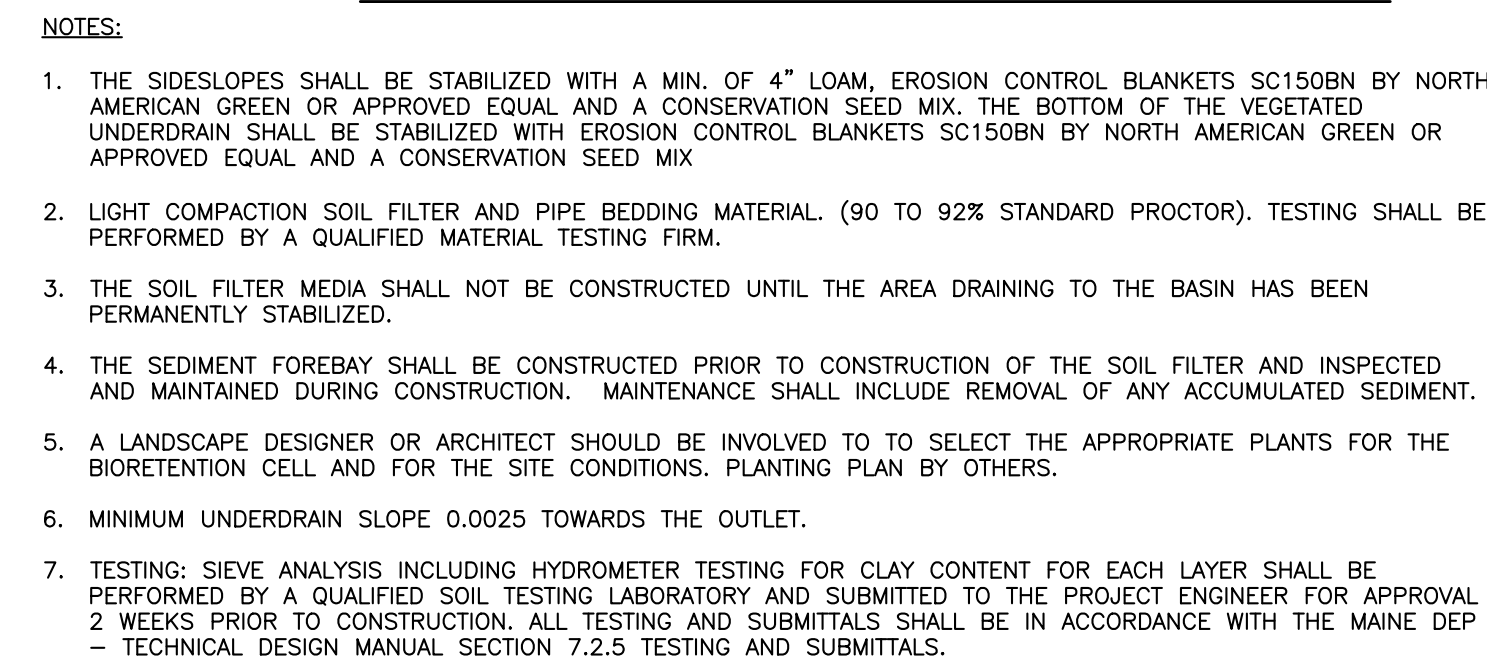
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SCALE:	AS NOTED
DESIGNED BY:	SJL
DRAWN BY:	AWG
CHECKED BY:	SJL/WHS



DRAWING NO.

C-44

PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION



SCHEDULE	
ITEM	ELEV.
A OVERFLOW INVERT	32.35'
B TOP OF SOIL FILTER	30.75'
C TOP OF GRAVEL	29.25'
D TOP OF STONE	28.92'
E UNDERDRAIN INVERT	27.35'
F BOTTOM OF STONE	27.00'

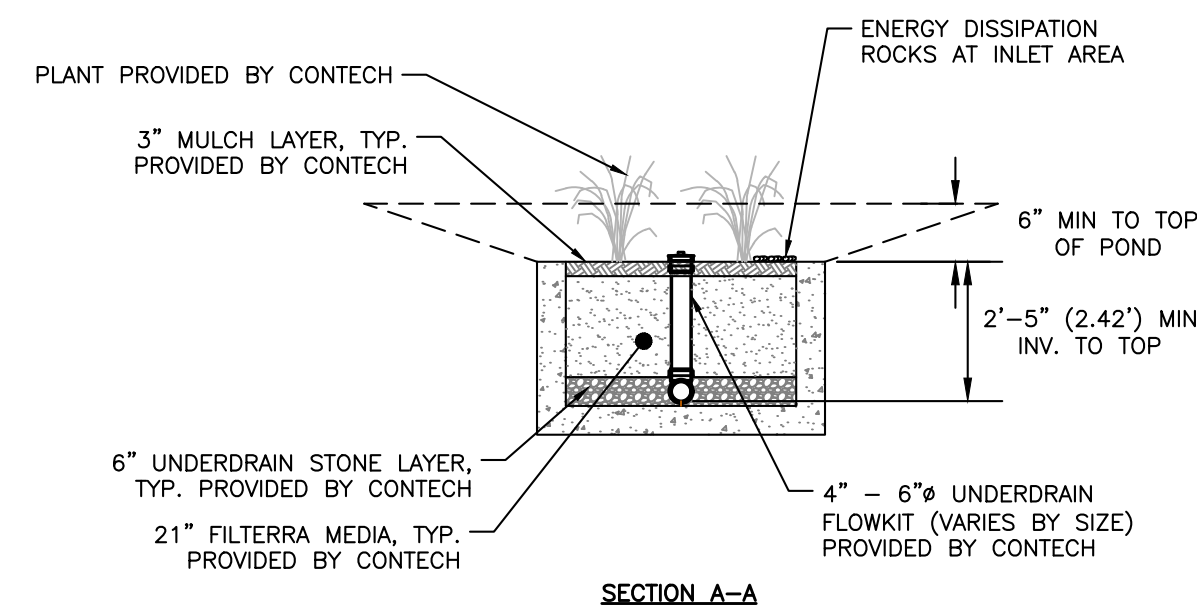
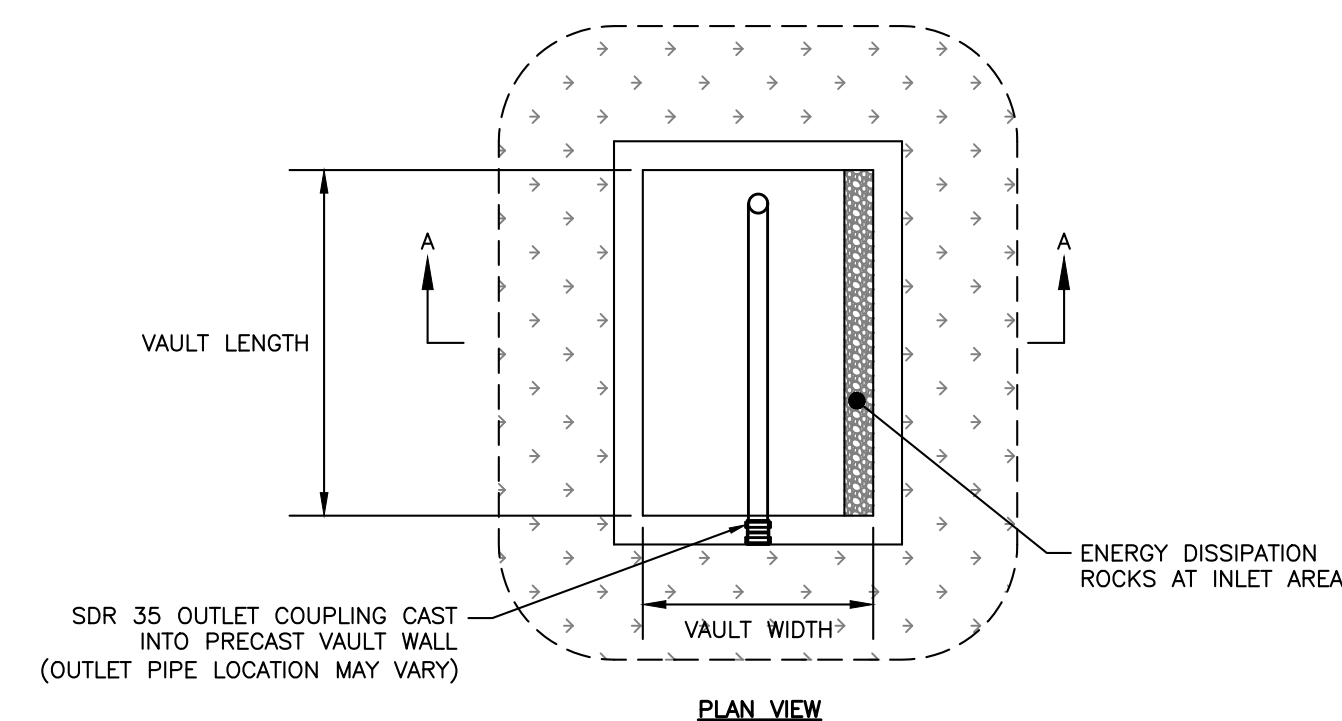
6" SOIL FILTER BED - LOAM TOPSOIL SPECIFICATION	
SIEVE SIZE	% PASSING BY WEIGHT
#4	75-95
#10	60-90
#40	35-85
#200	20-70
1. CLAY FRACTION <2% PASSING THE #200 SIEVE.	
2. LOAM SHALL BE LOOSE AND FRABLE AND SHALL BE FREE FROM ADMIXTURE OF SUBSOL REFUSE, LARGE STONES, CLODS OR ROOTS OR RHIZOMES OR "WITCH GRASS" OR OTHER UNDESIRABLE GRASSES.	

SOIL FILTER BED – SUPERHUMUS OR EQUIV. SPECIFICATION	
SIEVE SIZE	% PASSING BY WEIGHT
1"	100
#200	0-5
MINIMAL CLAY CONTENT, NO MORE THAN 3-5% PASSING #200 SIEVE	

12" SOIL FILTER BED – BLENDED SAND, LOAM, SUPERHUMUS SIEVE ANALYSIS	
SIEVE SIZE	% PASSING BY WEIGHT
#10	85–100
#20	70–100
#60	15–40
#200	8–15
1. CLAY FRACTION <2% PASSING THE #200 SIEVE.	
2. SUPERHUMUS OR EQUIVALENT	

SOIL FILTER BED – TRANSITION ZONE (TYPE B)	
SIEVE SIZE	% PASSING BY WEIGHT
1"	90–100
1/2"	75–100
#4	50–100
#20	15–80
#50	0–15
#200	0–5

SOIL FILTER BED – UNDERDRAIN BEDDING (TYPE C)	
SIEVE SIZE	% PASSING BY WEIGHT
1"	100
3/4"	90–100
3/8"	0–75
#4	0–25
#10	0–5



FILTERRA BIOSCAPE VAULT OFFLINE – BASIN

FILTERRA VAULT DATA TABLE				
UNIT #	SIZE	IRM ELEV.	BED ELEV.	INV. OUT
FT-1	4'X5'	36.70	35.70	30.90
FT-2	5'X5	36.90	35.90	31.40
FT-3	5'X5*	37.10	36.10	31.90
FT-4	4'X5'	36.95	35.95	32.35

VEGETATED UNDERDRAINED SOIL FILTER DETAIL
NOT TO SCALE

PERMIT LEVEL
NOT ISSUED FOR
CONSTRUCTION



PREPARED FOR

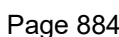
REVISIONS	DATE
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SUE DATE

SHEET TITLE

SHEET INFORMATION

1-00





PREPARED FOR

ZANTON COMPANY

[illegible]

ISSUE DATE

TE PLAN REVIEW
PRIL 26, 2022

EET TITLE

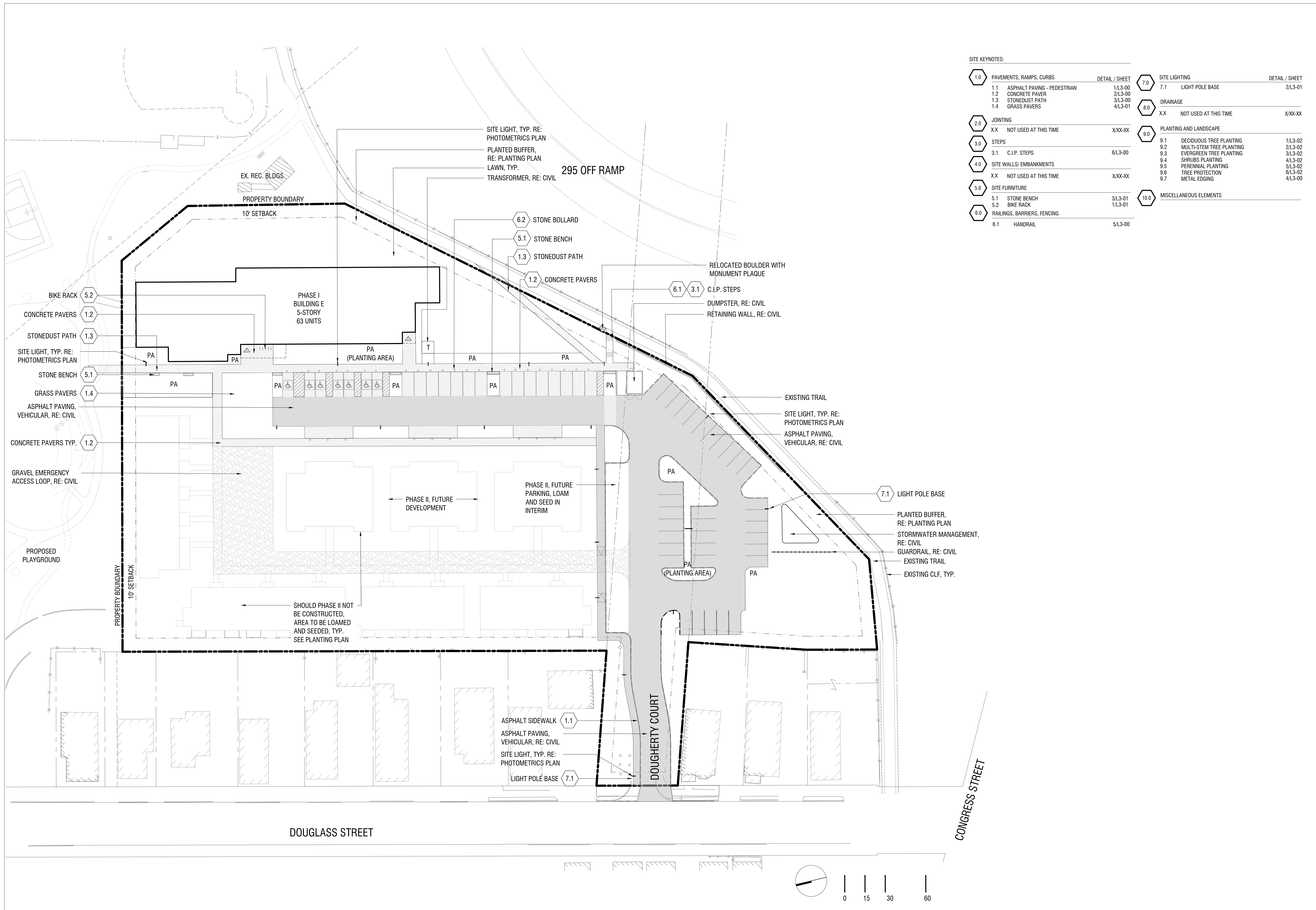
MATERIALS PLAN

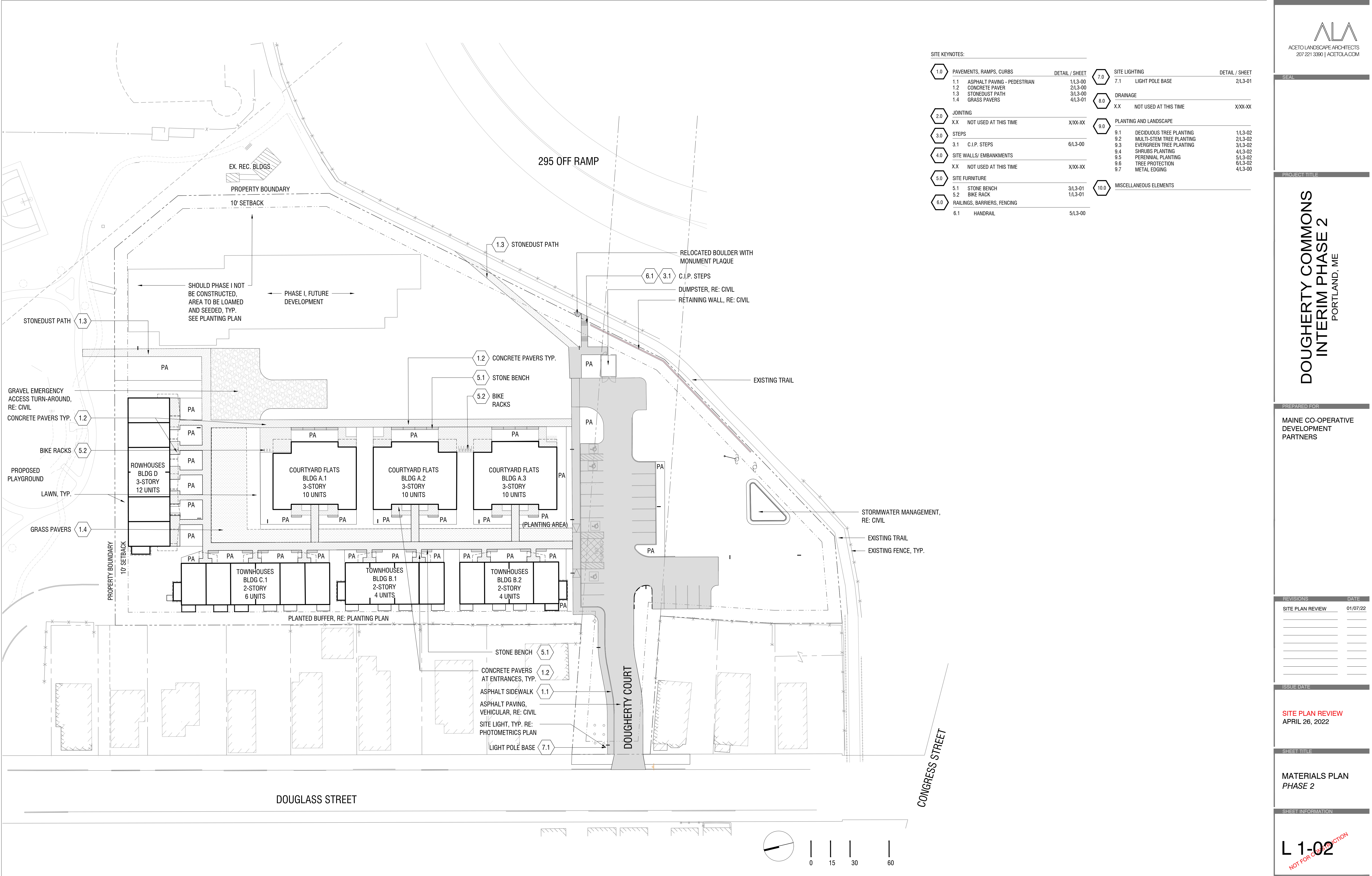
PHASE 1

EET INFORMATION

1-01

1-01





SITE KEYNOTES:			
	DETAIL / SHEET		DETAIL / SHEET
1.0 PAVEMENTS, RAMPS, CURBS		7.0 SITE LIGHTING	
1.1 ASPHALT PAVING - PEDESTRIAN	1/L3-00	7.1 LIGHT POLE BASE	2/L3-01
1.2 CONCRETE PAVER	2/L3-00		
1.3 STONEDUST PATH	3/L3-00	8.0 DRAINAGE	
1.4 GRASS PAVERS	4/L3-01	X.X NOT USED AT THIS TIME	X/XX-XX
2.0 JOINTING		9.0 PLANTING AND LANDSCAPE	
X.X NOT USED AT THIS TIME	X/XX-XX	9.1 DECIDUOUS TREE PLANTING	1/L3-02
3.0 STEPS		9.2 MULTI-STEM TREE PLANTING	2/L3-02
3.1 C.I.P. STEPS	6/L3-00	9.3 EVERGREEN TREE PLANTING	3/L3-02
4.0 SITE WALLS/ EMBANKMENTS		9.4 SHRUBS PLANTING	4/L3-02
X.X NOT USED AT THIS TIME	X/XX-XX	9.5 PERENNIAL PLANTING	5/L3-02
5.0 SITE FURNITURE		9.6 TREE PROTECTION	6/L3-02
5.1 STONE BENCH	3/L3-01	9.7 METAL EDGING	4/L3-00
5.2 BIKE RACK	1/L3-01		
6.0 RAILINGS, BARRIERS, FENCING		10.0 MISCELLANEOUS ELEMENTS	
6.1 HANDRAIL	5/L3-00		



ACETO LANDSCAPE ARCHITECTS
207.221.3390 | ACETOLA.COM

SEAL

PROJECT TITLE

DOUGHERTY COMMONS
INTERIM PHASE 2
PORTLAND, ME

PREPARED FOR

MAINE CO-OPERATIVE
DEVELOPMENT
PARTNERS

REVISIONS	DATE
SITE PLAN REVIEW	01/07/22

ISSUE DATE

SITE PLAN REVIEW
APRIL 26, 2022

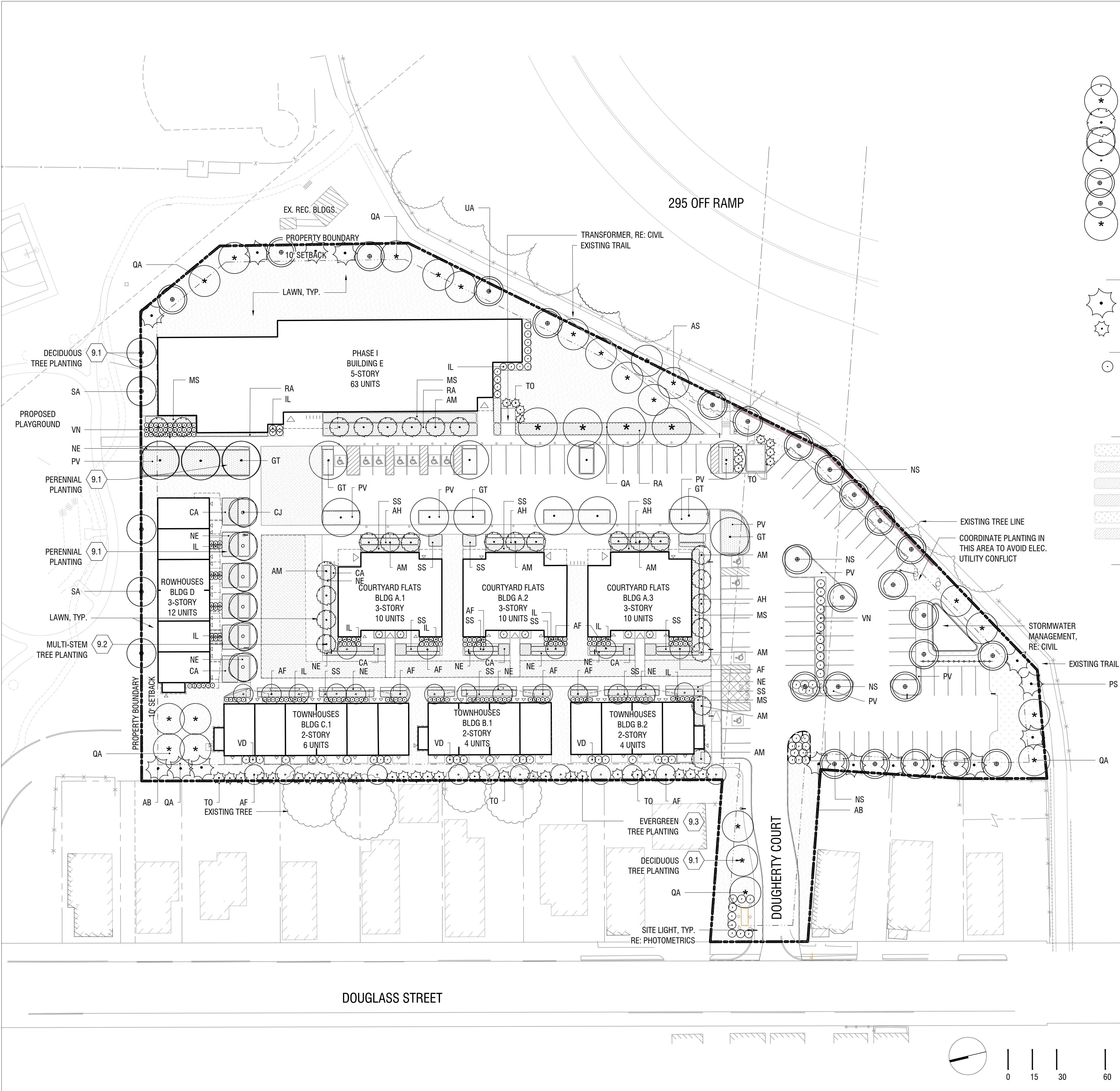
SHEET TITLE

MATERIALS PLAN
PHASE 2

SHEET INFORMATION

L 1-02

NOT FOR CONSTRUCTION



PLANT LIST

SYMB.	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	SPACING
TREES					
AF	ACER X FREEMANII 'ARMSTRONG'	UPRIGHT ARMSTRONG MAPLE	TBD	2.5" CAL. MIN.	PER PLAN
AS	ACER SACCHARUM	SUGAR MAPLE	TBD	2.5" CAL. MIN.	PER PLAN
AM	AMELANCHIER CANADENSIS	SERVICEBERRY (MULTI-STEM)	TBD	2.5" CAL. MIN.	PER PLAN
CJ	CERCIDIPHYLLUM JAPONICUM	KATSURA	TBD	2.5" CAL. MIN.	PER PLAN
GT	GLEDITSIA TRIACANTHOS X INERMIS	HONEY LOCUST	TBD	2.5" CAL. MIN.	PER PLAN
NS	NYSSA SYLVATICA	BLACK TUPELO	TBD	2.5" CAL. MIN.	PER PLAN
SA	SORBUS ALNIFOLIA	MOUNTAIN ASH	TBD	2.5" CAL. MIN.	PER PLAN
QA	QUERCUS ALBA	WHITE OAK	TBD	2.5" CAL. MIN.	PER PLAN
UA	ULMUS AMERICANA	AMERICAN ELM	TBD	2.5" CAL. MIN.	PER PLAN

TREES - EVERGREEN

AB	ABIES FRASERI	FRASER FIR	TBD	7-8"	PER PLAN
PS	PINUS STROBUS	WHITE PINE	TBD	7-8"	PER PLAN
PO	PICEA OMORIKA	SERBIAN SPRUCE	TBD	7-8"	PER PLAN
TO	THUJA OCCIDENTALIS 'TECHNY'	ARBORVITAE	TBD	6-7"	PER PLAN

SHRUBS

IL	ILLEX GLABRA 'SHAMROCK'	INKBERRY	TBD	#5	PER PLAN
RA	RHUS AROMATICA	LOW-GRO SUMAC	TBD	#2	PER PLAN
VD	VIBURNUM DENTATUM 'CHICAGO LUSTRE'	ARROWWOOD VIBURNUM	TBD	#5	PER PLAN
VN	VIBURNUM NUDUM 'WINTERHUR'	SMOOTH VIBURNUM	TBD	#5	PER PLAN

PERENNIALS AND ORNAMENTAL GRASSES

AH	AMSONIA HUBRICHTII	BLUE STAR	TBD	#1	PER PLAN
CA	CALAMAGROSTIS ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS	TBD	#1	PER PLAN
PV	PANICUM VIRGATUM 'ROTSTRAHLBUSCH'	SWITCH GRASS	TBD	#1	PER PLAN
MS	MISCANTHUS SINENSIS 'MY FAIR MAIDEN'	MAIDEN GRASS	TBD	#1	PER PLAN
NE	NEPETA 'WALKER'S LOW'	CATMINT	TBD	#1	PER PLAN
SS	SCHIZACHYRIUM SCOPARIUM 'PRAIRIE BLUES'	LITTLEBLUE STEM	TBD	#1	PER PLAN

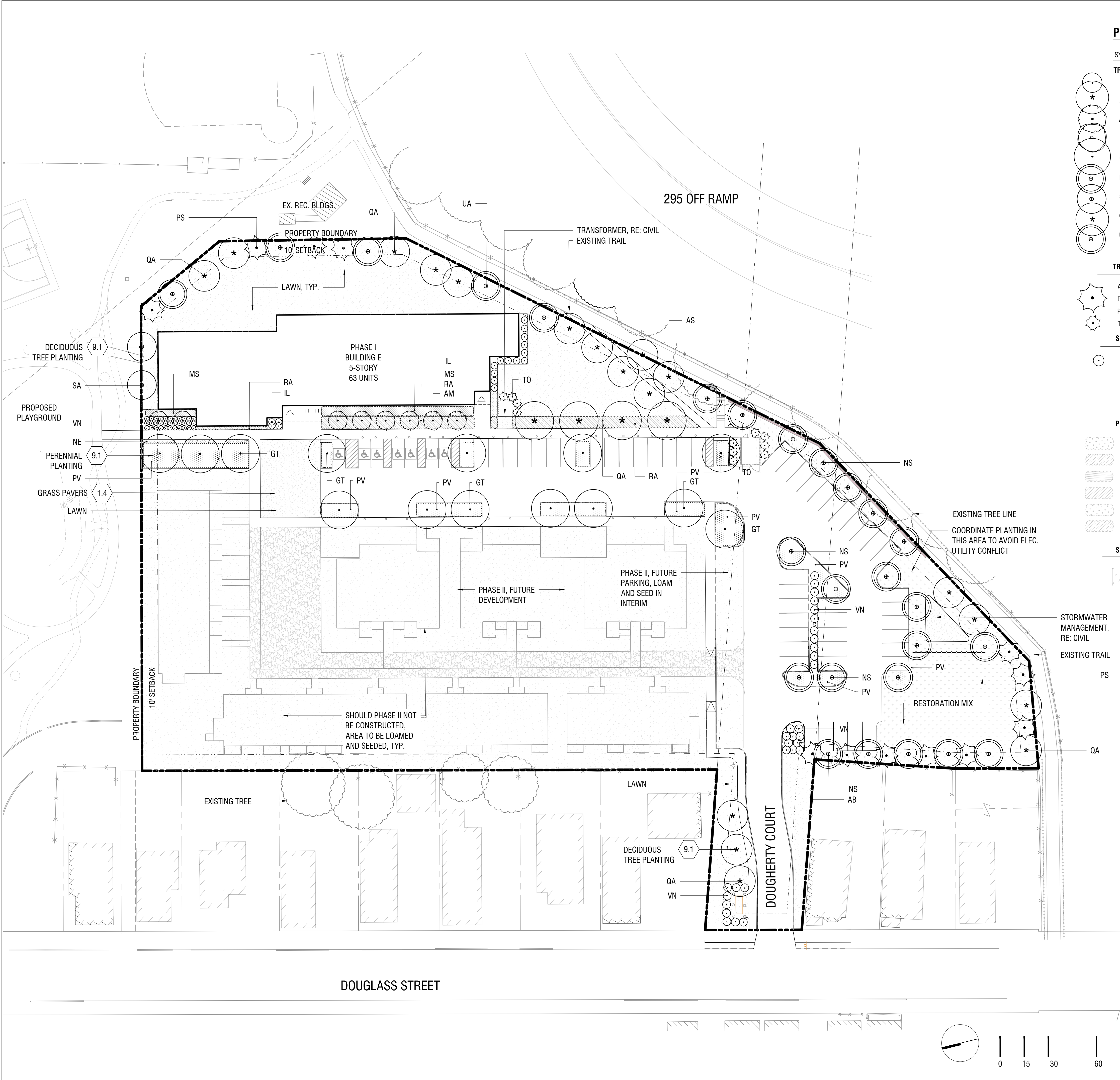
SEEDING

RESTORATION MIX NEW ENGLAND CONSERVATION/WILDLIFE MIX MFR: NEW ENGLAND WETLAND PLANTS TOTAL AREA: TBD APPLICATION RATE 25LBS/ACRE 1750 SQ.FT/LB (SEEDING RATE MAY VARY DEPENDING ON TIME OF YEAR, SEE SPEC. SHEET FOR INSTRUCTIONS)	LAWN WILDFLOWER FARM'S ECO-LAWN GRASS SEED TOTAL AREA: TBD ECO-LAWN IS A DROUGHT-RESISTANT GRASS THAT REQUIRES MOWING ONLY ONCE PER MONTH. EACH 5 POUND BAG OF SEED COVERS 1,000 SQUARE FEET. A THICK HEALTHY LAWN IS THE BEST DEFENCE AGAINST WEEDS, DISEASE, DROUGHT AND INSECT DAMAGE.
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SITE KEYNOTES:

1.0	PAVEMENTS, RAMPS, CURBS	DETAIL / SHEET	7.0	SITE LIGHTING	DETAIL / SHEET
1.1	ASPHALT PAVING - PEDESTRIAN	1/L3-00	7.1	LIGHT POLE BASE	2/L3-01
1.2	CONCRETE PAVER	2/L3-00			
1.3	STONE/UST PATH	3/L3-00	8.0	DRAINAGE	
1.4	GRASS PAVERS	4/L3-01	XX	NOT USED AT THIS TIME	X/XX-XX
2.0	JOINTING		9.0	PLANTING AND LANDSCAPE	
XX	NOT USED AT THIS TIME	X/XX-XX	9.1	DECIDUOUS TREE PLANTING	1/L3-02
3.0	STEPS		9.2	MULTI-STEM TREE PLANTING	2/L3-02
3.1	C.I.P. STEPS	6/L3-00	9.3	EVERGREEN TREE PLANTING	3/L3-02
4.0	SITE WALLS/ EMBANKMENTS		9.4	SHRUBS PLANTING	4/L3-02
XX	NOT USED AT THIS TIME	X/XX-XX	9.5	PERENNIAL PLANTING	5/L3-02
5.0	SITE FURNITURE		9.6	TREE PROTECTION	6/L3-02
5.1	STONE BENCH	3/L3-01	9.7	METAL EDGING	4/L3-00
5.2	BIKE RACK	1/L3-01			
6.0	RAILINGS, BARRIERS, FENCING		10.0	MISCELLANEOUS ELEMENTS	
6.1	HANDRAIL	5/L3-00			

REVISIONS	DATE
SITE PLAN REVIEW	01/07/22



PLANT LIST

SYMB.	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	SPACING
TREES					
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VD	VIBURNUM DENTATUM 'CHICAGO LUSTRE'	ARROWWOOD VIBURNUM	TBD	#5	PER PLAN
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MS	MISCANTHUS SINENSIS 'MY FAIR MAIDEN'	MAIDEN GRASS	TBD	#1	PER PLAN
NE	NEPETA 'WALKER'S LOW'	CATMINT	TBD	#1	PER PLAN
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SITE KEYNOTES:

1.0	PAVEMENTS, RAMPS, CURBS	DETAIL / SHEET	7.0	SITE LIGHTING	DETAIL / SHEET	
1.1	ASPHALT PAVING - PEDESTRIAN	1/L3-00	7.1	LIGHT POLE BASE	2/L3-01	
1.2	CONCRETE PAVER	2/L3-00	8.0	DRAINAGE		
1.3	STONEDUST PATH	3/L3-00		XX	NOT USED AT THIS TIME	XX/XX-XX
1.4	GRASS PAVERS	4/L3-01				
2.0	JOINTING		9.0	PLANTING AND LANDSCAPE		
3.0	STEPS		9.1	DECIDUOUS TREE PLANTING	1/L3-02	
4.0	3.1 C.I.P. STEPS	6/L3-00	9.2	MULTI-STEM TREE PLANTING	2/L3-02	
			9.3	EVERGREEN TREE PLANTING	3/L3-02	
			9.4	SHRUBS PLANTING	4/L3-02	
			9.5	PERENNIAL PLANTING	5/L3-02	
5.0	SITE WALLS/ EMBANKMENTS		9.6	TREE PROTECTION	6/L3-02	
	XX NOT USED AT THIS TIME	X/XX-XX	9.7	METAL EDGING	4/L3-00	
6.0	SITE FURNITURE		10.0	MISCELLANEOUS ELEMENTS		
5.1	STONE BENCH	3/L3-01				
5.2	BIKE RACK	1/L3-01				
6.0	RAILINGS, BARRIERS, FENCING					
	6.1 HANDRAIL	5/L3-00				

SEAL

PROJECT TITLE

DOUGHERTY COMMONS
INTERIM PHASE 1
PORTLAND, ME

PREPARED FOR

SZANTON COMPANY

REVISIONS

REVISIONS	DATE
SITE PLAN REVIEW	01/07/22

ISSUE DATE

SITE PLAN REVIEW
APRIL 26, 2022

SHEET TITLE

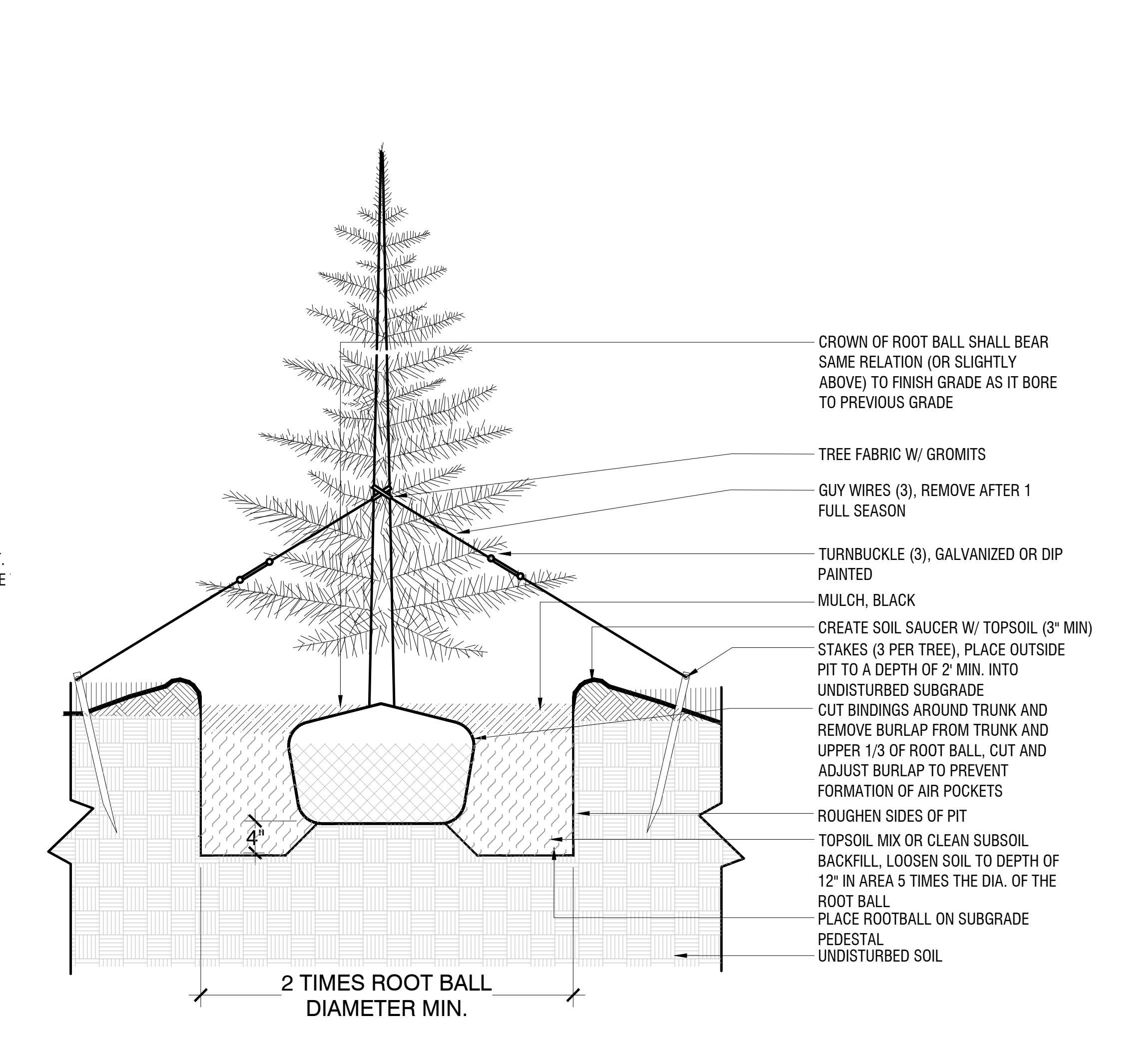
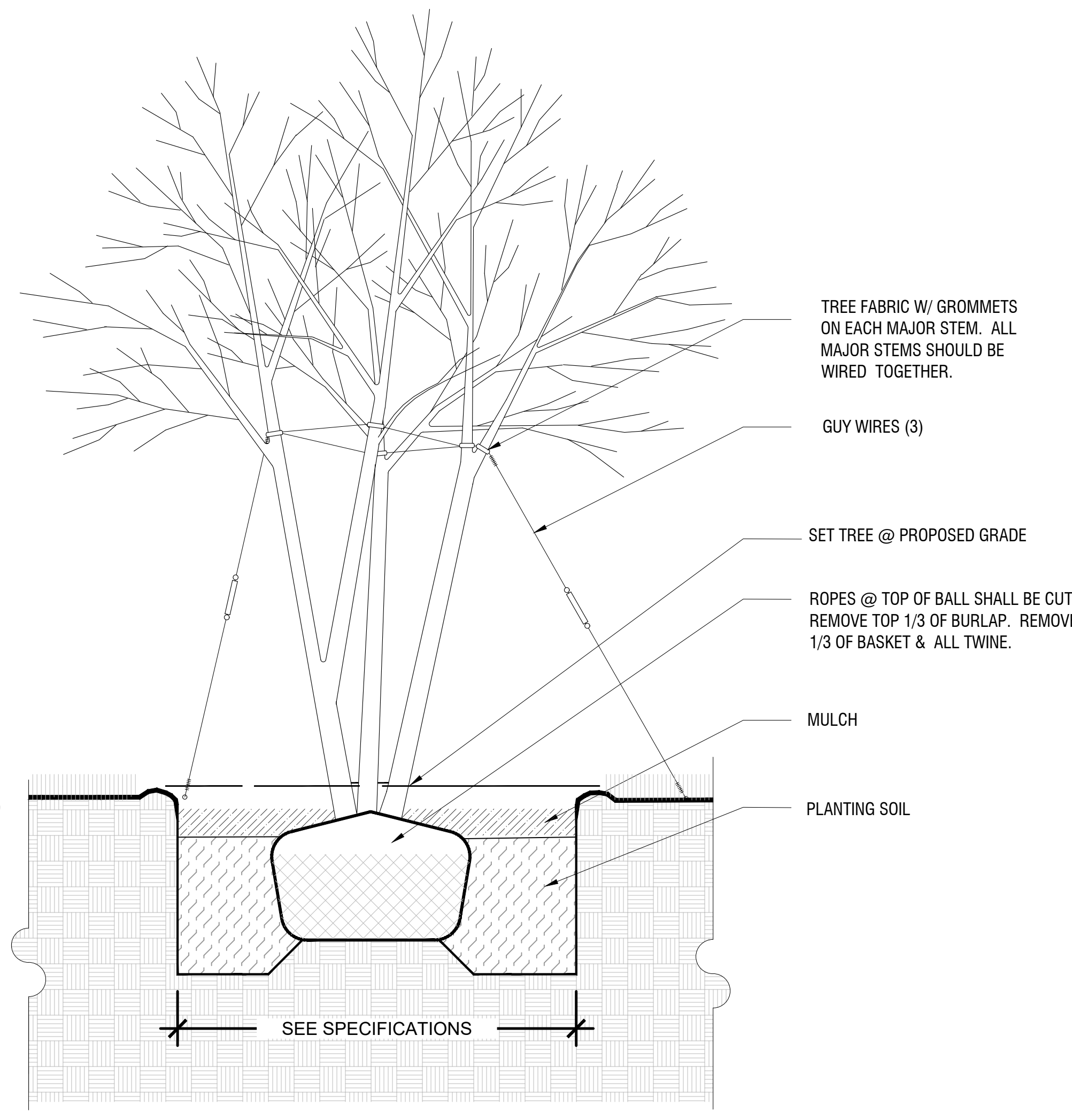
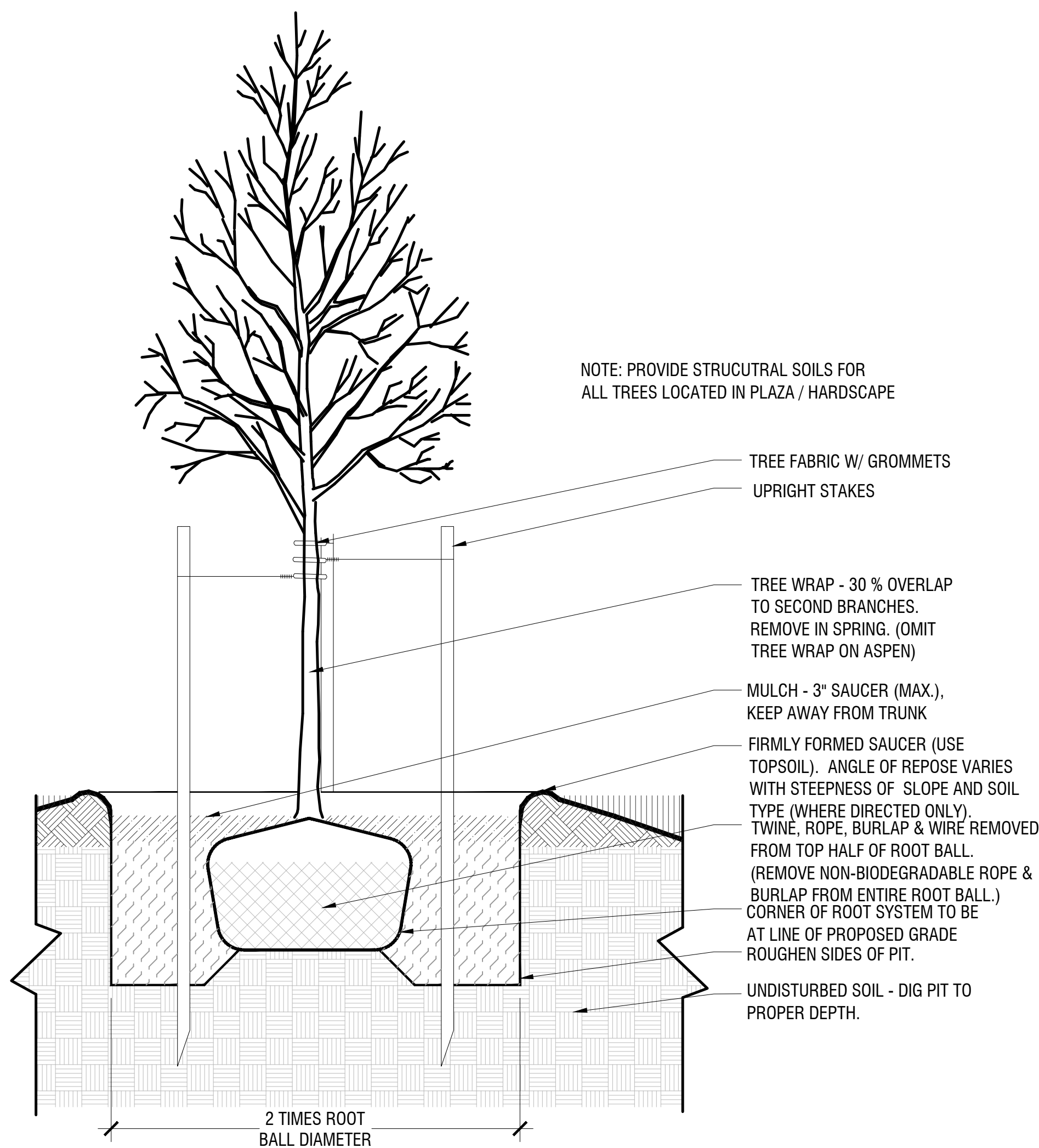
PLANTING PLAN
PHASE 1

SHEET INFORMATION

L 2-01

NOT FOR CONSTRUCTION

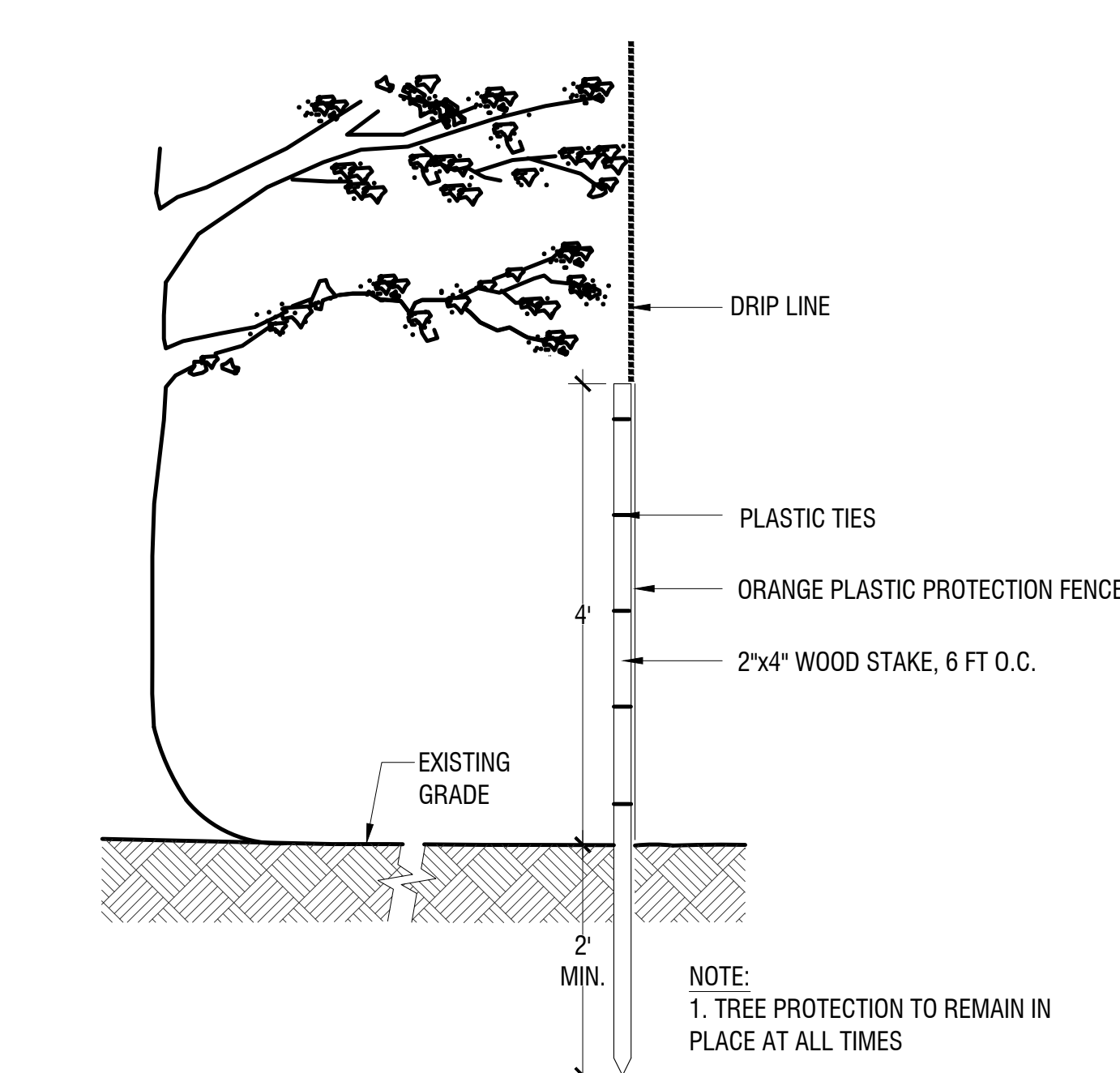
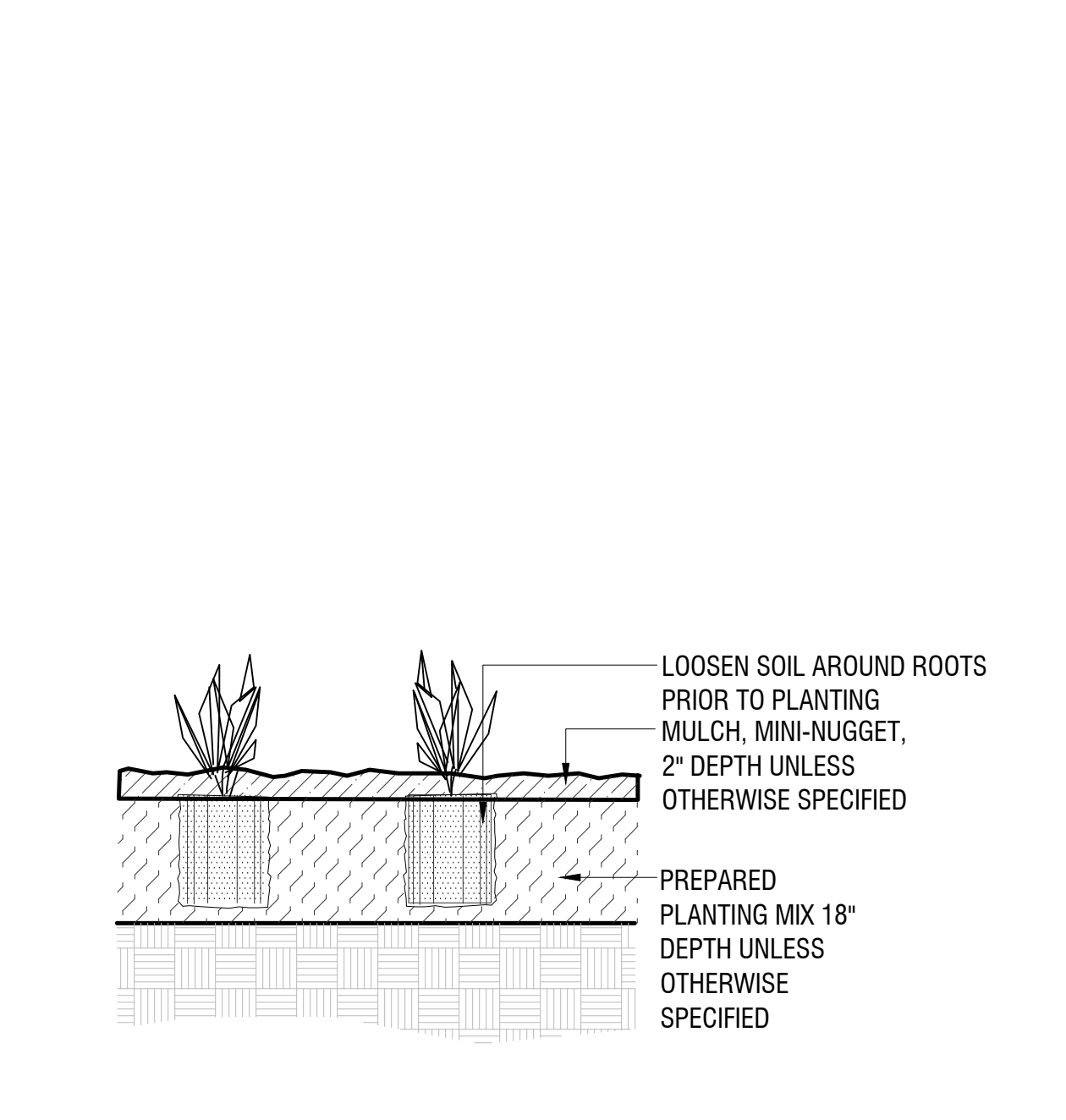
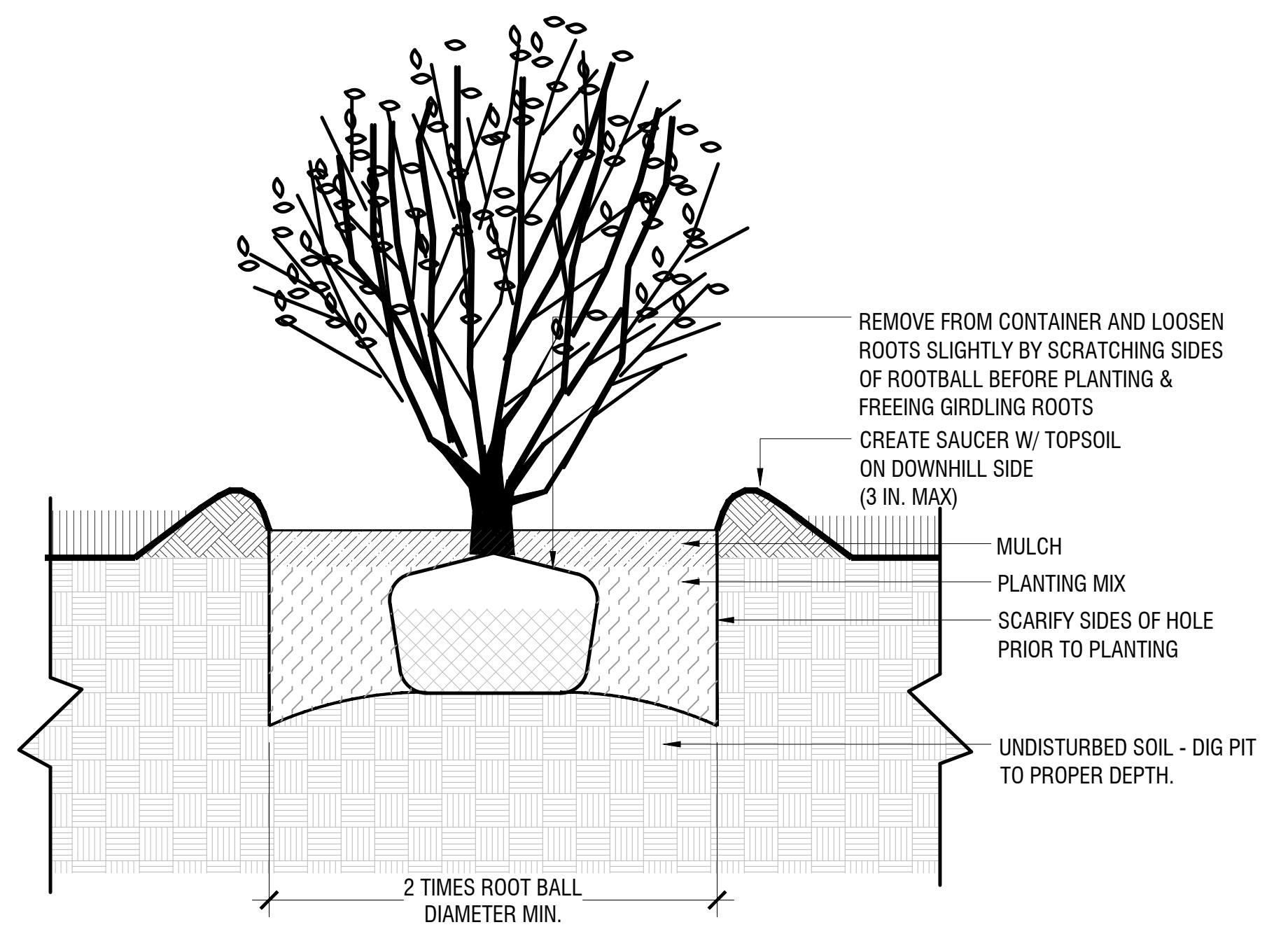
REVISIONS	DATE
SITE PLAN REVIEW	01/07/22



1 DECIDUOUS TREE PLANTING
N.T.S.

2 MULTI-STEM TREE PLANTING
N.T.S.

3 EVERGREEN TREE PLANTING
N.T.S.



SITE KEYNOTES:			
1.0	PAVEMENTS, RAMPS, CURBS	DETAIL / SHEET	
1.1	ASPHALT PAVING - PEDESTRIAN	1/L3-00	
1.2	CONCRETE PAVER	2/L3-00	
1.3	STONEDUST PATH	3/L3-00	
1.4	GRASS PAVERS	4/L3-01	
2.0	JOINTING		
XX	NOT USED AT THIS TIME	X/XX-XX	
3.0	STEPS		
3.1	C.I.P. STEPS	6/L3-00	
4.0	SITE WALLS/ EMBANKMENTS		
XX	NOT USED AT THIS TIME	X/XX-XX	
5.0	SITE FURNITURE		
5.1	STONE BENCH	3/L3-01	
5.2	BIKE RACK	1/L3-01	
6.0	RAILINGS, BARRIERS, FENCING		
6.1	HANDRAIL	5/L3-00	

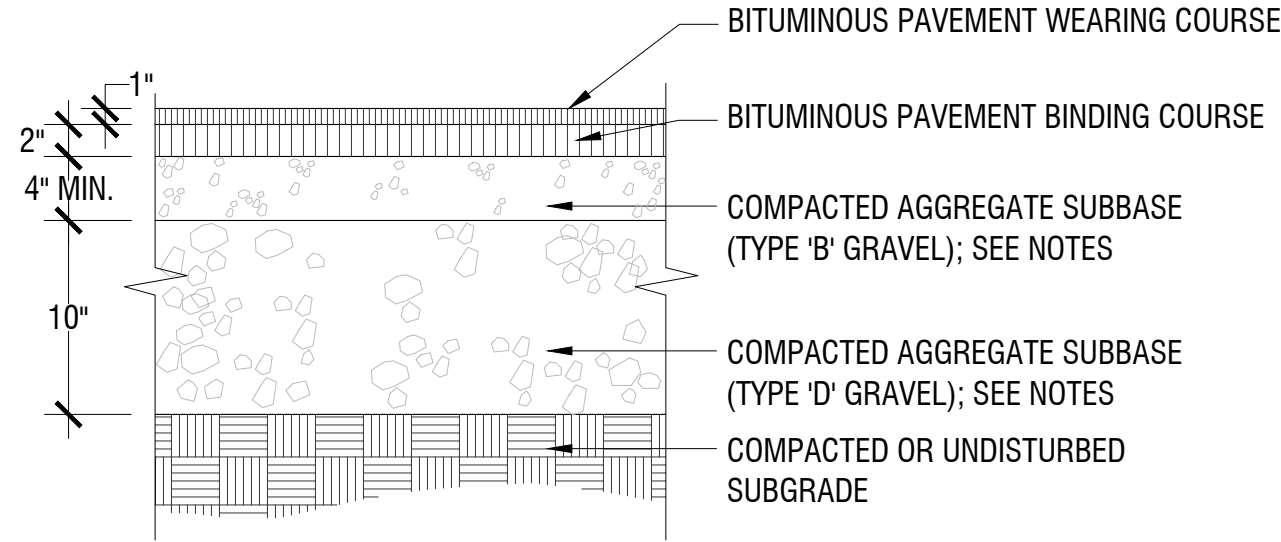
4 SHRUB PLANTING
1":1'-0"

5 PERENNIAL PLANTING
1":1'-0"

6 TREE PROTECTION
1":1'-0"

SITE KEYNOTES:

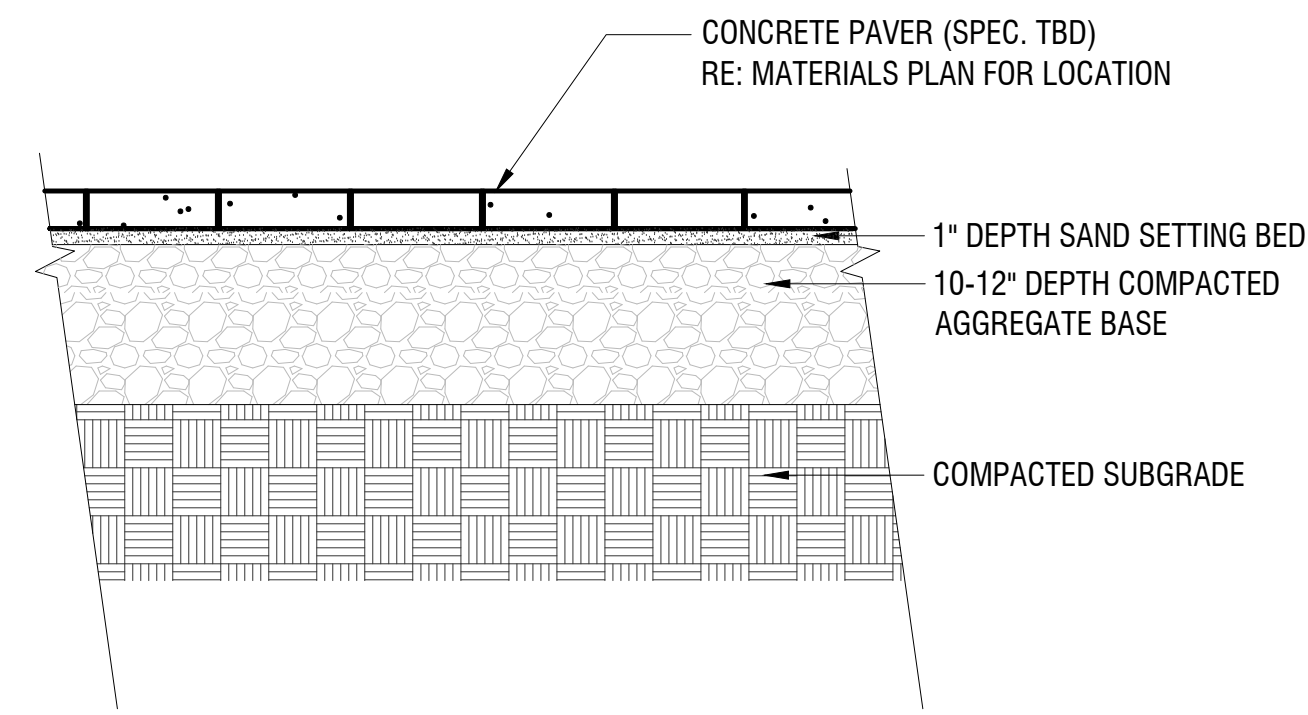
1.0	PAVEMENTS, RAMPS, CURBS	DETAIL / SHEET	7.0	SITE LIGHTING	DETAIL / SHEET
1.1	ASPHALT PAVING - PEDESTRIAN	1/L3-00	7.1	LIGHT POLE BASE	2/L3-01
1.2	CONCRETE PAVER	2/L3-00			
1.3	STONEDUST PATH	3/L3-00	8.0	DRAINAGE	
1.4	GRASS PAVERS	4/L3-01	X.X	NOT USED AT THIS TIME	X/XX-XX
2.0	JOINTING		9.0	PLANTING AND LANDSCAPE	
X.X	NOT USED AT THIS TIME	X/XX-XX	9.1	DECIDUOUS TREE PLANTING	1/L3-02
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X.X	NOT USED AT THIS TIME	X/XX-XX	9.5	PERENNIAL PLANTING	5/L3-02
5.0	SITE FURNITURE		9.6	TREE PROTECTION	6/L3-02
5.1	STONE BENCH	3/L3-01	9.7	METAL EDGING	4/L3-00
5.2	BIKE RACK	1/L3-01	10.0	MISCELLANEOUS ELEMENTS	
6.0	RAILINGS, BARRIERS, FENCING				
6.1	HANDRAIL	5/L3-00			



1 ASPHALT PAVING (PEDESTRIAN)

1":1'-0"

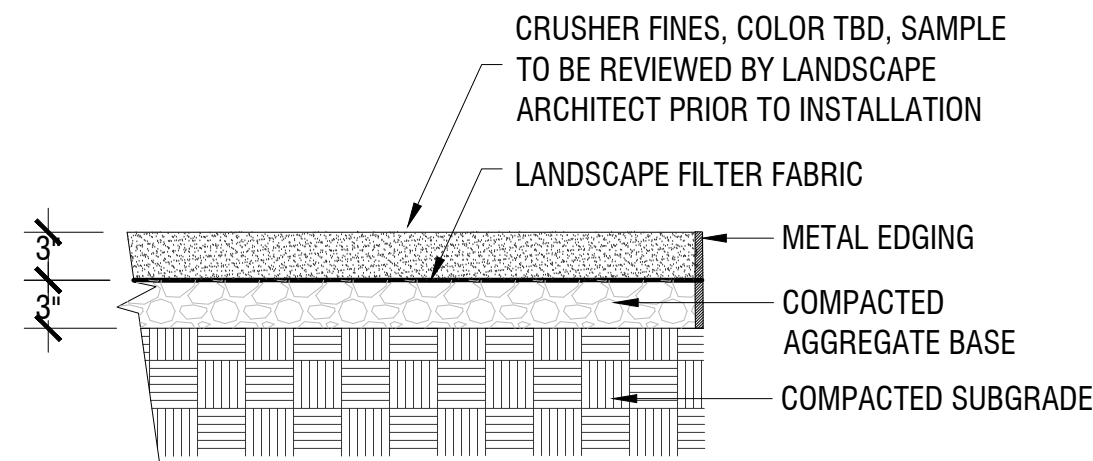
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2 CONCRETE PAVER

1":1'-0"

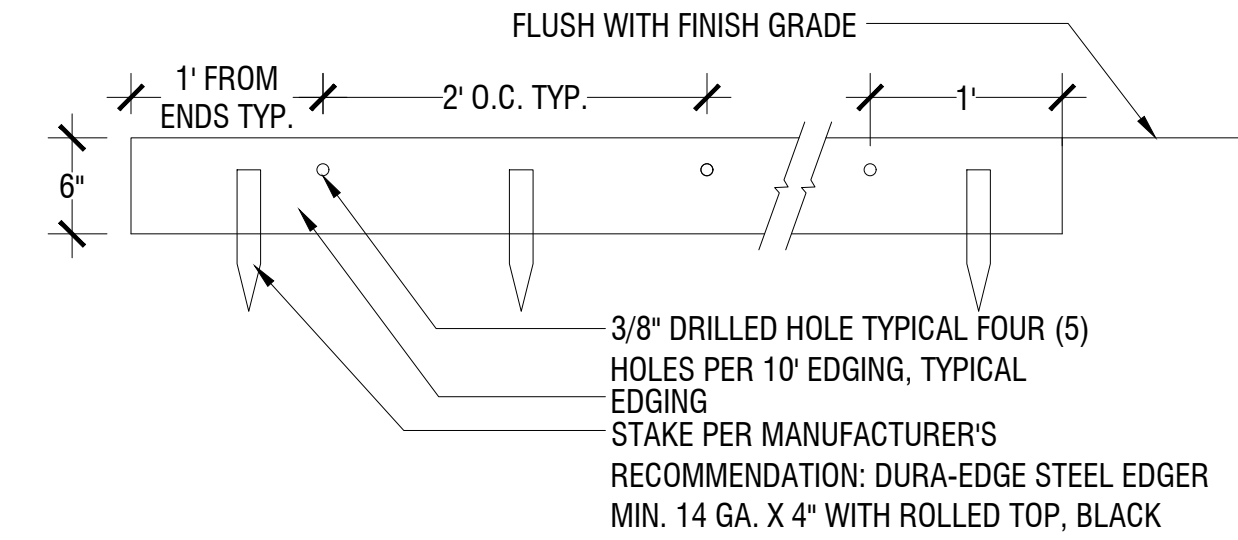
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3 STONEDUST PATH

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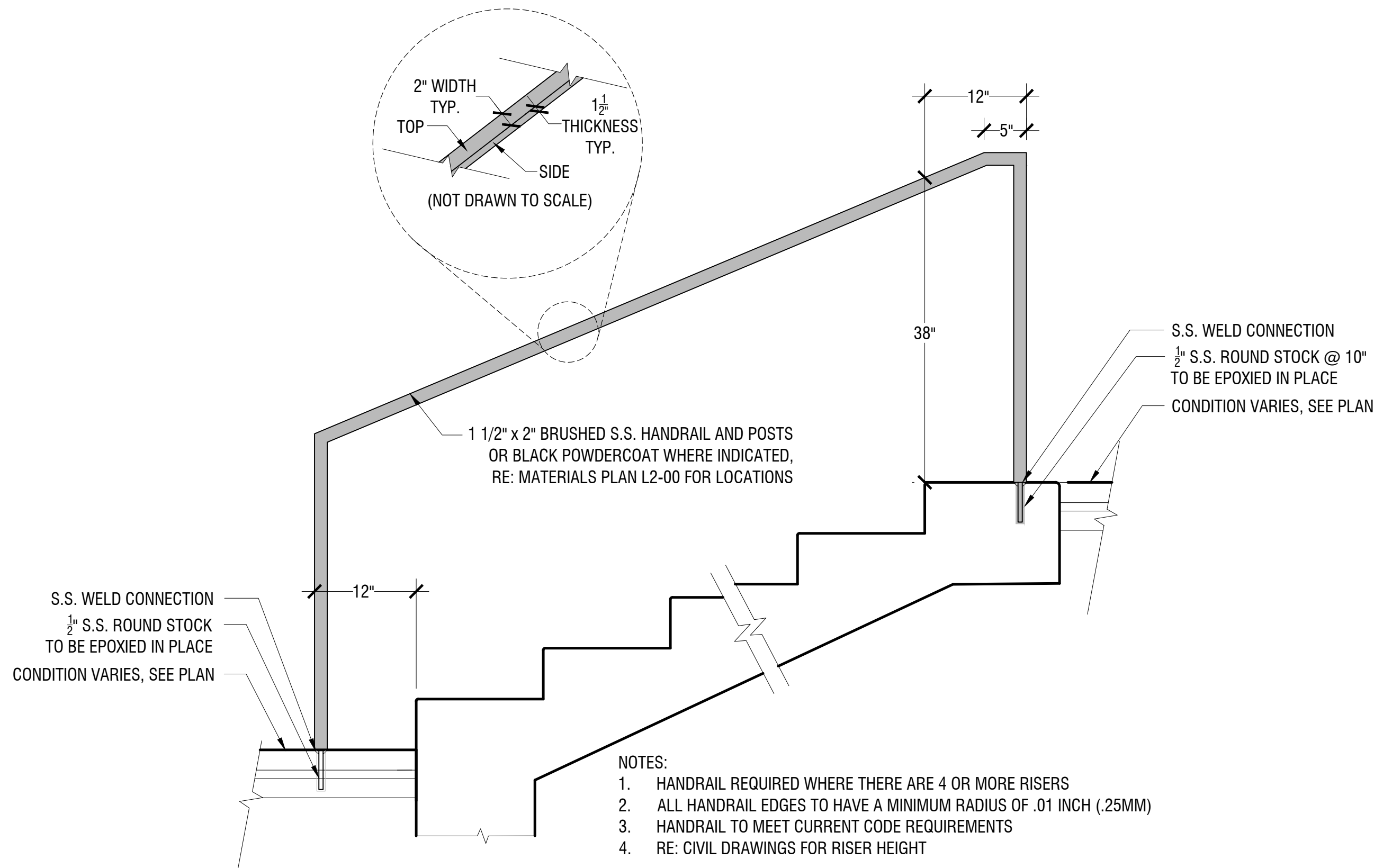
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4 METAL EDGING

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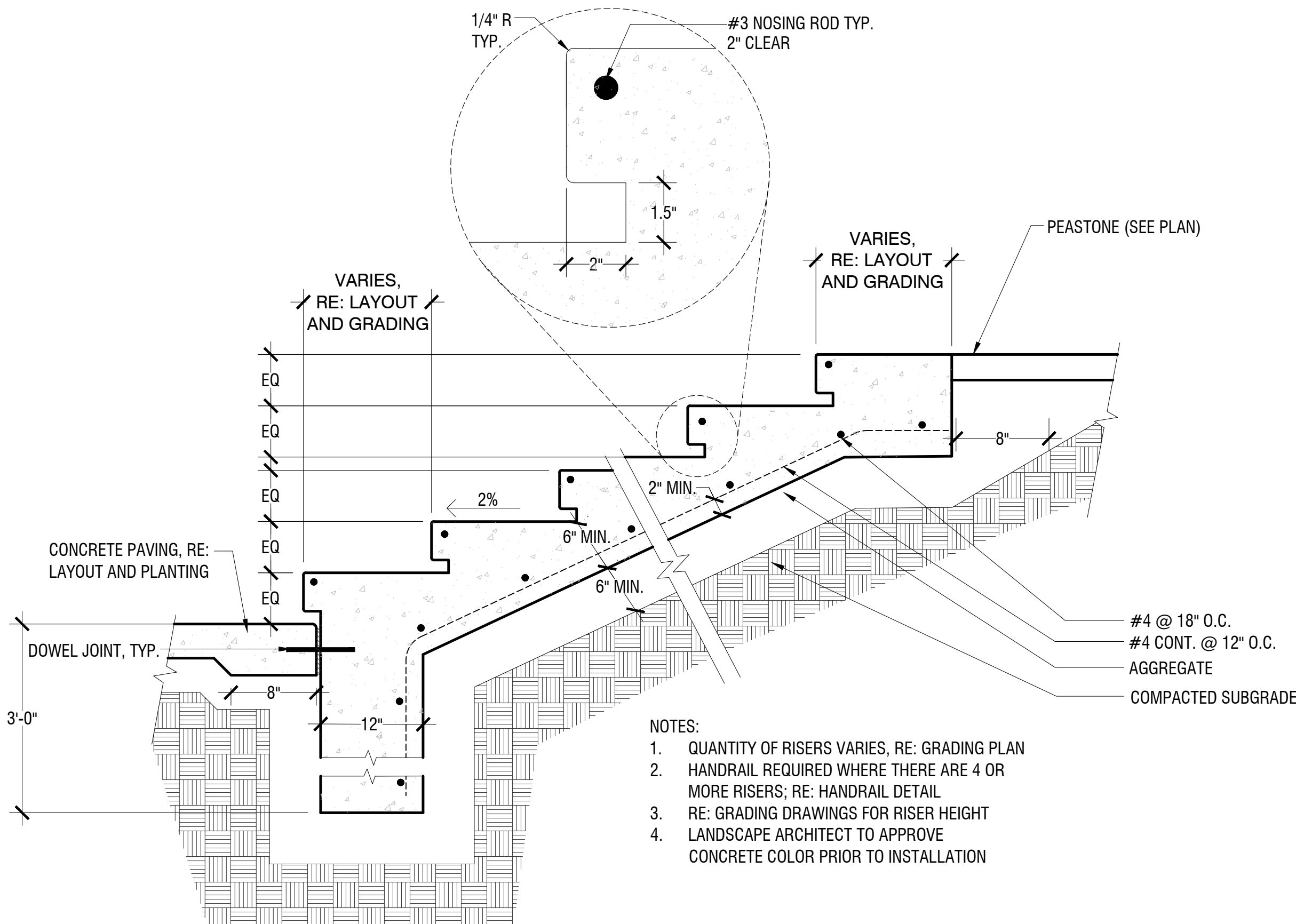
9.7



5 HANDRAIL

1":1'-0"

6.1



6 CONCRETE STEPS

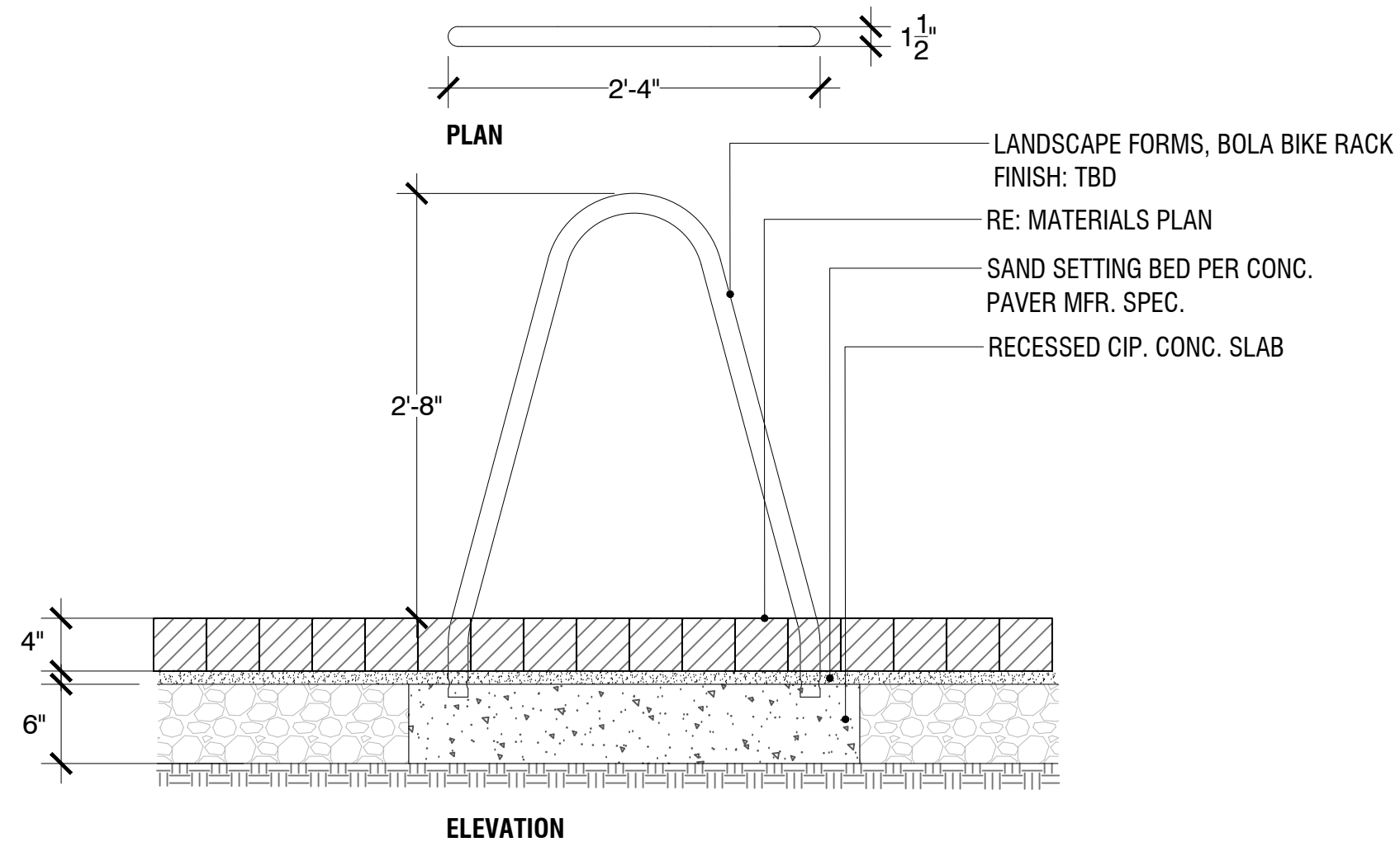
1":1'-0"

3.1

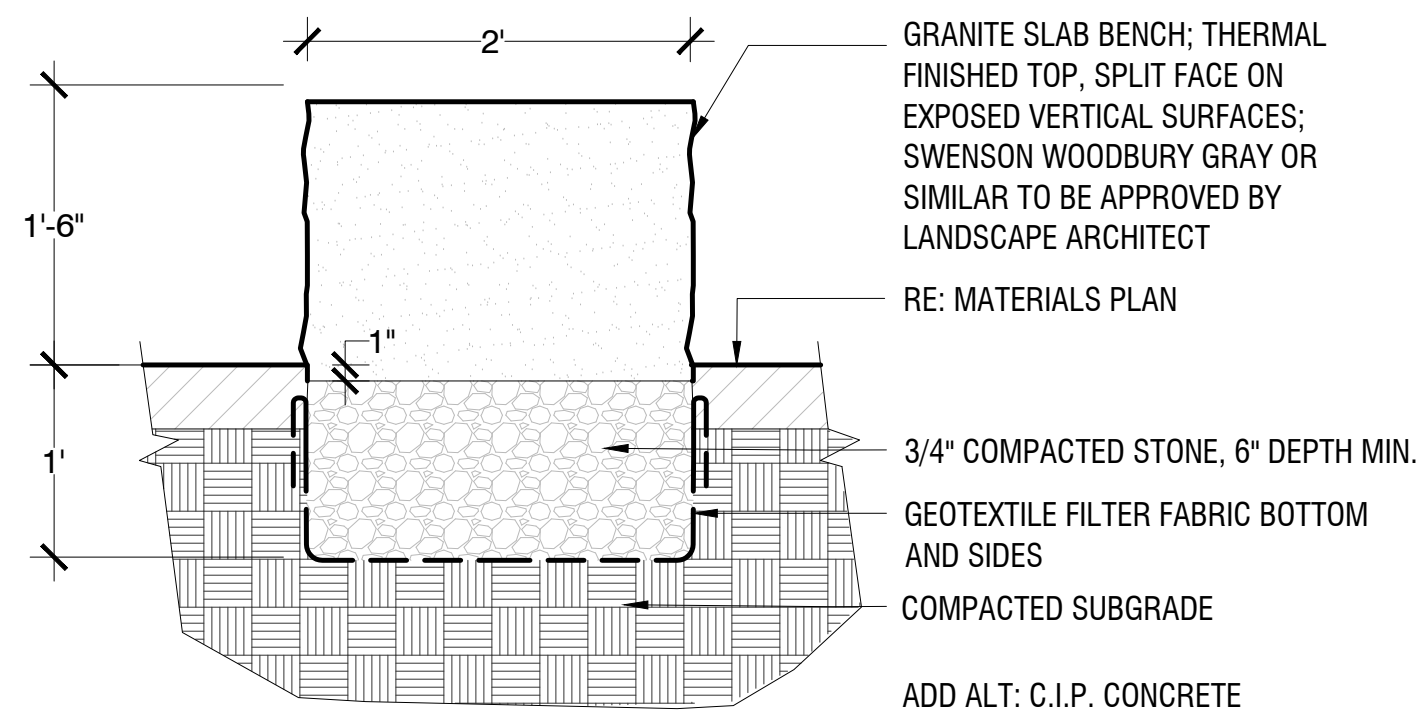
REVISIONS	DATE
SITE PLAN REVIEW	01/07/22

SITE KEYNOTES:

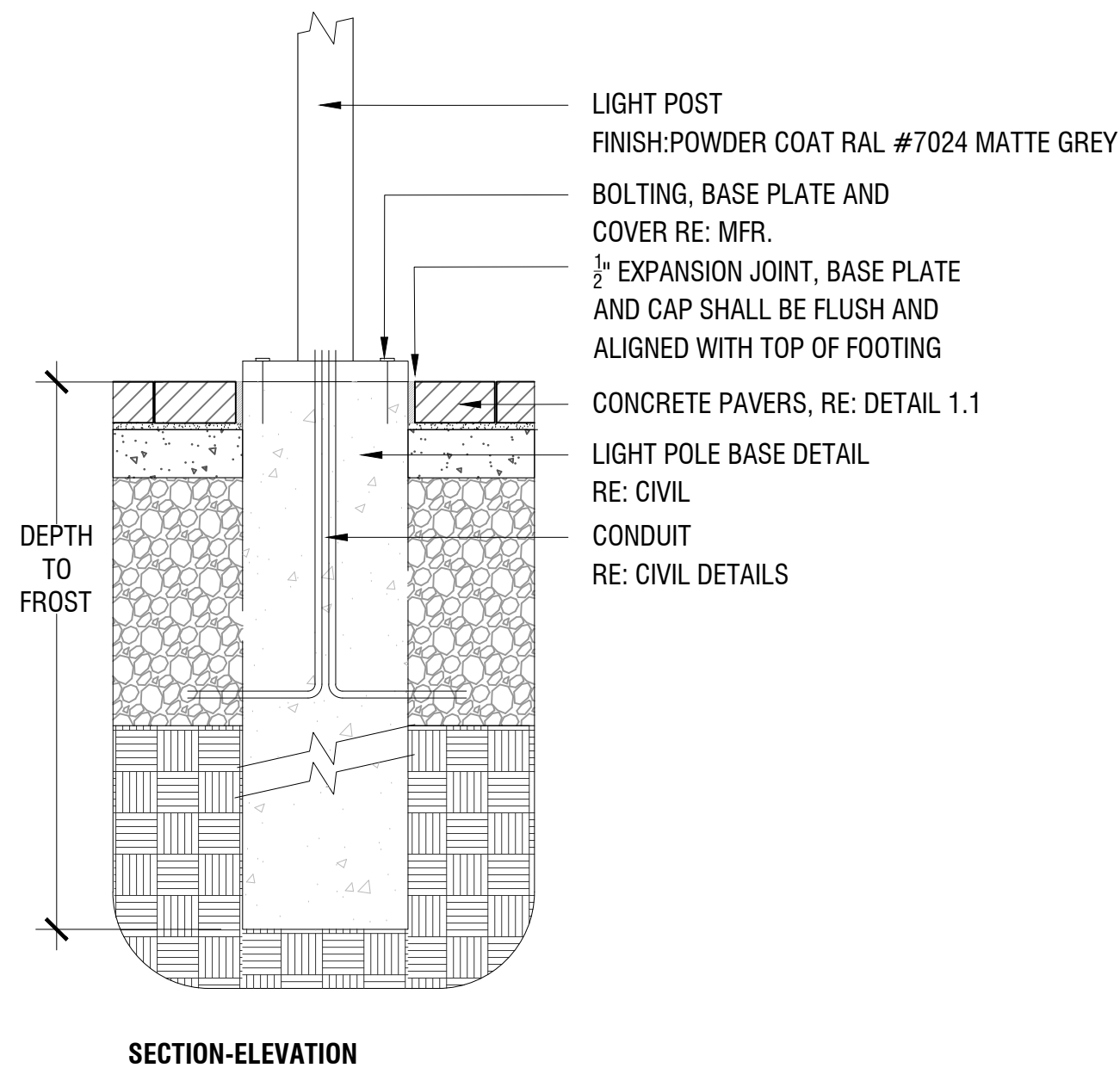
1.0	PAVEMENTS, RAMPS, CURBS	DETAIL / SHEET	7.0	SITE LIGHTING	DETAIL / SHEET
1.1	ASPHALT PAVING - PEDESTRIAN	1/L3-00	7.1	LIGHT POLE BASE	2/L3-01
1.2	CONCRETE PAVER	2/L3-00			
1.3	STONEDUST PATH	3/L3-00			
1.4	GRASS PAVERS	4/L3-01			
2.0	JOINTING		8.0	DRAINAGE	
X.X	NOT USED AT THIS TIME	X/XX-XX	X.X	NOT USED AT THIS TIME	X/XX-XX
3.0	STEPS		9.0	PLANTING AND LANDSCAPE	
3.1	C.I.P. STEPS	6/L3-00	9.1	DECIDUOUS TREE PLANTING	1/L3-02
			9.2	MULTI-STEM TREE PLANTING	2/L3-02
			9.3	EVERGREEN TREE PLANTING	3/L3-02
			9.4	SHRUBS PLANTING	4/L3-02
			9.5	PERENNIAL PLANTING	5/L3-02
			9.6	TREE PROTECTION	6/L3-02
			9.7	METAL EDGING	4/L3-00
4.0	SITE WALLS/ EMBANKMENTS		10.0	MISCELLANEOUS ELEMENTS	
X.X	NOT USED AT THIS TIME	X/XX-XX			
5.0	SITE FURNITURE				
5.1	STONE BENCH	3/L3-01			
5.2	BIKE RACK	1/L3-01			
6.0	RAILINGS, BARRIERS, FENCING				
6.1	HANDRAIL	5/L3-00			



1 BIKE RACK
N.T.S.



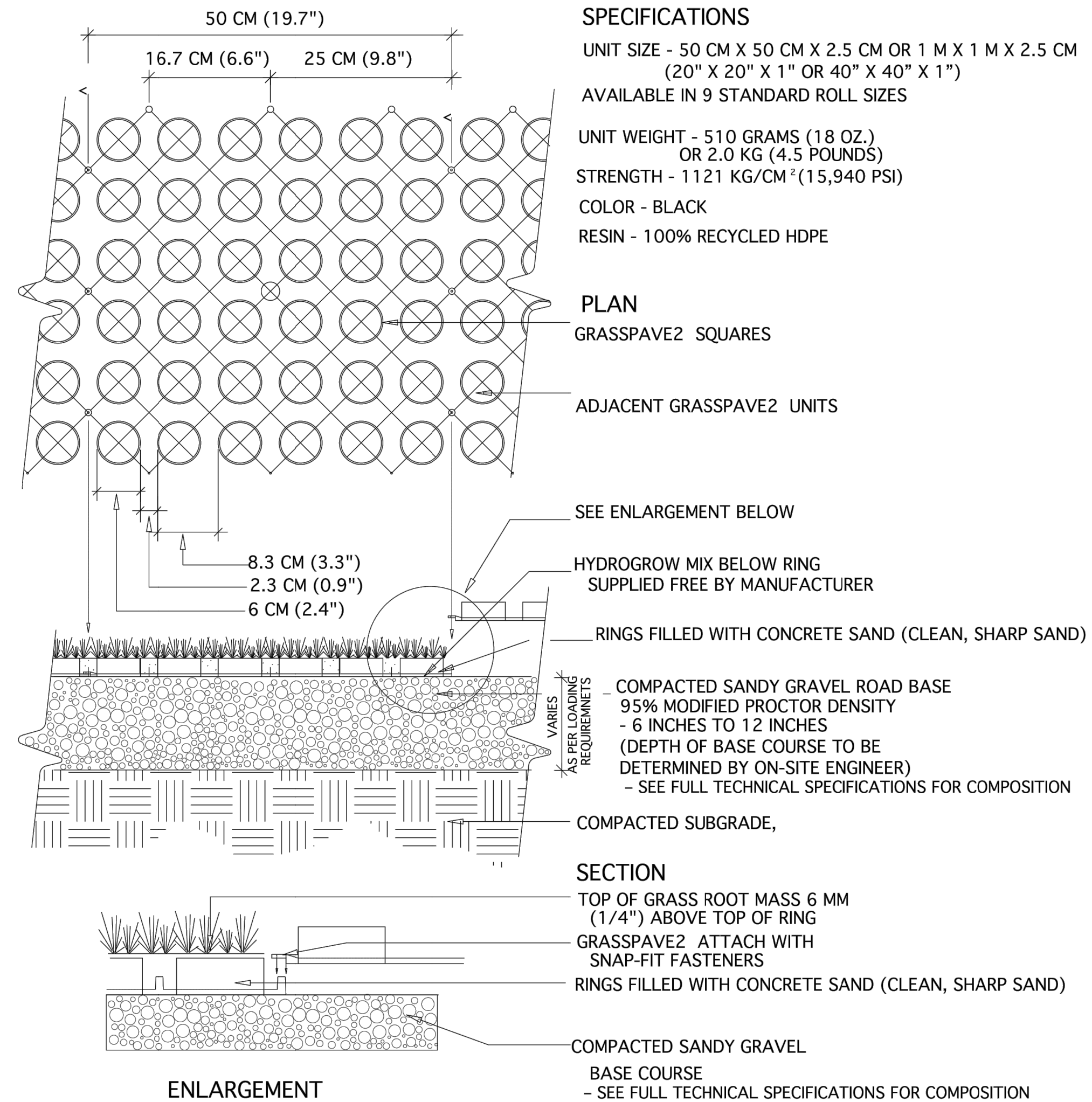
3 STONE BENCH
1":1'-0"



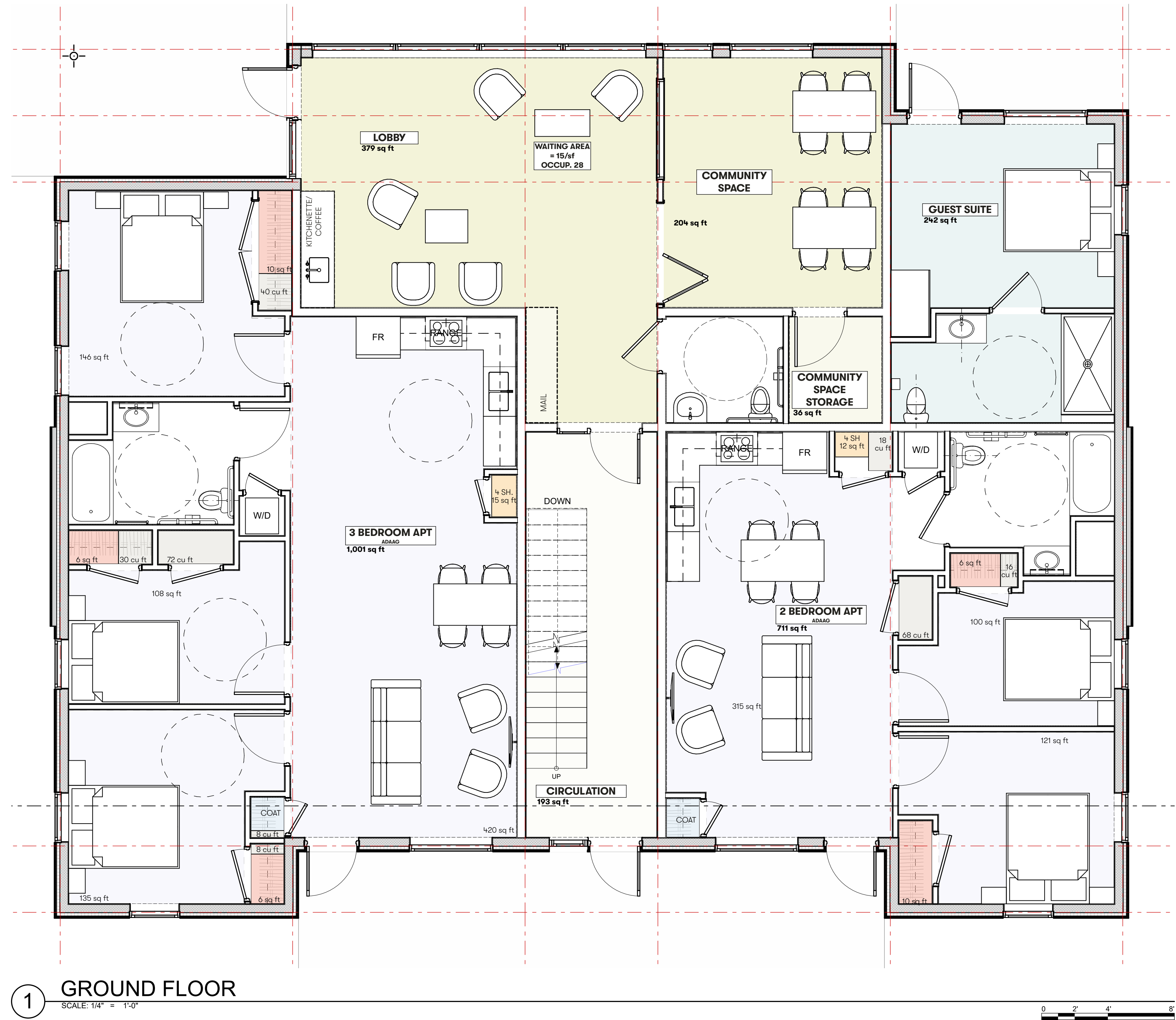
2 LIGHT POLE BASE
N.T.S.

TYPICAL GRASSPAVE2 DETAIL

CHOOSE THIS PRODUCT FOR REINFORCING GRASS WEARING SURFACES



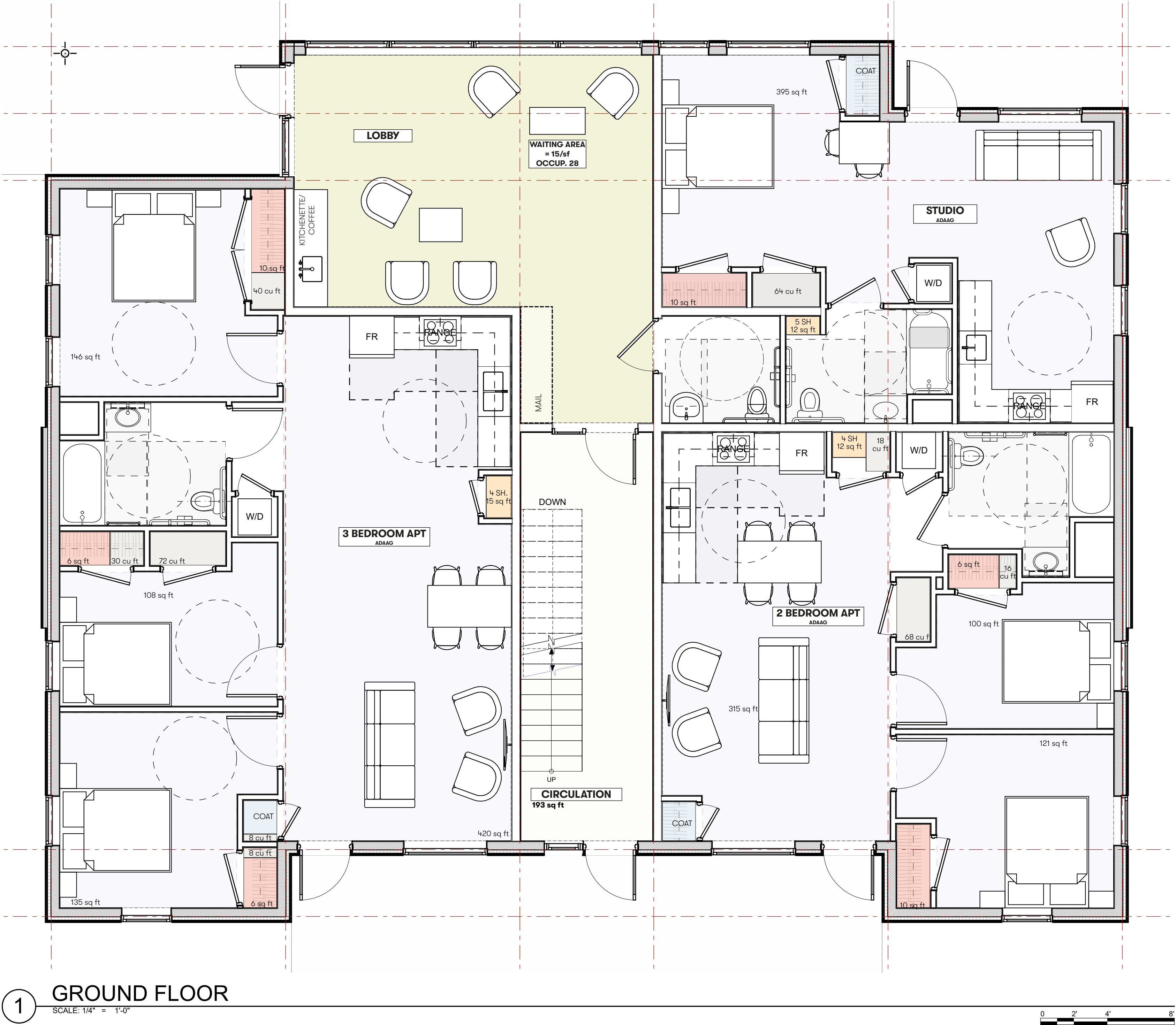
4 GRASS PAVE
1":1'-0"

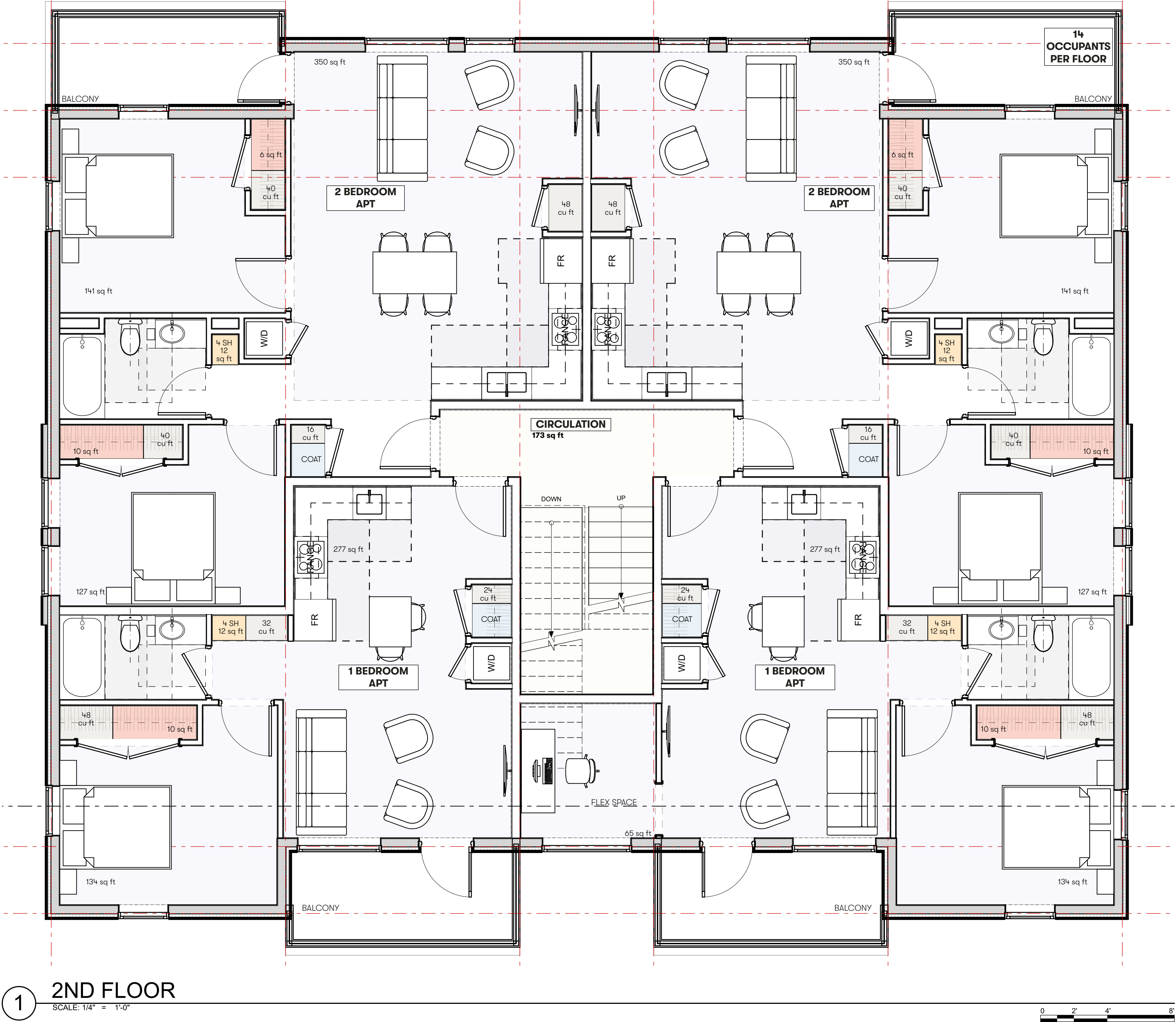


Community Flats Floor Plan: A-1 & A-2

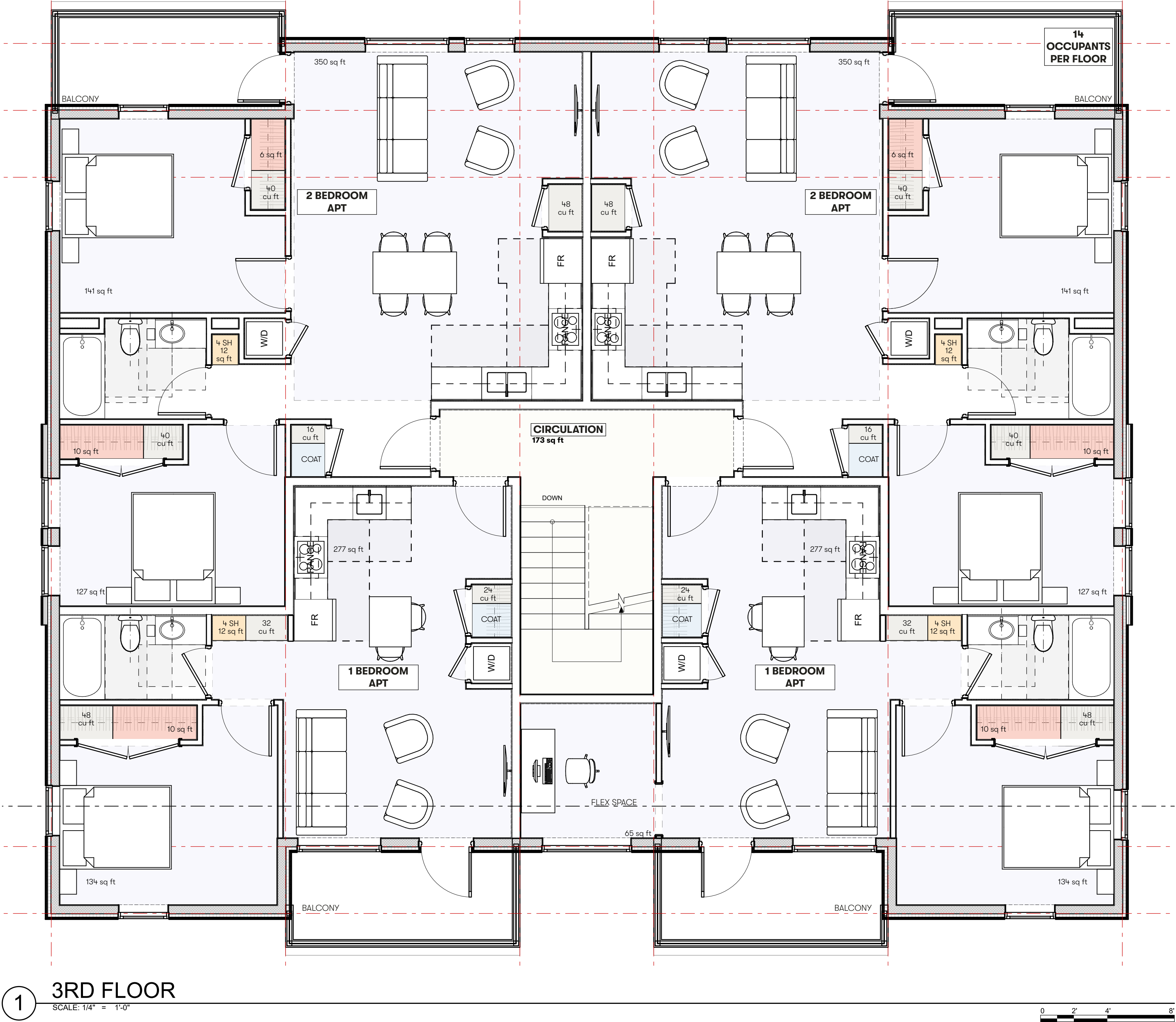
Douglass St Co-Op

Maine Community Development Partners
Lambert St Portland ME 04101

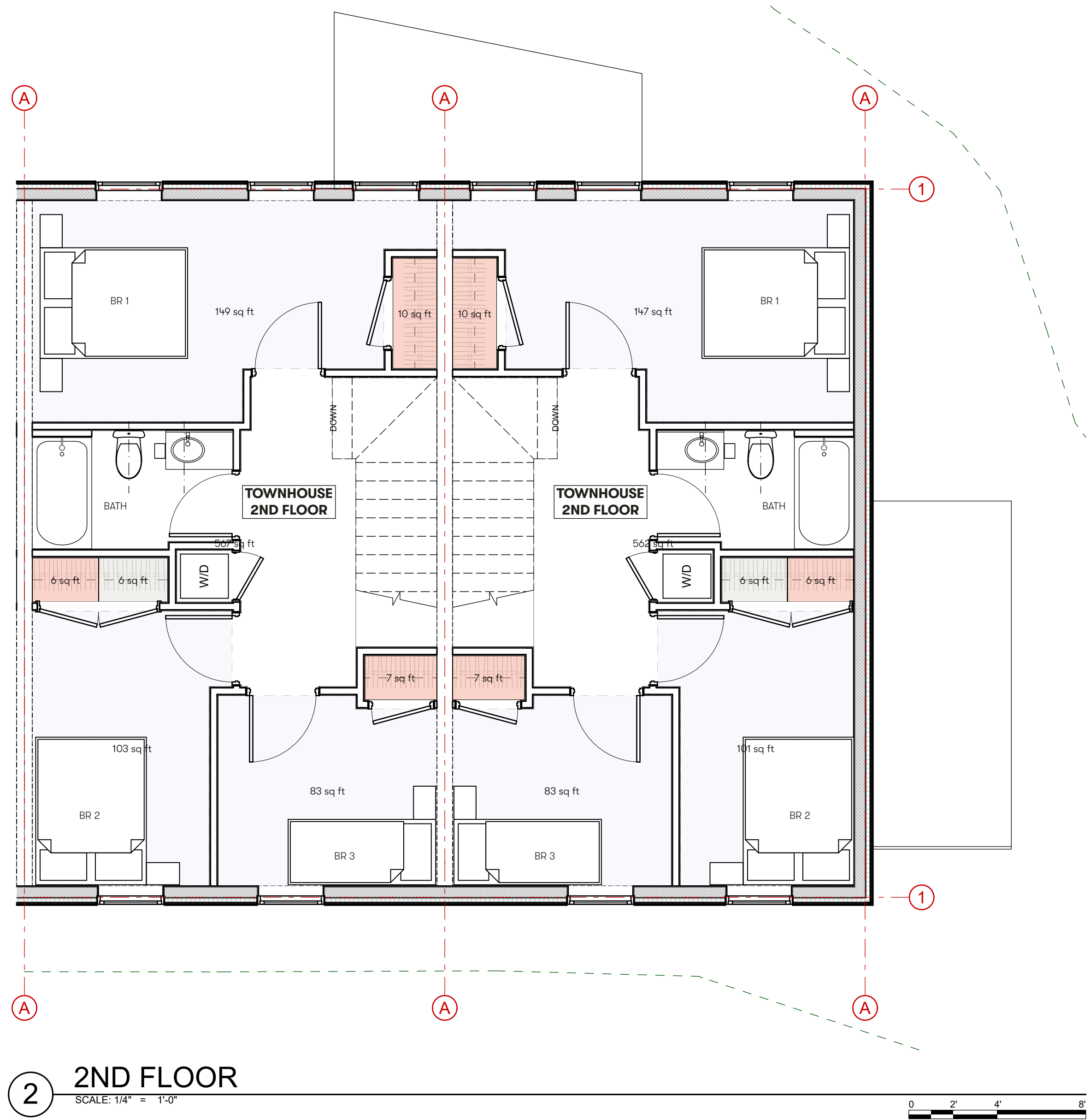
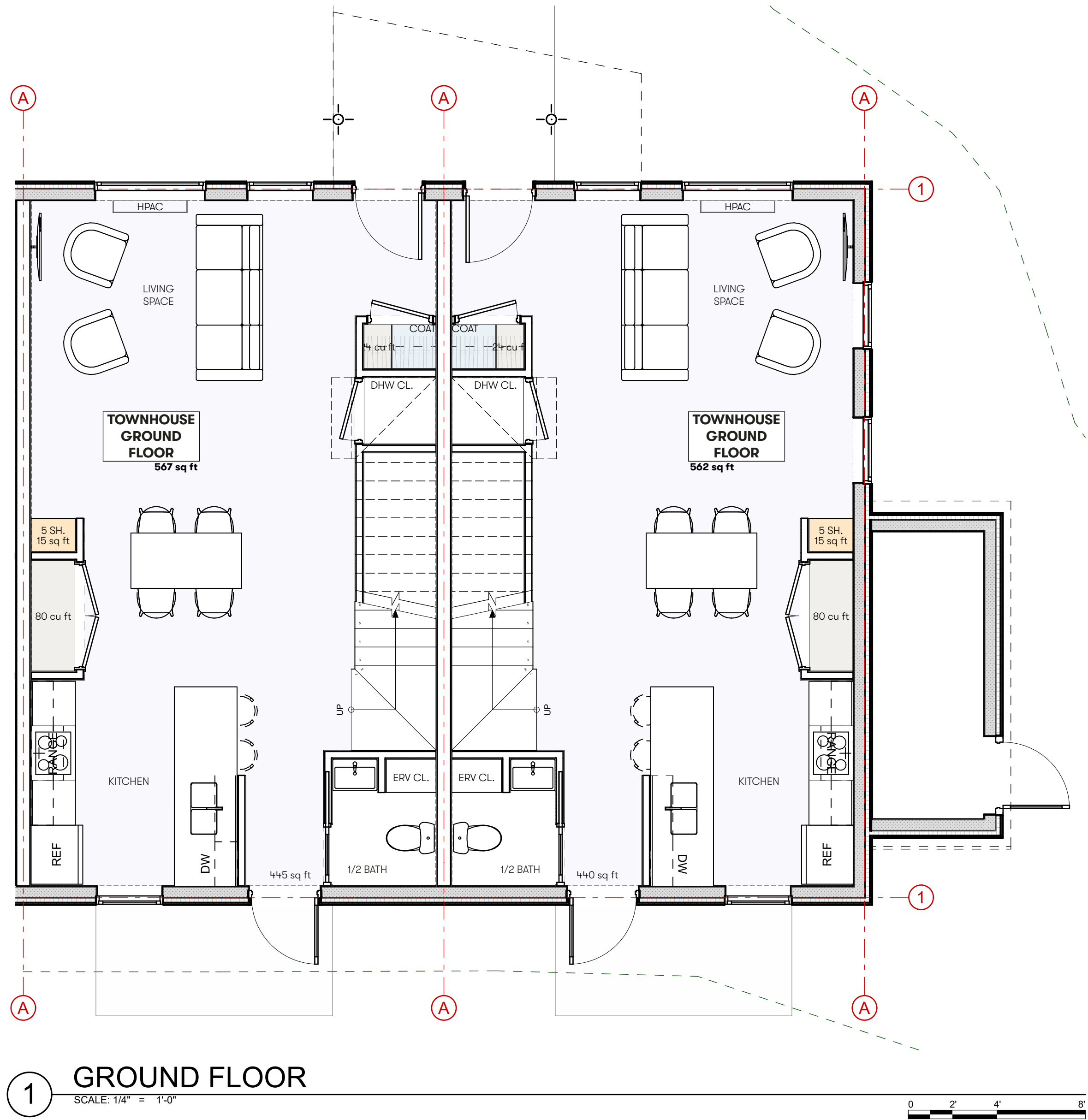


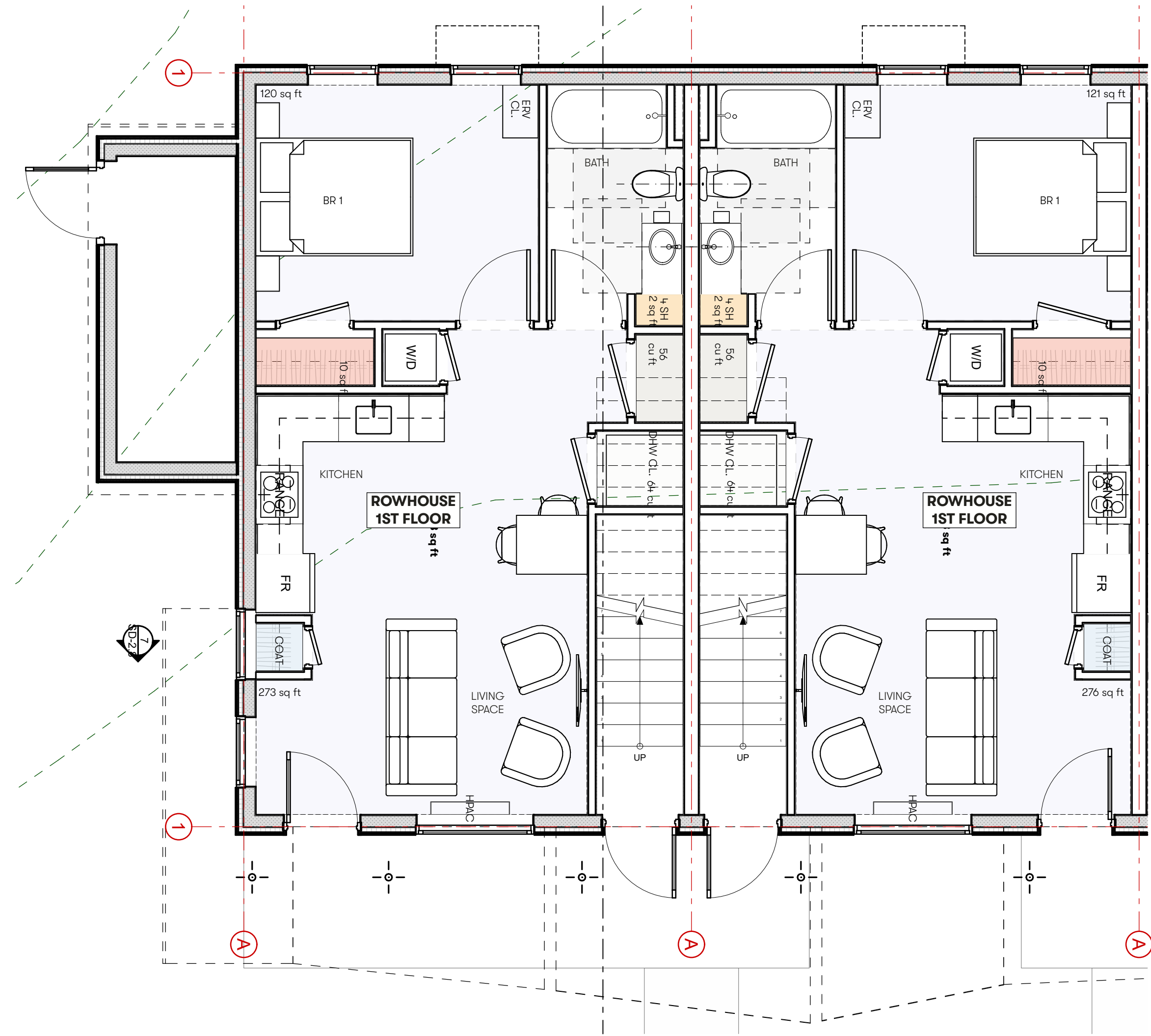


Community Flats Floor Plan: 2nd Floor

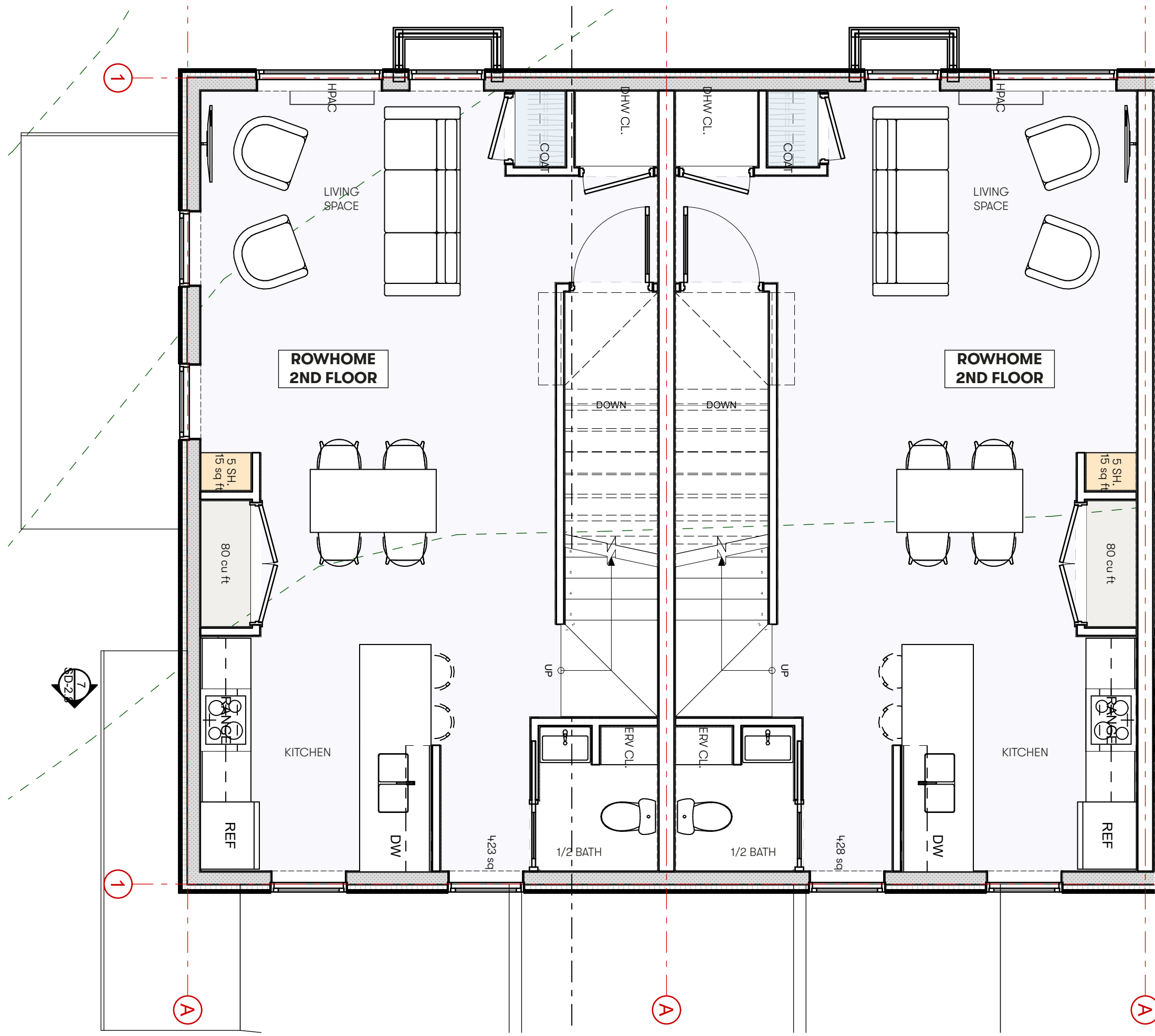


Community Flats Floor Plan: 3rd Floor

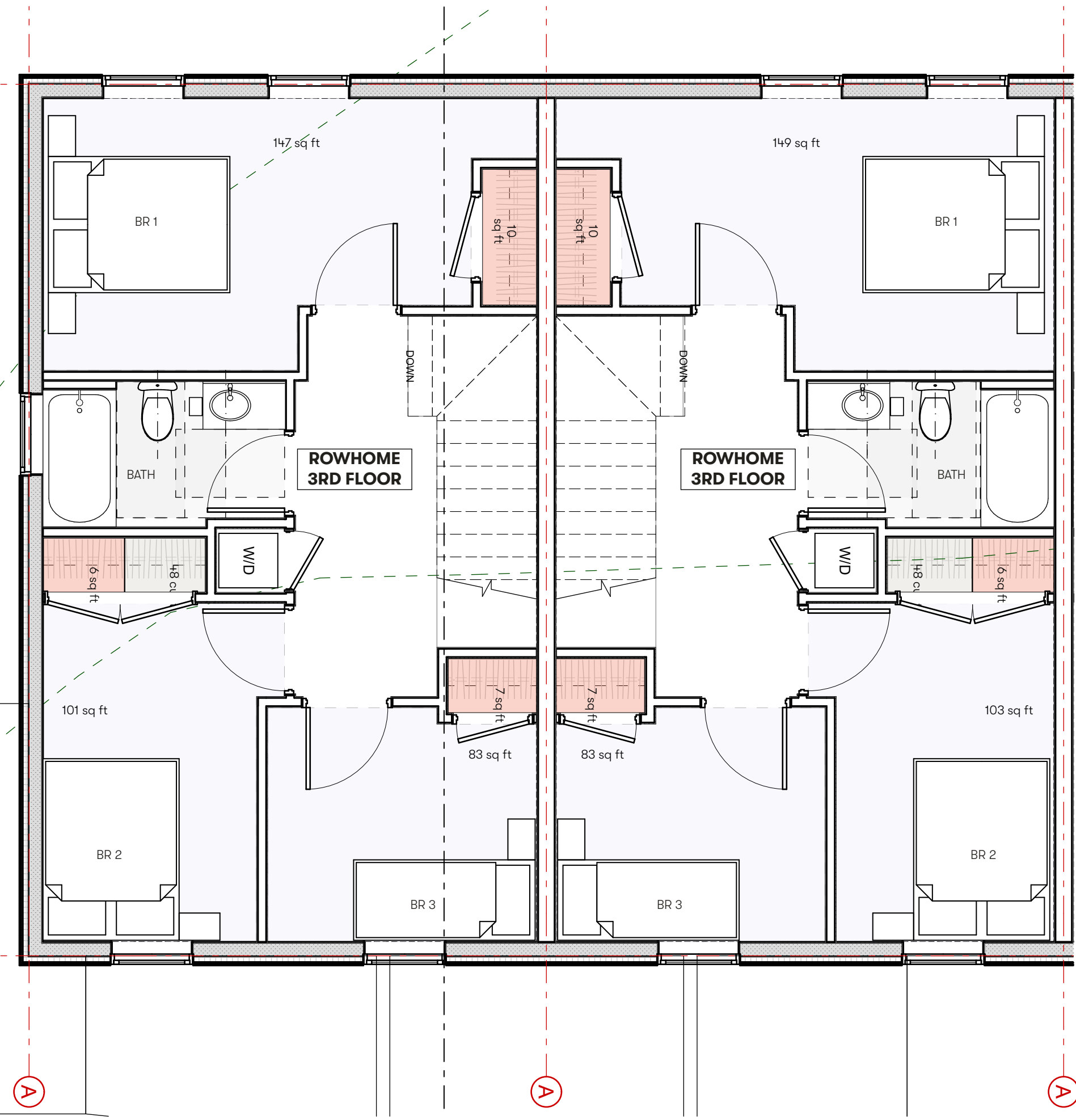




1 GROUND FLOOR
SCALE: 1/4" = 1'-0"



2 2ND FLOOR
SCALE: 1/4" = 1'-0"



3 3RD FLOOR
SCALE: 1/4" = 1'-0"



SIDING KEY

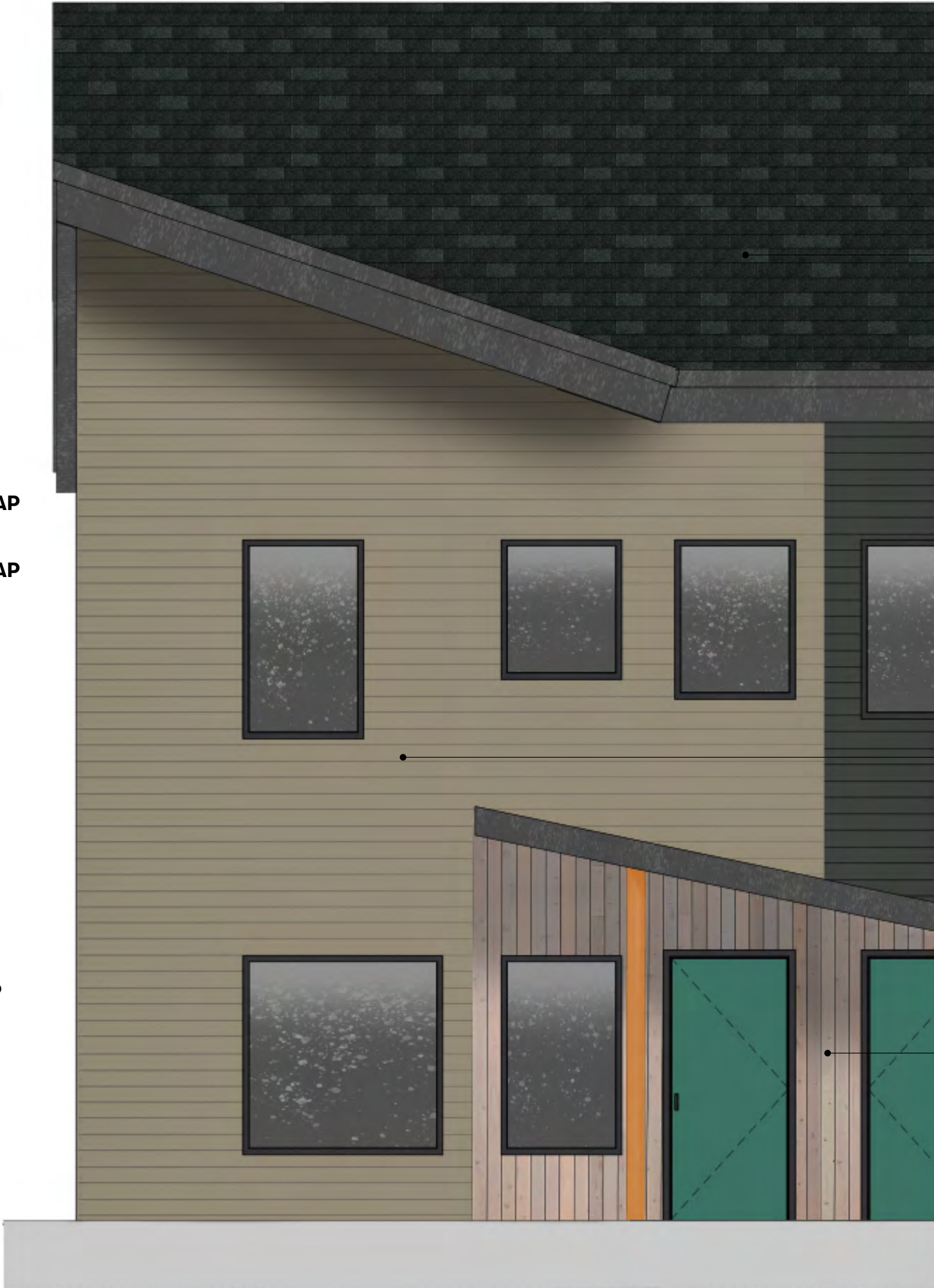
S1	CEDAR SHIPLAP SIDING	S4B	TRADITIONAL LAP SIDING 6" REVEAL (DARK GREY)
S2	REVERSE BOARD AND BATTEN SIDING	S4C	TRADITIONAL LAP SIDING 8" REVEAL (DARK GREY)
S3A	TRADITIONAL LAP SIDING 4" REVEAL (LIGHT GREY)	S5A	TRADITIONAL LAP SIDING 4" REVEAL (TAUPE)
S3B	TRADITIONAL LAP SIDING 6" REVEAL (LIGHT GREY)	S5B	TRADITIONAL LAP SIDING 6" REVEAL (TAUPE)
S3C	TRADITIONAL LAP SIDING 8" REVEAL (LIGHT GREY)	S5C	TRADITIONAL LAP SIDING 8" REVEAL (TAUPE)
S4A	TRADITIONAL LAP SIDING 4" REVEAL (DARK GREY)		

SIDING KEY

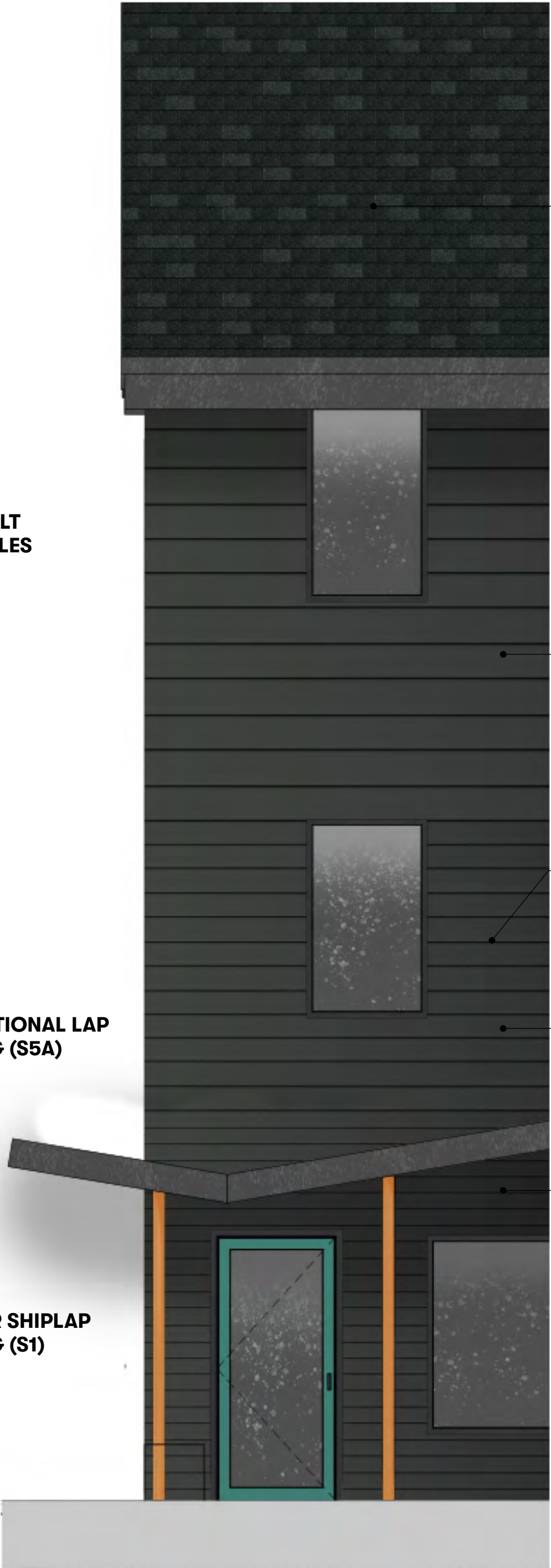
S1	CEDAR SHIPLAP SIDING	S4B	TRADITIONAL LAP SIDING 6" REVEAL (DARK GREY)
S2	REVERSE BOARD AND BATTEN SIDING	S4C	TRADITIONAL LAP SIDING 8" REVEAL (DARK GREY)
S3A	TRADITIONAL LAP SIDING 4" REVEAL (LIGHT GREY)	S5A	TRADITIONAL LAP SIDING 4" REVEAL (TAUPE)
S3B	TRADITIONAL LAP SIDING 6" REVEAL (LIGHT GREY)	S5B	TRADITIONAL LAP SIDING 6" REVEAL (TAUPE)
S3C	TRADITIONAL LAP SIDING 8" REVEAL (LIGHT GREY)	S5C	TRADITIONAL LAP SIDING 8" REVEAL (TAUPE)
S4A	TRADITIONAL LAP SIDING 4" REVEAL (DARK GREY)		



COMMUNITY FLATS



TOWNHOMES



ROWHOMES



Vertical Wood Siding Precedent



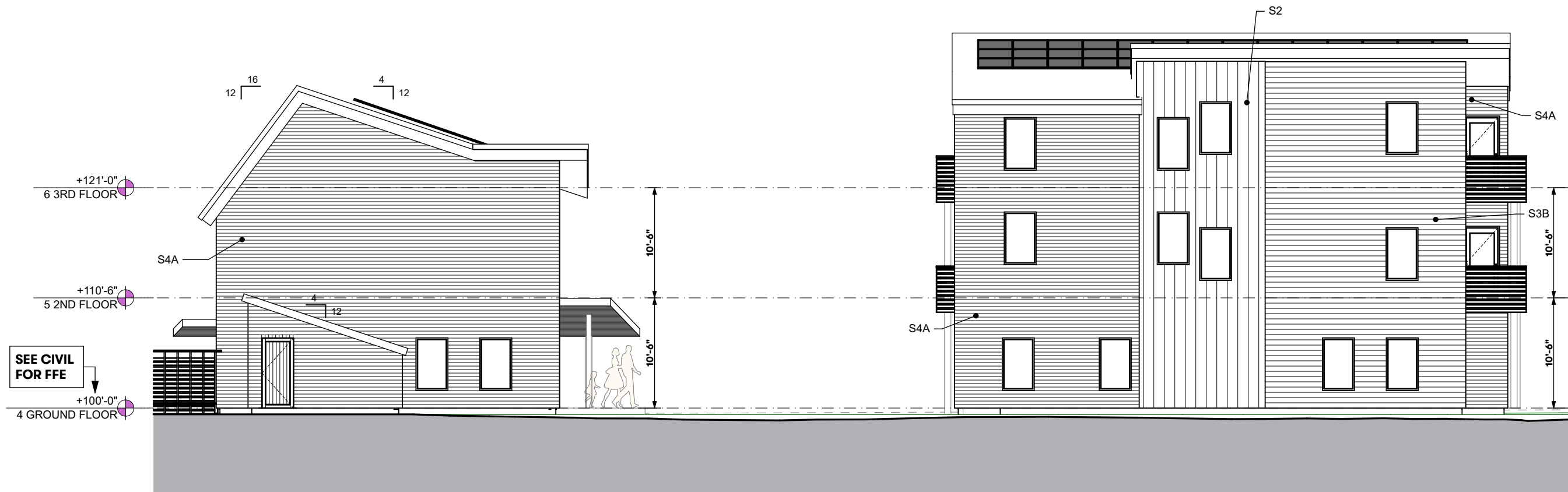
Canopy Precedent



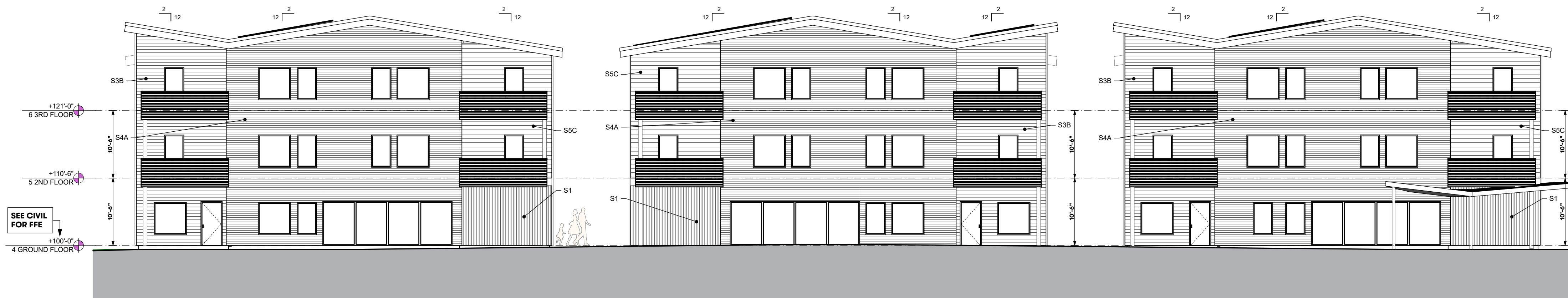
Lap Siding Precedent

Material Options

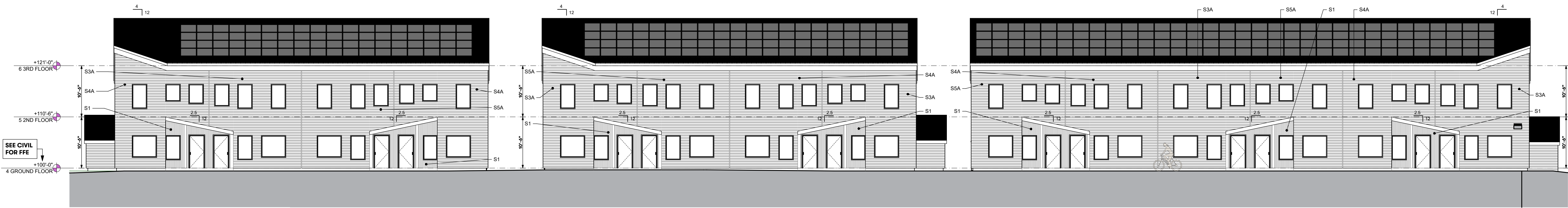
Douglass St Co-Op



TOWNHOME & COMMUNITY FLATS, SIDE ELEVATION
BUILDINGS B.2 & A.3



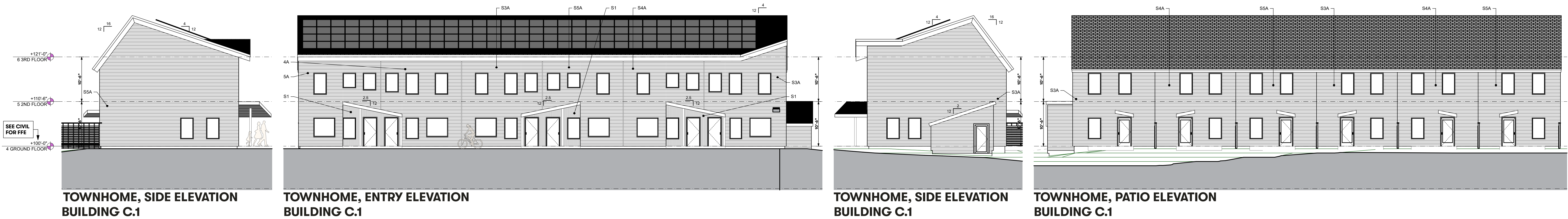
COMMUNITY FLATS, LOBBY ELEVATION
BUILDINGS A.1, A.2 & A.3



TOWNHOMES, ENTRY ELEVATION
BUILDINGS B.1, B.2 & C.1

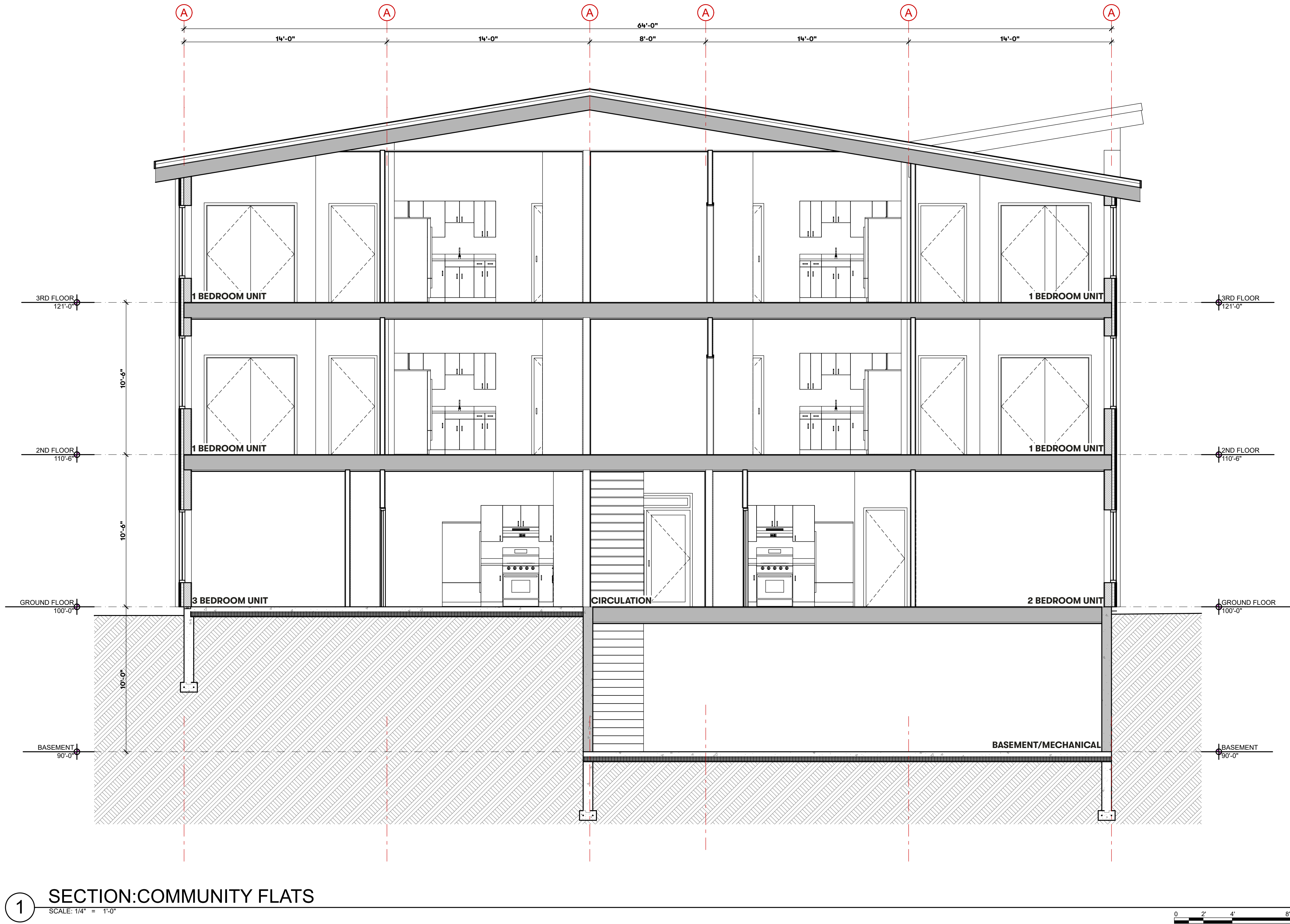
SIDING KEY

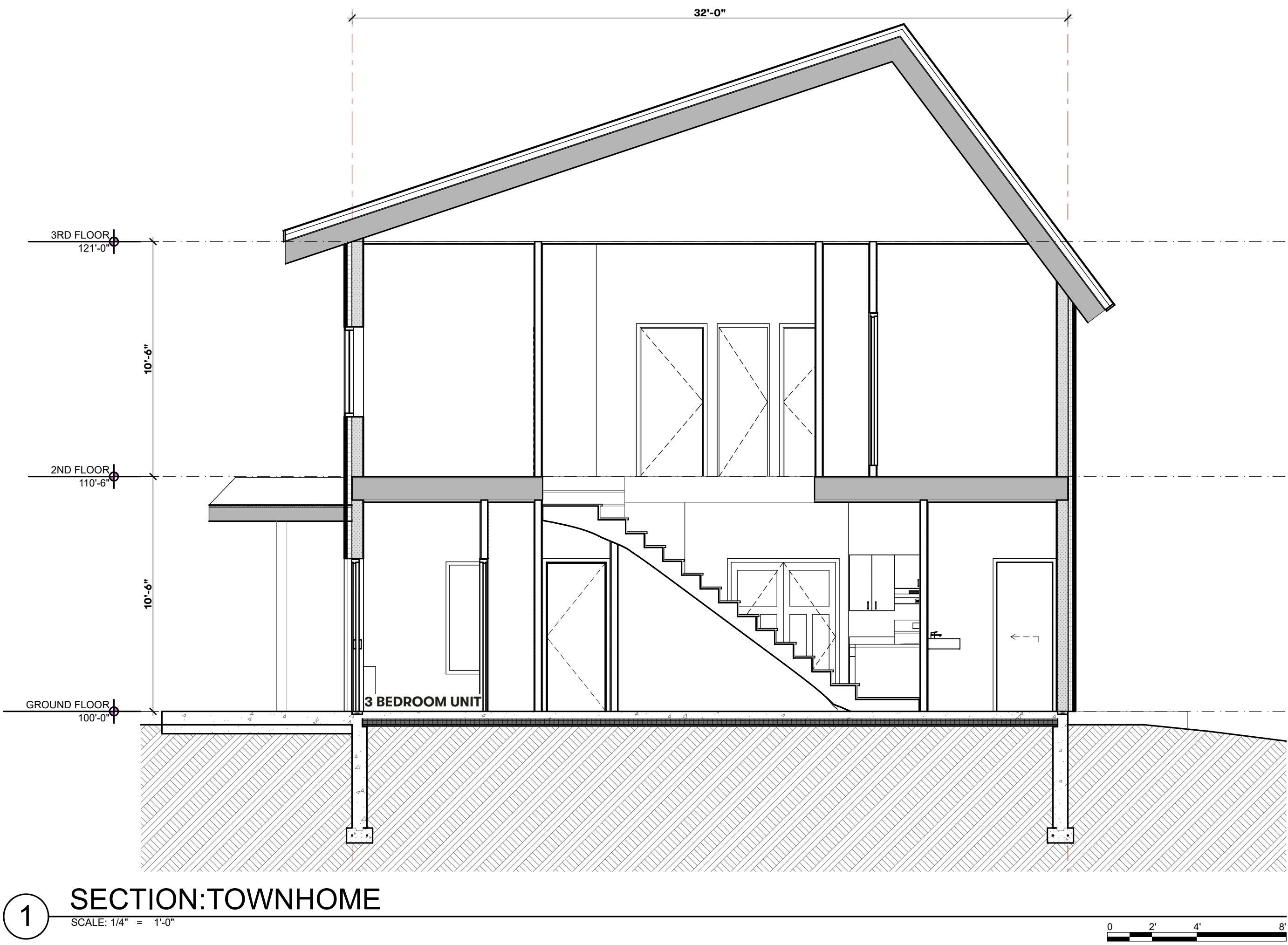
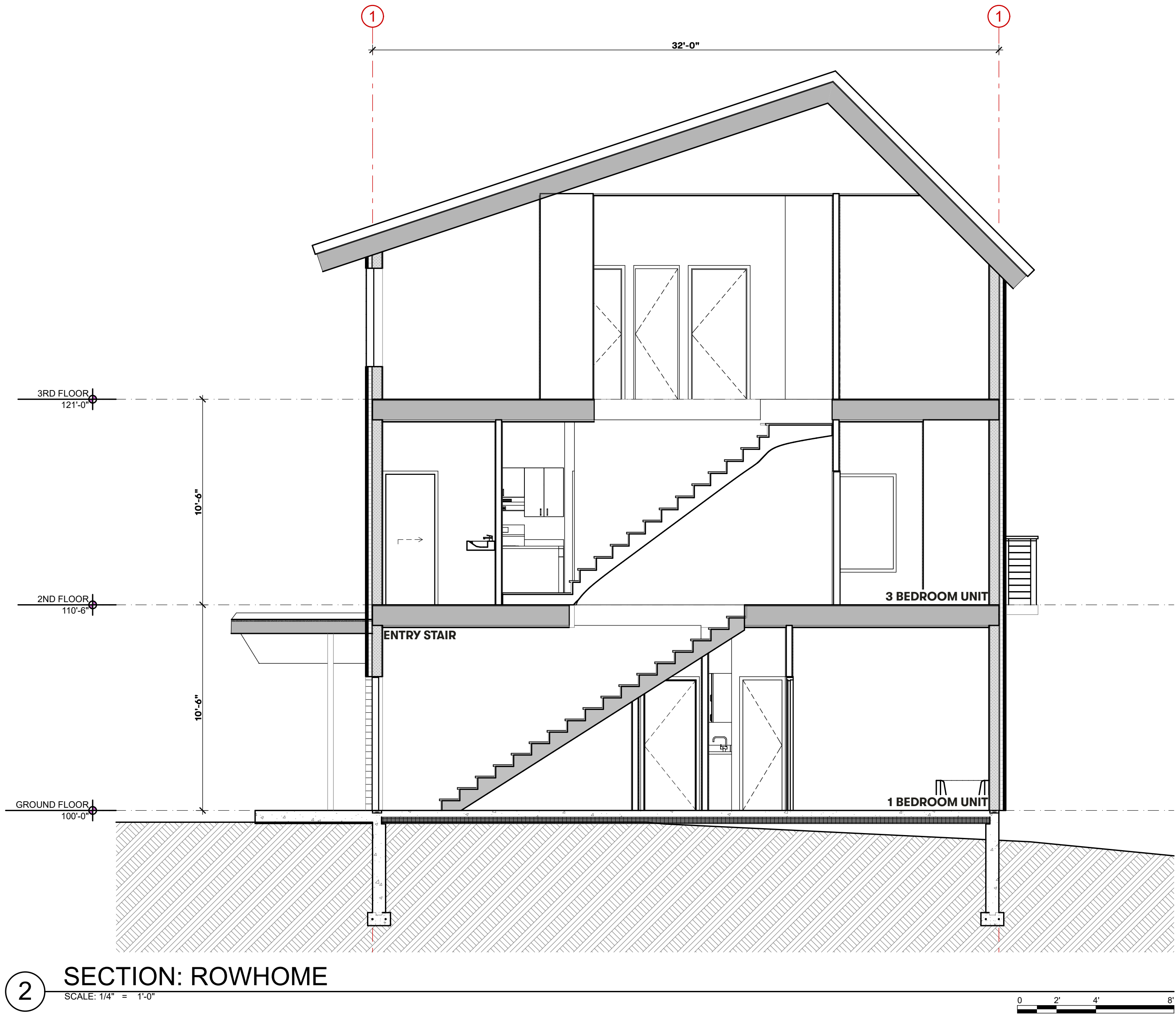
S1	CEDAR SHIPLAP SIDING	S4B	TRADITIONAL LAP SIDING 6" REVEAL (DARK GREY)
S2	REVERSE BOARD AND BATTEN SIDING	S4C	TRADITIONAL LAP SIDING 4" REVEAL (DARK GREY)
S3A	TRADITIONAL LAP SIDING 8" REVEAL (LIGHT GREY)	S5A	TRADITIONAL LAP SIDING 8" REVEAL (TAUPE)
S3B	TRADITIONAL LAP SIDING 6" REVEAL (LIGHT GREY)	S5B	TRADITIONAL LAP SIDING 6" REVEAL (TAUPE)
S3C	TRADITIONAL LAP SIDING 4" REVEAL (LIGHT GREY)	S5C	TRADITIONAL LAP SIDING 4" REVEAL (TAUPE)
S4A	TRADITIONAL LAP SIDING 8" REVEAL (DARK GREY)		



SIDING KEY

S1	CEDAR SHIPLAP SIDING	S4B	TRADITIONAL LAP SIDING 6" REVEAL (DARK GREY)
S2	REVERSE BOARD AND BATTEN SIDING	S4C	TRADITIONAL LAP SIDING 8" REVEAL (DARK GREY)
S3A	TRADITIONAL LAP SIDING 4" REVEAL (LIGHT GREY)	S5A	TRADITIONAL LAP SIDING 4" REVEAL (TAUPE)
S3B	TRADITIONAL LAP SIDING 6" REVEAL (LIGHT GREY)	S5B	TRADITIONAL LAP SIDING 6" REVEAL (TAUPE)
S3C	TRADITIONAL LAP SIDING 8" REVEAL (LIGHT GREY)	S5C	TRADITIONAL LAP SIDING 8" REVEAL (TAUPE)
S4A	TRADITIONAL LAP SIDING 4" REVEAL (DARK GREY)		





**Kaplan
Thompson
Architects**

102 Exchange Street
Portland, ME 04101
(207) 842-2888
kaplanthompson.com

PROJECT
**Douglass St
Co-Op**

Lambert St
Portland, ME 04101

NOT FOR CONSTRUCTION

PROJECT	MCP2
DATE	05/27/2021
REVISED 1	
REVISED 2	
DRAWN BY	CB
PHASE	Schematic Design

BUILDING SECTIONS
A-3.2



DOUGHERTY COMMONS
VIEW 1 - WOONERF



DOUGHERTY COMMONS
VIEW 2 - WOONERF



DOUGHERTY COMMONS
VIEW 3 - COMMON



DOUGHERTY COMMONS
VIEW 3 - COMMON



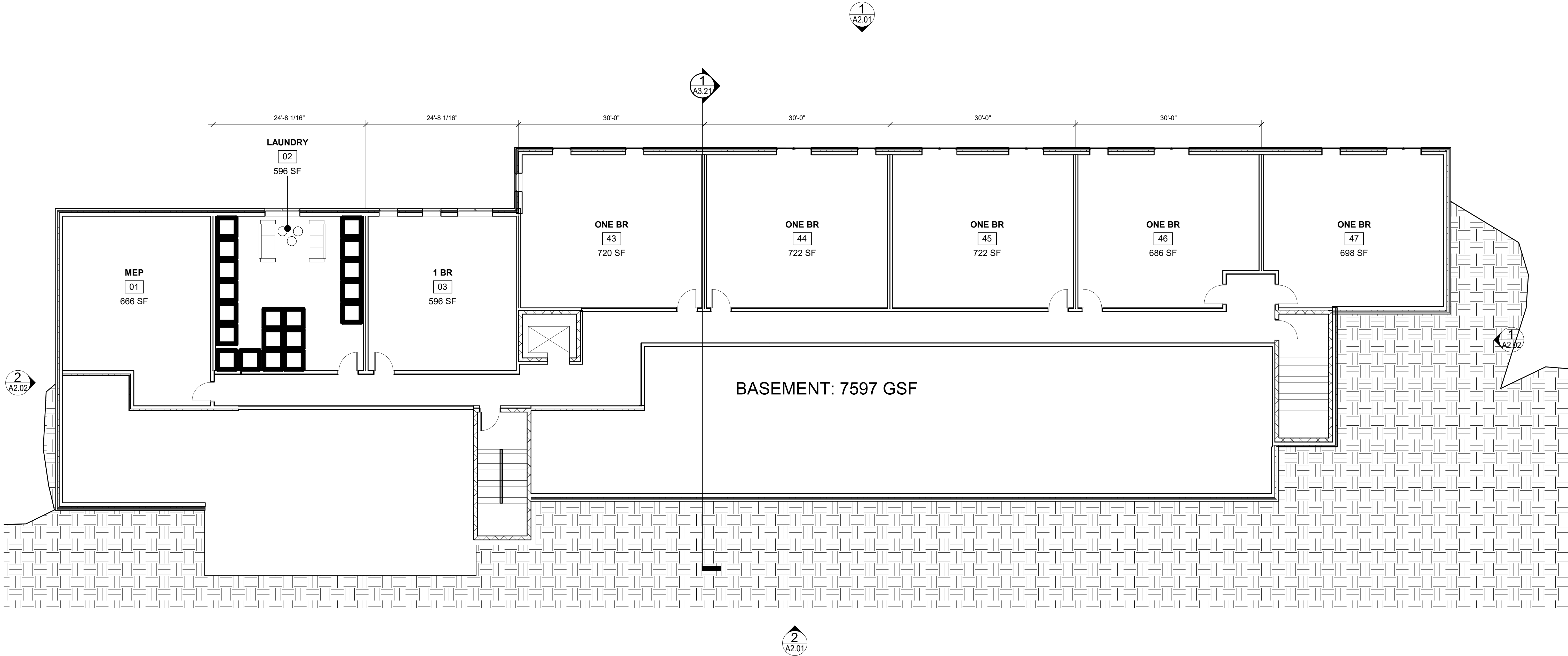
DOUGHERTY COMMONS
VIEW 4 - COMMON



DOUGHERTY COMMONS
VIEW 5 - PATHWAY

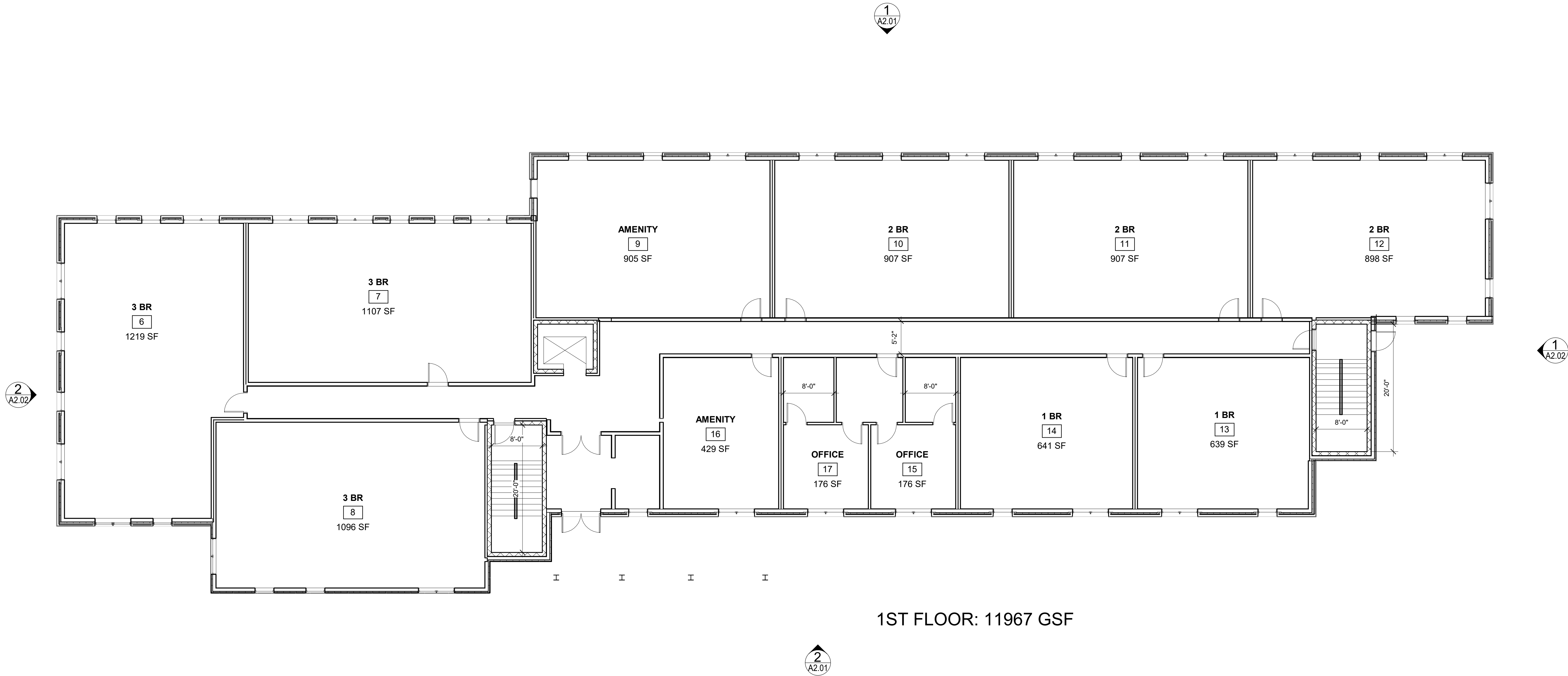


DOUGHERTY COMMONS
VIEW 6 - PATHWAY



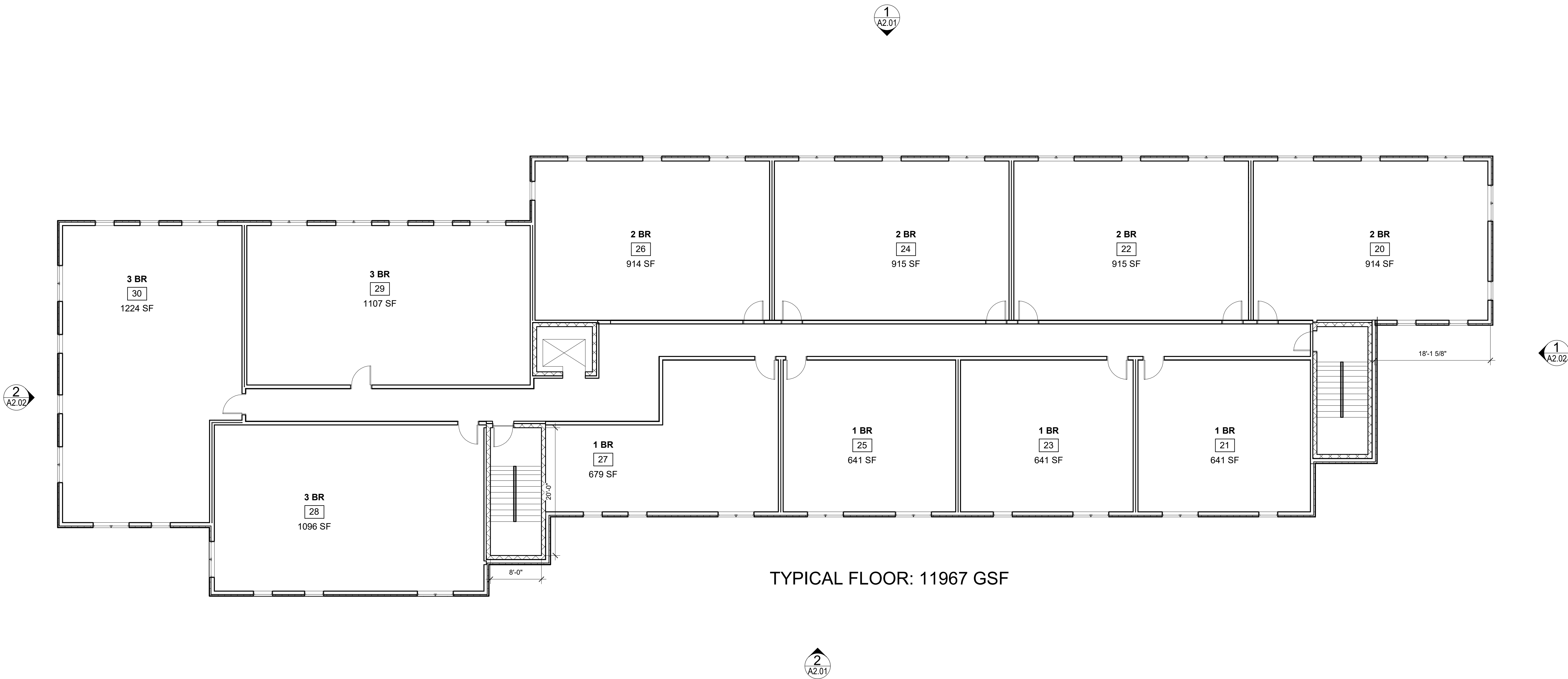
1 | BASEMENT
1/8" = 1'-0"

A1.00		Date: DEC 2021		Scale: 1/8" = 1'-0"	
		Basement			
Revisions:					
Project:		DOUGLASS STREET APARTMENTS			
Architect:		ARCHETYPE ARCHITECTS 48 Union Wharf Portland, Maine 04101 (207) 772-6022 ARCHETYPE@ARCHETYPEPA.COM			
Consultant:					
Prepared For:					
		Owner			
		Address City, State			



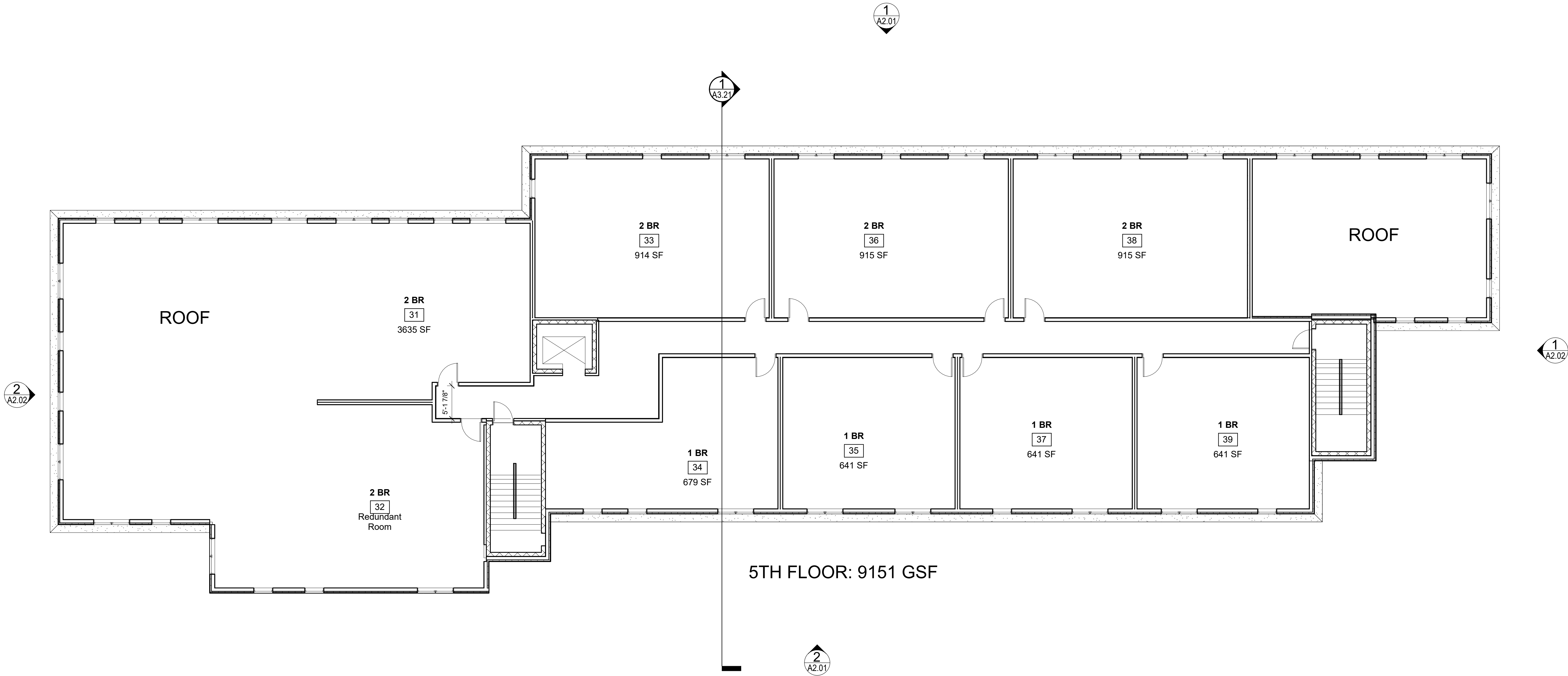
1 | 1ST FLOOR PLAN
1/8" = 1'-0"

A1.01		Date: DEC 2021	Scale: 1/8" = 1'-0"	Revisions:	Project: DOUGLASS STREET APARTMENTS	Architect: ARCHETYPE ARCHITECTS 48 Union Wharf Portland, Maine 04101 (207) 772-6022 ARCHETYPE@ARCHETYPEPA.COM	Consultant:	Prepared For:	
		First Floor						Owner	



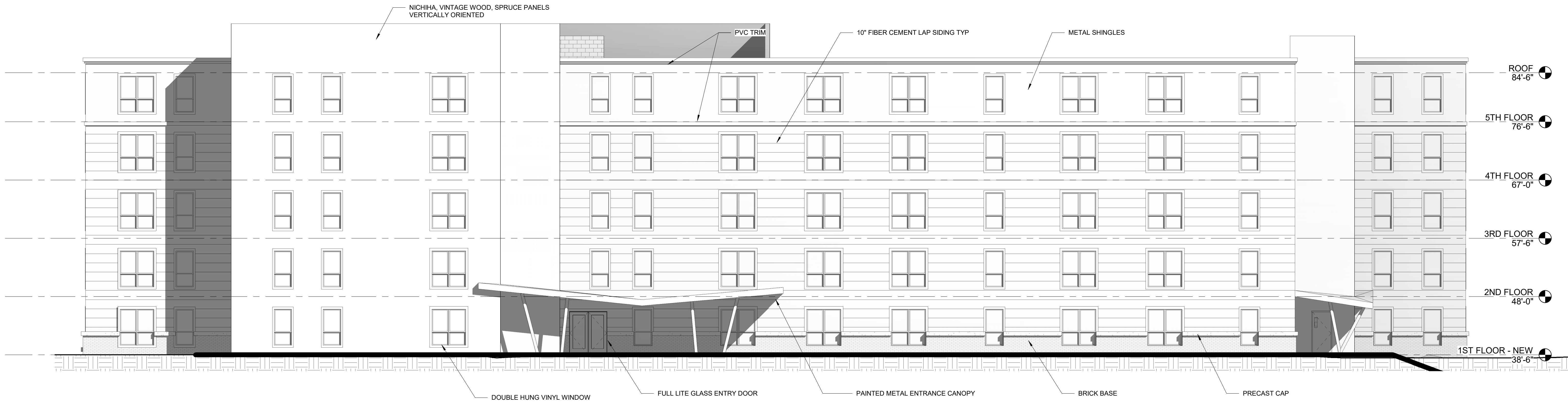
1 | FLOORS 2, 3, 4 AND 5 TYPICAL FLOOR PLAN
1/8" = 1'-0"

Prepared For:		Owner	
Consultant:		ARCHETYPE ARCHITECTS	
Architect:		DOUGLASS STREET APARTMENTS	
Project:		48 Union Wharf Portland, Maine 04101	
Revisions:		Date: DEC 2021	
Scale:		1/8" = 1'-0"	
Typical Floor Plan		A1.02	



1 | 5TH FLOOR
1/8" = 1'-0"

A1.05	Date: DEC 2021	Scale: 1/8" = 1'-0"	Revisions:	Project: DOUGLASS STREET APARTMENTS	Architect: ARCHETYPE ARCHITECTS 48 Union Wharf Portland, Maine 04101 (207) 772-6022 ARCHETYPE@ARCHETYPEPA.COM	Consultant:	Prepared For: Owner	Address City, State
	Fifth Floor Plan							



2 | Front Elevation
1/8" = 1'-0"



1 | Rear Elevation
1/8" = 1'-0"

Prepared For:	Owner	
	Address City, State	
Consultant:	Architect:	
	ARCHETYPE ARCHITECTS 48 Union Wharf Portland, Maine 04101 (207) 772-6022 ARCHETYPE@ARCHETYPEPA.COM	
Project:	DOUGLASS STREET APARTMENTS	
	Revisions:	
Date:	20 APRIL, 2022	Scale: 1/8" = 1'-0"
Building Elevations		
A2.01		



1 | Right Elevation
1/8" = 1'-0"



2 | Left Elevation
1/8" = 1'-0"

Date: 20 APRIL, 2022		Scale: 1/8" = 1'-0"	Building Elevations		Revisions:	Project: DOUGLASS STREET APARTMENTS	Architect: ARCHETYPE ARCHITECTS 48 Union Wharf Portland, Maine 04101 (207) 772-6022 ARCHETYPE@ARCHETYPEPA.COM	Consultant:	Prepared For: Owner	
A2.02										













1. FOR INFORMATION REGARDING PROPOSED GROUND LEVEL LAYOUT, REFER TO SITE PLAN, SHEET C-10, MOST RECENT VERSION.
2. FOR INFORMATION REGARDING PROPOSED UTILITIES, REFER TO THE UTILITY PLAN, SHEET C-20, MOST RECENT VERSION.
3. FOR INFORMATION REGARDING PROPOSED GRADING AND STORMWATER, REFER TO THE GRADING & DRAINAGE PLAN, SHEET C-30, MOST RECENT VERSION.
4. UNIT TABULATION PROVIDED BY ARCHETYPE ARCHITECTS; REFER TO ARCHITECTURAL PLANS FOR FLOOR PLANS AND BUILDING HEIGHTS.
5. TOTAL SITE AREA INCLUDES 3.34 ACRES (145,490 S.F.), SITE BOUNDARIES PER BOUNDARY SURVEY & TOPOGRAPHICAL MAP WITH EXISTING LOT LINES PROVIDED BY OWEN HASKELL, INC. ON 10/1/2017 BOUNDARY SURVEY, DATED JANUARY 2021.
6. AS OF 1/7/2021, THE SITE IS ENTIRELY COVERED BY THE RS ZONE PER THE CITY OF PORTLAND'S GIS WEBSITE.
7. LOCUS PARCEL IS SHOWN ON THE CITY OF PORTLAND ASSESSOR'S MAP CHART, BOOK 78, LOTS: C-2, B-7. THE MENTIONED LOTS HAVE BEEN RECENTLY COMBINED INTO ONE PARCEL.
8. PROPOSED DEVELOPMENT REMAINS OUTSIDE THE 100-YR FEMA FLOODPLAIN PER THE NATIONAL FLOOD INSURANCE PROGRAM, FLOOD INSURANCE RATE MAP COMMUNITY-PANEL NUMBER 230051 0013 B, INDEX DATED 7/17/1986.
9. THIS SHEET IS THE SUBDIVISION PLAN FOR THE CREATION OF UP TO ONE HUNDRED AND TWENTY (120) DWELLING UNITS IN THE PLANNED RESIDENTIAL UNIT DEVELOPMENT STANDARD.
10. ANY PROPERTY MARKED WITHIN A PEDESTRIAN OR VEHICULAR WAY SHALL BE FLUSH OR BELOW GRADE AT THE DISCRETION OF THE PROFESSIONAL LAND SURVEYOR AND/OR ENGINEER.
11. THE OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND MANAGEMENT OF THE ACCESS DRIVEWAY INCLUDING ALL DRIVEWAYS, SIDEWALKS, STORMWATER DEVICES, SITE LIGHTING, TRASH REMOVAL, RETAINING WALLS, AND SNOW REMOVAL.
12. THE OWNER SHALL COMPLY WITH THE CITY OF PORTLAND'S POST-CONSTRUCTION STORMWATER MANAGEMENT AGREEMENT, CHAPTER 302 STORMWATER INCLUDING ARTICLE III, POST-CONSTRUCTION STORMWATER MANAGEMENT AGREEMENT, WHICH SPECIFIES ANNUAL INSPECTIONS AND REPORTING REQUIREMENTS AT A MINIMUM. IN ADDITION, THE OWNER SHALL BE RESPONSIBLE FOR COMPLYING WITH THE CONDITIONS OF THE SUBMITTED STORMWATER MANAGEMENT AGREEMENT PROVIDED BY THE CITY OF PORTLAND'S STORMWATER DIVISION.
13. THE OWNER MUST COMPLY TO THE FOLLOWING AS APPROVED BY THE CITY:
 - 13.1. POST-CONSTRUCTION STORMWATER MANAGEMENT AGREEMENT:

WAIVERS & CONDITIONS OF APPROVAL:

[illegible]

RECEIVED: _____

RECORDED IN _____

ATTEST: _____

REGISTRAR

UNIT TABULATION		BLDG D (TBD)	464 SF	BLDG A (TBD)	508 SF	BLDG B (TBD)	1019 SF
UNIT NUMBER	SIZE, (SF)	BLDG D (TBD)	1019 SF	BLDG A (TBD)	697 SF	BLDG B (TBD)	1019 SF
BLDG 1 (TBD)	12,000 SF	BLDG D (TBD)	464 SF	BLDG A (TBD)	967 SF	BLDG B (TBD)	1019 SF
BLDG D (TBD)	464 SF	BLDG D (TBD)	1019 SF	BLDG A (TBD)	519 SF	BLDG B (TBD)	1019 SF
BLDG D (TBD)	1019 SF	BLDG D (TBD)	464 SF	BLDG A (TBD)	519 SF	BLDG B (TBD)	1019 SF
BLDG D (TBD)	464 SF	BLDG D (TBD)	1019 SF	BLDG A (TBD)	772 SF	BLDG B (TBD)	1019 SF
BLDG D (TBD)	1019 SF	BLDG D (TBD)	464 SF	BLDG A (TBD)	772 SF	BLDG C (TBD)	1019 SF
BLDG D (TBD)	464 SF	BLDG D (TBD)	1019 SF	BLDG A (TBD)	508 SF	BLDG C (TBD)	1019 SF
BLDG D (TBD)	1019 SF	BLDG D (TBD)	464 SF	BLDG A (TBD)	697 SF	BLDG C (TBD)	1019 SF
BLDG D (TBD)	464 SF	BLDG D (TBD)	1019 SF	BLDG A (TBD)	967 SF	BLDG C (TBD)	1019 SF
BLDG D (TBD)	1019 SF	BLDG A (TBD)	508 SF	BLDG A (TBD)	519 SF	BLDG C (TBD)	1019 SF
BLDG D (TBD)	464 SF	BLDG A (TBD)	697 SF	BLDG A (TBD)	519 SF	1 UNIT AREA MEASURED FROM OUTSIDE OF EXTERIOR WALLS TO THE CENTER OF SHARED WALLS	
BLDG D (TBD)	1019 SF	BLDG A (TBD)	967 SF	BLDG A (TBD)	772 SF		
BLDG D (TBD)	464 SF	BLDG A (TBD)	519 SF	BLDG A (TBD)	772 SF		
BLDG D (TBD)	1019 SF	BLDG B (TBD)	519 SF	BLDG B (TBD)	1019 SF		
BLDG D (TBD)	464 SF	BLDG B (TBD)	772 SF	BLDG B (TBD)	1019 SF		
BLDG D (TBD)	1019 SF	BLDG A (TBD)	772 SF				

PROPERTY LINE	
SETBACK	
WALKING TRAIL	
PROPERTY MARKER (FOUND)	
PROPERTY MARKER (TO BE SET)	
PAVEMENT	
GRASS PAVERS	
WOONERF	

ALL PROPOSED EASEMENTS TO BE REVIEWED BY OWEN HASKELL, INC. AND
RECORDED IN CCRD. ALL EXISTING EASEMENTS ARE TO REMAIN.

1. ANODE BED EASEMENT DOUGLASS STREET AT DOUGHERTY FIELD, CITY PLAN 882/53.

PLAN REFERENCES:

1. BOUNDARY WORKSHEET OF DOUGHERTY FIELD DOUGLASS STREET, ST. JAMES ST. AND INTERSTATE 295, BY THE CITY OF PORTLAND PUBLIC WORKS DEPARTMENT ENGINEERING SECTION DATED MARCH 2006, CITY PLAN # 99.
2. PLAN OF PORTLAND IN PORTLAND, MAINE BELONGING TO THE J.B. BROWN & SONS CORP & HEIRS OF ST JOHN SMITH BY E.C. JORDAN & CO., CITY PLAN 463/5.
3. PLAN OF LAND CONGRESS AND DOUGLASS STREETS OWNED BY CITY OF PORTLAND PARK COMMISSION BY CHANDLER H. BARRON C.E. DATED NOVEMBER 1946, CITY PLAN # 99/8.
4. ANODE BATTERY DOUGLASS STREET AT DOUGHERTY FIELD BY CITY OF PORTLAND PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION DATED 09/30/2016, CITY PLAN 882/53.
5. MAINE STATE HIGHWAY COMMISSION RIGHT OF WAY MAP STATE HIGHWAY "295" PORTLAND CUMBERLAND COUNTY FEDERAL AID PROJECT NO. I-295-3(24)295 DATED MAY 1967.
6. BOUNDARY SURVEY AT 43 & 91 DOUGLASS STREET, PORTLAND, MAINE MADE FOR THE SZANTON COMPANY MARCH 4, 2021, REVISED APRIL 5, 2021 BY OWEN HASKELL, INC.
7. CITY OF PORTLAND DEPARTMENT OF PUBLIC WORKS CONTRACT DRAWINGS DOUGHERTY FIELD RECONSTRUCTION PHASE 1 - WEST SCHOOL TO JAMES STREET APPROVED 2001, ON FILE AT THE CITY OF PORTLAND PUBLIC WORKS DEPARTMENT AS PLAN NUMBER 970/13.

SPACE AND BULK STANDARDS		
R5A ZONE	REQUIRED	PROVIDED
MINIMUM LOT SIZE	2.00 AC	3.35 AC
MINIMUM STREET FRONTAGE	50'	60'
FRONT YARD SETBACK	10'	15"
SIDE YARD SETBACK	10'	10.25'
REAR YARD SETBACK	10'	10.5'
MAXIMUM BUILDING HEIGHT	55'	53'
MAX. # OF DWELLING UNITS ON PROPERTY	182	120
COMMON RECREATION OPEN SPACE	200 SF / D.U.	346 SF / D.U.



VICINITY MAP
SCALE: 1"=1000'

DOUGLASS COMMONS, LLC.
10 FREE ST, 2ND FLOOR
PORTLAND, ME
CONTACT: CARL SZANTON

CIVIL/SITE
ENGINEER:
ACORN ENGINEERING, INC.
65 HANOVER STREET
PORTLAND, MAINE
CONTACT: SAM LABEL, P.E.

OWEN HASKELL, INC.
390 U.S. ROUTE 1
FALMOUTH, MAINE
CONTACT: JOHN SCHWANDA, P.L.S.

THIS SURVEY CONFORMS TO THE CURRENT STANDARDS OF PRACTICE SET FORTH BY THE MAINE STATE BOARD OF LICENSURE FOR LAND SURVEYORS.

FOR BOUNDARY
AND EXISTING
CONDITIONS ONLY

RANDY LOUBIER
OWEN HASKELL, INC.

DATE:

FOR RECORDING
NOT FOR CONSTRUCTION

[illegible]

SUBDIVISION PLAT - DOUGHERTY COMMONS

DOUGHERTY COMMONS

OWNER OF RECORD: DOUGLASS COMMONS, LLC
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

DRAWING NAME:

PROJECT NAME:
ADDRESS:

CLIENT/OWNER COMMENTS:

DOUGLAS COMMISSION, LEO
10 FREE STREET, SECOND FLOOR, PORTLAND ME 04101

FILE:	1154_CIVIL
JN:	1154
SCALE:	AS NOTED
DESIGNED BY:	SJL
DRAWN BY:	AWG
CHECKED BY:	SJL/WHs



DRAWING NO.

PLAT



OPEN SPACE EXHIBIT		
LANDSCAPE		29,225 SF
HARDSCAPE		7,100 SF
TOTAL		36,325 SF
REQUIRED		24,000 SF

ISSUED FOR	BY DATE
SITE PLAN REVIEW	SJL 1/11/22
COMMENT RESPONSE	SJL 4/27/22

DRAWING NAME:	OVERALL PLAN OPEN SPACE AREA EXHIBIT
PROJECT NAME:	DOUGHERTY COMMONS
CLIENT:	DOUGLASS COMMONS, LLC 10 FREE STREET, PORTLAND, ME 04101



ACORN
ENGINEERING, INC.

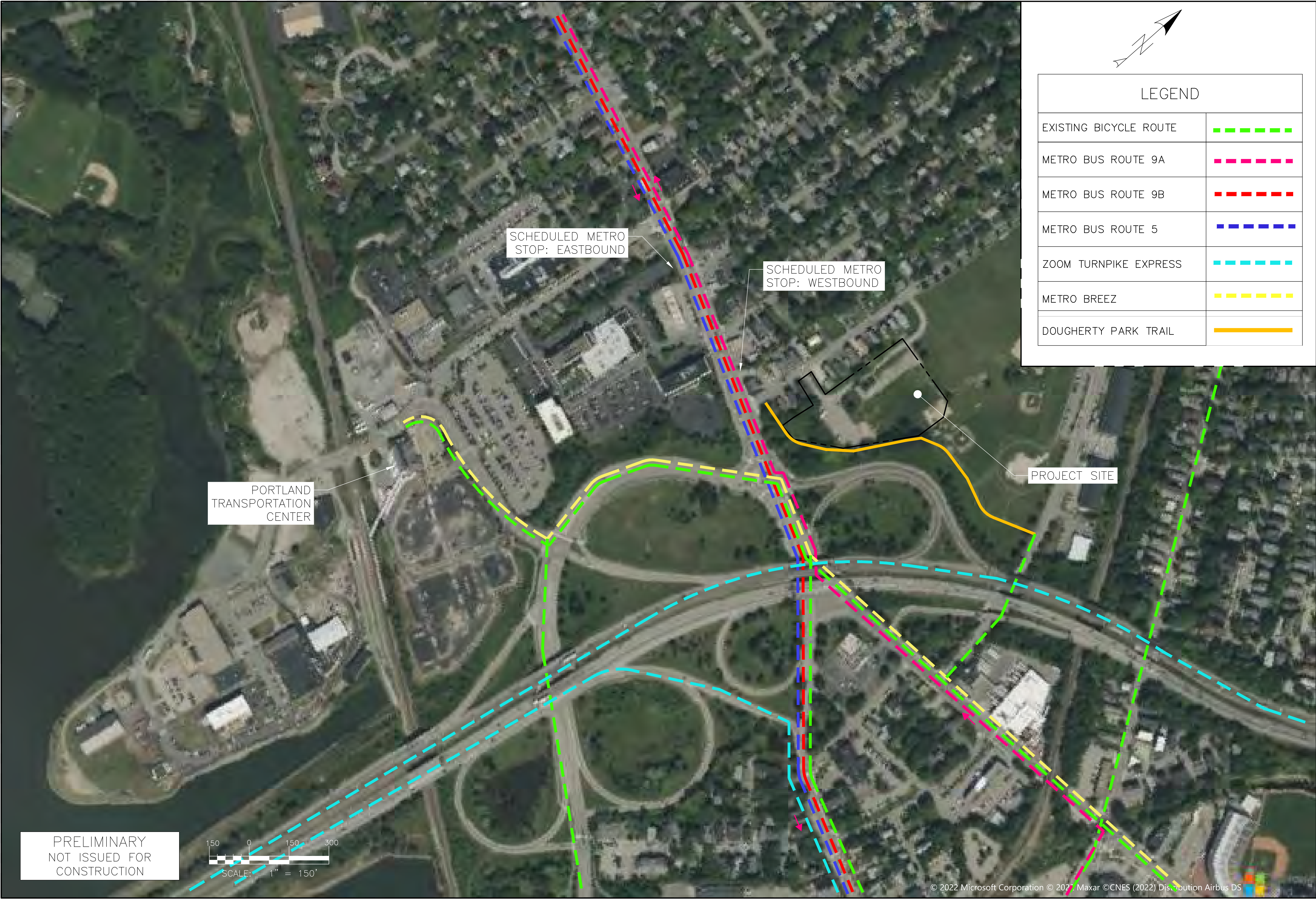
65 HANOVER STREET
PORTLAND, MAINE 04104
(207) 775-2655

FILE:	1154_CIVIL
JN:	1154
SCALE:	1' : 50'
DESIGN BY:	SJL
DRAWN BY:	AWG
CHECKED BY:	WHS

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DRAWING NO.
EX.

NOT FOR CONSTRUCTION



ISSUED FOR:

BY: DATE

COMMENT RESPONSE:

WHS 7/29/22

DRAWING NAME: MULTIMODAL TRANSPORTATION EXHIBIT

PROJECT NAME: DOUGHERTY COMMONS

CLIENT: DOUGLASS COMMONS, LLC. PORTLAND, ME

ACORN ENGINEERING, INC.

65 HANOVER ST. PORTLAND MAINE 04101

(207) 775-2655

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JN: 1154

SCALE: AS NOTED

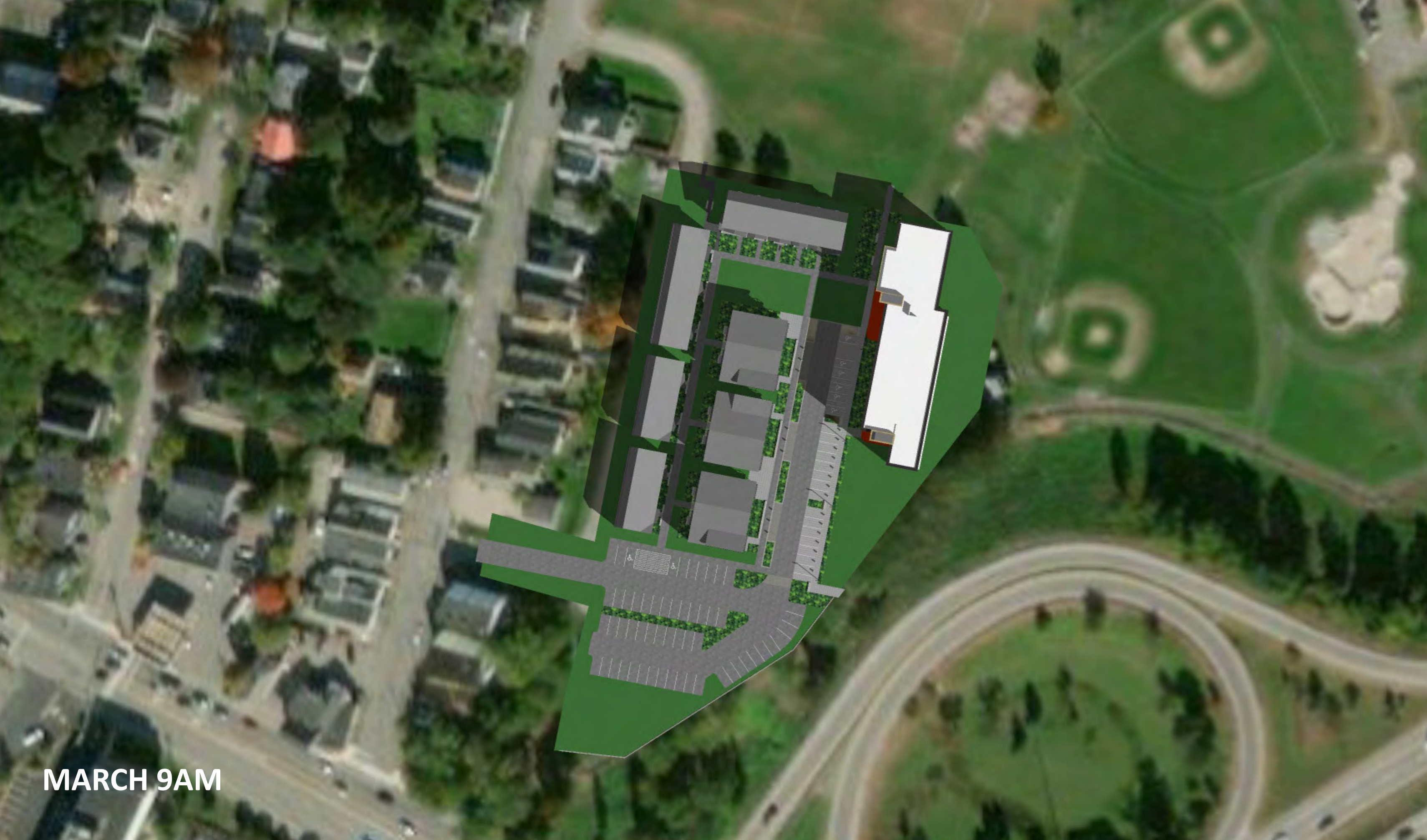
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DRAWN BY: SJL

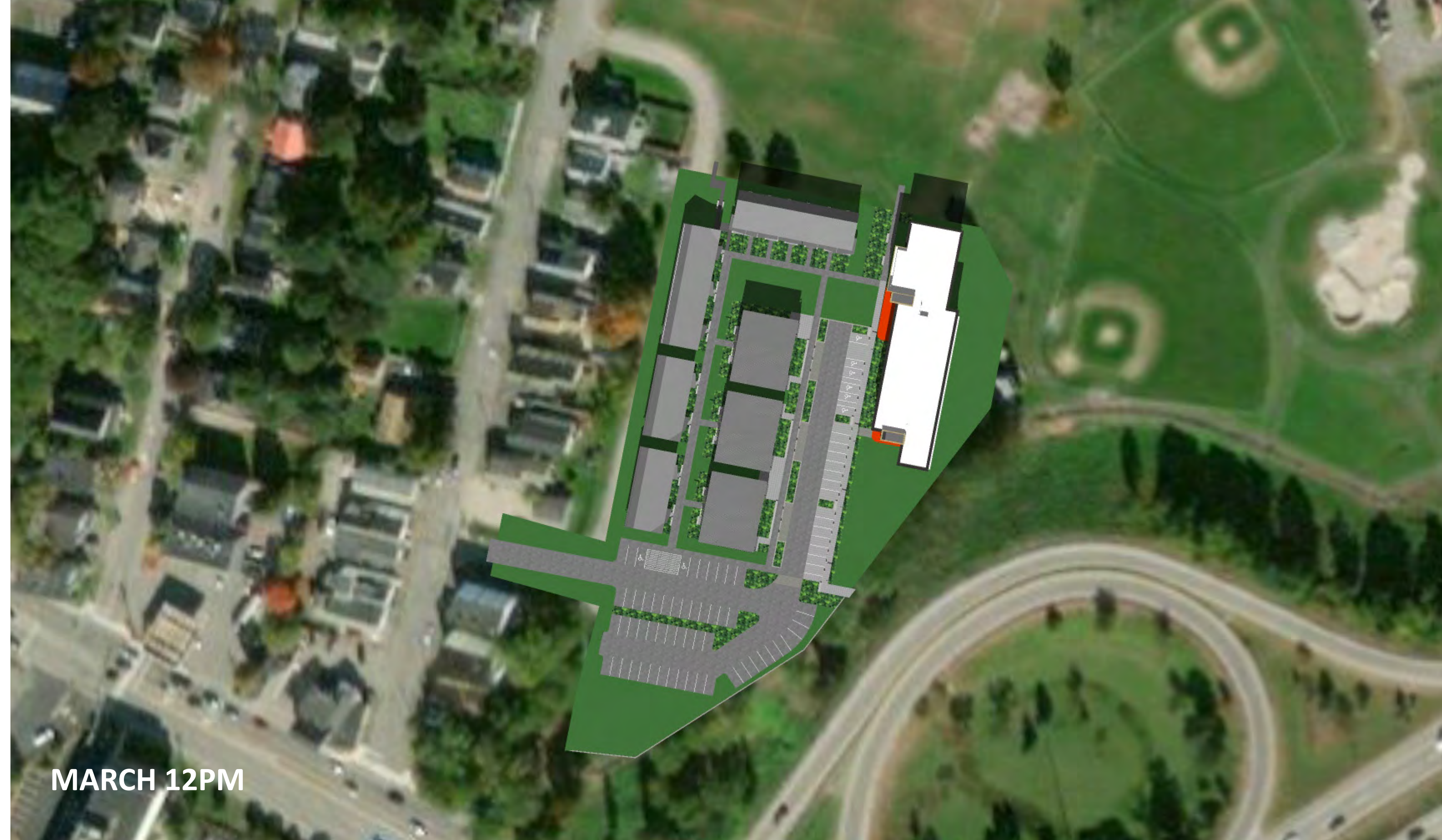
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DRAWING NO.

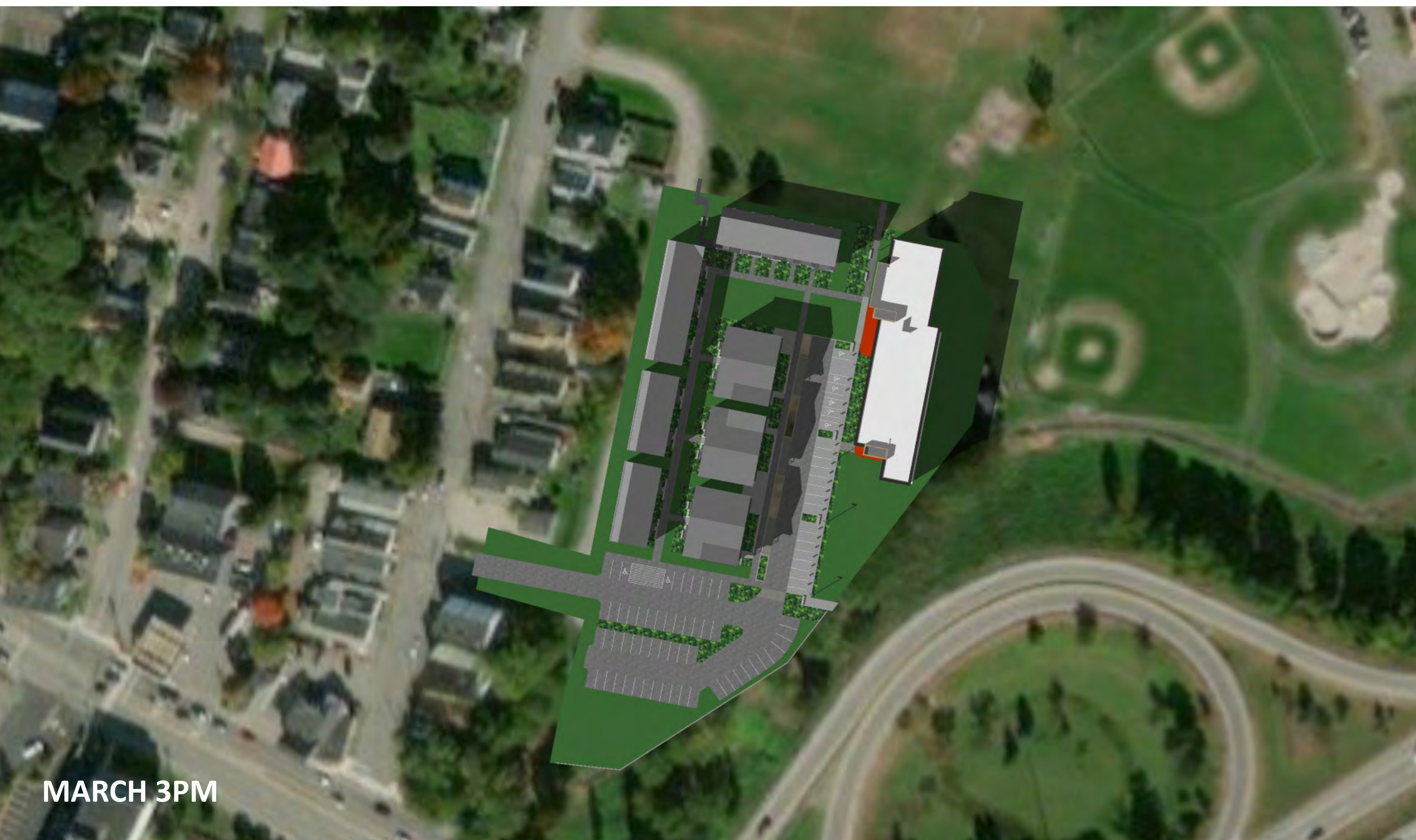
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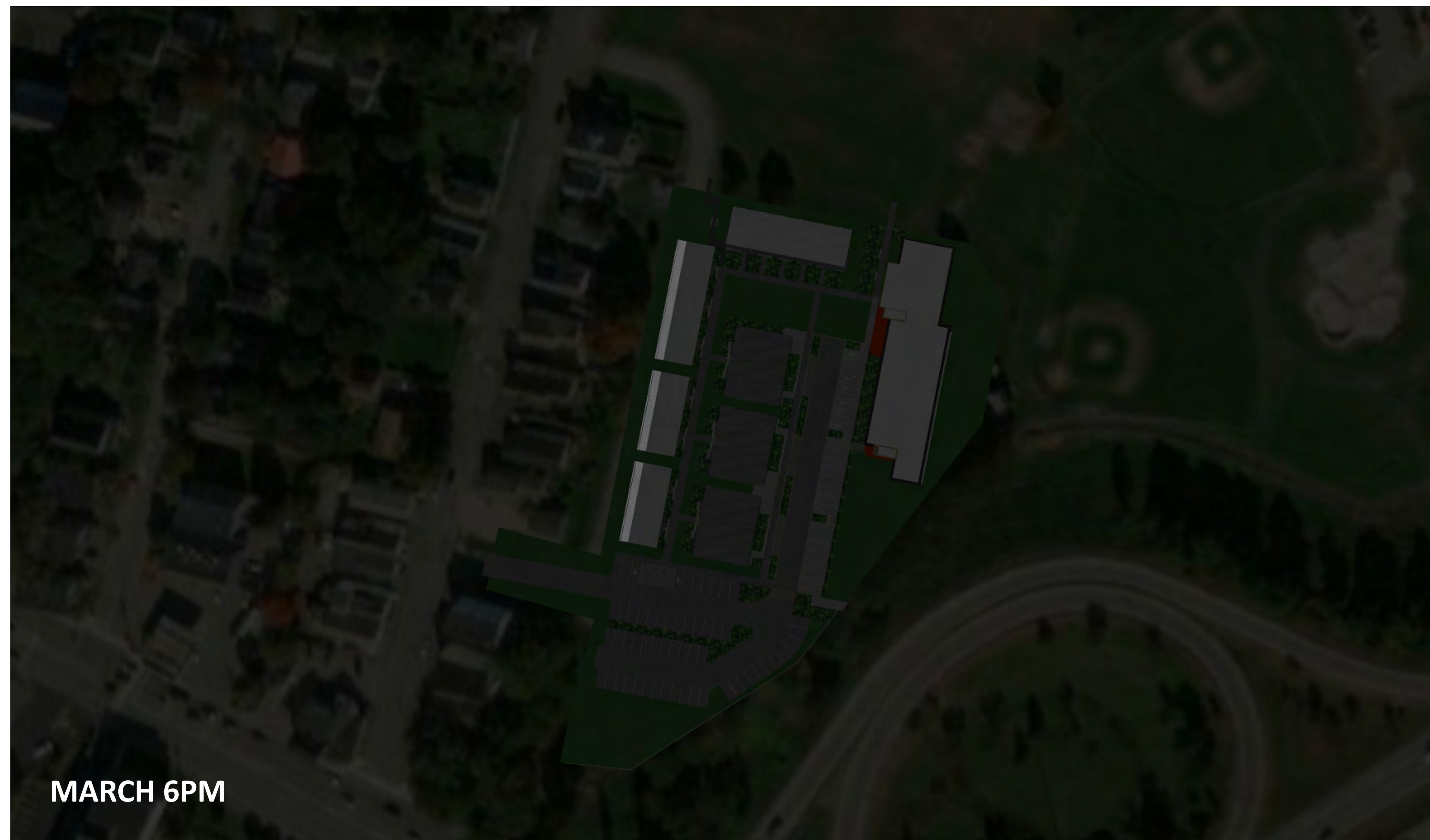
MARCH 9AM



MARCH 12PM

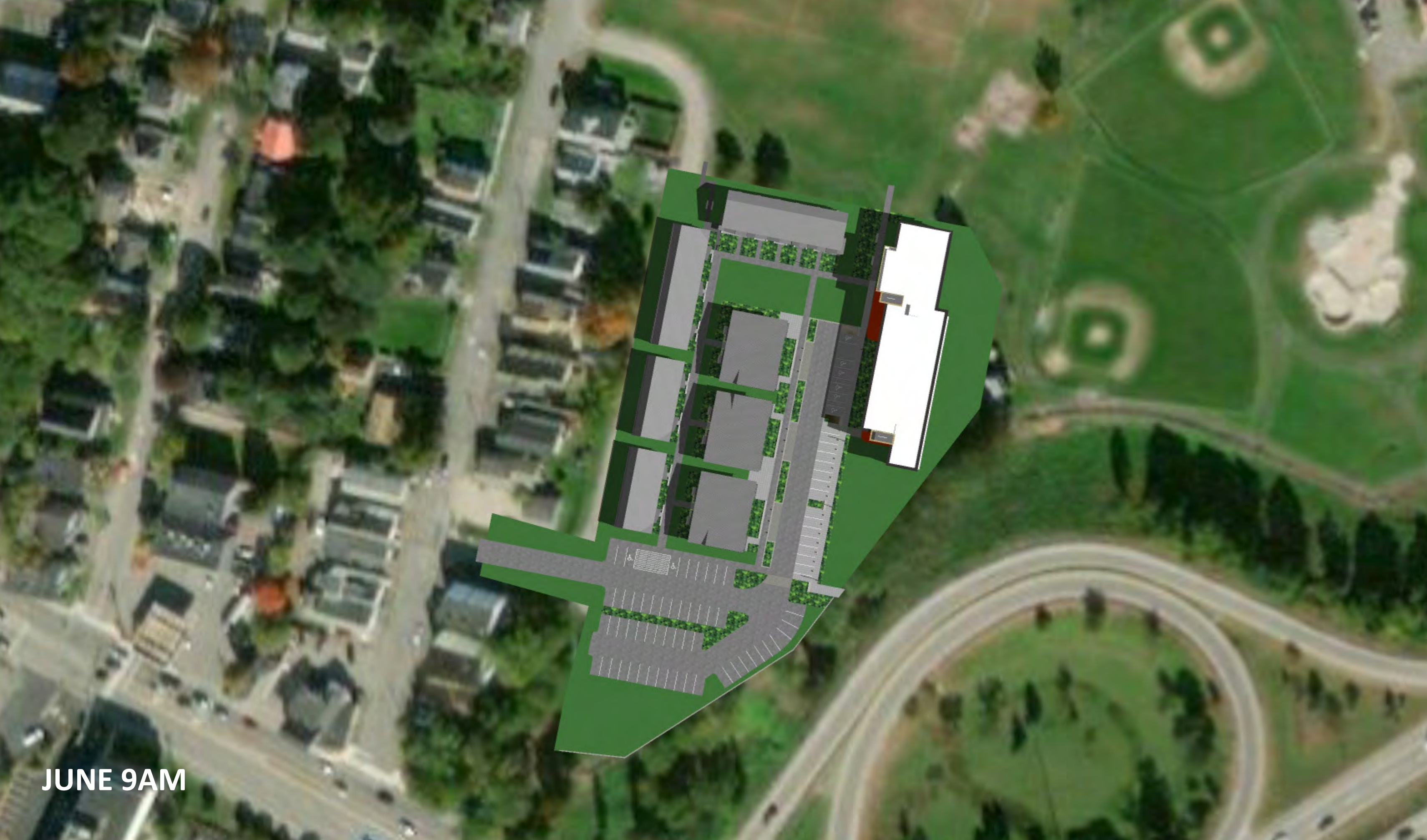


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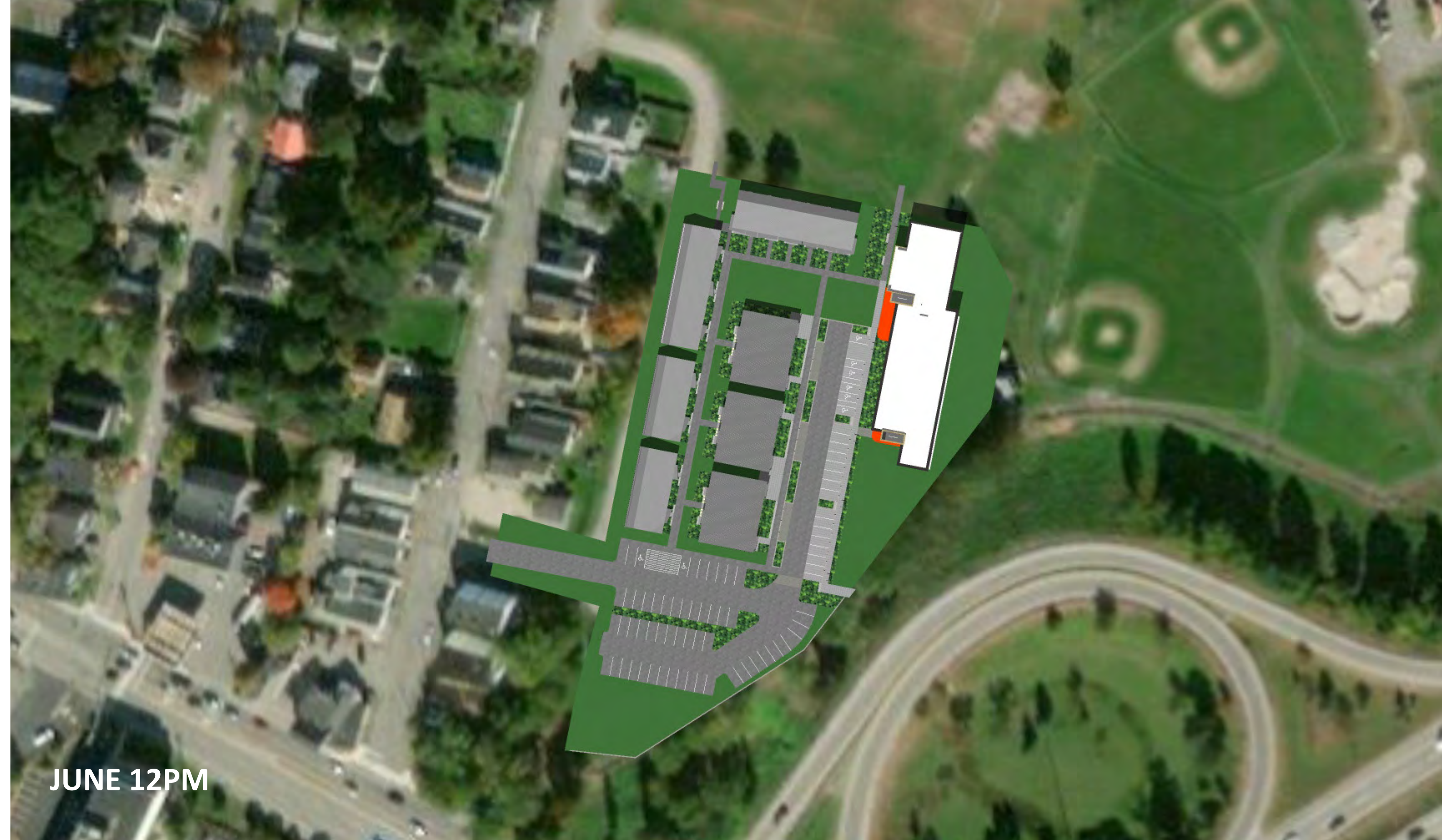


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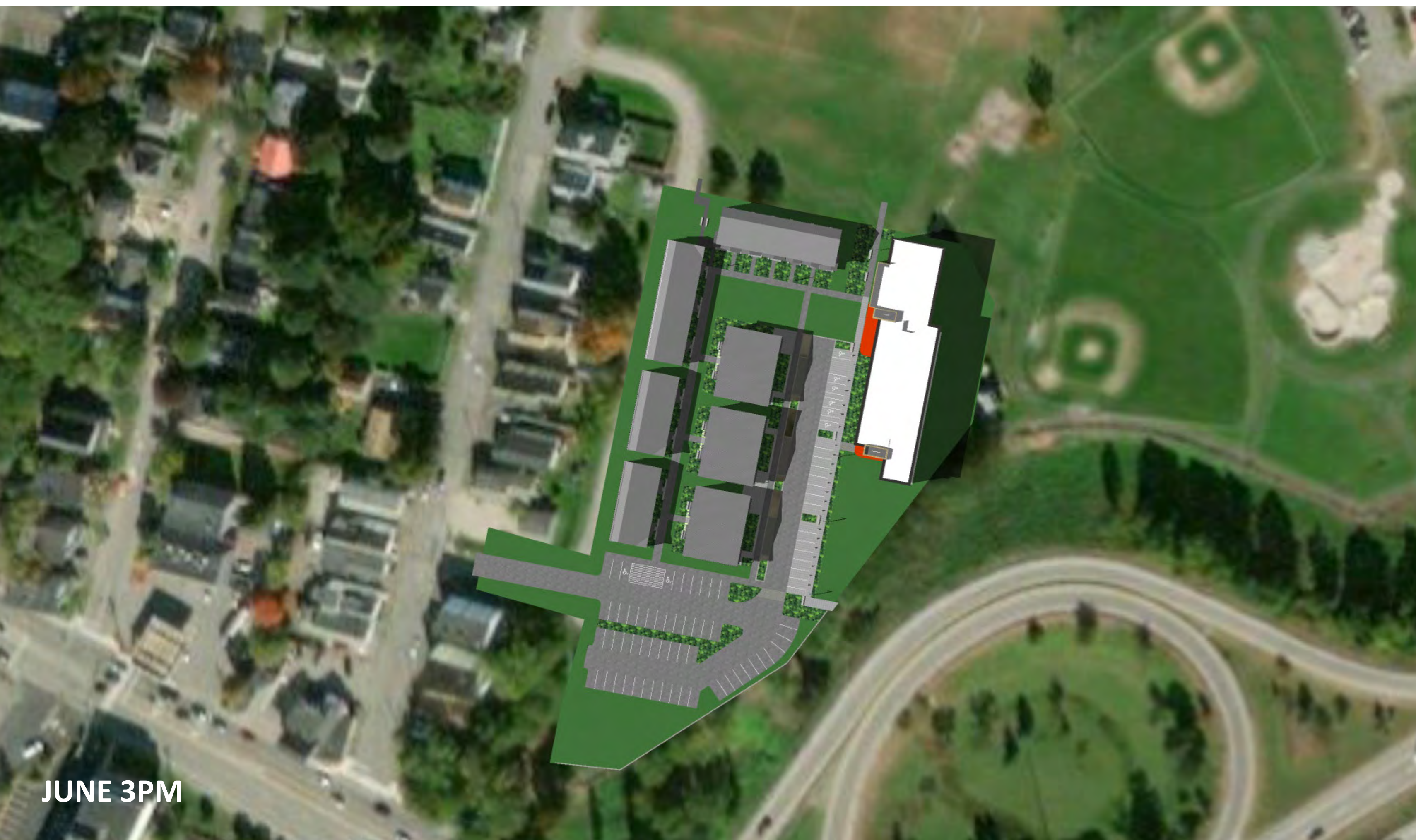
DOUGLASS COURT
SHADOW STUDY



JUNE 9AM



JUNE 12PM

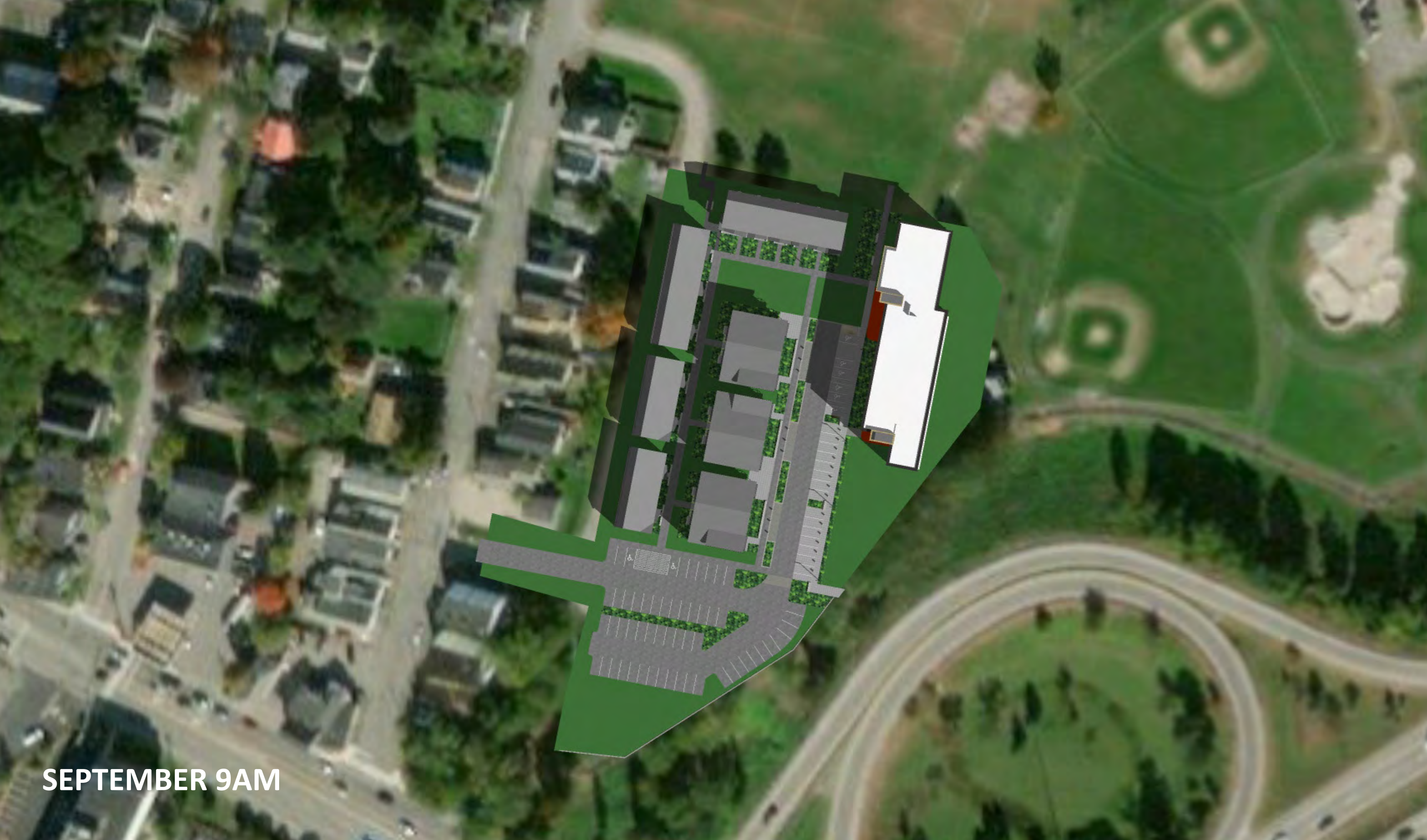


JUNE 3PM

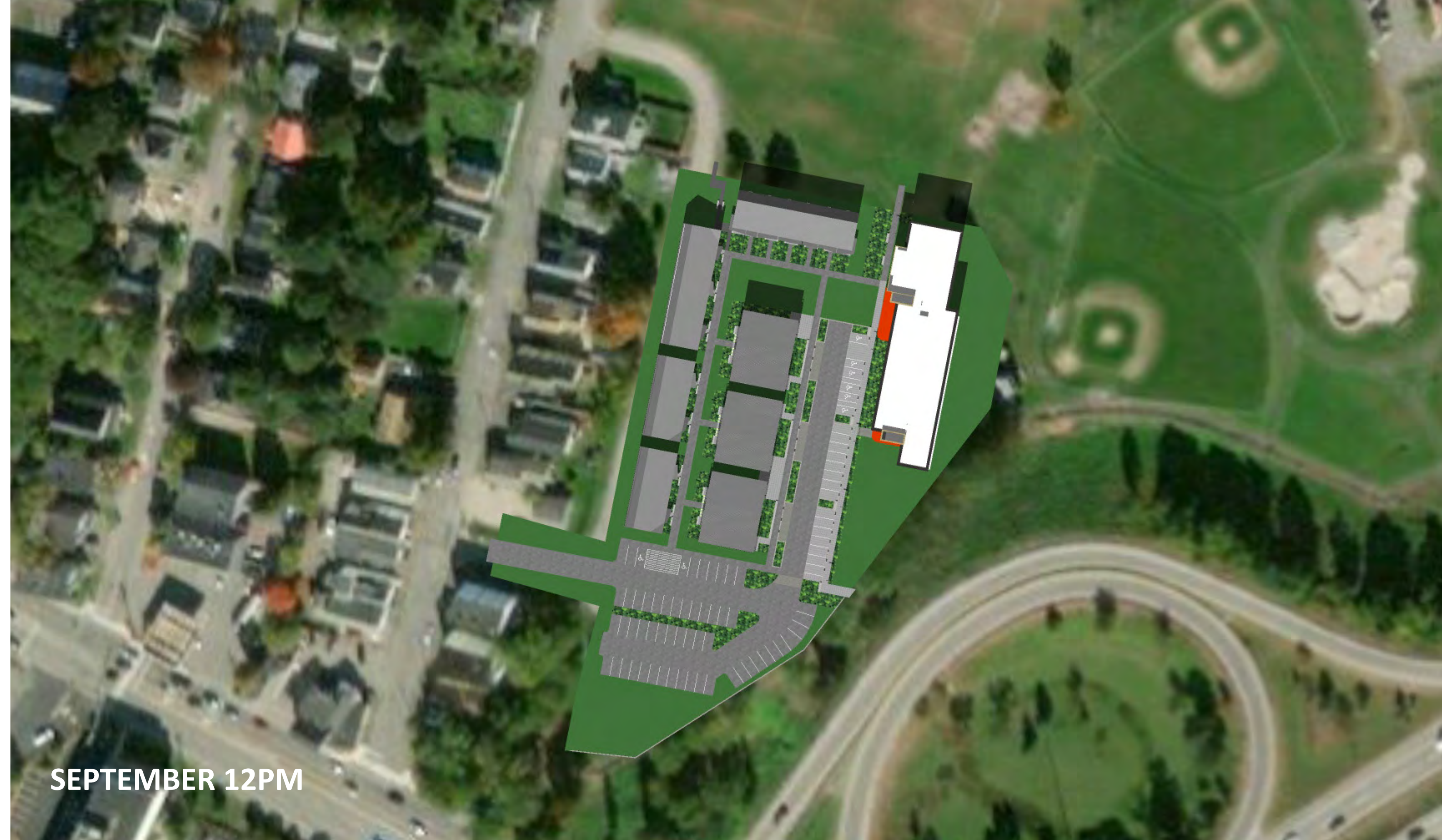


JUNE 6PM

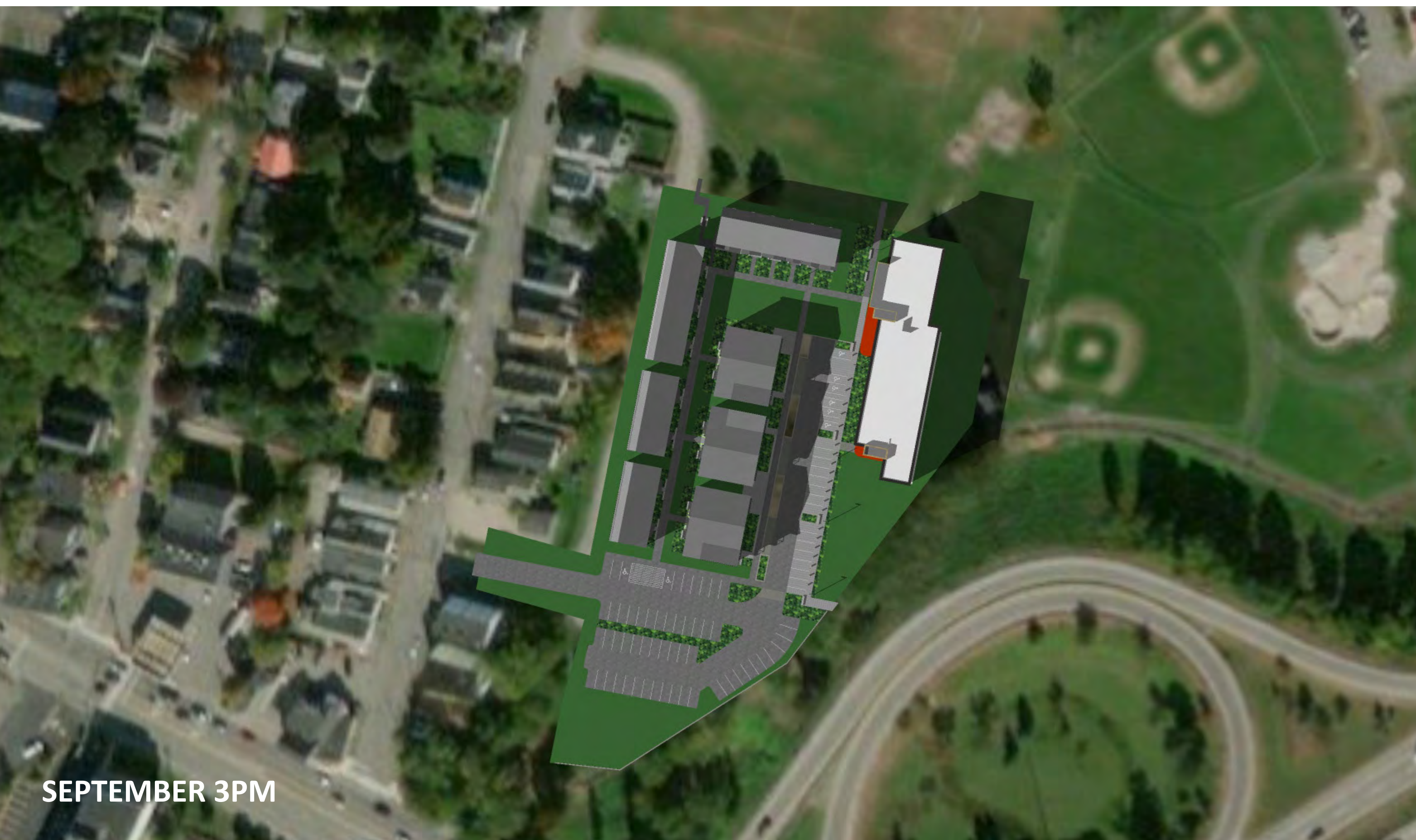
DOUGLASS COURT
SHADOW STUDY



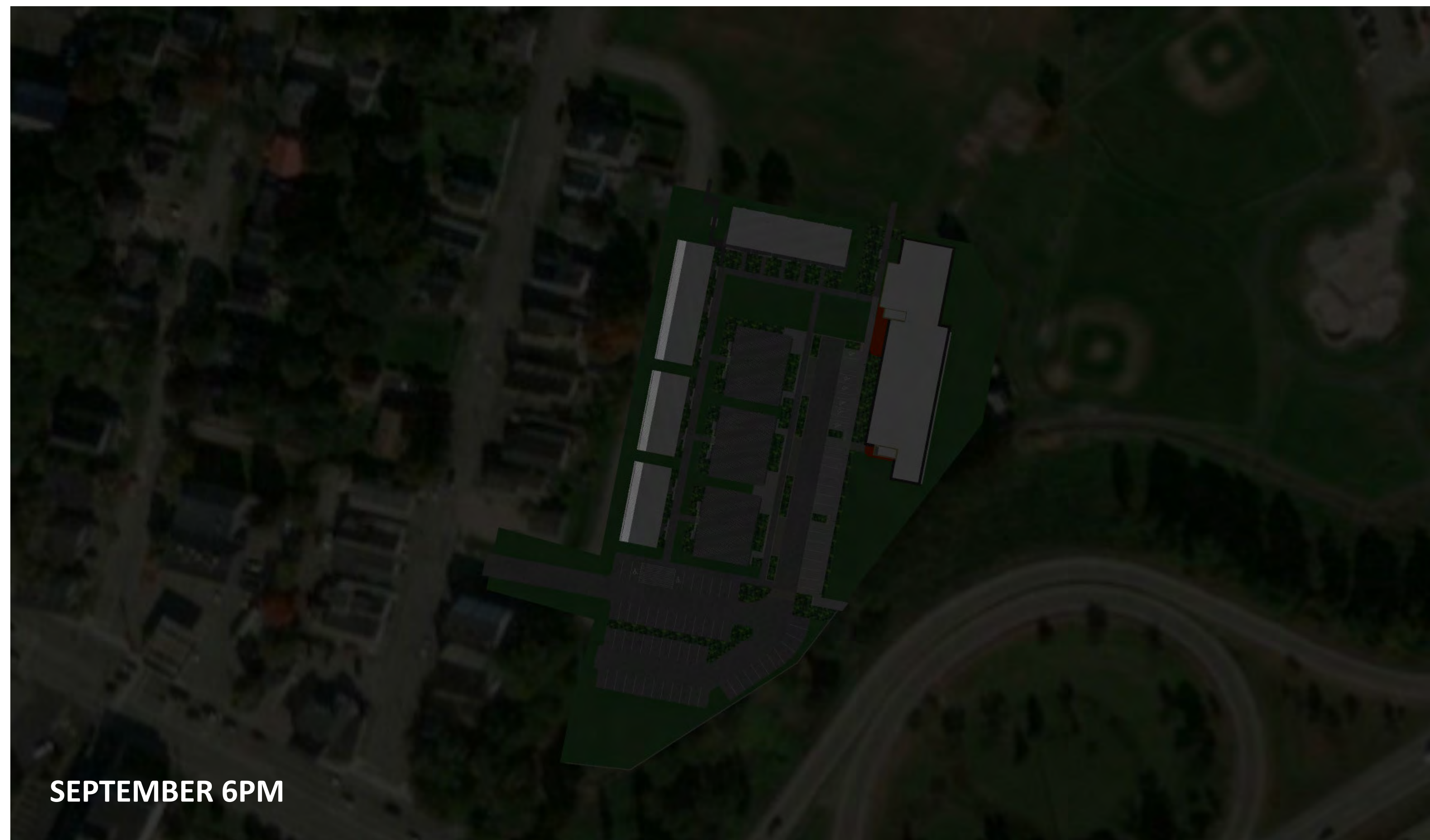
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SEPTEMBER 12PM



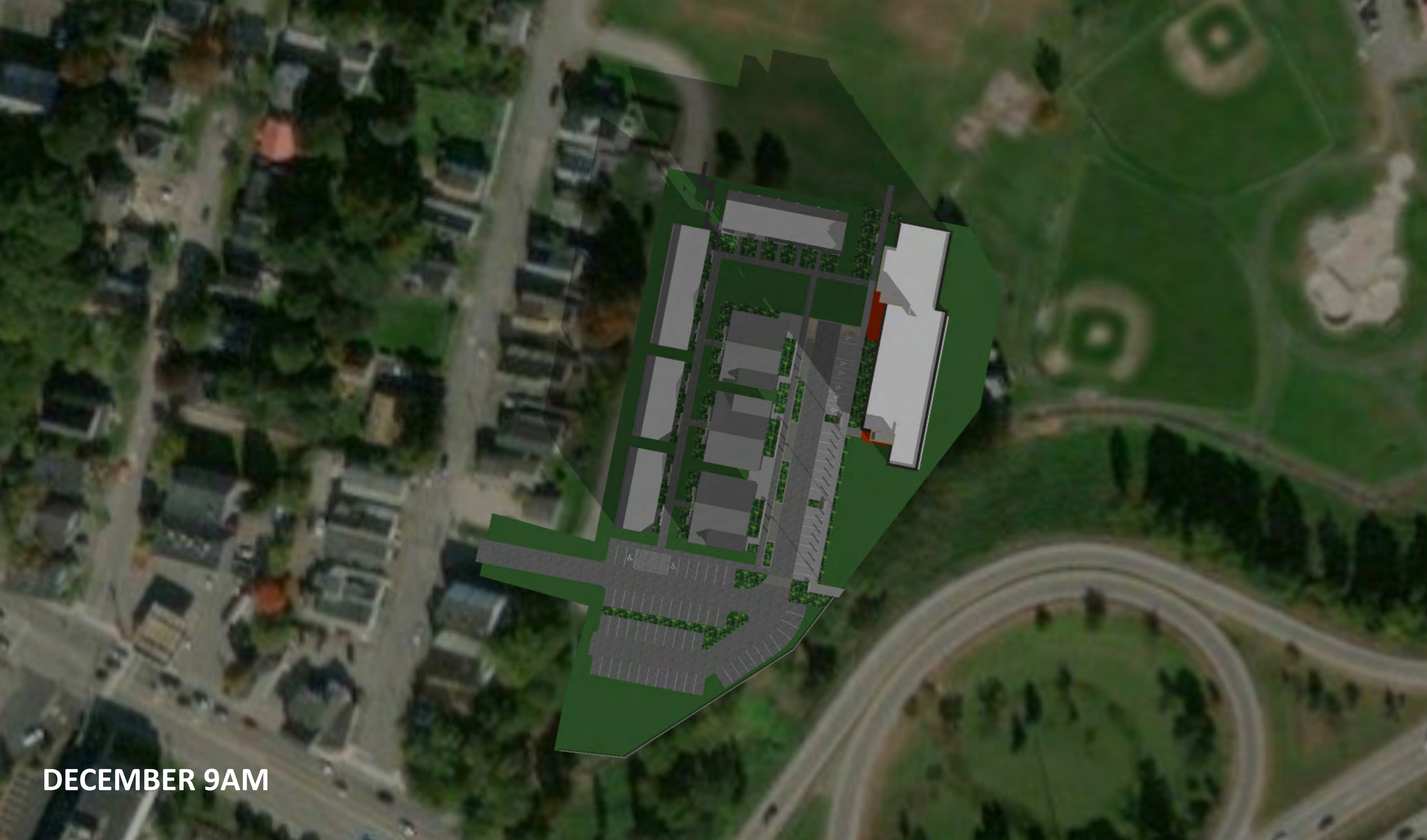
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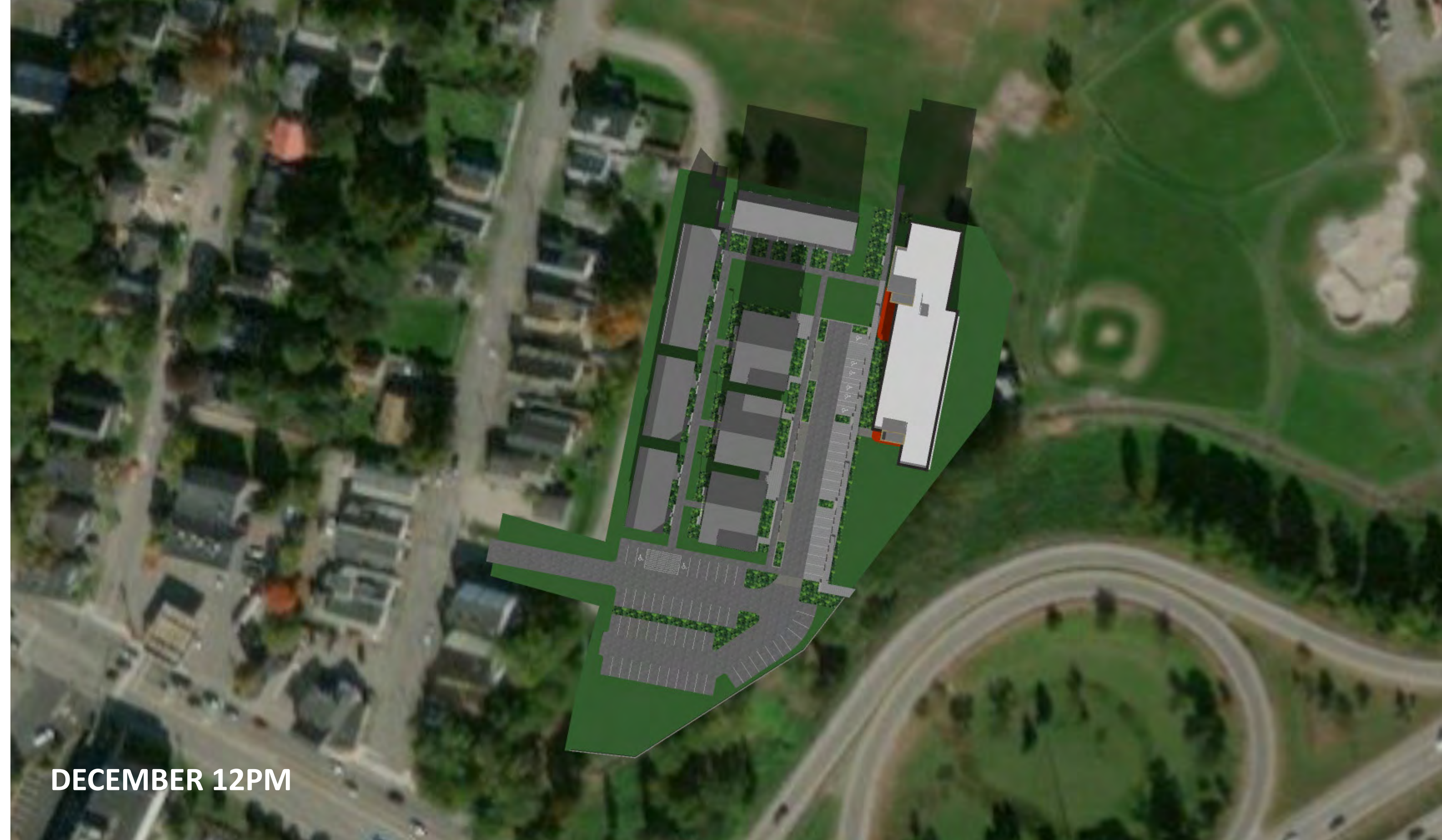
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DOUGLASS COURT

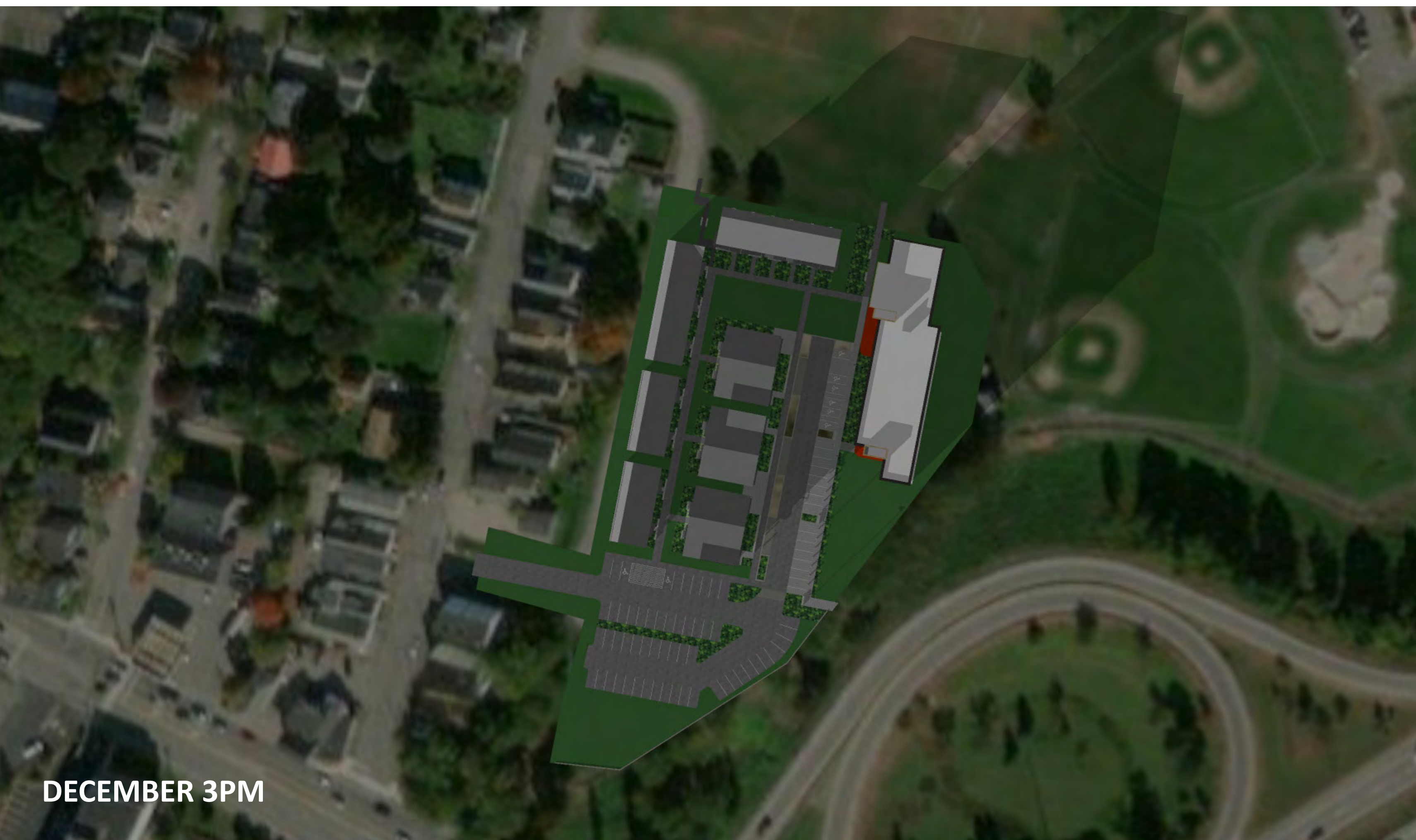
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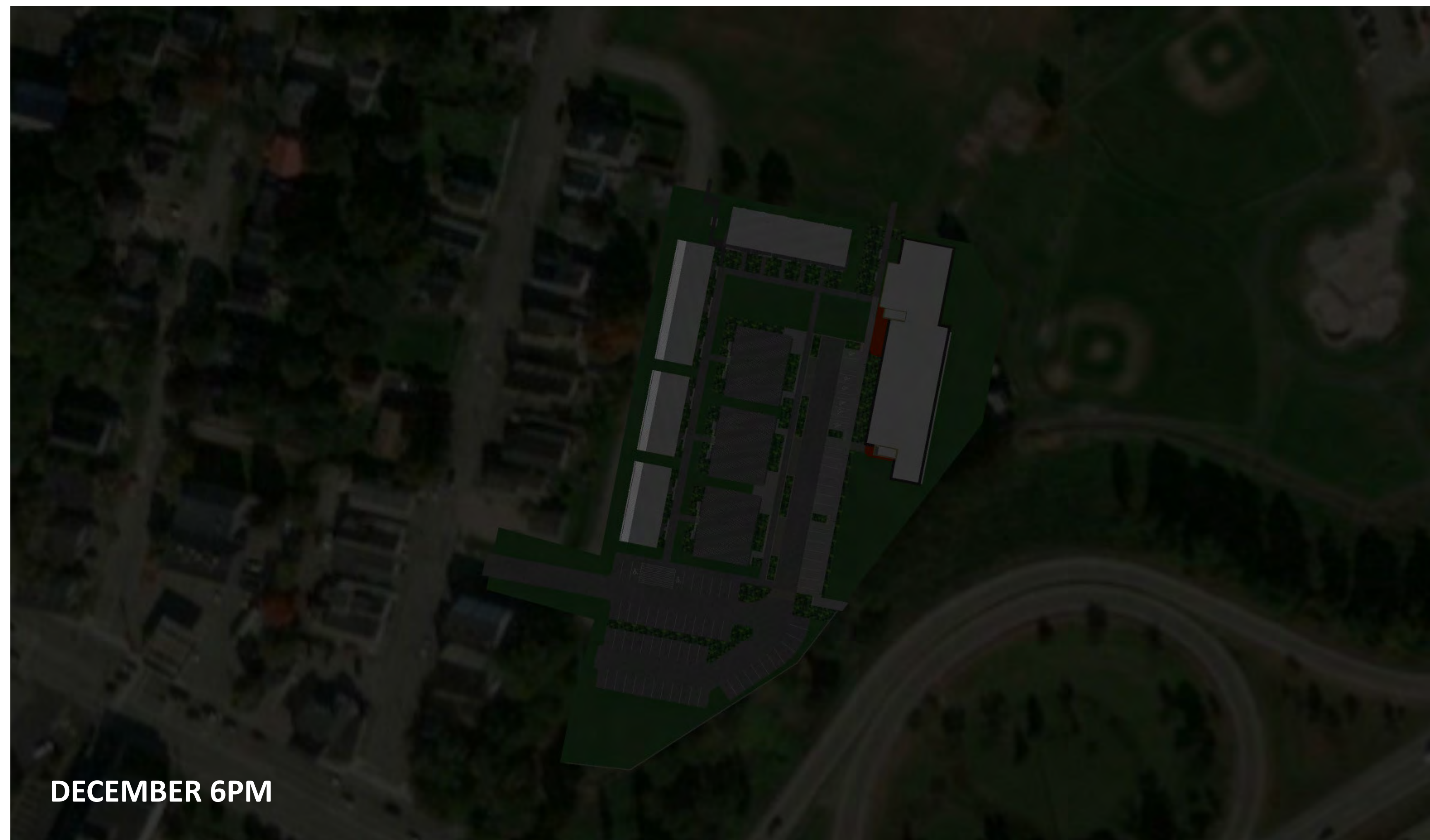
DECEMBER 9AM



DECEMBER 12PM



DECEMBER 3PM



DECEMBER 6PM

DOUGLASS COURT
SHADOW STUDY



DOUGHERTY COMMONS
VIEW OF DEVELOPMENT FROM DOUGLAS STREET



DOUGHERTY COMMONS
VIEW OF DEVELOPMENT FROM CONGRESS STREET



DOUGHERTY COMMONS
VIEW OF DEVELOPMENT FROM 295 OFF-RAMP

Attached please find a letter drafted by the Libbytown Neighborhood Association regarding proposed parking for the apartments to be built on Douglass St.

Thanks in advance for your consideration,

Maureen S. Morse

LNA Chair

The Libbytown Neighborhood is excited to see the development at Dougherty Field moving apace and appreciates the mix of incomes and demographics that it will bring to the neighborhood. However, we are concerned that the scheme seems to call for an overabundance of parking. As you certainly are aware, societal overdependence on motor vehicles has led to all manner of environmental, economic, and social problems. Furthermore, the LNA has been a strong supporter and advocate for this project. We support the mission but also seek greater vibrancy and more beauty for the neighborhood. Parking lots run counter to these goals. As the project is receiving significant public subsidy, it would seem necessary that the need is demonstrated.

As such we have the following questions:

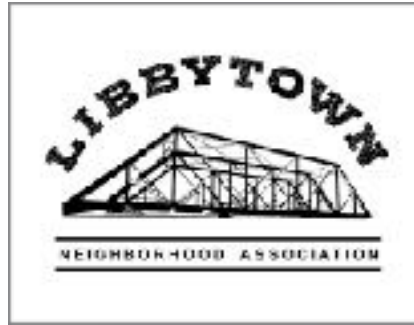
- Has there been a study of the amount of available on-street parking? There appears to already be an overabundance on St. James Street alone.
- Can the area designated for parking be put to better community use, such as a parklet. NB: The area where the Libbytown Community Garden now sits was at one time designated for parking Libbytown Neighborhood Association Portland Maine
- Has an assessment been as to the environmental impact of the parking?
 - Given the dire need for affordable housing, is there any indication that you would have any trouble filling the units if they did not come with parking? If no parking were provided and the lot was put to use as more housing, would those additional units rent? Would it strain the supply of on-street parking?
 - Why is de-bundling the parking (reducing rent for tenants who opt-out of parking) not part of the program?
 - Is there a fiduciary benefit to the development team for building parking?
- Have you made a workforce/demographic analysis to support the 1:1 parking ratio? For example, would all the tenants need ADA access?

- Given the cost of creating parking, how much of the project costs will parking consume?
- Is the project so well funded that the residents will not benefit from the long-term dividend from not having to maintain parking?
 - Given the high cost of maintaining parking (taxes, storm water fees, snow plowing, snow removal, re-paving, re-striping, etc.) can you provide figures of how much of the operating budget the parking will consume?
- Given the shortage of labor and specifically snow management personnel, what is the plan to conduct winter operations?
 - Given that parking lot plowing is most efficient in lots that contain no obstructions (e.g., trees) and contain ample space for snow storage, how do you intend to balance operational costs against a moderately scenic landscape that would provide shade.
- Has a TDM been prepared? Have you explored options in-lieu of parking such as car share, bike parking, etc? If not, doing so could save significant project costs if the ratio were lowered.
- Have you considered requesting the City designate an area for snow ban parking, for example on lightly used areas of St. James St, similar to on-street snow ban parking along the Eastern Promenade?
- If the parking for the co-operative housing is debundled then why is that not factored in?
- Parking on St. James Street will not only reduce the amount of impermeable surface but will also effectively narrow St. James Street which will reduce speeding along that stretch.

Given these concerns, we recommend a professional Traffic Demand Management study that gives strong consideration to utilizing on-street parking, reducing tenant parking to required ADA spaces; and to thus reduce the monthly rent accordingly.

With Regards,
Maureen S. Morse
LNA Chair

--
207-838-6120
917-696-5649
ZacharyBarowitz.com



January 26, 2022

Nathan Szanton
The Szanton Company
10 Free St.
Portland ME, 04101

Dear Mr. Szanton,

The Libbytown Neighborhood is excited to see the development at Dougherty Field moving apace and appreciates the mix of incomes and demographics that it will bring to the neighborhood. However, we are concerned that the scheme seems to call for an overabundance of parking. As you certainly are aware, societal overdependence on motor vehicles has led to all manner of environmental, economic, and social problems. Furthermore, the LNA has been a strong supporter and advocate for this project. We support the mission but also seek greater vibrancy and more beauty for the neighborhood. Parking lots run counter to these goals. As the project is receiving significant public subsidy, it would seem necessary that the need is demonstrated.

As such we have the following questions:

- Has there been a study of the amount of available on-street parking? There appears to already be an overabundance on St. James Street alone.
- Can the area designated for parking be put to better community use, such as a parklet. NB: The area where the Libbytown Community Garden now sits was at one time designated for parking

Libbytown Neighborhood Association Portland Maine

- Has an assessment been as to the environmental impact of the parking?
- Given the dire need for affordable housing, is there any indication that you would have any trouble filling the units if they did not come with parking? If no parking were provided and the lot was put to use as more housing, would those additional units rent? Would it strain the supply of on-street parking?
- Why is de-bundling the parking (reducing rent for tenants who opt-out of parking) not part of the program?
- Is there a fiduciary benefit to the development team for building parking?
- Have you made a workforce/demographic analysis to support the 1:1 parking ratio? For example, would all the tenants need ADA access?
- Given the cost of creating parking, how much of the project costs will parking consume?
- Is the project so well funded that the residents will not benefit from the long-term dividend from not having to maintain parking?
- Given the high cost of maintaining parking (taxes, storm water fees, snow plowing, snow removal, re-paving, re-striping, etc.) can you provide figures of how much of the operating budget the parking will consume?
- Given the shortage of labor and specifically snow management personnel, what is the plan to conduct winter operations?
- Given that parking lot plowing is most efficient in lots that contain no obstructions (e.g., trees) and contain ample space for snow storage, how do you intend to balance operational costs against a moderately scenic landscape that would provide shade.
- Has a TDM been prepared? Have you explored options in-lieu of parking such as car share, bike parking, etc? If not, doing so could save significant project costs if the ratio were lowered.
- Have you considered requesting the City designate an area for snow ban parking, for example on lightly used areas of St. James St, similar to

on-street snow ban parking along the Eastern Promenade?

- If the parking for the co-operative housing is debundled then why is that not factored in?
- Parking on St. James Street will not only reduce the amount of impermeable surface but will also effectively narrow St. James Street which will reduce speeding along that stretch.

Given these concerns, we recommend a professional Traffic Demand Management study that gives strong consideration to utilizing on-street parking, reducing tenant parking to required ADA spaces; and to thus reduce the monthly rent accordingly.

With Regards,
Maureen S. Morse
LNA Chair

RE: LNA Letter re parking at Douglass Street project

2 views

Subscribe ☐**Nathan Szanton**

Feb 17

to Maureen Morse, Emma Scudder, Damon Yakovleff, Fred's primary email, Zack Barowitz, planningboard@portlandmaine.gov, Azarro@portlandmaine.gov, rrodriguez@portlandmaine.gov, vpelletier@portlandmaine.gov, Carl Szanton, Amy Cullen, Liz Trice (liztrice@gmail.com), Matthew Peters, Brian Eng (bri.d.eng@gmail.com)

Dear Maureen,

As promised, attached is our response to your letter of January 26. We look forward to continuing conversation with LNA members and other neighbors at our Neighborhood Meeting on March 9.

As always, though, don't hesitate to get in touch with us at any time.

Thanks again for your letter.

Best,

Nathan Szanton



February 17, 2022

Ms. Maureen S. Morse, Chair
Libbytown Neighborhood Association
(by email)

Re: Dougherty Court Parking Plan

Dear Maureen,

Thank you very much for reaching out and sharing your thoughts about parking at our development at the site of former West School, which we've decided to name Dougherty Court. You raise important questions and highlight key reasons to avoid overbuilding parking. We agree with you that surface parking lots have many drawbacks, and we seek to create a walkable, pedestrian-oriented neighborhood that minimizes dependence on cars as much as possible. Our current site-wide plans are to construct only 69 parking spaces (56 for the apartments and 13 for the co-ops) for 120 units of housing (63 apartment and 57 co-op). That's an overall ratio of only 0.575 parking spaces per unit of housing. Please see our answers below to the questions you raised for additional explanation of our thought process.

Has there been a study of the amount of available on-street parking? There appears to already be an overabundance on St. James Street alone.

We have not formally studied the amount of available on-street parking, but like you, we have observed the availability of nearby on-street parking. It is only because of the on-street parking availability that exists nearby that we feel comfortable constructing only 69 parking spaces for 120 dwelling units.

Can the area designated for parking be put to better community use, such as a parklet. NB: The area where the Libbytown Community Garden now sits was at one time designated for parking Libbytown Neighborhood Association Portland Maine

While we would love to replace on-site parking with parklets, we feel that we have reduced on-site parking to the minimum amount that is commercially viable in this location. If we were downtown, we would have likely made a different decision.

Has an assessment been made as to the environmental impact of the parking?

Such an analysis will be included in the City's review of our site plan submission, as well as in MaineHousing's review of the site plan as we secure financing.

Given the dire need for affordable housing, is there any indication that you would have any trouble filling the units if they did not come with parking? If no parking were provided and the lot was put to use as more housing, would those additional units rent? Would it strain the supply of on-street parking?

We feel that constructing fewer on-site parking spaces and more apartments would run too much risk of harming our ability to lease the apartments. We feel that it would strain the supply of on-street parking, causing prospective residents to choose to live elsewhere. Importantly, though, if we experience that our surface parking is underutilized or unnecessary, we will consider adding additional housing to the site in a later development phase.

Why is de-bundling the parking (reducing rent for tenants who opt-out of parking) not part of the program?

Our rental housing building will offer 56 parking spaces for 63 units, which will mean that we cannot offer one parking space to each household. However, we are not planning on charging tenants an additional price for a parking space, due to concerns about the commercial viability of additional tenant charges.

Is there a fiduciary benefit to the development team for building parking?

Yes, we believe that creating more housing and less parking would tip the balance of parking scarcity too far to keep the building fully leased.

Have you made a workforce/demographic analysis to support the 1:1 parking ratio? For example, would all the tenants need ADA access?

Our plans have evolved and we no longer are planning to a 1:1 ratio, but the current 0.89:1 ratio is based on our experience leasing units at our four other Portland properties.

Given the cost of creating parking, how much of the project costs will parking consume?

The marginal cost of building parking, over and above the cost of landscaping that same area, is about \$8/sq. ft. Each parking space, including the requisite circulation space, consumes roughly 400 sq. ft.. Thus, the marginal cost of each parking space is about \$3,200. Multiplied by 56 parking spaces, that's about \$179,200. Out of an overall construction cost of our project of \$14.5 million, that's about 1.2%.

Is the project so well funded that the residents will not benefit from the long-term dividend from not having to maintain parking?

You're right that a long-term dividend in effect would be created by avoiding surface parking, but we feel that fewer on-site spaces impairs our ability to market the building. Again, if we find in the future that our parking is not being fully utilized, we may move to build additional housing in lieu of some of the surface parking.

Given the high cost of maintaining parking (taxes, storm water fees, snow plowing, snow removal, re-paving, re-striping, etc.) can you provide figures of how much of the operating budget the parking will consume?

We estimate the cost of maintaining parking spaces to be roughly equivalent to the cost of maintaining other hardscaped or landscaped areas.

Given the shortage of labor and specifically snow management personnel, what is the plan to conduct winter operations?

Current labor shortages certainly make it more difficult. At our other four Portland properties we are still able to hire snow management personnel and we expect a similar dynamic for Dougherty Court.

Given that parking lot plowing is most efficient in lots that contain no obstructions (e.g., trees) and contain ample space for snow storage, how do you intend to balance operational costs against a moderately scenic landscape that would provide shade.

It's important to us to build an attractive parking lot that does not simply read as a sea of parking. To that end, we are planning trees and other landscaping in the islands between parking bays.

Has a TDM been prepared? Have you explored options in-lieu of parking such as car share, bike parking, etc? If not, doing so could save significant project costs if the ratio were lowered.

No, but we will commission a TDM if requested by the Planning Board. As with all our properties, we encourage transportation by transit, bicycle, and car share and expect many residents to take advantage of these options. We will offer residents indoor, secure bicycle storage, as well as outdoor bike racks.

Have you considered requesting the City designate an area for snow ban parking, for example on lightly used areas of St. James St, similar to on-street snow ban parking along the Eastern Promenade?

We have not, largely because most of our residents will be parking on-site.

If the parking for the co-operative housing is debundled then why is that not factored in?

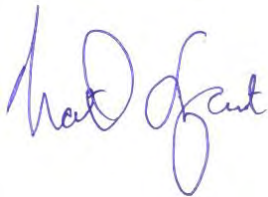
We're not quite sure what you mean by factored in, but it's true that our co-op development partners have made a different calculation regarding the need for on-site parking. We simply have a different philosophy about the importance of dedicated parking on site at this location.

Parking on St. James Street will not only reduce the amount of impermeable surface but will also effectively narrow St. James Street which will reduce speeding along that stretch.

That's no doubt true. We imagine that many of the co-op residents will park on St. James Street and deliver the narrowing effect that you mention.

Thank you again for reaching out. We value our relationship with LNA, and while we may not see completely eye-to-eye on this matter, we certainly hope to work together on this project wherever possible. If you'd like to discuss further, please feel free to reach out to me, or Carl Szanton (207-712-6191; cszanton@szantoncompany.com).

Sincerely,



Nathan S. Szanton
President, The Szanton Company

From: Nathan Szanton

Sent: Monday, January 31, 2022 10:02 AM

To: Maureen Morse <maureensheamorse@gmail.com>

Cc: Emma Scudder <scudder.emma@gmail.com>; Damon Yakovleff <damon.yakovleff@gmail.com>; Fred's primary email <fdillon@maine.rr.com>; Zack Barowitz <zbarowitz@gmail.com>; planningboard@portlandmaine.gov; 'Azarro@portlandmaine.gov'

<Azarro@portlandmaine.gov>; rrodriguez@portlandmaine.gov; vpelletier@portlandmaine.gov; Carl Szanton <cszanton@szantoncompany.com>; Amy Cullen <acullen@szantoncompany.com>; Liz Trice (liztrice@gmail.com) <liztrice@gmail.com>; Matthew Peters <matt@elysiancommunities.com>; Brian Eng (bri.d.eng@gmail.com) <bri.d.eng@gmail.com>

Subject: RE: LNA Request for Review of Parking at Douglass St. Project

Dear Maureen,

Thank you for your letter of January 26, on behalf of the Libbytown Neighborhood Association, about parking at our Douglass Street development. We agree with you that overbuilding of parking is poor planning on many levels.

Our team is reviewing your letter now, and will respond substantively within the next couple of weeks, via email. (We will copy everyone who is copied on this email.)

Thank you and the LNA for engaging with us. We appreciate that you took the time to gather your thoughts and share them with us.

All Best--

Nathan Szanton



Jennifer Munson <jmy@portlandmaine.gov>

Public Comment - 57 Douglass Street - Soil Conditions from Marsh/City Dump History

George Rheault <george.rheault@gmail.com>

Tue, Mar 22, 2022 at 10:25 AM

To: Planning Board <planningboard@portlandmaine.gov>, James Dealaman <jdealaman@portlandmaine.gov>, Christine Grimando <cdg@portlandmaine.gov>, jmy <jmy@portlandmaine.gov>, Abigail Reed <areed@portlandmaine.gov>

One of the biggest challenges for this site (other than its close proximity to the massive noise and pollution generated by the heavily traveled confluence of I-295, [Fore River Parkway](#) and Congress Street) is the condition of the underlying soils.

1.) Have planning staff explored in-depth any geo-technical studies produced by the City over time (when saving the West School was entertained before its demolition) or more recently by the applicant as part of its due diligence to date?

2.) Attached is a photo of the old West School. It is a very modest single-story structure yet it had major settlement issues associated with it during its relatively brief life, and the reasons why should get examined by planning staff if co-op buyers are going to be asked to take the risk of purchasing dwellings here. It cost the City of Portland somewhere around \$200,000 circa 2015 to demolish it (costs that presumably are not being recovered by the sale to the applicant) though the final cost and exactly when the demolition was officially completed is unknown though planning staff should be able to get that information relatively easy from other city departments.

3.) The former brickyards here were presumably attracted to the extensive clay deposits that once covered the wetlands marsh that existed here previous to European settlement (the excavations they made probably is why the city later turned it into a dump). What kind of implications for building dwellings on the site of former marshland should be explored by planning staff, especially since sea level rise may change the groundwater profile here in a few short decades (and very much within the duration of a 30-year mortgage)?

4.) Are there any city records which document the depth and extent of the city dump that once existed here (has anyone even seen a photo of the dump itself and when it officially stopped being used for that purpose)? Will pilings be necessary to properly stabilize and protect any structures and how much of the existing contents of the city dump will need to be removed in order to ensure long-term foundation stability here? It appears that small eruptions of dump waste have already migrated to the surface so obviously the "cover" on the dump is very superficial (hence why the West School had to be abandoned).

Please protect the financial and physical well-being of the future families residing here by asking the hard questions now.

Thank you.



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Page 949
Portland Public Library Archives



Jennifer Munson <jmy@portlandmaine.gov>

Public Comment - 57 Douglass Street: Unresolved Right, Title & Interest - paper street obligations

George Rheault <george.rheault@gmail.com>

Tue, Mar 22, 2022 at 10:27 AM

To: Planning Board <planningboard@portlandmaine.gov>, James Dealaman <jdealaman@portlandmaine.gov>, Christine Grimando <cdg@portlandmaine.gov>, jmy <jmy@portlandmaine.gov>, Abigail Reed <areed@portlandmaine.gov>

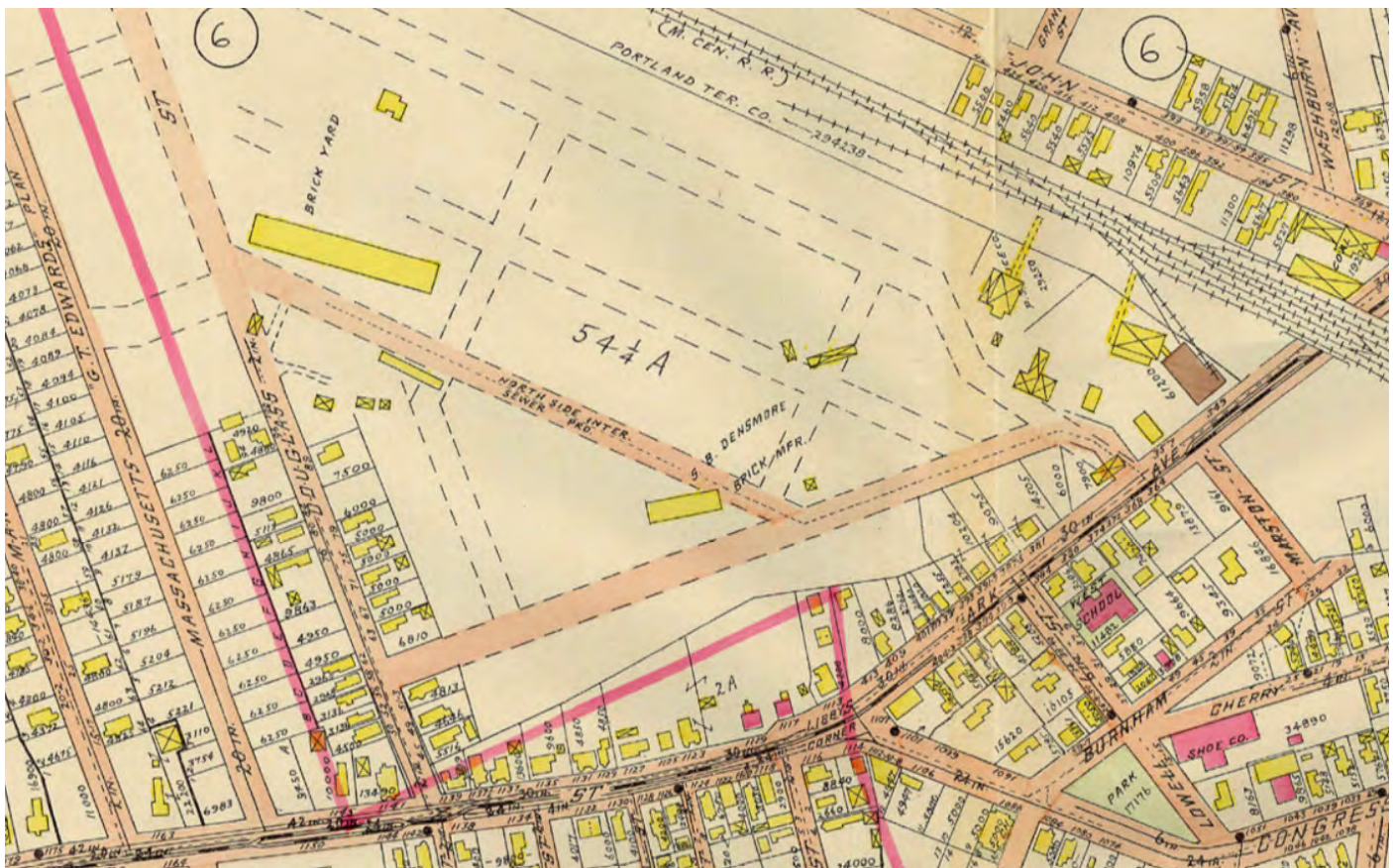
The issue of paper streets remains outstanding with respect to the application before you.

Considering how the Planning Department has recently held up another project in the vicinity (subdivision of 3 lots on an unimproved portion of Caroline Street) on the basis of questions about paper streets, it is really unconscionable that the applicant has not been asked similar questions, including providing justification from legal counsel on the status/question of the paper streets. It should be noted that the paper streets question was used as one excuse by city planning officials to keep the Caroline Street project from even having a Planning Board workshop scheduled to date.

The title survey provided by the applicant is clear as mud with respect to the possibility of still-in-force paper street claims. The Cumberland County Registry of Deeds reference is hard to navigate - the online access shows the relevant document ACTUALLY begins on Page 83 of Book 958 (no search for the Page 96 or 97 cited on the survey gets returned in the CCRD online database) from October 1915. The whereabouts and contents of the document referenced as "City Plan 406/63" on the title survey is also unknown, but should be produced to the public.

The buyers of these modest co-op units should be protected by the Planning Board process from future title problems that should be resolved and sorted out NOW.

Below is an excerpt from the 1913-1914 Richards Atlas for Portland showing the layout of the paper streets proposed by J.B. Brown & Sons for this area that later became a city dump. The complete source map can be found here: ["Richards Atlas : Plate 7" \(portlandlibrary.com\)](https://portlandlibrary.com/atlases/1913-1914-richards-atlas-for-portland/)



CITY of PORTLAND, MAINE
Request for Proposals for Disposition of City-Owned Property
Located at 43 & 91 Douglass Street
RFP #2020-2

I. NOTICE AND SPECIFICATIONS

The City of Portland, Maine seeks proposals from qualified developers for the creation of residential housing at 43 & 91 Douglass Street. The site is designated on the City of Portland Tax Assessor's Map as lot CBL 078 C002 & 078 B007.

Sealed proposals for the project, including an original, seven (7) copies, and one (1) digital copy, as specified herein, will be received by the Purchasing Office, Room 103, City Hall, 389 Congress Street, Portland, Maine 04101, until 3:15 p.m., Tuesday, June 16, 2020, at which time they will be publicly opened.

Proposals shall be submitted, and returned in sealed envelopes plainly marked on the outside "Disposition and Development of Property Located at 43 & 91 Douglass Street".

Proposals that are late, unsigned or submitted via fax will not be accepted. Proposals from individuals not registered with the Purchasing Office may be rejected; receipt of this document directly from the City of Portland indicates registration. Should a person receive this Request from a source other than the City, please contact 207-874-8654 to ensure that you are listed as a recipient for this proposal.

All questions must be submitted in writing to the Purchasing Office. These may be mailed, hand delivered, faxed to (207) 874-8652 or e-mailed to mff@portlandmaine.gov and be received no later than five (5) business days prior to the opening date. Questions received after this time will not be addressed. Any interpretation, correction, or change of this document will be made only by written addenda. Changes in any other manner will not be binding on the City and proposers should not rely on. Proposers should not have contact with any City staff with regard to this proposal unless to obtain general public information as specified in the document.

The disposal of this real estate shall be on the basis of a negotiated proposal, with the City of Portland reserving the right to refuse any and all proposals. *All proposers are advised that the property will be sold "as-is" and "where is", in its existing condition, with no warranties either expressed or implied.* The City makes no representations or warranties about of any of the information about the property set forth herein, which is provided to proposers for their convenience only. The successful proposer shall be responsible to inspect the property, or to hire its own professionals to do so. The City, and its agents, make no representations or warranties with respect to the title of the property, the accuracy of any statement as to boundaries or acreage, or as to any other matters contained in any description of the property, or as to the fitness of the property for a particular purpose, or as to development rights, merchantability, habitability, or as to any other matter, including without limitation, land use, zoning and subdivision issues or the environmental, mechanical, or structural condition of the property. The City disclaims any and all responsibility for injury to proposers, their agents or others while examining the property or at any other time. The City will not be responsible for any broker's commission.

Any and all improvements made to said property must be done in accordance with existing City Codes and Ordinances.

II. GENERAL INFORMATION

Summary of Request:

The City of Portland is committed to providing housing opportunities and has set a goal to evaluate the use of City-owned property to construct housing. As one-step in accomplishing this goal, the City of Portland will accept proposals for the development of housing on the lot located at 43 & 91 Douglass Street, which currently is a vacant lot but was the former site of the West School.

This request for proposals results from the December 16, 2019 approval by the Portland City Council (Resolve 10-19/20) on the recommendation of the Housing Committee to market the City-owned vacant property located at 43 and 91 Douglass Street.

The City of Portland uses the RFP process to ensure that public resources are utilized for maximum public benefit while accomplishing specific objectives and providing fair access to all applicants.

Site Information:

- a. Location:** 43 & 91 Douglass Street, as identified in the City of Portland Assessor's records as lot CBL 078 C002 and 078 B007, in the R-5 zone. The lot includes the former site of the West School. The site for disposition includes a portion of 91 Douglass Street, but not the entire lot (See Attachment 2).
- b. Existing Conditions:** 43 & 91 Douglass Street is located on two parcels with frontage on Douglass Street in the Libbytown neighborhood. A right-of-way bisects the two parcels. The surrounding context is predominantly residential with the majority of homes in the area being one and multi-family structures. Dougherty Play Field abuts the property to the north.
- c. Current use:** Vacant lot.
- d. General Dimensions:** 43 Douglass Street (estimated at .3981 acres), and an estimated 2.85-acre portion of 91 Douglass Street.
- e. Current Zoning:** R-5. The minimum lot size in the R-5 zone is 6,000 square feet for residential development (single-family and two-family), 9,000 square feet for a multi-plex development (three-family or more), and 2 acres for a planned residential unit development (PRUD). This parcel would allow for residential, multi-family, and PRUD development. The minimum lot area per unit in a PRUD is 3,000 square feet; the maximum units per building is 12 units. At an estimated 141,570 square feet, the maximum number of residential units that could be developed within a PRUD is 47 units. For complete zoning requirements, please refer to Chapter 14, Land

Use, of the City Code.

- f. Rezoning:** Higher density zoning that furthers exceptional projects and other city goals as outlined in Section III may be considered. It should be noted that changes to zoning require both Planning Board and City Council approval.
- g. Condition of the property at the time of sale:** This parcel is the location of a former city-dump, and later the West School. A natural gas line and gas company easement are located in the right-of-way and the 43 Douglass Street parcel thus precluding development over these sites. A 40' wide sewer easement is also identified in the unbuildable portion of the site.
- h. Environmental Conditions:** A Phase II Environmental Site Assessment (ESA) has been completed to evaluate current environmental conditions. Based on findings, special soil disposal restrictions may be required. Participation in the Maine DEP Voluntary Response Action Program (VRAP) should be considered. The Phase II ESA will be available on-line.
- i.** Proposers are urged to investigate water sources and utility connection requirements with the Department of Public Works.

III. CITY GOALS

The City's primary goals for the use of the property are:

1. Developments shall provide mixed income units. All units must be affordable to households earning 60% to 120% of the area median income (AMI). Currently, 60% AMI for a family of four is \$55,800 and 120% AMI for a family of four is \$111,600.

Affordable means that the percentage of income a household is charged in rent and other housing expenses including utilities, or must pay in monthly mortgage payments (including real estate taxes, mortgage insurance, condominium/HOA fees, insurance and utilities), does not exceed 30% of a household's gross income, or other amount established in city regulations that does not vary significantly from this amount.

Restrictions on the affordability of units must be in place for a minimum of 30 years for homeownership units, and the longest period allowed by law for rental units.

2. Development of mixed income homeownership or rental housing of excellent building and site design. Design principles should promote efficient use of land to create a development that is compatible with the existing pattern, scale, massing, and materials of the surrounding neighborhood. The development's buildings shall be designed to meet the City's Green Building Code.
3. Rezoning may be considered to support increase housing development opportunities or maximize the number of allowable housing units on the property.
4. Developments shall create housing options that are age inclusive.

The general terms for this real estate transaction include:

- Units must be used as the principal residence of the owner/tenant and owner/tenant shall not use the unit for the conduct of business (except for a home occupation allowed under the City of Portland zoning ordinance) or as an investment property. Units shall not be rented for short-term periods of one to thirty days.
- Property Sale Price. The City expects to receive Fair Market Value (“FMV”) for the property.
- Alternative Ownership Models. Alternative ownership models that will encourage a mixed income community with long term affordability for the maximum number of units, such as limited equity units, co-housing, cooperative, or a community land trust, may be considered in order to ensure the units affordability over time.
- Proposals must outline how they will maintain affordability.
- Other City Incentives. Other city financial incentives may be considered to support increase housing development opportunities or maximize the number of allowable housing units on the property.

IV. PROPOSED SCORING

An internal staff Committee will review proposals received, and will apply the following selection criteria in reviewing and scoring the applications.

Proposed use to achieve the City of Portland's goals

40 points

1. Market Demand - 20 points
 - a. 20 points - all units meet the City’s Goals and Terms noted in Section III
 - b. 15 points - at least 75% of the units meet the City’s Goals and Terms noted in Section III
 - c. 10 points - at least 50% of the units meet the City’s Goals and Terms noted in Section III
 - d. 0 points - project does not meet the City’s Goals and Terms noted in Section III
2. Economic diversity - 10 points
 - a. 10 points - creates housing options which promote economic diversity in the neighborhood in which the development is located
 - b. 0 points - does not promote economic diversity
3. Age Inclusive – 10 points
 - a. 10 points – creates housing which is age inclusive
 - b. 0 points – does not create housing which is age inclusive

Impact on surrounding neighborhood, including design.

25 points

1. Project Design -15 points
 - a. 15 points - the proposal is consistent with design characteristics
 - b. 10 points - the proposal is an adequate fit with neighborhood characteristics
 - c. 0 points - the design is a significant outlier
2. Amenities and unit design - 10 points
 - a. 10 points - amenities & unit design are well thought out and appropriate for residents
 - b. 5 points - amenities & unit design are adequate

- c. 0 points - amenities and unit design raise significant concerns that resident needs will not be adequately addressed

Applicant's ability to complete project, including financial feasibility, development team experience, capacity, and timeframe for completion.

35 points

1. Readiness to proceed - 15 points
 - a. 15 points - all projected sources of funding include letters of commitment or interest are projected at terms and conditions consistent with the City's prior experience with the funder
 - b. 10 points - most projected sources of funding include letters of commitment, letters of interest, or, if no letter is included, are projected at terms and conditions consistent with the City's prior experience with this funder
 - c. 0 points - one or more sources are projected on terms that are not consistent with the City's prior experience with the funder and are not documented by letter(s) from funder(s)
2. Track record of development team - 10 points
 - a. 10 points - every development team member has a successful track record with this type of project and at this scale
 - b. 8 points - all but one development team members have a successful track record with this type of project and at this scale; one development team member has relevant experience but at a smaller scale or not of this project type
 - c. 5 points - two development team members, while having relevant experience, are new to this type of project or this scale of development
 - d. 0 points - the development team does not meet the criteria above
3. Current Capacity of development team - 10 points
 - a. 10 points - development team members have exceptional depth of human and financial resources to complete this project
 - b. 8 points - development team members have the human and financial resources to complete this project
 - c. 5 points - development team has a staffing gap in a significant role and a plan to address that gap, OR there are some concerns about the financial resources of the team to move the development forward
 - d. 0 points - the development team does not meet the criteria described above

SUBMISSION INFORMATION

Interested parties are asked to submit a concept development (including preliminary drawings) and a brief description of the project, no longer than two pages, to include the number and type of units, occupants (owners/renters) to be served, special features, the impact on the neighborhood and other ways the proposal meets the primary goals of the City. A general project budget with projected funding sources, development timeline, and development team qualifications and financial capabilities is also required. This RFP does not require detailed architectural drawings or development pro formas.

Photographs and maps of the site and area are required.

- a) **Developer:** Name, address, telephone, email, fax number of the proposed owner/developer and the name(s) of an alternative contact person(s).
- b) **Proposal:** Each proposal submitted must specifically outline the proposed use of the property and any proposed rezoning requests.

- c) **Financial Feasibility:** Provide a business plan, which shall include prospective and committed sources of funding, development and operating budgets; a letter from a lending institution indicating the applicant's ability to finance the projected costs; and provide examples of prior projects that indicate the proven ability to develop a project of similar type and scale from a fiscal perspective.
- d) **Timetable:** Provide an overview of how the proposal will be implemented. Include approximate schedule for completion of each element, closing, construction start-up, substantial completion, final completion, and occupancy. Include applications for public or private financing.
- e) **Developer Capacity:** Identify the qualifications and experience of the development team for the project including a list of previously completed projects similar to the proposed project. This team may include key staff of the developer, architect, general contractor and future property management. Also, discuss the ability to complete the project including the qualifications of the development team, management plan, experience, capacity, project readiness to proceed, and timeframe for completion.
- f) **Occupancy and Management Plan:** Present a plan detailing the ownership structure (condominium, cooperative, etc.), resale restrictions and resale process, to ensure mixed income and long-term affordability.
- g) **Purchase Price:** Proposed purchase price for the property.
- h) **Copies:** Seven (7) copies, with the original so marked, and one (1) digital copy of each proposal shall be submitted.

V. SALE INFORMATION

After proposals are opened, city staff will make a recommendation to the City Council's Economic Development Committee (EDC) and the Housing Committee (HC). The EDC and HC will make a recommendation to the City Council.

VI. OTHER INFORMATION

Confidentiality: Proposals received by the City shall become a matter of public record, subject to public inspection, except to the extent, which an applicant designates in writing, proprietary data to be confidential and submits that data under separate cover, such information, may, to the extent permitted by law, be held from public inspection, as provided in applicable Maine law, including, without limitation, 5 MRS Sections 13119-A and 13119-B.

VII. LEGAL REQUIREMENTS

The contract for the disposition of the property will be executed only after review and final approval by the City Council.

VIII. RESERVATION of RIGHTS

The City of Portland reserves the right, at its sole discretion, to award as well as reject any and all proposals for the city-owned property, based on the quality and merits of the proposals received, or when it is determined to be in the public interest to do so. Furthermore, the City may extend deadlines and timeframes, as needed.

The City reserves the right to substantiate any proposer's qualifications, capability to perform, availability, past performance records, and to verify that the proposer is current in its financial obligations to the City.

The City of Portland, Maine, reserves the right to waive any informalities in proposals, to accept any proposal or portion thereof, and, to reject any and all proposals, as well as negotiate with the successful proposer(s) should it be in the best interest of the City to do so for a final purchase and sale agreement and ultimate sale of the property.

Pursuant to City procurement policy and ordinance, the City is unable to contract with businesses or individuals who are delinquent in their financial obligations to the City. These obligations may include but are not limited to real estate and personal property taxes and sewer user fees.

Proposers who are delinquent in their financial obligations to the City must do one of the following: bring the obligation current, negotiate a payment plan with the City's Treasury office, or agree to an offset, which shall be established by the contract, which shall be issued to the successful proposer

April 10, 2020

Matthew F. Fitzgerald
Purchasing Manager

Attachments:

- A. Proposal Signature
- B. Portland Assessor's Record
- C Site Map
- D Phase II ESA available online

PROPOSAL**NOTE: THIS PAGE IS TO BE COMPLETED AND RETURNED**

The UNDERSIGNED hereby declares that he/she or they are the only person(s), firm or corporation interested in this proposal as principal, which it is made without any connection with any other person(s), firm or corporation submitting a proposal for the same.

The UNDERSIGNED hereby declares that they have read and understand all conditions as outlined in the Request for Proposals, and that the proposal is made in accordance with same.

The UNDERSIGNED hereby declares that any person(s) employed by the City of Portland, Maine, who has direct or indirect personal or financial interest in this proposal or in any portion of the profits which may be derived therefrom has been identified and the interest disclosed by separate attachment. (Please include in your disclosure any interest which you know of. An example of a direct interest would be a City employee who would be paid to perform services under this proposal. An example of an indirect interest would be a City employee who is related to any officers, employees, principal or shareholders of your firm or to you. If in doubt as to status or interest, please disclose to the extent known).

The proposer acknowledges the receipt of Addenda numbered _____
If Applicable

COMPANY NAME: _____
(Individual, Partnership, Corporation, Joint Venture)

AUTHORIZED SIGNATURE: _____ DATE: _____
(Officer, Authorized Individual or Owner)

PRINT NAME & TITLE: _____

ADDRESS: _____

TELEPHONE: _____ E-MAIL: _____

FEDERAL TAX ID #: _____ DUNS #: _____

STATE OF INCORPORATION _____

(If incorporated in another State, businesses must be authorized to do business in the State of Maine.)

In your organizations preceding completed fiscal year, did the organization receive:

(1) 80 percent or more of its annual gross revenues in U.S. federal contracts, subcontracts, loans, grants, subgrants, and/or cooperative agreements; AND

(2) \$25,000,000 or more in annual gross revenues from U.S. federal contracts, subcontracts, loans, grants, subgrants, and/or cooperative agreements? ☐ Yes ☐ No

Does the public have access to information about the compensation of the executives in the organization through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (18 U.S.C. 78m(a), 78o(d) or section 6104 of the Internal Revenue Code of 1986? ☐ Yes ☐ No

NOTE: All bids must bear the handwritten signature of a duly authorized member or employee of the organization making the bid. **This sheet must be signed and returned with the application package.**

This page contains a detailed description of the Parcel ID you selected.

New Search!

Current Owner Information:

CBL	078 C002001
Land Use Type	GOVERNMENTAL
Verify legal use with Inspections Division	
Property Location	43 DOUGLASS ST
Owner Information	CITY OF PORTLAND 389 CONGRESS ST PORTLAND ME 04101
Book and Page	
Legal Description	78-C-2 DOUGLASS ST 43-53 REAR PROPOSED ST 17340SF
Rental Registration	No
Acres	0.3981

Current Assessed Valuation:

TAX ACCT NO.	10005	OWNER OF RECORD AS OF APRIL 2019
LAND VALUE	\$49,000.00	CITY OF PORTLAND
BUILDING VALUE	\$0.00	389 CONGRESS ST
MUNICIPAL TYPE	(\$49,000.00)	PORTLAND ME 04101
NET TAXABLE - REAL ESTATE	\$0.00	
TAX AMOUNT	\$0.00	

Any information concerning tax payments should be directed to the Treasury office at 874-8490 or [e-mailed](#).

This page contains a detailed description of the Parcel ID you selected.

New Search!

Current Owner Information:

CBL	078 B007001
Land Use Type	GOVERNMENTAL
Verify legal use with Inspections Division	
Property Location	91 DOUGLASS ST
Owner Information	CITY OF PORTLAND 389 CONGRESS ST PORTLAND ME 04101
Book and Page	
Legal Description	78-B-7 DOUGLASS ST 91-105 195648 SF
Rental Registration	No
Acres	4.4915

Current Assessed Valuation:

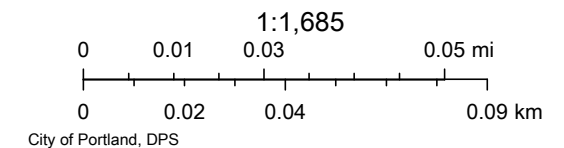
TAX ACCT NO.	10005	OWNER OF RECORD AS OF APRIL 2019
LAND VALUE	\$489,100.00	CITY OF PORTLAND
BUILDING VALUE	\$0.00	389 CONGRESS ST
MUNICIPAL TYPE	(\$489,100.00)	PORTLAND ME 04101
NET TAXABLE - REAL ESTATE	\$0.00	
TAX AMOUNT	\$0.00	

Any information concerning tax payments should be directed to the Treasury office at 874-8490 or [e-mailed](#).



3/10/2020, 12:45:58 PM

■ Override 1



Order 72-21/22

Passage: 7-0 (Fournier absent) on 10/18/2021

Effective 10/28/2021

KATE SNYDER (MAYOR)
 BELINDA S. RAY (1)
 SPENCER R. THIBODEAU (2)
 TAE Y. CHONG (3)
 ANDREW ZARRO (4)

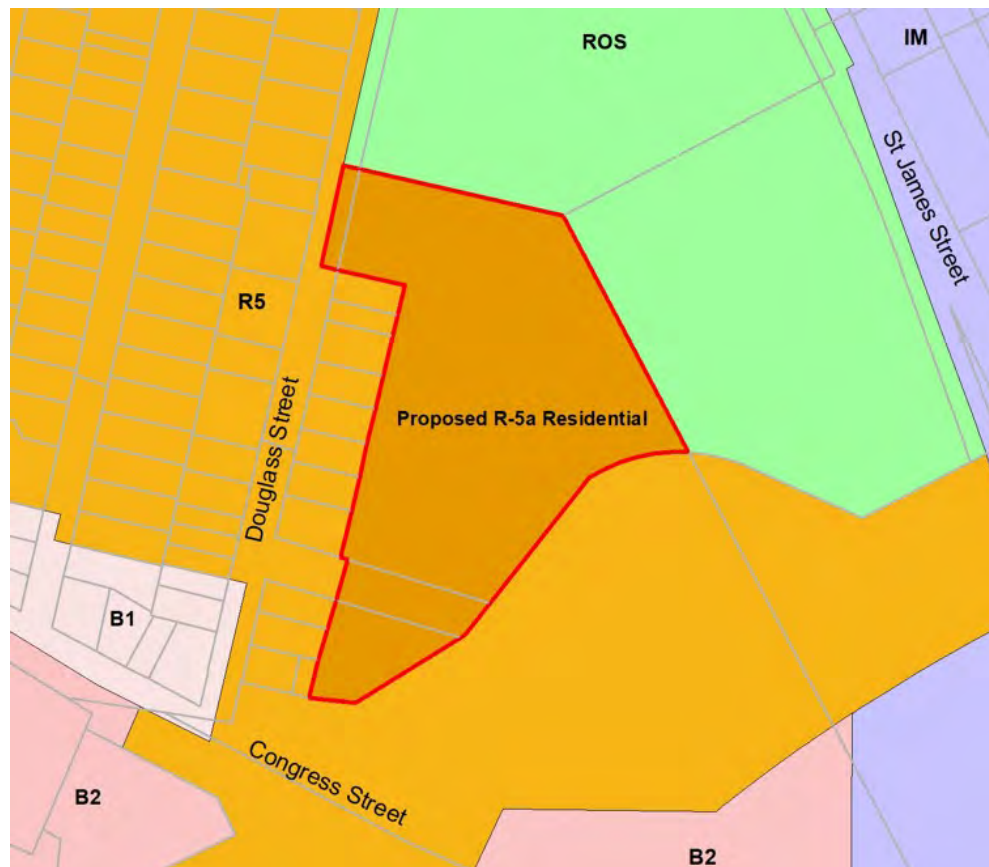
CITY OF PORTLAND
IN THE CITY COUNCIL

MARK DION (5)
 APRIL D. FOURNIER(A/L)
 PIOUS ALI (A/L)
 NICHOLAS M. MAVODONES, JR (A/L)

AMENDMENT TO ZONING MAP
RE: 43 AND 91 DOUGLASS STREET
FROM R-5 RESIDENTIAL TO R-5A RESIDENTIAL

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF PORTLAND, MAINE
IN CITY COUNCIL ASSEMBLED AS FOLLOWS:

That the Zoning Map of the City of Portland, dated December 2000, as amended and on file in the Department of Planning and Urban Development, and incorporated by reference into the Zoning Ordinance by §14-49, be and hereby is amended by adopting the attached map change amendment and specifically rezoning property at 43 and 91 Douglass Street from R-5 Residential to R-5a Residential as shown in the bordered area in the map below.





Jimmy Dealaman <jdealaman@portlandmaine.gov>

57 Douglas Street -Status Traffic Comments

Tom Errico <thomas.errico@tylin.com>

Thu, May 5, 2022 at 1:56 PM

To: James Dealaman <jdealaman@portlandmaine.gov>

Cc: Jeremiah Bartlett <jbartlett@portlandmaine.gov>

Hi Jimmy – I have reviewed the application materials and offer the following status traffic comments.

- I reviewed the applicant's trip generation estimate and I generally find the methodology to be reasonable. Given trip credits for the former school, the project does not require a Traffic Movement Permit. I also investigated the presence of High Crash Locations on Douglass Street between Congress Street and Brighton Avenue. There are no High Crash Locations. Based upon the trip generation estimate, the preparation of a traffic study is not recommended.

Status: I have no further comment.

- The applicant shall conduct a parking study to document the adequacy of the proposed parking supply. The parking study can be based on ITE and local data from similar type residential developments.

Status: I have reviewed the parking demand study prepared by the applicant and in general I find to it to be reasonable. I do not support the assumption that the project is less than half a mile from a rail station (criteria in the ITE Parking Generation Manual). The definition is intended for a commuter rail station and not an Amtrak station. Based upon my calculation the project will generate the following parking demand:

- Mid-Rise Multi-Family 19 Units x 0.90 spaces per unit = 17 spaces
- Low-Rise Multi-Family 28 Units x 0.76 spaces per unit = 21 spaces
- Affordable Housing – Income Limits 73 Units x 0.53 spaces per unit = 39 spaces
- Total = 77 spaces

This does increase the parking demand estimate slightly, but the proposed supply (78 spaces) is expected to be sufficient.

- In general, I find access and egress and circulation to be acceptable.

Status: I have no further comment.

- I do not support the applicant's justification for parking aisle width reduction. Waivers from the City's Technical Standards in most cases are justified by site or other constraints. The applicant shall present information that details site constraints that prevents them from meeting City Standards.

Status: The applicant is requesting an aisle width waiver in conjunction with reducing impervious area and documents the adequacy of vehicle movements into and out of parking spaces. I would suggest that the applicant review site specific details that prevent expansion of the parking area to meet the 24-foot aisle width standard and document why the site can't accommodate the wider aisle width.

- I generally support a waiver for the number of compact parking spaces given the likelihood of low parking space turnover due to it being a residential development with the expectation of tenants using alternative transportation. But like the previous comment, the applicant shall present information that details site constraints that prevents them from meeting City Standards.

Status: The applicant has reduced the number of compact parking spaces and a waiver is no longer required. I have no further comment.

If you have any questions, please contact me.

Best regards,

Tom Errico, PE

NE TRAFFIC ENGINEERING DIRECTOR

T +1 207.347.4354

M +1 207.400.0719

E thomas.errico@tylin.com

TYLin

12 Northbrook Drive Building A, Suite One
Falmouth, ME 04105, United States

[TYLin.com](https://www.tylin.com)





Jimmy Dealaman <jdealaman@portlandmaine.gov>

57 Douglass Street: Inclusionary Zoning

Victoria Volent <vvolent@portlandmaine.gov>

Thu, Mar 17, 2022 at 11:30 AM

To: James Dealaman <jdealaman@portlandmaine.gov>

Hi Jimmy,

57 Douglass Street proposes the construction of 120 units of housing over two phases. The project triggers Inclusionary Zoning as it would create ten or more new dwelling units through new construction. Per Section 18.2.3 C 3, "projects shall not be segmented or phases to avoid compliance with these provisions."

Phase I proposes the construction of one five-story building with 63 units of housing containing 35 one-bedroom, 18 two-bedroom, and 10 three-bedroom units.

Phase II proposes the construction of; one three-story townhouse containing 6 one-bedroom units and 6 three-bedroom units for a total of 12 units; three townhouses the first of which would contain 6 units (with 6 three-bedrooms), the second and third building would contain 4 units each for a total of 8 units (with a total of 8 three-bedroom units); three courtyard flats made up of 2 three-story building containing a total of 20 units (with 8 one-bedroom, 10 two-bedroom and 2 three-bedroom units) and a third three-story building containing 11 units (with 1 studio, 4 one-bedroom, 5 two-bedroom, and 1 three-bedroom units). The total bedroom count for Phase II is: 1 studio unit, 18 one-bedroom units, 15 two-bedroom units, and 23 three-bedroom units.

Phase I proposes to provide 46 units at or below 60% AMI (23 one-bedroom and 14 two-bedroom units) and 17 units at market rate. 46 out of 63 units equals 74% of the total units as deed restricted.

Phase II proposes to provide 25% of the cooperative units (15 units) deed restricted to households at or below 80% AMI.

25% of all one-bedroom units equals 13 one-bedroom units; 25% of all two-bedroom units equals 9 two-bedroom units; and 25% of all three bedroom units equals 8 bedroom units.

Based on the material presented, [57 Douglass Street](#) would comply with section 18.2 by providing 30 workforce units with 13 one-bedroom units, 9 two-bedroom units, and 8 three-bedroom units; In compliance with section 18.2, 57 Douglass Street has chosen to provide 61 units (50% of the total units) at or below 80% AMI.

Thank you,

Victoria

Victoria Volent
Housing Program Manager
[City of Portland](#)
[389 Congress Street](#)
Phone: 207-482-5028
[www.portlandmaine.gov](#)



Design Review Planning and Urban Development Department



Subject: 57 Douglass Street
Zone: R-5a
Date of Review: Tuesday, March 1, 2022
Reviewer(s): Sean King (Urban Designer), Jimmy Dealaman (Planner), Kevin Kraft (Deputy Director)
Project ID: PL-001838-2021

I. INTRODUCTION

The proposed Douglass Commons development is a new, family-oriented neighborhood providing both affordable home ownership and rental home opportunities with a plan to create a community of 108 households. Design principles proposed for the new neighborhood include a balance of green space, transit-orientation, walkability, community, privacy, and affordability.

II. DESIGN REVIEW COMMENTS

(h) Planned Residential Unit Development (PRUDs) in the R-5a Residential Zones

Standard (1) a. Design relationship to the site

Building placement, orientation and arrangement are responsive to surrounding neighborhood street network along with southern solar exposure to provide morning / evening light between proposed building types (community flats, townhomes, rowhomes, and apartment building). The proposed neighborhood has a new primary roadway access from Douglass Street, interior roadways are limited for vehicles to access parking while prioritizing pedestrian connections with walkways to residential entryways and open spaces. The location of parking and drainage facilities are proposed at the southern edge of the property to create the close proximity of buildings that promote a neighborhood quality for community interactions. The proposed development provides an interior network of open spaces with communal, shared and private spaces with three (3) pedestrian walkways that connect to public recreation and trail, in addition to one (1) sidewalk to Douglass Street.

Standard (1) b. Internal design character and relationship to the surrounding neighborhood

Context: The surrounding neighborhood contains a variety of residential housing types that range from single-family, two-family and multi-family dwelling units. The proximity of existing residential housing to each other is evident by the dimensional standard setbacks within the R-5 zone that also maintains a clear orientation to the street. Existing buildings include a majority of gable roofs, flat roofs utilized in multi-family units, entryway porches and simple windows. Other adjacent uses that border the property include Dougherty Field recreation area, Dougherty Field Path, and Interstate I-295 on/off ramps which do not reinforce the neighborhood form and must address adequate buffers from existing uses. **Applicant to provide additional 3-dimensional views from outside the property from Dougherty Field, Congress Street and Douglass Street.**

Architectural character: The overall design character should seek to reinforce the neighborhood development of multiple housing types that relate cohesively through the connectivity of materials. The characteristics of the four (4) proposed housing types (Courtyard flats, townhouses, rowhouses and apartments) include a range in siding material – cedar shiplap, reverse board and batten, traditional lap with reveal variation and color, HPL phenolic panel, fiber cement lap siding and paneling, in addition to shared entrance canopies of various form / material, and mixed pattern of fenestrations. **Applicant to provide clarification on materiality of lap siding, cornice and trim detailing for all housing types. Physical materials are encouraged to understand durability of proposed exterior finishes. To promote a strong cohesive identity of the proposed neighborhood character, a reduction in material types is recommended as well as color scheme continuity between Phase 1 & Complete Master Plan build-out**

buildings. Applicant to increase window fenestrations that face open space and parking lots to allow for greater visibility and natural light, specifically at Apartment building south façade at interior stairwell, Courtyard Flats A.1 & A.3, Townhouses B.2 & C.1, Rowhouses D.

Height, scale, and massing: The design and layout of buildings exhibit a cohesive design character expressed by a diversity of housing types, roof types and exterior facades to create a unique neighborhood. The transition in building heights from existing residential buildings along Douglass Street is appropriate, with taller building heights proposed interior to the property. **Because the building contains more than 2 units, the project must provide variation in roof and façade character through changes in façade setback, roof configuration, and projecting or recessed building elements. Applicant shall provide additional variation (ie. vestibule / shared porch recessed, façade projections, or cable roof configurations) in façade and/or roof form for building lengths greater than forty (40) feet, specifically the Apartments west façade, Rowhouse D.1 south façade, Townhouse B.1, B.2 & C.1 east façade.**

Standard (1) c. Recreation and open space

1. External buffers: Sufficient landscape buffers as screening provided around perimeter. **Applicant to address potential future parking expansion with an interim solution to include additional tree plantings or other screen planting to help buffer property from State of Maine Interstate 295 adjacent use.**
2. Internal buffers: Effective privacy between unit entryways, screening of utilities, roadways and waste collection provide sufficient planting proposed.
3. Passive recreational open space: Opportunities for passive recreational open space includes paved walkways, stone bench seating, lawn spaces and paved communal patio spaces. **Applicant to consider additional opportunities for communal open space at Apartment building, potentially at basement level with door access from shared Laundry Room to an outdoor amenity (ie patio, trellis, seating, planting etc.) that is easily accessible for residents.**
4. Active recreational open space: Master landscape plan promotes connection to existing recreational area at Dougherty Field. **Applicant to consider addition of site lighting to distinguish all property entry points, specifically at proposed pedestrian walkways & stairs connections to Dougherty Field and Path.**
5. Private open spaces: Proposed private open spaces include shared porches / entryways at Rowhouses, Townhouse, Courtyard Flats and Apartments. Individual unit patios proposed at back of Townhouses. Balconies proposed at Courtyard Flats. **Applicant to consider additional opportunities for private open space for residents (ie. balconies) at Apartment building.**

Design Review
Planning and Urban Development Department



Subject: 57 Douglass Street
Zone: R-5a
Date of Review: Thursday, May 5, 2022
Reviewer(s): Sean King (Urban Designer), Jimmy Dealaman (Planner)
Project ID: PL-001888-2021

I. DESIGN REVIEW COMMENTS

(h) Planned Residential Unit Development (PRUDs) in the R-5a Residential Zones.

(1) STANDARDS. Planned residential unit developments (PRUDs) in the R-3, R-5 or R-5a residential zones and manufactured housing parks in any zone shall meet the following standards. (red text denotes standards that are not met):

Standard (1) a. Design relationship to the site

The placement, orientation and arrangement of buildings types (Courtyard flats, Townhouses, Rowhouses and Apartment building) are responsive to the surrounding neighborhood street network and provide adequate southern solar exposure for morning / evening light. The proposed PRUD has a new primary roadway access from Douglass Street, interior roadways are limited for vehicles to access parking and drop-off areas to prioritize pedestrian accessibility with walkways to all residential entryways and open spaces. The location of parking and drainage facilities are proposed at the southern edge of the property to arrange the close proximity of buildings that complement the walkable connections to existing open space features at Dougherty Field and sidewalk connection to Douglass Street. The proposed development provides an interior network of open spaces with communal, shared and private spaces.

Standard (1) b. Internal design character and relationship to the surrounding neighborhood

Context: The surrounding neighborhood contains a variety of residential housing types that range from single-family, two-family and multi-family dwelling units. The proximity of existing residential housing to each other is evident by the dimensional standard setbacks within the R-5 zone that also maintains a clear orientation to the street. Existing buildings include a majority of gable roofs, flat roofs utilized in multi-family units, entryway porches and simple windows. Other adjacent uses that border the property include Dougherty Field recreation area, Dougherty Field Path, and Interstate I-295 on/off ramps which do not reinforce the neighborhood form and must address adequate buffers from existing uses. The applicant has provided updated plans and views to verify sufficient vegetated buffers from adjacent uses.

Architectural character: The overall building design character should complement existing development in the surrounding neighborhood that range in a variety of materials that include traditional lap siding, natural and composite siding shingles. The architectural character of the proposed building types (Courtyard flats, Townhouses, Rowhouses and Apartment building) include a range in siding material – cedar shiplap, reverse board and batten, traditional lap with reveal variation and color, fiber cement lap

siding and paneling, metal shingles and brick base that effectively relate to surrounding neighborhood. The proposed building types include shared entrance canopies of various form / color / material, façade articulation and window fenestration patterns oriented towards primary circulation routes.

Height, scale, and massing: The design and layout of buildings exhibit a cohesive design character expressed by a diversity of housing types, roof types and exterior facades to create a unique neighborhood. The transition in building heights from existing residential buildings along Douglass Street is appropriate, with taller building heights proposed interior to the property. Applicant has provided additional building design variation for all units and housing types above 2 units with building lengths greater than forty (40) feet. These variations include façade material changes to differentiate units vertically, variation in roof forms and building massing composition articulated with appropriate material changes.

Standard (1) c. Recreation and open space

1. External buffers: Sufficient landscape buffers via screening shrubs and tree plantings are provided around perimeter of the property. Applicant has confirmed the existing trees along State Interstate 295 on/off ramp as an existing external buffer to remain.
2. Internal buffers: Effective privacy between unit entryways, screening of utilities (e.g. transformer, generator), roadways and waste collection is proposed with sufficient screening shrubs.
3. Passive recreational open space: Proposed passive recreational open space includes paved walkways, stone bench seating, lawn spaces and paved communal patio spaces. **Applicant to consider additional opportunities for communal open space at Apartment building, potentially at basement level with door access from shared Laundry Room to an outdoor amenity (ie patio, trellis, seating, planting etc.) that is easily accessible for residents.**
4. Active recreational open space: The applicant's master landscape plan promotes connection to the existing recreational area at Dougherty Field and multi-use path managed by Portland Trails. Applicant has provided sufficient site lighting within close proximity to the proposed walkway and stair pedestrian access connection.
5. Private open spaces: Proposed private open spaces are included within the applicant's master landscape plan to include; balconies and entryway porches at Rowhouses, individual unit patios and entryway porches proposed at rear of Townhouses, and balconies proposed at Courtyard Flats. **Applicant to consider additional opportunities for private open space for residents (ie. Balconies, yards, decks, patios) at Apartment building.**



Jimmy Dealaman <jdealaman@portlandmaine.gov>

REMINDER: Review Comments Needed - 57 Douglass St

Lauren Swett <lswett@woodardcurran.com>
To: Jimmy Dealaman <jdealaman@portlandmaine.gov>

Wed, May 4, 2022 at 4:39 PM

Hi Jimmy,

I have reviewed their response to comments, and their new plans with phasing, and have the following remaining comments to include:

- Utility ability to serve confirmation remains.
- The plans have been set up to show Phase I and Phase II as stand along projects where the sequence of phasing could vary. I think this works, but there are a few things that should be confirmed further relative to this variability. I think this may be able to be addressed with a condition related to providing an update prior to start of work. Maybe it could be tied to receipt of building permit?
 - I think there may be some confusion with the areas that are shown on the phased construction management plans. The Phase I CM plan should show the impacts and required management associated with that phase of work; however the plan doesn't show any phasing or fencing associated with the Phase I space? The Phase I and Phase II CM plans are separate, but ultimately these will need to consider CM requirements associated with the other phase being under construction or up and operating. For example erosion control needs to be provided for all previously installed stormwater systems. I think these items are best addressed at the time when sequencing is known, so it could be part of a condition.
 - I think some additional clarifying notes should be provided on the Phase Grading plans clarifying how the work will integrate with each other depending on what phase happens first. Some of the notes provided are a bit confusing (for example, the "Phase II Site to be filled..." note on the Phase II plan). The phased plans should be very clear that there may be a need to coordinate between the two phases either between a construction project and a completed site, or between two construction projects t different phases of the work.
 - Similar clarification will be necessary for the utility plan, but as with all of the plans, this may be better completed at the time when sequencing is known.
 - The phasing will need to be taken into consideration with the stormwater maintenance agreement as well.
- The Applicant has noted that the variations in stormwater treatment systems shouldn't impact the overall stormwater model for the site. I agree with that. Ultimately, when the final system is selected, the plans and design information provided should reflect that system, and the manufacturer confirmation of the design should be for the final system. In addition, the Stormwater Maintenance Agreement should reflect this specific system, referring to the O&M requirements that will vary depending on the system selected. The draft agreement provided does not refer to these stormwater systems.

These remaining items are mostly related to clarity around phasing, so just some additional discussion with them, and thought around timing of conditions on when additional information should be provided is necessary. Please let me know if you have any questions.

Thanks!

Lauren

From: Jimmy Dealaman <jdealaman@portlandmaine.gov>

Sent: Wednesday, May 4, 2022 1:59 PM

To: Jason Grant <jgrant@portlandmaine.gov>; Lauren Swett <lszett@woodardcurran.com>; Jeff Tarling <jst@portlandmaine.gov>; Jennifer Ladd <jwl@portlandmaine.gov>

Subject: REMINDER: Review Comments Needed - 57 Douglass St

I've submitted my draft memo to Planning leadership and did my best to fill in the blanks. Can each of you send me written comments to reference for the Board at the upcoming workshop. Posting memo Friday, so if these are to be included tomorrow morning the absolute latest.

Jeff, if you're available to chat tomorrow morning before sending anything, I'd like to touch base about some of the items we covered this morning at dev rev.

Jason, as we discussed, sounds like your good with emergency vehicle access but just seeking the applicant provide vehicle turning analysis for Phase II plan.

Thanks!

Jimmy

--

Jimmy Dealaman

Planner

City of Portland

Planning and Urban Development Department

[389 Congress Street, 4th Floor](#)

Portland, Maine 04101

(207) 874-8718

jdealaman@portlandmaine.gov

www.portlandmaine.gov



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Jimmy Dealaman <jdealaman@portlandmaine.gov>

57 Douglas St

John Peverada <jbp@portlandmaine.gov>

Tue, May 3, 2022 at 3:20 PM

To: Jimmy Dealaman <jdealaman@portlandmaine.gov>

Cc: Kevin Kraft <kkraft@portlandmaine.gov>, James Rather <jrather@portlandmaine.gov>, Errico Thomas <thomas.errico@tylin.com>, Jeremiah Bartlett <jbartlett@portlandmaine.gov>, Anne McGuire <amcguire@portlandmaine.gov>, Mary Davis <mpd@portlandmaine.gov>

Jimmy,

I have reviewed the plans for this development and it looks quite impressive, however I am concerned that there are only 79 parking spaces for 120 units.

It is my understanding that the first phase will have a parking ratio of 1 to 1 which is good, but the second phase will only have 22 spaces for 63 units a ratio of .34 spaces per unit, which in my opinion is unacceptable.

I fully understand that more housing in the City could be beneficial; however I think that it should be created in a way that

it does not negatively impact others. In this specific case the existing residents of Douglas St. are already parking on the street,

coupled with people attending events at Dougherty Field can make for a tight parking supply. Not to mention where people will park during parking bans.

Most landlords that I talk to say that most of their tenants have at least one car and most have more, in many cases two families are sharing one apartment, or teenagers have cars, and others have overnight guest.

For the above stated reasons, I think that it is unfortunate that this development will not be providing at least one off street parking

space per unit for all units. I still believe that the majority of tenants/owners will own vehicles. Even if they do not use their vehicles daily, they will need a place to park or store them.

The following is a email I received from a resident of Parkside that supports my statements above.

"I am a Parkside resident and homeowner of a two unit on Sherman St...I have parking for only one vehicle and there are 4 tenants including myself...

Since I am older and work some nights until midnight, walking two or three blocks at that hour is really unsafe for both myself and or tenants.

What is the reality of increasing any type of city parking for this area. I am at the Maine Medical end of Sherman and there are NO nearby parking locations....With the new development of the housing on Cumberland Avenue this issue is going to get worse.....Several homes on my end of Sherman have no driveways at all so street parking is nearly IMPOSSIBLE to find.

I work privately as a caregiver for an elderly lady with Alzheimer's disease which requires me to be on call 24 hours a day, so a taxi is not an option.

Thoughts/ideas/anything? I am almost to the point of selling my home due to lack of parking.

Sincerely...."

Let me know if you need any additional information from me concerning this matter.

Please forward this memo onto the Planning Board.

Thanks
John