

1. LEGAL AD

Documents: [PB LGL AD 7-22-14.PDF](#)

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3. 899 Riverside Street

3.I. PB Memo

Documents: [RIVERSIDE ST. - 899 \(PB MEMO\).PDF](#)

3.II. Applicants Submittal

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4. 777 Stevens Avenue

4.I. Memo

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4.II. Staff Comments

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4.IV. Plans

Documents: [STEVENS AVE. - 777 \(PLANS\).PDF](#)

5. 89 Anderson Street

5.I. Memo

Documents: [ANDERSON ST. - 89 \(MEMO\).PDF](#)

5.II. Applicants Submittal

Documents: [ANDERSON ST. - 89 \(APPLICANTS SUBMITTAL\).PDF](#)

5.III. Neighborhood Mtg. Packet

Documents: [ANDERSON ST. - 89 \(NEIGHBORHOOD MTG. PACKET\).PDF](#)

5.IV. Public Comment

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6. 81 E. Oxford Street

6.I. Report

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6.II. Staff Attachments

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6.III. Applicants Submission Dated 7-1-14

Documents: [E. OXFORD ST. - 81 \(PLANS\).PDF](#), [E. OXFORD ST. - 81 \(APPLICANTS SUBMISSION DATED 7-1-14\).PDF](#)

6.IV. Applicants Submission Dated 7-18-14

Documents: [E. OXFORD ST. - 81 \(APPLICANTS SUBMISSION DATED \(7-18-14\).PDF](#)

6.V. Applicants Submission Dated 6-5-14

Documents: [E. OXFORD ST. - 81 \(APPLICANTS SUBMISSION DATED 6-5-14\).PDF](#)

7. 50 Industrial Way

7.I. PB Report

Documents: [INDUSTRIAL WAY - 50 \(PB REPORT\).PDF](#)

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Documents: [INDUSTRIAL WAY - 50 \(REPORT ATTACHMENTS\).PDF](#)

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8. 921 Riverside Street

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Documents: [RIVERSIDE ST. - 921 \(REPORT\).PDF](#)

8.II. Report Attachments

Documents: [RIVERSIDE ST. - 921 \(REPORT ATTACHMENTS\).PDF](#)

8.III. Applicants Submittal

Documents: [RIVERSIDE ST. - 921 \(APPLICANTS SUBMITTAL\).PDF](#)

8.IV. Plans

Documents: [RIVERSIDE ST. - 921 \(PLANS\).PDF](#)

**LEGAL ADVERTISEMENT
PORTLAND PLANNING BOARD MEETING**

The Portland Planning Board will hold a meeting on July 22, 2014, Room 209, 2nd Floor, City Hall, 389 Congress Street. **Public comments will be taken at both the workshop and public hearing.**
The agenda includes the following items:

Workshop – 4:00 p.m.

- i. 899 Riverside Street; Text Amendment; Spurwink, Applicant. Spurwink School at 899 Riverside Street has submitted a zoning text amendment to allow Intermediate Care facilities with up to 26 persons plus staff in the Industrial I-M zone and to clarify the zoning definition of intermediate care facilities to align with current state definitions. Spurwink proposes to relocate their offices at 899 Riverside to another location and to convert the office building to an intermediate care facility.
- ii. 777 Stevens Avenue; Map and Text Amendment; Park Danforth; The Park Danforth, Applicant. Park Danforth has submitted an application for a zoning map and text amendments in order to expand their elderly housing programs and construct a building addition. The proposed map amendment is to expand the R-6 zone to Arbor Street and along Forest Avenue (encompassing Tax Map 146, Chart C, Lots 6-9, 12 and 14), which are currently zoned Residential R-5 or Business B-2. The proposed text amendments define elderly independent living housing, set an R-6 maximum building height at 55 feet for elderly independent living housing, and allow one parking space per unit in all R-6 zones.
- iii. 89 Anderson Street; Map Amendment; Redfern Properties, Applicant. The Board will consider a proposal by the applicant to rezone 89 Anderson Street (the site has frontage along Anderson, Fox, and Everett Streets) from the Residential R-6 zone to the Community Business B-2b zone. The site is currently developed with a tire and auto service facility. The map amendment is proposed in order to enable a mixed use building at the site with ground floor commercial uses, including a restaurant, and with market-rate apartments on floors 2 through 4.

Public Hearing – 7:00 p.m.

- i. 81 East Oxford Street; Level III Site Plan; Bayside Anchor; Portland Housing Authority, Applicant. The Board will consider an application to construct the Bayside Anchor project, which consists of 45 rental apartments and community support spaces in a new 4 story building with associated site improvements at 81 East Oxford St.
- ii. 50 Industrial Way; Level III Site Plan; Allagash Brewery Expansion; 50 Industrial Way; Allagash Brewing, Applicant. The Board will consider an 18,360 sq. ft. phased building expansion that will connect the buildings at 50 and 100 Industrial Way. The project will include adding loading docks, site work, 2,422 sq. ft. bunker and a concrete pad for tank support.
- iii. 921 Riverside Street; Level III Site Plan; Trampoline Park; Kowabunga, LLC., Applicant. The Board will consider a change of use for a 25,087 sq. ft. warehouse to a trampoline center at 921 Riverside Street. The proposal is a permitted use in the Industrial IM zone.

STUART O'BRIEN, CHAIR - PORTLAND PLANNING BOARD

CITY OF PORTLAND, MAINE
PLANNING BOARD

Stuart G. O'Brien, Chair
Timothy Dean, Vice Chair
Elizabeth Boepple
Sean Dundon
Bill Hall
Carol Morrisette
Jack Soley

AGENDA
PORTLAND PLANNING BOARD

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WORKSHOP – 4:00 p.m.

- i. 899 Riverside Street; Text Amendment; Spurwink School, Applicant. Spurwink School at 899 Riverside Street has submitted a zoning text amendment to allow Intermediate Care facilities with up to 26 persons plus staff in the Industrial I-M zone and to clarify the zoning definition of intermediate care facilities to align with current state definitions. Spurwink proposes to relocate their offices at 899 Riverside to another location and to convert the office building to an intermediate care facility.
- ii. 777 Stevens Avenue; Map and Text Amendment; Park Danforth; The Park Danforth, Applicant. Park Danforth has submitted an application for a zoning map and text amendments in order to expand their elderly housing programs and construct a building addition. The proposed map amendment is to expand the R-6 zone to Arbor Street and along Forest Avenue (encompassing Tax Map 146, Chart C, Lots 6-9, 12 and 14), which are currently zoned Residential R-5 or Business B-2. The proposed text amendments define elderly independent living housing, set an R-6 maximum building height at 55 feet for elderly independent living housing, and allow one parking space per unit in all R-6 zones.
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PUBLIC HEARING – 7:00 p.m.

- 1. ROLL CALL AND DECLARATION OF QUORUM**
- 2. COMMUNICATIONS AND REPORTS**
- 3. REPORT OF ATTENDANCE AT THE MEETING HELD ON JULY 8, 2014:**

Workshop: O'Brien, Dean (5:00) Boepple, Dundon, Hall, and Soley present. Morrisette absent.

Public Hearing: O'Brien, Dean, Boepple, Dundon, Hall, and Soley present. Morrisette recused from first item and absent.

4. REPORT OF DECISIONS AT THE MEETING HELD ON JULY 8, 2014:

- i. Amendment to Conditional Rezoning Agreement; Casco Heights Condominiums (formerly Graves Hill Development); 802-828 Ocean Avenue; Ridge Development, LLC., Applicant. Dean moved and Hall seconded a motion to find the proposed First Amendment to the Conditional Rezoning Agreement to be consistent with the Comprehensive Plan. Vote: 1-5 (Boepple, Dean, Dundon, Hall, and Soley opposed. Morrisette recused). Dean moved and Hall seconded a motion to find the proposed First Amendment to the Conditional Rezoning Agreement to be consistent with the underlying R-5A zone. Vote: 1-5 (Boepple, Dean, Dundon, Hall, and Soley opposed. Morrisette recused). Dean moved and Hall seconded a motion to recommend to City Council the proposed conditional rezoning agreement as revised by staff and Planning Board for 802 Ocean Avenue. Vote: 0-6 (O'Brien, Dean, Boepple, Dundon, Hall, and Soley opposed. Morrisette recused).
- ii. International Marine Terminal, 528 Commercial Street, Level III Site Plan, Maine Department of Transportation, Applicant. Dean moved and Hall seconded a motion to approve the International Marine Terminal (IMT) expansion with six conditions of approval. Vote: 6-0, Morrisette absent. Dean moved and Hall seconded a motion that found the proposed site plan in conformance with Shoreland Zoning. Vote: 6-0 (Morrisette absent)
- iii. Seaport Lofts (aka Bay Hosue Phase 2) , Reivew of Exterior Elevations per Condition of Approval, 101-121 Newbury Street, 113 Newbury Street, LLC, Applicant. Dean moved and Hall seconded a motion that found the revised building elevations met a condition of approval from the Board's October 22, 2013 approval. Vote: 6-0, (Morrisette absent)

5. NEW BUSINESS

- i. 81 East Oxford Street; Level III Site Plan and Subdivision; Bayside Anchor; Portland Housing Authority, Applicant. The Board will consider an application to construct the Bayside Anchor project, which consists of 45 rental apartments and community support spaces in a new 4 story building with associated site improvements at 81 East Oxford St.
- ii. 50 Industrial Way; Level III Site Plan; Allagash Brewery Expansion; 50 Industrial Way; Allagash Brewing, Applicant. The Board will consider an 18,360 sq. ft. phased building expansion that will connect the buildings at 50 and 100 Industrial Way. The project will include adding loading docks, site work, 2,422 sq. ft. bunker and a concrete pad for tank support.
- iii. 921 Riverside Street; Level III Site Plan; Trampoline Park; Kowabunga, LLC., Applicant. The Board will consider a change of use for a 25,087 sq. ft. warehouse to a trampoline center at 921 Riverside Street. The proposal is a permitted use in the Industrial IM zone.

STUART O'BRIEN, CHAIR - PORTLAND PLANNING BOARD

Memorandum

Planning and Urban Development Department

Planning Division



To: Stuart O'Brien, Chair and Members of the Portland Planning Board
From: Shukria Wiar, Planner
Date: Thursday, July 12, 2014
Re: Text Amendment; 899 Riverside Street; City of Portland
Project #: 2012-108 CBL: 326 B004002
Meeting Date: July 22, 2014

I. INTRODUCTION

Spurwink Services has requested a text change to the City Ordinance to allow intermediate care facility as an allowable use in the moderate impact Industrial Zones (IM, I-Ma and I-Mb). The amendment requested is to section 14-247 *Permitted Uses* (IM, I-Ma and I-Mb Zones) and they request that "Intermediate care-facility for not more than twenty-six (26) persons plus staff" be added to the list of permitted uses as a new section (y) ([Attachment A](#)). The applicant is also proposing text amendment to *Section 14-47 Definitions* to clarify the definition of intermediate care facility in the City Ordinance.

The applicant seeks the amendment as it would allow Spurwink Services to use one of the existing buildings on the campus at 899 Riverside Street to be renovated for the use as an intermediate care facility. This building has been identified by the applicant as suitable for conversion from office space to intermediate care facility home.

Intermediate care facilities are not permitted in the industrial zones. They are permitted uses in the B-2, B2-b and B-2c zones and conditional use in R-1, R-2, R-3, R-5 and R-6 zones.

II. PROJECT DATA

Current Zoning: Moderate Impact Industrial (I-M)
Current Uses: Residence up to eight clients, offices for senior leadership, finance, marketing and development
Proposed Uses: The overall mix of uses to stay the same but intent is to permit the conversion of a formerly residential building now used as administrative offices to a residential accommodation meeting the definition of intermediate care facility with a larger number of clients (up to 26 clients plus staff) for the site.
Land Area: There are three separate structures on the property: one is used as eight-bed residence and two are various office spaces.

III. BACKGROUND AND EXISTING INFORMATION

Spurwink Services is a social service agency that serves the needs of children and adults with mental health concerns. They provide day-to-day services as well as residential treatment in many locations and settings.

Spurwink Services campus is located at 899 Riverside Street in the I-M zone. The campus consists of three building structures. Two of the structures, Smith House and Kaufman House, house the offices for the professional staff including senior management, finance, and development functions. The third building on the campus, Sue Wright House, is currently used as an eight-bed residence for students (plus staff) at the Baxter School for the Deaf. This is a lawful, non-conforming use of the building.

The offices that are housed on campus will be relocating to the converted office space within the former Rainbow Mall building on Washington Avenue. The applicant intends to convert one of the buildings used for office space to the proposed intermediate care facility use; thus the applicant is requesting the text amendment.

According to the applicant, this site is the prime location for the intermediate care facility

Because Spurwink Services supports families from the larger Cumberland County community, this location, its proximity to primary arterials and connector streets will provide greater accessibility to families, caregivers and State agency representatives that will travel to see clients cared for at the facility.



Please refer to the applicant's cover letter (Attachment A) for the reasons they are seeking to convert this site for an intermediate care facility for their clients.

IV. ZONING TEXT AMENDMENT PROPOSAL

The purpose of the proposal is to amend the paragraph Section 14-247 Permitted Uses of the IM zone to add subparagraph y, intermediate care facility as follows:

(y) *Intermediate care-facility for not more than twenty-six (26) persons plus staff*

The applicant is also proposing to clarify the definition of intermediate care facility in Section 14-47 Definitions to be consistent with State's definition. The underline text is the language that the applicant is adding to the existing definition:

Intermediate care facility: A facility which provides, on a regular basis, health-related care and services to individuals who do not require the degree of care and treatment which a hospital or extended care facility is designed to provide but who, because of their mental or physical condition, require such care and services above the level of room and board. Said facility must be licensed as a board care or Residential Care facility pursuant to the regulations promulgated by the State of Maine Department of Health and Human Services.

Planning staff recommends that the phrase “or equivalent” be added after Residential care facility to adapt to possible future changes in terminology at the state level, please see below:

Intermediate care facility: A facility which provides, on a regular basis, health-related care and services to individuals who do not require the degree of care and treatment which a hospital or extended care facility is designed to provide but who, because of their mental or physical condition, require such care and services above the level of room and board. Said facility must be licensed as a board care, Residential Care facility or equivalent pursuant to the regulations promulgated by the State of Maine Department of Health and Human Services.

V. ZONING POLICY ANALYSIS

The purpose of the I-M modest impact industrial zone (Section 14-26) is as follows:

The moderate impact industrial zones are intended to provide zones in areas of the city in which light and moderate impact industries and transportation-related uses will coexist.

The moderate impact industrial (I-M and I-Ma) zones are located on arterials or collectors. The I-Mb zones are similarly located on the peninsula. These locations provide for direct access onto arterials, thereby protecting residential neighborhoods from drive-through traffic.

The I-M, I-Ma and I-Mb industrial zones are intended to provide for larger industrial buildings and for the limited or controlled use of areas outside of structures for storage of materials and machinery. These facilities often require large volumes of imported materials and products which result in large volumes of shipping and receiving. Often uses may be highway-oriented and transportation-related, thus relying on citywide and regional transportation infrastructure.

Some of the permitted uses in the zones that are similar to the proposed use are day care facilities, correctional prerelease facilities, and general, business and professional offices. The moderate impact industrial zones are located on or near arterial ways and therefore protecting residential neighborhoods from drive through traffic and noise. According the applicant, one of the reason that the intermediate care facility will work in these zones, is that the such facilities requires a staff set-up that demand 24-hour care. Due to this demand, the shift changes that bring in traffic at all times, the facility is brightly lit for security reasons, and there is a consistent volume of traffic from the families, friend, medical professionals and state agency staff. The placement of the facility on an arterial is important due to these frequent visitations and the fact that the facility serves the larger region. Existing residential neighborhoods will not be impacted significantly by siting this facility in this IM location.

The applicant is proposing to cap the clients at twenty-six (26) plus staff. Intermediate care facilities are currently not permitted in the industrial zones. They are permitted uses in the B-2, B2-b and B-2c zones and conditional use in R-1, R-2, R-3, R-5 and R-6 zones. In the business zones, there is no cap on the amount of clients, whereas in the residential zones caps them at thirteen (13).

Planning staff has considered whether this text amendment should also be applied to the I-L zones. After research, there are very limited areas of I-L zones in the City which are located along arterials and have large lots, and the locations are of a smaller scale. There are more extensive areas zoned I-M.

The proposed text amendment for the definition of intermediate care facility aligns the City’s definition with the State definition.

VI. COMPREHENSIVE PLAN ANALYSIS

Matthew Winch, Principal Architect with Garrison Consulting, provided the applicant's assessment of the proposed text amendments and consistency with Portland's Comprehensive Plan (Attachment C). Mr. Winch cites relevant goals and policies from the following components of Portland Comprehensive Plan:

Housing: Sustaining Portland's Future; and
Portland Industry and Commerce Plan

In addition to the analysis provided by the applicant, the staff cites additional applicable policies below. Volume 1 of the Portland Comprehensive Plan includes references to all Portland strategic plans compiled as components of the comprehensive plan and how each addresses the state Growth Management Goals. Goals and policies of both the state and the city, as described in the strategic plans that comprise the Portland Comprehensive Plan, which are relevant to the proposed map amendment have been included below:

STATE GOAL C. To promote an economic climate that increases job opportunities and overall economic well-being;

The introduction to this goal cites the *Portland Neighborhood Economic Development Study*, among other plans. Specific strategies to achieve the above goal that pertain to this text amendment proposal include the following:

PORTLAND INDUSTRIAL AND COMMERCE PLAN - 1944

Goals

- Strengthen and Diversify the Economic Base
 - *create a variety of job opportunities for the full spectrum of the labor pool which:*
 - *are appropriate to our current and potential skills*
 - *provide good pay and benefits- a living wage*
 - *are rewarding/ satisfying*
 - *create a strong industrial base which is beneficial to the community*
- Revise Zoning
 - *protect neighboring residential zones*
 - *adopt clear, predictable, and enforceable regulations*
 - *promote compatible development within industrial districts*
 - *create thoughtful flexibility for emerging industries*

STATE GOAL D. To encourage and promote affordable, decent housing opportunities for all Maine citizens:

The introduction to this goal cites the *Housing, Sustaining Portland's Future*, among other plans. Specific strategies to achieve the above goal that may pertain to this text amendment proposal include the following:

Goals

- *Ensure that an adequate supply of housing is available to meet the needs, preferences, and financial capabilities of all Portland households, now and in the future.*
- *Maintain and enhance the livability of Portland's neighborhoods as the City grows and evolves through careful land use regulation, design and public participation that respects neighborhood integrity.*

Policies

- *Identify vacant land and redevelopment opportunities throughout the City to facilitate the construction of new housing.*
- *While accommodating needed services and facilities, protect the stability of Portland residential neighborhoods from excessive encroachment by inappropriately scaled and obtrusive commercial, institutional, governmental, and other non-residential uses.*

The introduction to this goal cites the *Regulation of Institutional Uses in the Residential Zones - 1983*, among other plans. Specific strategies to achieve the above goal that may pertain to this text amendment proposal include the following:

Goals

- *Reasonable expansion of existing institutions should be accommodated, but effective use of existing lot area should be required.*
- *For both new development and expansion of existing institutions, the displacement or conversion of existing dwelling should be avoided, and an institutional development proposal that causes significant residential displacement should be cause for denial of conditional use approval.*

Housing is not a permitted use in the City's industrial zones; however, intermediate care facilities are considered institutional use. Permitting this text amendment will allow this intuitional use to operate in the I-M zone district, which is centrally located for the region and along major arterials. This in turn will preserve the residential neighborhoods from institutional encroachment and traffic impacts. The Comprehensive Plan encourages institutional development in non-residential zones within the City, as seem in the above goals. This proposed development is effective use of the existing lot area. The site in question is a compatible location for this type of institutional residence.

With the proposed development, there will be an opportunity for economic growth. The facility will create new job opportunities. According to the applicant's analysis of the Comprehensive Plan,

Allowing up to (26) clients allows for greater staffing to client ration and creates a better service and salary ratio to staff based on available State and Federally funded support programs....

Please refer to Attachment C for the applicant's full analysis.

VII. PUBLIC COMMENT

No public comment has been submitted to the Planning Authority concerning this proposal.

VIII. NEXT STEPS

- The applicant is not required to hold a Neighborhood Meeting in respect of the text amendment.
- The applicant will need to address the Planning Board comments and return to the Board for Hearing. The request would then proceed to the City Council with the Planning Board's recommendation.

ATTACHMENTS:

Staff Review Comments and Background Information (none at the time PB Memo completed)

Public comments (none at the time PB Memo completed)

Applicant's Submittal

- A. Planning Board Narrative/ Coverletter
- B. Application
- C. Text Amendment Narrative/ Comprehensive Plan Assessment
- D. Right, Title and Interest
- E. Zoning Map



Transmittal

To: Barbara Barhydt **Project:** Spurwink Services – Land Use
Code Amendments
GC#2014-006
Date: 06/15/2014 **From:** Matthew Winch
Re: Planning Bd. Submission **cc:** Dan Bonner, file

Item:	Date	Quantity	Title
1	06/13/2014	1	Land Use Code Amendment Submission
2	06/15/2014	1	Digital Copy of Submission (DVD)

Remarks:



June 13, 2014

Portland Planning Board
389 Congress Street
Portland Maine, 04101

Re: Zoning Text Amendment
IM Zone – Allowable Uses

Dear Chair O'Brien and Members of the Planning Board,

Spurwink Services a Portland based 501-c3 charitable organization with a long-standing history of service to Portland area children and their families is requesting approval for text amendments to the Portland Land Use Code. Specifically those changes are:

- 1 To make an Intermediate care facility an allowable use in the IM Zone.
- 2 Clarify the definition of Intermediate care facility.

Spurwink Services is requesting these amendments ultimately to open the door to allowing them to convert a portion of their 899 Riverside Street campus to an Intermediate care facility.

Spurwink is a 60-year-old social service agency serving the needs of children and adults with mental health concerns and related trauma. Spurwink Services provides, among other services, both day treatment and residential treatment in a variety of locations and settings.

Spurwink Services 899 Riverside St campus is not only the location of their first residential program house (Sue Wright House), which is still currently used as a residence for up to 8 clients, but the campus is also currently home to senior leadership, finance, marketing and development offices for the entire agency. Some of these functions will soon be relocated to the converted office space within the old Rainbow Mall building on Washington Avenue. This move will open up a portion of the 899 Riverside St campus to re-use. The intent would be to renovate one building to house the proposed Intermediate care facility use.

Spurwink Services has targeted their Riverside Street campus for this use and as a result this text amendment because of a number of important factors.

- 1 Spurwink Services had a number of smaller 3-5 client residential treatment facilities throughout the area that were closed because they were no longer economically sustainable under current State and Federal funding models.
- 2 An analysis of funding and staffing models has shown that a residential treatment facility serving between 12 and 16 clients (plus appropriate staff) is an economically viable alternative to the smaller facilities. This larger facility and expanded client base will provide a more consistent funding stream and a higher quality of care to their clients.
- 3 Because Spurwink Services supports families from the larger Cumberland County community, this location, its proximity to primary arterials and connector streets will provide greater accessibility to families, caregivers and State agency representatives that will travel to see clients being cared for at the facility.

- 4 There is a desire to keep the clients Spurwink serves more closely connected to the communities in which they were raised. With referrals for residential treatment coming from Juvenile corrections as well as mental health hospitals, the IM Zone may serve as a very good intermediate step before fully integrating clients back more fully into the communities that they are returning to.

In this application for text amendment Spurwink Services proposed changes to the Land Use Ordinance are:

- 1 Add the following allowable use to Division 14 . I-M, I-Ma AND I-Mb INDUSTRIAL ZONES* Section 14-247. Permitted uses:

(y) Intermediate care facility for not more than (26) persons plus staff.

- 2 Clarify the following definition in Section 14-47 Definitions by adding the underlined text:

Intermediate care facility: A facility which provides, on a regular basis, health-related care and services to individuals who do not require the degree of care and treatment which a hospital or extended care facility is designed to provide but who, because of their mental or physical condition, require such care and services above the level of room and board. Said facility must be licensed as a board care or Residential Care Facility pursuant to the regulations promulgated by the State of Maine Department of Health and Human Services.

By recommending the City council approve these changes to the Land Use Ordinance a new use will be allowable in the IM Zone that is similar to two other currently approved uses, Day Care Facility and a Correctional prerelease facility. We have attached a supporting letter that analyzes the conformance to the Purpose statement of the IM Zone and conformance to the City's Comprehensive Plan

Sincerely,



Matthew G Winch
Principal



Zoning Map/Text Amendment/Contract or Conditional Rezoning Application Portland, Maine

Planning and Urban Development Department
Planning Division

Portland's Planning and Urban Development Department coordinates the review of requests for zoning map amendments, zoning text amendments and contract or conditional re-zoning. The Division also coordinates site plan, subdivision and other applications under the City's Land Use Code. Attached is the application form for a Zone Change.

Portland's development review process and requirements are outlined in the Land Use Code (Chapter 14) which is available on our website:

Land Use Code: <http://me-portland.civicplus.com/DocumentCenter/Home/View/1080>

Design Manual: <http://me-portland.civicplus.com/DocumentCenter/View/2355>

Technical Manual: <http://me-portland.civicplus.com/DocumentCenter/View/2356>

Planning Division

Fourth Floor, City Hall
389 Congress Street
(207) 874-8719

Office Hours

Monday thru Friday
8:00 a.m. – 4:30 p.m.

Engineer Name: Address: City/State : Zip Code:	Engineer Contact Information Work # Cell # Fax# e-mail:
Surveyor Name: To Be Determined Address: City/State : Zip Code:	Surveyor Contact Information Work # Cell # Fax# e-mail:
Architect Name: Garrison Consulting (c/o Matthew Winch) Address: 41 Edgewood Ave City/State : Portland, Maine Zip Code: 04103	Architect Contact Information Work # (207) 450-0750 Cell # (207) 450-0750 Fax# e-mail: matthewwinch@earthlink.net
Attorney Name: To Be Determined Address: City/State : Zip Code:	Attorney Contact Information Work # Cell # Fax# e-mail:

Right, Title, or Interest: Please identify the status of the applicant's right, title, or interest in the subject property:

Applicant is the current property Owner. See attached for proof of right, title and interest in the property

Provide documentary evidence, attached to this application, of applicant's right, title, or interest in the subject property.
(For example, a deed, option or contract to purchase or lease the subject property.)

Vicinity Map: Attach a map showing the subject parcel and abutting parcels, labeled as to ownership and/or current use.
(Applicant may utilize the City Zoning Map or Parcel Map as a source.)

Existing Use: Describe the existing use of the subject property:

There are 3 separate structures on the property. The Applicant currently uses two of the buildings, Smith House and Kaufmann House, to house offices for professional staff including but not limited to senior management, finance, facilities HR and development functions. The third building on the property, Sue Wright House, is used as an 8-bed residence (plus house parents) for students at Baxter School for the Deaf. This residence is not used for "treatment" purposes.

Current Zoning Designation(s): IM - Moderate Impact Industrial

Proposed Use of Property: Please describe the proposed use of the subject property. If construction or development is proposed, please describe any changes to the physical condition of the property.

The applicant will maintain the 8-bed residential use at Sue Wright House and maintain one of the buildings, Smith House, as office space for some staff functions which will remain on site. The applicant proposes to use Kaufmann House as (up to) a 16-person (plus staff) Intermediate care facility. The proposal at this time would not require any increase in volume or footprint. All construction associated with this conversion would take place within the existing connected structure of Kaufmann House.

Site Plan: On a separate sheet, please provide a site plan of the property showing existing and proposed improvements, including such features as buildings, parking, driveways, walkways, landscape and property boundaries. This may be a professionally drawn plan, or a carefully drawn plan, to scale, by the applicant. (Scale to suit, range from 1" = 10' to 1" = 50'.) Contract and conditional rezoning applications may require additional site plans and written material that address physical development and operation of the property to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations, and compatible with the surrounding neighborhood.

APPLICATION FEES:

Check all reviews that apply. (Payment may be made by Credit Card, Cash or Check payable to the City of Portland.)

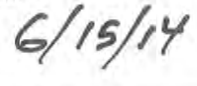
Zoning Map Amendment ___ \$2,000.00 (from ___ zone to ___ zone) Zoning Text Amendment <u>X</u> \$2,000,000 (to Section 14- <u>246 &</u> 14-47) Combination Zoning Text Amendment and Zoning Map Amendment ___ \$3,000.00 Conditional or Contract Zone ___ \$3,000.00 (A conditional or contract rezoning map be requested by an applicant in cases where limitations, conditions, or special assurances related to the physical development and operation of the property are needed to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations, and compatible with the surrounding neighborhood. Please refer to Division 1.5, Sections 14-60 to 62.)	The City invoices separately for the following: • Notices (\$.75 each) • Legal Ad (% of total Ad) • Planning Review (\$40.00 hour) • Legal Review (\$75.00 hour) • Third party review fees are assessed separately. Any outside reviews or analysis requested from the Applicant as part of the development review, are the responsibility of the Applicant and are separate from any application or invoice fees.
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APPLICATION SUBMISSION:

1. All plans and written application materials must be submitted electronically on a CD or thumb drive with each plan submitted as separate files, with individual file names which can be found on the **Electronic Plan and Document Submittal** page of the City's website at <http://me-portland.civicplus.com/764/Electronic-Plan-and-Document-Submittal>
2. **The submission shall include the following materials:**
 - a. One (1) paper set of the zoning amendment application, concept plan and written narrative.
 - b. Contract and conditional rezoning applications must include site plans and written material that address physical development and operation of the property to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations and compatible with the surrounding neighborhood.

APPLICANT SIGNATURE:

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Planning Authority and Code Enforcement's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature of Applicant:  CEO	Date: 
--	--



June 13, 2014

Portland Planning Board
389 Congress Street
Portland Maine, 04101

Re: Land Use Code Text Amendment
IM Zone – Allowable Uses

Dear Chair O'Brien and Members of the Planning Board,

In support of Spurwink Services (Applicant) application for a Land Use Code Text Amendment to the IM Zone please accept this supplemental letter in support of the request now before you. As you are aware, the Portland Land Use Code authorizes the Planning Board to recommend Land Use Code text amendments to the City Council for final approval. These amendments must be determined to be consistent with nature and purpose of the zone and they must in basic harmony with and thereby consistent with the City's comprehensive plan. The Applicant provides the following analysis.

The Applicant is proposing to add the following allowable use to Division 14 - I-M, I-Ma AND I-Mb INDUSTRIAL ZONES^o Section 14-247. Permitted uses:

- (y) Intermediate care facility for not more than (26) persons plus staff.

1 - The Proposed ICF Use is Consistent with the Purpose of the IM Zone, as well as the Permitted Uses in the Zone.

The Purpose of the IM Zone: The moderate impact industrial zones are intended to provide zones in areas of the city in which light and moderate impact industries and transportation-related uses will coexist.

The moderate impact industrial (I-M and I-Ma) zones are located on arterials or collectors. The I-Mb zones are similarly located on the peninsula. These locations provide for direct access onto arterials, thereby protecting residential neighborhoods from drive-through traffic.

The I-M, I-Ma and I-Mb industrial zones are intended to provide for larger industrial buildings and for the limited or controlled use of areas outside of structures for storage of materials and machinery. These facilities often require large volumes of imported materials and products which result in large volumes of shipping and receiving. Often uses may be highway-oriented and transportation-related, thus relying on citywide and regional transportation infrastructure.

Industrial uses in the moderate impact industrial zones may require separation from higher impact uses, which should be directed to the high impact industrial zone.

Some of the directly relevant and permitted uses in the zone include but are not limited to:

- (o) Day care facilities
- (r) Correctional prerelease facilities
- (t) General, business and professional offices

The inclusion an intermediate care facility as an allowable use is consistent with the purpose and the permitted uses for the zone. The purpose of the IM Zone is to an area for light to moderate industries and transportations related uses to coexist. Further and as stated above,

41 Edgewood Avenue Portland, ME 04103
(207) 450-0750
matthewwinch@earthlink.net

the zones are located on or near arterials, thereby protecting residential neighborhoods from drive through traffic.

Providing proper around the clock care to young children dealing with mental health related traumas requires a staffing set-up that demands 24-hour care. Staff is awake, active and alert during the nighttime hours, the facility is brightly lit at the exterior for security and nighttime shift changes to rotate staff are required. This type and level of activity is not ideal for a residential neighborhood where overnight activities are expected to be minimal if not non-existent.

Given that a facility of this type serves a group of people that are not living at their primary residence, a much higher and constant volume of traffic to and from the facility can be expected. Family, friends, medical professionals and staff from state agencies can all be expected visitors through the daytime and evening hours. Placing an Intermediate care facility close to arterials and collector streets protects residential neighborhoods from the impacts of associated traffic.

Finally, the use is consistent with other approved uses in the Zone. A daycare facility and correctional pre-release facility both anticipate a level and scope of care and security to maintain the well being of the population served. Daycare facilities are no longer an 8-5 business and the correctional pre-release facility includes overnight accommodation for the clients it is serving.

2 -The Proposed Use is in Basic Harmony with and Therefore Consistent with the City's Comprehensive Plan.

The proposed Zone text amendment will meet the stated goals of the comprehensive plan. Three primary and directly relevant goals are noted and analyzed.

Stated Goal A: To encourage orderly growth and development in appropriate areas of each community, while protecting the State's rural character, making efficient use of public services and preventing developmental sprawl.

Allowing an Intermediate care facility limited to (26) persons plus staff in the IM Zone encourages modest development of an institutional use that is similar in nature and scope to other allowable uses in the zone. As an allowable use it would be provided advantage of the necessary transportation infrastructure required to serve and support the zone and thereby the use. It will also allow the use to be placed in an area(s) of the city that has been defined for higher levels of traffic and around the clock activities and needs such as modest increases in noise and light pollution, which are less desirable in other areas of the city.

Stated Goal C: To promote an economic climate which increases job opportunities and overall economic well-being.

Portland's Industry and Commerce Plan includes 6 primary goals:

- Create a variety of job opportunities for the full spectrum of the labor pool.
- Recognize that jobs and prosperity improve the standard of living for residents.
- Preserve, protect and strengthen neighborhoods.
- Reduce tax burden on residential property owners.
- Make Portland attractive to new residents and businesses.
- Be creative, responsive and work hard to retain existing business.

Allowing an Intermediate care facility limited to (26) persons plus staff in the IM Zone encourages the development of a small to mid sized institutional facility that has a more favorable economic success model than the smaller uses (limited to under 12 clients) that are typically allowable in residential zones throughout the city. Allowing up to (26) clients allows for a greater staffing to client ratio and creates a better service and salary ratio to staff based on available State and Federally funded support programs (Maine Care, Medi Care/Medi Cade) and the like. By making this mid range type facility allowable for development in the IM Zone, it encourages and attracts development of a more economically viable sized facility in a zone intended to handle the increased demands on the infrastructure.

Stated Goal D: To encourage and promote affordable, decent housing opportunities for all Maine citizens.

Further the Goal states the need to maintain and enhance the livability of Portland's neighborhoods as the city grows and evolves through careful land use regulation, design and public participation that respects neighborhood integrity.

Policies to that Goal include:

- While accommodating needed services and facilities, protect the stability of Portland's residential neighborhoods from excessive encroachment by inappropriately scaled and obtrusive commercial, institutional, governmental and other non-residential uses.
- Ensure the integrity and economic value of Portland's neighborhoods.

Adding Intermediate care facility as an approved use in the IM Zone will preserve the quality and vitality of Portland's neighborhoods by allowing a larger scale and more economically viable institutional use to be located in a zone more suitable to handle the demands of the use.

Some residential zones do allow for very small Intermediate care facilities (limited to under 12 clients) that while fitting in with the scale and size of a traditional neighborhood environment, is not economically viable. Funding mechanisms do not adequately support the demands of a smaller facility, leading to a drop in service to clients as well as the ability to maintain and secure the property. This would have a negative affect on the city's policy goal to ensure the integrity and economic value of Portland's neighborhoods.

Allowing the use in the IM Zone enhances the economic vitality of the services associated with and intermediate care facility by allowing client levels to be raised to a higher and more appropriate staffing ratio.

As demonstrated above the proposed text amendment to the IM Zone and the clarification of the definition of the Intermediate care facility is consistent wit the City's Comprehensive Plan from land use, economic and neighborhood protection perspectives. Thank you for considering our proposal, we look forward to working with the Planning Board during this review process.

Sincerely,

A handwritten signature in dark ink, appearing to read 'm.g. winch', with a stylized flourish at the end.

Matthew G Winch
Principal

EDGEFIELD LODGE, CASCO
10 CANDLEWYCK ROAD, PORTLAND
98 RACKLEFF STREET, PORTLAND
899 RIVERSIDE STREET, PORTLAND
18 SONNET LANE, PORTLAND
342 WOODFORDS STREET, PORTLAND

WARRANTY DEED
Maine Statutory Short Form

No 82135 Bk 11161 Pg 333

KNOW ALL PERSONS BY THESE PRESENTS, that **SPURWINK ASSOCIATES LIMITED PARTNERSHIP (f/k/a SPURWINK ASSOCIATES)**, a Maine limited partnership with a place of business in Portland, in the County of Cumberland and State of Maine, for consideration paid, **GRANTS** with **WARRANTY COVENANTS** TO:

THE SPURWINK SCHOOL, a not-for-profit corporation with a place of business in Portland, County of Cumberland, State of Maine, whose mailing address is 899 Riverside Street, Portland, Maine:

Parcel One - Edgefield Lodge, Casco: Two (2) certain lots or parcels of land with the buildings thereon, situated on the easterly side of the highway leading through Casco Village to Spurr's Corner, so-called, in the Town of Casco, County of Cumberland and State of Maine, being more particularly bounded and described on Exhibit A annexed hereto and made a part hereof.

Being a portion of the premises conveyed to Spurwink Associates by warranty deed of Richard M. Smith and Harvey J. Berman dated December 5, 1983 and recorded in the Cumberland County Registry of Deeds in Book 6342, Page 331.

Parcel Two - 10 Candlewyck Road, Portland: A certain lot or parcel of land with the buildings thereon, situated on Candlewyck Road, in the City of Portland, County of Cumberland and State of Maine, being more particularly bounded and described on Exhibit B annexed hereto and made a part hereof.

Being a portion of the premises conveyed to Spurwink Associates by warranty deed of Harvey J. Berman, et al. dated December 5, 1983 and recorded in said Registry of Deeds in Book 6342, Page 329.

Parcel Three - 98 Rackleff Street, Portland: A certain lot or parcel of land with the buildings thereon, situated on the southerly side of Rackleff Street, in the City of Portland, County of Cumberland and State of Maine, being more particularly bounded and described on Exhibit C annexed hereto and made a part hereof.

Being a portion of the premises conveyed to Spurwink Associates by warranty deed of Harvey J. Berman, et al. dated December 5, 1983 and recorded in said Registry of Deeds in Book 6342, Page 329.

Parcel Four - 899 Riverside Street, Portland: Two (2) certain lots or parcels of land with the buildings thereon, situated on the southeasterly side of Riverside Street, in the City of Portland, County of Cumberland and State of Maine, being more particularly bounded and described on Exhibit D annexed hereto and made a part hereof.

MAINE REAL ESTATE TAX PAID

82135 B

Being a portion of the premises conveyed to Spurwink Associates by warranty deed of The Spurwink Riverside Corporation dated December 5, 1983 and recorded in said Registry of Deeds in Book 6342, Page 336.

Parcel Five - 18 Sonnet Lane, Portland: A certain lot or parcel of land with the buildings thereon, situated on the southerly side of Sonnet Lane, in the City of Portland, County of Cumberland and State of Maine, being more particularly bounded and described on Exhibit E annexed hereto and made a part hereof.

Being the same premises conveyed to Spurwink Associates by warranty deed of Janice M. Hawkins-Donovan dated February 20, 1990 and recorded in said Registry of Deeds in Book 9092, Page 15.

Parcel Six - 342 Woodfords Street, Portland: A certain lot or parcel of land with the buildings thereon, situated on Woodfords Street, in the City of Portland, County of Cumberland and State of Maine, being more particularly bounded and described on Exhibit F annexed hereto and made a part hereof.

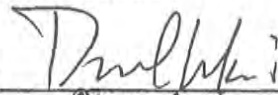
Being a portion of the premises conveyed to Spurwink Associates by warranty deed of Harvey J. Berman, et al. dated December 5, 1983 and recorded in said Registry of Deeds in Book 6342, Page 329.

IN WITNESS WHEREOF, the said SPURWINK ASSOCIATES LIMITED PARTNERSHIP has caused this instrument to be signed this 13th day of December, 1993.

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF



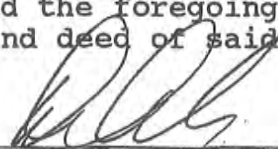
SPURWINK ASSOCIATES LIMITED
PARTNERSHIP

By 
Its David Lakavi
Gen. Mgr.

STATE OF MAINE
COUNTY OF CUMBERLAND

December 13, 1993

Personally appeared the above-named David Lakavi, in his said capacity, and acknowledged the foregoing to be his free act and deed, and the free act and deed of said corporation, before me.


Notary Public/Attorney at Law

David A. Anderson
Printed Name

S:\PUP02\DD.5

EXHIBIT D899 Riverside Street, Portland, Maine

A certain lot or parcel of land located in the City of Portland, County of Cumberland, and State of Maine, bounded and described as follows:

Beginning at a stone monument in the southeasterly side of Riverside Street, which monument marks the southwesterly corner of land conveyed by Jefferson H. Hodges, et al. to Richard M. Smith by deed dated July 12, 1960, and recorded in the Cumberland County Registry of Deeds, Book 2553, Page 229; THENCE, southeasterly along line of land formerly of said Smith and now of Spurwink Associates 417.8 feet to the southeasterly corner thereof; THENCE, continuing southeasterly along line of land conveyed by Jefferson H. Hodges, et al. to Riverside Industrial Park, Inc. by deed dated February 24, 1964 and recorded in said Registry in Book 2806, Page 441, 138.06 feet, more or less, to a fence which marked the line of land formerly of Lydia J. Stevens; THENCE, southwesterly 404.13 feet to an angle in said fence; THENCE, northwesterly 551.63 feet by line of said fence and over a stone monument to the southeasterly side of Riverside Street; THENCE, northeasterly by said Riverside Street 408.84 feet, more or less, to the stone monument at the point of beginning. Containing 5.16 acres, more or less.

Also, a certain lot or parcel of land with the buildings thereon situated on the southeasterly side of Riverside Street in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

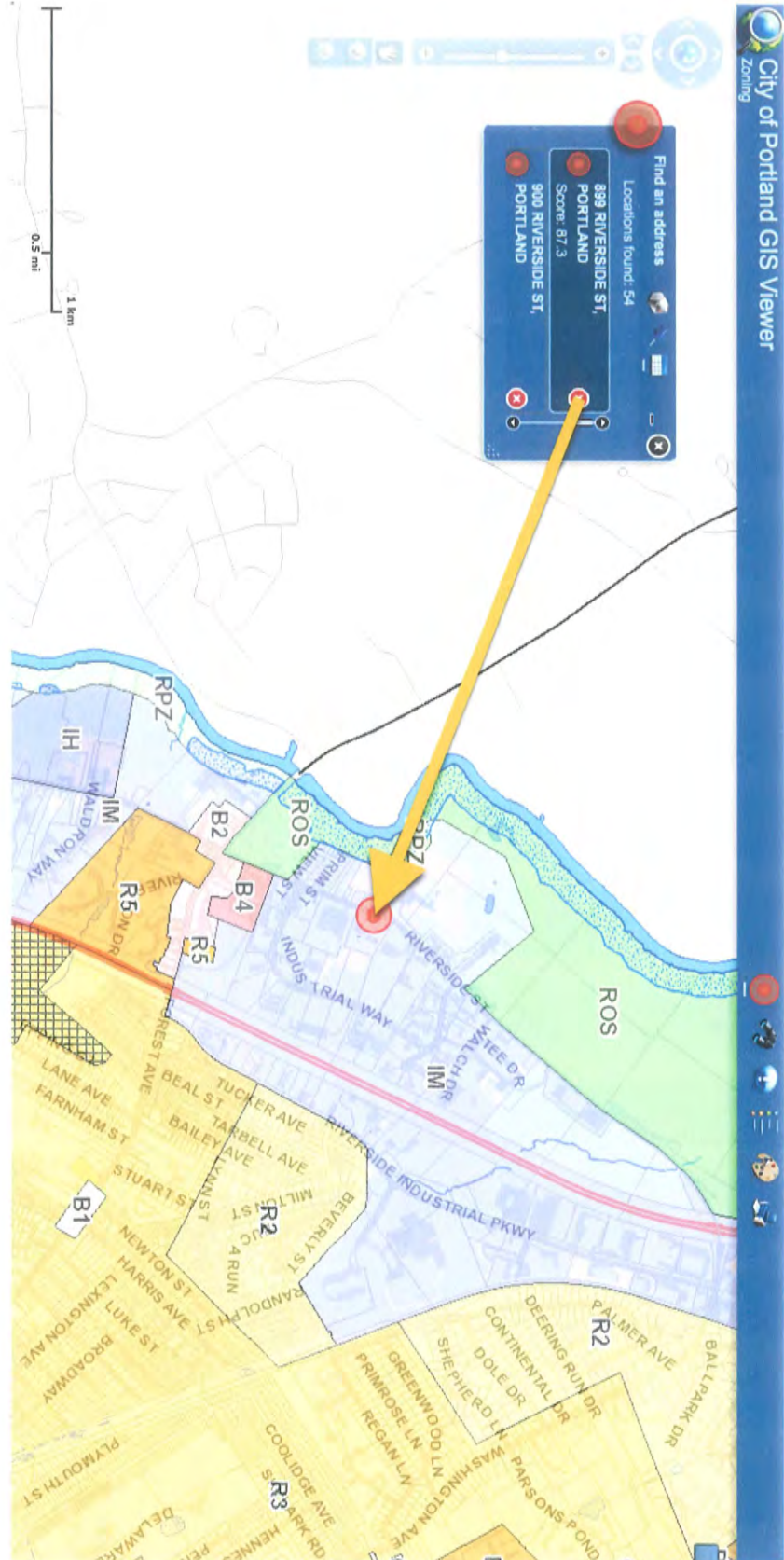
Beginning at a stone monument in the southeasterly side of Riverside Street, said stone monument being distant 408.84 feet, northeasterly from the northwesterly corner of the land conveyed to Jefferson H. Hodges and Edith G. Hodges by Arthur H. Jones by deed dated January 22, 1942, and recorded in Book 1667, Page 123; THENCE, North 36° 23' East along the southeasterly sideline of Riverside Street, a distance of 414.43 feet, to an iron; THENCE, South 42° 32' East, a distance of 425.4 feet to a point; THENCE, South 36° 18' West a distance of 353.3 feet to a point; THENCE, North 51° 03' West a distance of 417.8 feet, more or less, to the monument in the southeasterly sideline of Riverside Street and the point of beginning.

Together with the benefit of the rights reserved as set forth in the deed to Corley Family Realty Limited Partnership dated September 30, 1988, and recorded in Book 8467, Page 86, that no building or paving shall be constructed or placed within 30 feet of the southwesterly sideline of Spurwink Associates' remaining land and landscaping shall substantially adhere to the plans of Corley Family Realty Limited Partnership, approved by Spurwink Associates. This condition shall run with the land and shall bind Spurwink Associates and Corley Family Realty Limited Partnership herein, their respective successors and assigns, and all parties claiming by, through, or under them, so long as Spurwink Associates maintains the same buffer in which no building or paving shall be constructed or placed within 30 feet of Corley Family Realty Limited Partnership's northeasterly sideline.

excepting that certain lot or parcel of land conveyed to Corley Realty Limited Partnership by deed dated September 30, 1988, recorded in Book 8497, Page 86, and bounded and described as follows:

A certain lot or parcel of land situated on the southeast side of Riverside Street, in the City of Portland, County of Cumberland and State of Maine:

Beginning at a point on the southeast sideline of Riverside Street marking the westerly corner of land herein described and the northerly corner of land now or formerly of Eve Mitchell, said point being North 50° 22' 1.2" West 11.47 feet from a granite monument; THENCE, North 38° 26' 30" East along the southeasterly side of said Riverside Street 408.84 feet to an angle point; THENCE, North 36° 47' 33.6" East along the southeasterly side of said Riverside Street 14.12 feet to a point marking the northerly corner of land herein described and land of Spurwink Associates; THENCE, South 51° 33' 30" East 421 feet along land of Spurwink Associates to a point marking and easterly corner of land herein described and land now or formerly of the City of Portland; THENCE, South 36° 18' West 29.17 feet along land now or formerly of the City of Portland to an iron pipe marking a corner of land herein described; THENCE, South 51° 03' East 138.06 feet along land of the City of Portland to an iron pipe marking the easterly corner of land herein described and land now or formerly of Riverside Industrial Park; THENCE, South 39° 36' 30" West 404.13 feet along land of Riverside Industrial Park to an iron pipe marking the southerly corner of land herein described and land now or formerly of Mount Holyoke College; THENCE, North 50° 22' 1.2" West 540.16 feet along land now or formerly of Mount Holyoke College and Eve Mitchell to a granite monument; THENCE, North 50° 22' 1.2" West 11.47 feet along land now or formerly of Eve Mitchell to the southeast sideline of Riverside Street and the point of beginning, containing 5.377 acres.



Memorandum

Planning and Urban Development Department

Planning Division



To: Stuart O'Brien, Chair and Members of the Portland Planning Board
From: Shukria Wiar, Planner and Barbara Barhydt, Development Review Services Manager
Date: Thursday, July 16, 2014
Re: R-6 Zoning Map Amendment and Text Amendments for Park Danforth;
777 Stevens Avenue
Project #: 2012-108 CBL: 326 B004002
Meeting Date: July 22, 2014

I. INTRODUCTION

The Park Danforth has submitted an application for a zoning map amendment and accompanying text amendments for their property at 777 Stevens. The property is situated on a city block bounded by Forest and Stevens Avenues and Poland and Arbor Streets. The existing building is located in the R-6 zone and the rest of the block is zoned Residential R-5 along Stevens and a portion of Arbor Street and the B2 zone is along Forest Avenue and a portion of Arbor Street. The applicant applied for the proposed zoning map amendment to convert the whole block (except for one lot, held under separate ownership) to the Residential R6 zone.

The applicant is proposing text amendments to add the term elderly independent living housing to the definitions section of the Zoning Ordinance, to increase R-6 maximum building height for this specific type of housing, and to revise Division 20 to allow one space per unit for all R-6 zones. The amendments are proposed to support the applicant's plans to develop independent housing per persons aged 55 and over at this property.

The Table of Contents for this report is as follows:

I. Introduction	VI. Applicant's Text Amendments
II. Project Data	VII. Alternative Options for the Board's Consideration
III. Background and Existing Conditions	
IV. Proposed Development	
V. Applicant's Map Amendment	

II. PROJECT DATA

Existing Zoning: Residential R-6 and R-5, Business B-2
Existing Use: Residential Elderly Assisted Housing
Proposed Use: Residential Elderly Assisted Housing and Independent Living
Parcel Size: 4.12 acres

Residential Data:

- Existing Residential Units: 160 dwelling units in the existing building, 2 single families, one of which is vacant.
- Proposed Residential Units: 46 dwelling units
- Number of Units to be Demolished: two single family homes
- Number of Affordable Units: For the existing units- 70 are Section 8 housing and 36 market rate. The proposed units will be market rate.

Building Height(s): Existing is 65' and Proposed to be at 55'

Parking Spaces:

- Existing: Approximately 65 spaces
- Proposed: Approximately 40 spaces

Uses in Vicinity: Mixed commercial uses along Arbor Street, across the street on Stevens Avenue is the Maine State Armory and University of New England, on Poland Street there are residential use as well as offices, commercial uses along Forest Avenue.

III. BACKGROUND AND EXISTING CONDITIONS

The applicant, Park Danforth, is an elderly residential housing entity that has roots in the City for over 130 years and is a not-for-profit corporation. Park Danforth originally was located at the corner of Park and Danforth Streets, hence the name Park Danforth, and it was a “Mercantile Home for Aged Men”. Due to financial pressures, Danforth sold its property to 75 State Street and moved their current location at 777 Stevens Avenue in 1985 with seventy (70) Section 8 apartments and thirty-six (36) market rate residential apartments for the elderly. The facility expanded again in 1999 to provide eighteen (18) new apartments and thirty-six (36) Assisted Living studios. Currently the building consists of 124 apartments and 36 Assisted Living studios.

The Park Danforth was developed as a special needs independent living units, which is a permitted use in the R-6 zone. It is defined in R-6 as follows:

Special needs independent living units, provided that a building housing special needs independent living units shall not house other types of residential or other permitted uses. The owner of a special needs independent living unit building shall file in the Cumberland County Registry of Deeds a statement under oath that the building is a special needs independent living unit building and that any future change of use to a permitted residential use shall require a change in use review by the City of Portland and a decrease in the number of units in the building in accordance with the Portland City Code, chapter 14. The owner shall file proof of such recording with the building inspections division prior to the issuance of any certificates of occupancy for the new uses.

The existing height of the current building is 60 feet, which is no longer permitted in the R-6 zone, but Marge Schmuckal has confirmed that the building permit files note this was the permitted height at that time. The special needs independent living units (SNILU) are subject to the dimensional standards of the R-6 zone. The density provision does allow for a greater density for SNILUs as follows:

- a. Minimum area per dwelling unit: *One thousand (1,000) square feet per dwelling unit; and in the case of building additions and new construction, one thousand two hundred (1,200) square feet for each dwelling unit after the first three (3) units. This requirement may be reduced by up to twenty (20) percent for a special needs independent living unit.*

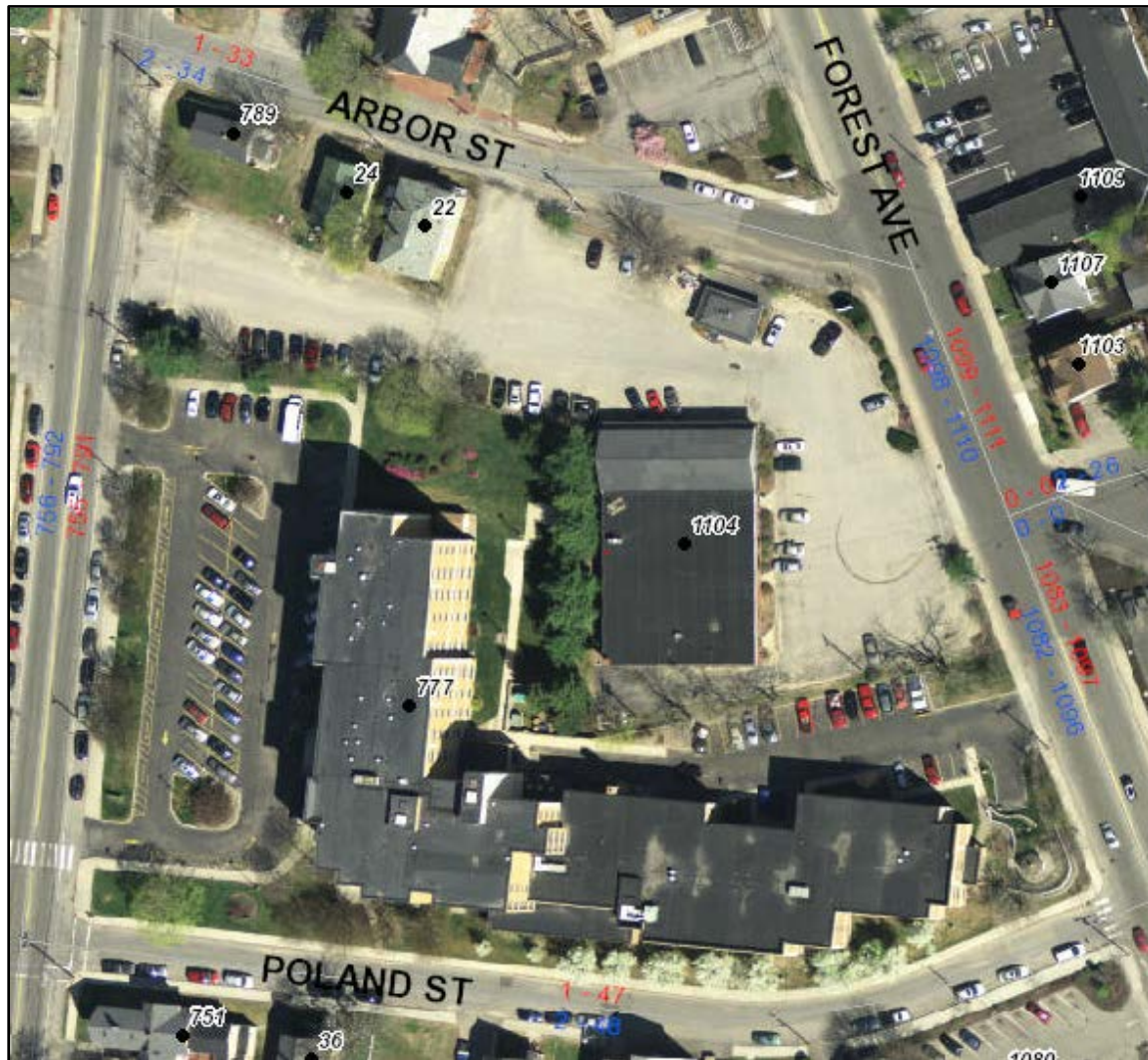
The proposed development is for market rate independent living units and is not proposed as a SNILU; thus the 20% density bonus would not apply.

The Park Danforth has been in negotiation for the past five years with the adjacent parcels, so the site now consists of eight parcels. The recently acquired sites include the Goodwill properties along Forest and Stevens Avenues and two existing residential parcels along Arbor Street. The applicant owns the entire city block with the exception of one residential property at 24 Arbor Street. They are in discussions with the property owner to purchase the single-family home, however the discussions are on hold at this time.

The zoning for this block is split between three zones. The existing building at 777 Stevens Avenue is zoned Residential R6. The properties at the corner of Stevens Avenue and Arbor Street, including 189

Stevens Avenue, 22 and 24 Arbor Street (24 Arbor Street is not included in the applicant's proposal) are presently zoned R5. The "Goodwill" facility and parcels are zoned Community Business B2 at 1104 Forest Avenue. The total parcel area of Park Danforth campus is 179,546 SF or 4.12 acres. The applicant explored developing the site under the current zoning designations, but there was a need for text amendments to B-2 for height and the limitations of R-5 zone. The applicant is seeking to have all of their holdings under one zone designation.

The Goodwill site is almost all impervious area (about 95%) with two buildings and paved parking on a lot area of 60,798 SF (1.40 acres). There are two single-family homes (one is vacant) on Arbor Street. The single family home at 24 Arbor Street is occupied and under separate ownership. It is not part of the applicant's proposed map amendment.



Aerial of the Park Danforth City Block

IV. PROPOSED DEVLEOPMENT

Park Danforth is presently developing a master plan for their campus at 777 Stevens Avenue. The total land area of the parcels making up the Park Danforth Campus is 179,546 SF or 4.12 acres. They would like to expand their current campus to provide for elderly housing that include "independent elderly housing" for a younger aging population. This includes people that do not need assistance with daily

living but would like to be in an interactive senior community with amenities and services. The main population being targeted is 75 years of age and plus.

According to the applicant's submission, the master plan will consist of open spaces, address the street presence, and provide for pedestrian and vehicular circulation and safety. Most the proposed vehicular circulation will remain one-way and exiting on an existing two-way drive which will be slightly modified. This drive will also access the new parking and the visitor entry. The existing driveway serving the Goodwill Store will be removed on Forest Avenue. Having said this, there will be four curb cuts on the remaining streets: one on Arbor Street for visitor entrance and for the new building, one off Forest Avenue for service entrance and two on Stevens Avenue. The campus will include two interior court yard gardens to provide safe and functional open space for the residents. Other site improvements include extensive landscaping and site features such as retaining wall and fencing.

The main building on the Park Danforth campus consists of a seven-story building along Stevens Avenue and a three-story building along Poland Street. Along with the newly acquired parcels, Park Danforth wants to build a new structure along Arbor Street and Forest Avenue. The new building will contain one level of underground parking for forty (40) cars and forty-six (46) new "Independent Living" units on the upper four floors. The total building area will be about 64,000 SF., not including the parking level, and is proposed to be 55 feet tall.

The building will be four-stories along Forest Avenue and Arbor Streets with the interior of the building facing the existing Park Danforth building will be five-stories. A building connection is proposed to connect the existing seven-story building with the new building at the new turn-around. According to the applicant the "building will feature varied window sizes, balconies, and materials, to coordinate and complement the existing Park Danforth building". Please refer to Attachment A for more details of the master plan for the campus.

Staff Comments: The proposed development is subject to site plan and subdivision review. In a very preliminary review, the staff has recommended that the applicant consider further reducing the number of curb cuts and minimizing the pavement on the site. Tom Errico, Consulting Traffic Engineer, commented as follows on the concept plan (Attachment 1):

- The proposed project does not meet City standards in regard to the number of driveways provided. The applicant should document specifically the purpose of each driveway as part of justifying a waiver from City standards. I would note that while the number of driveways has been reduced, I'm still concerned about access/egress conditions.
- Some of the driveways may not meet City corner clearance and spacing requirements and thus the applicant should provide information that support non-compliant conditions.
- The applicant will need to provide supporting information on the number of parking spaces provided on-site. I would suggest that the applicant conduct an existing parking demand study and use that information to document future parking needs.
- Sidewalk with curbing will be required for all property frontage areas.

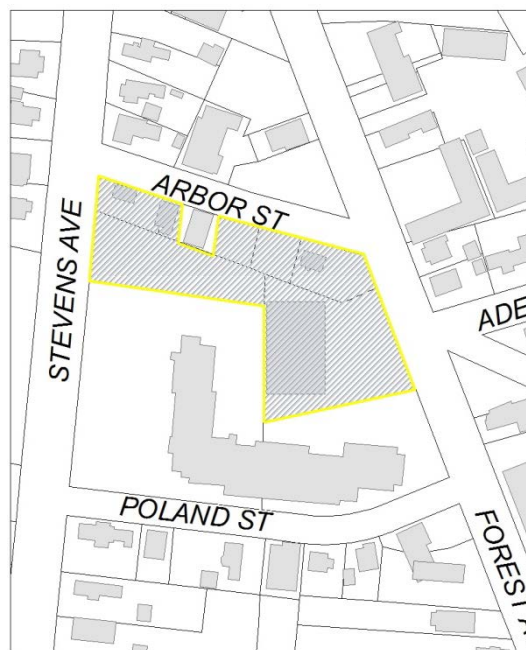
In addition, David Margolis-Pineo submitted preliminary comments on the site plan on July 17th and those comments are included as Attachment 2). The planning staff has recommended bringing the proposed addition closer to the corner or street. This does relate to the zoning discussion, since the front is viewed as Stevens Avenue (primary entrance) and the rear is along Forest Avenue, which has a rear setback depending upon the zone. The applicant's consultant has indicated that the change in grade and the desire to have first floor parking and a terrace for the building limits their ability to bring the building closer to the street.

V. APPLICANT'S PROPOSED ZONING MAP AMENDMENT

The request for the zoning map change is intended to include the entire city block, except 24 Arbor Street is under separate ownership, as an R6 to reach the higher density for the project. According to the applicant, the property owner at 24 Arbor is aware of the Park Danforth's intention and the requested change from the R5 to the R6 designation will have no adverse impact upon the remaining residence.' The existing zone designations are shown on the map to the right. The proposed map amendment is below and the Planning Staff are recommending that the entire block be advertised for consideration at a public hearing, including the one excluded parcel.



Excerpt of Existing Zoning Map



Applicant's Proposed R-6 Map Amendment

Proposed Zone Map Amendment
in the vicinity of 777 Stevens Avenue

VI. APPLICANT'S PROPOSED TEXT AMENDMENT

There are three text amendments that that applicant is requesting as part of this proposal: adding a new definition of Elderly Independent Living Housing, changing the building height to 55 feet in the R-6 zone for Elderly Independent Living Housing, and requiring fewer parking spaces for the residential off the peninsula. The applicant's proposal is summarized below and staff comments and alternatives are listed under B in this section.

1. Text Amendment to Add Definition

Currently the City's Land Use Ordinance does not define the term "Elderly Independent Living Housing". The applicant state the housing needs for the elderly population been changing significantly over the years and "Elderly Independent Living (EIL) housing is interpreted as multifamily housing and equates to a much higher parking requirement". The applicant is proposing to the following text amendment to Division 1 Section 14-47 Definitions:

Elderly Independent Living Housing; living units such as apartments, cottages, condominium units, multiplex housing, or single family unit, the occupancy of which is restricted to certain elderly residents. Elderly resident(s) must be 55 years of age or older, or in case of a couple, one who is 55 years or older, and do not require assistance with daily living activities or 24/7 skilled nursing. Such facilities may offer optional services to residents who desire them, such as dining services, basic housekeeping and laundry services, transportation to appointments, social programs and access to exercise equipment.

2. Text Amendment to Height Requirement

The applicant is requesting to amend the R-6 zone to add the Elderly Independent Living Housing as permitted use and the maximum building height to be 55 feet:

Section 14-136. Permitted Uses, (a) Residential: to include Elderly Independent Living Housing as a permitted use as defined in Section 14-47.

Section 14-139. Dimensional Requirements, (a) 7. Maximum structure height: to include Elderly Independent Living Housing: Fifty-five (55) feet.

3. Text Amendment to Division 20-Parking Requirement

The third proposed text amendment is to revise Division 20 Off-Street Parking Section 14-332.2. The applicant is requesting the parking requirement for residential development be decreased from two parking spaces per unit to one parking space. In Division 20, the requirement for residential development on-peninsula is one parking space per unit whereas off-peninsula is two spaces per unit. The text amendment that the applicant is proposing is the following:

Section 14 -332 (a) Residential Structure 3. For residential development on the peninsula (area defined as southerly of I-295) and including off-peninsula R6 zoned areas.

a. One (1) space per unit;

b. The required parking for multi-unit residential buildings may be partially met through provision of shared-use vehicles, which are vehicles owned and maintained by the owner/manager of the building and available for use on a fee basis to the residents of the building. One shared use vehicle shall be deemed to satisfy eight (8) required car spaces, but in no case shall more than 50% of the parking requirement be satisfied by shared vehicle use.

c. The planning board may establish a parking requirement that is less than the normally required number of spaces upon a finding of unique conditions that result in a lesser parking demand, such as housing for persons who cannot drive, housing that participates in a travel demand management program, availability of transit, or housing which includes permanent restrictions on automobile usage, and which is permanently restricted from utilizing resident on-street parking stickers.

Division 20 Off-Street Parking Section 14-332.2 (c) allows the Planning Board to determine the required number of parking spaces of projects if unique conditions exist, please see below:

The planning board may establish a parking requirement that is less than the normally required number of spaces upon a finding of unique conditions that result in a lesser parking demand, such as housing for persons who cannot drive, housing that participates in a travel demand management program, availability of transit, or housing which includes permanent restrictions on automobile usage, and which is permanently restricted from utilizing resident on-street parking stickers.

According to the applicant's assessment of parking requirements for elderly housing was conducted in communities surrounding Portland and it identified that elderly independent living communities require fewer parking spaces due to need for fewer cars. The assessment acknowledged that the average number for such a population, only one space per unit is required. The applicant is seeking certainty on the required parking number rather than deferring the determination to the time of development review.

VII. ALTERNATIVE OPTIONS FOR THE BOARD'S CONSIDERATION

The applicant met with Marge Schmuckal and Barbara Barhydt several times over the past few years as they explored concepts for their development. At the time, there were proposed amendments regarding the B-2 zone, but the work on the Residential R-6 zone had not been started. With the recent efforts for a comprehensive update the R-6 zone and the series of public meetings that are being held with neighborhood organizations, the Planning staff raises the concern that this is coming forward ahead of the comprehensive revisions. The applicant seeks to begin construction next spring, so they do not want to postpone their schedule.

The Planning Staff are offering zoning concepts as alternatives for the Planning Board's consideration. The three options are as follows:

- 1. Text amendments to the R-6 Zone and Parking Regulations**
 - a. Do not include a definition for elderly housing in Land Use Code
 - b. Establish An Increased Building Height Amendment in R-6 for Campus Development
 - c. Amend R-6 Purpose Statement to include Off-Peninsula Locations
 - d. Amend parking regulations to allow 1 space per unit for all R-6 zones
- 2. R-7 Map Amendment and text amendments**
- 3. Conditional Rezoning Agreement**

The options are summarized below.

1. TEXT AMENDMENTS TO THE R-6 ZONE AND PARKING REGULATIONS

a. Do Not Include a Definition for Elderly Housing in the Land Use Code

All types of housing, including age restricted housing, have been developed under the current broad zoning definitions for dwelling units and multi-family dwellings. Thus, the planning staff and the zoning administrator do not recommend creating a new definition for elderly independent housing, which would then need to be included as a permitted use throughout the applicable zones. An elderly housing development such as the Park Danforth project would be considered a multi-unit residential building under Portland's zoning code.

b. Establish An Increased Building Height Amendment in R-6 for Campus Development

The proposed R-6 text amendments are being presented to neighborhood groups throughout this summer. Based upon the preliminary public comments, there are concerns regarding the maximum height provisions of the zone and a desire to maintain a building height in context with existing development. Thus, the planning staff believes a building height increase

specific to elderly housing would be too encompassing and impact the R-6 zones both off and on-peninsula. Rather than establishing an increased height for the specific use of elderly housing, the Planning staff has considered whether additional height is more appropriate in campus settings, such as the Park Danforth, Deering Pavilion and Ricker Park. These multi-family complexes are the three off-peninsula sites that are zoned R-6 (aerials and photos below).

The following chart shows the three off-peninsula properties that are currently zoned R-6 have the following land area, estimated building height and date of construction:

RESIDENTIAL HOUSING IN THE R-6 ZONE			
Property	Acreage	Building Stories *	Year Built
Park Danforth	4.12	7 (65')	1984
Deering Pavilion	7.017	11	1973
Ricker's Park	4.89	3	1930

* There is no height data on file for these building, but several of the buildings appear to exceed the 45 foot maximum of the R-6 zone. While the City does not maintain data on building heights, staff has provided some photographs of the buildings on pages 9 and 10.

Thus the staff is suggesting an amendment that allows a building height of 55 feet on parcels with a minimum of four (4) acres:

Section 14-139. Dimensional Requirements, (a) 7. Maximum structure height:

Principal and attached accessory structure: Forty-five (45) feet.

Principal and attached accessory structure on a lot with a minimum of four (4) acres: Fifty-five (55)

Accessory detached structure: Eighteen (18) feet.

This mechanism of allowing additional height for large lots is employed in the B-2 zone where building heights of 65 feet are allowed on lots in excess of five (5) acres.

c. Amend R-6 Purpose Statement to include Off-Peninsula Locations

The purpose statement of the R-6 zone focuses on the peninsula; while there are presently three off-peninsula locations zoned R-6. As a companion to the above approach for the height amendment, the planning staff is recommending that the purposed statement be amended to include a statement that addressed larger scale residential developments located off-peninsula as follows:

Section 14-135. Purpose. The purpose of the R-6 residential zone is:

(a) To set aside areas on the peninsula for housing characterized primarily by multifamily dwellings at a high density providing a wide range of housing for differing types of households; and to conserve the existing housing stock and residential character of neighborhoods by controlling the scale and external impacts of professional offices and other nonresidential uses.

(b) *In cases of qualifying small, vacant, underutilized lots located in the urban residential and business zone, to encourage new housing development consistent with the compact lot development pattern typically found on the peninsula.*

(c) To provide for larger scale residential development located off-peninsula on ample campus style lots well serviced by transit.

d. ***Amend parking regulations to allow 1 space per unit for all R-6 zones***

The planning staff supports the applicant's proposal to set the parking ratio to one space per unit for the R-6 zones located off the peninsula.

Aerial of Deering Pavilion at 880 Forest



Deering Pavillion at 880 Forest Avenue- picture taken from their website



Aerial of Ricker's Park



Ricker's Park off of Forest Avenue- Picture taken from their website



Aerial of Park Danforth Campus



Existing Building at 777 Stevens Avenue



2. R-7 MAP AMENDMENT AND TEXT AMENDMENTS

a. R-7 Map Amendment

Since the rewrite of the R-6 zone is in development, the applicant and the Board are asked to consider the R-7 zone as a possibility for this site. A map amendment would encompass the full block for the Park Danforth campus and rezone the R-5, R-6, and B-2 to Residential R-7.

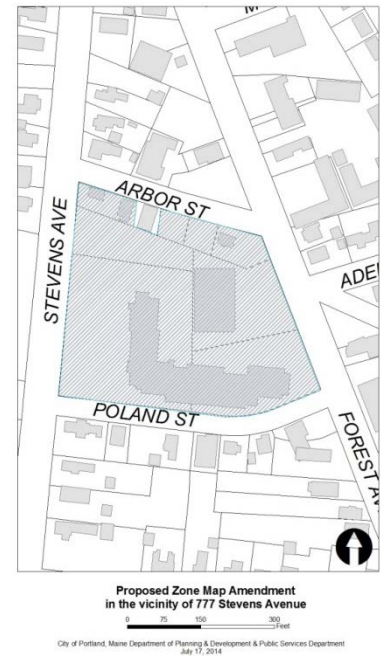
b. R-7 Text Amendments

The purpose statement for the R-7 zone is as follows:

The purpose of the R-7 Compact Urban Residential Overlay Zone is to encourage and accommodate compact residential development on appropriate locations on the Portland peninsula, pursuant to the New Vision for Bayside element of the comprehensive plan and housing plans of the City of Portland. Sites suitable for in-city living should be within walking distance of downtown or other work places, shopping and community facilities and have access to public or private off-site parking or transit service. The intent of this zone is to foster increased opportunities for compact in-city living for owners and renters representing a variety of income levels and household types.

Locations for siting the R-7 Zone are intended to be located on the peninsula of Portland, in the area encompassed in the Bayside plan, and other peninsula R-6 locations characterized by moderate to high density multi-family housing in a form and density exceeding that allowed in the R-6 Zone and where infill development opportunities exist; and areas on the peninsula with mixed business and residential zoning and uses which can accommodate higher density infill residential development without negatively impacting the existing neighborhood or adjacent properties. It may be appropriate in some cases to rezone to R-7 overlay through conditional or contract zoning to ensure that the new development is architecturally appropriate and compatible with the surrounding neighborhood.

The permitted uses of the R-6 zone are permitted in the R-7 zone. The R-7 dimensional requirements do not require any minimum lot size, frontage or minimum yard dimensions except for five feet for rear and side yards. The maximum lot coverage is 100% and the maximum density is 435 feet of land area per unit. The maximum building height is 50 feet.



Similar to the R-6 proposed amendments, several R-7 text amendments would need to be considered in order for the zone to support the proposed development. The purpose statement is focused on the peninsula, but the housing plan and the transportation plan support increased residential density for off-peninsula locations near services and public transit. The changes to the purpose statement could include the following:

The purpose of the R-7 Compact Urban Residential Overlay Zone is to encourage and accommodate compact residential development on appropriate locations on the Portland peninsula and off-peninsula locations, pursuant to the New Vision for Bayside element of the comprehensive plan and housing plans of the City of Portland. Sites suitable for in-city living should be within walking distance of downtown or other work places, shopping and community facilities and have access to public or private off-site parking or transit service. The intent of this zone is to foster increased opportunities for compact in-city living for owners and renters representing a variety of income levels and household types.

Locations for siting the R-7 Zone are intended to be located on the peninsula of Portland, in the area encompassed in the Bayside plan, and other peninsula and off-peninsula R-6 locations characterized by moderate to high density multi-family housing in a form and density exceeding that allowed in the R-6 Zone and where infill development opportunities exist; and areas on the peninsula and along transit corridors with mixed business and residential zoning and uses which can accommodate higher density infill residential development without negatively impacting the existing neighborhood or adjacent properties. It may be appropriate in some cases to rezone to R-7 overlay through conditional or contract zoning to ensure that the new development is architecturally appropriate and compatible with the surrounding neighborhood.

The density for the R-7 zone supports the proposed development and the unit sizes are between 800 and 1,000 square feet, so the development would meet the minimum habitable area of 400 square feet. However, the maximum building height is 50 feet. At this time, the applicant notes that the proposed building height will be approximately 52 feet, so the applicant would want this dimensional standard to be raised to 55 feet. This increase in height would apply in all R-7 zones, unless the Board suggests the height should be limited to large campus sites, as proposed above for R-6.

3. CONDITIONAL REZONING AGREEMENT

The purpose statement of the R-7 zone states that it can be applied through a conditional rezoning or a conditional rezoning could be used for an R-6 rezoning for the full block. The purpose statement for a conditional or contract zoning is as follows (Sec. 14-60):

Pursuant to 30-A M.R.S.A. Section 4503(9), conditional or contract zoning is hereby authorized for rezoning of property where, for reasons such as the unusual nature or unique location of the development proposed, the city council finds it necessary or appropriate to impose, by agreement with the property owner or otherwise, certain conditions or restrictions in order to ensure that the rezoning is consistent with the city's comprehensive plan. Conditional or contract zoning shall be limited to where a rezoning is requested by the owner of the property to be rezoned. Nothing in this division shall authorize either an agreement to change or retain a zone or a rezoning which is inconsistent with the city's comprehensive plan.

In the initial conversation with the applicant, they raised the question of pursuing a conditional rezoning agreement. The Planning Staff advised against this approach, since the Planning Board had indicated their lack of support for this zoning mechanism. With that said and the ongoing comprehensive update of the R-6 zone, this may be the appropriate option for this site. It can be argued that this four acre site with elderly and assisted housing at an urban density in tall buildings is

a unique location for Portland's off-peninsula neighborhoods. It is adjacent to the University of New England and across from the armory. Public transit is available on both Forest and Stevens Avenues, with retail establishments in the area. A conditional rezoning agreement could articulate the following:

- 1) Number and types of uses;
- 2) Restrictions on the scale and density of development;
- 3) Specifications for the design and layout of buildings and other improvements;
- 4) Schedules for commencement and completion of construction;
- 5) Performance guarantees securing completion and maintenance of improvements, and guarantees against defects;
- 6) Preservation of open space and buffers and protections of natural areas and historic sites;
- 7) Contributions toward the provision of municipal services required by the development; and
- 8) Provisions for enforcement and remedies for breach of any condition or restriction.

A draft conditional rezoning has not been developed and if this is the approach that the Planning Board supports a workshop on the proposed document would be needed.

VIII. COMPREHENSIVE PLAN ANALYSIS

Robert Metcalf, Principal Architect with Mitchell Associates, provided the applicant's assessment of the proposed zoning map and text amendments and consistency with Portland's Comprehensive Plan (Attachment A). Mr. Metcalf cites relevant goals and policies from the following components of Portland Comprehensive Plan:

Housing: Sustaining Portland's Future; and
A Time of Change: Portland's Transportation Plan

IX. NEXT STEPS

- Further develop the proposed amendments per the Planning Board's guidance
- Schedule a second workshop or public hearing

ATTACHMENTS:

Staff Review Comments and Background Information

1. Traffic Engineering Review (Tom Errico, T Y Lin), comments dated 7/17/2014
2. Department of Public Services Memo, David Margolis-Pineo, dated 7/17/2014

Public comments (none at the time PB Memo completed)

Applicant's Submittal

- A. Application
- B. Cover Letter
- C. Project Description
- D. Letter of Authorization
- E. Technical Capacity
- F. Right, Title and Interest (Warranty Deed)
- G. Maps
- H. Parking Requirements Comparison
- I. Definitions Comparison Plans

Plans

- P1. Conceptual Master Plan
- P2. Existing Conditions in Vicinity
- P3. Arbor Street Elevation

P4. Forest Avenue Elevation

From: Tom Errico <thomas.errico@tylin.com>
To: Shukria Wiar <SHUKRIAW@portlandmaine.gov>
CC: "Margolis-Pineo, David" <DMP@portlandmaine.gov>, Katherine Earley <KAS@portlandmaine.gov>, Jeremiah Bartlett <JBartlett@portlandmaine.gov>, Jeff Tarling <JST@portlandmaine.gov>
Date: 7/17/2014 11:32 AM
Subject: 777 Stevens Avenue - Preliminary Traffic Comments

Shukria - My preliminary traffic comments regarding the draft concept plan are noted below.

- * The proposed project does not meet City standards in regard to the number of driveways provided. The applicant should document specifically the purpose of each driveway as part of justifying a waiver from City standards. I would note that while the number of driveways have been reduced, I'm still concerned about access/egress conditions.
- * Some of the driveways may not meet City corner clearance and spacing requirements and thus the applicant should provide information that support non-compliant conditions.
- * The applicant will need to provide supporting information on the number of parking spaces provided on-site. I would suggest that the applicant conduct an existing parking demand study and use that information to document future parking needs.
- * Sidewalk with curbing will be required for all property frontage areas.

If you have any questions, please contact me.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
[T.Y. Lin International]T.Y. Lin International
12 Northbrook Drive
Falmouth, ME 04105
207.781.4721 (main)
207.347.4354 (direct)
207.400.0719 (mobile)
207.781.4753 (fax)
thomas.errico@tylin.com<mailto:thomas.errico@tylin.com>
Visit us online at www.tylin.com<http://www.tylin.com>
Twitter | Facebook | LinkedIn | YouTube

"One Vision, One Company"

Please consider the environment before printing.

MEMORANDUM

To: FILE
From: Shukria Wiar
Subject: Application ID: 2014-114
Date: 7/18/2014

Comments Submitted by: David Margolis-Pineo/Engineering DPS on 7/17/2014

July 17, 2014

Memo To:Shukria Wiar
Barbara Barhydt
From:David Margolis-Pineo
Re:Review Comments for 777 Stevens Ave

The Department of Public Services have the following preliminary comments for the above mentioned project.

- 1.The sidewalk material policy for this area is concrete. The applicant will be requested to install a concrete sidewalk with granite curbing for the entire length of Arbor St. There may be several existing sidewalk concrete panels which are damaged and may need replacing. We will work with the applicant to identify these locations. Since one existing curb cut is to closed, the applicant may wish to check the availability of stock piled granite curbing which the City may have available at a reasonable cost.
 - 2.A property survey will be required as defined in the application. Your surveyor, Owen and Haskell is familiar with the City's submittal requirements and this should not be an issue.
 - 3.The proposed driveway cut on Forest Ave is proposing an island encroaching the street right of way. This may or may not be desirable from a City standpoint.
 - 4.A sewer capacity approval will be required and project flows will need to be established.
 - 5.Utility and grading plans will be required.
 - 6.Stormwater treatment may be applicable for this project.
 7. The applicant is reminded that bike parking will be required.
- We have no further comments at this time.



Zoning Map/Text Amendment Application Portland, Maine

Planning and Urban Development Department
Planning Division and Planning Board

Portland's Planning and Urban Development Department coordinates the development review process for requests for zoning map amendments, zoning text amendments and contract or conditional rezoning. The Division also coordinates site plan, subdivision and other applications under the City's Land Use Code. The **Application Process for a Zone Change** is summarized below under Section I and the associated costs for reviews are found under Section II, **Development Review Fees, Public Notices and Guarantees**, and are listed on the fee structure sheet.

I. APPLICATION SUBMITTAL

Pre-application meeting

Prior to submitting a zoning amendment application, the Planning Division recommends that the applicant or the designated representative schedule a pre-application meeting to discuss the review process and applicable standards for a proposal. Please contact Barbara Barhydt, Development Review Services Manager at 874-8699 to schedule a meeting.

Zoning Amendment Application

All plans and written application materials must be uploaded to a website for review. At the time of application, instructions for uploading the plans will be provided to the applicant. One paper set of the plans, written materials and application fee must be submitted to the Planning Division Office to start the review process.

- Submit one (1) complete paper set of the zoning amendment application with a concept plan and a written narrative. Contract and conditional rezoning applications must include site plans and written material that address physical development and operation of the property to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations, and compatible with the surrounding neighborhood. Applications may be submitted between 8 a.m. and 4:30 p.m. Monday through Friday at the Planning Division on the 4th floor of City Hall, 389 Congress Street, Portland.
- All applications are processed in the order in which they are received.
- In order for the Planning Division's Administrative Staff to accept and log-in an application, the application form must be complete, it shall be signed by the applicant's or the applicant's designated representative, and all applicable fees paid at the time of submittal.
- The Land Use Code is available on the City's website at www.portlandmaine.gov.
- If the application is found to be incomplete, the applicant will be informed in writing of the required plans and materials.

II. DEVELOPMENT REVIEW FEES, PUBLIC NOTICES AND GUARANTEES

Zoning Application Fees

- Each application must be submitted with the applicable fees as listed in the fee structure on page 4. The fees cover general administrative processing costs.
- Application fees may be paid in cash or by check (addressed to the City of Portland).
- An application will not be processed without the required application fees.

Fee for City Review Services

- The City of Portland charges fees for service to cover the cost of reviews by Planning and Legal staff members. The charges will be billed at an hourly rate and will be invoiced monthly for reimbursement.
- Current billing rates: Planning services, \$40.00/ hour and Legal services: \$75.00/hour.

Fee for Third Party Review

- Portland contracts with local engineering firms to conduct engineering reviews of development proposals. The direct cost of all engineering services or third-party consultant reviews, such as the civil engineering review of stormwater management plans, traffic impact reviews and such other reviews as required under the City's Ordinances, will be included in the monthly invoices for reimbursement.

Public Notices

- Public notices must be sent to property owners within 500 for all proposals at the time an application is received. Zoning map amendments for Industrial zones require notices to be sent to property owners within 1,000 feet.
- In advance of a Planning Board workshop or public hearing, public notices for projects must be sent to property owners and are posted in a legal ad in the Portland Press Herald and on the City's web site.
- In addition, zoning map amendments, text amendments and conditional rezoning agreements require individual notices to be posted in the Portland Press Herald.
- The Planning Division mails public notices and posts notices in the newspaper. The applicant will be billed for actual or apportioned costs for advertising and sending mailed notices.
- The applicant is required to hold a neighborhood meeting under the City's regulations for zone change requests. The mailing labels must be purchased from the Planning Division for the neighborhood meeting invitation. A request for labels requires a minimum of two business days to generate the mailing labels and a charge of \$1.00 per sheet will be payable upon receipt of the labels.

Third Party Review Fees

- Engineer and Third Party Review Fees - The fees are assessed by the Consulting Engineers and Third Party Reviewers.
- Inspection Fee - This fee is 2% of the Performance Guarantee or as assessed by Planning or Public Works Engineer with \$300.00 being the minimum.

Noticing/Advertisements Planning Board/City Council Review

- Legal Advertisement: Percent of total bill
- Notices: .75 cents each
(notices are sent to neighbors upon receipt of an application, workshop and public hearing meetings for Planning Board and public hearing meeting for City Council)

Planning Division
Fourth Floor, City Hall
389 Congress Street
(207) 874-8721 or 874-8719

Office Hours
Monday thru Friday
8:00 a.m. – 4:30 p.m.

PROJECT ADDRESS: 777 Stevens Avenue, Portland

CHART/BLOCK/LOT: 146 C Lots 5 & 10, (new)146 C lots 6-9, 11, 12, 14

DESCRIPTION OF PROPOSED ZONE CHANGE AND PROJECT:

Requesting a zone map amendment & zoning text amendment reflective of attached plans. Project to expand The Park Danforth campus to provide 46 elderly independent living housing units and site improvements.

CONTACT INFORMATION:

	Applicant's Contact for electronic plans Name: Mitchell Associates e-mail Address rmetcalf@mitchellassociates.biz work # 207.774.4427
Applicant – must be owner, Lessee or Buyer Name: The Park Danforth-Denise Vachon, CEO Business Name, if applicable: Address: 777 Stevens Avenue City/State : Portland, ME Zip Code: 04103	Applicant Contact Information Work # 207.797.7710 Home# Cell # Fax# e-mail: vachon@parkdanforth.com
Owner – (if different from Applicant) Name: The Home for the Aged & HFA Forest Avenue Properties, LLC Address: 777 Stevens Avenue City/State : Portland, ME Zip Code: 04103	Owner Contact Information Work # Home# Cell # Fax# e-mail: vachon@parkdanforth.com
Agent/ Representative Name: Robert Metcalf/ Mitchell & Assoc. Address: 70 Center Street City/State : Portland, ME Zip Code: 04101	Agent/Representative Contact information Work # 207.774.4427 Cell # e-mail: rmetcalf@mitchellassociates.biz
Billing Information Name: The Park Danforth, Attn: Denise Vachon Address: 777 Stevens Avenue City/State : Portland, ME Zip Code: 04103	Billing Information Work # 207.797.7710 Cell # Fax# e-mail: vachon@parkdanforth.com
Engineer Name: N/A Address: City/State : Zip Code:	Engineer Contact Information Work # Cell # Fax# e-mail:

Surveyor Name: Owen Haskell Surveyors, Inc. Address: 390 U.S. Rt 1, Unit 10 City/State : Falmouth, ME Zip Code: 04105	Surveyor Contact Information Work # 207.774.0424 Cell # Fax# e-mail: www.owenhaskell.com
Architect Name: Joan Eagleson Lavallee/Brensinger Architects Address: 155 Dow St. Suite 400 City/State : Manchester, NH Zip Code: 03101	Architect Contact Information Work # 603.622.5450 Cell # Fax# e-mail: joan.eagleson@lbpa.com
Attorney Name: Melissa Murphy-Perkins Thompson Address: 1 Canal Plaza City/State : Portland Zip Code: 04101	Attorney Contact Information Work # 207.774.2635 Cell # Fax# e-mail: mmurphy@perkinsthompson.com

Right, Title, or Interest: Please identify the status of the applicant's right, title, or interest in the subject property:

See attached deeds.

Provide documentary evidence, attached to this application, of applicant's right, title, or interest in the subject property. (For example, a deed, option or contract to purchase or lease the subject property.)

Vicinity Map: Attach a map showing the subject parcel and abutting parcels, labeled as to ownership and/or current use. (Applicant may utilize the City Zoning Map or Parcel Map as a source.)

Existing Use: Describe the existing use of the subject property:

See attached description.

Current Zoning Designation(s):

Business (B-2), Residential (R-5), Residential (R-6)
--

Proposed Use of Property: Please describe the proposed use of the subject property. If construction or development is proposed, please describe any changes to the physical condition of the property.

See attached project narrative.

Site Plan: On a separate sheet, please provide a site plan of the property showing existing and proposed improvements, including such features as buildings, parking, driveways, walkways, landscape and property boundaries. This may be a professionally drawn plan, or a carefully drawn plan, to scale, by the applicant. (Scale to suit, range from 1" = 10' to 1' = 50'.) Contract and conditional rezoning applications may require additional site plans and written material that address physical development and operation of the property to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations, and compatible with the surrounding neighborhood.

APPLICATION FEE:

Check the type of zoning review that applies. Payment may be made in cash or check payable to the City of Portland.

Zoning Map Amendment ____ \$2,000.00 (from ____ zone to ____ zone)	Fees Paid (office use) ____	The City invoices separately for the following: • Notices (\$.75 each) (notices are sent to neighbors upon receipt of an application, workshop and public hearing meetings for Planning Board and public hearing meeting for City Council) • Legal Ad (% of total Ad) • Planning Review (\$40.00 hour) • Legal Review (\$75.00 hour) Third party review is assessed separately.
Zoning Text Amendment ____ \$2,000.00 (to Section 14- ____) (For a zoning text amendment, attach on a separate sheet the exact language being proposed, including existing relevant text, in which language to be deleted is depicted as crossed out (<u>example</u>) and language to be added is depicted as underline (<u>example</u>)	____	
Combination Zoning Text Amendment and Zoning Map Amendment X \$3,000.00	____	
Conditional or Contract Zone ____ \$3,000.00 (A conditional or contract rezoning map be requested by an applicant in cases where limitations, conditions, or special assurances related to the physical development and operation of the property are needed to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations, and compatible with the surrounding neighborhood. Please refer to Division 1.5, Sections 14-60 to 62.)	____	

Signature of Applic 	Date: June 23, 2014
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Further Information

In the event of withdrawal of the zoning amendment application by the applicant, a refund of two-thirds of the amount of the zone change fee will be made to the applicant as long as the request is submitted to the Planning Division prior to the advertisement being submitted to the news paper.



A Guide to Holding Neighborhood Meetings Portland, Maine

Planning and Urban Development Department
Planning Division and Planning Board

In order to improve communication between development applicants and neighbors, the City of Portland requires applicants, proposing certain types of projects, to hold a neighborhood meeting.

What type of development proposal requires a neighborhood meeting?

Neighborhood meetings, organized and hosted by the applicant, are required for the following development proposals:

- Proposed zone changes, contract zones and zoning text amendments that would result in major development;
- Subdivisions of five or more units or lots; and
- Level III site plan proposals for preliminary or final site plans:
 - Portland's new site plan ordinance went into effect in August, 2010. It now includes provisions for preliminary and final plans. Neighborhood meetings are to be held three weeks after submitting a preliminary plan or within two weeks of submitting a final plan, if a preliminary plan was not submitted.

Who must be invited to a neighborhood meeting?

Property owners within 500 feet of the proposed development (1000 feet for proposed industrial subdivisions and zone changes) as well as those people on a list of interested citizens and neighborhood groups must be invited to the planned neighborhood meeting.

The Planning Division provides the mailing labels for the neighborhood meeting invitation. We require at least 48 hours notice to generate the mailing labels and a charge of \$1.00 per sheet will be payable upon receipt of the labels.

When and where must the neighborhood meeting be held?

The neighborhood meeting must be held within three weeks of submitting a preliminary site plan. If an applicant chooses only to submit a final site plan, then the neighborhood meeting must be held within two weeks of submitting the final plan and not less than seven days prior to the Planning Board public hearing.

The meeting should be held in the evening, during the week, at a convenient location within the Portland neighborhood surrounding the proposed site. Community meeting spaces at libraries, schools or other places of assembly are recommended. Neighborhood schools are usually available for evening meetings.

Meetings should not be held on the same day as scheduled Planning Board or City Council meetings. The City Council generally meets on the first and third Monday of each month and the Planning Board generally meets on the second and fourth Tuesday of each month; however additional meetings may be scheduled. An updated schedule may be found on the City's website: www.portlandmaine.gov

When must invitations be sent?

Invitations to a neighborhood meeting must be sent no less than ten days (to include weekends) prior to the neighborhood meeting. If the notice is for a final site plan, then the neighborhood meeting must be held no less than seven days (to include weekends) prior to the public hearing. Notices may be sent by regular mail and do not need to be sent by certified mail.

What information should the invitation include?

A recommended invitation format is included in this packet of material.

Sign-up Sheets and Meeting Minutes

At the meeting, the applicant must circulate a sign-up sheet for those in attendance. The applicant must also keep accurate minutes of the meeting.

After holding the neighborhood meeting, the applicant must submit the sign-up sheet and meeting minutes to the Planning Division. The meeting minutes and sign-up sheet will be attached to the Planning Board report. A public hearing will not be scheduled until the meeting minutes and sign-up sheet are submitted to the Planning Division.

Certification

Included with this packet is a Certification to be completed and signed by the applicant. The applicant is required to certify when the invitations were sent out.

Please call the Planning Division at 874-8721 or 874-8719 if you have any questions.

Attachments

1. Neighborhood Meeting Invitation Format
2. Neighborhood Meeting Certification

~Applicant/Consultant: Please include all of the information listed below in the notice sent to neighbors~

Neighborhood Meeting Invitation Format

Applicant/Consultant Letterhead

(Date)

Dear Neighbor:

Please join us for a neighborhood meeting to discuss our plans for a (development proposal) located at (location/number and street address).

Meeting Location: _____

Meeting Date: _____

Meeting Time: _____

The City code requires that property owners within 500 feet of the proposed development and residents on an "interested parties list", be invited to participate in a neighborhood meeting. A sign-in sheet will be circulated and minutes of the meeting will be taken. Both the sign-in sheet and minutes will be submitted to the Planning Board.

If you have any questions, please call (telephone number of applicant or consultant).

Sincerely,

(Applicant)

Note:

Under Section 14-32(C) and 14-525 of the City Code of Ordinances, an applicant for a Level III development, subdivision of over five lots/units, or zone change is required to hold a neighborhood meeting within three weeks of submitting a preliminary application or two weeks of submitting a final site plan application, if a preliminary plans was not submit. The neighborhood meeting must be held at least seven days prior to the Planning Board public hearing on the proposal. Should you wish to offer additional comments on this proposed development, you may contact the Planning Division at 874-8721 or send written correspondence to the Planning and Urban Development Department, Planning Division 4th Floor, 389 Congress Street Portland, ME 04101 or by email: to bab@portlandmaine.gov

Neighborhood Meeting Certification

I, (applicant/consultant) hereby certify that a neighborhood meeting was held on (date) at (location) at (time).

I also certify that on (date at least seven days prior to the neighborhood meeting), invitations were mailed to all addresses on the mailing list provided by the Planning Division, including property owners within 500 feet of the proposed development or within 1000 feet of a proposed industrial subdivision or industrial zone change and the residents on the "interested parties" list.

Signed,

_____ (date)

Attached to this certification are:

1. Copy of the invitation sent
2. Sign-in sheet
3. Meeting minutes

June 30, 2014

Ms. Barbara Barhydt
Development Review Services Manager
City of Portland
389 Congress Street
Portland, Maine 04101

**Re: Park Danforth
777 Stevens Avenue
Request for Map Change
And Text Amendment**

Dear Barbara,

On behalf of The Park Danforth we are pleased to submit the following application for a zone map change and text amendments for the properties identified as Tax Map 146 Chart C Lots 6-9, 11, 12 & 14 situated between Stevens and Forest Avenues. The Park Danforth is an elderly residential housing entity that has been in existence for over 130 years in the city of Portland. The proposed map change and text amendments are being proposed to address an expanded housing program and site enhancement to offer a quality environment for an aging population.

History



The Park Danforth, a not-for-profit corporation, has been in existence for over a 130 years, evolving from the “Mercantile Home for Aged Men” located at the corner of Park and Danforth Streets. During the mid - 1970’s the facility model was expanded to provide a larger state-licensed and Medicaid supported residential care program coupled with internal subsidies as well. With financial pressures changing from both state reimbursements and increasing pressure for subsidies from its investments, The Park Danforth considered its options to continue its mission while remaining financially solvent. Making a bold move, The Park Danforth sold its program and property to 75 State Street – another strong not for profit provider – and moved its operations to the current 777 Stevens Avenue location in 1985 with 70 Section 8 apartments and 36 market rate residential apartments for the elderly in the mix. In 1999, to further its mission of service, The Park Danforth expanded the facility to provide 18 new apartments and 36 Assisted Living studios. The current makeup of The Park Danforth today consist of 124 apartments classified by the city as Special Needs Independent Living Units and 36 Assisted Living studios classified by the city as Intermediate Care units, 3 of which are licensed for double occupancy units.

Mission Statement

“The Park Danforth is a not-for-profit corporation dedicated to providing high quality housing and services to those 60 years of age or older. Our Mission is to provide housing and services to enhance a person’s quality of life, respect personal dignity, and accommodate the need for privacy and self-determination. In doing so, we aim to respond to the individual’s changing needs brought about through aging.”

Existing Conditions

Ms. Barbara Barhydt

The Park Danforth properties consist of 8 parcels identified on the Assessors maps as Map 146, Chart C, Lot's 5-12 & 14. Over the past 5 years, The Park Danforth has negotiated the purchase of the adjacent parcels that include the Goodwill properties along Forest Avenue extending to Stevens Avenue and two existing residential properties along Arbor Street and presently own an entire city block with the exception



of one residential property, 24 Arbor Street, identified as lot 13. They have been in discussions with the property owner to purchase however due to health issues discussions are temporally on hold. Further discussions will continue when appropriate.



The properties are bound by Stevens Avenue, Poland Street, Forest Avenue and Arbor Street. Of the existing property held by The Park Danforth, Map 146, lot 5 & 10 are presently zoned R6. Lots 6-9 and a portion of 14, held by The Park Danforth, are presently zoned R5 and Lots 11, 12 and a portion of 14, "Goodwill" operation, are zoned B2. Not included in the application is Lot 13, 24 Arbor Street, is also in the R5 zone. The total parcel area of The Park Danforth campus is 179,546 SF or 4.12 acres. The Goodwill site is almost entirely impervious (95% +/-) consisting of two buildings and paved parking, with a lot area of 60,798 +/-SF or 1.40 acres. Of the two Arbor Street properties acquired, one has an existing single family residence and the second parcel is presently vacant.

Ms. Barbara Barhydt

Proposed Map Change

The Park Danforth is currently developing a master development plan to expand their opportunities for providing elderly housing to include “independent elderly housing” for a younger aging population including those that do not require assistance with daily living but who are looking for housing that provides opportunities for an interactive senior community with amenities and services for their choosing. The target market is 75 years of age plus.

The map change request is intended to include the entire city block as an R6 to reach the density necessary to achieve a successful project. As indicated above, with exception of one residential property on Arbor Street, The Park Danforth owns all of the land within the city block. While the owners of the Arbor Street property have not been contacted to request a letter of support for reasons previously mentioned, they have been informed of The Park Danforth’s intentions. The requested change from the R5 to the R6 designation will have no adverse impact upon the remaining residence.

R5 (Residential) to R6 (Residential)

Chart 146	Block C	Lots	6-9 and portion of 14
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B2 to R6 (Residential)

Chart 146	Block C	Lots	11, 12 and portion of 14
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Proposed Development

The Park Danforth currently consist of a seven-story building along Stevens Avenue, and a three-story building along Poland Street. With the acquired parcels along Arbor Street and Forest Avenue, The Park Danforth seeks to build a new structure along Arbor Street and Forest Avenue comprised of 46 new “Independent Living” units on four and five floors with one level of underground parking for approximately 40 cars. The building will be approximately 64,000 SF. excluding the parking level, and 55 feet tall at its highest point.

The majority of the building will be four-stories along Forest Avenue and Arbor Streets with a five-story element at the corner. The interior of the building that faces the existing Park Danforth building will be five-stories. The new building will connect to the existing seven-story building with a one-story structure at the new turn-around. The building will feature varied window sizes, balconies, and materials, to coordinate and complement the existing Park Danforth building.

The proposed campus Master Plan addresses functional open spaces, provides an opportunity to enhance the street presence, address pedestrian and vehicular circulation and safety. The total land area of the parcels making up The Park Danforth Campus is 179,546 +/-SF or 4.12 acres. Current residents and emergency service vehicles will continue to access by the Stevens Avenue-Poland Street entry, circulation will remain as

Ms. Barbara Barhydt

one-way, exiting from a modified existing driveway that will be two-way, providing access to new parking and the new visitor entry. An existing curb cut along Forest Avenue serving the Goodwill is to be eliminated. A reconfigured drive on Arbor Street will be identified as the primary access to the new visitor entrance and for the proposed new elderly independent living units. The Forest Avenue service entrance will be modified to accommodate for enhanced open space garden court yards and to diminish the visual presence from Forest Avenue. Parking will be accommodated for by well distributed parking areas and proposed parking garage to minimize the presence of large areas of paved parking.

Site improvements will include enhanced street presence along Arbor Street and Forest Avenue through extensive plantings and site features including retaining walls, fencing, and lighting, buffering, and parking distributed in small lots. The campus will include two interior court yard gardens to provide safe and functional open space for the varied skill levels of the elderly resident population.

Conformance with Comprehensive Plan

The proposed expansion, density and target market support the goals set-forth in the City's Comprehensive Plan "Portland's Goals and Policies for the Future". The proposed expansion of The Park Danforth provides for the density and mix of housing opportunities identified in the following sections of the Comprehensive plan. The Park Danforth campus will provide for a strong transition between business community along Forest Avenue, with the residential community along Poland Street and the changing UNE campus along Stevens Avenue.

STATE GOAL A: To encourage orderly growth and development in appropriate areas of each community, while protecting the State's rural character, making efficient use of public services and preventing development sprawl;

I. HOUSING: SUSTAINING PORTLAND'S FUTURE – Nov. 18, 2002

Goal

Portland's Comprehensive Plan encourages a manageable level of growth that will sustain the city as a healthy urban center in which to live and work and to achieve a shared vision for Portland. Portland should encourage sustainable development patterns and opportunities within the city by promoting efficient land use, conservation of natural resources, and easy access to public transportation, services, and public amenities.

Policies

- o Encourage growth in Portland that strives for a dynamic balance of the essential elements of the city, such as excellent schools, diverse housing choices, proximity

Ms. Barbara Barhydt

to services and employment, increased public transit usage, expanded economic base, high quality services, and an affordable tax rate.

- o Target Portland to achieve and maintain a 25% share of Cumberland County's population.
- o Maximize development where public infrastructure and amenities, such as schools, parks, public/alternative transportation, sewer lines, and roads, exist or may be expanded at minimal costs.
- o Create new housing to support Portland as an employment center and to achieve an improved balance between jobs and housing.
- o Encourage neighborhood business centers throughout the city to reduce dependence on the car and to make neighborhood life without a car more practical.
- o Locate and design housing to reduce impacts on environmentally sensitive areas.
- o Design housing to use new technologies and materials that reduce costs and increase energy efficiency.

The expansion of Park Danforth will provide the opportunity, for an aging population, a choice for residents of Portland and Greater Portland to remain in the city and have access to services, transportation and cultural activities. The property is in the heart of a diverse vibrant university community that provides for life-long learning opportunities through adult education programs and UNE offerings. Shopping and services are within walking distance of the campus.

The proposed expansion will incorporate new building technologies and sustainability.

III. A TIME OF CHANGE: PORTLAND TRANSPORTATION PLAN - July 1993

Transportation Plan Guiding Principle

Provide maximum mobility in a balanced transportation system, which encompasses all modes, to support the economic vitality and quality of life of the Portland community.

Land Use and Transportation Link

Link the transportation plan with land use planning policies in the City and region to guide decision-making for development and infrastructure investment.

- o Ensure that future growth does not foster auto dependency.

Ms. Barbara Barhydt

Transportation Policies

- o Vibrant neighborhoods include nearby, small-scale commercial areas that provide both convenient service and natural meeting places. Provide routine, daily services within walking distance of residents of all neighborhoods, as long as the businesses providing the services are small-scale, are designed compatibly with residences, and fit into the fabric of the neighborhood.
- o Allow development along transit corridors and near community commercial centers to evolve at a density sufficient to make public transit, walking, and biking viable options.

Public transportation is available along Stevens and Forest Avenue with bus stop locations on both street frontages. The property is within walking distance of neighborhood services.

STATE GOAL D. To encourage and promote affordable, decent housing opportunities for all Maine citizens:

I. HOUSING: SUSTAINING PORTLAND'S FUTURE- Nov.18, 2002

Goal

Ensure that an adequate supply of housing is available to meet the needs, preferences, and financial capabilities of all Portland households, now and in the future.

Policies

- o Ensure the construction of a diverse mix of housing types that offers a continuum of options across all income levels, which are both renter and owner-occupied, including but not limited to the following:
 - Affordable housing, including starter homes;
 - Housing units for decreasing household size, such as young professionals, empty nesters, single-parent households, and senior citizens;
 - Housing for special markets, such as SRO's, student or dormitory housing, group homes, and artist housing including live/work opportunities;
 - Higher density housing, such as row houses, small lots, reuse of nonresidential buildings, and mixed use buildings;
 - Housing development that encourages community, such as co-op housing;
 - Housing with a range of services and medical support for the elderly and special needs population, including assisted living, congregate care, group homes and nursing homes; and
- o A variety of housing choices should be available such that no one should have to spend more than 30% of their income for housing.
- o Encourage higher density housing for both rental and home ownership opportunities, particularly located near services, such as schools, businesses, institutions, employers, and public transportation.
- o Increase Portland's rental housing stock to maintain a reasonable balance between supply and demand yielding consumer choice, affordable rents, and reasonable return to landlords.
- o Increase home ownership opportunities for all types of households and all income levels.

- o Ensure that a continuum of housing is available for people with special needs and circumstances ranging from emergency shelters and transitional housing to permanent housing (rental and homeownership), which offer appropriate supportive services.
- o Identify vacant land and redevelopment opportunities throughout the City to facilitate the construction of new housing.

The Park Danforth will provide a higher density of development and address a growing sector of population, providing for a much needed rental housing for the elderly.

Goal

Maintain and enhance the livability of Portland's neighborhoods as the City grows and evolves through careful land use regulation, design and public participation that respects neighborhood integrity.

Policies

- o While accommodating needed services and facilities, protect the stability of Portland residential neighborhoods from excessive encroachment by inappropriately scaled and obtrusive commercial, institutional, governmental, and other non-residential uses.
- o Support Portland's livable neighborhoods by encouraging a mix of uses that provide goods and services needed and are within walking distance of most residents.
- o Encourage innovative new housing development, which is designed to be compatible with the scale, character, and traditional development patterns of each individual residential neighborhood.
- o Encourage new housing development in proximity to neighborhood assets such as open space, schools, community services and public transportation.
- o Ensure the integrity and economic value of Portland's neighborhoods.
- o Encourage Portland's neighborhoods to address the City's housing issues through the Neighborhood Based Planning Process.
- o Encourage neighborhood populations that are economically, socially, culturally and ethnically diverse.

The Park Danforth provides an opportunity for affordable market rate elderly as well as subsidized (Section 8 HUD) housing for the aging population. A range of services provided supports the diverse needs of the aging elder population as needs increase, providing the opportunity for individuals to remain independent.

Campus improvements will enhance the character of the residential and university neighborhood providing street presence, incorporating green space and improved circulation.

To provide for the demand and growth of an aging population and maintain the sustainability of the Park Danforth Mission, the proposed master plan incorporates an expansion to include 46 elderly independent living housing units. The opportunity provided by controlling the majority of a city block, creates a campus that has a street presence along all frontages. The goal is to provide an opportunity for an active-wellness based community that provides for social interaction, functional outdoor green spaces, and addresses' security for a wide range of elderly skill levels.

Proposed Text Amendment

Presently the city land use ordinance does not define "Elderly Independent Living Housing". Elderly housing needs and housing opportunities have been changing significantly over the past 15 years or better to address a wider spectrum of elder housing needs. Currently, Elderly Independent Living (EIL) housing is interpreted as multifamily housing and equates to a much higher parking requirement. While the ordinance, Division 20 Off-Street Parking Section 14-332.2 (c) allows the Planning Board to determine the required number of parking spaces for projects of 50,000 SF or greater based upon a parking analysis submitted by an applicant. Establishing the required parking for EIL is crucial to the development of this expanded program offering before proceeding to developing plans for Site Plan approval.

As stated above, The Park Danforth is a not-for-profit corporation whose mission is to provide dignified and quality housing to serve an aging population. There is a significant financial and economic hardship associated with development of this property without having an acknowledged defined parking requirement to base a development program on. Based upon a market study and financial evaluation, the expansion, to be financially viable, must have a minimum of 46 dwelling units. The master plan, as presented, has been developed based upon that premise.

To address this, two text amendments are being proposed, one that defines "Independent Living Housing" and one that establishes the parking requirements for "Elderly Independent Living Housing". Based upon evaluation of industry standards and definitions we are proposing the following language to be added to Division 1 Section 14-47 Definitions:

- o ***Elderly Independent Living Housing; living units such as apartments, cottages, condominium units, multiplex housing, or single family unit, the occupancy of which is restricted to certain elderly residents. Elderly resident(s) must be 55 years of age or older, or in case of a couple, one who is 55 years or older, and do not require assistance with daily living activities or 24/7 skilled nursing. Such facilities may offer optional services to residents who desire them, such as dining services, basic housekeeping and laundry services, transportation to appointments, social programs and access to exercise equipment.***

Division 7. R6 Residential Zone

1. Amend Section 14-136. Permitted Uses, (a) Residential: to include ***Elderly Independent Living Housing*** as a permitted use as defined in Section 14-47.
2. Amend Section 14-139. Dimensional Requirements, (a) 7. Maximum structure height: to include ***Elderly Independent Living Housing: Fifty-five (55) feet.***

The Park Danforth as approved in 1982 is 65 feet tall, the addition along Poland Street is a 3 story addition with a scale that is more in keeping with the adjacent residential and mixed commercial uses. The proposed addition, provides for a transition between the existing 7 story building fronting on Stevens Avenue and mixed commercial scale uses along Arbor Street that include the former Ava Maria Gift Shop, former Arbor Street Fire Station, which is now offices, and the Po' Boys and Pickles sandwich shop. The side of the building closest to Arbor Street and Forest Avenue will be four stories with the 5 story element located at the midpoint and a 5 story section facing toward the interior courtyard. Forest Avenue is considered a rear yard and requires a 20 FT setback and Arbor Street is considered a side setback (side street) requiring a 15 FT setback. The setback along Forest Avenue is proposed to be 45 FT +/- and the setback along Arbor Street is proposed to be 55 FT +/-.

Division 20 Off-Street Parking

An assessment of parking requirements for Elderly Independent Living Housing was undertaken to identify parking requirements that would meet with the expectations of the program being developed. Communities surrounding Portland have defined elderly housing to address a sector of the population that is constantly changing. Review of the literature and parking requirements from several surrounding communities indicate that elderly independent living communities require fewer parking spaces due to need

for fewer cars. The average number for the intended population is 1 space per dwelling unit.

Portland is fortunate to have a public transit system that is currently looking to expand its role to provide services to the urban population providing more opportunities and reduce the need for automobiles. Based upon review of the industry literature and parking requirements in surrounding communities we are proposing the following amendment to Section 14-332. Uses requiring off-street parking.

*Section 14 -332 (a) Residential Structure 3. For residential development on the peninsula (area defined as southerly of I-295) **and including off-peninsula R6 zoned areas.***

There are only three areas zoned R6 off of the peninsula, they include the current Park Danforth campus, as permitted, Deering Pavilion (Forest Avenue) and Back Cove Apartments (off Forest Avenue). The R6 designation for both Deering Pavilion and Back Cove Apartments only encompass the entire properties.

The Park Danforth as well as Deering Pavilion provide housing for the aging population and both are on Metro bus routes. There is a Metro stop on both the Stevens and Forest Avenue frontages of The Park Danforth.

To support the parking requirement, the attached documentation has been provided:

- Parking requirements for elderly independent living for surrounding communities in the Greater Portland area,

Enclosed for your consideration are the following:

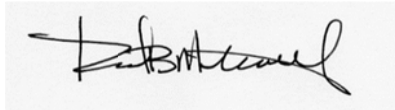
- Zone Map and Text Amendment Application
- Application Fee \$3,000
- Letter of Authorization
- Technical Capacity
- Right, Title or Interest- Deeds
- Context Map
- Portland Zoning Map
- Proposed Zone Change Map
- Surrounding Community Parking Requirements
- Boundary and Topographic Survey Plan (Existing Conditions)
- Concept Master Plan A
- Massing Concept Forest Avenue
- Massing Concept Arbor Street
- Preliminary Forest Avenue Building Elevation
- Preliminary Arbor Street Building Elevation

Ms. Barbara Barhydt

We look forward to the opportunity to meet with you and the Planning Board to discuss the application. Should you have any questions and or comments, please do not hesitate to contact me.

Sincerely

Mitchell & Associates

A handwritten signature in black ink, appearing to read "R. B. Metcalf", is displayed within a light gray rectangular box.

Robert B. Metcalf, Principal

Maine Licensed Landscape Architect

Enclosure

Cc Denise Vachon, CEO

William Shanahan

Melissa Murphy, Esq

Ron Norton

Joan Eagleson



June 12, 2014

City of Portland
Attention: Planning Department
389 Congress Street
Portland, ME 04101

RE: Letter of Authorization

To Whom It May Concern:

This letter authorizes Mr. Robert Metcalf or Mr. John Mitchell, Mitchell & Associates to act as an agent on behalf of The Park Danforth, 777 Stevens Avenue, Portland, Maine for submission on any and all application materials that relate to the zoning and site plan permitting application(s) for the proposed zone map, text amendment and Level III Site Plan application (s) with the City of Portland Planning department.

Sincerely,



Denise M. Vachon
Chief Executive Officer

DMV/smc



June 23, 2014

To: Interested Parties
 From: Denise M. Vachon, CEO
 Re: Statement of Technical Capability

The Park Danforth is a long-standing not-for-profit provider of housing and services to those 60 years of age and older, having served the greater Portland community since 1881. Once the Mercantile Home for Aged Men located at the corner of Park and Danforth Streets, The Park Danforth of today is located on Stevens Avenue and has evolved into a recognized leader in the field of aging services. Today, it provides a unique mix of federally-assisted and market rate housing, a combination that allows for and accommodates the changing financial conditions that some of its residents face. This financial safety net is the cornerstone of The Park Danforth's Mission. Additionally, Clark's Terrace at The Park Danforth, which opened its doors in 2000, offers Assisted Living studios and round-the-clock supports and services that create another safety net – one that provides for a higher level of catered service when living more independently is no longer practical or safe. All together these programs and offerings are the basis of the practice that embodies and manifests The Park Danforth's Mission "to provide high quality housing and services...(and to) accommodate changing needs brought about by aging."

The Park Danforth is governed by a 10-member volunteer Board of Trustees representing a variety of not-for-profit and proprietary businesses, as well as lending, investment and insurance businesses, health care and legal practices, and consumers. It is a single-site organization, with administrative offices embedded in the housing property and program. The Park Danforth currently serves 130 residents in 124 apartments, (70 of which are federally-assisted and available to eligible very-low and extremely-low income residents), and 36 residents in its Assisted Living program. It funds and provides approximately \$400,000 of unreimbursed services and supports to its residents each year. And, it is proud to employ 83 full- and part-time employees.

The Executive Team is made up of tenured and capable professionals:

- Denise Vachon, CEO has been the organization's leader since 1986, and successfully led the expansion project between 1997 to its completion in 2000, the Masonry remediation project completed in 2008, and is the licensed administrator for the organization's assisted living program.
- Robert Moore, CFO, has extensive background in marketing and business development, and has been on the team for more than two years.
- Lisa Noonan, COO, has been in a management position with the organization for fourteen years, and in this role for more than two years as well.

The Development Team is also seasoned. On the team are

- Lavallee Brensinger Architects (Manchester NH), regional leaders in the design and development of senior housing, health care and behavioral health environments.
- Mitchell & Associates, highly recognized and reputable landscape architects, engaged to support the property development and to assist in the City approval process.
- Ron Norton, President, CMCS (Construction Management Consulting Services). Mr. Norton is engaged to advise the Board of Trustees, its Committees and staff and to assist in the navigation of the development process as well, with a focus on value-based construction design and design options.
- Melissa Murphy, Perkins Thompson, is highly regarded in her work in Real Estate. She has served as Registered Agent for The Park Danforth for more than a decade, and is The Park Danforth's primary legal counsel on this project.
- The Board of Trustees is chaired by Catherine Lamson of MEMIC. Also in office are Michael Bevilacqua of John T Gorman Foundation, Erik Hayward of Libra Foundation and Dana Mitiguy of R.M. Davis, Inc. Chairing the Real Estate Committee is Bill Shanahan of Northern New England Housing Investment Fund.

Altogether, the history of this organization as a provider of elderly housing and services in this community speaks to its ability to develop and successfully administer this expansion and renovation. Its leadership is unified and committed to creating new housing and a revitalized environment that will respond to the changing needs of an elderly consumer, while remaining true and committed to its not-for-profit Mission and culture of service.

Thank you for your consideration.

Doc# 19676 Sk:30973 Pg: 330

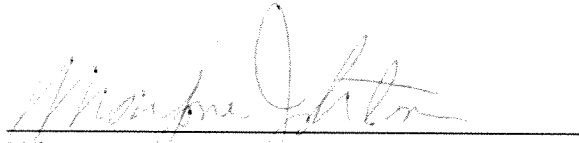
WARRANTY DEED

MAINE INVESTMENT PROPERTIES, LLC, a Maine limited liability company with a place of business at 1651 Broadway, South Portland, Maine 04106, for consideration paid, grants to **HOME FOR THE AGED**, a Maine non-profit corporation with a place of business at 777 Stevens Avenue, Portland, Maine 04103, with WARRANTY COVENANTS, the following described land in Portland, County of Cumberland, and State of Maine:

See Exhibit A attached hereto and made a part hereof

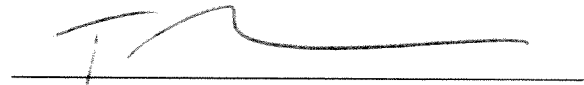
Also hereby conveying all rights, easements, privileges, and appurtenances, belonging to the premises hereinabove described.

WITNESS my hand and seal this 5th day of August, 2013.



Witness

MAINE INVESTMENT PROPERTIES, LLC



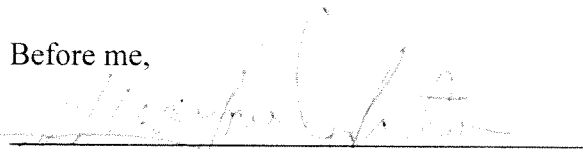
By: Timothy J. McGonagle
Its: Managing Member

State of Maine
County of Cumberland

August 8, 2013

Personally appeared before me Timothy J. McGonagle in his capacity as Managing Member for Maine Investment Properties, LLC, and acknowledged the foregoing instrument to be his free act and deed in his said capacity.

Before me,



Notary Public/Attorney at Law

Printed Name:

My Commission Expires:

MARJORIE A. JOHNSTON
Notary Public, Maine
My Commission Expires September 30, 2018

MAINE REAL ESTATE TAX PAID

Doc# 49476 BK100913 Pg 331
EXHIBIT A

A certain lot or parcel of land, with any buildings thereon, situated in the City of Portland, County of Cumberland, and State of Maine, being more particularly bounded and described as follows:

Commencing at a point on the southerly side of Arbor Street in said Portland at the northwesterly corner of land now or formerly of George H. Bangs; thence westerly along the said southerly side line of said Arbor Street fifty (50) feet to land now or formerly of William B. Barnett; thence southerly nearly at right angles to the southerly side line of Arbor Street, on line of said Barnett land, fifty-seven (57) feet to the Northerly side line of land now or formerly of D. Murphy heirs; thence easterly fifty (50) feet along the northerly side line of said Murphy land to land of said Bangs; thence northerly fifty-seven (57) feet along line of said Bangs land to the point of beginning.

Meaning and intending to convey the same property by deed from MECAP, LLC to Maine Investment Properties, LLC dated January 12, 2012 and recorded in the Cumberland County Registry of Deeds in Book 29305, Page 210.

Received
Recorded Register of Deeds
Aug 15, 2013 01:31:26P
Cumberland County
Pamela E. Lovley

QUITCLAIM DEED
WITH COVENANT
Maine Statutory Short Form

KNOW ALL PERSONS BY THESE PRESENTS, That **Sarah A. Meyer** of Portland, County of Cumberland and State of Maine, for consideration paid, grants to **Home for the Aged**, a Maine non-profit corporation, whose mailing address is 777 Stevens Avenue, Portland, Maine 04103, with QUITCLAIM COVENANT, the real property situated in Portland, County of Cumberland and State of Maine more particularly described in Exhibit A attached hereto and incorporated herein by reference.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this
27 of May, 2014.

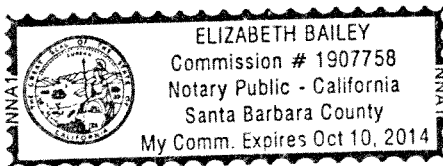
Witness

Sarah Meyer
Sarah A. Meyer

State of California
County of Santa Barbara

May 27 2014

Personally appeared before me the above named **Sarah A. Meyer** and acknowledged the foregoing instrument to be her free act and deed.



Elizabeth Bailey
Notary Public

EXHIBIT A

A certain lot or parcel of land, with the buildings thereon, situated on the easterly side of Stevens Avenue, in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning on said side of Stevens Avenue at the northwesterly corner of land formerly of Murphy;

Thence northerly on the easterly line of Stevens Avenue a distance of 48 feet to the southerly line of Arbor Street;

Thence easterly on the southerly line of Arbor Street a distance of 93 feet, more or less, to land conveyed by William B. Barnett to the Trustees of Maple Lodge of Good Templars by deed dated August 11, 1913 and recorded in Cumberland County Registry of Deeds in Book 916, Page 445 (the Grantor's deed contained a scrivener's error which mistakenly referenced the foregoing recording information as Book 916, Page 443);

Thence southerly by said Lodge land a distance of 48 feet, more or less, to said former Murphy land;

Thence westerly by said Murphy land to said Stevens Avenue at the point of beginning.

Meaning and intending to convey and hereby conveying the same premises conveyed to Sarah Meyer by deed of Stuart A. Anderson, Personal Representative of the Estate of Veronica M. Anderson dated March 19, 2010 and recorded in the Cumberland County Registry of Deeds in Book 27660, Page 339.

STATUTORY WARRANTY DEED

AJS Family Limited Partnership, a Maine limited partnership, with a principal place of business in the City of South Portland, County of Cumberland and State of Maine, and **Robert L. Adam**, an individual, of Westbrook, County of Cumberland and State of Maine,

For Consideration Paid, GRANT with WARRANTY COVENANTS TO:

HFA Forest Avenue Properties, LLC, a Maine limited liability company with a principal place of business in the City of Portland, County of Cumberland and State of Maine, with a mailing address of 777 Stevens Avenue, Portland, Maine 04103,

A certain lot or parcel of land, with the buildings and improvements thereon, situated on the westerly side of Forest Avenue, southerly side of Arbor Street, and easterly side of Stevens Avenue, in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning on the westerly side of Forest Avenue at the northeasterly corner of land conveyed by George D. Little to the City of Portland by deed dated June 3, 1908 and recorded in Cumberland County Registry of Deeds, in Book 826, Page 132; thence northerly by Forest Avenue two hundred one and one tenth (201.1) feet to Arbor Street; thence westerly by Arbor Street, two hundred sixteen and twenty-five hundredths (216.25) feet to the easterly corner of land conveyed by George B. Bangs to William B. Barnett by deed dated May 10, 1892, and recorded in said Registry of Deeds, in Book 590, Page 353, now or formerly of Grenier; thence South 34° 30' West by said former William Barnett land, fifty-eight and thirteen hundredths (58.13) feet to the southeasterly corner of said Barnett land; thence North 51° 30' West by said Barnett land and by land formerly of Wright, et al., later of Lowery, and by land now or formerly of Walter Barnett, one hundred sixty-two and sixty-five hundredths (162.65) feet to Stevens Avenue; thence southwesterly by Stevens Avenue, eighty-eight and 46/100 (88.46) feet to a monument; thence South 63° 45' East by land of Westbrook Junior College, two hundred forty-two and seven-tenths (242.7) feet to an iron; thence South 16° 15' West by Westbrook Junior College, one hundred sixty-nine and ninety-three hundredths (169.93) feet to land now or formerly of the City of Portland; thence northeasterly by said City of Portland land, two hundred twenty-one and 81/100 (221.81) feet to Forest Avenue at the point of beginning.

For Grantors' source of title, reference is made to the following deeds recorded at the Cumberland County Registry of Deeds:

- 1) Warranty Deed from Pine State Beef Company to Lloyd B. Wolf dated November 21, 1972, and recorded in Book 3329, Page 17;

MAINE REAL ESTATE TAX PAID

- 2) Warranty Deed from Lloyd B. Wolf to Lloyd B. Wolf and Robert L. Adam, dated February 3, 1986, and recorded in Book 7062, Page 48; and
- 3) Quitclaim Deed from Lloyd B. Wolf to AJS Family Limited Partnership (one-half interest) dated December 30, 1997, and recorded in Book 13529, Page 18.

IN WITNESS WHEREOF, the said AJS Family Limited Partnership, by and through its duly authorized General Partner, Lloyd B. Wolf, and Robert L. Adam, individually, have caused this instrument to be signed and sealed this 23rd day of April, 2012.

AJS Family Limited Partnership

[Signature]
[Signature]

By: [Signature]
Lloyd B. Wolf, its General Partner

[Signature]
Robert L. Adam

STATE OF MAINE
CUMBERLAND, SS.

Date: April 23, 2012

Then personally appeared the above-named LLOYD B. WOLF, General Partner of said AJS Family Limited Partnership as aforesaid and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said limited partnership.

Before me,

[Signature]
Attorney at Law/Notary Public
Melissa H. Murphy

STATE OF MAINE
CUMBERLAND, SS.

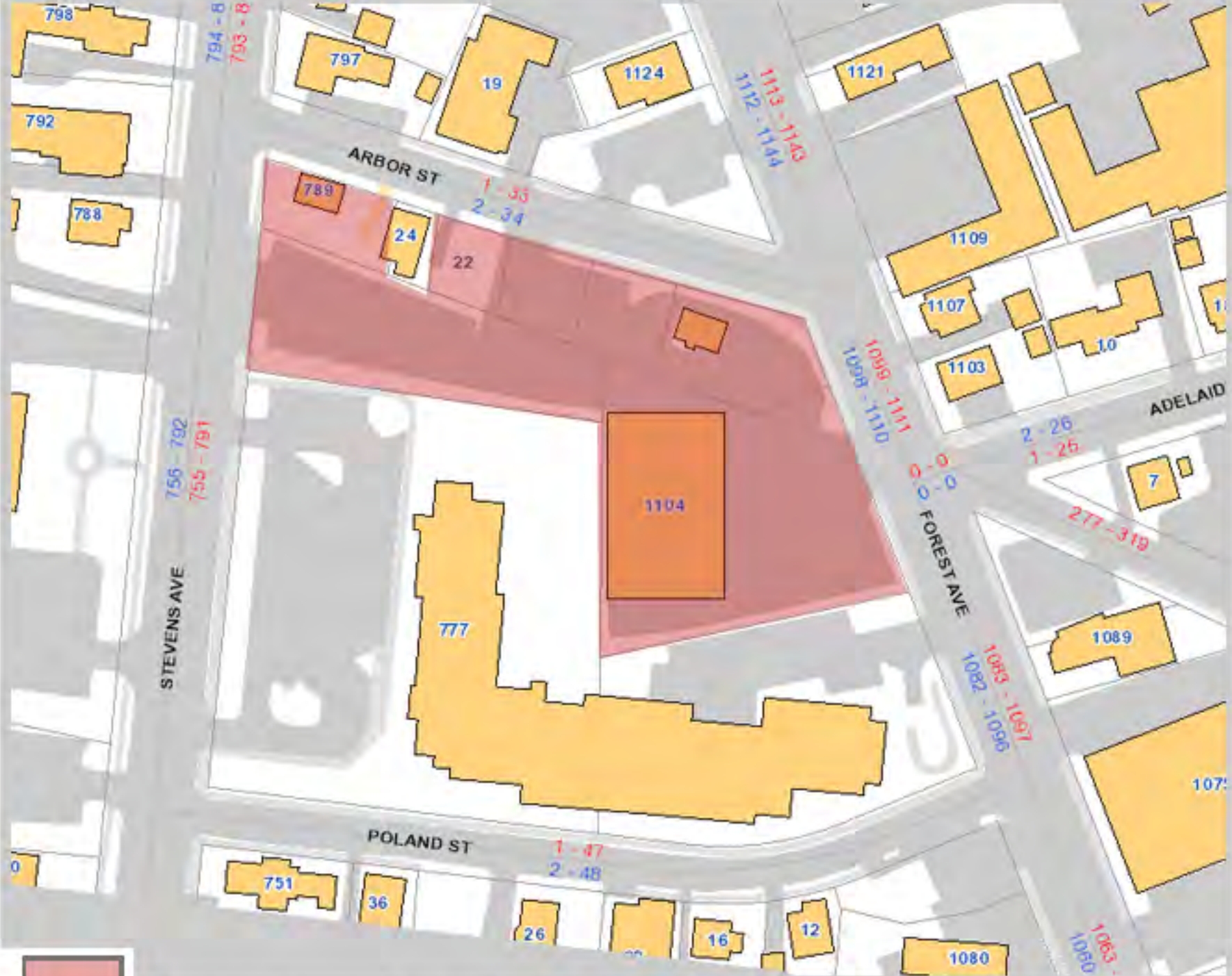
Date: April 23, 2012

Then personally appeared the above-named ROBERT L. ADAM and acknowledged the foregoing instrument to be his free act and deed.

Before me,

[Signature]
Attorney at Law/Notary Public
Melissa H. Murphy

Received
Recorded Register of Deeds
Apr 24, 2012 10:28:36A
Cumberland County
Pamela E. Lovley



Proposed zone change parcels

City of Portland, Parcel Map



797

Retail

Multi-use
Commercial

1124

Restaurant

1121

792
Church

788

ARBOR ST

FOREST AVE

Commercial

ADEL ST

State of
ME
Armory

GOODWILL

THE PARK DANFORTH

UNE

POLAND ST

Single Family Residences

LODGE

Starbucks

The Park Danforth

Context Map



ELDERLY HOUSING

PARKING REQUIRMENTS

TOWN	DEFINITION	PARKING REQUIREMENT
Augusta	Elderly Housing	1 space/dwelling unit
Kennebunk	Elderly Congregate Housing	1 parking space/ dwelling unit. + 1 space/employee at peak shift + 1 space/ 6 residential care units
Kittery	Elderly Housing	1.5 spaces/ dwelling unit w/ <2 bedrooms or 2 spaces/unit w/ 2+ bedrooms
Saco	Elderly Congregate Housing Elder Housing Facility-Limited Svc.	1 space/ 2 units 1 space/ 3 units
Wells	Congregate Housing	1 space/ housing unit plus 1 space for each 300 s.f. of office space
Portsmouth, New Hampshire	Elderly Housing (age-restricted)	1.25 spaces/dwelling unit

DEFINITIONS

Augusta Zoning

Elderly Housing: The city does not have a definition of Elderly housing.

TABLE 5.1.14-A SCHEDULE OF REQUIRED OFF-STREET PARKING

Land Use	Unit of Measure	Standard—# spaces
Residential:		
Single-family, efficiency, and multifamily	du (dwelling unit)	2.0/du
Elderly	du (dwelling unit)	1.0/du

Kennebunk Zoning Ordinance

Elderly Congregate Housing: A type of dwelling which is occupied by elderly persons and that provides shared community space and shared dining facilities and normally also provides its residents with housekeeping services, personal care and assistance, transportation assistance, recreational activities, and /or specialized shared service such as medical support services. By “elderly” persons is meant a person 60 years old or older, or a couple that constitutes a household and at least one of whom is 60 years or older at the time of entry into the facility or a disabled or handicapped person as established below. By “share community space” is meant space designed to be used in common for the enjoyment and leisure of residents of the facility, such as, by way of example only, reading rooms, sitting rooms, recreational rooms, rooms for entertaining guest, and exercise rooms. By “shared dining facilities” is meant a room or rooms designed for serving of meals to residents sitting together, plus the kitchen and ancillary facilities required to prepare the meals. An elderly congregate housing development shall include either or both of the following types of residential units:

- Dwelling units, as defined by this Ordinance, that is, single housekeeping units with living, sanitary, a and sleeping and permanent cooking facilities: and
- Residential care units, which do not meet the definition of a dwelling unit because they have no cooking facilities within the units, but which normally consist of rooms with sleeping and sanitary facilities.

Additionally, the term elderly congregate housing includes specialized facilities that provide long-term residential care, such that those designed specifically for persons with Alzheimer’s Disease or other afflictions of the elderly for which specialized care outside of a nursing home may be appropriate. Elderly congregate housing is distinct from “convalescent or rest home or nursing home”, which is defined separately.

A person who meets the definition of “disabled” or “handicapped” as set forth in Section 501 (b) of the Housing Act of 1949, the Fair Housing Act, the Americans with Disabilities Act or the Rehabilitations Act of 1973, or in regulations issued by either the United States Department of Housing or Urban Development or the United States Department of Agriculture, Rural Development shall be deemed to meet the elderly congregate housing age requirements of this ordinance and may occupy dwelling units within such elderly congregate housing developments even if that person is not 60 years or older or is not part of a household with another member who is 60 years or older.

Parking Requirement: 1 space/dwelling unit + 1 space/employee at Peak shift + 1 space/6 residential care units

Kittery Zoning Ordinance

Elderly housing: means a residential use occupied principally by residents who are at least fifty-five (55) years of age (or in the case of a couple, at least one of whom is at least fifty-five) years of age) in which the accommodations are all dwelling units with private bathrooms and cooking facilities. Occupants of this residential use may also include handicapped individuals of any age. This housing does not provide a regular program of services to all of its residents although individual residents may arrange for the provision of services within the facility. Elderly housing includes very limited shared community space and shared dining and kitchen facilities but may include limited facilities for allied health services, social services, and personal services such as physical and occupational therapy, a beauty shop, recreational programs, elderly day care, and similar programs. The use of these facilities must be accessory to the primary residential use of the facility but may be open to nonresidents of the facility. Elderly housing does not include eldercare facilities that are typically referred to as independent living units, congregate care units, assisted living units, dementia or Alzheimer’s units, or hospice units, or a nursing care or convalescent care facility that provides nursing services.

Parking Requirement: 1.5 spaces/dwelling unit w/< 2bedrooms or 2 spaces > 2 bedrooms

Saco

Elder/Disability Housing Facility: A housing project or development that provides housing in dwelling units for senior households in which a head of household is at least 55 (fifty-five) years old or for disabled persons regardless of age. The project does not provide a regular program of supportive services or meals to its residents but may include facilities for outside agencies or programs to provide services to residents. Disabled means having a physical or mental disability (including hearing, mobility and visual impairments, chronic alcoholism, chronic mental illness, AIDS, AIDS Related Complex and mental retardation) that substantially limits one or more major life activities, and having a record of such a disability or are regarded as having such a disability. Elder/Disability Housing Facilities shall not average more than 1.5 bedrooms per unit.
(Amended 5/21/12)

Parking Requirement: 1 space per 2units

Elder/Disability Housing Facility –Limited Service:

A housing project that provides housing in dwelling units or other Accommodations such as suites or individual rooms for senior households in which a head of household is at least 55 (fifty-five) years old or for disabled persons regardless of age. The project provides a regular program of supportive services and/or meals to some or all residents but does not provide twenty-four hour a day care or medical oversight. In addition to the residential facilities, the project may include common facilities to provide services to residents. This use may include facilities that are commonly referred to as retirement housing, congregate housing, or independent living centers that provide limited support services. Elder/Disability Housing Facilities –Limited Service shall not average more than 1.5 bedrooms per unit.

(Amended 5/21/12)

Parking Requirement: 1 space per three units

(d) Multi-Family Dwelling: A building containing three (3) or more dwelling units, such buildings being designed exclusively for residential use and occupancy by three (3) or more families living independently of one another, with the number of families not exceeding the number of dwelling units. The term also includes apartments located in commercial structures containing commercial space as the principal first floor use.

Parking Requirement: Multifamily residential restricted to elderly -1 space per two units

Wells ME, Zoning

Elderly Housing: Housing units intended for and occupied solely by persons 55 years of age or older or an elderly couple one of whom is 55 years of age or older. Elderly housing may have the same common amenities as congregate housing.

Parking Requirement: 1 space/housing unit plus 1 space for each 300 SF of office space

Portsmouth NH Zoning Ordinance

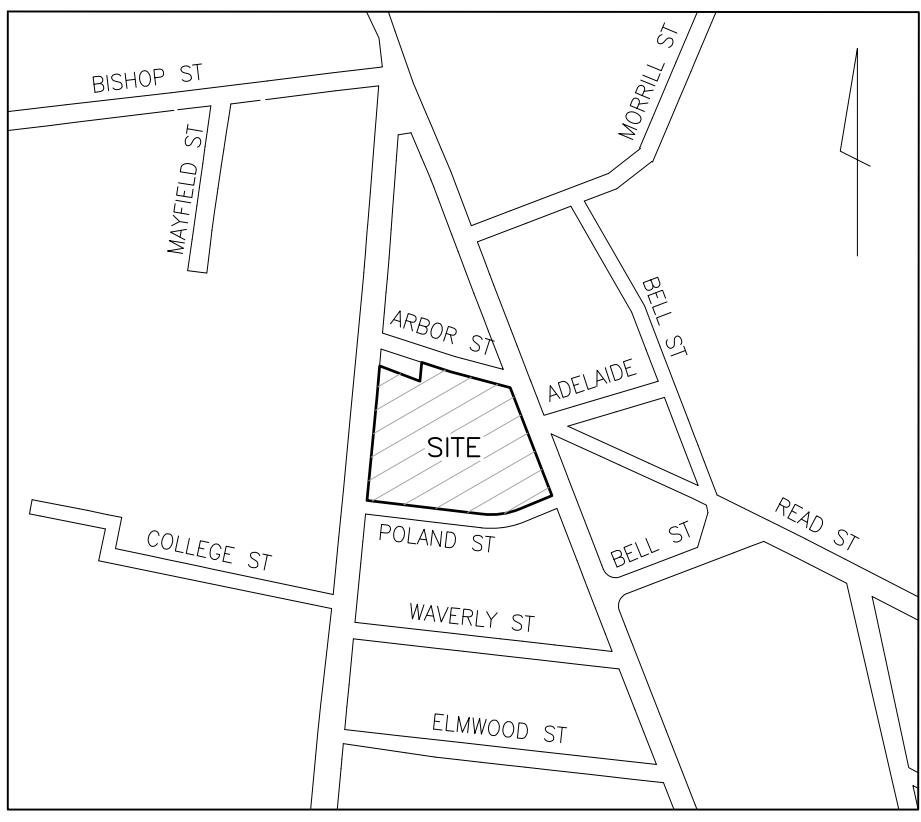
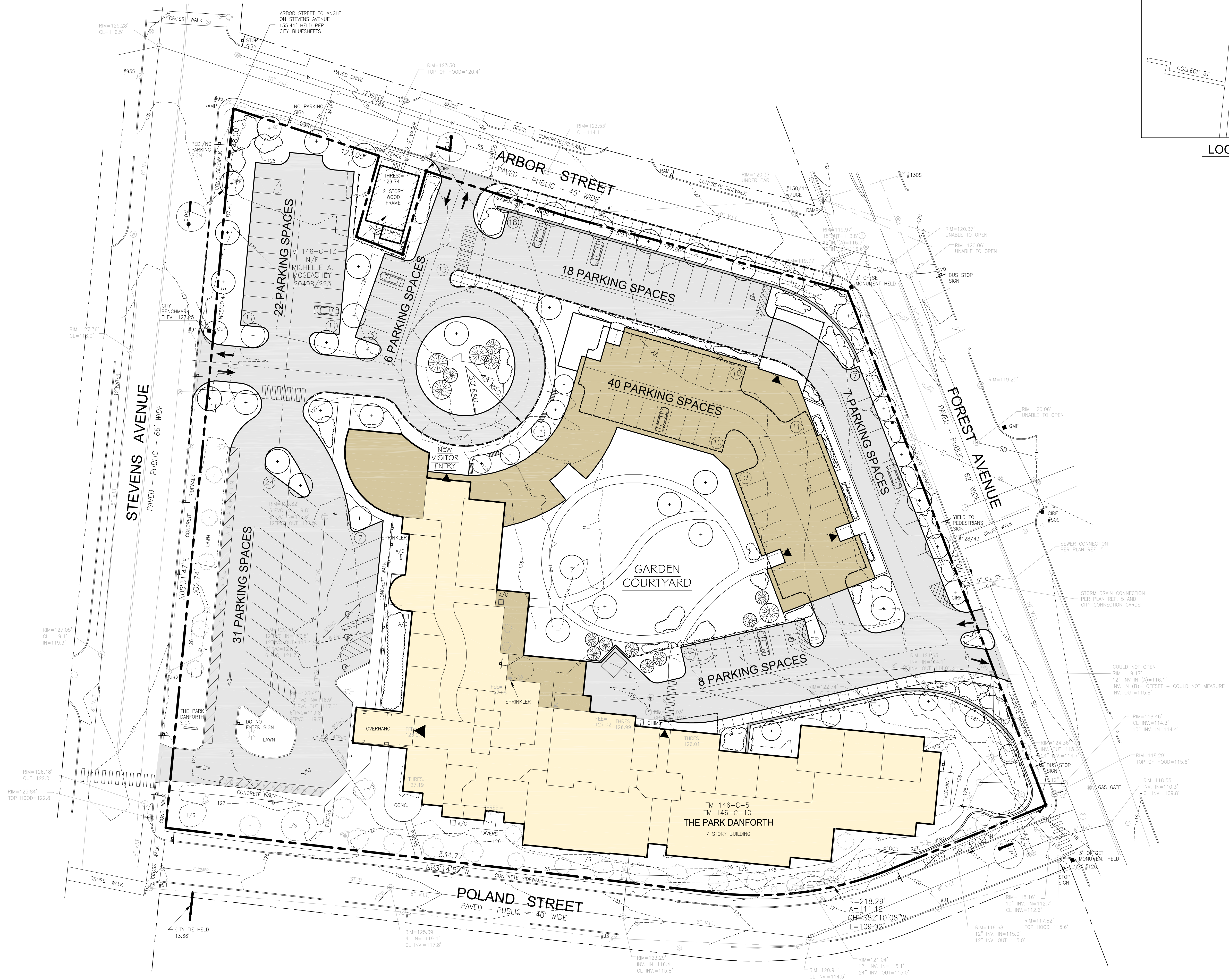
Age-restricted housing: A residential development consisting of independent dwelling units restricted to occupancy by persons at least 55 years old, which may contain limited social or recreational facilities or services for the residents but which do not include centralized dining and on-site medical services. (See also: assisted living facility; congregate care facility; continuing care retirement community.)

Independent living unit: A dwelling unit in a continuing care retirement community (CCRC), in which residents live independently while having access to all common facilities and services of the CCRC, but without the inclusive supportive services typically associated with Assisted Living or Skilled Nursing units

Continuing care retirement community (CCRC):

A residential development that provides multiple elements of senior adult living including independent living units, assisted living units and skilled nursing care, enabling residents to live at a single location as their medical needs change over time. A CCRC includes common dining, recreation and health facilities and other common areas; provides services such as medical, programmed social activities; and may include limited accessory retail and personal services. A CCRC is intended for and solely occupied by persons 62 years of age or older and thereby qualifies as “housing for older persons” under state law.

Parking Requirement: (Age Restricted) 1.25 spaces/dwelling unit



LOCATION MAP
N.T.S.

Prepared For:
Owner:
Home For The Aged P1
777 Stevens Avenue
Portland, Maine 04103
Tel.: 207-797-7710

Applicant:
The Park Danforth
777 Stevens Avenue
Portland, Maine 04103
Tel.: 207-797-7710

Prepared By:
MITCHELL & ASSOCIATES
Landscape Architects
The Staples School
70 Center Street
Portland, Maine 04101
Tel.: 207-774-4427

The Park Danforth

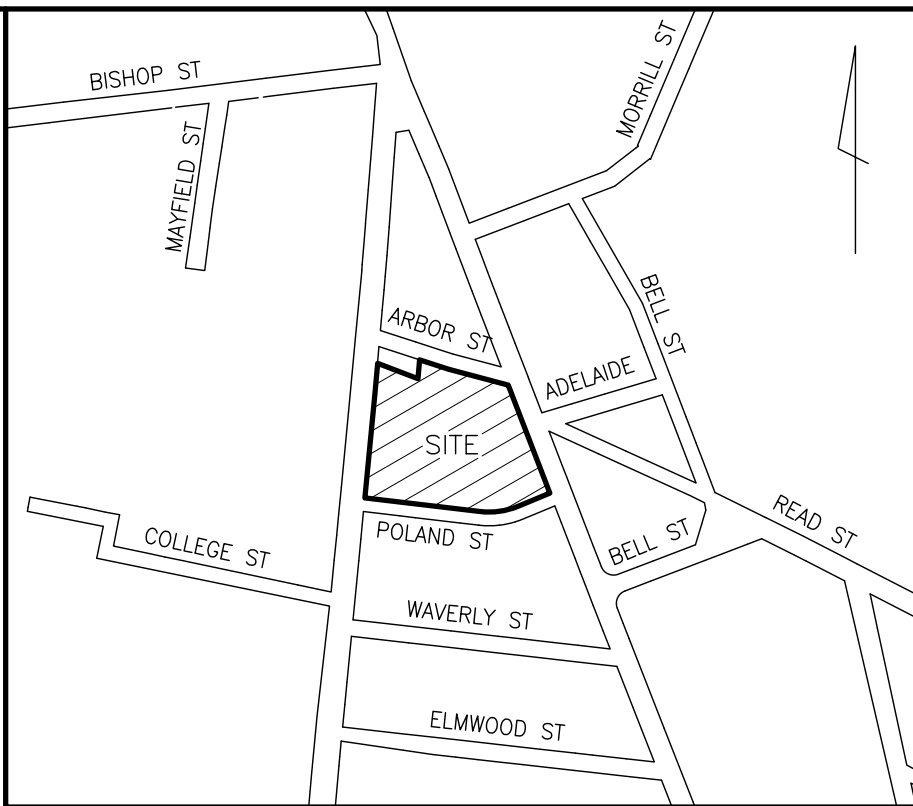
Portland, Maine
Stevens Avenue

Date:	JUNE 24, 2014
Issued For:	
Revisions:	
Reproduction or reuse of this document without the expressed written consent of Mitchell & Associates is prohibited. © 2014	
Title:	CONCEPT MASTER PLAN

Scale: 1"=30'

North:

Sheet No.: **A**



LOCATION MAP

N.T.S.

PLAN REFERENCES

- "PLAN OF PROPERTY IN PORTLAND, MAINE FOR DR. LLOYD B. WOLF AUG. 1973 H.J. & E.C. JORDAN - SURVEYORS"
- "PARK-DANFORTH CONDOMINIUM PLANS SITE PLAN HOUSING FOR THE ELDERLY, A CONDOMINIUM SITUATE AT: STEVENS AND FOREST AVENUES AT POLAND STREET, PORTLAND, CUMBERLAND, MAINE 12/7/83 LARRY SLAUGHTER -SURVEYOR" RECORDED IN PLAN BOOK 140 PAGE 37
- "THE PARK-DANFORTH CONDOMINIUM 777 STEVENS AVE PORTLAND, MAINE RECORDING PLAT 09-23-97 LAND USE CONSULTANTS, INC." RECORDED IN PLAN BOOK 197 PAGE 515
- BLUE BOOK SHEETS FOR STEVENS AVE., FOREST AVE., POLAND STREET, AND ARBOR STREET, FROM THE PORTLAND ENGINEERING DEPARTMENT
- "FOREST AVENUE DEVELOPMENT PORTLAND MAINE SITE PLAN MADE FOR HANNAFORD BROS. CO. SOUTH PORTLAND, MAINE" BY E.C. JORDAN CO. CONSULTING ENGINEERS DATED JAN 6 1986.

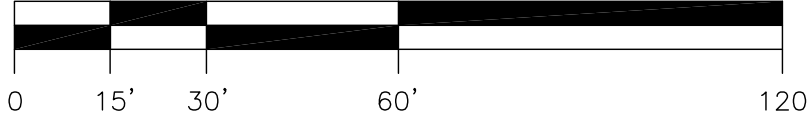
GENERAL NOTES

- OWNER OF RECORD:
HFA FOREST AVENUE PROPERTIES, LLC LOTS 146-C-6, 146-C-9, 146-C-11, 146-C-12, 146-C-14;
ALL IN BOOK 29524 PAGE 325
HOME FOR THE AGED LOTS 146-C-8 BOOK 30933 PAGE 330, 146-C-5, 146-C-10 BOOK 6354 PAGE 117.
- BEARINGS ARE BASED ON CITY DATUM, MAINE STATE PLANE WEST ZONE (NAD83).
- ELEVATIONS ARE ON CITY DATUM, BASED ON BENCH MARK AT 3' OFFSET MONUMENT UNDER COVER ON EASTERLY SIDE OF STEVENS AVENUE.
- THE LINES AROUND THE LAND OF MCGEACHEY ARE BASED ON THE DEED DIMENSIONS. THE DASHED LINES ARE AS SHOWN ON PLAN REFERENCE 1. A BOUNDARY AGREEMENT IS RECOMMENDED WITH MCGEACHEY AND MEYER.

LEGEND

- IRON PIPE OR ROD FOUND
- MONUMENT FOUND
- UTILITY POLE
- MANHOLE
- ELECTRIC/GAS METER
- SIGN
- CATCH BASIN
- HYDRANT
- WATER VALVE OR SHUTOFF
- LIGHT POLE
- IRRIGATION CONTROL VALVE
- BOLLARD
- DECIDUOUS TREE
- CONIFEROUS TREE
- INTERIOR LOT LINE
- FENCE
- CURB
- OVERHEAD WIRES
- UNDERGROUND ELECTRIC
- WATER LINE
- GAS LINE
- STORM DRAIN
- SANITARY SEWER
- 1' CONTOUR

GRAPHIC SCALE



UTILITY NOTE

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. CALL 1-888-DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION.

CERTIFICATE

OWEN HASKELL, INC. HEREBY CERTIFIES THAT THIS PLAN IS BASED ON, AND THE RESULT OF, AN ON THE GROUND FIELD SURVEY AND THAT TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, IT CONFORMS TO THE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CURRENT STANDARDS OF PRACTICE.

DATE

JOHN C. SCHWANDA, PLS NO. 1252

BOUNDARY & TOPOGRAPHIC SURVEY

ON

STEVENS AVE., ARBOR ST., FOREST AVE. & POLAND ST.

PORTLAND, MAINE

MADE FOR

MITCHELL & ASSOCIATES

OWEN HASKELL, INC.

390 U.S. ROUTE ONE, FALMOUTH, ME 04105 (207) 774-0424

PROFESSIONAL LAND SURVEYORS

Drwn By	SDG	Date	Job No.
Trace By	JLW	JANUARY 2, 2014	2013-217P
Check By	JCS	Scale	Drwg. No.
Book No.	1123	1" = 30'	1



The Park Danforth

Proposed New Construction

Conceptual Elevation - Arbor Street

SCALE: NTS

06/23/14

LAVALLEE BRENSINGER ARCHITECTS



The Park Danforth

Proposed New Construction

Conceptual Elevation - Forest Street

SCALE: NTS

06/23/14

LAVALLEE | BRENSINGER ARCHITECTS



Memorandum

Planning and Urban Development Department

Planning Division

To: Chair O'Brien and Members of the Portland Planning Board
From: Nell Donaldson, Planner
Date: July 17, 2014
Re: 89 Anderson Street rezone
CBLs: 12 I 001001, 005
Meeting Date: July 22, 2014

I. INTRODUCTION

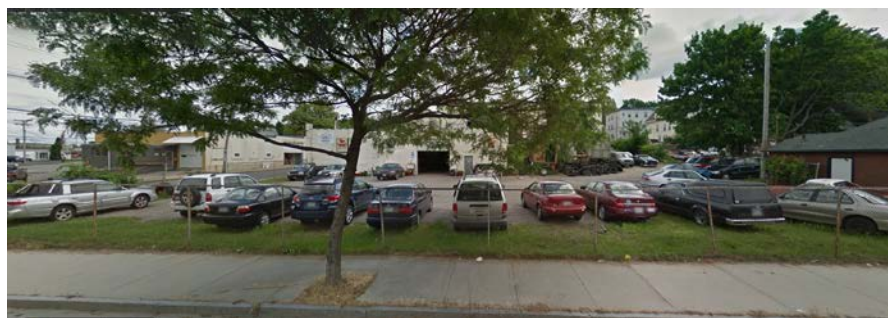
Redfern Properties proposes a zoning map amendment for the property at 89 Anderson Street at the corner of Anderson and Fox Streets in East Bayside. The property is currently zoned Residential R-6; the applicant proposes to rezone it to Community Business B-2b. Redfern has argued that rezoning the site to B-2b will best allow them to develop a mixed use building with commercial uses on the ground floor and residential units above.



A legal ad for the Board workshop was posted on the city's web page and appeared in the *Portland Press Herald* on July 14 and 15, 2014. Notices were also sent to 150 property owners within 500 feet of the site and to the interested citizen list.

II. BACKGROUND

89 Anderson, which consists of two parcels, is currently occupied by 3Gs Tire and Auto Service. The eastern half of the site houses a one-story brick garage building. The remainder of the site, including the corner of Anderson and Fox Streets, is dedicated to surface parking. There is some evidence that the site has long housed a garage; the tax records indicate this as the property's use as far back as 1924.



Figures 1(top) & 2: 89 Anderson Street from corner of Anderson and Fox; site from Anderson Street looking east.

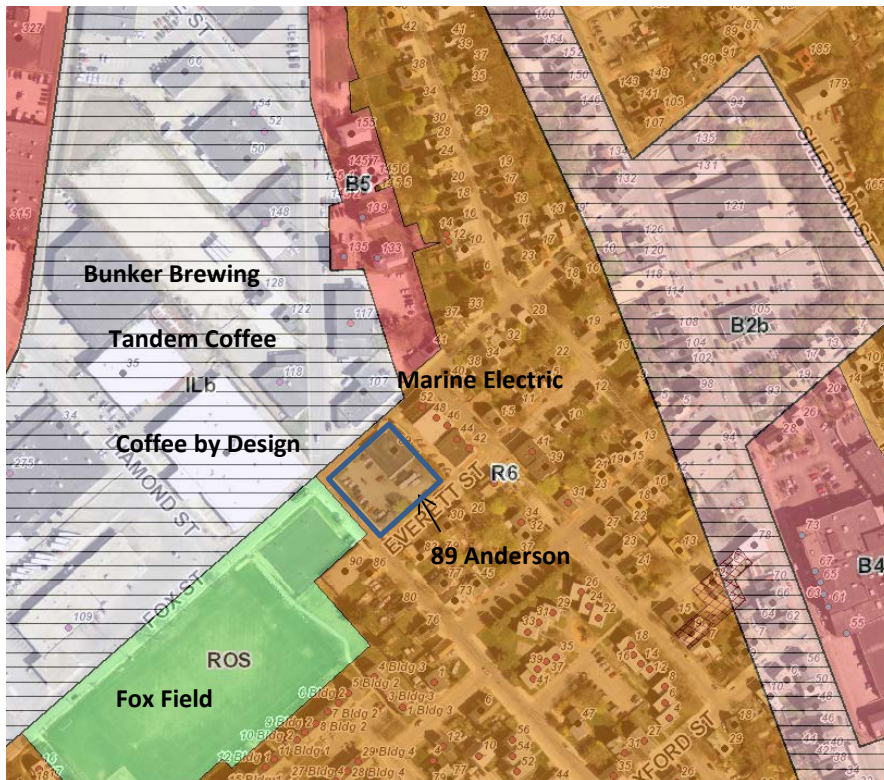


Figure 3: 89 Anderson zoning context

The site lies at the intersection of several zones. The property itself is zoned R-6; as such, it is surrounded on two sides by mostly residential uses, including some large multi-family housing to the east. Most of the adjacent housing is of a scale characteristic of the city's East End. A sizable Recreation Open Space (ROS) parcel, the site of the Kennedy Park basketball courts and field, lies directly to the southwest. An Industrial IL-b zone, with uses typical of the evolving East Bayside, including Coffee By Design's roastery, Tandem coffee roasters, and Bunker Brewery, lies across Fox Street. The Urban Commercial Business B-5 zone is the nearest commercial zone; portions of Anderson Street north of Fox

are zoned B-5. This B-5 zone is home to numerous multi-family properties, including a recent condominium development. There is a B-2b zone east of the site on Washington Avenue. This B-2b zone includes restaurant, retail, office, and residential uses.

II. PROPOSED MAP AMENDMENT

Current Zoning:	R-6 (Residential)
Proposed Zoning:	B-2b (Community Business)
Current Uses:	Auto repair
Proposed Uses:	Mixed-use with first floor commercial (restaurant) and upper floor residential
Parcel Area:	23,357 SF
Area to be Rezoned:	23,357 SF

III. ZONING ANALYSIS

The applicant proposes to develop 53 units of high-density housing on the site as well as first floor commercial space and, in particular, a restaurant. The underlying zone precludes this plan, however, on at least two counts. The existing R-6 zoning allows a density of 1 unit/1,000 SF of lot area for the first three units and 1 unit/1,200 SF thereafter, a density that the applicant has stated is too low to support the project. Secondly, restaurant uses are not permitted in the R-6 zone; nor are other commercial establishments, such as retail or office. For this reason, the applicant has requested a rezoning to B-2b, which, as recently amended, allows housing at a density of 1 unit/435 SF and restaurant and office uses by right.

In the process of review, city staff assessed several alternatives to the B-2b, including the Neighborhood Business B-1b zone, which has been used in similar locations around the city, and the Urban Commercial Business B-5, which is represented in the nearest business zone. Although both of these zones would allow the housing density desired by the applicant, the B-1b would limit the site in terms of total floor area and require significant setbacks. The B-5 would significantly upzone it, allowing a much greater building height, a much greater variety of retail on the ground floor, as well as many more residential units.

Table 1: Purposes

	R-6 Residential	B-2b
Purpose	To set aside areas on the peninsula for housing characterized primarily by multifamily dwellings at a high density providing a wide range of housing for differing types of households; and to conserve the existing housing stock and residential character of neighborhoods by controlling the scale and external impacts of professional offices and other nonresidential uses. In cases of qualifying small, vacant, underutilized lots located in the urban residential and business zone, to encourage new housing development consistent with the compact lot development pattern typically found on the peninsula.	To provide neighborhood and community retail, business and service establishments that are oriented to and built close to the street. The B-2b zone is appropriate in areas where a more compact urban development pattern exists such as on-peninsula or in areas off-peninsula where a neighborhood compatible commercial district is established which exhibits a pedestrian scale and character. Such locations may include the peninsula and other arterials and intersections with an existing urban or neighborhood oriented building pattern.

Likewise, staff considered the Residential R-7 zone, which allows a higher residential density and has been used for other large residential projects in East Bayside. In fact, under recent long-term planning discussions for East Bayside, the 89 Anderson Street site was considered for possible redesignation as R-7. As in the R-6, however, restaurants are not allowed in the R-7.

Purpose

The existing R-6 zoning is designed to promote dense, neighborhood-scale housing. The purpose of the R-6 zone, which can currently be found predominantly in the East and West Ends of the city, is to “set aside areas...for housing characterized primarily by multi-family dwellings at a high density” and to “conserve the existing housing stock and residential character of neighborhoods by controlling the scale and external impacts of professional offices and other nonresidential uses” (*Section 14-135*).

The B-2b zone, in contrast, is written to encourage commercial development, particularly neighborhood and community retail, in a compact, urban form. The B-2 and B-2b is expressly written for “arterials and intersections with an existing urban or neighborhood oriented building pattern” (*Section 14-181*). The B-2b can be found on Washington Avenue, Congress Street east and west of downtown, St John Street, and Forest Avenue.

Permitted Uses

The R-6 zone explicitly encourages high-density housing, and permits most housing types by right. However, the R-6 zone does not permit most non-residential uses, and commercial uses are excluded entirely. Some institutional uses are conditionally permitted. It should be noted that the auto repair use which currently occupies 89 Anderson is technically non-conforming. It should also be noted that the planning staff is currently presenting R-6 amendments to neighborhood associations for feedback and anticipates putting the amendments to the zone before the board in the fall. However, the R-6 amendments, as currently proposed, would not support commercial uses on the first floor.

The Business B-2b zone, as its name implies, explicitly permits both the residential uses permitted in the R-6 zone as well as a host of commercial, institutional, and other establishments. The B-2b is slightly more permissive than the B-1, permitting office uses, personal services, business services, and retail establishments, but also funeral homes, health clubs, theaters, hotels, dairies, bakeries, and veterinary hospitals, among others. Restaurants are permitted by right in the B-2b.

Table 2: Permitted and Conditional Uses – Shown with X if listed in Zone

			R-6	B-2b
Permitted	Residential	Single-family and two-family dwellings	x	x
		Multi-family dwellings	x	x ¹
		Handicapped family units	x	x
		Single-family manufactured housing	x	
		Combined living/working spaces		x
		Lodging houses	x	x
		Institutional	Schools	
	Clinics			x
	Places of assembly			x
	Long term, extended and intermediate care facilities			x
	Governmental buildings and uses/municipal uses		x	x
	College, university or trade schools			x
	Nursery schools, kindergartens			
	Day care facilities			x
	Business	General, business & professional offices		x
		Personal services		x
		Offices of building tradesmen		x
		Retail establishments		x
		Restaurants		x
		Drinking establishments		x
		Billiard parlors		x
		Mortuaries or funeral homes		x
		Miscellaneous repair services, excluding motor vehicle repair		x
		Communication studios or broadcast and receiving facilities		x
		Health clubs and gymnasiums		x
		Veterinary hospitals		x
		Theaters		x
		Hotels		x
		Dairies and bakeries		x
		Drive-throughs when accessory to a principal use		x
Registered medical marijuana dispensaries			x	
Other		Accessory uses	x	x
		Cemeteries	x	
		Parks	x	
	Home occupation	x		
	Special needs independent living units	x		
	Conversion into bed and breakfast			
	Hostels	x	x	
	Wind energy systems	x	x	
	Utility substations		x	
	Bed and breakfasts		x	

Table 2: Permitted and Conditional Uses – Shown with X if listed in Zone

			R-6	B-2b
		Studios for artists and craftspeople		x
Conditional	Residential	Sheltered care group homes	x	
		Conversion into bed and breakfast (over 5 rooms)	x	
	Institutional	Schools	x	
		Long-term and extended care facilities	x	
		Intermediate care facility	x	
		Places of assembly	x	
		Hospital	x	
		College, university, trade schools	x	
	Business	Major and minor auto service stations existing as of 1999		x
		Car washes		x
		Drive-throughs associated with a permitted use adjacent to residential zones		x
		Automobile dealerships		x
	Other	Utility substations	x	
		Professional offices	x	
		Chancellery	x	
		Nursery school and kindergartens	x	
		Off-street parking for passenger cars for permitted uses	x	
		Day care facilities	x	
		Temporary wind anemometer towers	x	x
		Hostels	x	
		Wind energy systems	x	x
		Printing and publishing establishments		x
		Wholesale distribution establishments		x
		Research and developments and related production establishments		x

¹ If nearest residential zone is R-4, R-5, R-6, or R-7 or if first floor is used for commercial purposes.

Dimensional Requirements and Form

Though the R-6 explicitly encourages high density housing, the existing R-6 zoning provides certain density controls – minimum area per dwelling unit, maximum lot coverages, and minimum open space ratios – that limit the buildout of any given parcel. The R-6's basic control for density, the minimum requirement of 1,000 SF of lot area per dwelling unit for the first three units with 1,200 SF of lot area required per dwelling unit thereafter, would limit the residential buildout of the parcel to approximately 20 units. The R-6 also poses setback requirements of 10-20 feet, which guarantees that buildings will be separated both from each other and the street.

The city's business zones generally encourage a more dense, urban form. The B-2b zone has no lot coverage limits or required open space ratio, and the setbacks are considerably smaller. Further, the B-2b allows one dwelling unit for each 435 SF of lot area, or more than twice the number of units allowed in the R-6. The B-2b also allows a slightly taller building than the R-6, 50 feet, so long as the first floor is occupied by a commercial use.

Table 3: Dimensional Requirements

	R-6¹	B-2b
Min. Lot Size	4,500 SF+ (depending on use)	None
Min. Lot Area per D.U.	1,000 SF for first 3 units 1,200 SF thereafter	435 SF if active street frontage
Min. Street Frontage	40 ft.	25 ft.
Min. Lot Width	40 ft.	
Min. Front Yard	10 ft.	None
Max. Front yard		10 ft., except for irregularly shaped lots or lots with < 40 ft. of frontage
Min. Rear Yard	20 ft. (for structures >100SF)	10 ft.; 5 ft. for accessory structures
Min. Side Yard	10 – 15 ft. (based on height)	None; 5 ft. for accessory structures
Max. Structure Height	45 ft.	45 ft., except 50 ft. if first floor is occupied by a commercial use
Max. Floor Area		
Max. Lot Coverage	If < 20 DU, 50% of lot area If > 20 DU, 40% of lot area	
Open Space Ratio	If < 20 DU, 20% of lot area If > 20 DU, 30% of lot area	
Max. Impervious Surface		Residential: N/A Business and non-residential uses: 90%

¹ Additional dimensional requirements apply for small residential lot development, bed and breakfasts, places of assembly

IV. POLICY ANALYSIS

The applicant argues in their cover letter that the “site lies at the convergence of several zones and represents an opportunity to improve an underdeveloped property in a way that will contribute to the neighborhood and city.” They attest that the proposed zone change will meet numerous goals of the city’s comprehensive plan, and quotes five of these, including creating “new housing on Portland’s peninsula,” “encourag[ing] neighborhood business centers,” and “maximiz[ing] development where public infrastructure and amenities already exist” (*Attachment 1*).

In addition, the applicant cites the 2010 Sustainable Design Assessment Team (SDAT) report for East Bayside, which identified the corner of Fox and Anderson Streets as a “Place with Potential.” The report (*Attachment 1*) calls this corner a “community center both geographically and socially” and prescribes pedestrian improvements, landscaping improvements, and efforts to “attract neighborhood-serving uses, such as a coffee shop or a deli.”

Generally, the city’s housing plan, *Housing: Sustaining Portland’s Future*, includes numerous policies which support the development of high-density rental housing and mixed-used buildings with neighborhood commercial, including the following,

- *Create new housing to support Portland as an employment center and to achieve an improved balance between jobs and housing*

- *Encourage neighborhood business centers throughout the city to reduce dependence on the car and to make neighborhood life without a car more practical*
- *Ensure that an adequate supply of housing is available to meet the needs, preferences, and financial capabilities of all Portland households, now and in the future*
 - *Ensure the construction of a diverse mix of housing types that offers a continuum of options across all income levels, which are both renter and owner-occupied;*
- *Maintain and enhance the livability of Portland's neighborhoods as the city grows and evolves through careful land use regulation, design, and public participation that respects neighborhood integrity*
 - *Support Portland's livable neighborhoods by encouraging a mix of uses that provide goods and services needed and are within walking distance of most residents*

However, it should also be noted that *Housing: Sustaining Portland's Future* also advises against commercial encroachment with policies such as the following,

- *While accommodating needed services and facilities, protect the stability of Portland residential neighborhoods from excessive encroachment by inappropriately scaled and obtrusive commercial, institutional, governmental, and other non-residential uses*

V. PUBLIC COMMENT/NEIGHBORHOOD MEETING

As of the writing of this memo, the Planning Division has received one public comment that is included in the packet. The Neighborhood meeting was held on July 16, 2014 and Nell Donaldson, attended the meeting. The neighborhood packet is included as an attachment to this report. A number of residents were present at this meeting raising questions about the zone change and the proposed project. The vast majority of questions focused on issues regarding potential gentrification and demographic shifts in the neighborhood; concerns were expressed about the proposed density; the affordability of the residential units; the sizes of the proposed units (with a range of studios, 1 bedrooms, and 2 bedrooms conceptualized at this time); and traffic generation, access, and circulation. Attendees questioned whether the number of units could be reduced or the building scaled down in size. Attendees also recommended setting aside some units as affordable and introducing larger, family-sized units. Lastly, one neighbor recommended that the applicant consider the B-2c zone as an alternative.



Figures 4: Potential alternative area of rezoning

VI. DISCUSSION ITEMS

In conversations between staff, the question of the extent of the rezoning arose. The eastern third of the 89 Anderson block houses three large multi-unit buildings. The new zoning designation could be expanded to include these buildings (*Figure 4*). This would make the new zone almost contiguous with the nearest business zone.

City staff could also consider a rezoning to B-2c, as recommended by the applicant's neighbor at the neighborhood meeting. The uses of the B-2c are obviously similar to the B-2b, except in the fact that it prohibits drinking establishments. The B-2c zone would require maximum 80% impervious surface area, while B-2b allows 90% impervious. All the B-2 zone categories allow 50 feet building height for structures with first floor commercial.

VII. NEXT STEPS

- Provide initial feedback on zone change request
- Schedule a public hearing or a second workshop

VIII. ATTACHMENTS

1. Applicant's submittal
2. Public Comment
 - a. Ellen Bailey, e-mail, 7/17/2014
3. Developer's Neighborhood Packet – dated 7/18/2014



P.O. Box 8816
Portland, ME 04104
Office: 207-776-9715
Fax: 207-221-2822
www.redfernproperties.com

June 23, 2014

Ms. Barbara Barhydt
City of Portland, Planning Division
389 Congress Street, 4th Floor
Portland, ME 04101

Dear Barbara:

Please find attached a Zoning Map Amendment Application related to 89 Anderson Street. Our current plans for 89 Anderson call for a mixed-use building with commercial uses on the ground floor, including a restaurant and residential rental apartments on upper floors.

Per the attached, the parcel sits at the convergence of several Zones and represents an opportunity to improve an underdeveloped property in a way that will contribute to the neighborhood and City. Per our typical standards, the new building will be constructed to a very high environmental standard. The Application and related development plans would support the City's goals as outlined in the comprehensive plan as follows:

- Create new housing on Portland's peninsula
- Encourage neighborhood business centers
- Maximize Development where public infrastructure and amenities already exist
- Locate and Design Housing to reduce impact on Environmentally Sensitive Areas
- Design Housing to use new technology and materials that reduce costs and increase energy efficiency

In addition, our development plans consider the 2010 report entitled "Creating a Sustainable Vision for Maine's Most Diverse Neighborhood". The report created by a Sustainable Design Assessment Team (SDAT), led by experts from the American Institute of Architects (AIA), and in consultation with local officials, community leaders, technical experts, non-profit organizations, and citizens (including many neighbors) takes a comprehensive look at the East Bayside neighborhood and makes recommendations for

a sustainable future. The intersection at Fox and Anderson Streets is called out as one of several "Places with Potential". The report calls out recommendations for creating "Sense of Place" at this corner and suggests "attracting neighborhood-serving uses, such as a coffee shop or deli", among other things. B-2b zoning would support such uses.

Please find attached the following in support of this application:

- 1. Zoning Map Amendment Application Form**
- 2. Copy of Purchase and Sale Agreement**
- 3. Vicinity Map Showing Current Zoning**
- 4. Rendering of Proposed Building**
- 5. Proposed Site Plan and Floor Plans**
- 6. Excerpt from report "Creating Sustainable Vision for Maine's Most Diverse Neighborhood" pages 60-62**

We are committed to creating a progressive and noteworthy project that will enhance an already diverse and dynamic neighborhood. Please do not hesitate to contact me.

Sincerely,



Jonathan Culley
Redfern Properties LLC



Zoning Map/Text Amendment/Contract or Conditional Rezoning Application Portland, Maine

Planning and Urban Development Department
Planning Division

Portland's Planning and Urban Development Department coordinates the review of requests for zoning map amendments, zoning text amendments and contract or conditional re-zoning. The Division also coordinates site plan, subdivision and other applications under the City's Land Use Code. Attached is the application form for a Zone Change.

Portland's development review process and requirements are outlined in the Land Use Code (Chapter 14) which is available on our website:

Land Use Code: <http://me-portland.civicplus.com/DocumentCenter/Home/View/1080>

Design Manual: <http://me-portland.civicplus.com/DocumentCenter/View/2355>

Technical Manual: <http://me-portland.civicplus.com/DocumentCenter/View/2356>

Planning Division

Fourth Floor, City Hall
389 Congress Street
(207) 874-8719

Office Hours

Monday thru Friday
8:00 a.m. – 4:30 p.m.

PROJECT NAME: _____

PROPOSED DEVELOPMENT ADDRESS:

____ 89 Anderson Street, Portland _____

PROJECT DESCRIPTION:

____ Mixed-use building with ground floor commerical and residential apartments on
floors 2-4. _____

CHART/BLOCK/LOT: 12-I-1.5

CONTACT INFORMATION:

Applicant – must be owner, Lessee or Buyer Name: Jonathan Culley Business Name, if applicable: Redfern Properties LLC Address: P.O. Box 8816 City/State : Portland, ME Zip Code: 04104	Applicant Contact Information Work # 207-221-5746 Home# Cell # 207-776-9715 Fax# 207-221-2822 e-mail: jonathan@redfernproperties.com
Owner – (if different from Applicant) Name: Perigee LLC Address: P.O. Box 4714 City/State : Portland, ME Zip Code: 04112	Owner Contact Information Work # 207-874-9569 Home# Cell # Fax# e-mail:
Agent/ Representative Name: Address: City/State : Zip Code:	Agent/Representative Contact information Work # Cell # e-mail:
Billing Information Name: Redfern Properties LLC Address: P.O. Box 8816 City/State : Portland, ME Zip Code: 04105	Billing Information Work # 207-221-5746 Cell # 207-776-9715 Fax# 207-221-5746 e-mail: jonathan@redfernproperties.com

Engineer Name: Will Savage, Acorn Engineering Address: 158 Danforth St. City/State : Portland, ME Zip Code: 04102	Engineer Contact Information Work # 207-775-2655 Cell # 207-317-1884 Fax# e-mail: wsavage@acorn-engineering.com
Surveyor Name: Nadeau Land Surveys Address: 918 Brighton Ave. City/State : Portland, ME Zip Code: 04103	Surveyor Contact Information Work # 207-878-7870 Cell # Fax# 207-878-7871 e-mail: jim@nadeaulandsurveys.com
Architect Name: Ryan Senatore Architecture Address: 565 Congress St., Suite 304 City/State : Portland, ME Zip Code: 04101	Architect Contact Information Work # 207-650-6414 Cell # Fax# e-mail: ryan@senatorearchitecture.com
Attorney Name: Eben Adams, Pierce Atwood Address: 254 Commercial St. City/State : Portland, ME Zip Code: 04101	Attorney Contact Information Work # 207-791-1175 Cell # Fax# 207-791-1350 e-mail: eadams@pierceatwood.com

Right, Title, or Interest: Please identify the status of the applicant's right, title, or interest in the subject property:

The Applicant, Redfern Properties LLC has entered into a Purchase and Sale

Agreement with the Owner, Perigee LLC. The Purchase and Sale Agreement

is attached.

Provide documentary evidence, attached to this application, of applicant's right, title, or interest in the subject property.
(For example, a deed, option or contract to purchase or lease the subject property.)

Vicinity Map: Attach a map showing the subject parcel and abutting parcels, labeled as to ownership and/or current use.
(Applicant may utilize the City Zoning Map or Parcel Map as a source.)

Existing Use: Describe the existing use of the subject property:

The property is currently used as a Tire and Auto Service garage. This is

believed to be a non-conforming use.

Current Zoning Designation(s): R-6

Proposed Use of Property: Please describe the proposed use of the subject property. If construction or development is proposed, please describe any changes to the physical condition of the property.

Redfern Properties intends to build a mixed-use building with ground floor

commercial uses, including a restaurant on the corner of Fox & Anderson.

Floors 2-4 will consist of market-rate rental apartments.

Site Plan: On a separate sheet, please provide a site plan of the property showing existing and proposed improvements, including such features as buildings, parking, driveways, walkways, landscape and property boundaries. This may be a professionally drawn plan, or a carefully drawn plan, to scale, by the applicant. (Scale to suit, range from 1" = 10' to 1' = 50'.) Contract and conditional rezoning applications may require additional site plans and written material that address physical development and operation of the property to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations, and compatible with the surrounding neighborhood.

APPLICATION FEES:

Check all reviews that apply. (Payment may be made by Credit Card, Cash or Check payable to the City of Portland.)

Zoning Map Amendment <u> X </u> \$2,000.00 (from <u> R-6 </u> zone to <u> B-2b </u> zone) Zoning Text Amendment <u> </u> \$2,000,000 (to Section 14-<u> </u>) Combination Zoning Text Amendment and Zoning Map Amendment <u> </u> \$3,000.00 Conditional or Contract Zone <u> </u> \$3,000.00 (A conditional or contract rezoning map be requested by an applicant in cases where limitations, conditions, or special assurances related to the physical development and operation of the property are needed to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations, and compatible with the surrounding neighborhood. Please refer to Division 1.5, Sections 14-60 to 62.)	The City invoices separately for the following: • Notices (\$.75 each) • Legal Ad (% of total Ad) • Planning Review (\$40.00 hour) • Legal Review (\$75.00 hour) • Third party review fees are assessed separately. Any outside reviews or analysis requested from the Applicant as part of the development review, are the responsibility of the Applicant and are separate from any application or invoice fees.
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APPLICATION SUBMISSION:

1. All plans and written application materials must be submitted electronically on a CD or thumb drive with each plan submitted as separate files, with individual file names which can be found on the **Electronic Plan and Document Submittal** page of the City's website at <http://me-portland.civicplus.com/764/Electronic-Plan-and-Document-Submittal>
2. **The submission shall include the following materials:**
 - a. One (1) paper set of the zoning amendment application, concept plan and written narrative.
 - b. Contract and conditional rezoning applications must include site plans and written material that address physical development and operation of the property to ensure that the rezoning and subsequent development are consistent with the comprehensive plan, meet applicable land use regulations and compatible with the surrounding neighborhood.

APPLICANT SIGNATURE:

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Planning Authority and Code Enforcement's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature of Applicant: 	Date: 6/23/2014
---	-------------------------------



Individual Member
Individual Membership



Specialist,
Industrial and
Office Real Estate

CBRE | The Boulos Company

CONTRACT FOR THE SALE OF REAL ESTATE

Date: 4/10/14

One Canal Plaza, Portland, ME 04101
(207) 772-1333

RECEIVED OF: Redfern Properties LLC and/or Assigns whose mailing address is PO Box 8816, Portland ME 04112, hereinafter called the Purchaser(s), the sum of [REDACTED] as earnest money deposit and in part payment of the purchase price of the following described real estate, situated in the municipality of Portland, County of Cumberland, State of Maine and located at 25-37 Everett Street, 89-99 Anderson Street and 52-64 Fox Street being all the property owned by the Seller(s) at the above address, and described at said County's Registry of Deeds Book 24750, Page 045 and further described as: two parcels consisting of .469 +/- acre and .067 +/- acre improved by two single story commercial buildings and referenced by the City of Portland Assessor as aMap 12, Block I, Lots 1 and 5 as shown on the attached plan upon the terms and conditions indicated below:

1. PERSONAL PROPERTY: The following items of personal property are included in this sale (if applicable): n/a
2. PURCHASE PRICE: The TOTAL purchase price being [REDACTED] to be paid as follows: earnest money deposit to be paid into Escrow account upon full execution of the Contract, extension payments for Permitting and Approval, as outlined in paragraph 22, and the balance to be paid by bank check or wire transfer at Closing.
3. EARNEST MONEY/ACCEPTANCE: CBRE | The Boulos Company shall hold said earnest money in a non-interest bearing account and act as Escrow Agent until closing, unless otherwise noted in Contract; this offer shall be valid until April 10, 2014 at 4:00 PM; and, in the event of the Seller's non-acceptance, this earnest money shall be returned promptly to the Purchaser(s).
4. TITLE: That a deed, conveying good and merchantable title in accordance with standards adopted by the Maine Bar Association shall be delivered to the Purchaser(s) and this transaction shall be closed and the Purchaser(s) shall pay the balance due and execute all necessary papers on or before forty five (45) days following successful completion of inspection period (paragraph 10) and Permitting and Approvals Period (Addendum A). Purchaser agrees to provide written notice to Seller that the conditions have been waived at least five (5) days prior to the first day of the month prior to Closing so the Seller(s) can provide adequate notice to Seller(s) tenant to vacate the premises prior to Closing. If Seller(s) is unable to convey in accordance with the provisions of this paragraph, then the Seller(s) shall have a reasonable time period, not to exceed thirty (30) days, from the time the Seller(s) receives written notice of the defect, unless otherwise agreed to by both parties, to remedy the title, after which time, if such defect is not corrected so that there is merchantable title, the Purchaser(s) may, within fifteen (15) days thereafter, at Purchaser's option, declare the contract null and void and any earnest money shall be returned to the Purchaser(s) and neither party shall have any further obligation hereunder. If the Purchaser(s) does not declare the contract void within the period set forth above, the Purchaser(s) shall have waived the right to object to title. The Seller(s) hereby agrees to make a good-faith effort to cure any title defect during such period.
5. DEED: That the property shall be conveyed by a warranty deed, and shall be free and clear of all encumbrances except building and zoning restrictions of record, restrictive covenants and conditions of record and usual public utilities servicing the property and shall be subject to applicable land use and building laws and regulations.
6. POSSESSION /OCCUPANCY: Possession/occupancy of premises shall be given to Purchaser(s) immediately at closing, and the property shall be conveyed free and clear of any tenants or leases, unless otherwise agreed by both parties in writing.
7. LEASES/TENANT SECURITY DEPOSITS: Seller(s) agrees to transfer at closing to Purchaser(s) all Seller(s)' rights under the current leases to the property and all security deposits held by Seller(s) pursuant to said leases.
8. RISK OF LOSS: Until the transfer of title, the risk of loss or damage to said premises by fire or otherwise, is assumed by the Seller(s) unless otherwise agreed in writing. Said premises shall then be in substantially the same condition as at present, excepting reasonable use and wear.
9. PRORATIONS: The following items shall be prorated as of the date of closing:
 - a. Real Estate Taxes based on the municipality's tax year. Seller is responsible for any unpaid taxes for prior years.
 - b. Fuel
 - c. n/a
 - d. ~~Rents~~
 - e. Metered utilities, such as water and sewer, shall be paid by Seller(s) through the date of closing.
 - f. Purchaser(s) and Seller(s) shall each pay its transfer tax as required by the State of Maine.
10. INSPECTION PERIOD: The Purchaser(s) is encouraged to seek information from professionals regarding any specific issue of concern. Purchaser(s) acknowledges receipt of disclosure form attached hereto. The Agent makes no warranties regarding the condition, permitted use or value of the Seller's real or personal property. This Contract is subject to the following inspections, with the results being satisfactory to the Purchaser(s):

TYPE OF INSPECTION			RESULTS REPORTED	TYPE OF INSPECTION	Seller(s)		RESULTS REPORTED
	YES	NO			YES	NO	
a. General Building	☒	☐	Within 90 days	g. Lead Paint	☐	☒	Within ____ days
b. Utilities to site	☒	☐	Within 90 days	h. Pests	☐	☒	Within ____ days
c. Geotechnical	☒	☐	Within 90 days	i. ADA	☐	☒	Within ____ days
d. Survey	☒	☐	Within 90 days	j. Wetlands	☒	☐	Within 90 days
e. Curb Access	☒	☐	Within 90 days	k. Environmental Scan	☒	☐	Within 90 days
f. Access for utilities	☒	☐	Within 90 days	l. Other: <u>zoning</u>	☒	☐	Within 90 days

The use of days is intended to mean from the effective date of this Contract. All inspections will be done by inspectors chosen and paid for by the Purchaser(s). If the result of any inspection or other condition specified herein is unsatisfactory to the Purchaser(s), in Purchaser(s) sole discretion, Purchaser(s) may declare the Contract null and void by notifying Seller(s) in writing within the specified number of days, and any earnest money shall be returned to the Purchaser(s). If the Purchaser(s) does not notify the Seller(s) that an inspection is unsatisfactory within the time period set forth above, this contingency is waived by the Purchaser(s) and the earnest money deposit is paid to the Seller(s) and credited to the Purchase Price if a Closing occurs. In the event of a title defect or Seller(s) default, the Seller(s) shall pay the deposit amount back to the Purchaser(s). In the absence of inspection(s) mentioned above, the Purchaser(s) is relying completely upon Purchaser's own opinion as to the condition of the property.

11. FINANCING: Intentionally Deleted.

12. AGENCY DISCLOSURE: The Purchaser(s) and Seller(s) acknowledge that they have been informed that the Selling Licensee is acting as a Buyer's agent in this transaction and is representing the Purchaser(s) and that the Listing Licensee is acting as a Buyer's agent in this transaction and is representing the Purchaser(s). The Purchaser(s) is responsible for paying the brokerage commission. The Seller(s) shall have no responsibility to pay a brokerage commission. Furthermore, pursuant to Real Estate Commission requirements, the Purchaser(s) provides notice and the Seller(s) acknowledges that a potential partner of the purchasing entity, Drew Sigfridson, is a licensed real estate broker in the State of Maine with CBRE | The Boulos Company.

13. DEFAULT: If Purchaser(s) fails to perform any of the terms of this Contract or is otherwise in default of any of its obligations, Seller shall retain the earnest money as full and complete liquidated damages and shall have no further claims against the Purchaser. If Seller(s) fails to perform any of the terms of this Contract or is otherwise in default of any of its obligations, Purchaser(s) shall have the option of employing all available legal and equitable remedies. Notwithstanding any other provision of this agreement, Escrow Agent shall have the right to require written releases from both parties prior to releasing the earnest money to either party. If a dispute arises between Purchaser(s) and Seller as to the existence of a default hereunder and/or the release of the earnest money and said dispute is not resolved by the parties within (30) days, Escrow Agent may elect to file an action in interpleader and deposit the earnest money in the court to resolve said dispute, or otherwise disburse the earnest money pursuant to Maine Real Estate Commission regulations. Purchaser(s) and Seller, jointly and severally, shall indemnify Escrow Agent for all costs, losses, expenses, and damages, including reasonable attorneys' fees, incurred by Escrow Agent in connection with said action and/or in connection with any dispute relating to this Contract and/or the Deposit.

14. MEDIATION: Any dispute or claim arising out of or relating to this Contract or the premises addressed in this Contract shall be submitted to mediation in accordance with the Maine Residential Real Estate Mediation Rules of the American Arbitration Association. This clause shall survive the closing of this transaction.

15. PRIOR STATEMENTS: Any verbal representations, statements and agreements are not valid unless contained herein. This Contract completely expresses the obligations of the parties. This is a Maine contract and shall be construed according to the laws of Maine.

16. HEIRS/ASSIGNS: This Contract is assignable ☒ Yes ☐ No. This Contract shall extend to and be obligatory upon heirs, personal representatives, successors, and assigns (if assignment is allowed by the terms of this Contract), of the respective parties.

17. COUNTERPARTS: This Contract may be signed on any number of identical counterparts, including telefacsimile copies, with the same binding effect as if the signatures were on one instrument. Original or telefacsimiled signatures are binding.

18. BINDING CONTRACT: This Contract is a binding contract when signed by both Seller(s) and Purchaser(s) and when that fact has been communicated to all parties or to their agents. The Effective Date of the Contract is noted below. Time is of the essence of this Contract.

19. REVIEW OF LEASES AND INCOME AND EXPENSE INFORMATION: The Seller(s) shall provide the Purchaser(s) with copies of all leases regarding the subject property within five (5) days of the effective date of this contract. Purchaser(s) shall have ten (10) days from such delivery to review leases and income & expense information regarding the property. If the result of the review is unsatisfactory to the Purchaser(s), in Purchaser(s) sole discretion, Purchaser(s) may declare the Contract null and void by notifying the Seller(s) in writing within the specified number of days set forth above, and any earnest money shall be returned to the Purchaser(s). If the Purchaser(s) does not notify the Seller(s) that the review is unsatisfactory within the time period set forth above, this contingency is waived by the Purchaser(s).

20. Seller(s) and Purchaser(s) acknowledge receipt of the Maine Real Estate Commission Disclosure of Agency Relationship Form (Form #2), if the property is, or has a component of, one to four residential dwelling units.

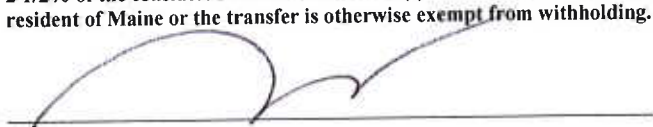
21. ADDENDA: This Contract has addenda containing additional terms and conditions: YES ☒ NO ☐

TC
Seller(s)

DP1
Purchaser(s)

A COPY OF THIS CONTRACT IS TO BE RECEIVED BY ALL PARTIES AND, BY SIGNATURE, RECEIPT OF A COPY IS HEREBY ACKNOWLEDGED. IF NOT FULLY UNDERSTOOD CONSULT AN ATTORNEY.

Seller(s) acknowledges that the laws of the State of Maine provide that every buyer of real property located in Maine must withhold a withholding tax equal to 2 1/2% of the consideration unless the Seller(s) furnishes to the Buyer(s) a certificate by the Seller(s) stating, under penalty of perjury, that Seller(s) is/are a resident of Maine or the transfer is otherwise exempt from withholding.


Purchaser

Redfern Properties and/or Assigns

Name/Title

4/9/2014
Date

Soc. Sec. # or Tax I.D. #

Purchaser

Name/Title

Date

Soc. Sec. # or Tax I.D. #

The Seller(s) accepts the offer and agrees to deliver the above-mentioned property at the price and upon the terms and conditions set forth above.

Signed this _____ day of _____, Effective date of Contract: April 10, 2014.

The Listing Licensee is Drew Sigfridson of CBRE | The Boulos Company (Company).

The Selling Licensee is Drew Sigfridson of CBRE | The Boulos Company (Company).


Seller

Perigee LLC

Name/Title

041014
Date

Soc. Sec. # or Tax I.D. #

Seller

Name/Title

Date

Soc. Sec. # or Tax I.D. #

Offer reviewed and refused on _____, Seller

Seen and agreed to:


Seller(s)

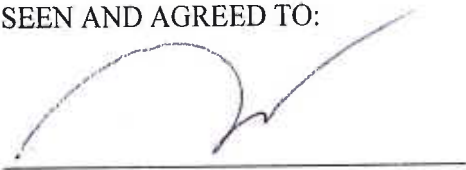

Purchaser(s)

Addendum A

1. PERMITTING AND APPROVALS PERIOD: The Contract shall be conditioned upon the Purchaser's receipt of permits and approvals for its planned development, including the expiration of any appeals period. Purchaser shall have **One Hundred Twenty (120) days** after the completion of the inspection period to attain permits and approvals for its planned development on the subject property. In addition, Purchaser shall have the right to **five (5), thirty (30) day** extensions of the Permitting and Approvals Period, upon payment on each occasion, prior to the end of the Permitting and Approvals Period (as the same may have been previously extended), of an additional [REDACTED]

[REDACTED] Dollars for extensions 4 and 5, if needed, (the "Extension Payments") to the Seller(s), which Extension Payments shall be non-refundable (except in the event of Seller's default under the Contract), but credited to the Purchase Price if a Closing occurs. If Purchaser elects to terminate the Contract within the Inspection Period, the Deposit shall be returned to Buyer; otherwise, the Deposit shall be nonrefundable and retained by Seller (except in the event of Seller's default under the Contract), provided that it shall be credited to the Purchase Price if a Closing occurs.

SEEN AND AGREED TO:



Purchaser

4/9/2014
Date



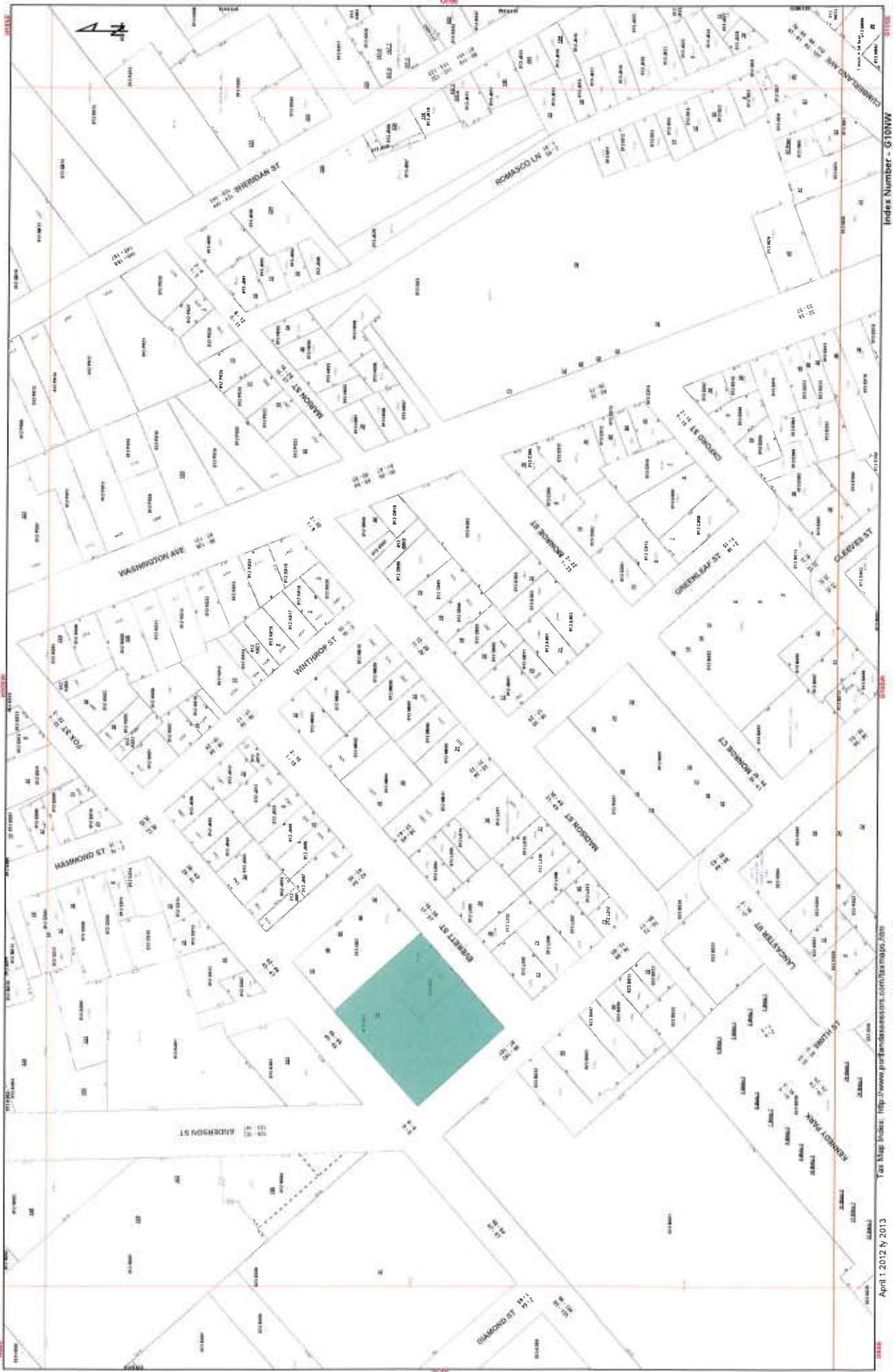
Seller

041014
Date

Seen and agreed to:

TC
Seller(s)

Purchaser(s)

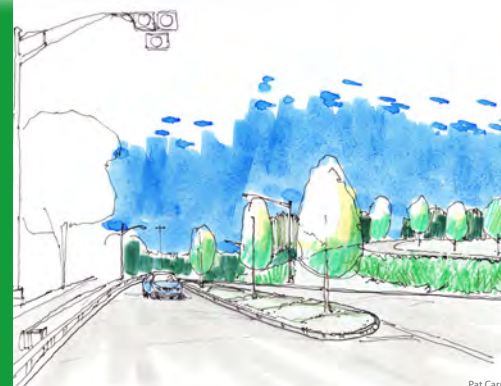




Sergio Gaddar



Anthony Meunch



Pat Carroll



Att. D

Anthony Meunch

PORTLAND, ME SDAT

Creating a Sustainable Vision for Maine's Most Diverse Neighborhood



Anthony Meunch

AIA Center for Communities by Design

PLACES WITH POTENTIAL

Place with Potential: Fox and Anderson

The intersection of Fox Street and Anderson Street is a community center both geographically and socially. It is at the juncture between the residential neighborhood and the light industrial/arts district. It includes Fox Field, which is the primary outdoor recreational facility in East Bayside and a gathering place for youth. There is potential for both creating a place where a broader spectrum of community members can gather and for building upon the improvements to Fox Field that the City and community are already making. Some ideas for how Fox and Anderson could be transformed over time as funding is found are listed below.

- Paint crosswalks at the 4-way stop.
- Install curb extensions (“bulb-outs”) to increase sidewalk area to emphasize the pedestrian orientation and channelize vehicular traffic. The sidewalk paving could be brick as shown in the adjacent sketches.



Top: Plan view of crosswalks, curb extension and a green space.

Bottom: Bird's eye sketch showing brick paving, street trees and a gateway.



Above: The intersection of Fox and Anderson Streets today.

Below: A sketch showing crosswalks, curb extensions, brick sidewalks, a pocket park, street trees and storm-water collection parkways.

- Working with the property owner and tenant on the northeast corner, add a pocket park on the undeveloped triangle of land and the curb extension with facilities that would complement the uses at Fox Field and support commercial activity.
- Plant street trees in parkways, install pedestrian street lights, and other streetscape improvements.
- Attract neighborhood-serving uses, such as a coffee shop or a deli, to Anderson Street near its intersection with Fox Street.
- Continue to refine facilities around the edges of Fox Field to accommodate complementary park uses, including seating, picnicking, and other park uses. Close the street for special community events and turn the street into a outdoor room.
- Consider programming events at Fox Field.
- Expand the park as more facilities are needed.
- Add a recreation / community center near Fox Field.



Existing sidewalk on Fox Street adjacent to Fox Field.



Sketch of sidewalk with curb extension, storm water parkway and trees.

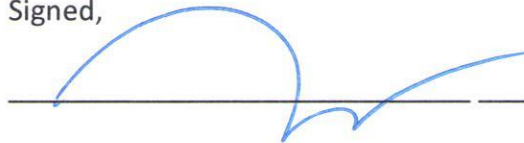
89 Anderson Street
Neighborhood Meeting Certification

I, Jonathan Culley of Redfern Properties LLC hereby certify that a neighborhood meeting was held on July 16, 2014 at our office at 178 Washington Avenue, Portland at 6:00pm.

I also certify that on July 1, 2014, invitations were mailed to the following:

1. All addresses on the mailing list provided by the Planning Division which includes property owners within 500 feet of the proposed development or within 1000 feet of a proposed industrial subdivision or industrial zone change.
2. Residents on the "interested parties" list.
3. A digital copy of the notice was also provided to Jennifer Yeaton of the Planning Division at jmy@portlandmaine.gov and Nell Donaldson, the assigned planner, to be forwarded to those on the interested citizen list who receive e-mail notices.

Signed,



7/18/2014

Attached to this certification are:

1. Copy of the invitation sent
2. Sign-in sheet
3. Meeting minutes



P.O. Box 8816
Portland, ME 04104
Office: 207-221-5746
Fax: 207-221-2822
www.redfernproperties.com

July 1, 2014

Dear Neighbor:

Please join us for a neighborhood meeting to discuss our plans for a new development at the corner of Fox and Anderson Streets (89 Anderson). The project consists of two commercial spaces on the ground floor and residential rental apartments on Floors 2-4. This meeting pertains to our Application for a Zoning Map Amendment. Should our project go forward, there will be additional meetings in the future that will pertain to a Site Plan review.

Meeting Location: Redfern Office, 178 Washington Ave, Portland
Meeting Date: Wednesday, July 16th
Meeting Time: 6:00pm

The City Code requires that property owners within 500 feet of the proposed development and residents on an "interested parties list", be invited to participate in a neighborhood meeting. A sign-in sheet will be circulated and minutes of the meeting will be taken. Both the sign-in sheet and minutes will be submitted to the Planning Board.

If you have any questions, please contact me at 207-221-5746 or jonathan@redfernproperties.com. I hope to see you at the meeting.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jonathan Culley", is written over a light blue circular background.

Jonathan Culley
Redfern Properties LLC

SIGN-IN SHEET

89 Anderson Street

Neighborhood Meeting Zone Map Amendment Application

July 16, 2014, 6pm

Redfern Properties Office, 178 Washington Ave

Name

Address

Nell Donaldson

City of Portland

Candyn Treat

41 Hammond St. - treat5@yahoo.com

Wade R. Fleming

16 Hall St

Martie Voland

28 Hammond St.

Edie Woodward

28 Hammond St.

Jed Rathbun

9 Everett St.

Cynthia Loring

15 Everett St. jlmikmi@maine.rr.com

Will Pratt

18 Marlison St. will@tandemcoffee.com

Wendy West

Resident 23 Fox St. / EBNO Board Member

Chris Brown

32 Everett cbrown@maine.rr.com

Timothy Poulson

11 Boynton St. infinitegoldkin@gmail.com

SIGN-IN SHEET

89 Anderson Street

Neighborhood Meeting Zone Map Amendment Application

July 16, 2014, 6pm

Redfern Properties Office, 178 Washington Ave

Name Olga Davis
BYRON DAVIS
Ellen Bailey
Cynthia Cochran
Christopher Teret
Heather Abt
SUSAN ABT
K. Snyder
COLE CASWELL
Sue Lippert
TIM LIPPERT
Michelle Castner
KRA RATHBAND
Evan Carroll
ALEX LEEMAN
Kathleen McLean
F. Haynes
Dan + Michelle Hall
REBECCA LEEMAN

Address olyadavis@gmail.com
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17 Hammond St. efbailey66@gmail.com
73 Anderson St christopherteret@hotmail.com
30 Everett St.
65 Randall St.
72 Waterville St. Karsny@yahoo.com
89 ANDERSON ST.
76 Anderson sue.lippert@icloud.com
76 ANDERSON talippert@gmail.com
86 Anderson St mcastner@icloud.com
9 EVERETT ST.
5 Everett
51 HAMMOND
53 Hammond.
178 Washington AVE.
9 Apple Way Topsham.
23 FOX ST. PTLD reeman@gmail.com

SIGN-IN SHEET

89 Anderson Street

Neighborhood Meeting Zone Map Amendment Application

July 16, 2014, 6pm

Redfern Properties Office, 178 Washington Ave

Name

Karen Farber
Hope Churpaka

Address

Maine Craft Distilling 101 Fox St.
86 Anderson St hondahawk88@hotmail.com

89 Anderson Street

Neighborhood Meeting – Zoning Map Amendment Application

Meeting held July 16, 2014, 6pm at Redfern Properties Office, 178 Washington Ave, Portland

Meeting Minutes:

Please note that minutes are not verbatim, but we have made our best efforts to reflect meaning and intent.

The meeting began at 6:05pm. Jonathan Culley, principal of Redfern Properties introduced himself and Ryan Senatore, or Ryan Senatore Architecture. Jonathan Culley provided background on Redfern Properties, which has been developing real estate in Portland since 2005. Culley emphasized that Redfern is local, with its office in the East Bayside neighborhood. He described current projects Munjoy Heights and West End Place, and explained Redfern's core values of progressive, super energy-efficient infill developments. Culley explained Redfern's view that infill development and increasing urban density benefits our environment as well as our cultural institutions; that reversing 'suburban sprawl' is good for our society.

Culley explained City of Portland's approval process, that this evening's meeting is related to the Zoning Map Amendment Application and that if the Zone change is approved there will be a Site Plan review which is a more detailed process focusing on the more technical aspects of the project such as traffic, parking, stormwater, architectural design, landscaping, etc. Culley said there will be another neighborhood meeting related to Site Plan review if the Zone Change is approved.

Culley discussed why Redfern is pursuing B2B zoning, explaining that the R7 Zone would allow for the same building size and residential density, but would not allow for the ground floor commercial space. He referred to the 2010 AIA "A Vision for East Bayside" Study which recommended a community gathering space, such as a deli or coffee shop at the corner of Fox and Anderson, and that this is only feasible with Business Zoning. Culley described both ground floor commercial spaces and shared Redfern's vision for a community room, perhaps in cooperation with East Bayside Neighborhood Organization (EBNO) or some other non-profit, community based organization. Culley indicated Redfern's willingness to provide a 'no-cost' lease to a well-suited non-profit organization to use this space, and create a positive street presence on Anderson Street. Culley described how Redfern is engaged with Bruce Hyman of the City of Portland to improve the sidewalk/crosswalk design that the City if working on should the project go forward.

Culley presented a Zoning Map and showed how 89 Anderson street is at the convergence of a number of different zones, with R-6, R-7, ILB, B5, and B2B all within a few hundred feet of the property.

Ryan Senatore shared a preliminary rendering of the building and described the architectural elements of the current design. He discussed our architectural strategies to address scale and massing. He described the elements on the ground floor commercial spaces and how they are designed to interact with the street.

The presentation was concluded and the floor was opened for questions and comments. Questions and comments are in bold:

Q. Are you planning on green space in the back?

Culley described plans for strips of green space around the parking lot and for vegetative elements between the sidewalk and building, but explained that we do not have a final site plan.

Q. Where is the entrance to the garage? Several concerns were expressed about a potential vehicle entry on Fox Street, related to traffic patterns on Fox Street.

Culley responded that the site plan presented was preliminary and that we did not have strong views about whether the parking entrance was on Fox or Everett and that a traffic study would be commissioned later in the process that would inform those design decisions.

Q. Is the entire lot built? Avesta typically uses 80/20 providing for some green space.

Culley discussed the difference between lot coverage and green space, explaining that our lot coverage was less than 60%, and reiterated that % green space was to be determined.

Comment: I have a philosophical difference am not into density, it is not what I would choose for our City.

Q. What is the unit mix, will these support families.

Culley indicated that the current plan was for roughly 10 studios, 31 1-bedrooms, and 12 2-bedrooms, and that this was very preliminary and would be determined by market demand.

Q. How many total apartments?

The Zoning would allow for up to 53 apartments and that is the current plan.

Q. How much parking are you planning?

53 spots, one spot for each apartment.

Q. What if two people share an apartment and they each have two cars, where do they park?

Culley indicated that Redfern is seeing a number of situations where people living in Portland don't have cars and this may balance out, but that a parking and traffic study which be done later in the process.

Comment: My building has 3 units, and there are 5 cars.

Comment: My main concern is that there is a crisis of affordable housing and the neighborhood is becoming unaffordable.

Culley explained that his view is that this project will improve affordability and not hurt it. He explained his view that the best way to improve affordability is to introduce new supply to address the demand. By bring the apartment supply closer in line with apartment demand, affordability should improve.

Comment: I disagree with that response. The things that improve affordability are inclusionary zoning and rent control. It is irresponsible to be building housing without addressing affordability. The neighborhood is changing and some working people are being forced out.

Culley explains that these are not high-priced condominiums that they are more modest market-rate apartments, and would be significantly less expensive and downscale from the West End Place building we are doing on the West End.

Q. I have been studying zoning. Why not leave it R6? This could support 23 units, why wouldn't 23 units work?

To cover land and construction costs, if we were to build 23 units, they would need to be high-end condos for the project to be feasible and we don't want to do that. We believe that building modest, market-rate apartments for working people is better for this site.

Q. I was looking at B2C Zoning and wondering if that would provide more protection for the neighborhood?

Culley said he did not know what B2C zoning was but would look into it. Nell Donaldson, planner with City of Portland indicated that she was not overly familiar with B2C zoning.

Q. Will Redfern be managing the building?

We are not a property manager, but we do intend to own the building for a long time. We would hire a professional property management company.

Comment: Business on Fox in the ILB are worried that if residential development continues that the commercial/industrial district may be at risk and rents will rise.

Culley responded that he understands the City Council to be very protective of the ILB zone and he wouldn't expect residential development in the ILB anytime soon, but that is not something he is expert on, and that this would be a question for the City.

Q: 3Gs is providing a function for the area. Now we will have to drive to South Portland to get our cars serviced. Has there been any thought to a different type of business that would serve the community on the ground floor? The last thing we need is another restaurant.

We are not marketing the space and are not tied to a restaurant, but is largely in response to the AIA study. A grocery store wouldn't work well because of Whole Foods, but we don't know exactly what the commercial space would be, and we remain open minded.

Q. Did you consider a three-story building without the commercial space, but still 53 units.

This wouldn't work because we need parking on the ground floor. The building is largely above the parking. Culley referred again to the site plan and explained how the parking sits in relation to the commercial and residential spaces.

Q. Is there a plan for parking for the businesses?

Culley explained that the City would likely require some parking for the businesses, depending on the type of use, but he thought that a restaurant would require some parking. He suggested that this might be solved with leased parking off site.

Q. Is there anyplace else in the City that has something similar in scale within a R6?

Bayside Anchor was recently approved and is an excellent comparison, Walker Terrace and 53 Danforth are 2 R7 type buildings. Nell Donaldson, planner, City of Portland, explained that much of East End and West End is R6 and there are some big buildings.

Q. Can the neighborhood support this density?

Nell Donaldson reiterated that the Planning Board will take a general review of density during the Zoning review but will take a very detailed review during the Site Plan review and will consider traffic, stormwater, etc., all the things that determine whether the neighborhood can support this density.

Q. Is anyone taking a holistic view of growth and how Portland's overall growth impacts traffic? Traffic on Fox street is getting bad. It seems like no one is looking at the big picture.

Nell Donaldson explained that every site plan review requires a traffic engineer and that any traffic analysis should address 'background traffic assumptions' and all of the projects that have come before would be included in any traffic study. An open discussion about traffic on Fox Street ensued.

Q. You talked about the process for rezoning and then Site Plan review. The order seems backward. Can you explain the process again. If you get a zone change but not Site Plan review, would the zone revert back to R6?

Nell Donaldson explained the zoning process and the rationale for the process.

Q. You said that roughly 10% of the 300,000 Greater Portland population lives on Portland peninsula? How are you defining Greater Portland?

Culley apologized saying his numbers were approximate and not precise, but were meant to reflect his view that we have an opportunity to have a denser city and with increased urban density will come a lower carbon footprint, more vibrant neighborhoods, and more successful arts and cultural institutions.

Q. Is this building going flush with the sidewalk? Would the balconies overhang the sidewalk?

Ryan Senatore reviewed the Site Plan and showed how the building is at the sidewalk/property line on the corner of Fox and Anderson, but we are holding the façade 4' back from the sidewalk for most of the property. These balconies would not overhang.

Q. How do the apartments on Marginal Way do?

Culley explained that this was student housing, set up more as a dormitory than apartments, and that, he understood them to be successful, though had no first-hand knowledge.

Q. How many apartments are in your West End building?

Culley responded 39 units, that it was a similar building but on a slightly smaller lot.

Q. Are there any buildings going up that look similar to this?

Culley responded that he hoped the building was 'unique' but the West End Place building and the 118 Congress building were somewhat similar in scale, organization, etc.

Q. It sounds like you are thinking about a vision for a greener city, but I want to encourage you to think about where do the plumbers and electricians live? Where do the working class people live? Please think about the relationship between class and environment.

Culley: I appreciate these points. While it is certainly a question of numbers, I don't think that working class people will be excluded. These are not upscale units. While the term affordable is subject to some debate, we envision that this is a place that a school teacher could afford to live.

Comment: Several people weighed in on the question of what is affordable. One participant calculated that someone making \$12 an hour, which is above minimum wage, would have to exceed the recommended income as % of rent guidelines to live here. Another participant who was a teacher opined that a beginning teacher would have trouble paying \$1,000 per month in rent for a studio apartment. A number of neighbors expressed sincere concerns about affordability.

Culley again indicated that these are complex problems, and we share these concerns about housing affordability, but that we remain of the view that more supply of market rate apartments will increase overall affordability of housing in Portland.

Comment: In cities like New York and San Francisco, that have gotten bigger and more expensive, I wonder where the people who work in grocery stores live. Portland is growing now and it is very important that we get this right. I am very concerned about families and how they will be able to afford to live on the peninsula.

Culley, one more comment, as an owner of apartments, we will not set the market. It is possible that instead of getting \$1,000, we only get \$800 per month and we might lose money. The market will set the rents. People will only pay what they can afford to pay. It is a complex socio/economic discussion.

Q. You mentioned your unit mix. Was there any discussion of doing a 3-bedroom unit?

Culley: Our unit mix is not final, and will be driven by perceived market demand. The trend seems to be for smaller units, as opposed to bigger units, but we will keep looking to the market for information before we finalize our unit mix. Right now, the market seems to be for studio, 1 and 2 bedroom apartment.

Q. Question to Nell Donaldson: What kind of things are you as a planner and what is the Planning Board looking for to base you decision on the Zone Change request?

Nell Donaldson: The basic threshold is whether the Zone change is consistent with the Master Plan/Comprehensive Plan.

Q. Jonathan, what is your backup plan if you do not get the zone change?

We most likely would not go through with our purchase of the property. Our contract, as is typical, is contingent on getting our approvals.

Q. What is the Planning Board meeting schedule?

Nell Donaldson: The meeting is next Tuesday, July 22 at 4pm in room 209 at City Hall. The workshop starts at 4pm, but this is the 3rd item on the agenda so it likely won't be reviewed before 5pm. After the workshop, the Planning Board may request another workshop or they might schedule a public hearing at which they will take a vote. Public Comment will be taken at workshops and public hearings.

Q. Why does the City keep changing and relaxing ordinances in order to permit new developments? How do you protect the residents?

Nell Donaldson: This is complex, but we make zoning and ordinances and then things change, but zoning remains static. The City tries to adapt to emerging trends. The City is actively trying protect your interests, while responding to demands from many constituencies and demographics. East Bayside is changing and we want to protect the things that are good, while allowing for organic growth.

Comment: We feel like we are not being protected, like the sale of Congress Square Park and the way the mayor was robo-calling before the vote. We feel like it is pro-development.

Nell Donaldson: These are good concerns, and while you may feel like you are not being listened to, I can tell you that City Staff talks a lot about these issues and concerns. Please come to the Planning Board and express your opinions.

Comment: I am not sure the purpose of this meeting, but it seems like you are asking us for something, and you have a duty to consider our comments and make some structural changes to your proposal. It does not sound like you have agreed to any changes at this meeting, and so I will go to the Planning Board and say that I do not see any reason to allow for this Zoning change.

Culley: I am certainly listening to everyone's comments and concerns. I think the real purpose of this meeting is to share information, rather than to negotiate changes. We have tried to be very transparent in describing the project, and giving you the information you need to create some opinions. We have

tried to tell you why we think this is good for Portland. While I would like to get support of all neighbors, I understand if some of you don't support the project, and I certainly respect your opinions.

Q. Could this deal be viable for you if the building was smaller?

I don't think the project would be viable if it was materially smaller. I don't think we could get our Bank to fund the project.

Comment: I don't agree that this project will reduce rents in Portland I don't believe that if traffic is bad, it helps to build another lane.

Q. In the name of transparency will you share your financial figures that you have been showing the Bank?

We certainly have assumptions, and while I am not willing to share my personal financial details, I can share that we are currently projecting average rents of around \$1,200. Rents for studios would be lower and 2-bedrooms would be higher. These are the current directions.

Comment: I can't imagine that 53 units is a magic number.

Again, the deal would not be viable if there were many fewer than 53 units. I can't say whether the breakeven or viability threshold is 49,50,51, etc., but I can certainly say that this deal wouldn't work with 40 units. 53 is the allowable units per the zoning. We would need to be very close to 53 units to make this work.

Comment: The number one consideration is not the amount of profit you make, but the impact on the neighborhood.

Culley: I agree. As I stated, we work here and live here and will be living with and around our developments and we only want to do good development. The City process is there to protect the neighborhood. Also, I offer that we have built buildings in the past that people were against and then we built them and they decided they weren't so bad, maybe they even liked the change. Maybe some of the people who move into this building will be interesting people who add to the fabric of the neighborhood. Change and uncertainty are difficult for neighborhoods and we understand that.

Q: What is the market rate for a studio apartment?

Culley: I know of studio apartments on Congress Street that rent for around \$900. There are certainly units that rent for less, but for newer apartments, maybe \$900. We expect our studios to be between \$900-1000 per month. Again our assumptions are roughly \$900-1000 per month for studio apartments, \$1100-1200 for one bedrooms and slightly higher for two-bedrooms.

Comment: An \$1,000 studio apartment is really expensive. I am looking to pay about \$450 per month. Adding these apartments to East Bayside doesn't help.

Culley, I appreciate your point. I am not trying to define 'affordable'. We are only saying that adding to housing supply should improve affordability based on the law of supply and demand.

Comment: I am an electrician, and I have a family, and I own a house and my mortgage is \$760 per month and I am struggling to pay the bills. I am scraping by. This is real. Please be honest and look at the reality of how people are living. Face up to the reality that this is not affordable.

Comment: I just did some calculations. If you pay 40% of your income for housing, and work 40 hours per week, you would need to make \$12 an hour to afford one of these apartments. Minimum wage is nowhere near \$12 per hour. We would like to get minimum wage up to \$12 per hour in Portland.

Culley, I would be for it!

Q. What about the people who are living behind the parking lot. What is the rear setback?

Ryan Senatore: There is a 10' setback, but their building doesn't go to the property line. There is a parking lot for their building.

Culley: There will likely be a retaining wall between the properties.

Comment: It is important that people come to Planning Board meetings and speak up. Or email the City.

Nell Donaldson: Please come to the meeting or email me and your comments will be included in the Planning Board. My email is hcd@portlandmaine.gov

Q. How often do these projects get turned down by the Planning Board?

Nell Donaldson: Not very often. However many projects are changed. There is a Site Plan Ordinance that sets many criteria, including parking, stormwater, etc. When plans do not meet these standards, they must adapt to meet the criteria.

Comment: But the ordinances are being bent.

Nell Donaldson: The ordinance has a number of subjective criteria and the Planning Board has to make some decisions.

Q. How many citizens will it take to slow down the development happening in Portland? In 2012 there were 60 building permits, in 2013 there were 450.

Nell Donaldson: Yes, things have been busy. I encourage people to get involved and make comments and get involved. The Director of Planning is very interested in getting involvement from citizens and hearing people's opinions.

Q. Is the Comprehensive Plan available on the City website? Is there a plan for East Bayside?

Nell Donaldson: Yes it is. I am not sure exactly where it is but it is on the City web site. Comprehensive Plan is a collection of plans that have been developed over the years.

There is not necessarily a plan for each neighborhood.

Q. How does a parking/traffic study fit in to the Planning Board meeting?

Nell Donaldson: The Board may talk generally about parking and traffic, but the detailed discussion would happen later during Site Plan review.

Q. The Workshop is next Tuesday, do we know the next meeting would be?

Nell Donaldson: After the workshop the Board will either request another workshop or schedule a Public Hearing where they would take a vote on whether to recommend to the City Council. We do not have a date yet for any subsequent meetings.

The meeting was adjourned at 7:37pm.

Jennifer Yeaton - Concerns about the Proposed Zoning Change for 89 Anderson Street

From: Ellen Bailey <efbailey66@gmail.com>
To: <hcd@portlandmaine.gov>
Date: 7/17/2014 5:51 PM
Subject: Concerns about the Proposed Zoning Change for 89 Anderson Street

July 17, 2014

To Nell Donaldson (City Planner),

Thank you so much for your willingness to hear residents' concerns about the proposal submitted by Jonathan Culley of Redfern to rezone the property at 89 Anderson Street from an R-6 (residential) to a B-2b (community business) zone. I have a few concerns about this change that I will share and will reference a few city documents along with my concerns.

My first concern is the increase in traffic that will result at the corner of Fox and Anderson by putting in retail at that intersection. The intersection of Fox and Anderson is already a very difficult to negotiate and adding retail along with potentially 53+ new residents is going to cause a dangerous situation to become even more dangerous. This area is widely used by pedestrians, cyclists, and joggers. Because many people use this intersection, it becomes confusing and undermines everyone's safety. I am particularly concerned that adding a retail space to this intersection (like a restaurant) will just create an even more difficult, confusing and dangerous situations for drivers, pedestrians and residents.

There are also many children living near this location and I am concerned for their safety in particular, as they play in the vicinity and on occasion run out in to the street after a stray ball. This location is also a school bus stop where many children get on and off the bus. Adding a retail space here is going to increase the potential for accidents involving the children who live in the nearby buildings.

In addition, I am alarmed that the entrance and exit to this mixed use development is going to be located on Fox Street (according to the current plans). Fox Street is being used by an increasing number of cars and trucks every day and the intersection of Fox and Anderson is a particularly difficult one to navigate. Adding 53+ residents to Fox Street, who will most likely all own at least one car, is going to be yet another influx of traffic concerns, especially since residents will be trying to turn into and out of their apartment complex via Fox Street. When cars currently enter or exit the Three GGGs garage it creates quite a bit of confusion and undermines the safety of all who are trying to negotiate the intersection. I am of the opinion that the traffic in and out of a 53-unit building that also houses retail (such as a restaurant) is going to be higher than the current Three GGGs traffic, thus making that intersection even more active, more confusing and more dangerous.

My concerns here echo the concerns outlined in *Sustainable Portland: Final Report of the Mayor's Sustainable Portland Taskforce*. The taskforce outlined several challenges to the sustainability of

communities in Portland. Their number one concern was traffic. They state, "Portland has a deserved reputation for a high quality of life, but sustaining this quality requires constant vigilance given the numerous challenges facing our community. The Sustainable Portland Task Force highlighted several of these challenges: 1. Traffic – Existing neighborhood traffic conditions with high traffic volumes and excessive speeding on neighborhood streets result in excessive energy consumption and undermine neighborhood livability and 'sense of place'." (p. 26)

I am concerned that Fox Street traffic is already undermining the livability in East Bayside and adding retail spaces, along with a large number of new residents on Fox Street is going to make a bad traffic situation even worse. For this reason, I don't think 89 Anderson Street should be considered for any type of business zone, nor do I think the zoning should allow for such high residential density. This corner is too dangerous for this type of influx. I am of the opinion that this intersection should remain an R-6 zone for reasons of safety for all residents, drivers and pedestrians.

I have other concerns that are more related to a Site Level Review, but I would still like to mention them here as I believe they relate to the zoning change request. I am very concerned about the lack of affordable housing in Portland and based on the initial figures given for the cost of renting one of the apartments at this new development, I am quite sure the working people of Portland will not be able to live in this building. The rates I have heard are \$1,000 dollars per month for the cheapest apartments, the studios. The one and two-bedroom apartments will be even more expensive. This type of expensive housing is not in keeping with the current situation in East Bayside. We are largely what is called "working class" and need affordable "workforce housing" in our neighborhood. This also echoes goals outlined in the *Sustainable Portland* report. One of the benchmarks under the recommendations for maintaining and growing the economy of Portland is "availability and affordability of 'workforce housing'." (p. 22) East Bayside has long been an area where the workforce of Portland can afford to live. This building does not follow that desired goal, a goal which the city of Portland has set.

This difference in income needed to live in the proposed development also is in direct conflict with the section entitled *Sustainable Portland: The Community*. The second paragraph of a section entitled "Landlords, Tenants, and Developers as Partners in Sustainability states, "The City also needs to ensure that there are adequate opportunities for the sustainable development of new housing and business spaces that support transit use and walkability while promoting and preserving neighborhood viability and integrity." (p. 25)

This project fails in two of the objectives in that sentence. First, it will actually undermine walkability because it will increase the danger for pedestrians due to an increase in traffic. Secondly, this building and any sort of zoning change away from R-6 will undermine the integrity of the neighborhood. The rest of the neighborhood is R-6. Maintaining the integrity of the neighborhood means maintaining the R-6, family friendly zone.

Some have tried to make the argument to me that since there is an industrial zone across Fox Street, then this does not actually undermine the integrity of the neighborhood. I strongly disagree with this on two counts. One, retail and industrial zones are quite different. I am of the opinion that the B-2b retail zones should stay up on Washington Avenue, not leak down Fox Street. Equating industrial zoning to the type of retail zoning on Washington is not accurate. They are very different and create quite different traffic patterns. Second, it does not matter what is on the other side of Fox Street. The rest of the Fox –

Anderson- Everatt neighborhood is R-6, is designed for family dwellings and is dedicated to the working class of Portland. In order to maintain the integrity of that block, I am of the opinion that the zone should be consistent and that zone is R-6.

I would like to close by emphasizing that in the *Sustainable Portland* document, one of the main goals is to attract families to Portland. This quote comes from the section entitled "*Challenges to a Sustainable Community*". They state one of the challenges as being the perception of urban density and clarify with this statement: "If the city of Portland is to achieve a density that competes with sprawling suburbs and provides viable transit alternatives to single occupancy vehicles, the City must promote and protect the image and reality of urban living that attracts a wide range of current and future residents – especially families with children." (p. 27)

This project being proposed by Jonathan Culley of Redfern is the absolute opposite of what is stated in this document. His proposed development is certainly not inviting to families with children. In fact, such small residences really discourage families from moving to Portland. The goal of being family friendly further strengthens my view that East Bayside should remain R-6. East Bayside is a great area for families and we need to build dwellings for them, not tiny, little studio apartments in a B-2b or R-7 that are barely large enough for even two people.

Thank you for reading and considering my concerns on this zoning change.

To be very clear, I am not in favor of a B-2b zone at 89 Anderson Street. I am in favor of maintaining the current zone and that is an R-6 zone.

Sincerely,

Ellen Bailey (resident of Hammond Street, which is in East Bayside)

--

Ellen Bailey

**Memorandum
Planning and Urban Development Department
Planning Division**



To: Stuart O'Brien, Chair and Members of the Portland Planning Board

From: Richard Knowland, Senior Planner

Date: July 18, 2014

Re: Bayside Anchor; Corner of Boyd St. and East Oxford St.; Portland Housing Development Corp.

Project #: 2014-079 CBL: 22-01-04 and 01

Meeting Date: July 22, 2014

I. INTRODUCTION

A public hearing has been scheduled to consider a proposal by Bayside Anchor Development, LLC for a 45 unit housing development on the corner of Boyd Street and East Oxford Street. The development is called Bayside Anchor with a listed address of 81 East Oxford Street.

The property is part of the East Bayside residential campus of the Portland Housing Authority (PHA) which includes Kennedy Park, Bayside Terrace and Bayside East. For development and financing purposes, Bayside Anchor will be owned by an affiliate corporation and have its own lot but function as part of the PHA campus.

The development is subject to site plan and subdivision review. The Board of Appeals reviewed the proposed Head Start use since a kindergarten/nursery school is a conditional use in the R-6 zone which tracks the R-7 zone. The application was approved at a public hearing held on July 17, 2014 according to the Zoning Administrator.

The Board held a workshop on the Bayside Anchor proposal on June 10, 2014. Since that date the applicant has submitted updated material (Attachments 1 to 13) dated July 1, 2014 and supplemental material (Attachments 14 to 17) received on July 18, 2014. Attachment P includes site plans and other drawings.

Notice of this public hearing consisted of a legal ad item appearing in the Portland Press Herald on July 14 and July 15. Notices were sent to 103 notices area property owners.

II. FINDINGS

Zoning:	R-7
Land Area:	20,147 sf
Existing Use:	Parking lot (26 spaces)
Proposed Uses:	Residential, first floor (Head Start and day care, PHA offices, community policing office)
Dwelling Units:	45 (5 efficiencies; 34 one bedrooms; 6 two bedrooms)
Building Footprint:	9,610 sf
Building Floor Area:	38,770 sf
	Residential Space: 35,870 sf
	Non-Residential Space: 2,900 sf
Lot Coverage:	68%
Impervious:	7,532 sf (existing)
	13,767 sf (proposed)
Building Height:	45 ft.
Proposed Parking Spaces:	34 (off-site from campus parking surplus)
Proposed Bicycle Spaces:	30 inside building; 8 outside
Project Cost:	\$5,293,654

The submission lists Portland Development Corporation and Bayside Anchor Development Company, LLC as co-applicants. The property owner is listed as the Portland Housing Authority. Bayside Anchor will be owned by an affiliate corporation for development and financing purposes but will function as part of the PHA campus.

The Bayside Anchor was the subject of a zone change from R-6 to R-7 which was reviewed by the Planning Board at a public hearing on April 22, 2014 and then subsequently approved by the City Council on May 19, 2014. For purposes of holding a public hearing the entire East Bayside R-6 was advertised for a R-7 designation although in the end the Board's recommendation reduced the size of the map change to several blocks near Franklin Street which are part of the PHA campus. Bayside Anchor is within the new R-7 district. See enacted zoning map (Attachment A).

III. PROPOSED DEVELOPMENT

PHA proposes to construct a 45 unit multi-family building at the corner of Boyd Street and Oxford Street on the site of an existing parking lot. A significant portion of the building's first floor will be devoted to non-residential space including PHA campus offices, Head Start pre-school and a community policing office. These services are presently located elsewhere on the PHA campus but will now be consolidated in one location. Of the 45 units, 9 are expected to be market rate.

The building hugs the street frontage of Oxford Street and is within several feet of the street line. The building continues this pattern along Boyd Street except that a portion of the building has been recessed to accommodate an outdoor play area for Head Start as well as a patio (court yard) and open space on the northerly side of property. The patio (1,385 sf) and Head

Start outdoor area (370 sf) feature a concrete paver surface. Other amenities within the patio area include an extended seating wall, space for picnic tables, and a rain garden area. Between the patio area and the property line is a lawn area encompassing about 6,000 sf.

No on-site parking is provided. Off-street parking will be provided from the existing PHA campus parking lots.

Building Design

The submission describes Bayside Anchor as an example of “innovative sustainable design practices including incorporation of Passivhaus ultra-low-energy design principles, including plentiful fresh air, passive and active solar design, superinsulation and airtightness, used in conjunction with highly efficient energy recovery ventilation, to dramatically reduce energy demand and cost of expensive multi-family mechanical systems.”

Submitted building elevation drawings indicate the four story building is just under 45 feet tall. See Attachment P. Solar panels are shown on top of the flat roof with screening for mechanical equipment below.

The primary façade treatment is described as fiber-cement panel siding. A manufacturer’s catalogue sheet has been provided. See Attachment 19.

The site plan indicates a ramp is proposed along the Boyd Street face of the building (5 feet wide and 16 feet long with railing) to provide access into the entrance. Applicant indicates grade differences require this arrangement. As the ramp and rail are located within the street right-of-way we have requested an explanation. See Attachment 18.

Legal Agreements

Bayside Anchor proposes a number of improvements within the street right-of-way. Licenses and or easements will be required for the following improvements.

- Concrete foundations and footings within the Oxford and Boyd Street rights-of-way
- Permanent canopies extending from the building into the right-of-way.
- Pedestrian ramp/steps on Boyd Street.
- A pedestrian easement to the City where sidewalk encroaches on BA land on Oxford

Draft easement and license agreements need to be submitted for review and City Council approval.

Upon approval and according to the proposed Parking Management Plan, the PHDC/Bayside Anchor Development Company LLC will enter into a formal agreement with PHA for the long term use of these spaces.

Also there is a walkway that runs through the property to a PHA property. Confirmation of legal rights for PHA residents to use the walkway as well as reciprocal rights for Bayside Anchor tenants to use the connecting (off-site) walkway should be provided.

IV. DEVELOPMENT REVIEW

The site plan has been reviewed by City Staff including Planning Staff, Zoning Administrator, Public Services (and review consultants), City Arborist and the Fire Department for conformance with the review standards of the Site Plan Ordinance (sec 14-526) and the Subdivision Ordinance (14-497). Written staff comments are shown on Attachments B to D. Review standards are shown in italics with responses in normal print.

A. SITE PLAN ORDINANCE REVIEW

(1) Transportation Standards

a. Impact on Surrounding Street Systems

Gorrill-Palmer Consulting Engineers has submitted traffic analysis report entitled "Traffic Forecast, Parking Assessment and TDM Plan for Bayside Anchor" dated May 2014. See Attachment 13.

The G-P analysis indicates the following trip generation forecast for all uses (residential and non-residential) associated with Bayside Anchor.

Weekday	237 trip ends
AM Peak Hour	24 trip ends
PM Peak Hour	29 trip ends

G-P indicates "this level of traffic increase will not have a notable effect on the adjacent roadway system". Consultant also indicates a review of 2010-2012 found no high crash locations in the project vicinity.

Traffic related comments from Tom Errico (Traffic Review Consultant) are summarized below and shown in their entirety on Attachment B.

- The project is expected to generate 24 vehicles during the AM peak hour and 29 vehicles during the PM peak hour and does not trigger a MaineDOT Traffic Movement Permit.
- The applicant has provided a parking demand calculation for the entire PHA Campus and has determined that overall there will be an adequate off-street parking supply for the future build-out condition. I concur with this conclusion.
- The applicant has submitted a TDM plan and I generally find it to be acceptable. I would suggest that the details of the plan should be modified such that the initial post-occupancy monitoring study be conducted after 6 months, and annually thereafter. I would also suggest that the trigger for TDM Plan adjustments should not simply be based upon the parking generation threshold rate noted in the Plan but specific issues that are identified in the post-study.

- The proposed crosswalks on Boyd Street and Oxford Street have been reviewed by the City's Crosswalk Committee and the applicant has revised the project plans per comments from the City's Crosswalk Committee.
- A review of the Franklin Street Study indicates the Bayside Anchor plans does not appear to conflict with any potential Oxford Street connection to Franklin Street.
- The applicant will be responsible for providing supporting materials to the TS&E Committee and the City Council for the on-street parking regulation changes on both Boyd Street and Oxford Street. Specifically, the on-street parking changes will include the parking spaces immediately along the property frontage as well and prohibiting parking on the west side of Boyd Street between Cumberland Avenue and East Lancaster Street during winter months (as requested by the Fire Department).
- The applicant has revised the plans to include additional handicapped parking spaces across Oxford Street. The applicant should confirm that the space dimensions meet ADA standards and provide information on the non-handicapped space in terms of use and whether it meets City parking space dimension standards.
- The applicant has provided sufficient information on how Head Start Pick-up and Drop-off activities will be managed and the proposed on-street parking regulations include short-term 15-minute parking spaces, which I find acceptable.
- New Comments:
- The applicant has submitted a Construction Management Plan and my comments are noted below. A revised construction management plan shall be submitted and approved prior to the issuance of any City permits.
- Sidewalk detours need to be adjusted. It would be my suggestion that the detour for the closed Oxford Street sidewalk would occur at Mayo Street. It is unclear how pedestrians will be routed for the closed Boyd Street sidewalk. All detours will need to be ADA compliant.
- Additional detail will be required as it related to street occupancy and specific traffic control details.
- On-street parking signage along the property frontage shall be installed as part of the project.

(2) Access and Circulation

a. Site Access and Circulation

The project does not have any on-site parking or driveways. Parking will take place either on the street or at various PHA parking lots on the East Bayside campus.

Although no vehicle circulation takes place on the site it is important that functional circulation be provided between the street and the proposed uses. A 15 minute parking space will be designated along Boyd Street to accommodate potential drop-offs from Head Start. Along Oxford Street two 15 minute drop-off spaces will be designated to accommodate truck deliveries, drop-offs or assist tenants in transferring grocery bags up to their apartment rather than walking an extended distance from the campus parking. A police parking space will also be designated along Oxford Street.

Loading and Servicing

See above discussion for designated parking spaces along the project street frontage. The application indicates there is a dedicated trash room on the first floor that will accommodate all residential waste which has direct access onto Oxford Street.

b. Sidewalks

Applicant is proposing a new brick sidewalk along the Boyd and Oxford project frontage.

The sidewalk along Oxford Street varies from 6'- 4" to 8'- 4" wide with a typical 5 foot wide esplanade. The esplanade includes 5 street trees and 2 bike racks. The plan indicates that a concrete paver will be used within a portion of the Oxford Street esplanade. The plan should be revised reflecting a standard brick surface or grass.

A new handicap ramp and crosswalk will line up with Bayside Anchor residential entrance on Oxford Street. The mid-block crosswalk extends across the street where a new handicap ramp will be installed which provides direct access to two handicap parking spaces in a PHA parking lot.

Along Boyd Street the curb line has been extended out to accommodate a ramp that runs along the face of the building. The ramp is about 16 feet long (with railing) and 5 feet wide. The curb line tapers back to the normal curb line just past the northerly edge of the building. Along Boyd Street space limitations preclude an esplanade but 6 street trees are proposed. The sidewalk along Boyd is a minimum 6 feet wide but widens at the bumpout at the corner of Boyd and Oxford.

(3) Public Transit Access

Not applicable. Development is not located along an existing public transit route.

(4) Parking

As PHA is not proposing on-site parking for Bayside Anchor and is relying on existing campus parking resources, documentation of existing campus parking supply and demand is important. Tom Errico (Traffic Review Consultant) has reviewed this documentation and concurs with the projected demand that an adequate supply of off-street parking is being provided. See Attachment B. See G-P parking analysis on Attachment 13.

G-P has provided documentation that PHA's existing East Bayside campus has a parking demand of 0.56 spaces per dwelling unit. This was based on a May 4, 2014 Sunday night survey (9:00 PM to midnight) that found the highest demand of PHA parking lots was 91. With 157 spaces this translates into a surplus of 66 spaces.

As some PHA residents are likely to park on-street, G-P also surveyed the number parking spaces occupied by vehicles during the study period which was found to be 58 spaces. Adding these spaces to the 91 spaces results in parking ratio of 0.92 spaces per occupied housing unit.

G-P determined the number of unoccupied on and off-street parking spaces within certain distances of the Bayside Anchor site.

Unoccupied parking within 300 feet of the project:

- Parking lots:18
- On Street spaces: 73
- Total: 91

Unoccupied parking within 500 feet of the project:

- Parking lots: 58
- On Street spaces:130
- Total:188

G-P also reviewed occupancy counts for other peninsula projects including 53 Danforth St., 645 Congress St., Walker Terrace, Oak Street Lofts and Franklin Towers. The average parking demand for these projects was calculated by G-P at 0.48 spaces per unit.

Based on the above analysis, G-P is forecasting a parking demand of 0.75 spaces per dwelling unit for Bayside Anchor. Based upon Bayside Anchor's 45 units, this translates into a parking demand of 34 spaces.

Parking Supply is summarized below

Within 300 feet of the project: 118 spaces on street; 36 in PHA lots [total:154]

Within 500 feet of the project: 227 spaces on street; 109 in PHA lots [total:336]

Parking Demand is summarized below

Within 300 feet of the project: 123 spaces

Within 500 feet of the project: 208 spaces

Net Available Parking to Bayside Anchor: A comparison of parking demand and parking supply shows there is projected to be 31, and 128 spaces within 300 and 500 feet respectively upon completion of the project for the projected demand of 34 spaces. Most of these spaces are on-street.

(5) Transportation Demand Management

The submission includes a brief description of the elements of a proposed TDM plan

1. The PHA Property manager will coordinate the TDM plan.
2. PHA will adopt policies limiting each household to one parking permit per household.
3. Automobile Parking Reduction Strategies...38 bicycle parking spaces are proposed with 30 of these located within the building.

Mr. Errico is recommending that details of the plan should be modified such that initial post-occupancy monitoring study be conducted after 6 months, and annually thereafter. The trigger for TDM adjustments should not simply be based upon the parking generation threshold rate noted in the plan but specific issues identified in the post-study.

(b) Environmental Quality Standards

(1) Preservation of Significant Features

The site is located in an urban site previously disturbed. The site does not have any significant natural features as defined in this section of the site plan ordinance.

(2) Landscaping and Landscape Preservation

There are 6 mature trees on the site. Four of the trees will be removed while 2 others will be "removed and stockpiled for future use". It appears these two trees will be transplanted as street trees along Boyd Street. A tree across the street on Oxford Street where a crosswalk will be installed for handicap parking spaces is also slated to be removed and stockpiled for reuse.

Site Landscaping

Eleven street trees are proposed with 5 on Oxford Street and 6 on Boyd Street. Seven of the trees are Ginkos while the remainder are Eastern Redbuds. Six Serviceberry trees are proposed near the patio along with a Katsuratree.

The site plan indicates that the rain garden vegetation will be composed of 9 different types of plants.

Two Serviceberry and one Katsuratree are shown along the northerly property line.

A total of 21 trees will be planted on the site or along the street. The Technical Standards require 1 trees per multi-family dwelling unit or 45 trees for Bayside Anchor which calculates to a deficit of 24 trees. In this case, the normal street tree contribution fee would be \$200 per tree or \$4,800.

(3) Water Quality, Stormwater Management and Erosion Control

Stormwater Management

The proposed development will result in a net increase of 7,000 sf. in impervious area.

Quantity - Applicant proposes to disconnect an existing storm drain on the site that discharges into a combined sewer so that stormwater runoff will be by surface flow. Detention will be provided to temporarily store stormwater and release it slowly over time, thus keeping the post development discharge rates below the existing rates. Storage will be provided by a modular box underdrain system placed under the proposed patio.

Quality - Stormwater treatment is achieved by a rain garden installed adjacent to the patio area. Site plan indicates that a FocalPoint biofiltration system will be used which will treat at a minimum, the first inch of rainfall from the site's new impervious area.

Erosion and Sedimentation Control – An erosion and sedimentation control plan has been submitted (sheet C4).

David Senus, Development Review Engineer, has reviewed the plan and finds it acceptable (See Attachment C) with the following conditions.

On sheet L-1.0 the applicant proposes to demolish the existing storm drain pipe on the site up to a location within the site boundary, then cap and abandon the existing pipe to avoid excavating to the main in Boyd Street. The storm drain pipe should be demolished to the right-of-way line, and the remaining portion of the storm drain pipe in the street should be abandoned following the procedures outlined in Section 2.6.11 of the City's Technical Manual. These procedures should be identified on the plan.

On sheet C-2 the Typical Trench Detail should be modified to reflect the City's standard (Fig II-12 of the City's Technical Manual) for all pipe work within the right-of-way.

C. Public Infrastructure and Community Safety Standards

1. Consistency with City Master Plans

The proposal appears to be consistent with City master plans.

2. Public Safety and Fire Prevention

There is a fire hydrant on Boyd Street directly across from the site. The building has access from two streets.

One issue that arose up during the review was the relative width of Boyd Street (about 29 feet) and the presence of on-street parking on both sides of the street and its potential impact on Fire Department access during winter months when snow banks may lessen the net width of the roadway. To address this issue discussion focused on limiting on-street parking along the project frontage as well as prohibiting parking on the west side of Boyd Street between Cumberland Avenue and East Lancaster Street during winter months. Capt. Chris Pirone has reviewed the site plan and finds it acceptable with a limitation on on-street parking during winter months. Approval of a change in the parking regulations requires City Council approval. The applicant is being requested to provide supporting materials for these changes to the

Transportation, Sustainability and Energy Committee and City Council in support of this change.

3. Availability and Adequate Capacity of Public Utilities.

The site plan indicates power, water, gas and sewer are available utilities in either Oxford Street or Boyd Street. The latest submission from the applicant does not contain an ability to serve letter from these utilities. This information should be provided.

c. Site Design Standards

1. Massing, Ventilation and Wind Impact

There are no known health or safety issues associated with the bulk, location or height of the proposed building in reference to reducing ventilation to abutting structures or changes in wind climate. At its closest point the proposed building is in excess of 25 feet from the nearest residential dwelling.

The bulk, location or height appears to minimize any substantial diminution in the value or utility surrounding structures based on the proposed building setbacks, as well as the building design and project investment.

HVAC equipment venting mechanisms appear to be located on top of the roof well above the adjacent residential buildings which should mitigate any exhaust related issues.

2. Shadows

The submission states: The Bayside Anchor project is 46'-0" in building height, with an approximate length of 195'-0' in length on the winter solstice. There are no significant public resources within 195'-0" of the project site as defined in the City of Portland Technical Manual, Section 11.3, therefore no significant shadow impacts are anticipated and no further shadow study is required.

3. Snow and Ice Loading

Given that the roof is flat there does not appear to be any unique snow or ice loading issues associated with this project.

4. View Corridors

The site will not obstruct public views identified in the Downtown Vision Corridor Protection Plan.

5. *Historic Resources*

The site is not located on nor is it adjacent to a designated landmark, historic district or historic landscape district.

There are no known historic archeological resources believed to be on the site.

6. *Exterior Lighting*

Wall mounted fixtures are shown along the retaining walls that frames the plaza. The plan references the light fixtures as Beta Cal Lighting (Confine – 15” – 24 degree; In Wall LED – 12” AFG. A catalog cut of the fixture should be provided. The photometric values are acceptable.

Applicant is proposing 4 street light fixtures within the street right-of-way. The fixtures are described as Kim lighting fixtures (Bounce series) mounted on 14 foot high poles. See Attachment 15. These are not listed as acceptable street light fixtures in the City's Technical standards. While the light fixtures represent an interesting aesthetic quality, proposing a non-standard street light raises a host of City policy issues including design, maintenance and on-going cost concerns. There is currently only one street light in the vicinity of the site at the corner of Boyd and East Oxford.

The applicant's goal is to improve lighting around the sidewalk area of the project which could be accomplished with lights mounted on a street pole or possibly mounted on the building. The proposed street light fixture is not acceptable. Therefore lighting should be a condition of approval reflecting submission of an acceptable street light or an acceptable lighting fixture on the applicant's property.

Noise and Vibration

HVAC equipment must meet federal and state requirements. The plan seems to indicate that mechanical equipment will have a screen on top of the roof.

7. *Signage and Wayfinding*

A specific signage plan should be submitted although signage would appear to be limited. A concept signage plan appeared in the initial submission but the final submission did not include a complete plan.

8. *Zoning Related Design Standards*

Residential Developments: Shall integrate with and respect the character of surrounding residential development in terms of architectural form, landscaping and open space, façade materials, roof pitch, massing and height as demonstrated by compliance with all applicable design standards as listed in the design manual

Technical Design Standards for Multi-Family Developments:

i. The exterior design of the proposed structures including architectural style, façade materials, roof pitch, building form and height, window pattern and spacing, porches and entryways, cornerboard and trim details, façade variation in projecting or recessed building elements, shall be designed to complement and enhance the nearest neighborhood. The design of exterior facades shall provide positive visual interest by incorporating appropriate architectural elements.

The composition of the façade compliments and enhances the neighborhood and provides positive visual interest. The first floor is clearly differentiated from the upper three floors through color and material which emphasizes a pedestrian scale environment. The entry ways further emphasize this pedestrian scale with integrated canopies.

The mass of the four story building is softened by the use of varying exterior materials and colors along the façade which helps break up the perceived size of the building. The façade also has window “projections” along the façade suggesting bay windows which also creates scale and visual interest to the façade. The number of windows along the façade are numerous and well balanced with a pattern that also creates visual interest.

ii. The proposed development shall respect the existing relationship of buildings to public streets. New development shall be integrated with the existing city fabric and streetscape including building placement, landscaping, lawn areas, porch and entrance areas, fencing and other streetscape elements

The development is integrated with the existing city fabric and streetscape by placing the building close to the street line, planting street trees along the street frontage, planting an esplanade along Oxford Street, providing a defined entry way into the building with a first floor façade treatment that differentiates itself from the taller portions of the building and a building a terrace area for residents that is visually linked to the Boyd Street sidewalk.

iii. Open Space designed to complement and enhance the building form and development proposed on the site.

Open space has been created on the site to complement the building form and development on the site. Using the L-shaped configuration of the building, a patio for residents has been provided as well as a play area for Head Start. The patio area incorporates an extended seating wall and a picnic area for residents. Directly adjacent to the patio area is an extended lawn area of about 6,000 sf.

iv. The design of dwellings provides ample windows to enhance opportunities for sunlight and air and shall also provide sufficient storage areas.

A review of the building façade indicates the windows are ample in number and size to enhance opportunities for sunlight and air. A review of the interior floor plans indicates a bicycle storage room has been provided on the first floor.

v. Scale and surface of parking, driveways and paved areas are arranged and landscaped to properly screen vehicles from adjacent properties and streets.

There are no driveways, parking spaces or paved areas on the site.

B. SUBDIVISION ORDINANCE REVIEW

1. *Water or air pollution*

There are no known water or air pollution issues associated with this project. The development is served by a public sewer.

2./3. *Water availability/water supply*

The development will be served by an existing Portland Water District water main in East Oxford Street. A letter confirming ability to serve should be submitted.

4. *Soil Erosion*

A soil erosion plan has been submitted. See C4.

5. *Highway or public road congestion*

See site plan review (traffic section) of this report.

6. *Sanitary waste and stormwater*

The development will be served by an existing sewer line in Boyd Street. A sewer capacity letter should be submitted.

Stormwater information is provided in site plan review (stormwater section) of this report.

7. *Solid waste and sewage*

Solid waste will be collected and disposed on a regular basis by a private hauler according to the submission. There is a dedicated trash room on the first floor that will accommodate all residential waste.

Sanitary waste will be accommodated by a sewer main in Boyd Street.

8. *Scenic, natural beauty, aesthetics, historic sites, wildlife habitat*

The project is located on a previously disturbed urban site with none of the natural features listed in this standard.

9. Land development plan

The proposed development is consistent with the City's land development (comprehensive) plan in numerous ways in particular Housing: Sustaining Portland's Future an element of the City's Comprehensive Plan. Key policies met by this project include dense housing in infill or service areas, support affordable housing, encouraging mixed use developments and encouraging the Portland Housing Authority to develop housing.

10. Financial and technical capacity

The General Partner for the proposed Bayside Anchor Project is Bayside Anchor Development Company, LLC., a special purpose limited partnership created to take advantage of the Low Income Housing Tax Credit Program. The Developer and Guarantor of the project is the Portland Housing Development Corporation, a Maine non-profit corporation controlled by the Portland Housing Authority. The PHDC will act as developer of the project and will be responsible for the successful completion of the project and will provide financial guarantees to both the construction lender and the investor limited partner.

The primary source of the \$5,300,000 capital needed for the project will come from equity raised by selling tax credits. The remaining funds will come from a combination of subsidy sources including the Northern New England Housing Investment Fund and other financial investors. A letter of financial interest from Bangor Savings Bank has been provided.

The technical capacity to undertake the project is represented by the Bayside Anchor Development Company LLC (owner/developer); Avesta Housing (development partner and consultant); Kaplan Thompson (architects); Carroll Associates (Landscape Architects); and Wright Ryan (construction manager).

11. Pond, lake, wetland, river

Not applicable. The site is not located in proximity to the water bodies covered by this standard.

12. Groundwater quantity and quality

Not applicable. The site is served by public water.

13. Flood Prone Area

Not applicable. The site is not located in a flood prone or flood hazard area. The first floor elevation of the building at Boyd Street is 22 feet while the flood elevation in Back Cove is 10 feet

14. *Wetlands*

Not applicable. There are no wetlands on the site.

15. *River, stream, brook*

Not applicable. There is no river, stream or brook on the site.

V. MOTIONS FOR THE BOARD TO CONSIDER

Waiver

The Planning Board **(finds/does not find)** that the applicant has demonstrated all of the required street trees cannot be planted along the street or site and the Board **(finds/does not find)** undue hardship may result from strict compliance with these regulations and that the public interest is secured with the variation. The Planning Board **(waives/does not waive)** Section 14-526 (b)(2)(b)(iii) Street Trees of the Site Plan Ordinance and the applicant shall contribute \$4,800 to Portland's Tree Fund as the proportionate cost of the 24 trees.

Site Plan

On the basis of the application, plans, reports and other information submitted by the applicant, findings and recommendations contained in the Planning Board Report for application #2014-079 relevant to the Site Plan Ordinance and other regulations, and the testimony presented at the Planning Board hearing, the Planning Board finds that the plan **(is/is not)** in conformance with site plan standards of the land use code, subject to the following conditions of approval.

1. That the applicant shall submit letters from Portland Water District (water), Central Maine Power (electricity) and City of Portland (sanitary waste) regarding their ability to serve the project.
2. That a revised lighting plan addressing the lights within the right-of-way shall be submitted for City staff review and approval.
3. That the plan and supporting material shall be revised addressing the written comments of Tom Errico (Traffic Review Consultant) dated July 17, 2014 for review and approval.
4. That the plan shall be revised addressing the written comments of David Senus (Development Review Engineer) dated July 16, 2014 for review and approval.
5. That the applicant shall address the written comments of David Margolis-Pineo (Deputy City Engineer) dated July 16, 2014.

6. That the applicant prepare material for submission to the Transportation Sustainability and Energy Committee and City Council supporting a modification to the parking schedule for Boyd Street and East Oxford Street along the applicant's property frontage as well as modifications requested by the Fire Department along Boyd Street to enhance winter vehicle access.
7. That the applicant shall submit requested easement and or license agreements within the City rights-of-way for review City Council and approval.
8. A copy of the PHDC /Bayside Anchor Development Company LLC agreement with Portland Housing Authority for the long term use of parking spaces for the Bayside Anchor development and the shared use paths shall be submitted to Corporation Counsel for review and approval.
9. That the site plan shall be revised eliminating the concrete pavers shown within the Boyd Street esplanade and replaced with brick or grass for City staff review and approval.

Subdivision

On the basis of the application, plans, reports and other information submitted by the applicant, findings and recommendations contained in the Planning Board Report for application #2014-079 relevant to the Site Plan Ordinance and other regulations, and the testimony presented at the Planning Board hearing, the Planning Board finds that the plan **(is/is not)** in conformance with site plan standards of the land use code, subject to the following conditions of approval

1. That the applicant shall submit requested easement and or license agreements within the City rights-of-way for City Council review and approval.
2. That a revised subdivision recording plat shall be submitted for Planning Staff review and approval reflecting all property easements.

Attachments:

Staff Attachments:

- A. Enacted R-7 Zoning Map
- B. Tom Errico (Traffic Review Consultant) Memo dated July 17, 2014
- C. David Senus (Development Review Consultant) dated July 16, 2014
- D. David Margolis-Pineo (Deputy City Engineer) dated July 16, 2014

Applicant Submissions

Submission Dated July 1, 2014

1. Cover Letter
2. Development Review Application
3. Neighborhood Meeting Certification
4. Project Description
5. Response to Staff Comments
6. Right, Title and Interest
7. Response to Zoning Requirements
8. Summary of Easements
9. Solid Waste
10. Request for Waivers
11. Financial and Technical Capability
12. Stormwater Management
13. Traffic and Parking Analysis

Submission Receive July 18, 2014

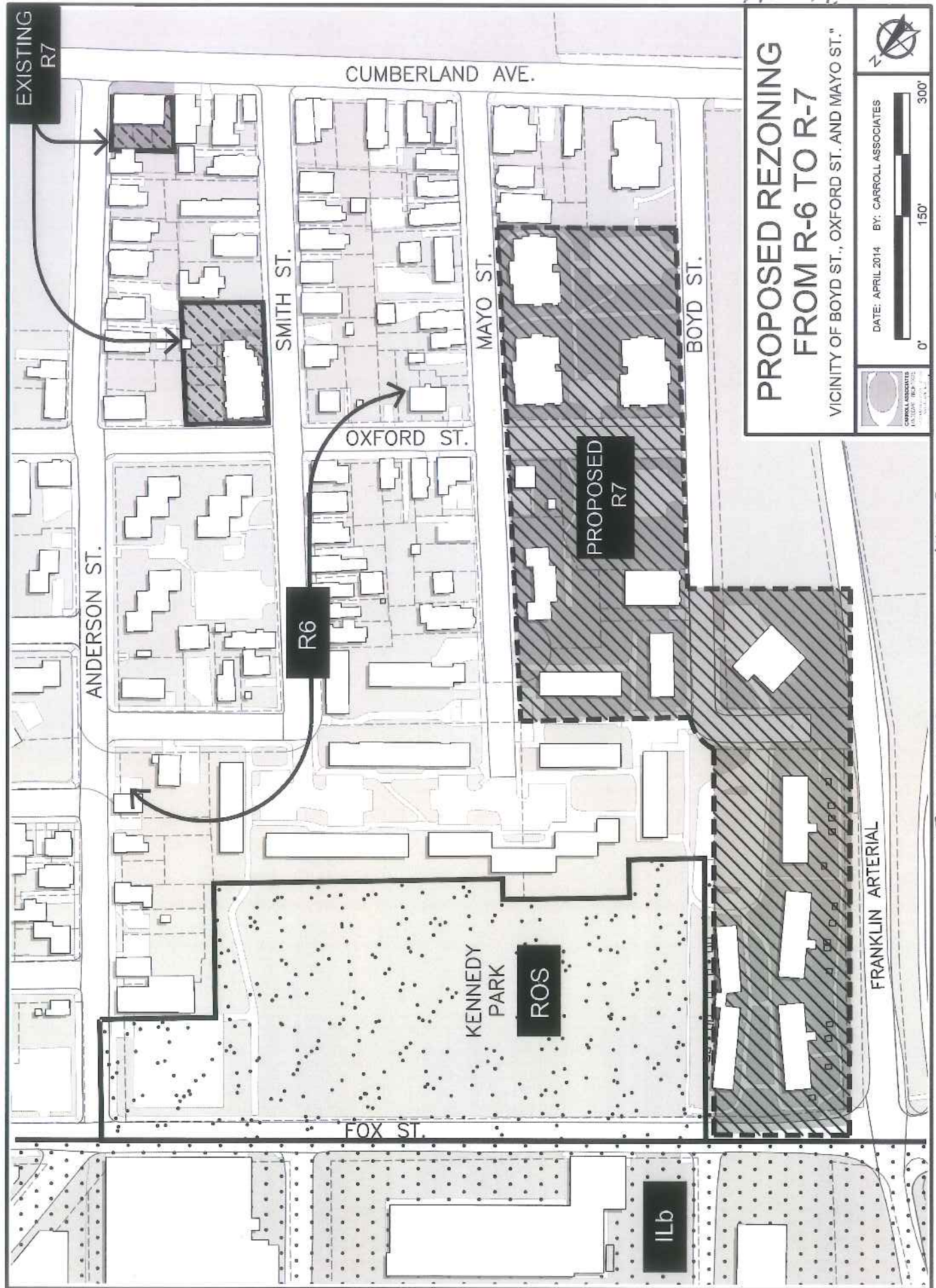
14. Response to Staff Comments
15. Lighting Fixture Info
16. Neighborhood Meeting Minutes
17. Terrace Pavers

Submission Received June 5, 2014

18. Response to Staff Comments
19. Hardie Panel Siding Info

P. Site Plan, Subdivision and other Drawings Dated July 1, 2014

ATT A



ENACTED ZONING MAP

ATT B

Rick Knowland - Bayside Anchor - Final Traffic Comments

From: Tom Errico <thomas.errico@tylin.com>
To: Rick Knowland <RWK@portlandmaine.gov>
Date: 7/17/2014 9:39 AM
Subject: Bayside Anchor - Final Traffic Comments
CC: Katherine Earley <KAS@portlandmaine.gov>, "Margolis-Pineo, David" <DMP@p...>

Rick – The following represents my final comments as a status update of my June 5, 2014 Preliminary Comments.

- The project is expected to generate 24 vehicles during the AM peak hour and 29 vehicles during the PM peak hour. This level of traffic does not trigger the requirement for a MaineDOT Traffic Movement Permit.

Status: No further comment required.

- I continue to review the parking analysis for the project but note the following:
 - During a field review of the site during a weekday morning, a significant number of vehicles were parked in the immediate area of the proposed site. Cars were parked on both sides of Boyd Street and there were no on-street parking spaces available. I would further note that the travel lane was very narrow in this area and is a cause for concern and review.

Status: See response below. I have no further comment.

- It has been the City's general policy not to include on-street parking spaces in the determination of parking supply adequacy for a proposed project. I would suggest that the project determine parking supply adequacy from using off-street parking lots only (I would note that based upon the applicants data, it appears adequate off-street parking can be provided).

Status: The applicant has provided a parking demand calculation for the entire PHA Campus and has determined that overall there will be an adequate off-street parking supply for the future build-out condition. I concur with this conclusion and therefore I have no further comment.

- The applicant should provide information on how the PHA parking lots will be managed. Specific details should be provided.

Status: The applicant has submitted a TDM plan and I generally find it to be acceptable. I would suggest that the details of the plan should be modified such that the initial post-occupancy monitoring study be conducted after 6 months, and annually thereafter. I would also suggest that the trigger for TDM Plan adjustments should not simply be based upon the parking generation threshold rate noted in the Plan but specific issues that are identified in the post-study.

- It is my understanding that the proposed crosswalks on Boyd Street and Oxford Street have been reviewed by the City's Crosswalk Committee. I will provide specific comments on the crosswalks in the future.

Status: The applicant has revised the project plans per comments from the City's Crosswalk Committee. I have no further comment.

- It should be noted that recommendations from the Franklin Street Study may include some type of transportation connection from Oxford Street to Franklin Street. I need to review this possibility and

whether it impacts the proposed site plan.

Status: The plans do not appear to conflict with any potential Oxford Street connection to Franklin Street. I have no further comment.

- Changes to on-street parking regulations may require an amendment to the City's Traffic Schedule and thus action by the City Council. If required, the applicant will be requested to provide information in support of the Council packet.

Status: The applicant will be responsible for providing supporting materials to the TS&E Committee and the City Council for the on-street parking regulation changes on both Boyd Street and Oxford Street. Specifically, the on-street parking changes will include the parking spaces immediately along the property frontage as well as prohibiting parking on the west side of Boyd Street between Cumberland Avenue and East Lancaster Street during winter months (as requested by the Fire Department).

- The project appears to use existing handicapped parking spaces across Oxford Street. The applicant should provide information that the parking spaces dimensionally meet ADA standards. During my field review, one of the spaces was occupied, so the applicant should provide information on the use of these spaces for both the existing and proposed sites.

Status: The applicant has revised the plans to include additional handicapped parking spaces across Oxford Street. The applicant should confirm that the space dimensions meet ADA standards and provide information on the non-handicapped space in terms of use and whether it meets City parking space dimension standards.

- The applicant should provide information on how Head Start Pick-up and Drop-off activities will be managed.

Status: The applicant has provided sufficient information and the proposed on-street parking regulations include short-term 15-minute parking spaces, which I find acceptable. I have no further comment.

- The applicant should provide details on where Police Station vehicles will park (if required).

Status: An on-street parking space on Oxford Street is noted on the site plan and I have no further comment.

New Comments

- The applicant has submitted a Construction Management Plan and my comments are noted below. A revised construction management plan shall be submitted and approved prior to the issuance of any City permits.
 - Sidewalk detours need to be adjusted. It would be my suggestion that the detour for the closed Oxford Street sidewalk would occur at Mayo Street. It is unclear how pedestrians will be routed for the closed Boyd Street sidewalk. All detours will need to be ADA compliant.
 - Additional detail will be required as it related to street occupancy and specific traffic control details.
- On-street parking signage along the property frontage shall be installed as part of the project.

If you have any questions, please contact me.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director



MEMORANDUM

TO: Rick Knowland, Planner
FROM: David Senus, P.E.
DATE: July 16, 2014
RE: 81 East Oxford Street, Final Level III Site Plan Application

Woodard & Curran has reviewed the Final Level III Site Plan Application for the proposed Bayside Anchor Project located at 81 East Oxford Street in Portland, Maine. The project consists of constructing 45 rental apartments and outdoor community terrace, relocating existing accessory community facilities to the new building, re-establishing the street edge, and improvements to the Oxford and Boyd Street sidewalks.

Documents Reviewed by W&C

- Level III Final Site Plan Application and attachments, dated July 1, 2014, prepared by Carroll Associates on behalf of Bayside Anchor Development Company, LLC.
- Engineering Plans and Landscaping Plans, Sheets C1 through C6, L-1.0, L-2.0, L-3.0, L-4.0, L-5.0, L-5.1, L-5.2, dated July 1, 2014, prepared by Ransom Consulting and Carroll Associates on behalf of Bayside Anchor Development Company, LLC.

Comments

- 1) In accordance with Section 5 of the City of Portland Technical Manual, a Level III Site Plan project is required to submit a stormwater management plan pursuant to the regulations of MaineDEP Chapter 500 Stormwater Management Rules, including conformance with the Basic, General, and Flooding Standards. We offer the following comments:
 - a) Basic Standards: The Applicant has provided plans, notes, and details to address erosion and sediment control requirements, inspection and maintenance requirements, and good housekeeping practices in general accordance with Appendix A, B, & C of MaineDEP Chapter 500.
 - b) General Standards: The project will result in a net increase in impervious area of approximately 6,235 square feet. As such, the project is required to include stormwater management features for stormwater quality control. The Applicant is proposing to treat runoff from the site's new impervious area utilizing the FocalPoint bio-filtration system. The Applicant has provided adequate information and calculations to demonstrate that the proposed treatment unit is adequately sized and will provide sufficient treatment in accordance with the General Standards.
 - c) Flooding Standard: The project will result in a net increase in impervious area of approximately 6,235 square feet. The Applicant is proposing to provide detention via an R-Tank system. The Applicant has provided sufficient information to demonstrate that the project meets the Flooding Standard.
- 2) Sheet L-1.0 – The Applicant proposes to demolish the existing storm drain pipe on the site up to a location within the site boundary, then cap and abandon the existing pipe to avoid excavating to the main in Boyd Street. The storm drain pipe should be demolished to the right-of-way line, and the remaining portion of the storm drain pipe in the street should be abandoned following the procedures outlined in Section 2.6.11 of the City's Technical Manual. These procedures should be identified on the plan.
- 3) Sheet C-2 – The Typical Trench Detail should be modified to reflect the City's standard (Fig II-12 of the City's Technical Manual) for all pipe work within the right-of-way.

ATTN

Rick Knowland - Final Review comments for Bayside Anchor

From: David Margolis-Pineo
To: Rick Knowland
Date: 7/16/2014 3:20 PM
Subject: Final Review comments for Bayside Anchor
CC: Barbara Barhydt; William Clark

Rick,

Sorry for the late response.

June 12, 2014

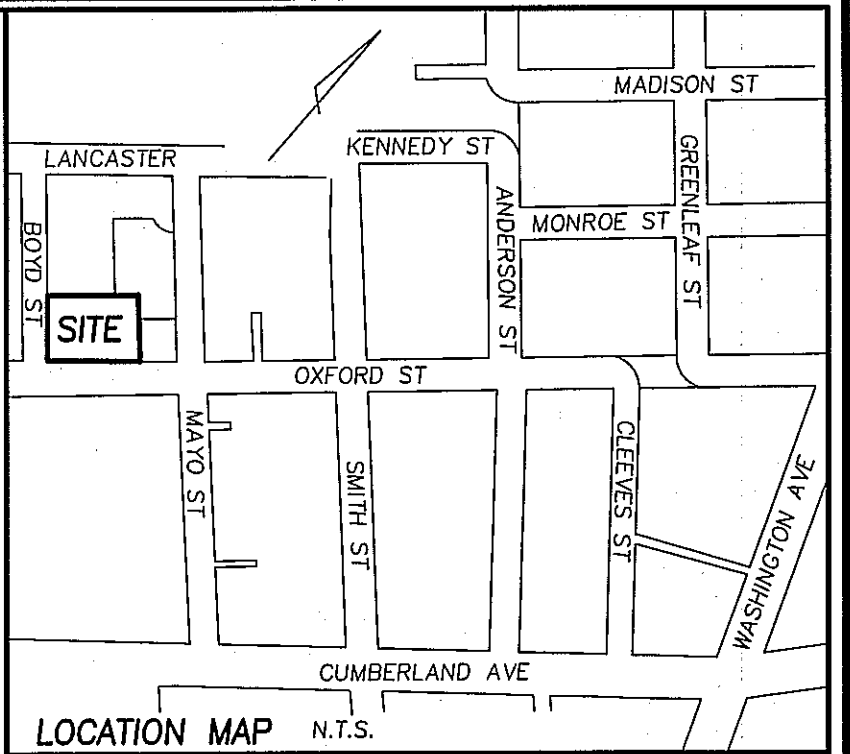
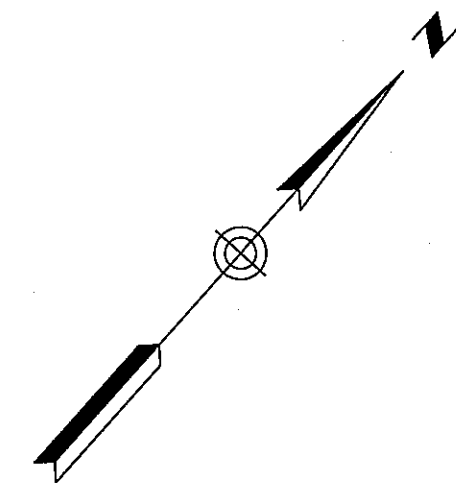
July 16, 2014

Memo To: Barbara Barhydt
Rick Knowland
From: David Margolis-Pineo
Public Services Staff
Re: Bayside Anchor – 81 East Oxford Street

The Department of Public Service has the following comments.

1. Survey plan fails to meet the submission requirement and is unacceptable. Please review requirements and resubmit.
Survey plan now complete. Question still remains if an access easement should be placed to cover the walkway to the abutting property.
2. There are several proposed encroachments into the road right of way which will require either easements or licenses.
Issued addressed.
3. Proposed street parking will need to be reviewed. Since Boyd St is approximately 29.5' wide and Oxford is approximately 27.5' wide, access for emergency vehicles may be an issue.
No response required. Issue will be addressed by others.
4. With the loss of 26 parking spaces and the need of 30 additional spaces, campus parking needs will be evaluated.
No response required. Issue will be addressed by others.
5. **Please be aware that a permanent easement will be required if the proposed building's footing extends into the road right of way.**

We have no further comments at this time.



LEGEND

- IRON PIPE OR ROD FOUND
- MONUMENT FOUND
- WATER VALVE
- HYDRANT
- UTILITY POLE
- MANHOLE
- MANHOLE
- SIGN
- DECIDUOUS TREE
- FENCE
- CURB
- OVERHEAD WIRES

PLAN REFERENCES

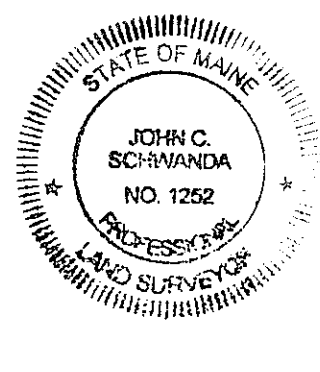
- "PLAN OF PROPERTY, TOPOGRAPHY & UTILITIES PORTLAND HOUSING AUTHORITY, PORTLAND, CUMBERLAND COUNTY, MAINE H.I. & E.C. JORDAN - SURVEYORS JULY 1968"
- "STANDARD BOUNDARY SURVEY FOR HABITAT FOR HUMANITY OF GREATER PORTLAND IN PORTLAND, MAINE APRIL 10, 1992 OWEN HASKELL, INC. JOB NO. 92052P"

NOTES

- OWNER OF RECORD: PORTLAND HOUSING AUTHORITY, 14 BAXTER BOULEVARD, PORTLAND, MAINE BOOK 3129/374, 3127/900, 3111/722, 3111/725, AND 13150/152.
- LOCUS IS SHOWN AS PORTLAND PROPERTY MAP 22 BLOCK 1 LOT 4 AND A PORTION OF LOT 1.
- BEARINGS ARE BASED ON MAINE STATE PLANE WEST NAD 83.
- BENCH MARK: MONUMENT T102-77-1 AT NORTHWEST CORNER OF ANDERSON STREET AND EAST LANCASTER STREET, ELEVATION 19.57 CITY DATUM.
- STREET LINES ARE BASED ON MONUMENTS FOUND ON OXFORD STREET AND HELD AS SHOWN AND PLAN REFERENCE 1.
- SURVEY WAS PERFORMED UNDER WINTER CONDITIONS.

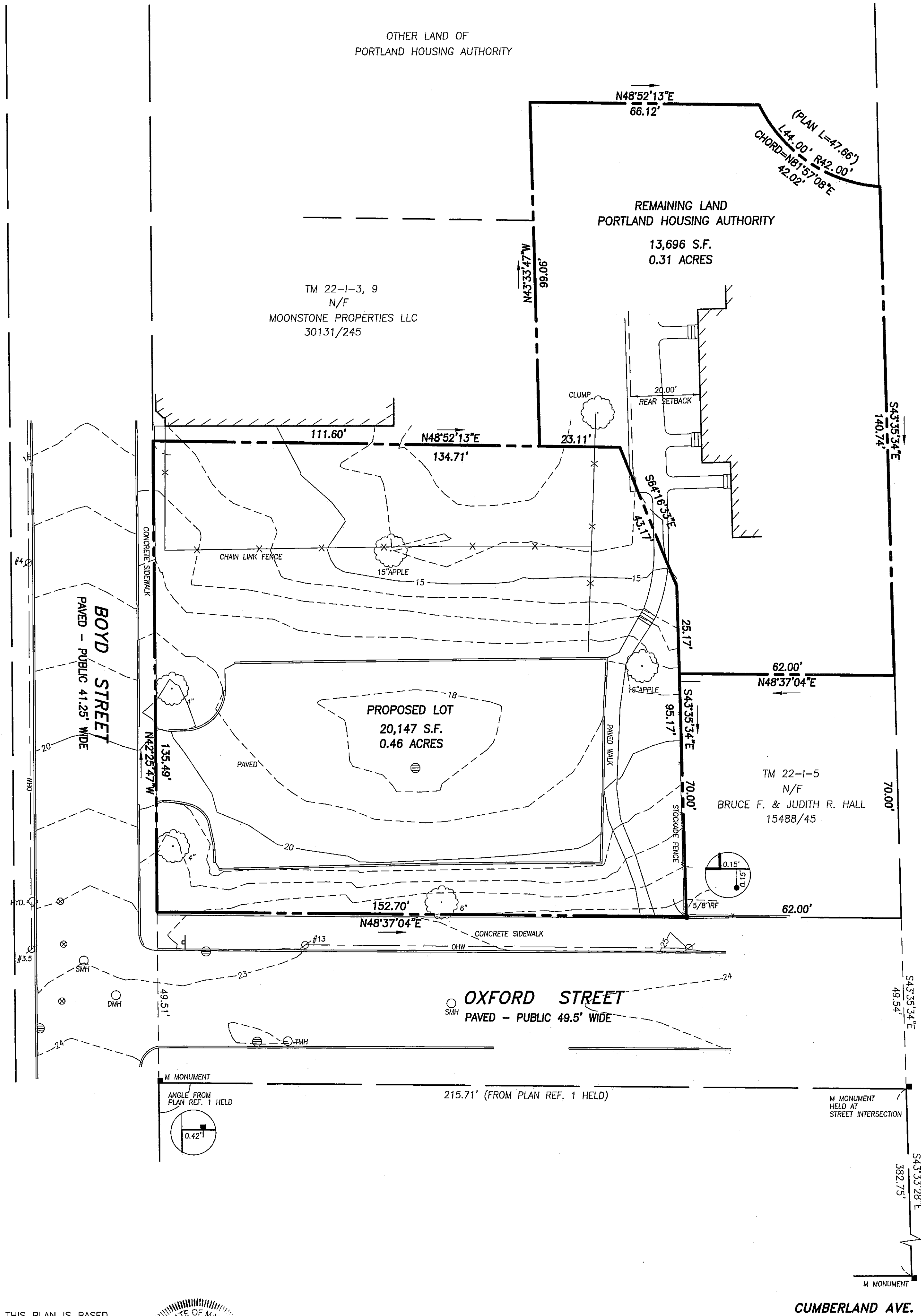
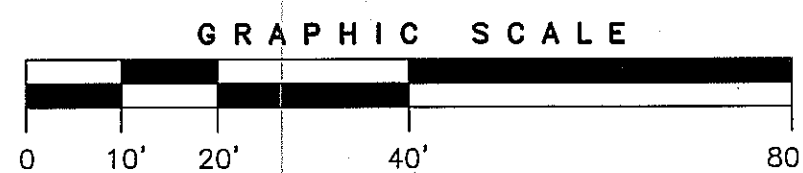
CERTIFICATE

OWEN HASKELL, INC. HEREBY CERTIFIES THAT THIS PLAN IS BASED ON, AND THE RESULT OF, AN ON THE GROUND FIELD SURVEY AND THAT TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, IT CONFORMS TO THE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CURRENT STANDARDS OF PRACTICE.

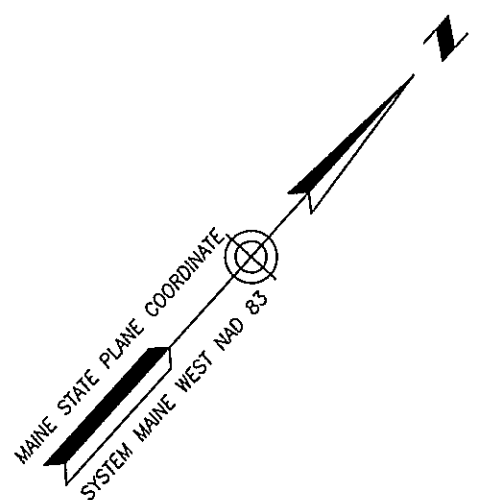


5-7-2013
DATE

JOHN C. SCHWANDA, PLS 1252



BOUNDARY SURVEY AND LOT DIVISION OXFORD STREET & BOYD STREET, PORTLAND, MAINE MADE FOR PORTLAND HOUSING AUTHORITY		
OWEN HASKELL, INC. 390 U.S. ROUTE ONE, FALMOUTH, ME 04105 (207) 774-0424 PROFESSIONAL LAND SURVEYORS		
Drwn By JCS	Date MAY 7, 2013	Job No. 2012-199P
Trace By JLW	Scale 1" = 20'	Drwg. No. 1
Check By JCS		
Book No. 1115,1116		



ZONING:

R-7 ZONE - COMPACT URBAN RESIDENTIAL OVERLAY

MINIMUM LOT SIZE: NONE
MINIMUM FRONTAGE: NONE
FRONT SETBACK: NONE
SIDE SETBACK: 5 FT.
REAR SETBACK: 5 FT.
MAXIMUM LOT COVERAGE: 100%
MAXIMUM BUILDING HEIGHT: 50 FT.

FLOOD ZONE NOTE:

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE C OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 230051 0013 B, WHICH BEARS AN EFFECTIVE DATE OF JULY 17, 1986 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

PLAN REFERENCES

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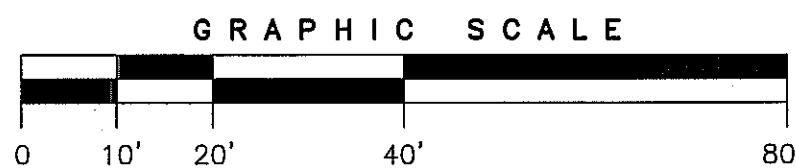
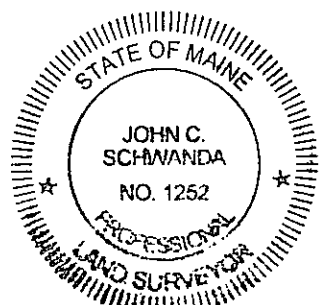
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- SURVEY WAS PERFORMED UNDER WINTER CONDITIONS.

UTILITY NOTE:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEY FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. CALL 1-800-DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

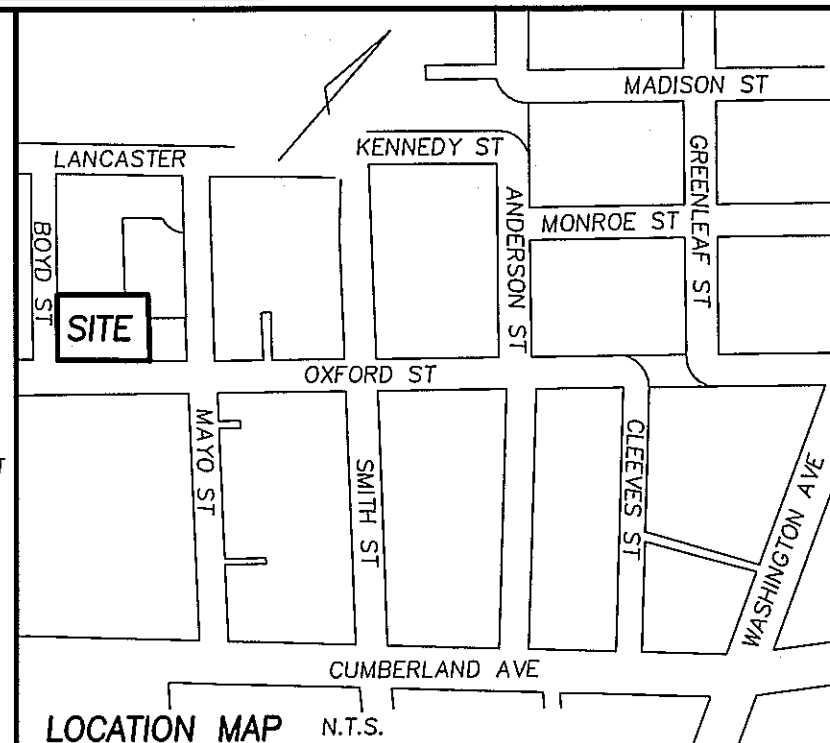
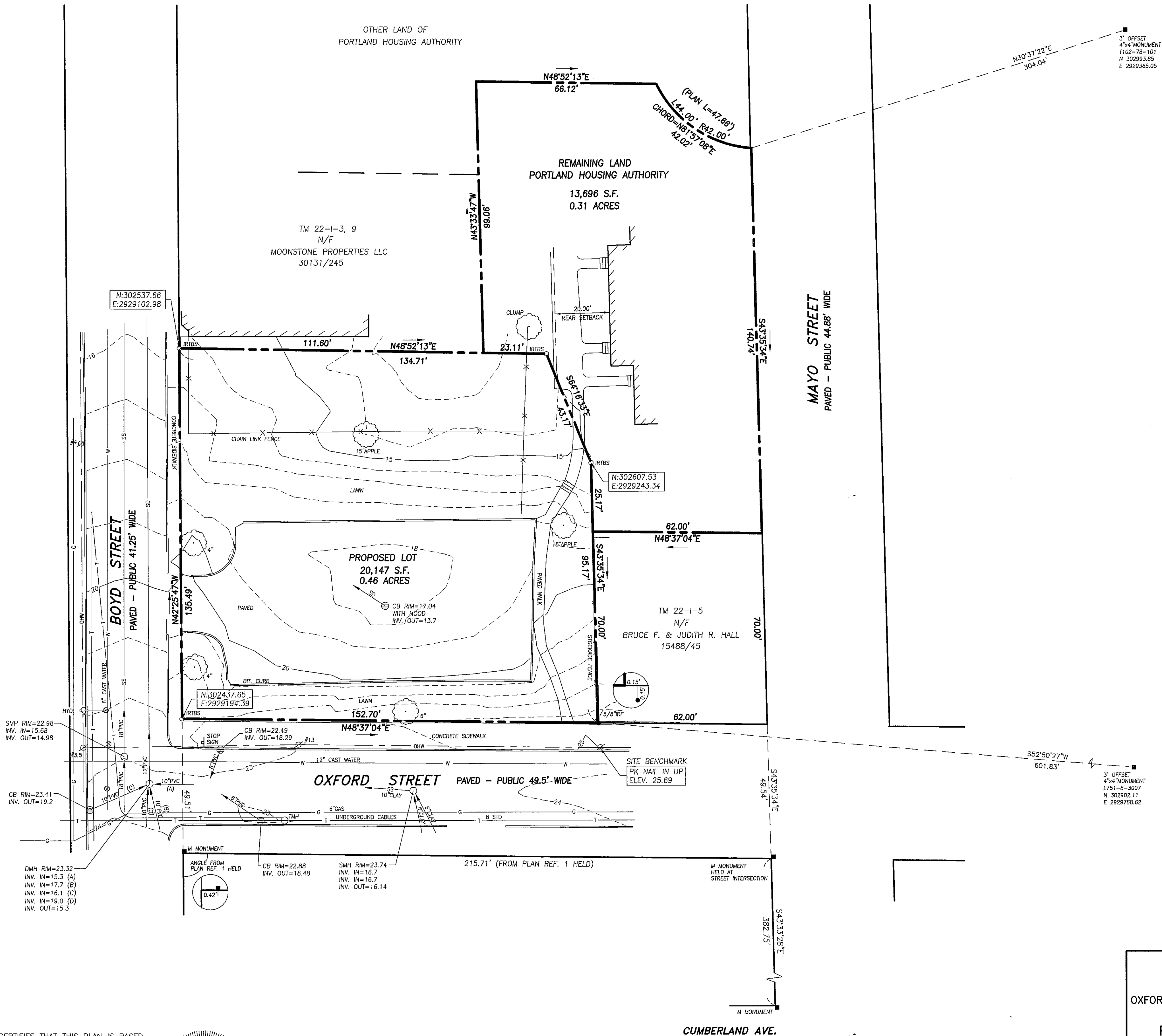
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DATE 6-30-2014

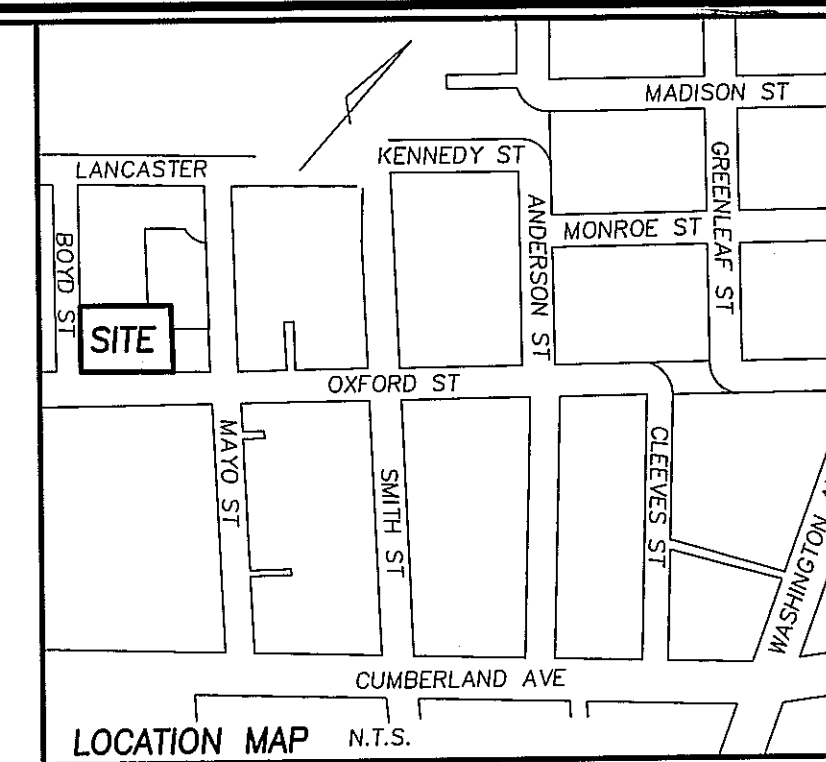
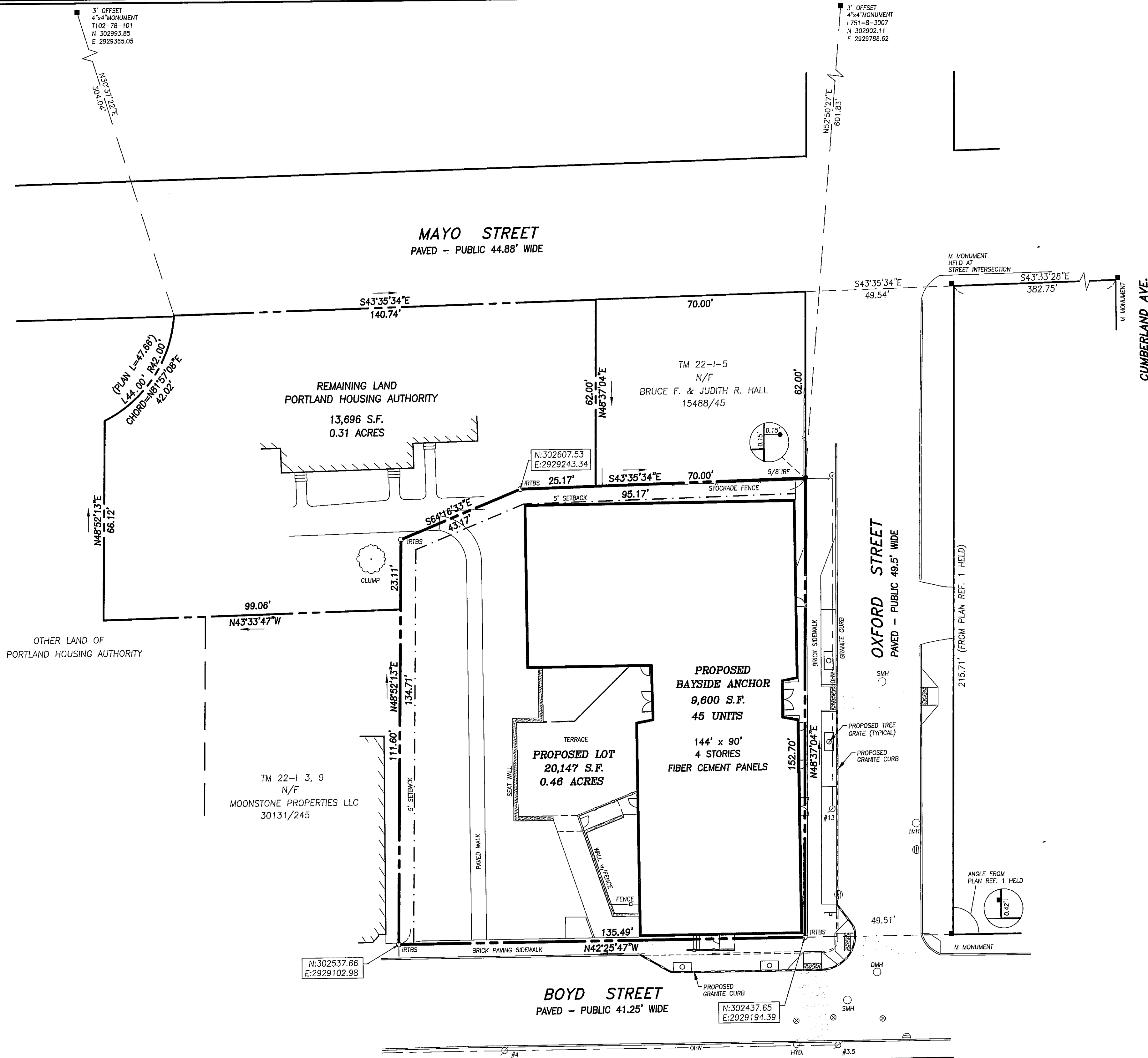
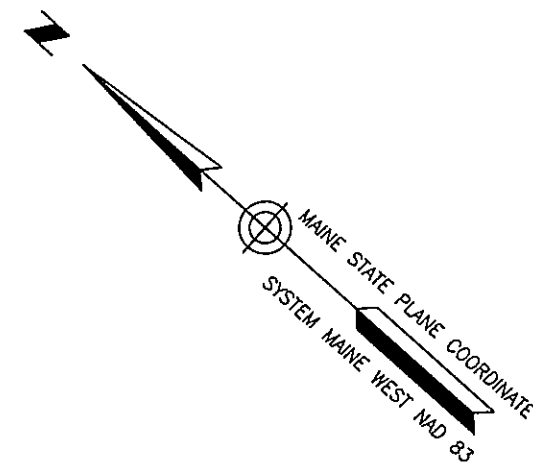
JOHN C. SCHWANDA, PLS 1252



LEGEND

- 5/8" IRON ROD TO BE SET
- IRON PIPE OR ROD FOUND
- MONUMENT FOUND
- WATER VALVE
- HYDRANT
- UTILITY POLE
- MANHOLE
- MANHOLE
- SIGN
- DECIDUOUS TREE
- FENCE
- CURB
- OVERHEAD WIRES
- SANITARY SEWER
- STORM DRAIN
- WATER LINE
- GAS LINE
- TELEPHONE LINE

BOUNDARY SURVEY AND LOT DIVISION		
OXFORD STREET & BOYD STREET, PORTLAND, MAINE		
MADE FOR PORTLAND HOUSING AUTHORITY		
OWEN HASKELL, INC.		
390 U.S. ROUTE ONE, FALMOUTH, ME 04105 (207) 774-0424		
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Drwn By JCS	Date MAY 7, 2013	Job No. 2012-199P
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 - FENCE
 - CURB
 - OVERHEAD WIRES

APPROVED BY THE
CITY OF PORTLAND PLANNING BOARD

DATE

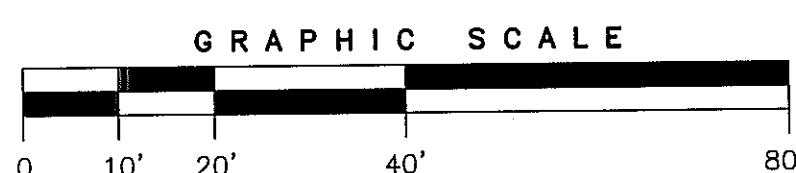
ZONING:

R-7 ZONE - COMPACT URBAN RESIDENTIAL OVERLAY

MINIMUM LOT SIZE: NONE
MINIMUM FRONTAGE: NONE
FRONT SETBACK: NONE
SIDE SETBACK: 5 FT.
REAR SETBACK: 5 FT.
MAXIMUM LOT COVERAGE: 100%
MAXIMUM BUILDING HEIGHT: 50 FT.

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- "BOUNDARY SURVEY AND LOT DIVISION, OXFORD STREET & BOYD STREET, PORTLAND, MAINE MADE FOR PORTLAND HOUSING AUTHORITY" MAY 7, 2013 BY OWEN HASKELL, INC.
- "SUBDIVISION PLAN, BAYSIDE ANCHOR, PORTLAND HOUSING DEVELOPMENT CORPORATION" MAY 12, 2014 BY CARROLL ASSOCIATES.

NOTES

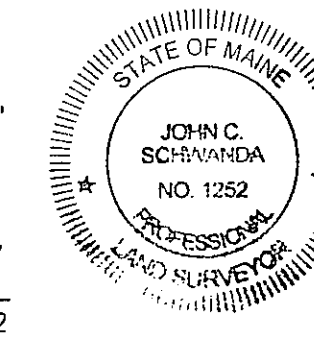
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- PROPOSED IMPROVEMENTS TAKEN FROM PLAN REFERENCE 4.

CERTIFICATE

OWEN HASKELL, INC. HEREBY CERTIFIES THAT THIS PLAN IS BASED ON, AND THE RESULT OF, AN ON THE GROUND FIELD SURVEY AND THAT TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, IT CONFORMS TO THE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CURRENT STANDARDS OF PRACTICE.

DATE 6-30-2014

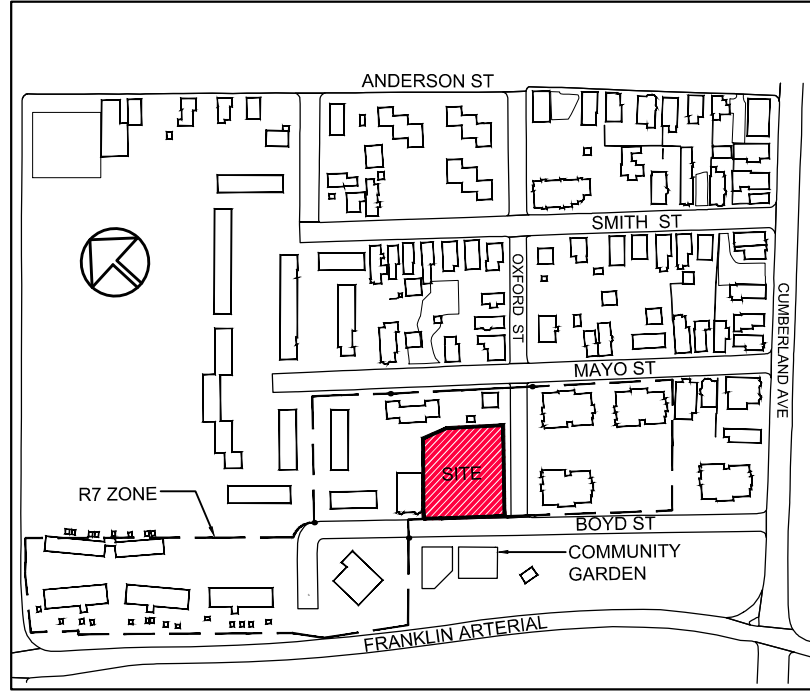
John C. Schwanda
JOHN C. SCHWANDA, PLS 1252



RECORDING PLAT
ON
OXFORD STREET & BOYD STREET, PORTLAND, MAINE
MADE FOR OWNER OF RECORD
PORTLAND HOUSING AUTHORITY
14 BAXTER BOULEVARD, PORTLAND, MAINE

OWEN HASKELL, INC.
390 U.S. ROUTE ONE, FALMOUTH, ME 04105 (207) 774-0424
PROFESSIONAL LAND SURVEYORS

Drawn By	Date	Job No.
JCS	JUNE 30, 2014	2012-199P
Trace By	Scale	Drwg. No.
JLW	1" = 20'	1RP
Check By		
JCS		
Book No.	1115,1116	



LOCUS
N.T.S.

LEGEND
(EXISTING)

- IRON PIPE OR ROD FOUND
- MONUMENT FOUND
- ⊗ WATER VALVE
- ⊕ HYDRANT
- UTILITY POLE
- MANHOLE
- MANHOLE
- ⊥ SIGN
- ⊙ DECIDUOUS TREE
- × FENCE
- CURB
- OHW
- OVERHEAD WIRES
- EXISTING CONTOURS

(DEMO / SITE PREP)

- × TO BE REMOVED
- ~ CURB TO BE REMOVED
- ⊗ BIT. CONC. PAVING TO BE REMOVED
- ⊗ CONC. PAVING TO BE REMOVED
- ⊗ STEPS TO BE REMOVED
- ⊗ TREE TO BE REMOVED AND STOCKPILED FOR REUSE

CHAIN LINK FENCE TO BE REMOVED

TREE TO BE REMOVED AND STOCKPILED FOR REUSE

UTILITY POLE MOUNTED LIGHT TO BE REMOVED (ONLY REMOVE LIGHT DIRECTED TOWARDS PARKING LOT, LIGHT DIRECTED TOWARDS COMMUNITY GARDEN SHALL REMAIN)

KAPLAN THOMPSON
ARCHITECTS
424 fore st., portland, me 04101
207-842-2888 fax: 842-2828
JESSE@KAPLANTHOMPSON.COM

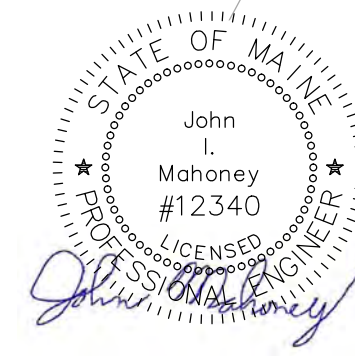
CARROLL ASSOCIATES
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SITE PLAN APPLICATION



Project:
BAYSIDE ANCHOR
Portland Housing Development
Corporation
81 East Oxford Street
Portland, ME

Drawing: **SITE PREP PLAN**

Scale: **1"=10'**
Date: July 1, 2014

Drawn by: EPK
Revised:

SITE PREPARATION NOTES

1. THE SITE SHALL BE GRUBBED AS SHOWN ON THE PLANS. EXISTING PAVEMENT SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.

2. KEEP ALL STREETS FREE OF DUST, MUD, AND DEBRIS. SURFACES MUST BE SWEEPED CLEAN AT END OF EACH WORK DAY AND OTHER TIMES AS REQUIRED TO MINIMIZE TRACKING OF MUD AND CREATION OF DUST. INSTALL STABILIZED CONSTRUCTION ENTRANCE AT PRIMARY ACCESS ROUTE ONTO MAIN STREET AND MAINTAIN AS REQUIRED THROUGHOUT CONSTRUCTION.

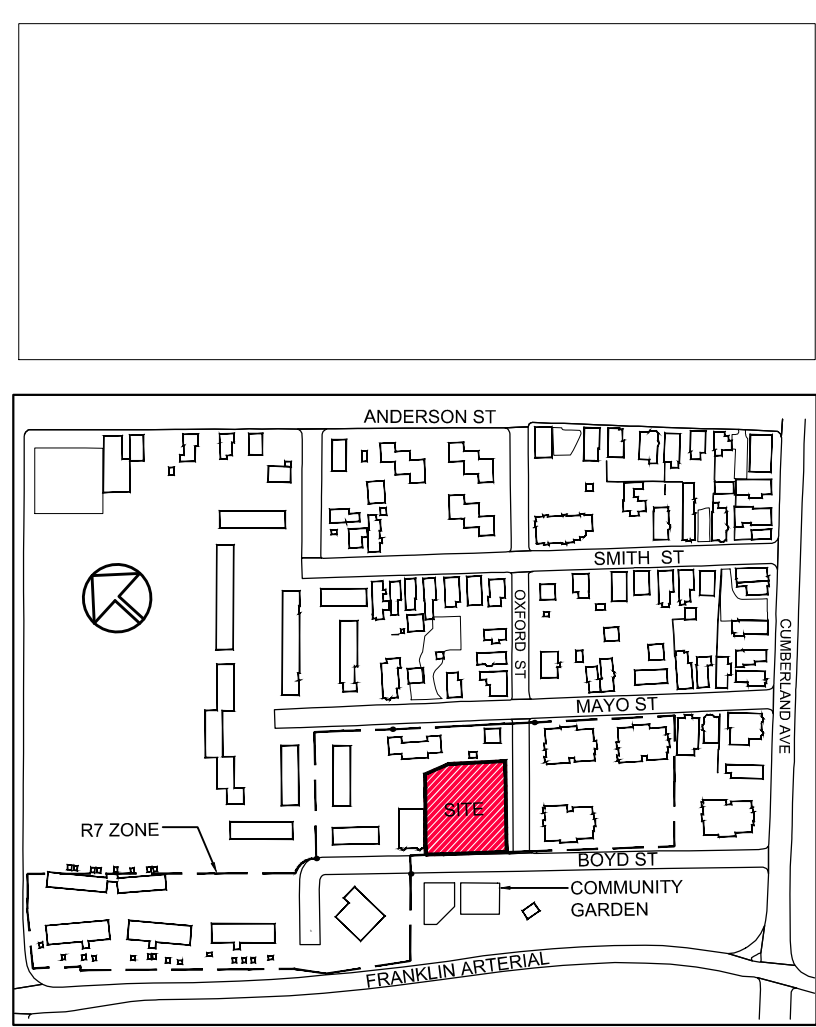
3. CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES IN ACCORDANCE WITH THE EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS (SEE EROSION CONTROL PLAN L-C.1)

4. STRIP AND STOCKPILE ALL LOAM FROM VEGETATED AREA WITHIN CONTRACT LIMITS

LOT SIZE 20,147 SF
MAP 22, BLOCK 1,
LOT 4 AND 1

0' 10' 20'

L1.0



LOCUS

N.T.S.

LEGEND
(EXISTING)

- IRON PIPE OR ROD FOUND
- MONUMENT FOUND
- WATER VALVE
- HYDRANT
- UTILITY POLE
- MANHOLE
- MANHOLE
- SIGN
- DECIDUOUS TREE
- FENCE
- CURB
- OVERHEAD WIRES
- EXISTING CONTOURS

(PROPOSED)

- 7" VERTICAL GRANITE CURB
- 6" VERTICAL GRANITE CURB
- FLUSH / TRANSITION GRANITE CURB
- TREE GRATE
- NEW TREE
- RELOCATED TREE
- SHRUBS
- LAWN
- RAIN GARDEN
- BIT. CONC. PAVING
- BRICK PAVING
- SPECIAL PAVING
- PLAY SURFACING
- WALL
- BENCH
- BIKE RACK
- POLE LIGHT
- WALL LIGHT
- FENCE

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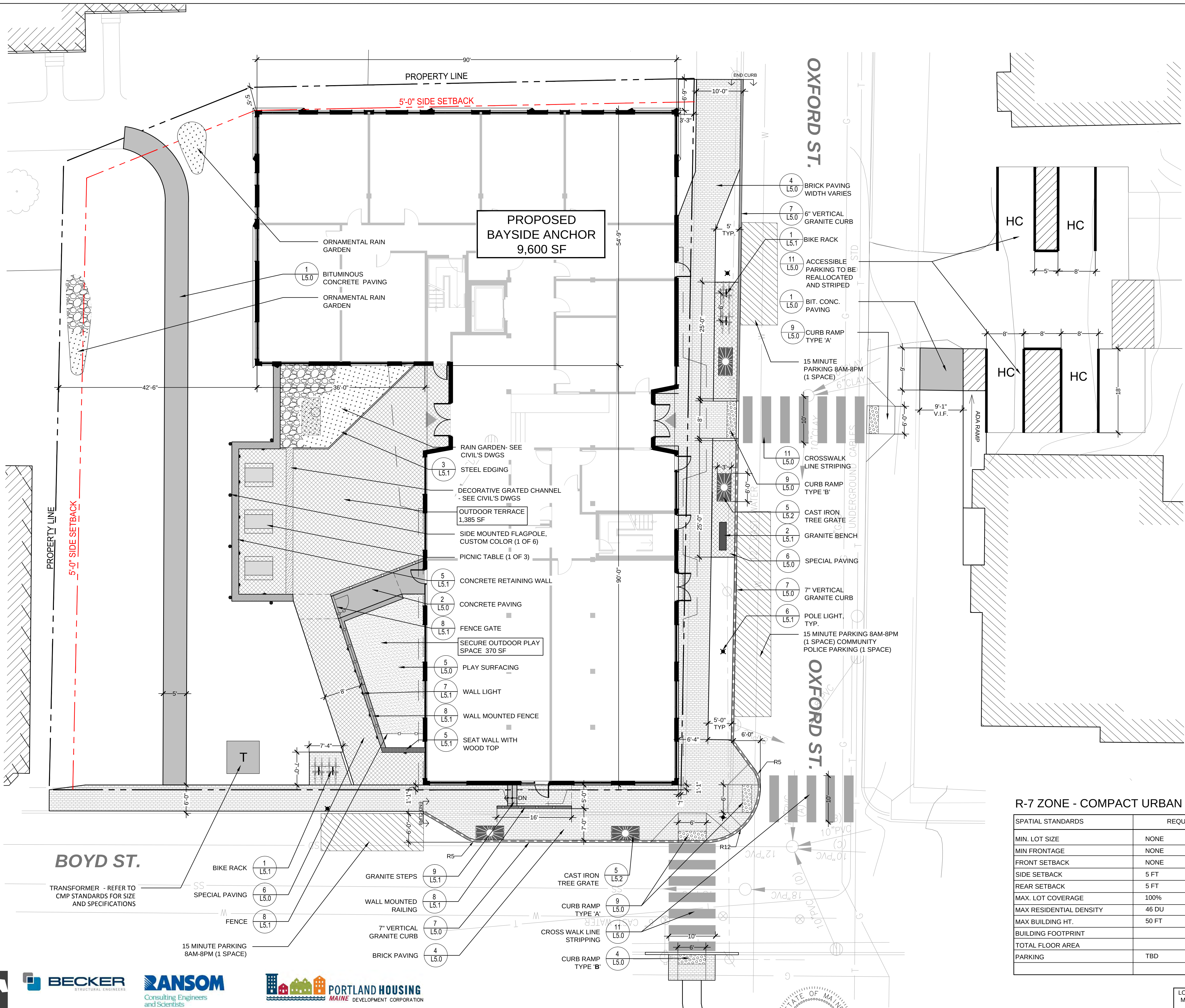
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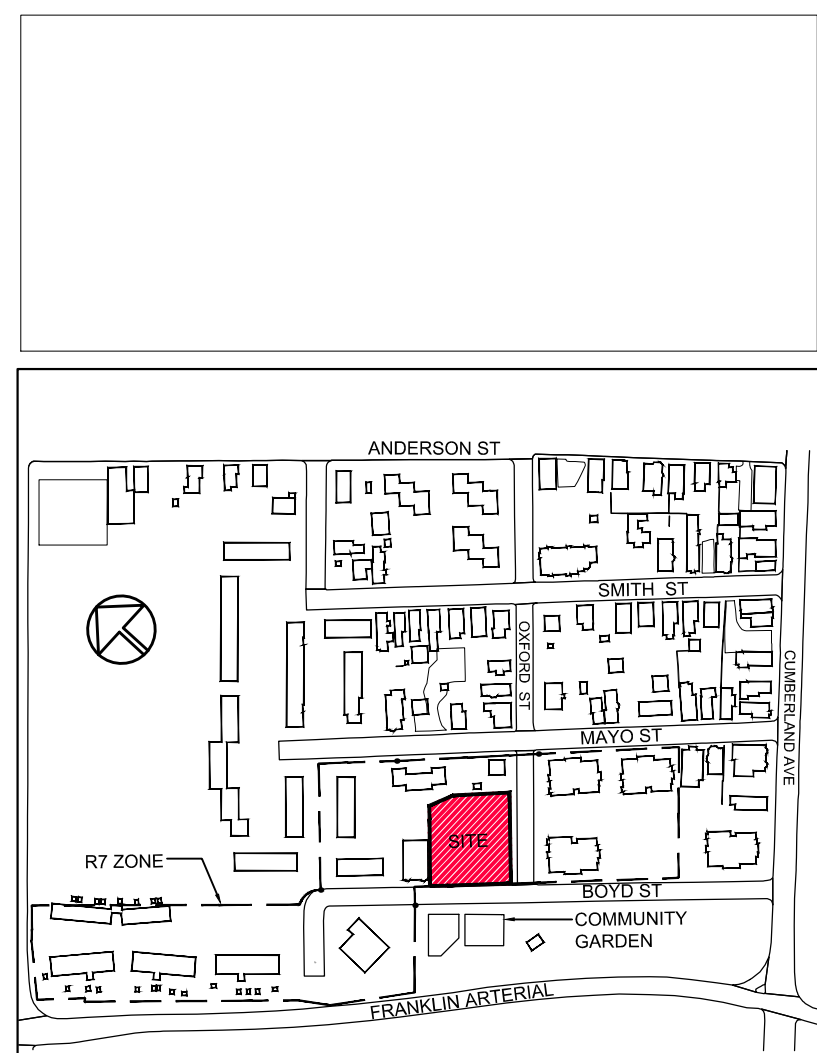
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LEGEND (EXISTING)

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- MANHOLE
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(PROPOSED)

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- POLE LIGHT
- WALL LIGHT
- FENCE

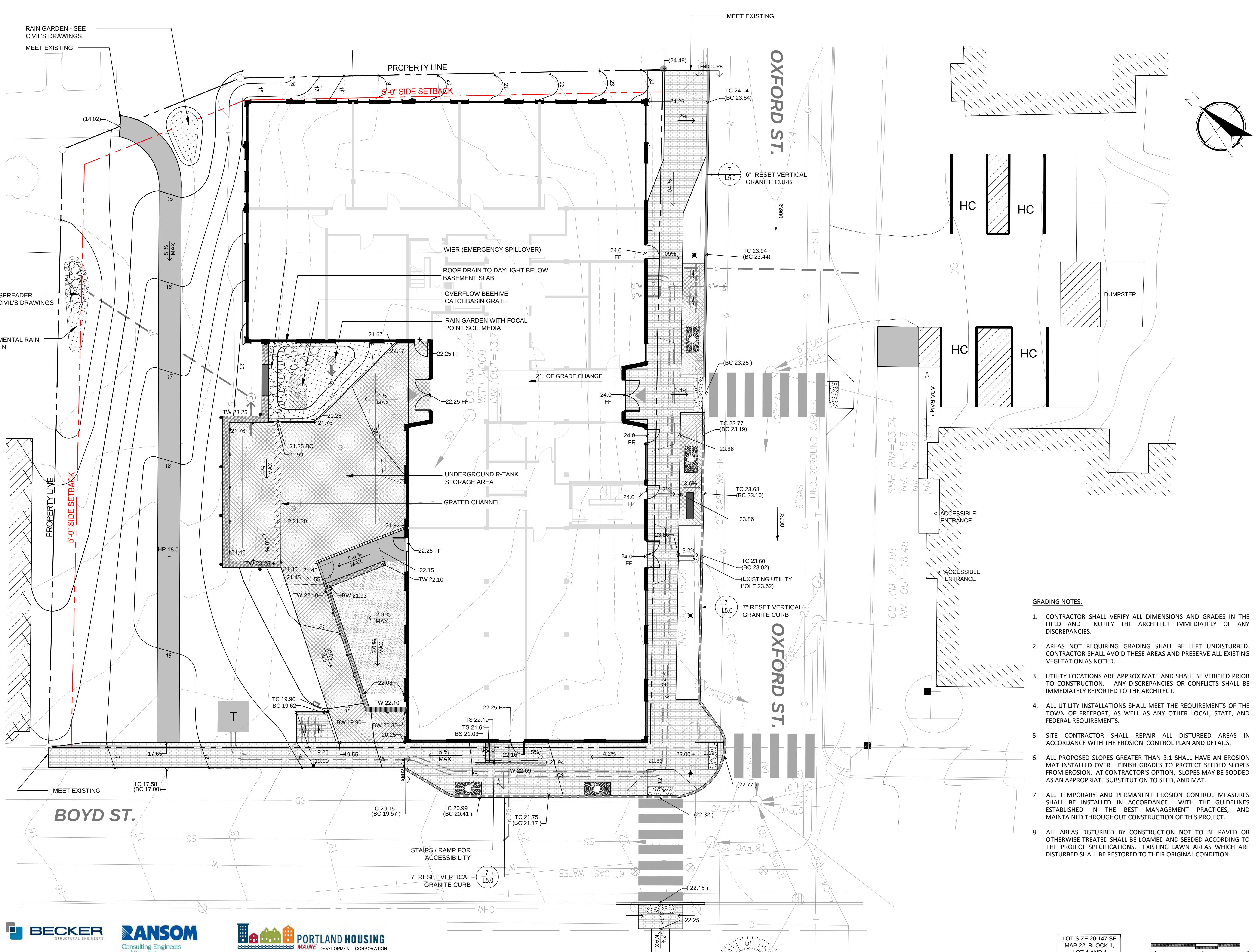
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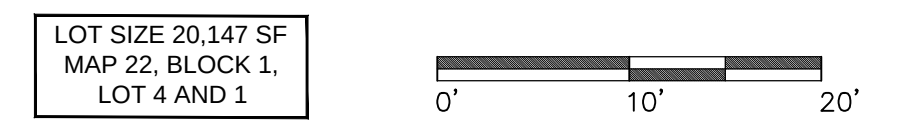
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- GRADING NOTES:**
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GRADES IN THE FIELD AND NOTIFY THE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES.
 - AREAS NOT REQUIRING GRADING SHALL BE LEFT UNDISTURBED. CONTRACTOR SHALL AVOID THESE AREAS AND PRESERVE ALL EXISTING VEGETATION AS NOTED.
 - UTILITY LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED PRIOR TO CONSTRUCTION. ANY DISCREPANCIES OR CONFLICTS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT.
 - ALL UTILITY INSTALLATIONS SHALL MEET THE REQUIREMENTS OF THE TOWN OF FREEPORT, AS WELL AS ANY OTHER LOCAL, STATE, AND FEDERAL REQUIREMENTS.
 - SITE CONTRACTOR SHALL REPAIR ALL DISTURBED AREAS IN ACCORDANCE WITH THE EROSION CONTROL PLAN AND DETAILS.
 - ALL PROPOSED SLOPES GREATER THAN 3:1 SHALL HAVE AN EROSION MAT INSTALLED OVER FINISH GRADES TO PROTECT SEEDED SLOPES FROM EROSION. AT CONTRACTOR'S OPTION, SLOPES MAY BE SODDED AS AN APPROPRIATE SUBSTITUTION TO SEED, AND MAT.
 - ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE GUIDELINES ESTABLISHED IN THE BEST MANAGEMENT PRACTICES, AND MAINTAINED THROUGHOUT CONSTRUCTION OF THIS PROJECT.
 - ALL AREAS DISTURBED BY CONSTRUCTION NOT TO BE PAVED OR OTHERWISE TREATED SHALL BE LOAMED AND SEEDED ACCORDING TO THE PROJECT SPECIFICATIONS. EXISTING LAWN AREAS WHICH ARE DISTURBED SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.



SITE PLAN APPLICATION



Project:
BAYSIDE ANCHOR
Portland Housing Development
Corporation
81 East Oxford Street
Portland, ME

Drawing: **SITE GRADING PLAN**
Scale: **1"=10'**
Date: July 1, 2014
Drawn by: EPK
Revised:

L3.0



EXISTING)

EXISTING)

- (PROPOSED)

- KAPLAN THOMPSON**
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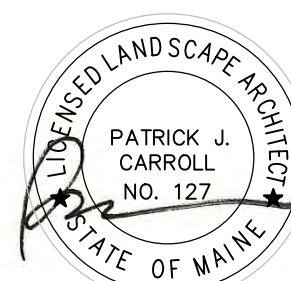
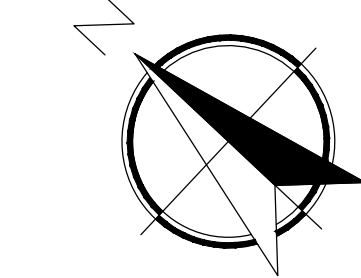


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PLANT LIST - RAIN GARDEN MIX								
QUANTITY	SYB.	BOTANICAL NAME	COMMON NAME	Wet	Moist	Mesic	Dry	Size
6		<i>andropogon scoparius</i>	<i>Little Bluestem</i>			X	X	# 3
6		<i>deschampsia cespitosa</i>	<i>Tufted Hair Grass</i>		X	X		# 3
8		<i>cornus sericea 'arrow'</i>	<i>Arctic Fire Dogwood</i>	X	X	X		# 5
5		<i>vaccinium corybosum</i>	<i>Highbush Blueberry</i>		X	X		# 5
60		<i>iris versicolor</i>	<i>Blue Flag Iris</i>	X	X			# 1
60		<i>aster novae-angliae</i>	<i>New England Aster</i>		X	X	X	# 1
20		<i>eupatorium fistulosum</i>	<i>Joe Pye Weed</i>			X	X	# 1
60		<i>rudbeckia fulgida</i>	<i>black-eyed susan</i>		X	X		# 1
60		<i>echinacea purpurea</i>	<i>Purple Coneflower</i>			X	X	# 1



LOT SIZE 20,147 SF
MAP 22, BLOCK 1,
LOT 4 AND 1

SITE PLAN APPLICATION

Project:
BAYSIDE ANCHOR
Portland Housing Development
Corporation
81 East Oxford Street
Portland, ME

Drawing: SITE | LANDSCAPE PLAN

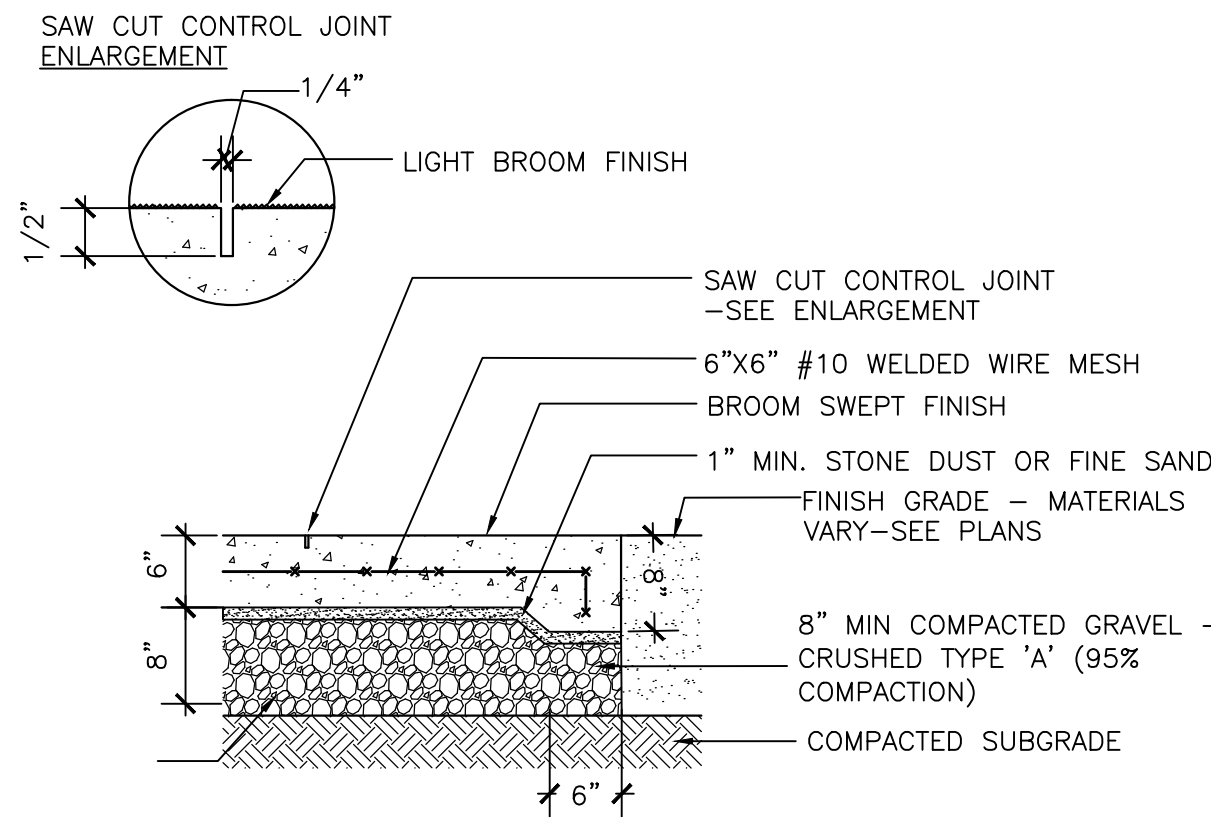
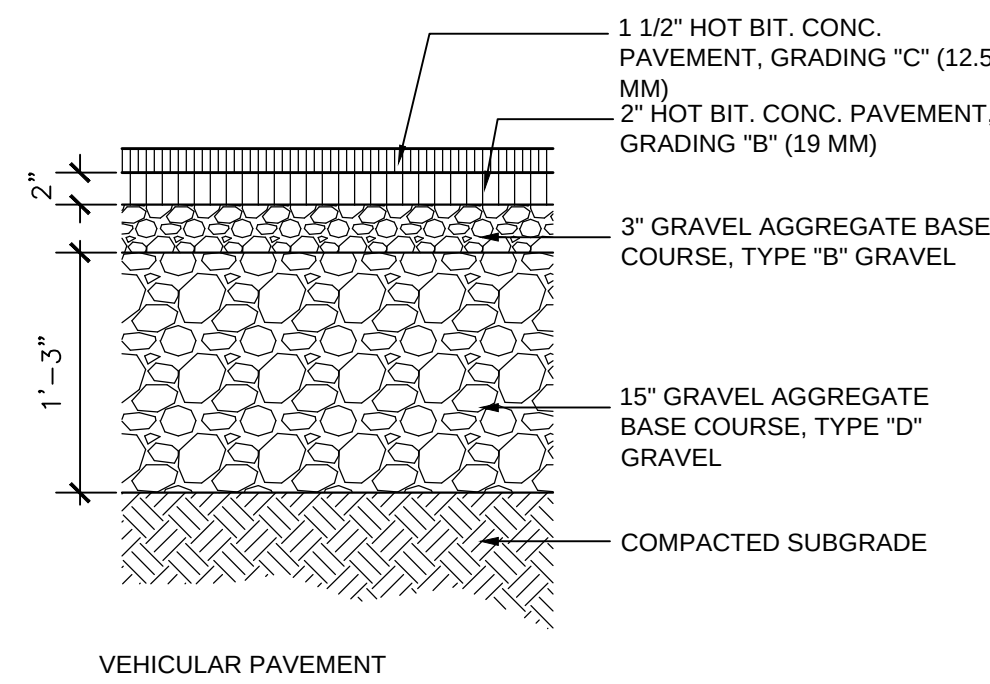
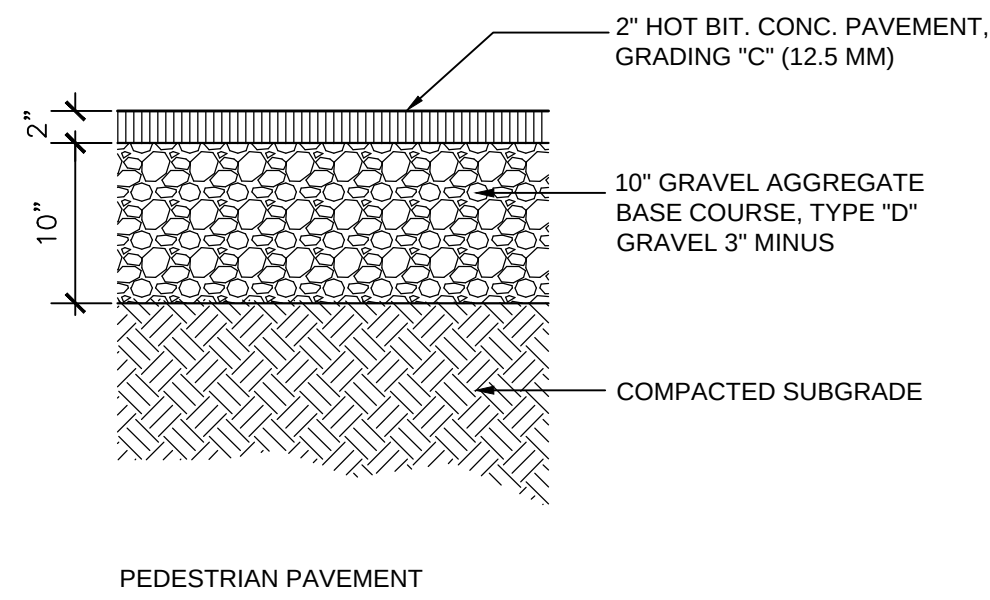
Scale: 1"=10'

Drawn by: EPK

Date: July 1, 2014

Revised:

L4.0



CONCRETE SPECIFICATION:

- 4000 p.s.i.
- 3/4" AGGREGATE
- 5 - 7 % AIR ENTRAINMENT
- SLUMP - 4" ± 1"

CONTROL JOINT SPECIFICATION:

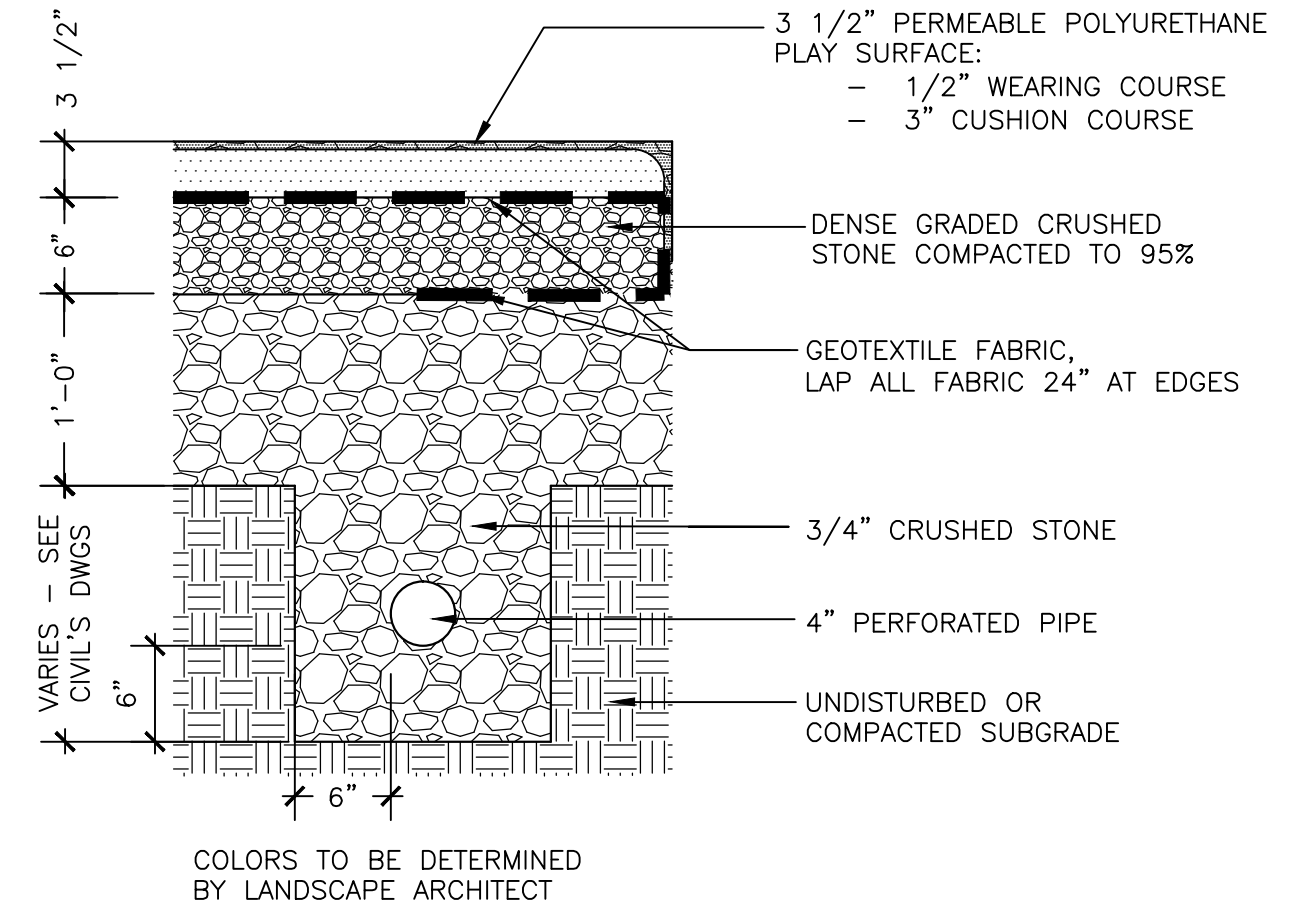
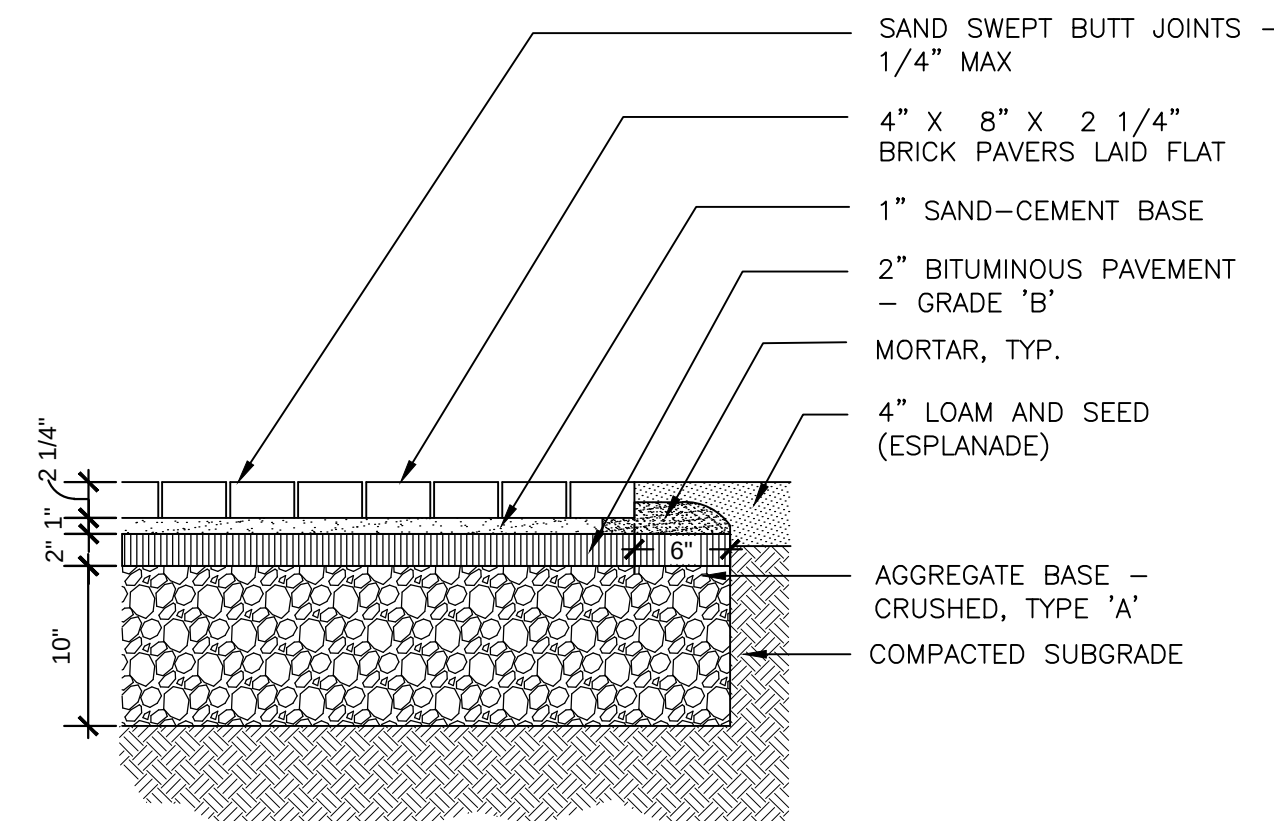
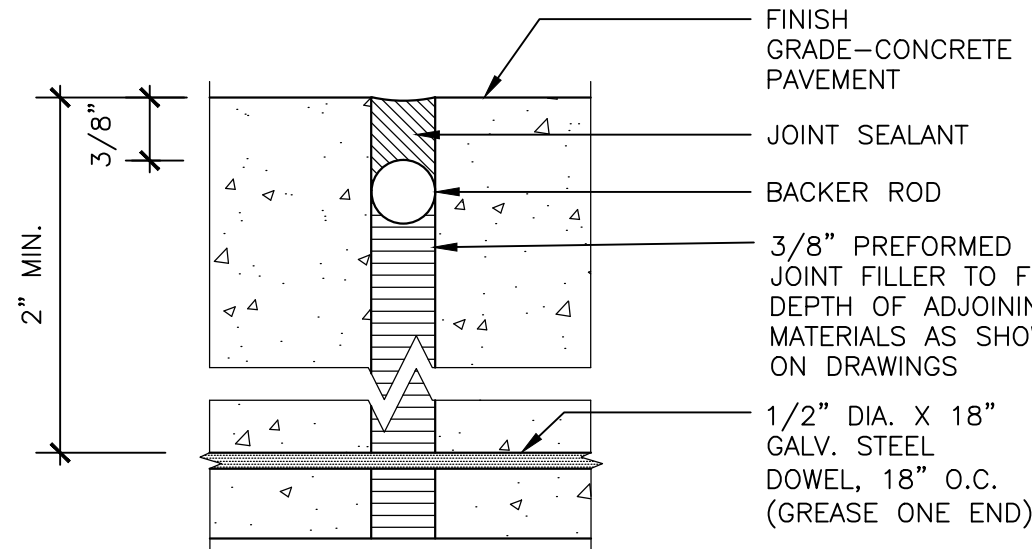
- SPACING OF JOINTS:
 - 10 FEET ON CENTER ALONG LENGTH
 - 6 FEET ON CENTER ALONG WIDTH
- SAW CUT JOINTS AT 1 1/2" MAX. DEPTH

FINISH SPECIFICATION:

- BROOM SWEEP FINISH
- CURE WITH CURE-10-SPEC MS
- AFTER CONSTRUCTION JOINTS HAVE BEEN FILLED AND SEALED, APPLY "CONSOLIDOCK SALTGUARD"

NOTE:

ALL CONCRETE SHALL BE PLACED BY AN A.C.I. FLATWORK CERTIFIED FINISHER



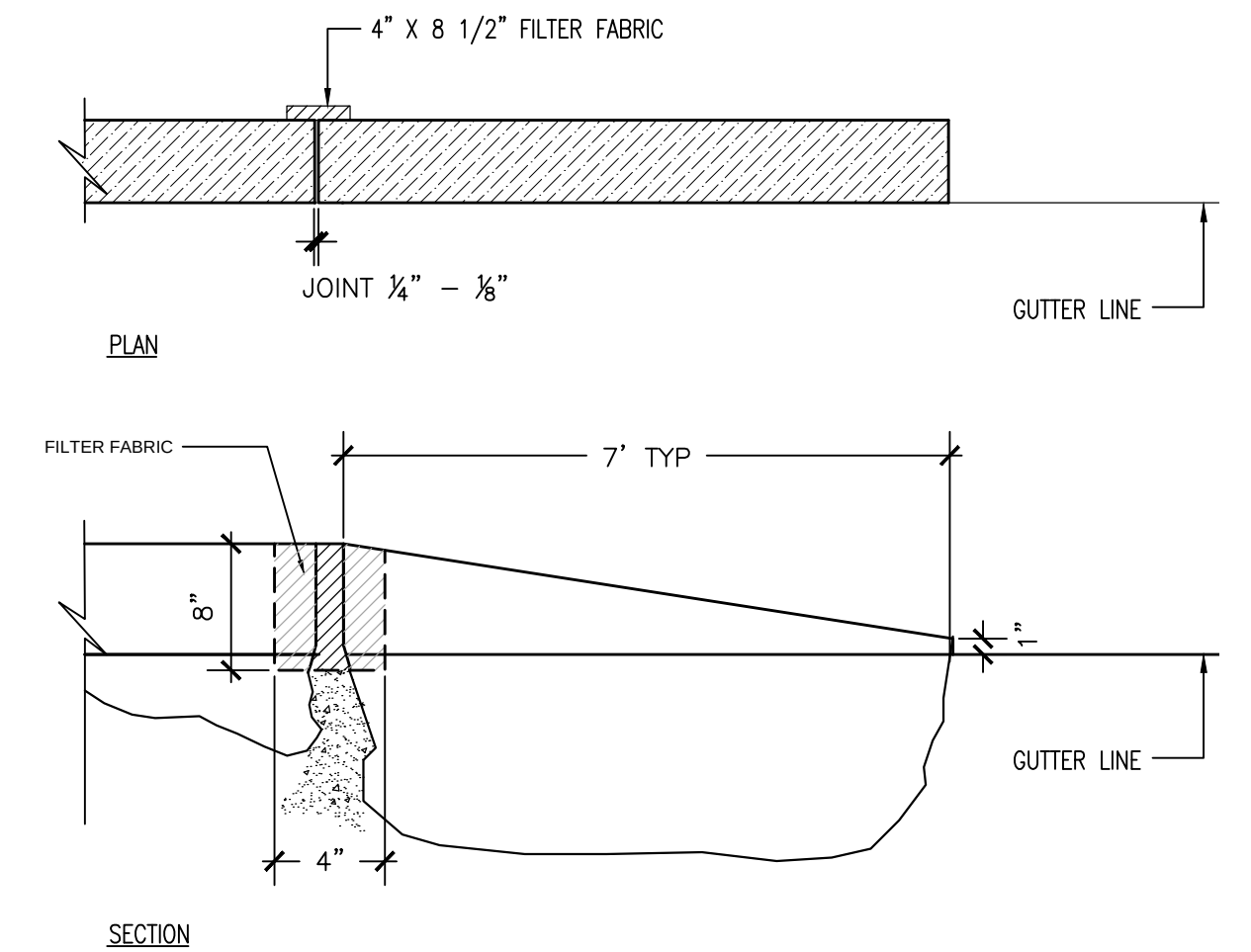
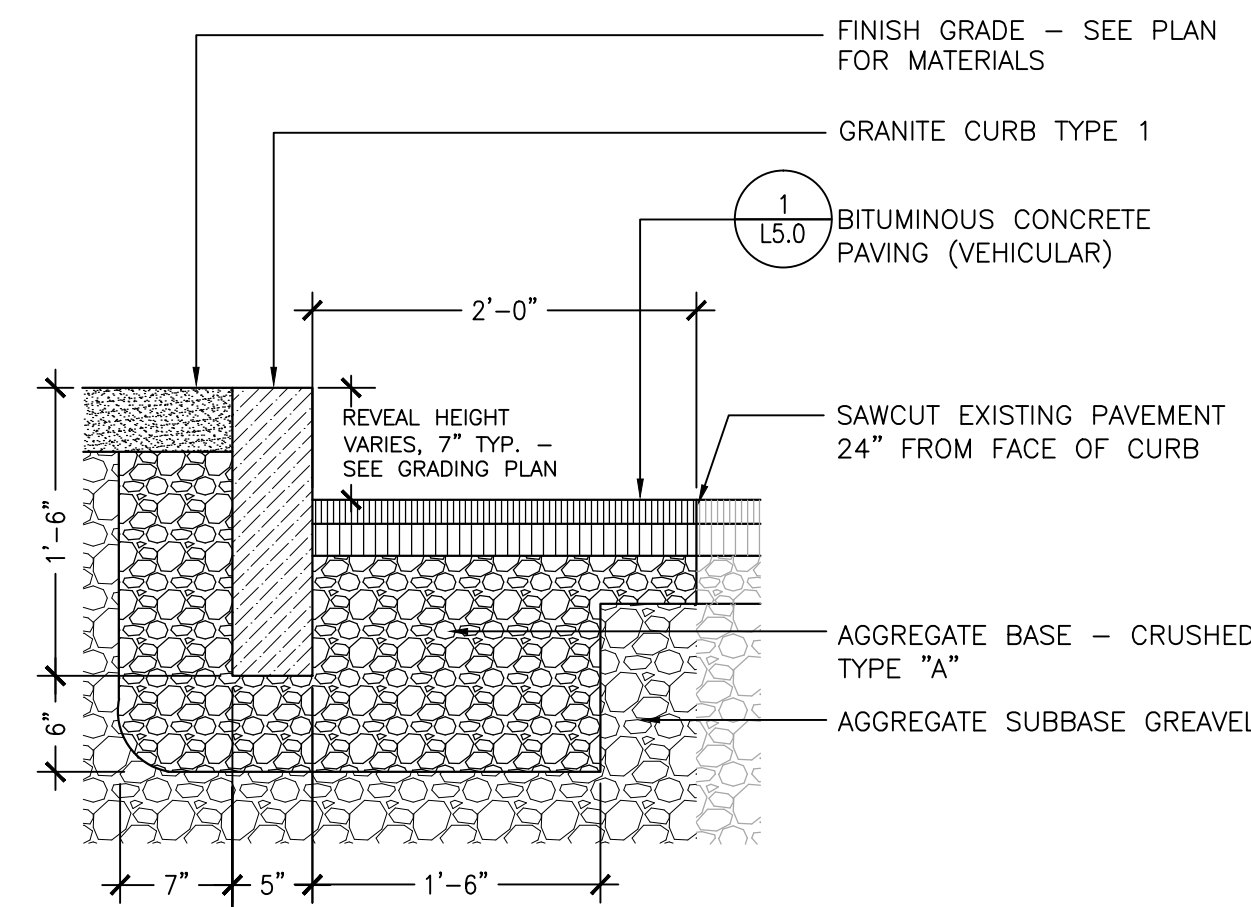
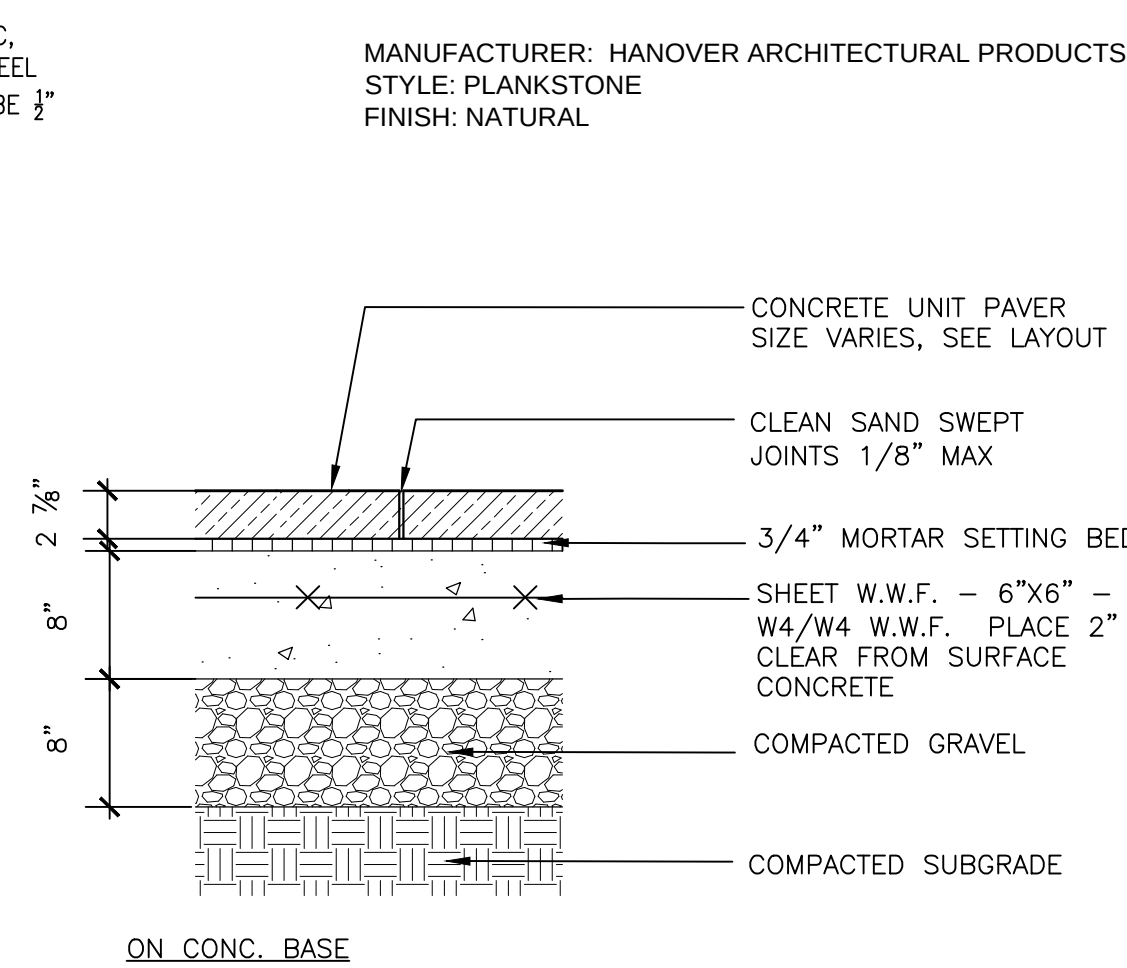
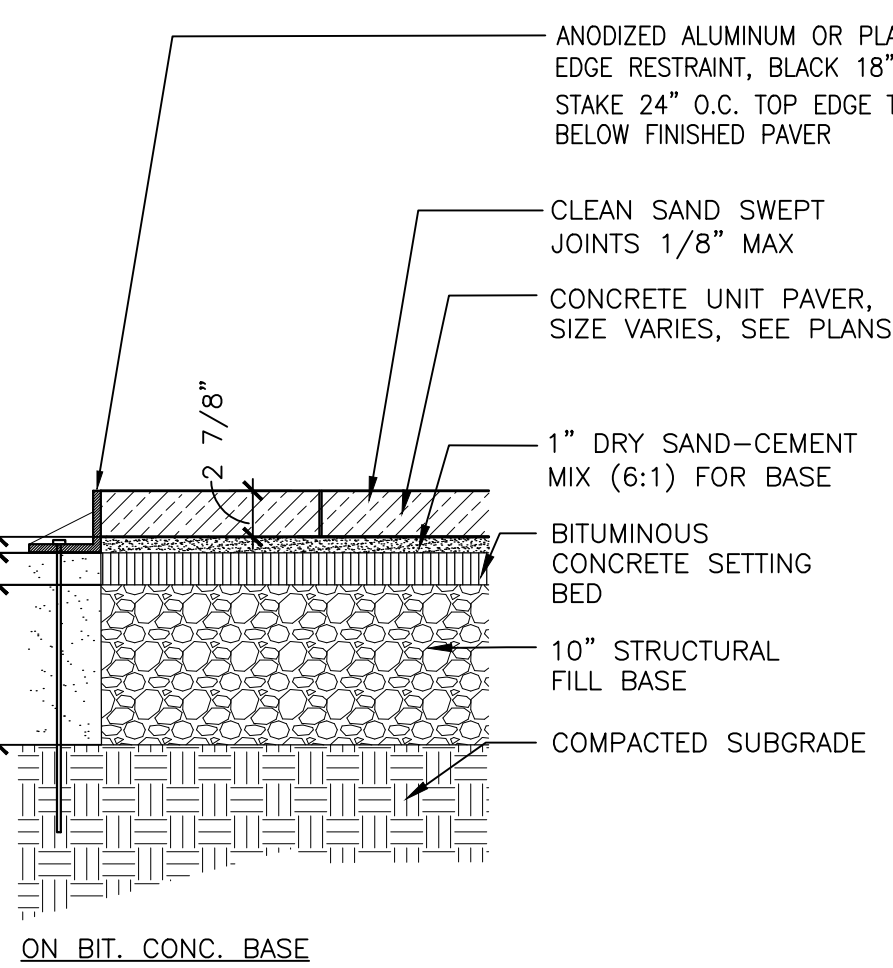
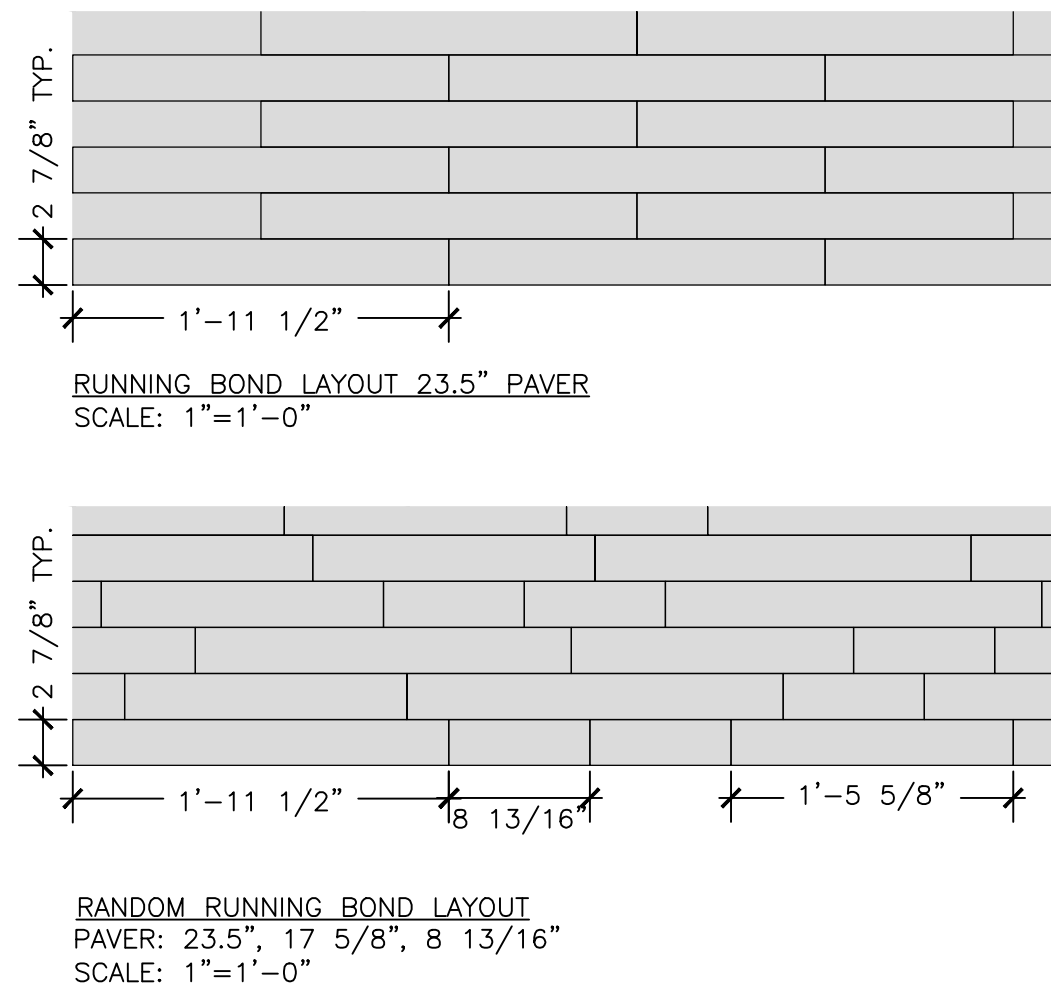
1 BITUMINOUS CONCRETE PAVING
SCALE: 1"=1'-0"

2 CONCRETE PAVING
SCALE: 3/4"=1'-0"

3 EXPANSION JOINT
SCALE: 1"=1'-0"

4 BRICK PAVING
SCALE: 1"=1'-0"

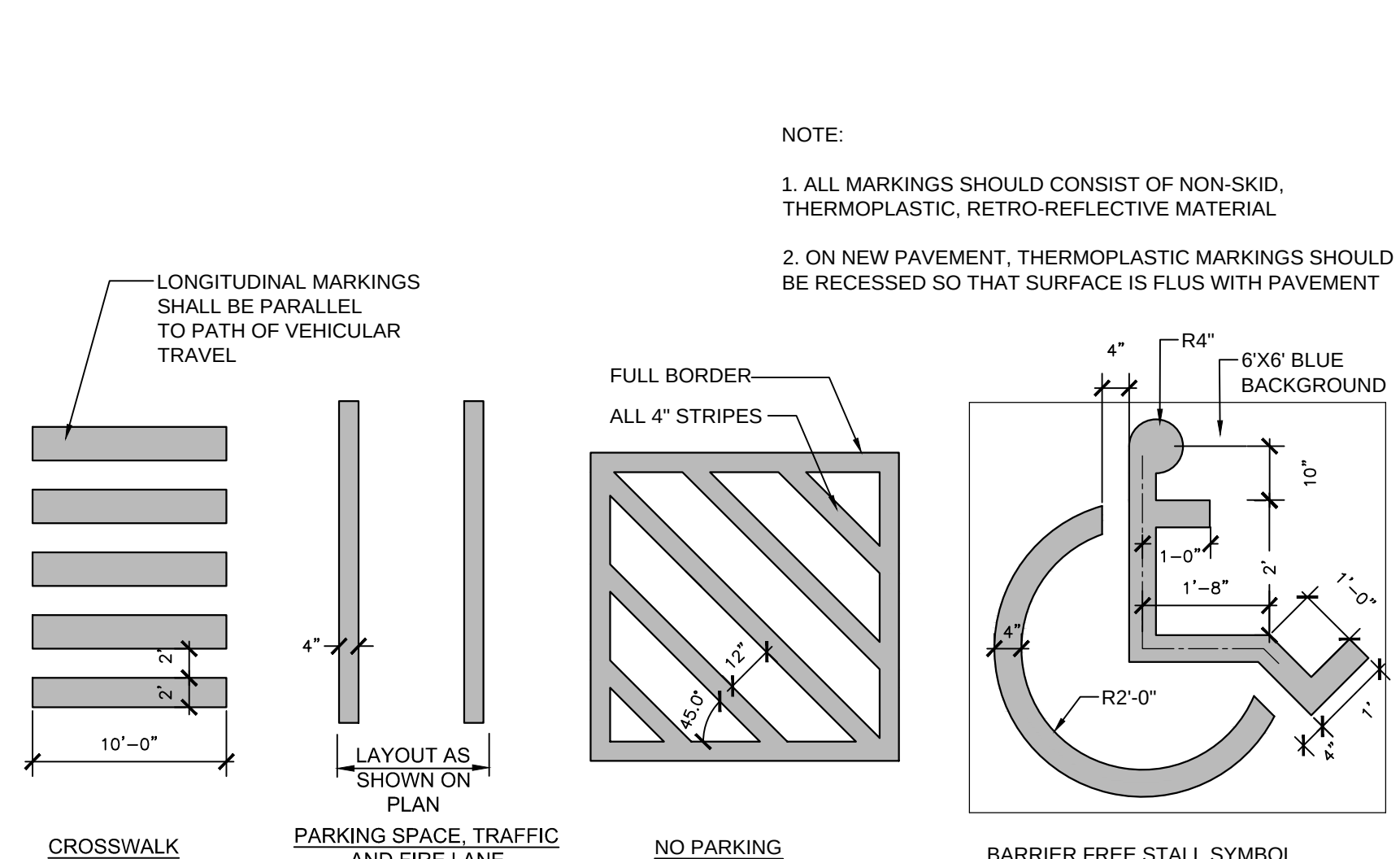
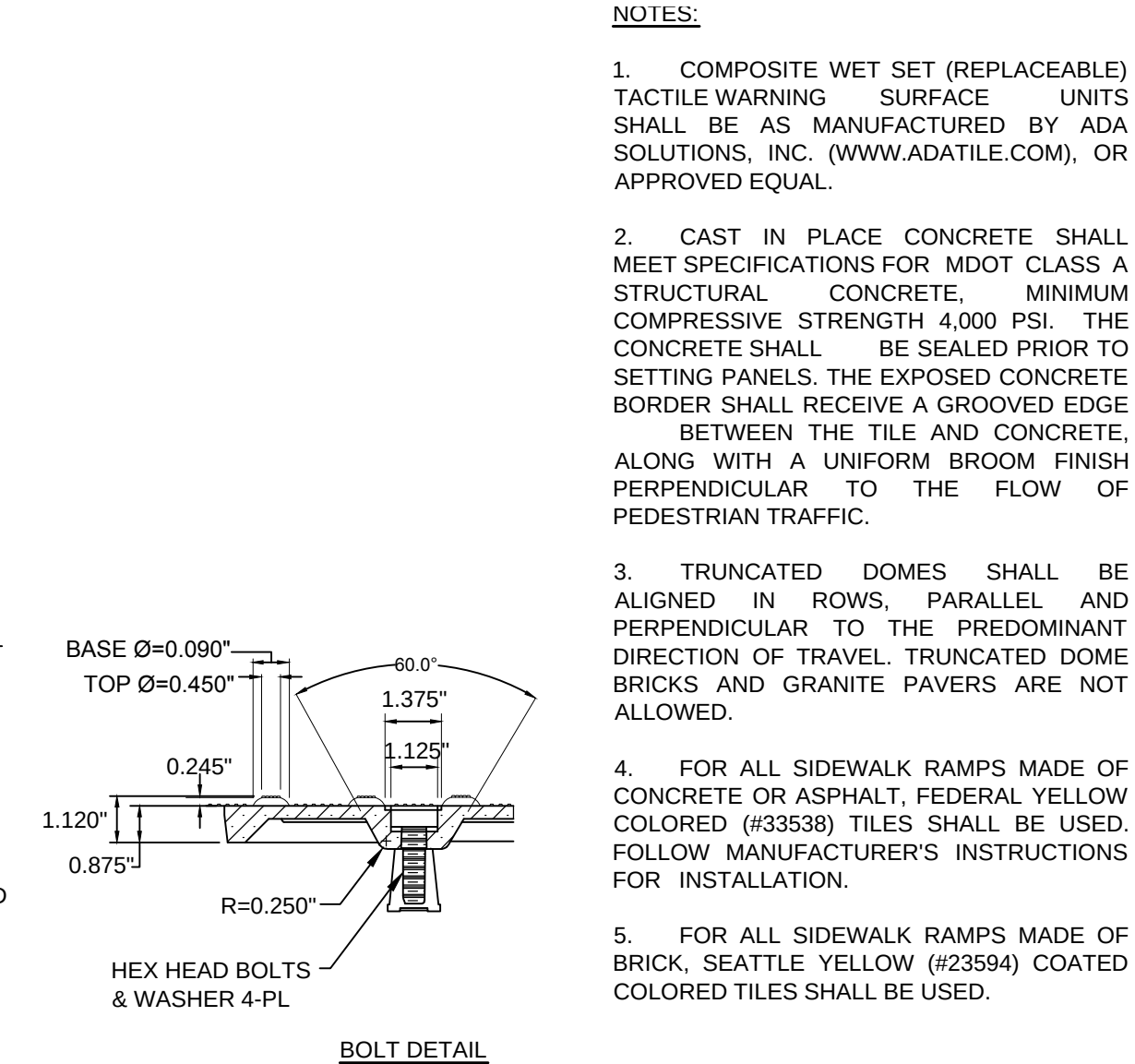
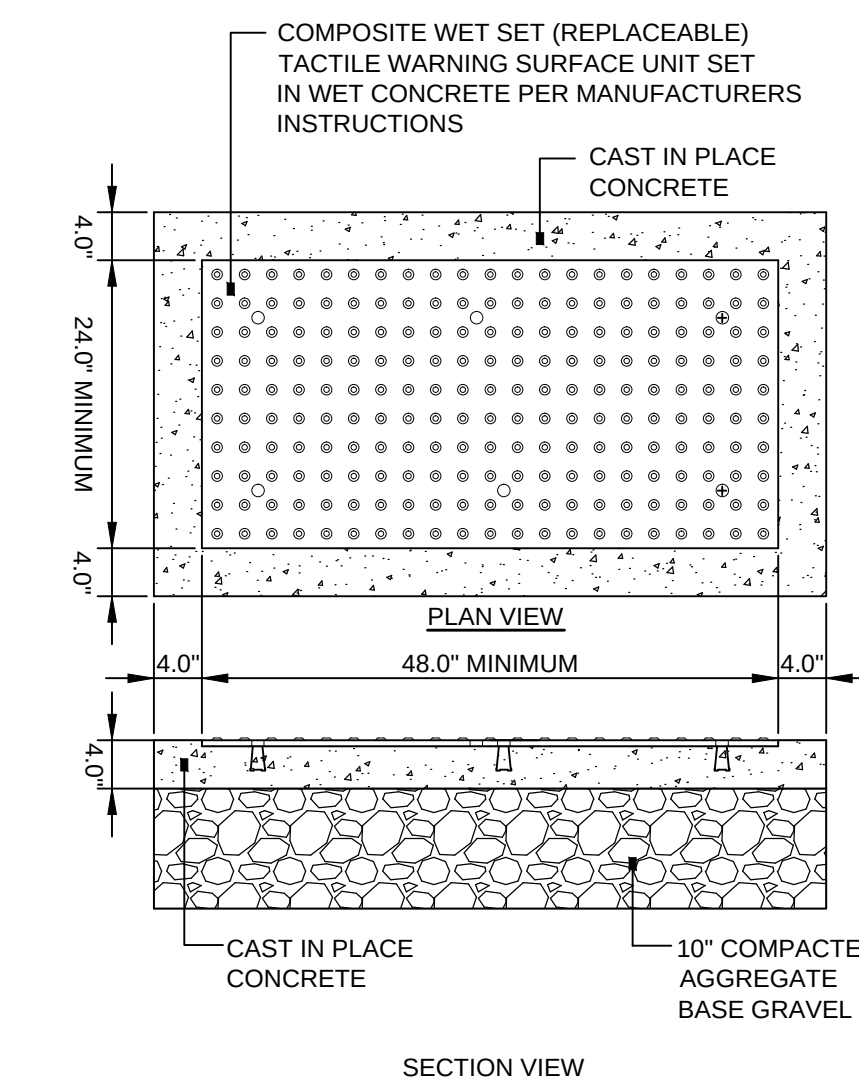
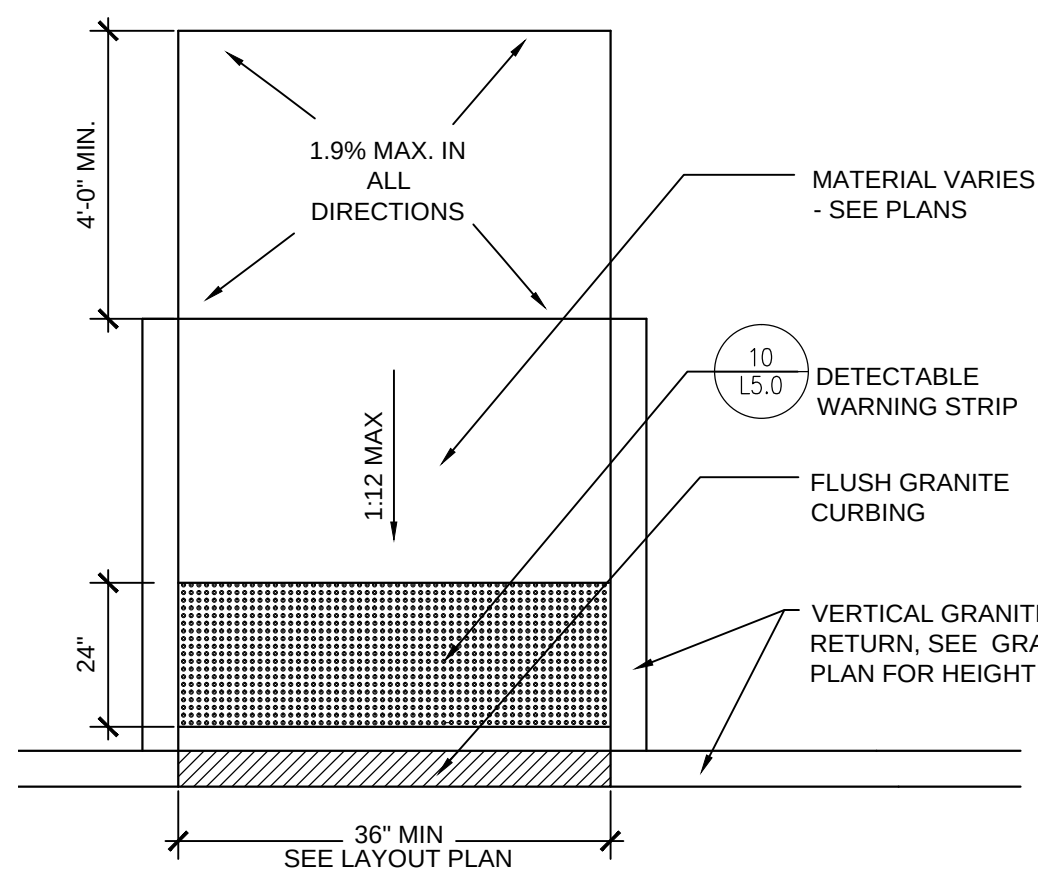
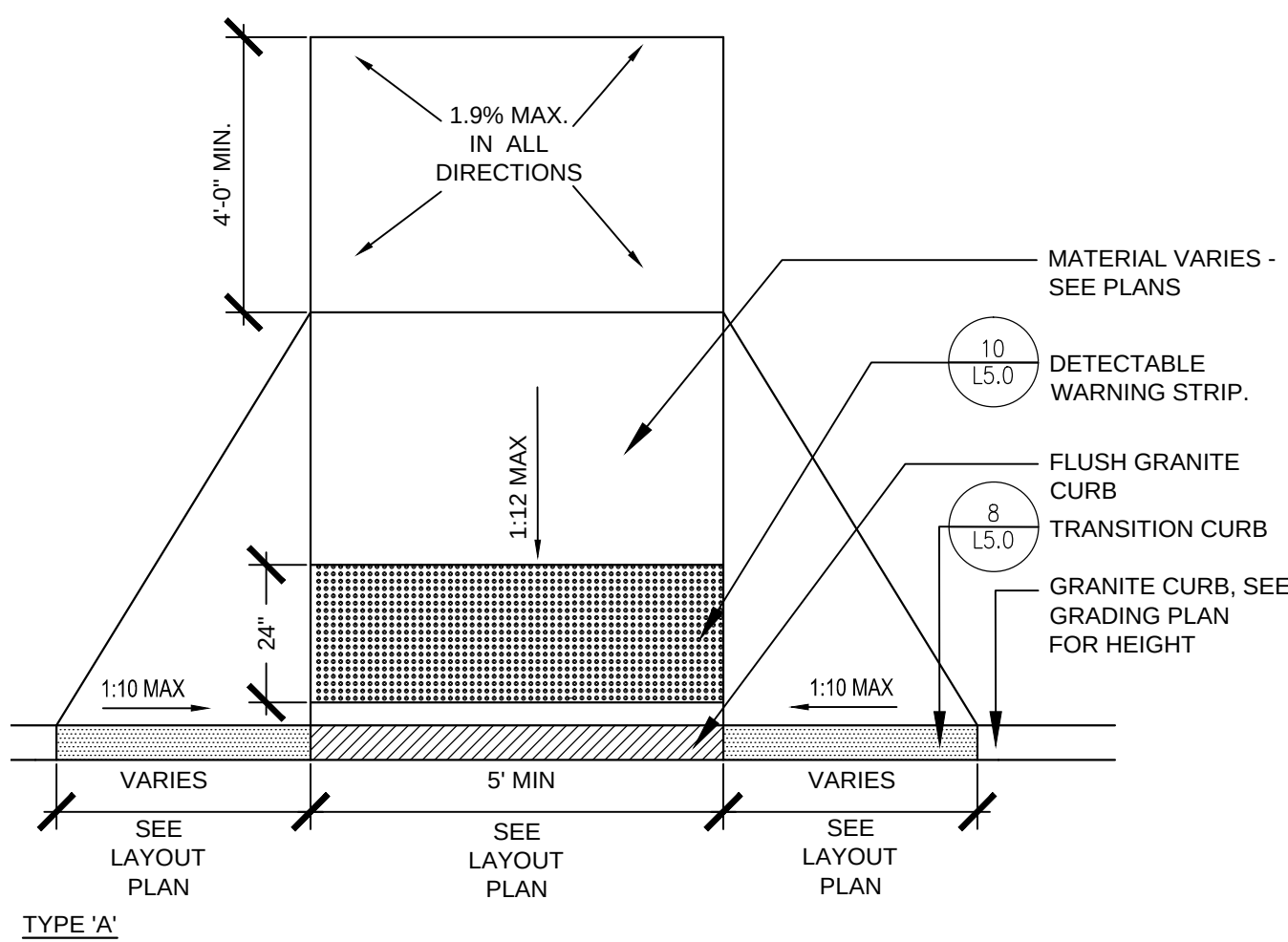
5 PLAY SURFACING
SCALE: 1"=1'-0"



6 SPECIAL PAVING
SCALE: 1"=1'-0"

7 RESET GRANITE CURBING
SCALE: 1"=1'-0"

8 TRANSITION CURB
SCALE: 1"=1'-0"



9 CURB RAMP
SCALE: 3/8"=1'-0"

10 DETECTABLE WARNING STRIP
SCALE: N.T.S.

11 LINE STRIPING
SCALE: N.T.S.

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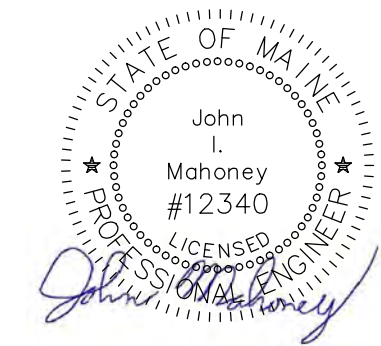
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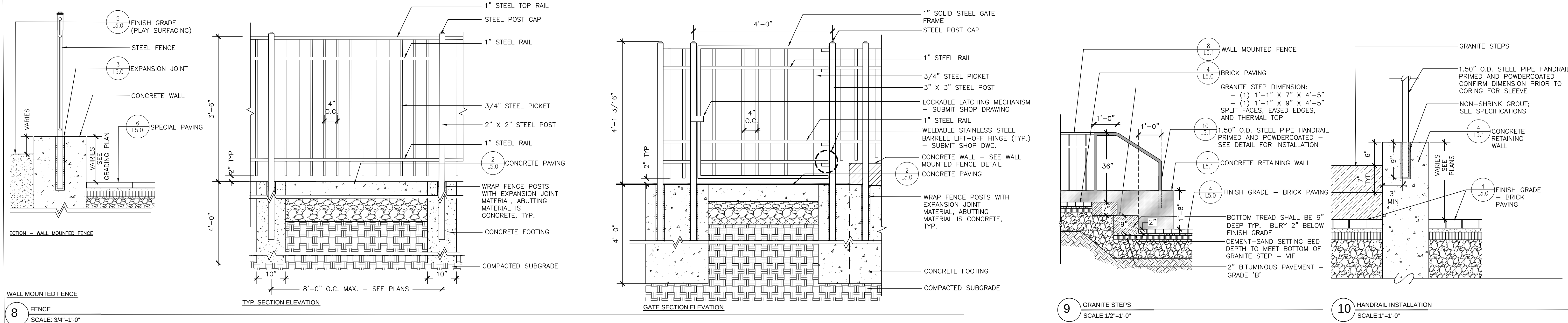
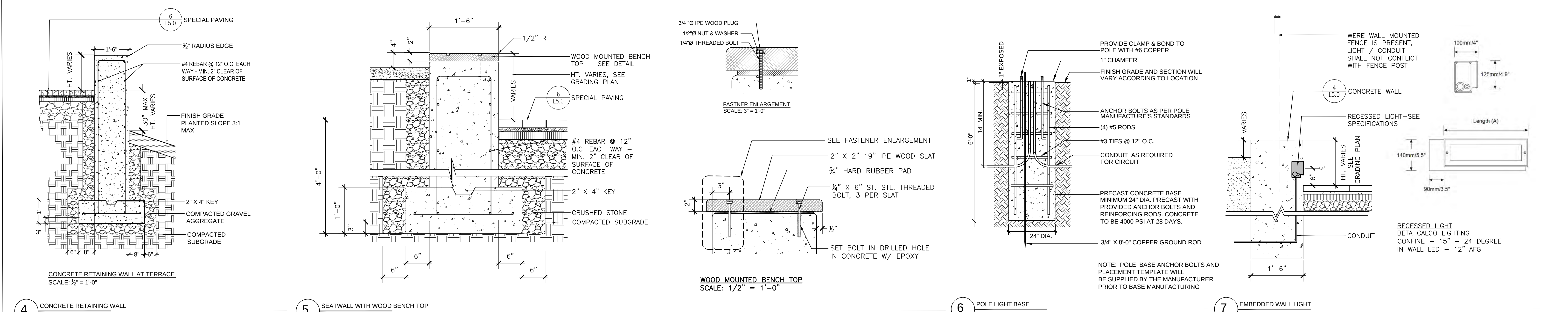
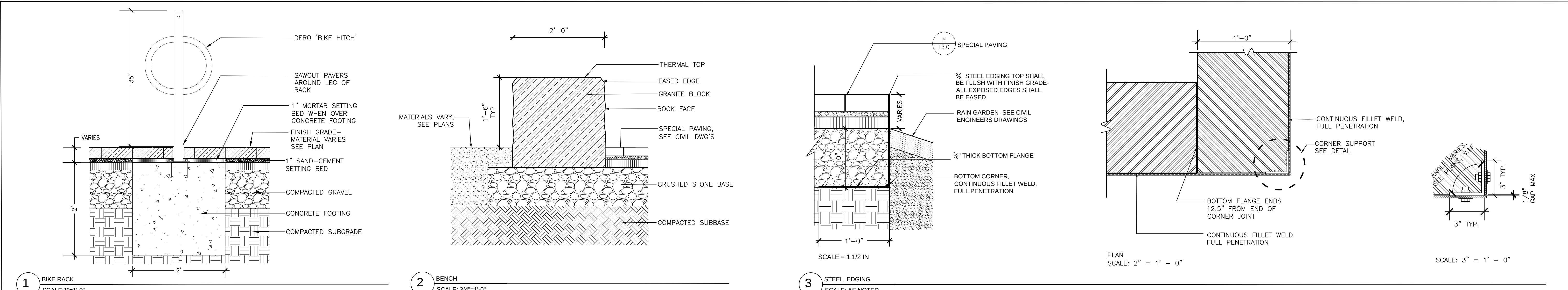
SITE PLAN APPLICATION

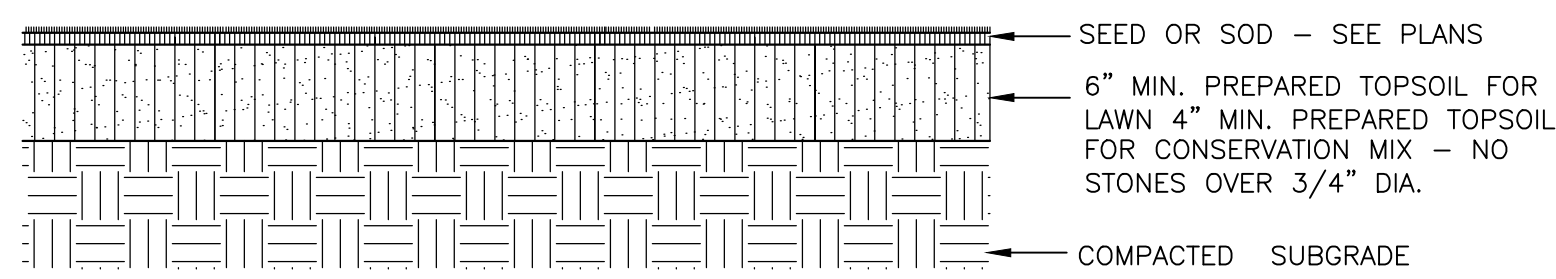


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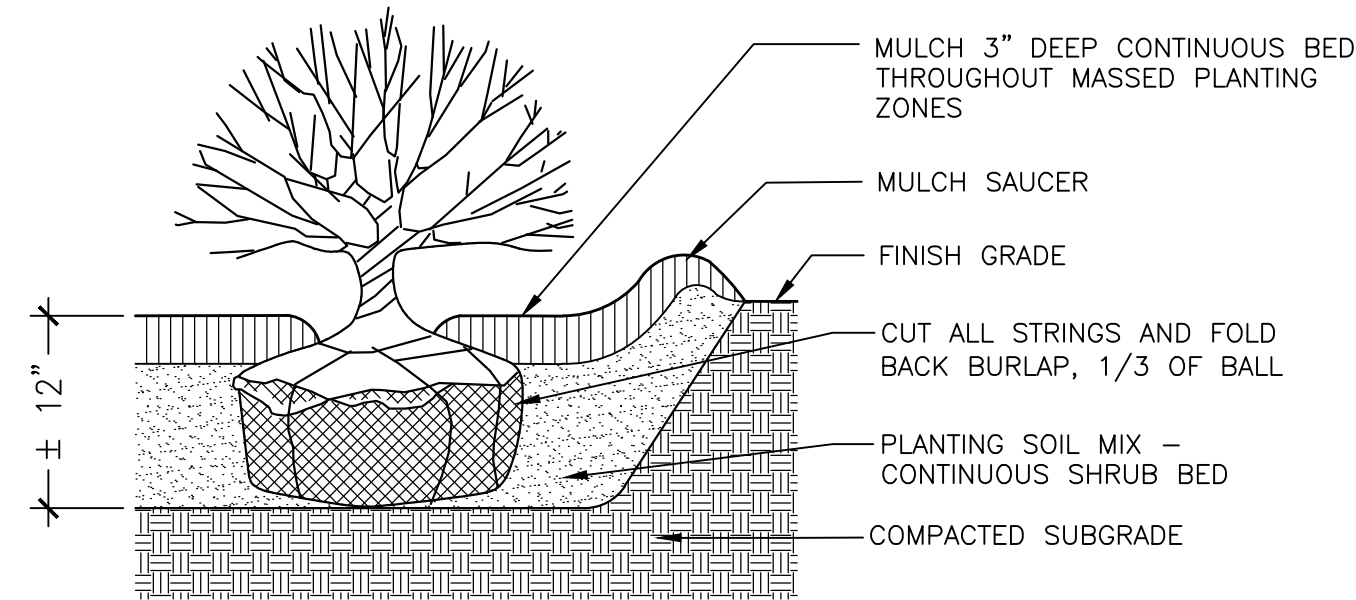
Drawing: **DETAILS - SITE PAVING AND EDGING**
Scale: **AS NOTED**
Date: July 1, 2014
Drawn by: EPK
Revised:

L5.0

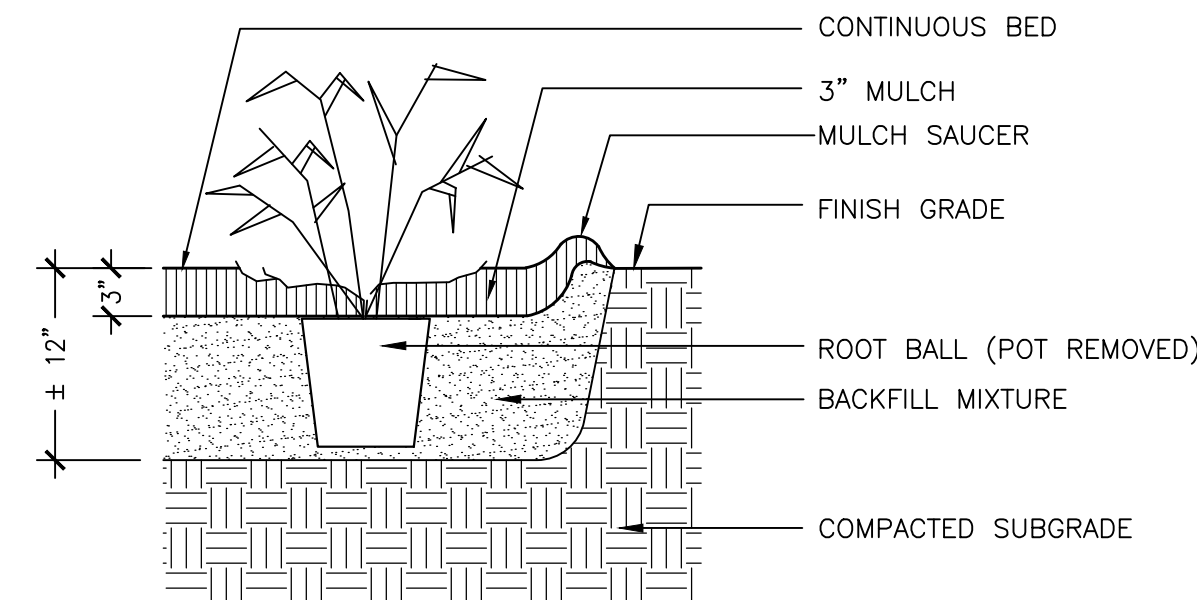




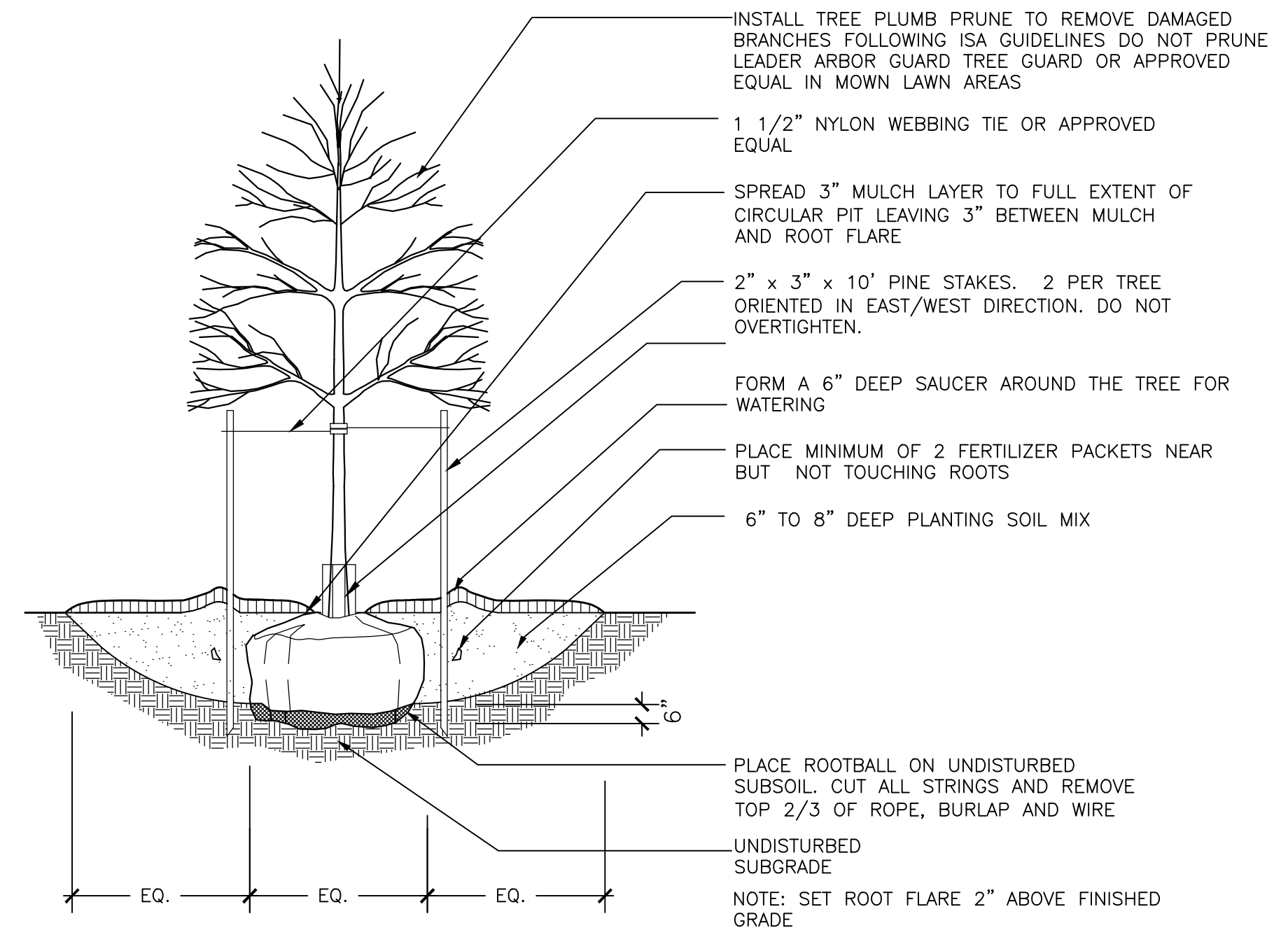
1 SEEDED OR SODDED LAWN
SCALE: 1"=1'-0"



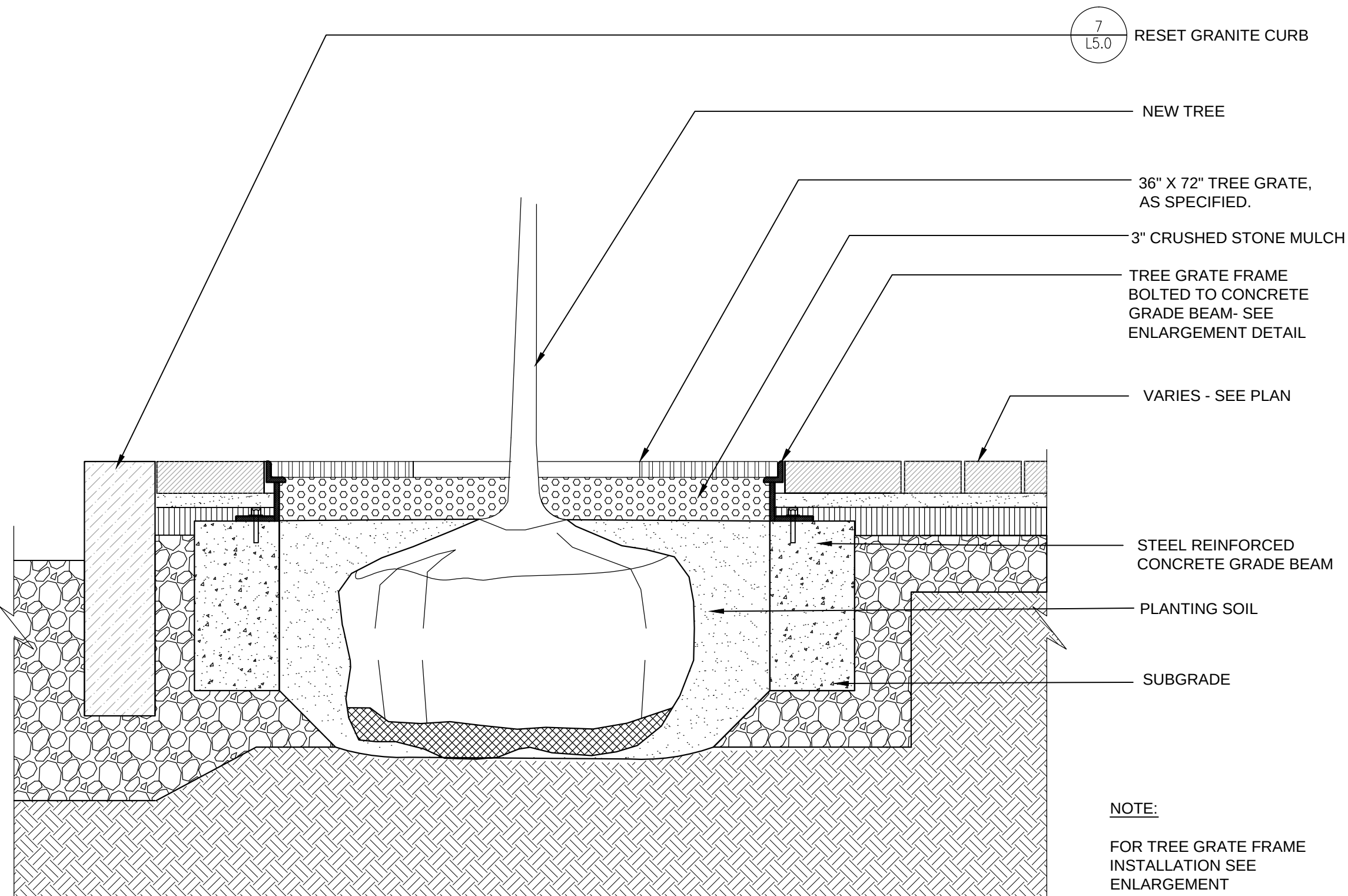
2 SHRUB PLANTING
SCALE: 3/4"=1'-0"



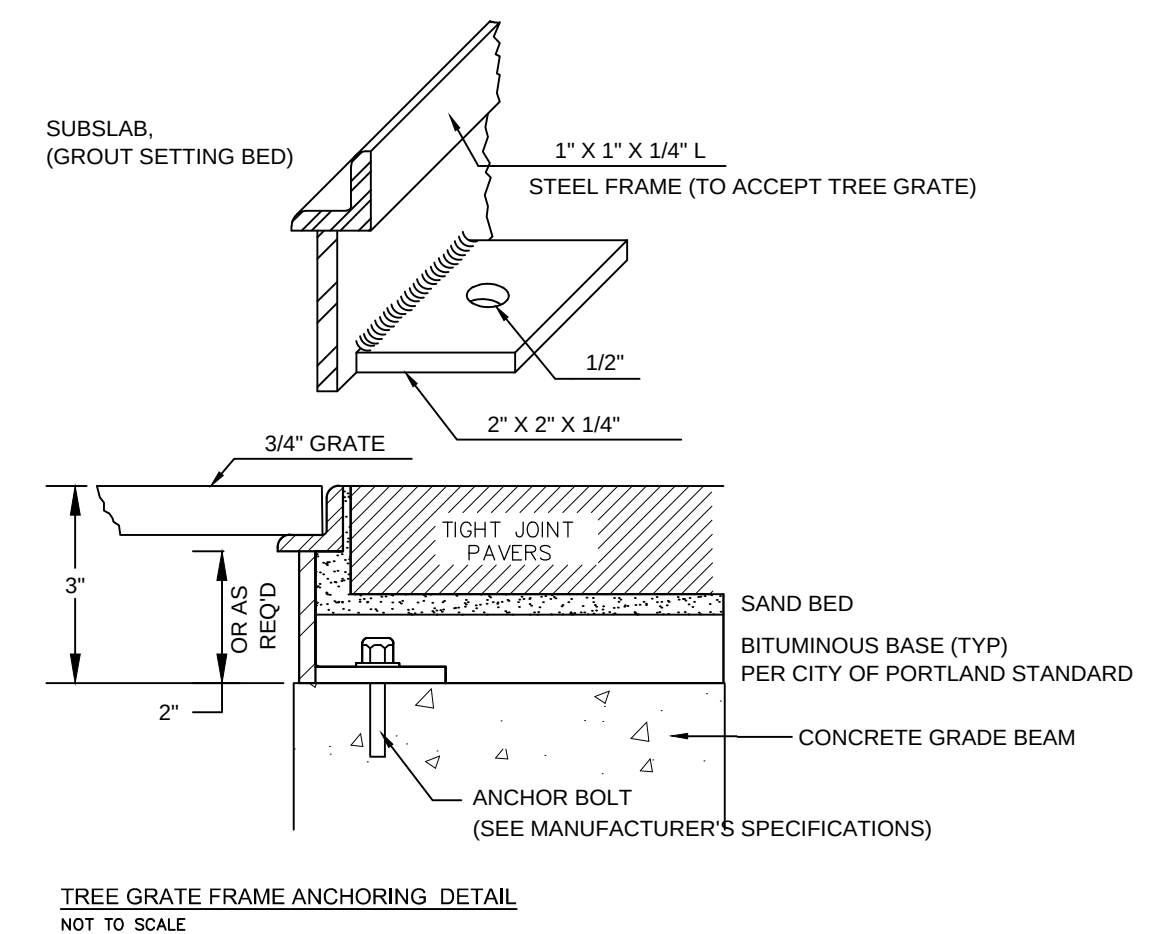
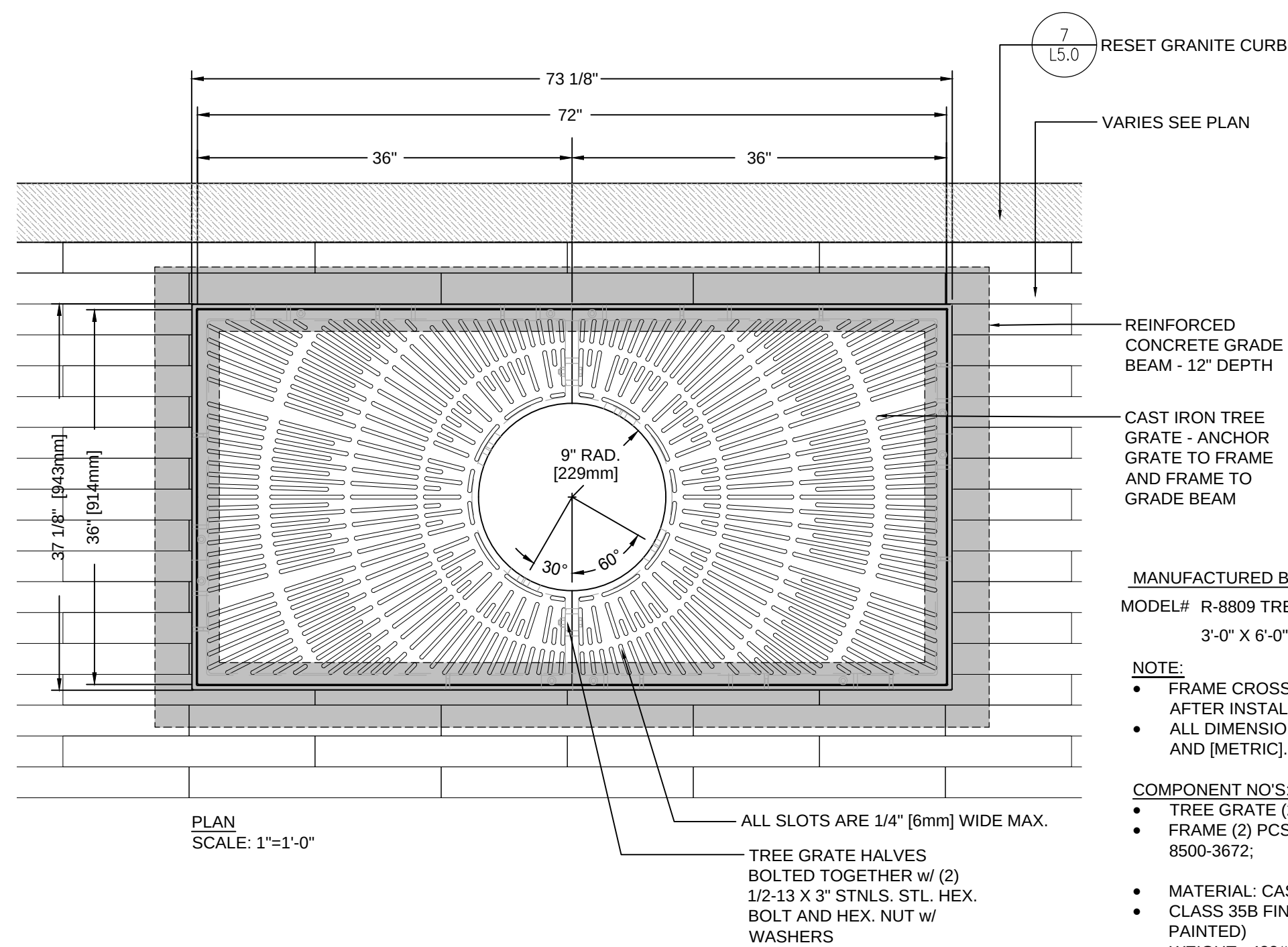
3 GRASS / PERENNIAL PLANTING
SCALE: 1"=1'-0"



4 TREE IN LAWN OR ESPLANADE
SCALE: 1"=1'-0"

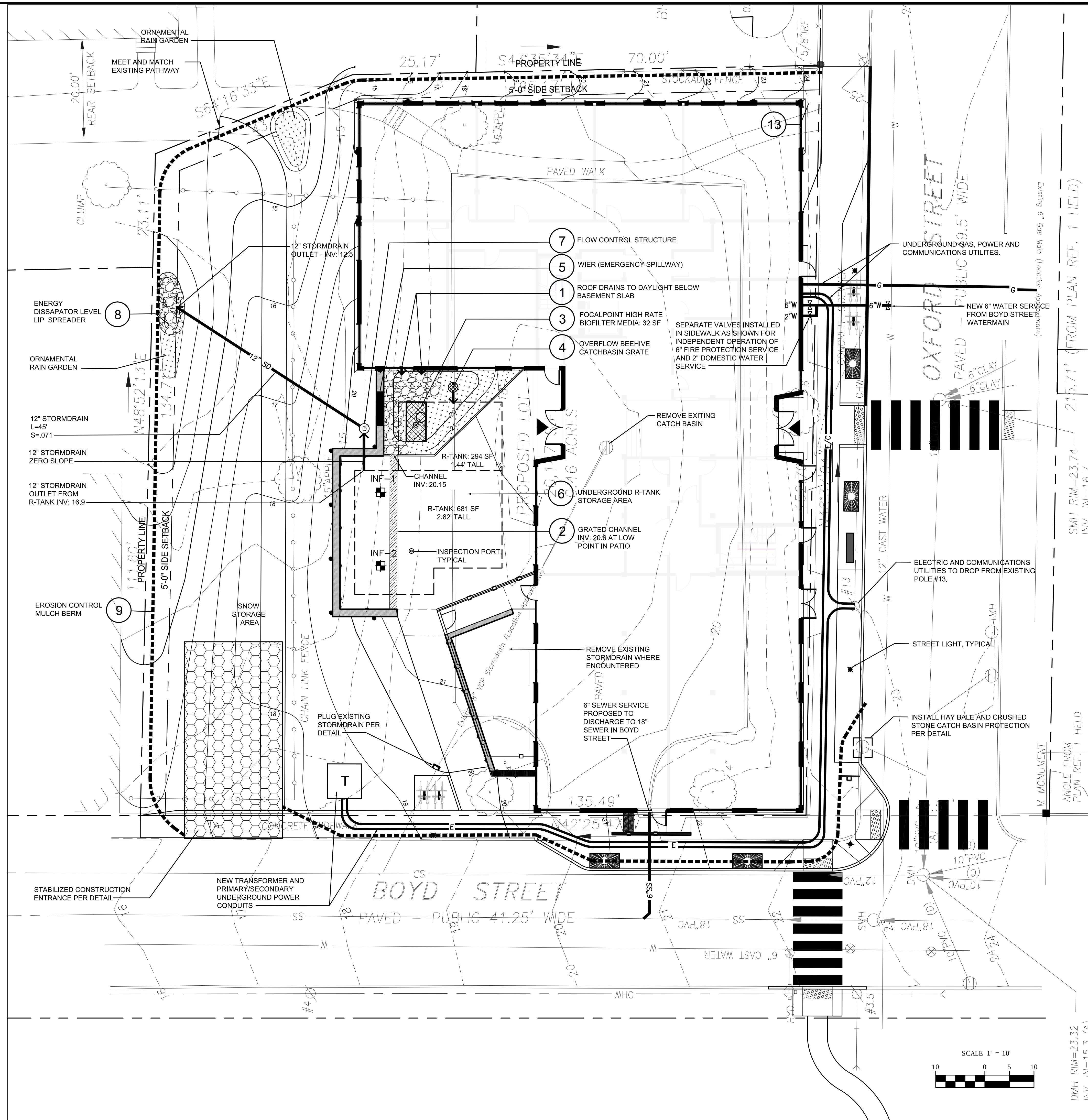


5 TREE IN TREEGRATE
SCALE: AS NOTED



3. ROOF DRAINS DAYLIGHT (EL: 20.0) JUST BENEATH THE BUILDING SLAB AND DISCHARGE TO AN ENERGY DISSIPATION AREA CONSISTING OF LARGE NATURAL STONES. STONES WILL BE INDIVIDUALLY PLACED TO DIRECT SPLASHING OR SPRAY AWAY FROM WALKING SURFACES.
2. THE MAJORITY OF THE PATIO AREA WILL DRAIN TO A GRATED CHANNEL THAT CONVEYS RUNOFF FROM A LOW POINT IN THE PATIO (EL: 21.2) TO THE SAME ENERGY DISSIPATION AREA. THIS CHANNEL IS NECESSARY BECAUSE, IN ORDER TO MAKE THE PATIO AND BUILDING DOORS ACCESSIBLE TO ALL, MUCH OF THE PATIO SURFACE NEEDED TO BE GRADED AHEAD FROM THE RAIN GARDEN. THIS GRATED CHANNEL IS MODELED AFTER THE CHANNEL RECENTLY INSTALLED BENEATH THE SIDEWALK IN THE COMMERCIAL STREET RIGHT-OF-WAY AS PART THE MARRIOTT COURTYARD HOTEL CONSTRUCTION BUT WILL BE SMALLER IN SCALE.
CHANNEL INVERT AT LOW POINT IN PATIO: 20.6
CHANNEL INVERT AT DISCHARGE POINT: 20.15
MAINTAIN 2% SLOPE ALONG CHANNEL
3. BOTH THE ROOF AND PATIO WATER WILL DRAIN INTO A RAIN GARDEN AND PERCOLATE THROUGH THE FocalPoint HIGH RATE BIOFILTER MEDIA (SURFACE EL: 20.0) .
4. DURING LARGER RAIN EVENTS WATER WILL OVERFLOW INTO A HARCO OVERFLOW DRAIN WITH A BEE HIVE GRATE. THE HARCO DRAIN WILL HAVE AN INSERT DESIGNED TO REMOVE TRASH AND FLOATABLES BEFORE THESE MATERIALS GET INTO THE R-TANKS.
RIM ELEVATION: EL: 20.5
12" INV OUT: 16.95
5. DURING EXTREME WEATHER EVENTS, OR IF THE CATCH BASIN GRATE WERE TO CLOG, WATER WILL FLOW OVER A WEIR (EL: 21.0) THAT IS FLUSH WITH THE ADJACENT GRASS AREA THEN FLOW OVER THE LOWLAND PORTION OF THE SITE AND EXIT THE PROPERTY IN THE LOCATION OF THE EXISTING SURFACE DISCHARGE. SOD SHALL BE INSTALLED ON THE GRASS AREA IMMEDIATELY ADJACENT TO THE WEIR .
6. AFTER FILTERING THROUGH THE FOCAL POINT MEDIA RUNOFF WILL FLOW INTO AN UNDERGROUND R-TANK STORAGE AREA (CONCEPTUAL LOCATION SHOWN AS DASHED LINE) . WATER FROM THE CATCH BASIN WILL FLOW INTO THIS SAME R-TANK STORAGE AREA WHERE IT WILL BE DETAINED THEN RELEASED SLOWLY TO KEEP RUNOFF FLOW RATES FROM THE SITE BELOW PREDEVELOPMENT CONDITIONS.
7. WATER WILL DISCHARGE FROM THE R-TANKS INTO A FLOW CONTROL STRUCTURE WITH A SERIES OF ORIFICES TO SLOWLY RELEASE THE STORMWATER RUNOFF. SEE DETAIL.
RIM: 20.7
12" INV IN: 16.9
12" INV OUT: 15.7
8. DISCHARGE FROM THE FLOW CONTROL STRUCTURE WILL OUTLET INTO A LEVEL LIP SPREADER (EL: 12.5) THAT SLOWS AND DISPERSES THE RUNOFF BEFORE IT LEAVES THE SITE IN THE SAME LOCATION AS THE EXISTING SURFACE DISCHARGE.
9. INSTALL EROSION AND SEDIMENTATION CONTROL MULCH BERM ALONG ALL DOWN GRADIENT BOUNDARIES OF THE SITE. BEFORE ANY SOIL DISTURBANCE, CONTRACTOR SHALL CONTACT THE CIVIL ENGINEER (JOHN MAHONEY: 831-61155 john.mahoney@ransomenv.com) TO INSPECT THE ESC MEASURES. IT IS RECOGNIZED THAT THE SPECIFIC GEOMETRY OF THE BERM WILL BE ADJUSTED TO MINIMIZE SOIL DISTURBANCE BASED ON SITE CONDITIONS AND CONSTRUCTION SEQUENCING. THE MULCH BERM IS DESIGNED TO HANDLE DISBURSED SURFACE WATER FLOW ONLY AND NOT CONCENTRATED FLOWS. THESE TOPICS CAN BE DISCUSSED DURING THE INSPECTION.

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GRADES IN THE FIELD AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
2. AREAS NOT REQUIRING GRADING SHALL BE LEFT UNDISTURBED. CONTRACTOR SHALL AVOID THESE AREAS AND PRESERVE ALL EXISTING VEGETATION AS NOTED.
3. UTILITY LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED PRIOR TO CONSTRUCTION. ANY DISCREPANCIES OR CONFLICTS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT.
4. ALL UTILITY INSTALLATIONS SHALL MEET THE REQUIREMENTS OF THE TOWN OF FREEPORT, AS WELL AS ANY OTHER LOCAL, STATE, AND FEDERAL REQUIREMENTS.
5. SITE CONTRACTOR SHALL REPAIR ALL DISTURBED AREAS IN ACCORDANCE WITH THE EROSION CONTROL PLAN AND DETAILS.
6. ALL PROPOSED SLOPES GREATER THAN 3:1 SHALL HAVE AN EROSION MAT INSTALLED OVER FINISH GRADES TO PROTECT SEEDS FROM EROSION. AT CONTRACTOR'S OPTION, SLOPES MAY BE SODDED AS AN APPROPRIATE SUBSTITUTION TO SEED, AND MAT.
7. ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE GUIDELINES ESTABLISHED IN THE BEST MANAGEMENT PRACTICES, AND MAINTAINED THROUGHOUT CONSTRUCTION OF THIS PROJECT.
8. ALL AREAS DISTURBED BY CONSTRUCTION NOT TO BE PAVED OR OTHERWISE TREATED SHALL BE LOAMED AND SEEDED ACCORDING TO THE PROJECT SPECIFICATIONS. EXISTING LAWN AREAS WHICH ARE DISTURBED SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.

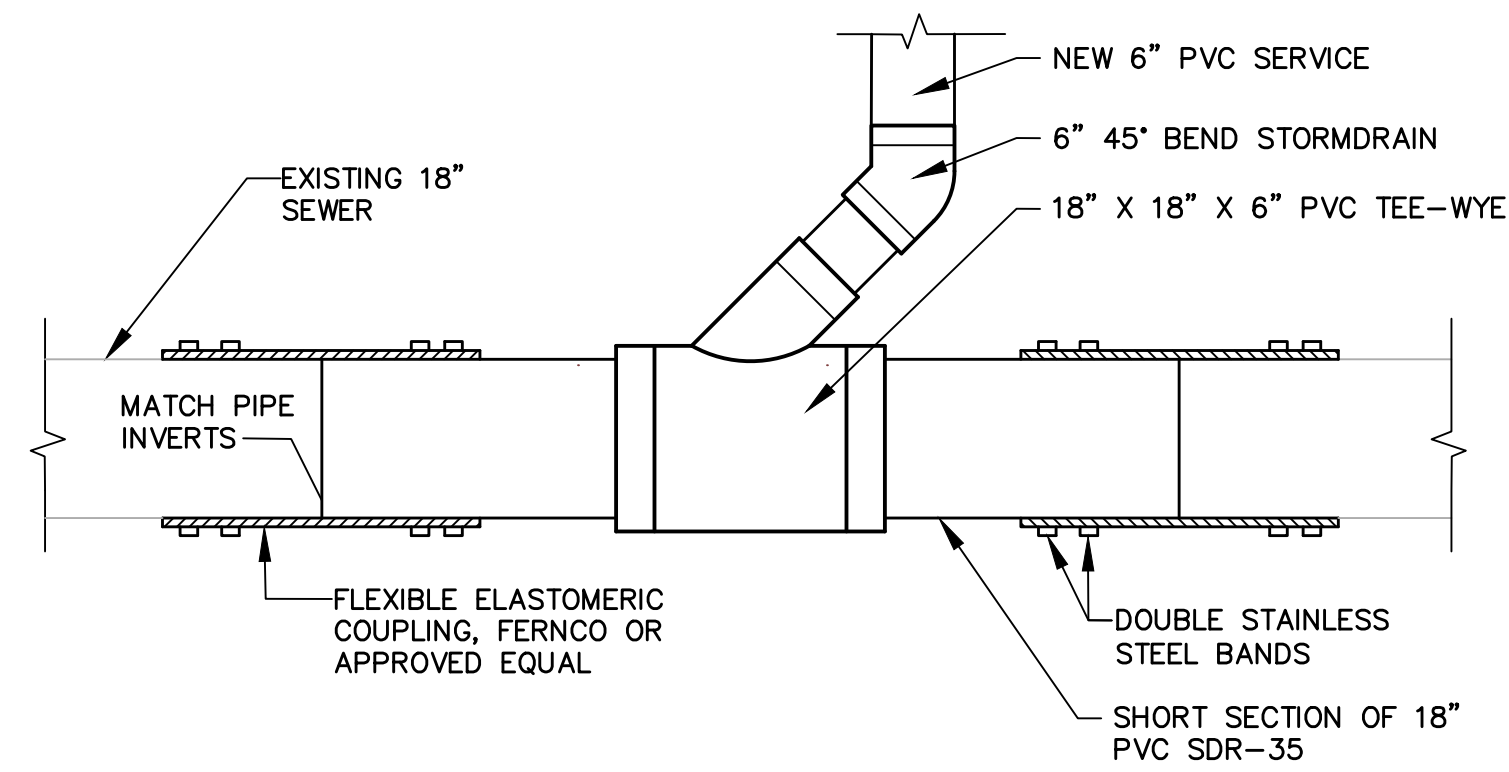


ISSUED FOR PERMITTING ONLY

Drainage & Utility Plan

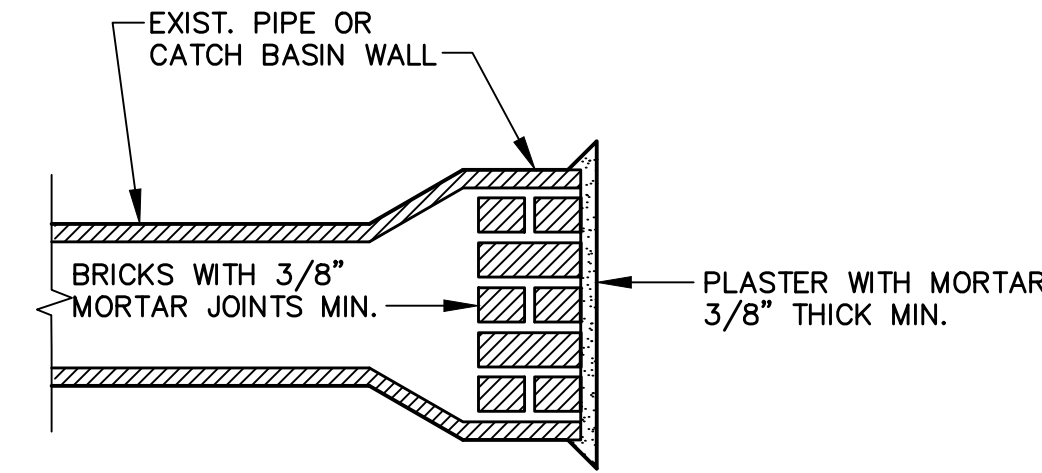
A	City Permitting	7-1-14
No.	Revision/Issue	Date
Design by: JIM		Checked by: SJB
Drawn by: JIM		Approved by: SJB
Project: 131.06132		
Sheet No:		

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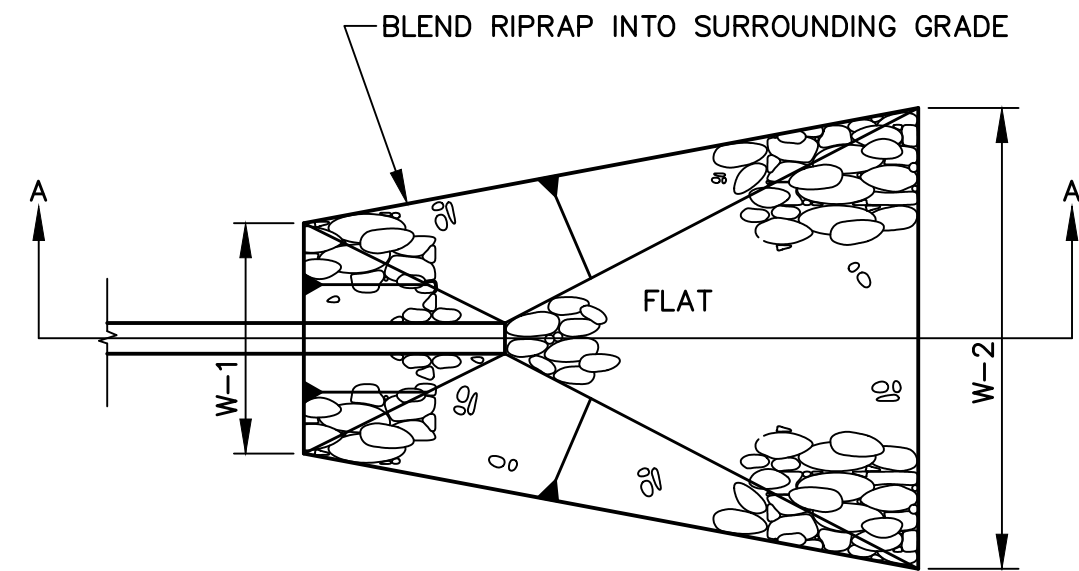


1. The existing sewer may be PVC. If this is the case then the connection shall be made using 18" bell and spigot joints, NOT Ferncos.
2. All damaged piping shall be removed by saw cutting and replaced with new PVC. Contractor shall remove clay bell (by saw cutting) to facilitate Fernco installation. Saw cuts shall be square so that joints between new and existing pipes do not have gaps.
3. Contractor is responsible for maintaining sewer flows while making the new stormdrain connections. Base flow has been observed in the 24" clay sewer. As such, contractor should be prepared for bypass pumping. Bypass pumping shall be coordinated with the City. Contractor shall provide the City 24 hours notice.
4. Bypass pumping may be required and shall be coordinated with the City.

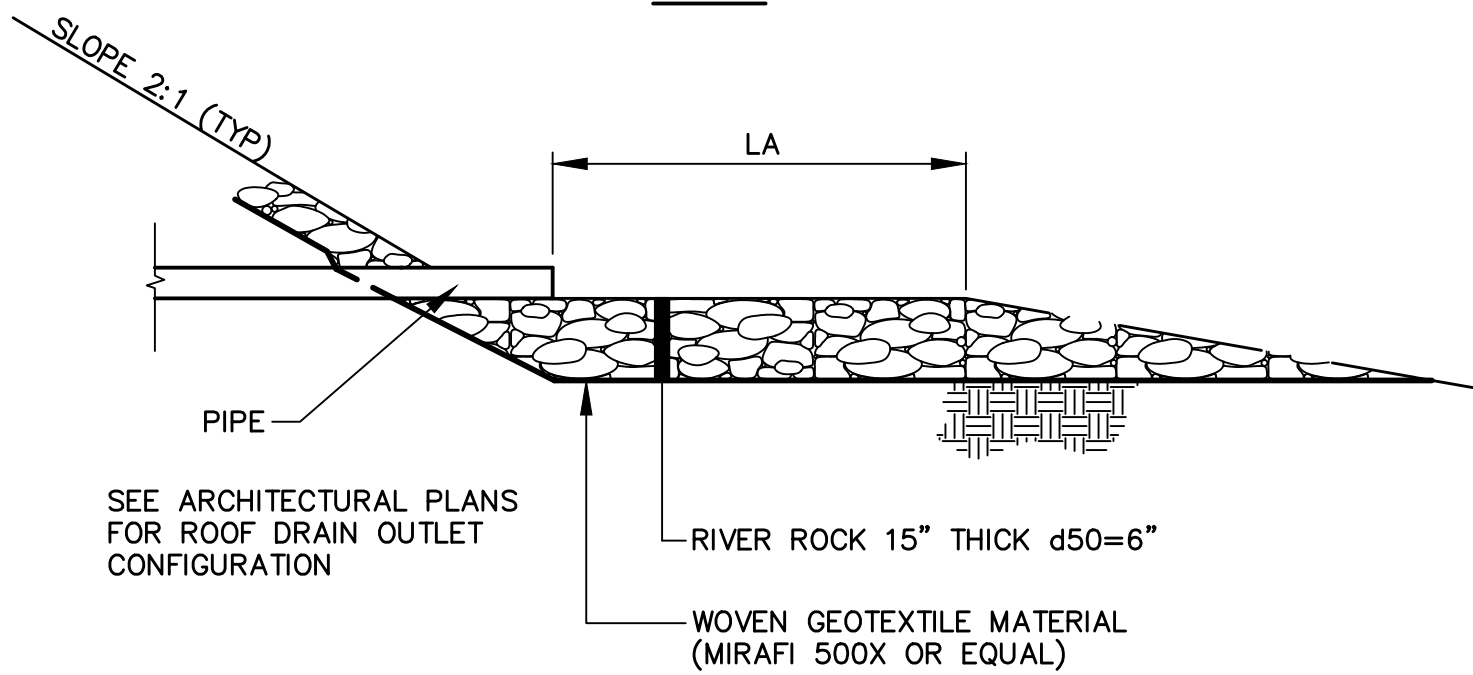
SEWER SERVICE CONNECTION
NOT TO SCALE



MASONRY PLUG DETAIL
NOT TO SCALE



PLAN

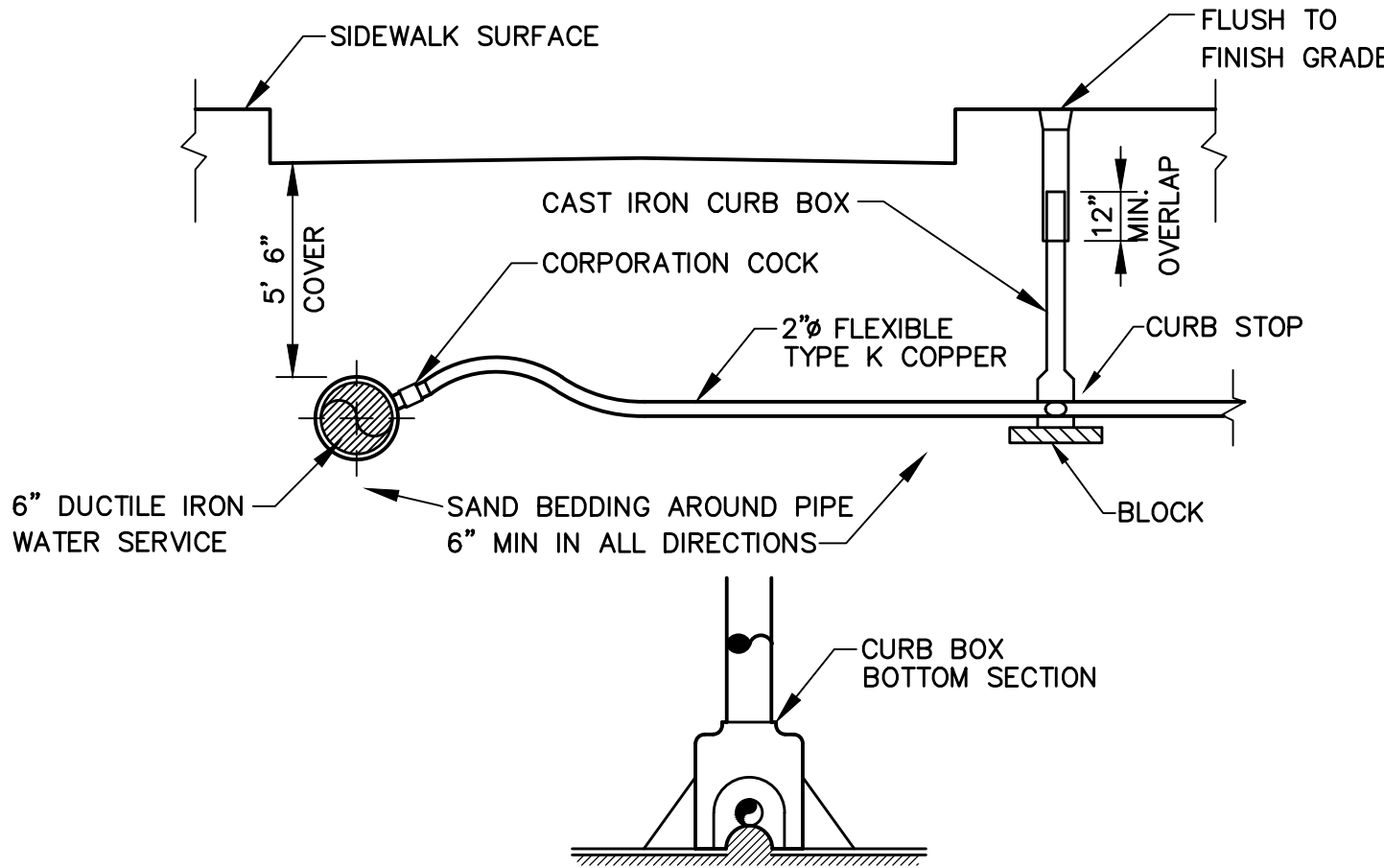


SECTION A-A

APRON SCHEDULE*					
PIPE	RIPRAP**			RIPRAP**	
	d50 SIZE (FT)	THICKNESS t (INCH)	LENGTH LA (FT) (MIN)	WIDTH W1 (FT)	WIDTH W2 (FT)
12" OR LESS	0.5'	15"	10'	3.0'	12'

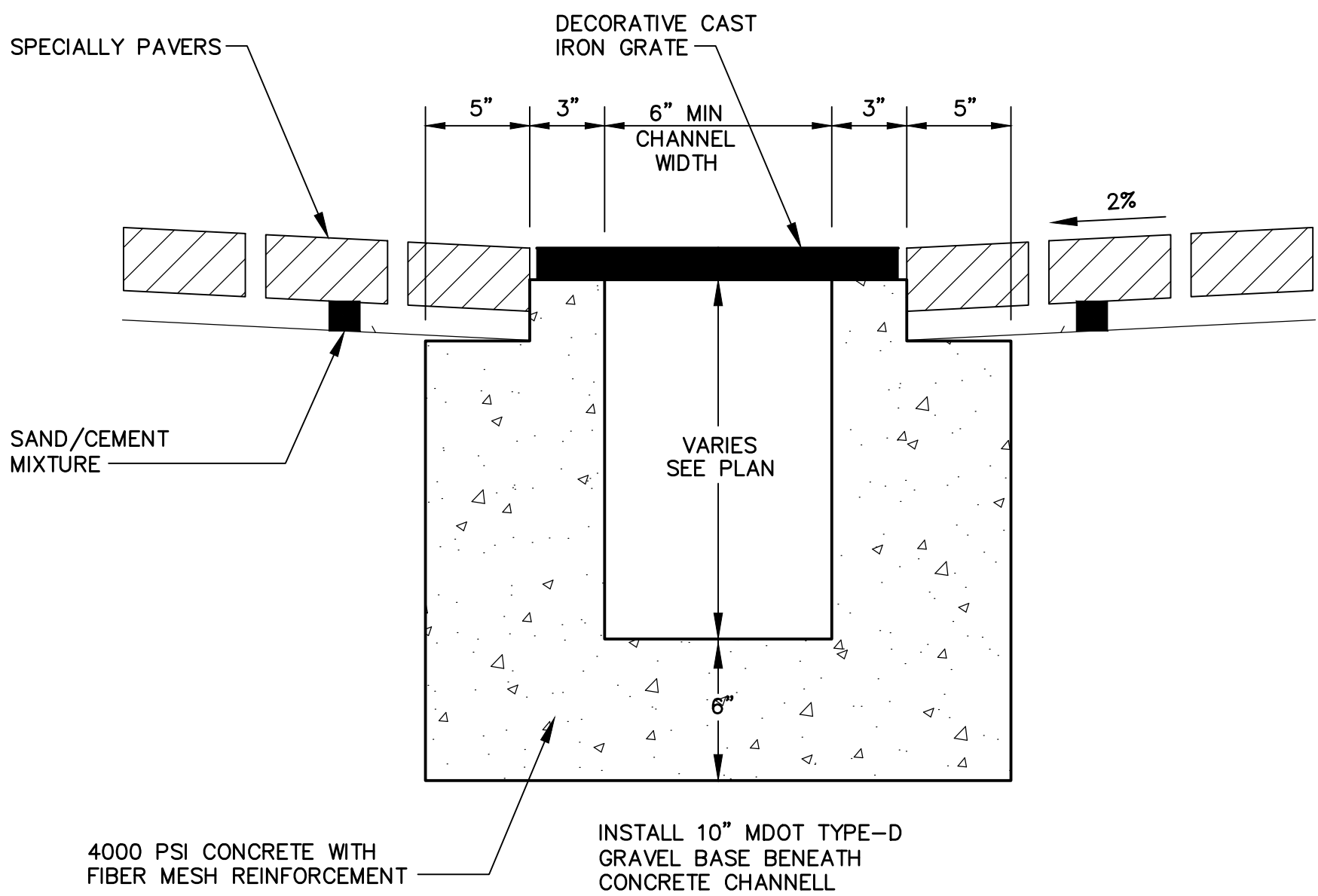
* SEE PLANS FOR SHAPE/SIZE OF ENERGY DISSIPATORS
** RIP RAP SHALL CONSIST OF ROUND NATURAL STONE SUCH AS RIVER ROCK

ENERGY DISSIPATER (RIVER ROCK) DETAIL

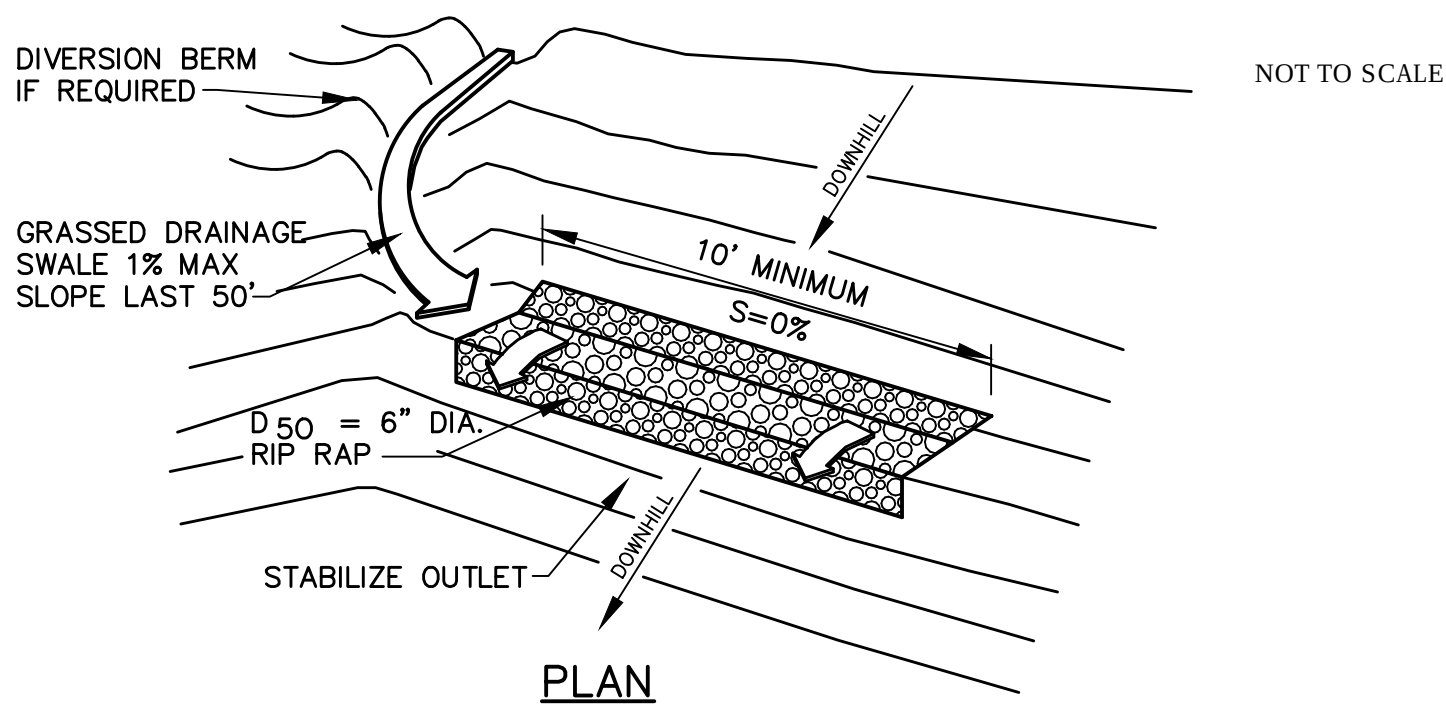


ALL MATERIALS AND WORKMANSHIP SHALL MEET PORTLAND WATER DISTRICT STANDARDS
CONTRACTOR TO COORDINATE WITH PDW FOR SERVICE TAP

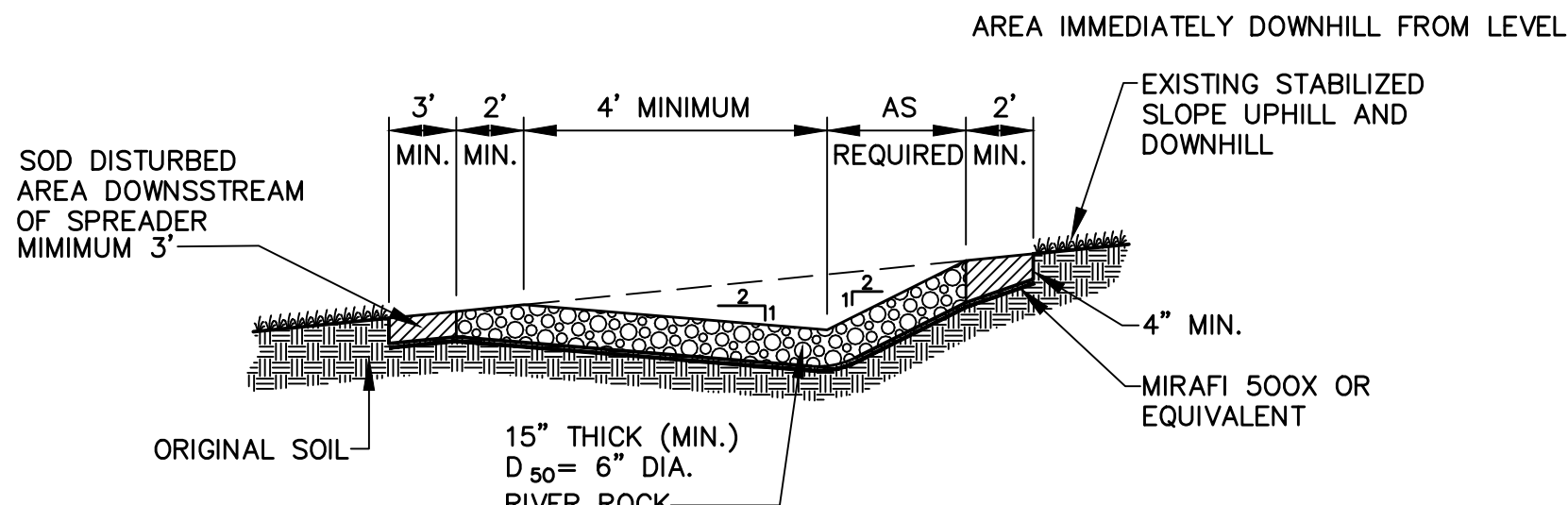
TYPICAL COPPER DOMESTIC SERVICE DETAIL
NOT TO SCALE



GRATED CHANNEL DRAIN IN PAVEMENT AREA
NOT TO SCALE

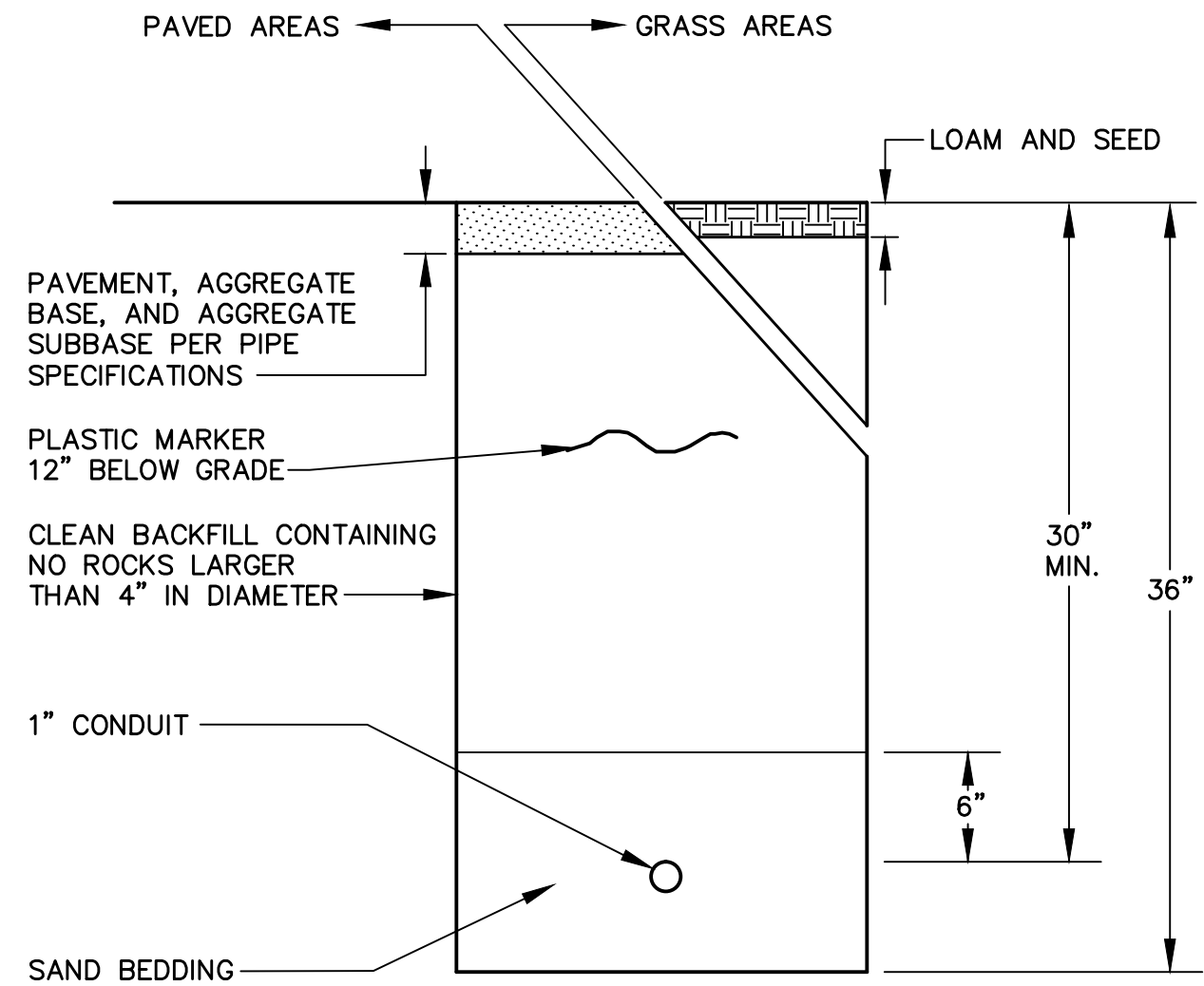


PLAN

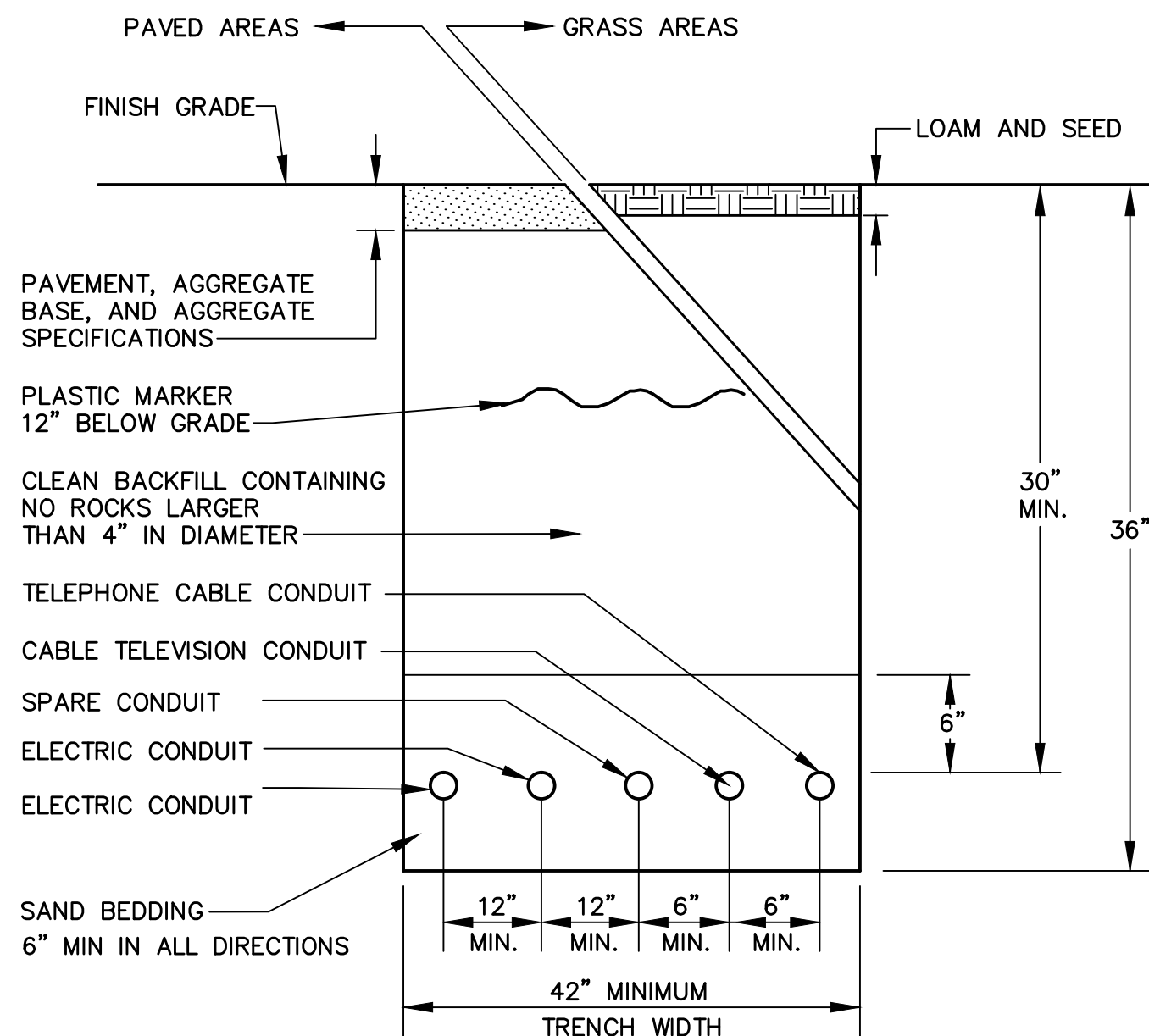


NOTE:
SPREADER SHALL BE LEFT UNDISTURBED.

SECTION
LEVEL SPREADER DETAIL
NOT TO SCALE

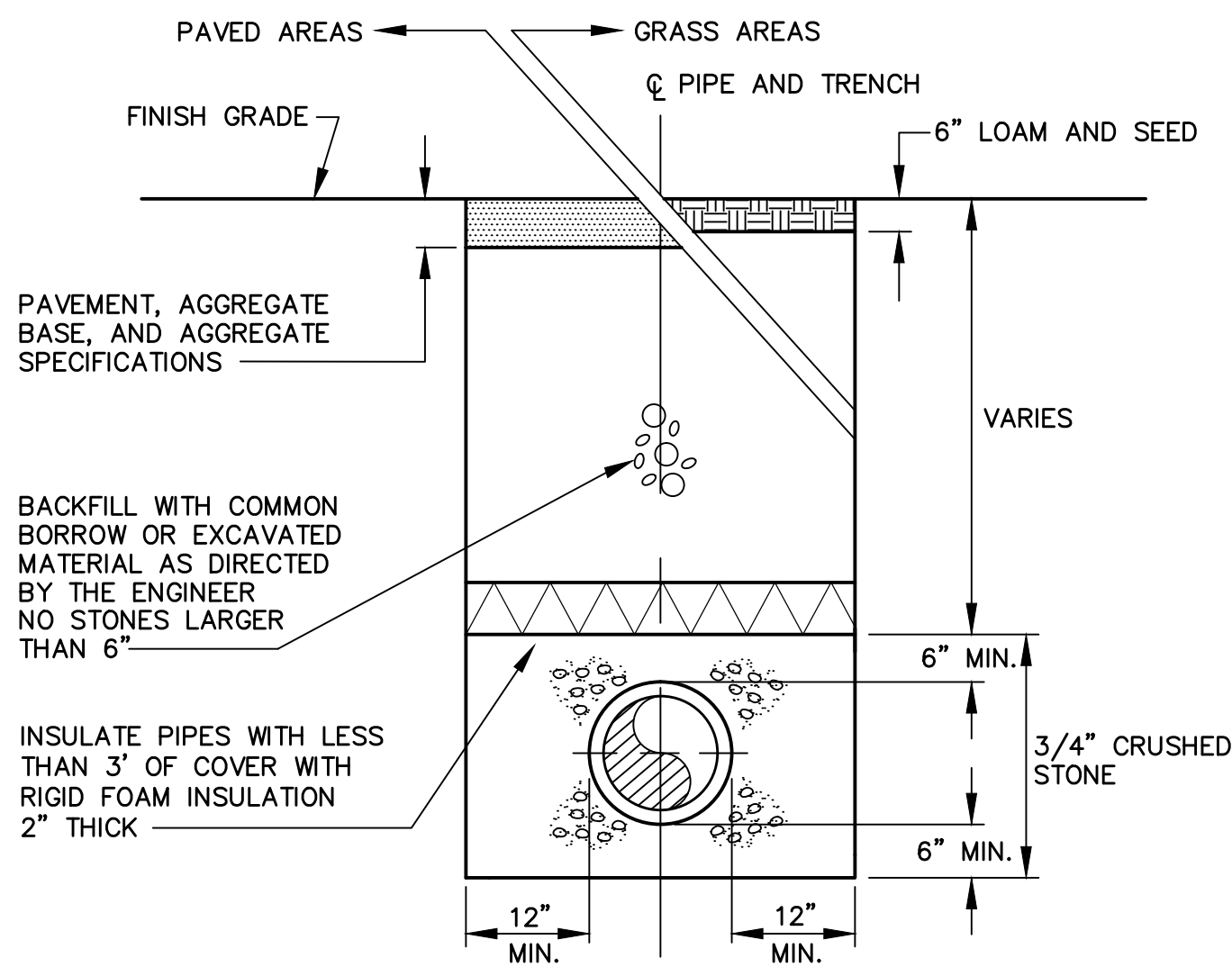


STREET LIGHTING CONDUIT TRENCH DETAIL
NOT TO SCALE



SEE ELECTRICAL PLANS FOR CONDUIT SIZES

UNDERGROUND UTILITY TRENCH DETAIL
NOT TO SCALE



TYPICAL TRENCH - STORMDRAIN & SEWER
NOT TO SCALE

Project:
Bayside Anchor
81 East Oxford Street
Portland, Maine

Prepared for:
Portland Housing Development Corporation
14 Baxter Boulevard
Portland, Maine

KAPLAN THOMPSON ARCHITECTS
424 Fore St., Portland, ME 04101
207-842-2888 fax: 842-2828
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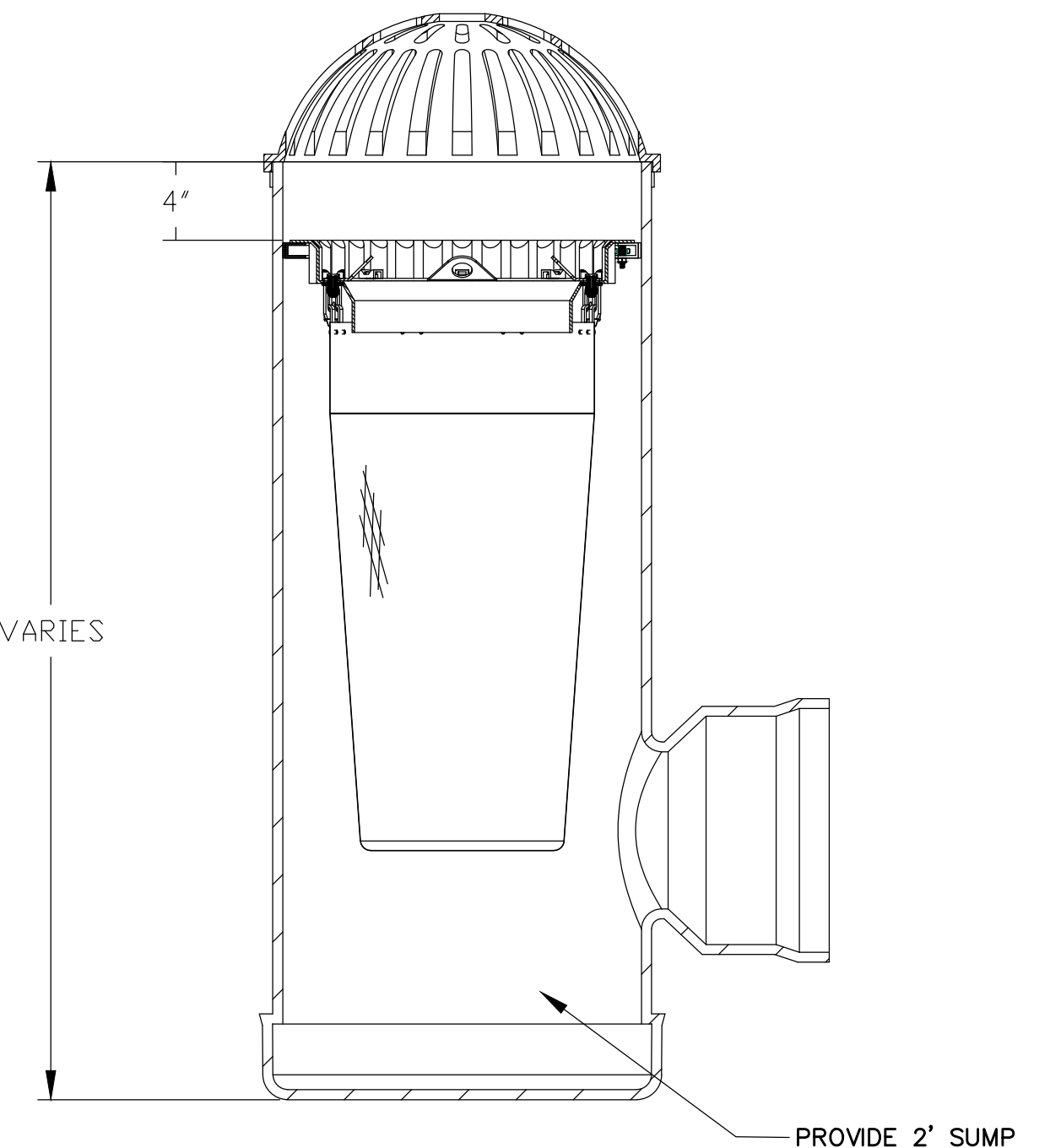
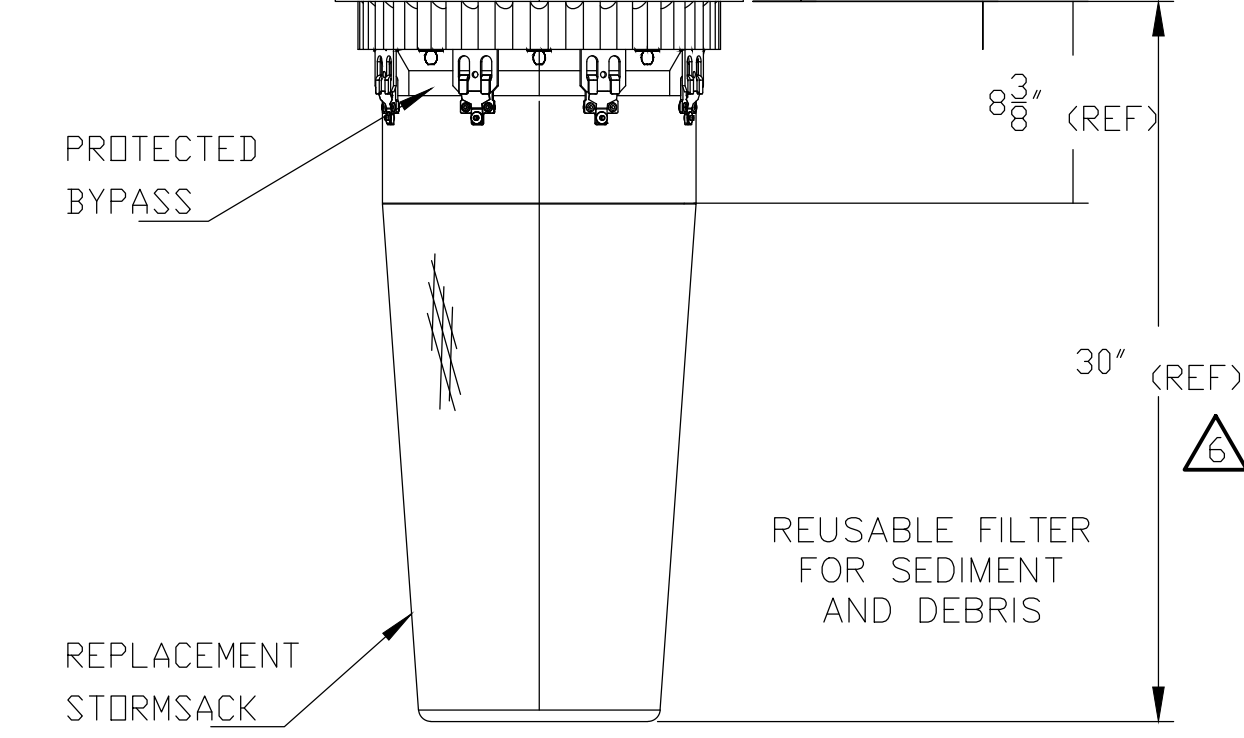
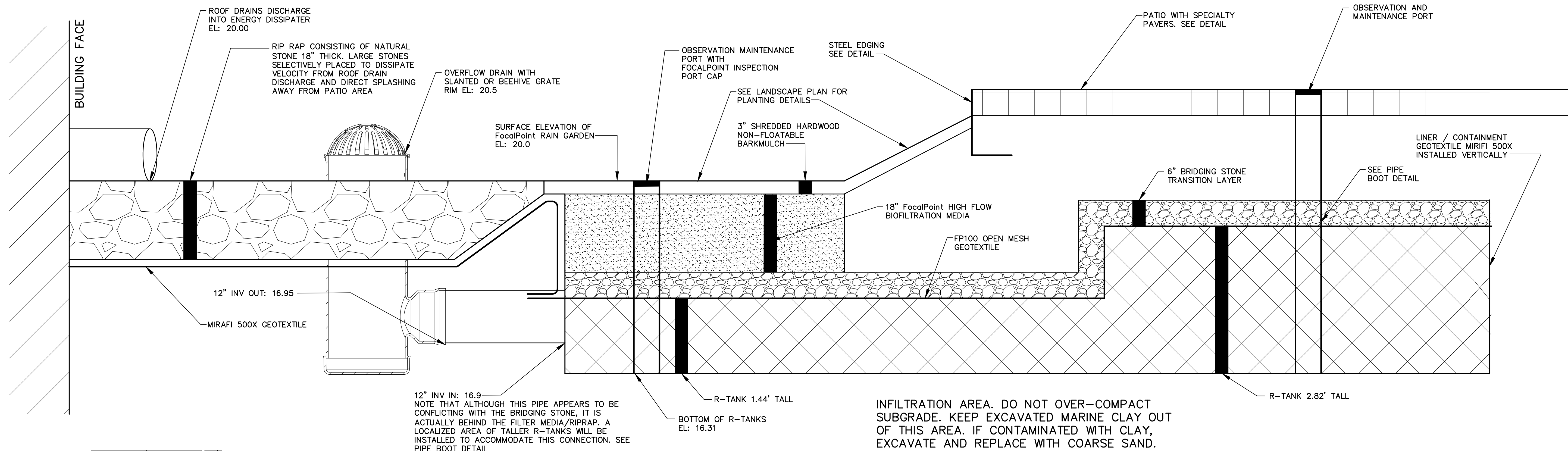
PORTLAND HOUSING MAINE DEVELOPMENT CORPORATION
14 BAXTER BLVD
PORTLAND, ME 04101
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F: 207.774.6471



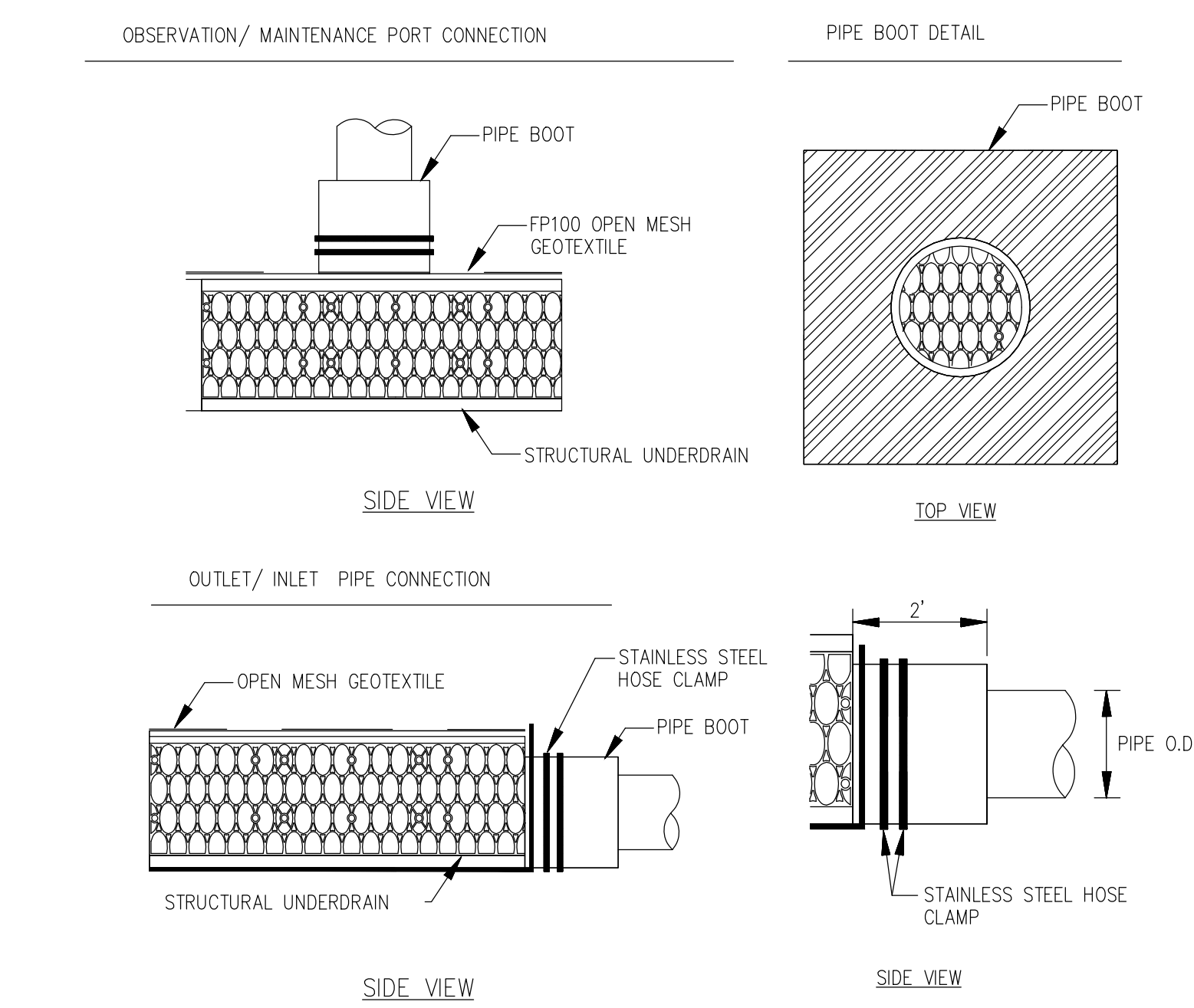
Civil Details

A	City Permitting	7-1-14
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Drawn by:	JIM	Approved by: SUB
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Sheet No:		

C2



SECTION A-A
18" HARCO OVERFLOW DRAIN
NOT TO SCALE



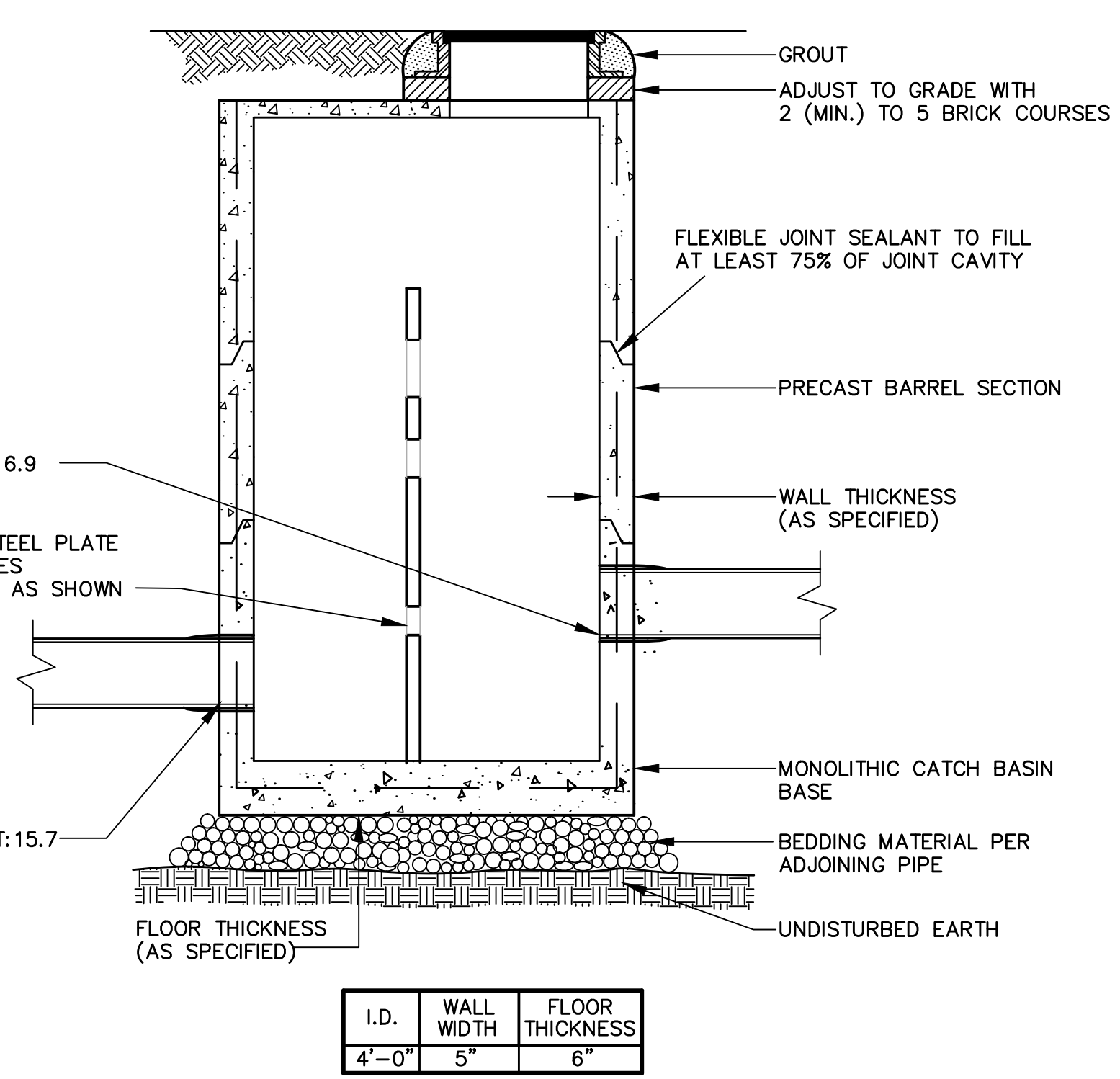
R-TANK PIPE AND OBSERVATION PORT CONNECTIONS
NOT TO SCALE

- NOTES FOR 9780-1-000 18" CATCH-IT:
- PERFORMANCE CHARACTERISTICS (TYP):
 - DEBRIS CAPACITY: 1.65 CU-FT
 - FILTERED FLOW RATE: 1440 GPM (2.5 CFS)
 - BYPASS FLOW RATE: 445 GPM (1.0 CFS)
 - USE ONLY WITH FABCO REPLACEABLE STORMSACK, P/N: 9780-1-200

FOCAL POINT & R-TANK SOTRMWATER MANAEMENT SYSTEM DETAIL
NOT TO SCALE

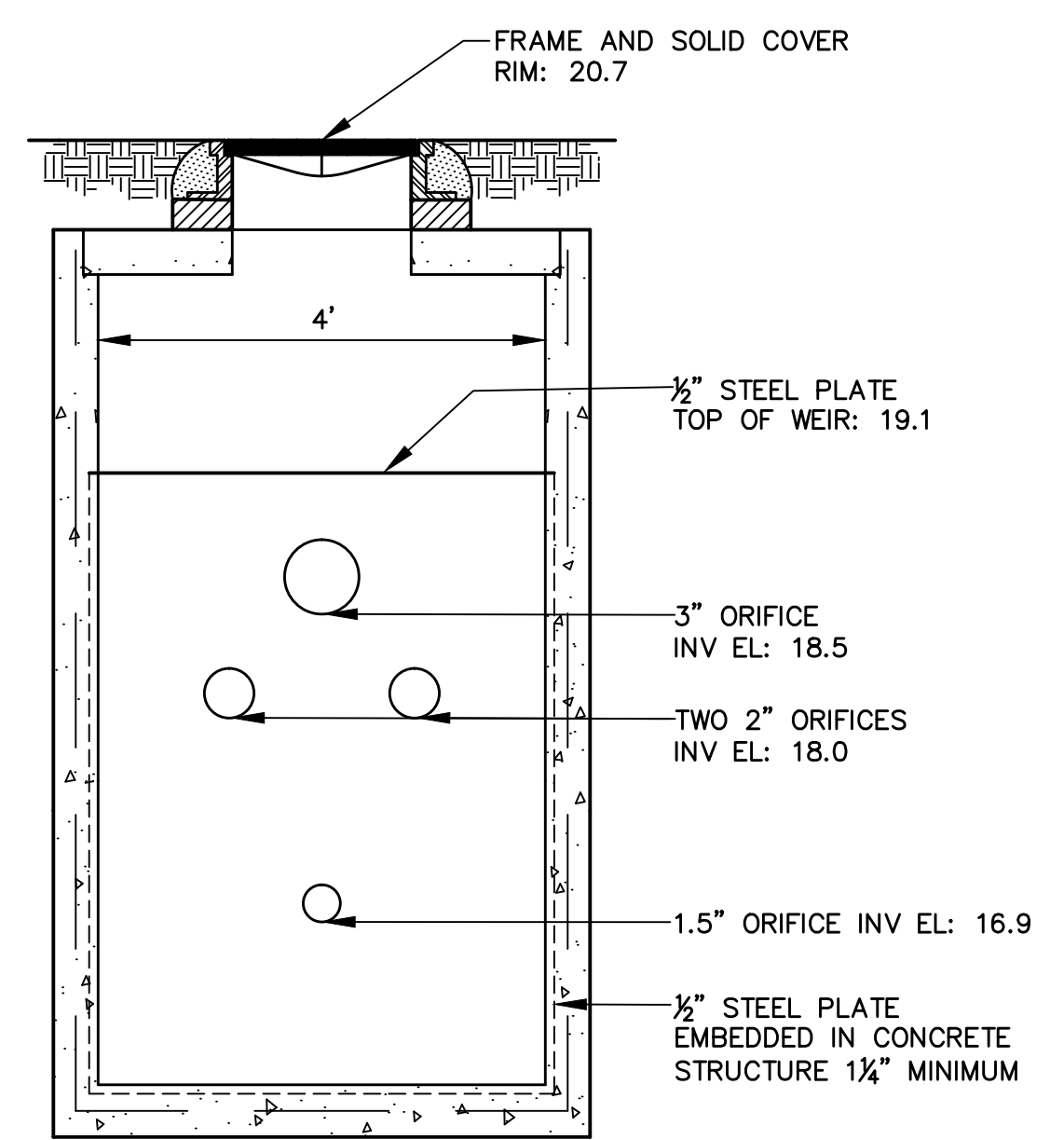
FOCALPOINT R-TANK AND HARCO DRAIN ARE PROVIDED BY FABCO INDUSTRIES, FOR AVAILABILITY CONTACT:

Robert, J Woodman P.E., CPESC
Director, Engineering Support
FABCO Industries, Inc.
93 Falmouth Rd, Falmouth ME 04105
Mobile Office Phone (+1 (207) 272-4431
Fax (+1 (631) 501-5528 |
rwoodman@fabco-industries.com
www.fabco-industries.com



I.D.	WALL WIDTH	FLOOR THICKNESS
4'-0"	5"	6"

FLOW CONTROL STRUCTURE
NOT TO SCALE



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Portland, Maine

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Portland, Maine

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F: 207.774.6471

STATE OF MAINE
John L. Mahoney
#12340
LICENSED PROFESSIONAL ENGINEER

Drainage Details

A	City Permitting	7-1-14
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Drawn by:	JIM	Approved by: SUB
Project:	131.06132	
Sheet No:	C3	

Existing Erosion Problems

Ransom Consulting, Inc. is not aware of any existing erosion problems on site.

Protected Natural Resources

There are no wetlands on-site that have been observed or delineated.

Erosion Control Measures and Site Stabilization

The primary emphasis of the erosion & sediment control plan is as follows:

- Rapid vegetation of exposed areas to minimize the period of soil exposure.
- Rapid stabilization of drainage paths to avoid channel erosion.
- The use of on-site measures to capture sediment (hay bale dam, erosion control berm)
- Development of a careful construction sequence.

The following temporary and permanent erosion and sediment control devices will be implemented as part of the site development. These devices shall be installed as indicated on the plans or as described within this report. For further reference, see the Maine Erosion and Sediment Control BMPs (most recent revision).

Temporary Erosion Control Measures

The following measures are planned as temporary erosion & sedimentation control measures during construction. These temporary erosion control measures should be removed within 30 days after permanent stabilization has been established.

1. Crushed stone--stabilized construction entrances shall be placed at site entrances.
2. Wood waste compost berms (erosion control berm) shall be installed downstream of any disturbed areas to trap runoff borne sediments until the tributary areas are vegetated. The erosion control berms shall be installed per the details provided and inspected regularly, including before and after a storm event of 0.5 inches or greater. Repairs shall be made if there are any signs of erosion or sedimentation below the fence or berm line. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind berm, the barrier shall be replaced with a stone check dam.
3. Straw, hay mulch and hydroseeding is intended to provide cover for bare or seeded areas until vegetation is established and should be applied within 7 days at a rate a 115 pounds per 1000 square feet. Mulch placed between April 15th and October 15th (on slopes of less then 15 percent) shall be anchored by applying water. Mulch placed on slopes of equal to or steeper than 15 percent shall be covered by fabric netting and anchored with staples in accordance with manufacturer's recommendation. Slopes steeper than 3:1 shall receive erosion control blankets or rip rap.
4. Temporary stockpiles of stumps, grubblings, or common excavation will be protected as follows:
 - Stockpiles shall be stabilized within seven days by either temporarily seeding the stockpile by a hydroseed method containing an emulsified mulch tackifier or by covering the stockpile with mulch, such as shredded hay, straw, or erosion control mix.
 - Stockpiles shall be surrounded by sedimentation barrier at the time of formation.
5. All disturbed areas that are within 75 Feet of an undisturbed wetland shall receive mulch or erosion control mesh fabric within 48 hours of initial disturbance of soil. All areas within 75 Feet of an undisturbed wetland shall be mulched prior to any predicted rain event regardless of the 48 hour window. In other areas, the time period may be extended to 7 days.
6. State and local roads shall be swept to control mud and dust as necessary. Additional stone shall be added to the stabilized construction entrance to minimize the tracking of material off the site and onto the surrounding roadways.
7. Stormdrain catch basin inlet protection shall be provided through the use of stone sediment barriers or approved sediment bags (such as Silt Sack). Installation details are provided in the plan set. The barriers shall be inspected after each rainfall and repairs made as necessary. Sediment shall be removed and the barrier restored to its original dimensions when the sediment has accumulated to half the design depth of the barrier. The barrier shall be removed when the tributary drainage area has been stabilized.
8. Water and/or calcium chloride shall be furnished and applied in accordance with MDOT specifications--Section 637--Dust Control.
9. Loam and seed is intended to serve as the primary permanent vegetative measure for all bare areas not provided with other erosion control measures, such as riprap.
10. Water from construction trench dewatering or temporary stream diversion shall pass first through a filter bag or secondary containment structure (e.g. hay bale lined pool) prior to discharge. The discharge site shall be selected to avoid flooding, icing, and sediment discharges to a protected resource. In no case shall the filter bag or containment structure be located within 75 feet of a protected natural resource.

Permanent Erosion Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. All areas disturbed during construction, but not subject to other restoration (paving, riprap, etc.) will be loamed, limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas as noted. All areas within 75 feet of an undisturbed wetland shall be mulched prior to any predicted rain event regardless of the 48 hour window. Native topsoil shall be stockpiled and reused for final restoration when it is of sufficient quality.
2. All stormdrain pipe outlets shall have riprap aprons at their outlet to protect the outlet and receiving channel from scour and deterioration. Installation details are provided in the plan set. The aprons and plunge pools shall be installed and stabilized to the extent practicable prior to directing runoff to the tributary pipe or culvert.
3. Catch basins shall be provided with sediment sumps and inlet hoods for all outlet pipes that are 18" in diameter or less.

Implementation Schedule

The following construction sequence shall be required to insure the effectiveness of the erosion and sedimentation control measures are optimized:

Note: For all grading activities, the contractor shall exercise extreme caution not to overexpose the site by limiting the disturbed area. The construction of BMPs should either be performed after the tributary area is stabilized or temporary erosion control measures need to be implemented to protect the BMPs from being clogged with construction sediment.

1. Install crushed stone to stabilized construction entrances.
2. Install perimeter erosion control berm.
3. Clear and grub site within the specified clearing limits.
4. Commence installation of drainage infrastructure.
5. Commence earthwork and grading to subgrade.
6. Commence construction of building foundation.
7. Continue earthwork and grading to subgrade as necessary for construction.
8. Complete remaining earthwork operations.
9. Complete installation of drainage infrastructure.
10. Install subbase and base gravel within proposed expansion and parking.
11. Loam, lime, fertilize, seed and mulch disturbed areas.
12. Install surface course paving for driveway and parking areas.
13. Once the site is stabilized and a 90% catch of vegetation has been obtained, remove all temporary erosion control measures.
14. Touch up loam and seed.

Note: All bare areas not subject to final paving, riprap, or gravel; shall be vegetated.

Prior to construction of the project, the contractor shall submit to the owner a schedule for the completion of the work, which will satisfy the above construction sequence in the specified order, however, several separate items may be constructed simultaneously. Work must also be scheduled or phased to reduce the extent of the exposed areas as specified below. The intent of this sequence is to provide for erosion control and to have structural measures such as erosion control and construction entrances in place before large areas of land are stripped.

- The work shall be conducted in sections which shall:
- Limit the amount of exposed area to those areas in which work is expected to be undertaken during the preceding 30 days.
 - Vegetate the disturbed areas as rapidly as possible. All areas shall be permanently stabilized within seven days of final grading or before a storm event; or temporarily stabilized within 48 hours of initial disturbance of soil for areas within 75 feet of an undisturbed wetland and 7 days for all other areas.
 - Incorporate planned inlets and drainage system as early as possible into the construction phase. The ditches shall be immediately lined or vegetated as soon as their installation is complete.

Winter Stabilization Plan

The winter construction period is from November 1 through April 15. If the construction site is not stabilized with pavement, a road gravel base, 75% mature vegetation cover or riprap by November 15th, then the site shall be protected with over-winter stabilization.

Winter excavation and earthwork shall be completed such that any area left exposed can be controlled by the contractor. Exposed areas shall be limited to those areas in which work is expected to commence and complete in the next fifteen (15) days and that can be mulched within one day prior to any snow event.

All areas shall be considered to be bare until the subbase gravel is installed within pavement/building areas or the areas have been loamed, seeded and mulched. Hay and straw mulch rate shall be a minimum of 150 pounds per 1,000 square feet (3 tons/acre) and shall be properly anchored.

The contractor shall install any added measures, which may be necessary to control erosion/sedimentation from the site dependent upon the actual site and weather conditions. Continuation of earthwork operations on additional areas shall not begin until the exposed soil surface on the area being worked has been stabilized, in order to minimize areas without erosion control protection.

1. Soil Stockpiles
Stockpiles of soil or subsoil shall be mulched for over winter protection with hay or straw at twice the normal rate or at 150 lbs/1,000 SF. (3 tons per acre) or with a four-inch layer of woodwaste erosion control mix. This shall be done within 24 hours of stocking and re-established prior to any rainfall or snowfall. Any soil stockpile shall not be placed (even covered with hay or straw) within 100 feet from any natural resources.
2. Sediment Barriers
During frozen conditions, sediment barriers shall consist of woodwaste filter berms as frozen soil prevents the proper installation of hay bales and sediment silt fences.
3. Mulching
An area shall be considered bare until areas of future loam and seed have been loamed, 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 SF. or 1.5 tons/acre) and shall be properly anchored. 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 with straw or hay at a rate of 150 lb. per 1,000 square feet (3 tons/acre) and adequately anchored that ground surface is not visible though the mulch.

Between the dates of November 1st and April 15th all mulch shall be anchored by peg line, mulch netting, tracking, or wood cellulose fiber. When ground surface is not visible through the mulch then cover is sufficient. After November 1st, mulch and anchoring of all bare soil shall occur at the end of each final grading workday.

4. Mulching on Slopes and Ditches
Slopes shall not be left exposed for any extended time of work suspension unless fully mulched and anchored with peg and netting or with erosion control blankets. Mulching shall be applied at a rate of 230 lbs/1,000 s.f. on all slopes greater than 8%.

Mulch netting shall be used to anchor mulch in all drainage ways with a slope greater than 3% for slopes exposed to direct winds and for all other slopes greater than 8%. Erosion control blankets shall be used in lieu of mulch in all drainage ways with slopes greater than 8%. Erosion control mix can be used to substitute erosion control blankets on all slopes except ditches.

5. Seeding
Between the dates of October 15th and April 1st, loam or seed will 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 such time as the final treatment can be applied. If the date is after November 1st and if the exposed area has been loamed, final graded with a uniform surface, then the area may be dormant seeded at a rate of three times higher than specified for permanent seed and then mulched. Dormant seeding may be selected to be placed prior to the placement of mulch and fabric netting anchored with staples. 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/1000 SF.

All areas seeded during the winter shall be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 90% 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.

6. Dewatering
Water from construction trench dewatering or temporary stream diversion shall pass first through a filter bag or secondary containment structure (e.g. hay bale lined pool) prior to discharge. The discharge site shall be selected to avoid flooding, icing, and sediment discharges to a protected resource.

7. Inspection and Monitoring
Maintenance measures shall be applied as needed during the entire construction season. After each rainfall, snow storm or period of thawing and runoff, the site contractor shall perform a visual inspection of all installed erosion control measures and perform repairs as needed to insure their continuous function. Following the temporary and/or final seeding and mulching, the contractor shall in the spring inspect and repair any damages and/or unestablished spots. Established vegetative cover means a minimum of 85% to 90% of areas vegetated with vigorous growth.

Standards for Timely Stabilization of Construction Sites During Winter

Standard for the timely stabilization of disturbed soils
By September 15th the applicant shall seed and mulch all disturbed soils on areas having a slope less than 15%. If the applicant fails to stabilize these soils by this date, then the applicant shall take one of the following actions to stabilize the soil for late fall and winter.

Stabilize the soil with temporary vegetation--By October 1st the applicant shall seed the disturbed soil with winter rye at a seeding rate of three pounds per 1000 square feet, lightly mulch the seeded soil with hay or straw at 75 pounds per 1000 square feet, and anchor the mulch with plastic netting. The applicant shall monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or cover at least 75% of the disturbed soil before November 15th, then the applicant shall mulch the area for over-winter protection as described above.

Stabilize the soil with sod--The applicant shall stabilize the disturbed soil with properly installed sod by October 1st. Proper installation includes the applicant 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 the applicant shall mulch the disturbed soil by spreading hay or straw at a rate of at least 150 pounds per 1000 square feet on the area so that no soil is visible through the mulch. Prior to applying the mulch, the applicant shall remove any snow accumulation on the disturbed area. Immediately after applying the mulch, the applicant will anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

Maintenance of Facilities

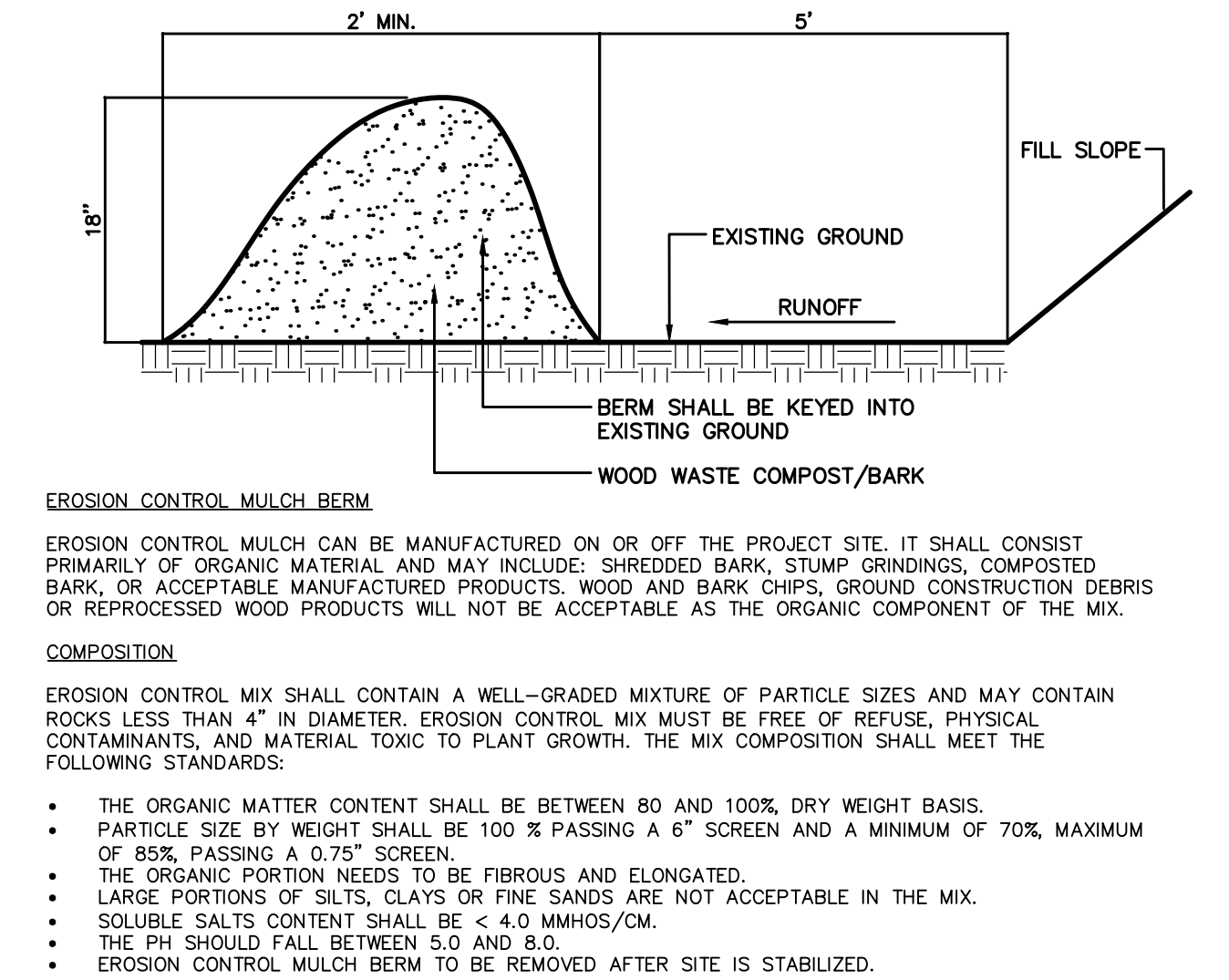
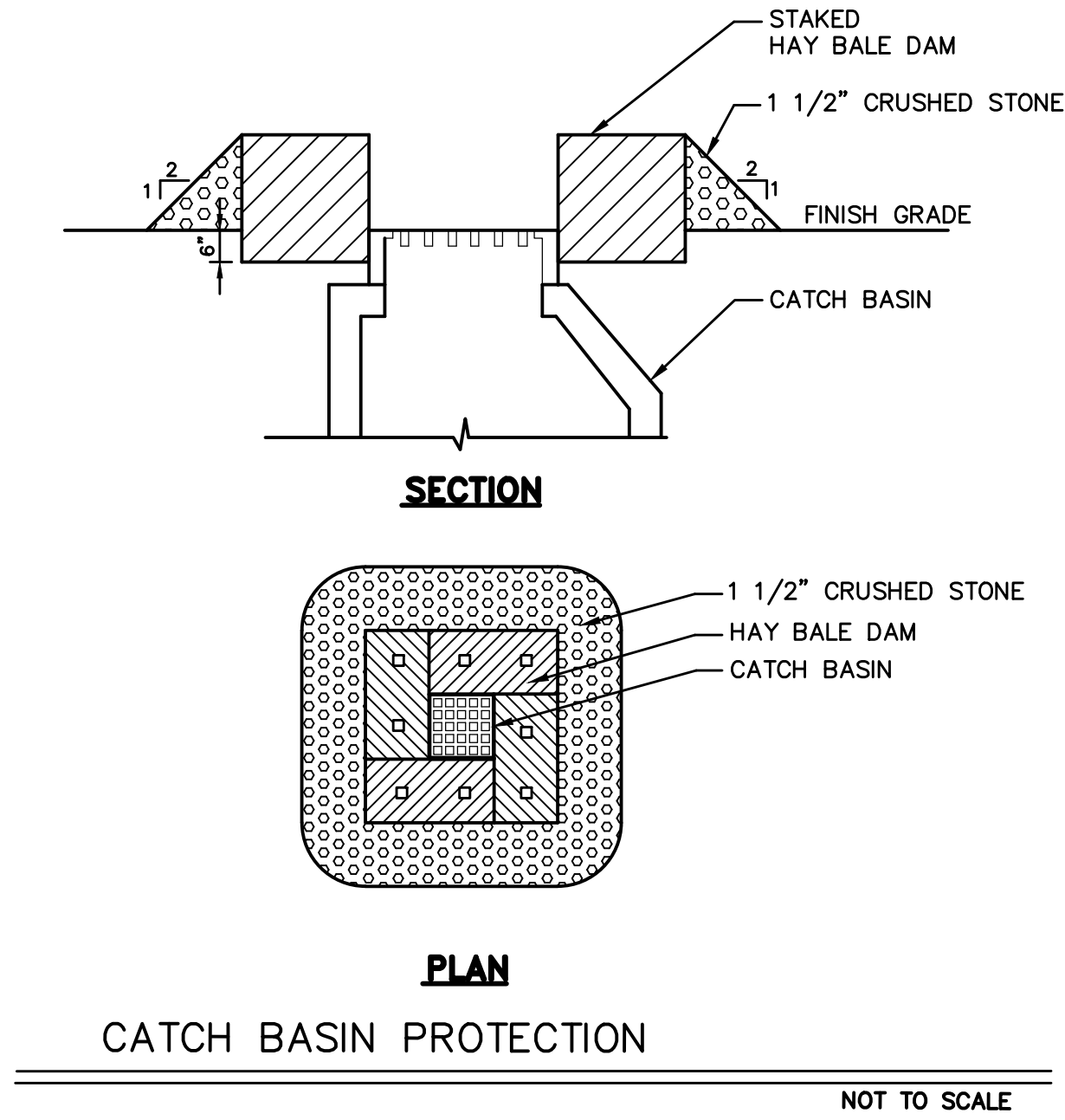
The stormwater facilities will be maintained by the Owner. The contract documents will require the contractor to designate a person responsible for maintenance of the sedimentation control features during construction as required by the Erosion Control Report and/or Construction Plans. Long-term operation/maintenance recommended for the stormwater facilities is presented below and should be recertified every five years.

The responsible party may contract with such professionals, as may be necessary in order to comply with this provision and may rely on the advice of such professionals in carrying out its duty hereunder, provided, that the following operation and maintenance procedures are hereby established as a minimum for compliance with this section.

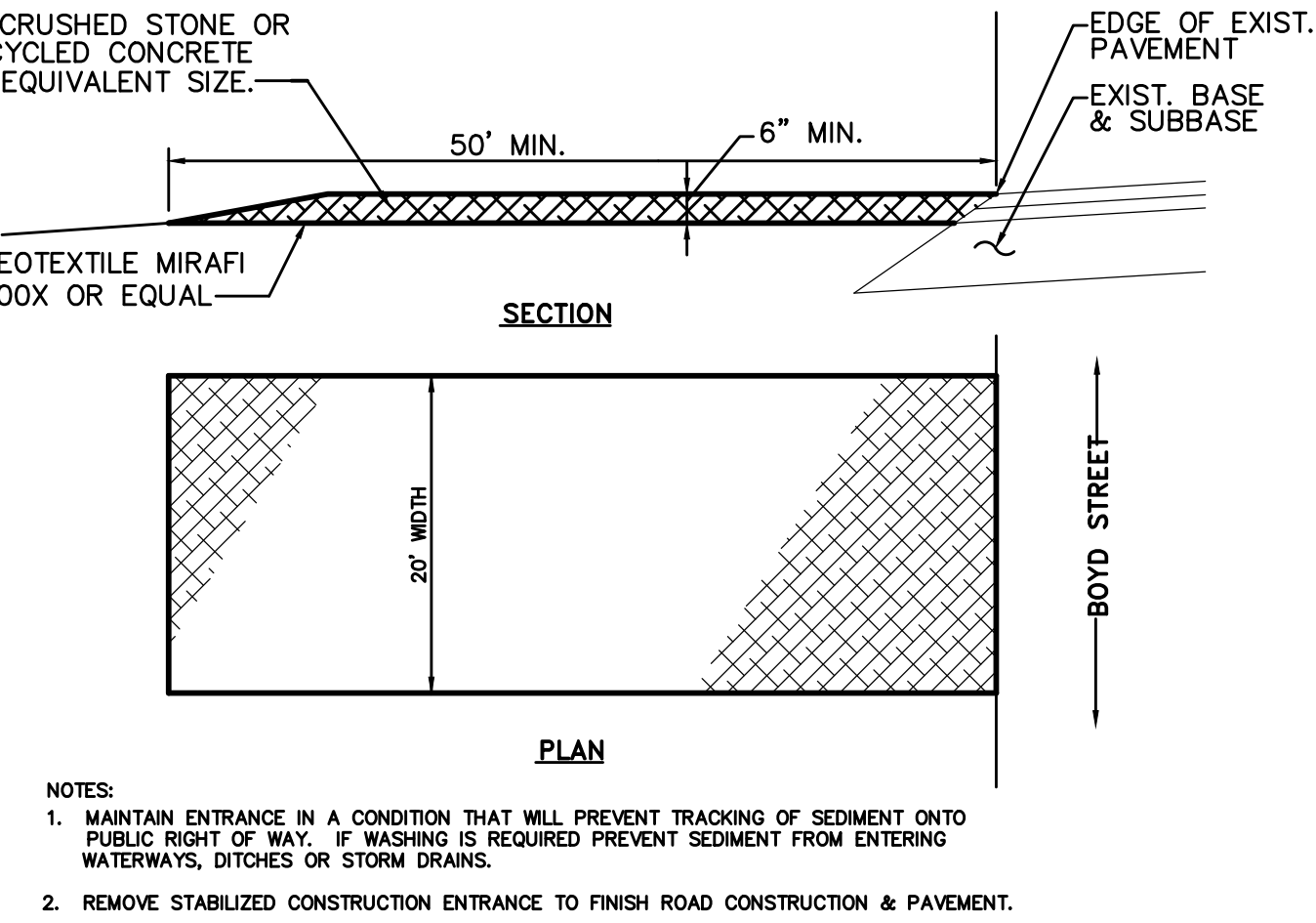
Inspection and Maintenance Frequency and Corrective Measures:
The following areas, facilities, and measures will be inspected and the identified deficiencies will be corrected. Clean-out must include the removal and legal disposal of any accumulated sediments and debris.

Underdrained Surface Soil Filter Basin:
Inspect basin two times per year (preferably in spring and fall) to ensure that water infiltrates into the subsurface completely (Treatment volume must drain over a minimum time 24 hours and a maximum time of 48 hours) and that vegetation is carefully managed to prevent creating mosquito and other vector habitats. The use and regular maintenance of pretreatment BMPs will significantly minimize maintenance requirements for the basin. Scarification or other disturbance should only be performed when there are actual signs of clogging or significant loss of infiltration capacity, rather than on a routine basis. Always remove deposited sediments as required.

Parking Surfaces:
Clear accumulations of winter sand in parking lots at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping.



EROSION CONTROL MULCH BERM
NOT TO SCALE



STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

Project:

Bayside Anchor

81 East Oxford Street
Portland, Maine

Prepared for:

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KAPLAN THOMPSON

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C

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STATE OF MAINE

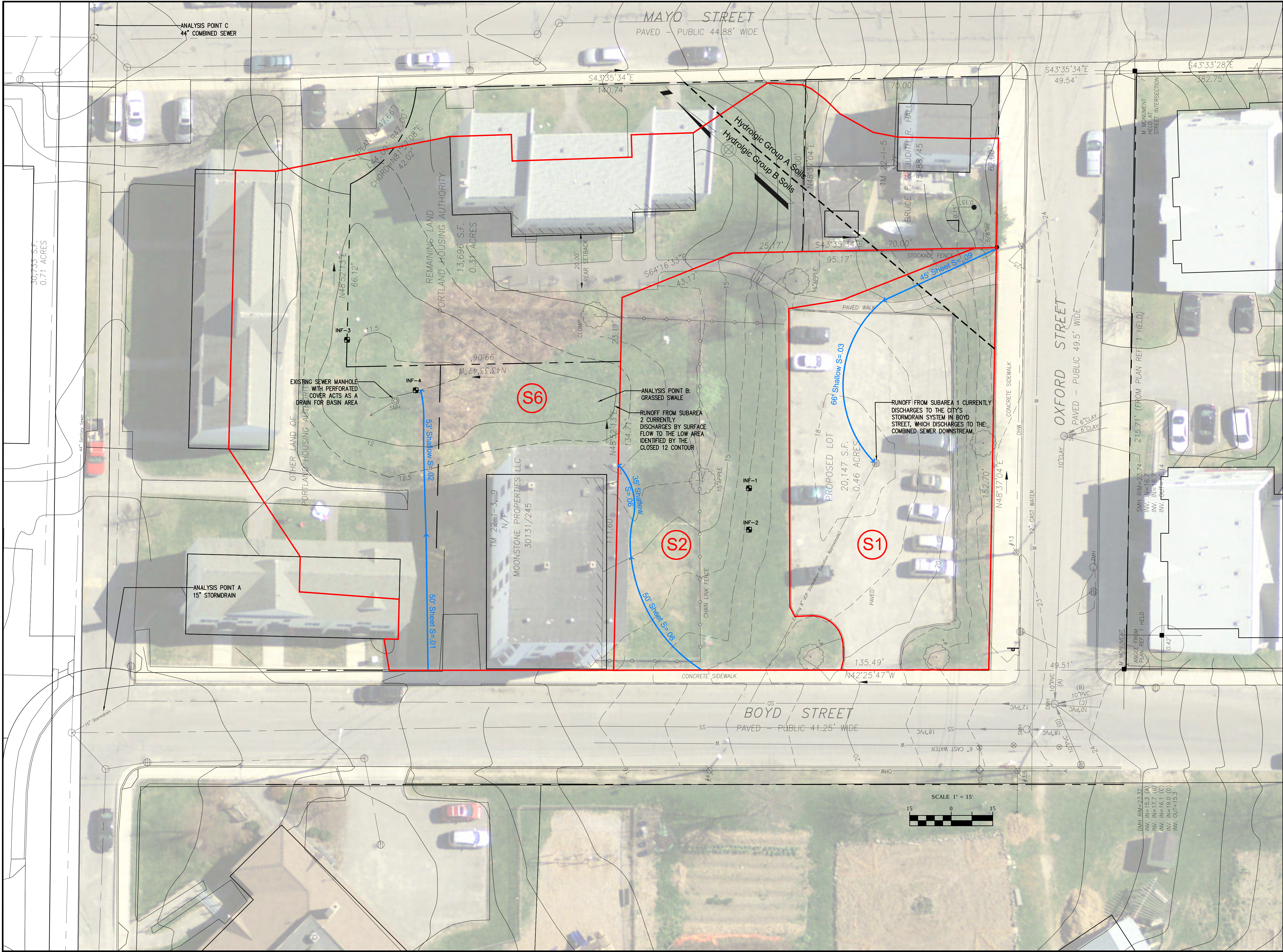
John Mahoney

#12340

REGISTERED PROFESSIONAL ENGINEER

ESC Details & Notes

A	City Permitting	7-1-14
No.	Revision/Issue	Date
Design by:	JIM	Checked by: SUB
Drawn by:	JIM	Approved by: SUB
Project:	131.06132	
Sheet No:	C4	
Sheet 1 of ---		



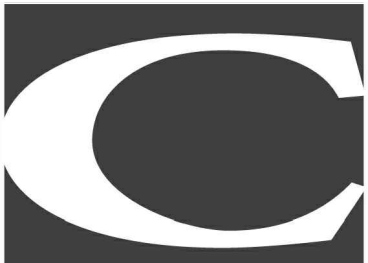
Project:

Bayside Anchor
81 East Oxford Street
Portland, Maine

Prepared for:

Portland Housing
Development Corporation
14 Baxter Boulevard
Portland, Maine

KAPLAN THOMPSON
ARCHITECTS
424 fore st., portland, me 04101
207-842-2888 fax: 842-2828
jesse@kaplanthompson.com



CARROLL ASSOCIATES
LANDSCAPE ARCHITECTS
217 COMMERCIAL STREET, STE 200
PORTLAND, MAINE 04101
207.772.1552 V. F. 207.772.0712



BECKER
STRUCTURAL ENGINEERS

75 YORK ST.
PORTLAND, ME 04101
P: 207.879.1838
F: 207.879.1822



RANSOM
Consulting, Inc.

400 Commercial Street, Suite 404,
Portland, Maine 04101
Tel (207) 772-2891
Fax (207) 772-3248
www.ransomenv.com



PORTLAND HOUSING
MAINE DEVELOPMENT CORPORATION

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PORTLAND, ME 04101
P: 207.773.4753
F: 207.774.6471

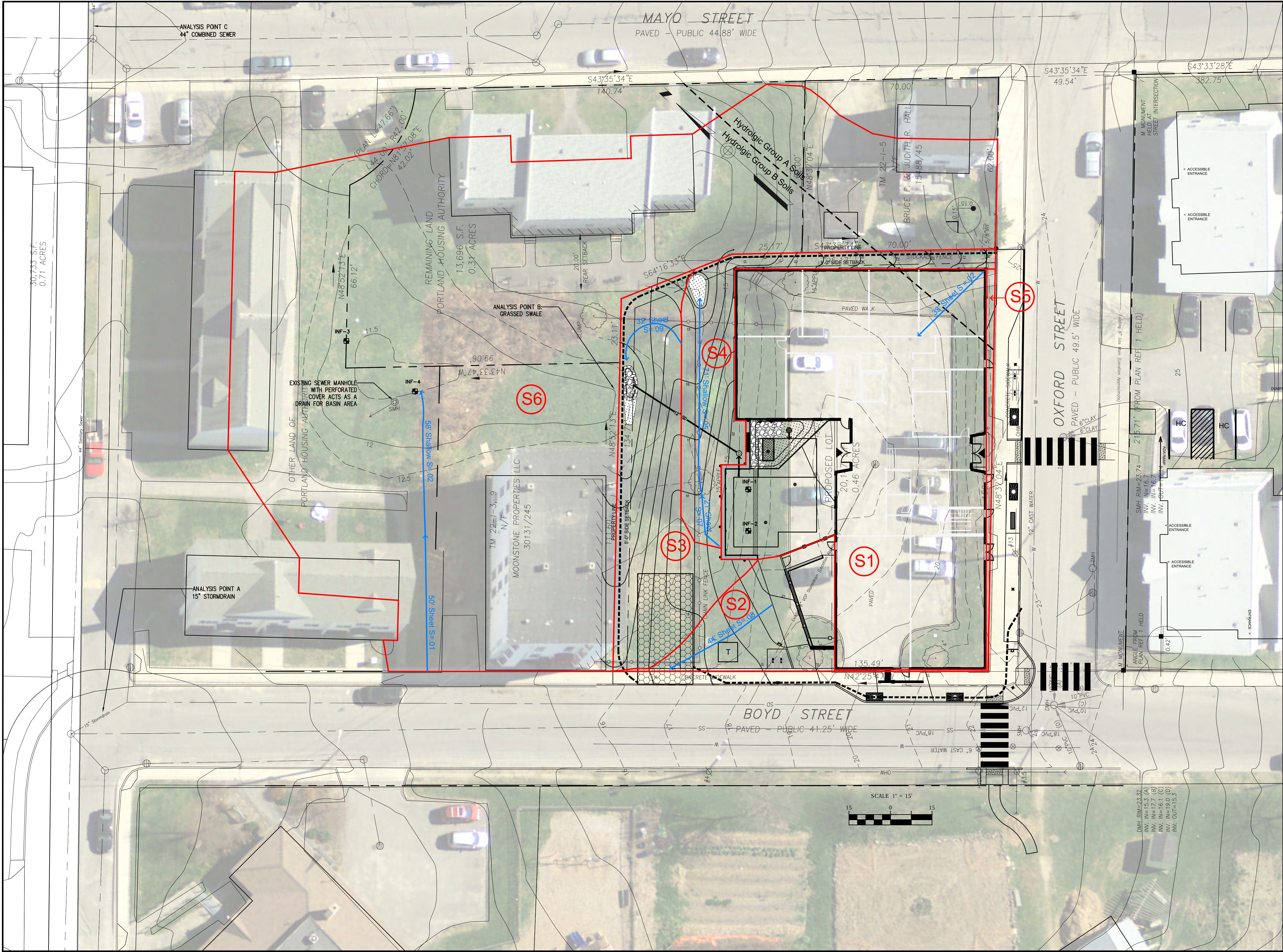


STATE OF MAINE
John Mahoney
#12340
LICENSED PROFESSIONAL ENGINEER

Pre Development
Hydrology

A	City of Portland Permitting	7-1-14
No.	Revision/Issue	Date
Design by:	JIM	Checked by: SUB
Drawn by:	JIM	Approved by: SUB
Project:	131.06132	
Sheet No:	C5	

Sheet 1 of ---



Project:

Bayside Anchor

81 East Oxford Street
Portland, Maine

Prepared for:

Portland Housing
Development Corporation
14 Baxter Boulevard
Portland, Maine

KAPLAN THOMPSON
ARCHITECTS

424 fore st., portland, me 04101
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jesse@kaplonthompson.com

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LANDSCAPE ARCHITECTS

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P: 207.773.4753
F: 207.774.6471

STATE OF MAINE

John Mahoney #12340

REGISTERED PROFESSIONAL ENGINEER

Post Development
Hydrology

A	City of Portland Permitting	7-1-14
No.	Revision/Issue	Date
Design by:	JIM	Checked by: SUB
Drawn by:	JIM	Approved by: SUB
Project:	131.06132	
Sheet No:	C6	
	Sheet 1 of ---	

Bounce Series

Pole Mount 16' AFG (14' Pole)

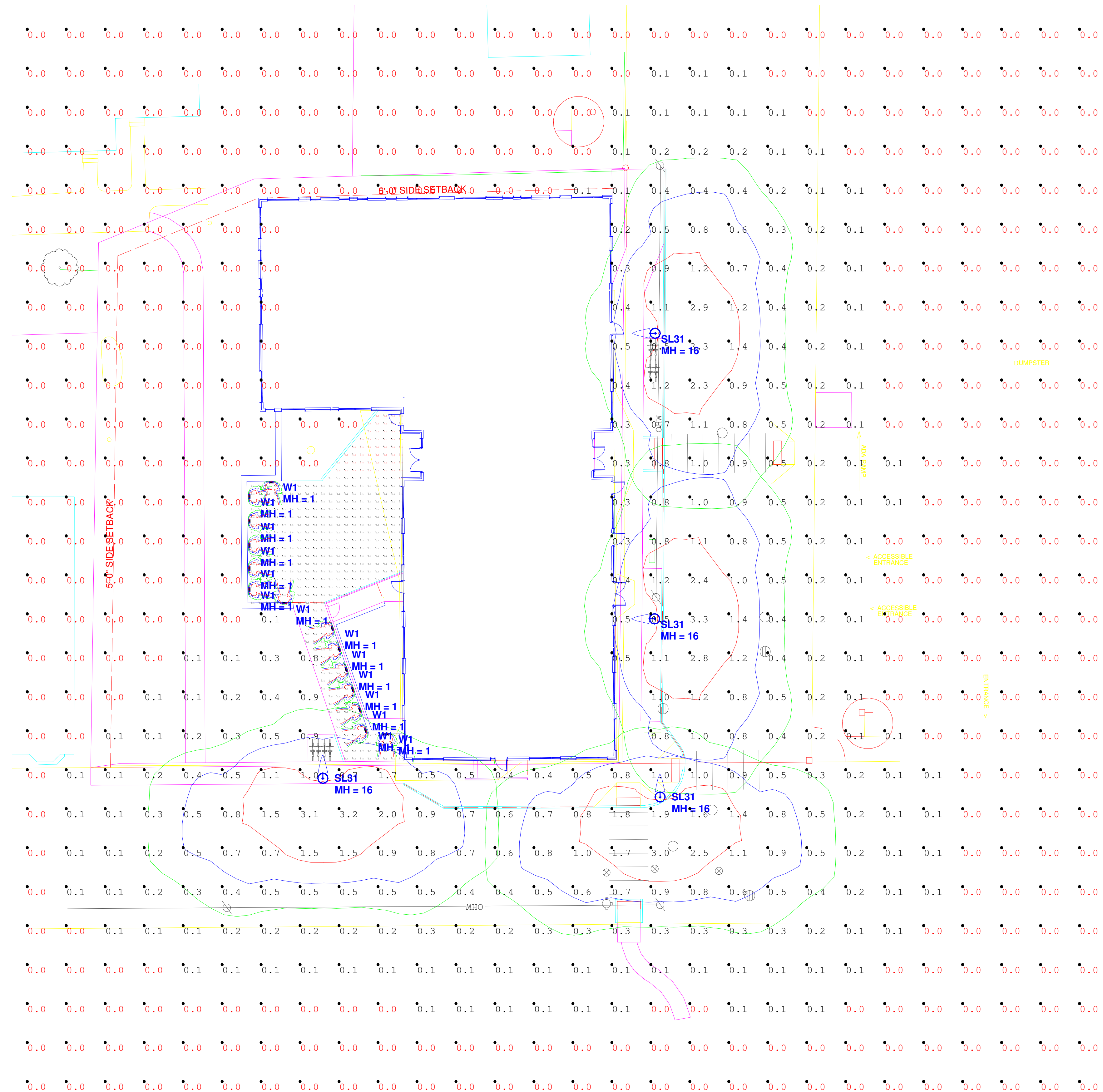


Beta Calco Lighting

Confine - 15" - 24 Degree
In Wall LED - 12" AFG



Luminaire Schedule				
Symbol	Qty	Label	LLF	Description
	4	SL31	0.900	BNSH13E35-60L5K
	14	W1	0.900	8107229



15 Pleasant Hill Rd
P.O. Box 1597
Scarborough, Maine 04070
email: swaneylighting.com
ph: 207-883-7100
fax: 207-885-9605

Revisions		
#	Date	Comments

Drawn By: Dave Charron
Date: 6/21/14
Not to Scale

Bayside Anchor

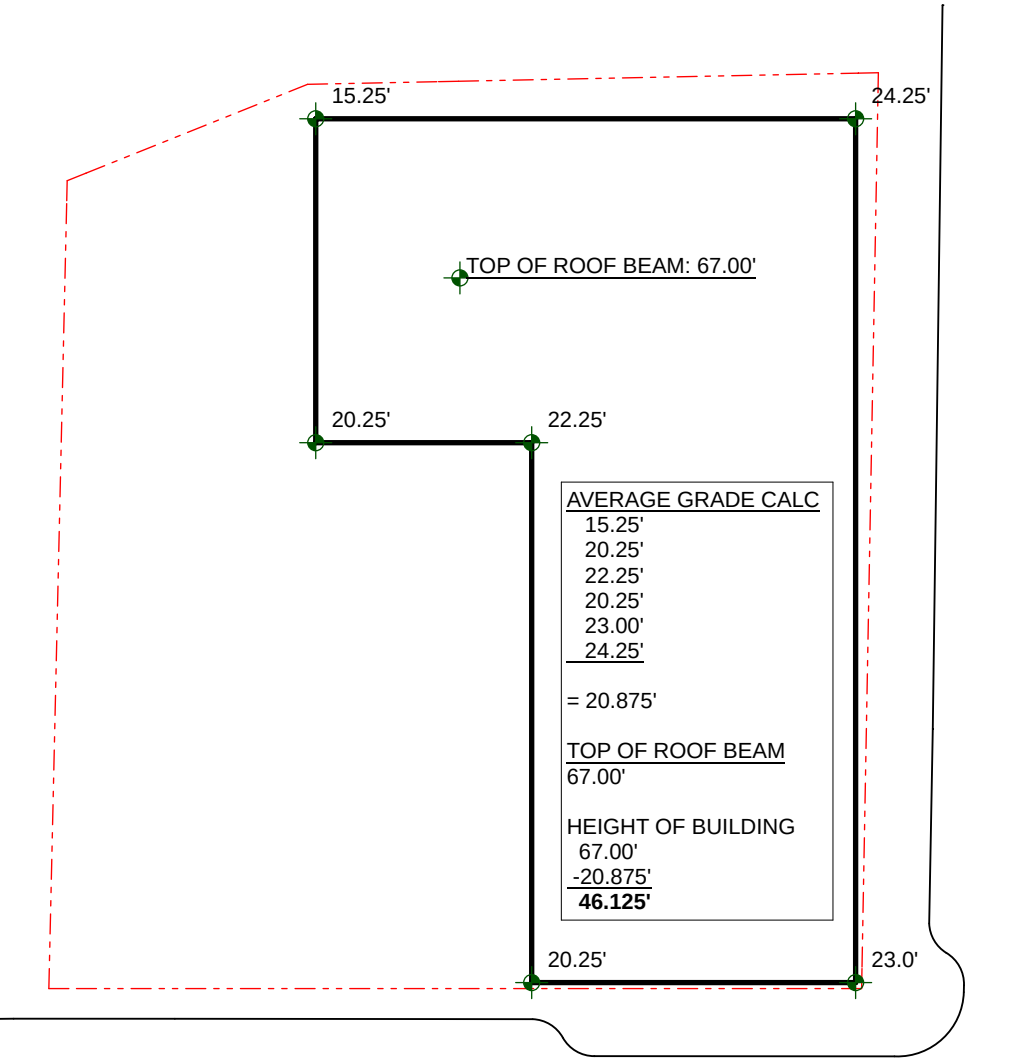
Portland, Maine

UNIT MIX: GROUND FLOOR	
Zone Category	Quantity
1 BR	4
EFFICIENCY	2
	6

UNIT MIX: TOTAL	
Zone Category	Quantity
1 BR	34
2 BR	6
EFFICIENCY	5
	45

UNIT MIX: TOTAL BUILDING		
Floor (Story)	Zone Category	Quantity
1st FLOOR	1 BR	4
1st FLOOR	EFFICIENCY	2
2nd FLOOR	1 BR	10
2nd FLOOR	2 BR	2
2nd FLOOR	EFFICIENCY	1
3rd FLOOR	1 BR	10
3rd FLOOR	2 BR	2
3rd FLOOR	EFFICIENCY	1
4th FLOOR	1 BR	10
4th FLOOR	2 BR	2
4th FLOOR	EFFICIENCY	1
		45

GROUND FLOOR PROGRAM			
ID	Zone Name	Area	Zone Category
100	GROSS AREA	9,562	GROSS AREA
101	LOBBY	778	CIRCULATION
102	COMMUNITY ROOM	413	COMMUNITY SERVICE FACILITY
103	OFFICE	69	COMMUNITY SERVICE FACILITY
104	LAUNDRY	205	UTILITY
105	TRASH	245	UTILITY
107	MAINT.	49	UTILITY
107	MECH	96	UTILITY
108	BIKE STOR.	283	UTILITY
109	ADA	58	UTILITY
109	ADA	58	UTILITY
111	EFFICIENCY	432	EFFICIENCY
111	EFFICIENCY ADA	432	EFFICIENCY
112	1 BR APT	540	1 BR
112	1 BR APT	576	1 BR
112	1 BR APT	576	1 BR
112	1 BR APT	576	1 BR
121	HEAD START	1,244	COMMUNITY SERVICE FACILITY
122	PHA NEIGHBORHOOD SERVICE HUB	1,242	COMMUNITY SERVICE FACILITY
123	COMMUNITY POLICE	260	COMMUNITY SERVICE FACILITY



2 BUILDING HEIGHT CALC

NOT TO SCALE

0 16' 32' 64'

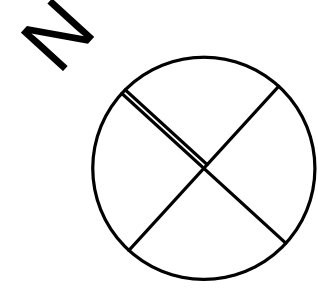


1 1st FLOOR

SCALE: 1/8" = 1'-0"

BOYD ST

0 4' 8' 16'



SITE PLAN REVIEW

PROJECT:
BAYSIDE ANCHOR
PORTLAND HOUSING DEVELOPMENT
CORPORATION
81 EAST OXFORD STREET
PORTLAND, ME

DRAWING: 1ST FLOOR PLAN

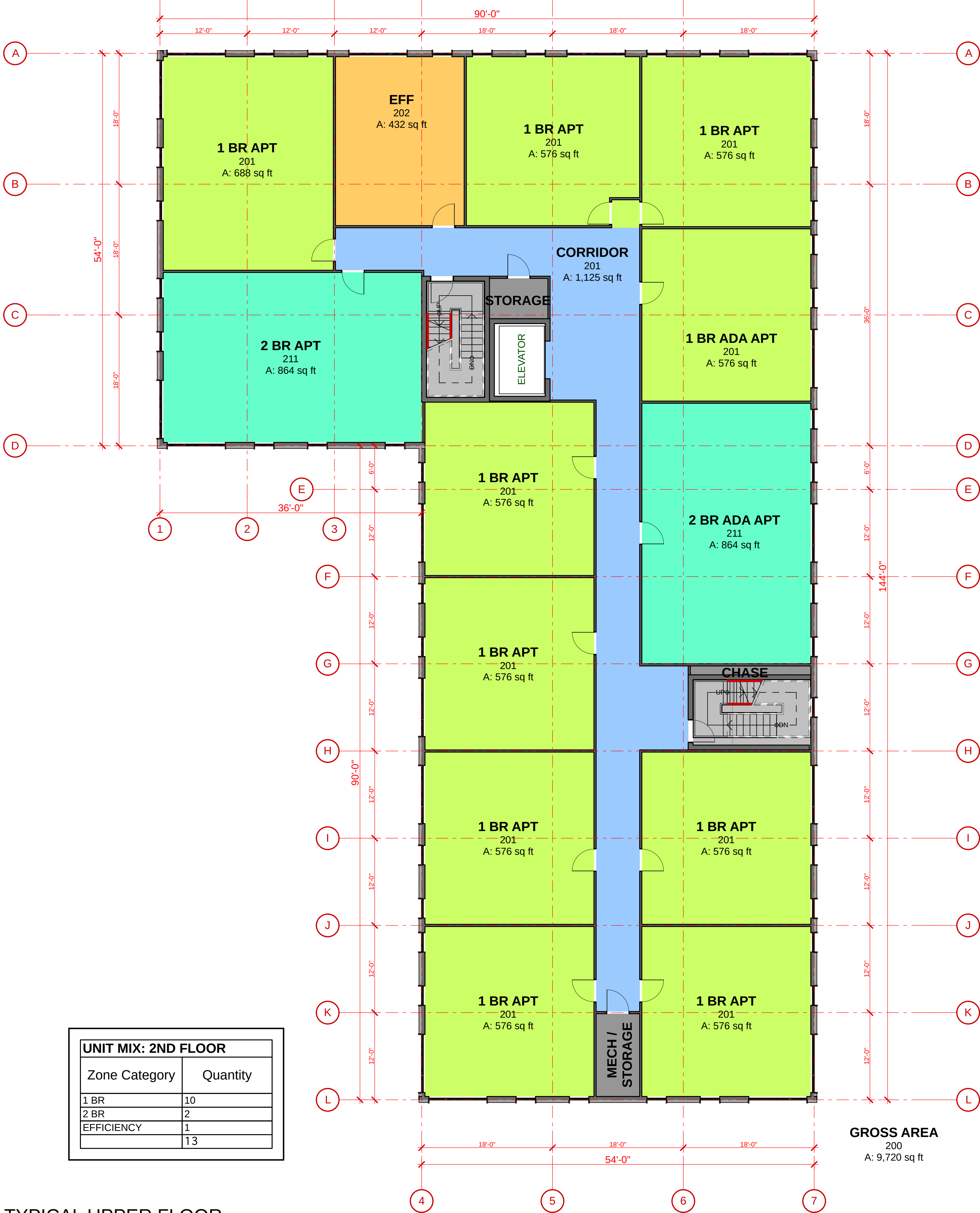
SCALE:

DATE: JUNE 30, 2014

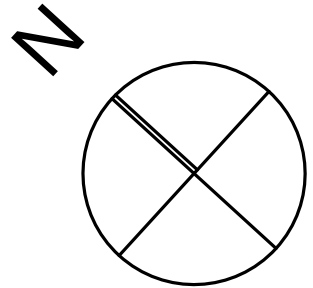
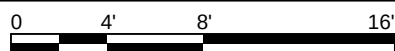
DRAWN BY: JJT

REVISED:

A-1.1



1 TYPICAL UPPER FLOOR
SCALE: 1/8" = 1'-0"



SITE PLAN REVIEW

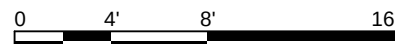
PROJECT:
BAYSIDE ANCHOR
PORTLAND HOUSING DEVELOPMENT
CORPORATION
81 EAST OXFORD STREET
PORTLAND, ME

DRAWING: 2ND FLOOR PLAN

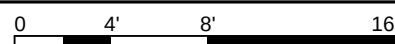
SCALE: DRAWN BY: JJT
DATE: JUNE 30, 2014 REVISED:



1 NORTHWEST ELEVATION
SCALE: 1/8" = 1'-0"



2 SOUTHEAST ELEVATION
SCALE: 1/8" = 1'-0"



SITE PLAN REVIEW

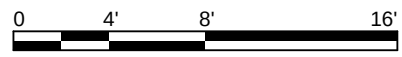
PROJECT:
BAYSIDE ANCHOR
PORTLAND HOUSING DEVELOPMENT
CORPORATION
81 EAST OXFORD STREET
PORTLAND, ME

DRAWING: 1/8" NW & SE ELEVATIONS

SCALE: DRAWN BY: JJT
DATE: JUNE 30, 2014 REVISED:



1 SOUTHWEST ELEVATION
SCALE: 1/8" = 1'-0"



2 NORTHEAST ELEVATION
SCALE: 1/8" = 1'-0"



SITE PLAN REVIEW

PROJECT:
BAYSIDE ANCHOR
PORTLAND HOUSING DEVELOPMENT
CORPORATION
81 EAST OXFORD STREET
PORTLAND, ME

DRAWING: 1/8" SW & NE ELEVATIONS

SCALE: DRAWN BY: JJT

DATE: JUNE 30, 2014 REVISED:



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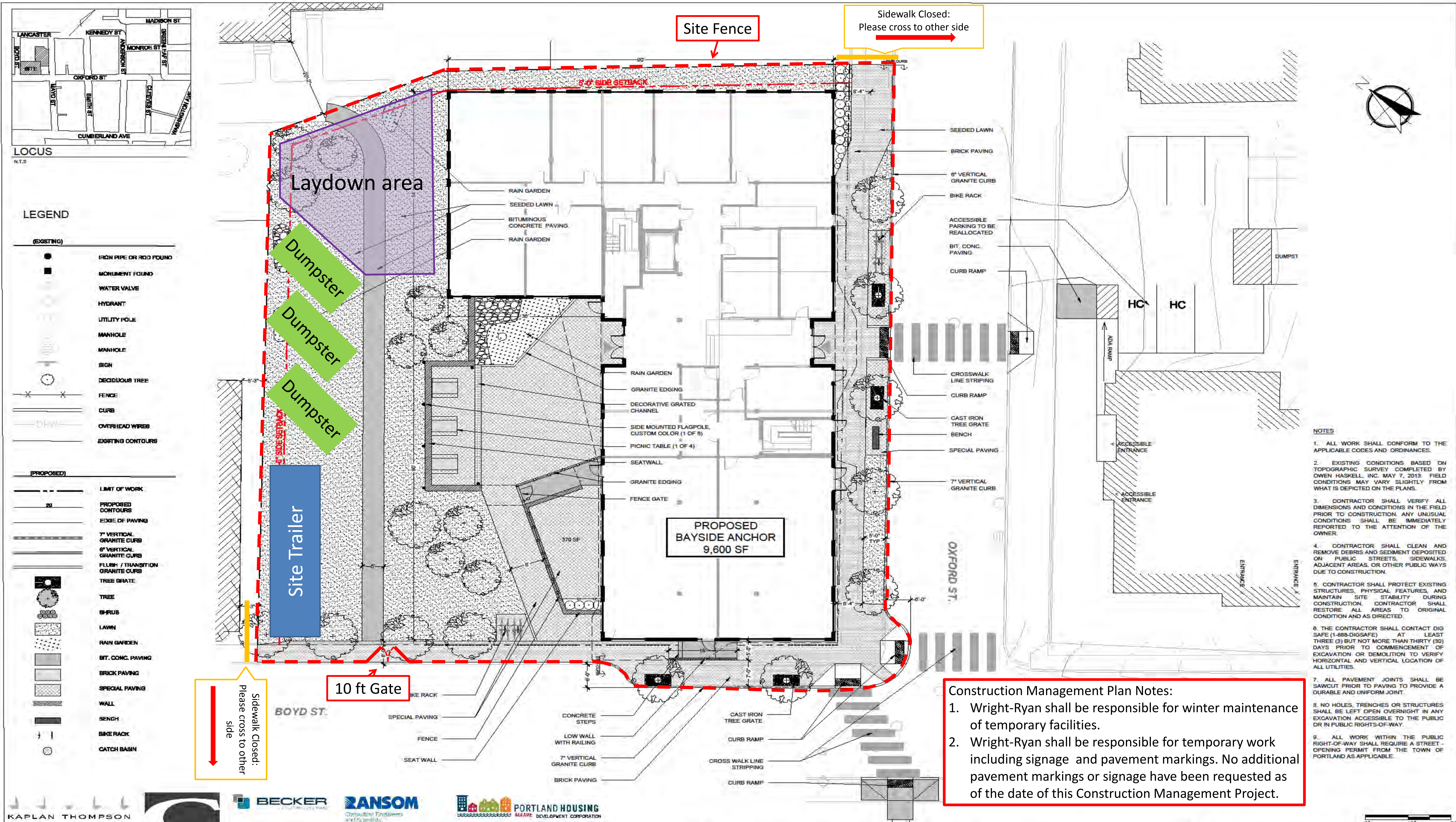
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F: 207.879.1822

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Consulting Engineers
and Scientists
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F: 207.772.3248

PORTLAND HOUSING
DEVELOPMENT CORPORATION
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PORTLAND, ME 04101
P: 207.773.4753
F: 207.774.6471

SITE PLAN REVIEW

PROJECT: BAYSIDE ANCHOR PORTLAND HOUSING DEVELOPMENT CORPORATION 81 EAST OXFORD STREET PORTLAND, ME		DRAWING: BOYD STREET PERSPECTIVE	
SCALE:		DRAWN BY: JJT	
DATE: JUNE 30, 2014		REVISED:	



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207-842-2885 fax: 842-2828

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PORTLAND, ME 04101
P: 207.773.4753
F: 207.774.6471

SITE PLAN APPLICATION

Project:
BAYSIDE ANCHOR
Portland Housing Development Corporation
Oxford & Boyd St
Portland, ME

Scale: 1"=10'
Date: 7/1/14
Drawn by: EPK
Revised:
CMP

Bayside Anchor 81 East Oxford Street Portland, Maine

Application For:

***Final Site Plan Review
Subdivision Review***

Submitted By:

*Carroll Associates
217 Commercial Street, Suite 200
Portland, Maine 04101*

*Kaplan Thompson Architects
254 Fore Street
Portland, Maine 04101*

For:

*Bayside Anchor Development Company, LLC
14 Baxter Boulevard
Portland, ME 04101*

*Portland Housing Development Corporation, LLC
14 Baxter Boulevard
Portland, ME 04101*

Date:

July 1, 2014



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Technical Ability	
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Drawings (reduced to 11x17)	
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C-0.1	Recording Plat
L-1.0	Site Prep Plan
L-2.0	Site Plan
L-3.0	Grading/ Drainage Plan
L-4.0	Landscape Plan
L-5.0	Site Details- Paving/ Edging
L-5.1	Site Details- Site Furnishings
L-5.2	Site Details- Planting
C-1	Drainage and Utility Plan
C-2	Civil Details
C-3	Drainage Details
C-4	ESC Details and Notes
C-5	Pre-Development Hydrology
C-6	Post Development Hydrology
C-7	Site Lighting Plan
A-1.1	First Floor Plan
A-1.2	Second Floor Plan
A-2.1	1/8" NW and SE Elevations
A-2.2	1/8" SW and NE Elevations
A-2.3	Elevation Detail
A-9.1	Boyd Street Perspective
CMP	Construction Management Plan



July 1, 2014

Mr. Rick Knowlton
City of Portland Planning Authority
4th Floor, City Hall
389 Congress Street
Portland, ME 04101

RE: Bayside Anchor, 81 East Oxford Street

Dear Rick,

On behalf of the Portland Housing Authority and Portland Housing Development Corporation, we are pleased to submit this Final Plan Site Plan and Subdivision Plan Application for Bayside Anchor, a 45 Unit residential housing project in East Bayside. As you know we have been working closely with you and other City staff on this for several months, and we believe the information in the application and support materials address the comments and issues that have been expressed by Staff, the Planning Board and the neighborhood as this has moved through the process.

As you are aware, Zoning determined that the relocation of Head Start to the new building from its current location on Boyd Street does require a Conditional Use Permit, and so we have applied for this and are scheduled to appear before the ZBA on July 17.

We look forward to continue to work with you, Planning Department staff, and the Planning Board in the review of this project. Please feel free to contact me to discuss any questions or concerns you may have regarding the attached application materials.

Sincerely,
CARROLL ASSOCIATES

A handwritten signature in black ink, appearing to read 'Patrick J. Carroll', with a long horizontal flourish extending to the right.

Patrick J. Carroll
Principal

Enc.

Cc: Mark Adelson, PHA
Brooks More, Avesta Housing
Jesse Thompson, KTA
John Mahoney, Ransom Consulting

DEVELOPMENT REVIEW APPLICATION



Level III – Preliminary and Final Site Plans Development Review Application Portland, Maine

Planning and Urban Development Department
Planning Division

Portland's Planning and Urban Development Department coordinates the development review process for site plan, subdivision and other applications under the City's Land Use Code. Attached is the application form for a Level II: Preliminary or Final Site Plan. Please note that Portland has delegated review from the State of Maine for reviews under the Site Location of Development Act, Chapter 500 Stormwater Permits, and Traffic Movement Permits.

Level III: Site Plan Development includes:

- New structures with a total floor area of 10,000 sq. ft. or more except in Industrial Zones.
- New structures with a total floor area of 20,000 sq. ft. or more in Industrial Zones.
- New temporary or permanent parking area(s) or paving of existing unpaved parking areas for more than 75 vehicles.
- Building addition(s) with a total floor area of 10,000 sq. ft. or more (cumulatively within a 3 year period) except in Industrial Zones.
- Building addition(s) with a total floor area of 20,000 sq. ft. or more in Industrial Zones.
- A change in the use of a total floor area of 20,000 sq. ft. or more in any existing building (cumulatively within a 3 year period).
- Multiple family development (3 or more dwelling units) or the addition of any additional dwelling unit if subject to subdivision review.
- Any new major or minor auto business in the B-2 or B-5 Zone, or the construction of any new major or minor auto business greater than 10,000 sq. ft. of building area in any other permitted zone.
- Correctional prerelease facilities.
- Park improvements: New structures greater than 10,000 sq. ft. and/or facilities encompassing 20,000 sq. ft. or more (excludes rehabilitation or replacement of existing facilities); new nighttime outdoor lighting of sports, athletic or recreation facilities not previously illuminated.
- Land disturbance of 3 acres or more (includes stripping, grading, grubbing, filling or excavation).

The Land Use Code (including Article V), the Technical Manual, and the Design Manual are available on the City's web site at <http://www.portlandmaine.gov/planning/default.asp>

Planning Division

Fourth Floor, City Hall
389 Congress Street
(207) 874-8721 or 874-8719

Office Hours

Monday thru Friday
8:00 a.m. – 4:30 p.m.

PROJECT NAME: BAYSIDE ANCHOR

PROPOSED DEVELOPMENT ADDRESS:

81 East Oxford Street

PROJECT DESCRIPTION:

New construction of 45 rental apartments and community support spaces including relocation of the existing Head Start program, PHA Administrative offices, and Neighborhood Policing Station in a new four story building located at the corner of Oxford and Boyd Streets in East Bayside, along with associated site development.

CHART/BLOCK/LOT: Map 22, Block 1, Lot 4 and 1

PRELIMINARY PLAN

05/12/2014 (date)

FINAL PLAN

07/01/2014 (date)

CONTACT INFORMATION:

Applicant – must be owner, Lessee or Buyer Name: Mark Adelson Business Name, if applicable: Portland Housing Authority Address: 14 Baxter Boulevard City/State : Portland, ME Zip Code: 04101	Applicant Contact Information Work # 207-773-4753 Home# Cell # Fax# 207-774-6471 e-mail: madelson@porthouse.org
Owner – (if different from Applicant) Name: Address: same as applicant City/State : Zip Code:	Owner Contact Information Work # Home# Cell # Fax# e-mail:
Agent/ Representative Name: Patrick Carroll Carroll Associates Address: 217 Commercial Street City/State : Portland, ME Zip Code: 04101	Agent/Representative Contact information Work # 207-772-1552 Cell # 207-329-8976 e-mail: pcarroll@carroll-assoc.com
Billing Information Name: Mark Adelson Portland Housing Authority Address: 14 Baxter Boulevard City/State : Portland, ME Zip Code: 04101	Billing Information Work # 207-773-4753 Cell # Fax# 207-774-6471 e-mail: madelson@porthouse.org

Engineer Name: John Mahoney Ransom Consulting, Inc. Address: 400 Commercial Street, Suite 404 Portland, ME 04101 City/State : Zip Code:	Engineer Contact Information Work # 207-772-2891 Cell # 207-831-6165 Fax# 207-772-3248 e-mail: john.mahoney@ransomenv.com
Surveyor Name: Owen Haskell, Inc. 390 US Route One Address: Falmouth, ME 04105 City/State : Zip Code:	Surveyor Contact Information Work # 207-774-0424 Cell # Fax# e-mail: jswan@owenhaskell.com
Architect Name: Jesse Thompson Kaplan Thompson Architects Address: 424 Fore Street Portland, ME 04101 City/State : Zip Code:	Architect Contact Information Work # 207-842-2888 Cell # Fax# e-mail: jesse@kaplanthompson.com
Attorney Name: Address: City/State : Zip Code:	Attorney Contact Information Work # Cell # Fax# e-mail:

APPLICATION FEES:

Check all reviews that apply. (Payment may be made by Cash or Check payable to the City of Portland.)

Level III Development (check applicable reviews) ☒ Less than 50,000 sq. ft. (\$500.00) ☐ 50,000 - 100,000 sq. ft. (\$1,000) ☐ 100,000 – 200,000 sq. ft. (\$2,000) ☐ 200,000 – 300,000 sq. ft. (\$3,000) ☐ over \$300,00 sq. ft. (\$5,000) ☐ Parking lots over 11 spaces (\$1,000) ☐ After-the-fact Review (\$1,000.00 plus applicable application fee) Plan Amendments (check applicable reviews) ☐ Planning Staff Review (\$250) ☐ Planning Board Review (\$500) The City invoices separately for the following: • Notices (\$.75 each) • Legal Ad (% of total Ad) • Planning Review (\$40.00 hour) • Legal Review (\$75.00 hour) Third party review fees are assessed separately. Any outside reviews or analysis requested from the Applicant as part of the development review, are the responsibility of the Applicant and are separate from any application or invoice fees.	Other Reviews (check applicable reviews) ☐ Traffic Movement (\$1,000) ☐ Stormwater Quality (\$250) ☒ Subdivisions (\$500 + \$25/lot) # of Lots 45 x \$25/lot = \$ 1,125 ☐ Site Location (\$3,000, except for residential projects which shall be \$200/lot) # of Lots ___ x \$200/lot = _____ ☐ Other _____ ☐ Change of Use ☐ Flood Plain ☐ Shoreland ☐ Design Review ☐ Housing Replacement ☐ Historic Preservation
--	---

APPLICATION SUBMISSION:

1. All site plans and written application materials must be submitted electronically on a CD or DVD with each plan submitted as separate files, with individual file names (see submittal requirements document attached).
2. In addition, one (1) paper set of the plans (full size), one (1) paper set of plans (11 x 17), paper copy of written materials, and the application fee must be submitted to the Planning Division Office to start the review process.

The application must be complete, including but not limited to the contact information, project data, application checklists, wastewater capacity, plan for fire department review, and applicant signature. The submissions shall include one (1) paper packet with folded plans containing the following materials:

1. One (1) full size site plans that must be folded.
2. One (1) copy of all written materials or as follows, unless otherwise noted:
 - a. Application form that is completed and signed.
 - b. Cover letter stating the nature of the project.
 - c. All Written Submittals (Sec. 14-525 2. (c), including evidence of right, title and interest.
3. A stamped standard boundary survey prepared by a registered land surveyor at a scale not less than one inch to 50 feet.
4. Plans and maps based upon the boundary survey and containing the information found in the attached sample plan checklist.
5. One (1) set of plans reduced to 11 x 17.

Refer to the application checklist for a detailed list of submission requirements.

Portland's development review process and requirements are outlined in the Land Use Code (Chapter 14), which includes the Subdivision Ordinance (Section 14-491) and the Site Plan Ordinance (Section 14-521). Portland's Land Use Code is on the City's web site <http://www.portlandmaine.gov/citycode/chapter014.pdf>

APPLICANT SIGNATURE:

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Planning Authority and Code Enforcement's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for a Level II Site Plan review. It is not a permit to begin construction. An approved site plan, a Performance Guarantee, Inspection Fee, Building Permit, and associated fees will be required prior to construction. Other Federal, State or local permits may be required prior to construction, which are the responsibility of the applicant to obtain.

Signature of Applicant: 	Date: 07/01/2014
---	--------------------------------

PROJECT DATA

The following information is required where applicable, in order to complete the application.

Total Area of Site	20,147	sq. ft.
Proposed Total Disturbed Area of the Site	20,147	sq. ft.
If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with DEP and a Stormwater Management Permit, Chapter 500, with the City of Portland		
Impervious Surface Area		
Impervious Area (Total Existing)	7,532	sq. ft.
Impervious Area (Total Proposed)	13,767	sq. ft.
Building Ground Floor Area and Total Floor Area		
Building Footprint (Total Existing)	0.00	sq. ft.
Building Footprint (Total Proposed)	9,610	sq. ft.
Building Floor Area (Total Existing)	0.00	sq. ft.
Building Floor Area (Total Proposed)	38,770	sq. ft.
Zoning		
Existing	R6	
Proposed, if applicable	R7	
Land Use		
Existing	VACANT (PARKING LOT)	
Proposed	RESIDENTIAL/ ACCESSORY USES	
Residential, If applicable		
# of Residential Units (Total Existing)	0	
# of Residential Units (Total Proposed)	45	
# of Lots (Total Proposed)	1	
# of Affordable Housing Units (Total Proposed)	36	
Proposed Bedroom Mix		
# of Efficiency Units (Total Proposed)	5	
# of One-Bedroom Units (Total Proposed)	34	
# of Two-Bedroom Units (Total Proposed)	6	
# of Three-Bedroom Units (Total Proposed)	0	
Parking Spaces		
# of Parking Spaces (Total Existing)	26	
# of Parking Spaces (Total Proposed)	34- SEE CAMPUS PARKING PLAN	
# of Handicapped Spaces (Total Proposed)	2	
Bicycle Parking Spaces		
# of Bicycle Spaces (Total Existing)	0	
# of Bicycle Spaces (Total Proposed)	38 TOTAL, 30 INSIDE, 8 OUTSIDE	
Estimated Cost of Project		
	\$ 5,293,654.00	

PRELIMINARY PLAN (Optional) - Level III Site Plan			
Applicant Checklist	Planner Checklist	# of Copies	GENERAL WRITTEN SUBMISSIONS CHECKLIST
X		1	Completed Application form
X		1	Application fees
X		1	Written description of project
X		1	Evidence of right, title and interest
N/A		1	Evidence of state and/or federal approvals, if applicable
X		1	Written assessment of proposed project's compliance with applicable zoning requirements
X		1	Summary of existing and/or proposed easement, covenants, public or private rights-of-way, or other burdens on the site
X		1	Written requests for waivers from site plan or technical standards, if applicable.
X		1	Evidence of financial and technical capacity
X		1	Traffic Analysis (may be preliminary, in nature, during the preliminary plan phase)
Applicant Checklist	Planner Checklist	# of Copies	SITE PLAN SUBMISSIONS CHECKLIST
X		1	Boundary Survey meeting the requirements of Section 13 of the City of Portland's Technical Manual
X		1	Preliminary Site Plan including the following: (information provided may be preliminary in nature during preliminary plan phase)
X			Proposed grading and contours;
X			Existing structures with distances from property line;
X			Proposed site layout and dimensions for all proposed structures (including piers, docks or wharves in Shoreland Zone), paved areas, and pedestrian and vehicle access ways;
X			Preliminary design of proposed stormwater management system in accordance with Section 5 of the Technical Manual (note that Portland has a separate applicability section);
X			Preliminary infrastructure improvements;
X			Preliminary Landscape Plan in accordance with Section 4 of the Technical Manual;
N/A			Location of significant natural features (including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features) located on the site as defined in Section 14-526 (b) (1);
N/A			Proposed buffers and preservation measures for significant natural features, as defined in Section 14-526 (b) (1);
X			Location , dimensions and ownership of easements, public or private rights of way, both existing and proposed;
X			Exterior building elevations.

FINAL PLAN - Level III Site Plan			
Applicant Checklist	Planner Checklist	# of Copies	GENERAL WRITTEN SUBMISSIONS CHECKLIST (* If applicant chooses to submit a Preliminary Plan, then the * items were submitted for that phase and only updates are required)
X		1	* Completed Application form
X		1	* Application fees
X		1	* Written description of project
X		1	* Evidence of right, title and interest
NA		1	* Evidence of state and/or federal permits
X		1	* Written assessment of proposed project's specific compliance with applicable Zoning requirements
X		1	* Summary of existing and/or proposed easements, covenants, public or private rights-of-way, or other burdens on the site
X		1	* Evidence of financial and technical capacity
X		1	Construction Management Plan
X		1	A traffic study and other applicable transportation plans in accordance with Section 1 of the technical Manual, where applicable.
NA		1	Written summary of significant natural features located on the site (Section 14-526 (b) (a))
X		1	Stormwater management plan and stormwater calculations
X		1	Written summary of project's consistency with related city master plans
X		1	Evidence of utility capacity to serve
X		1	Written summary of solid waste generation and proposed management of solid waste
X		1	A code summary referencing NFPA 1 and all Fire Department technical standards
X		1	Where applicable, an assessment of the development's consistency with any applicable design standards contained in Section 14-526 and in City of Portland Design Manual
X		1	Manufacturer's verification that all proposed HVAC and manufacturing equipment meets applicable state and federal emissions requirements.

Applicant Checklist	Planner Checklist	# of Copies	SITE PLAN SUBMISSIONS CHECKLIST (* If applicant chooses to submit a Preliminary Plan, then the * items were submitted for that phase and only updates are required)
X		1	* Boundary Survey meeting the requirements of Section 13 of the City of Portland's Technical Manual
		1	Final Site Plans including the following:
X			Existing and proposed structures, as applicable, and distance from property line (including location of proposed piers, docks or wharves if in Shoreland Zone);
X			Existing and proposed structures on parcels abutting site;
X			All streets and intersections adjacent to the site and any proposed geometric modifications to those streets or intersections;
X			Location, dimensions and materials of all existing and proposed driveways, vehicle and pedestrian access ways, and bicycle access ways, with corresponding curb lines;
X			Engineered construction specifications and cross-sectional drawings for all proposed driveways, paved areas, sidewalks;
NA			Location and dimensions of all proposed loading areas including turning templates for applicable design delivery vehicles;
NA			Existing and proposed public transit infrastructure with applicable dimensions and engineering specifications;
X			Location of existing and proposed vehicle and bicycle parking spaces with applicable dimensional and engineering information;
X			Location of all snow storage areas and/or a snow removal plan;
X			A traffic control plan as detailed in Section 1 of the Technical Manual;
NA			Proposed buffers and preservation measures for significant natural features, where applicable, as defined in Section 14-526(b)(1);
NA			Location and proposed alteration to any watercourse;
NA			A delineation of wetlands boundaries prepared by a qualified professional as detailed in Section 8 of the Technical Manual;
NA			Proposed buffers and preservation measures for wetlands;
X			Existing soil conditions and location of test pits and test borings;
X			Existing vegetation to be preserved, proposed site landscaping, screening and proposed street trees, as applicable;
X			A stormwater management and drainage plan, in accordance with Section 5 of the Technical Manual;
X			Grading plan;
NA			Ground water protection measures;
NA			Existing and proposed sewer mains and connections;

- Continued on next page -

X		Location of all existing and proposed fire hydrants and a life safety plan in accordance with Section 3 of the Technical Manual;
X		Location, sizing, and directional flows of all existing and proposed utilities within the project site and on all abutting streets;
X		Location and dimensions of off-premises public or publicly accessible infrastructure immediately adjacent to the site;
X		Location and size of all on site solid waste receptacles, including on site storage containers for recyclable materials for any commercial or industrial property;
X		Plans showing the location, ground floor area, floor plans and grade elevations for all buildings;
NA		A shadow analysis as described in Section 11 of the Technical Manual, if applicable;
NA		A note on the plan identifying the Historic Preservation designation and a copy of the Application for Certificate of Appropriateness, if applicable, as specified in Section Article IX, the Historic Preservation Ordinance;
X		Location and dimensions of all existing and proposed HVAC and mechanical equipment and all proposed screening, where applicable;
X		An exterior lighting plan in accordance with Section 12 of the Technical Manual;
NA		A signage plan showing the location, dimensions, height and setback of all existing and proposed signs;
X		Location, dimensions and ownership of easements, public or private rights of way, both existing and proposed.

CITY OF PORTLAND WASTEWATER CAPACITY APPLICATION

Department of Public Services,
55 Portland Street,
Portland, Maine 04101-2991



Date: 6/27/14

Mr. Frank J. Brancely,
Senior Engineering Technician,
Phone #: (207) 874-8832,
Fax #: (207) 874-8852,
E-mail: fjb@portlandmaine.gov

1. Please, Submit Utility, Site, and Locus Plans.

Site Address: 81 OXFORD ST.

Chart Block Lot Number: 022 100 100 1

Proposed Use: APARTMENTS

Previous Use: N/A - VACANT

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.

Existing gravity line in Boyd St.

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: RICK KNOWLAND Phone: 874-8725

Owner/Developer Name: PORTLAND HOUSING DEVELOPMENT CORPORATION

Owner/Developer Address: 14 BAXTER BLVD., PORTLAND

Phone: 773-4753 Fax: 774-6471 E-mail:

Engineering Consultant Name: RANSOM CONSULTING - JOHN MAHONEY

Engineering Consultant Address: 400 COMMERCIAL ST., PORTLAND

Phone: 772-2891 Fax: 772-3248 E-mail: John.Mahoney@ransomenl.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: 6,048 GPD

Peaking Factor/ Peak Times:

Specify the source of design guidelines: (i.e. ☒ "Handbook of Subsurface Wastewater Disposal in Maine,"
☐ "Plumbers and Pipe Fitters Calculation Manual," ☐ Portland Water District Records, ☐ Other (specify)

(Note: Please submit calculations showing the derivation of your design flows, either on the following page, in the space provided, or attached, as a separate sheet)

4. Please, Submit External Grease Interceptor Calculations.

N/A

Total Drainage Fixture Unit (DFU) Values:

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

N/A

Estimated Industrial Process Wastewater Flows Generated:

Do you currently hold Federal or State discharge permits?

Is the process wastewater termed categorical under CFR 40?

OSHA Standard Industrial Code (SIC):

Peaking Factor/Peak Process Times:

GPD

Yes No

Yes No

<http://www.osha.gov/oshstats/sicser.html>

(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 below, or attached, as a separate sheet)

Notes, Comments or Calculation

DWELLING UNITS

$$\begin{array}{lcl} \text{EFFICIENCY APTS.: } 5 \times 120 \text{ gpd/apt.} & = & 600 \text{ gpd} \\ 34 \text{ 1-BDRM APTS: } 34 \times 120 \text{ gpd/apt.} & = & 4080 \text{ gpd} \\ 6 \text{ 2-BDRM APTS: } 6 \times 180 \text{ gpd/apt.} & = & 1080 \text{ gpd} \\ & & \hline & & 5760 \text{ gpd} \end{array}$$

OTHER:

$$\begin{array}{lcl} \text{SCHOOL/HEADSTART: } 18 \text{ STUDENTS} \times 10 \text{ gpd/student} & = & 180 \text{ gpd} \\ 3 \text{ EMPLOYEES} \times 12 \text{ gpd/emp.} & = & 36 \text{ gpd} \\ & & \hline & & 216 \text{ gpd} \\ \text{OFFICES: } 6 \text{ employees} \times 12 \text{ gpd/emp} & = & 72 \text{ gpd} \end{array}$$

$$\text{Total} = 6,048 \text{ gpd}$$



Consulting
Engineers
and Scientists

June 27, 2014

Mr. Rico Spugnardi
Means Coordinator
Portland Water District
225 Douglass Street
PO Box 3553
Portland, Maine 04104-3553

RE: Capacity to Serve
Bayside Anchor Development
81 East Oxford Street
Portland, ME

Dear Rico:

On behalf the Portland Housing Development Corporation, Ransom Consulting (Ransom) is requesting a determination of whether the Portland Water District has the capacity to serve the proposed Bayside Anchor development project at 81 East Oxford Street in Portland, Maine. The development will consist of 45 new residential apartments which vary between efficiencies and 2 bedroom units. The majority (34) are one bedroom units. In addition, there are community spaces (laundry, storage, community room) and services (head start and neighborhood hub) located on the first floor. Based on the number of bedrooms, the number of employees, and the Maine State Plumbing Code we anticipate the design flow to be approximately 6,048 gallons per day for domestic service. The development will also have a sprinkler system for fire protection.

Enclosed is a site grading and stormwater plan which also includes the proposed utilities, L2.0. As designed, there is a proposed 6" line from the main which branches to separate 2" domestic water service and a 6" fire protection service. Each of these services will have separate shutoff valves at the right-of-way boundary for independent operation. It is our understanding that there is an existing water main in Boyd Street; however, we have no information regarding the availability of water in Oxford Street. Due to the location of the mechanical room in the proposed building, it would be desirable to provide water service off of Oxford Street if there is a main with adequate capacity available.

In addition, in order to adequately design the sprinkler system for the building, we are requesting any fire flow data that you may have available in the vicinity of the proposed project. It would be helpful to have the static and residual pressures recorded during fire flow testing as well as a map showing the general locations of the hydrants used during the test, if this information is available.

400 Commercial Street, Suite 404, Portland, Maine 04101, Tel (207) 772-2891, Fax (207) 772-3248

Pease International Tradeport, 112 Corporate Drive, Portsmouth, New Hampshire 03801, Tel (603) 436-1490

12 Kent Way, Suite 100, Byfield, Massachusetts 01922, Tel (978) 465-1822

2127 Hamilton Avenue, Hamilton, New Jersey 08619, Tel (609) 584-0090

60 Valley Street, Building F, Suite 106, Providence, Rhode Island 02909, Tel (401) 433-2160

www.ransomenv.com

Spugnardi
Portland Water District

Please provide response to the address below (or by email) at your earliest convenience. If you have any questions, please feel free to call me at (207) 772-2891.

Sincerely,

A handwritten signature in blue ink that reads "John Mahoney". The signature is written in a cursive, flowing style.

John Mahoney, P.E.
Project Engineer

Enclosure: Plans for Bayside Anchor development

NEIGHBORHOOD MEETING CERTIFICATION



Tom Valleau, Chairperson
Robyn Tucker, Vice Chairperson
Faith McLean, Commissioner
Shirley Peterson, Commissioner
Christian MilNeil, Commissioner
Mariar Balow, Commissioner
Evan Carroll, Commissioner

Mark B. Adelson
Executive Director

14 Baxter Boulevard
Portland, Maine 04101
Office: 207-773-4753
Fax: 207-761-5886
www.porthouse.org

Bayside Anchor Site Plan Application Neighborhood Meeting List of Attendees

Meeting Location: PHA Kennedy Park Community Room, 58 Boyd Street
Meeting Date: Wednesday, June 4, 2014
Meeting Time: 6:00 PM

[illegible]

PROJECT DESCRIPTION

PROJECT SUMMARY

BAYSIDE ANCHOR PROJECT DESCRIPTION

The Portland Housing Authority (PHA) has owned and managed affordable housing in the East Bayside neighborhood for over 40 years, and currently manages approximately 155 apartments, comprising the Kennedy Park, Bayside Terrace and Bayside East neighborhoods. In 2012 the PHA identified and designated .46 acre parcel of excess land within its East Bayside developments at the corner of Oxford and Boyd Streets as a prime redevelopment site. This property currently contains an overflow parking lot for the PHA properties and is the site for the proposed Bayside Anchor Project.

The Bayside Anchor program and design was developed in response to the national Lowering The Cost Competition (www.loweringcost.com). This competition has been organized and sponsored by the Enterprise Foundation and Deutsche Bank to explore strategies to lower the cost of affordable housing. In July 2013, it was announced that Bayside Anchor was the first prize winner.

The development program for Bayside Anchor includes construction of 45 new rental apartments and relocation of additional accessory uses which are currently located in adjacent buildings to this site. The building will contain approximately 35,870 sf of residential space and 2,900 sf of non-residential space in a four story building that has a strong street frontage on Oxford and Boyd Streets. The building will occupy approximately 9,610 sf of footprint and will not exceed 45 feet in elevation. The following describes the development program in greater detail:

- **Apartments and mixed incomes:** Bayside Anchor features 45 new apartments, with mixed incomes and unit types ranging from studios serving residents with incomes at or below 40% of area median income (AMI) to two-bedroom units at market rents. Of the 45 apartments, 9 are envisioned to be market rate units. The unit and mixed income breakdown includes;
 - 5 studios: 3 at 50% AMI, 1 at 40% AMI, 1 MR
 - 34 one-BRs: 8 at 60% AMI, 13 at 50% AMI, 6 at 40% AMI, 7 MR
 - 6 two-BR's: 2 at 60% AMI, 2 at 50% AMI, 1 at 40% AMI, 1 MR
- **Mixed uses:** Bayside Anchor devotes a significant portion of the building's ground floor to community service facilities including Head Start and community policing, as well as a management and resource hub for residents in the building and the surrounding public housing neighborhoods. These services are currently provided on PHA property in the surrounding neighborhood. Bayside Anchor allows the consolidation of these services in a new building creating a community focal point for the neighborhood residents.
- **Innovative sustainable design** practices including incorporation of *Passivhaus* ultra-low-energy design principles, including plentiful fresh air, passive and active solar design, superinsulation and airtightness, used in conjunction with highly efficient energy recovery ventilation, to dramatically reduce energy demand and cost of expensive multifamily mechanical systems. In addition, treatment of all storm water will be on site without use of subsurface storm water management systems.

Site development for Bayside Anchor includes reconstruction of sidewalks along Oxford and Boyd Streets, providing such amenities as benches and bicycle racks, lighting, and enhanced crosswalks on the corner of Oxford and Boyd Streets by providing curb bump-outs, ramps and striping. We also propose development of an outdoor terrace on the west side of the building which is envisioned to provide outdoor community gathering space for residents and neighbors.

The property is served by public utilities including Portland Water Company, Central Maine Power, Unitil, and the City of Portland. An existing combined storm drain collecting runoff from the existing parking lot will be removed from service and all stormwater is proposed to be collected and treated prior to discharge on the site. A preliminary stormwater management plan has been completed for the proposed project and is attached to this application.

Parking for the Bayside Anchor project is proposed to be handled through development of a Parking Management Plan for Bayside Anchor and all of the adjacent PHA properties. Several parking counts and studies have indicated that there is a significant amount of underutilized off-street parking that exists within the existing Kennedy Park, Bayside Terrace, and Bayside East neighborhoods. All off-street parking is currently managed by PHA as a campus and we believe through continued management and implementation of the parking Management Plan the needs of the Bayside Anchor project can be easily met with the existing parking inventory. As such, we have developed a Parking Management Plan that identifies inventory, demand, and strategies for managing the current and future parking needs of the PHA campus. This study is attached to the application for City review.

The property is currently located in the R6 Residential Zone and is currently undergoing a map rezone to R7. The proposal was reviewed by the Planning Board in April and is scheduled for a second reading with the City Council on May 19. The project meets all requirements of the R7 Residential Overlay Zone District.

RESPONSE TO STAFF COMMENTS



PROJECT MEMO: **Bayside Anchor**

TO: Rick Knowland
FROM: Pat Carroll
DATE: July 1, 2014

RE: **Response to Preliminary Staff Comments**

Attached are responses to the comments received to date from Portland Staff Review of the Preliminary Plan Submission:

Rick Knowlton, Senior Planner -5/30/2014

1. *Need a subdivision plan.*

Response: A Recording Plat is submitted as part of this Final Submission.

2. *The assumption is that the Head Start use is a conditional use like other kindergarten uses unless clarifying information is submitted to support applicant's position. This material will be reviewed by Marge Schmuckal, Zoning Administrator.*

Response: We have applied to the Zoning Board of Appeals for a Conditional Use Approval for the the Head Start Program, and are scheduled to appear before the ZBA on -7/17/2014.

3. *Please provide a response to the railing/ramp being within the city right-of-way. Generally we try to avoid this situation within a right of way. Could the ramp be located on the side of the building? Of course making that change may result in removing the door along Boyd St. which may not be ideal in terms of having doorways on streets. Could someone discuss this issue?*

Response. The entrance to the Head Start is located on Boyd Street to provide a safe and distinguishable entry for the Head Start Program. Due to the grades along Boys Street and the need to provide an accessible entrance we are proposing a solution which encroaches into the Boyd Street right of way. We looked at several options for relocating the entry, including relocating to the end of the building as suggested, but they would entail significant interior ramps which reduce the usable space and function of the room. Our solution includes bumping out the curbing in this area and around the corner of Oxford and Boyd Streets, providing a clear pedestrian flow around the entry and creating a safe pedestrian zone for residents, visitors, and students at this end of the building. We do understand that an easement or license for this use will be required and propose to work with City Staff on creating the proper legal framework for its use.

4. *TDM stops at page 7. Is that it?*

Response. The TDM Plan has been resubmitted with the correct texts and exhibits.

5. *Fiber cement paneling. Please submit a spec on this material as well as a sample.*

Response. Product information for the fiber cement siding was previously submitted and reviewed at a review meeting, we will bring samples of the products to the Public Hearing for review by the Planning Board.

6. *I'm not sure if you need a waiver for parking. Have you identified specific off-site spaces for Bayside Anchor residents?*

Response. The TDM Plan identifies that there is adequate parking within the East bayside "Campus" as controlled and managed by Portland Housing Authority. It identifies measures to be undertaken by the PHA to reduce the demand for automobiles and manage their parking on the campus. At this time no assigned parking spaces are proposed, but the Applicant is prepared to do so if future use indicates a need to do so. This is fully outlined in the TDM Plan submitted by Gorrill Palmer.

7. *Is the Parking Management Plan and Campus Transportation Plan the same thing?*

Response. Yes,

8. *Dimensions of sidewalk and esplanade should be shown.*

Response. The dimensions of all sidewalks and esplanades on the plan are clearly indicated on the Site Plan.

David Margolis Pineo, DPS, 06/16/2014

1. *Survey plan fails to meet the submission requirement and is unacceptable. Please review requirements and resubmit.*

Response: The survey plan has been updated and is being submitted with the Final Plan Submission.

2. *There are several proposed encroachments into the road right of way which will require either easements or licenses.*

Response: We agree and have listed those easements and licenses in the application. We anticipate these will be executed prior to issuance of a building permit.

3. *On-Street parking will need to be reviewed. Since Boyd St is approximately 29.5' wide and Oxford is approximately 27.5' wide, access for emergency vehicles may be an issue.*

Response: See Traffic Study by Gorrill Palmer. We are proposing elimination of parking at the intersection of Boyd and Oxford Streets, designation of 3 short term parking at the corner, and elimination of two on-street spaces along Boyd Street to allow vehicle pull off areas if necessary. Given the low volume of traffic existing and proposed on Boyd Street we believe this is an appropriate solution to the issue.

4. *With the loss of 26 parking spaces and the need of 30 additional spaces, campus parking needs will be evaluated.*

Response: A full evaluation of off street parking demand has been prepared by Gorrill Palmer and is attached to this Application for review.

David Senus, Woodard and Curran, 05/30/2014

- 1) *The application is preliminary. As such, we anticipate that additional documents will be submitted with the final application, including details, confirmation of capacity to serve the development from utilities, stormwater design calculations, and a Construction Management Plan. The Applicant should note that all work proposed within the City Right-of-Way should comply with the City of Portland Technical Manual. Woodard & Curran will perform a review of the Final Application upon receipt of those documents.*

Response: The Final Plan Submittal has been reviewed and we believe it contains all information, details and requirements of the Site Plan and Subdivision Standards.

- 2) *In accordance with Section 5 of the City of Portland Technical Manual, a Level III Site Plan project is required to submit a stormwater management plan pursuant to the regulations of MaineDEP Chapter 500 Stormwater Management Rules, including conformance with the Basic, General, and Flooding Standards. We offer the following comments:*
- a) *Basic Standards: The Applicant should provide a plan, notes, and details to address erosion and sediment control requirements, inspection and maintenance requirements, and good housekeeping practices in general accordance with Appendix A, B, & C of MaineDEP Chapter 500.*
 - b) *General Standards: The project will result in a net increase in impervious area of approximately 6,235 square feet. As such, the project is required to include stormwater management features for stormwater quality control. The Applicant is proposing to treat one inch of rainfall from the site's new impervious area utilizing the FocalPoint bio-filtration system. The Applicant has noted that the proposed system will be sized and designed in accordance with Chapter 7.5 of Volume III of the MaineDEP Stormwater BMP Manual. As part of the final submission package, the Applicant should provide additional information and calculations demonstrating that the proposed treatment unit will be adequately sized and will provide sufficient treatment, in accordance with the General Standards.*
 - c) *Flooding Standard: The project will result in a net increase in impervious area of approximately 6,235 square feet. As such, the project is required to include specific stormwater management features to control the rate of stormwater runoff from the site. The Applicant is proposing to provide detention via an R-Tank system. The Applicant has noted that, although flow rates will be decreased, the volume of water discharged to the downstream basin area may increase, and additional information on the results of this scenario will be provided in the final site plan application. The Applicant is also proposing to disconnect the existing stormdrain that currently discharges to the combined sewer, but requests the ability to reconnect should unanticipated future conditions require the use of this drain. As part of the final submission package, the Applicant should provide adequate documentation, such as a HydroCAD model, demonstrating that stormwater runoff from the proposed site will not exceed the peak runoff rates from the existing site and that the infiltration area will have adequate capacity to infiltrate the design storm events without impacting adjacent infrastructure. If in the future the Applicant determines that the system must be reconnected to the City's combined sewer system, the Applicant will be required to receive approval by Planning and the Department of Public Services for the change.*

Response: A Full Stormwater Management Plan is attached to this application that addresses all of the above comments.

- 3) *The Applicant "propose(s) to disconnect the existing storm drain that discharges to the combined sewer and outlet stormwater runoff to the surface only", relying on infiltration of stormwater on an area of adjacent property under common ownership. The Applicant states "It should be noted that, although flow rates will be decreased, the volume of water discharged to the downstream basin area may increase. We will provide an opinion on this in the final site plan application". The Applicant's approach to stormwater management is keeping with the City's interests and design standards for the management of stormwater on sites; however, as indicated by the Applicant, additional engineering data, calculations and information will need to be presented to ensure that the approach will provide for a functional system. As part of the additional information, the Applicant should perform a test pit and document soil type, presence of groundwater, and soil infiltration rates in the infiltration area.*

Response: An infiltration test was performed on the site to determine soil type, groundwater levels and rate of infiltration in the discharge area, and is attached to this application. Additionally, field examinations during and after significant storm events indicated no ponding of runoff in this area.

- 4) *The Applicant requests guidance on how their proposed stormwater management approach may affect a future (possible) stormwater service charge that is being considered by the City. The City is considering a service charge program that includes credit reductions to the service charge for treatment and/or detention of stormwater on a site. The program has not been finalized; however, compliance with City's stormwater management standards is anticipated to result in certain credit reductions in the service fee.*

Response: We anticipate future discussions with the City regarding this charge as the project is finalized.

- 5) *The Applicant should provide additional design information and details for the stormwater features as part of the final application.*

Response: Detailed Stormwater management plans and details are provided in the Final Submission Package.

- 6) *The Plans should depict the routing of the existing drainage system on the site and should show how the existing storm drain pipe will be demolished and plugged or capped at the main.*

Response: Agree, this has been identified on the site plans. In order to avoid trenching across Boyd Street, we are suggesting that this drain be capped just outside the right of way. We will coordinate with the City DPW on the final location of where the existing drain line will be capped.

- 7) *The Applicant should provide a Stormwater Management Plan, which should include a stormwater inspection and maintenance plan developed in accordance with and in reference to MaineDEP Chapter 500 guidelines and Chapter 32 of the City of Portland Code of Ordinances.*

Response: We agree, and a Stormwater management Plan has been submitted with this application that includes an Inspection and Maintenance Plan in accordance with the DEP and City requirements.

- 8) *Final plans must be stamped by a professional engineer (Section 14-527, sub-section (e) of the City of Portland Land Use Ordinance).*

Response: All site plans and details will be stamped by a Professional Engineer.

RIGHT, TITLE, & INTEREST

032817

43BOYD.QUI.DED.1
04.16.97

197

JUL

-9

AM

11

31

QUITCLAIM DEED

KNOW ALL PERSONS BY THESE PRESENTS, that the City of Portland, a body politic and corporate in the County of Cumberland, State of Maine, in consideration of one dollar (\$1.00) and other valuable consideration paid by Portland Housing Authority, a quasi-municipal corporation of Portland, County of Cumberland, State of Maine, the receipt whereof is hereby acknowledged, does hereby remise, release, bargain, sell and convey and forever quitclaim to the said Portland Housing Authority, its successors and assigns, a certain lot or parcel of land described in Schedule A, attached hereto and incorporated herein by reference.

IN WITNESS WHEREOF, the said City of Portland has hereunto caused this instrument to be signed by Duane G. Kline, its duly authorized Director of Finance, this 16th day of April, 1997.

Henrik F. Paulson
Witness

CITY OF PORTLAND

By:

Duane G. Kline
Director of Finance

STATE OF MAINE
CUMBERLAND, ss.

April 16, 1997

Personally appeared the above-named Duane G. Kline, in his capacity as the Director of Finance of the City of Portland, and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of the City of Portland.

Before me,

Henrik F. Paulson
Notary Public/Attorney at Law

Printed Name

JENNIFER L. BARCOCK

Notary Public, Maine

My Commission Expires 6-26-03

43BOYD.QUI.DED.1
04.16.97**SCHEDULE A**

A certain lot or parcel of land known as Tax, Map and Lot 22-I-4 as shown on the maps of the Tax Assessor for the fiscal year 1997.

Meaning and intending to convey the interest acquired by the Grantor by virtue of a real estate tax lien filed in the Cumberland County Registry of Deeds on June 15, 1992 in Book 10118, Page 126; a real estate tax lien filed in the Cumberland County Registry of Deeds on June 11, 1993 in Book 10756, Page 176; a real estate tax lien filed in the Cumberland County Registry of Deeds on June 7, 1994 in Book 11473, Page 226; a real estate tax lien filed in the Cumberland County Registry of Deeds on June 8, 1995 in Book 11952, Page 010; and a real estate tax lien filed in the Cumberland County Registry of Deeds on June 19, 1996 in Book 12570, Page 206.

RECEIVED
CUMBERLAND COUNTY REGISTRY OF DEEDS

1997 JUN 20 PM 1:31

CUMBERLAND COUNTY

John P. O'Brien

22-1-3
22-1-9

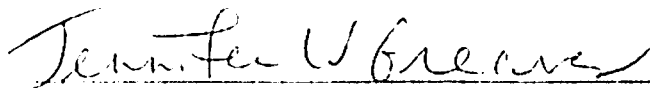
Warranty Deed

MOONSTONE PROPERTIES LLC, also known as Moonstone Properties, LLC, a Maine limited liability company with a mailing address of 661 Allen Avenue, Portland, ME 04103, for consideration paid, grants to **Portland Housing Development Corporation**, a Maine Corporation with a mailing address of 14 Baxter Boulevard, Portland, ME 04101, with WARRANTY COVENANTS, a certain parcel situated in the City of Portland, in the County of Cumberland, and State of Maine, bounded and described as follows, to wit:

See Attached Exhibit A

Meaning and intending to describe the same premises conveyed by Quitclaim Deed Without Covenant from Synergy Properties, LLC to Moonstone Properties, LLC dated and recorded November 15, 2012 in the Cumberland County Registry of Deeds in Book 30131, Page 245.

In Witness Whereof, the said Jennifer W. Greaves, in her capacity as Sole Manager and Member of Moonstone Properties LLC, has set forth her hand this 12th day of March, 2013.



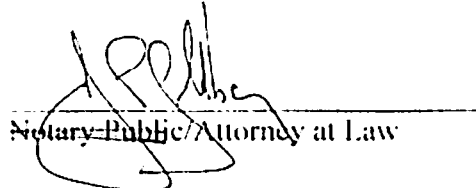
Jennifer W. Greaves, Sole Manager and Member
Moonstone Properties LLC
Duly Authorized Thereunto

STATE OF MAINE
CUMBERLAND, ss.

March 12, 2013

Then personally appeared the above-named Jennifer W. Greaves, in her capacity as sole member and manager of Moonstone Properties LLC and acknowledged the foregoing instrument to be her free act and deed and the free act and deed of Moonstone Properties LLC.

Before me,


Notary Public/Attorney at Law

JONATHAN L. GOLDBEIL

MAINE REAL ESTATE TAX PAID

EXHIBIT A

47-49 Boyd Street, Portland, ME

A certain lot or parcel of land with the buildings thereon, situated in the City of Portland, County of Cumberland, and State of Maine bounded and described as follows:

Beginning at a point on the easterly side of Boyd Street, said point being situated one hundred thirty-five and fifty-eight hundredths (135.58) feet northerly from the intersection of said line of Boyd Street with the northerly line of Oxford Street; thence easterly by a line parallel to Lancaster Street one hundred eight (108) feet to Boyd line, so-called; thence northerly by said Boyd line fifty (50) feet, more or less, to a point; thence westerly by a line parallel to Lancaster Street one hundred eight (108) feet to Boyd Street; thence by said Boyd Street to the point begun at.

Also another certain lot or parcel of land with the buildings thereon, situated in said Portland, and bounded and described as follows:

Beginning at a stake in the northeasterly sideline of Boyd Street nineteen (19) feet from the house on Boyd Street formerly owned by Samuel H. Colesworthy and Joseph C. Colesworthy; thence running southeasterly along the said sideline of Boyd Street thirty (30) feet to land formerly of Samuel H. Colesworthy, being the northwesterly corner of the first parcel above; thence northeasterly along said first parcel above, formerly of said Colesworthy; thence by said Colesworthy land northwesterly thirty (30) feet to the other land formerly of said Colesworthy; thence sixty (60) feet to the point of beginning. Excepting and reserving however, that portion of said parcel conveyed by Cumberland Savings and Loan Association to Florence S. F. Hooper by deed dated June 23, 1943, and recorded in the Cumberland County Registry of Deeds in Book 1720, Page 96.

Also another certain lot or parcel of land, situated in the rear of Boyd Street in said Portland, bounded and described as follows:

Beginning at the northeasterly corner of a lot of land conveyed by Cumberland Savings and Loan Association to Florence S. F. Hooper by deed dated June 23, 1943, at a point on the division line between the northeasterly sideline of said Association's land and the southwesterly sideline of said Hooper's land; thence northeasterly on a prolongation of the southeasterly side of the premises conveyed by said Association to said Hooper by the aforementioned deed forty-eight (48) feet, more or less, to the northeasterly sideline of land of said Hooper; thence southeasterly along the northeasterly sideline of said Hooper's land fifteen (15) feet to a point in the southeasterly sideline of said Hooper's land; thence southwesterly along the last named bound forty-eight (48) feet, more or less, to the division line between the northeasterly sideline of said Association's land and the southwesterly sideline of said Hooper's land; thence northwesterly along said last named division line fifteen (15) feet, more or less, to the point of beginning.

Received
Recorded Register of Deeds
Mar 12, 2013 03:35:55P
Cumberland County
Pamela E. Lovley

Drummond Woodsum & MacMahon
84 Marginal Way, Suite 600
Portland, ME 04101-2480
GDU

JPP
M

Declaration of Trust
(Modernization Grant Projects)

No 75284 & 10432 P 93

70000
Whereas, Portland Housing Authority (herein called the "Public Housing Agency (PHA)"), a public body corporate and politic, duly created and organized pursuant to and in accordance with the provisions of the laws of the State of Maine and the United States of America, Secretary of Housing and Urban Development (herein called HUD) pursuant to the United States Housing Act of 1937 (42 U.S.C. 1437, et seq.) and the Department of Housing and Urban Development Act (5 U.S.C. 624 entered into a certain contract with the effective date as of June 30, 1964 (herein called the "Annual Contributions Contract") and certain Modernization Project Grant Amendments to the Annual Contributions Contract with the effective dates as of September 24, 1990 and October 15, 1991 (herein called the Modernization Grant Amendment) providing for a grant to be made by HUD to assist the PHA in modernizing lower income housing project(s); and

Whereas, as of the date of the execution of this Declaration of Trust the Modernization Grant Amendment and the Annual Contributions Contract cover certain individual lower income housing projects located in the City of Portland, County of Cumberland, State of Maine which provide approximately 1024 dwelling units, and which lower income housing projects are known as Modernization Project Nos. ME36P003910-Z and ME36P00311-Z and individual projects, as follows:

Project No. <u>ME36P003001</u>	with approximately	<u>200</u>	dwelling units
Project No. <u>ME36P003002</u>	with approximately	<u>46</u>	dwelling units
Project No. <u>ME36P003003</u>	with approximately	<u>24</u>	dwelling units
Project No. <u>ME36P003004</u>	with approximately	<u>200</u>	dwelling units
Project No. <u>ME36P003005</u>	with approximately	<u>100</u>	dwelling units
Project No. <u>ME36P003006</u>	with approximately	<u>150</u>	dwelling units
Project No. <u>ME36P003008</u>	with approximately	<u>150</u>	dwelling units
Project No. <u>ME36P003009</u>	with approximately	<u>100</u>	dwelling units
Project No. <u>ME36P003010</u>	with approximately	<u>50</u>	dwelling units
Project No. <u>ME36P003011</u>	with approximately	<u>4</u>	dwelling units

and

Whereas, the modernization of each Project will have been financed with grant assistance provided by HUD.

Now Therefore, to assure HUD of the performance by the PHA of the covenants contained in the Modernization Grant Amendment and the Annual Contributions Contract, the PHA does hereby acknowledge and declare that it is possessed of and holds in trust for the benefit of HUD, for the purposes herein stated, the following described real property situated in the City of Portland, County of Cumberland, State of Maine, To Wit:

(SEE ATTACHED SCHEDULES 1 - 10)

and all buildings and fixtures erected ~~or to be erected thereon, or appurtenant thereto.~~

The PHA hereby declares and acknowledges that during the existence of the trust hereby created, HUD has been granted and is possessed of an interest in the above described Project property, To Wit:

The right to require the PHA to remain seized of the title to said property and to refrain from transferring, conveying assigning, ~~leasing~~, mortgaging, pledging, or otherwise encumbering or permitting or suffering any transfer, conveyance, assignment, lease, mortgage, pledge or other encumbrance of said property or any part thereof, appurtenances thereto, or any rent, revenues, income, or receipts therefrom or in connection therewith, or any of the benefits or contributions granted to it by or pursuant to the Modernization Grant Amendment and the Annual Contributions Contract, or any interest in any of the same except that the PHA may, (1) ~~to the extent and in the manner provided in the Annual Contributions Contract,~~ (a) lease dwellings and other spaces and facilities in any Project, or (b) convey or otherwise dispose of any real or personal property which is determined to be excess to the needs of any Project, or (c) convey or dedicate land for use as streets, alleys, or other public rights-of-way, and grant easements for the establishment, operation, and maintenance of public utilities; or (d) enter into and perform contracts for the sale of dwelling units to members of tenant families, as authorized by the United States Housing Act of 1937, or (2) with the approval of HUD, release any Project from the trust hereby created; Provided, That nothing herein contained shall be construed as prohibiting the conveyance of title to or the delivery of possession of any Project to HUD pursuant to the Annual Contributions Contract.

~~The endorsement by a duly authorized officer of HUD (1) upon~~
any conveyance or transfer made by the PHA of any real or
personal property which is determined to be excess to the needs
of any Project, or (2) upon any instrument of conveyance or
dedication of property, or any interest therein, for use as
streets, alleys, or other public rights-of-way, or for the
establishment, operation and maintenance of public utilities, or
(3) upon any instrument of release made by the PHA of any Project
shall be effective to release such property from the trust hereby
created.

The individual projects covered by the Modernization Grant
Amendment shall be subject to this Declaration of Trust for a
period of twenty years beginning on the date of the Modernization
Grant Amendment. Each individual project shall also be subject
to this Declaration of Trust for a period of twenty years after
the date of the most recent Modernization Grant Amendment
applicable to that project. Upon expiration of the period during
which the PHA is obligated to operate the individual projects in
accordance with the Annual Contributions Contract, the trust
hereby created shall terminate and no longer be effective.

In Witness Whereof, the PHA by its officers thereunto duly
authorized has caused these presents to be signed in its name and
its corporate seal to be hereunto affixed and attested
this 11th day of March, 19 92.

(Seal)

Portland Housing Authority

SEAL

Attest:

[Signature], Secretary

By:

[Signature]
Chairman

STATE OF MAINE

County of Cumberland SS.

March 11, 1992

Personally appeared the above-named Joseph R. Mazziotti, Chairman
of the Portland Housing Authority and acknowledged the above
instrument to be his free act and deed, in said capacity, and the free
act and deed of said Portland Housing Authority.

Before me,

[Signature]

Notary Public/Attorney at Law

BRUCE R. LORING
NOTARY PUBLIC, MAINE
MY COMMISSION EXPIRES MAY 23, 1993

SEAL

SCHEDULE 2

KENNEDY PARK
BK 8541 / PG 0003,0004
Project ME3-2

A certain lot or parcel of land situated in the Bayside area of the City of Portland, County of Cumberland, State of Maine, and bounded and described as follows:

Beginning at a monument on the northerly side of Lancaster Street, said monument being distant S 67° 12' W 105.42 feet from a monument at the intersection of the northerly side of said Lancaster Street with the westerly side of Anderson Street;

Thence from said monument and by land now or formerly of the Harold J. Bumpus heirs N 22° 48' W 90.00 feet to a monument in the center line of a 20 foot passageway now or formerly known as Anderson Lane;

Thence continuing across said Anderson Lane and by an old passageway now land of the Grantor herein N 24° 03½ W 67.46 feet to a monument and land of the City of Portland Playground;

Thence by said Playground on the following described courses:

S 67° 12' W 343.71 feet to a monument;

Thence N 22° 48' W 30.00 feet;

Thence S 67° 12' W 152.75 feet;

Thence S 22° 49' E 47.00 feet;

Thence S 67° 10' W 100.00 feet to the easterly side of Boyd Street as it formerly existed;

Thence by said Boyd Street S 22° 50' E 140.00 feet to the intersection of the easterly side of said Boyd Street with the northerly side of said Lancaster Street;

Thence S 24° 06' E 154.00 feet and crossing said Lancaster Street and continuing on the easterly sideline of said Boyd Street to land now or formerly of Ralph DiPietro;

Thence by said DiPietro land N 67° 12' E 109.72 feet to land now or formerly of Esther Hensley;

Thence by said Hensley land on the following described course:

N 25° 14' W 34.00 feet;

Thence N 67° 12' E 66.12 feet;

Thence by a concave curve to the southeast having a radius of 42 feet, a distance of 43.66 feet, measured on the arc thereof, to the intersection of said curb with the westerly sideline of Mayo Street (said curve is not tangent to either the line from which it originates or terminates).

Thence crossing said Mayo Street N 67° 12' E 22.46 feet to the centerline of said Mayo Street.

Thence still crossing said Mayo Street and by land now or formerly of Thomas Sesto N 66° 46' E 131.70 feet to land now or formerly of Antonio Piacentini;

Thence by said Piacentini land on the following described courses:

N 19° 09' W 13.32 feet;

Thence N 67° 12' E 89.34 feet to the westerly side of Smith Street;

Thence by said Smith Street N 24° 50' W 77.88 feet to a point of curvature;

Thence continuing by said Smith Street and by a convex curve to the northeast having a radius of 48.29 feet, a distance of 77.57 feet when measured on the arc thereof, to the northerly said side Lancaster Street and a point of tangency;

Thence by said Lancaster Street N 67° 12' E 94.99 feet to the point of beginning;

Said above described courses are magnetic and of the date of 1959.

Together with all right, title, and interest, if any, in and to so much of said Lancaster Street, Smith Street, Mayo Street, and Boyd Street as lies adjacent to the above-mentioned premises and was acquired by said Portland Renewal Authority (formerly Portland Slum Clearance and Redevelopment Authority) by the aforementioned statements of taking.

Being portions of two lots of land described in statements of taking by the Portland Renewal Authority (formerly the Slum Clearance and Redevelopment Authority) the first dated February 3, 1960 and recorded in the Cumberland County Registry of Deeds, Book 2523, Page 341. The second dated March 22, 1963 and recorded in said Registry in Book 2528, Page 322.

Plans of the above-mentioned areas are recorded in said Registry in Plan Book 52, Pages 62 and 66.

SCHEDULE 3
BAYSIDE TERRACE
Project ME3-3

A certain lot or parcel of land situated in the Bayside area of the City of Portland, County of Cumberland, State of Maine and bounded and described as follows:

Beginning at the corner formed by the intersection of the easterly side of Boyd Street as it formerly existed with the southerly side of Fox Street, thence by the easterly side of said Boyd Street and by the City of Portland Bayside Playground and other land of the City of Portland Public Housing Authority on the following described courses:

S 22° 50' E 448.19 feet to a point;

Thence S 24° 06' E 36.17 feet to a point of curvature on the easterly side of said Boyd Street;

Thence crossing said Boyd Street by a concave curve to the northwest having a radius of 37.00 feet a distance of 57.28 feet measured on the arc thereof to the northerly side of Lancaster Street;

Thence by said Lancaster Street S 67° 12' W 140.02 feet to the corner formed by projecting the easterly sideline of Ell's Lane (so called) southeasterly to intersect said Lancaster Street;

Thence by said Ell's Lane (so called) on its projection and by its easterly sideline N 22° 57' W 447.73 feet to the southerly side of Fox Street;

Thence by said Fox Street N 67° 03' E 177.10 feet to the easterly side of said Boyd Street and the point of beginning.

Said above described courses are magnetic and of the date of 1959.

Said above described lot contains 79,411.6 square feet.

Being a portion of the lot of land described in a statement of taking by the Portland Renewal Authority (formerly the Slum Clearance and Redevelopment Authority) dated February 3, 1960 and recorded in the Cumberland County Registry of Deeds in Book 2523 Page 341. A plan of said area being recorded in said Registry in Plan Book 52 Page 62.

Together with all right, title, and interest, if any, in and to so much of said Fox Street, Boyd Street, Lancaster Street, and Ell's Lane (so called) as lies adjacent to the above described premises and was acquired by said Portland Renewal Authority (formerly the Portland Slum Clearance and Redevelopment Authority) by the aforementioned statement of taking.

SCHEDULE 5

BAYSIDE EAST

BK 8541 / PGs 0006,0007,0009,0009

ME3-5

A certain lot or parcel of land situated on the southwesterly side of Mayo Street and the northwesterly side of Oxford Street in the City of Portland, County of Cumberland and State of Maine, and being more particularly bounded and described as follows:

Beginning at a point on the northwesterly side of Oxford Street, which point is the most southerly corner of land now or formerly of the Mekail Amergian heirs; thence S 67° 09' 14" W along the northwesterly side of Oxford Street, 152.70 feet to the intersection of the northwesterly side of Oxford Street with the northeasterly side of Boyd Street; thence N 23° 53' 37" W along the northeasterly side of Boyd Street, 106.70 feet to the most southerly corner of land now or formerly of Maria Pesce; thence N 66° 24' 23" E along said land of Maria Pesce, 112.10 feet to the most easterly corner of said Pesce land; thence N 25° 01' 37" W by said Pesce land and by land now or formerly of Frank P. Briggs, 125.91 feet to other land of the Portland Housing Authority known as Project ME3-2; thence N 67° 24' 23" E by said land of the Portland Housing Authority 66.12 feet to a point on an arc; thence in a general southeasterly direction along an arc having a radius of 42 feet, 43.66 feet to the southwesterly side of Mayo Street; thence South 25° 03' 04" E along the southwesterly side of Mayo Street, 140.74 feet to the most northerly corner of land now or formerly of the Mekail Amergian heirs; thence S 67° 09' 14" W along said land of the Amergian heirs, 62 feet to the most westerly corner of said land of the Amergian heirs; thence S 25° 03' 04" E by said land of the Amergian heirs, 70 feet to the northwesterly side of Oxford Street and the point of beginning, containing 30,732.850 square feet.

Also another lot or parcel of land situated on the southeasterly side of Oxford Street and the southwesterly side of Mayo Street in said Portland, being more particularly bounded and described as follows:

Beginning at a monument at the intersection of the southeasterly side of Oxford Street with the southwesterly side of Mayo Street; thence S 25° 03' 24" E along the southwesterly side of Mayo Street, 236.40 feet to the most northerly corner of land now or formerly of Jehovah's Witnesses, Inc.; thence S 69° 19' 36" W along said land of Jehovah's Witnesses, Inc., 110.79 feet to the most westerly corner of said land of Jehovah's Witnesses, Inc.; thence S 23° 53' 37" E along said land of Jehovah's Witnesses, Inc. and land now or formerly of Warren and Grace DiPietro, 146.24 feet to the northwesterly side of Cumberland Avenue; thence S 68° 51' 13" W along the northwesterly side of Cumberland Avenue, 109.98 feet to a monument at the intersection of the northwesterly side of Cumberland Avenue with the northeasterly side of Boyd Street; thence N 23° 53' 37" W along the northeasterly side of Boyd Street, 375.05 feet to a monument at the intersection of the northeasterly side of Boyd Street with the southeasterly side of Oxford Street; thence N 67° 09' 14" E along the southeasterly side of Oxford Street, 215.71 feet to the southwesterly side of Mayo Street at the point of beginning; containing 66,714.892 square feet.

Also another certain lot or parcel of land situated on the northwesterly side of Oxford Street and the southwesterly side of Anderson Street in said Portland, and being more particularly bounded and described as follows:

Beginning at a point on the southwesterly side of Anderson Street at the most easterly corner of land now or formerly of Jacob S. Lamport, et al; thence S 22° 45' 26" E by the southwesterly side of Anderson Street, 228.00 feet to the intersection of the southwesterly side of Anderson Street with the northwesterly side of Oxford Street; thence S 67° 09' 11" W by the northwesterly side of Oxford Street, 191.53 feet to a monument at the intersection of the northwesterly side of Oxford Street with the northeasterly side of Smith Street; thence N 24° 12' 56" W along the northeasterly side of Smith Street, 200.17 feet to the most southerly corner of land now or formerly of Robert W. Dunn; thence N 66° 18' 21" E by said land of Dunn, 79.86 feet to the most southerly corner of Bronet S. Sanuk, et al; thence N 68° 08' 34" E by said land of Sanuk, et al, 36.81 feet to the most easterly corner of said Sanuk land; thence N 22° 45' 26" W by said Sanuk land, 27.44 feet to said land of Jacob S. Lamport, et al; thence S 67° 14' 34" W by said land of Lamport, et al, 80.00 feet to the southwesterly side of Anderson Street and the point of beginning; containing 41,153.96 square feet.

Also another lot or parcel of land situated on the southwesterly side of Greenleaf Street and the northwesterly side of Oxford Street in said Portland, and being more particularly bounded and described as follows:

Beginning on the northwesterly side of Oxford Street at a point which is N 67° 09' 11" E, 120.13 feet from the intersection of the northwesterly side of Oxford Street with the northeasterly side of Anderson Street, which point marks the most easterly corner of land now or formerly of Nicholas DiPietro, et al; thence N 22° 50' 45" W along said land of DiPietro 79.92 feet to the most northerly corner of said DiPietro land; thence South 67° 09' 11" W by said DiPietro land, 40 feet to the most easterly corner of land now or formerly of Beverly Ann Hayden; thence N 22° 45' 26" W by said land of Hayden, 100 feet to the southeasterly side of Munroe Street; thence N 22° 42' 43" W, crossing said Munroe Street, 50.00 feet to the northwesterly side of said Munroe Street; thence S 67° 17' 17" W, 80.11 feet to the intersection of the northwesterly side of Munroe Street (now Monroe Court) with the northeasterly side of Anderson Street; thence N 22° 45' 26" W by the northeasterly side of Anderson Street, 160.32 feet to the intersection of the northeasterly side of Anderson Street with the southeasterly side of Madison Street; thence N 67° 19' 47" E by the southeasterly side of Madison Street, 239.65 feet to the intersection of the southeasterly side of Madison Street with the southwesterly side of Greenleaf Street; thence S 22° 43' 36" E by the southwesterly side of Greenleaf Street, 160.14 feet to the intersection of the southwesterly side of Greenleaf Street with the northwesterly side of Munroe Street; thence continuing on the same course by the southwesterly side of Greenleaf Street across Munroe Street, 50.00 feet to the intersection of the southwesterly side of Greenleaf Street with the southeasterly side of Munroe Street; thence continuing on the same course of S 22° 43' 36" E along the southwesterly side of Greenleaf Street, 179.55 feet to the intersection of the southwesterly side of Greenleaf Street with the northwesterly side of Oxford Street; thence S 67° 09' 11" W by the northwesterly side of Oxford Street, 119.24 feet to said land of Nicholas DiPietro, et al, to the point of beginning; containing 71,814.13 square feet.

Also a certain lot or parcel of land situated on the southwesterly side of Kellogg Street in said Portland, and being more particularly bounded and described as follows:

Beginning at a point on the southwesterly side of Kellogg Street which is S 36° 49' E, 80.00 feet from the intersection of the southwesterly side of Kellogg Street with the southeasterly side of Monument Street, which point is the most easterly corner of land of the Portland Renewal Authority; thence S 36° 49' E by the southwesterly side of Kellogg Street 340.00 feet to a point which is N 36° 49' W, 20.00 feet from the most northerly corner of land now or formerly of Michael J. Conely; thence S 53° 11' W along a course that is parallel to and 20.00 feet from the northwesterly sideline of said Michael J. Conely land, 80.00 feet to land now or formerly of Hilda Blunda; thence N 36° 49' W by land of said Hilda Blunda, land now or formerly of Ida C. Tucci, land now or formerly of Ralph Grimaldi, land now or formerly of Antonio DiPietrantonio, land now or formerly of Joseph N. Gorham, land now or formerly of Robert Bowdoin, and land of the Portland Renewal Authority, 340.00 feet to the most southerly corner of land now or formerly of Elcuterio Guidi; thence N 53° 11' E by said Guidi land and by land of the Portland Renewal Authority, 80.00 feet to the southwesterly side of Kellogg Street and the point of beginning; containing 27,200 square feet.

Also a certain lot or parcel of land situated on the northeasterly side of Kellogg Street and the southeasterly side of Monument Street in said Portland, and being more particularly bounded and described as follows:

Beginning at a spike set at the intersection of the northeasterly side of Kellogg Street with the southeasterly side of Monument Street; thence N 57° 41' E by the southeasterly side of Monument Street, 80.25 feet to the most westerly corner of land now or formerly of Lee H. Jones; thence S 36° 49' E by said land of Jones, by land now or formerly of Guido and Mary Pardi, and land now or formerly of Mary T. Solak, 166.70 feet to a stake at the most westerly corner of land now or formerly of Phyllis R. Terroni; thence S 53° 11' W by land now or formerly of Mariangela D'Ambri, 80.00 feet to the northeasterly side of Kellogg Street; thence N 36° 49' W along the northeasterly side of Kellogg Street, 173.00 feet to the southeasterly side of Monument Street and the point of beginning; containing 13,588.0 square feet.

Also another lot or parcel of land situated on the southeasterly side of Lancaster Street and the southwesterly side of Boyd Street in said Portland, and being more particularly bounded and described as follows:

Beginning at a drill hole at the corner formed by the intersection of the southwesterly side of Boyd Street with the southeasterly side of Lancaster Street; thence S 48° 56' 21" W by the southeasterly side of Lancaster Street, 152.10 feet to an iron on the northeasterly side of the Franklin Street Arterial Highway; thence by said Franklin Street Arterial Highway by convex curve to the southeast, having a radius of 2,827.79 feet, a distance of 112.77 feet measured on the arc thereof to an iron set at a point of tangent in said curve; thence continuing by said Franklin Street Arterial Highway S 48° 46' 15" E, 31.98 feet to an iron at the former location of the northwesterly side of Heath Street; thence N 48° 56' 21" E by said former northwesterly side of Heath Street, 138.15 feet to a drill hole in the southwesterly side of Boyd Street; thence N 42° 21' 07" W by the southwesterly side of Boyd Street, 143.75 feet to the southeasterly side of Lancaster Street and the point of beginning.

Said above described courses are based on true meridian as determined by the Maine State Highway Commission.

The above described lot is hereby conveyed subject to an easement granted to the City of Portland, dated March 9, 1970 and recorded in the Cumberland County Registry of Deeds in Book 3121, Page 708.

RESPONSE TO ZONING REQUIREMENTS

BAYSIDE ANCHOR RESPONSE TO ZONING REQUIREMENTS

The Bayside Anchor Project cannot meet the current R6 zoning for the project and has proposed a map change to the Zoning Map to change the existing R6 Zone to R7. This process has begun and the rezoning is currently before the City Council. We understand that the final approval of the project cannot be undertaken until the rezoning is approved, but request that technical review of the project begin anticipating this map change.

The following is a response to a review of the current zoning requirements for R7:

Consistency with Comprehensive Plan:

Bayside Anchor is consistent with the City's Comprehensive Plan. Portland continues to struggle with an inadequate supply of apartments serving all incomes. Bayside Anchor will increase the supply of rental housing at rents serving a wide range of residents.

Consistency with Purpose of the R-7 Zone:

Bayside Anchor development will be located at the corner of Boyd and Oxford Streets in Portland's East Bayside neighborhood. The development will be adjacent to Portland Housing Authority's Bayside East, Bayside Terrace, and Kennedy Park developments.

East Bayside's boundaries are roughly those of Census Tract 5 with the exception of the India Street neighborhood and that Congress Street acts as the neighborhood's southern boundary. East Bayside is predominantly low income. The 2010 census indicates that census tract 5 has a poverty rate of 54.1%. In 2012, the 178 families living in public housing in the East Bayside neighborhood had an average annual household income under \$20,000.

The Bayside Anchor site is within walking distance of downtown and all its amenities. Additionally, it is a short walk away from the #1, #6, #7 and #8 Metro bus lines.

Meeting the Requirements of the R-7 Zone:

- The proposed Bayside Anchor building conforms to the dimensional and height requirements of the R-7 zone.
- The 45 units proposed fall within the maximum of 46 units permitted under the R-7 density restriction of 435 square feet of land area per unit.
- All of the units exceed the 400 square feet per unit floor area requirement of the R-7.
- Required off-street automobile parking will be delivered as part of an overall PHA Campus Transportation Demand Management plan. Our TDM plan outlines how automobile parking, bicycle parking and Public Transportation will be accommodated. The development team believes that the Bayside Anchor proposal presents an excellent opportunity to pursue progressive alternatives to off-street automobile parking using proven and documented demand reduction strategies.



TRANSMITTAL

DATE July 1, 2014
TO Barbara Barhydt
COMPANY City of Portland
PROJECT Bayside Anchor
RE Level III Site Plan Submittal

BUILDING CODE & USE SUMMARY

MUBEC (Maine Uniform Building Code)
IBC 2009
IECC 2009
NFPA 101 Life Safety
Maine State Internal Plumbing Code (reference Uniform Plumbing Code 2009)

Mixed use building: three (3) stories of residential apartments over ground floor apartments and accessory uses.
IBC 2009 Uses: R-2, B, E & A-3
NFPA Uses: Apartment Building, Day Care, Business. Separated Occupancies.

NFPA I & FIRE DEPARTMENT TECHNICAL STANDARDS

The Bayside Anchor project will be fully protected with an automatic NFPA 13 sprinkler system throughout. There is a hydrant located directly across Boyd St from the project, approximately 40'-0" from the face of building. The project will be fully accessible along the full lengths of Boyd St & Oxford St and the front door is located on Oxford St within 50'-0" of an access road.
Elevator cab sizes will meet Portland Fire Department requirements.
All details will be reviewed with the Portland Fire Department as required.

EMISSIONS REQUIREMENTS

All HVAC equipment in this project will not be subject to the Federal & State Emission reporting requirements. The HVAC equipment will meet the requirements of ASHRAE 90.1-2007 Energy Efficiency Standard and the IECC 2009.

SHADOW STUDY

The Bayside Anchor project is ~46'-0" in building height, with an approximate longest shadow length of 195'-0" in length on the winter solstice. There are no significant public resources within 195'-0" of the project site as defined in the City of Portland Technical Manual, Section 11.3, therefore no significant shadow impacts are anticipated and no further shadow study is required.

SUMMARY OF EASEMENTS

BAYSIDE ANCHOR
SUMMARY OF EXISTING AND/OR PROPOSED EASEMENTS, COVENANTS, RIGHTS-OF-WAY OR OTHER
BURDENS ON THE SITE

Existing:

The proposed .46 acre Bayside Anchor site is currently part of the larger Bayside East Public Housing development owned and managed by the Portland Housing Authority (PHA). Although owned by PHA, the U.S. Department of Housing and Urban Development (HUD) holds a Declaration of Trust on all public housing properties. At time the property is conveyed from PHA to PHDC/Bayside Anchor Development Company LLC, HUD's Declaration of Trust will be removed from this portion of the property.

There are no other existing easements, covenants, rights-of-way or other burdens on the property.

Proposed:

Proposed easements, covenants, licenses, rights-of-way or other burdens planned for the proposed Bayside Anchor site include the following:

1. Concrete Foundations and footings within the Oxford and Boyd Street Rights of Way
2. Permanent canopies extending from the building into the right of way
3. The pedestrian ramp/ steps on Boyd Street
4. A Pedestrian easement to the City where sidewalk encroaches on BA land on Oxford

Draft language for these easements and licenses is submitted as part of this Application. Final documents will be executed prior to submittal for a building permit.

The site plan contemplates using existing excess off-street parking spaces in the neighborhood currently owned by PHA. Upon approval and according to the proposed Parking Management Plan, the PHDC/Bayside Anchor Development Company LLC will enter into a formal agreement with PHA for the long term use of these spaces.

BAYSIDE ANCHOR SOLID WASTE

Solid Waste will be collected and disposed by private Hauler on a regular basis. There is a dedicated trash room on the first floor that will accommodate all residential waste. It has direct access onto Oxford Street.

Construction Waste will be sorted on site and either recycled or legally disposed of by the General Contractor.

REQUESTS FOR WAIVERS

**BAYSIDE ANCHOR
REQUEST FOR WAIVERS**

There are no waivers from the Site Plan and Technical Standards requested by this Applicant as part of this Application.

FINANCIAL AND TECHNICAL CAPACITY

FINANCIAL CAPACITY

TECHNICAL ABILITY

BAYSIDE ANCHOR FINANCIAL CAPACITY

Financial Capacity

The General Partner for the proposed Bayside Anchor Project is Bayside Anchor Development Company, LLC, a special purpose limited partnership created to take advantage of the Low-Income Housing Tax Credit (LIHTC) Program. The Developer and Guarantor of the project is the Portland Housing Development Corporation (PHDC), a Maine non-profit corporation controlled by the Portland Housing Authority (PHA). PHDC will act as developer of the project. In its role as developer, PHDC will be responsible for the successful completion of the project and will provide financial guarantees to both the construction lender and the investor limited partner. PHA is a financially sound non-profit corporation with a positive net worth and ample cash reserves to assure the successful completion of the project in the event of any difficulties during construction.

The total estimated development cost of the Bayside Anchor Project development is approximately \$ 5,300,000. The property will be sold to the PHDC by its current owner, Portland Housing Authority. The primary source of capital for the project will come from equity raised by selling tax credits. The remaining funds will come from a combination of subsidy sources including the Northern New England Housing Investment Fund and other financial investors. Application to MSHA for tax credits and subsidy financing is due in October, 2014 with results expected before yearend.

Letters of Interest from NNEHI and Bangor Savings have been requested and will be submitted to the City as part of this application when received.



TERM SHEET
THIS IS NOT A COMMITMENT TO LEND
May 12, 2014
(Effective through September 12, 2014)

Mark B. Adelson
Executive Director
Portland Housing Authority
14 Baxter Blvd.
Portland, ME 04101

Re: Bayside Anchor Apartments Low Income Housing Tax Credit project

Dear Mark,

We are pleased at the prospect of presenting this proposal for financing for the proposed Bayside Anchor Apartments ("Project"), a low income housing tax credit family housing project that Bayside Anchor Apartments, LP ("Borrower") and Portland Housing Development Corporation ("Developer") wish to develop in Portland, Maine. The proposed terms and conditions are provided for discussion purposes only and do not constitute an offer, agreement, or commitment to lend. The actual terms and conditions upon which the Bank may extend credit to the borrower are subject to the satisfactory completion of due diligence, formal credit approval, satisfactory review of loan documentation, and such other terms and conditions as determined by the Bank.

This term sheet is issued to accompany the Borrower's application for MaineHousing subsidy and low income housing tax credit allocation and the Sponsors application to the Federal Home Loan Bank of Boston's Affordable Housing Program (AHP) for the Project described below and will give a general idea of the terms upon which Bangor Savings Bank ("Bank") would extend this loan, with the understanding that this letter does not constitute a commitment to extend financing.

Borrower:	Bayside Anchor Apartments, LP
General Partner:	Bayside Anchor Development Company, LLC
Project Developer:	Portland Housing Development Corporation
Project Sponsors:	Portland Housing Development Corporation Portland Housing Authority
Project:	Bayside Anchor Apartments, a 45 unit multi-family rental housing project to be constructed under the Low Income Housing Tax Credit program and other sources including MaineHousing subsidy to be located at Boyd & Oxford streets, Portland, Maine

Loan Amount:	Up to \$3,399,280
Type:	Construction Line of Credit
Purpose:	To provide construction financing for improvements to a 45 unit family LIHTC subsidized affordable housing project to be located in Portland, Maine.
Maturity:	Twelve (12) months
Repayment:	Monthly payments of interest with principal due upon construction completion of project.
Rate:	A variable rate at 1-Month LIBOR plus 2.75%.
Loan Fee:	\$10,000 payable at construction loan closing
Inspection Fees:	\$600.00 per month while construction is in process. This is based on one funding remittance per month
Collateral:	1. First mortgage on real estate and improvements at Boyd & Oxford Streets, Portland, Maine. 2. First security interest and collateral assignment and pledge of all contracts, plans, permits, leases, rents, business assets and accounts related to the project and rights related thereto. 3. Collateral assignment and pledge of permanent sources of funding and equity contributions sufficient to fully fund completion of the project and pay Bank construction loan in full.
Guarantees:	Unlimited corporate guarantee for completion and repayment by: • General Partner, Bayside Anchor Development Company • Project Developer, Portland Housing Development Corporation
Guarantee:	Limited non-recourse guarantee for completion and repayment by Project Sponsor, Portland Housing Authority, with recourse limited to certain unrestricted non-federal funds of Portland Housing Authority.
Conditions:	1. Subject to approval and confirmation acceptable to the Bank of the proposed equity sources, grants, MaineHousing subsidy awards, or other equivalent funding sources sufficient for 100% completion of the project and repayment in full of the Bank's construction loan at construction completion.

2. Subject to an award and allocation of Low Income Housing Tax Credits by the Maine State Housing Authority and such other subsidy or MaineHousing loan program awards sufficient to provide 100% of the permanent funding for the project.
3. Subject to an "As Is", "Investment Value", "Upon Completion-Subsidized", and "Upon Completion Stabilized" Fair Market Value appraisal of the proposed affordable housing LIHTC Project in Portland, Maine indicating a maximum LTV of 85%.
4. Subject to Bank receipt and satisfactory review of a Phase I Environmental Risk Assessment and such other follow-up analysis that may be determined to be necessary by the Bank in its sole discretion.
5. Subject to Bank receipt and satisfactory review of the Market Feasibility Study, final development and construction budget, project pro-forma financial statements, project plans, drawings, and specifications, and a fixed price or guaranteed maximum price construction contract from a bonded general contractor.
6. Subject to satisfactory review of project plans, specifications, and construction contract by a construction engineer acceptable to the Bank.
7. Subject to conformity with any construction procedures, requirements, and inspections required under agreements with governmental authorities, the Maine State Housing Authority, the LIHTC equity investors, City of Portland, and all permanent funding providers.
8. Subject to terms and conditions of a construction loan agreement including establishment and maintenance of borrower's construction deposit, construction escrow, and reserve deposit accounts with the Bank, control and disbursement of all funds necessary for construction completion according to standard Bank policy and procedures, and inspection by a construction engineer selected by the Bank.

**Other General
Conditions:**

- a. Subject to receipt and review of the Borrower's and Guarantors financial statements and all other information required by the Bank for underwriting and credit review. The Bank will thereafter require annual financial statements of the Borrower and Guarantor within 120 days of fiscal year end with copies of audited statements by the date required by HUD & MSHA.

Any commitment that Bangor Savings Bank issues, will be subject to the terms of its usual loan documentation, as approved by counsel for the Bank in connection with this particular transaction, and may include terms and conditions that are different from, or that are in addition to, the terms and conditions stated in this letter. The Borrower is responsible for all out-of-pocket costs and expenses incurred by the Bank in connection with the proposed loan including appraisal, legal fees, filing fees, environmental due diligence as required, etc. As mentioned above, this letter is intended only to give you a general idea of the Bank's current thinking regarding a structure for this transaction that may be appropriate.

We look forward to hearing from you, and appreciate the opportunity to present this term sheet to you. We appreciate the important commitment to affordable housing and the community development effort involved in this project and we hope to proceed further with our discussions and the underwriting process.

Sincerely,

A handwritten signature in black ink that reads "Laura Huddy". The script is fluid and cursive, with a long horizontal flourish extending from the end of the name.

Laura Huddy
Vice President
Commercial Lending Group

BAYSIDE ANCHOR TECHNICAL CAPACITY

Technical Capacity

The Portland Housing Development Corporation (PHDC) is the non-profit development arm and component corporation of the Portland Housing Authority (PHA). It was created in 1983 to develop and finance affordable housing in Portland, and assist in implementing PHA's strategic goals in this area, which include; expand the inventory of affordable housing, modernize and redevelop PHA existing housing stock, and utilize excess PHA property to accomplish this.

PHA has granted PHDC an option to purchase the land for this purpose. PHDC has convened some of Maine's most forward-thinking development, construction and design firms to create a proposal that provides the neighborhood with much-needed services and affordable apartments.

Development Team:

- **Owner/Developer: Bayside Anchor Development Company LLC** is a subsidiary of PHDC created specifically for the development and ownership of Bayside Anchor.
- **Development Partner and Consultant: Avesta Housing** has developed over 2,000 units in Maine over the last 40 years including several hundred in Portland. Avesta brings its extensive experience as a consultant, development partner and property manager to Bayside Anchor. For this project Avesta Housing Development Corporation will provide consulting services relating to design, permitting, construction and management of the project for a defined period of time upon occupancy.
- **Architect: Kaplan Thompson Architects** is a leader in Maine and the nation in building super-efficient residences at attainable costs. Kaplan Thompson is the lead designer on the project.
- **Landscape Architect: Carroll Associates;** Patrick Carroll brings his extensive urban design and planning experience to the project.
- **Construction Manager: Wright Ryan** is the leading builder of affordable apartments in Maine. They completed the initial estimates which include the innovative cost saving and construction techniques that make the project unique.

STORMWATER MANAGEMENT

STORMWATER REPORT
GEOTECHNICAL INVESTIGATIONS

Bayside Anchor Stormwater Management Narrative

Date: July 1, 2014
To: City of Portland
From: John Mahoney, P.E.
Peer Review: Stephen J. Bradstreet, P.E.
Location: 81 East Oxford Street, Portland, Maine

List of Appendices:

Appendix A: Post Construction Stormwater Management Plan
Appendix B: Stormwater BMP Inspection and Maintenance Requirements
Appendix C: FocalPoint Sizing Summary
Appendix D: Soil Infiltration Testing
Appendix E: Pre Development Hydro CAD Calculations (digital copy only)
Appendix F: Post Development Hydro CAD Calculations (digital copy only)

Existing Conditions:

The site is a 20,147 SF (.46 acres) acre parcel on the northern corner of Boyd and Oxford Streets that slopes moderately to the northwest from elevation 24 at Oxford Street to elevation 13 in the northern corner. The property contains a 7,000 square foot paved parking lot and a paved path, while the remaining land cover is grass.

Stormwater runoff from the parking lot and the upland grass strip drains to a catch basin in the parking lot, which drains to a separated stormdrain system in Boyd Street (S1 on Sheet C-5). This stormdrain discharges to the City's combined sewer system at the bottom of Boyd Street. As such, discharge from this portion of the site is essentially into the combined sewer.

Stormwater runoff from the grass area on the lowland portion of the site discharges on the surface leaving the site to the northwest and flowing to a low area in the backyards of multiple buildings. This low area is shown as an enclosed 12' contour on the attached drainage plan. It is our understanding that stormwater from the subject property (as well as other adjacent properties) drains to this low area and infiltrates.

Approximately 6" above the lowest portion of this existing basin area is a sewer manhole that has a cover with small holes (36 holes 5/8" in diameter). This manhole functions as a drain during heavy weather events.

The existing low basin area has been observed during heavy rainfall on multiple occasions and no ponding has been noted. Residents in adjacent apartments have indicated that they have never seen the area flood. The USDA medium intensity soil survey classifies this area as moderately well drained (Hydrological Group B).

It should be noted that that this low area and the surrounding residences as well as the subject properties are all under control, management and/or ownership of Portland Housing Authority.

Proposed Development:

The owner proposes to construct a 4 story apartment building on a 10,000 SF footprint with a patio, pathway and other hardscape areas; while the northwestern lowland portion of the site will remain lawn. The proposed development will increase the site's impervious area by approximately 6,301 square feet.

Stormwater Management – Basic Standards:

Erosion and sedimentation control measures are drawn, detailed and described on Sheets C1 through C4. Good housekeeping practices in accordance with MaineDEP Chapter 500 are described in the notes on Sheet C4. A post construction stormwater management plan is provided in Appendix A. Stormwater BMP inspection and maintenance requirements are provided in Appendix B.

Stormwater Management - Quality:

We propose to use the FocalPoint biofiltration system for stormwater treatment. This system is similar in configuration to a standard rain garden system where stormwater runoff flows through a soil filter that removes pollutants and reduces temperature. Where standard rain gardens have permeability rates in the range of 2 – 3 inches per hour; the FocalPoint system's engineered soil filter media provides permeability rates in excess of 100 inches per hour. This permeability rate is guaranteed by the manufacturer and they provide testing at no additional cost. This high permeability facilitates treatment of relatively large impervious areas with small rain gardens making the FocalPoint system ideal for compact urban developments.

FocalPoint is approved by Maine DEP and will be sized and designed in accordance with Chapter 7.5 in Volume III of the Maine Stormwater Best Management Practices Manual.

Additionally, the City recently used the FocalPoint system on a sewer separation project in Victor Road area adjacent to Payson Park. It is our understanding that the system is working well and we would greatly appreciate any input from the City on how the installation went.

We propose to install a 32 SF FocalPoint system with 6" deep ponding area (rain garden) of 184 SF. As can be seen in the attached calculation spreadsheet (*Appendix C: FocalPoint Sizing Summary*), this configuration will provide treatment for 6,684 SF of impervious area.

Stormwater Management - Quantity:

We propose to disconnect the existing stormdrain that discharges to the combined sewer and outlet stormwater runoff to the surface only. The surface discharge would be in the location of the existing surface discharge described above and the drainage patterns will remain the same. Detention will be provided on the Bayside Anchor Site in order to temporarily store stormwater and release it slowly over time.

Storage will be provided with the R-Tank tank system. R-Tank is a modular box underdrain system with high void space (95%) that can be stacked like Lego's beneath the proposed patio to provide the required storage volume. We propose to install 2,343 CF of storage beneath the proposed patio. Because 575 CF of this storage will be below the elevation of the lowest outlet, the system has the potential to capture and infiltrate .6-inches of rainfall from the tributary building and patio area (11,805 SF).

Infiltration Rates:

In an effort to assess the infiltration potential for the area beneath the R-Tanks and the downstream low area under common ownership; Ransom conducted infiltration tests in four locations: INF-1 through INF-4 as shown on Sheets C1, C5 and C6. Two test holes were located in the proposed patio area behind the building where we intend to install the R-Tank system and two test holes were located in the low area downstream of the development, described above.

Test pits were performed by hand using the soil and sizing augers included with the Guelph Permeameter testing Kit. In the R-Tank area testing was conducted at approximately elevation 16. The bottom of the R-Tanks is proposed to be elevation 16.31. In order to assess the potential to infiltrate from the ground surface, testing in the low basin was conducted just below the ground surface at approximate elevation 11. All test pits were terminated in a layer of Loam Fill with characteristics of "Urban Fill". The testing procedures and results are described in more detail in *Appendix D: Soil Infiltration Testing*.

The infiltration rates assumed in the HydroCAD modeling are as follows:

1. Area Beneath R-Tanks (INF 1 & 2): 0.25 inches per hour
2. Downstream Basin Area (INF 3 & 4): 0.10 inches per hour

These rates are based on the average of the two tests for each area with a 50% reduction to account for the variability in the thickness of the infiltrating Loam Fill layer and the potential for rising water table elevations during flood events.

Hydraulic Analysis:

Stormwater runoff calculations for quantity were made using the HydroCAD 8.5 computer program, which is based on the Soil Conservation Service's TR-20 methodology. Runoff hydrographs are generated based on a standard type III 24 hour storm.

Five storm events were modeled as follows:

1. 1" storm: The 1" storm event was analyzed with the hope of simulating a heavy weather event that would typically happen multiple times over a given year and may impact the CSO frequency and volume.
2. 2-year frequency flood event: 3" rainfall
3. 10-year frequency flood event: 4.7" rainfall
4. 25-year frequency flood event: 5.5" rainfall
5. 100-year frequency flood event: 6.7" rainfall

Runoff Curve numbers were determined based on land coverage and soil type. Soils were extracted from the Cumberland County Medium Intensity Soil Survey. The vast majority of the site has Hydrological Group B (Well Drained) soils with a small area of Hydrological Group A (Excessively Drained) soils in the upland eastern corner. This boundary can be seen on Sheets C5 and C6. Times of concentration were developed based on runoff flow paths for each subarea and shown on Sheets C5 and C6. A minimum Tc of 6 minutes was set in the HydroCAD model per Maine DEP guidance.

Peak runoff flow rates and runoff volumes are provided for the following three analysis points, which are identified on Sheets C5 and C6.

1. The 15" Stormdrain at the bottom of Boyd Street at the intersection of Lancaster Street. This stormdrain was chosen as a common discharge point for the existing parking lot and a much smaller area of the post development Bayside Anchor site. This analysis point allows us to demonstrate substantial reductions in the volume and rates of stormwater entering the combined sewer system without the benefit of detention.
2. The grassed swale at the boundary of the Bayside Anchor site and downhill PHA properties. This analysis point is considered **internal to the PHA campus**, thus internal to the stormwater management system. In other words, Analysis point B is not a discharge point. Runoff rates and volumes are provided to facilitate a thorough review.
3. The 44" combined sewer that, based on the City's GIS data, runs along the Lancaster Street alignment. This analysis point was chosen as a common discharge point for the entire area of study area in order to assess the development's impact on the combined sewer by comparing flow rates and volumes before and after the development.

Analysis Point A shows substantial reductions in both the flow rates and volumes for water leaving the study area without the benefit of detention-attenuation.

Analysis Point B shows increases in runoff rates and volumes. Runoff passing this point is detained a second time in the existing basin area before leaving the PHA campus. The HydroCAD model shows that the existing drain (sewer manhole with small holes) has the capacity to drain up to a 25 year storm, while providing significant attenuation, without overflowing onto Mayo Street. Consider also that no increases are predicted for the 1" storm.

Analysis Point C shows substantial reduction in the peak runoff rates for all storms. Runoff volumes are substantially reduced for the 1" storm event, while volumes for the flooding events are essentially the same with slight increases for the 2- year and 10-year storms and slight decreases for 25-year and 100-year storms. Although the 2-year and 10 year storm show slight increases in volume, the peak runoff rates for these storms are reduced by more than 60%. Thus the runoff volumes are spread out over a longer time period and will have less impact on CSO events.

Peak runoff rates and runoff volumes for the above analysis points and storm events are tabulated in the following tables. HydroCAD calculations can be found in Appendices E & F.

Note that the two "Ornamental Rain Gardens" in the northern property corner shown on Sheet C1, have not been considered in this analysis.

Storm Event	PRE-Development Peak Runoff RATES cubic feet per second (CFS)		
	Analysis Point A Stormdrain	Analysis Point B Grassed Swale	Analysis Point C Combined Sewer
1" Storm	.05	.00	.05
2 Year Frequency Storm	.47	.05	.55
10 Year Frequency Storm	.87	.29	1.07
25 Year Frequency Storm	1.06	.43	1.29
100 Year Frequency Storm	1.35	.66	1.61

Storm Event	POST-Development Peak Runoff RATES cubic feet per second (CFS)		
	Analysis Point A Stormdrain	Analysis Point B Grassed Swale	Analysis Point C Combined Sewer
1" Storm	.01	.00	.01
2 Year Frequency Storm	.09	.10	.20
10 Year Frequency Storm	.18	.49	.39
25 Year Frequency Storm	.22	.85	.46
100 Year Frequency Storm	.29	1.90	1.22

Storm Event	PRE-Development Runoff VOLUMES acre feet (AF) volume of water 1' deep over one acre		
	Analysis Point A Stormdrain	Analysis Point B Grassed Swale	Analysis Point C Combined Sewer
1" Storm	.004	.000	.004
2 Year Frequency Storm	.031	.006	.077
10 Year Frequency Storm	.059	.021	.184
25 Year Frequency Storm	.073	.030	.238
100 Year Frequency Storm	.094	.044	.308

Storm Event	POST-Development Runoff VOLUMES acre feet (AF) volume of water 1' deep over one acre		
	Analysis Point A Stormdrain	Analysis Point B Grassed Swale	Analysis Point C Combined Sewer
1" Storm	.001	.000	.001
2 Year Frequency Storm	.006	.037	.083
10 Year Frequency Storm	.013	.079	.186
25 Year Frequency Storm	.015	.100	.225
100 Year Frequency Storm	.020	.133	.304

APPENDIX A

Post Construction Stormwater Management Plan

Bayside Anchor Stormwater Management Narrative

City of Portland

81 East Oxford St

Portland, Maine

Bayside Anchor Post-construction stormwater management plan

The Applicant shall maintain the BMPs in accordance with the approved plan and shall demonstrate compliance with the plan as follows:

- (a) *Inspections.* The owner or operator of a BMP shall hire a qualified post-construction stormwater inspector to at least annually, inspect the BMPs, including but not limited to any parking areas, catch basins, drainage swales, detention basins and ponds, pipes and related structures, in accordance with all municipal and state inspection, cleaning and maintenance requirements of the approved post-construction stormwater management plan.
- (b) *Maintenance and repair.* If the BMP requires maintenance, repair or replacement to function as intended by the approved post-construction stormwater management plan, the owner or operator of the BMP shall take corrective action(s) to address the deficiency or deficiencies as soon as possible after the deficiency is discovered and shall provide a record of the deficiency and corrective action(s) to the department of public services ("DPS") in the annual report.
- (c) *Annual report.* The owner or operator of a BMP or a qualified post-construction stormwater inspector hired by that person, shall, on or by June 30 of each year, provide a completed and signed certification to DPS in a form provided by DPS, certifying that the person has inspected the BMP(s) and that the year adequately maintained and functioning as intended by the approved post-construction stormwater management plan, or that they require maintenance or repair, including the record of the deficiency and corrective action(s) taken.
- (d) *Filing fee.* Any persons required to file an annual certification under this section shall include with the annual certification a filing fee established by DPS to pay the administrative and technical costs of review of the annual certification.
- (e) *Right of entry.* In order to determine compliance with this article and with the post-construction stormwater management plan, DPS may enter upon property at reasonable hours with the consent of the owner, occupant or agent to inspect the BMPs.

APPENDIX B

Stormwater BMP Inspection and Maintenance Requirements

Bayside Anchor Stormwater Management Narrative

City of Portland
81 East Oxford St
Portland, Maine

Bayside Anchor: Stormwater BMP Inspection Log

**The City of Portland, ME requires ongoing annual inspections to ensure the proper maintenance and operation of stormwater management facilities.
Inspections must be conducted by third parties qualified by the City.**

A. General Information

Use only one Cover Sheet per site with as many specific structural BMP Inspection Report attachments as needed. Attach required color digital photos of site, structures and devices as applicable with captions.

Project Name:	Bayside Anchor	Inspection Date:	
Parcel Map, Block and Lot:	022I001001	Current Weather:	
BMP Owner:	Portland Housing Development Cooperation	Date / Amount Last Precip:	
Owner Mailing Address:	14 Baxter Boulevard Portland, Maine	3PI Company:	
Owner Phone #:	207-773-4753	3PI Mailing Address:	
Owner Email:	madelson@porthouse.org	Inspector Name:	
		Inspector Phone #:	
		Inspector Email:	

B. Inspection Report Attachments

Please document the number of each structural BMP type found at this site in the blank spaces provided below. Use additional Attachments if / as needed and submit all Attachments together with the Cover Sheet as a single report.

BMP Type	Number BMPs at site
Vegetated Areas	-
Stormdrain Outlets	1
Stormdrain Structures: Overflow Control and Harco Drain with Stormsack	2
FocalPoint High Flow Biofiltration Unit	1
R-Tank Subsurface Detention-Infiltration System	1

Other (describe	

C. Inspection Results

FAIL**

☐

** If any one item on an Inspection Report attachment is coded as "Work Needed" then entire BMP fails inspection.

** If a site has multiple BMPs and one fails inspection, mark as "Fail" until all BMPs pass inspection.

Note: Applicable BMP Inspection Reports and confirmatory color digital photos summarizing required repairs must be submitted to the City following completion of the preliminary inspection. A re-inspection and certification must be completed within 60 days of the failed preliminary report. It is recommended that the inspector be part of the repair / maintenance process to ensure that repairs are performed properly.

PASS

☐

Note: a qualified professional (as determined by the City) must sign below and include all applicable Inspection Report attachments and confirmatory digital color photos with captions.

D. Professional Certification (as qualified by City of Portland Stormwater Program Coordinator)

To be completed only when all BMPs at this site are functioning as designed with no outstanding maintenance issues.

I, _____, as a duly qualified third party inspector attest that a thorough inspection has been completed for ALL applicable BMPs that are associated with this particular site. All inspected structural BMPs are performing as designed and intended and are in compliance with the provisions of the City Portland's Standards

Signature: _____

Date: _____

Form Adapted from the City of South Portland's Annual Structural BMP Inspection Report Cover Sheet

Owner: Portland Housing Development Cooperation	Operator:
Location & Parcel Id: 022I001001	Inspector:
	Date:
General Information	Observations
Inspection duration (hours)	
Days since last precipitation	
Quantity of last precipitation (in)	
Type of inspection	
Storm event	
Current weather	
Photos taken	☐ Yes ☐ No ☐ NA
Nearby natural resources	☐ Yes ☐ No ☐ NA
Copy of ESC plan	☐ Yes ☐ No ☐ NA
MEDEP Permit # (if applicable)	
General info notes	
Vegetated Areas	Observations
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
Vegetated area notes	
Stormdrain outlets	Observations
Accumulated sediments and debris at the outlet and within the conduit have been removed.	☐ Yes ☐ No ☐ NA
Erosion damage at the outlet have been repaired	☐ Yes ☐ No ☐ NA
Outlet notes	

Stormdrain Structures (Require inspection TWICE per year)	Observations
Accumulated sediments from inflow channels, pipes and sumps between basins have been removed and legally disposed of.	☐ Yes ☐ No ☐ NA
Floating debris and floating oils have been removed.	☐ Yes ☐ No ☐ NA
Debris and Sediment Removed From Harco Stormsack	☐ Yes ☐ No ☐ NA
Stormdrain Structure system notes	
The Harco Stormsack in the overflow drain shall be inspected every three months for the first year and twice annually after that. It is CRITICAL THAT THE STORMSACK BE MAINTAINED IN ORDER TO PREVENT DEBRIS AND SEDIMENT FROM ENTERING THE R-TANKs.	

FocalPoint High Flow Biofiltration and R-Tank System	Observations
Bark Mulch Layer Removed Replaced Annually	☐ Yes ☐ No ☐ NA
Accumulated sediments and debris (trash) within the surrounding ponding (rain garden) area have been removed and legally disposed of	☐ Yes ☐ No ☐ NA
Water level observed in inspection all 3 inspection port to ensure that the infiltration area is draining adequately and excessive sediment has not built up.	☐ Yes ☐ No ☐ NA
Eroded areas have been repaired.	☐ Yes ☐ No ☐ NA
<i>FocalPoint/R-Tank notes</i> If sediment accumulates beyond an acceptable level in the R-Tank storage system, it will be necessary to flush the underdrain. This can be done by pumping water into the Observation/Maintenance Port or adjacent overflow structure, allowing the turbulent flows through the underdrain to re- suspend the fine sediments. If multiple Observation/Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency. Measures shall be taken to capture sediment before discharge to downstream PHA properties.	
Other Comments	Observations
Corrective action needed	☐ Yes ☐ No ☐ NA
<i>If corrective action in needed, please explain detail</i> 	
Verbal notification provided to responsible party	☐ Yes ☐ No
Verbal notification contact	
Follow up required	☐ Yes ☐ No
<i>Final comment notes</i> 	

Photos (use additional pages as needed)

Review Notes

Date Reviewed:
Reviewed by:
Date entered:
Date edited:
Edited by:



FocalPoint

BIOFILTRATION SYSTEMS

Operations & Maintenance





FocalPoint⁶

BIOFILTRATION SYSTEMS

results include

REMOVES
85%

OF TOTAL SUSPENDED SOLIDS
65% TOTAL PHOSPHORUS

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 HPMBS, is filtered by the High Performance 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® 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® Stormwater systems by following instructions in this manual.



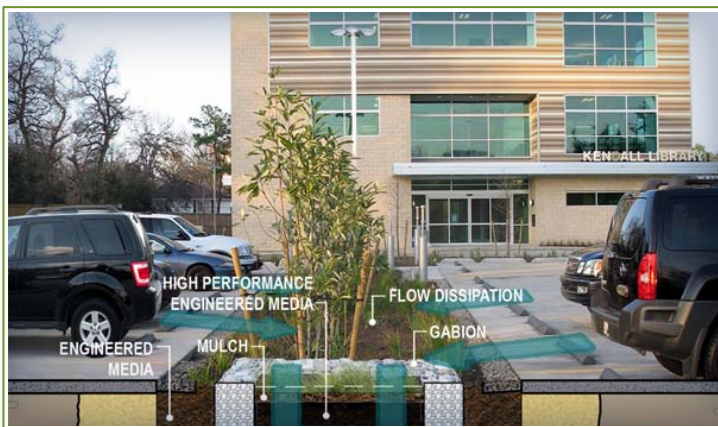


BASIC OPERATIONS

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 hardwood mulch (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® systems. To ensure the safe and specified function of this storm water 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 units as described in approved plans. A comprehensive installation manual is available at www.convergentwater.com.



results include

REMOVES
93%

OIL & GREASE
43% TOTAL NITROGEN



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® 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® 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 overaccumulation 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 Contractor or 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 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; e.g. some fast food restaurants require more frequent trash removal. Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented require additional maintenance visits.

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 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® system.

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®. 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® 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®
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.

MAINTENANCE VISIT PROCEDURE

1. Inspection of FocalPoint® and surrounding area

- Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

Record on Maintenance Report the following:

Standing Water	yes no
Damage to HPMBS System	yes no
to Overflow conveyance	yes no
Is Bypass Clear	yes no

If yes answered to any of these observations, record with close-up photographs (numbered).

2. Removal of Silt / Sediment / Clay

- Dig out silt (if any) and mulch and remove trash & foreign items.

Record on Maintenance Report the following:

Silt / Clay	yes no
Cups / Bags	yes no
Leaves	yes no
Volume of material removed	_____

3. Removal of debris, trash and mulch

- After removal of mulch and debris, measure distance from the top of the FocalPoint® 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 FocalPoint® media (not top soil or other) to recharge to the distance specified.

Record on Maintenance Report the following:

Distance to from media surface to flow line of overflow conveyance (inches) _____
of Buckets of Media Added _____



4. Mulch Replacement

Most maintenance visits require only replacement mulch (if utilized). Bags of clean, double shredded hardwood mulch are typically used for smaller biofiltration beds, however larger systems may require truck loads of mulch. 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® engineered soil media available from the VAR/Contractor.

- Add double shredded mulch 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® system to allow for entry of trash during a storm event.

5. 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

Record on Maintenance Report the following:

Height above Grate (feet) _____

Width at Widest point (feet) _____

Health alive | dead

Damage to Plant yes | no

6. Clean area around FocalPoint®

- Clean area around unit and remove all refuse to be disposed of appropriately.

7. 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

<i>Element</i>	<i>Problem</i>	<i>What To Check</i>	<i>Should Exist</i>	<i>Action</i>
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.	Recommend contact manufacturer or VAR
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 manufacturer or 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

SPECIFICATIONS FOR A HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS) Material, Performance and Installation Specification

I. Summary

The following general specifications describe the components and installation requirements for a High Performance Modular Biofiltration System (HPMBS) for filtration of storm water that utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban storm water runoff. The modular treatment system in which the biologically active biofiltration media is used shall be a complete, integrated system designed to be placed in Square Foot or Linear Foot increments per the approved drawings to treat contaminated runoff from impervious surfaces.

The High Performance Modular Biofiltration System (HPMBS) is comprised of the following components:

A. Plant Component

1. Manufacturer shall provide a regionalized list of acceptable plants.
2. Plants, as specified in the approved drawings/manufacturer's plant list, shall be installed at the time the HPMBS is commissioned for use.
3. Plants and planting are typically included in landscape contract.

B. Biofilter Component

1. This component employs a high performance cross-section in which each element is highly dependent on the others to meet the performance specification for the complete system. It is important that this entire cross-section be provided as a complete system, and installed as such.
2. As indicated in the approved drawings, the elements of the Biofilter include:
 - A. *A mulch protective layer (if specified).*
 - B. *An advanced high infiltration rate biofiltration planting media bed which utilizes physical, chemical and biological mechanisms of the soil, plant, and microbe complex, to remove pollutants found in storm water runoff.*
 - C. *A separation layer which utilizes the concept of 'bridging' to separate the biofiltration media from the underdrain without the use of geotextile fabrics.*

D. *A wide aperture mesh layer utilized to prevent bridging stone from entering the underdrain/storage element.*

E. *A modular, high infiltration rate 'flat pipe' style underdrain/storage system which is designed to directly infiltrate or exfiltrate water through its surface.*

C. Energy Dissipation Component

1. An Energy Dissipation Component is typically specified to slow and spread out water as it enters the system. This component is dependent upon the design in the approved drawings, but typically consists of a rock gabion, rock filter dam or dense vegetation element, such as native grasses, either surrounding the Biofiltration Component or located immediately upstream of it.

D. Pretreatment Component

1. Pretreatment, when specified, is typically accomplished by locating the Biofiltration Component within a traditional vegetated BMP such as a vegetated swale, vegetated depression, traditional bioretention system, vegetated filter strip, sediment forebay, etc. These BMPs provide primary TSS removal when desirable.

E. Observation and Maintenance Component

1. An Observation and Maintenance Port shall be installed per the approved drawings to provide for easy inspection of the underdrain/storage element, and cleanout access if needed.

F. Extreme Event Overflow (by others)

1. An Extreme Event Overflow should be located external to, but near the Biofiltration element to provide bypass when needed. This may be an overland flow bypass structure, grated inlet, safe overland surface flow, or any configuration that serves the purpose. In the case of an inlet, it must be designed to minimize the likelihood of clogging by vegetative material. Typical inlet solutions involve inclined or dome style inlet grates with a StormSack by FABCO Industries.

II. Quality Assurance and Performance Specifications

The quality and composition of all system components and all other appurtenances and their assembly process shall be subject to inspection upon delivery of the system to the work site.

Installation is to be performed only by skilled work people with satisfactory record of performance on earthworks, pipe, chamber, or pond/landfill construction projects of

comparable size and quality.

A. Plants

1. Plants must be compatible with the HPMBS media and the associated highly variable hydrologic regime. Plants are typically facultative with fibrous roots systems such as native grasses and shrubs.
2. Manufacturer shall provide a regionalized list of acceptable plants.
3. All plant material shall comply with the type and size required by the approved drawings and shall be alive and free of obvious signs of disease.

B. Mulch (if specified)

1. Mulch, typically double shredded hardwood (non-floatable), shall comply with the type and size required by the approved drawings, and shall be screened to minimize fines.

C. Biofiltration Media

1. Biologically active biofiltration media shall be visually inspected to ensure appropriate volume, texture and consistency with the approved drawings, and must bear a batch number marking from the manufacturer which certifies performance testing of the batch to meet or exceed the required infiltration rate.
2. Manufacturer shall have a minimum of 5 years experience and a minimum of 4,000 systems installed operational units.
3. Within 90 days after project completion, the infiltration rate shall be confirmed at the manufacturer or installer's expense, by a wetted condition hydraulic conductivity test.
 - a. *Failure to pass this test will result in removal and replacement of all media in the system at no cost to the project owner/operator.*
 - b. *Test must utilize the equipment and follow the standard operating procedures found in the Harris County Texas manual entitled, Low Impact Development & Green Infrastructure Design Criteria for Storm Water Management (2011).*
 - c. *Replacement media, if required, must be taken from a different batch than the original.*
4. Manufacturer shall provide, at no additional cost to the project owner/operator, maintenance of the biofiltration system for a period of one year.
5. Pollutant Removal performance, composition and characteristics of the

Biofiltration Media must meet or exceed the following minimum standards as demonstrated by testing acceptable to the project engineer:

Pollutant	Removal Efficiency
TSS	85%
Total Nitrogen	43%
Heavy Metals	58-82%
Phosphorus	65 %
Oil & Grease	90%
Bacteria	60%
Composition and Characteristics	
Sand - Fine	< 5%
Sand – Medium	10% - 15%
Sand – Coarse	15% - 25%
Sand – Very Coarse	40% - 45%
Gravel	10% - 20%
Infiltration Rate	>100 inches per hour
Peat Moss*	5% - 15%
* Peat Moss Specification	
Listed by Organic Materials Review Institute 100% natural peat (no composted, sludge, yard or leaf waste) Total Carbon >85% Carbon to Nitrogen Ratio 15:1 to 23:1 Lignin Content 49% to 52% Humic Acid >18% pH 6.0 to 7.0 Moisture Content 30% to 50% 95% to 100% passing 2.0mm sieve > 80% passing 1.0mm sieve	

D. Underdrain/Storage System

1. Underdrain/storage components shall be manufactured in an ISO certified facility and be manufactured from at least 90% post consumer recycled materials.
2. Underdrain/storage components shall meet or exceed the following characteristics:

Property	Value
Surface Void Area	≥ 85%
Unit Weight	3.25 lbs/cf
Service Temperature	-14° to 167°
Unconfined Crush Strength	32.48 psi
180 Day Creep Test	
Load Applied – Initial and Sustained	11.16 psi
• Creep Sustained – After 180 Days	0.20 inches
• Creep Sustained – After 180 Days	1.13 %
• Projected Creep – 40 years	1.72%

E. Separation Mesh

1. Separation Mesh shall be composed of high-tenacity monofilament polypropylene yarns that are woven together to produce an open mesh geotextile which shall be inert to biological degradation and resistant to naturally encountered chemicals, alkalis and acids. The mesh shall meet or exceed the following characteristics:

Properties	Test Method	Unit	Min Ave Roll Value	
			MD	CD
Tensile Strength	ASTM D4595	kN/m (lbs/ft)	21 (1440)	25.3 (1733)
Creep Reduced Strength	ASTM D5262	kN/m (lbs/ft)	6.9 (471)	8.3 (566)
Long Term Allowable Design Load	GRI GG-4	kN/m (lbs/ft)	5.9 (407)	7.2 (490)
UV Resistance (at 500 hours)	-	% strength retained	90	
Aperture Size (machine direction)	-	mm (in)	2 (0.08)	
Aperture Size (cross machine direction)	-	mm (in)	2 (0.08)	
Mass/Unit Area	ASTM D5261	g/m ² (oz/yd ²)	197 (5.8)	

F. Bridging Stone

1. Bridging Stone shall be 3/8" pea gravel, or other diameter sized to prevent migration of filter media, as specified by manufacturer.
2. Stone must be washed and free from sediment, soil and contaminants.

III. Delivery, Storage and Handling

- A.** Protect all materials from damage during delivery and store UV sensitive materials under tarp to protect from sunlight including all plastics, when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.
- B.** Biofiltration media shall be segregated from any other aggregate materials and shall be protected against contamination, including contamination from any stormwater runoff from areas of the site which are not stabilized.

IV. Submittals

A. Product Data

- 1. Submit manufacturer's product data and approved Installation Manual as well as manufacturer's Operations and Maintenance Manual for the system. It will be the responsibility of the system owner/operator or their contractor to ensure the system is operated and maintained in accordance with the manual.

B. Certification

- 1. Manufacturer shall submit a letter of certification that the complete system meets or exceeds all technical and packaging requirements. Biofiltration media packaging must bear a batch number marking from the manufacturer which matches a letter from the manufacturer certifying performance testing of the batch to meet or exceed the required infiltration rate.

C. Drawings

- 1. Manufacturer shall provide dimensional drawings including details for construction, materials, specifications and pipe connections.

D. Manufacturer's Warranty

- 1. Manufacturer shall provide a warranty for all components of the HPMBS for a period of one year provided the unit is installed, operated and maintained in accordance with the manual. Improper operation, maintenance or accidental or illegal activities (i.e. dumping of pollutants, vandalism, etc.) will void the warranty. Biofiltration media shall be warranted to pass the post-installation infiltration test described in this document.

E. Substitutions

- 1. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data for both flow rate and pollutant

removal of biofiltration media. Pollutant removal data must follow specified protocols. All components must meet or exceed Quality Assurance and Performance Criteria indicated herein.

V. Project Conditions

- A.** Review manufacturer's recommended installation procedures and coordinate installation with other work affected, such as grading, excavation, utilities, construction access and erosion control to prevent all non- installation related construction traffic over the completed HPBMS.
- B. Cold Weather**
 - 1. Do not use frozen materials or materials mixed or coated with ice or frost.
 - 2. Do not build on frozen ground or wet, saturated or muddy subgrade.
 - 3. Care must be taken when handling plastics when air temperature is at 40 degrees or below as plastic becomes brittle.
- C.** Protect partially completed installation against damage from other construction traffic when work is in progress and following completion of backfill by establishing a perimeter with highly visible construction tape, fencing, or other means until construction is complete.
- D.** Soil stabilization of the surrounding site must be complete before the Biofiltration System can be brought online. Soil stabilization occurs when 90% of the site has been paved or vegetated. Temporary erosion control and/or sedimentation prevention measures shall be implemented to reduce the possibility of sediments being transported into the Biofiltration System prior to full stabilization of the site. Significant sediment loads can damage the HPBMS and lead to failure if not prevented or remediated promptly.

VI. PRODUCTS

A. Acceptable HPBMS

FocalPoint High Performance Biofiltration System

B. Acceptable Manufacturer or Authorized Sales Representative

FABCO Industries, Inc.
97 Walnut Street
South Portland, ME 04106
207-831-2795
sgorneau@fabco-industries.com
www.fabco-industries.com

VII. Packaging

- A.** HPMBS is assembled on site.
- B.** Modular underdrain/storage unit is shipped flat and modules are assembled prior to installation.
- C.** Biofiltration media is delivered in one ton super sacks each labeled with manufacturer's batch number and/or in bulk with accompanying manufacturer's certification.
- D.** Other components are delivered in bulk.

VIII. Execution

A. Excavation and Backfill

- 1. Base of excavation shall be smooth, level and free of lumps or debris, and compacted unless infiltration of storm water into subgrade is desired. A thin layer (3") of compacted base material is recommended to establish a level working platform (may not be needed in sandy soils). If the base of the excavation is pumping or appears excessively soft, a geotechnical engineer should be consulted for advice. In many cases, a stabilization geotextile and 6" of compactable material that drains well will be sufficient to amend the bearing capacity of the soil.
- 2. Most applications require 8 oz Non-Woven Geotextile or equivalent nonwoven geotextile with a nominal weight of 8 oz per square yard to line the excavation to separate in situ soils and the HPMBS. (Applications requiring water to infiltrate the in situ sub-soils should use a bridging stone rather than geotextile to provide a separation layer between the HPMBS and the in situ soils). Geotextile, when utilized, should be placed on the bottom and up the sides of the excavation. Absolutely no geotextiles should be used in the water column. If an impermeable liner is specified, it shall be installed according to manufacturer's instructions and recommendations.
- 3. Specified backfill material must be free from lumps, debris and any sharp objects that could penetrate the geotextile. Material is used for backfill along the sides of the system as indicated in engineering detail drawings.

B. Inspection

- 1. Examine prepared excavation for smoothness, compaction and level. Check for presence of high water table, which must be kept at levels below the bottom of the under drain structure at all times. If the base is pumping or appears excessively soft, a geotechnical engineer should be consulted for advice.
- 2. Installation commencement constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found to be

unsatisfactory, contact Project Manager or Engineer for resolution prior to installation.

IX. Cleanup and Protection during Ongoing Construction Activity

- A.** Perform cleaning during the installation and upon completion of the work.
- B.** Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation.
- C.** If surrounding drainage area is not fully stabilized, a protective covering of geotextile fabric should be securely placed to protect the Biofiltration Media.
- D.** Construction phase erosion and sedimentation controls shall be placed to protect the inlet(s) to the Biofiltration System. Excessive sedimentation, particularly prior to establishment of plants may damage the HPMBs.
- E.** Strictly follow manufacturer's guidelines with respect to protection of the HPMBs between Installation and Commissioning phases.

X. Commissioning

- A.** Commissioning should only be carried out once the contributing drainage area is fully stabilized. If Commissioning must be carried out sooner, it is imperative that appropriate erosion and sediment controls be placed to prevent the entry of excessive sediment/pollutant loads into the system.
- B.** Commissioning entails removing the protective covering from the Biofiltration Media, planting the plant material in accordance with the approved drawings, and placing mulch if specified.
 - 1. Dig planting holes the depth of the root ball and two to three times as wide as the root ball. Wide holes encourage horizontal root growth that plants naturally produce.
 - 2. With trees, you must ensure you are not planting too deep. Don't dig holes deeper than root balls. The media should be placed at the root collar, not above the root collar. Otherwise the stem will be vulnerable to disease.
 - 3. Strictly follow manufacturer's planting guidance.
- C.** Cover the exposed root ball top with mulch. Mulch should not touch the plant base because it can hold too much moisture and invite disease and insects. Evenly place 3 inches of double-shredded hardwood mulch (if specified) on

the surface of the media.

- D. Plantings shall be watered-in at installation and temporary irrigations shall be provided, if specified.

XI. Using the HPMBS

A. Maintenance Requirements

1. Each correctly installed HPMBS is to be maintained by the manufacturer for a minimum period of one year. The cost of this service is to be included in the price of the system.
2. Annual maintenance consists of two (2) scheduled visits unless otherwise specified.
3. Each maintenance visit consists of the following:
 1. *Complete system inspection*
 2. *Removal of foreign debris, silt, plant material, trash and mulch (if needed)*
 3. *Evaluation of biofiltration media*
 4. *Evaluation of plant health*
 5. *Inspection of underdrain/storage system via Observation/Maintenance Port*
 6. *Properly dispose of all maintenance refuse items (trash, mulch, etc.)*
 7. *Take photographs documenting plant growth and general system health*
 8. *Update and store maintenance records*
 9. *To ensure long term performance of the HPMBS, continuing annual maintenance should be performed per the manufacturer's Operations and Maintenance Manual.*
4. If sediment accumulates beyond an acceptable level in the underdrain/storage system, it will be necessary to flush the underdrain. This can be done by pumping water into the Observation/Maintenance Port or adjacent overflow structure, allowing the turbulent flows through the underdrain to re-suspend the fine sediments. If multiple Observation/Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency.

Sediment-laden water can be pumped out and either captured for disposal or filtered through a Dirtbag filter bag, if permitted by the locality.

XII. Measurement and Payment

Given the integrated nature of the HPMBS, measurement and payment will be based not on the individual component prices, but on the size of the Biofiltration Media bed. The external dimension as indicated in the approved plans and executed in the installation will be measured in Square Feet and payment will be made per Square Foot of the HPMBS.

APPENDIX C

FocalPoint Sizing Summary

Bayside Anchor Stormwater Management Narrative
City of Portland
81 East Oxford St
Portland, Maine

FOCALPOINT SIZING AND CALCULATION SHEET



PROJECT: PORTLAND HOUSING PROJECT

PREPARED BY: ROB WOODMAN, PE – FABCO INDUSTRIES, INC.

PREPARED FOR: JOHN MAHONEY, PE – RANSOM CONSULTING, INC.

DATE: JUNE 29, 2014

Based on the following data provided by the project engineer, Fabco Industries has calculated the proposed sizing of the FocalPoint system and the ability of the system to treat the Water Quality Volume (W_{QV}) prior to overflow/bypass:

- Tributary Impervious Area = 6,301 sf
- Tributary Pervious Area = 0 sf
- Water Quality Volume (W_{QV})* = 525 cf ---- use **525 cf** for water quality goal -----

* The Water Quality Volume is based on the Maine DEP Chapter 500 requirement to treat 1.0" of runoff from impervious areas and 0.4" from pervious areas.

Using the *ACF FP and RT Calc version 1.8*, the proposed size of the FocalPoint unit shall be **32 sf** with a minimum ponding volume of **92 cf** above the unit prior to overflow. The chart below summarizes the associated calculation and performance verification. The unit is capable of treating **557 cf** prior to overflow (32 cf more than the required WQV) – equal to a treated tributary area of **6,684 sf**.

FocalPoint BIOFILTRATION SYSTEMS		
Water Quality Volume and Design Event		
Water Quality Volume (W_{QV})	525	ft ³
Design Event	557	ft ³
Directions		
Water Quality Volume calculated from previous Sheet		
Total event volume calculated from previous sheet		
System Configuration		
Is FocalPoint used?	Yes	Enter Yes if FocalPoint used. Enter No if runoff flows directly into RTank and proceed to RTank Design worksheet
Step 4 - FocalPoint Configuration		
4.1 - FocalPoint Factor of Safety	1	Enter optional factor-of-safety
4.2 - FocalPoint bed area	32	Enter target FocalPoint footprint, 20 SF min. (See Step 4.5)
4.3 - Storage volume above FocalPoint provided	92	Enter available surface storage volume (See Step 4.5)
4.4 - Desired treatment time	24	Select 24, 48, 72 or 96 hrs from toggle
4.5 - Water Quality Volume treated prior to overflow?	Yes	If Yes = W_{QV} has been treated
4.6 - FocalPoint drain within desired time?	Yes	If No = larger FocalPoint bed (Step 4.2) and/or surface storage volume (Step 4.3) required
4.7 - Flow in excess of storage volume above	To RTank	If Yes = time goal has been met
Select routing location for overflow/bypass vol. from toggle: Off site to disregard flow, RTank to store for retention / detention, harvesting, or infiltration		
Step 5 - Evaluation of Design		
5.1 - Volume treated prior to overflow	No Overflow	Result = Volume ft ³ treated prior to overflow/bypass
5.2 - Total volume treated	557	Result = Total Volume ft ³ treated

APPENDIX D

Soil Infiltration Testing

Bayside Anchor Stormwater Management Narrative
City of Portland
81 East Oxford St
Portland, Maine

Technical Memorandum: Soil Infiltration Testing

Date: June 24, 2014
To: City of Portland
From: John Mahoney, P.E.
Peer Review: Jay Johonnett, P.E.
Subject: Soils Infiltration Testing for Bayside Anchor Development

Ransom Consulting, Inc. (Ransom) completed four test holes and field saturated hydraulic conductivity (soil infiltration) tests on June 12, 2014. The purpose of this work was to assess the potential for infiltrating stormwater on the Bayside Anchor site as well as the infiltration potential of the low area in the center of the block (identified by the closed 12 contour) on Sheets C1, C5 and C6. The following sections outline the work performed by Ransom and our findings.

SUBSURFACE EXPLORATIONS

Four test holes, designated INF-1 through INF-4, were excavated on June 12, 2014 at the approximate locations shown on Sheets C1, C5 and C6. Two test holes were located in the proposed patio area behind the building where we intend to install subsurface stormwater detention using the R-Tank system and two test holes were located in the low area downstream of the development, described above. Test pits were performed by hand using the soil and sizing augers included with the Guelph Permeameter testing Kit. All test pits were terminated in a layer of Loam Fill with characteristics of "Urban Fill".

Ransom representatives monitored the test pits, made visual observations for seasonal high groundwater and performed field saturated hydraulic conductivity tests. Soils observed by Ransom were visually classified in general accordance with visual manual procedures (ASTM D 2488) and described using modified Burmister Soil Classification System descriptors and United States Department of Agriculture (USDA) soil types. Ransom collected soil samples, placed them in sealed containers and returned the samples to our office for further evaluation and potentially laboratory testing, if required. Elevations of the ground surface at the test pits were inferred based on a topographic survey plan for the Bayside Anchor site (INF-1 & INF-2) and from the City of Portland's GIS contours (INF-3 & INF-4).

SUBSURFACE CONDITIONS

Soils

Soils observed in all the infiltration test holes were Loam Fill consisting of dark brown fine to medium sand, with some silt and trace fine to coarse gravel. Soils contained small percentages (5% to 10%) of materials characteristic of “urban fill” such as bricks, concrete, ash and wood.

Based on visual classification, samples from all 4 infiltration test holes appeared to be the same fill material and with the observation that soils from test holes INF-3 and INF-4 (lower area) appeared to have somewhat more loam and less sand or “urban fill” type materials than INF-1 and INF-2. The soils observed during test hole excavations did not appear to change with depth in any of the test holes and no soil horizons were observed.

Groundwater

Soils were excavated 6 inches to 1 foot below the elevation at which the infiltration tests were conducted. Groundwater was not observed in any of the test holes conducted. No mottling or evidence of a seasonal high groundwater table was observed in the test hole excavations.

SATURATED HYDRAULIC CONDUCTIVITY TESTING

Ransom performed field saturated hydraulic conductivity testing in test pits INF-1, INF-2, INF-3 and INF-4 in site soils at depths ranging from approximately 4 inches to 15 inches below grade.

- INF-1 and INF-2 were excavated 12 inches to 14 inches BGS along the 17 contour to target elevation 16 which is approximately elevation of the bottom of R-Tank system proposed below the patio.
- INF-3 and INF-4 were excavated to more shallow depths in order to target infiltration rates at the ground surface, 4-inches and 8-inches BGS respectively.

The tests were performed using a Guelph Permeameter (ASTM International designation: D 5126-90) with the combined reservoir method. Soil permeability (saturated hydraulic conductivity) was calculated by averaging two single head tests.

More information about the Guelph Permeameter can be found here:

http://www.soilmoisture.com/prod_details.asp?prod_id=292

The approximate depth and elevation to the bottom of the test hole and the field saturated hydraulic conductivity rate measured in each test hole are provided in the following table.

Bayside Anchor Infiltration Testing
June 24, 2014

Test Pit Designation	Approximate Bottom of Guelph Permeameter Test Hole			Field Saturated Hydraulic Conductivity Rate (inches per hour)	Soil Classification
	Approximate Surface EL (feet)	Approximate Depth BGS (inches)	Test EL (feet)		
INF-1	17.0	15"	15.8	0.65	Loam Fill
INF-2	17.0	14"	15.8	0.36	Loam Fill
INF-3	11.7	4"	11.4	0.42	Loam Fill
INF-4	11.5	8"	10.8	0.09	Loam Fill

Note: The field saturated hydraulic conductivity rates reported are the average of two single head tests.

Individual tests only measure hydraulic conductivity in the immediate vicinity of the test, and may not be representative of the average hydraulic conductivity of the soil at the Site; additionally, field determined hydraulic conductivity is generally accurate only to an order-of-magnitude. Various factors may influence test results, including soil saturation, a non-homogeneous soil profile surrounding the test interval, the presence of large gravel or cobbles, or variation in soil density. Hydraulic conductivity rates selected for design should be evaluated based on the measured data in conjunction with published values for the material.

Input
Result

Single Head Method (1)

Reservoir Cross-sectional area in cm^2
(enter "35.22" for Combined and "2.16" for Inner reservoir): **35.22**

Enter water Head Height ("H" in cm): **7.5**

Enter the Borehole Radius ("a" in cm): **2.5**

Enter the soil texture-structure category (enter one of the below numbers): **3**

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc

Steady State Rate of Water Level Change ("R" in cm/min): **0.5000**

Res Type 35.22 H 7.5 a 2.5 $\alpha^* = 0.12 \text{ cm}^{-1}$

H/a 3 C = 1.20101

a* 0.12 Q = 0.2935

C0.01 1.148 $K_{fs} = 4.58\text{E-}04 \text{ cm/sec}$

C0.04 1.212 $2.75\text{E-}02 \text{ cm/min}$

C0.12 1.201 $4.58\text{E-}06 \text{ m/sec}$

C0.36 1.201 $1.08\text{E-}02 \text{ inch/min}$

C 1.201 $1.80\text{E-}04 \text{ inch/sec}$

R 0.500 $\Phi_m = 3.82\text{E-}03 \text{ cm}^2/\text{min}$

Q 0.294

pl 3.142

Single Head Method (2)

Reservoir Cross-sectional area in cm^2
(enter "35.22" for Combined and "2.16" for Inner reservoir): **35.22**

Enter water Head Height ("H" in cm): **7.5**

Enter the Borehole Radius ("a" in cm): **2.5**

Enter the soil texture-structure category (enter one of the below numbers): **3**

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc

Steady State Rate of Water Level Change ("R" in cm/min): **0.5000**

Res Type 35.22 H 7.5 a 2.5 $\alpha^* = 0.12 \text{ cm}^{-1}$

H/a 3 C = 1.20101

a* 0.12 Q = 0.2935

C0.01 1.14768 $K_{fs} = 4.58\text{E-}04 \text{ cm/sec}$

C0.04 1.21161 $2.75\text{E-}02 \text{ cm/min}$

C0.12 1.20101 $4.58\text{E-}06 \text{ m/sec}$

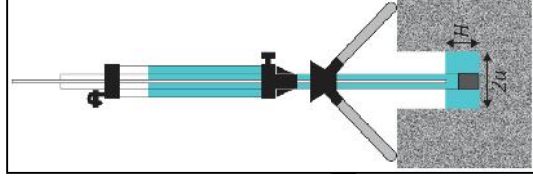
C0.36 1.20101 $1.08\text{E-}02 \text{ inch/min}$

C 1.20101 $1.80\text{E-}04 \text{ inch/sec}$

R 0.500

Q 0.2935

pl 3.1415 $\Phi_m = 3.82\text{E-}03 \text{ cm}^2/\text{min}$



Average

$K_{fs} =$ **4.58E-04** cm/sec
2.75E-02 cm/min
4.58E-06 m/s
1.08E-02 inch/min
1.80E-04 inch/sec

$\Phi_m =$ **3.82E-03** cm^2/min

Calculation formulas related to shape factor (C). Where H is the first water head height (cm), H_1 is the first water head height (cm), H_2 is the second water head height (cm), α is borehole radius (cm) and α^* is macroscopic capillary length factor which is calculated according to the soil texture-structure category. For one-head method, only C_1 needs to be calculated while for two-head method, C_1 and C_2 are calculated (Zarg et al., 1998).

Soil Texture-Structure Category	α^* (cm ⁻¹)	Shape Factor
Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.101	$C_1 = \left(\frac{H_2/a}{2.081 + 0.121(H_2/a)} \right)^{0.072}$
Soils which are both fine textured (clayey or silty) and unstructured, may also include some fine sands.	0.04	$C_1 = \left(\frac{H_1/a}{1.992 + 0.091(H_1/a)} \right)^{0.082}$ $C_2 = \left(\frac{H_2/a}{1.992 + 0.091(H_2/a)} \right)^{0.083}$
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093(H_1/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093(H_1/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$

Calculation formulas related to one-head and two-head methods. Where R is steady-state rate of fall of water in reservoir (cm/s), K_{fs} is Soil saturated hydraulic conductivity (cm/s), Φ_m is Soil matrix flux potential (cm^2/s), α^* is Macroscopic capillary length parameter (from Table 2), α is Borehole radius (cm), H_1 is the first head of water established in borehole (cm), H_2 is the second head of water established in borehole (cm) and C_1 is Shape factor (from Table 2).

One Head, Combined Reservoir	$K_{fs} = \frac{C_1 \times Q_1}{2\pi H_1^2 + \pi \alpha^2 C_1 + 2\pi \left(\frac{H_1}{\alpha^*} \right)}$
One Head, Inner Reservoir	$\Phi_m = \frac{C_1 \times Q_1}{(2\pi H_1^2 + \pi \alpha^2 C_1) \alpha^* + 2\pi H_1}$
Two Head, Combined Reservoir	$G_1 = \frac{H_2 C_1}{\pi (2H_1 H_2 (H_2 - H_1) + \alpha^2 (H_1 C_2 - H_2 C_1))}$ $G_2 = \frac{H_2 C_2}{\pi (2H_1 H_2 (H_2 - H_1) + \alpha^2 (H_1 C_2 - H_2 C_1))}$ $K_{fs} = G_2 Q_2 - G_1 Q_1$ $G_3 = \frac{(2H_2^2 + \alpha^2 C_2) C_1}{2\pi (2H_1 H_2 (H_2 - H_1) + \alpha^2 (H_1 C_2 - H_2 C_1))}$ $G_4 = \frac{(2H_2^2 + \alpha^2 C_2) C_2}{2\pi (2H_1 H_2 (H_2 - H_1) + \alpha^2 (H_1 C_2 - H_2 C_1))}$ $\Phi_m = G_4 Q_1 - G_3 Q_2$
Two Head, Inner Reservoir	$Q_1 = \bar{R}_1 \times 2.16$ $Q_2 = \bar{R}_2 \times 2.16$

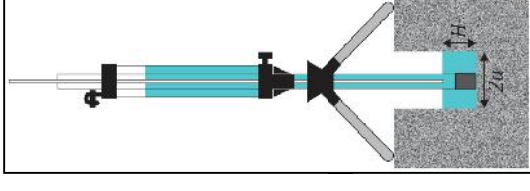
Input
Result

Single Head Method (1)

Reservoir Cross-sectional area in cm^2 (enter "35.22" for Combined and "2.16" for Inner reservoir): Enter water Head Height ("H" in cm): Enter the Borehole Radius ("a" in cm):	35.22 7.5 2.5
Enter the soil texture-structure category (enter one of the below numbers): 1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc. 2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands. 3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils. 4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc	
Enter the soil texture-structure category (enter one of the below numbers): 3	
Steady State Rate of Water Level Change ("R" in cm/min): 0.1600	
Res Type 35.22 H 7.5 a 2.5 H/a 3 a* 0.12 C 0.01 1.148 C 0.04 1.212 C 0.12 1.201 C 0.36 1.201 C 1.201 R 0.160 Q 0.094 pl 3.142	$\alpha^* = 0.12 \text{ cm}^{-1}$ C = 1.20101 Q = 0.09392 $K_{fs} = 1.47\text{E-}04 \text{ cm/sec}$ 8.79E-03 cm/min 1.47E-06 m/sec 3.46E-03 inch/min 5.77E-05 inch/sec $\Phi_m = 1.22\text{E-}03 \text{ cm}^2/\text{min}$

Single Head Method (2)

Reservoir Cross-sectional area in cm^2 (enter "35.22" for Combined and "2.16" for Inner reservoir): Enter water Head Height ("H" in cm): Enter the Borehole Radius ("a" in cm):	35.22 7.5 2.5
Enter the soil texture-structure category (enter one of the below numbers): 1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc. 2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands. 3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils. 4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc	
Enter the soil texture-structure category (enter one of the below numbers): 3	
Steady State Rate of Water Level Change ("R" in cm/min): 0.4000	
Res Type 35.22 H 7.5 a 2.5 H/a 3 a* 0.12 C 0.01 1.14768 C 0.04 1.21161 C 0.12 1.20101 C 0.36 1.20101 C 1.20101 R 0.400 Q 0.2348 pl 3.1415	$\alpha^* = 0.12 \text{ cm}^{-1}$ C = 1.20101 Q = 0.2348 $K_{fs} = 3.66\text{E-}04 \text{ cm/sec}$ 2.20E-02 cm/min 3.66E-06 m/sec 8.65E-03 inch/min 1.44E-04 inch/sec $\Phi_m = 3.05\text{E-}03 \text{ cm}^2/\text{min}$



Calculation formulas related to one-head and two-head methods. Where R is steady-state rate of fall of water in reservoir (cm/s), K_{fs} is Soil saturated hydraulic conductivity (cm/s), Φ_m is Soil matrix flux potential (cm^2/s), a^* is Macroscopic capillary length parameter (from Table 2), α is Borehole radius (cm), H_1 is the first head of water established in borehole (cm), H_2 is the second head of water established in borehole (cm) and C_1 and C_2 are Shape Factor (from Table 2).

Soil Texture-Structure Category	a^* (cm ⁻¹)	Shape Factor
Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.101	$C_1 = \left(\frac{H_2/a}{2.081 + 0.121(H_2/a)} \right)^{0.072}$ $C_2 = \left(\frac{H_1/a}{1.992 + 0.091(H_1/a)} \right)^{0.082}$ $C_2 = \left(\frac{H_2/a}{1.992 + 0.091(H_2/a)} \right)^{0.083}$
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093(H_1/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093(H_1/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36	$C_1 = \left(\frac{H_1/a}{2.074 + 0.093(H_1/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$

Calculation formulas related to shape factor (C). Where H is the first water head height (cm), H_2 is the second water head height (cm), a is borehole radius (cm) and a^* is macroscopic capillary length factor which is calculated according to the soil texture-structure category. For one-head method, only C_1 needs to be calculated while for two-head method, C_1 and C_2 are calculated (Zarg et al., 1998).

One Head, Combined Reservoir	$Q_1 = \bar{R}_1 \times 35.22$	$K_{fs} = \frac{C_1 \times Q_1}{2\pi H_1^2 + \pi a^2 C_1 + 2\pi \left(\frac{H_1}{a^*} \right)}$
One Head, Inner Reservoir	$Q_1 = \bar{R}_1 \times 2.16$	$\Phi_m = \frac{C_1 \times Q_1}{(2\pi H_1^2 + \pi a^2 C_1)a^* + 2\pi H_1}$
Two Head, Combined Reservoir	$Q_1 = \bar{R}_1 \times 35.22$ $Q_2 = \bar{R}_2 \times 35.22$	$G_1 = \frac{H_2 C_1}{\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $G_2 = \frac{H_2 C_2}{\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $K_{fs} = G_2 Q_2 - G_1 Q_1$ $G_3 = \frac{(2H_2^2 + a^2 C_2)C_1}{2\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $G_4 = \frac{(2H_2^2 + a^2 C_2)C_2}{2\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $\Phi_m = G_4 Q_1 - G_3 Q_2$
Two Head, Inner Reservoir	$Q_1 = \bar{R}_1 \times 2.16$ $Q_2 = \bar{R}_2 \times 2.16$	$K_{fs} = G_2 Q_2 - G_1 Q_1$ $G_3 = \frac{(2H_2^2 + a^2 C_2)C_1}{2\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $G_4 = \frac{(2H_2^2 + a^2 C_2)C_2}{2\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $\Phi_m = G_4 Q_1 - G_3 Q_2$

Average

$K_{fs} =$ 2.56E-04 cm/sec 1.54E-02 cm/min 2.56E-06 m/s 6.06E-03 inch/min 1.01E-04 inch/sec	$\Phi_m =$ 2.14E-03 cm^2/min
---	--

Input
Result

Single Head Method (1)

Reservoir Cross-sectional area in cm ² (enter "35.22" for Combined and "2.16" for Inner reservoir):	35.22
Enter water Head Height ("H" in cm):	7.5
Enter the Borehole Radius ("a" in cm):	2.5

Enter the soil texture-structure category (enter one of the below numbers):

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc

Steady State Rate of Water Level Change ("R" in cm/min):	0.4500
--	--------

Res Type 35.22

H 7.5

a 2.5

H/a 3

a* 0.12

C 1.20101

Q = 0.26415

C 0.01 1.148

C 0.04 1.212

C 0.12 1.201

C 0.36 1.201

C 1.201

R 0.450

Q 0.264

pi 3.142

$\alpha^* = 0.12 \text{ cm}^{-1}$

$C = 1.20101$

$Q = 0.26415$

$K_{fs} = 4.12E-04 \text{ cm/sec}$
2.47E-02 cm/min
4.12E-06 m/sec
9.74E-03 inch/min
1.62E-04 inch/sec

$\Phi_m = 3.43E-03 \text{ cm}^2/\text{min}$

Single Head Method (2)

Reservoir Cross-sectional area in cm ² (enter "35.22" for Combined and "2.16" for Inner reservoir):	35.22
Enter water Head Height ("H" in cm):	7.5
Enter the Borehole Radius ("a" in cm):	2.5

Enter the soil texture-structure category (enter one of the below numbers):

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc

Steady State Rate of Water Level Change ("R" in cm/min):	0.2000
--	--------

Res Type 35.22

H 7.5

a 2.5

H/a 3

a* 0.12

C 1.20101

Q = 0.1174

C 0.01 1.14768

C 0.04 1.21161

C 0.12 1.20101

C 0.36 1.20101

C 1.20101

R 0.200

Q 0.1174

pi 3.1415

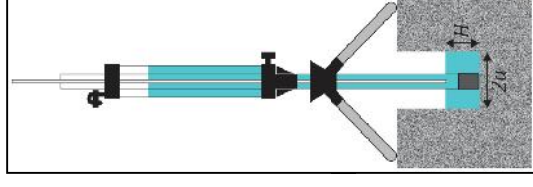
$\alpha^* = 0.12 \text{ cm}^{-1}$

$C = 1.20101$

$Q = 0.1174$

$K_{fs} = 1.83E-04 \text{ cm/sec}$
1.10E-02 cm/min
1.83E-06 m/sec
4.33E-03 inch/min
7.21E-05 inch/sec

$\Phi_m = 1.53E-03 \text{ cm}^2/\text{min}$



Average

$K_{fs} = 2.98E-04 \text{ cm/sec}$ 1.79E-02 cm/min 2.98E-06 m/s 7.03E-03 inch/min 1.17E-04 inch/sec
$\Phi_m = 2.48E-03 \text{ cm}^2/\text{min}$

Calculation formulas related to shape factor (C). Where H is the first water head height (cm), H₂ is the second water head height (cm), a is borehole radius (cm) and a* is macroscopic capillary length factor which is calculated according to the soil texture-structure category. For one-head method, only C₁ needs to be calculated while for two-head method, C₁ and C₂ are calculated (Zarg et al., 1998).

Soil Texture-Structure Category	a* (cm)	Shape Factor
Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.101	$C_1 = \left(\frac{H_2/a}{2.081 + 0.121(H_2/a)} \right)^{0.072}$
Soils which are both fine textured (clayey or silty) and unstructured, may also include some fine sands.	0.04	$C_1 = \left(\frac{H_2/a}{1.992 + 0.091(H_2/a)} \right)^{0.082}$ $C_2 = \left(\frac{H_2/a}{1.992 + 0.091(H_2/a)} \right)^{0.083}$
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12	$C_1 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36	$C_1 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$

Calculation formulas related to one-head and two-head methods. Where R is steady-state rate of fall of water in reservoir (cm/s), K_{fs} is Soil saturated hydraulic conductivity (cm/s), Φ_m is Soil matrix flux potential (cm²/s), a* is Macroscopic capillary length parameter (from Table 2), a is Borehole radius (cm), H₁ is the first head of water established in borehole (cm), H₂ is the second head of water established in borehole (cm) and C₁ is Shape factor (from Table 2).

One Head, Combined Reservoir	$Q_1 = R_1 \times 35.22$	$K_{fs} = \frac{C_1 \times Q_1}{2\pi H_1^2 + \pi a^2 C_1 + 2\pi \left(\frac{H_1}{a} \right)}$
One Head, Inner Reservoir	$Q_1 = R_1 \times 2.16$	$\Phi_m = \frac{C_1 \times Q_1}{(2\pi H_1^2 + \pi a^2 C_1)a^* + 2\pi H_1}$
Two Head, Combined Reservoir	$Q_1 = R_1 \times 35.22$ $Q_2 = R_2 \times 35.22$	$G_1 = \frac{H_2 C_1}{\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $G_2 = \frac{H_2 C_2}{\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $K_{fs} = G_2 Q_2 - G_1 Q_1$ $G_3 = \frac{(2H_1^2 + a^2 C_1)C_1}{2\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $G_4 = \frac{(2H_2^2 + a^2 C_2)C_2}{2\pi(2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $\Phi_m = G_3 Q_1 - G_4 Q_2$
Two Head, Inner Reservoir	$Q_1 = R_1 \times 2.16$ $Q_2 = R_2 \times 2.16$	

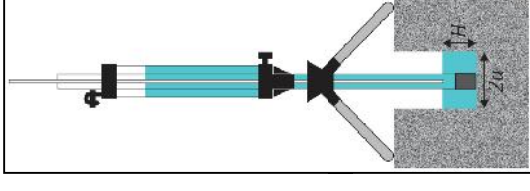
Input
Result

Single Head Method (1)

Reservoir Cross-sectional area in cm^2 (enter "35.22" for Combined and "2.16" for Inner reservoir): Enter water Head Height ("H" in cm): Enter the Borehole Radius ("a" in cm):	35.22 7.5 2.5
Enter the soil texture-structure category (enter one of the below numbers): 1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc. 2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands. 3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils. 4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc	
Enter the soil texture-structure category (enter one of the below numbers): 1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc. 2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands. 3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils. 4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc	
Steady State Rate of Water Level Change ("R" in cm/min): 0.0800	
Res Type H a H/a a* C C.01 C.04 C.12 C.36 C R Q pi	35.22 7.5 2.5 3 0.12 1.20101 0.04696 7.33E-05 4.40E-03 7.33E-07 1.73E-03 2.88E-05 6.11E-04
$\alpha^* = 0.12 \text{ cm}^{-1}$ $C = 1.20101$ $Q = 0.04696$ $K_{fs} = 7.33E-05 \text{ cm/sec}$ $3.00E-03 \text{ cm/min}$ $5.50E-07 \text{ m/sec}$ $1.30E-03 \text{ inch/min}$ $2.16E-05 \text{ inch/sec}$ $\Phi_m = 6.11E-04 \text{ cm}^2/\text{min}$	

Single Head Method (2)

Reservoir Cross-sectional area in cm^2 (enter "35.22" for Combined and "2.16" for Inner reservoir): Enter water Head Height ("H" in cm): Enter the Borehole Radius ("a" in cm):	35.22 7.5 2.5
Enter the soil texture-structure category (enter one of the below numbers): 1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc. 2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands. 3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils. 4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc	
Enter the soil texture-structure category (enter one of the below numbers): 1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc. 2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands. 3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils. 4. Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc	
Steady State Rate of Water Level Change ("R" in cm/min): 0.0600	
Res Type H a H/a a* C C.01 C.04 C.12 C.36 C R Q pi	35.22 7.5 2.5 3 0.12 1.20101 0.03522 5.50E-05 3.30E-03 5.50E-07 1.30E-03 2.16E-05 4.58E-04
$\alpha^* = 0.12 \text{ cm}^{-1}$ $C = 1.20101$ $Q = 0.03522$ $K_{fs} = 5.50E-05 \text{ cm/sec}$ $3.30E-03 \text{ cm/min}$ $5.50E-07 \text{ m/sec}$ $1.30E-03 \text{ inch/min}$ $2.16E-05 \text{ inch/sec}$ $\Phi_m = 4.58E-04 \text{ cm}^2/\text{min}$	



Average

$K_{fs} =$ 6.41E-05 3.85E-03 6.41E-07 1.51E-03 2.52E-05	cm/sec cm/min m/s inch/min inch/sec
$\Phi_m =$ 5.34E-04	cm ² /min

Calculation formulas related to shape factor (C). Where H is the first water head height (cm), H₂ is the second water head height (cm), a is borehole radius (cm) and a* is macroscopic capillary length factor which is calculated according to the soil texture-structure category. For one-head method, only C₁ needs to be calculated while for two-head method, C₁ and C₂ are calculated (Zarg et al., 1998).

Calculation formulas related to one-head and two-head methods. Where R is steady-state rate of fall of water in reservoir (cm/s), K_{fs} is Soil saturated hydraulic conductivity (cm/s), Φ_m is Soil matrix flux potential (cm²/s), a* is Macroscopic capillary length parameter (from Table 2), a is Borehole radius (cm), H₁ is the first head of water established in borehole (cm), H₂ is the second head of water established in borehole (cm) and C₁ is Shape factor (from Table 2).

Soil Texture-Structure Category	a* (cm)	Shape Factor
Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01	$C_1 = \left(\frac{H_2/a}{2.081 + 0.121(H_2/a)} \right)^{0.072}$ $C_2 = \left(\frac{H_2/a}{1.992 + 0.091(H_2/a)} \right)^{0.082}$
Soils which are both fine textured (clayey or silty) and unstructured, may also include some fine sands	0.04	$C_1 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.084}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils	0.12	$C_1 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36	$C_1 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$ $C_2 = \left(\frac{H_2/a}{2.074 + 0.093(H_2/a)} \right)^{0.754}$

One Head, Combined Reservoir	One Head, Inner Reservoir
$Q_1 = R_1 \times 35.22$ $Q_1 = R_1 \times 2.16$	$Q_1 = R_1 \times 35.22$ $Q_2 = R_2 \times 35.22$
$K_{fs} = \frac{C_1 \times Q_1}{2\pi H_1^2 + \pi a^2 C_1 + 2\pi \left(\frac{H_1}{a} \right)}$ $\Phi_m = \frac{C_1 \times Q_1}{(2\pi H_1^2 + \pi a^2 C_1) a^* + 2\pi H_1}$	$G_1 = \frac{H_2 C_1}{\pi (2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $G_2 = \frac{H_2 C_2}{\pi (2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $K_{fs} = G_2 Q_2 - G_1 Q_1$ $G_3 = \frac{(2H_2^2 + a^2 C_2) C_1}{2\pi (2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $G_4 = \frac{(2H_2^2 + a^2 C_2) C_2}{2\pi (2H_1 H_2 (H_2 - H_1) + a^2 (H_1 C_2 - H_2 C_1))}$ $\Phi_m = G_4 Q_1 - G_3 Q_2$
Two Head, Combined Reservoir	Two Head, Inner Reservoir
$Q_1 = R_1 \times 2.16$ $Q_2 = R_2 \times 2.16$	$Q_1 = R_1 \times 2.16$ $Q_2 = R_2 \times 2.16$

Table 4 (continued):

GP FIELD DATA SHEET

Date 6-12-14 Investigator JIMSECTION 2: STANDARDIZED PROCEDURE
FOR PERMEAMETER READINGS
AND CALCULATIONS

Reservoir Constants: (See label on Permeameter)

Combined Reservoirs X	cm ²
Inner Reservoir Y	cm ²

☒ CHECK
RESERVOIR
USED
Depth of Well Hole 15"

Note: In standardized procedure the radius of the well hole is always 3.0 cm

1st Set of Readings with height of water in well (H₁) set at 5 cm7.5 cm = H2nd Set of Readings with height of water in well (H₂) set at 10 cm7.5 cm = H

READING NUMBER	Time	Time INTERVAL (MIN)	WATER LEVEL IN RESERVOIR, (CM)	WATER LEVEL CHANGE, (CM)	RATE OF WATER LEVEL CHANGE, R ₁ (CM/MIN)
1	2	2	6.0		
2	5	2	7.5	1.5	
3	6	2	8.5	1.0	
4	8	2	9.5	1.0	.5
5	10	2	10.5	1.0	.5
6	12	2	11.5	1.0	.5
7	14	2	12.5	1.0	.5
8					
9					
10					
11					
12					

READING NUMBER	TIME	TIME INTERVAL (MIN)	WATER LEVEL IN RESERVOIR, (CM)	WATER LEVEL CHANGE, (CM)	RATE OF WATER LEVEL CHANGE, R ₂ (CM/MIN)
1	2	2	9.0		
2	4	2	10.6	1.6	
3	6	2	12.0	1.4	
4	8	2	13.0	1.0	.5
5	10	2	14.0	1.0	.5
6	12	2	15.0	1.0	.5
7	13	2			
8	14				
9					
10					
11					
12					

CALCULATIONS

R, the steady state rate of flow, is achieved when R is the same in three consecutive time intervals.

For the 1st Set of Readings $\bar{R}_1 = (\text{---}) / 60 = \text{---} \text{ cm/sec}$ For the 2nd Set of Readings $\bar{R}_2 = (\text{---}) / 60 = \text{---} \text{ cm/sec}$

$$K_{fs} = [(0.0041) (\text{---}) (\text{---})] - [(0.0054) (\text{---}) (\text{---})] = \text{---} \text{ cm/sec}$$

FIELD SATURATED PERMEABILITY CONSTANT RESERVOIR CONSTANT R₁ STEADY STATE RATE OF FLOW RESERVOIR CONSTANT R₂ STEADY STATE RATE OF FLOW

$$\phi_{fs} = [(0.0572) (\text{---}) (\text{---})] - [(0.0237) (\text{---}) (\text{---})] = \text{---} \text{ cm}^2/\text{sec}$$

WATER FILLS POTENTIAL RESERVOIR CONSTANT R₁ STEADY STATE RATE OF FLOW RESERVOIR CONSTANT R₂ STEADY STATE RATE OF FLOW

$$\alpha = (\text{---}) / (\text{---}) = \text{---} \text{ cm}^2$$

ALPHA PERMEAMETER ϕ_{fs} K_{fs}

$$\Delta D = (\text{---}) - (\text{---}) = \text{---} \text{ cm}^3/\text{cm}^3$$

DEPTH (INCH) ϕ_{fs} FIELD SATURATED WATER CONTENT OF SAMPLE IN CM³/CM³ ϕ_{fs} AUGMENT WATER CONTENT OF SAMPLE IN CM³/CM³

$$S = \sqrt{2} (\text{---}) (\text{---}) = \text{---} \text{ cm sec}^{-1/2}$$

UNSATURATED ϕ_{fs} K_{fs}

ESTIMATED	CHECK ONE
MEASURED	

Result from Spreadsheet = $1.08 \times 10^{-2} \text{ in/min} = .65 \text{ in/hour}$

Table 4 (continued):

GP FIELD DATA SHEET

SECTION 2: STANDARDIZED PROCEDURE
FOR PERMEAMETER READINGS
AND CALCULATIONSDate 6-12-14 Investigator JIM

Reservoir Constants: (See label on Permeameter)

Combined Reservoirs X	cm ²
Inner Reservoir Y	cm ²

☒ CHECK
RESERVOIR
USED
Depth of Well Hole 14"

Note: In standardized procedure the radius of the well hole is always 3.0 cm

1st Set of Readings with height of water in well (H₁) set at 5 cm 7.5 cm

READING NUMBER	TIME	TIME INTERVAL (MIN)	WATER LEVEL IN RESERVOIR, (CM)	WATER LEVEL CHANGE, (CM)	RATE OF WATER LEVEL CHANGE, R ₁ , (CM/MIN)
1	1	1	4.2	4.2	
2	2	1	5.0	.8	
3	3	1	5.3	.3	
4	4	1	5.5	.2	
5	6	2	6.0	.5	
6	8	2	6.3	.3	
7	10	2	6.6	.3	
8	15	5	7.5	.9	
9	20	5	8.3	.8	.16
10	25	5	9.1	.8	.16
11	30	5	9.9	.8	.16
12					
13					
14					
15					

2nd Set of Readings with height of water in well (H₂) set at 10 cm

READING NUMBER	TIME	TIME INTERVAL (MIN)	WATER LEVEL IN RESERVOIR, (CM)	WATER LEVEL CHANGE, (CM)	RATE OF WATER LEVEL CHANGE, R ₂ , (CM/MIN)
1	2	2	2.1	2.1	
2	4	2	3.0	.9	
3	6	2	3.8	.8	
4	8	2	4.6	.8	.4
5	10	2	5.4	.8	.4
6	12	2	6.2	.8	.4
7					
8					
9					
10					
11					
12					
13					

CALCULATIONS

R, the steady state rate of flow, is achieved when R is the same in three consecutive time intervals.

For the 1st Set of Readings $\bar{R}_1 = (\text{---}) / 60 = \text{---} \text{ cm/sec}$ For the 2nd Set of Readings $\bar{R}_2 = (\text{---}) / 60 = \text{---} \text{ cm/sec}$

$$K_{fs} = [(.0041)(\text{---})(\text{---})] - [(.0054)(\text{---})(\text{---})] = \text{---} \text{ cm/sec}$$

FIELD SATURATED PERMEABILITY RESERVOIR CONSTANT R₁ - STEADY STATE RATE OF FLOW RESERVOIR CONSTANT R₂ - STEADY STATE RATE OF FLOW

$$\phi_{fs} = [(.0572)(\text{---})(\text{---})] - [(.0237)(\text{---})(\text{---})] = \text{---} \text{ cm}^2/\text{sec}$$

WATER FILLED POTENTIAL RESERVOIR CONSTANT R₁ - STEADY STATE RATE OF FLOW RESERVOIR CONSTANT R₂ - STEADY STATE RATE OF FLOW

$$a = (\text{---}) / (\text{---}) = \text{---} \text{ cm}^3$$

ALPHA PERMEAMETER R₁ R₂

$$\Delta \theta = (\text{---}) - (\text{---}) = \text{---} \text{ cm}^3/\text{cm}^3$$

INITIAL HEAD R₁ R₂

$$S = \sqrt{2}(\text{---})(\text{---}) = \text{---} \text{ cm sec}^{-1/2}$$

COEFFICIENT R₁ R₂

ESTIMATED
MEASURED

CHECK ONE

$$6.06 \times 10^{-3} \text{ in/hr} \times 60 = 0.36 \text{ in/hr}$$

Table 4 (continued):

GP FIELD DATA SHEET

SECTION 2: STANDARDIZED PROCEDURE
FOR PERMEAMETER READINGS
AND CALCULATIONSDate 6-12-14 Investigator JIM

Reservoir Constants: (See label on Permeameter)

Combined Reservoirs X	cm ²
Inner Reservoir Y	cm ²

☒ CHECK
RESERVOIR
USED
Depth of Well Hole 4"

Note: In standardized procedure the radius of the well hole is always 3.0 cm

1st Set of Readings with height of water in well (H₁) set at 5 cm7.5 cm

READING NUMBER	TIME	TIME INTERVAL (MIN)	WATER LEVEL IN RESERVOIR, (CM)	WATER LEVEL CHANGE, (CM)	RATE OF WATER LEVEL CHANGE, R ₁ , (CM/MIN)
1	2	2	3.2		
2	4	2	3.3	.1	
3	6	2	4.5	.7	
4	8	2	4.9	.4	
5	10	2	5.5	.6	
6	12	2	6.4	1.3	
7	14	2	7.8	1.0	
8	16	2	9.7	.9	.45
9	18	2	9.6	.9	.45
10	20	2	10.2	.9	.45
11	22	2	11.4	.9	.45

2nd Set of Readings with height of water in well (H₂) set at 10 cm7.5 cm

READING NUMBER	TIME	TIME INTERVAL (MIN)	WATER LEVEL IN RESERVOIR, (CM)	WATER LEVEL CHANGE, (CM)	RATE OF WATER LEVEL CHANGE, R ₂ , (CM/MIN)
1	2	2	1.6		
2	4	2	2.0	.4	
3	6	2	2.4	.4	
4	8	2	2.9	.5	
5	10	2	3.3	.4	.2
6	12	2	3.6	.4	.2
7	14	2	4.0	.4	.2

CALCULATIONS

R₁, the steady state rate of flow, is achieved when R₁ is the same in three consecutive time intervals.For the 1st Set of Readings $\bar{R}_1 = (\frac{\quad}{\quad}) / 60 = \quad \text{cm/sec}$ For the 2nd Set of Readings $\bar{R}_2 = (\frac{\quad}{\quad}) / 60 = \quad \text{cm/sec}$

$$K_{11} = [(0.0041)(\frac{\quad}{\quad})(\frac{\quad}{\quad})] - [(0.0054)(\frac{\quad}{\quad})(\frac{\quad}{\quad})] = \quad \text{cm/sec}$$

FIELD SATURATED
PERMEABILITY
RESERVOIR
CONSTANT
R₁ STEADY STATE
RATE OF FLOW
RESERVOIR
CONSTANT
R₂ STEADY STATE
RATE OF FLOW

$$\phi_{11} = [(0.0572)(\frac{\quad}{\quad})(\frac{\quad}{\quad})] - [(0.0237)(\frac{\quad}{\quad})(\frac{\quad}{\quad})] = \quad \text{cm}^2/\text{sec}$$

WATER CONTENT
POTENTIAL
RESERVOIR
CONSTANT
R₁ STEADY STATE
RATE OF FLOW
RESERVOIR
CONSTANT
R₂ STEADY STATE
RATE OF FLOW

$$\alpha = (\frac{\quad}{\quad}) / (\frac{\quad}{\quad}) = \quad \text{cm}^2$$

ALPHA FACTOR
h₁
h₂

$$\Delta \theta = (\frac{\quad}{\quad}) - (\frac{\quad}{\quad}) = \quad \text{cm}^3/\text{cm}^3$$

WATER CONTENT
POTENTIAL
WATER CONTENT OF SAMPLE IN EQUILIBRIUM
WATER CONTENT OF SAMPLE IN EQUILIBRIUM

$$S = \sqrt{2(\frac{\quad}{\quad})(\frac{\quad}{\quad})} = \quad \text{cm sec}^{-1/2}$$

STORAGE COEFFICIENT
h₁
h₂

ESTIMATED	CHECK ONE
MEASURED	

$$7.03 \times 10^{-3} \times 60 = .42 \text{ in/hour}$$

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www.soilmoisture.com - sales@soilmoisture.com

INF - 4

SECTION 2: STANDARDIZED PROCEDURE FOR PERMEAMETER READINGS AND CALCULATIONS

JIM

811

☒ CHECK
RESERVOIR
USED

754m

7.5cm

754m

[illegible]

$\bar{R}$, the steady state rate of flow, is achieved when R is the same in three consecutive time intervals.

 $\kappa,$

24 -

FILED 5/10/68
FBI - NEW YORK
COMM-FBI

UNCLASSIFIED
FOUO

ALP A. F. VAWTCH

[illegible]

• **Author:** [Name]

ESTIMATED		CHECK ONE
MEASURED		

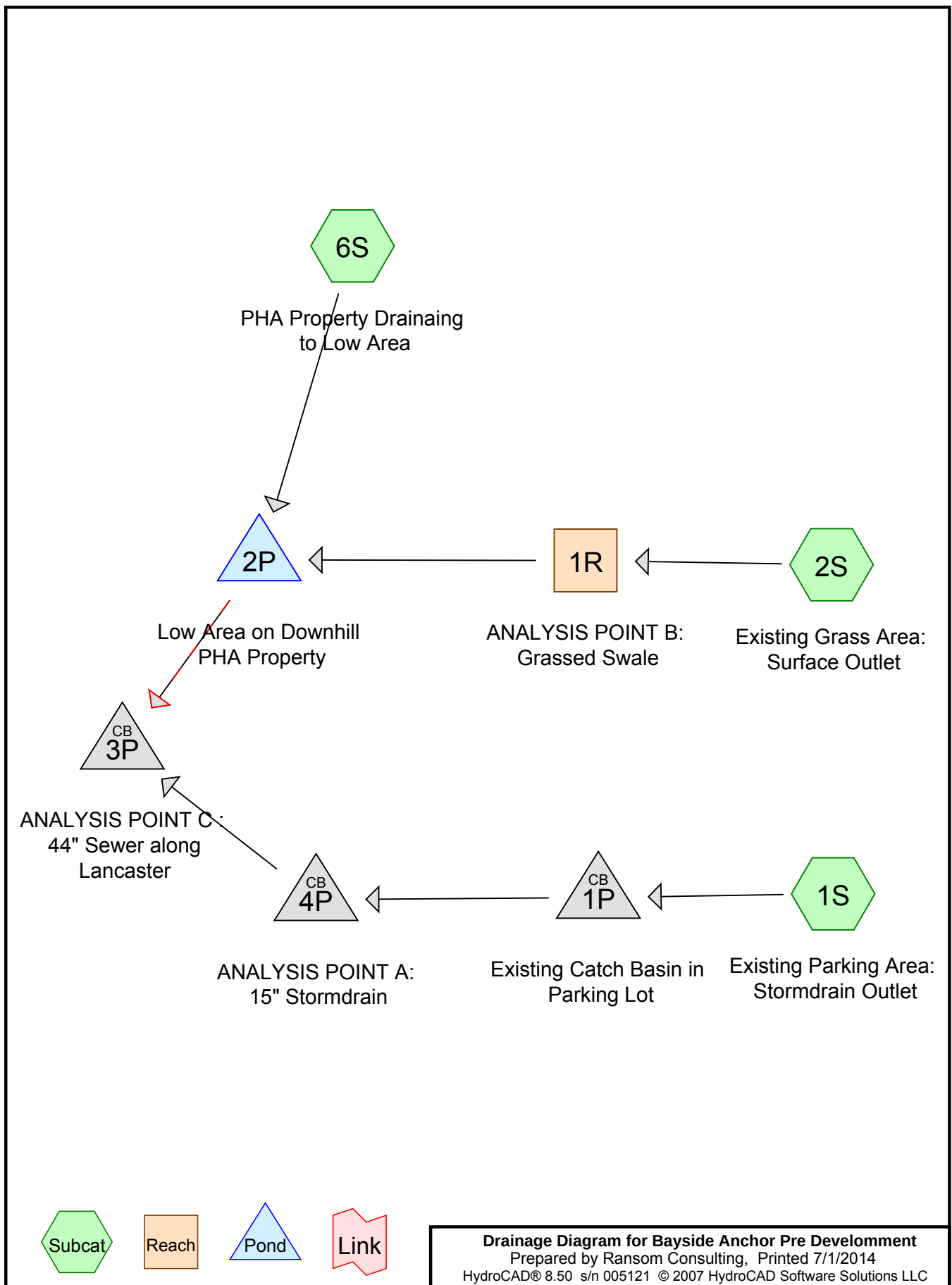
$$1.5 \times 10^{-3} \text{ in/min} \times 60 = .09 \text{ in/hour}$$

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APPENDIX E

Pre Development Hydro CAD Calculations

Bayside Anchor Stormwater Management Narrative
City of Portland
81 East Oxford St
Portland, Maine



Bayside Anchor Pre Development

Type III 24-hr 1-inch Rainfall=1.00"

Prepared by Ransom Consulting

Printed 7/1/2014

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Page 2

Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Existing Parking Area: Runoff Area=9,995 sf 73.39% Impervious Runoff Depth>0.20"
Flow Length=111' Tc=6.0 min CN=87 Runoff=0.05 cfs 0.004 af

Subcatchment2S: Existing Grass Area: Runoff Area=10,142 sf 1.84% Impervious Runoff Depth=0.00"
Flow Length=85' Slope=0.0600 '/' Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment6S: PHA Property Drainaing Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>0.01"
Flow Length=103' Tc=8.1 min CN=73 Runoff=0.00 cfs 0.001 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.015 L=20.0' S=0.0100 '/' Capacity=121.86 cfs Outflow=0.00 cfs 0.000 af

Pond 1P: Existing Catch Basin in Parking Lot Peak Elev=13.12' Inflow=0.05 cfs 0.004 af
8.0" x 100.0' Culvert Outflow=0.05 cfs 0.004 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=11.29' Storage=29 cf Inflow=0.00 cfs 0.001 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

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.08' Inflow=0.05 cfs 0.004 af
44.0" x 100.0' Culvert Outflow=0.05 cfs 0.004 af

Pond 4P: ANALYSISPOINT A: 15" Stormdrain Peak Elev=7.11' Inflow=0.05 cfs 0.004 af
15.0" x 25.0' Culvert Outflow=0.05 cfs 0.004 af

Total Runoff Area = 1.160 ac Runoff Volume = 0.005 af Average Runoff Depth = 0.05"
63.13% Pervious = 0.732 ac 36.87% Impervious = 0.428 ac

Bayside Anchor Pre Development

Prepared by Ransom Consulting

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Type III 24-hr 1-inch Rainfall=1.00"

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Summary for Subcatchment 1S: Existing Parking Area: Stormdrain Outlet

Runoff = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
7,335	98	Paved parking & roofs
552	39	>75% Grass cover, Good, HSG A
2,108	61	>75% Grass cover, Good, HSG B
9,995	87	Weighted Average
2,660		Pervious Area
7,335		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	45	0.0900	0.26		Sheet Flow, AB
					Grass: Short n= 0.150 P2= 3.00"
0.3	66	0.0300	3.52		Shallow Concentrated Flow, BC
					Paved Kv= 20.3 fps
3.2	111	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Existing Grass Area: Surface Outlet

Runoff = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
187	98	Paved parking & roofs
159	39	>75% Grass cover, Good, HSG A
9,796	61	>75% Grass cover, Good, HSG B
10,142	61	Weighted Average
9,955		Pervious Area
187		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.22		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.00"
0.1	35	0.0600	6.08	12.16	Trap/Vee/Rect Channel Flow,
					Bot.W=0.00' D=1.00' Z= 2.0 ' Top.W=4.00'
					n= 0.035 Earth, dense weeds
3.8	85	Total, Increased to minimum Tc = 6.0 min			

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Type III 24-hr 1-inch Rainfall=1.00"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 0.00 cfs @ 15.13 hrs, Volume= 0.001 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.233 ac, 1.84% Impervious, Inflow Depth = 0.00" for 1-inch event

Inflow = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Outflow = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 2.00 hrs, Average Depth at Peak Storage= 0.00'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



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Type III 24-hr 1-inch Rainfall=1.00"

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Summary for Pond 1P: Existing Catch Basin in Parking Lot

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 0.20" for 1-inch event
 Inflow = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af
 Outflow = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 13.12' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	8.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 9.00' S= 0.0400 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.05 cfs @ 12.10 hrs HW=13.12' TW=7.11' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.05 cfs @ 1.18 fps)**Summary for Pond 2P: Low Area on Downhill PHA Property**

Inflow Area = 0.930 ac, 27.86% Impervious, Inflow Depth > 0.01" for 1-inch event
 Inflow = 0.00 cfs @ 15.13 hrs, Volume= 0.001 af
 Outflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Atten= 96%, Lag= 292.2 min
 Discarded = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 11.29' @ 20.00 hrs Surf.Area= 262 sf Storage= 29 cf

Plug-Flow detention time=230.1 min calculated for 0.000 af (3% of inflow)

Center-of-Mass det. time= 43.1 min (1,031.1 - 988.0)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

Bayside Anchor Pre Development

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Type III 24-hr 1-inch Rainfall=1.00"

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Discarded OutFlow Max=0.00 cfs @ 20.00 hrs HW=11.29' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 2.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster

Inflow Area = 1.160 ac, 36.87% Impervious, Inflow Depth > 0.04" for 1-inch event
Inflow = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af
Outflow = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 3.08' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.05 cfs @ 12.10 hrs HW=3.08' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.05 cfs @ 1.33 fps)

Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 0.20" for 1-inch event
Inflow = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af
Outflow = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 12.10 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 7.11' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.05 cfs @ 12.10 hrs HW=7.11' TW=3.08' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.05 cfs @ 1.51 fps)

Bayside Anchor Pre Development

Type III 24-hr 2-Year Rainfall=3.00"

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Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Existing Parking Area: Runoff Area=9,995 sf 73.39% Impervious Runoff Depth>1.62"
Flow Length=111' Tc=6.0 min CN=87 Runoff=0.47 cfs 0.031 af

Subcatchment2S: Existing Grass Area: Runoff Area=10,142 sf 1.84% Impervious Runoff Depth>0.32"
Flow Length=85' Slope=0.0600 '/' Tc=6.0 min CN=61 Runoff=0.05 cfs 0.006 af

Subcatchment6S: PHA Property Drainaing Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>0.78"
Flow Length=103' Tc=8.1 min CN=73 Runoff=0.60 cfs 0.045 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.01' Max Vel=0.50 fps Inflow=0.05 cfs 0.006 af
n=0.015 L=20.0' S=0.0100 '/' Capacity=121.86 cfs Outflow=0.05 cfs 0.006 af

Pond 1P: Existing Catch Basin in Parking Lot Peak Elev=13.40' Inflow=0.47 cfs 0.031 af
8.0" x 100.0' Culvert Outflow=0.47 cfs 0.031 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=11.85' Storage=715 cf Inflow=0.65 cfs 0.051 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Secondary=0.17 cfs 0.046 af Outflow=0.17 cfs 0.046 af

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.25' Inflow=0.55 cfs 0.077 af
44.0" x 100.0' Culvert Outflow=0.55 cfs 0.077 af

Pond 4P: ANALYSISPOINT A: 15" Stormdrain Peak Elev=7.33' Inflow=0.47 cfs 0.031 af
15.0" x 25.0' Culvert Outflow=0.47 cfs 0.031 af

Total Runoff Area = 1.160 ac Runoff Volume = 0.082 af Average Runoff Depth = 0.85"
63.13% Pervious = 0.732 ac 36.87% Impervious = 0.428 ac

Bayside Anchor Pre Development

Type III 24-hr 2-Year Rainfall=3.00"

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Summary for Subcatchment 1S: Existing Parking Area: Stormdrain Outlet

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
7,335	98	Paved parking & roofs
552	39	>75% Grass cover, Good, HSG A
2,108	61	>75% Grass cover, Good, HSG B
9,995	87	Weighted Average
2,660		Pervious Area
7,335		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	45	0.0900	0.26		Sheet Flow, AB
					Grass: Short n= 0.150 P2= 3.00"
0.3	66	0.0300	3.52		Shallow Concentrated Flow, BC
					Paved Kv= 20.3 fps
3.2	111	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Existing Grass Area: Surface Outlet

Runoff = 0.05 cfs @ 12.13 hrs, Volume= 0.006 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
187	98	Paved parking & roofs
159	39	>75% Grass cover, Good, HSG A
9,796	61	>75% Grass cover, Good, HSG B
10,142	61	Weighted Average
9,955		Pervious Area
187		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.22		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.00"
0.1	35	0.0600	6.08	12.16	Trap/Vee/Rect Channel Flow,
					Bot.W=0.00' D=1.00' Z= 2.0 ' Top.W=4.00'
					n= 0.035 Earth, dense weeds
3.8	85	Total, Increased to minimum Tc = 6.0 min			

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Type III 24-hr 2-Year Rainfall=3.00"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 0.60 cfs @ 12.13 hrs, Volume= 0.045 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.233 ac, 1.84% Impervious, Inflow Depth > 0.32" for 2-Year event

Inflow = 0.05 cfs @ 12.13 hrs, Volume= 0.006 af

Outflow = 0.05 cfs @ 12.14 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.50 fps, Min. Travel Time= 0.7 min

Avg. Velocity = 0.46 fps, Avg. Travel Time= 0.7 min

Peak Storage= 2 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.01'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



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Type III 24-hr 2-Year Rainfall=3.00"

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Summary for Pond 1P: Existing Catch Basin in Parking Lot

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 1.62" for 2-Year event
 Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.031 af
 Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.47 cfs @ 12.09 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 13.40' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	8.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 9.00' S= 0.0400 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.47 cfs @ 12.09 hrs HW=13.40' TW=7.33' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.47 cfs @ 2.15 fps)**Summary for Pond 2P: Low Area on Downhill PHA Property**

Inflow Area = 0.930 ac, 27.86% Impervious, Inflow Depth > 0.66" for 2-Year event
 Inflow = 0.65 cfs @ 12.13 hrs, Volume= 0.051 af
 Outflow = 0.17 cfs @ 12.59 hrs, Volume= 0.046 af, Atten= 74%, Lag= 28.0 min
 Discarded = 0.00 cfs @ 12.59 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af
 Secondary = 0.17 cfs @ 12.59 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 11.85' @ 12.59 hrs Surf.Area= 2,974 sf Storage= 715 cf

Plug-Flow detention time=68.3 min calculated for 0.046 af (91% of inflow)

Center-of-Mass det. time= 38.1 min (868.1 - 829.9)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

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Type III 24-hr 2-Year Rainfall=3.00"

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Discarded OutFlow Max=0.00 cfs @ 12.59 hrs HW=11.85' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Secondary OutFlow Max=0.17 cfs @ 12.59 hrs HW=11.85' TW=3.17' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 2.39 fps)

Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster

Inflow Area = 1.160 ac, 36.87% Impervious, Inflow Depth > 0.80" for 2-Year event
Inflow = 0.55 cfs @ 12.10 hrs, Volume= 0.077 af
Outflow = 0.55 cfs @ 12.10 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min
Primary = 0.55 cfs @ 12.10 hrs, Volume= 0.077 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 3.25' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.55 cfs @ 12.10 hrs HW=3.25' (Free Discharge)

↑**1=Culvert** (Inlet Controls 0.55 cfs @ 1.72 fps)

Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 1.62" for 2-Year event
Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.47 cfs @ 12.09 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 7.33' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.47 cfs @ 12.09 hrs HW=7.33' TW=3.25' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.47 cfs @ 2.66 fps)

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Type III 24-hr 10-Year Rainfall=4.70"

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Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Existing Parking Area: Runoff Area=9,995 sf 73.39% Impervious Runoff Depth>3.09"
Flow Length=111' Tc=6.0 min CN=87 Runoff=0.87 cfs 0.059 af

Subcatchment2S: Existing Grass Area: Runoff Area=10,142 sf 1.84% Impervious Runoff Depth>1.08"
Flow Length=85' Slope=0.0600 ' ' Tc=6.0 min CN=61 Runoff=0.29 cfs 0.021 af

Subcatchment6S: PHA Property Drainaing Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>1.89"
Flow Length=103' Tc=8.1 min CN=73 Runoff=1.54 cfs 0.110 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.03' Max Vel=0.95 fps Inflow=0.29 cfs 0.021 af
n=0.015 L=20.0' S=0.0100 ' ' Capacity=121.86 cfs Outflow=0.29 cfs 0.021 af

Pond 1P: Existing Catch Basin in Parking Lot Peak Elev=13.60' Inflow=0.87 cfs 0.059 af
8.0" x 100.0' Culvert Outflow=0.87 cfs 0.059 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=12.23' Storage=2,373 cf Inflow=1.82 cfs 0.131 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Secondary=0.27 cfs 0.125 af Outflow=0.27 cfs 0.126 af

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.36' Inflow=1.07 cfs 0.184 af
44.0" x 100.0' Culvert Outflow=1.07 cfs 0.184 af

Pond 4P: ANALYSISPOINT A: 15" Stormdrain Peak Elev=7.47' Inflow=0.87 cfs 0.059 af
15.0" x 25.0' Culvert Outflow=0.87 cfs 0.059 af

Total Runoff Area = 1.160 ac Runoff Volume = 0.190 af Average Runoff Depth = 1.96"
63.13% Pervious = 0.732 ac 36.87% Impervious = 0.428 ac

Summary for Subcatchment 1S: Existing Parking Area: Stormdrain Outlet

Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.059 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
7,335	98	Paved parking & roofs
552	39	>75% Grass cover, Good, HSG A
2,108	61	>75% Grass cover, Good, HSG B
9,995	87	Weighted Average
2,660		Pervious Area
7,335		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	45	0.0900	0.26		Sheet Flow, AB
					Grass: Short n= 0.150 P2= 3.00"
0.3	66	0.0300	3.52		Shallow Concentrated Flow, BC
					Paved Kv= 20.3 fps
3.2	111	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Existing Grass Area: Surface Outlet

Runoff = 0.29 cfs @ 12.10 hrs, Volume= 0.021 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
187	98	Paved parking & roofs
159	39	>75% Grass cover, Good, HSG A
9,796	61	>75% Grass cover, Good, HSG B
10,142	61	Weighted Average
9,955		Pervious Area
187		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.22		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.00"
0.1	35	0.0600	6.08	12.16	Trap/Vee/Rect Channel Flow,
					Bot.W=0.00' D=1.00' Z= 2.0 ' Top.W=4.00'
					n= 0.035 Earth, dense weeds
3.8	85	Total, Increased to minimum Tc = 6.0 min			

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Type III 24-hr 10-Year Rainfall=4.70"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 1.54 cfs @ 12.12 hrs, Volume= 0.110 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.233 ac, 1.84% Impervious, Inflow Depth > 1.08" for 10-Year event

Inflow = 0.29 cfs @ 12.10 hrs, Volume= 0.021 af

Outflow = 0.29 cfs @ 12.10 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.95 fps, Min. Travel Time= 0.4 min

Avg. Velocity = 0.48 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.03'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



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Type III 24-hr 10-Year Rainfall=4.70"

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Summary for Pond 1P: Existing Catch Basin in Parking Lot

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 3.09" for 10-Year event
 Inflow = 0.87 cfs @ 12.09 hrs, Volume= 0.059 af
 Outflow = 0.87 cfs @ 12.09 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.87 cfs @ 12.09 hrs, Volume= 0.059 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 13.60' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	8.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 9.00' S= 0.0400 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.87 cfs @ 12.09 hrs HW=13.60' TW=7.47' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.87 cfs @ 2.63 fps)**Summary for Pond 2P: Low Area on Downhill PHA Property**

Inflow Area = 0.930 ac, 27.86% Impervious, Inflow Depth > 1.68" for 10-Year event
 Inflow = 1.82 cfs @ 12.12 hrs, Volume= 0.131 af
 Outflow = 0.27 cfs @ 12.81 hrs, Volume= 0.126 af, Atten= 85%, Lag= 41.6 min
 Discarded = 0.00 cfs @ 12.81 hrs, Volume= 0.001 af
 Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af
 Secondary = 0.27 cfs @ 12.81 hrs, Volume= 0.125 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 12.23' @ 12.81 hrs Surf.Area= 5,600 sf Storage= 2,373 cf

Plug-Flow detention time= 105.3 min calculated for 0.125 af (96% of inflow)

Center-of-Mass det. time= 91.3 min (900.6 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

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Type III 24-hr 10-Year Rainfall=4.70"

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Discarded OutFlow Max=0.00 cfs @ 12.81 hrs HW=12.23' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Secondary OutFlow Max=0.27 cfs @ 12.81 hrs HW=12.23' TW=3.21' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 3.83 fps)

Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster

Inflow Area = 1.160 ac, 36.87% Impervious, Inflow Depth > 1.91" for 10-Year event
Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.184 af
Outflow = 1.07 cfs @ 12.09 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min
Primary = 1.07 cfs @ 12.09 hrs, Volume= 0.184 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 3.36' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=1.06 cfs @ 12.09 hrs HW=3.36' (Free Discharge)

↑**1=Culvert** (Inlet Controls 1.06 cfs @ 2.03 fps)

Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 3.09" for 10-Year event
Inflow = 0.87 cfs @ 12.09 hrs, Volume= 0.059 af
Outflow = 0.87 cfs @ 12.09 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.0 min
Primary = 0.87 cfs @ 12.09 hrs, Volume= 0.059 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 7.47' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.87 cfs @ 12.09 hrs HW=7.47' TW=3.35' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 0.87 cfs @ 3.06 fps)

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Type III 24-hr 25-Year Rainfall=5.50"

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Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Existing Parking Area: Runoff Area=9,995 sf 73.39% Impervious Runoff Depth>3.81"
Flow Length=111' Tc=6.0 min CN=87 Runoff=1.06 cfs 0.073 af

Subcatchment2S: Existing Grass Area: Runoff Area=10,142 sf 1.84% Impervious Runoff Depth>1.53"
Flow Length=85' Slope=0.0600 ' ' Tc=6.0 min CN=61 Runoff=0.43 cfs 0.030 af

Subcatchment6S: PHA Property Drainaing Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>2.48"
Flow Length=103' Tc=8.1 min CN=73 Runoff=2.03 cfs 0.144 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.04' Max Vel=1.11 fps Inflow=0.43 cfs 0.030 af
n=0.015 L=20.0' S=0.0100 ' ' Capacity=121.86 cfs Outflow=0.43 cfs 0.030 af

Pond 1P: Existing Catch Basin in Parking Lot Peak Elev=13.73' Inflow=1.06 cfs 0.073 af
8.0" x 100.0' Culvert Outflow=1.06 cfs 0.073 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=12.39' Storage=3,365 cf Inflow=2.45 cfs 0.174 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Secondary=0.30 cfs 0.165 af Outflow=0.30 cfs 0.166 af

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.39' Inflow=1.29 cfs 0.238 af
44.0" x 100.0' Culvert Outflow=1.29 cfs 0.238 af

Pond 4P: ANALYSISPOINT A: 15" Stormdrain Peak Elev=7.53' Inflow=1.06 cfs 0.073 af
15.0" x 25.0' Culvert Outflow=1.06 cfs 0.073 af

Total Runoff Area = 1.160 ac Runoff Volume = 0.247 af Average Runoff Depth = 2.55"
63.13% Pervious = 0.732 ac 36.87% Impervious = 0.428 ac

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Type III 24-hr 25-Year Rainfall=5.50"

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Summary for Subcatchment 1S: Existing Parking Area: Stormdrain Outlet

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.073 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
7,335	98	Paved parking & roofs
552	39	>75% Grass cover, Good, HSG A
2,108	61	>75% Grass cover, Good, HSG B
9,995	87	Weighted Average
2,660		Pervious Area
7,335		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	45	0.0900	0.26		Sheet Flow, AB
					Grass: Short n= 0.150 P2= 3.00"
0.3	66	0.0300	3.52		Shallow Concentrated Flow, BC
					Paved Kv= 20.3 fps
3.2	111	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Existing Grass Area: Surface Outlet

Runoff = 0.43 cfs @ 12.10 hrs, Volume= 0.030 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
187	98	Paved parking & roofs
159	39	>75% Grass cover, Good, HSG A
9,796	61	>75% Grass cover, Good, HSG B
10,142	61	Weighted Average
9,955		Pervious Area
187		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.22		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.00"
0.1	35	0.0600	6.08	12.16	Trap/Vee/Rect Channel Flow,
					Bot.W=0.00' D=1.00' Z= 2.0 ' Top.W=4.00'
					n= 0.035 Earth, dense weeds
3.8	85	Total, Increased to minimum Tc = 6.0 min			

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Type III 24-hr 25-Year Rainfall=5.50"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 2.03 cfs @ 12.12 hrs, Volume= 0.144 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.233 ac, 1.84% Impervious, Inflow Depth > 1.53" for 25-Year event

Inflow = 0.43 cfs @ 12.10 hrs, Volume= 0.030 af

Outflow = 0.43 cfs @ 12.10 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.11 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 0.49 fps, Avg. Travel Time= 0.7 min

Peak Storage= 8 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.04'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



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Type III 24-hr 25-Year Rainfall=5.50"

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Summary for Pond 1P: Existing Catch Basin in Parking Lot

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 3.81" for 25-Year event
 Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.073 af
 Outflow = 1.06 cfs @ 12.09 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.06 cfs @ 12.09 hrs, Volume= 0.073 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 13.73' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	8.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 9.00' S= 0.0400 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=1.06 cfs @ 12.09 hrs HW=13.73' TW=7.53' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.06 cfs @ 3.04 fps)**Summary for Pond 2P: Low Area on Downhill PHA Property**

Inflow Area = 0.930 ac, 27.86% Impervious, Inflow Depth > 2.24" for 25-Year event
 Inflow = 2.45 cfs @ 12.11 hrs, Volume= 0.174 af
 Outflow = 0.30 cfs @ 12.95 hrs, Volume= 0.166 af, Atten= 88%, Lag= 50.4 min
 Discarded = 0.00 cfs @ 12.95 hrs, Volume= 0.001 af
 Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af
 Secondary = 0.30 cfs @ 12.95 hrs, Volume= 0.165 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 12.39' @ 12.95 hrs Surf.Area= 6,673 sf Storage= 3,365 cf

Plug-Flow detention time= 131.6 min calculated for 0.166 af (96% of inflow)

Center-of-Mass det. time= 115.8 min (918.9 - 803.0)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

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Type III 24-hr 25-Year Rainfall=5.50"

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Discarded OutFlow Max=0.00 cfs @ 12.95 hrs HW=12.39' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Secondary OutFlow Max=0.30 cfs @ 12.95 hrs HW=12.39' TW=3.22' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Orifice Controls 0.30 cfs @ 4.29 fps)

Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster

Inflow Area = 1.160 ac, 36.87% Impervious, Inflow Depth > 2.47" for 25-Year event
Inflow = 1.29 cfs @ 12.09 hrs, Volume= 0.238 af
Outflow = 1.29 cfs @ 12.09 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.0 min
Primary = 1.29 cfs @ 12.09 hrs, Volume= 0.238 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 3.39' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=1.28 cfs @ 12.09 hrs HW=3.39' (Free Discharge)

↑**1=Culvert** (Inlet Controls 1.28 cfs @ 2.13 fps)

Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 3.81" for 25-Year event
Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.073 af
Outflow = 1.06 cfs @ 12.09 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
Primary = 1.06 cfs @ 12.09 hrs, Volume= 0.073 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 7.53' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=1.06 cfs @ 12.09 hrs HW=7.53' TW=3.39' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 1.06 cfs @ 3.19 fps)

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Type III 24-hr 100-Year Rainfall=6.70"

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Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Existing Parking Area: Runoff Area=9,995 sf 73.39% Impervious Runoff Depth>4.90"
Flow Length=111' Tc=6.0 min CN=87 Runoff=1.35 cfs 0.094 af

Subcatchment2S: Existing Grass Area: Runoff Area=10,142 sf 1.84% Impervious Runoff Depth>2.28"
Flow Length=85' Slope=0.0600 ' ' Tc=6.0 min CN=61 Runoff=0.66 cfs 0.044 af

Subcatchment6S: PHA Property Drainaing Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>3.42"
Flow Length=103' Tc=8.1 min CN=73 Runoff=2.80 cfs 0.199 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.05' Max Vel=1.31 fps Inflow=0.66 cfs 0.044 af
n=0.015 L=20.0' S=0.0100 ' ' Capacity=121.86 cfs Outflow=0.66 cfs 0.044 af

Pond 1P: Existing Catch Basin in Parking Lot Peak Elev=13.98' Inflow=1.35 cfs 0.094 af
8.0" x 100.0' Culvert Outflow=1.35 cfs 0.094 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=12.62' Storage=5,002 cf Inflow=3.44 cfs 0.243 af
Discarded=0.00 cfs 0.001 af Primary=0.05 cfs 0.002 af Secondary=0.34 cfs 0.212 af Outflow=0.39 cfs 0.216 af

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.44' Inflow=1.61 cfs 0.308 af
44.0" x 100.0' Culvert Outflow=1.61 cfs 0.308 af

Pond 4P: ANALYSISPOINT A: 15" Stormdrain Peak Elev=7.60' Inflow=1.35 cfs 0.094 af
15.0" x 25.0' Culvert Outflow=1.35 cfs 0.094 af

Total Runoff Area = 1.160 ac Runoff Volume = 0.337 af Average Runoff Depth = 3.49"
63.13% Pervious = 0.732 ac 36.87% Impervious = 0.428 ac

Summary for Subcatchment 1S: Existing Parking Area: Stormdrain Outlet

Runoff = 1.35 cfs @ 12.09 hrs, Volume= 0.094 af, Depth> 4.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
7,335	98	Paved parking & roofs
552	39	>75% Grass cover, Good, HSG A
2,108	61	>75% Grass cover, Good, HSG B
9,995	87	Weighted Average
2,660		Pervious Area
7,335		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	45	0.0900	0.26		Sheet Flow, AB
					Grass: Short n= 0.150 P2= 3.00"
0.3	66	0.0300	3.52		Shallow Concentrated Flow, BC
					Paved Kv= 20.3 fps
3.2	111	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Existing Grass Area: Surface Outlet

Runoff = 0.66 cfs @ 12.09 hrs, Volume= 0.044 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
187	98	Paved parking & roofs
159	39	>75% Grass cover, Good, HSG A
9,796	61	>75% Grass cover, Good, HSG B
10,142	61	Weighted Average
9,955		Pervious Area
187		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.22		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.00"
0.1	35	0.0600	6.08	12.16	Trap/Vee/Rect Channel Flow,
					Bot.W=0.00' D=1.00' Z= 2.0 ' Top.W=4.00'
					n= 0.035 Earth, dense weeds
3.8	85	Total, Increased to minimum Tc = 6.0 min			

Bayside Anchor Pre Development

Type III 24-hr 100-Year Rainfall=6.70"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 2.80 cfs @ 12.12 hrs, Volume= 0.199 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.233 ac, 1.84% Impervious, Inflow Depth > 2.28" for 100-Year event

Inflow = 0.66 cfs @ 12.09 hrs, Volume= 0.044 af

Outflow = 0.66 cfs @ 12.10 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 1.31 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 0.51 fps, Avg. Travel Time= 0.6 min

Peak Storage= 10 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.05'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



Bayside Anchor Pre Development

Type III 24-hr 100-Year Rainfall=6.70"

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Summary for Pond 1P: Existing Catch Basin in Parking Lot

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 4.90" for 100-Year event
 Inflow = 1.35 cfs @ 12.09 hrs, Volume= 0.094 af
 Outflow = 1.35 cfs @ 12.09 hrs, Volume= 0.094 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.35 cfs @ 12.09 hrs, Volume= 0.094 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 13.98' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	8.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 9.00' S= 0.0400 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=1.34 cfs @ 12.09 hrs HW=13.97' TW=7.60' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.34 cfs @ 3.85 fps)**Summary for Pond 2P: Low Area on Downhill PHA Property**

Inflow Area = 0.930 ac, 27.86% Impervious, Inflow Depth > 3.14" for 100-Year event
 Inflow = 3.44 cfs @ 12.11 hrs, Volume= 0.243 af
 Outflow = 0.39 cfs @ 12.99 hrs, Volume= 0.216 af, Atten= 89%, Lag= 52.7 min
 Discarded = 0.00 cfs @ 12.99 hrs, Volume= 0.001 af
 Primary = 0.05 cfs @ 12.99 hrs, Volume= 0.002 af
 Secondary = 0.34 cfs @ 12.99 hrs, Volume= 0.212 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 12.62' @ 12.99 hrs Surf.Area= 7,985 sf Storage= 5,002 cf

Plug-Flow detention time= 165.2 min calculated for 0.216 af (89% of inflow)

Center-of-Mass det. time= 129.7 min (925.4 - 795.7)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

Bayside Anchor Pre Development

Type III 24-hr 100-Year Rainfall=6.70"

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Discarded OutFlow Max=0.00 cfs @ 12.99 hrs HW=12.62' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)**Primary OutFlow** Max=0.05 cfs @ 12.99 hrs HW=12.62' TW=3.24' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**(Weir Controls 0.05 cfs @ 0.31 fps)**Secondary OutFlow** Max=0.34 cfs @ 12.99 hrs HW=12.62' TW=3.24' (Dynamic Tailwater)↑**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 4.85 fps)**Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster**

Inflow Area = 1.160 ac, 36.87% Impervious, Inflow Depth > 3.19" for 100-Year event

Inflow = 1.61 cfs @ 12.09 hrs, Volume= 0.308 af

Outflow = 1.61 cfs @ 12.09 hrs, Volume= 0.308 af, Atten= 0%, Lag= 0.0 min

Primary = 1.61 cfs @ 12.09 hrs, Volume= 0.308 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 3.44' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=1.60 cfs @ 12.09 hrs HW=3.44' (Free Discharge)↑**1=Culvert** (Inlet Controls 1.60 cfs @ 2.25 fps)**Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain**

Inflow Area = 0.229 ac, 73.39% Impervious, Inflow Depth > 4.90" for 100-Year event

Inflow = 1.35 cfs @ 12.09 hrs, Volume= 0.094 af

Outflow = 1.35 cfs @ 12.09 hrs, Volume= 0.094 af, Atten= 0%, Lag= 0.0 min

Primary = 1.35 cfs @ 12.09 hrs, Volume= 0.094 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 7.60' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=1.34 cfs @ 12.09 hrs HW=7.60' TW=3.44' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 1.34 cfs @ 3.36 fps)

APPENDIX F

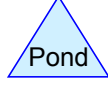
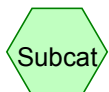
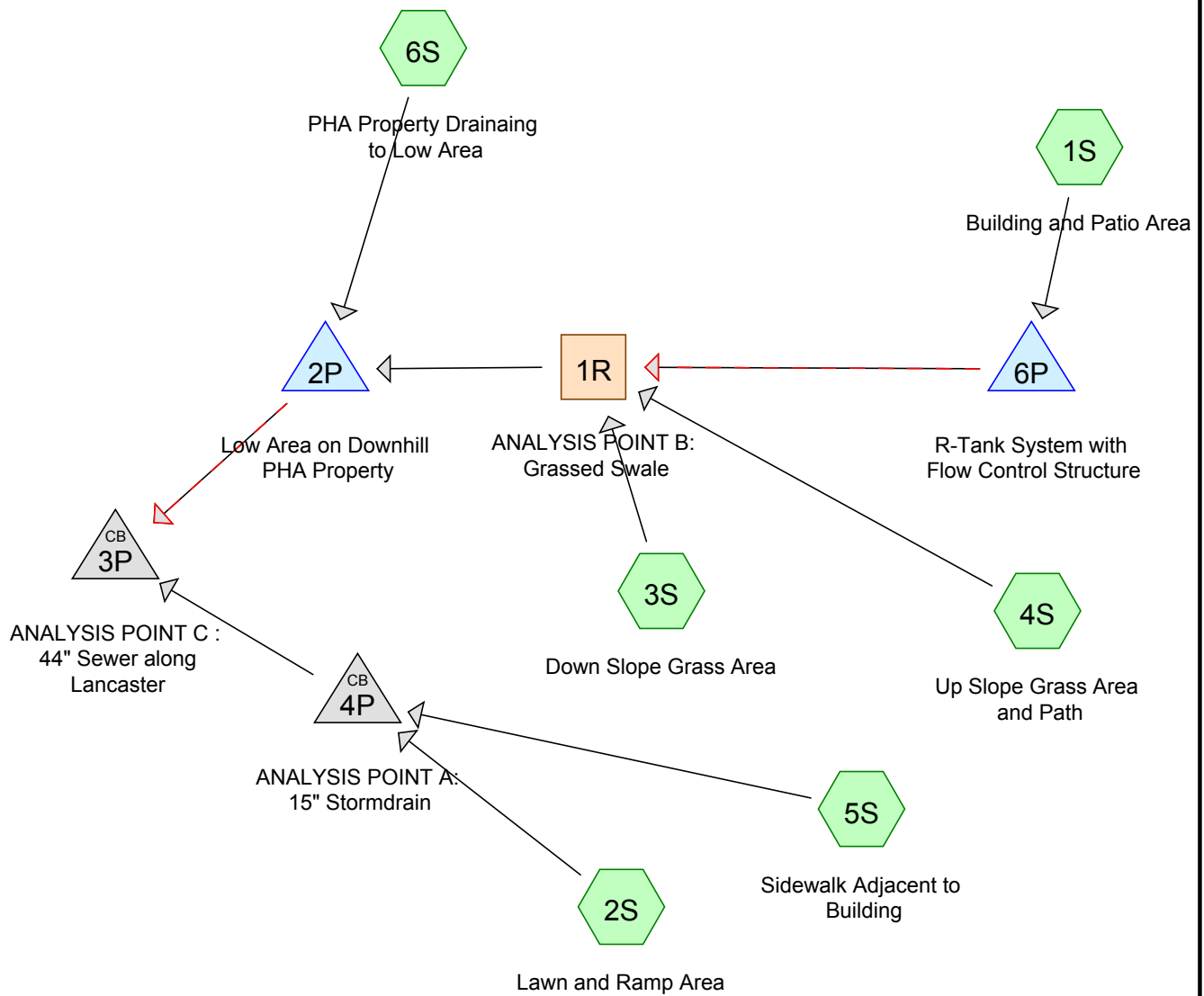
Post Development Hydro CAD Calculations

Bayside Anchor Stormwater Management Narrative

City of Portland

81 East Oxford St

Portland, Maine



Drainage Diagram for Bayside Anchor Post Development

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Bayside Anchor Post Development

Type III 24-hr 1-inch Rainfall=1.00"

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Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Building and Patio Runoff Area=11,705 sf 100.00% Impervious Runoff Depth>0.75"
Flow Length=33' Slope=0.0200 '/' Tc=6.0 min CN=98 Runoff=0.24 cfs 0.017 af

Subcatchment2S: Lawn and Ramp Area Runoff Area=2,007 sf 56.35% Impervious Runoff Depth>0.10"
Flow Length=44' Slope=0.0800 '/' Tc=6.0 min CN=82 Runoff=0.00 cfs 0.000 af

Subcatchment3S: Down Slope Grass Area Runoff Area=3,677 sf 5.30% Impervious Runoff Depth=0.00"
Flow Length=32' Slope=0.0900 '/' Tc=6.0 min CN=63 Runoff=0.00 cfs 0.000 af

Subcatchment4S: Up Slope Grass Area Runoff Area=2,439 sf 16.97% Impervious Runoff Depth=0.00"
Flow Length=103' Tc=6.0 min CN=65 Runoff=0.00 cfs 0.000 af

Subcatchment5S: Sidewalk Adjacent to Runoff Area=284 sf 100.00% Impervious Runoff Depth>0.75"
Flow Length=5' Slope=0.0200 '/' Tc=6.0 min CN=98 Runoff=0.01 cfs 0.000 af

Subcatchment6S: PHA Property Draining Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>0.01"
Flow Length=103' Tc=8.1 min CN=73 Runoff=0.00 cfs 0.001 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.015 L=20.0' S=0.0100 '/' Capacity=121.86 cfs Outflow=0.00 cfs 0.000 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=11.29' Storage=29 cf Inflow=0.00 cfs 0.001 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

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.04' Inflow=0.01 cfs 0.001 af
44.0" x 100.0' Culvert Outflow=0.01 cfs 0.001 af

Pond 4P: ANALYSISPOINT A: 15" Storm drain Peak Elev=7.05' Inflow=0.01 cfs 0.001 af
15.0" x 25.0' Culvert Outflow=0.01 cfs 0.001 af

Pond 6P: R-Tank System with Flow Control Peak Elev=16.84' Storage=0.011 af Inflow=0.24 cfs 0.017 af
Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

Total Runoff Area = 1.159 ac Runoff Volume = 0.018 af Average Runoff Depth = 0.19"
50.82% Pervious = 0.589 ac 49.18% Impervious = 0.570 ac

Bayside Anchor Post Development

Type III 24-hr 1-inch Rainfall=1.00"

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Summary for Subcatchment 1S: Building and Patio Area

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.017 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
11,705	98	Paved parking & roofs
11,705		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0200	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.00"
0.5	33	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Lawn and Ramp Area

Runoff = 0.00 cfs @ 12.14 hrs, Volume= 0.000 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
1,131	98	Paved parking & roofs
876	61	>75% Grass cover, Good, HSG B
2,007	82	Weighted Average
876		Pervious Area
1,131		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	44	0.0800	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
3.0	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Down Slope Grass Area

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
195	98	Paved parking & roofs
3,482	61	>75% Grass cover, Good, HSG B
3,677	63	Weighted Average
3,482		Pervious Area
195		Impervious Area

Bayside Anchor Post Development

Type III 24-hr 1-inch Rainfall=1.00"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
2.2	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S: Up Slope Grass Area and Path

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
414	98	Paved parking & roofs
1,755	61	>75% Grass cover, Good, HSG B
270	39	>75% Grass cover, Good, HSG A
2,439	65	Weighted Average
2,025		Pervious Area
414		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.4	71	0.0500	3.35		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
2.6	103	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 5S: Sidewalk Adjacent to Building

Runoff = 0.01 cfs @ 12.08 hrs, Volume= 0.000 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
284	98	Paved parking & roofs
284		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.73		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
0.1	5	Total, Increased to minimum Tc = 6.0 min			

Bayside Anchor Post Development

Type III 24-hr 1-inch Rainfall=1.00"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 0.00 cfs @ 15.13 hrs, Volume= 0.001 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.409 ac, 69.10% Impervious, Inflow Depth = 0.00" for 1-inch event

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



Bayside Anchor Post Development

Type III 24-hr 1-inch Rainfall=1.00"

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Summary for Pond 2P: Low Area on Downhill PHA Property

Inflow Area = 1.106 ac, 48.58% Impervious, Inflow Depth > 0.01" for 1-inch event
 Inflow = 0.00 cfs @ 15.13 hrs, Volume= 0.001 af
 Outflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Atten= 96%, Lag= 292.2 min
 Discarded = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 11.29' @ 20.00 hrs Surf.Area= 262 sf Storage= 29 cf

Plug-Flow detention time= 230.0 min calculated for 0.000 af (3% of inflow)

Center-of-Mass det. time= 43.1 min (1,031.1 - 988.0)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 20.00 hrs HW=11.29' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)↑**2=Orifice/Grate** (Controls 0.00 cfs)**Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster**

Inflow Area = 1.159 ac, 49.18% Impervious, Inflow Depth > 0.01" for 1-inch event
 Inflow = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af
 Outflow = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Bayside Anchor Post Development

Type III 24-hr 1-inch Rainfall=1.00"

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Peak Elev= 3.04' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long 44" Sewer CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.01 cfs @ 12.11 hrs HW=3.04' (Free Discharge)↑**1=44" Sewer** (Barrel Controls 0.01 cfs @ 0.77 fps)**Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain**

Inflow Area = 0.053 ac, 61.76% Impervious, Inflow Depth > 0.18" for 1-inch event
 Inflow = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af
 Outflow = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 7.05' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.01 cfs @ 12.11 hrs HW=7.05' TW=3.04' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.01 cfs @ 0.90 fps)**Summary for Pond 6P: R-Tank System with Flow Control Structure**

Inflow Area = 0.269 ac, 100.00% Impervious, Inflow Depth > 0.75" for 1-inch event
 Inflow = 0.24 cfs @ 12.08 hrs, Volume= 0.017 af
 Outflow = 0.01 cfs @ 11.23 hrs, Volume= 0.006 af, Atten= 98%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.23 hrs, Volume= 0.006 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 16.84' @ 16.99 hrs Surf.Area= 0.022 ac Storage= 0.011 af

Flood Elev= 19.90' Surf.Area= 0.022 ac Storage= 0.053 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 59.0 min (816.8 - 757.8)

Volume	Invert	Avail.Storage	Storage Description
#1	16.31'	0.009 af	14.00'W x 21.00'L x 1.44'H R-Tank 1.44' 0.010 af Overall x 95.0% Voids
#2	16.31'	0.044 af	26.00'W x 26.00'L x 3.00'H R-Tank 2.82' 0.047 af Overall x 95.0% Voids
		0.053 af	Total Available Storage

Bayside Anchor Post Development

Type III 24-hr 1-inch Rainfall=1.00"

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Device	Routing	Invert	Outlet Devices
#1	Primary	16.90'	1.5" Vert. 1.5" Orifice C= 0.600
#2	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#3	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#4	Primary	18.50'	3.0" Vert. 3" Orifice C= 0.600
#5	Secondary	19.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#6	Discarded	16.31'	0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 11.23 hrs HW=16.35' (Free Discharge)

↑ **6=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.31' TW=13.00' (Dynamic Tailwater)

↑ **1=1.5" Orifice** (Controls 0.00 cfs)

↑ **2=2" Orifice** (Controls 0.00 cfs)

↑ **3=2" Orifice** (Controls 0.00 cfs)

↑ **4=3" Orifice** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.31' TW=13.00' (Dynamic Tailwater)

↑ **5=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Bayside Anchor Post Development

Type III 24-hr 2-Year Rainfall=3.00"

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Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Building and Patio Runoff Area=11,705 sf 100.00% Impervious Runoff Depth>2.64"
Flow Length=33' Slope=0.0200 '/' Tc=6.0 min CN=98 Runoff=0.78 cfs 0.059 af

Subcatchment2S: Lawn and Ramp Area Runoff Area=2,007 sf 56.35% Impervious Runoff Depth>1.28"
Flow Length=44' Slope=0.0800 '/' Tc=6.0 min CN=82 Runoff=0.07 cfs 0.005 af

Subcatchment3S: Down Slope Grass Area Runoff Area=3,677 sf 5.30% Impervious Runoff Depth>0.38"
Flow Length=32' Slope=0.0900 '/' Tc=6.0 min CN=63 Runoff=0.03 cfs 0.003 af

Subcatchment4S: Up Slope Grass Area Runoff Area=2,439 sf 16.97% Impervious Runoff Depth>0.45"
Flow Length=103' Tc=6.0 min CN=65 Runoff=0.02 cfs 0.002 af

Subcatchment5S: Sidewalk Adjacent to Runoff Area=284 sf 100.00% Impervious Runoff Depth>2.64"
Flow Length=5' Slope=0.0200 '/' Tc=6.0 min CN=98 Runoff=0.02 cfs 0.001 af

Subcatchment6S: PHA Property Draining Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>0.78"
Flow Length=103' Tc=8.1 min CN=73 Runoff=0.60 cfs 0.045 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.01' Max Vel=0.64 fps Inflow=0.10 cfs 0.037 af
n=0.015 L=20.0' S=0.0100 '/' Capacity=121.86 cfs Outflow=0.10 cfs 0.037 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=11.88' Storage=827 cf Inflow=0.69 cfs 0.082 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Secondary=0.18 cfs 0.077 af Outflow=0.18 cfs 0.077 af

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.16' Inflow=0.20 cfs 0.083 af
44.0" x 100.0' Culvert Outflow=0.20 cfs 0.083 af

Pond 4P: ANALYSISPOINT A: 15" Storm drain Peak Elev=7.15' Inflow=0.09 cfs 0.006 af
15.0" x 25.0' Culvert Outflow=0.09 cfs 0.006 af

Pond 6P: R-Tank System with Flow Control Peak Elev=18.05' Storage=0.035 af Inflow=0.78 cfs 0.059 af
Discarded=0.01 cfs 0.008 af Primary=0.07 cfs 0.032 af Secondary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.040 af

Total Runoff Area = 1.159 ac Runoff Volume = 0.115 af Average Runoff Depth = 1.19"
50.82% Pervious = 0.589 ac 49.18% Impervious = 0.570 ac

Bayside Anchor Post Development

Type III 24-hr 2-Year Rainfall=3.00"

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Summary for Subcatchment 1S: Building and Patio Area

Runoff = 0.78 cfs @ 12.08 hrs, Volume= 0.059 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
11,705	98	Paved parking & roofs
11,705		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0200	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.00"
0.5	33	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Lawn and Ramp Area

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,131	98	Paved parking & roofs
876	61	>75% Grass cover, Good, HSG B
2,007	82	Weighted Average
876		Pervious Area
1,131		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	44	0.0800	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
3.0	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Down Slope Grass Area

Runoff = 0.03 cfs @ 12.12 hrs, Volume= 0.003 af, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
195	98	Paved parking & roofs
3,482	61	>75% Grass cover, Good, HSG B
3,677	63	Weighted Average
3,482		Pervious Area
195		Impervious Area

Bayside Anchor Post Development

Type III 24-hr 2-Year Rainfall=3.00"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
2.2	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S: Up Slope Grass Area and Path

Runoff = 0.02 cfs @ 12.11 hrs, Volume= 0.002 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
414	98	Paved parking & roofs
1,755	61	>75% Grass cover, Good, HSG B
270	39	>75% Grass cover, Good, HSG A
2,439	65	Weighted Average
2,025		Pervious Area
414		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.4	71	0.0500	3.35		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
2.6	103	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 5S: Sidewalk Adjacent to Building

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 0.001 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
284	98	Paved parking & roofs
284		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.73		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
0.1	5	Total, Increased to minimum Tc = 6.0 min			

Bayside Anchor Post Development

Type III 24-hr 2-Year Rainfall=3.00"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 0.60 cfs @ 12.13 hrs, Volume= 0.045 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.409 ac, 69.10% Impervious, Inflow Depth > 1.09" for 2-Year event

Inflow = 0.10 cfs @ 12.13 hrs, Volume= 0.037 af

Outflow = 0.10 cfs @ 12.14 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.64 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 0.51 fps, Avg. Travel Time= 0.7 min

Peak Storage= 3 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.01'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



Bayside Anchor Post Development

Type III 24-hr 2-Year Rainfall=3.00"

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Summary for Pond 2P: Low Area on Downhill PHA Property

Inflow Area = 1.106 ac, 48.58% Impervious, Inflow Depth > 0.89" for 2-Year event
 Inflow = 0.69 cfs @ 12.13 hrs, Volume= 0.082 af
 Outflow = 0.18 cfs @ 12.86 hrs, Volume= 0.077 af, Atten= 74%, Lag= 43.8 min
 Discarded = 0.00 cfs @ 12.86 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.18 cfs @ 12.86 hrs, Volume= 0.077 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 11.88' @ 12.86 hrs Surf.Area= 3,232 sf Storage= 827 cf

Plug-Flow detention time=63.1 min calculated for 0.077 af (94% of inflow)

Center-of-Mass det. time= 43.3 min (911.2 - 867.9)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 12.86 hrs HW=11.88' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)**Secondary OutFlow** Max=0.18 cfs @ 12.86 hrs HW=11.88' TW=3.15' (Dynamic Tailwater)↑**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 2.56 fps)**Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster**

Inflow Area = 1.159 ac, 49.18% Impervious, Inflow Depth > 0.86" for 2-Year event
 Inflow = 0.20 cfs @ 12.38 hrs, Volume= 0.083 af
 Outflow = 0.20 cfs @ 12.38 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.20 cfs @ 12.38 hrs, Volume= 0.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Bayside Anchor Post Development

Type III 24-hr 2-Year Rainfall=3.00"

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Peak Elev= 3.16' @ 12.38 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long 44" Sewer CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.20 cfs @ 12.38 hrs HW=3.16' (Free Discharge)↑**1=44" Sewer** (Barrel Controls 0.20 cfs @ 2.00 fps)**Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain**

Inflow Area = 0.053 ac, 61.76% Impervious, Inflow Depth > 1.44" for 2-Year event
 Inflow = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af
 Outflow = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 7.15' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.09 cfs @ 12.09 hrs HW=7.15' TW=3.15' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.09 cfs @ 1.78 fps)**Summary for Pond 6P: R-Tank System with Flow Control Structure**

Inflow Area = 0.269 ac, 100.00% Impervious, Inflow Depth > 2.64" for 2-Year event
 Inflow = 0.78 cfs @ 12.08 hrs, Volume= 0.059 af
 Outflow = 0.08 cfs @ 12.86 hrs, Volume= 0.040 af, Atten= 90%, Lag= 46.4 min
 Discarded = 0.01 cfs @ 7.11 hrs, Volume= 0.008 af
 Primary = 0.07 cfs @ 12.86 hrs, Volume= 0.032 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 18.05' @ 12.86 hrs Surf.Area= 0.022 ac Storage= 0.035 af

Flood Elev= 19.90' Surf.Area= 0.022 ac Storage= 0.053 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 150.6 min (880.6 - 729.9)

Volume	Invert	Avail.Storage	Storage Description
#1	16.31'	0.009 af	14.00'W x 21.00'L x 1.44'H R-Tank 1.44' 0.010 af Overall x 95.0% Voids
#2	16.31'	0.044 af	26.00'W x 26.00'L x 3.00'H R-Tank 2.82' 0.047 af Overall x 95.0% Voids
		0.053 af	Total Available Storage

Bayside Anchor Post Development

Type III 24-hr 2-Year Rainfall=3.00"

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Device	Routing	Invert	Outlet Devices
#1	Primary	16.90'	1.5" Vert. 1.5" Orifice C= 0.600
#2	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#3	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#4	Primary	18.50'	3.0" Vert. 3" Orifice C= 0.600
#5	Secondary	19.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#6	Discarded	16.31'	0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 7.11 hrs HW=16.35' (Free Discharge)

↑ **6=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.07 cfs @ 12.86 hrs HW=18.05' TW=13.01' (Dynamic Tailwater)

↑ **1=1.5" Orifice** (Orifice Controls 0.06 cfs @ 5.03 fps)

└ **2=2" Orifice** (Orifice Controls 0.00 cfs @ 0.78 fps)

└ **3=2" Orifice** (Orifice Controls 0.00 cfs @ 0.78 fps)

└ **4=3" Orifice** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.31' TW=13.00' (Dynamic Tailwater)

↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Bayside Anchor Post Development

Type III 24-hr 10-Year Rainfall=4.70"

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Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Building and Patio Runoff Area=11,705 sf 100.00% Impervious Runoff Depth>4.26"
Flow Length=33' Slope=0.0200 ' ' Tc=6.0 min CN=98 Runoff=1.23 cfs 0.095 af

Subcatchment2S: Lawn and Ramp Area Runoff Area=2,007 sf 56.35% Impervious Runoff Depth>2.63"
Flow Length=44' Slope=0.0800 ' ' Tc=6.0 min CN=82 Runoff=0.15 cfs 0.010 af

Subcatchment3S: Down Slope Grass Area Runoff Area=3,677 sf 5.30% Impervious Runoff Depth>1.20"
Flow Length=32' Slope=0.0900 ' ' Tc=6.0 min CN=63 Runoff=0.12 cfs 0.008 af

Subcatchment4S: Up Slope Grass Area Runoff Area=2,439 sf 16.97% Impervious Runoff Depth>1.33"
Flow Length=103' Tc=6.0 min CN=65 Runoff=0.09 cfs 0.006 af

Subcatchment5S: Sidewalk Adjacent to Runoff Area=284 sf 100.00% Impervious Runoff Depth>4.26"
Flow Length=5' Slope=0.0200 ' ' Tc=6.0 min CN=98 Runoff=0.03 cfs 0.002 af

Subcatchment6S: PHA Property Draining Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>1.89"
Flow Length=103' Tc=8.1 min CN=73 Runoff=1.54 cfs 0.110 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.04' Max Vel=1.17 fps Inflow=0.49 cfs 0.079 af
n=0.015 L=20.0' S=0.0100 ' ' Capacity=121.86 cfs Outflow=0.49 cfs 0.079 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=12.39' Storage=3,356 cf Inflow=1.94 cfs 0.189 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Secondary=0.30 cfs 0.173 af Outflow=0.30 cfs 0.174 af

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.21' Inflow=0.39 cfs 0.186 af
44.0" x 100.0' Culvert Outflow=0.39 cfs 0.186 af

Pond 4P: ANALYSISPOINT A: 15" Storm drain Peak Elev=7.20' Inflow=0.18 cfs 0.012 af
15.0" x 25.0' Culvert Outflow=0.18 cfs 0.012 af

Pond 6P: R-Tank System with Flow Control Peak Elev=18.88' Storage=0.047 af Inflow=1.23 cfs 0.095 af
Discarded=0.01 cfs 0.009 af Primary=0.39 cfs 0.064 af Secondary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.073 af

Total Runoff Area = 1.159 ac Runoff Volume = 0.232 af Average Runoff Depth = 2.40"
50.82% Pervious = 0.589 ac 49.18% Impervious = 0.570 ac

Bayside Anchor Post Development

Type III 24-hr 10-Year Rainfall=4.70"

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Summary for Subcatchment 1S: Building and Patio Area

Runoff = 1.23 cfs @ 12.08 hrs, Volume= 0.095 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
11,705	98	Paved parking & roofs
11,705		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0200	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.00"
0.5	33	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Lawn and Ramp Area

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.010 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
1,131	98	Paved parking & roofs
876	61	>75% Grass cover, Good, HSG B
2,007	82	Weighted Average
876		Pervious Area
1,131		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	44	0.0800	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
3.0	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Down Slope Grass Area

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.008 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
195	98	Paved parking & roofs
3,482	61	>75% Grass cover, Good, HSG B
3,677	63	Weighted Average
3,482		Pervious Area
195		Impervious Area

Bayside Anchor Post Development

Type III 24-hr 10-Year Rainfall=4.70"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
2.2	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S: Up Slope Grass Area and Path

Runoff = 0.09 cfs @ 12.10 hrs, Volume= 0.006 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
414	98	Paved parking & roofs
1,755	61	>75% Grass cover, Good, HSG B
270	39	>75% Grass cover, Good, HSG A
2,439	65	Weighted Average
2,025		Pervious Area
414		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.4	71	0.0500	3.35		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
2.6	103	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 5S: Sidewalk Adjacent to Building

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 0.002 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
284	98	Paved parking & roofs
284		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.73		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
0.1	5	Total, Increased to minimum Tc = 6.0 min			

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Type III 24-hr 10-Year Rainfall=4.70"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 1.54 cfs @ 12.12 hrs, Volume= 0.110 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.409 ac, 69.10% Impervious, Inflow Depth > 2.32" for 10-Year event

Inflow = 0.49 cfs @ 12.30 hrs, Volume= 0.079 af

Outflow = 0.49 cfs @ 12.30 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Max. Velocity= 1.17 fps, Min. Travel Time= 0.3 min

Avg. Velocity= 0.60 fps, Avg. Travel Time= 0.6 min

Peak Storage= 8 cf @ 12.30 hrs, Average Depth at Peak Storage= 0.04'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



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Type III 24-hr 10-Year Rainfall=4.70"

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Summary for Pond 2P: Low Area on Downhill PHA Property

Inflow Area = 1.106 ac, 48.58% Impervious, Inflow Depth > 2.05" for 10-Year event
 Inflow = 1.94 cfs @ 12.12 hrs, Volume= 0.189 af
 Outflow = 0.30 cfs @ 13.53 hrs, Volume= 0.174 af, Atten= 84%, Lag= 84.6 min
 Discarded = 0.00 cfs @ 13.53 hrs, Volume= 0.001 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.30 cfs @ 13.53 hrs, Volume= 0.173 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 12.39' @ 13.53 hrs Surf.Area= 6,664 sf Storage= 3,356 cf

Plug-Flow detention time= 134.7 min calculated for 0.174 af (92% of inflow)

Center-of-Mass det. time= 109.0 min (934.1 - 825.1)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 13.53 hrs HW=12.39' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)**Secondary OutFlow** Max=0.30 cfs @ 13.53 hrs HW=12.39' TW=3.19' (Dynamic Tailwater)↑**2=Orifice/Grate** (Orifice Controls 0.30 cfs @ 4.28 fps)**Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster**

Inflow Area = 1.159 ac, 49.18% Impervious, Inflow Depth > 1.92" for 10-Year event
 Inflow = 0.39 cfs @ 12.10 hrs, Volume= 0.186 af
 Outflow = 0.39 cfs @ 12.10 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.39 cfs @ 12.10 hrs, Volume= 0.186 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

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Peak Elev= 3.21' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long 44" Sewer CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100'/' Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.39 cfs @ 12.10 hrs HW=3.21' (Free Discharge)↑**1=44" Sewer** (Inlet Controls 0.39 cfs @ 1.57 fps)**Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain**

Inflow Area = 0.053 ac, 61.76% Impervious, Inflow Depth > 2.83" for 10-Year event
 Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.012 af
 Outflow = 0.18 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.18 cfs @ 12.09 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 7.20' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100'/' Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.18 cfs @ 12.09 hrs HW=7.20' TW=3.21' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.18 cfs @ 2.12 fps)**Summary for Pond 6P: R-Tank System with Flow Control Structure**

Inflow Area = 0.269 ac, 100.00% Impervious, Inflow Depth > 4.26" for 10-Year event
 Inflow = 1.23 cfs @ 12.08 hrs, Volume= 0.095 af
 Outflow = 0.40 cfs @ 12.37 hrs, Volume= 0.073 af, Atten= 68%, Lag= 17.5 min
 Discarded = 0.01 cfs @ 4.70 hrs, Volume= 0.009 af
 Primary = 0.39 cfs @ 12.37 hrs, Volume= 0.064 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 18.88' @ 12.37 hrs Surf.Area= 0.022 ac Storage= 0.047 af

Flood Elev= 19.90' Surf.Area= 0.022 ac Storage= 0.053 af

Plug-Flow detention time= 175.2 min calculated for 0.073 af (76% of inflow)

Center-of-Mass det. time= 112.4 min (834.0 - 721.6)

Volume	Invert	Avail.Storage	Storage Description
#1	16.31'	0.009 af	14.00'W x 21.00'L x 1.44'H R-Tank 1.44' 0.010 af Overall x 95.0% Voids
#2	16.31'	0.044 af	26.00'W x 26.00'L x 3.00'H R-Tank 2.82' 0.047 af Overall x 95.0% Voids
		0.053 af	Total Available Storage

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Device	Routing	Invert	Outlet Devices
#1	Primary	16.90'	1.5" Vert. 1.5" Orifice C= 0.600
#2	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#3	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#4	Primary	18.50'	3.0" Vert. 3" Orifice C= 0.600
#5	Secondary	19.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#6	Discarded	16.31'	0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 4.70 hrs HW=16.35' (Free Discharge)

↑ **6=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.39 cfs @ 12.37 hrs HW=18.88' TW=13.04' (Dynamic Tailwater)

↑ **1=1.5" Orifice** (Orifice Controls 0.08 cfs @ 6.67 fps)

└ **2=2" Orifice** (Orifice Controls 0.09 cfs @ 4.31 fps)

└ **3=2" Orifice** (Orifice Controls 0.09 cfs @ 4.31 fps)

└ **4=3" Orifice** (Orifice Controls 0.12 cfs @ 2.45 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.31' TW=13.00' (Dynamic Tailwater)

↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

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Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Building and Patio Runoff Area=11,705 sf 100.00% Impervious Runoff Depth>5.02"
Flow Length=33' Slope=0.0200 ' ' Tc=6.0 min CN=98 Runoff=1.45 cfs 0.112 af

Subcatchment2S: Lawn and Ramp Area Runoff Area=2,007 sf 56.35% Impervious Runoff Depth>3.31"
Flow Length=44' Slope=0.0800 ' ' Tc=6.0 min CN=82 Runoff=0.19 cfs 0.013 af

Subcatchment3S: Down Slope Grass Area Runoff Area=3,677 sf 5.30% Impervious Runoff Depth>1.67"
Flow Length=32' Slope=0.0900 ' ' Tc=6.0 min CN=63 Runoff=0.17 cfs 0.012 af

Subcatchment4S: Up Slope Grass Area Runoff Area=2,439 sf 16.97% Impervious Runoff Depth>1.83"
Flow Length=103' Tc=6.0 min CN=65 Runoff=0.13 cfs 0.009 af

Subcatchment5S: Sidewalk Adjacent to Runoff Area=284 sf 100.00% Impervious Runoff Depth>5.02"
Flow Length=5' Slope=0.0200 ' ' Tc=6.0 min CN=98 Runoff=0.04 cfs 0.003 af

Subcatchment6S: PHA Property Draining Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>2.48"
Flow Length=103' Tc=8.1 min CN=73 Runoff=2.03 cfs 0.144 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.06' Max Vel=1.44 fps Inflow=0.85 cfs 0.100 af
n=0.015 L=20.0' S=0.0100 ' ' Capacity=121.86 cfs Outflow=0.85 cfs 0.100 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=12.59' Storage=4,813 cf Inflow=2.70 cfs 0.244 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Secondary=0.34 cfs 0.209 af Outflow=0.34 cfs 0.210 af

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.23' Inflow=0.46 cfs 0.225 af
44.0" x 100.0' Culvert Outflow=0.46 cfs 0.225 af

Pond 4P: ANALYSISPOINT A: 15" Storm drain Peak Elev=7.23' Inflow=0.22 cfs 0.015 af
15.0" x 25.0' Culvert Outflow=0.22 cfs 0.015 af

Pond 6P: R-Tank System with Flow Control Peak Elev=19.16' Storage=0.051 af Inflow=1.45 cfs 0.112 af
Discarded=0.01 cfs 0.009 af Primary=0.48 cfs 0.078 af Secondary=0.20 cfs 0.002 af Outflow=0.68 cfs 0.089 af

Total Runoff Area = 1.159 ac Runoff Volume = 0.292 af Average Runoff Depth = 3.03"
50.82% Pervious = 0.589 ac 49.18% Impervious = 0.570 ac

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Type III 24-hr 25-Year Rainfall=5.50"

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Summary for Subcatchment 1S: Building and Patio Area

Runoff = 1.45 cfs @ 12.08 hrs, Volume= 0.112 af, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
11,705	98	Paved parking & roofs
11,705		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0200	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.00"
0.5	33	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Lawn and Ramp Area

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.013 af, Depth> 3.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
1,131	98	Paved parking & roofs
876	61	>75% Grass cover, Good, HSG B
2,007	82	Weighted Average
876		Pervious Area
1,131		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	44	0.0800	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
3.0	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Down Slope Grass Area

Runoff = 0.17 cfs @ 12.10 hrs, Volume= 0.012 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
195	98	Paved parking & roofs
3,482	61	>75% Grass cover, Good, HSG B
3,677	63	Weighted Average
3,482		Pervious Area
195		Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
2.2	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S: Up Slope Grass Area and Path

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
414	98	Paved parking & roofs
1,755	61	>75% Grass cover, Good, HSG B
270	39	>75% Grass cover, Good, HSG A
2,439	65	Weighted Average
2,025		Pervious Area
414		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.4	71	0.0500	3.35		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
2.6	103	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 5S: Sidewalk Adjacent to Building

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 0.003 af, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
284	98	Paved parking & roofs
284		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.73		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
0.1	5	Total, Increased to minimum Tc = 6.0 min			

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Type III 24-hr 25-Year Rainfall=5.50"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 2.03 cfs @ 12.12 hrs, Volume= 0.144 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.409 ac, 69.10% Impervious, Inflow Depth > 2.94" for 25-Year event

Inflow = 0.85 cfs @ 12.23 hrs, Volume= 0.100 af

Outflow = 0.85 cfs @ 12.24 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Max. Velocity= 1.44 fps, Min. Travel Time= 0.2 min

Avg. Velocity = 0.62 fps, Avg. Travel Time= 0.5 min

Peak Storage= 12 cf @ 12.24 hrs, Average Depth at Peak Storage= 0.06'

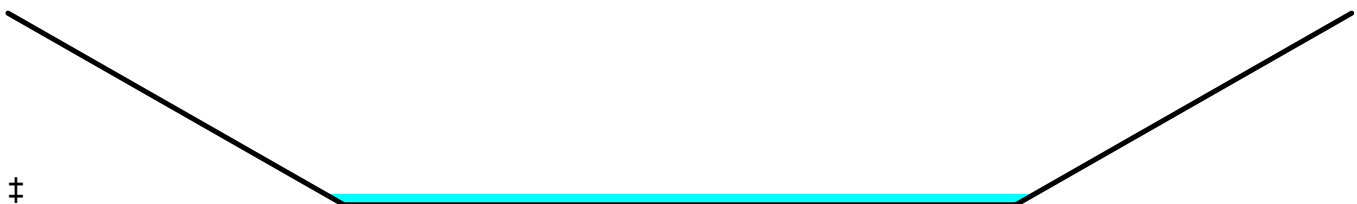
Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



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Type III 24-hr 25-Year Rainfall=5.50"

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Summary for Pond 2P: Low Area on Downhill PHA Property

Inflow Area = 1.106 ac, 48.58% Impervious, Inflow Depth > 2.65" for 25-Year event
 Inflow = 2.70 cfs @ 12.12 hrs, Volume= 0.244 af
 Outflow = 0.34 cfs @ 13.70 hrs, Volume= 0.210 af, Atten= 87%, Lag= 94.7 min
 Discarded = 0.00 cfs @ 13.70 hrs, Volume= 0.001 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.34 cfs @ 13.70 hrs, Volume= 0.209 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 12.59' @ 13.70 hrs Surf.Area= 7,860 sf Storage= 4,813 cf

Plug-Flow detention time= 165.2 min calculated for 0.210 af (86% of inflow)

Center-of-Mass det. time= 122.2 min (936.6 - 814.3)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 13.70 hrs HW=12.59' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=11.10' TW=3.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)**Secondary OutFlow** Max=0.34 cfs @ 13.70 hrs HW=12.59' TW=3.20' (Dynamic Tailwater)↑**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 4.79 fps)**Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster**

Inflow Area = 1.159 ac, 49.18% Impervious, Inflow Depth > 2.33" for 25-Year event
 Inflow = 0.46 cfs @ 12.10 hrs, Volume= 0.225 af
 Outflow = 0.46 cfs @ 12.10 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.46 cfs @ 12.10 hrs, Volume= 0.225 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Bayside Anchor Post Development

Type III 24-hr 25-Year Rainfall=5.50"

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Peak Elev= 3.23' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long 44" Sewer CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.46 cfs @ 12.10 hrs HW=3.23' (Free Discharge)↑**1=44" Sewer** (Inlet Controls 0.46 cfs @ 1.64 fps)**Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain**

Inflow Area = 0.053 ac, 61.76% Impervious, Inflow Depth > 3.52" for 25-Year event
 Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.015 af
 Outflow = 0.22 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.22 cfs @ 12.09 hrs, Volume= 0.015 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 7.23' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100 '/ Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.22 cfs @ 12.09 hrs HW=7.23' TW=3.23' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.22 cfs @ 2.23 fps)**Summary for Pond 6P: R-Tank System with Flow Control Structure**

Inflow Area = 0.269 ac, 100.00% Impervious, Inflow Depth > 5.02" for 25-Year event
 Inflow = 1.45 cfs @ 12.08 hrs, Volume= 0.112 af
 Outflow = 0.68 cfs @ 12.24 hrs, Volume= 0.089 af, Atten= 53%, Lag= 9.4 min
 Discarded = 0.01 cfs @ 3.99 hrs, Volume= 0.009 af
 Primary = 0.48 cfs @ 12.24 hrs, Volume= 0.078 af
 Secondary = 0.20 cfs @ 12.24 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 19.16' @ 12.24 hrs Surf.Area= 0.022 ac Storage= 0.051 af

Flood Elev= 19.90' Surf.Area= 0.022 ac Storage= 0.053 af

Plug-Flow detention time= 161.4 min calculated for 0.089 af (79% of inflow)

Center-of-Mass det. time= 102.0 min (821.0 - 719.1)

Volume	Invert	Avail.Storage	Storage Description
#1	16.31'	0.009 af	14.00'W x 21.00'L x 1.44'H R-Tank 1.44' 0.010 af Overall x 95.0% Voids
#2	16.31'	0.044 af	26.00'W x 26.00'L x 3.00'H R-Tank 2.82' 0.047 af Overall x 95.0% Voids
		0.053 af	Total Available Storage

Bayside Anchor Post Development

Type III 24-hr 25-Year Rainfall=5.50"

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Device	Routing	Invert	Outlet Devices
#1	Primary	16.90'	1.5" Vert. 1.5" Orifice C= 0.600
#2	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#3	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#4	Primary	18.50'	3.0" Vert. 3" Orifice C= 0.600
#5	Secondary	19.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#6	Discarded	16.31'	0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 3.99 hrs HW=16.35' (Free Discharge)

↑ **6=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.48 cfs @ 12.24 hrs HW=19.16' TW=13.06' (Dynamic Tailwater)

↑ **1=1.5" Orifice** (Orifice Controls 0.09 cfs @ 7.14 fps)

└ **2=2" Orifice** (Orifice Controls 0.11 cfs @ 5.00 fps)

└ **3=2" Orifice** (Orifice Controls 0.11 cfs @ 5.00 fps)

└ **4=3" Orifice** (Orifice Controls 0.17 cfs @ 3.53 fps)

Secondary OutFlow Max=0.20 cfs @ 12.24 hrs HW=19.16' TW=13.06' (Dynamic Tailwater)

↑ **5=Sharp-Crested Rectangular Weir**(Weir Controls 0.20 cfs @ 0.81 fps)

Bayside Anchor Post Development

Type III 24-hr 100-Year Rainfall=6.70"

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Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Building and Patio Runoff Area=11,705 sf 100.00% Impervious Runoff Depth>6.17"
Flow Length=33' Slope=0.0200 ' ' Tc=6.0 min CN=98 Runoff=1.77 cfs 0.138 af

Subcatchment2S: Lawn and Ramp Area Runoff Area=2,007 sf 56.35% Impervious Runoff Depth>4.36"
Flow Length=44' Slope=0.0800 ' ' Tc=6.0 min CN=82 Runoff=0.25 cfs 0.017 af

Subcatchment3S: Down Slope Grass Area Runoff Area=3,677 sf 5.30% Impervious Runoff Depth>2.46"
Flow Length=32' Slope=0.0900 ' ' Tc=6.0 min CN=63 Runoff=0.26 cfs 0.017 af

Subcatchment4S: Up Slope Grass Area Runoff Area=2,439 sf 16.97% Impervious Runoff Depth>2.65"
Flow Length=103' Tc=6.0 min CN=65 Runoff=0.19 cfs 0.012 af

Subcatchment5S: Sidewalk Adjacent to Runoff Area=284 sf 100.00% Impervious Runoff Depth>6.17"
Flow Length=5' Slope=0.0200 ' ' Tc=6.0 min CN=98 Runoff=0.04 cfs 0.003 af

Subcatchment6S: PHA Property Draining Runoff Area=30,378 sf 36.55% Impervious Runoff Depth>3.42"
Flow Length=103' Tc=8.1 min CN=73 Runoff=2.80 cfs 0.199 af

Reach 1R: ANALYSISPOINT B: Grassed Avg. Depth=0.09' Max Vel=1.97 fps Inflow=1.90 cfs 0.133 af
n=0.015 L=20.0' S=0.0100 ' ' Capacity=121.86 cfs Outflow=1.90 cfs 0.133 af

Pond 2P: Low Area on Downhill PHA Property Peak Elev=12.70' Storage=5,712 cf Inflow=4.68 cfs 0.332 af
Discarded=0.00 cfs 0.001 af Primary=0.81 cfs 0.055 af Secondary=0.36 cfs 0.229 af Outflow=1.17 cfs 0.285 af

Pond 3P: ANALYSISPOINT C : 44" Sewer along Lancaster Peak Elev=3.38' Inflow=1.22 cfs 0.304 af
44.0" x 100.0' Culvert Outflow=1.22 cfs 0.304 af

Pond 4P: ANALYSISPOINT A: 15" Storm drain Peak Elev=7.26' Inflow=0.29 cfs 0.020 af
15.0" x 25.0' Culvert Outflow=0.29 cfs 0.020 af

Pond 6P: R-Tank System with Flow Control Peak Elev=19.28' Storage=0.053 af Inflow=1.77 cfs 0.138 af
Discarded=0.01 cfs 0.009 af Primary=0.51 cfs 0.090 af Secondary=0.99 cfs 0.013 af Outflow=1.51 cfs 0.112 af

Total Runoff Area = 1.159 ac Runoff Volume = 0.387 af Average Runoff Depth = 4.01"
50.82% Pervious = 0.589 ac 49.18% Impervious = 0.570 ac

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Type III 24-hr 100-Year Rainfall=6.70"

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Summary for Subcatchment 1S: Building and Patio Area

Runoff = 1.77 cfs @ 12.08 hrs, Volume= 0.138 af, Depth> 6.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
11,705	98	Paved parking & roofs
11,705		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0200	1.07		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.00"
0.5	33	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Lawn and Ramp Area

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
1,131	98	Paved parking & roofs
876	61	>75% Grass cover, Good, HSG B
2,007	82	Weighted Average
876		Pervious Area
1,131		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	44	0.0800	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
3.0	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Down Slope Grass Area

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
195	98	Paved parking & roofs
3,482	61	>75% Grass cover, Good, HSG B
3,677	63	Weighted Average
3,482		Pervious Area
195		Impervious Area

Bayside Anchor Post Development

Type III 24-hr 100-Year Rainfall=6.70"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
2.2	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S: Up Slope Grass Area and Path

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
414	98	Paved parking & roofs
1,755	61	>75% Grass cover, Good, HSG B
270	39	>75% Grass cover, Good, HSG A
2,439	65	Weighted Average
2,025		Pervious Area
414		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	32	0.0900	0.24		Sheet Flow, AB Grass: Short n= 0.150 P2= 3.00"
0.4	71	0.0500	3.35		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
2.6	103	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 5S: Sidewalk Adjacent to Building

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 0.003 af, Depth> 6.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
284	98	Paved parking & roofs
284		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.73		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 3.00"
0.1	5	Total, Increased to minimum Tc = 6.0 min			

Bayside Anchor Post Development

Type III 24-hr 100-Year Rainfall=6.70"

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Summary for Subcatchment 6S: PHA Property Draining to Low Area

Runoff = 2.80 cfs @ 12.12 hrs, Volume= 0.199 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
11,102	98	Paved parking & roofs
2,539	39	>75% Grass cover, Good, HSG A
16,737	61	>75% Grass cover, Good, HSG B
30,378	73	Weighted Average
19,276		Pervious Area
11,102		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.00"
0.4	53	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.1	103	Total			

Summary for Reach 1R: ANALYSIS POINT B: Grassed Swale

Inflow Area = 0.409 ac, 69.10% Impervious, Inflow Depth > 3.91" for 100-Year event

Inflow = 1.90 cfs @ 12.13 hrs, Volume= 0.133 af

Outflow = 1.90 cfs @ 12.13 hrs, Volume= 0.133 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Max. Velocity= 1.97 fps, Min. Travel Time= 0.2 min

Avg. Velocity = 0.66 fps, Avg. Travel Time= 0.5 min

Peak Storage= 19 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.09'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 121.86 cfs

10.00' x 1.00' deep channel, n= 0.015 Brickwork

Side Slope Z-value= 5.0 ' ' Top Width= 20.00'

Length= 20.0' Slope= 0.0100 ' '

Inlet Invert= 13.00', Outlet Invert= 12.80'



Summary for Pond 2P: Low Area on Downhill PHA Property

Inflow Area = 1.106 ac, 48.58% Impervious, Inflow Depth > 3.60" for 100-Year event
 Inflow = 4.68 cfs @ 12.12 hrs, Volume= 0.332 af
 Outflow = 1.17 cfs @ 12.56 hrs, Volume= 0.285 af, Atten= 75%, Lag= 26.2 min
 Discarded = 0.00 cfs @ 12.56 hrs, Volume= 0.001 af
 Primary = 0.81 cfs @ 12.56 hrs, Volume= 0.055 af
 Secondary = 0.36 cfs @ 12.56 hrs, Volume= 0.229 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 12.70' @ 12.56 hrs Surf.Area= 8,438 sf Storage= 5,712 cf

Plug-Flow detention time= 139.4 min calculated for 0.285 af (86% of inflow)

Center-of-Mass det. time= 96.4 min (898.8 - 802.3)

Volume	Invert	Avail.Storage	Storage Description
#1	11.10'	8,461 cf	Custom Stage Data (Prismatic) listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
11.10	50	0	0
11.50	507	111	111
12.00	4,064	1,143	1,254
12.50	7,381	2,861	4,115
13.00	10,000	4,345	8,461

Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Secondary	11.60'	0.6" Horiz. Orifice/Grate X 36.00 Limited to weir flow C= 0.600
#3	Discarded	11.10'	0.010 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 12.56 hrs HW=12.70' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.81 cfs @ 12.56 hrs HW=12.70' TW=3.38' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir**(Weir Controls 0.81 cfs @ 0.79 fps)

Secondary OutFlow Max=0.36 cfs @ 12.56 hrs HW=12.70' TW=3.38' (Dynamic Tailwater)

↑**2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 5.05 fps)

Summary for Pond 3P: ANALYSIS POINT C : 44" Sewer along Lancaster

Inflow Area = 1.159 ac, 49.18% Impervious, Inflow Depth > 3.15" for 100-Year event
 Inflow = 1.22 cfs @ 12.55 hrs, Volume= 0.304 af
 Outflow = 1.22 cfs @ 12.55 hrs, Volume= 0.304 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.22 cfs @ 12.55 hrs, Volume= 0.304 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

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Type III 24-hr 100-Year Rainfall=6.70"

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Peak Elev= 3.38' @ 12.55 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	44.0" x 100.0' long 44" Sewer CPP, square edge headwall, Ke= 0.500 Outlet Invert= 2.00' S= 0.0100'/' Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=1.22 cfs @ 12.55 hrs HW=3.38' (Free Discharge)↑**1=44" Sewer** (Inlet Controls 1.22 cfs @ 2.10 fps)**Summary for Pond 4P: ANALYSIS POINT A: 15" Stormdrain**

Inflow Area = 0.053 ac, 61.76% Impervious, Inflow Depth > 4.58" for 100-Year event
 Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.020 af
 Outflow = 0.29 cfs @ 12.09 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.29 cfs @ 12.09 hrs, Volume= 0.020 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 7.26' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	7.00'	15.0" x 25.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 6.75' S= 0.0100'/' Cc= 0.900 n= 0.013 Clay tile

Primary OutFlow Max=0.29 cfs @ 12.09 hrs HW=7.26' TW=3.26' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.29 cfs @ 2.38 fps)**Summary for Pond 6P: R-Tank System with Flow Control Structure**

Inflow Area = 0.269 ac, 100.00% Impervious, Inflow Depth > 6.17" for 100-Year event
 Inflow = 1.77 cfs @ 12.08 hrs, Volume= 0.138 af
 Outflow = 1.51 cfs @ 12.13 hrs, Volume= 0.112 af, Atten= 15%, Lag= 3.0 min
 Discarded = 0.01 cfs @ 3.21 hrs, Volume= 0.009 af
 Primary = 0.51 cfs @ 12.13 hrs, Volume= 0.090 af
 Secondary = 0.99 cfs @ 12.13 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 19.28' @ 12.13 hrs Surf.Area= 0.022 ac Storage= 0.053 af

Flood Elev= 19.90' Surf.Area= 0.022 ac Storage= 0.053 af

Plug-Flow detention time= 144.7 min calculated for 0.112 af (81% of inflow)

Center-of-Mass det. time= 89.4 min (805.6 - 716.2)

Volume	Invert	Avail.Storage	Storage Description
#1	16.31'	0.009 af	14.00'W x 21.00'L x 1.44'H R-Tank 1.44' 0.010 af Overall x 95.0% Voids
#2	16.31'	0.044 af	26.00'W x 26.00'L x 3.00'H R-Tank 2.82' 0.047 af Overall x 95.0% Voids
		0.053 af	Total Available Storage

Bayside Anchor Post Development

Type III 24-hr 100-Year Rainfall=6.70"

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Device	Routing	Invert	Outlet Devices
#1	Primary	16.90'	1.5" Vert. 1.5" Orifice C= 0.600
#2	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#3	Primary	18.00'	2.0" Vert. 2" Orifice C= 0.600
#4	Primary	18.50'	3.0" Vert. 3" Orifice C= 0.600
#5	Secondary	19.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#6	Discarded	16.31'	0.250 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 3.21 hrs HW=16.35' (Free Discharge)

↑ **6=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.51 cfs @ 12.13 hrs HW=19.28' TW=13.09' (Dynamic Tailwater)

↑ **1=1.5" Orifice** (Orifice Controls 0.09 cfs @ 7.33 fps)

└ **2=2" Orifice** (Orifice Controls 0.11 cfs @ 5.27 fps)

└ **3=2" Orifice** (Orifice Controls 0.11 cfs @ 5.27 fps)

└ **4=3" Orifice** (Orifice Controls 0.19 cfs @ 3.90 fps)

Secondary OutFlow Max=0.98 cfs @ 12.13 hrs HW=19.28' TW=13.09' (Dynamic Tailwater)

↑ **5=Sharp-Crested Rectangular Weir**(Weir Controls 0.98 cfs @ 1.38 fps)

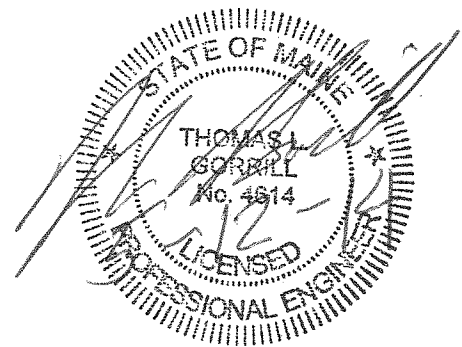
TRAFFIC AND PARKING MANAGEMENT

**Traffic Forecast, Parking
Assessment and TDM
Plan
for
Bayside Anchor
Portland, Maine**

Prepared for:

**Portland Housing Corporation
14 Baxter Blvd
Portland, ME 04101**

May 2014



Prepared by:



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**Traffic Forecast, Parking Study and Transportation Demand Management Plan
Bayside Anchor
Portland, Maine**

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Appendix

Maine DOT Crash Data
Trip Generation Calculations
Parking Summary Data

Executive Summary

The following Executive Summary is prepared for the reader's convenience, but is not intended to be a substitute for reading the full report.

Gorrill-Palmer Consulting Engineers, Inc. was retained by Portland Housing Corporation (PHA) to prepare this traffic forecast, parking study and Transportation Demand Management Plan for their proposed Bayside Anchor project. The project consists of 45 residential units, including 36 affordable units, a relocated head start program, administration offices for Portland Housing and a neighborhood police office. The site is located in the northwest quadrant of the intersection of Oxford and Boyd Streets. The site currently consists of a 26 space paved parking lot. Based on this study, our office has determined the following:

1. The proposed development is forecast to generate 24 and 29 trip ends in the weekday AM and PM peak hours respectively. (Note: A trip end is either a trip in or out of the site. Thus a round trip would equal two trip ends). At this level of trip generation, this project does **not** require a Maine Department of Transportation (MaineDOT) Traffic Movement Permit.
2. Gorrill-Palmer Consulting Engineers, Inc. referenced the Maine DOT collision records to determine if there were any high crash locations in the project vicinity. No high crash locations were identified in the vicinity of the project site.
3. Gorrill-Palmer Consulting Engineers, Inc. completed a parking inventory of the East Bayside Portland Housing Authority Properties. Based on this study, we found that there is sufficient parking within this "campus" area to accommodate the additional uses proposed with this project.
4. PHA is proposing a Transportation Demand Management (TDM) Plan which will support the City's transportation and environmental sustainability goals by encouraging and promoting bicycling, walking, and use of transit.

Based on these findings, it is the opinion of Gorrill-Palmer Consulting Engineers, Inc. that the proposed project can be accommodated by the City's transportation system.

I. *Existing and Proposed Site*

The proposed site is located on the northwest quadrant of the intersection of Oxford Street and Boyd Street in Portland. The site currently consists of a paved 26 space parking lot.

Proposed for the site are 45 units of residential housing including 36 affordable units, a relocated head start program, administration offices for Portland Housing and a neighborhood police office. Parking for the project will be accommodated within the existing parking lots on the PHA properties and on street.

II. *Background Conditions*

Gorrill-Palmer Consulting Engineers, Inc. based the study on the following information:

- A site plan prepared by Carroll Associates.
- Crash data for 2010-2012 provided by the Maine Department of Transportation.
- Parking inventory performed at the existing East Bayside PHA properties, the adjacent streets, and at similar projects in Portland.

III. *Trip Generation*

Gorrill-Palmer Consulting Engineers, Inc. used the Institute of Transportation Engineers (ITE) publication *Trip Generation*, 9th Edition to estimate the potential trip generation for each land use component of the proposed building.

Apartments: The proposed project will have 45 units with 36 of those being affordable. The project includes 5 efficiency units, 34 one bedroom and 6 two bedroom units. Based on Land Use Code (LUC) 220, Apartment, with 45 units, the proposed housing is anticipated to generate the following trips (note- a trip end is a trip into or out of the site; thus a round trip is equal to two trip ends):

Weekday	396 trip ends
AM Peak Hour	26 trip ends
PM Peak Hour	42 trip ends

ITE trip rates are based on surveys of predominantly ~~suburban~~ suburban locations rather than urban. In addition, these surveys do not take into account the high percentage of affordable units which typically have less cars. Therefore, our office reviewed a trip generation count we had on file for Pearl Place which was taken on Tuesday, October 5, 2010 from 3:30 to 5:30. Based upon the counts, the actual trip generation was low; only twenty peak hour trips were recorded at the site driveway for the 60 units in place when the count was done, and no on-street parking associated with the facility was observed during the count. It should be noted that significant pedestrian trips to and from the site were observed which is also anticipated for the Bayside Anchor project. This results in a

PM peak hour trip rate of .33 for this existing facility. Applying this rate to the proposed 45 units yields 15 trip ends during the PM peak hour.

Given these results and the fact that the project is in an urban area, that 80 % of the units will be affordable, and that the area is very bikeable and walkable, our office has reduced the rates derived from the ITE LUC 220 for apartments by 50% resulting in the following forecast for the housing component of the project:

Weekday	198 trip ends
AM Peak Hour	13 trip ends
PM Peak Hour	21 trip ends

Head Start Program: The head start program anticipates that there will be 17 children enrolled with three staff during the school year only. Based on Land Use Code (LUC) 520, Elementary School with 17 students, the proposed head start is anticipated to generate the following trips:

Weekday	22 trip ends
AM Peak Hour	8 trip ends
PM Peak Hour	5 trip ends

This estimate is likely high given that many of the students who will be attending are living in the neighborhood and will walk.

Offices: The Portland Housing Authority office and a community police station will also be located within the building. The total square footage of these two uses combined is 1502. Based on Land Use Code (LUC) 715, Single Tenant Office Building with 1502 square feet, the proposed office component of the building is anticipated to generate the following trips:

Weekday	17 trip ends
AM Peak Hour	3 trip ends
PM Peak Hour	3 trip ends

Total Traffic Forecast: Combining the trip generation forecast for each component of the building results in the following traffic forecast for the project:

Weekday	237 trip ends
AM Peak Hour	24 trip ends
PM Peak Hour	29 trip ends

This level of traffic increase will not have a notable effect on the adjacent roadway system.

IV. Crash Data

In order to evaluate whether a location has a crash problem, Maine DOT uses two criteria to define High Crash Locations (HCL). Both criteria must be met in order to be classified as an HCL.

1. 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. A CRF of less than 1.00 indicates a rate less than average) and;
2. A minimum of 8 crashes over a three-year period.

Our office reviewed the 2010-2012 crash data in this area and found there were no high crash locations in the vicinity of the project site. A copy of the collision history is included in the Appendix.

V. Parking Evaluation

While PHA wants to provide adequate parking for the project, parking results in loss of open space and increasing stormwater impacts, and uses valuable urban land. At the same time, providing too little parking would have adverse impacts on residents and the surrounding neighborhood. The applicant's goal through the parking demand analysis process is to find the appropriate ratio of parking spaces. Our office has data suggesting actual parking demand will be well below one space per unit. To estimate the parking demand for the proposed project, Gorrill-Palmer Consulting Engineers, Inc. consulted two additional sources; a parking use inventory completed by our office for the existing East Bayside PHA properties; and secondly, relevant parking studies we have completed. Each of these are summarized below:

Parking study of existing East Bayside PHA Properties and On Street Parking Our office completed an inventory of occupied and available parking spaces for the East Bayside PHA Properties as well as the adjacent neighborhood streets on Sunday evening, May 4th 2014 for each hour from 9 PM to midnight. This represents a time period when most residents would be parked in the neighborhood. A summary of the results for the peak period at 12 midnight is presented below. A summary of the complete parking survey is included in the Appendix of this report:

Parking Survey Results within East Bayside PHA Properties

Highest Demand observed in PHA Parking Lots: 91 spaces

Total Parking Lot Spaces: 157 spaces

Total Available Spaces in Parking Lots: 66 spaces

According to occupancy information furnished by PHA, 162 units of the 164 total were occupied as of May 1, 2014. Therefore, the parking ratio within the PHA off street lots was 0.56 spaces per unit.

On Street Parking for Area Bounded by Anderson, Cumberland and Boyd Streets

Highest On Street Demand observed: 137 spaces

Total on Street Spaces: 298 spaces

Total Available Spaces on street: 161 spaces

This data clearly shows that there is substantial available parking within the neighborhood today. While there are 66 spaces available within the PHA parking lots, some residents are parking on the streets. Therefore, to estimate the total parking demand associated with the existing PHA properties, we have included the number of spaces which were occupied adjacent to PHA properties which were estimated to be 58 spaces. Adding these additional spaces to the 91 spaces occupied in the existing PHA lots results in an overall existing parking ration of 0.92 spaces per occupied unit today for the PHA housing properties. This is likely a high rate since we have been conservative (estimated on the high side) when attributing the on street parking to the existing PHA properties.

As can be seen from the parking data in the Appendix compiled for this report, our office also determined the number of unoccupied on and off street spaces available within 300 and 500 feet of the proposed building. This data is summarized below for 12 midnight, which was the peak period observed:

Unoccupied parking within 300 feet of the project:

- Parking lots: 18
- On Street spaces: 73
- Total: 91

Unoccupied parking within 500 feet of the project:

- Parking lots: 58
- On Street spaces: 130
- Total: 188

Other Relevant Parking Studies

Our office also reviewed data from other projects we have on file in our office in estimating an appropriate parking ration for this project which is summarized below:

- Island View Apartments in Portland- This inventory was performed on July 12, 2004 from 6:00 to 9:00 PM. Island View Apartments is a 70-unit apartment building on the corner of North Road and Walnut Road in Portland. It contains a total of 84 parking spaces, 29 of which are designated visitor parking only, and 2 of which are handicap. In the peak half-hour period, a maximum of 49 parking spaces were occupied. This translates to a demand of 0.70 parking spaces per dwelling unit.

- As part of studies for similar projects in the past, our office examined the parking occupancy of apartment buildings in downtown Portland with dedicated parking lots, either behind or within the building as part of another application. Our office completed parking occupancy counts from 10-11 PM (within the peak period, based on ITE and ULI data) at 53 Danforth Street, 645 Congress Street, and Walker Terrace (at the corner of Congress and Walker Street) on Tuesday, October 26, 2010.

In addition, we referenced the parking supply for Franklin Towers and the recently-completed Oak Street Lofts. Franklin Towers has 200 units, and based upon aerial data, a parking supply of 56 spaces. Oak Street Lofts has 37 units, and 16 parking spaces, although it should be noted that half of these spaces (eight) are for motorcycles. For the purposes of this letter, it is assumed that peak demand at both of these facilities is at 100 percent occupancy.

Based on the occupancy counts, the following parking demand was determined:

53 Danforth:	43 units, 29 spaces occupied	=	0.67 spaces/unit
645 Congress:	56 units, 28 spaces occupied	=	0.50 spaces/unit
Walker Terrace:	40 units, 20 spaces occupied	=	0.50 spaces/unit
Oak Street Lofts:	37 units, 16 spaces occupied*	=	0.43 spaces/unit
Franklin Towers:	200 units, 58 spaces occupied**	=	0.29 spaces/unit
AVERAGE:			0.48spaces/unit

*Assumes 100% occupancy at Oak Street.

** Assumes 58 spaces based upon aerial imagery, and 100% occupancy at Franklin Towers.

- This information indicates an average need for 0.48 spaces per apartment within the Portland Peninsula.

Recommended Parking Ratio - Based on the level of demand at the above referenced studies, and the planned implementation of the proposed Transportation Demand Management Plan, it is the opinion of Gorrill Palmer that appropriate parking demand for the proposed Bayside Anchor Project as well as the existing PHA "Bayside campus" properties is 0.75 spaces per unit for the proposed housing.

Evaluation of Parking Supply vs. Demand - The proposed project will result in the loss of the 26 space parking lot currently on the project site. The comparison of the available parking supply vs the anticipated demand upon completion of the project is summarized below:

Parking Supply: The available off and on street parking supplies within 300 and 500 feet upon completion of the project are summarized below:

- Within 300 feet of the project: 118 spaces on street; 36 in PHA lots
- Within 500 feet of the project: 227 spaces on street; 109 in PHA lots

- Combined Totals
 - Within 300 feet:154
 - Within 500 feet:336

Parking Demand: Based on the recommended parking ratio of 0.75 spaces per unit, the proposed 45 unit project is estimated to generate an additional demand of 34 spaces. The resulting parking demands within 300 and 500 feet of the project are summarized below:

- Within 300 feet of the project: 123 spaces
- Within 500 feet of the project: 208 spaces

Comparison of Parking Demand vs Supply: A comparison of the parking demand and supply shows that there is projected to be 31, and 128 spaces within 300 and 500 feet respectively upon completion of the project. It is noted that while the proposed head start and office components of the project will also require parking, these uses are not expected to coincide with the peak parking period which occurs during the evening when residents return from work.

VI. Transportation Demand Management Plan

PHA Housing has requested development of a Transportation Demand Management (TDM) Plan for their campus which will support the City's transportation and environmental sustainability goals by encouraging and promoting bicycling, walking, and use of transit. Avesta will be managing the project for PHA and is very familiar with the importance of a TDM plan. Following is a description of the elements of the Plan.

TDM Coordinator

PHA Housing has a Property Manager who will coordinate the TDM plan. The TDM coordinator will be responsible for posting changes and updates to the Metro schedule and U Car information in the lobby as well as other information relevant to promoting and encouraging the greater use of bicycling, walking, and bus-based transit.

Parking Limits within the Lease

PHA Housing plans to adopt parking policies limiting each household to no more than a single parking permit, i.e. one (1) vehicle per residence.

Automobile Parking Reduction Strategies

The Applicant proposes to take the following measures to reduce the demand for vehicles.

Bicycle Parking

PHA Housing plans to provide a total of 38 parking spaces for bicycles with 30 of these located within the building. These spaces are envisioned to be wall-mounted lockable racks

within controlled-access rooms. This configuration will provide for bicycle security, convenience, and protection from the weather.

Encourage Use of Local Transit Options

PHA's TDM coordinator will provide route maps, schedules, and ticket information in packets along with their lease agreement. Free ride tickets will be available to all tenants of the PHA properties in East Bayside. In addition, maps, routes, and ticket information will be posted clearly in the entry areas in both the existing and future apartment buildings.

U Car Share

Portland is one of 38 municipalities served by U Car Share in the United States. In Portland, the service provides a total of four cars, one of which is 118 Congress Street, a walkable distance from the project. These vehicles are available on an hourly or daily basis. PHA will make residents aware of and encourage use of this service, which will allow for use of a car for certain trips, which can reduce the need for an owned car. Information will be provided to each incoming resident with their lease agreement.

Sidewalk Facilities

Sidewalks surround the proposed project encouraging walking to and from the project. In addition the PHA campus provides a linkage to the Portland Trail system.

Tenant Packets

Upon signing a lease, each tenant will be provided with an extensive packet which will include information on transportation incentives and resources. Tenant packets will, at a minimum, include:

- Information on the free ride tickets on Metro to be provided by PHA
- The Greater Portland Transit Guide and other bus transit trip planning resources
- Registration form and program information for U Car Share.
- Bicycle commuting information and other resources gathered from the Bicycle Coalition of Maine and Bicycle Meet Up commuter program
- Portland Trails map

Education

The on-site information about transportation options will include:

- Transportation information located in the common area/lobby.
- Maps, information on METRO ticket passes available at the PHA office, and other transportation information available in the office

Monitoring

As part of its TDM Plan monitoring program, PHA Housing will assess the utilization of its on- and off-site parking on an on-going basis and monitor the operation of the parking areas. Demand for handicapped parking will be monitored on a monthly basis. PHA Housing will track tenant requests for additional on-site bicycle and scooter-motorcycle parking.

One year after initial occupancy and annually thereafter, PHA Housing will revisit the TDM plan taking into account the following:

- Tenant vehicle ownership (bicycle, scooter-motorcycle, automobile)
- Tenant parking utilization of on and off-site parking, including nearby parking garages and on-street parking spaces
- The means of travel by tenants (bus, walk, bicycle, automobile, scooter-motorcycle, car share, carpool or other)

PHA Housing will update the TDM Plan and submit a draft plan to the City's TDM Manager for review and comments. Should the vehicle ownership of tenants exceed 0.75 spaces/unit or 34 cars, additional TDM measures and/or parking measures will be considered.

Timetable for Action Items

Action Item	Timeframe for Implementation
Appoint/Confirm Property Manager for TDM Coordination	October 2014
Assemble Tenant TDM Packets	June/July 2015 (anticipated)
TDM Plan Implementation / On-site Parking Monitoring	January 2016 (anticipated, Assuming July 2015 occupancy)
Assess success of first 12 months of TDM Program and Report to City on initial effectiveness	July 2016
Submit Year Two TDM Program with needed modifications (and annually thereafter)	March 2018

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS☒ Crash Summary I☐ Section Detail☒ Crash Summary II☐ 1320 Public☐ 1320 Private☐ 1320 SummaryREPORT DESCRIPTION

Boyd St area

REPORT PARAMETERS

Year 2010, Start Month 1 through Year 2012 End Month: 12

Route: 0560293

Start Node: 18521
End Node: 18929Start Offset: 0
End Offset: 0☒ Exclude First Node
☐ Exclude Last Node

Route: 0560847

Start Node: 18929
End Node: 19463Start Offset: 0
End Offset: 0☒ Exclude First Node
☐ Exclude Last Node

Route: 0561238

Start Node: 18919
End Node: 19463Start Offset: 0
End Offset: 0☐ Exclude First Node
☒ Exclude Last Node

Route: 0560069

Start Node: 18919
End Node: 18921Start Offset: 0
End Offset: 0☒ Exclude First Node
☐ Exclude Last Node

Route: 0560493

Start Node: 18922
End Node: 18924Start Offset: 0
End Offset: 0☒ Exclude First Node
☐ Exclude Last Node

Route: 0560666

Start Node: 18915
End Node: 18918Start Offset: 0
End Offset: 0☒ Exclude First Node
☐ Exclude Last Node

Route: 0560834

Start Node: 18918
End Node: 18924Start Offset: 0
End Offset: 0☒ Exclude First Node
☒ Exclude Last Node

Route: 0560234

Start Node: 18917
End Node: 18932Start Offset: 0
End Offset: 0☒ Exclude First Node
☒ Exclude Last Node

Route: 0560235

Start Node: 19464
End Node: 18916Start Offset: 0
End Offset: 0☒ Exclude First Node
☒ Exclude Last Node

Route: 0560235

Start Node: 18916
End Node: 18923Start Offset: 0
End Offset: 0☒ Exclude First Node
☒ Exclude Last Node

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☒ Crash Summary I ☐ Section Detail ☒ Crash Summary II ☐ 1320 Public ☐ 1320 Private ☐ 1320 Summary

REPORT DESCRIPTION

Boyd St area

REPORT PARAMETERS

Year 2010, Start Month 1 through Year 2012 End Month: 12

Route: 0560235

Start Node: 18923

Start Offset: 0

☒ Exclude First Node

End Node: 18920

End Offset: 0

☒ Exclude Last Node

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

Crash Summary I

Nodes																		
Node	Route - MP	Node Description	U/R	Total Crashes	K	Injury Crashes			A	B	C	PD	Injury	Percent Annual M Ent-Veh	Crash Rate	Critical Rate	CRF	
18953	0560293 - 0.06	0509373 POR,N,BOYD,FOX ST.	2	3	0	0	0	1	0	2			33.3	1.997	0.50	0.45	1.11	
														Statewide Crash Rate:	0.14			
18952	0560293 - 0.16	0509372 POR,FOX,DIAMOND ST.	2	1	0	0	0	0	0	1			0.0	1.968	0.17	0.45	0.00	
														Statewide Crash Rate:	0.14			
18929	0560293 - 0.21	0509349 POR,ANDERSON,FOX ST.	2	2	0	0	0	0	1	1			50.0	1.808	0.37	0.46	0.00	
														Statewide Crash Rate:	0.14			
18930	0560847 - 0.53	0509350 POR,ANDERSON,EVERETT ST.	2	0	0	0	0	0	0	0			0.0	0.148	0.00	0.46	0.00	
														Statewide Crash Rate:	0.14			
18931	0560847 - 0.56	0509351 POR,ANDERSON,MADISON ST.	2	1	0	0	0	0	1	0			100.0	0.150	2.22	0.47	4.75	
														Statewide Crash Rate:	0.14			
18932	0560847 - 0.59	0509352 POR,E,LANCASTER,ANDERSON ST.	2	0	0	0	0	0	0	0			0.0	0.132	0.00	0.41	0.00	
														Statewide Crash Rate:	0.14			
19464	0560847 - 0.65	0509886 POR,ANDERSON ST,E,OXFORD STR.	2	0	0	0	0	0	0	0			0.0	0.163	0.00	0.50	0.00	
														Statewide Crash Rate:	0.14			
19463	0560847 - 0.74	Int of ANDERSON ST CUMBERLAND AV	2	3	0	0	0	0	1	2			33.3	2.054	0.49	0.42	1.15	
														Statewide Crash Rate:	0.13			
18919	0561238 - 0.84	Int of BOYD ST CUMBERLAND AV	2	3	0	0	0	0	1	2			33.3	2.449	0.41	0.40	1.01	
														Statewide Crash Rate:	0.13			
18910	0561238 - 0.87	Int of CUMBERLAND AV, LOCUST ST	2	2	0	0	0	0	0	2			0.0	2.390	0.28	0.41	0.00	
														Statewide Crash Rate:	0.13			
18922	0561238 - 0.89	Int of CUMBERLAND AV MAYO ST	2	0	0	0	0	0	0	0			0.0	2.241	0.00	0.41	0.00	
														Statewide Crash Rate:	0.13			
18915	0561238 - 0.94	Int of CUMBERLAND AV, SMITH ST	2	3	0	0	0	0	0	3			0.0	2.266	0.44	0.41	1.07	
														Statewide Crash Rate:	0.13			
18920	0560069 - 0.08	0509340 POR,BOYD,E,OXFORD ST.	2	1	0	0	0	0	0	1			0.0	0.170	1.96	0.51	3.85	
														Statewide Crash Rate:	0.14			
18921	0560069 - 0.15	0509341 POR,LANCASTER 1,BOYD ST.	2	0	0	0	0	0	0	0			0.0	0.068	0.00	-0.18	0.00	
														Statewide Crash Rate:	0.14			
18923	0560493 - 0.08	0509343 POR,MAYO,E,OXFORD ST.	2	0	0	0	0	0	0	0			0.0	0.131	0.00	0.40	0.00	
														Statewide Crash Rate:	0.14			
18924	0560493 - 0.16	0509344 POR,KENNEDY,MAYO ST.	2	0	0	0	0	0	0	0			0.0	0.050	0.00	-0.70	0.00	
														Statewide Crash Rate:	0.14			
18916	0560666 - 0.14	0509336 POR,SMITH,E,OXFORD ST.	2	1	0	0	0	0	0	1			0.0	0.170	1.96	0.51	3.85	
														Statewide Crash Rate:	0.14			
18917	0560666 - 0.21	0509337 POR,SMITH,E,LANCASTER ST	2	0	0	0	0	0	0	0			0.0	0.084	0.00	0.08	0.00	
														Statewide Crash Rate:	0.14			
18918	0560666 - 0.22	0509338 POR,KENNEDY,SMITH ST.	2	0	0	0	0	0	0	0			0.0	0.045	0.00	-0.96	0.00	
														Statewide Crash Rate:	0.14			
Study Years: 3.00			NODE TOTALS:				20	0	0	0	1	4	15	25.0	18.484	0.36	0.25	1.43

Crash Summary I

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section U/R Length	Sections					Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF
						Total Crashes	K	A	B	C	PD				
18521	18953	194034	0 - 0.06	0560293 - 0 RD INV 05 60293	0.06	2	0	0	0	0	0	0.00125	0.00	974.19	0.00
Int of FOX ST, FRANKLIN ST															
18952	18953	194637	0 - 0.10	0560293 - 0.06 RD INV 05 60293	0.10	2	1	0	1	0	0	0.00181	184.16	885.84	0.00
0509372 POR, FOX, DIAMOND ST.															
18929	18952	194603	0 - 0.05	0560293 - 0.16 RD INV 05 60293	0.05	2	0	0	0	0	0	0.00088	0.00	1068.04	0.00
0509349 POR, ANDERSON, FOX ST.															
18929	18930	194602	0 - 0.04	0560847 - 0.49 RD INV 05 60847	0.04	2	0	0	0	0	0	0.00006	0.00	1031.16	0.00
0509349 POR, ANDERSON, FOX ST.															
18930	18931	194605	0 - 0.03	0560847 - 0.53 RD INV 05 60847	0.03	2	0	0	0	0	0	0.00004	0.00	525.37	0.00
0509350 POR, ANDERSON, EVERETT ST.															
18931	18932	194607	0 - 0.03	0560847 - 0.56 RD INV 05 60847	0.03	2	1	0	0	0	0	0.00004	8875.04	351.26	25.27
0509351 POR, ANDERSON, MADISON ST.															
18932	19464	194609	0 - 0.06	0560847 - 0.59 RD INV 05 60847	0.06	2	5	0	1	0	4	0.00007	25034.05	1177.21	21.27
0509352 POR, E, LANCASTER, ANDERSON ST.															
19463	19464	195146	0 - 0.09	0560847 - 0.65 RD INV 05 60847	0.09	2	2	0	0	0	1	0.00008	7958.54	1328.15	5.99
Int of ANDERSON ST, CUMBERLAND AV															
18910	18919	3129300	0 - 0.03	0561238 - 0.84 RD INV 05 61238	0.03	2	3	0	0	1	2	0.00069	1442.26	702.55	2.05
Int of CUMBERLAND AV, LOCUST ST															
18910	18922	3118713	0 - 0.02	0561238 - 0.87 RD INV 05 61238	0.02	2	0	0	0	0	0	0.00045	0.00	757.37	0.00
Int of CUMBERLAND AV, LOCUST ST															
18915	18922	3117967	0 - 0.05	0561238 - 0.89 RD INV 05 61238	0.05	2	2	0	0	1	1	0.00108	616.01	636.99	0.00
Int of CUMBERLAND AV, SMITH ST															
18915	19463	3131702	0 - 0.04	0561238 - 0.94 RD INV 05 61238	0.04	2	2	0	0	0	2	0.00082	808.89	677.68	1.19
Int of CUMBERLAND AV, SMITH ST															
18919	18920	194589	0 - 0.08	0560069 - 0 RD INV 05 60069	0.08	2	4	0	0	0	3	0.00013	10594.45	1444.47	7.33
Int of BOYD ST, CUMBERLAND AV															
18920	18921	194590	0 - 0.07	0560069 - 0.08 RD INV 05 60069	0.07	2	4	0	0	0	3	0.00010	13990.69	1382.73	10.12
0509340 POR, BOYD, E, OXFORD ST.															
18922	18923	194592	0 - 0.08	0560493 - 0 RD INV 05 60493	0.08	2	1	0	1	0	0	0.00007	4476.68	1260.29	3.55
Int of CUMBERLAND AV, MAYO ST															
18923	18924	194593	0 - 0.08	0560493 - 0.08 RD INV 05 60493	0.08	2	1	0	0	0	0	0.00005	6486.09	899.65	7.21
0509343 POR, MAYO, E, OXFORD ST.															
18915	18916	194580	0 - 0.08	0560666 - 0.06 RD INV 05 60666	0.08	2	2	0	0	0	2	0.00009	7068.44	1379.02	5.13
Int of CUMBERLAND AV, SMITH ST															
18916	18917	194583	0 - 0.07	0560666 - 0.14 RD INV 05 60666	0.07	2	1	0	0	0	0	0.00006	5551.62	1082.04	5.13
0509336 POR, SMITH, E, OXFORD ST.															
18917	18918	194586	0 - 0.01	0560666 - 0.21 RD INV 05 60666	0.01	2	0	0	0	0	0	0.00001	0.00	-	0.00
0509337 POR, SMITH, E, LANCASTER ST															
18918	18924	194588	0 - 0.04	0560834 - 0 RD INV 05 60834	0.04	2	1	0	0	0	1	0.00001	23296.99	-4098.52	0.00
0509338 POR, KENNEDY, SMITH ST.															

Crash Summary I

Sections																		
Start Node	End Node	Element	Offset Begin - End	Route - MP	Section U/R Length	Total Crashes	K	A	B	C	PD	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF		
18917	18932	194587	0 - 0.04	0560234 - 0	0.04	2	0	0	0	0	0	0.0	0.00001	0.00	-6213.23	0.00		
				RD INV 05 60234													Statewide Crash Rate: 336.58	
18916	19464	194585	0 - 0.02	0560235 - 0.07	0.02	2	0	0	0	0	0	0.0	0.00002	0.00	-3362.02	0.00		
				RD INV 05 60235													Statewide Crash Rate: 336.58	
18916	18923	194584	0 - 0.05	0560235 - 0.09	0.05	2	2	0	0	0	1	0.0	0.00003	23267.31	-382.86	0.00		
				RD INV 05 60235													Statewide Crash Rate: 336.58	
18920	18923	194591	0 - 0.05	0560235 - 0.14	0.05	2	0	0	0	0	0	0.0	0.00002	0.00	-1152.75	0.00		
				RD INV 05 60235													Statewide Crash Rate: 336.58	
Study Years:		3.00		Section Totals:		1.27	32	0	0	3	2	20	15.6	0.00787	1355.10	534.30	2.54	
Grand Totals:				1.27		52	0	0	0	4	6	35	19.2	0.00787	2202.03	676.00	3.26	

Crash Summary

Section Details														
Start Node	End Node	Element	Offset Begin - End	Route - MP	Total Crashes	K	A	B	C	PD	Crash Report	Crash Date	Crash Mile Point	Injury Degree
18521	18953	194034	0 - 0.06	0560293 - 0	0	0	0	0	0	0	2010-14202C	07/09/2010	0.07	B
18952	18953	194637	0 - 0.10	0560293 - 0.06	1	0	0	1	0	0				
18929	18952	194603	0 - 0.05	0560293 - 0.16	0	0	0	0	0	0				
18929	18930	194602	0 - 0.04	0560847 - 0.49	0	0	0	0	0	0				
18930	18931	194605	0 - 0.03	0560847 - 0.53	0	0	0	0	0	0	2010-5508C	02/25/2010	0.57	
18931	18932	194607	0 - 0.03	0560847 - 0.56	1	0	0	0	0	0				
18932	19464	194609	0 - 0.06	0560847 - 0.59	5	0	0	1	0	4				
											2010-8633C	04/27/2010	0.61	PD
											2012-42600	10/31/2012	0.62	PD
											2011-8643C	06/05/2011	0.64	B
											2010-4524C	02/27/2010	0.64	PD
19463	19464	195146	0 - 0.09	0560847 - 0.65	2	0	0	0	0	1	2011-3003C	02/11/2011	0.66	PD
											2011-960C	01/21/2011	0.70	
18910	18919	3129300	0 - 0.03	0561238 - 0.84	3	0	0	0	1	2	2011-4295C	02/25/2011	0.85	PD
											2011-3566C	02/15/2011	0.85	PD
											2011-3255	06/23/2011	0.86	C
18910	18922	3118713	0 - 0.02	0561238 - 0.87	0	0	0	0	0	0	2010-7683C	03/30/2010	0.90	C
18915	18922	3117967	0 - 0.05	0561238 - 0.89	2	0	0	0	1	1				
											2010-18272C	08/21/2010	0.90	PD
18915	19463	3131702	0 - 0.04	0561238 - 0.94	2	0	0	0	0	2	2011-3474	06/24/2011	0.95	PD
											2012-48363	12/21/2012	0.97	PD
18919	18920	194589	0 - 0.08	0560069 - 0	4	0	0	0	0	3	2012-32126	07/06/2012	0.02	PD
											2011-6502	08/03/2011	0.04	PD
											2012-25406	04/01/2012	0.07	
											2012-42011	10/26/2012	0.07	PD
18920	18921	194590	0 - 0.07	0560069 - 0.08	4	0	0	0	0	3	2012-45906	12/02/2012	0.10	PD
											2011-20488	12/29/2011	0.13	PD
											2011-19176	12/15/2011	0.14	
											2011-14468	11/03/2011	0.14	PD
18922	18923	194592	0 - 0.08	0560493 - 0	1	0	0	1	0	0	2011-11163	09/27/2011	0.06	B
18923	18924	194593	0 - 0.08	0560493 - 0.08	1	0	0	0	0	0	2012-47097	12/13/2012	0.10	
18915	18916	194580	0 - 0.08	0560666 - 0.06	2	0	0	0	0	2	2011-5271C	03/04/2011	0.10	PD
											2011-2931C	02/06/2011	0.10	PD
18916	18917	194583	0 - 0.07	0560666 - 0.14	1	0	0	0	0	0	2011-21044	12/31/2011	0.16	

Crash Summary

Section Details														
Start Node	End Node	Element	Offset Begin - End	Route - MP	Total Crashes	K	A	B	C	PD	Crash Report	Crash Date	Crash Mile Point	Injury Degree
18917	18918	194586	0 - 0.01	0560666 - 0.21	0	0	0	0	0	0				
18918	18924	194588	0 - 0.04	0560834 - 0	1	0	0	0	0	1	2010-9926C	05/16/2010	0.01	PD
18917	18932	194587	0 - 0.04	0560234 - 0	0	0	0	0	0	0				
18916	19464	194585	0 - 0.02	0560235 - 0.07	0	0	0	0	0	0				
18916	18923	194584	0 - 0.05	0560235 - 0.09	2	0	0	0	0	1	2012-2926	02/04/2012	0.12	
											2010-16408C	08/06/2010	0.13	PD
18920	18923	194591	0 - 0.05	0560235 - 0.14	0	0	0	0	0	0				
Totals:					32	0	0	3	2	20				

Maine Department Of Transportation - Traffic Engineering, Crash Records Section
Crash Summary II - Characteristics

Crashes by Day and Hour

Day Of Week	Hour of Day												PM												Un	Tot
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11		
SUNDAY	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	2	0	1	0	7
MONDAY	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	3
TUESDAY	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	9
WEDNESDAY	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	0	2	0	0	0	0	0	6
THURSDAY	1	1	0	0	0	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	7
FRIDAY	0	2	0	0	0	0	0	0	0	3	0	1	0	3	2	0	1	0	1	1	0	0	2	0	0	16
SATURDAY	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	4
Totals	2	3	0	0	1	0	1	1	2	4	2	4	4	3	5	3	2	1	2	4	2	2	3	1	0	52

Vehicle Counts by Type

Unit Type	Total	Unit Type	Total
1-Passenger Car	59	23-Bicyclist	2
2-(Sport) Utility Vehicle	14	24-Witness	12
3-Passenger Van	3	25-Other	7
4-Cargo Van (10K lbs or Less)	1	Total	114
5-Pickup	9		
6-Motor Home	0		
7-School Bus	0		
8-Transit Bus	1		
9-Motor Coach	0		
10-Other Bus	0		
11-Motorcycle	0		
12-Moped	0		
13-Low Speed Vehicle	0		
14-Autocycle	0		
15-Experimental	0		
16-Other Light Trucks (10,000 lbs or Less)	0		
17-Medium/Heavy Trucks (More than 10,000 lbs)	3		
18-ATV - (4 wheel)	0		
20-ATV - (2 wheel)	0		
21-Snowmobile	0		
22-Pedestrian	3		

Crash Summary II - Characteristics

Crashes by Driver Action at Time of Crash

Driver Action at Time of Crash	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
No Contributing Action	10	10	1	0	0	0	21
Ran Off Roadway	1	0	0	0	0	0	1
Failed to Yield Right-of-Way	6	4	0	0	0	0	10
Ran Red Light	0	0	0	0	0	0	0
Ran Stop Sign	0	0	0	0	0	0	0
Disregarded Other Traffic Sign	0	0	0	0	0	0	0
Disregarded Other Road Markings	0	0	0	0	0	0	0
Exceeded Posted Speed Limit	2	0	0	0	0	0	2
Drove Too Fast For Conditions	1	1	0	0	0	0	2
Improper Turn	2	1	0	0	0	0	3
Improper Backing	4	1	0	0	0	0	5
Improper Passing	0	0	0	0	0	0	0
Wrong Way	0	0	0	0	0	0	0
Followed Too Closely	0	0	0	0	0	0	0
Failed to Keep in Proper Lane	0	1	0	0	0	0	1
Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	0	0	0	0	0	0	0
Swerved or Avoided Due to Wind, Slippery Surface, Motor Vehicle, Object, Non-Motorist in Roadway	0	0	0	0	0	0	0
Over-Correcting/Over-Steering	0	0	0	0	0	0	0
Other Contributing Action	0	0	0	0	0	0	0
Unknown	0	2	0	0	0	0	2
Total	26	20	1	0	0	0	47

Crashes by Apparent Physical Condition And Driver

Apparent Physical Condition	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
Apparently Normal	38	32	1	0	0	1	72
Physically Impaired or Handicapped	0	0	0	0	0	0	0
Emotional(Depressed, Angry, Disturbed, etc.)	0	0	0	0	0	0	0
Ill (Sick)	0	0	0	0	0	0	0
Asleep or Fatigued	0	1	0	0	0	0	1
Under the Influence of Medications/Drugs/Alcohol	3	1	0	0	0	0	4
Other	0	3	0	0	0	0	3
Total	41	37	1	0	0	1	80

Driver Age by Unit Type

Age	Driver	Bicycle	SnowMobile	Pedestrian	ATV	Total
09-Under	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	2	0	0	0	0	2
20-24	14	0	0	0	0	14
25-29	21	0	0	0	0	21
30-39	17	0	0	0	0	17
40-49	15	0	0	0	0	15
50-59	10	0	0	0	0	10
60-69	5	0	0	0	0	5
70-79	3	0	0	0	0	3
80-Over	0	0	0	0	0	0
Unknown	10	2	0	3	0	15
Total	97	2	0	3	0	102

Crash Summary II - Characteristics

Most Harmful Event		Most Harmful Event		Injury Data	
Most Harmful Event	Total	Most Harmful Event	Total	Severity Code	Number Of Injuries
1-Overturn / Rollover	0	38-Other Fixed Object (wall, building, tunnel, etc.)	0	K	0
2-Fire / Explosion	0	39-Unknown	6	A	0
3-Immersion	0	40-Gate or Cable	0	B	5
4-Jackknife	0	41-Pressure Ridge	0	C	7
5-Cargo / Equipment Loss Or Shift	0	Total	50	PD	0
6-Fell / Jumped from Motor Vehicle	0			Total	12
7-Thrown or Falling Object	0				
8-Other Non-Collision	2				
9-Pedestrian	0				
10-Pedalcycle	0				
11-Railway Vehicle - Train, Engine	0				
12-Animal	0				
13-Motor Vehicle in Transport	30				
14-Parked Motor Vehicle	12				
15-Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle	0				
16-Work Zone / Maintenance Equipment	0				
17-Other Non-Fixed Object	0				
18-Impact Attenuator / Crash Cushion	0				
19-Bridge Overhead Structure	0				
20-Bridge Pier or Support	0				
21-Bridge Rail	0				
22-Cable Barrier	0				
23-Culvert	0				
24-Curb	0				
25-Ditch	0				
26-Embankment	0				
27-Guardrail Face	0				
28-Guardrail End	0				
29-Concrete Traffic Barrier	0				
30-Other Traffic Barrier	0				
31-Tree (Standing)	0				
32-Utility Pole / Light Support	0				
33-Traffic Sign Support	0				
34-Traffic Signal Support	0				
35-Fence	0				
36-Mailbox	0				
37-Other Post Pole or Support	0				

Traffic Control Devices		Road Character	
Traffic Control Device	Total	Road Grade	Total
1-Traffic Signals (Stop & Go)	0	1-Level	34
2-Traffic Signals (Flashing)	0	2-On Grade	15
3-Advisory/Warning Sign	0	3-Top of Hill	1
4-Stop Signs - All Approaches	5	4-Bottom of Hill	2
5-Stop Signs - Other	9	5-Other	0
6-Yield Sign	0	Total	52
7-Curve Warning Sign	0		
8-Officer, Flagman, School Patrol	0		
9-School Bus Stop Arm	0		
10-School Zone Sign	0		
11-R.R. Crossing Device	0		
12-No Passing Zone	0		
13-None	38		
14-Other	0		
Total	52		

Light	
Light Condition	Total
1-Day/light	29
2-Dawn	0
3-Dusk	1
4-Dark - Lighted	20
5-Dark - Not Lighted	0
6-Dark - Unknown Lighting	1
7-Unknown	1
Total	52

Crash Summary II - Characteristics**Crashes by Year and Month**

Month	2010	2011	2012	Total
JANUARY	1	2	2	5
FEBRUARY	2	6	1	9
MARCH	2	1	0	3
APRIL	1	0	1	2
MAY	1	0	1	2
JUNE	0	3	0	3
JULY	1	0	3	4
AUGUST	4	1	1	6
SEPTEMBER	1	2	1	4
OCTOBER	1	1	3	5
NOVEMBER	1	2	0	3
DECEMBER	0	3	3	6
Total	15	21	16	52

Report is limited to the last 10 years of data.

Crash Summary II - Characteristics

Crashes by Crash Type and Type of Location

Crash Type	Straight Road	Curved Road	Three Leg Intersection	Four Leg Intersection	Five or More Leg Intersection	Driveways	Bridges	Interchanges	Other	Parking Lot	Private Way	Cross Over	Railroad Crossing	Total
Object in Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rear End / Sideswipe	13	3	2	2	0	4	0	0	0	0	0	0	0	24
Head-on / Sideswipe	4	0	0	0	0	0	0	0	0	0	0	0	0	4
Intersection Movement	0	0	8	3	0	2	0	0	0	0	0	0	0	13
Pedestrians	1	0	1	1	0	0	0	0	0	0	0	0	0	3
Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Went Off Road	2	0	1	0	0	0	0	0	0	0	0	0	0	3
All Other Animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle	1	0	1	0	0	0	0	0	0	0	0	0	0	2
Other	2	0	1	0	0	0	0	0	0	0	0	0	0	3
Jackknife	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rollover	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fire	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submersion	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thrown or Falling Object	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	23	3	14	6	0	6	0	0	0	0	0	0	0	52

Crash Summary II - Characteristics**Crashes by Weather, Light Condition and Road Surface**

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Blowing Sand, Soil, Dirt												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Blowing Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Clear												
Dark - Lighted	11	0	0	0	0	0	0	0	0	0	0	11
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	12	1	0	0	0	0	0	0	0	0	1	14
Dusk	1	0	0	0	0	0	0	0	0	0	0	1
Unknown	1	0	0	0	0	0	0	0	0	0	0	1
Cloudy												
Dark - Lighted	2	0	0	0	0	0	0	0	0	0	2	4
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	2	0	0	0	0	0	0	0	0	0	2	4
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics**Crashes by Weather, Light Condition and Road Surface**

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Fog, Smog, Smoke												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Other												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Rain												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	4	4
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	7	7
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Severe Crosswinds												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Sleet, Hail (Freezing Rain or Drizzle)												
Dark - Lighted	0	1	0	0	0	0	0	0	0	0	0	1
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	1	0	0	0	0	0	0	0	0	0	1
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	1	0	0	0	1
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	1	0	0	0	0	0	2	0	0	0	3
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	29	4	0	0	0	0	0	3	0	0	0	52

JN:2876
Project Description: Bayside Anchor, Portland
Project Location: Corner of Oxford and Boyd
Date:5-11-14

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

**Apartment
Land Use Code (LUC) 220**

Dwelling Units: 45

Average Rate

Time Period	ITE Trip Rate	Sample Size	Trip Ends	Directional Split *		Directional Distribution		R ²
				IN	OUT	IN	OUT	
Weekday	T = 6.65 (X)	88	299	50%	50%	150	149	N/A
AM Peak Hour of Adj. Street Traffic	T = 0.51 (X)	78	23	20%	80%	5	18	N/A
PM Peak Hour of Adj. Street Traffic	T = 0.62 (X)	90	28	65%	35%	18	10	N/A
AM Peak Hour of Generator	T = 0.55 (X)	83	25	30%	70%	8	17	N/A
PM Peak Hour of Generator	T = 0.67 (X)	85	30	60%	40%	18	12	N/A
Saturday	T = 6.39 (X)	15	288	50%	50%	144	144	N/A
Saturday Peak Hour of Gen.	T = 0.52 (X)	14	23	**	50%	12	11	N/A

* Percentages rounded to nearest 5%

** Not Available (Assumption)

Fitted Curve Equation

Time Period	ITE Trip Rate	Sample Size	Trip Ends	Directional Split *		Directional Distribution		R ²
				IN	OUT	IN	OUT	
Weekday	T = 6.06 (X) + 123.56	88	396	50%	50%	198	198	0.88
AM Peak Hour of Adj. Street Traffic	T = 0.49 (X) + 3.73	78	26	20%	80%	5	21	0.83
PM Peak Hour of Adj. Street Traffic	T = 0.55 (X) + 17.65	90	42	65%	35%	28	14	0.77
AM Peak Hour of Generator	T = 0.54 (X) + 2.45	83	27	30%	70%	8	19	0.82
PM Peak Hour of Generator	T = 0.60 (X) + 14.91	85	42	60%	40%	25	17	0.80
Saturday	T = 7.85 (X) - 256.19	15	97	50%	50%	49	48	0.85
Saturday Peak Hour of Gen.	T = 0.41 (X) + 19.23	14	38	**	50%	19	19	0.56

* Percentages rounded to nearest 5%

** Not Available (Assumption)

JN:2876
 Project Description: Bayside Anchor
 Project Location: Boyd and Oxford, Portland
 Date: 5-11-14

Gorrill-Palmer Consulting Engineers, Inc.
 P.O. Box 1237
 15 Shaker Road
 Gray, Maine 04039

**Single Tenant Office Building
 Land Use Code (LUC) 715**

Gross Floor Area (ft²): 1,502

Average Rate

Time Period	ITE Trip Rate	Trip Ends
Weekday	$T = 11.65 (X)$	17
AM Peak Hour	$T = 1.80 (X)$	3
PM Peak Hour	$T = 1.74 (X)$	3

Directional Split *		Directional Distribution	
IN	OUT	IN	OUT
50%	50%	9	8
90%	10%	3	0
15%	85%	0	3

* Percentages rounded to nearest 5%

Fitted Curve

Time Period	ITE Trip Rate	Trip Ends
Weekday	$\ln(T) = 0.60 \ln(X) + 4.30$	94
AM Peak Hour	$T = 1.67(X) + 21.93$	24
PM Peak Hour	$T = 1.52 (X) + 34.60$	37

Directional Split *		Directional Distribution	
IN	OUT	IN	OUT
50%	50%	47	47
90%	10%	22	2
15%	85%	6	31

* Percentages rounded to nearest 5%

JN:2876
 Project Description: Bayside Anchor
 Project Location: corner of Oxford and Boyd, Portland
 Date:

Gorrill-Palmer Consulting Engineers, Inc.
 P.O. Box 1237
 15 Shaker Road
 Gray, Maine 04039

**Elementary School
 Land Use Code (LUC) 520**

Students 17

Average Rate

Time Period	ITE Trip Rate	Trip Ends	Sample Size	Directional Split *		Directional Distribution		R ²
				IN	OUT	IN	OUT	
Weekday	T = 1.29 (X)	22	33	50%	50%	11	11	---
AM Peak Hour of Adj. Street Traffic	---	---	---	---	---	---	---	---
PM Peak Hour of Adj. Street Traffic	T = 0.15 (X)	3	20	50%	50%	2	1	---
AM Peak Hour of Generator	T = 0.45 (X)	8	48	55%	45%	4	4	---
PM Peak Hour of Generator	T = 0.28 (X)	5	44	45%	55%	2	3	---
Saturday	---	---	---	---	---	---	---	---
Saturday Peak Hour of Generator	---	---	---	---	---	---	---	---

* Percentages rounded to nearest 5%

Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Sample Size	Directional Split *		Directional Distribution		R ²
				IN	OUT	IN	OUT	
Weekday	---	---	---	---	---	---	---	---
AM Peak Hour of Adj. Street Traffic	---	---	---	---	---	---	---	---
PM Peak Hour of Adj. Street Traffic	---	---	---	---	---	---	---	---
AM Peak Hour of Generator	$\ln(T) = 1.14\ln(X) - 1.86$	4	48	55%	45%	2	2	0.5
PM Peak Hour of Generator	$\ln(T) = 1.09\ln(X) - 1.92$	3	37	45%	55%	1	2	0.54
Saturday	---	---	---	---	---	---	---	---
Saturday Peak Hour of Generator	---	---	---	---	---	---	---	---

* Percentages rounded to nearest 5%

9:00 PM

PARKING LOTS

Location	Total Parked Vehicles	# Parked Vehicles within 300' of Bayside Anchor	# Parked Vehicles within 500' of Bayside Anchor
Kennedy Park lots	27	14	27
Bayside Terrace lots	20	6	20
Bayside East lots	32	15	20
Total Parked Vehicles:	79	35	67
Total Parking Spaces:	157	62	135
Total Available Spaces:	78	27	68
Boyd Street	14	9	14
Mayo Street	26	22	26
Smith Street	24	0	24
Anderson Street (E Lancaster to Cumberland)	22	0	0
E Lancaster Street	2	0	2
Oxford Street (Anderson to Boyd)	6	4	6
Cumberland Avenue (Anderson to Franklin)	26	0	8
Total Parked Vehicles:	120	35	80

ON-STREET PARKING

10:00 PM

PARKING LOTS

Location	Total Parked Vehicles	# Parked Vehicles within 300' of Bayside Anchor	# Parked Vehicles within 500' of Bayside Anchor
Kennedy Park lots	28	19	28
Bayside Terrace lots	23	6	23
Bayside East lots	32	16	21
Total Parked Vehicles:	83	41	72
Total Parking Spaces:	157	62	135
Total Available Spaces:	74	21	63
Boyd Street	15	10	15
Mayo Street	29	23	29
Smith Street	27	0	27
Anderson Street (E Lancaster to Cumberland)	25	0	0
E Lancaster Street	3	0	3
Oxford Street (Anderson to Boyd)	7	5	7
Cumberland Avenue (Anderson to Franklin)	22	0	10
Total Parked Vehicles:	128	38	91

ON-STREET PARKING

11:00 PM

PARKING LOTS

Location	Total Parked Vehicles	# Parked Vehicles within 300' of Bayside Anchor	# Parked Vehicles within 500' of Bayside Anchor
Kennedy Park lots	27	17	27
Bayside Terrace lots	25	8	25
Bayside East lots	36	18	23
Total Parked Vehicles:	88	43	75
Total Parking Spaces:	157	62	135
Total Available Spaces:	69	19	60
Boyd Street	18	12	18
Mayo Street	33	26	33
Smith Street	28	0	28
Anderson Street (E Lancaster to Cumberland)	27	0	0
E Lancaster Street	4	0	3
Oxford Street (Anderson to Boyd)	9	6	9
Cumberland Avenue (Anderson to Franklin)	20	0	9
Total Parked Vehicles:	139	44	100

ON-STREET PARKING

12:00 AM

PARKING LOTS

Location	Total Parked Vehicles	# Parked Vehicles within 300' of Bayside Anchor	# Parked Vehicles within 500' of Bayside Anchor
Kennedy Park lots	29	19	29
Bayside Terrace lots	25	7	25
Bayside East lots	37	18	23
Total Parked Vehicles:	91	44	77
Total Parking Spaces:	157	62	135
Total Available Spaces:	66	18	58
Boyd Street	18	12	18
Mayo Street	34	27	34
Smith Street	28	0	24
Anderson Street (E Lancaster to Cumberland)	25	0	0
E Lancaster Street	5	0	3
Oxford Street (Anderson to Boyd)	9	6	9
Cumberland Avenue (Anderson to Franklin)	18	0	9
Total Parked Vehicles:	137	45	97

ON-STREET PARKING

East Bayside Properties - Parking Study

Date: 5/4/2014
JN: 2876

Within 300' of Bayside Anchor

	9:00 PM	10:00 PM	11:00 PM	12:00 AM
Parked Cars In Lots	35	41	43	44
Total Lot Spaces	62	62	62	62
Available Lot Spaces	27	21	19	18
Parked Cars On-Street	35	38	44	45

Within 500' of Bayside Anchor

	9:00 PM	10:00 PM	11:00 PM	12:00 AM
Parked Cars In Lots	67	72	75	77
Total Lot Spaces	135	135	135	135
Available Lot Spaces	68	63	60	58
Parked Cars On-Street	80	91	100	97

On-Street Parking

Total On-Street Parking Spaces	Street Name	Street Segment
11	Cumberland Ave	Anderson St to Smith St
13	Cumberland Ave	Smith St to Mayo St
8	Cumberland Ave	Mayo St to Boyd St
0	Cumberland Ave	Boyd St to Franklin St
15	Oxford St	Anderson St to Smith St
12	Oxford St	Smith St to Mayo St
18	Oxford St	Mayo St to Boyd St
15	E Lancaster St	Anderson St to Smith St
31	Boyd St	Cumberland Ave to Oxford St
25	Boyd St	Oxford St to Bayside Terrace
31	Mayo St	Cumberland Ave to Oxford St
22	Mayo St	Oxford St to Kennedy Park lot
27	Smith St	Cumberland Ave to Oxford St
23	Smith St	Oxford St to Kennedy Park lot
28	Anderson St	Cumberland Ave to Oxford St
19	Anderson St	Oxford St to E Lancaster St

2/3 →

Total: 298 On Street Parking Spaces

within 300' 118 spaces within 300'

within 500' 227 spaces within 500'

June 30, 2014

Mark B. Adelson, Executive Director
Portland Housing Authority
14 Baxter Boulevard
Portland, Maine 04101

Subject: Response to Traffic Review Comments from Tom Errico

Dear Mark:

Gorrill-Palmer Consulting Engineers, Inc. (GPCEI) is pleased to respond to the comments emailed on June 5, 2014 from Tom Errico to Rick Knowland concerning traffic and parking for Bayside Anchor. Each of the comments are repeated below for your convenience followed by our response.

Responses to June 5th Email from Tom Errico:

Comment: *"The project is expected to generate 24 vehicles during the AM peak hour and 29 vehicles during the PM peak hour. This level of traffic does not trigger the requirement for a MaineDOT Traffic Movement Permit."*

Response: No response required

Comment: *"I continue to review the parking analysis for the project but note the following:*

During a field review of the site during a weekday morning, a significant number of vehicles were parked in the immediate area of the proposed site. Cars were parked on both sides of Boyd Street and there were no on-street parking spaces available. I would further note that the travel lane was very narrow in this area and is a cause for concern and review."

Response: We agree that there are a significant number of vehicles parked on the upper part of Boyd Street between Oxford and Cumberland Streets during the week. While this does narrow the effective width of the street, which is a potential cause for concern for public safety in terms of emergency vehicle access, it does serve to let drivers know they are entering an urban neighborhood and they appear to slow down as a result of this narrowing. This traffic calming benefits the neighborhood as a whole, particularly bicyclists and pedestrians. We offer two potential suggestions to address the public safety issue while retaining the positive traffic calming benefit of parked vehicles. First, based on visual observations, a majority of the parked vehicles in this area appear to be people who work downtown outside of this neighborhood but leave their cars parked all day. We recommend that the City consider implementing a two hour parking restriction on Boyd Street between

Mr. Mark Adelson
June 30, 2014
Page 2 of 4

Oxford and Cumberland Streets. Second, we recommend that two forty foot no parking zones be implemented, with one on each side of the street midway between Oxford and Cumberland Streets to allow vehicles to pull over for an oncoming vehicle to let them pass. In our opinion, this would represent an appropriate balance on this relatively low volume street.

Comment: "It has been the City's general policy not to include on-street parking spaces in the determination of parking supply adequacy for a proposed project. I would suggest that the project determine parking supply adequacy from using off-street parking lots only (I would note that based upon the applicants data, it appears adequate off-street parking can be provided)."

Response: Using a parking ration of 0.75 per unit for the proposed (45 units) and existing (164 units) results in a parking demand of 157 spaces for the 209 units. The Portland Housing Authority currently has 183 off street spaces in the neighborhood, however 26 spaces, which are underutilized will be lost as a result of the proposed project reducing the number of off street spaces to 157. The parking assessment completed for the project presents parking demand data for 5 projects which showed an average demand of 0.48 spaces per unit. Based on this information it appears that a parking ratio of 0.75 is reasonable and it would assume no on street parking, which as a practical matter does occur to some extent but is helpful as a traffic calming mechanism.

Comment: The applicant should provide information on how the PHA parking lots will be managed. Specific details should be provided"

Response: PHA had considered assigning specific spaces to tenants, however, they have elected instead to monitor the parking once the project is construction since assignments may not prove to be necessary. They propose to issue parking guidelines to tenants that describe which lot they should park in if they have a car and monitor this program as part of their ongoing TDM monitoring program. From there, they will see if they would need to take the next step of assigning the spaces. As mentioned in the Transportation Demand Management Plan (TDM), tenants will be encouraged to use alternative forms of transportation such as the Metro, bicycling, walking, etc. and the success of this program will be monitored and reported to City staff. As previously noted, PHA will assign tenant spaces should it prove necessary.

Comment: "It is my understanding that the proposed crosswalks on Boyd Street and Oxford Street have been reviewed by the City's Crosswalk Committee. I will provide specific comments on the crosswalks in the future."

Mr. Mark Adelson
June 30, 2014
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Response: The crosswalk committee approved the proposed crosswalk at their June meeting.

Comment: *"It should be noted that recommendations from the Franklin Street Study may include some type of transportation connection from Oxford Street to Franklin Street. I need to review this possibility and whether it impacts the proposed site plan."*

Response: The proposed project should not interfere with the potential for a future connection.

Comment: *"Changes to on-street parking regulations may require an amendment to the City's Traffic Schedule and thus action by the City Council. If required, the applicant will be requested to provide information in support of the Council packet."*

Response: We are proposing one space on Boyd Street and three spaces on Oxford Street be signed for 15 minutes spaces. The reason for this request is to provide for visitor traffic to the proposed building. We understand that these proposals, if supported by City staff, may require Council Action.

Comment: *"The project appears to use existing handicapped parking spaces across Oxford Street. The applicant should provide information that the parking spaces dimensionally meet ADA standards. During my field review, one of the spaces was occupied, so the applicant should provide information on the use of these spaces for both the existing and proposed sites."*

Response: Two additional handicapped parking spaces across Oxford Street will be developed to meet ADA requirements including their connection to the Oxford Street sidewalk and crosswalk connection to the Bayside Anchor entrance. The existing handicap spaces will be relocated within the same lot to maintain their use by two accessible Bayside East apartments on that block.

Comment: *"The applicant should provide information on how Head Start Pick-up and Drop-off activities will be managed."*

Response: As discussed during our meeting at the site on June 24th, the large majority of the students already live in the neighborhood and will be walking. For those that area dropped off and or picked up, the applicant is proposing to have four spaces designated as 15 minute parking, three on Oxford Street and one directly adjacent to the HeadStart entrance.

Mr. Mark Adelson
June 30, 2014
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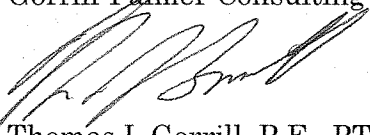
Comment: The applicant should provide details on where Police Station vehicles will park (if required)

Response: one space will be reserved in front of the police station for use by a police vehicle only during business hours.

Please let me know if you have any further questions.

Sincerely,

Gorrill-Palmer Consulting Engineers, Inc.

A handwritten signature in black ink, appearing to read 'T. L. Gorrill', is written over the printed name.

Thomas L Gorrill, P.E., PTOE
Principal



April 2, 2014

Mr. Rick Knowland, Senior Planner
City of Portland
389 Congress Street
Portland, ME 04101

RE: Bayside Anchor Response to Staff Comments

Dear Rick,

We are in receipt of your initial staff comments regarding the Application for Site Plan and Subdivision Approval and offer the following responses:

1. There is apparently no service utility letter from Portland Water District or any other utility in the submitted material.
Response: Letters of Capacity have been requested from the Portland Water District and the City of Portland Wastewater Division and were included in the application. We expect their official response prior to the Public Hearing. Power is proposed to be routed down from Cumberland Avenue and will be confirmed once the final building design and loads have been calculated.
2. Need most recent neighborhood meeting notes.
Response: The minutes from the Neighborhood Meeting are attached to this letter.
3. The site plan labels the brick sidewalk as "brick paving" which might be confused with "brick pavers". Please use the term brick sidewalk on the plan.
Response: We have made the requested change to the Site Plan which clarifies that the sidewalk will be "brick" meeting City Standards.
4. Sheet L3.0 references "town of Freeport".
Response: This was an oversight and has been corrected on the Site Plan.
5. The subdivision plat references "45 units". Revise to "45 housing units" or "45 dwelling units".
Response: We have made the requested change to the Site Plan.
6. Site plan bike parking standard references 2 bike spaces for every 5 housing units. Does the site plan meet that standard?
Response: The proposed site plan indicates four outside bicycle racks, 2 on Oxford and 2 just off the right of way on Boyd Street, providing a total of 8 bicycle spaces that will be used by tenants and guests on an as-needed basis. Additionally, there is an interior bicycle storage area on the first floor of the building with a capacity for up to 34 bicycles.
7. One of the bike racks is within the city right-of-way. Does that rack design meet city standards?
Response: The exterior bicycle racks are detailed on Sheet L-5.1 and identified as "Dero Bike Hitch" which meets City Standards.

8. Do you have a catalog cut for the exterior light fixtures indicating they have a cut-off feature?

Response: The proposed lighting is indicated on the Photometric Plan. The fixtures are Sharp cut-off type with LED illumination. A catalog cut sheet is attached to this response letter.

9. Do you have the equivalent of 2 trees per dwelling units? If not we'll need to discuss this further such as additional street trees in the neighborhood.

Response: We are proposing a total of 15 trees to be located within or adjacent to the public right-of-way as part of this project. We are aware of the requirement for trees per dwelling unit and would be open to discussions with staff on locating the remaining trees within the neighborhood or paying a fee into the City Tree fund as required per ordinance.

10. A transformer is proposed close to Boyd Street. What is the projected size and color of the transformer?

Response: We do not have a final design of the transformer requirements but are anticipating a standard CMP pad mounted transformer on a 7 ft x 7 ft pad. The standard color for these transformers is green.

11. Could you provide more info on the "special paver" for the rear terrace area? Also I believe this material is shown within a portion of the esplanade along Oxford St. which would be unusual since the sidewalk standard is brick.

Response: The "Special Paver" indicated for the rear terrace is a concrete paver manufactured by Hanover Pavers called "Plankstone". We are also proposing to use the same paver in a small portion of the esplanade along Oxford Street associated with the main entrance and gathering area. Use of this same product is intended to provide continuity between the front and rear of the project. Within the Head Start outdoor space we are proposing to utilize a porous, rubberized surfacing that will provide cushioning for the younger children and a differentiation for this space from the rest of the terrace. Details of these surfaces are indicated on Sheet L-5.0

Please review the comments and let me know if there are other issues or comments from other staff resulting from their review. As always, we appreciate the opportunity to work closely with you and the Staff on review of the project and look forward to meeting with the Planning Board on July 22 to discuss the project in greater detail. Please contact me if you have any questions or concerns.

With Regards,
CARROLL ASSOCIATES



Patrick J. Carroll, Principal

CC: Mark Adelson, PHA
Brooks More, Avesta
Rick Knowland, City of Portland

Bounce[®]

Pedestrian Scale Luminaire

70 - 200W H.I.D.



KIM LIGHTING

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SITE / AREA
PARKING STRUCTURE
ROADWAY
ARCHITECTURAL FLOOD
ACCENT
LANDSCAPE

MAILING ADDRESS:
P.O. BOX 60080
CITY OF INDUSTRY, CA 91716-0080

BUSINESS ADDRESS:
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CITY OF INDUSTRY, CA 91745
U.S.A.

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FAX 626 / 369-2695

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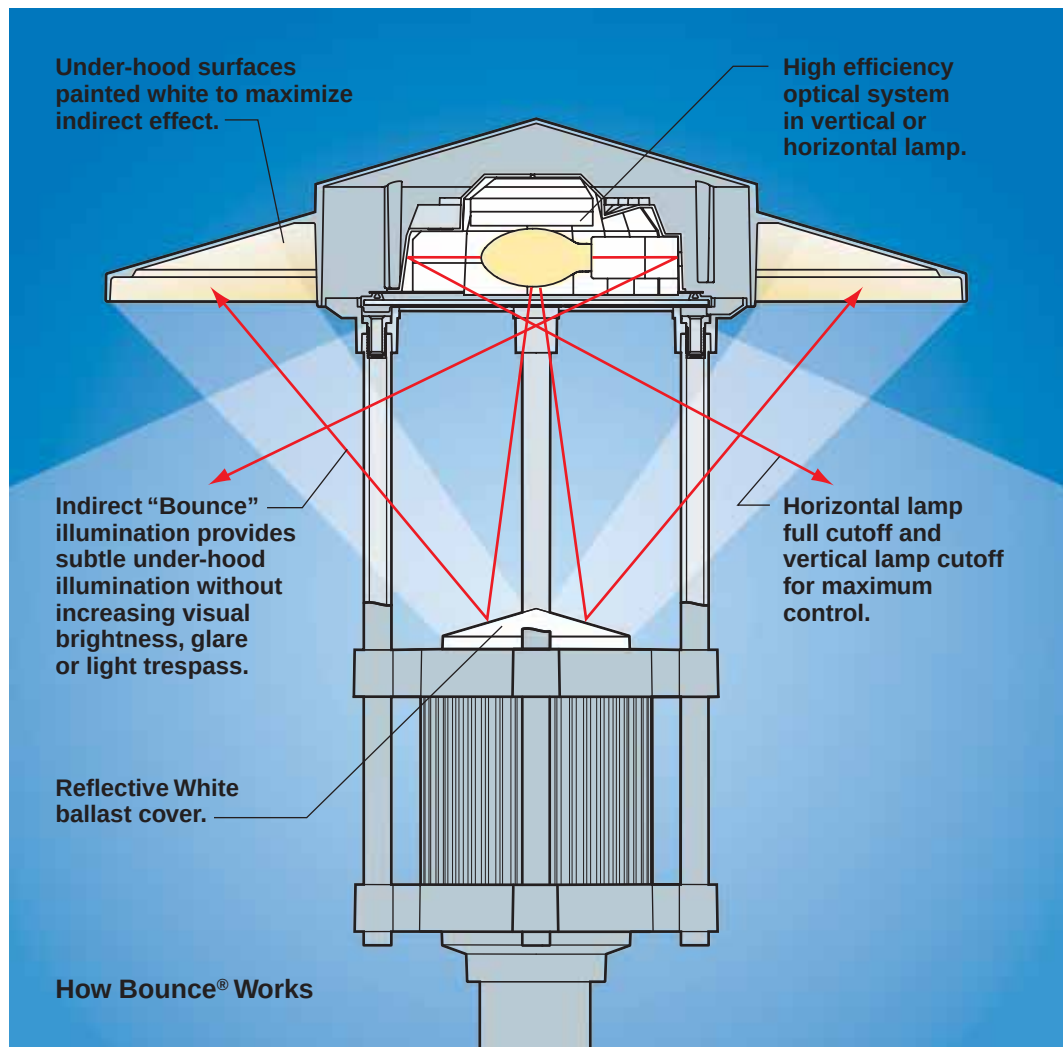


Hubbell
Lighting, Inc.

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5506510288
Version 10/10

Bounce®

The Bounce® luminaire design combines the look of contemporary European lanterns with the cutoff control and optical performance provided in every Kim area lighting product. Rather than waste light by discharging it in lateral planes, the Bounce luminaire utilizes either Vertical or Horizontal lamp optical systems with cutoff lighting control. A subtle indirect component is captured from light bouncing off the reflective white ballast compartment cover, to illuminate the underside of the fixture's hood. Bounce addresses the growing concern for control of glare and light trespass, with a unique visual presence both day and night.





Kim Theory of Relativity

The Relationship of Outdoor Lighting to Site and Architecture



ACA AC Arm Mount



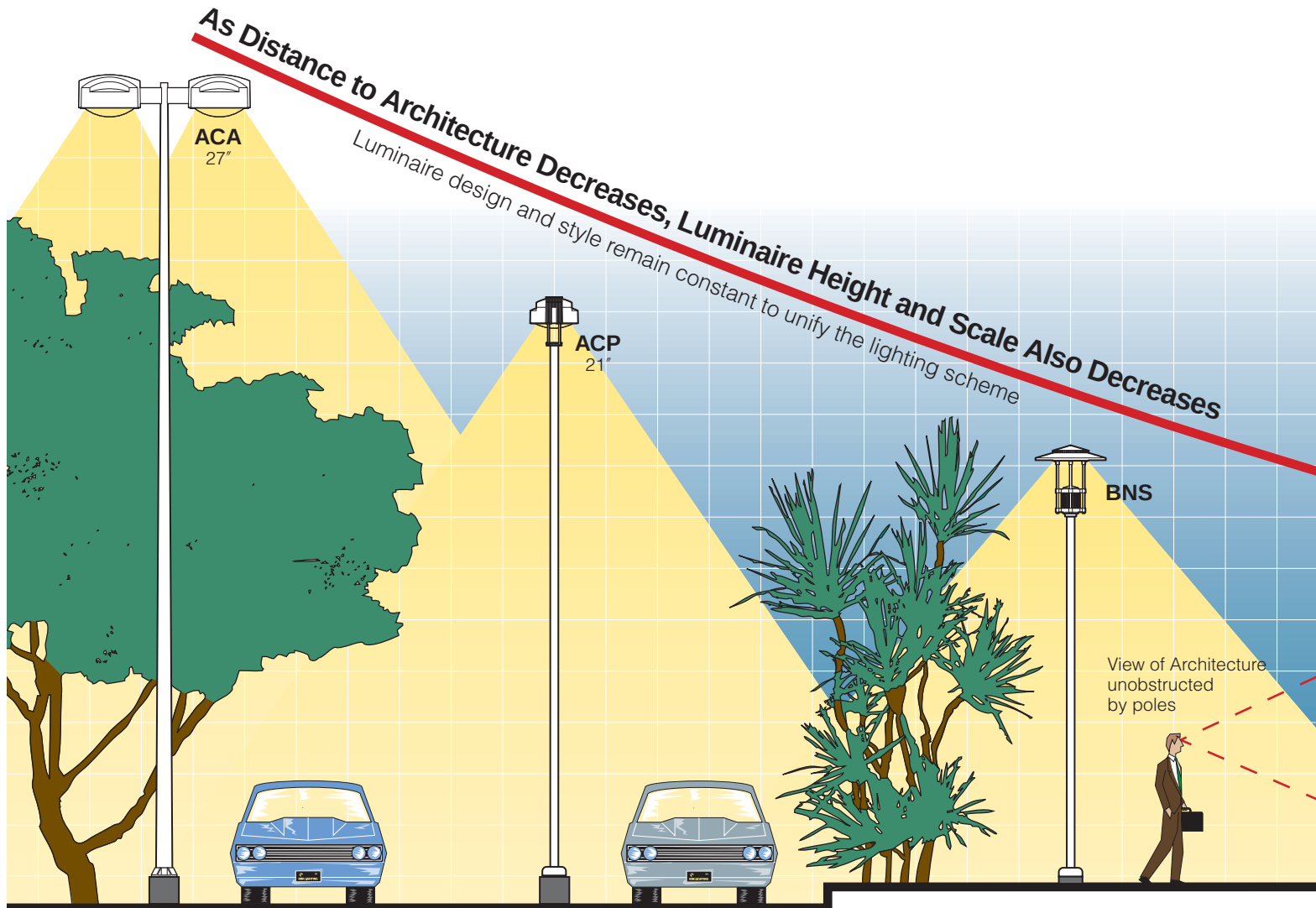
BNS Bounce®



LTV Lightvault®



GEM™ Bollard



SITE / ROADWAY ZONE

Parking lots and roadways require luminaires on 20' - 40' poles to efficiently light these large areas. Therefore, this lighting becomes dominant, and sets the design and style for all other lighting as you progress towards the building.

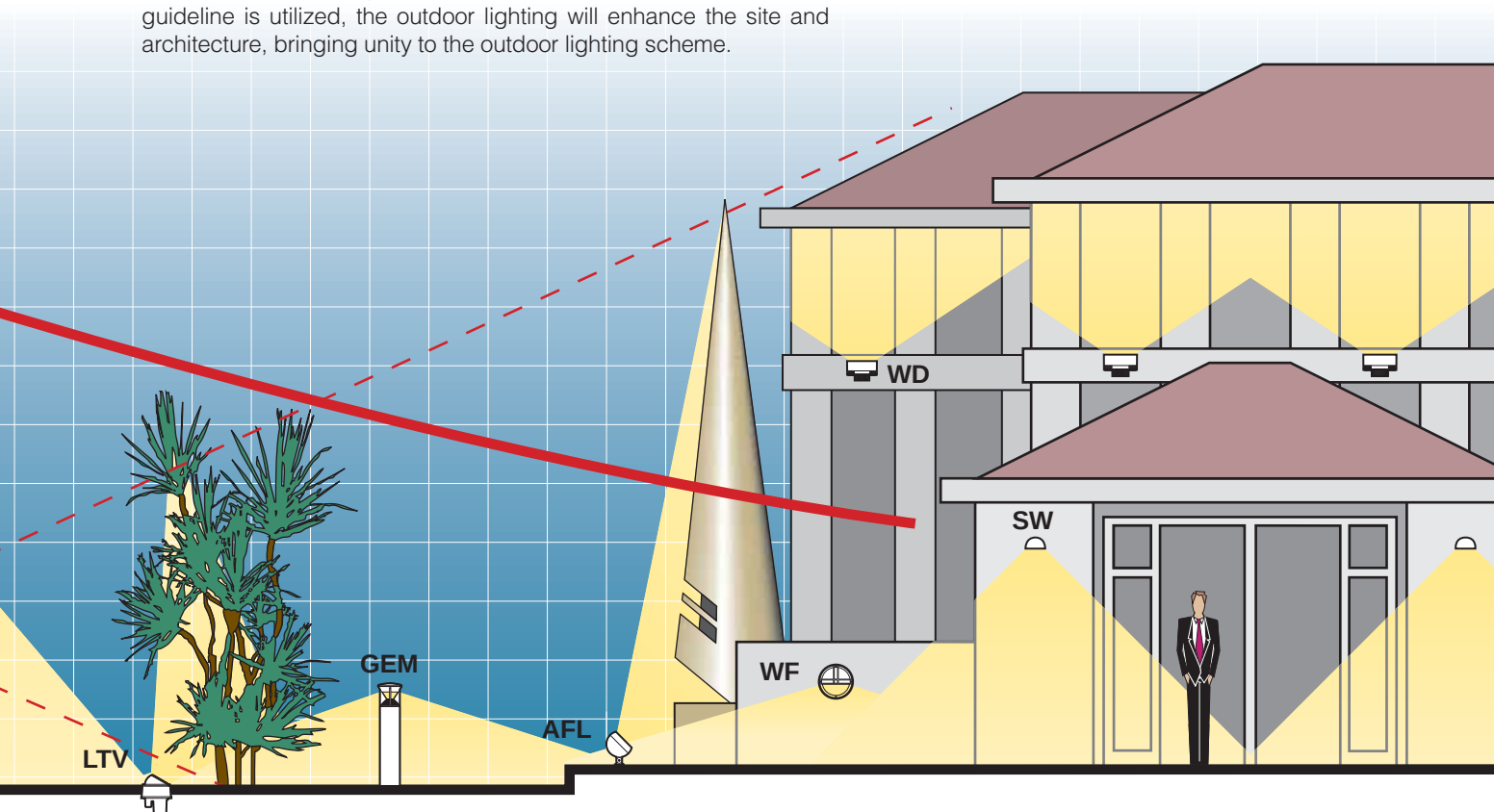
PEDESTRIAN ZONE

As you leave the parking lot and transition to pedestrian areas, poles should decrease in height to 10' - 16'. In addition, luminaires should decrease in scale, and can have more decorative features to be appreciated at the pedestrian level.



KIM THEORY OF RELATIVITY

The purpose of this guideline is to bring a cohesive look to outdoor lighting, maximizing lighting efficiency while preserving the architectural experience. Simply stated, the Kim Theory of Relativity says “Poles belong in parking lots. And, once you leave the parking lot, the outdoor lighting should become less and less conspicuous until it becomes an integral part of the architecture.” In addition, the luminaire style and geometry should remain consistent. If this guideline is utilized, the outdoor lighting will enhance the site and architecture, bringing unity to the outdoor lighting scheme.



LANDSCAPE / PATH ZONE

Near the building, luminaires should begin to disappear, blending into the landscape and hardscape elements.

BUILDING / PERIMETER ZONE

No pole mounted luminaires should ever be used near the building, as they will dominate the architecture. The only exception would be the use of decorative luminaires to delineate entrances to the structure. Building mounted, architecturally compatible fixtures should be almost invisible.

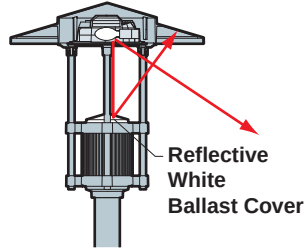
Horizontal or Vertical Lamp

See the **Kim Site / Roadway Optical Systems Catalog** for complete details and explanation of optical system features.

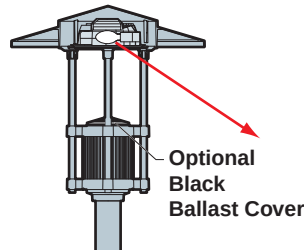
Cutoff and Bounce Optical Design

Unlike lantern style products that emit the majority of their light in the horizontal plane, the Kim Bounce design incorporates a Cutoff optical system for distribution of illumination onto the ground, combined with a controlled up-light feature to provide a subtle and unique night-time presence. For locations where Full Cutoff optical control is required, an optional black ballast cover, combined with either dark bronze or black fixture finish, and the Horizontal Lamp flat lens optical system, meet the stringent standard of no illumination at 90° from the vertical optical plane.

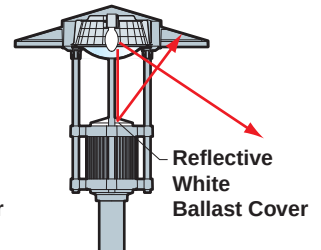
Horizontal Lamp
with indirect light



Horizontal Lamp
with Full Cutoff option



Vertical Lamp
with indirect light



Horizontal Lamp

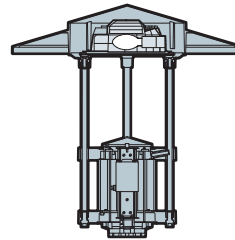
Available in **Type II**, **Type III**, **Type IV**, and **Type V** Square distributions, providing **maximum cutoff control** and very good uniformity.

Die-Cast Reflector Construction

Bounce utilizes die-cast aluminum optical chambers to provide a rigid foundation for the high efficiency reflector components. This produces the most durable, accurate, and highly repeatable optical system possible. The optical chamber is painted reflective white to increase efficiency and reduce lamp source apparent brightness.

Convex Lens Option

An optional Convex Lens produces a subtle improvement in uniformity where fixtures are spaced widely apart. This option will also increase fixture presence and improves houseside shielding effectiveness. Maintains Cutoff classification.



Cutoff Control

The horizontal lamp optical system, combined with tight control of the subtle up-light into the fixture hood, maintains its classification as "Cutoff", producing low glare and control of light trespass.

Full Cutoff Option

For locations where Full Cutoff optical control is mandated, an optional black ballast cover can be specified. This eliminates all indirect up-light distribution, producing a Full Cutoff luminaire, when used in conjunction with a dark bronze or black luminaire finish, and the standard flat lens.



Type II



Type III



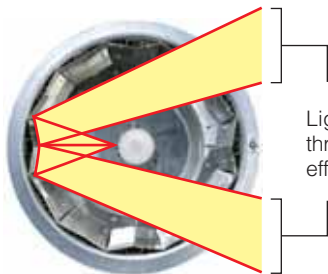
Type IV



Type V

Vertical Lamp

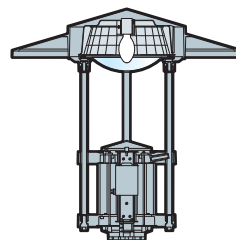
Available in **Asymmetric** and **Symmetric** distributions, providing vertical lamp performance in a compact luminaire profile with excellent uniformity. **Symmetric** downlight distribution (BNS1F3 and BNS1F5) produces a soft glow and maximum fixture presence.



Light is directed around, not through the lamp for maximum efficiency.

Reflected Energy Directed Around the Lamp

Wide-beam vertical lamp reflectors often redirect heat and light back through the lamp, reducing efficiency. The Kim Split Beam optical design re-directs energy around the lamp into the desired useable lighting zones. The result is a cooler running lamp and higher luminaire efficiency.



Cutoff Control

The vertical lamp optical system, combined with tight control of the subtle up-light into the fixture hood, maintains its classification as "Cutoff", producing low glare and control of light trespass.



Asymmetric



Symmetric
Square

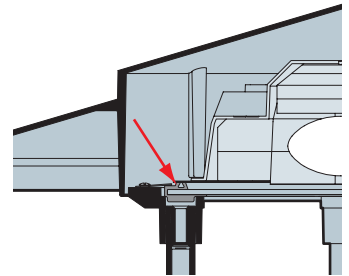
Precision Components

The hood and ballast chamber cover are die-cast aluminum for precision and repeatability. The ballast housing and support rods are extruded aluminum. Use of low-copper aluminum alloys (<0.6% Cu) provides trouble-free service and corrosion resistance.



Sealed Optical Chamber

The optical chamber is completely sealed, including wire entries. The lens is sealed with a molded silicone gasket. By eliminating the intrusion of moisture, dust, and insects, efficiency and maximum light output is maintained between maintenance intervals.



No-Tool Relamping

The hood is secured with a latch, and is hinged for relamping. A self-locking stop arm retains the hood/lamp compartment in the open position for easy maintenance.



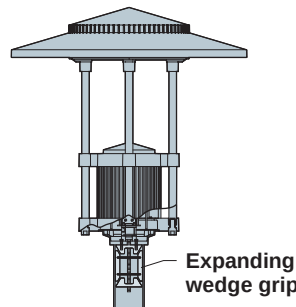
Easy Installation

The ballast module is factory prewired with a quick-disconnect plug, and mounted to a slide-in tray. Removal for maintenance or access to mounting fasteners is done without disturbing fixture wiring.



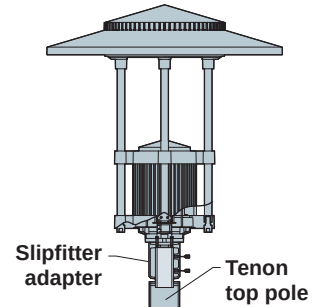
Post Top Mounting

The Bounce® post top mounting can be installed flush to square cut round poles. The **FM** Flush Mount for 4" round poles, produces the cleanest appearance with fully concealed fasteners, utilizing Kim's patented wedge grip. A single concealed bolt attaches the fixture.



Pole Top Tenon Mount

The Bounce® Pole Tenon Mount, for 2" pipe-size tenon (2 3/8" O.D. x 4 1/2" minimum length) provides flexibility for mounting to specialty poles (by others). **PT** Pole Tenon mount is held in place by four set screws. One set screw is drilled into tenon to prevent fixture rotation.



Twin Post Top Mounting

The Bounce® twin post top mount is installed onto 4" or 5" poles with extruded arms and risers with cast end caps. All fasteners and trim components are provided.



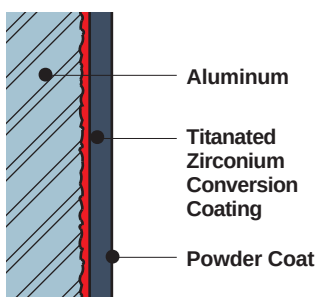
Wall Mount

The Bounce® wall mount installation includes a cast mounting plate, a cast cover plate, and an extruded arm and riser with cast end caps.



Eight Stage Durable Powder Coat Finish

Kim's state-of-the-art powder coat paint system is engineered to provide the highest quality finish with absolute paint adhesion under weather extremes. The Super TGIC thermoset polyester powder coat finish is applied over a Titanated Zirconium conversion coating. This finish system has exceeded the A.S.T.M. 2500 hour salt spray test.



1. Power wash and degrease.
2. Detergent tank bath.
3. Clear water rinse bath.
4. Premium Titanated Zirconium conversion coating as used in the automobile industry.
5. Clear water rinse bath.
6. Dry off oven.
7. Powder coating, 2.5 mil nominal thickness.
8. Bake for 20 minutes at 410°F.

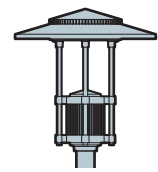
Standard Super TGIC Colors

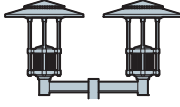
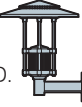
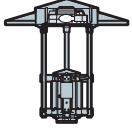
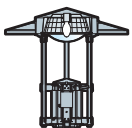
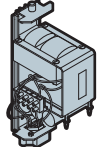
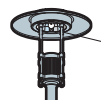
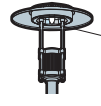
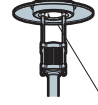
- BL-P** Black
- DB-P** Dark Bronze
- LG-P** Light Gray
- PS-P** Platinum Silver
- WH-P** White

Ordering Information

BNS1 Bounce

BNS1



Ordering Example:		Mounting	Fixture	Electrical Module	Finish	Options	Pole																																																										
For Standard Fixture and Pole		FM / BNS1H2 / 100MH277 / PS-P / A-33 / PRA14-4125FM / PS-P																																																															
		1	2	3	4	5-10 See p. 9	See Kim Pole Catalog (PRA, KRS for NS) Omit for 1W Wall Mount																																																										
1 Mounting:	 Flush Mount 4" O.D. Poles only EPA: 1.2 Cat. No.: FM  Tenon Mount For Poles with 2" Pipe-size Tenon EPA: 1.2 Cat. No.: PT  Twin Mount 4" or 5" O.D. Poles only 3.6 2SB  Wall Mount n/a 1W																																																																
2 Fixture:	Cat. No. designates BNS1 fixture and light distribution. See the Kim Site/Roadway Optical Systems Catalog for detailed information on reflector design and application. Horizontal Lamp Flat Glass Lens  Type II Cat. No.: BNS1H2  Type III Cat. No.: BNS1H3  Type IV Forward Throw Cat. No.: BNS1H4  Type V Square Cat. No.: BNS1H5  Vertical Lamp Convex Glass Lens  Asymmetric Cat. No.: BNS1F3  Symmetric Square Cat. No.: BNS1F5 																																																																
3 Electrical Module:	 Lamp Watts 100 Lamp Type HPS Line Volts 277 <table><tr><td>70HPS120</td><td>100HPS120</td><td>150HPS120</td><td>175MH120</td><td rowspan="2">¹ Not for use in horizontal lamp reflectors.</td></tr><tr><td>70HPS208</td><td>100HPS208</td><td>150HPS208</td><td>175MH208</td></tr><tr><td>70HPS240</td><td>100HPS240</td><td>150HPS240</td><td>175MH240</td><td rowspan="2">² Check with local codes for use of medium base sockets with the 480 volt.</td></tr><tr><td>70HPS277</td><td>100HPS277</td><td>150HPS277</td><td>175MH277</td></tr><tr><td>70HPS347</td><td>100HPS347</td><td>150HPS347</td><td>175MH347</td><td></td></tr><tr><td>70HPS480²</td><td>100HPS480²</td><td>150HPS480²</td><td>175MH480²</td><td></td></tr><tr><td>70PMH120</td><td>100PMH120</td><td>150PMH120</td><td>175PMH120¹</td><td>200PMH120¹</td></tr><tr><td>70PMH208</td><td>100PMH208</td><td>150PMH208</td><td>175PMH208¹</td><td>200PMH208¹</td></tr><tr><td>70PMH240</td><td>100PMH240</td><td>150PMH240</td><td>175PMH240¹</td><td>200PMH240¹</td></tr><tr><td>70PMH277</td><td>100PMH277</td><td>150PMH277</td><td>175PMH277¹</td><td>200PMH277¹</td></tr><tr><td>70PMH347</td><td>100PMH347</td><td>150PMH347</td><td>175PMH347¹</td><td>200PMH347¹</td></tr><tr><td>70PMH480²</td><td>100PMH480²</td><td>150PMH480²</td><td>175PMH480^{1,2}</td><td>200PMH480^{1,2}</td></tr></table>							70HPS120	100HPS120	150HPS120	175MH120	¹ Not for use in horizontal lamp reflectors.	70HPS208	100HPS208	150HPS208	175MH208	70HPS240	100HPS240	150HPS240	175MH240	² Check with local codes for use of medium base sockets with the 480 volt.	70HPS277	100HPS277	150HPS277	175MH277	70HPS347	100HPS347	150HPS347	175MH347		70HPS480 ²	100HPS480 ²	150HPS480 ²	175MH480 ²		70PMH120	100PMH120	150PMH120	175PMH120 ¹	200PMH120 ¹	70PMH208	100PMH208	150PMH208	175PMH208 ¹	200PMH208 ¹	70PMH240	100PMH240	150PMH240	175PMH240 ¹	200PMH240 ¹	70PMH277	100PMH277	150PMH277	175PMH277 ¹	200PMH277 ¹	70PMH347	100PMH347	150PMH347	175PMH347 ¹	200PMH347 ¹	70PMH480 ²	100PMH480 ²	150PMH480 ²	175PMH480 ^{1,2}	200PMH480 ^{1,2}
70HPS120	100HPS120	150HPS120	175MH120	¹ Not for use in horizontal lamp reflectors.																																																													
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70HPS480 ²	100HPS480 ²	150HPS480 ²	175MH480 ²																																																														
70PMH120	100PMH120	150PMH120	175PMH120 ¹	200PMH120 ¹																																																													
70PMH208	100PMH208	150PMH208	175PMH208 ¹	200PMH208 ¹																																																													
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70PMH277	100PMH277	150PMH277	175PMH277 ¹	200PMH277 ¹																																																													
70PMH347	100PMH347	150PMH347	175PMH347 ¹	200PMH347 ¹																																																													
70PMH480 ²	100PMH480 ²	150PMH480 ²	175PMH480 ^{1,2}	200PMH480 ^{1,2}																																																													
4 Finish:	Color: Black Cat. No.: BL-P Dark Bronze DB-P Light Gray LG-P Platinum Silver PS-P White WH-P Custom Colors CC-P Consult representative for custom colors.																																																																
5 Optional Photocell:	Line Volts: 120V Cat. No.: A-30 208V A-31 240V A-32 277V A-33 347V A-35 480V A-34																																																																
6 Optional Convex Glass Lens:	Cat. No.: CGL Tempered convex glass lens replaces standard flat lens. For horizontal lamp Type II, Type III, Type IV, and Type V distribution.  Convex Glass Lens																																																																
7 Optional Convex Polycarbonate Lens:	Cat. No.: CP Clear convex Polycarbonate Lens replaces standard glass lens.  Convex Polycarbonate Lens																																																																
8 Optional Houseside Shield:	Cat. No.: HS Not for use with Type V (horizontal lamp) or symmetric (vertical lamp) light distributions.  HS for flat lens Cat. No.: HSC For use with all fixtures with convex glass or polycarbonate lenses. Not for use with Type V or symmetric light distributions.  HSC for convex lens																																																																
9 Optional Black Ballast Cover:	Cat. No.: BBC Replaces reflective white ballast cover with black ballast cover. For use in conjunction with black or dark bronze fixture finish and horizontal lamp optics utilizing a flat lens only. Eliminates under-hood illumination.																																																																
10 Optional Fusing:	Line Volts: 120V Cat. No.: SF 208V DF 240V DF 277V SF 347V SF 480V DF																																																																



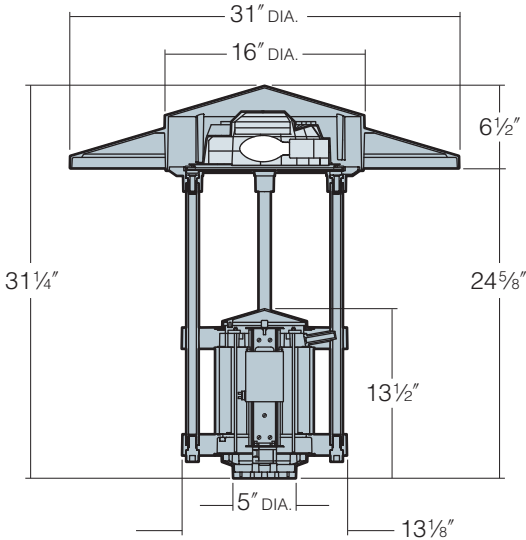
Luminaire Specifications

BNS1

Dimensions

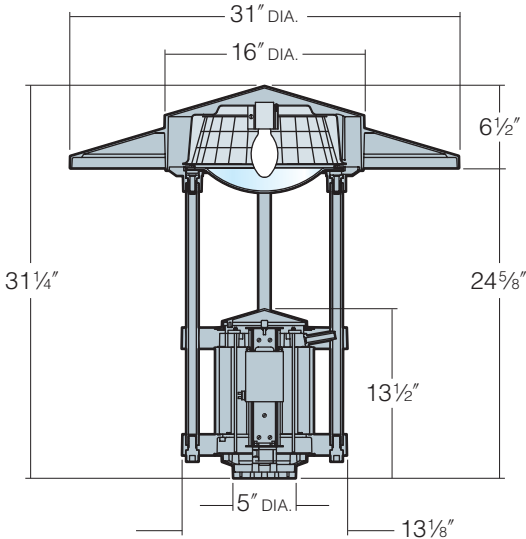
Horizontal Lamp

70 to 175 watt
Medium Base Lamps

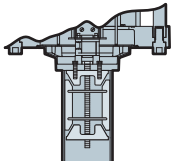


Vertical Lamp

70 to 200 watt
Medium Base Lamps

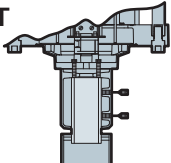


FM



4" O.D. extruded
aluminum pole

PT



Pole with 2" pipe-size tenon
(2 3/8" O.D. x 4 1/2" min. length)

Hood and Lens Frame: Die-cast, low copper (<0.6% Cu) aluminum hood and lens frame with stainless steel hinge. The hood is opened with a tool-less latch made of die-cast aluminum and stainless steel brackets. The hood is held open for relamping with a stainless steel wire self-locking stop arm. The 3/16" thick clear flat or convex tempered glass lens seals against the reflector flange by a one-piece molded silicone gasket, to produce a fully sealed optical chamber. The underside of the hood is always painted white.

Reflector Module: Specular Alzak® optical segments are rigidly mounted within an aluminum enclosure (die-cast for horizontal, spun for vertical) which attach to the hood as a one-piece module with four captive screws. The 4KV, medium base socket is factory prewired with a high temperature quick-disconnect plug. The wires pass through a silicone gasket to maintain sealed optical chamber integrity.

Ballast Chamber: Die-cast, low copper (<0.6% Cu) aluminum flanges compress a ribbed extruded aluminum chamber. The die-cast aluminum cover is held with two captive stainless steel screws and a retaining wire is provided to secure the cover during installation or servicing. The four heavy wall extruded support rods are mechanically fastened to the lens frame with stainless steel fasteners. The support rods are held in position through die-cast arms and mechanically fastened at the bottom with a custom aluminum bolt. The electrical wiring is channeled through a support rod with an aluminum bushing. The die-cast cover is always painted reflective white. (Optional Black Ballast Cover).

Electrical Module: All electrical components are UL and CSA recognized mounted on a single bracket and factory prewired to a main power disconnect plug. The power quick-disconnect plugs are glass-filled thermoplastic, self aligning, and rated for 10,000 matings. The male portion of the plug is mounted to the ballast bracket and the female portion is mounted to the bottom die-cast flange section. Wires are supplied to reach the pole hand hole. Power to the ballast disconnects when the bracket is pulled out. All ballasts are high power factor with starting temperatures of -40°F for HPS and -20°F for MH lamp modes.

Finish: Super TGIC thermoset polyester powder coat paint, 2.5 mil nominal thickness, applied over a Titanated Zirconium conversion coating; 2500 hour salt spray test endurance rating. Standard colors are Black, Dark Bronze, Light Gray, Platinum Silver, or White. Custom colors are available and subject to additional charges, minimum quantities and longer lead times. Consult representative.

CAUTION: Fixtures must be grounded in accordance with national, state, and/or local codes. Failure to do so may result in serious personal injury.

Listings and Ratings

UL cUL 1598	25C Ambient
IP66 Rated	ISO 9001:2000

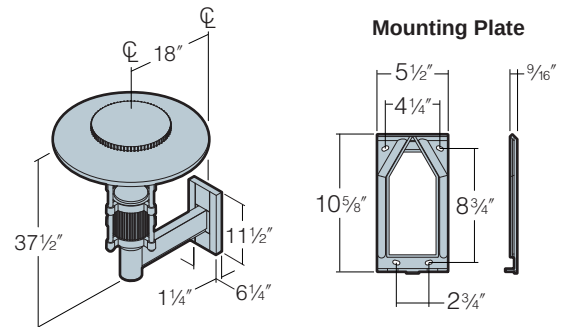
Pole Mounting

FM - Flush Mounting by means of an expansion device activated by a single bolt within the ballast compartment. Pole must have a plain-cut top. Standard pole size is 4" O.D. (Other pole adapter sizes available; contact Kim representative).

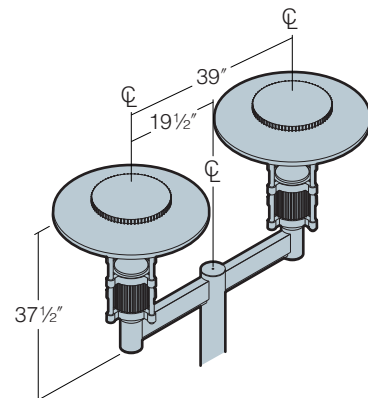
PT - Pole Tenon mounting by means of a cast aluminum adapter containing four recessed 3/8" stainless steel allen head set screws. Pole must have a 2" pipe-size tenon (2 3/8" O.D. x 4 1/2" minimum length). Pole tenon must be field drilled at one set screw location to secure against fixture rotation.

See page 6 for complete ordering information

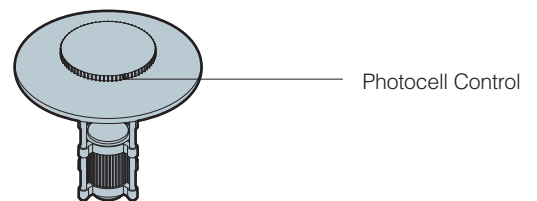
Wall Mounting: Extruded aluminum arm is factory assembled, with internal concealed draw bolts, to an extruded aluminum fixture support riser and a cast aluminum wall cover plate. A cast aluminum wall mounting plate pre-attaches to wall with bolts (by others). Fixture riser has a cast aluminum bottom cap. Wall cover plate has a removable cast aluminum cover for field splice access. Complete arm assembly can be mounted before field splices are made. All components are mechanically attached with no visible welds or fasteners. All wall components are finished to match fixture.



Twin Mounting: Two extruded aluminum arms are supplied with internal concealed draw bolts for attachment to Kim 4" and 5" O.D. poles with predrilled mounting holes. Arms are 180° apart, supplied with an internal pole reinforcing plate with wire strain relief and an extruded aluminum riser for mounting FM (Flush Mount) fixtures only. A cast aluminum pole cap and matching riser cap are included, and all components are mechanically fastened to eliminate welds and visible fasteners. All components are finished to match fixture.



Photocell: Factory installed fully gasketed sensor mounted in the hood.

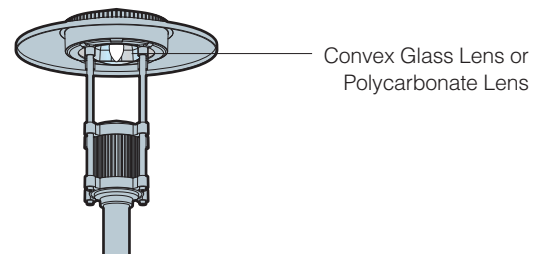


Convex Glass Lens: The 3/16" thick clear convex tempered glass lens replaces the standard flat glass lens in horizontal lamp fixtures. Provides increased lens presence and provides a subtle improvement in uniformity where pole spacing is extreme.

NOTE: Convex lens is standard on all Vertical Lamp Optical Systems.

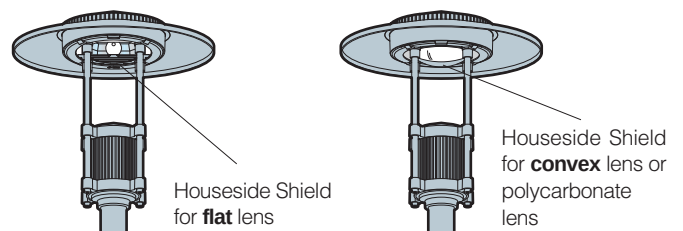
Polycarbonate Lens: One piece vacuum formed, clear, UV stabilized convex polycarbonate, fully gasketed, replacing the standard tempered flat or convex glass lens.

CAUTION: Use only when vandalism is anticipated to be high. Useful life of lens is limited by UV discoloration from sunlight and metal halide lamps.



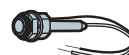
Houseside Shield: (Types II, III, IV - Asymmetric distributions only).

The cutoff horizontal reflectors are available with stamped aluminum louvers that pass streetside light and block houseside light, and a blackened panel added to the reflector to reduce houseside reflections. The vertical reflectors and horizontal reflectors with the optional convex lens are available with a formed aluminum shield that passes streetside light and blocks houseside light, and a blackened panel added to the reflector to reduce houseside reflections.



Black Ballast Cover: (For Full Cutoff distributions). Replaces reflective white ballast cover with black ballast cover. For use in conjunction with black or dark bronze fixture finish and horizontal lamp optics utilizing a flat lens only. Eliminates indirect under-hood illumination and horizontal light distribution, to produce a full cutoff light distribution. For use with Black or Dark Bronze fixtures only.

Fusing: High temperature fuse holders factory installed. Fuse is included.





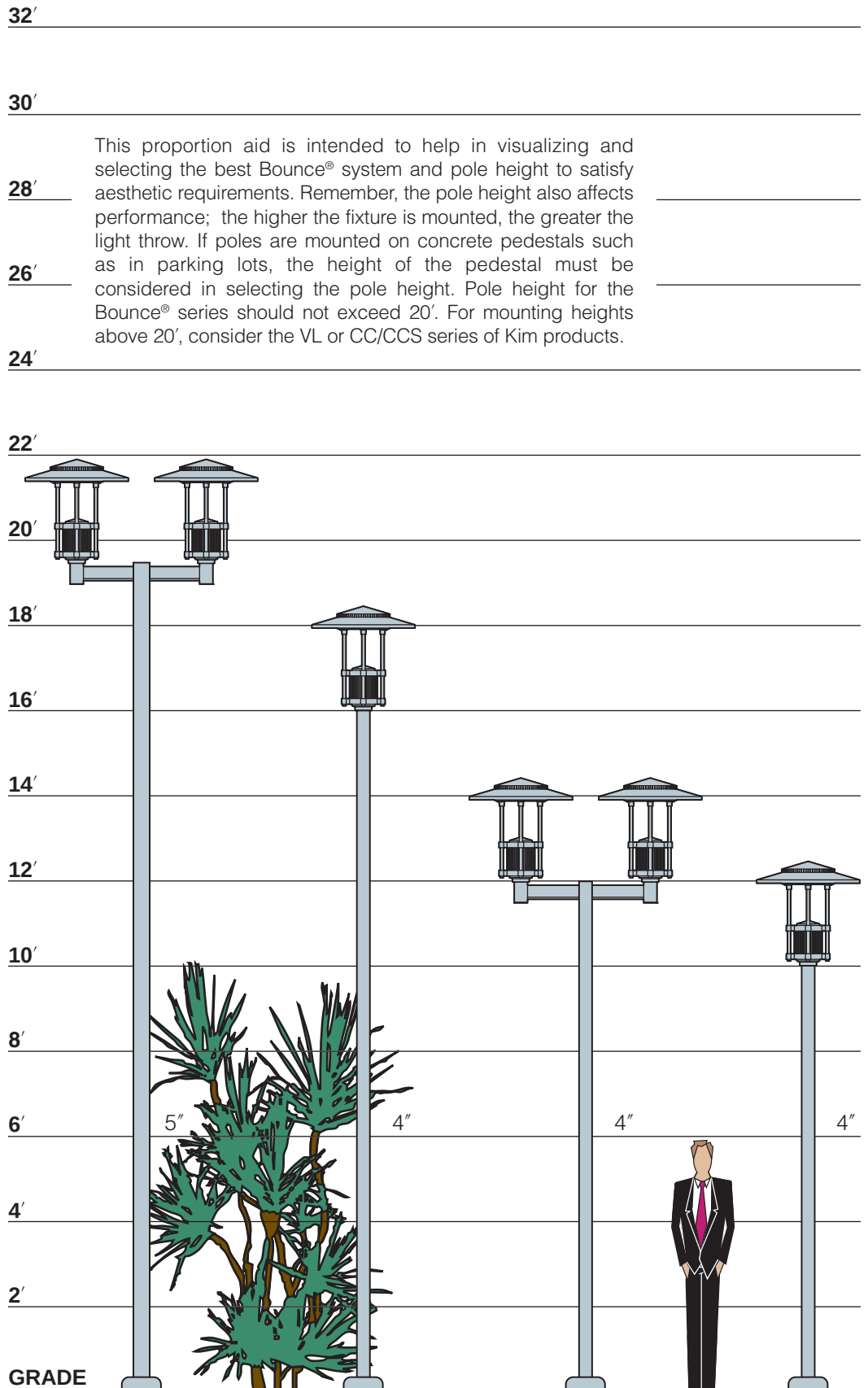
70 to 200 Watt / 10' to 20' Poles

The role of a Pedestrian Scale Luminaire

A true pedestrian scale luminaire like the Bounce® can satisfy many diverse requirements. Where pole mounting heights are restricted by local code and aesthetics, the Bounce® series is ideal. It is specifically designed for broad illumination at low mounting heights, in such locations as parks or along small streets, where mature trees would block the light if taller poles were used. The smaller scale of one or two story structures may dictate the use of a pedestrian scale luminaire so lighting equipment does not overpower the architecture. These are just a few instances where Bounce® provides an exceptional solution.

Mounting Height

As a pedestrian scale luminaire, Bounce® is most commonly mounted on 8' to 20' poles. Within this height range, the fixture, coupled with the standard 4" pole diameter, provides pleasing proportions. Wide throw light distributions also provide outstanding uniformity of illumination. This translates to maximum pole spacing, and the economy this brings in terms of initial cost and long term energy conservation.



Lamp and Electrical Guide

Lamp	Lamp Watts	ANSI Ballast Type	Life (Hours)	Initial Lumens ¹	Voltage	Operating Amps.	Open Circuit	Starting Amps.	Max. Amps.					
HIGH PRESSURE SODIUM														
70HPS ED-17 Coated Medium Base	70	S-62	24000+	5860	120	0.81	1.45	0.75	1.45					
					208	0.47	0.85	0.45	0.85					
					240	0.40	0.75	0.37	0.75					
					277	0.35	0.65	0.35	0.65					
					347	0.30	0.55	0.30	0.55					
100HPS ED-17 Coated Medium Base	100	S-54	24000+	8800	480³	0.21	0.36	0.21	0.36					
					120	1.15	2.20	1.30	2.20					
					208	0.67	1.25	0.75	1.25					
					240	0.58	1.10	0.65	1.10					
					277	0.50	0.85	0.60	0.85					
150HPS ED-17 Coated Medium Base	150	S-55	24000+	15000	347	0.39	0.70	0.45	0.70					
					480³	0.29	0.55	0.35	0.55					
					120	1.65	2.80	2.00	2.80					
					208	0.95	1.60	1.15	1.60					
					240	0.83	1.40	1.00	1.40					
					277	0.72	1.25	0.85	1.25					
					347	0.56	0.92	0.52	0.92					
					480³	0.42	0.70	0.50	0.70					
					METAL HALIDE									
					175MH ED-17 Coated Medium Base	175	M-57	10000+	13300	120	1.80	1.80	1.30	1.80
208	1.04	1.04	0.75	1.04										
240	0.90	0.90	0.65	0.90										
277	0.80	0.80	0.55	0.80										
347	0.65	0.70	0.50	0.70										
					480³	0.45	0.45	0.35	0.45					
					PULSE START METAL HALIDE									
					70PMH ED-17 Coated Medium Base	70	M-98	10000+	5700	120	0.80	1.90	0.55	1.90
										208	0.46	1.00	0.30	1.00
										240	0.40	0.90	0.25	0.90
277	0.35	0.80	0.25	0.80										
347	0.28	0.65	0.20	0.65										
100PMH ED-17 Coated Medium Base	100	M-90	12000+	8500	480³	0.23	0.50	0.26	0.50					
					120	1.15	2.30	1.20	2.30					
					208	0.66	1.40	0.80	1.40					
					240	0.58	1.15	0.65	1.15					
					277	0.50	1.00	0.60	1.00					
150PMH ED-17 Coated Medium Base	150	M-102	10000+	12000	347	0.40	1.00	0.40	1.00					
					480³	0.30	0.15	0.30	0.55					
					120	1.60	3.65	1.75	3.65					
					208	1.00	2.10	1.30	2.10					
					240	0.80	1.80	0.85	1.80					
175PMH² ED-17 Coated Medium Base	175	M-137	15000+	16600	277	0.70	1.58	0.77	1.58					
					347	0.55	1.25	0.65	1.25					
					480³	0.42	0.81	0.45	0.81					
					120	1.80	1.80	0.95	1.80					
					208	1.05	1.05	0.55	1.05					
200PMH² ED-17 Coated Medium Base	200	M-136	12000+	20000	240	0.90	0.90	0.45	0.90					
					277	0.80	0.80	0.40	0.80					
					347	0.63	0.60	0.32	0.63					
					480³	0.46	0.44	0.13	0.46					
					120	2.00	2.00	0.75	2.00					
					208	1.20	1.20	0.40	1.20					
					240	1.00	1.00	0.35	1.00					
					277	0.85	0.85	0.30	0.85					
					347	0.70	0.65	0.25	0.70					
					480³	0.50	0.50	0.18	0.50					

¹ All initial lumen values and rated life shown may vary, due to operating orientation (vertical/horizontal), and from one manufacturer to another. Consult lamp manufacturer's data for exact lumen and life data.

² Indicated lamps are for use in vertical lamp luminaires only. Data provided is extracted from Venture Uni-Form product information.

³ 480 volt with medium base lamp sockets may require approval by the local building code authority.

NOTE: For lamp/ballast information outside of the U.S.A. and Canada, please consult your local Kim representative.

WARNING: All fixtures must be grounded in accordance with local codes or the National Electrical Code. Failure to do so may result in serious personal injury. Lamps by others.



Applications Assistance

Kim Lighting utilizes the latest computer technology and software to provide specifiers with reliable evaluations of lighting system performance.

Kim can analyze a proposed luminaire layout or provide recommendations based on performance criteria.

Hard copies of plans can be sent directly to the Kim Applications Department via fax, express or regular mail. Any .dwg or .dxf file can be transmitted via modem or email (kim.apps@kimlighting.com), or placed on diskette, CD ROM or Zip disk, and forwarded to Kim Lighting c/o Kim Apps.

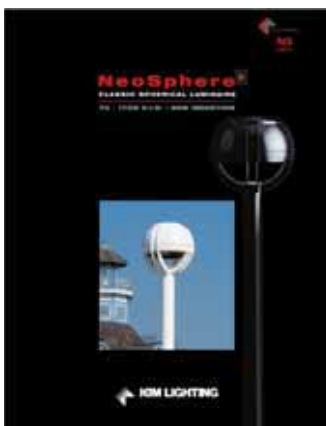


Photometric Files

Kim photometric files are available free in both electronic and hard copy format.

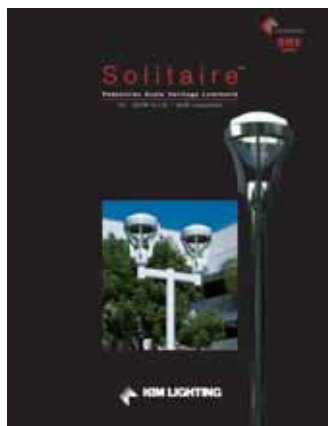
Electronic photometric files include .pdf file format pages for printing and .ies files for use in lighting calculation software. The complete .ies / .pdf library is available on CD ROM and on the internet at www.kimlighting.com.

Other Kim Pedestrian Zone Luminaires



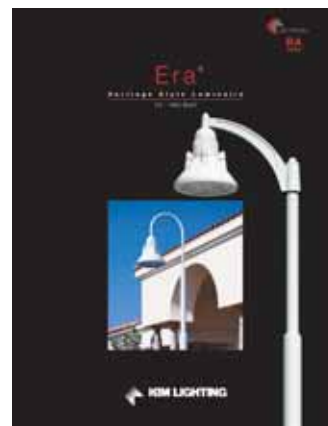
NeoSphere®

Spherical style with a full compliment of optical choices from cutoff to induction fluorescent.



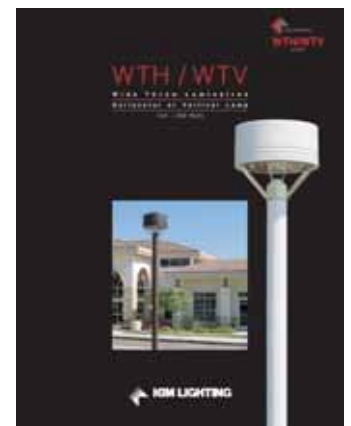
Solitaire™

Classic lantern style with modern optical design, from cutoff to induction fluorescent.



Era®

Heritage style with a wide range of mounting and optical choices.



WTH / WTV

Curvilinear style with reveal banding, provides simple and clean contemporary accent.

Bounce[®]

Pedestrian Scale Luminaire



Because of a continuing product improvement program, Kim Lighting reserves the right to change specifications without notice.

How may we serve you better?
Let us know by visiting our web site at:
www.kimlighting.com

Your input is valuable to us.



KIM LIGHTING



Bayside Anchor Site Plan Application

Neighborhood Meeting June 4, 2014

Meeting Minutes

Development Team Attendees: Mark Adelson, Portland Housing Development Corp; Brooks More, Avesta Housing; Pat Carroll, Carroll Associates; Erin _____, Carroll Associates; Jesse Thompson, Kaplan Thompson Architects; Morgan Law, Kaplan Thompson Architects.

Five members of the public were in attendance.

Mark Adelson briefly introduced the project concept, location and the development team.

Pat Carroll described the project, location, current use of the land, general building dimensions, exterior improvements to sidewalks and walkways, handicapped parking, landscaping and exterior terrace. He also explained that parking is to be built for the project except of the handicapped spaces. Parking would be available on the current lots PHA throughout the Bayside campus.

Jesse Thompson described the building and units in more detail, including the mix of affordable and market rate units, the units sizes, and the location of entrances and common areas. He also explained the environmental and energy efficiency goals for the building.

Question from a PHA resident at Bayside Terrace: What will the rents be and is it similar to Public Housing. It was explained that the rents are affordable but not subsidized like Public Housing.

Comment from a PHA resident at Bayside Terrace: The development should include apartments with three bedrooms too.

Question from Smith Street resident: Will there be more opportunities for public comment? The response was yes, at the Planning Board Workshop and Public Hearing.

Comment from Smith Street resident: She doesn't love the color shown on the elevation, but she likes the features surrounding windows. Her tastes are more conservative.

Meeting Ended at 7:00 P.M.



NEW Hanover®
PlankStone™





shown in #B92966 with Tudor® finish

Hanover® PlankStone™

Hanover’s NEW PlankStone™ introduces a completely new look for modular paving. Sized at 2 7/8” x 23 1/2” with a 4” thickness, Hanover® PlankStone™ creates the look of traditional wood board decking. Pieces can be laid horizontally, vertically or in alternating directions. Installation designs are endless.

Hidden spacers allow for sand joint interlock. PlankStone™ is suggested for pedestrian use only. Hanover® PlankStone™ is stocked in Chocolate/Tan and Natural/Charcoal color blends with a Natural finish. Tudor® finish, as well as custom aggregates and color blending are available when quantities permit.



NEW PlankStone™ with Tudor® Finish
2 7/8" x 23 1/2" x 4"

shown in #B91841

NEW PlankStone™ with Natural Finish
2 7/8" x 23 1/2" x 4"

shown in Chocolate/Tan Blend

	thickness	pcs. per s.f.	s.f. per strap	pcs. per cube	s.f. per cube	s.f. per truck	lbs. per cube
2 7/8" x 23 1/2"	4"	2	-	100	50	1050	2145

Sizes shown are nominal. Products are made to fit metric modules.



ATT 18

June 5, 2014

Mr. Rick Knowland
City of Portland Planning Authority
4th Floor, City Hall
389 Congress Street
Portland, ME 04101

RE: Bayside Anchor, 81 East Oxford Street

Dear Rick,

On behalf of the Portland Housing Authority and Portland Housing Development Corporation, we are pleased to submit this response to Staff comments relating to the Preliminary Level III Site Plan Application for Bayside Anchor. We appreciate the thorough review that staff has taken to date and look forward to working closely with the City as this project develops. We offer the following responses to comments submitted through today in email, letter, and voice conversations:

Comments by Rick Knowland in email received 05.30.2014

1. *Need a subdivision plan.*

Response. A subdivision plan will be submitted by Owen Haskell as part of the final submission.

2. *The assumption is that the Head Start use is a conditional use like other kindergarten uses unless clarifying information is submitted to support applicant's position. This material will be reviewed by Marge Schmuckal, Zoning Administrator.*

Response. As the name Bayside Anchor describes, this proposed building is envisioned to function as the community hub for the PHA Campus and East Bayside neighborhood. We believe Head Start is an important accessory use to the existing PHA campus development and as such is allowed under the current R-7 zoning.

Head Start is a federally funded half-day morning early childhood education program that operates only during the school year. The programs serve 4 and 5 years olds from low income families in the neighborhood. The Head Start and Childcare programs have been serving PHA residents in its current location on PHA property, 58 Boyd Street, since the early 1990's. It fills a tremendous need and has become an integral part of PHA's effort to promote and assist families to succeed and achieve self-sufficiency. PHA families are the priority for the program's annual recruitment and registration. The large majority of participants are Portland Housing Authority residents, and it is anticipated this will remain the case upon completion of Bayside Anchor. Currently there are a total of 36 students enrolled in the program, split between morning and afternoon sessions.

The current location for Head Start will be closed when the Bayside Anchor project is completed, and we are proposing to simply move this program from its existing location to the new Bayside Anchor building. The Opportunity Alliance (TOA) will lease approximately 1,244 square feet of space from the Bayside Anchor Apartments LP to house their Head Start and Childcare programs for this area.

Head Start eligibility is based on household income. 90% of enrollees must come from households with incomes at or below the federal poverty line. Currently, 100% of the children in the East Bayside Head Start location are from households with incomes below the federal poverty line. No fees are charged to families with children in the Head Start program.

During the summer, when the Head Start and Childcare programs are inactive, the space will be used for a variety of neighborhood services including the Summer Lunch Program operated by the Portland Housing Authority with funding from USDA and the Maine DHHS Summer Food Service Program, which provides free meals that meet Federal nutrition guidelines to all children 18 years old and under in areas with significant concentrations of low-income children.

In addition to the Head Start, Childcare, and Summer Lunch Program and activities, we anticipate this space will also be used for large community meetings and workshops, similar to how the existing facility is being utilized.

3. *Please provide a response to the railing/ramp being within the city right-of-way. Generally we try to avoid this situation within a right of way. Could the ramp be located on the side of the building? Of course making that change may result in removing the door along Boyd St. which may not be ideal in terms of having doorways on streets. Could someone discuss this issue?*

Response. We have proposed this solution in an effort to provide accessible route into the Head Start facility. The elevation of this part of the building is approximately 18" higher than the sidewalk grade along Boyd Street, and the grade drops moving west along the street. We are proposing widening the sidewalk in this location to maintain a 7 foot minimum circulation path around the stair/ ramp area. We think this solution creates a strong presence on the street, provides a safe pedestrian zone for residents and Head Start students/ parents, and adds life and character to this important side of the building. Please note that an accessible ramp/ sloped walk access to the Head Start is proposed along the west side of the building, but we feel the Boyd Street entrance needs to also be accessible.

4. *TDM stops at page 7. Is that it?*

Response. An oversight on the scanned copy. The corrected report was submitted to your attention earlier today.

5. *Fiber cement paneling. Please submit a spec on this material as well as a sample.*

Response. The use of fiber cement siding is prevalent throughout the construction industry, it provides a strong, long wearing surface that can hold paint for 15-25 years. All siding materials will be installed over a ventilated rain screen to allow proper drying of materials and increased durability of the building enclosure. A cut sheet on the proposed product is attached to this letter, and we intend to submit samples of the proposed material for review at the Workshop.

6. *I'm not sure if you need a waiver for parking. Have you identified specific off-site spaces for Bayside Anchor residents?*

Response. We have identified specific off-site spaces for the two handicap spaces for the project on the lot directly across Oxford Street from the building entrance. Other tenant parking spaces are proposed to be offered within the existing pool of parking associated with the adjacent PHA neighborhoods of Kennedy Park, Bayside Terrace, and Bayside East. We have submitted a Transportation Demand Management Plan for the project that identifies methods

and goals of reducing demand for parking by residents, and will be actively monitoring and reporting parking activities for the PHA campus back to the City. We feel this approach utilizes the existing inventory of off-street parking, reduces the need to construct new impervious areas, and through active management will be able to adjust the TDM plan over time if necessary.

In addition to the off street parking management, the Applicant would also consider management of on-street parking on Oxford and Boyd Streets to provide short term drop-off, loading/ unloading, and dedicated space for the neighborhood police vehicle.

7. *Is the Parking Management Plan and Campus Transportation Plan the same thing?*

Response. Yes, this will be corrected in the final submission.

8. *Dimensions of sidewalk and esplanade should be shown.*

Response. These dimensions are shown on Sheet L-1. The sidewalk along Oxford Street varies from 6'-4" to 8'-4", the sidewalk along Boyd Street is 6'-0", flaring out to 12'-0" at the building and intersection with Oxford Street. The esplanade is 5'-0" wide typical.

We are also in receipt of a memo from David Senus dated May 30, 2014 regarding site drainage, utilities, and other items. We offer the following comments:

- 1) *The application is preliminary. As such, we anticipate that additional documents will be submitted with the final application, including details, confirmation of capacity to serve the development from utilities, stormwater design calculations, and a Construction Management Plan. The Applicant should note that all work proposed within the City Right-of-Way should comply with the City of Portland Technical Manual. Woodard & Curran will perform a review of the Final Application upon receipt of those documents.* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.
- 2) *In accordance with Section 5 of the City of Portland Technical Manual, a Level III Site Plan project is required to submit a stormwater management plan pursuant to the regulations of Maine DEP Chapter 500 Stormwater Management Rules, including conformance with the Basic, General, and Flooding Standards. We offer the following comments:*
 - a) *Basic Standards: The Applicant should provide a plan, notes, and details to address erosion and sediment control requirements, inspection and maintenance requirements, and good housekeeping practices in general accordance with Appendix A, B, & C of Maine DEP Chapter 500.* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.
 - b) *General Standards: The project will result in a net increase in impervious area of approximately 6,235 square feet. As such, the project is required to include stormwater management features for stormwater quality control. The Applicant is proposing to treat one inch of rainfall from the site's new impervious area utilizing the Focal Point bio-filtration system. The Applicant has noted that the proposed system will be sized and designed in accordance with Chapter 7.5 of Volume III of the Maine DEP Stormwater BMP Manual. As part of the final submission package, the Applicant should provide additional information and calculations demonstrating that the proposed treatment unit will be adequately sized and will provide sufficient treatment, in accordance with the General Standards.* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.

- c) *Flooding Standard: The project will result in a net increase in impervious area of approximately 6,235 square feet. As such, the project is required to include specific stormwater management features to control the rate of stormwater runoff from the site. The Applicant is proposing to provide detention via an R-Tank system. The Applicant has noted that, although flow rates will be decreased, the volume of water discharged to the downstream basin area may increase, and additional information on the results of this scenario will be provided in the final site plan application. The Applicant is also proposing to disconnect the existing stormdrain that currently discharges to the combined sewer, but requests the ability to reconnect should unanticipated future conditions require the use of this drain. As part of the final submission package, the Applicant should provide adequate documentation, such as a HydroCAD model, demonstrating that stormwater runoff from the proposed site will not exceed the peak runoff rates from the existing site and that the infiltration area will have adequate capacity to infiltrate the design storm events without impacting adjacent infrastructure. If in the future the Applicant determines that the system must be reconnected to the City's combined sewer system, the Applicant will be required to receive approval by Planning and the Department of Public Services for the change.*
- General Standards: The project will result in a net increase in impervious area of approximately 6,235 square feet. As such, the project is required to include stormwater management features for stormwater quality control. The Applicant is proposing to treat one inch of rainfall from the site's new impervious area utilizing the Focal Point bio-filtration system. The Applicant has noted that the proposed system will be sized and designed in accordance with Chapter 7.5 of Volume III of the Maine DEP Stormwater BMP Manual. As part of the final submission package, the Applicant should provide additional information and calculations demonstrating that the proposed treatment unit will be adequately sized and will provide sufficient treatment, in accordance with the General Standards.* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.
- 3) *The Applicant "propose(s) to disconnect the existing storm drain that discharges to the combined sewer and outlet stormwater runoff to the surface only", relying on infiltration of stormwater on an area of adjacent property under common ownership. The Applicant states "It should be noted that, although flow rates will be decreased, the volume of water discharged to the downstream basin area may increase. We will provide an opinion on this in the final site plan application". The Applicant's approach to stormwater management is keeping with the City's interests and design standards for the management of stormwater on sites; however, as indicated by the Applicant, additional engineering data, calculations and information will need to be presented to ensure that the approach will provide for a functional system. As part of the additional information, the Applicant should perform a test pit and document soil type, presence of groundwater, and soil infiltration rates in the infiltration area.*
- General Standards: The project will result in a net increase in impervious area of approximately 6,235 square feet. As such, the project is required to include stormwater management features for stormwater quality control. The Applicant is proposing to treat one inch of rainfall from the site's new impervious area utilizing the Focal Point bio-filtration system. The Applicant has noted that the proposed system will be sized and designed in accordance with Chapter 7.5 of Volume III of the Maine DEP Stormwater BMP Manual. As part of the final submission package, the Applicant should provide additional information and calculations demonstrating that the proposed treatment unit will be adequately sized and will provide sufficient treatment, in accordance with the General Standards.* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.

- 4) *The Applicant requests guidance on how their proposed stormwater management approach may affect a future (possible) stormwater service charge that is being considered by the City. The City is considering a service charge program that includes credit reductions to the service charge for treatment and/or detention of stormwater on a site. The program has not been finalized; however, compliance with City's stormwater management standards is anticipated to result in certain credit reductions in the service fee.* **Response:** We anticipate working closely with Public Services on this issue as we move through the review and approval phase of the project.
- 5) *The Applicant should provide additional design information and details for the stormwater features as part of the final application.* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.
- 6) *The Plans should depict the routing of the existing drainage system on the site and should show how the existing storm drain pipe will be demolished and plugged or capped at the main.* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.
- 7) *The Applicant should provide a Stormwater Management Plan, which should include a stormwater inspection and maintenance plan developed in accordance with and in reference to MaineDEP Chapter 500 guidelines and Chapter 32 of the City of Portland Code of Ordinances.* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.
- 8) *Final plans must be stamped by a professional engineer (Section 14-527, sub-section (e) of the City of Portland Land Use Ordinance).* **Response.** We agree with this observation and will insure the final plan submittal shall include this information as required.

We look forward to working with you, Planning Department staff, and the Planning Board in the review of this project. Please feel free to contact me to discuss any questions or concerns you may have regarding the attached application materials.

Sincerely,
CARROLL ASSOCIATES



Patrick J. Carroll
Principal

Enc.

Cc: Mark Adelson, PHA
Brooks More, Avesta Housing
Jesse Thompson, KTA
John Mahoney, Ransom Consulting



HardiePanel®



HardiePanel® Vertical Siding Technical Guide

Version 1.1
Effective September 2013

Visit JamesHardieCommercial.com
for most recent version



Technical Services:
1-800-942-7343

IMPORTANT: This Guide is subject to updates, check for latest version. Failure to install and finish this product in accordance with applicable building codes and James Hardie's written application instructions may lead to personal injury, affect system performance, violate local building codes, and void the product only warranty. Before installation, confirm that you are using the correct HardieZone® product. To determine which HardieZone® applies to your location, visit www.hardiezone.com or call 1-866-942-7343 (866 9-HARDIE). For warranty services call 866-375-8603.



Traditional Applications For Multifamily and Light Commercial Construction

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1 | INTRODUCTION

The extensive range of products offered by James Hardie provides the freedom, aesthetics and affordability you need to create a distinct look for apartments, condos, senior living and commercial real estate.

This document is a guide only. It is intended for use by architects, and general contractors who may be involved with the design and installation of HardiePanel vertical siding to create traditional looks in Multifamily and Light Commercial Construction. This document must be read in conjunction with the current multi-family / commercial installation requirements.

1.1 SCOPE

The material contained herein is aimed to provide guidance and technical specification for the use of HardiePanel® vertical siding in traditional solutions/applications for light commercial and multifamily construction. The most important change involves the requirement of HardiePanel® to be installed in a rainscreen application.

1.2 APPLICATION

HardiePanel vertical siding is a panel product that accommodates for traditional design styles. HardiePanel vertical siding offers versatile and durable design options for architects and builders. This product is ideal for achieving a board and batten look or other traditional styles. When used in multifamily or light commercial applications, HardiePanel vertical siding must be installed over 3/8" furring in a rainscreen application. This application is limited to six stories maximum.

James Hardie recognizes that style and applications are complementary and does not recommend ColorPlus® panel for every application. Applications with ColorPlus® panels that require touch-up to cover fasteners are not recommended. Primed panels should be used in such applications (refer to section 4.1). HardiePanel siding may not be used as trim. Contact technical support if your design involves curved or pitched wall designs. Refer to product installation instructions for further details at www.jameshardiecommercial.com.

1.3 RESPONSIBILITY

While care has been taken to provide the contained specifications, details, and other material content, we cannot incorporate every design iteration for intended application. It is the responsibility of the licensed architect, designer, specifier or builder to ensure that the construction details are suitable for the project's intended application. The responsible party shall also identify moisture related risks associated with any particular building design. The wall design and construction must effectively manage moisture. Properly designed rainscreens should incorporate wall system features to manage water, as regional climatic needs dictate.

The responsible parties shall ensure that the product meets aesthetic requirements before installation; and that the application suits the product intent for assemblies and in accordance with local building codes. Mockup walls / constructions are recommended. James Hardie assumes no responsibility for rectifying obvious aesthetic surface variations subsequent to installation.

1.4 WORK SAFETY

James Hardie embraces safe working practices and believes that safety should be of paramount importance. We remain committed to jobsite safety and recommend safe use of our products.

James Hardie products contain sand, a source of respirable crystalline silica, which is considered by some international authorities to be an occupational source leading to health impairment, namely fibrosis. Some studies suggest smoking may increase the risks. We promote and encourage the use of protective equipment proven to limit the amount of silica dust exposure.

Additionally, work in areas with ample ventilation. Minimize dust when cutting, position cutting station so that wind will blow dust away from users and others in the area. When cutting, sanding, rebating or drilling avoid breathing dust. Wear properly fitted dust mask or respirator. Make others in the immediate area aware of the risks and encourage use of dust masks or respirators. Use HardieBlade® Saw Blade and dust reducing circular saws attached to a HEPA vacuum.

1 | INTRODUCTION

1.5 SUSTAINABILITY

James Hardie believes sustainable building and construction practices are important and can be addressed in the following ways: raw materials, manufacturing, products design interface, and communities.

James Hardie is a longstanding industry innovator and prides itself on product development, building science, and innovative manufacturing. James Hardie products are made from natural and sustainable raw materials of portland cement, ground sand, cellulose fibers, and small amounts of additives as required for product properties. We have a high selection standard for our raw materials, and 75% of raw materials are locally sourced. We also embrace practices of fuel conservation and efficiency in manufacturing and shipping.

James Hardie factories worldwide continue to implement the principles in compliance with our sustainability policy. Our Illinois and Virginia manufacturing facilities are ISO 14001 certified for Environmental Management Systems.

Our technology advancements include products that are Engineered for Climate®. Our ColorPlus® Technology offers a durable finish that minimizes Volatile Organic Compounds (VOC) on the job sites.

We recognize that informed product decisions have to be made in order to create high performance structures that deliver on their sustainability obligation. James Hardie products are easy to incorporate into practical building systems – they are durable and low maintenance. While products alone do not provide LEED points, under USGBC LEED program, James Hardie projects may contribute to LEED NC points MR 5, MR 2.2c for homes, (regional materials) and MR 4, MR 2.2b for homes, (recycled content).



2 | PRODUCT INFORMATION

2.1 PRODUCT SELECTION

James Hardie offers a full range of products that meet a wide variety of design needs. All of our products are engineered for climate. HZ5® products are engineered for freezing wet climates, and HZ10® products are engineered for humid and hot climates. James Hardie gives you the ability to get the right siding for your climate. To find which product zone your project is located in visit: www.hardiezone.com



All James Hardie products are primed and ready to paint. For the ultimate in performance, our products are also available with ColorPlus® Technology. ColorPlus technology is a proprietary process for applying baked-on finish to maximize durability and resistance to the elements. Our color palette has been selected to meet regional demands with more than 20 color offerings.

2.2 PRODUCT INFORMATION

HardiePanel vertical siding is a great option for a smooth and traditional panelized look.

HardiePanel vertical siding

Surface textures include:

- Smooth • Select Sierra 8 • Cedarmill® • Stucco

Thickness: 5/16" (7.9mm)

Widths: 48" (1.22 m)

Length: 96" (2.44 m), 108" (2.74m), 120" (3.0 m)

Weight: 2.3 lbs./sq.ft.

Available in primed or with ColorPlus Technology



Stucco



Cedarmill®



Sierra 8



Smooth

In addition to HardiePanel vertical siding, James Hardie offers

* RH 30%-90%

a full range of products to suit most styles:

- HardieWrap® Weather Barrier
- Artisan® Lap Siding
- Artisan® Accent Trim
- HardiePlank® Lap Siding
- HardieShingle® Siding
- HardieTrim® Boards

For a modern panel look, please refer to www.JamesHardieCommerical.com.

2.3 HARDIEPANEL TECHNICAL DATA

James Hardie exterior cladding complies with physical properties and supplementary requirements described in ASTM C1186. A partial property list follows.

- Dimensional Tolerance: length, width.....0.5%
- Dimensional Tolerance: thickness.....±1.6 mm
- Flexural Strength: wet condition.....7 MPa
- Flexural Strength: equilibrium condition.....10 MPa
- Flexural Strength: freeze/thaw, wet retention.....>80%
- Flexural Strength: warm water, wet retention.....>85%
- Moisture Movement*:.....0.05% (A direction), 0.06% (B direction)
- Average Density.....1.3 g/cm³
- Water Tightness.....Pass
- Warm Water Resistance.....Pass
- Heat/Rain Resistance.....Pass
- Surface Burning Characteristics (ASTM E84).....FSI=0, SDI<5
- Thermal Conductivity (ASTM C177).....2.07 BTU/hr-ft²-°F
- Coefficient of Thermal Expansion (Longitudinal, ASTM E228).....6.70x10⁻⁶ in/in°F
- Coefficient of Thermal Expansion (Transverse, ASTM E228).....6.65x10⁻⁶ in/in°F

2.4 ACCESSORIES

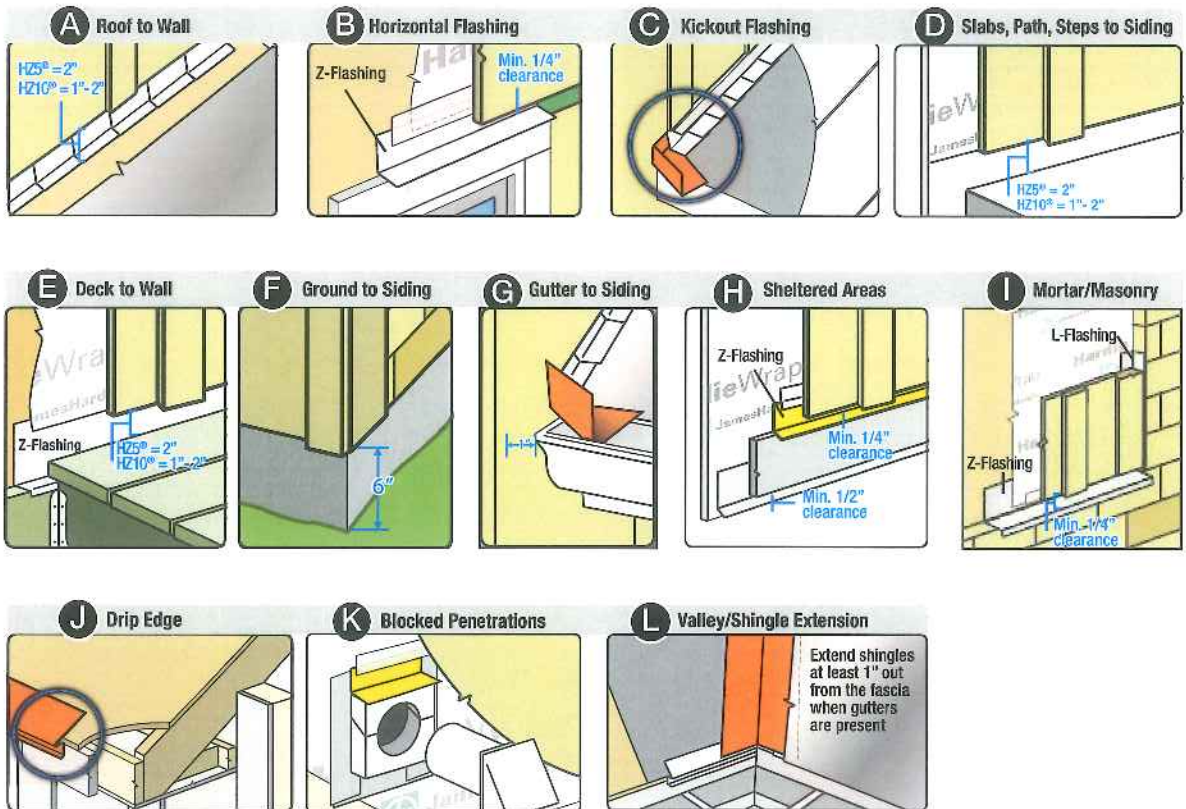
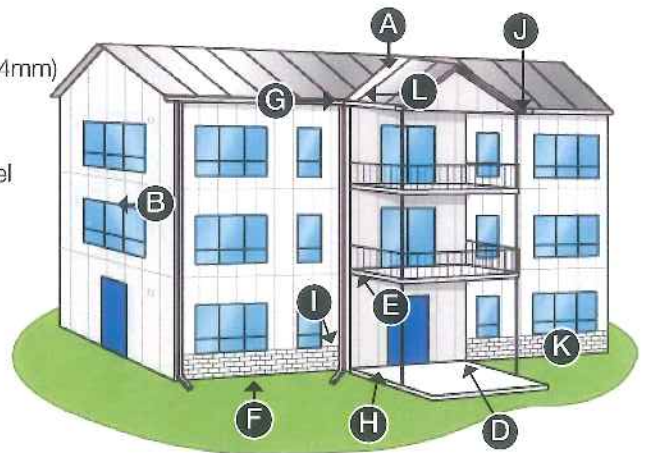
There are a number of manufacturers for fasteners, furring, caulking, and paint. James Hardie does not specify any one brand of product for use in conjunction with HardiePanel vertical siding. It is the architect's responsibility to select components based on technical information and warranties as supplied by third party manufacturers.

3 | GENERAL REQUIREMENTS

3.1 CLEARANCES

Siding and trim must be installed in compliance with local building code requirements for clearances between the bottom edge of the siding and the adjacent finished grade. All clearance requirements must be followed when installing James Hardie siding products.

- James Hardie requires a minimum 6" (152mm) clearance to finished grade on the exterior of the building (8" or 203mm in Canada).
- Install kick out flashing at roof-wall junctions.
- Ensure gutters have end caps and must have a minimum 1" (25.4mm) clearance between end cap and siding or trim.
- Every horizontal break surface must be flashed.
- A minimum 1/4" (6.4mm) clearance is required between the panel factory edge and the horizontal flashing.
- Do not caulk the gap between flashing and product.
- James Hardie requires maintaining a 2" (50 mm) clearance between product and horizontal surfaces other than at grade.



3 | GENERAL REQUIREMENTS

3.2 FRAMING REQUIREMENTS

James Hardie siding products can be installed onto wood or steel framing. Stud spacing is to be a maximum of 24" (600mm) on center. Additional framing may be required at key locations such as joints or abutments. Irregularities in framing and sheathing can transfer through to the finished application.

James Hardie has solutions for the following frame types:

- Wood
- Structural steel construction must be min 20 ga.
- Over concrete masonry wall (ASTM C90)

3.3 RAINSCREEN REQUIREMENTS

When used in multifamily or light commercial applications, HardiePanel vertical siding must be installed over furring in a rainscreen application. Furring shall be installed between the cladding and a code-approved water-resistive barrier. Furring shall be a minimum 3/8" thick and a minimum 1-1/2" wide.

It is the responsibility of the designer, engineer, or builder to:

- Adhere to all the installation requirements listed in the relevant product installation instructions.
- Provide adequate details for water management.
- Understand both the limitations of each system component and the interaction between system components.
- Account for both interior and exterior moisture control.
- Identify all moisture-related risks associated with the building design.

20-16 gauge must be used when using light gauge steel z-girts as rainscreen furring. Rainscreen furring must be designed to be structurally fit for purpose. At thicker gauge steel, 16 ga., self-drilling wing tipped screws work best.

Alkaline Copper Quaternary (ACQ) treated lumber may pose a corrosive risk affecting aluminum trim components and metal trim or accessories, such as screws. Wood preservative manufacturers generally advise that aluminum, galvalume, or uncoated galvanized metals should not be used in direct contact with wood containing ACQ or similar water based preservatives. Metals should be separated from treated wood with a barrier

or industrial coating. Check with treatment manufacturers for specific recommendations.

When using Treated Plywood or Treated Dimensional wood:

- BEST: MCS or MCQ treated wood
- BETTER: CA or ACQ treated wood
- GOOD: CA or ACQ treated wood, not to be used when 1 mile from coastal saltwater.

James Hardie does not recommend the use of drainage mats or drainage boards. These products can compress during the installation process, impairing drainage channels and causing a wavy appearance in the panel.

Bug (vermin) screens or cavity vent strips may be installed at rainscreen openings to deter insect infestations. Note, this may reduce ventilation capacity.

3 | GENERAL REQUIREMENTS

3.4 FASTENING REQUIREMENTS

Wood furring:

The wood furring thickness will be dependent on the details of the wall assembly, with a minimum thickness of 3/8". The fastener should be selected using ESR-1844 Table 4, "Maximum Wind Speeds for Exposure Category (mph)," according to the wind speed desired for the given stud spacing, building height, and exposure category. The fastener must be fully encompassed in wood with specific gravity equivalent to the reference wood stud specific gravity, as found in ESR-1844 Table 4.

The furring may count as all of the necessary penetration if:

- It is attached with its own fastener schedule to resist the wind load desired while holding the weight of the product, and
- It encompasses the full length of the fastener, and
- The furring specific gravity is equivalent to the reference wood stud specific gravity, as found in ESR-1844 Table 4.

The furring may count as part of the necessary penetration if:

- It is attached directly to other wood structural members, which encompasses the rest of the fastener, and
- The furring specific gravity is equivalent to the reference wood stud specific gravity, as found in ESR-1844 Table 4.

Steel furring:

The steel furring must be a minimum 20 gauge steel and must maintain a minimum 3/8" gap. The fastener should be selected using ESR-1844 Table 4, "Maximum Wind Speeds for Exposure Category (mph)," according to the wind speed desired for the given stud spacing, building height, and exposure category. If a nail or pin is used, it must penetrate the furring to a depth of 1/4". If a screw is used, it must penetrate the furring for three full threads.

Concrete Masonry Units (CMU):

Wood or steel furring must be used over CMU such that the furring transfers the wind loads and other necessary forces back to the structure.

Note: For description of attachment of furring over foam to structure consult with Foam Sheathing Coalition (FSC) in reference to fastener selection. See Tech Matters: Guide To Attaching Exterior Wall Coverings Through Foam Sheathing To Wood or Steel Wall Framing, 2011. (Table 1a: Siding minimum fastening requirements for direct cladding attachment over foam plastic sheathing to support cladding weight.)

General Fastening:

HardiePanel siding can be fastened by hand or pneumatically. All fasteners should be driven such that they are snug or flush with the panel surface. No fasteners should be countersunk or recessed with the intent of concealing the fasteners. James Hardie ColorPlus Touch-up is not intended to conceal fastener heads.

Corrosion-resistant fasteners must be used. The following are recommended:

- Galvanized, preferably hot-dipped in the case of nails
- Stainless steel, especially for installation near the ocean or other large bodies of water or in very humid climates

The following are not recommended:

- Electro-galvanized, since premature corrosion may occur

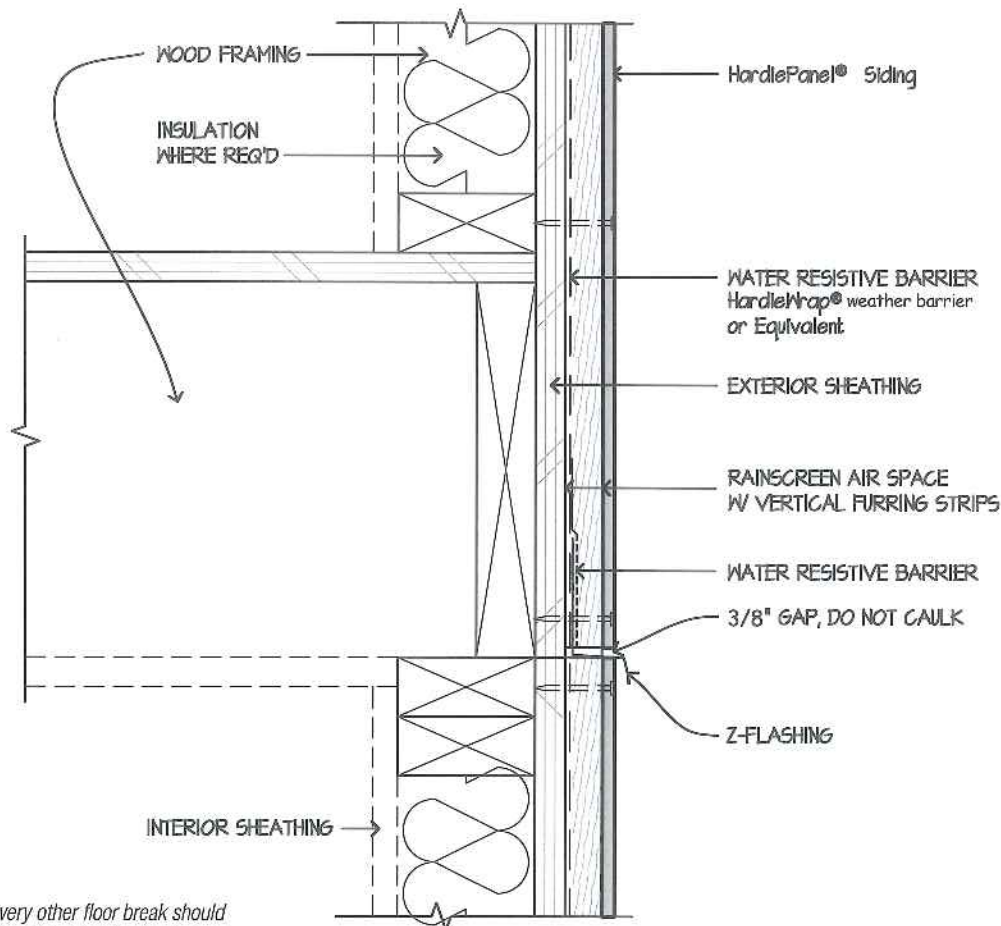
DO NOT USE:

- Clipped-head nails
- Staples
- Aluminum fasteners of any kind

James Hardie is not responsible for the corrosion resistance of fasteners.

Fastener type, size and spacing are determined in accordance with IBC/IRC requirements. Fastener specification for your project is dependent on the project design wind loads. Consult applicable product evaluation report or product listing for correct fastener spacing and fastener dimensions. The following are recommended: ESR-1844, TDI EC-23, Miami Dade County NOA 12-0218.11, State of Florida PA FL13223.

3 | GENERAL REQUIREMENTS



Note: every other floor break should have z-flashing extending back to the weather barrier.

HORIZONTAL VIEW - RAINSCREEN

These drawings are published as an information guide only. These CAD drawings are intended as templates to assist the designer. They do not contain the full details required for construction and must be read in conjunction with the installation instructions on www.jameshardie.com. You should obtain architectural, engineering or other technical advice to assess the suitability of these drawings to the requirements of your particular project. James Hardie accepts no liability in respect to the use of these drawings.

For fastener specifications and complete installation instructions refer to appropriate documentation at www.JamesHardie.com

DETAIL:

PANEL
3.05

HardiePanel® Siding Details

- Wood Framing with Wood Furring Strips
- OSB or Plywood Sheathing
- Shown with Siding Nails into Framing



JamesHardie

4 | PRINCIPLES FOR DESIGN

4.1 DESIGN OPTIONS

HardiePanel siding can be used to create a wide variety of traditional styles, especially when combined with HardieTrim board and battens.

Four textures are available, as outlined in section 2, and most products are available both primed and with ColorPlus technology. Applications that either cover fasteners or accentuate exposed fasteners as a design feature are recommended when installing HardiePanel with ColorPlus technology.

The following tables outline the recommended applications for both primed and ColorPlus panels. Not all designs will be suitable for every application.

Traditional styles that are ideally suited for HardiePanel vertical siding.

ColorPlus Products	Vertical Joints	Horizontal Joints	Fasteners
Stucco, Cedarmill, Smooth	Batten at joints and at stud centers to cover fasteners	Z-flashing with or without trim	As per ESR 1844
	Moderate contact	Z-Flashing	As per ESR 1844 exposed fastener only
	Batten or Trim	Z-Flashing with Trim	As per ESR 1844 exposed fastener only

Do not caulk joints between ColorPlus panels. Do not use Touch-up on fastener heads on ColorPlus panels.

Primed Products (Field Painted)	Vertical Joints	Horizontal Joints	Fasteners
Stucco, Cedarmill, Smooth	Vertical batten typically 12-16" on center*	Z-flashing with or without trim	As per ESR 1844
	Moderate contact	Z-Flashing	As per ESR 1844
	Batten or Trim	Z-Flashing with Trim	As per ESR 1844
Sierra 8	Moderate contact	Z-Flashing	As per ESR 1844

Provide additional support for battens when not installed on stud locations.



Battened Panel



Trimmed Joints

4.2 MOISTURE MANAGEMENT

Wall construction and design must effectively manage moisture, considering both the interior and exterior environments of the building. This is particularly important for buildings that have a high risk of wind-driven rain penetration or those that are artificially heated or cooled.

The EEBA states, "The fundamental principle of water management is to shed water by layering materials in such a way that water is directed downwards and outwards of the building or away from the building. The key to this fundamental principle is drainage."¹

Furthermore, "all water that is intercepted by the second line of defense [described as the system behind the cladding] must be dissipated to the exterior by means of drainage or evaporation, or both. Drainage is the only transport process with sufficient capacity to dissipate free water quickly enough to prevent deterioration from starting. [...] In most other [not including masonry veneer] circumstances, a 10-mm-deep cavity will provide sufficient drainage while allowing for typical construction practices."²

Wall openings, penetrations, junctions, connections, window sills, heads, and jambs must incorporate appropriate flashing for water management. A weather resistant barrier shall be continuous, with all junctions and penetrations properly detailed to prevent water entry. The cladding layer, where attached over furring, must also be detailed to minimize water entry.

¹ EEBA (Energy & Environmental Building Association™) Water Management Guide by Joseph W. Lstriburek, Ph.D., Peng. June 2004.

² http://archive.nrc-cnrc.gc.ca/obj/irc/doc/ctu-n34_eng.pdf

4 | PRINCIPLES FOR DESIGN

4.3 PENETRATIONS

All penetrations shall be treated to manage moisture. Backer rod and sealant or gasketed cover plates should be used where applicable. Electrical outlets are properly installed when flush with the surface of the cladding.

Blocking is required around penetrations in the building envelope, such as hose bibs or holes with a diameter of 1-1/2" (38mm) or greater. Cap flashing must be installed over the top of the trim block.

The point of contact between the substructure and structural or mechanical stand-offs, such as awnings or access ladders, must be treated as a penetration of the siding or trim. Where blocking requires structural support, such as stair railings, wood blocking is required.

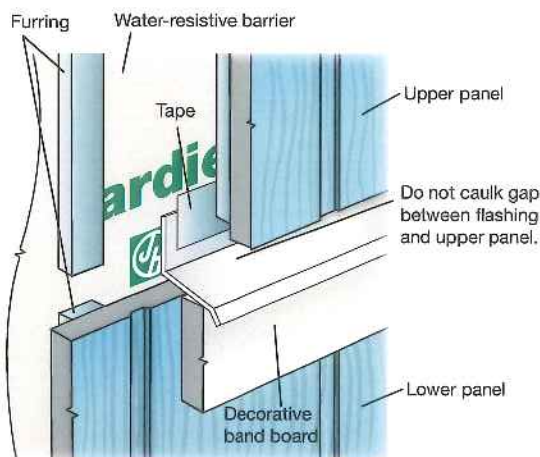
4.4 JOINT TREATMENT

Vertical joint treatment for panels shall be installed as follows:

- Moderate contact of the panels abutted together or
- Leave a 1/8" gap between panels and fill with caulk (for primed products only) or
- Cover joint with batten or trim board.

All horizontal joints must be flashed. If decorative band board is used, flashing shall extend over it.

Adding horizontal blocking between vertical furring members is not needed. If used, kerfed blocks are the accepted best practice for water management.



4.5 TRIM APPLICATIONS

All horizontal trim must have cap flashing. Trim is not intended for use as wall capping or rail caps. Refer to the HardieTrim® board installation instructions for details and trim requirements.

Horizontal joints for panels must be properly flashed to minimize water penetration. Treat joints using Z-flashing or flashed belly bands.

4.6 FLOOR TRANSITIONS & CONTROL JOINTS

Control joints should be considered in the building design such that the integrity of the cladding is maintained over time.

Panel may terminate anywhere between the top plate and bottom plate at a floor joist. All floor transitions must be flashed. A Z-flashing that extends back to the weather barrier must be provided at least at every other floor.

Do not bridge floors with siding or furring. Panels may terminate at top or bottom of a floor-break. Leave a minimum 3/8" (9.5mm) gap to accommodate anticipated structural movement. All floor transitions must be flashed with drainage flashing.

Vertical movement must be considered in the horizontal joint design.

Where the wall span is significant in length, the design professional should take into consideration the siding's coefficient of thermal expansion and moisture movement in their design.

Refer to technical data for computation.

6 | Finishing & Maintenance

6.1 CAULKING

James Hardie recommends the use of caulks and sealants that remain permanently flexible. For best results use an elastomeric joint sealant complying with ASTM C920 Grade NS, Class 25 or higher, or a latex joint sealant complying with ASTM C834.

Caulking/sealant must be applied in accordance with the manufacturer's written instructions. Note: Some caulking manufacturers, such as OSI Quad, do not allow tooling.

DO NOT caulk nail heads when using ColorPlus products.

6.2 PAINTING

Primed boards require painting to meet requirements of the warranty.

- Sheets must be dry and free of dirt or debris before coating.
- Coating must be completed within 180 days of sheet installation.
- 100% acrylic topcoats are recommended.
- For application rates refer to paint manufacturer's specification.
- Back-rolling is recommended if the siding is sprayed.
- Do not paint when product is wet.
- Do not use stain on James Hardie products.
- All field-cut sand cut-outs shall be primed and coated.
- Consult with paint manufacturer when field painting aluminum trims and stainless steel fasteners.

6.3 COLORPLUS® TECHNOLOGY

Our pre-finished product reduces overall need for painting and re-painting. This proprietary process applies a consistent, multi-coat factory finish, using industrial coating developed specifically for James Hardie fiber cement products. ColorPlus technology is a baked-on the board coating which delivers a high-quality, long-lasting finish.

Our color palette was created by color specialists, who handpicked custom colors and combinations for each area of the country. Architects can count on more than 20 color offerings that embrace different styles and environments.

Products are delivered with a protective laminate facing to

protect from scratching and marring during shipping and installation. Touch-up kits have been developed as color matching solutions to correct for minor nicks and scrapes occurring in the field. Likewise, edge coaters are available for the treatment of field cut edges. ColorPlus touch-up shall be used sparingly. Do not use ColorPlus touch-up to cover fastener heads. Products with gouges, gashes, or defects approximately larger than a dime should be removed.



Visit JamesHardieCommercial.com for the full color availability in your projects area.

6.4 CLEANING AND MAINTENANCE

Cleaning and maintaining the exterior of your home is an important part of sustaining its beauty and value. The extent and nature of maintenance will depend on the geographic location and exposure of the building. As a guide, normal care and maintenance are recommended.

To remove dirt and debris, wash down exterior surfaces with a water hose or low pressure water spray. ColorPlus products can be cleaned with a soft brush or rag. Stains and stubborn dirt can be washed with a mild detergent and soft brush.

Ensure required ground clearances and drainage slopes are maintained. Do not fill landscaping up to the siding. Keep vegetation, such as shrubs, brush or small trees trimmed back and away from the homes siding.

7 | Additional Specifications

7.1 PERFORMANCE REFERENCES

- ASTM C 1186 – Standard Specification for Flat Fiber-Cement Sheets
- ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
- ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure.

PRODUCT APPROVALS

James Hardie maintains Government Reports, Evaluation Reports, and bulletins for specified requirements. Information can be found through Technical Services, which include:

- ICC-ES ESR 1844 State of Florida product approval, F13223
- Miami-Dade County Florida Notice of Acceptance, NOA 12-02 14.14
- Texas Department of Insurance (TDI) Evaluation Reports, EC-23
- Wildland Urban Interface Compliance for CalFire Listing
- FEMA recognition for flood resistance
- Canada CCMC Product Evaluation Report 12678

FIRE RATED ASSEMBLIES

James Hardie exterior siding has been tested and classified by IAS certified laboratories to ASTM standards. James Hardie has been tested and complies with ICC-ES ESR, National evaluation reports published by International Code Council Evaluation Services. Testing certifies that products are non-combustible (ASTM E136), approved for fire-resistance rated construction (ASTM E119), and has a flame spread index of 0 and smoke index <5 (ASTM E84).

Fire-resistance rated wall assemblies has been certified by Underwriter Laboratories (UL) to meet the requirements of 1-hour.

- UL Design No. U356 (BXUV.U356)
- U425

- JH/WA 60-11
- JH/WA 60-12
- JH/WA 120-01
- JH/WA 120-03

The use of these building materials in a rainscreen assembly design, with a minimum 3/8" (9.5mm) air cavity does not affect fire rated performance.

ASSEMBLIES

Three-Part Specification

Three-part format specification is available at:
www.JamesHardieCommercial.com

CAD Details

For CAD files visit James Hardie's website at:
www.JamesHardieCommercial.com

TECHNICAL SERVICES

James Hardie Building Products maintains a staff to assist building professionals with questions regarding products, installation, or technical needs. For questions, please call 1-800-942-7343 or email info@jameshardie.com.

Brochures and product samples can be requested by visiting www.JamesHardieCommercial.com

WARRANTIES

HardiePanel vertical siding includes a 30-year non-prorated limited transferable product only warranty. Siding is offered with ColorPlus® Technology, which comes with a 15-year express limited finish warranty.

For full warranty visit www.JamesHardieCommercial.com.



ColorPlus® Technology



PLANNING BOARD REPORT PORTLAND, MAINE

Allagash Brewing Company Expansion
50 Industrial Way
Level III Site Plan Review
2014-098
50 Industrial Way LLC (Allagash Brewing Company), Applicant
CBL: 326-B009001

Submitted to: Portland Planning Board
Public Hearing Date: July 22, 2014

Prepared by: Nell Donaldson, Planner
Date: July 17, 2014

I. INTRODUCTION

Allagash Brewing Company has requested a Level III Site Plan review for a proposed building addition of 28,000 sq. ft. to include a production building, a concrete tank support pad, and a bunker. The proposal also includes site improvements associated with the loading dock area, 10 additional parking spaces, a reconfigured stormwater management system, and landscaping.

This is the fourth expansion of the original Allagash facility on this site. The first building was housed on the central of three lots platted as part of the 1986 Turnpike Industrial Park, now owned by Allagash. The most recent expansion included a retail component and extensive parking on the westernmost of these lots; staff approved this expansion in 2012.

The proposal consists of two phases and will result in a new infill building between the two existing buildings, buildings along the rear of the recently developed parking lot, and a large concrete pad. A third phase, an addition at the north corner of the existing parking area, has been included in a phasing plan for information purposes; it is not under consideration as part of this review.

A total of 73 notices were sent to property owners within 500 feet of the site and a legal ad ran on July 14 and 15, 2014.

Applicant: 50 Industrial Way, LLC

Consultants: Rick Meek, Sebago Technics, Engineer; Grant Hayes Associates, Architect

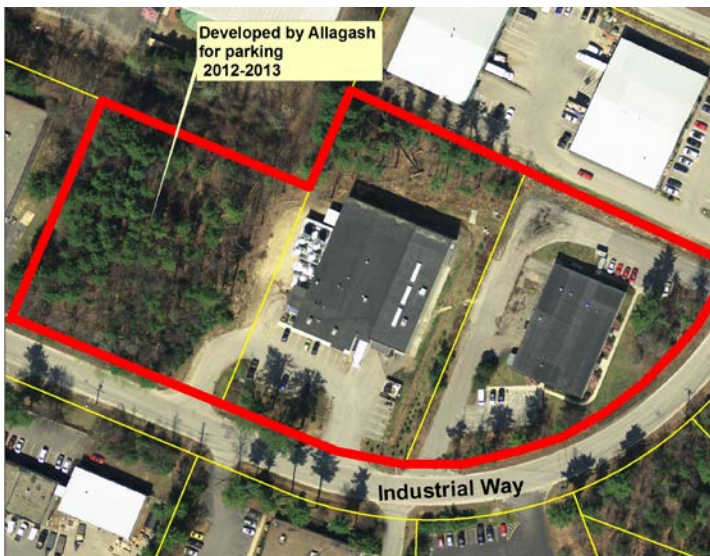
II. REQUIRED REVIEWS

<i>Waiver Requests</i>	<i>Applicable Standards</i>
Curb Cuts – to allow four curb cuts on site <i>Supported by consulting traffic engineer</i>	<i>Technical Manual 1.7.1.8 Number of driveways: limits the number of driveways for any site to two.</i>
Sidewalk – to waive sidewalk requirement on Industrial Way <i>Supported by consulting traffic engineer</i>	<i>Section 14-526(a)2.c(i) Sidewalks: requires sidewalks along all frontages unless the site meets the applicable waiver criteria in Section 14-506.</i>
Curbing – to waive curbing requirement on Industrial Way <i>Supported by DPS</i>	<i>Section 14-526(a)2.c(i) Sidewalks: requires curbs along all frontages unless the site meets waiver criteria in Section 14-506</i>
Street Trees – to waive requirement that street trees be planted in right-of-way <i>Requested by applicant; deemed unnecessary by staff</i>	<i>Site Plan Standard and waiver Section 14-526 (b) (iii)</i>
<i>Review</i>	<i>Applicable Standards</i>
Site Plan	<i>Section 14-526, with phasing as provided under 14-524(g)iii</i>

III. PROJECT DATA

Existing Zoning	I-M
Existing Use	Brewery
Proposed Use	Brewery
Parcel Size	191,979 SF

	<i>Existing</i>	<i>Proposed</i>	<i>Net Change</i>
Building Footprint	35,722 SF	57,770 SF	22,048 SF
Building Floor Area	37,055 SF	65,080 SF	28,025 SF
Impervious Surface Area	93,404 SF	118,200 SF	24,796 SF
Parking Spaces	64	74	10
Bicycle Parking Spaces	17	17	0
Estimated Cost of Project	\$750,000		

**IV. EXISTING CONDITIONS**

The site is currently developed in a pattern that relates to the original Turnpike Industrial Park subdivision, with a building on the southeasternmost lot and a separate building which spans the two remaining lots. Each of these buildings is served by two curb cuts, and the western building, which contains a retail component, is accompanied by a large parking lot. Street trees, landscaping and tree buffer protection has been undertaken in association with the previous expansions.



Figures 1 & 2: Allagash site, 50 Industrial Way

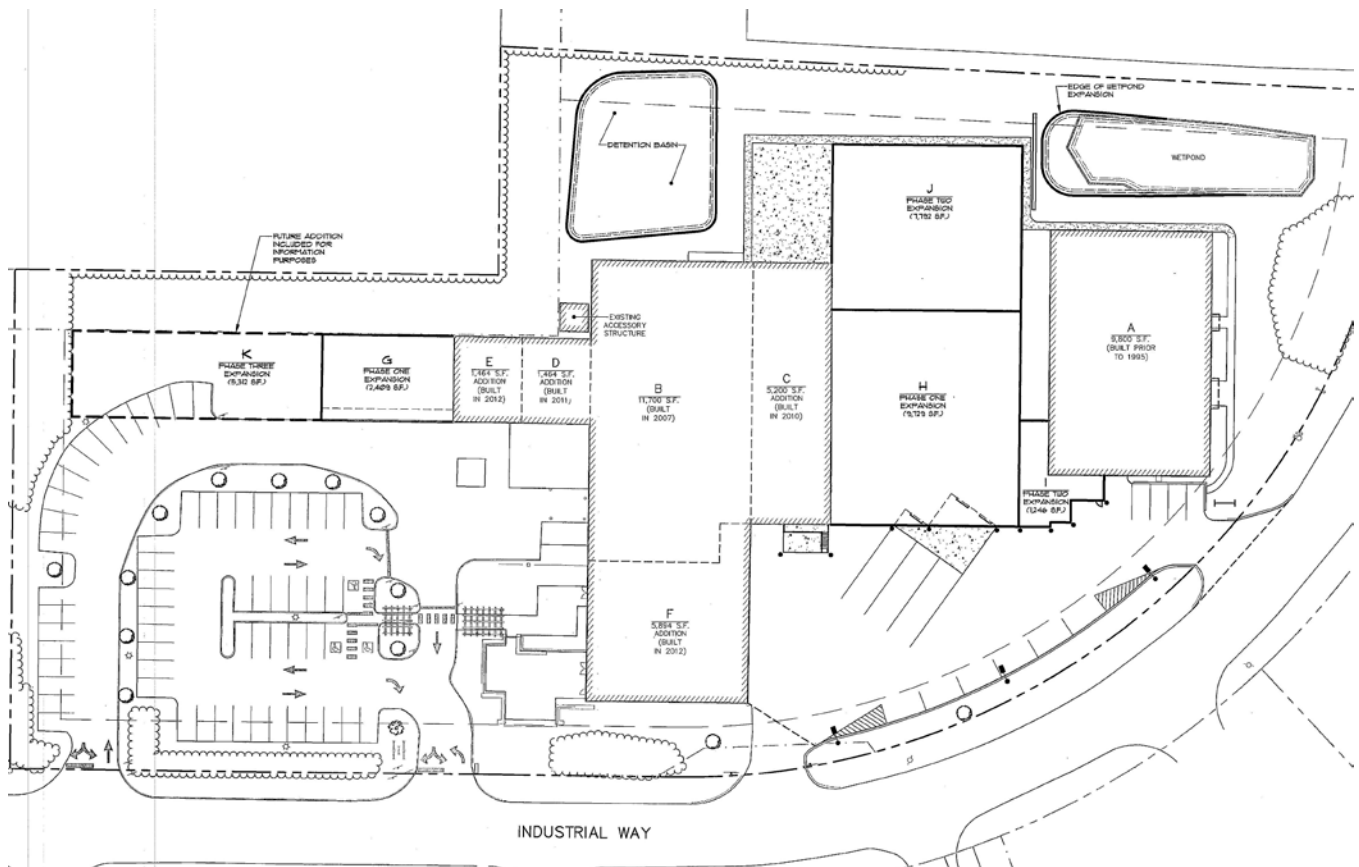


Figure 3: Proposed Allagash Expansion

V. PROPOSAL

The current additions are proposed over two phases and include:

- A new production building (with portions labeled H, I, and J above) to connect the two large existing buildings, to total 18,800 sq. ft. and be built in two phases;
- A small building (G above) of 2,400 sq. ft. at the rear of the existing parking lot;
- A concrete pad measuring 40' X 60' for tanks, to be built in two phases;
- A new detention basin and expansion of the existing wet pond;
- Replanting in the buffer area; and
- Site improvements and additional parking in the vicinity of the existing loading dock area.

It should be noted that the applicant anticipates a third phase of construction, to include an addition near the existing parking lot (K above). It is assumed that this third phase would be reviewed under a site plan amendment in the future. A condition of approval relating to this third phase has been included.

VI. PUBLIC COMMENT

The Planning Authority received one public comment on the project, a letter of support (*Attachment PC-1*). The applicant also held a neighborhood meeting. No one attended (*Attachment PC-2*).

VII. RIGHT, TITLE, & INTEREST

The applicant provided copies of deeds for each of the lots under consideration as evidence of right, title, and interest (*Attachment D*).

VIII. FINANCIAL & TECHNICAL CAPACITY

The applicant has provided a letter from Bath Savings Institution attesting to their capacity to finance the proposed expansion (*Attachment L*). Qualifications from Sebago Technics are also provided as evidence of technical capacity.

IX. ZONING ANALYSIS

Marge Schmuckal, Zoning Administrator, has indicated that the proposal meets the requirements of the I-M zone,

7/10/14: The newest additions to Allagash Brewery are meeting the I-M industrial dimensional zone requirements, including setbacks, impervious surface, and parking. The zoning analysis mentioned the height of the newest buildings as 31' or 34' depending on which set of given information is used. However the submitted building elevation page does not have any dimensions on it and does not have any scaling information on it. I am pretty sure the maximum height of 75' is not being violated. I will need an elevation plan to confirm the building height.

7/16/14: The applicant revised the zoning assessment sheet to reflect a building height of 34' which is well under the 75' maximum height. The building height also affects the required setbacks in this I-M zone. The I-M zone setback are being met using the 34' building height. The building permit #2014-01527 has been applied for and signed off for zoning at this time.

X. SITE PLAN REVIEW**1. Transportation Standards****a. Impact on Surrounding Street Systems**

The applicant submitted a traffic analysis during preliminary review. Tom Errico, consulting traffic engineer, has confirmed his agreement with the trip generation data, writing,

I have reviewed the traffic analysis conducted by the applicant and I concur that the proposed traffic volume level does not required a Traffic Movement Permit.

As part of his original review comments, Mr. Errico requested crash data for the intersection of Industrial Way and Riverside Street as well as other adjacent intersections. After reviewing this data, he writes,

I have reviewed the requested crash data provided by the applicant and I concur that there are no safety problems on Riverside Street in the vicinity of the project. I also concur that the crash statistics at the Forest Avenue/Riverside Street are not relevant given the recent MaineDOT improvements. I have no further comment on this issue.

b. Access and Circulation

The current proposal does not substantially alter the existing access and circulation arrangements, although it does reconfigure loading docks and some parking under Phase 1. A turning template showing truck movements into the loading bays has been provided (*Attachment P20*). Again, Mr. Errico has indicated his general approval of the project from a traffic perspective (*Attachment 2*).

At present, there are four curb cuts providing vehicular access to the site. Mr. Errico has confirmed his support for a waiver required with respect to the number of driveways, writing,

The project will exceed the number of driveways permitted by the City and a waiver is required (four driveways exist and a maximum of two driveways are permitted). I support a waiver from the City's Technical Standard given that the driveways already exist; the project generally separates trucks and passenger vehicle activity; the curved alignment of Industrial Parkway creates site vehicle circulation constraints; and that low volumes and speeds exist on Industrial Parkway.

It should be noted that a gravel drive providing access to the adjacent lot, which was originally shown on the site plans, has been removed. The area where this drive stood is now proposed to include new trees.

The site is not proposed to include sidewalks and a waiver has been requested under *Section 14-506*. It should be noted that, in 2012, the Planning Authority granted a sidewalk waiver under a prior Allagash expansion. Mr. Errico has indicated his support for this waiver, writing

In my professional opinion the appropriate criteria for waiving a sidewalk should be the criteria noting loss of site features and the criteria that notes that a safe and reasonable pedestrian alternative is available via use of Industrial Way as a shared street (due to low vehicle speeds and volumes). I believe there is an expectation of pedestrian demand from these land uses. Accordingly, given historically site plan approvals and traffic conditions I support a waiver for construction of the sidewalk.

Curbing is not proposed along Industrial Way; again, a waiver has been requested under *Section 14-506*. As with the sidewalks, it should be noted that the Planning Authority granted a curbing waiver in 2012 under an application for a prior expansion. As in 2012, this waiver is supported by staff on the grounds of the following waiver criteria: (4) strict adherence to the curb requirement would result in the loss of significant site features related to landscaping or topography that are deemed to be of a greater public value, and (5) runoff from the development site or within the street does not require curbing for stormwater management.

c. *Public Transit Access*

A public transit facility is not required.

d. *Parking*

The proposal includes the construction of ten additional parking spaces in Phase 1. This will bring the total number of parking spaces on site to 74, or ten more than are technically required by ordinance. Ms. Schmuckal has confirmed that the project meets the off-street parking requirement (*Attachment 1*). Snow storage is shown along the street frontage adjacent to the new parking.

Seventeen bicycle parking spaces are currently provided on site. The applicant proposes to move seven of these existing bicycle parking spaces to the easternmost entrance under Phase 1, as depicted on the site plan. The plan meets the requirement for bicycle parking.

e. *Transportation Demand Management*

A transportation demand management (TDM) plan is not required.

2. *Environmental Quality Standards*

a. *Preservation of Significant Natural Features*

There is an area of forested wetlands located near the rear of the site. The applicant has proposed work in Phase 2 which will require alteration of this wetland under a NRPA permit and a Maine Programmatic General Permit. The applicant has asked that these permits be included as a condition of approval. Such a condition has been suggested here.

b. *Landscaping and Landscape Preservation*

The proposal includes additional street trees along the eastern frontage area in association with the addition under Phase 1. Though these street trees are not proposed within the right-of-way, they are within ten feet of the property line and thus are considered sufficient to meet the street tree requirement (*Section 14-526(b)(iii)*). No waiver is required.

Under Phase 2, the applicant has proposed planting 25 fruit trees within the preservation buffer, a feature of the original Turnpike Industrial Park subdivision, along part of the northern site boundary. Jeff Tarling, the City Arborist, has indicated at staff development review meetings that he considers such planting would maintain the “buffer” function.

The proposal also includes new Norway spruce and American elm trees along the site’s northern boundary near the location of the detention basin under Phase 2. These trees are meant as a buffer. Plans actually indicate that these two features – the landscaping and the detention pond – may conflict. This issue

remains unresolved. Per the comments of David Senus, consulting civil engineer (*Attachment 3*), its resolution has been included as a condition of approval.

c. *Water Quality/Storm Water Management/Erosion Control*

The proposal includes a Stormwater Management Plan (*Attachment P*). The applicant has noted that Phase 2 will require an expansion of the existing wet pond, construction of the proposed stormwater detention basin, a Tier 2 Wetland Alteration Permit, and a Maine Programmatic General Permit. As noted above, the applicant has requested that a condition of approval be granted which will allow Phase 1 construction to proceed without these permits and without construction of the detention basin and wet pond expansion.

At the request of Mr. Senus, the applicant has provided a clearer phasing plan showing stormwater management measures and associated grading under each phase. Mr. Senus writes,

The Applicant has noted that the Phase 2 work will require obtaining an NRPA Tier 2 Wetland Alteration Permit and a Maine Programmatic General Permit through the MaineDEP and USACOE, respectively. Per the Applicant's request, we support the request to include a Condition of Approval that requires obtaining these permits prior to construction of Phase 2 of the project. Copies of these permits will be required to be filed with the City Planning Office prior to proceeding with Phase 2 construction activities.

In accordance with Section 5 of the City of Portland Technical Manual, a Level III Site Plan project is required to submit a stormwater management plan pursuant to the regulations of MaineDEP Chapter 500 Stormwater Management Rules, including conformance with the Basic, General, and Flooding Standards. We offer the following comments:

- a) Basic Standard: The Applicant has provided a plan, notes, and details to address erosion and sediment control requirements, inspection and maintenance requirements, and good housekeeping practices in general accordance with Appendix A, B, & C of MaineDEP Chapter 500 for the Phase 1 work; however, the Applicant should clarify what controls may be needed for Phases 2 & 3 of construction (i.e. – will there be different access locations requiring alternate stabilized construction entrances?).*
- b) General Standards: The Applicant has demonstrated that the existing wet pond is adequately sized to meet the General Standards for the Phase 1 development, and that the proposed modifications to the wet pond during Phase 2 will meet the General Standards under that future phase.*
- c) Flooding Standard: The Applicant has provided sufficient information to demonstrate that the project will meet the Flooding Standard for each progressive phase of work.*

Sheet C7.2 – The Landscape Plan for Phase 2 shows trees within the drainage way and inslope for the detention pond (along the north edge of the site). This landscape plan should be coordinated with the grading plan, and notes should be added to ensure the grading work doesn't impact the installation of the landscaping (and vice versa).

Mr. Senus has further added that the following comments remain to be addressed,

The Applicant should provide a stormwater inspection and maintenance plan developed in accordance with and in reference to MaineDEP Chapter 500 guidelines and Chapter 32 of the City of Portland Code of Ordinances.

The final submission package should include details for the proposed detention pond and for the proposed wet pond expansion.

The grading around proposed CB-1 should be better defined to ensure runoff from the parking area enters the catch basin for treatment and storage instead of flowing into the adjacent roadway swale.

The Tipdown Curb Installation detail specifies a 2” reveal; however, in accordance with the City of Portland Technical Manual, tipdowns within the City Right-of-Way should only have a 1” curb reveal at driveways.

Will the proposed segmented block retaining wall will be designed by others? If yes, then design and submittal requirements for the proposed retaining wall system should be noted on the plan, along with any known design parameters related to the soils or adjacent site features.

3. Public Infrastructure and Community Safety Standards

a. Consistency with Related Master Plans

The project is generally consistent with related master plans.

b. Public Safety and Fire Prevention

The Fire Department has indicated in discussions that there are no major concerns with the proposed expansion.

c. Availability and Capacity of Public Utilities

The applicant has provided evidence of water and sewer capacity (*Attachment M*).

4. Site Design Standards

a. Massing, Ventilation, and Wind Impact

There are no anticipated issues with massing, ventilation, or wind impacts.

b. Shadows

There are no anticipated adverse shadow impacts to publicly accessible open spaces.

c. Snow and Ice Loading

No adverse snow and ice loading issues are expected.

d. View Corridors

The project is not located on a protected view corridor.

e. Historic Resources

There are no potential impacts to historic resources.

f. Exterior Lighting

The applicant has indicated new exterior lighting under both phases of development. Lighting cut sheets and a photometric plan meeting the city’s technical standards have been provided (*Attachment T*).

g. Noise and Vibration

There are no anticipated adverse noise or vibration impacts associated with the expansion project.

h. Signage and Wayfinding

No new signage or wayfinding is proposed.

i. Zoning-Related Design Standards

There are no design standards for development in the I-M zone.

XI. PROPOSED MOTIONS

A. WAIVERS

On the basis of the application, plans, reports and other information submitted by the applicant; findings and recommendations contained in the Planning Board report for the public hearing on July 22, 2014 for application 2014-098 relevant to Portland's Technical and Design Standards and other regulations; and the testimony presented at the Planning Board hearing:

1. The Planning Board **finds/does not find**, based upon the consulting transportation engineer's review (*Attachment 2*), that extraordinary conditions exist or undue hardship may result from strict compliance with the Technical Standard (*Section 1.7.1.8*) which limits the number of driveways for any site to two, that substantial justice and the public interest are secured with the variation in this standard, and that the variation is consistent with the intent of the ordinance. The Planning Board **waives/does not waive** the Technical Standard (*Section 1.7.8.1*) to allow four curb cuts on site; and
2. The Planning Board **finds/does not find**, based upon the consulting transportation engineer's review (*Attachment 2*), that extraordinary conditions exist or undue hardship may result from strict compliance with the Site Plan Standard (*Section 14-526(a)2.C(i)*) which requires sidewalks along all frontages, that substantial justice and the public interest are secured with the variation in this standard, and that the variation is consistent with the intent of the ordinance. The Planning Board **waives/does not waive** the Site Plan Standard (*Section 14-526(a)2.C(i)*) to allow the applicant not to install sidewalks on Industrial Way; and
3. The Planning Board **finds/does not find**, based upon the consulting transportation engineer's review (*Attachment 4*), that extraordinary conditions exist or undue hardship may result from strict compliance with the Site Plan Standard (*Section 14-526(a)2.C(i)*) which requires curbs along all frontages, that substantial justice and the public interest are secured with the variation in this standard, and that the variation is consistent with the intent of the ordinance. The Planning Board **waives/does not waive** the Site Plan Standard (*Section 14-526(a)2.C(i)*) to allow the applicant not to install curbs on Industrial Way; and

C. SITE PLAN REVIEW

On the basis of the application, plans, reports and other information submitted by the applicant; findings and recommendations contained in the Planning Board report for the public hearing on July 22, 2014 for application 2014-098 relevant to the site plan regulations; and the testimony presented at the Planning Board hearing, the Planning Board finds that the plan **is/is not** in conformance with the site plan standards of the land use code, subject to the following conditions of approval that must be met prior to the issuance of a building permit, unless otherwise stated:

1. The applicant shall submit application material relevant to Phase 3 of the project, which shall be reviewed and approved by the Planning Authority as a future amendment to this approval, prior to issuance of a permit for that phase;
2. The applicant shall provide erosion and sedimentation control plans for Phase 2, details related to the proposed detention pond and wet pond expansion, a NRPA Tier 2 Wetland Alteration Permit, and a Maine Programmatic General Permit for review and approval by the Planning Authority prior to commencing Phase 2 of the project;
3. The applicant shall resolve outstanding issues related to the location of landscaping within and adjacent to the proposed detention basin for review and approval by the Planning Authority; and
4. The applicant shall provide additional submittals addressing the outstanding comments of David Senus, consulting civil engineer, dated July 16, 2014, for review and approval by the Planning Authority.

XII. ATTACHMENTS

PLANNING BOARD REPORT ATTACHMENTS

1. Zoning Administrator review (memo from Marge Schmuckal, 7/16/14)
2. Traffic Engineering review (emails from Tom Errico, 6/27/14, 7/2/14, and 7/16/14)
3. Stormwater review (memo from David Senus, 7/16/14)

PUBLIC COMMENTS

- PC-1. Letter from Bruce Micucci (7/8/14)
PC-2. Neighborhood Meeting Minutes

APPLICANT'S SUBMITTAL

- A. Cover letter
- B. Application
- C. Project Description
- D. Right, Title and Interest
- E. State and Federal Permits
- F. Zoning Assessment
- G. Existing/Proposed Easements
- H. Waivers
- I. Traffic Analysis
- J. Significant Natural Features
- K. City Master Plan Consistency
- L. Financial and Technical Capacity
- M. Utility Capacity to Serve
- N. Fire Safety
- O. Construction Management Plan
- P. Stormwater Management Plan
- Q. Solid Waste/Design
- R. Conformance with Design Standards
- S. Manufacturer's Catalog Package
- T. Lighting Cut Sheets and Photometrics

PLANS

- P1. Cover sheet
- P2. Existing Conditions Plan
- P3. Demolition Plan – Phase 1
- P4. Demolition Plan – Phase 2
- P5. Phasing Plan
- P6. Site Plan – Phase 1
- P7. Site Plan – Phase 2
- P8. Grading and Utility Plan – Phase 1
- P9. Grading and Utility Plan – Phase 2
- P10. Landscape and Lighting Plan – Phase 1
- P11. Landscape and Lighting Plan – Phase 2
- P12. Details
- P13. Details
- P14. Elevation
- P15. Elevation
- P16. Stormwater Plan
- P17. Stormwater Plan
- P18. Stormwater Plan
- P19. Stormwater Plan
- P20. Turning Template

MEMORANDUM

To: FILE
From: Jean Fraser
Subject: Application ID: 2014-098
Date: 7/16/2014

Comments Submitted by: Marge Schmuckal/Zoning on 7/10/2014

The newest additions to Allagash Brewery are meeting the I-M industrial dimensional zone requirements, including setbacks, impervious surface, and parking. The zoning analysis mentioned the height of the newest buildings as 31' or 34' depending on which set of given information is used. However the submitted building elevation page does not have any dimensions on it and does not have any scaling information on it. I am pretty sure the maximum height of 75' is not being violated. I will need an elevation plan to confirm the building height.

Marge Schmuckal
Zoning Administrator

Comments Submitted by: Marge Schmuckal/Zoning on 7/16/2014

The applicant revised the zoning assessment sheet to reflect a building height of 34' which is well under the 75' maximum height. The building height also affects the required setbacks in this I-M zone. The I-M zone setbacks are being met using the 34' building height. The building permit #2014-01527 has been applied for and signed off for zoning at this time.

Marge Schmuckal
Zoning Administrator

From: Tom Errico <thomas.errico@tylin.com>
To: Jean Fraser <JF@portlandmaine.gov>
CC: David Margolis-Pineo <DMP@portlandmaine.gov>
Date: 6/27/2014 10:06 AM
Subject: RE: Allagash Brewery sidewalk

Jean - In my professional opinion the appropriate criteria for waiving a sidewalk should be the criteria noting loss of site features and the criteria that notes that a safe and reasonable pedestrian alternative is available via use of Industrial Way as a shared street (due to low vehicle speeds and volumes). I believe there is an expectation of pedestrian demand from these land uses. Accordingly, given historically site plan approvals and traffic conditions I support a waiver for construction of the sidewalk. I can elaborate further if you would like.

Thanks
Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
[T.Y. Lin International]T.Y. Lin International
12 Northbrook Drive
Falmouth, ME 04105
207.781.4721 (main)
207.347.4354 (direct)
207.400.0719 (mobile)
207.781.4753 (fax)

From: Tom Errico <thomas.errico@tylin.com>
To: Jean Fraser <JF@portlandmaine.gov>
CC: David Margolis-Pineo <DMP@portlandmaine.gov>, Katherine Earley <KAS@port...>
Date: 7/2/2014 12:11 PM
Subject: Allagash Brewery Expansion

Jean - I have reviewed the application materials for the noted project and I find the project to be acceptable from a traffic perspective with the following comments.

* I have reviewed the traffic analysis conducted by the applicant and I concur that the proposed traffic volume level does not required a Traffic Movement Permit.

* The applicant has provided a review of High Crash Locations in the study area. I concur with their conclusion, but the applicant should conduct a crash analysis along Riverside Street in the vicinity of the project.

* The project will exceed the number of driveways permitted by the City and a waiver is required (four driveways exist and a maximum of two driveways are permitted). I support a waiver from the City's Technical Standard given that the driveways already exist; the project generally separates trucks and passenger vehicle activity; the curved alignment of Industrial Parkway creates site vehicle circulation constraints; and that low volumes and speeds exist on Industrial Parkway.

If you have any questions or comments, please contact me.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
[T.Y. Lin International]T.Y. Lin International
12 Northbrook Drive
Falmouth, ME 04105
207.781.4721 (main)
207.347.4354 (direct)
207.400.0719 (mobile)
207.781.4753 (fax)
thomas.errico@tylin.com<mailto:thomas.errico@tylin.com>
Visit us online at www.tylin.com<http://www.tylin.com>
Twitter | Facebook | LinkedIn | YouTube

"One Vision, One Company"

Please consider the environment before printing.

From: Tom Errico <thomas.errico@tylin.com>
To: Jean Fraser <JF@portlandmaine.gov>
CC: Katherine Earley <KAS@portlandmaine.gov>, "Margolis-Pineo, David" <DMP@portlandmaine.gov>, Jeremiah Bartlett <JBartlett@portlandmaine.gov>, Jeff Tarling <JST@portlandmaine.gov>, Helen Donaldson <HCD@portlandmaine.gov>
Date: 7/17/2014 9:50 AM
Subject: Allagash - Updated Final Traffic Comment

Jean - I have reviewed the requested crash data provided by the applicant and I concur that there are no safety problems on Riverside Street in the vicinity of the project. I also concur that the crash statistics at the Forest Avenue/Riverside Street are not relevant given the recent MaineDOT improvements. I have no further comment on this issue.

Please contact me if you have any questions.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
[T.Y. Lin International]T.Y. Lin International
12 Northbrook Drive
Falmouth, ME 04105
207.781.4721 (main)
207.347.4354 (direct)
207.400.0719 (mobile)
207.781.4753 (fax)
thomas.errico@tylin.com<mailto:thomas.errico@tylin.com>
Visit us online at www.tylin.com<http://www.tylin.com>
Twitter | Facebook | LinkedIn | YouTube

"One Vision, One Company"

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MEMORANDUM



TO: Jean Fraser & Nell Donaldson
FROM: David Senus, P.E.
DATE: July 16, 2014
RE: Allagash Brewing Expansion, Final Level III Site Plan Application

Woodard & Curran has reviewed the Final Level III Site Plan Application for the proposed Allagash Brewing Expansion located at 50 Industrial Way in Portland, Maine. The project consists of constructing two building additions, a tank support pad, additional loading docks, the expansion of an existing wet pond, the construction of a new stormwater detention basin, and other associated site work. The project will be constructed in three phases.

Documents Reviewed by W&C

- Level III Final Site Plan Application and attachments, dated July 11, 2014, prepared by Sebago Technics on behalf of 50 Industrial Way, LLC.
- Engineering Plans, Sheets C1, C2, C3.1, C3.2, C4, C5.1, C5.2, C6.1, C6.2, C7.1, C7.2, C8, C9, C10.1, C10.2, C10.3, C10.4, REV dated July 11, 2014, prepared by Sebago Technics on behalf of 50 Industrial Way, LLC.

Comments *(Comments in italics have not been address from previous review memo dated 6/19/2014)*

- 1) The Applicant has noted that the Phase 2 work will require obtaining an NRPA Tier 2 Wetland Alteration Permit and a Maine Programmatic General Permit through the MaineDEP and USACOE, respectively. Per the Applicant's request, we support the request to include a Condition of Approval that requires obtaining these permits prior to construction of Phase 2 of the project. Copies of these permits will be required to be filed with the City Planning Office prior to proceeding with Phase 2 construction activities.
- 2) In accordance with Section 5 of the City of Portland Technical Manual, a Level III Site Plan project is required to submit a stormwater management plan pursuant to the regulations of MaineDEP Chapter 500 Stormwater Management Rules, including conformance with the Basic, General, and Flooding Standards. We offer the following comments:
 - a) Basic Standard: The Applicant has provided a plan, notes, and details to address erosion and sediment control requirements, inspection and maintenance requirements, and good housekeeping practices in general accordance with Appendix A, B, & C of MaineDEP Chapter 500 for the Phase 1 work; however, the Applicant should clarify what controls may be needed for Phases 2 & 3 of construction (i.e. – will there be different access locations requiring alternate stabilized construction entrances?).
 - b) General Standards: The Applicant has demonstrated that the existing wet pond is adequately sized to meet the General Standards for the Phase 1 development, and that the proposed modifications to the wet pond during Phase 2 will meet the General Standards under that future phase.
 - c) Flooding Standard: The Applicant has provided sufficient information to demonstrate that the project will meet the Flooding Standard for each progressive phase of work.
- 3) Sheet C7.2 – The Landscape Plan for Phase 2 shows trees within the drainage way and inslope for the detention pond (along the north edge of the site). This landscape plan should be coordinated with the grading plan, and notes should be added to ensure the grading work doesn't impact the installation of the landscaping (and vice versa).
- 4) *The Applicant should provide a stormwater inspection and maintenance plan developed in accordance with and in reference to MaineDEP Chapter 500 guidelines and Chapter 32 of the City of Portland Code of Ordinances.*
- 5) *The Applicant has requested confirmation of capacity to serve the development from utilities. Confirmation letters should be forwarded to the City upon receipt.*



- 6) *The final submission package should include details for the proposed detention pond and for the proposed wet pond expansion.*
- 7) *The grading around proposed CB-1 should be better defined to ensure runoff from the parking area enters the catch basin for treatment and storage instead of flowing into the adjacent roadway swale.*
- 8) *The Tipdown Curb Installation detail specifies a 2" reveal; however, in accordance with the City of Portland Technical Manual, tipdowns within the City Right-of-Way should only have a 1" curb reveal at driveways.*
- 9) *Will the proposed segmented block retaining wall will be designed by others? If yes, then design and submittal requirements for the proposed retaining wall system should be noted on the plan, along with any known design parameters related to the soils or adjacent site features.*



July 11, 2014
02249

Jean Fraser, Planner
Planning and Urban Development Department
City of Portland
389 Congress Street
Portland, ME 04101

Level III Final Site Plan Application;
50 Industrial Way, LLC - Allagash Brewing Company
Tax Map 326 Block B, Lot 8, Lot 9 and Lot 10

Dear Jean:

On behalf of 50 Industrial Way, LLC, Sebago Technics, Inc. is submitting this Final Site Plan application for an expansion of the Allagash Brewing facility located at 50 Industrial Way in Portland, Maine. As you will recall, we met with the Planning Board at their July 8th workshop meeting to introduce the proposed phased development for this property.

Generally, the application and plans have been updated to clarify the proposed phasing for this project and to address specific comments contained in the Planning Division memorandum. The following information summarizes the modifications:

Application and Narratives

Exhibit 1 - The application form has been completed, signed and dated to include final application criteria. The project data sheet has been updated to correspond with the site improvements through Phase 2.

Exhibit 2 – The project description has been updated to reflect the proposed phasing for the project.

Exhibit 4 – The applicant understands that State and Federal permits will be required prior to commencing construction which impacts the wetlands on-site. As such, the condition of approval request has been reworded accordingly.

Exhibit 5 – The proposed space and bulk dimensions for Phase 1 and Phase 2 have been incorporated in the narrative.

Exhibit 7 – The waiver criteria for the sidewalk has been modified as suggested by Tom Errico in his email dated July 2, 2014. The waiver request pertaining to the number of driveways has been added, as suggested by Tom Errico in his email dated July 2, 2014.

Exhibit 8 – Crash data was obtained for the latest three year period (2011-2013) which was not previously available at the time of our original traffic memorandum dated June 3rd, 2013 (data provided at that time was from 2010-2012). Four intersections on Riverside Street within a ½ mile of the Allagash site were requested beginning with Evergreen Dr. @ Riverside St. to the north, Industrial Way @ Riverside St., Forest Ave. @ Riverside St. and Waldron Way @ Riverside St. During this time period, Forest Ave. @ Riverside St. had 34 crashes, with a CRF of 1.10, making it a High Crash Location (minimum of 8 crashes in a three year period and a CRF greater than 1.00). The remaining three intersections all experienced 0 crashes in a three year period. From this data it appears that 32 of the 34 crashes experienced at Riverside and Forest were rear ends collisions as a result of driver inattention, which is very typical of a signalized, heavily congested traffic signal. Given this fact and MaineDOT recently completing a project through this intersection in 2012, it is our opinion that there are no correctible crash patterns on Riverside Street. Crash summaries along with the police reports (where applicable) are provided for all four intersections. The crash data sheets are appended to the original traffic analysis memorandum.

Exhibit 15 – The stormwater management plan has been modified to demonstrate compliance with Chapter 500 in both Phase 1 and Phase 2 of the proposed development. HydroCAD calculations and Watershed plans for the 2010 site conditions, 2012 site conditions, 2014 – Phase 1 site conditions and 2014 – Phase 2 site conditions are provided for comparison. The calculations are included within Exhibit 15 and the plans are provided as individual PDF files. (C10.1 Stormwater, C10.2 Stormwater, C10.3 Stormwater and C10.4 Stormwater, respectively)

Plans

C1 Cover – The cover sheet has been amended to show the current list of plans. Please note that the stormwater plans are not included on the cover. The proposed gravel access drive has been removed.

C2 Existing Conditions – The plan was corrected to remove an aerial utility cable which had served 100 Industrial Way, but was removed during the previous construction activity.

C3.1 Demolition: Phase 1 – This plan was added to depict the required demolition to complete Phase 1.

C3 Demolition – This plan was updated to depict the required demolition to complete Phase 2. Phase 1 site elements are shown as “existing”.

C4 Phasing – This plan was updated to show the final proposed limits of each phase of construction. The proposed gravel access drive has been removed.

C5.1 Site: Phase 1 – This plan was added to depict the proposed site improvements associated with Phase 1.

C5 Site – This plan was updated to depict the proposed site improvements associated with Phase 2. Phase 1 site elements are shown as “existing”. The proposed gravel access drive has been removed.

C6.1 Grading: Phase 1 – This plan was added to depict the proposed grading, utility and storm drainage infrastructure associated with Phase 1.

C6 Grading – This plan was updated to depict the proposed grading, utility and storm drainage infrastructure associated with Phase 2. Phase 1 grading, utility and storm drainage elements are shown as “existing”. The proposed gravel access drive has been removed and grading adjusted accordingly.

C7.1 Landscape: Phase 1 – This plan was added to depict the proposed landscape and lighting improvements associated with Phase 1.

C7 Landscape - This plan was updated to depict the proposed landscape and lighting improvements associated with Phase 2. Phase 1 landscape and lighting elements are shown as “existing”. Additional plantings have been added adjacent to the proposed detention basin and concrete pad.

C8 Details – There are no changes to this plan. It is provided with a consistent revision note.

C9 Details - There are no changes to this plan. It is provided with a consistent revision note.

C10.1 Stormwater through C10.4 Stormwater – As noted previously, these plans are provided for review of the stormwater management plan.

C11 Turning Template – This plan is provided to satisfy the requirements of the site plan submission checklist.

We are awaiting responses from the Portland Water District and City of Portland Public Services Department regarding capacity to serve the project’s potable water demand and wastewater flows, respectively. We are also awaiting completion of a photometric plan which will address Section 12 of the Technical Manual. These items will be forwarded upon receipt or completion.

We are hopeful that the information provided is sufficient to complete a review of the application and to proceed with final approval of the development proposal. Please contact me if you have any questions or if you require additional information. Thank you for your consideration.

Sincerely,

SEBAGO TECHNICS, INC.



Richard L. Meek, P.E.
Sr. Project Engineer

RLM:llg

cc: Rob Tod, Allagash Brewing Company
Paul Ureneck, CBRE/Boulos Asset Management



FINAL SITE PLAN APPLICATION

For

Allagash Brewing Company

Prepared for:

50 Industrial Way, LLC
50 Industrial Way
Portland, ME 04103

July 11, 2014

Table of Contents

Level III Site Plan

Preliminary Plan Written Requirements

Exhibit 1	Application Form	Revised 7-11-14
Exhibit 2	Project Description	Revised 7-11-14
Exhibit 3	Title, Right and Interest	
Exhibit 4	State and Federal Permits	Revised 7-11-14
Exhibit 5	Assessment of Zoning	Revised 7-11-14
Exhibit 6	Existing/Proposed Easements	
Exhibit 7	Waivers	Revised 7-11-14
Exhibit 8	Traffic Analysis	
Exhibit 9	Significant Natural Features	
Exhibit 10	City Master Plan Consistency	

Final Plan Written Requirements

Exhibit 11	Financial and Technical Capacity	
Exhibit 12	Utility Capacity to Serve	
Exhibit 13	Fire Safety	
Exhibit 14	Construction Management Plan	
Exhibit 15	Stormwater Management plan	Revised 7-11-14
Exhibit 16	Solid Waste	
Exhibit 17	Conformance with Design Standards	
Exhibit 18	Manufacturer's Catalog Package	

Exhibit 1

Application Form



Jeff Levine, AICP, Director
Planning & Urban Development Department

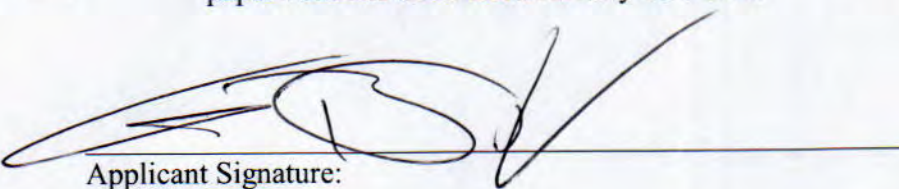
Electronic Signature and Fee Payment Confirmation

Notice: Your electronic signature is considered a legal signature per state law.

By digitally signing the attached document(s), you are signifying your understanding this is a legal document and your electronic signature is considered a **legal signature** per Maine state law. You are also signifying your intent on paying your fees by the opportunities below.

I, the undersigned, intend and acknowledge that no Site Plan or Historic Preservation Applications can be reviewed until payment of appropriate application fees are ***paid in full*** to the Inspections Office, City of Portland Maine by method noted below:

- ☐ Within 24-48 hours, once my complete application and corresponding paperwork has been electronically delivered, I intend to **call the Inspections Office** at 207-874-8703 and speak to an administrative representative and provide a credit/debit card over the phone.
- ☐ Within 24-48 hours, once my application and corresponding paperwork has been electronically delivered, I intend to **call the Inspections Office** at 207-874-8703 and speak to an administrative representative and provide a credit/debit card over the phone.
- ☐ I intend to deliver a payment method through the U.S. Postal Service mail once my application paperwork has been electronically delivered.

Applicant Signature: 

7/14/14
Date:

I have provided digital copies and sent them on:

Date:

NOTE:

All electronic paperwork must be delivered to buildinginspections@portlandmaine.gov or by physical means i.e. a thumb drive or CD to the Inspections Office, City Hall, 3rd Floor, Room 315.



Level III – Preliminary and Final Site Plans Development Review Application Portland, Maine

Planning and Urban Development Department
Planning Division

Portland's Planning and Urban Development Department coordinates the development review process for site plan, subdivision and other applications under the City's Land Use Code. Attached is the application form for a Level III: Preliminary or Final Site Plan. Please note that Portland has delegated review from the State of Maine for reviews under the Site Location of Development Act, Chapter 500 Stormwater Permits, and Traffic Movement Permits.

Level III: Site Plan Development includes:

- New structures with a total floor area of 10,000 sq. ft. or more except in Industrial Zones.
- New structures with a total floor area of 20,000 sq. ft. or more in Industrial Zones.
- New temporary or permanent parking area(s) or paving of existing unpaved parking areas for more than 75 vehicles.
- Building addition(s) with a total floor area of 10,000 sq. ft. or more (cumulatively within a 3 year period) except in Industrial Zones.
- Building addition(s) with a total floor area of 20,000 sq. ft. or more in Industrial Zones.
- A change in the use of a total floor area of 20,000 sq. ft. or more in any existing building (cumulatively within a 3 year period).
- Multiple family development (3 or more dwelling units) or the addition of any additional dwelling unit if subject to subdivision review.
- Any new major or minor auto business in the B-2 or B-5 Zone, or the construction of any new major or minor auto business greater than 10,000 sq. ft. of building area in any other permitted zone.
- Correctional prerelease facilities.
- Park improvements: New structures greater than 10,000 sq. ft. and/or facilities encompassing 20,000 sq. ft. or more (excludes rehabilitation or replacement of existing facilities); new nighttime outdoor lighting of sports, athletic or recreation facilities not previously illuminated.
- Land disturbance of 3 acres or more (includes stripping, grading, grubbing, filling or excavation).

Portland's development review process and requirements are outlined in the Land Use Code (Chapter 14) which is available on our website:

Land Use Code: <http://me-portland.civicplus.com/DocumentCenter/Home/View/1080>

Design Manual: <http://me-portland.civicplus.com/DocumentCenter/View/2355>

Technical Manual: <http://me-portland.civicplus.com/DocumentCenter/View/2356>

Planning Division

Fourth Floor, City Hall
389 Congress Street
(207) 874-8719

Office Hours

Monday thru Friday
8:00 a.m. – 4:30 p.m.

PROJECT NAME: Allagash Brewery 2015 Expansion

PROPOSED DEVELOPMENT ADDRESS:

50 Industrial Way, Portland

PROJECT DESCRIPTION:

2,400 SQ FT Tank Support Addition (Bunker), 18,360 sq.ft.

Production Exp. (connecting 50&100 Industrial Way Facilities)
Adding loading docks and associated site work.

CHART/BLOCK/LOT: 326, B (89, 210)

PRELIMINARY PLAN

6-3-14 (date)

FINAL PLAN

7-11-14 (date)

CONTACT INFORMATION:

Applicant – must be owner, Lessee or Buyer Name: 50 Industrial Way, LLC Business Name, if applicable: Allagash Brewing Co. Address: 50 Industrial Way City/State : Portland, ME Zip Code: 04103	Applicant Contact Information Work # 207-878-5385 Home# Cell # 207-450-4274 Fax# e-mail: robtod@allagash.com
Owner – (if different from Applicant) Name: Address: City/State : Zip Code:	Owner Contact Information Work # Home# Cell # Fax# e-mail:
Agent/ Representative Name: Richard Meek, P.E. Address: 75 John Roberts RD Suite 1A City/State : So. Portland Zip Code: 04106	Agent/Representative Contact information Work # 207-200-2075 Cell # e-mail: rmeek@sebagotechnics.com
Billing Information Name: Rob Too c/o Allagash Brewing Co. Address: 50 Industrial Way City/State : Portland, ME Zip Code: 04103	Billing Information Work # 207-878-5385 Cell # 207-450-4274 Fax# e-mail: robtod@allagash.com

Engineer Name: Richard Meek Address: 75 John Roberts RD Suite 1A City/State : So. Portland Zip Code: 04106	Engineer Contact Information Work # 207-200-2075 Cell # Fax# 207-856-2206 e-mail: rmeek@sebagotechnics.com
Surveyor Name: Matthew Ek Address: 15 John Roberts RD Suite 1A City/State : So. Portland Zip Code: 04106	Surveyor Contact Information Work # 207-200-2058 Cell # Fax# 207-871-9308 e-mail: mek@sebagotechnics.com
Architect Name: Mike Hays c/o Grant Hays Assoc. Address: P.O. BOX 6179 City/State : Falmouth, ME Zip Code: 04105	Architect Contact Information Work # 207-871-5900 Cell # Fax# 207-871-9308 e-mail: mhays@earhlink.net
Attorney Name: David Galgay c/o Verrill Dana, LLP Address: ONE Portland Square City/State : Portland, ME Zip Code: 04112	Attorney Contact Information Work # 207-774-4000 Cell # Fax# 774-7499 e-mail: dgalgay@verrilldana.com

APPLICATION FEES:

Check all reviews that apply. (Payment may be made by Credit Card, Cash or Check payable to the City of Portland.)

Level III Development (check applicable reviews) ☒ Less than 50,000 sq. ft. (\$500.00) ☐ 50,000 - 100,000 sq. ft. (\$1,000) ☐ 100,000 – 200,000 sq. ft. (\$2,000) ☐ 200,000 – 300,000 sq. ft. (\$3,000) ☐ over \$300,00 sq. ft. (\$5,000) ☐ Parking lots over 11 spaces (\$1,000) ☐ After-the-fact Review (\$1,000.00 plus applicable application fee) Plan Amendments (check applicable reviews) ☐ Planning Staff Review (\$250) ☐ Planning Board Review (\$500) The City invoices separately for the following: • Notices (\$.75 each) • Legal Ad (% of total Ad) • Planning Review (\$40.00 hour) • Legal Review (\$75.00 hour) Third party review fees are assessed separately. Any outside reviews or analysis requested from the Applicant as part of the development review, are the responsibility of the Applicant and are separate from any application or invoice fees.	Other Reviews (check applicable reviews) ☐ Traffic Movement (\$1,000) ☒ Stormwater Quality (\$250) ☐ Subdivisions (\$500 + \$25/lot) # of Lots ___ x \$25/lot = ____ ☐ Site Location (\$3,000, except for residential projects which shall be \$200/lot) # of Lots ___ x \$200/lot = ____ ☐ Other _____ ☐ Change of Use ☐ Flood Plain ☐ Shoreland ☐ Design Review ☐ Housing Replacement ☐ Historic Preservation
--	---

APPLICATION SUBMISSION:

1. All site plans and written application materials must be submitted electronically on a CD or thumb drive with each plan submitted as separate files, with individual file which can be found on the **Electronic Plan and Document Submittal** page of the City's website at <http://me-portland.civicplus.com/764/Electronic-Plan-and-Document-Submittal>
2. In addition, one (1) paper set of the plans (full size), one (1) paper set of plans (11 x 17), paper copy of written materials, and the application fee must be submitted to the Building Inspections Office to start the review process.

The application must be complete, including but not limited to the contact information, project data, application checklists, wastewater capacity, plan for fire department review, and applicant signature. The submissions shall include one (1) paper packet with folded plans containing the following materials:

1. One (1) full size site plans that must be folded.
2. One (1) copy of all written materials or as follows, unless otherwise noted:
 - a. Application form that is completed and signed.
 - b. Cover letter stating the nature of the project.
 - c. All Written Submittals (Sec. 14-525 2. (c), including evidence of right, title and interest.
3. A stamped standard boundary survey prepared by a registered land surveyor at a scale not less than one inch to 50 feet.
4. Plans and maps based upon the boundary survey and containing the information found in the attached sample plan checklist.
5. One (1) set of plans reduced to 11 x 17.

Please refer to the application checklist (attached) for a detailed list of submission requirements.

APPLICANT SIGNATURE:

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Planning Authority and Code Enforcement's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for a Level II Site Plan review. It is not a permit to begin construction. An approved site plan, a Performance Guarantee, Inspection Fee, Building Permit, and associated fees will be required prior to construction. Other Federal, State or local permits may be required prior to construction, which are the responsibility of the applicant to obtain.

Signature of Applicant:

Date:

7/14/14

PROJECT DATA

The following information is required where applicable, in order to complete the application.

Total Area of Site	191,979	sq. ft.
Proposed Total Disturbed Area of the Site	171,000	sq. ft.
If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with DEP and a Stormwater Management Permit, Chapter 500, with the City of Portland.		
Impervious Surface Area		
Impervious Area (Total Existing)	93,404	sq. ft.
Impervious Area (Total Proposed)	118,200	sq. ft.
Building Ground Floor Area and Total Floor Area		
Building Footprint (Total Existing)	35,722	sq. ft.
Building Footprint (Total Proposed)	57,770	sq. ft.
Building Floor Area (Total Existing)	37,055	sq. ft.
Building Floor Area (Total Proposed)	65,080	sq. ft.
Zoning		
Existing	I - M	
Proposed, if applicable	I - M	
Land Use		
Existing	BREWERY	
Proposed	BREWERY	
Residential, If applicable		
# of Residential Units (Total Existing)	N/A	
# of Residential Units (Total Proposed)	N/A	
# of Lots (Total Proposed)	N/A	
# of Affordable Housing Units (Total Proposed)	N/A	
Proposed Bedroom Mix		
# of Efficiency Units (Total Proposed)	N/A	
# of One-Bedroom Units (Total Proposed)	N/A	
# of Two-Bedroom Units (Total Proposed)	N/A	
# of Three-Bedroom Units (Total Proposed)	N/A	
Parking Spaces		
# of Parking Spaces (Total Existing)	64	
# of Parking Spaces (Total Proposed)	74	
# of Handicapped Spaces (Total Proposed)	3	
Bicycle Parking Spaces		
# of Bicycle Spaces (Total Existing)	10	
# of Bicycle Spaces (Total Proposed)	10	
Estimated Cost of Project		
	\$750,000	

PROJECT DATA (PHASE 1)

The following information is required where applicable, in order to complete the application.

Total Area of Site	191,979	sq. ft.
Proposed Total Disturbed Area of the Site	160,300	sq. ft.
If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with DEP and a Stormwater Management Permit, Chapter 500, with the City of Portland.		
Impervious Surface Area		
Impervious Area (Total Existing)	93,404	sq. ft.
Impervious Area (Total Proposed)	108,400	sq. ft.
Building Ground Floor Area and Total Floor Area		
Building Footprint (Total Existing)	35,722	sq. ft.
Building Footprint (Total Proposed)	47,660	sq. ft.
Building Floor Area (Total Existing)	37,055	sq. ft.
Building Floor Area (Total Proposed)	54,970	sq. ft.
Zoning		
Existing	I-M	
Proposed, if applicable	I-M	
Land Use		
Existing	BREWERY	
Proposed	BREWERY	
Residential, If applicable		
# of Residential Units (Total Existing)	N/A	
# of Residential Units (Total Proposed)	N/A	
# of Lots (Total Proposed)	N/A	
# of Affordable Housing Units (Total Proposed)	N/A	
Proposed Bedroom Mix		
# of Efficiency Units (Total Proposed)	N/A	
# of One-Bedroom Units (Total Proposed)	N/A	
# of Two-Bedroom Units (Total Proposed)	N/A	
# of Three-Bedroom Units (Total Proposed)	N/A	
Parking Spaces		
# of Parking Spaces (Total Existing)	64	
# of Parking Spaces (Total Proposed)	74	
# of Handicapped Spaces (Total Proposed)	3	
Bicycle Parking Spaces		
# of Bicycle Spaces (Total Existing)	10	
# of Bicycle Spaces (Total Proposed)	10	
Estimated Cost of Project		
	\$750,000	

PRELIMINARY PLAN (Optional) - Level III Site Plan			
Applicant Checklist	Planner Checklist	# of Copies	GENERAL WRITTEN SUBMISSIONS CHECKLIST
X		1	Completed Application form
X		1	Application fees
X		1	Written description of project
X		1	Evidence of right, title and interest
X		1	Evidence of state and/or federal approvals, if applicable
X		1	Written assessment of proposed project's compliance with applicable zoning requirements
X		1	Summary of existing and/or proposed easement, covenants, public or private rights-of-way, or other burdens on the site
X		1	Written requests for waivers from site plan or technical standards, if applicable.
X		1	Evidence of financial and technical capacity
X		1	Traffic Analysis (may be preliminary, in nature, during the preliminary plan phase)
Applicant Checklist	Planner Checklist	# of Copies	SITE PLAN SUBMISSIONS CHECKLIST
X		1	Boundary Survey meeting the requirements of Section 13 of the City of Portland's Technical Manual
		1	Preliminary Site Plan including the following: (information provided may be preliminary in nature during preliminary plan phase)
X			Proposed grading and contours;
X			Existing structures with distances from property line;
X			Proposed site layout and dimensions for all proposed structures (including piers, docks or wharves in Shoreland Zone), paved areas, and pedestrian and vehicle access ways;
X			Preliminary design of proposed stormwater management system in accordance with Section 5 of the Technical Manual (note that Portland has a separate applicability section);
X			Preliminary infrastructure improvements;
X			Preliminary Landscape Plan in accordance with Section 4 of the Technical Manual;
X			Location of significant natural features (including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features) located on the site as defined in Section 14-526 (b) (1);
X			Proposed buffers and preservation measures for significant natural features, as defined in Section 14-526 (b) (1);
X			Location , dimensions and ownership of easements, public or private rights of way, both existing and proposed;
X			Exterior building elevations.

FINAL PLAN - Level III Site Plan			
Applicant Checklist	Planner Checklist	# of Copies	GENERAL WRITTEN SUBMISSIONS CHECKLIST (* If applicant chooses to submit a Preliminary Plan, then the * items were submitted for that phase and only updates are required)
X		1	* Completed Application form
N/A		1	* Application fees
X		1	* Written description of project
X		1	* Evidence of right, title and interest
X		1	* Evidence of state and/or federal permits
X		1	* Written assessment of proposed project's specific compliance with applicable Zoning requirements
X		1	* Summary of existing and/or proposed easements, covenants, public or private rights-of-way, or other burdens on the site
X		1	* Evidence of financial and technical capacity
X		1	Construction Management Plan
X		1	A traffic study and other applicable transportation plans in accordance with Section 1 of the technical Manual, where applicable.
X		1	Written summary of significant natural features located on the site (Section 14-526 (b) (a))
X		1	Stormwater management plan and stormwater calculations
X		1	Written summary of project's consistency with related city master plans
X		1	Evidence of utility capacity to serve
X		1	Written summary of solid waste generation and proposed management of solid waste
X		1	A code summary referencing NFPA 1 and all Fire Department technical standards
X		1	Where applicable, an assessment of the development's consistency with any applicable design standards contained in Section 14-526 and in City of Portland Design Manual
X		1	Manufacturer's verification that all proposed HVAC and manufacturing equipment meets applicable state and federal emissions requirements.

Applicant Checklist	Planner Checklist	# of Copies	SITE PLAN SUBMISSIONS CHECKLIST (* If applicant chooses to submit a Preliminary Plan, then the * items were submitted for that phase and only updates are required)
X		1	* Boundary Survey meeting the requirements of Section 13 of the City of Portland's Technical Manual
X		1	Final Site Plans including the following:
X			Existing and proposed structures, as applicable, and distance from property line (including location of proposed piers, docks or wharves if in Shoreland Zone);
X			Existing and proposed structures on parcels abutting site;
X			All streets and intersections adjacent to the site and any proposed geometric modifications to those streets or intersections;
X			Location, dimensions and materials of all existing and proposed driveways, vehicle and pedestrian access ways, and bicycle access ways, with corresponding curb lines;
X			Engineered construction specifications and cross-sectional drawings for all proposed driveways, paved areas, sidewalks;
X			Location and dimensions of all proposed loading areas including turning templates for applicable design delivery vehicles;
N/A			Existing and proposed public transit infrastructure with applicable dimensions and engineering specifications;
X			Location of existing and proposed vehicle and bicycle parking spaces with applicable dimensional and engineering information;
X			Location of all snow storage areas and/or a snow removal plan;
N/A			A traffic control plan as detailed in Section 1 of the Technical Manual;
N/A			Proposed buffers and preservation measures for significant natural features, where applicable, as defined in Section 14-526(b)(1);
N/A			Location and proposed alteration to any watercourse;
X			A delineation of wetlands boundaries prepared by a qualified professional as detailed in Section 8 of the Technical Manual;
N/A			Proposed buffers and preservation measures for wetlands;
N/A			Existing soil conditions and location of test pits and test borings;
X			Existing vegetation to be preserved, proposed site landscaping, screening and proposed street trees, as applicable;
X			A stormwater management and drainage plan, in accordance with Section 5 of the Technical Manual;
X			Grading plan;
N/A			Ground water protection measures;
X			Existing and proposed sewer mains and connections;

- Continued on next page -

X		Location of all existing and proposed fire hydrants and a life safety plan in accordance with Section 3 of the Technical Manual;
X		Location, sizing, and directional flows of all existing and proposed utilities within the project site and on all abutting streets;
X		Location and dimensions of off-premises public or publicly accessible infrastructure immediately adjacent to the site;
X		Location and size of all on site solid waste receptacles, including on site storage containers for recyclable materials for any commercial or industrial property;
X		Plans showing the location, ground floor area, floor plans and grade elevations for all buildings;
N/A		A shadow analysis as described in Section 11 of the Technical Manual, if applicable;
N/A		A note on the plan identifying the Historic Preservation designation and a copy of the Application for Certificate of Appropriateness, if applicable, as specified in Section Article IX, the Historic Preservation Ordinance;
X		Location and dimensions of all existing and proposed HVAC and mechanical equipment and all proposed screening, where applicable;
X		An exterior lighting plan in accordance with Section 12 of the Technical Manual;
X		A signage plan showing the location, dimensions, height and setback of all existing and proposed signs;
X		Location, dimensions and ownership of easements, public or private rights of way, both existing and proposed.



**PORTLAND FIRE DEPARTMENT
SITE REVIEW
FIRE DEPARTMENT CHECKLIST**



A separate drawing[s] shall be provided as part of the site plan application for the Portland Fire Department's review.

1. Name, address, telephone number of applicant
- 2.
3. Name address, telephone number of architect
4. Proposed uses of any structures [NFPA and IBC classification]
- 5.
6. Square footage of all structures [total and per story]
7. Elevation of all structures
8. Proposed fire protection of all structures
 - **As of September 16, 2010 all new construction of one and two family homes are required to be sprinkled in compliance with NFPA 13D. This is required by City Code. (NFPA 101 2009 ed.)**
9. Hydrant locations
10. Water main[s] size and location
11. Access to all structures [min. 2 sides]
12. A code summary shall be included referencing NFPA 1 and all fire department. Technical standards.

Some structures may require Fire flows using annex H of NFPA 1

CITY OF PORTLAND WASTEWATER CAPACITY APPLICATION

Department of Public Services,
55 Portland Street,
Portland, Maine 04101-2991



Mr. Frank J. Brancely,
Senior Engineering Technician,
Phone #: (207) 874-8832,
Fax #: (207) 874-8852,
E-mail: fjb@portlandmaine.gov

Date: June 3, 2014

1. Please, Submit Utility, Site, and Locus Plans.

Site Address: 50 Industrial Way, Portland ME 04103

Chart Block Lot Number: 326/B/8, 9, 10

Proposed Use: Brewery

Previous Use: Brewery

Existing Sanitary Flows: 900 GPD

Existing Process Flows: 22,000 GPD

Description and location of City sewer that is to
receive the proposed building sewer lateral.

10" DIA. Pipe, Unknown Material Located

Aproximately in The Center of Industrial Way

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: _____ Phone: _____
Owner/Developer Name: Rob Tod c/o 50 Industrial Way, LLC
Owner/Developer Address: 50 Industrial Way, Portland ME 04103
Phone: 207-878-5385 Fax: _____ E-mail: robtod@allagash.com
Engineering Consultant Name: Richard Meek c/o Sebago Technics, Inc.
Engineering Consultant Address: 75 John Roberts RD Suite 1A So. Portland, ME 04106
Phone: 207-200-2075 Fax: 207-856-2206 E-mail: rmeek@sebagotechnics.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: 975 GPD
Peaking Factor/ Peak Times: M-F 5am to 11pm
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)
15 GPD per employee = 65 employees x 15 GPD = 975 GPD

*(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: 28,000 GPD

Do you currently hold Federal or State discharge permits? Yes X No _____

Is the process wastewater termed categorical under CFR 40? Yes _____ No X

OSHA Standard Industrial Code (SIC): 2082 <http://www.osha.gov/oshstats/sicser.html>

Peaking Factor/Peak Process Times: M - F 5am to 11pm

(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 below, or attached, as a separate sheet)

Notes, Comments or Calculation

Exhibit 2

Project Description

Project Description

50 Industrial Way, LLC (the applicant) currently owns and operates the Allagash Brewing Company facility located in the I-M zone at 50 Industrial Way, identified as Block B, Lot 9 on the City of Portland Tax Map 326. The original Site Plan was approved in 2006; with construction of 11,700 square feet footprint occurring in 2007. A 5,200 square foot addition (approved as part of the original Site Plan) was constructed in 2010. The applicant purchased the adjacent, undeveloped, lot identified as Block B, Lot 8 on the City of Portland Tax Map 326 in April 2011. A 1,464 square foot addition was approved and constructed in 2011. In November 2011, the applicant purchased the adjacent lot identified as Block B, Lot 10 on the City of Portland Tax Map 326 (100 Industrial Way). In 2012, a 1,464 square foot building addition, a 5,894 square foot building addition and a 64 space parking lot were approved and constructed.

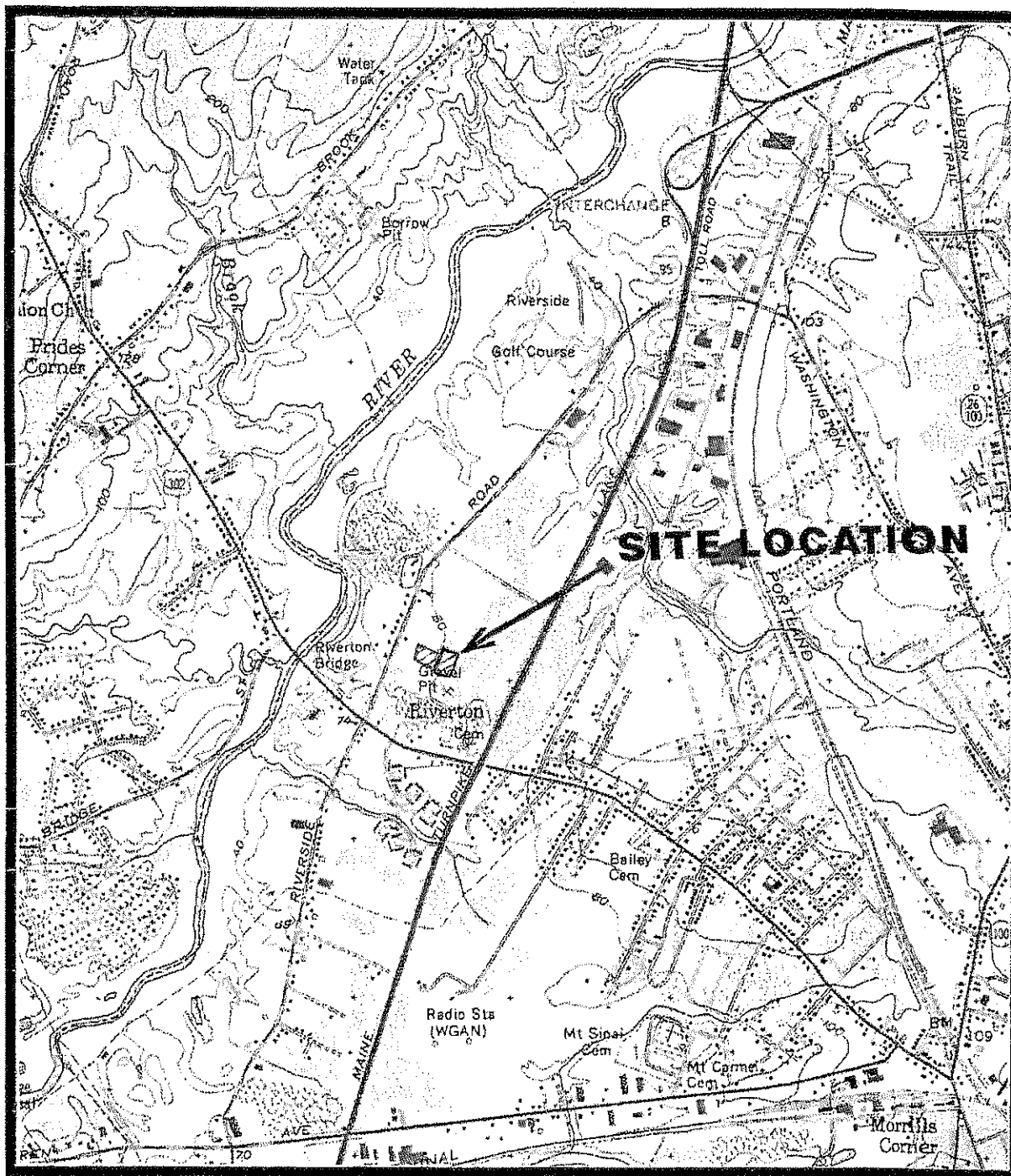
The proposed development includes a 19,100 square feet building addition (2015 Production addition), which will connect 50 Industrial Way and 100 Industrial Way, a 40' x 60' concrete tank support pad, a 2,422 square feet building addition (Bunker), site improvements associated with the loading dock area and a future Bunker expansion.

The project is proposed to be phased. Phase 1 will include approximately 10,000 square feet of the 2015 Production addition, approximately 40' x 16' of the concrete tank support pad, the Bunker addition and the site improvements associated with the loading dock area. Phase 2 will include construction of an approximately 7,800 square feet addition at the rear of the 2015 Production addition, connection of 50 Industrial Way and 100 Industrial Way and completion of the 40' x 60' concrete tank support pad. Phase 2 will require expansion of the existing wet pond, construction of the proposed stormwater detention basin, and applications for a Tier 2 wetland alteration permit with the Maine Department of Environmental Protection (MDEP) and a Tier 1 Maine Programmatic General Permit with the U.S. Army Corps of Engineers (ACOE). Phase 3 will include an approximately 4,560 square foot addition to the Bunker.

All utilities including: public water, sanitary sewer, natural gas, electrical and communications are currently serving the existing building via connections within Industrial Way. These utilities will be extended to the proposed addition(s) within the building.

The majority of stormwater runoff from the site will be collected and routed to the existing wet pond such that the post-development peak rates of discharge will be maintained or reduced when compared to the pre-development peak rates of discharge. In addition, the wet pond provides water quality treatment in general conformance with Chapter 500 of the Maine Stormwater Law.

FIGURE 1



SITE LOCATION MAP
 USGS TOPOGRAPHIC
 7.5 MIN. QUADRANGLE
 PORTLAND WEST
 SCALE: 1"=2,000'

Exhibit 3

Title, Right and Interest

Title, Right or Interest

The record owner of the parcel(s) is 50 Industrial Way, LLC by deeds recorded at the Cumberland County Registry of Deeds (CCRD). The parcels are identified on the City of Portland Tax Map 326 as Block B, Lot 8 (subdivision Lot 19), Lot 9 (subdivision Lot 18) and Lot 10 (subdivision Lot 17). Copies of the following deeds are attached, for reference:

Lot 9	CCRD Book 18385, page 348, dated November 14, 2002
Lot 8	CCRD Book 28660, page 237, dated April 26, 2011
Lot 10	CCRD Book 29167, page 291, dated November 30, 2011

QUITCLAIM DEED WITH COVENANT

NORTHEASTERN GRAPHIC SUPPLY, INC., a Maine corporation, for consideration paid, grants to 50 INDUSTRIAL WAY LLC, a Maine limited liability company with an address of 100 Industrial Way, Portland, Maine, 04103, with Quitclaim Covenant, the following described real property:

A certain lot or parcel of land, with any buildings and improvements thereon, situated in on the northerly side of Industrial Way, so-called, in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Lot 18 as shown on a Plan entitled Turnpike Industrial Park-Riverside Street, Portland Maine; Recording Plat, made for Portland Venture Partners, 100 Silver Street, Portland, Maine, by Land Use Consultants, dated March 25, 1986, revised through September 9, 1986 and recorded in the Cumberland County Registry of Deeds, in Plan Book 157, Page 61 ("the Subdivision Plan"), to which Subdivision Plan reference is hereby made for a more particular description.

Meaning and intending to convey and hereby conveying the same premises as conveyed to Northeastern Graphic Supply by deed of Alfred H. Milliken, Jr., et als, dated June 2, 1988 and recorded in the Cumberland County Registry of Deeds in Book 8317, Page 51.

Together with an easement to benefit the above described Lot 18, over the parcel of land described hereinafter (the "Easement Area") for ingress and egress by foot and by vehicle, together with the right to construct, improve, maintain, repair, grade, excavate, fill and pave a driveway within the Easement Area for access to Lot 18, and together with the right to install within the Easement Area, both above and below ground, utility services to include, without limitation, facilities necessary or convenient for the transmission of electricity, gas, telephone communications, cable television, computer communications, sewerage and water.

The Easement Area is a fifty (50) foot wide parcel of land, being a portion of Lot 19 as shown on the Subdivision Plan, bound and described as follows:

Beginning on the northerly side of Industrial Park Way, also known as Industrial Way, at the southwesterly corner of Lot 18 as shown on the Subdivision Plan, said point also being the most southerly corner of Lot 19 as shown on the Subdivision Plan;

Thence N 29° 52' 15" E along the westerly sideline of Lot 18 and the easterly sideline of Lot 19 a distance of 90.00 feet;

MAINE REAL ESTATE TAX PAID

Received
Recorded Register of Deeds
Nov 15, 2002 10:01:56A
Cumberland County
Maine

Thence N 60° 03' 55" W through land of Northeastern Graphic Supply, Inc., being Lot 19 as aforesaid, a distance of 50.00 feet;

Thence S 29° 52' 15" W through land of Northeastern Graphic Supply, Inc., being Lot 19 as aforesaid, a distance of 90.00 feet to the northerly sideline of Industrial Way;

Thence S 60° 03' 55" E along the northerly sideline of Industrial Way a distance of 50.00 feet to the point of beginning.

The Easement Area consists of approximately 4,500 square feet.

The Grantor herein reserves for itself, its successors and assigns, the right to use the Easement Area in common with the Grantee for all purposes, including but not limited to, ingress and egress by foot and vehicle and the right to install and/or connect to all utilities located within the Easement Area, all of which reserved rights shall benefit the Grantor's adjoining property.

IN WITNESS WHEREOF, Northeastern Graphic Supply, Inc. has caused this instrument to be executed by Brian Kroot, its President this 14th day of November, 2002.

WITNESS

NORTHEASTERN GRAPHIC
SUPPLY, INC.

By: [Signature]

Brian Kroot

Its: President

State of Maine

County of Cumberland

November 14, 2002

Personally appeared before me the above named Brian Kroot, President of Northeastern Graphic Supply, Inc. and acknowledged the foregoing instrument to be his/her free act and deed in said capacity and the free act and deed of Northeastern Graphic Supply, Inc.

Catherine E. Decker
Notary Public/Attorney at Law

Print Name CATHERINE E. DECKER

My Commission Expires N/A

QUITCLAIM DEED WITH COVENANT

NORTHEASTERN GRAPHIC SUPPLY, INC., a Maine corporation, for consideration paid, grants to 50 INDUSTRIAL WAY LLC, a Maine limited liability company with an address of 100 Industrial Way, Portland, Maine 04103, with Quitclaim Covenant, the following described real property:

A certain lot or parcel of land, with any buildings and improvements thereon, situated on the northerly side of Industrial Way, so-called, in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Lot 19 as shown on a Plan entitled Turnpike Industrial Park-Riverside Street, Portland, Maine, Recording Plat, made for Portland Venture Partners, 100 Silver Street, Portland, Maine, by Land Use Consultants, dated March 25, 1986, revised through September 9, 1986 and recorded in the Cumberland County Registry of Deeds, in Plan Book 157, Page 61 ("the Subdivision Plan"), to which Subdivision Plan reference is hereby made for a more particular description.

Meaning and intending to convey and hereby conveying a portion of the premises as conveyed to Northeastern Graphic Supply, Inc. by deed of Turnstone Properties, dated March 29, 1988 and recorded in the Cumberland County Registry of Deeds in Book 8226, Page 37.

IN WITNESS WHEREOF, Northeastern Graphic Supply, Inc. has caused this instrument to be executed by Brian Kroot, its Treasurer, as of the 26th day of April, 2011.

WITNESS

NORTHEASTERN GRAPHIC
SUPPLY, INC.

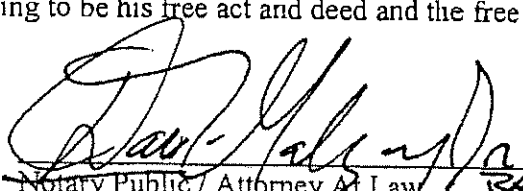
By: 

Brian Kroot
Its Treasurer

State of Maine
County of Cumberland, ss.

April 26, 2011

Personally appeared before me the above named Brian Kroot, Treasurer of Northeastern Graphic Supply, Inc. and acknowledged the foregoing to be his free act and deed and the free act and deed of Northeastern Graphic Supply, Inc.


Notary Public / Attorney At Law
Print Name: David L. GALLEY JR
My Commission Expires: _____

Received
Recorded Register of Deeds
Apr 26, 2011 12:41:53P
Cumberland County
Pamela E. Lovley

QUITCLAIM DEED
With Covenant

THAT, 100 INDUSTRIAL WAY, LLC, a Maine Limited Liability Company with an office in Portland, County of Cumberland, State of Maine (Grantor) in consideration of one dollar and other valuable consideration paid by 50 INDUSTRIAL WAY LLC, a Maine Limited Liability Company with an office in Portland, County of Cumberland, State of Maine whose mailing address is 50 Industrial Way, Portland, Maine 04103 (Grantee), the receipt whereof Grantor does hereby acknowledge, does hereby remise, release, bargain, sell and convey and forever quitclaim unto the said 50 Industrial Way LLC, its successors and assigns forever, the following described real estate:

A certain lot or parcel of land, together with the buildings and improvements thereon, situated on the northerly side of Industrial Way, so-called, in the City of Portland, County of Cumberland and State of Maine, and described as follows:

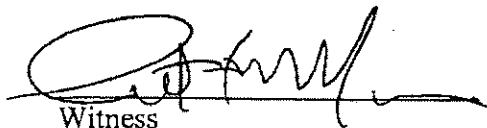
Lot 17 as shown on a Plan of Turnpike Industrial Park made for Portland Venture Partners by Land Use Consultants (Jeffrey H. McAllister, Registered Land Surveyor No. 1263), dated March 25, 1986 and recorded September 17, 1986 in the Cumberland County Registry of Deeds in Plan Book 157, page 61, to which Plan reference is hereby made for a more particular description.

Being the same premises conveyed to the Grantor herein by deed from Bruce E. Milliken dated August 29, 2006 and recorded in the Cumberland County Registry of Deeds in Book 24314, Page 237.

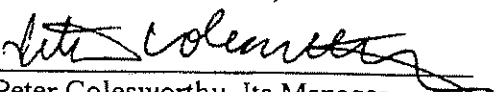
TO HAVE AND TO HOLD the same, together with all the privileges and appurtenances thereunto belonging to the said 50 Industrial Way LLC, its successors and assigns forever.

AND Grantor does covenant with the said Grantee, its successors and assigns, that Grantor shall and will warrant and defend the premises to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons claiming by, through or under Grantor.

IN WITNESS WHEREOF, Peter Colesworthy, Manager of 100 Industrial Way, LLC have hereunto set my hand and seal in my said capacity this 30th day of November, 2011.


Witness

100 INDUSTRIAL WAY, LLC

By: 
Peter Colesworthy, Its Manager

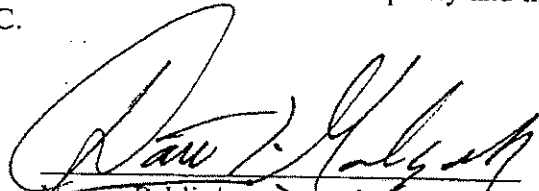
MAINE REAL ESTATE TAX PAID

State of Maine
Cumberland, ss.

November 30, 2011

Personally appeared Peter Colesworthy, Manager of 100 Industrial Way, LLC and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said 100 Industrial Way, LLC.

Before me,


Notary Public/
Attorney at Law
David L. Gallagher Jr.
Bar # 003643

Received
Recorded Register of Deeds
Dec 01, 2011 11:31:38A
Cumberland County
Pamela E. Lovley

Exhibit 4

State and Federal Permits

State and Federal Permits

The development of the site has required alteration (filling) of approximately 14,790 square feet of forested wetlands. As such, a Natural Resource Protection Act Permit (NRPA) - Tier 1 and a Maine Programmatic General Permit - Tier 1 were obtained. These permit applications were filed through the Maine Department of Environmental Protection (MDEP) and the Army Corps of Engineers, respectively. Copies of the existing permits are provided, for reference.

The remaining wetlands on site (approximately 3,757 square feet) will be directly altered or impacted during Phase 2 of the proposed expansion. As such, a Natural Resource Protection Act Permit (NRPA) - Tier 2 and a Maine Programmatic General Permit will be required. The applicant would prefer to delay application for the State and Federal permits until necessary to construct Phase 2. As such, the applicant will be requesting a Condition of Approval which requires the State and Federal permits to be obtained prior to commencing with construction which impacts the wetlands.

A Notice of Intent to Comply with Maine Construction General Permit application will be filed with the MDEP because greater than one acre of disturbance is proposed. This permit is typically approved 14 days after submission unless notified otherwise. A copy of the application will be forwarded once submitted to MDEP.



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION
AUGUSTA, ME 04333

DEPARTMENT ORDER
IN THE MATTER OF

50 INDUSTRIAL WAY, LLC
Portland, Cumberland County
ALLAGASH BREWING COMPANY
L-21059-TC-D-N (approval)

) NATURAL RESOURCES PROTECTION ACT
) FRESHWATER WETLAND ALTERATION
) WATER QUALITY CERTIFICATION
) FINDINGS OF FACT AND ORDER

Project History: In Department Order # L-21059-TC-B-N, dated December 28, 2005, the applicant received approval to fill approximately 14,180 square feet of freshwater wetlands to construct a new 18,200-square foot production warehouse and office facility with associated parking and loading. In Department Order # L-21059-TC-C-N, dated September 7, 2011, the applicant received approval to fill an additional 979 square feet of freshwater wetland to construct a 1,600 square foot building addition.

Project Description: The applicant proposes to fill an additional 64 square feet of freshwater wetlands to relocate an existing accessory structure adjacent to the existing building. This accessory structure contains an open-air brewing tank that requires electrical and piping connections with the existing building. The applicant considered alternate locations around the existing building, but the alternatives were rejected because they would either require more extensive wetland impacts, would be located in a stormwater management area, or would conflict with brewing equipment within the existing building. In order to minimize wetland impacts to the greatest extent practicable, side slopes of fill along the wetland boundary and within the wetlands will be constructed at a 2:1 ratio. With the wetland fill proposed by the applicant, the total cumulative wetland alteration for the development will be approximately 14,790 square feet. The proposed project is shown on a plan titled "Site Plan of Allagash Brewing Company" drawn by Sebago Technics and dated July 29, 2011, with a last revision date of September 29, 2011. According to the Department's Geographic Information System (GIS), there are no mapped significant wildlife habitats associated with the project site. The project is located on Industrial Way in Portland.

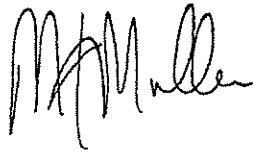
Permit for:	☒ Tier 1
DEP Decision:	☒ Approved ☐ Denied (see attached letter)
CORPS Action:	☒ The Corps has been notified of your application. The following are subject to Federal screening: (1) projects with previously authorized or unauthorized work, in combination with a Tier I permit for a single and complete project, which total more than 15,000 square feet of altered area; (2) projects with multiple state permits and/or state exemptions which apply to a single and complete project that total more than 15,000 square feet of altered area; and (3) projects that may impact a vernal pool, as determined by the State of Maine or the Corps. If your activity is listed above, <i>Corps approval is required for your project.</i> For information regarding the status of your application contact the Corps' Maine Project Office at 623-8367.

Standard Conditions:

- 1) If construction or operation of the activity is not begun within four (4) years from the date signed, this permit shall lapse and the applicant shall reapply to the Department for a new permit. This permit is transferable only with prior approval from the Department. If the activity is associated with a larger project, starting any aspect of that project constitutes start of construction.
- 2) The project shall be completed according to the plans in the application. Any change in the project plans must be reviewed and approved by the Department.
- 3) Properly installed erosion control measures shall be installed prior to beginning the project, and all disturbed soil should be stabilized immediately upon project completion.
- 4) A copy of this approval will be sent to the City of Portland. Department approval of your activity does not supersede or substitute the need for any necessary local approvals.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DEPARTMENT OF ENVIRONMENTAL PROTECTION



This permit is digitally signed by Michael Mullen on behalf of Commissioner Patricia Aho. It is digitally signed pursuant to 10 M.R.S.A. § 9418. It has been filed with the Board of Environmental Protection as of the signature date.
2011.10.31 13:34:20 -04'00'

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES...

cgw/l21059dn/ats73963



Natural Resource Protection Act (NRPA) Standard Conditions

THE FOLLOWING STANDARD CONDITIONS SHALL APPLY TO ALL PERMITS GRANTED UNDER THE NATURAL RESOURCE PROTECTION ACT, TITLE 38, M.R.S.A. SECTION 480-A ET. SEQ. UNLESS OTHERWISE SPECIFICALLY STATED IN THE PERMIT.

- A. Approval of Variations From Plans. The granting of this permit is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from these plans, proposals, and supporting documents is subject to review and approval prior to implementation.
- B. Compliance With All Applicable Laws. The applicant shall secure and comply with all applicable federal, state, and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation, as appropriate.
- C. Erosion Control. The applicant shall take all necessary measures to ensure that his activities or those of his agents do not result in measurable erosion of soils on the site during the construction and operation of the project covered by this Approval.
- D. Compliance With Conditions. Should the project be found, at any time, not to be in compliance with any of the Conditions of this Approval, or should the applicant construct or operate this development in any way other the specified in the Application or Supporting Documents, as modified by the Conditions of this Approval, then the terms of this Approval shall be considered to have been violated.
- E. Time frame for approvals. If construction or operation of the activity is not begun within four years, this permit shall lapse and the applicant shall reapply to the Board for a new permit. The applicant may not begin construction or operation of the activity until a new permit is granted. Reapplications for permits may include information submitted in the initial application by reference. This approval, if construction is begun within the four-year time frame, is valid for seven years. If construction is not completed within the seven-year time frame, the applicant must reapply for, and receive, approval prior to continuing construction.
- F. No Construction Equipment Below High Water. No construction equipment used in the undertaking of an approved activity is allowed below the mean high water line unless otherwise specified by this permit.
- G. Permit Included In Contract Bids. A copy of this permit must be included in or attached to all contract bid specifications for the approved activity.
- H. Permit Shown To Contractor. Work done by a contractor pursuant to this permit shall not begin before the contractor has been shown by the applicant a copy of this permit.

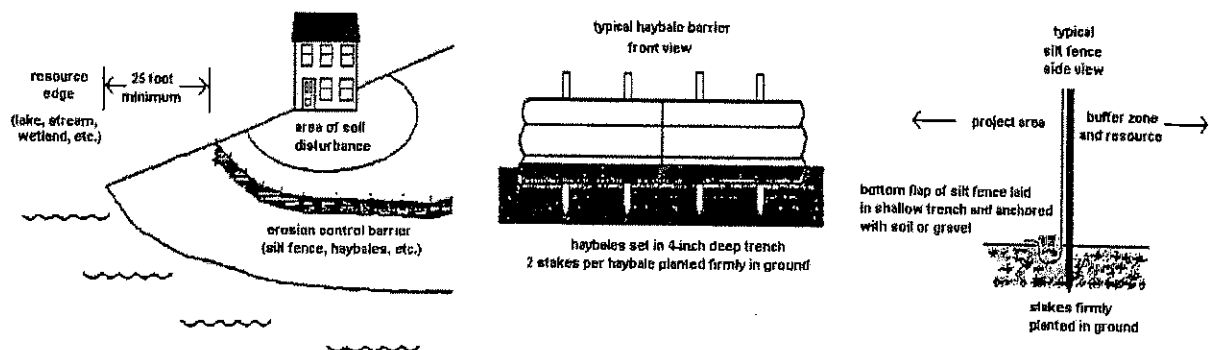


STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
 17 STATE HOUSE STATION, AUGUSTA, MAINE 04333

Erosion Control for Homeowners

Before Construction

1. If you have hired a contractor, make sure you discuss your permit-by-rule with them. Talk about what measures they plan to take to control erosion. Everybody involved should understand what the resource is, and where it is located. Most people can identify the edge of a lake or river. However, the edges of wetlands are often not so obvious. Your contractor may be the person actually pushing dirt around, but you are both responsible for complying with the permit-by-rule.
2. Call around to find where erosion control materials are available. Chances are your contractor has these materials already on hand. You probably will need silt fence, hay bales, wooden stakes, grass seed (or conservation mix), and perhaps filter fabric. Places to check for these items include farm & feed supply stores, garden & lawn suppliers, and landscaping companies. It is not always easy to find hay or straw during late winter and early spring. It also may be more expensive during those times of year. Plan ahead -- buy a supply early and keep it under a tarp.
3. Before any soil is disturbed, make sure an erosion control barrier has been installed. The barrier can be either a silt fence, a row of staked hay bales, or both. Use the drawings below as a guide for correct installation and placement. The barrier should be placed as close as possible to the soil-disturbance activity.
4. If a contractor is installing the erosion control barrier, double check it as a precaution. Erosion control barriers should be installed "on the contour", meaning at the same level or elevation across the land slope, whenever possible. This keeps stormwater from flowing to the lowest point along the barrier where it can build up and overflow or destroy the barrier.



During Construction

1. Use lots of hay or straw mulch on disturbed soil. The idea behind mulch is to prevent rain from striking the soil directly. It is the force of raindrops hitting the bare ground that makes the soil begin to move downslope with the runoff water, and cause erosion. More than 90% of erosion is prevented by keeping the soil covered.
2. Inspect your erosion control barriers frequently. This is especially important after a rainfall. If there is muddy water leaving the project site, then your erosion controls are not working as intended. You or your contractor then need to figure out what can be done to prevent more soil from getting past the barrier.
3. Keep your erosion control barrier up and maintained until you get a good and healthy growth of grass and the area is permanently stabilized.



DEP INFORMATION SHEET

Appealing a Commissioner's Licensing Decision

Dated: May 2004

Contact: (207) 287-2811

SUMMARY

There are two methods available to an aggrieved person seeking to appeal a licensing decision made by the Department of Environmental Protection's (DEP) Commissioner: (1) in an administrative process before the Board of Environmental Protection (Board); or (2) in a judicial process before Maine's Superior Court. This INFORMATION SHEET, in conjunction with consulting statutory and regulatory provisions referred to herein, can help aggrieved persons with understanding their rights and obligations in filing an administrative or judicial appeal.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

DEP's General Laws, 38 M.R.S.A. § 341-D(4), and its Rules Concerning the Processing of Applications and Other Administrative Matters (Chapter 2), 06-096 CMR 2.24 (April 1, 2003).

HOW LONG YOU HAVE TO SUBMIT AN APPEAL TO THE BOARD

The Board must receive a written notice of appeal within 30 calendar days of the date on which the Commissioner's decision was filed with the Board. Appeals filed after 30 calendar days will be rejected.

HOW TO SUBMIT AN APPEAL TO THE BOARD

Signed original appeal documents must be sent to: Chair, Board of Environmental Protection, c/o Department of Environmental Protection, 17 State House Station, Augusta, ME 04333-0017; faxes are acceptable for purposes of meeting the deadline when followed by receipt of mailed original documents within five (5) working days. Receipt on a particular day must be by 5:00 PM at DEP's offices in Augusta; materials received after 5:00 PM are not considered received until the following day. The person appealing a licensing decision must also send the DEP's Commissioner and the applicant a copy of the documents. All the information listed in the next section must be submitted at the time the appeal is filed. Only the extraordinary circumstances described at the end of that section will justify evidence not in the DEP's record at the time of decision being added to the record for consideration by the Board as part of an appeal.

WHAT YOUR APPEAL PAPERWORK MUST CONTAIN

The materials constituting an appeal must contain the following information at the time submitted:

1. *Aggrieved Status.* Standing to maintain an appeal requires the appellant to show they are particularly injured by the Commissioner's decision.
2. *The findings, conclusions or conditions objected to or believed to be in error.* Specific references and facts regarding the appellant's issues with the decision must be provided in the notice of appeal.
3. *The basis of the objections or challenge.* If possible, specific regulations, statutes or other facts should be referenced. This may include citing omissions of relevant requirements, and errors believed to have been made in interpretations, conclusions, and relevant requirements.
4. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license or permit to changes in specific permit conditions.

5. *All the matters to be contested.* The Board will limit its consideration to those arguments specifically raised in the written notice of appeal.
6. *Request for hearing.* The Board will hear presentations on appeals at its regularly scheduled meetings, unless a public hearing is requested and granted. A request for public hearing on an appeal must be filed as part of the notice of appeal.
7. *New or additional evidence to be offered.* The Board may allow new or additional evidence as part of an appeal only when the person seeking to add information to the record can show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process or show that the evidence itself is newly discovered and could not have been presented earlier in the process. Specific requirements for additional evidence are found in Chapter 2, Section 24(B)(5)

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A license file is public information made easily accessible by DEP. Upon request, the DEP will make the material available during normal working hours, provide space to review the file, and provide opportunity for photocopying materials. There is a charge for copies or copying services.
2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing your appeal.* DEP staff will provide this information on request and answer questions regarding applicable requirements.
3. *The filing of an appeal does not operate as a stay to any decision.* An applicant proceeding with a project pending the outcome of an appeal runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will formally acknowledge initiation of the appeals procedure, including the name of the DEP project manager assigned to the specific appeal, within 15 days of receiving a timely filing. The notice of appeal, all materials accepted by the Board Chair as additional evidence, and any materials submitted in response to the appeal will be sent to Board members along with a briefing and recommendation from DEP staff. Parties filing appeals and interested persons are notified in advance of the final date set for Board consideration of an appeal or request for public hearing. With or without holding a public hearing, the Board may affirm, amend, or reverse a Commissioner decision. The Board will notify parties to an appeal and interested persons of its decision.

II. APPEALS TO MAINE SUPERIOR COURT

Maine law allows aggrieved persons to appeal final Commissioner licensing decisions to Maine's Superior Court, see 38 M.R.S.A. § 346(1); 06-096 CMR 2.26; 5 M.R.S.A. § 11001; & MRCivP 80C. Parties to the licensing decision must file a petition for review within 30 days after receipt of notice of the Commissioner's written decision. A petition for review by any other person aggrieved must be filed within 40-days from the date the written decision is rendered. The laws cited in this paragraph and other legal procedures govern the contents and processing of a Superior Court appeal.

ADDITIONAL INFORMATION: If you have questions or need additional information on the appeal process, contact the DEP's Director of Procedures and Enforcement at (207) 287-2811.

Note: The DEP provides this INFORMATION SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751
MAINE GENERAL PERMIT (GP)
AUTHORIZATION LETTER AND SCREENING SUMMARY

50 Industrial Way, LLC.
Allagash Brewing Company
50 Industrial Way
Portland, Maine 04103

CORPS PERMIT # NAE-2005-04110 Amend #2
CORPS PGP ID# Non-screen
STATE ID# L-21059-TC-B-N

DESCRIPTION OF WORK:

To amend Department of the Army permit NAE-2005-04110 to place additional fill in 64 SF (0.001 acres) of wetland in conjunction with the construction of an 1,600 square foot expansion to the existing facility and relocating an 250 SF accessory structure off 50 Industrial Way at Portland, Maine as shown on the attached plans entitled "Allagash Brewing Company for 50 Industrial Way, LLC, Portland, Maine" by Sebago Technics in 2 sheets. The total cumulative impacts to wetlands is 14,790 SF (0.34 acres).

LAT/LONG COORDINATES : 43.70284 N 70.31806 W USGS QUAD: ME-PORTLAND WEST

I. CORPS DETERMINATION:

Based on our review of the information you provided, we have determined that your project will have only minimal individual and cumulative impacts on waters and wetlands of the United States. Your work is therefore authorized by the U.S. Army Corps of Engineers under the enclosed Federal Permit, the Maine General Permit (GP). Accordingly, we do not plan to take any further action on this project.

You must perform the activity authorized herein in compliance with all the terms and conditions of the GP (including any attached Additional Conditions and any conditions placed on the State 401 Water Quality Certification including any required mitigation). Please review the enclosed GP carefully, including the GP conditions beginning on page 5, to familiarize yourself with its contents. You are responsible for complying with all of the GP requirements; therefore you should be certain that whoever does the work fully understands all of the conditions. You may wish to discuss the conditions of this authorization with your contractor to ensure the contractor can accomplish the work in a manner that conforms to all requirements.

If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

Condition 41 of the GP (page 18) provides one year for completion of work that has commenced or is under contract to commence prior to the expiration of the GP on October 12, 2015. You will need to apply for reauthorization for any work within Corps jurisdiction that is not completed by October 12, 2016.

This authorization presumes the work shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to the undersigned.

No work may be started unless and until all other required local, State and Federal licenses and permits have been obtained. This includes but is not limited to a Flood Hazard Development Permit issued by the town if necessary.

II. STATE ACTIONS: PENDING [], ISSUED [], DENIED [] DATE _____

APPLICATION TYPE: PBR: _____ TIER 1: X TIER 2: _____ TIER 3: _____ LURC: _____ DMR LEASE: _____ NA: _____

III. FEDERAL ACTIONS:

JOINT PROCESSING MEETING: Non-screen LEVEL OF REVIEW: CATEGORY 1: X CATEGORY 2: _____

AUTHORITY (Based on a review of plans and/or State/Federal applications): SEC 10: _____, 404: X, 10/404: _____, 103: _____

EXCLUSIONS: The exclusionary criteria identified in the general permit do not apply to this project.

FEDERAL RESOURCE AGENCY OBJECTIONS: EPA_NO _____, USF&WS_NO _____, NMFS_NO _____

If you have any questions on this matter, please contact my staff at 207-623-8367 at our Manchester, Maine Project Office. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at <http://per2.nwp.usace.army.mil/survey.html>

Rodney A. Howe
RODNEY A. HOWE
SENIOR PROJECT MANAGER
MAINE PROJECT OFFICE

Frank J. Del Giudice 9/30/11
FRANK J. DEL GIUDICE DATE
CHIEF, PERMITS & ENFORCEMENT BRANCH
REGULATORY DIVISION

Exhibit 5

Assessment of Zoning

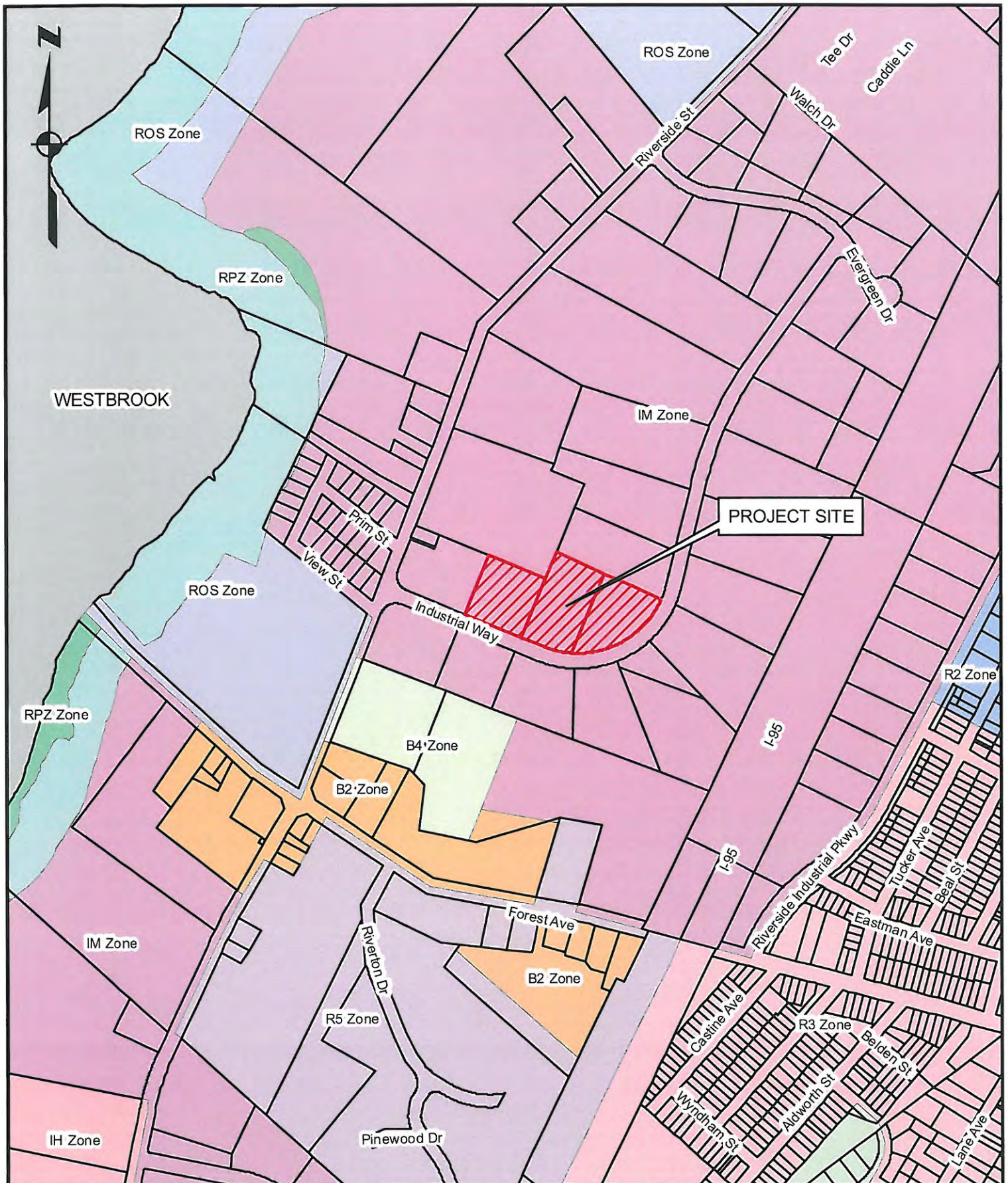
Assessment of Zoning

A copy of the zoning map indicating the location of the project site is provided. As depicted, the subject parcel is located entirely within the medium intensity industrial zone (I-M); and does not abut any other City zoning districts.

The proposed use is a brewery, which is a permitted use as described in Section 14-247.a of the City of Portland Code of Ordinances.

In accordance with the dimensional requirements defined in Section 14-250 of the City of Portland Code of Ordinances, the proposed development meets or exceeds the requirements as follows:

	<u>Ordinance Requirement</u>	<u>Phase 1</u>	<u>Phase 2</u>
Min. lot size	none	4.407 acres	4.407 acres
Max. impervious ratio	75%	56.5%	61.6%
Max. building height	75 feet	34 feet	34 feet
Min. side yard	25 feet	74.5 feet	36.3 feet
Min. rear yard	25 feet	30.6 feet	30.6 feet
Min. front yard	1 ft./1 ft. of building height	35.8 feet	35.8 feet
Min. street frontage	60 feet	881.5 feet	881.5 feet
Pavement setback	10 feet	12 feet	12 feet



SEBAGO
TECHNICS
WWW.SEBAGOTECHNICS.COM

75 John Roberts Rd - Suite 1A
South Portland, ME 04106
Tel: 207-203-2100

250 Goddard Rd - Suite B
Lewiston, ME 04240
Tel: 207-789-5656

ZONING MAP OF LOT 18, TURNPIKE INDUSTRIAL PARK

LOCATION:
INDUSTRIAL WAY
PORTLAND, MAINE

INFORMATION:
ZONING MAP AND PARCEL DATA FROM
THE CITY OF PORTLAND GIS DEPARTMENT

SCALE: 1" = 500'

DATE: 07/03/12

Exhibit 6

Existing/Proposed Easements

Existing/Proposed Easements

There is an existing drainage easement to the City of Portland located along the site frontage in the vicinity of the loading dock entrance. Additionally, the site is encumbered by an existing 30 foot preservation buffer. The site is composed of three parcels which were created as lots within the Turnpike Industrial Park Subdivision in 1986. The subdivision abuts property previously occupied by Spurwink School which prompted the 30 foot wide preservation buffer to be established within all lots which abut the Spurwink School property.

There are no proposed easements anticipated in association with the project.

Exhibit 7

Waivers

Waivers

The applicant is requesting a waiver pertaining to the construction of curbs and sidewalks along the site's frontage. In accordance with the provisions of Sec 14-506 (b) – Sidewalks, the following apply:

1. A safe alternative walking route is reasonably and safely available, for example, by way of a sidewalk on the other side of the street that is lightly traveled.
2. Strict adherence to the sidewalk requirement would result in the loss of significant site features related to landscaping or topography that are deemed to be of a greater public value (i.e. the existing roadside drainage swales).

In accordance with the provisions of Sec 14-506 (b) – Curbing, the following apply:

1. Strict adherence to the sidewalk requirement would result in the loss of significant site features related to landscaping or topography that are deemed to be of a greater public value (i.e. the existing roadside drainage swales).
2. Stormwater runoff within the street does not require curbing for stormwater management.

The applicant is requesting a waiver pertaining to the number of street trees. In accordance with the provisions of Sec 4.6.3 of the City Technical manual, trees are required within the right-of-way spaced at 30-45 feet on-center. The following mitigating circumstances apply:

1. The City maintains drainage swales along Industrial Way. The existing swales occupy the area from the edge of pavement to the limits of the right-of-way.
2. Existing trees, which will be preserved to the extent possible, exceed the 30 to 45 foot spacing requirement.
3. Providing street trees within the right-of-way potentially conflicts with the sight distance requirements of the existing driveways.

The applicant is requesting a waiver pertaining to the number of driveways. In accordance with the provisions of Section 1.7.2.8 of the City of Portland Technical Manual, only two curb cuts are permitted per site. The following mitigating circumstances apply:

1. The applicant owns three contiguous lots, which were purchased separately. There are four existing driveways accessing the site (three parcels).
2. The site development generally separates trucks and passenger vehicle movements.
3. The curved alignment of Industrial Way creates circulation constraints on site, particularly for truck movements.
4. Industrial Way is a low volume, low speed street.

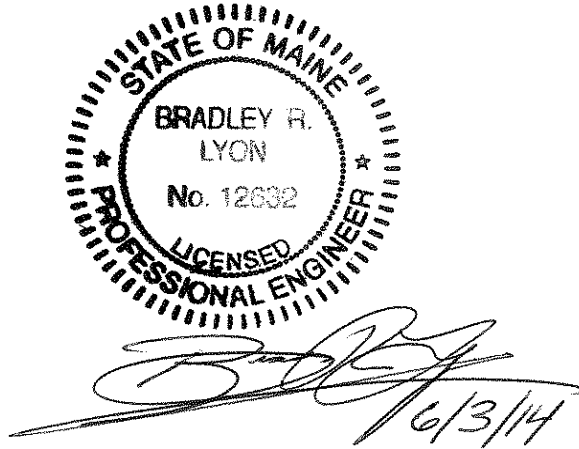
Exhibit 8

Traffic Analysis



Memorandum

Project: 02249
To: Richard Meek, P.E.,
Project Manager
From: Bradley Lyon, P.E., PTOE,
Sr. Transportation Engineer
Date: June 3rd, 2014
Subject: Traffic Evaluation for the
2015 Allagash Brewing Company
Expansion, Portland, ME



This memorandum is to present relevant traffic information in response to the City of Portland's Technical Manual, Section 1.1 Traffic Studies which states, *"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."*

Proposed Development Plan

The applicant is proposing to expand their existing operations located at 100 and 50 Industrial Way in Portland, ME. Once the project is complete, the full build out will comprise of 57,276 s.f. of manufacturing / office space with 50 employees, 3,810 s.f. of warehouse and 1,736 s.f. of specialty retail (tour facility and merchandise) with 10 employees.

Trip Generation

Given the fact that the existing development does not currently have a Traffic Movement Permit and was developed within the last 10 years, we have calculated the total trip generation for the weekday AM, weekday PM and Saturday peak hours of the generator per ITE's Trip

Generation, 8th Edition including both the existing and proposed buildout. Land Use Code (LUC) #140 Manufacturing, LUC #150 Warehousing and LUC #814 Specialty Retail were used. As can be seen from the attached table, trip generation rates were used per 1,000 square feet and averaged with rates per employee where possible.

Using this methodology the total trip ends generated by this development is expected to be 49 trips in the weekday AM peak hour, 51 trips in the weekday PM peak hour and 26 trips in the Saturday peak hour.

Given the fact that the warehousing component of this facility will primarily include deliveries by tractor trailer we factored the trip ends for this use by 2.0 per the City of Portland's Technical Manual, Section 1.1 Traffic Studies, in order to calculate an applicable passenger car equivalent (PCE). In turn the total PCE generated by this development is expected to be 57 PCE in the weekday AM Peak Hour, 56 PCE in the weekday PM Peak Hour and 26 PCE in the Saturday Peak Hour. Since this development generates less than 100 PCE in a peak hour a Traffic Movement Permit (TMP) will not be required.

Road Classification

The development is located on Industrial Way, which is classified by the MaineDOT as a "local road" and therefore is not located on an arterial.

High Crash Locations

High crash locations (HCL's) are defined by MaineDOT as locations having a minimum of 8 crashes in a three-year period and a Critical Rate Factor (CRF) greater than 1. The latest three year period from 2010-2012 was studied and it was determined that there was one high crash location within a ½ mile radius of the project site located on the section of roadway between the intersection of Riverside Street @ Forest Avenue to the intersection of Riverton Drive @ Forest Avenue. As can be seen from the attached crash summary report provided by MaineDOT there were 13 crashes and a CRF of 2.40 within the latest three year period. MaineDOT recently had a roadway improvement project in 2012 (Project No. NH-1310(700)E) that began at the intersection of Riverside Street @ Forest Avenue and extended easterly for 0.41 miles to the intersection of Castine Avenue @ Forest Avenue. Given the fact that MaineDOT recently made improvements to this corridor in 2012 and that the crash data we're analyzing is from 2010-2012, a determination cannot be made on the effectiveness of this project in correcting this HCL. Since there are no other HCL's within a ½ mile of this project we believe no further action is needed.

Level of Service

The major intersections within ¼ mile of the project site at Industrial Way were determined to be Riverside Street @ Forest Avenue, Riverton Drive @ Forest Avenue and Hannaford Drive @ Forest Avenue. As stated previously, MaineDOT recently had a project that improved this corridor in 2012, therefore, it is our opinion that any intersections that may have been

previously identified as failing intersections will have been improved by this project and no further action is needed.

Conclusions

Based on traffic assessment, we offer the following conclusions:

- The proposed expansion of the Allagash Brewing Company facility on 100 and 50 Industrial Way is expected to generate less than 100 PCE and therefore will not require a Traffic Movement Permit (TMP).
- Even though the development generates more than 25 PCE, a Scoping Meeting will not be required per the City of Portland's Technical Manual, Section 1.1 Traffic Studies due to the fact that
 - (1) The development is located on a "local road" and not an arterial.
 - (2) There is only 1 high crash location within a ½ mile radius of the development. This high crash location occurs within the limits of a MaineDOT project which was built in 2012. Since this project was built less than 3 years ago it cannot be determined if the presence of the high crash location has been eliminated as a result of this construction.
 - (3) There are no intersections within a ¼ mile that have been identified in a previous traffic study as a failing intersection, with an overall Level of Service below Level of Service D. The recent construction of the MaineDOT project on Forest Avenue (Project No. NH-1310(700)E) covered all three major intersections of Riverside Street @ Forest Avenue, Riverton Drive @ Forest Avenue and Hannaford Drive @ Forest Avenue.

Enclosures

1. Trip Generation Computations
2. 2010-2012 MaineDOT Crash Summary Reports

**2015 Allagash Brewing Company Expansion
50 Industrial Way, Portland**

TRIP GENERATION COMPUTATIONS

FULL BUILD OUT

MANUFACTURING, LUC #140				
BY 1000 SF	SF	RATE (Trips/1000SF)	TOTAL TRIP ENDS	PASSENGER CAR EQUIVALENTS
WEEKDAY AM PEAK HOUR	57,276	$T=0.83(X)-17.71$	30	30
WEEKDAY PM PEAK HOUR	57,276	$T=0.76(X)-5.15$	38	38
SATURDAY PEAK HOUR	57,276	0.28	16	16
BY EMPLOYEES	Employees	RATE (Trips/Employee)	TOTAL TRIP ENDS	PASSENGER CAR EQUIVALENTS
WEEKDAY AM PEAK HOUR	50	$\ln(T)=0.89\ln(X)-0.11$	29	29
WEEKDAY PM PEAK HOUR	50	$\ln(T)=0.82\ln(X)+0.31$	34	34
SATURDAY PEAK HOUR	50	0.16	8	8
AVERAGE	TOTAL TRIP ENDS			PASSENGER CAR EQUIVALENTS
WEEKDAY AM PEAK HOUR	29			29
WEEKDAY PM PEAK HOUR	36			36
SATURDAY PEAK HOUR	12			12

WAREHOUSING, LUC #150				
BY 1000 SF	SF	RATE (Trips/1000SF)	TOTAL TRIP ENDS	PASSENGER CAR EQUIVALENTS
WEEKDAY AM PEAK HOUR	3,810	$\ln(T)=0.70\ln(X)+1.11$	8	15
WEEKDAY PM PEAK HOUR	3,810	$\ln(T)=0.78\ln(X)+0.72$	6	12
SATURDAY PEAK HOUR	3,810	0.13	1	2

SPECIALTY RETAIL CENTER, LUC #814				
BY 1000 SF	SF	RATE (Trips/1000SF)	TOTAL TRIP ENDS	PASSENGER CAR EQUIVALENTS
WEEKDAY AM PEAK HOUR	1,736	6.84	12	12
WEEKDAY PM PEAK HOUR	1,736	5.02	9	9
SATURDAY PEAK HOUR*	1,736	6.84	12	12

TOTAL TRIP GENERATION		
	TOTAL TRIP ENDS	TOTAL PASSENGER CAR EQUIVALENTS
WEEKDAY AM PEAK HOUR	49	57
WEEKDAY PM PEAK HOUR	51	56
SATURDAY PEAK HOUR*	25	26

*Data for Saturday Peak Hour is not available, therefore the highest rate between the AM and PM peak hours has been used

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☒ Crash Summary I ☐ Section Detail ☒ Crash Summary II ☐ 1320 Public ☐ 1320 Private ☐ 1320 Summary

REPORT DESCRIPTION

Rt 302

REPORT PARAMETERS

Year 2010, Start Month 1 through Year 2012 End Month: 12

Route: 0302X

Start Node: 16885

Start Offset: 0

☐ Exclude First Node

End Node: 16894

End Offset: 0

☐ Exclude Last Node

Crash Summary I

Nodes														
Node	Route - MP	Node Description	U/R	Total Crashes	K	Injury A	Crashes B	Crashes C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
16885	0302X - 3.32	Int of FOREST AV STUART ST	2	1	0	0	0	0	1	0.0	6.570	0.05	0.30	0.00
												Statewide Crash Rate:	0.12	
16886	0302X - 3.37	Int of FARNHAM ST FOREST AV	2	1	0	0	0	0	1	0.0	6.318	0.05	0.30	0.00
												Statewide Crash Rate:	0.12	
16887	0302X - 3.42	Int of FOREST AV LANE AV	2	0	0	0	0	0	0	0.0	6.484	0.00	0.30	0.00
												Statewide Crash Rate:	0.12	
16888	0302X - 3.46	Int of BAILEY AV FOREST AV	2	3	0	0	1	1	1	66.7	6.209	0.16	0.30	0.00
												Statewide Crash Rate:	0.12	
16889	0302X - 3.52	Int of ALDWORTH ST FOREST AV	2	2	0	0	0	1	1	50.0	6.028	0.11	0.30	0.00
												Statewide Crash Rate:	0.12	
16890	0302X - 3.56	Int of FOREST AV TUCKER AV	2	0	0	0	0	0	0	0.0	5.871	0.00	0.30	0.00
												Statewide Crash Rate:	0.12	
A16891	0302X - 3.62	Int of CASTINE AV FOREST AV	2	0	0	0	0	0	0	0.0	0.000	0.00	0.00	0.00
												Statewide Crash Rate:	0.12	
P13321	0302X - 3.64	Int of FOREST AV, RIVERSIDE IND P	9	7	0	0	1	2	4	42.9	6.285	0.37	1.10	0.00
												Statewide Crash Rate:	0.65	
18508	0302X - 3.92	Int of FOREST AV RIVERTON DR	2	3	0	0	1	0	2	33.3	5.607	0.18	0.31	0.00
												Statewide Crash Rate:	0.12	
P16892	0302X - 4	Int of FOREST AV RIVERSIDE ST	9	29	0	0	3	9	17	41.4	10.580	0.91	1.00	0.00
												Statewide Crash Rate:	0.65	
A66782	0302X - 4.02	Int of FOREST AV RD INV 3209706	2	0	0	0	0	0	0	0.0	0.000	0.00	0.00	0.00
												Statewide Crash Rate:	0.12	
16893	0302X - 4.23	TL Portland Westbrook	2	0	0	0	0	0	0	0.0	7.613	0.00	0.28	0.00
												Statewide Crash Rate:	0.12	
16894	0302X - 4.27	Int of BRIDGTON RD EAST BRIDGE ST	9	12	0	0	0	2	10	16.7	7.774	0.51	1.06	0.00
												Statewide Crash Rate:	0.65	
Study Years:	3.00	NODE TOTALS:		58	0	0	6	15	37	36.2	75.339	0.26	0.38	0.67

Crash Summary I

Sections																				
Start Node	End Node	Element	Offset Begin - End	Route - MP	Section Length	U/R	Total Crashes	K	Injury A	Crashes B	Crashes C	PD	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF			
16885	16886	3122266	0 - 0.05	0302X - 3.32	0.05	2	0	0	0	0	0	0	0.0	0.00315	0.00	460.39	0.00			
Int of FOREST AV		STUART ST		US 302											Statewide Crash Rate: 168.84					
16886	16887	3106435	0 - 0.05	0302X - 3.37	0.05	2	1	0	0	0	0	1	0.0	0.00313	106.61	461.14	0.00			
Int of FARNHAM ST		FOREST AV		US 302											Statewide Crash Rate: 168.84					
16887	16888	3106436	0 - 0.04	0302X - 3.42	0.04	2	0	0	0	0	0	0	0.0	0.00245	0.00	491.47	0.00			
Int of FOREST AV		LANE AV		US 302											Statewide Crash Rate: 168.84					
16888	16889	3129284	0 - 0.06	0302X - 3.46	0.06	2	2	0	0	1	1	0	100.0	0.00361	184.54	444.23	0.00			
Int of BAILEY AV		FOREST AV		US 302											Statewide Crash Rate: 168.84					
16889	16890	3122267	0 - 0.04	0302X - 3.52	0.04	2	1	0	0	0	1	0	100.0	0.00238	140.08	494.96	0.00			
Int of ALDWORTH ST		FOREST AV		US 302											Statewide Crash Rate: 168.84					
16890	16891	3106437	0 - 0.06	0302X - 3.56	0.06	2	3	0	0	1	1	1	66.7	0.00337	296.35	452.13	0.00			
Int of FOREST AV		TUCKER AV		US 302											Statewide Crash Rate: 168.84					
13321	16891	3106247	0 - 0.02	0302X - 3.62	0.02	2	0	0	0	0	0	0	0.0	0.00112	0.00	596.88	0.00			
Int of FOREST AV,		RIVERSIDE IND P		US 302											Statewide Crash Rate: 168.84					
13321	18508	3123934	0 - 0.28	0302X - 3.64	0.28	2	7	0	0	0	4	3	57.1	0.01598	146.05	311.30	0.00			
Int of FOREST AV,		RIVERSIDE IND P		US 302											Statewide Crash Rate: 168.84					
16892	18508	3106439	0 - 0.08	0302X - 3.92	0.08	2	13	0	0	2	1	10	23.1	0.00423	1024.45	426.58	2.40			
Int of FOREST AV		RIVERSIDE ST		US 302											Statewide Crash Rate: 168.84					
16892	66782	3154570	0 - 0.02	0302X - 4	0.02	2	0	0	0	0	0	0	0.0	0.00151	0.00	556.20	0.00			
Int of FOREST AV		RIVERSIDE ST		US 302											Statewide Crash Rate: 168.84					
66782	16893	3154571	0 - 0.21	0302X - 4.02	0.21	2	7	0	0	1	2	4	42.9	0.01581	147.62	312.01	0.00			
Int of FOREST AV		RD INV 3209706		US 302											Statewide Crash Rate: 168.84					
16893	16894	3106441	0 - 0.04	0302X - 4.23	0.04	2	3	0	0	0	1	2	33.3	0.00308	324.75	462.97	0.00			
TL Portland		Westbrook		US 302											Statewide Crash Rate: 168.84					
Study Years: 3.00				Section Totals:			0.95		37		0	0	5	11	21	43.2	0.05981	206.22	245.08	0.84
				Grand Totals:			0.95		95		0	0	11	26	58	38.9	0.05981	529.48	362.08	1.46

Crash Summary

Section Details

Start Node	End Node	Element	Offset Begin - End	Route - MP	Total Crashes	K	Injury Crashes				Crash Report	Crash Date	Crash Mile Point	Injury Degree
							A	B	C	PD				
16885	16886	3122266	0 - 0.05	0302X - 3.32	0	0	0	0	0	0				
16886	16887	3106435	0 - 0.05	0302X - 3.37	1	0	0	0	0	1	2011-2956C	02/10/2011	3.41	PD
16887	16888	3106436	0 - 0.04	0302X - 3.42	0	0	0	0	0	0				
16888	16889	3129284	0 - 0.06	0302X - 3.46	2	0	0	1	1	0	2012-48564	12/25/2012	3.47	B
											2010-24429C	11/03/2010	3.51	C
16889	16890	3122267	0 - 0.04	0302X - 3.52	1	0	0	0	1	0	2010-7680C	03/30/2010	3.55	C
16890	16891	3106437	0 - 0.06	0302X - 3.56	3	0	0	1	1	1	2010-2543C	02/03/2010	3.57	C
											2012-45902	12/02/2012	3.60	B
											2010-15287C	08/01/2010	3.61	PD
13321	16891	3106247	0 - 0.02	0302X - 3.62	0	0	0	0	0	0				
13321	18508	3123934	0 - 0.28	0302X - 3.64	7	0	0	0	4	3	2010-16651C	08/09/2010	3.66	PD
											2011-17266	11/29/2011	3.67	C
											2011-1772C	01/31/2011	3.75	C
											2012-32345	07/11/2012	3.75	PD
											2010-30516C	12/31/2010	3.84	C
											2012-253	01/08/2012	3.89	C
											2011-728C	01/13/2011	3.91	PD
16892	18508	3106439	0 - 0.08	0302X - 3.92	13	0	0	2	1	10	2012-46813	12/08/2012	3.95	PD
											2011-8558C	05/22/2011	3.96	PD
											2010-17574C	08/17/2010	3.97	B
											2012-27943	05/09/2012	3.97	B
											2011-14946	11/07/2011	3.97	C
											2012-40847	10/11/2012	3.97	PD
											2012-46520	12/06/2012	3.97	PD
											2010-24466C	11/09/2010	3.97	PD
											2010-30511C	12/31/2010	3.97	PD
											2011-18190	12/08/2011	3.97	PD
											2012-24623	02/10/2012	3.98	PD
											2010-10353C	05/23/2010	3.98	PD
											2010-8639C	04/17/2010	3.99	PD
16892	66782	3154570	0 - 0.02	0302X - 4	0	0	0	0	0	0				

Crash Summary

Section Details

Start Node	End Node	Element	Offset Begin - End	Route - MP	Total Crashes	K	Injury Crashes				Crash Report	Crash Date	Crash Mile Point	Injury Degree
							A	B	C	PD				
66782	16893	3154571	0 - 0.21	0302X - 4.02	7	0	0	1	2	4	2012-2229	01/28/2012	4.03	B
											2011-3530	06/27/2011	4.03	C
											2011-18467	12/10/2011	4.03	PD
											2011-18464	12/09/2011	4.06	C
											2011-7450	08/10/2011	4.06	PD
											2012-51181	12/08/2012	4.19	PD
											2010-18314C	08/29/2010	4.20	PD
16893	16894	3106441	0 - 0.04	0302X - 4.23	3	0	0	0	1	2	2011-5674	01/25/2011	4.26	C
											2010-8060C	04/12/2010	4.26	PD
											2010-16138C	07/21/2010	4.26	PD
Totals:					37	0	0	5	11	21				

Crash Summary II - Characteristics

Crashes by Day and Hour

Day Of Week	AM												PM												Un	Tot
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11		
SUNDAY	0	1	0	0	0	0	0	1	1	1	2	2	1	0	0	0	0	1	0	0	1	1	0	0	0	12
MONDAY	0	0	0	0	1	0	0	1	1	2	2	0	1	1	3	1	1	2	1	0	0	0	1	0	0	18
TUESDAY	0	0	0	0	0	0	0	2	3	1	1	0	1	1	2	1	2	1	1	0	1	1	0	1	0	19
WEDNESDAY	0	0	0	0	0	0	0	1	1	2	0	3	1	0	0	3	1	3	1	0	0	0	0	0	0	16
THURSDAY	0	0	0	0	0	0	0	2	0	0	0	0	3	1	3	0	0	1	3	0	0	0	0	1	0	14
FRIDAY	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	2	0	3	1	0	0	0	1	0	0	10
SATURDAY	1	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6
Totals	1	1	1	1	1	1	0	7	6	8	7	5	7	3	8	7	4	11	7	1	2	2	2	2	0	95

Vehicle Counts by Type

Unit Type	Total	Unit Type	Total
1-Passenger Car	114	23-Bicyclist	2
2-(Sport) Utility Vehicle	30	24-Witness	6
3-Passenger Van	11	25-Other	2
4-Cargo Van (10K lbs or Less)	0	Total	197
5-Pickup	27		
6-Motor Home	0		
7-School Bus	0		
8-Transit Bus	0		
9-Motor Coach	0		
10-Other Bus	0		
11-Motorcycle	1		
12-Moped	0		
13-Low Speed Vehicle	0		
14-Autocycle	0		
15-Experimental	0		
16-Other Light Trucks (10,000 lbs or Less)	0		
17-Medium/Heavy Trucks (More than 10,000 lbs)	2		
18-ATV - (4 wheel)	0		
20-ATV - (2 wheel)	0		
21-Snowmobile	0		
22-Pedestrian	2		

Crash Summary II - Characteristics

Crashes by Driver Action at Time of Crash

Driver Action at Time of Crash	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
No Contributing Action	23	21	2	0	0	0	46
Ran Off Roadway	2	0	0	0	0	0	2
Failed to Yield Right-of-Way	7	6	0	0	0	0	13
Ran Red Light	2	0	0	0	0	0	2
Ran Stop Sign	0	0	0	0	0	0	0
Disregarded Other Traffic Sign	0	0	0	0	0	0	0
Disregarded Other Road Markings	0	0	0	0	0	0	0
Exceeded Posted Speed Limit	0	1	1	0	0	0	2
Drove Too Fast For Conditions	4	0	0	0	0	0	4
Improper Turn	3	0	0	0	0	0	3
Improper Backing	1	1	0	0	0	0	2
Improper Passing	1	1	0	0	0	0	2
Wrong Way	0	0	0	0	0	0	0
Followed Too Closely	10	13	2	0	0	0	25
Failed to Keep in Proper Lane	2	2	0	0	0	0	4
Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	0	1	0	0	0	0	1
Swerved or Avoided Due to Wind, Slippery Surface, Motor Vehicle, Object, Non-Motorist in Roadway	0	0	0	0	0	0	0
Over-Correcting/Over-Steering	1	0	0	0	0	0	1
Other Contributing Action	2	5	1	0	0	0	8
Unknown	0	1	0	0	0	0	1
Total	58	52	6	0	0	0	116

Crashes by Apparent Physical Condition And Driver

Apparent Physical Condition	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
Apparently Normal	90	78	11	1	0	2	182
Physically Impaired or Handicapped	0	0	0	0	0	0	0
Emotional(Depressed, Angry, Disturbed, etc.)	1	0	0	0	0	0	1
Ill (Sick)	0	0	0	0	0	0	0
Asleep or Fatigued	0	0	0	0	0	0	0
Under the Influence of Medications/Drugs/Alcohol	4	2	0	0	0	0	6
Other	0	1	0	0	0	0	1
Total	95	81	11	1	0	2	190

Driver Age by Unit Type

Age	Driver	Bicycle	SnowMobile	Pedestrian	ATV	Total
09-Under	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	8	0	0	0	0	8
20-24	27	0	0	0	0	27
25-29	24	0	0	0	0	24
30-39	31	0	0	0	0	31
40-49	39	0	0	0	0	39
50-59	30	0	0	0	0	30
60-69	19	0	0	0	0	19
70-79	6	0	0	0	0	6
80-Over	0	0	0	0	0	0
Unknown	3	2	0	2	0	7
Total	187	2	0	2	0	191

Crash Summary II - Characteristics

Most Harmful Event			
Most Harmful Event	Total	Most Harmful Event	Total
1-Overturn / Rollover	0	38-Other Fixed Object (wall, building, tunnel, etc.)	2
2-Fire / Explosion	0	39-Unknown	13
3-Immersion	0	40-Gate or Cable	0
4-Jackknife	0	41-Pressure Ridge	0
5-Cargo / Equipment Loss Or Shift	0	Total	93
6-Fell / Jumped from Motor Vehicle	0		
7-Thrown or Falling Object	0		
8-Other Non-Collision	0		
9-Pedestrian	2		
10-Pedalcycle	0		
11-Railway Vehicle - Train, Engine	0		
12-Animal	0		
13-Motor Vehicle in Transport	70		
14-Parked Motor Vehicle	0		
15-Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle	0		
16-Work Zone / Maintenance Equipment	0		
17-Other Non-Fixed Object	0		
18-Impact Attenuator / Crash Cushion	0		
19-Bridge Overhead Structure	0		
20-Bridge Pier or Support	0		
21-Bridge Rail	0		
22-Cable Barrier	0		
23-Culvert	0		
24-Curb	1		
25-Ditch	0		
26-Embankment	0		
27-Guardrail Face	2		
28-Guardrail End	0		
29-Concrete Traffic Barrier	0		
30-Other Traffic Barrier	0		
31-Tree (Standing)	1		
32-Utility Pole / Light Support	1		
33-Traffic Sign Support	1		
34-Traffic Signal Support	0		
35-Fence	0		
36-Mailbox	0		
37-Other Post Pole or Support	0		

Traffic Control Devices		
Traffic Control Device	Total	
1-Traffic Signals (Stop & Go)	59	
2-Traffic Signals (Flashing)	0	
3-Advisory/Warning Sign	0	
4-Stop Signs - All Approaches	0	
5-Stop Signs - Other	1	
6-Yield Sign	1	
7-Curve Warning Sign	0	
8-Officer, Flagman, School Patrol	1	
9-School Bus Stop Arm	0	
10-School Zone Sign	0	
11-R.R. Crossing Device	0	
12-No Passing Zone	1	
13-None	32	
14-Other	0	
Total	95	

Injury Data		
Severity Code	Injury Crashes	Number Of Injuries
K	0	0
A	0	0
B	11	13
C	26	35
PD	58	0
Total	95	48

Road Character	
Road Grade	Total
1-Level	79
2-On Grade	16
3-Top of Hill	0
4-Bottom of Hill	0
5-Other	0
Total	95

Light	
Light Condition	Total
1-Daylight	66
2-Dawn	1
3-Dusk	3
4-Dark - Lighted	25
5-Dark - Not Lighted	0
6-Dark - Unknown Lighting	0
7-Unknown	0
Total	95

Crash Summary II - Characteristics

Crashes by Year and Month

Month	2010	2011	2012	Total
JANUARY	1	4	2	7
FEBRUARY	1	3	1	5
MARCH	3	2	2	7
APRIL	3	2	1	6
MAY	4	3	1	8
JUNE	1	2	2	5
JULY	3	0	2	5
AUGUST	6	2	4	12
SEPTEMBER	2	0	3	5
OCTOBER	2	2	3	7
NOVEMBER	5	4	2	11
DECEMBER	4	3	10	17
Total	35	27	33	95

Report is limited to the last 10 years of data.

Crash Summary II - Characteristics

Crashes by Crash Type and Type of Location

Crash Type	Straight Road	Curved Road	Three Leg Intersection	Four Leg Intersection	Five or More Leg Intersection	Driveways	Bridges	Interchanges	Other	Parking Lot	Private Way	Cross Over	Railroad Crossing	Total
Object in Road	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Rear End / Sideswipe	17	0	22	24	0	4	0	0	0	0	0	0	0	67
Head-on / Sideswipe	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Intersection Movement	0	0	5	2	0	7	0	0	0	0	0	0	0	14
Pedestrians	1	0	0	1	0	0	0	0	0	0	0	0	0	2
Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Went Off Road	6	1	2	0	0	0	0	0	0	0	0	0	0	9
All Other Animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackknife	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rollover	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fire	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submersion	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thrown or Falling Object	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	25	1	31	27	0	11	0	0	0	0	0	0	0	95

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Blowing Sand, Soil, Dirt												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Blowing Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Clear												
Dark - Lighted	13	0	0	0	0	0	0	1	0	0	2	16
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	39	0	0	0	0	0	0	0	0	0	2	41
Dusk	1	0	0	0	0	0	0	0	0	0	1	2
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Cloudy												
Dark - Lighted	1	1	0	0	0	0	0	0	0	0	2	4
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	12	0	0	0	0	0	0	0	0	0	1	13
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Fog, Smog, Smoke												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Other												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Rain												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	3	3
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	1	1
Daylight	1	0	0	0	0	0	0	0	0	0	6	7
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Severe Crosswinds												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Sleet, Hail (Freezing Rain or Drizzle)												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	1	1
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	1	1
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	1	4	0	0	0	5
Dusk	0	0	0	0	0	0	0	1	0	0	0	1
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	67	1	0	0	0	0	1	6	0	0	0	95

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☒ Crash Summary I - Single Node ☐ Section Detail ☒ Crash Summary II ☐ 1320 Public ☐ 1320 Private ☐ 1320 Summary

REPORT DESCRIPTION

Evergreen Dr. @ Riverside St.

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: 0560621

Start Node: 19434

Start Offset: 0

☐ Exclude First Node

End Node: 19434

End Offset: 0

☐ Exclude Last Node

Crash Summary I

Nodes														
Node	Route - MP	Node Description	U/R	Total Crashes	K	Injury A	Crashes B	Crashes C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
19434	0560621 - 2.33	Int of EVERGREEN DR RIVERSIDE ST	2	0	0	0	0	0	0	0.0	2.539	0.00	0.40	0.00
												Statewide Crash Rate: 0.13		
Study Years:	3.00	NODE TOTALS:		0	0	0	0	0	0	0.0	2.539	0.00	0.40	0.00

Crash Summary II - Characteristics

Crashes by Day and Hour

	AM											Hour of Day											PM												
Day Of Week	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	Un	Tot									
SUNDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
MONDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
TUESDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
WEDNESDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
THURSDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
FRIDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
SATURDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									

Vehicle Counts by Type

Unit Type	Total	Unit Type	Total
1-Passenger Car	0	23-Bicyclist	0
2-(Sport) Utility Vehicle	0	24-Witness	0
3-Passenger Van	0	25-Other	0
4-Cargo Van (10K lbs or Less)	0	Total	0
5-Pickup	0		
6-Motor Home	0		
7-School Bus	0		
8-Transit Bus	0		
9-Motor Coach	0		
10-Other Bus	0		
11-Motorcycle	0		
12-Moped	0		
13-Low Speed Vehicle	0		
14-Autocycle	0		
15-Experimental	0		
16-Other Light Trucks (10,000 lbs or Less)	0		
17-Medium/Heavy Trucks (More than 10,000 lbs)	0		
18-ATV - (4 wheel)	0		
20-ATV - (2 wheel)	0		
21-Snowmobile	0		
22-Pedestrian	0		

Crash Summary II - Characteristics

Crashes by Driver Action at Time of Crash

Driver Action at Time of Crash	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
No Contributing Action	0	0	0	0	0	0	0
Ran Off Roadway	0	0	0	0	0	0	0
Failed to Yield Right-of-Way	0	0	0	0	0	0	0
Ran Red Light	0	0	0	0	0	0	0
Ran Stop Sign	0	0	0	0	0	0	0
Disregarded Other Traffic Sign	0	0	0	0	0	0	0
Disregarded Other Road Markings	0	0	0	0	0	0	0
Exceeded Posted Speed Limit	0	0	0	0	0	0	0
Drove Too Fast For Conditions	0	0	0	0	0	0	0
Improper Turn	0	0	0	0	0	0	0
Improper Backing	0	0	0	0	0	0	0
Improper Passing	0	0	0	0	0	0	0
Wrong Way	0	0	0	0	0	0	0
Followed Too Closely	0	0	0	0	0	0	0
Failed to Keep in Proper Lane	0	0	0	0	0	0	0
Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	0	0	0	0	0	0	0
Swerved or Avoided Due to Wind, Slippery Surface, Motor Vehicle, Object, Non-Motorist in Roadway	0	0	0	0	0	0	0
Over-Correcting/Over-Steering	0	0	0	0	0	0	0
Other Contributing Action	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Crashes by Apparent Physical Condition And Driver

Apparent Physical Condition	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
Apparently Normal	0	0	0	0	0	0	0
Physically Impaired or Handicapped	0	0	0	0	0	0	0
Emotional(Depressed, Angry, Disturbed, etc.)	0	0	0	0	0	0	0
Ill (Sick)	0	0	0	0	0	0	0
Asleep or Fatigued	0	0	0	0	0	0	0
Under the Influence of Medications/Drugs/Alcohol	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Driver Age by Unit Type

Age	Driver	Bicycle	SnowMobile	Pedestrian	ATV	Total
09-Under	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-39	0	0	0	0	0	0
40-49	0	0	0	0	0	0
50-59	0	0	0	0	0	0
60-69	0	0	0	0	0	0
70-79	0	0	0	0	0	0
80-Over	0	0	0	0	0	0
Unknown	0	0	0	0	0	0
Total	0	0	0	0	0	0

Crash Summary II - Characteristics

Most Harmful Event			
Most Harmful Event	Total	Most Harmful Event	Total
1-Overturn / Rollover	0	38-Other Fixed Object (wall, building, tunnel, etc.)	0
2-Fire / Explosion	0	39-Unknown	0
3-Immersion	0	40-Gate or Cable	0
4-Jackknife	0	41-Pressure Ridge	0
5-Cargo / Equipment Loss Or Shift	0	Total	0
6-Fell / Jumped from Motor Vehicle	0		
7-Thrown or Falling Object	0		
8-Other Non-Collision	0		
9-Pedestrian	0		
10-Pedalcycle	0		
11-Railway Vehicle - Train, Engine	0		
12-Animal	0		
13-Motor Vehicle in Transport	0		
14-Parked Motor Vehicle	0		
15-Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle	0		
16-Work Zone / Maintenance Equipment	0		
17-Other Non-Fixed Object	0		
18-Impact Attenuator / Crash Cushion	0		
19-Bridge Overhead Structure	0		
20-Bridge Pier or Support	0		
21-Bridge Rail	0		
22-Cable Barrier	0		
23-Culvert	0		
24-Curb	0		
25-Ditch	0		
26-Embankment	0		
27-Guardrail Face	0		
28-Guardrail End	0		
29-Concrete Traffic Barrier	0		
30-Other Traffic Barrier	0		
31-Tree (Standing)	0		
32-Utility Pole / Light Support	0		
33-Traffic Sign Support	0		
34-Traffic Signal Support	0		
35-Fence	0		
36-Mailbox	0		
37-Other Post Pole or Support	0		

Traffic Control Devices		
Traffic Control Device	Total	
1-Traffic Signals (Stop & Go)	0	
2-Traffic Signals (Flashing)	0	
3-Advisory/Warning Sign	0	
4-Stop Signs - All Approaches	0	
5-Stop Signs - Other	0	
6-Yield Sign	0	
7-Curve Warning Sign	0	
8-Officer, Flagman, School Patrol	0	
9-School Bus Stop Arm	0	
10-School Zone Sign	0	
11-R.R. Crossing Device	0	
12-No Passing Zone	0	
13-None	0	
14-Other	0	
Total	0	

Injury Data		
Severity Code	Injury Crashes	Number Of Injuries
K	0	
A	0	
B	0	
C	0	
PD	0	0
Total	0	0

Road Character	
Road Grade	Total
1-Level	0
2-On Grade	0
3-Top of Hill	0
4-Bottom of Hill	0
5-Other	0
Total	0

Light	
Light Condition	Total
1-Daylight	0
2-Dawn	0
3-Dusk	0
4-Dark - Lighted	0
5-Dark - Not Lighted	0
6-Dark - Unknown Lighting	0
7-Unknown	0
Total	0

Crash Summary II - Characteristics

Crashes by Year and Month

Month	2011	2012	2013	Total
JANUARY	0	0	0	0
FEBRUARY	0	0	0	0
MARCH	0	0	0	0
APRIL	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	0	0	0	0
AUGUST	0	0	0	0
SEPTEMBER	0	0	0	0
OCTOBER	0	0	0	0
NOVEMBER	0	0	0	0
DECEMBER	0	0	0	0
Total	0	0	0	0

Report is limited to the last 10 years of data.

Crash Summary II - Characteristics

Crashes by Crash Type and Type of Location

Crash Type	Straight Road	Curved Road	Three Leg Intersection	Four Leg Intersection	Five or More Leg Intersection	Driveways	Bridges	Interchanges	Other	Parking Lot	Private Way	Cross Over	Railroad Crossing	Total
Object in Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rear End / Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Head-on / Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intersection Movement	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Went Off Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All Other Animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackknife	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rollover	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fire	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submersion	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thrown or Falling Object	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Blowing Sand, Soil, Dirt												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Blowing Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Clear												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Cloudy												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Fog, Smog, Smoke												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Other												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Rain												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Severe Crosswinds												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Sleet, Hail (Freezing Rain or Drizzle)												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☒ Crash Summary I - Single Node ☐ Section Detail ☒ Crash Summary II ☐ 1320 Public ☐ 1320 Private ☐ 1320 Summary

REPORT DESCRIPTION

Industrial Way @ Riverside St.

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: 0560621

Start Node: 19435

Start Offset: 0

☐ Exclude First Node

End Node: 19435

End Offset: 0

☐ Exclude Last Node

Crash Summary I

Nodes														
Node	Route - MP	Node Description	U/R	Total Crashes	K	Injury A	Crashes B	Crashes C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
19435	0560621 - 1.95	Int of INDUSTRIAL WY RIVERSIDE ST	2	0	0	0	0	0	0	0.0	2.962	0.00	0.39	0.00
												Statewide Crash Rate: 0.13		
Study Years:	3.00	NODE TOTALS:		0	0	0	0	0	0	0.0	2.962	0.00	0.39	0.00

Crash Summary II - Characteristics

Crashes by Day and Hour

	AM											Hour of Day											PM												
Day Of Week	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	Un	Tot									
SUNDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
MONDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
TUESDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
WEDNESDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
THURSDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
FRIDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
SATURDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									

Vehicle Counts by Type

Unit Type	Total	Unit Type	Total
1-Passenger Car	0	23-Bicyclist	0
2-(Sport) Utility Vehicle	0	24-Witness	0
3-Passenger Van	0	25-Other	0
4-Cargo Van (10K lbs or Less)	0	Total	0
5-Pickup	0		
6-Motor Home	0		
7-School Bus	0		
8-Transit Bus	0		
9-Motor Coach	0		
10-Other Bus	0		
11-Motorcycle	0		
12-Moped	0		
13-Low Speed Vehicle	0		
14-Autocycle	0		
15-Experimental	0		
16-Other Light Trucks (10,000 lbs or Less)	0		
17-Medium/Heavy Trucks (More than 10,000 lbs)	0		
18-ATV - (4 wheel)	0		
20-ATV - (2 wheel)	0		
21-Snowmobile	0		
22-Pedestrian	0		

Crash Summary II - Characteristics

Crashes by Driver Action at Time of Crash

Driver Action at Time of Crash	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
No Contributing Action	0	0	0	0	0	0	0
Ran Off Roadway	0	0	0	0	0	0	0
Failed to Yield Right-of-Way	0	0	0	0	0	0	0
Ran Red Light	0	0	0	0	0	0	0
Ran Stop Sign	0	0	0	0	0	0	0
Disregarded Other Traffic Sign	0	0	0	0	0	0	0
Disregarded Other Road Markings	0	0	0	0	0	0	0
Exceeded Posted Speed Limit	0	0	0	0	0	0	0
Drove Too Fast For Conditions	0	0	0	0	0	0	0
Improper Turn	0	0	0	0	0	0	0
Improper Backing	0	0	0	0	0	0	0
Improper Passing	0	0	0	0	0	0	0
Wrong Way	0	0	0	0	0	0	0
Followed Too Closely	0	0	0	0	0	0	0
Failed to Keep in Proper Lane	0	0	0	0	0	0	0
Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	0	0	0	0	0	0	0
Swerved or Avoided Due to Wind, Slippery Surface, Motor Vehicle, Object, Non-Motorist in Roadway	0	0	0	0	0	0	0
Over-Correcting/Over-Steering	0	0	0	0	0	0	0
Other Contributing Action	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Crashes by Apparent Physical Condition And Driver

Apparent Physical Condition	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
Apparently Normal	0	0	0	0	0	0	0
Physically Impaired or Handicapped	0	0	0	0	0	0	0
Emotional(Depressed, Angry, Disturbed, etc.)	0	0	0	0	0	0	0
Ill (Sick)	0	0	0	0	0	0	0
Asleep or Fatigued	0	0	0	0	0	0	0
Under the Influence of Medications/Drugs/Alcohol	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Driver Age by Unit Type

Age	Driver	Bicycle	SnowMobile	Pedestrian	ATV	Total
09-Under	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-39	0	0	0	0	0	0
40-49	0	0	0	0	0	0
50-59	0	0	0	0	0	0
60-69	0	0	0	0	0	0
70-79	0	0	0	0	0	0
80-Over	0	0	0	0	0	0
Unknown	0	0	0	0	0	0
Total	0	0	0	0	0	0

Crash Summary II - Characteristics

Most Harmful Event			
Most Harmful Event	Total	Most Harmful Event	Total
1-Overturn / Rollover	0	38-Other Fixed Object (wall, building, tunnel, etc.)	0
2-Fire / Explosion	0	39-Unknown	0
3-Immersion	0	40-Gate or Cable	0
4-Jackknife	0	41-Pressure Ridge	0
5-Cargo / Equipment Loss Or Shift	0	Total	0
6-Fell / Jumped from Motor Vehicle	0		
7-Thrown or Falling Object	0		
8-Other Non-Collision	0		
9-Pedestrian	0		
10-Pedalcycle	0		
11-Railway Vehicle - Train, Engine	0		
12-Animal	0		
13-Motor Vehicle in Transport	0		
14-Parked Motor Vehicle	0		
15-Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle	0		
16-Work Zone / Maintenance Equipment	0		
17-Other Non-Fixed Object	0		
18-Impact Attenuator / Crash Cushion	0		
19-Bridge Overhead Structure	0		
20-Bridge Pier or Support	0		
21-Bridge Rail	0		
22-Cable Barrier	0		
23-Culvert	0		
24-Curb	0		
25-Ditch	0		
26-Embankment	0		
27-Guardrail Face	0		
28-Guardrail End	0		
29-Concrete Traffic Barrier	0		
30-Other Traffic Barrier	0		
31-Tree (Standing)	0		
32-Utility Pole / Light Support	0		
33-Traffic Sign Support	0		
34-Traffic Signal Support	0		
35-Fence	0		
36-Mailbox	0		
37-Other Post Pole or Support	0		

Traffic Control Devices		
Traffic Control Device	Total	
1-Traffic Signals (Stop & Go)	0	
2-Traffic Signals (Flashing)	0	
3-Advisory/Warning Sign	0	
4-Stop Signs - All Approaches	0	
5-Stop Signs - Other	0	
6-Yield Sign	0	
7-Curve Warning Sign	0	
8-Officer, Flagman, School Patrol	0	
9-School Bus Stop Arm	0	
10-School Zone Sign	0	
11-R.R. Crossing Device	0	
12-No Passing Zone	0	
13-None	0	
14-Other	0	
Total	0	

Injury Data		
Severity Code	Injury Crashes	Number Of Injuries
K	0	
A	0	
B	0	
C	0	
PD	0	0
Total	0	0

Road Character	
Road Grade	Total
1-Level	0
2-On Grade	0
3-Top of Hill	0
4-Bottom of Hill	0
5-Other	0
Total	0

Light	
Light Condition	Total
1-Daylight	0
2-Dawn	0
3-Dusk	0
4-Dark - Lighted	0
5-Dark - Not Lighted	0
6-Dark - Unknown Lighting	0
7-Unknown	0
Total	0

Crash Summary II - Characteristics

Crashes by Year and Month

Month	2011	2012	2013	Total
JANUARY	0	0	0	0
FEBRUARY	0	0	0	0
MARCH	0	0	0	0
APRIL	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	0	0	0	0
AUGUST	0	0	0	0
SEPTEMBER	0	0	0	0
OCTOBER	0	0	0	0
NOVEMBER	0	0	0	0
DECEMBER	0	0	0	0
Total	0	0	0	0

Report is limited to the last 10 years of data.

Crash Summary II - Characteristics

Crashes by Crash Type and Type of Location

Crash Type	Straight Road	Curved Road	Three Leg Intersection	Four Leg Intersection	Five or More Leg Intersection	Driveways	Bridges	Interchanges	Other	Parking Lot	Private Way	Cross Over	Railroad Crossing	Total
Object in Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rear End / Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Head-on / Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intersection Movement	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Went Off Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All Other Animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackknife	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rollover	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fire	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submersion	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thrown or Falling Object	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Blowing Sand, Soil, Dirt												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Blowing Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Clear												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Cloudy												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Fog, Smog, Smoke												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Other												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Rain												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Severe Crosswinds												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Sleet, Hail (Freezing Rain or Drizzle)												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☒ Crash Summary I -
Single Node ☐ Section Detail ☒ Crash Summary II ☐ 1320 Public ☐ 1320 Private ☒ 1320 Summary

REPORT DESCRIPTION

Riverside St. @ Forest Ave. along with 66781 & 66782

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: 0302X

Start Node: 16892

Start Offset: 0

☐ Exclude First Node

End Node: 16892

End Offset: 0

☐ Exclude Last Node

Crash Summary I

Nodes

Nodes															
Node	Route - MP	Node Description		U/R	Total Crashes	K	Injury A	Crashes B	Crashes C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
P16892	0302X - 4	Int of FOREST AV	RIVERSIDE ST	9	34	0	0	2	8	24	29.4	10.263	1.10	1.01	1.10
												Statewide Crash Rate: 0.65			
Study Years:	3.00	NODE TOTALS:			34	0	0	2	8	24	29.4	10.263	1.10	1.01	1.10

Crash Summary II - Characteristics

Crashes by Day and Hour

Day Of Week	AM												PM												Un	Tot
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11		
SUNDAY	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	2
MONDAY	0	0	0	0	0	0	0	0	2	0	0	0	2	2	1	0	1	0	1	0	0	0	0	0	0	9
TUESDAY	0	0	0	0	0	0	1	2	1	1	1	0	1	1	0	0	0	0	2	0	1	0	0	0	0	11
WEDNESDAY	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	5
THURSDAY	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0	5
FRIDAY	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
SATURDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	1	4	4	2	1	2	5	4	1	1	1	3	4	0	1	0	0	0	0	34

Vehicle Counts by Type

Unit Type	Total	Unit Type	Total
1-Passenger Car	43	23-Bicyclist	0
2-(Sport) Utility Vehicle	14	24-Witness	2
3-Passenger Van	4	25-Other	0
4-Cargo Van (10K lbs or Less)	0	Total	73
5-Pickup	5		
6-Motor Home	0		
7-School Bus	1		
8-Transit Bus	0		
9-Motor Coach	0		
10-Other Bus	0		
11-Motorcycle	1		
12-Moped	0		
13-Low Speed Vehicle	0		
14-Autocycle	0		
15-Experimental	0		
16-Other Light Trucks (10,000 lbs or Less)	0		
17-Medium/Heavy Trucks (More than 10,000 lbs)	2		
18-ATV - (4 wheel)	0		
20-ATV - (2 wheel)	0		
21-Snowmobile	0		
22-Pedestrian	1		

Crash Summary II - Characteristics

Crashes by Driver Action at Time of Crash

Driver Action at Time of Crash	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
No Contributing Action	16	14	2	0	0	0	32
Ran Off Roadway	0	0	0	0	0	0	0
Failed to Yield Right-of-Way	1	1	0	0	0	0	2
Ran Red Light	1	0	0	0	0	0	1
Ran Stop Sign	0	0	0	0	0	0	0
Disregarded Other Traffic Sign	0	0	0	0	0	0	0
Disregarded Other Road Markings	0	0	0	0	0	0	0
Exceeded Posted Speed Limit	0	0	0	0	0	0	0
Drove Too Fast For Conditions	1	0	0	0	0	0	1
Improper Turn	0	0	0	0	0	0	0
Improper Backing	0	1	0	0	0	0	1
Improper Passing	0	1	0	0	0	0	1
Wrong Way	0	0	0	0	0	0	0
Followed Too Closely	8	5	0	0	0	0	13
Failed to Keep in Proper Lane	0	0	0	0	0	0	0
Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	0	1	0	0	0	0	1
Swerved or Avoided Due to Wind, Slippery Surface, Motor Vehicle, Object, Non-Motorist in Roadway	1	1	0	0	0	0	2
Over-Correcting/Over-Steering	0	0	0	0	0	0	0
Other Contributing Action	2	6	1	0	0	0	9
Unknown	0	0	0	0	0	0	0
Total	30	30	3	0	0	0	63

Crashes by Apparent Physical Condition And Driver

Apparent Physical Condition	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
Apparently Normal	33	33	3	0	0	1	70
Physically Impaired or Handicapped	0	0	0	0	0	0	0
Emotional(Depressed, Angry, Disturbed, etc.)	1	0	0	0	0	0	1
Ill (Sick)	0	0	0	0	0	0	0
Asleep or Fatigued	0	0	0	0	0	0	0
Under the Influence of Medications/Drugs/Alcohol	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total	34	33	3	0	0	1	71

Driver Age by Unit Type

Age	Driver	Bicycle	SnowMobile	Pedestrian	ATV	Total
09-Under	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	1	0	0	0	0	1
20-24	9	0	0	0	0	9
25-29	9	0	0	0	0	9
30-39	13	0	0	0	0	13
40-49	13	0	0	0	0	13
50-59	13	0	0	0	0	13
60-69	9	0	0	0	0	9
70-79	2	0	0	0	0	2
80-Over	1	0	0	0	0	1
Unknown	0	0	0	1	0	1
Total	70	0	0	1	0	71

Crash Summary II - Characteristics

Most Harmful Event			
Most Harmful Event	Total	Most Harmful Event	Total
1-Overturn / Rollover	0	38-Other Fixed Object (wall, building, tunnel, etc.)	0
2-Fire / Explosion	0	39-Unknown	10
3-Immersion	0	40-Gate or Cable	0
4-Jackknife	0	41-Pressure Ridge	0
5-Cargo / Equipment Loss Or Shift	0	Total	62
6-Fell / Jumped from Motor Vehicle	0		
7-Thrown or Falling Object	0		
8-Other Non-Collision	0		
9-Pedestrian	1		
10-Pedalcycle	0		
11-Railway Vehicle - Train, Engine	0		
12-Animal	0		
13-Motor Vehicle in Transport	51		
14-Parked Motor Vehicle	0		
15-Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle	0		
16-Work Zone / Maintenance Equipment	0		
17-Other Non-Fixed Object	0		
18-Impact Attenuator / Crash Cushion	0		
19-Bridge Overhead Structure	0		
20-Bridge Pier or Support	0		
21-Bridge Rail	0		
22-Cable Barrier	0		
23-Culvert	0		
24-Curb	0		
25-Ditch	0		
26-Embankment	0		
27-Guardrail Face	0		
28-Guardrail End	0		
29-Concrete Traffic Barrier	0		
30-Other Traffic Barrier	0		
31-Tree (Standing)	0		
32-Utility Pole / Light Support	0		
33-Traffic Sign Support	0		
34-Traffic Signal Support	0		
35-Fence	0		
36-Mailbox	0		
37-Other Post Pole or Support	0		

Traffic Control Devices		
Traffic Control Device	Total	
1-Traffic Signals (Stop & Go)	31	
2-Traffic Signals (Flashing)	0	
3-Advisory/Warning Sign	0	
4-Stop Signs - All Approaches	0	
5-Stop Signs - Other	0	
6-Yield Sign	0	
7-Curve Warning Sign	0	
8-Officer, Flagman, School Patrol	1	
9-School Bus Stop Arm	0	
10-School Zone Sign	0	
11-R.R. Crossing Device	0	
12-No Passing Zone	0	
13-None	2	
14-Other	0	
Total	34	

Injury Data		
Severity Code	Injury Crashes	Number Of Injuries
K	0	0
A	0	0
B	2	2
C	8	10
PD	24	0
Total	34	12

Road Character	
Road Grade	Total
1-Level	28
2-On Grade	6
3-Top of Hill	0
4-Bottom of Hill	0
5-Other	0
Total	34

Light	
Light Condition	Total
1-Daylight	30
2-Dawn	0
3-Dusk	1
4-Dark - Lighted	3
5-Dark - Not Lighted	0
6-Dark - Unknown Lighting	0
7-Unknown	0
Total	34

Crash Summary II - Characteristics

Crashes by Year and Month

Month	2011	2012	2013	Total
JANUARY	1	0	0	1
FEBRUARY	1	0	0	1
MARCH	0	0	1	1
APRIL	2	0	1	3
MAY	0	0	2	2
JUNE	0	2	0	2
JULY	0	1	2	3
AUGUST	1	4	1	6
SEPTEMBER	0	2	2	4
OCTOBER	1	2	1	4
NOVEMBER	1	2	0	3
DECEMBER	0	4	0	4
Total	7	17	10	34

Report is limited to the last 10 years of data.

Crash Summary II - Characteristics

Crashes by Crash Type and Type of Location

Crash Type	Straight Road	Curved Road	Three Leg Intersection	Four Leg Intersection	Five or More Leg Intersection	Driveways	Bridges	Interchanges	Other	Parking Lot	Private Way	Cross Over	Railroad Crossing	Total
Object in Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rear End / Sideswipe	0	0	1	30	0	0	0	0	0	0	0	0	0	31
Head-on / Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intersection Movement	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Pedestrians	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Went Off Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All Other Animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackknife	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rollover	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fire	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submersion	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thrown or Falling Object	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	33	0	0	0	0	0	0	0	0	0	34

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Blowing Sand, Soil, Dirt												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Blowing Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Clear												
Dark - Lighted	3	0	0	0	0	0	0	0	0	0	0	3
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	20	0	0	0	0	0	0	0	0	0	0	20
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Cloudy												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	6	0	0	0	0	0	0	0	0	0	0	6
Dusk	0	0	0	0	0	0	0	0	0	0	1	1
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Fog, Smog, Smoke												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Other												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Rain												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	2	2
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Severe Crosswinds												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Sleet, Hail (Freezing Rain or Drizzle)												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	1	1	0	0	0	2
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	29	0	0	0	0	0	1	1	0	0	0	34

Crash Date: 1/4/2011 Time: 08:18 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe
 Weather: 1 - Clear
 Road Grade: 1 - Level
 Traffic Control: 1 - Traffic Signals (Stop & Go)

Type of Location: 4 - Four Leg Intersection
 Light: 1 - Daylight
 Surface Condition: 1 - Dry

Cont. Circ. Env 1
 Cont. Circ. Road 1

Cont. Circ. Env 2
 Cont. Circ. Road 2

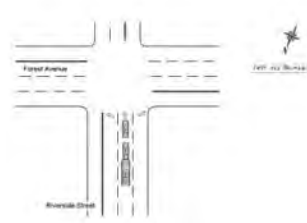
Narrative

Unit 1 driver stated that she was stopped in traffic on Riverside Street at the stop light at Forest Avenue. Unit 1 driver said that she was in the middle lane to head straight and was behind another vehicle. Unit 1 driver stated that while she was completely stopped, Unit 2 struck her from the rear.

Unit 2 driver stated that he was stopped behind Unit 1 on Riverside Street at the red light at Forest Avenue. Unit 2 driver told me the following: "I was stopped and I must have looked down to grab my soda or something and then boom, she backed right into me." I confirmed with the driver of Unit 2 that he was saying that at a red light, Unit 1 went in reverse and struck Unit 2. Unit 2 driver showed me his bent license plate and stated that it could not have bent the way it did if he went forward into Unit 1.

There are no other witnesses to this crash.

Diagram



Unit: 1 Type: 1 - Passenger Car
 Most Damaged Area: 6 - Rear
 Pre-Crash Actions: 11 - Stopped in traffic
 Seq. Events 1:
 Seq. Events 3:
 Driver Distracted By:
 Driver Action 1:

Veh. Travel Dir.: 4 - Westbound
 Most Harmful Event:
 Contrib Circ. - Vehicle: 1 - None
 Seq. Events 2:
 Seq. Events 4:
 Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	57	2 - Female	4 - Possible Injury

Unit: 2 Type: 2 - (Sport) Utility Vehicle
 Most Damaged Area: 12 - Front
 Pre-Crash Actions: 9 - Starting in traffic
 Seq. Events 1:
 Seq. Events 3:
 Driver Distracted By:
 Driver Action 1:

Veh. Travel Dir.: 4 - Westbound
 Most Harmful Event:
 Contrib Circ. - Vehicle: 1 - None
 Seq. Events 2:
 Seq. Events 4:
 Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 2: 14 - Followed Too Closely

Person Type	Age	Sex	Injury Degree
1 - Driver	20	1 - Male	5 - No Injury

Crash Date: 2/7/2011

Time: 14:44

City: Portland

Street/Highway: RIVERSIDE ST

Start Node: 16892

Int of FOREST AV RIVERSIDE ST

End Node: 0

Offset: 0

OE Start Node: 16892

Int of FOREST AV RIVERSIDE ST

OE End Node:

Type of Crash: 2 - Rear End / Sideswipe

Type of Location: 3 - Three Leg Intersection

Weather: 1 - Clear

Light: 1 - Daylight

Road Grade: 1 - Level

Surface Condition: 1 - Dry

Traffic Control: 1 - Traffic Signals (Stop & Go)

Cont. Circ. Env 1

Cont. Circ. Env 2

Cont. Circ. Road 1

Cont. Circ. Road 2

Narrative

Unit #1 was stopped in traffic waiting to make a right hand turn onto Forest Avenue from Riverside Street. Unit #2 was behind Unit #1. Unit #2 thought that Unit #1 had already turned and hit Unit #1.

Diagram

**Unit: 1** Type: 2 - (Sport) Utility Vehicle

Most Damaged Area: 6 - Rear

Pre-Crash Actions: 5 - Making right turn

Seq. Events 1:

Seq. Events 3:

Driver Distracted By:

Driver Action 1:

Veh. Travel Dir.: 1 - Northbound

Most Harmful Event:

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	51	2 - Female	5 - No Injury

Unit: 2 Type: 1 - Passenger Car

Most Damaged Area: 1 - Front Passenger Corner

Pre-Crash Actions: 5 - Making right turn

Seq. Events 1:

Seq. Events 3:

Driver Distracted By:

Driver Action 1:

Veh. Travel Dir.: 1 - Northbound

Most Harmful Event:

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	62	2 - Female	5 - No Injury

Crash Date: 4/19/2011 Time: 18:11 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 10385 Int of RIVERSIDE ST, WALDRON WY OE End Node: 16892 Int of FOREST AV RIVERSIDE ST

Type of Crash: 2 - Rear End / Sideswipe

Type of Location: 4 - Four Leg Intersection

Weather: 2 - Cloudy

Light: 1 - Daylight

Road Grade: 1 - Level

Surface Condition: 1 - Dry

Traffic Control: 1 - Traffic Signals (Stop & Go)

Cont. Circ. Env 1

Cont. Circ. Env 2

Cont. Circ. Road 1

Cont. Circ. Road 2

Narrative

Diagram

UNIT NO.1 AND UNIT NO.2 RIGHT LANE OUTBOUND RIVERSIDE STREET STOPPED IN TRAFFIC AT INTERSECTION OF FOREST AVENUE. THE TRAFFIC LIGHT TURNED GREEN AND UNIT NO.1 BEGAN TO MOVE. OPERATOR OF UNIT NO.2 ADMITTED THAT HAND SLIPPED OFF THE CLUTCH AND HE PANICKED. THE FRONT END AND RIGHT SIDE OF UNIT NO.2 STRUCK THE LEFT REAR OF UNIT NO.1.



4-19-11 jte.

Unit: 1 Type: 1 - Passenger Car
 Most Damaged Area: 7 - Rear Driver Side
 Pre-Crash Actions: 9 - Starting in traffic
 Seq. Events 1:
 Seq. Events 3:
 Driver Distracted By:
 Driver Action 1:

Veh. Travel Dir.: 1 - Northbound
 Most Harmful Event:
 Contrib Circ. - Vehicle: 1 - None
 Seq. Events 2:
 Seq. Events 4:
 Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	35	1 - Male	5 - No Injury

Unit: 2 Type: 11 - Motorcycle
 Most Damaged Area: 1 - Front Passenger Corner
 Pre-Crash Actions: 9 - Starting in traffic
 Seq. Events 1:
 Seq. Events 3:
 Driver Distracted By:
 Driver Action 1:

Veh. Travel Dir.: 1 - Northbound
 Most Harmful Event:
 Contrib Circ. - Vehicle: 1 - None
 Seq. Events 2:
 Seq. Events 4:
 Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 2: 14 - Followed Too Closely

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	21	1 - Male	5 - No Injury

Crash Date: 4/20/2011 Time: 07:19 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe	Type of Location: 4 - Four Leg Intersection
Weather: 1 - Clear	Light: 1 - Daylight
Road Grade: 1 - Level	Surface Condition: 1 - Dry
Traffic Control: 1 - Traffic Signals (Stop & Go)	
Cont. Circ. Env 1	Cont. Circ. Env 2
Cont. Circ. Road 1	Cont. Circ. Road 2

Narrative

VEH 1 WAS STOPPED IN TRAFFIC. VEH 2 WAS STOPPED BEHIND VEH 1. VEH 2 PROCEEDED FORWARD BEFORE THE LIGHT TURNED GREEN AND BEFORE VEH 1 PROCEEDED FORWARD. VEH 2 STRUCK VEH 1.

Diagram



Unit: 1	Type: 1 - Passenger Car	Veh. Travel Dir.: 4 - Westbound
Most Damaged Area: 5 - Rear Passenger Corner		Most Harmful Event:
Pre-Crash Actions: 11 - Stopped in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1:		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By:		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1:		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	43	2 - Female	4 - Possible Injury

Unit: 2	Type: 2 - (Sport) Utility Vehicle	Veh. Travel Dir.: 4 - Westbound
Most Damaged Area: 15 - Non-Collision		Most Harmful Event:
Pre-Crash Actions: 11 - Stopped in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1:		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By:		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 14 - Followed Too Closely		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	27	2 - Female	5 - No Injury

Crash Date: 8/1/2011

Time: 18:33

City: Portland

Street/Highway: 23 BRIDGTON RD

Start Node: 16892

Int of FOREST AV RIVERSIDE ST

End Node: 0

Offset: 0

OE Start Node:

OE End Node:

Type of Crash: 2 - Rear End / Sideswipe

Type of Location: 4 - Four Leg Intersection

Weather: 1 - Clear

Light: 1 - Daylight

Road Grade: 1 - Level

Surface Condition: 1 - Dry

Traffic Control: 1 - Traffic Signals (Stop & Go)

Cont. Circ. Env 1 1 - None

Cont. Circ. Env 2

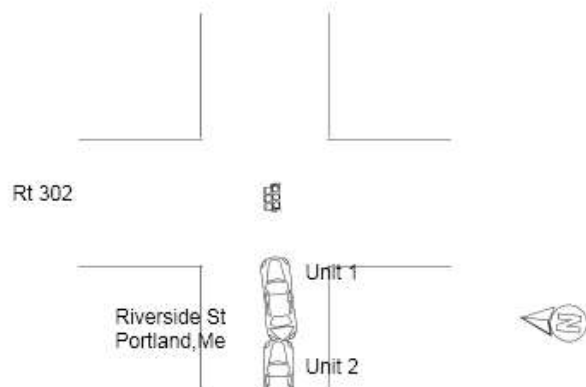
Cont. Circ. Road 1 1 - None

Cont. Circ. Road 2

Narrative

Unit 1 stopped at light on Riverside Street--Unit 2 behind Unit 1--
Both units began moving in traffic to make a left hand turn onto Rt 302--When Unit 2's operator took foot off of clutch his vehicle did a small jump forward striking Unit 1 on its bumper--did not observe any damage on either vehicle--Unit 1 operator acknowledge that it wasn't a hard hit--Unit 1 operator and passenger complained of neck or back pain--not sure if this could be an attempt for insurance fraud??

Diagram

**Unit: 1** Type: 1 - Passenger Car

Most Damaged Area:

Pre-Crash Actions: 9 - Starting in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	45	2 - Female	4 - Possible Injury
2 - Passenger	47	1 - Male	4 - Possible Injury

Unit: 2 Type: 1 - Passenger Car

Most Damaged Area:

Pre-Crash Actions: 9 - Starting in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 19 - Other Contributing Action

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 15 - Other

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	45	1 - Male	5 - No Injury

Crash Date: 10/11/2011 Time: 09:30 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2 1 - None

Narrative

V2 STOPPED AT THE TRAFFIC LIGHT AT FOREST AVE AND RIVERSIDE ST. V1 TRAVELLING BEHIND V2. V1 DRIVER THOUGHT TRAFFIC HAD STARTED. V1 PULLED AHEAD AND STRUCK V2.
 V2 DRIVER COMPLAINING OF BACK PAIN REFUSED MEDCU.

Diagram



Unit: 1 Type: 2 - (Sport) Utility Vehicle
 Most Damaged Area: 1 - Front Passenger Corner
 Pre-Crash Actions: 9 - Starting in traffic
 Seq. Events 1: 50 - No Other Events
 Seq. Events 3:
 Driver Distracted By: 1 - Not Distracted
 Driver Action 1: 19 - Other Contributing Action

Veh. Travel Dir.: 3 - Eastbound
 Most Harmful Event: 39 - Unknown
 Contrib Circ. - Vehicle: 1 - None
 Seq. Events 2: 50 - No Other Events
 Seq. Events 4:
 Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	32	2 - Female	5 - No Injury
2 - Passenger	0	2 - Female	5 - No Injury
2 - Passenger	3	1 - Male	5 - No Injury

Unit: 2 Type: 1 - Passenger Car
 Most Damaged Area: 6 - Rear
 Pre-Crash Actions: 11 - Stopped in traffic
 Seq. Events 1: 50 - No Other Events
 Seq. Events 3:
 Driver Distracted By: 1 - Not Distracted
 Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 3 - Eastbound
 Most Harmful Event: 39 - Unknown
 Contrib Circ. - Vehicle: 1 - None
 Seq. Events 2: 50 - No Other Events
 Seq. Events 4:
 Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	28	1 - Male	4 - Possible Injury

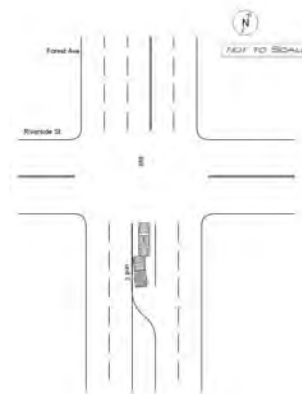
Crash Date: 11/10/2011 Time: 07:51 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 2 - Cloudy Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

Unit 1 and unit 2 were north bound on Forest Ave. Unit 1 was in left turn lane (turning left onto Riverside St). Driver of unit 1 stated that traffic light had changed from green to yellow so she stopped. Unit 2 was behind unit 1. Driver of unit 2 stated that he saw the light turn yellow and unit 1 stop but he was too close to avoid collision with unit 1. Units collided in road way.

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 1 - Northbound
 Most Damaged Area: 8 - Rear Driver Quarter Panel Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 11 - Stopped in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	26	2 - Female	5 - No Injury

Unit: 2 Type: 5 - Pickup Veh. Travel Dir.: 1 - Northbound
 Most Damaged Area: 1 - Front Passenger Corner Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 10 - Slowing in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 5 - External Distraction (outside the vehicle) Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 14 - Followed Too Closely Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	31	1 - Male	5 - No Injury

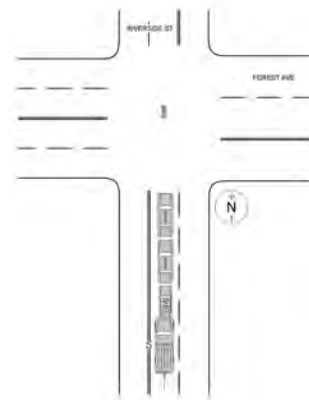
Crash Date: 6/1/2012 Time: 09:33 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

V1 WAS STOPPED ON RIVERSIDE ST DUE TO THE LIGHT AHEAD AT FOREST AVE BEING RED. V2 WAS STOPPED BEHIND V1. MR WELLS' FOOT SLIPPED OFF OF THE BRAKE OF V2. V2 WENT FORWARD AND STRUCK THE REAR OF V1.

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 1 - Northbound
 Most Damaged Area: 6 - Rear Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 11 - Stopped in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	65	1 - Male	5 - No Injury
8 - Passenger/Owner	73	1 - Male	5 - No Injury

Unit: 2 Type: 5 - Pickup Veh. Travel Dir.: 1 - Northbound
 Most Damaged Area: Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 9 - Starting in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 16 - Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	22	1 - Male	5 - No Injury
2 - Passenger	23	1 - Male	5 - No Injury
2 - Passenger	21	2 - Female	5 - No Injury

Crash Date: 6/25/2012 Time: 08:30 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe	Type of Location: 4 - Four Leg Intersection
Weather: 1 - Clear	Light: 1 - Daylight
Road Grade: 1 - Level	Surface Condition: 1 - Dry
Traffic Control: 1 - Traffic Signals (Stop & Go)	
Cont. Circ. Env 1 1 - None	Cont. Circ. Env 2
Cont. Circ. Road 1 1 - None	Cont. Circ. Road 2 1 - None

Narrative

Operator of Unit 1 stated she believed Unit 2 was continuing forward in the lane. Operator stated she pulled forward then collided with Unit 2.

Operator of Unit 2 stated she was stopped in the lane behind traffic when Unit 1 collided with the rear bumper of her vehicle.

Diagram



Unit: 1	Type: 1 - Passenger Car	Veh. Travel Dir.: 4 - Westbound
Most Damaged Area: 1 - Front Passenger Corner		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 1 - Following roadway		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 3 - Failed to Yield Right-of-Way		Driver Action 2: 14 - Followed Too Closely

Person Type	Age	Sex	Injury Degree
1 - Driver	27	2 - Female	5 - No Injury

Unit: 2	Type: 2 - (Sport) Utility Vehicle	Veh. Travel Dir.: 4 - Westbound
Most Damaged Area: 6 - Rear		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 11 - Stopped in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 1 - No Contributing Action		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	47	2 - Female	5 - No Injury

Crash Date: 7/26/2012 Time: 18:18 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe	Type of Location: 4 - Four Leg Intersection
Weather: 1 - Clear	Light: 1 - Daylight
Road Grade: 1 - Level	Surface Condition: 1 - Dry
Traffic Control: 1 - Traffic Signals (Stop & Go)	
Cont. Circ. Env 1 1 - None	Cont. Circ. Env 2
Cont. Circ. Road 1 1 - None	Cont. Circ. Road 2

Narrative

Vehicle 1 was stopped in traffic at the traffic light. Vehicle 2 was also stopped at the solid red light in front of vehicle 1. vehicle 2 wanted to change directions and subsequently backed up in order to try and make a right hand turn. As a result, vehicle 2 backed up into vehicle 1 causing minimal damage.

Diagram



Unit: 1	Type: 1 - Passenger Car	Veh. Travel Dir.: 4 - Westbound
Most Damaged Area: 12 - Front		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 11 - Stopped in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 1 - No Contributing Action		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	53	1 - Male	3 - Non-Incapacitating

Unit: 2	Type: 3 - Passenger Van	Veh. Travel Dir.: 4 - Westbound
Most Damaged Area: 6 - Rear		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 20 - Backing		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 11 - Improper Backing		Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	27	2 - Female	5 - No Injury
2 - Passenger	19	2 - Female	5 - No Injury
2 - Passenger	9	2 - Female	5 - No Injury
2 - Passenger	9	2 - Female	5 - No Injury
2 - Passenger	9	2 - Female	5 - No Injury
2 - Passenger	9	2 - Female	5 - No Injury

Crash Date: 8/14/2012 Time: 07:30 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node: 18508 Int of FOREST AV RIVERTON DR

Type of Crash: 2 - Rear End / Sideswipe

Type of Location: 4 - Four Leg Intersection

Weather: 1 - Clear

Light: 1 - Daylight

Road Grade: 1 - Level

Surface Condition: 1 - Dry

Traffic Control: 1 - Traffic Signals (Stop & Go)

Cont. Circ. Env 1 1 - None

Cont. Circ. Env 2

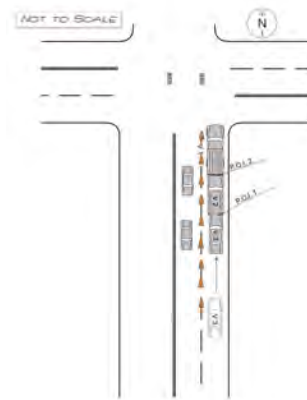
Cont. Circ. Road 1 1 - None

Cont. Circ. Road 2

Narrative

V1 and V2 were stopped at the intersection of Forest Avenue and Riverside Street. V3 struck V2, causing V2 to bump V1. All operators stated they were not injured and did not require MEDCU. The operator of V 3 had an expired license (Minnesota oln: K511110771907) and was issued a summons.

Diagram



Unit: 1 Type: 5 - Pickup

Most Damaged Area: 6 - Rear

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 1 - Northbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	28	1 - Male	5 - No Injury

Unit: 2 Type: 1 - Passenger Car

Most Damaged Area: 6 - Rear

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 1 - Northbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	54	2 - Female	5 - No Injury

Unit: 3 Type: 1 - Passenger Car

Most Damaged Area: 12 - Front

Pre-Crash Actions: 10 - Slowing in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 6 - Unknown

Driver Action 1: 19 - Other Contributing Action

Veh. Travel Dir.: 1 - Northbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
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1 - Driver

22

2 - Female

5 - No Injury

Crash Date: 8/16/2012 Time: 13:20 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 4 - Intersection Movement	Type of Location: 4 - Four Leg Intersection
Weather: 4 - Rain	Light: 1 - Daylight
Road Grade: 2 - On Grade	Surface Condition: 2 - Wet
Traffic Control: 1 - Traffic Signals (Stop & Go)	
Cont. Circ. Env 1 1 - None	Cont. Circ. Env 2
Cont. Circ. Road 1 1 - None	Cont. Circ. Road 2

Narrative

V1 was stopped in traffic traveling South on Forest Av. V2 was stopped in traffic traveling West on Riverside St. V2 started in traffic, V1 started traveling through the intersection and struck V2.

Diagram



Unit: 1	Type: 1 - Passenger Car	Veh. Travel Dir.: 2 - Southbound
Most Damaged Area: 3 - Center Passenger Side		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 11 - Stopped in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 4 - Ran Red Light		Driver Action 2: 3 - Failed to Yield Right-of-Way

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	66	2 - Female	5 - No Injury
2 - Passenger	47	2 - Female	5 - No Injury

Unit: 2	Type: 1 - Passenger Car	Veh. Travel Dir.: 4 - Westbound
Most Damaged Area: 1 - Front Passenger Corner		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 9 - Starting in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 1 - No Contributing Action		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	59	1 - Male	3 - Non-Incapacitating

Crash Date: 8/20/2012 Time: 16:48 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 10385 Int of RIVERSIDE ST, WALDRON WY OE End Node: 16892 Int of FOREST AV RIVERSIDE ST

Type of Crash: 2 - Rear End / Sideswipe

Type of Location: 4 - Four Leg Intersection

Weather: 1 - Clear

Light: 1 - Daylight

Road Grade: 1 - Level

Surface Condition: 1 - Dry

Traffic Control: 1 - Traffic Signals (Stop & Go)

Cont. Circ. Env 1 1 - None

Cont. Circ. Env 2

Cont. Circ. Road 1 1 - None

Cont. Circ. Road 2

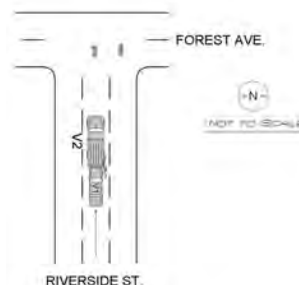
Narrative

Diagram

Both V1 and V2 were heading westbound on Riverside St. heading toward Forest Ave. V2 was obeying the traffic light and came to a full stop. V1 was following too closely and rear-ended V2. The impact speed was minimal however the trailer hitch on V2 caused significant damage to V1's front end. V1 was towed away from the scene. V2 drove away.

Neither V1 or V2 stated any injury.

No traffic citations were issued as a result of the accident.



Unit: 1

Type: 1 - Passenger Car

Most Damaged Area: 12 - Front

Veh. Travel Dir.: 4 - Westbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Pre-Crash Actions: 10 - Slowing in traffic

Contrib Circ. - Vehicle: 1 - None

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 2:

Seq. Events 3:

Seq. Events 4:

Driver Distracted By: 1 - Not Distracted

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 1: 14 - Followed Too Closely

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	60	1 - Male	5 - No Injury

Unit: 2

Type: 5 - Pickup

Most Damaged Area: 6 - Rear

Veh. Travel Dir.: 4 - Westbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Pre-Crash Actions: 11 - Stopped in traffic

Contrib Circ. - Vehicle: 1 - None

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 2:

Seq. Events 3:

Seq. Events 4:

Driver Distracted By: 1 - Not Distracted

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 1: 1 - No Contributing Action

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	28	1 - Male	5 - No Injury

Crash Date: 8/22/2012 Time: 11:46 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2 1 - None

Narrative

VEHICLE 2 WAS STOPPED AT THE INTERSECTION OF FOREST AVE AND RIVERSIDE ST, HEADING INBOUND. VEHICLE 1 DRIVER STATED SHE WAS STOPPED BEHIND VEHICLE 2. SHE STATED HER FOOT CAME OFF THE PEDAL, BUT SHE DID NOT RECALL HOW IT HAPPENED. VEHICLE 1 STRUCK VEHICLE 2.

Diagram



Unit: 1 Type: 1 - Passenger Car
 Most Damaged Area: 12 - Front
 Pre-Crash Actions: 9 - Starting in traffic
 Seq. Events 1: 21 - Motor Vehicle In Transport
 Seq. Events 3:
 Driver Distracted By: 6 - Unkown
 Driver Action 1: 19 - Other Contributing Action

Veh. Travel Dir.: 2 - Southbound
 Most Harmful Event: 13 - Motor Vehicle in Transport
 Contrib Circ. - Vehicle: 1 - None
 Seq. Events 2:
 Seq. Events 4:
 Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	41	2 - Female	5 - No Injury
2 - Passenger	10	2 - Female	5 - No Injury
2 - Passenger	13	2 - Female	5 - No Injury

Unit: 2 Type: 1 - Passenger Car
 Most Damaged Area: 6 - Rear
 Pre-Crash Actions: 11 - Stopped in traffic
 Seq. Events 1: 21 - Motor Vehicle In Transport
 Seq. Events 3:
 Driver Distracted By: 1 - Not Distracted
 Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 2 - Southbound
 Most Harmful Event: 13 - Motor Vehicle in Transport
 Contrib Circ. - Vehicle: 1 - None
 Seq. Events 2:
 Seq. Events 4:
 Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	32	1 - Male	5 - No Injury

Crash Date: 9/4/2012 Time: 12:54 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node: 16893 TL Portland Westbrook

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 4 - Rain Light: 1 - Daylight
 Road Grade: 2 - On Grade Surface Condition: 2 - Wet
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2 1 - None

Narrative

UNIT #1 WAS STOPPED IN TRAFFIC HEADED INBOUND ON FOREST AVENUE AT RIVERSIDE STREET. UNIT #2 WAS SLOWING IN TRAFFIC BEHIND UNIT #1. UNIT #2 STATED THAT HIS FOOT SLIPPED ON THE GAS AND HE HIT UNIT #1 CAUSING MINOR DAMAGE. DRIVER OF UNIT #1 COMPLAINED OF NECK PAIN BUT REFUSED MEDICAL ATTENTION.

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 6 - Rear Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 11 - Stopped in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 50 - No Other Events Seq. Events 2: 50 - No Other Events
 Seq. Events 3: 50 - No Other Events Seq. Events 4: 50 - No Other Events
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	57	2 - Female	4 - Possible Injury

Unit: 2 Type: 1 - Passenger Car Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 12 - Front Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 10 - Slowing in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 50 - No Other Events Seq. Events 2: 50 - No Other Events
 Seq. Events 3: 50 - No Other Events Seq. Events 4: 50 - No Other Events
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 19 - Other Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	58	1 - Male	5 - No Injury

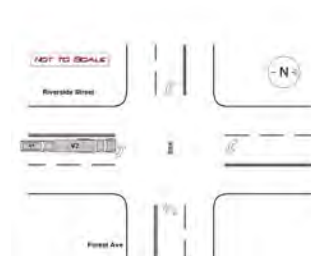
Crash Date: 9/10/2012 Time: 13:57 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 2 - Cloudy Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

On Monday, September 10, 2012 at 13:57:00, Officer Alissa Poisson responded to a crash at the intersection of RIVERSIDE ST and FOREST AVE in Portland Maine. At the time of the crash, the weather was cloudy and the road surface was dry. V1 and V2 were traveling north on Riverside Street, in the left turn only lane, approaching Forest Ave. V1 was directly behind V2. The driver of V1 stated the traffic was moving forward slowly and he thought they were continuing through the intersection, but V2 stopped for a light turning red. V1 continued forward and struck V2.

Diagram



Vehicles...

Vehicle #1, operated by Joshua Carras, DOB 7/12/1980 was northbound following roadway and followed too closely. Vehicle #1 sustained functional damage to the front.

Vehicle #1 occupant(s) are listed...

Unit: 1 Type: 2 - (Sport) Utility Vehicle

Most Damaged Area: 12 - Front

Pre-Crash Actions: 1 - Following roadway

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 14 - Followed Too Closely

Veh. Travel Dir.: 1 - Northbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	32	1 - Male	5 - No Injury

Unit: 2 Type: 17 - Medium/Heavy Trucks (More than 10,000 lbs)

Most Damaged Area:

Pre-Crash Actions: 10 - Slowing in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 1 - Northbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	35	1 - Male	5 - No Injury

STATE OF MAINE CRASH REPORT

Report Number

12-002242

Narrative / Diagram Supplemental

On Monday, September 10, 2012 at 13:57:00, Officer Alissa Poisson responded to a crash at the intersection of RIVERSIDE ST and FOREST AVE in Portland Maine. At the time of the crash, the weather was cloudy and the road surface was dry. V1 and V2 were traveling north on Riverside Street, in the left turn only lane , approaching Forest Ave. V1 was directly behind V2. The driver of V1 stated the traffic was moving forward slowly and he thought they were continuing through the intersection, but V2 stopped for a light turning red. V1 continued forward and struck V2.

Vehicles...

Vehicle #1, operated by Joshua Carras, DOB 7/12/1980 was northbound following roadway and followed too closely. Vehicle #1 sustained functional damage to the front.

Vehicle #1 occupant(s) are listed below:

Driver: Joshua Carras DOB 7/12/1980 Injury: No Injury

Vehicle #2, operated by James Sadolsky, DOB 8/25/1977 was northbound slowing in traffic. Vehicle #2 had no observable damage. V2 is a trailer, being towed by Nebraska Apportioned 136091

Vehicle #2 occupant(s) are listed below:

Driver: James Sadolsky DOB 8/25/1977 Injury: No Injury

Crash Date: 10/16/2012 Time: 10:43 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 2 - Cloudy Light: 1 - Daylight
 Road Grade: 2 - On Grade Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2 1 - None

Narrative

V1 STOPPED IN TRAFFIC ON FOREST AV INBOUND. V2 DRIVER WAS DISTRACTED BY LOOKING AHEAD/ AROUND V1. V1 DRIVER STATED SHE " HIT THE GAS INSTEAD OF THE BRAKE PEDAL". V2 STRUCK V1. NO INJURIES.

Diagram



Unit: 1 Type: 3 - Passenger Van Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 6 - Rear Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 11 - Stopped in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 50 - No Other Events Seq. Events 2: 50 - No Other Events
 Seq. Events 3: 50 - No Other Events Seq. Events 4: 50 - No Other Events
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	52	1 - Male	5 - No Injury

Unit: 2 Type: 1 - Passenger Car Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 12 - Front Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 8 - Starting from parked Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 50 - No Other Events Seq. Events 2: 50 - No Other Events
 Seq. Events 3: 50 - No Other Events Seq. Events 4: 50 - No Other Events
 Driver Distracted By: 5 - External Distraction (outside the vehicle) Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 19 - Other Contributing Action Driver Action 2: 19 - Other Contributing Action

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	69	2 - Female	5 - No Injury

Crash Date: 10/17/2012 Time: 11:51 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 4 - Intersection Movement	Type of Location: 4 - Four Leg Intersection
Weather: 1 - Clear	Light: 1 - Daylight
Road Grade: 1 - Level	Surface Condition: 1 - Dry
Traffic Control: 8 - Officer, Flagman, School Patrol	
Cont. Circ. Env 1 1 - None	Cont. Circ. Env 2
Cont. Circ. Road 1 1 - None	Cont. Circ. Road 2

Narrative

Unit 1 was allowed to proceed by Officer into intersection. Unit 2 observed a green light and proceeded into intersection against officer direction. Driver of unit 2 stated that he did not see officer. Vehicles collided in road way. Officer was in roadway in full duty gear and traffic vest. Independent witness to the accident stated that she saw the light turn green and unit 2 proceed and unit 1 approaching from the west. Unit 2 was heading north.

Diagram



Unit: 1	Type: 3 - Passenger Van	Veh. Travel Dir.: 1 - Northbound
Most Damaged Area: 1 - Front Passenger Corner		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 1 - Following roadway		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 1 - No Contributing Action		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	64	1 - Male	5 - No Injury

Unit: 2	Type: 1 - Passenger Car	Veh. Travel Dir.: 4 - Westbound
Most Damaged Area: 11 - Front Driver Corner		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 1 - Following roadway		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 5 - External Distraction (outside the vehicle)		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 3 - Failed to Yield Right-of-Way		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	23	1 - Male	5 - No Injury

Crash Date: 11/6/2012 Time: 13:06 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

V2 WAS STOPPED IN THE LEFT ONLY LANE ON RIVERSIDE AT THE INTERSECTION WITH FOREST. V1 WAS TO THE REAR OF V2 AND ALSO STOPPED. V1 MOVED FORWARD FOR UNKNOWN REASONS AND MADE CONTACT WITH V2, CAUSING DAMAGE. OPERATOR OF V1 STATED THAT THE CAR LURCHED FORWARD DUE TO AN UNKNOWN MECHANICAL MALFUNCTION. SHE ALSO STATED THAT THE CAR WAS 'LOCKED' OR 'FROZEN' DUE TO AN APPARENT ELECTRICAL MALFUNCTION AFTER THE CRASH. A AAA TOW TRUCK WAS SUMMONED TO TOW THE VEHICLE.

Diagram



Unit: 1 Type: 2 - (Sport) Utility Vehicle

Most Damaged Area: 12 - Front

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 14 - Followed Too Closely

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 6 - Power Train

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	51	2 - Female	5 - No Injury
2 - Passenger	4	1 - Male	5 - No Injury
2 - Passenger	3	2 - Female	5 - No Injury

Unit: 2 Type: 1 - Passenger Car

Most Damaged Area: 6 - Rear

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	47	1 - Male	5 - No Injury
2 - Passenger	69	2 - Female	4 - Possible Injury
2 - Passenger	52	2 - Female	4 - Possible Injury

Crash Date: 11/25/2012 Time: 12:15 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2 1 - None

Narrative

V1 STOPPED AT RED LIGHT AT FOREST AVE AND RIVERSIDE ST.
 V2 DRIVER THOUGHT V1 HAD PULLED FORWARD TO TAKE A
 RIGHT ON RED. V2 DRIVER TURNED TO HIS LEFT AND PULLED
 FORWARD. V2 STRUCK V1. NO INJURIES.

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 6 - Rear Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 11 - Stopped in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 50 - No Other Events Seq. Events 2: 50 - No Other Events
 Seq. Events 3: 50 - No Other Events Seq. Events 4: 50 - No Other Events
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	45	2 - Female	5 - No Injury

Unit: 2 Type: 1 - Passenger Car Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 1 - Front Passenger Corner Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 8 - Starting from parked Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 50 - No Other Events Seq. Events 2: 50 - No Other Events
 Seq. Events 3: 50 - No Other Events Seq. Events 4: 50 - No Other Events
 Driver Distracted By: 5 - External Distraction (outside the vehicle) Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 19 - Other Contributing Action Driver Action 2: 19 - Other Contributing Action

Person Type	Age	Sex	Injury Degree
1 - Driver	23	1 - Male	5 - No Injury

Crash Date: 12/11/2012 Time: 20:19 City: Portland Street/Highway: Riverside Street
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 4 - Dark - Lighted
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2 1 - None

Narrative

VEHICLE 2 WAS SLOWING TO COME TO A STOP AT A RED LIGHT LOCATED AT RIVERSIDE ST. AND FOREST AVE. HEADED NORTHBOUND. VEHICLE 2 WAS SLOWING DOWN TOWARDS THE RED LIGHT BUT NOT STOPPED COMPLETELY. VEHICLE 2 WAS IN THE LEFT HAND TURN ONLY LANE ON RIVERSIDE STREET. AT THIS TIME VEHICLE 1 REAR ENDED VEHICLE 2. THE OPERATOR OF VEHICLE 1 STATED SHE WAS FOLLOWING VEHICLE 2 TO CLOSELY. SHE ALSO SAYS HER VEHICLE SURGES AFTER SHE LETS OFF THE BREAKS. THE OPERATOR OF VEHICLE 1 STATED THE VEHICLE SURGED AFTER SHE WAS SLOWING DOWN AND HIT VEHICLE 2.

MWR 12-11-2012

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 1 - Northbound
 Most Damaged Area: 12 - Front Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 1 - Following roadway Contrib Circ. - Vehicle: 2 - Brakes
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 14 - Followed Too Closely Driver Action 2: 1 - No Contributing Action

Person Type	Age	Sex	Injury Degree
1 - Driver	22	2 - Female	5 - No Injury

Unit: 2 Type: 1 - Passenger Car Veh. Travel Dir.: 1 - Northbound
 Most Damaged Area: 6 - Rear Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 10 - Slowing in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	50	2 - Female	5 - No Injury

Crash Date: 12/17/2012 Time: 12:25 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe

Type of Location: 4 - Four Leg Intersection

Weather: 6 - Snow

Light: 1 - Daylight

Road Grade: 2 - On Grade

Surface Condition: 4 - Slush

Traffic Control: 1 - Traffic Signals (Stop & Go)

Cont. Circ. Env 1 1 - None

Cont. Circ. Env 2

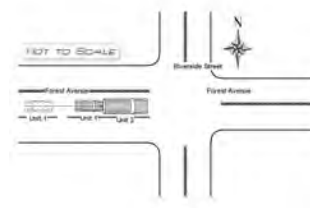
Cont. Circ. Road 1 1 - None

Cont. Circ. Road 2 1 - None

Narrative

Unit 1 and Unit 2 were traveling East on Forest Avenue, with Unit 1 following Unit 2. Unit 2 came to a stop at the red traffic light at the intersection of Forest Avenue and Riverside Street, in the straight lane and Unit 1 came to a stop behind Unit 2. The operator of Unit 1 stated that when he saw traffic in the lane to the right of him moving forward, he was not paying attention and he began driving forward. Unit 1 rear-ended Unit 2, causing no visible damage to Unit 2 and minor damage to the front of Unit 1. The driver of Unit 2 stated that she had head pain and was not sure if it was from the accident or from the stress of the operator of Unit 1 yelling at her. She refused medical attention. Both units were driven from the scene.

Diagram



Unit: 1 Type: 1 - Passenger Car

Most Damaged Area: 12 - Front

Pre-Crash Actions: 9 - Starting in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 5 - External Distraction (outside the vehicle)

Driver Action 1: 14 - Followed Too Closely

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4:

Cond. at Time Crash: 3 - Emotional(Depressed, Angry, Disturbed, etc.)

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	49	1 - Male	5 - No Injury

Unit: 2 Type: 2 - (Sport) Utility Vehicle

Most Damaged Area:

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	49	2 - Female	4 - Possible Injury

Crash Date: 12/23/2012 Time: 17:45 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 4 - Dark - Lighted
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

V1 WAS ATTEMPTING TO TURN LEFT ONTO FOREST AVENUE FROM RIVERSIDE STREET AT THE FOREST AVENUE/RIVERSIDE STREET INTERSECTION. V1 WAS IN LEFT TURN ONLY ON RIVERSIDE STREET NEAR THE 820 BLOCK.

V1 DRIVER STATES THE LIGHT TURNED GREEN, THE VEHICLE IN FRONT OF HIM DID NOT PROCEED. WHILE WAITING FOR THE VEHICLE TO PROCEED, V2 STRUCK V1 IN THE REAR BUMPER.

V2 DRIVER STATED SHE SAW THE LIGHT TURN GREEN AND V1'S BRAKE LIGHTS TURN OFF. AT THIS TIME SHE PROCEEDED TO DRIVE FORWARD, STRIKING V1 IN THE REAR BUMPER.

V1 SUSTAINED MINOR DAMAGE TO THE REAR BUMPER. V2 SUSTAINED NO DAMAGE. NO INJURIES.

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 2 - Southbound
 Most Damaged Area: 6 - Rear Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 10 - Slowing in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	37	1 - Male	5 - No Injury

Unit: 2 Type: 2 - (Sport) Utility Vehicle Veh. Travel Dir.: 2 - Southbound
 Most Damaged Area: Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 10 - Slowing in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 14 - Followed Too Closely Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	23	2 - Female	5 - No Injury

Crash Date: 12/26/2012 Time: 17:31 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 5 - Pedestrians Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 4 - Dark - Lighted
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

ON WEDNESDAY, 12-26-12 AT 1731 HOURS, OFCS WERE DISPATCHED TO THE INTERSECTION OF FOREST AVE AND RIVERSIDE ST FOR A REPORT OF A CAR VS PEDESTRIAN ACCIDENT. ON ARRIVAL I LOCATED V1 BUT THE PEDESTRIAN COULD NOT BE LOCATED. OFCS SEARCHED THE AREA AND DID NOT LOCATE THE PEDESTRIAN AND THE PEDESTRIAN DID NOT CALL POLICE OR MAKE HIMSELF KNOWN.

THE DRIVER OF V1 WAS STOPPED AT THE REDLIGHT HEADING NORTH ON RIVERSIDE ST. AS THE LIGHT TURNED GREEN V1 BEGAN ACCELERATING AND HEARD A BANG/THUMP ON THE SIDE OF HER CAR. SHE STOPPED AT THE 7-11 ON THE OTHER SIDE OF THE INTERSECTION AND SAW A MALE WALK FROM THE ROAD TO THE CORNER (SOUTHEAST). SHE CALLED TO THE MALE WHO STATED HE WAS FINE. SHE ASKED HIM IF HE NEEDED MEDICAL ATTENTION AND HE SAID NO, AND CONTINUED WALKING AWAY AND MADE NO ATTEMPTS TO...

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 1 - Northbound
 Most Damaged Area: Most Harmful Event: 9 - Pedestrian
 Pre-Crash Actions: 9 - Starting in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 17 - Pedestrian Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	52	2 - Female	5 - No Injury

Unit: 50 Type: 22 - Pedestrian Veh. Travel Dir.:
 Most Damaged Area: Most Harmful Event:
 Pre-Crash Actions: Contrib Circ. - Vehicle:
 Seq. Events 1: Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: Cond. at Time Crash:
 Driver Action 1: Driver Action 2:

Person Type	Age	Sex	Injury Degree
3 - Pedestrian	48	1 - Male	4 - Possible Injury

STATE OF MAINE CRASH REPORT

Report Number

12-003327

Narrative / Diagram Supplemental

ON WEDNESDAY, 12-26-12 AT 1731 HOURS, OFCS WERE DISPATCHED TO THE INTERSECTION OF FOREST AVE AND RIVERSIDE ST FOR A REPORT OF A CAR VS PEDESTRIAN ACCIDENT. ON ARRIVAL I LOCATED V1 BUT THE PEDESTRIAN COULD NOT BE LOCATED. OFCS SEARCHED THE AREA AND DID NOT LOCATE THE PEDESTRIAN AND THE PEDESTRIAN DID NOT CALL POLICE OR MAKE HIMSELF KNOWN.

THE DRIVER OF V1 WAS STOPPED AT THE REDLIGHT HEADING NORTH ON RIVERSIDE ST. AS THE LIGHT TURNED GREEN V1 BEGAN ACCELERATING AND HEARD A BANG/THUMP ON THE SIDE OF HER CAR. SHE STOPPED AT THE 7-11 ON THE OTHER SIDE OF THE INTERSECTION AND SAW A MALE WALK FROM THE ROAD TO THE CORNER (SOUTHEAST). SHE CALLED TO THE MALE WHO STATED HE WAS FINE. SHE ASKED HIM IF HE NEEDED MEDICAL ATTENTION AND HE SAID NO, AND CONTINUED WALKING AWAY AND MADE NO ATTEMPTS TO STOP. THIS MALE WAS PRESUMED TO BE THE PEDESTRIAN THAT WAS INVOLVED THAT OFCS COULD NOT LOCATE AT THE TIME.

ON FRIDAY, 12-28-12 A MALE CALLED TO REQUEST A REPORT BE DONE FOR THIS ACCIDENT. THE MALE IDENTIFIED HIMSELF AS THE PEDESTRIAN INVOLVED AND HAD GONE TO THE HOSPITAL TO BE TREATED FOR A CONCUSSION FROM THIS INCIDENT.

I SPOKE TO THE MALE INQUIRING HIS RECOLLECTION OF THE EVENTS. THE MALE CLAIMED THAT THE LIGHTS WERE ALL RED FOR THE VEHICLES ON RIVERSIDE ST. HE PROCEEDED TO CROSS RIVERSIDE FROM WEST TO EAST. HE THEN IMPLIED THAT V1 RAN THE REDLIGHT AND STRUCK HIM, CAUSING HIM TO FLY INTO THE AIR. HE THEN FELL TO THE GROUND HITTING HIS HEAD AND WAS ALMOST RUN OVER BY ANOTHER VEHICLE. HE THEN GOT UP AND DID NOT REMEMBER ANYTHING THAT HAPPENED UNTIL HE WALKED TO THE BUS STOP BY RIVERTON PARK AND GOT ON THE BUS. P1 ADMITTED THAT HE SAW OFCS AT THE SCENE AND DID NOT MAKE HIMSELF KNOWN PRIOR TO GETTING ON THE BUS AND LEAVING THE AREA. I ASKED HIM WHY HE LEFT AND HE SAID THAT HE WAS IN SHOCK AND NEEDED TO GO TO THE HOSPITAL. P1 ALSO CLAIMED THAT HE HEARD AND FELT THE THE SIDE MIRROR OF V1 BREAK WHEN V1 STRUCK HIM. I DID NOT OBSERVE ANY DAMAGE TO V1, AND THE SIDE MIRROR WAS NOT BROKEN. P1 THEN STATED THAT HE NEEDED V1 INSURANCE INFORMATION BECAUSE "SOMEBODY NEEDS TO PAY FOR MY MEDICAL BILLS." WHEN I INFORMED HIM THAT THERE WAS NO DAMAGE TO V1 AS HE CLAIMED, AND THAT HE CROSSED WHEN V1 HAD A GREEN LIGHT AND WAS AT FAULT, P1 RESPONDED WITH "I'M GONNA GET A LAWYER."

NO OTHER CARS STOPPED TO CHECK THE WELL BEING FROM THE ACCIDENT OR CALL 911, TO INCLUDE THE SUPPOSED CAR THAT NEARLY RAN OVER P1, DESPITE THE FACT THAT THIS OCCURRED AT A BUSY INTERSECTION DURING RUSH HOUR TRAFFIC.

BASED ON SPEAKING WITH THE DRIVER OF V1 AND THE CLAIMS MADE BY P1, P1 CROSSED RIVERSIDE ST AGAINST THE CROSSING SIGNAL. AS THE LIGHT TURNED GREEN FOR V1, P1 ATTEMPTED TO STOP AND SLIPPED AND FELL INTO THE SIDE OF V1.

Crash Date: 3/19/2013 Time: 06:50 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 6 - Snow Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 3 - Snow
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 2 - Weather Conditions Cont. Circ. Env 2
 Cont. Circ. Road 1 2 - Road Surface Condition (Wet, Icy, Snow, Slush, etc.) Cont. Circ. Road 2

Narrative

V2 WAS ON FOREST AVENUE [SOUTH] AND STOPPED AT THE INTERSECTION [RED LIGHT] WITH RIVERSIDE STREET. V1 WAS ALSO TRAVELING SOUTH ON FOREST AVENUE AND APPROACHING V2 FROM BEHIND. V1 ATTEMPTED TO STOP, SLID IN THE SLIPPERY ROAD CONDITIONS AND MADE CONTACT WITH V2. BOTH VEHICLES SUSTAINED DAMAGE.

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 2 - Southbound
 Most Damaged Area: 1 - Front Passenger Corner Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 10 - Slowing in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 9 - Drove Too Fast For Conditions Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	29	1 - Male	5 - No Injury

Unit: 2 Type: 1 - Passenger Car Veh. Travel Dir.: 2 - Southbound
 Most Damaged Area: 7 - Rear Driver Side Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 11 - Stopped in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	38	1 - Male	5 - No Injury

Crash Date: 4/29/2013 Time: 08:12 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

U2 was traveling east on Riverside St. U1 was behind U2. U2 came to a stop at the intersection of Riverside St and Forest Ave. U1 also stopped behind U2. In front of U2 was a third vehicle. All three vehicles were stopped at the red light. When the light turned green, the front vehicle went forward and then stalled out, stopping in the process. U2 quickly stopped in order to avoid crashing into the third vehicle. U1, due to the trucks weight and size, could not stop as fast and crashed into the rear of U2. The third vehicle left the scene, possibly not knowing his actions caused an accident. U2 has significant damage to its rear. The truck was pushed in and the fenders were also pushed out. U1 has no visible damage.

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 6 - Rear Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 9 - Starting in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2: 50 - No Other Events
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 17 - Swerved or Avoided Due to Wind, Slippery Surface. Motor Vehicle. Object. Non-Motorist in Driver Action 2: 1 - No Contributing Action

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	26	2 - Female	5 - No Injury

Unit: 2 Type: 17 - Medium/Heavy Trucks (More than 10,000 lbs) Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 9 - Starting in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2: 50 - No Other Events
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 17 - Swerved or Avoided Due to Wind, Slippery Surface. Motor Vehicle. Object. Non-Motorist in Driver Action 2: 1 - No Contributing Action

Person Type	Age	Sex	Injury Degree
1 - Driver	45	1 - Male	5 - No Injury

Crash Date: 5/3/2013

Time: 08:42

City: Portland

Street/Highway: FOREST AV

Start Node: 16892

Int of FOREST AV RIVERSIDE ST

End Node: 0

Offset: 0

OE Start Node: 16892

Int of FOREST AV RIVERSIDE ST

OE End Node: 16893

TL Portland Westbrook

Type of Crash: 2 - Rear End / Sideswipe

Type of Location: 4 - Four Leg Intersection

Weather: 1 - Clear

Light: 1 - Daylight

Road Grade: 2 - On Grade

Surface Condition: 1 - Dry

Traffic Control: 13 - None

Cont. Circ. Env 1 1 - None

Cont. Circ. Env 2

Cont. Circ. Road 1 1 - None

Cont. Circ. Road 2 1 - None

Narrative

Diagram

VEHICLE TWO (SCHOOL BUS) WAS STOPPED IN TRAFFIC ON FOREST AVE NEAR THE INTERSECTION WITH RIVERSIDE ST, WHEN VEHICLE ONE WHO BELIEVED THAT THE BUS WAS STARTING TO MOVE STRUCK THE BACKEND OF THE BUS.

VEHICLE ONE HAD FUNCTIONAL DAMAGE TO THE FRONT END AND WAS TOWED BY AAA.

VEHICLE TWO HAD NO OBSERVABLE DAMAGE.

NO INJURIES WERE REPORTED AT THE SCENE.



Unit: 1 Type: 1 - Passenger Car

Most Damaged Area: 12 - Front

Pre-Crash Actions: 1 - Following roadway

Seq. Events 1: 50 - No Other Events

Seq. Events 3: 50 - No Other Events

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 14 - Followed Too Closely

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 39 - Unknown

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4: 50 - No Other Events

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2: 1 - No Contributing Action

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	59	1 - Male	5 - No Injury

Unit: 2 Type: 7 - School Bus

Most Damaged Area:

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 50 - No Other Events

Seq. Events 3: 50 - No Other Events

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 39 - Unknown

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4: 50 - No Other Events

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	54	1 - Male	5 - No Injury
2 - Passenger	50	1 - Male	5 - No Injury
2 - Passenger	15	1 - Male	5 - No Injury
2 - Passenger	17	1 - Male	5 - No Injury
2 - Passenger	17	1 - Male	5 - No Injury
2 - Passenger	16	2 - Female	5 - No Injury
2 - Passenger	15	1 - Male	5 - No Injury
2 - Passenger	17	1 - Male	5 - No Injury

Crash Date: 5/27/2013 Time: 13:08 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2 1 - None

Narrative

V1 STOPPED ON FOREST AVE AT RIVERSIDE ST. V2 TRAVELLING BEHIND V1. V2 OBSERVED LIGHT TURN GREEN AND "THOUGHT" V1 WAS MOVING. V2 STRUCK V1.
 NO INJURIES.

Diagram



Unit: 1 Type: 1 - Passenger Car Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 6 - Rear Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 11 - Stopped in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 50 - No Other Events Seq. Events 2: 50 - No Other Events
 Seq. Events 3: 50 - No Other Events Seq. Events 4: 50 - No Other Events
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	40	2 - Female	5 - No Injury

Unit: 2 Type: 1 - Passenger Car Veh. Travel Dir.: 3 - Eastbound
 Most Damaged Area: 12 - Front Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 8 - Starting from parked Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 50 - No Other Events Seq. Events 2: 50 - No Other Events
 Seq. Events 3: 50 - No Other Events Seq. Events 4: 50 - No Other Events
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 19 - Other Contributing Action Driver Action 2: 19 - Other Contributing Action

Person Type	Age	Sex	Injury Degree
1 - Driver	34	1 - Male	5 - No Injury

Crash Date: 7/16/2013 Time: 07:26 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

VEH 1 WAS SB ON FOREST STOPPED IN TRAFFIC IN MIDDLE LANE. VEH 2 WAS BEHIND VEH 1 AND CHANGED LANES TO GO INTO TURNING LANE. VEH 2 MISJUDGED AND SIDESWIPE VEH 1 FROM BEHIND.

amp

Diagram



Unit: 1 Type: 2 - (Sport) Utility Vehicle Veh. Travel Dir.: 2 - Southbound
 Most Damaged Area: 8 - Rear Driver Quarter Panel Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 11 - Stopped in traffic Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 1 - No Contributing Action Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	42	2 - Female	5 - No Injury

Unit: 2 Type: 1 - Passenger Car Veh. Travel Dir.: 2 - Southbound
 Most Damaged Area: 3 - Center Passenger Side Most Harmful Event: 13 - Motor Vehicle in Transport
 Pre-Crash Actions: 17 - Changing Lanes Contrib Circ. - Vehicle: 1 - None
 Seq. Events 1: 21 - Motor Vehicle In Transport Seq. Events 2:
 Seq. Events 3: Seq. Events 4:
 Driver Distracted By: 1 - Not Distracted Cond. at Time Crash: 1 - Apparently Normal
 Driver Action 1: 12 - Improper Passing Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	83	2 - Female	5 - No Injury

Crash Date: 7/25/2013 Time: 12:22 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe	Type of Location: 4 - Four Leg Intersection
Weather: 2 - Cloudy	Light: 1 - Daylight
Road Grade: 1 - Level	Surface Condition: 1 - Dry
Traffic Control: 1 - Traffic Signals (Stop & Go)	
Cont. Circ. Env 1 1 - None	Cont. Circ. Env 2
Cont. Circ. Road 1 1 - None	Cont. Circ. Road 2 1 - None

Narrative

Vehicle One was traveling south on Riverside St towards the intersection with Forest Ave, when it failed to observe traffic stopped in front of it. Vehicle Three was in front stopped for traffic in front of it, Vehicle Two was stopped behind Vehicle Three, when Vehicle One struck Vehicle Two which was then pushed into Vehicle Three.

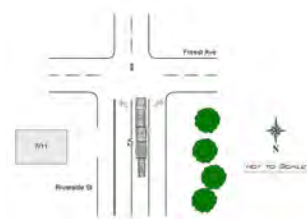
Vehicle One had major front end damage and was towed by "Southern Towing"

Vehicle Two had minor front and rear damage

Vehicle Three had minor rear end damage

No injuries were reported at the scene.

Diagram



Unit: 1

Type: 1 - Passenger Car

Most Damaged Area: 12 - Front

Pre-Crash Actions: 1 - Following roadway

Seq. Events 1: 50 - No Other Events

Seq. Events 3: 50 - No Other Events

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 14 - Followed Too Closely

Veh. Travel Dir.: 2 - Southbound

Most Harmful Event: 39 - Unknown

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4: 50 - No Other Events

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2: 1 - No Contributing Action

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	37	1 - Male	5 - No Injury

Unit: 2

Type: 5 - Pickup

Most Damaged Area: 6 - Rear

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 50 - No Other Events

Seq. Events 3: 50 - No Other Events

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 2 - Southbound

Most Harmful Event: 39 - Unknown

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4: 50 - No Other Events

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	39	1 - Male	5 - No Injury

Unit: 3

Type: 2 - (Sport) Utility Vehicle

Most Damaged Area: 6 - Rear

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 50 - No Other Events

Seq. Events 3: 50 - No Other Events

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 2 - Southbound

Most Harmful Event: 39 - Unknown

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 50 - No Other Events

Seq. Events 4: 50 - No Other Events

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type

Age

Sex

Injury Degree

Maine Crash Report Summary

6 - Driver/Owner	45	1 - Male	5 - No Injury
2 - Passenger	47	2 - Female	5 - No Injury

Crash Date: 8/14/2013 Time: 17:10 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node: 16893 TL Portland Westbrook

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 1 - Clear Light: 1 - Daylight
 Road Grade: 1 - Level Surface Condition: 1 - Dry
 Traffic Control: 1 - Traffic Signals (Stop & Go)
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2

Narrative

Vehicle 1 was stopped in traffic. Vehicle 2 was slowing in traffic but the operator looked down to pick up her beverage and struck vehicle 1 from behind.

Diagram

**Unit: 1** Type: 2 - (Sport) Utility Vehicle

Most Damaged Area: 6 - Rear

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 2 - Southbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	23	2 - Female	5 - No Injury
2 - Passenger	23	2 - Female	5 - No Injury

Unit: 2 Type: 1 - Passenger Car

Most Damaged Area: 12 - Front

Pre-Crash Actions: 10 - Slowing in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3:

Driver Distracted By: 4 - Other Inside the Vehicle (Eating, Reading, Grooming, Smoking, Passengers, etc.)

Driver Action 1: 19 - Other Contributing Action

Veh. Travel Dir.: 2 - Southbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2:

Seq. Events 4:

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	33	2 - Female	5 - No Injury

Crash Date: 9/3/2013

Time: 18:04

City: Portland

Street/Highway: RIVERSIDE ST

Start Node: 16892

Int of FOREST AV RIVERSIDE ST

End Node: 0

Offset: 0

OE Start Node: 16892

Int of FOREST AV RIVERSIDE ST

OE End Node:

Type of Crash: 2 - Rear End / Sideswipe

Type of Location: 4 - Four Leg Intersection

Weather: 2 - Cloudy

Light: 3 - Dusk

Road Grade: 1 - Level

Surface Condition: 2 - Wet

Traffic Control: 1 - Traffic Signals (Stop & Go)

Cont. Circ. Env 1 1 - None

Cont. Circ. Env 2

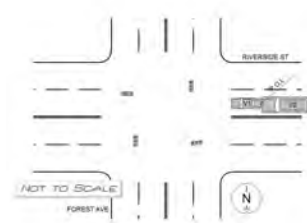
Cont. Circ. Road 1 1 - None

Cont. Circ. Road 2 1 - None

Narrative

V1 WAS STOPPED AT A RED LIGHT. V2 MOVED FORWARD DID NOT REALIZE THAT V1 WAS STOPPED FOR THE RED LIGHT AND HIT V1 IN THE REAR END. V1 AND V2 HAD MINOR DAMAGE AND WERE ABLE TO DRIVE AWAY.

Diagram



Unit: 1 Type: 1 - Passenger Car

Most Damaged Area: 6 - Rear

Pre-Crash Actions: 11 - Stopped in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3: 50 - No Other Events

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 1 - No Contributing Action

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 7 - Separation of Units

Seq. Events 4: 50 - No Other Events

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	16	1 - Male	5 - No Injury

Unit: 2 Type: 2 - (Sport) Utility Vehicle

Most Damaged Area: 12 - Front

Pre-Crash Actions: 9 - Starting in traffic

Seq. Events 1: 21 - Motor Vehicle In Transport

Seq. Events 3: 50 - No Other Events

Driver Distracted By: 1 - Not Distracted

Driver Action 1: 14 - Followed Too Closely

Veh. Travel Dir.: 3 - Eastbound

Most Harmful Event: 13 - Motor Vehicle in Transport

Contrib Circ. - Vehicle: 1 - None

Seq. Events 2: 7 - Separation of Units

Seq. Events 4: 50 - No Other Events

Cond. at Time Crash: 1 - Apparently Normal

Driver Action 2: 1 - No Contributing Action

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	61	2 - Female	5 - No Injury

Crash Date: 9/26/2013 Time: 15:13 City: Portland Street/Highway: FOREST AV
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node: 16893 TL Portland Westbrook

Type of Crash: 2 - Rear End / Sideswipe Type of Location: 4 - Four Leg Intersection
 Weather: 2 - Cloudy Light: 1 - Daylight
 Road Grade: 2 - On Grade Surface Condition: 1 - Dry
 Traffic Control: 13 - None
 Cont. Circ. Env 1 1 - None Cont. Circ. Env 2
 Cont. Circ. Road 1 1 - None Cont. Circ. Road 2 1 - None

Narrative

VEHICLE ONE, TWO AND THREE WERE ALL TRAVELING EAST ON FOREST AVE HEADING TOWARDS THE INTERSECTION OF RIVERSIDE ST AND FOREST AVE.

VEHICLE THREE WAS THE LEAD CAR STOPPED IN TRAFFIC WITH VEHICLE TWO BEHIND IT, ALSO STOPPED IN TRAFFIC. VEHICLE ONE THEN STRUCK VEHICLE TWO, WHICH WAS THEN PUSHED INTO VEHICLE THREE.

VEHICLE ONE HAD MINOR DAMAGE TO THE FRONT BUMPER/HOOD AREA.

VEHICLE TWO HAD MINOR DAMAGE TO THE REAR BUMPER WITH FUNCTIONAL DAMAGE TO THE FRONT BUMPER/HOOD.

VEHICLE THREE HAD MINOR DAMAGE TO THE REAR...

Diagram



Unit: 1	Type: 1 - Passenger Car	Veh. Travel Dir.: 3 - Eastbound
Most Damaged Area: 12 - Front		Most Harmful Event: 39 - Unknown
Pre-Crash Actions: 1 - Following roadway		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 50 - No Other Events		Seq. Events 2: 50 - No Other Events
Seq. Events 3: 50 - No Other Events		Seq. Events 4: 50 - No Other Events
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 14 - Followed Too Closely		Driver Action 2: 1 - No Contributing Action

Person Type	Age	Sex	Injury Degree
1 - Driver	77	2 - Female	5 - No Injury

Unit: 2	Type: 1 - Passenger Car	Veh. Travel Dir.: 3 - Eastbound
Most Damaged Area: 12 - Front		Most Harmful Event: 39 - Unknown
Pre-Crash Actions: 11 - Stopped in traffic		Contrib Circ. - Vehicle: 2 - Brakes
Seq. Events 1: 50 - No Other Events		Seq. Events 2: 50 - No Other Events
Seq. Events 3: 50 - No Other Events		Seq. Events 4: 50 - No Other Events
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 1 - No Contributing Action		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	63	1 - Male	5 - No Injury

Unit: 3	Type: 2 - (Sport) Utility Vehicle	Veh. Travel Dir.: 3 - Eastbound
Most Damaged Area: 6 - Rear		Most Harmful Event: 39 - Unknown
Pre-Crash Actions: 11 - Stopped in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 50 - No Other Events		Seq. Events 2: 50 - No Other Events
Seq. Events 3: 50 - No Other Events		Seq. Events 4: 50 - No Other Events
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 1 - No Contributing Action		Driver Action 2:

Person Type	Age	Sex	Injury Degree

Maine Crash Report Summary

1 - Driver	74	1 - Male	5 - No Injury
2 - Passenger	66	2 - Female	5 - No Injury

STATE OF MAINE CRASH REPORT

Report Number

13-2724

Narrative / Diagram Supplemental

VEHICLE ONE, TWO AND THREE WERE ALL TRAVELING EAST ON FOREST AVE HEADING TOWARDS THE INTERSECTION OF RIVERSIDE ST AND FOREST AVE.

VEHICLE THREE WAS THE LEAD CAR STOPPED IN TRAFFIC WITH VEHICLE TWO BEHIND IT, ALSO STOPPED IN TRAFFIC. VEHICLE ONE THEN STRUCK VEHICLE TWO, WHICH WAS THEN PUSHED INTO VEHICLE THREE.

VEHICLE ONE HAD MINOR DAMAGE TO THE FRONT BUMPER/HOOD AREA.

VEHICLE TWO HAD MINOR DAMAGE TO THE REAR BUMPER WITH FUNCTIONAL DAMAGE TO THE FRONT BUMPER/HOOD.

VEHICLE THREE HAD MINOR DAMAGE TO THE REAR BUMPER.

NO INJURIES WERE REPORTED AT THE SCENE.

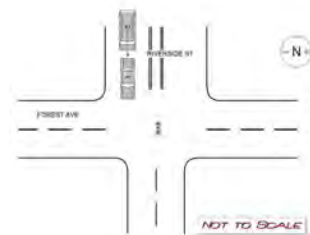
Crash Date: 10/21/2013 Time: 12:01 City: Portland Street/Highway: RIVERSIDE ST
 Start Node: 16892 Int of FOREST AV RIVERSIDE ST End Node: 0 Offset: 0
 OE Start Node: 16892 Int of FOREST AV RIVERSIDE ST OE End Node:

Type of Crash: 2 - Rear End / Sideswipe	Type of Location: 4 - Four Leg Intersection
Weather: 1 - Clear	Light: 1 - Daylight
Road Grade: 1 - Level	Surface Condition: 1 - Dry
Traffic Control: 1 - Traffic Signals (Stop & Go)	
Cont. Circ. Env 1 1 - None	Cont. Circ. Env 2
Cont. Circ. Road 1 1 - None	Cont. Circ. Road 2

Narrative

VEH 2 REAR ENDED VEH 1 WHO WAS STOPPED IN TRAFFIC.

Diagram



Unit: 1	Type: 1 - Passenger Car	Veh. Travel Dir.: 3 - Eastbound
Most Damaged Area: 6 - Rear		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 11 - Stopped in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 1 - No Contributing Action		Driver Action 2:

Person Type	Age	Sex	Injury Degree
6 - Driver/Owner	34	1 - Male	5 - No Injury

Unit: 2	Type: 3 - Passenger Van	Veh. Travel Dir.: 3 - Eastbound
Most Damaged Area: 12 - Front		Most Harmful Event: 13 - Motor Vehicle in Transport
Pre-Crash Actions: 9 - Starting in traffic		Contrib Circ. - Vehicle: 1 - None
Seq. Events 1: 21 - Motor Vehicle In Transport		Seq. Events 2:
Seq. Events 3:		Seq. Events 4:
Driver Distracted By: 1 - Not Distracted		Cond. at Time Crash: 1 - Apparently Normal
Driver Action 1: 14 - Followed Too Closely		Driver Action 2:

Person Type	Age	Sex	Injury Degree
1 - Driver	60	1 - Male	5 - No Injury

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☒ Crash Summary I - Single Node ☐ Section Detail ☒ Crash Summary II ☐ 1320 Public ☐ 1320 Private ☐ 1320 Summary

REPORT DESCRIPTION

Waldron Way @ Riverside St.

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: 0560621

Start Node: 10385

Start Offset: 0

☐ Exclude First Node

End Node: 10385

End Offset: 0

☐ Exclude Last Node

Crash Summary I

Nodes														
Node	Route - MP	Node Description	U/R	Total Crashes	K	Injury A	Crashes B	Crashes C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
10385	0560621 - 1.48	Int of RIVERSIDE ST, WALDRON WY	2	0	0	0	0	0	0	0.0	5.771	0.00	0.31	0.00
												Statewide Crash Rate: 0.12		
Study Years:	3.00	NODE TOTALS:		0	0	0	0	0	0	0.0	5.771	0.00	0.31	0.00

Crash Summary II - Characteristics

Crashes by Day and Hour

	AM											Hour of Day											PM												
Day Of Week	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	Un	Tot									
SUNDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
MONDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
TUESDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
WEDNESDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
THURSDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
FRIDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
SATURDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									

Vehicle Counts by Type

Unit Type	Total	Unit Type	Total
1-Passenger Car	0	23-Bicyclist	0
2-(Sport) Utility Vehicle	0	24-Witness	0
3-Passenger Van	0	25-Other	0
4-Cargo Van (10K lbs or Less)	0	Total	0
5-Pickup	0		
6-Motor Home	0		
7-School Bus	0		
8-Transit Bus	0		
9-Motor Coach	0		
10-Other Bus	0		
11-Motorcycle	0		
12-Moped	0		
13-Low Speed Vehicle	0		
14-Autocycle	0		
15-Experimental	0		
16-Other Light Trucks (10,000 lbs or Less)	0		
17-Medium/Heavy Trucks (More than 10,000 lbs)	0		
18-ATV - (4 wheel)	0		
20-ATV - (2 wheel)	0		
21-Snowmobile	0		
22-Pedestrian	0		

Crash Summary II - Characteristics

Crashes by Driver Action at Time of Crash

Driver Action at Time of Crash	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
No Contributing Action	0	0	0	0	0	0	0
Ran Off Roadway	0	0	0	0	0	0	0
Failed to Yield Right-of-Way	0	0	0	0	0	0	0
Ran Red Light	0	0	0	0	0	0	0
Ran Stop Sign	0	0	0	0	0	0	0
Disregarded Other Traffic Sign	0	0	0	0	0	0	0
Disregarded Other Road Markings	0	0	0	0	0	0	0
Exceeded Posted Speed Limit	0	0	0	0	0	0	0
Drove Too Fast For Conditions	0	0	0	0	0	0	0
Improper Turn	0	0	0	0	0	0	0
Improper Backing	0	0	0	0	0	0	0
Improper Passing	0	0	0	0	0	0	0
Wrong Way	0	0	0	0	0	0	0
Followed Too Closely	0	0	0	0	0	0	0
Failed to Keep in Proper Lane	0	0	0	0	0	0	0
Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	0	0	0	0	0	0	0
Swerved or Avoided Due to Wind, Slippery Surface, Motor Vehicle, Object, Non-Motorist in Roadway	0	0	0	0	0	0	0
Over-Correcting/Over-Steering	0	0	0	0	0	0	0
Other Contributing Action	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Crashes by Apparent Physical Condition And Driver

Apparent Physical Condition	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
Apparently Normal	0	0	0	0	0	0	0
Physically Impaired or Handicapped	0	0	0	0	0	0	0
Emotional(Depressed, Angry, Disturbed, etc.)	0	0	0	0	0	0	0
Ill (Sick)	0	0	0	0	0	0	0
Asleep or Fatigued	0	0	0	0	0	0	0
Under the Influence of Medications/Drugs/Alcohol	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Driver Age by Unit Type

Age	Driver	Bicycle	SnowMobile	Pedestrian	ATV	Total
09-Under	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-39	0	0	0	0	0	0
40-49	0	0	0	0	0	0
50-59	0	0	0	0	0	0
60-69	0	0	0	0	0	0
70-79	0	0	0	0	0	0
80-Over	0	0	0	0	0	0
Unknown	0	0	0	0	0	0
Total	0	0	0	0	0	0

Crash Summary II - Characteristics

Most Harmful Event			
Most Harmful Event	Total	Most Harmful Event	Total
1-Overturn / Rollover	0	38-Other Fixed Object (wall, building, tunnel, etc.)	0
2-Fire / Explosion	0	39-Unknown	0
3-Immersion	0	40-Gate or Cable	0
4-Jackknife	0	41-Pressure Ridge	0
5-Cargo / Equipment Loss Or Shift	0	Total	0
6-Fell / Jumped from Motor Vehicle	0		
7-Thrown or Falling Object	0		
8-Other Non-Collision	0		
9-Pedestrian	0		
10-Pedalcycle	0		
11-Railway Vehicle - Train, Engine	0		
12-Animal	0		
13-Motor Vehicle in Transport	0		
14-Parked Motor Vehicle	0		
15-Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle	0		
16-Work Zone / Maintenance Equipment	0		
17-Other Non-Fixed Object	0		
18-Impact Attenuator / Crash Cushion	0		
19-Bridge Overhead Structure	0		
20-Bridge Pier or Support	0		
21-Bridge Rail	0		
22-Cable Barrier	0		
23-Culvert	0		
24-Curb	0		
25-Ditch	0		
26-Embankment	0		
27-Guardrail Face	0		
28-Guardrail End	0		
29-Concrete Traffic Barrier	0		
30-Other Traffic Barrier	0		
31-Tree (Standing)	0		
32-Utility Pole / Light Support	0		
33-Traffic Sign Support	0		
34-Traffic Signal Support	0		
35-Fence	0		
36-Mailbox	0		
37-Other Post Pole or Support	0		

Traffic Control Devices		
Traffic Control Device	Total	
1-Traffic Signals (Stop & Go)	0	
2-Traffic Signals (Flashing)	0	
3-Advisory/Warning Sign	0	
4-Stop Signs - All Approaches	0	
5-Stop Signs - Other	0	
6-Yield Sign	0	
7-Curve Warning Sign	0	
8-Officer, Flagman, School Patrol	0	
9-School Bus Stop Arm	0	
10-School Zone Sign	0	
11-R.R. Crossing Device	0	
12-No Passing Zone	0	
13-None	0	
14-Other	0	
Total	0	

Injury Data		
Severity Code	Injury Crashes	Number Of Injuries
K	0	
A	0	
B	0	
C	0	
PD	0	0
Total	0	0

Road Character	
Road Grade	Total
1-Level	0
2-On Grade	0
3-Top of Hill	0
4-Bottom of Hill	0
5-Other	0
Total	0

Light	
Light Condition	Total
1-Daylight	0
2-Dawn	0
3-Dusk	0
4-Dark - Lighted	0
5-Dark - Not Lighted	0
6-Dark - Unknown Lighting	0
7-Unknown	0
Total	0

Crash Summary II - Characteristics

Crashes by Year and Month

Month	2011	2012	2013	Total
JANUARY	0	0	0	0
FEBRUARY	0	0	0	0
MARCH	0	0	0	0
APRIL	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	0	0	0	0
AUGUST	0	0	0	0
SEPTEMBER	0	0	0	0
OCTOBER	0	0	0	0
NOVEMBER	0	0	0	0
DECEMBER	0	0	0	0
Total	0	0	0	0

Report is limited to the last 10 years of data.

Crash Summary II - Characteristics

Crashes by Crash Type and Type of Location

Crash Type	Straight Road	Curved Road	Three Leg Intersection	Four Leg Intersection	Five or More Leg Intersection	Driveways	Bridges	Interchanges	Other	Parking Lot	Private Way	Cross Over	Railroad Crossing	Total
Object in Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rear End / Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Head-on / Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intersection Movement	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Went Off Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All Other Animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackknife	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rollover	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fire	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submersion	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thrown or Falling Object	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Blowing Sand, Soil, Dirt												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Blowing Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Clear												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Cloudy												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Fog, Smog, Smoke												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Other												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Rain												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Severe Crosswinds												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Sleet, Hail (Freezing Rain or Drizzle)												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0

Exhibit 9

Significant Natural Features

Significant Natural Features

There are no known mapped significant natural features within the project site. However, there is an area of forested wetlands, which was identified during the initial site assessment, located in the rear of the parcel. Approximately 14,790 square feet of this wetland has been altered (filled) as a result of development at this property. The remaining 3,757 square feet will be altered during Phase 2 of construction.

The property is located within the Dole Brook Watershed. The watershed is not currently listed as an Urban Impaired Stream by the MDEP. However, the City's Public Services Department has identified this resource as an impaired water body, which may necessitate future stormwater management requirements within the watershed.

Exhibit 10

City Master Plan

City Master Plan Consistency

The Allagash Brewery is currently located in the moderate intensity industrial zone (I-M). The site is accessed from Industrial Way which intersects Riverside Street, north of Forest Avenue.

The expansion meets the current zoning requirements. In addition, the expansion will create additional jobs as Allagash Brewery's business continues to grow. This is consistent with the Portland's Comprehensive Plan as posted on the City of Portland website.

Specifically, in the Portland Industry and Commerce section of Portland's Goals and Policies for the Future, State Goal C strives "to promote an economic climate which increases job opportunities and overall economic well-being". Additionally, in the Industrial Zones section of the Future Land Use Plan, "no changes to the zone are anticipated".

Exhibit 11

Financial and Technical Capacity

Financial and Technical Capacity

The applicant for the development of this project is 50 Industrial Way, LLC. The applicant is the owner and operator of Allagash Brewing Company and is responsible for the construction of the existing facility as well as the subsequent building additions.

A letter from Bath Savings Institution is provided as evidence of financial capacity.

The applicant has retained Sebago Technics, Inc., a consulting engineering firm, to assist in the engineering, land planning and permitting of the development. Please find attached in the following section a brief history of Sebago Technics along with qualifications of some of Sebago Technics' key personnel.



Bath Savings Institution

Since 1852

June 2, 2014

City of Portland
Planning Division
389 Congress Street
Portland, ME 04101

RE: Allagash Brewing Company / 50 Industrial Way LLC

To Whom It May Concern:

Allagash Brewing has been a customer of Bath Savings Institution since June 2006. We assisted with financing the construction of the current Allagash Brewing facility at 50 Industrial Way in Portland and we are looking to assist them in their continued expansion. This letter is to underscore that Bath Savings Institution believes that 50 Industrial Way, LLC and Allagash Brewing have the financial capacity to finance the proposed expansion of the existing building at 50 Industrial Way as well as the site work.

If you have any questions regarding the financial capacity of 50 Industrial Way, LLC, to undertake the expansion of their current building please do not hesitate to give me call.

Thank you for your consideration.

Sincerely,

Geoff G. Gattis
Executive Vice President

:sjk

cc: Allagash Brewing Company

Sebago Technics, Inc.
Technical Ability

Sebago Technics has been retained to perform the civil engineering, stormwater management, and sediment and erosion control design for the proposed project. The technical phase of this project includes the preparation of a detailed grading design, taking into account hydrological considerations and stormwater management. The permitting phase of this project consists of the preparation of all state and local application packages and coordination throughout the entire review process from initial submission to final approval.

Company Background

The firm was established in 1981. The company as a whole has grown to approximately 50 professionals. The firm consists of civil/site engineers, surveyors, landscape architects, soil scientist, and other professionals. In 1986, a computer-aided design drafting (CADD) division was established to further enhance our scope of available services. Sebago Technics, Inc. provides full-range technical assistance to developers, contractors and municipalities in the areas of commercial, residential and industrial developments.

Key Personnel

Matthew W. Ek, P.L.S.

A Registered Land Surveyor, he joined the firm in 1994. His expertise in boundary and topographic surveying provides comprehensive land planning and design services to clients.

Richard L. Meek, P.E.

A licensed Professional Engineer, he joined the firm in 2002 as a design engineer. His 14 years of practice in consulting engineering firms provides the required experience to allow for effective project management.

Exhibit 12

Utility Capacity to Serve



Portland Water District

FROM SEBAGO LAKE TO CASCO BAY

July 14, 2014

Sebago Technics
75 John Roberts Road – Suite 1A
South Portland, ME 04106-6963

Attn: Richard L. Meek, P.E.
Re: Allagash Brewing Company; 50 Industrial Way, Portland
Ability to Serve with PWD Water

Dear Mr. Meek :

The Portland Water District has received your request for an Ability to Serve determination for the noted site submitted on June 10, 2014. Based on the information provided, we can confirm that the District will be able to serve the proposed project as further described in this letter.

Please note that this letter does not constitute approval of this project from the District. Please review this letter for any special conditions specified by the District and to determine the appropriate next steps to take to move your project through the submittal and approval process.

Existing Site Service

According to District records, the project site does currently have existing water service A 4-inch diameter ductile iron domestic water service line and a 6-inch diameter ductile iron fire service line, located as shown on the attached water service cards, provides water service to this site. Please refer to the "Conditions of Service" section of this letter for requirements related to the use of these services.

Water System Characteristics

According to District records, there is a 12-inch diameter ductile iron water main on the north side of Industrial Way and a public fire hydrant located adjacent to the site.

The current data from the nearest hydrant with flow test information is as follows:

Hydrant Location: Industrial Way 570' east of Riverside Street
Hydrant Number: POD-HYD01742
Last Tested: 9/27/2006
Static Pressure: 80 psi
Residual Pressure: Not Measured
Flow: 2,348 GPM

Public Fire Protection

It is not anticipated that this project will include the installation of new public hydrants to be accepted into the District water system. The decision to require new hydrants and to determine



their locations is solely that of the local fire department. It is your responsibility to contact the Portland Fire Department to ensure that this project is adequately served by existing and/or proposed hydrants.

Domestic Water Needs

The data noted above indicates there should be adequate pressure and volume of water to serve the domestic water needs of the proposed facility expansion. Based on the high water pressure in this area, we recommend that you consider the installation of pressure reducing devices that comply with state plumbing codes.

Private Fire Protection Water Needs

You have indicated that this project will require water service to provide private fire protection to the site. Please note that the District does not guarantee any quantity of water or pressure through a fire protection service. Please share these results with your sprinkler system designer so that they can design the fire protection system to best fit the noted conditions. If the data is out of date or insufficient for their needs, please contact the MEANS Division to request a hydrant flow test and we will work with you to get more complete data.

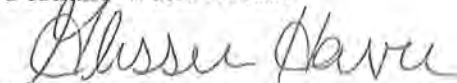
Conditions of Service

The existing water services at this site may be used by the proposed development provided that the development team concludes that these services will provide adequate flow and pressure for the anticipated needs. Any existing services that will no longer be used by the proposed development must be retired per District standards.

The existing water meter is a 2-inch displacement type meter which is capable of handling a maximum flow rate of 160 gallons per minute. If a larger meter will be necessary please contact the MEANS group to request an upgrade.

If the District can be of further assistance in this matter, please let us know.

Sincerely,
Portland Water District



Glissen Havu, E.I.
Design Engineer



Michael J. Bobinsky
Director of Public Services

15 July 2014

Mr. Richard L. Meek,
Sebago Technics,
P.O. Box 1339,
Westbrook, Maine 04098-1339.

RE: The Capacity to Handle Wastewater Flows, from the Proposed Expansions to the Allagash Brewery, at 50-100 Industrial Way.

Dear Mr. Meek:

The existing ten-inch diameter polyvinyl chloride sewer pipe located in Industrial Way has adequate capacity to **transport**, while The Portland Water District sewage treatment facilities, located off Marginal Way, have adequate capacity to **treat** the total anticipated wastewater flows of **28,780 GPD**, from the proposed project.

Anticipated Wastewater Flows from the Proposed Brewery Expansions:

Estimated Industrial Process Wastewater Flows Generated	= 28,000 GPD
65 Proposed Employees @ 12 GPD/Employee	= <u>780 GPD</u>
Total Proposed Wastewater Flows for this Project	= 28,780 GPD

In order to offset any increase in sanitary flows, the City combined sewer overflow (C.S.O.) abatement consent agreement (with the U.S.E.P.A., and with the Maine D.E.P.) requires C.S.O. mitigation, in order to offset any increase in sanitary flows, from all projects. If the City can be of further assistance, please call 874-8832.

Sincerely,
CITY OF PORTLAND

Frank J. Brancely, B.A., M.A.
Senior Engineering Technician

FJB

CC: Jeffrey Levine, Director, Department of Planning, and Urban Development, City of Portland
Barbara Barhydt, Development Review Services Mgr., Dep't. of Planning, and Urban Development, City of Portland
Jean Fraser, Planner, Department of Planning, and Urban Development, City of Portland
David Margolis-Pineo, Deputy City Engineer, City of Portland
Michael Farmer, P.E., Project Engineer, City of Portland
Bradley A. Roland, P.E., Environmental Projects Engineer, City of Portland
Benjamin N. Pearson, E.I., Industrial Pretreatment Coordinator, City of Portland
John Emerson, Wastewater Coordinator, City of Portland
Rhonda Zazzara, Field Inspection Coordinator, City of Portland
Jane Ward, Administrative Assistant, City of Portland

C:\Frank's\Capacity Letters\Industrial Way 50

Exhibit 13

Fire Safety

Fire Safety

The existing building and proposed addition(s) will comply with the applicable NFPA regulations. In addition, the site plan generally complies with the applicable sections of the Technical Design Manual in the following manner:

- 3.2 There is an existing City owned and maintained hydrant within the public right-of-way directly in front of the existing facility.
- 3.4.1 There are no dead end roads greater than 150 feet on this site.
- 3.4.2 Access to at least two sides of the building is provided on site.
- 3.4.3 The building setbacks meet the zoning requirements and allow adequate access for emergency vehicles.
- 3.4.4 The main entry is within fifty feet of the site access drive.
- 3.4.5 There are no clearance restrictions associated with this site.
- 3.4.6 There are no elevators associated with this structure.
- 3.5 The access lane meets the requirements of section 3.5.
- 3.6 The subdivision requirements do not apply to this project.
- 3.7 There is no blasting anticipated for this project.

Additional information is provided in the attached memorandum and code analysis prepared by Michael F. Hays, Maine licensed Architect #ARC1724.

GRANT HAYS ASSOCIATES

ARCHITECTURE  INTERIOR DESIGN

MEMO

DATE: May 27, 2014

TO: City of Portland

FROM: Mike Hays

RE: Allagash Brewing Company
24,795 sf New Addition

CC: Richard Meek, Paul Ureneck, Aaron Wilson, Sean Diffley, file

Architect of Record: Michael F. Hays, Maine Licensed Architect #ARC1724
Grant Hays Associates
P.O. Box 6179
Falmouth, Maine 04105
207-871-5900 (o) / 207-318-7972 (m)
mike@granthays.com

Proposed Use of Structure: Per NFPA 101 Life Safety Code – 2012 Edition:
Industrial with ancillary Business & Mercantile (Existing)
Industrial with ancillary Business (New Addition)
Building Type: II (000)

Per International Building Code – 2009 Edition:
Factory (F2); Business (B) & Mercantile (M)
Building Type: 2B

Building Size:

First Floor:	48,238 sf
Second Floor:	6,212 sf
Mezzanine:	4,847 sf
Total:	59,295 sf

Building Elevations:

Existing & New Addition First Floor:	83.5'
Existing & New Addition Second Floor:	95.5'
Existing & New Addition Mezzanine:	95.5'

Fire Protection: Existing Building = NFPA 13 supervised/monitored fire suppression system and fire alarm system.
Proposed New Addition = NFPA 13 supervised/monitored fire suppression system and fire alarm system.

CODE ANALYSIS
2014 ADDITION
ALLAGASH BREWING COMPANY
50 INDUSTRIAL WAY
PORTLAND, MAINE

NFPA 101 Life Safety Code - 2012 Edition

Building Classification:	Existing Industrial (ancillary Business & Mercantile) New Addition – Industrial (ancillary Business) Total First Floor Area = 48,238 sf Total Second Floor Area = 6,212 sf Total Mezzanine Floor Area = 4,847 sf (10%) Building Total Floor Area = 59,295 sf
Hazard Classification:	Ordinary Hazard
Construction Type:	Type II (000)
Occupant Loads:	52,043 SF Industrial @ 100 sf/occupant = 521 occupants (40 actual) 7,252 SF Business @ 100 sf/occupant = 73 occupants (35 actual) 1,904 SF Mercantile @ 30 sf/occupant = 64 occupants Total Calculated Load: 658 Occupants (139 actual)
Separation of Use Rating:	2 hour (1 Hour)
Janitor, Mech, Stor Rating:	1 hour
Stair Rating:	2 hour (1 Hour)
Elevator Shafts:	2 hours (Note: Elevator not required per 2010 ADA)
Area of Refuge:	1 hour (None)
Minimum Stair width:	44" clear; 36" if less than 50 occupants
Maximum Riser height:	7"
Minimum Tread width:	11"
Minimum Headroom:	6'-8" at stairs; 7'-6" at occupied areas
Maximum ht between landings:	12'-0"
Handrail height:	34"-38" @ 42" guardrail
Handrail top extension:	12" horz.
Handrail bottom extension:	11" angled + 12" horz.
Handrail diameter:	1-1/4" O.D.
Maximum balluster open space:	less than 4"

<u>Building Uses</u>	<u>Industrial</u>	<u>Business/Mercantile</u>
“(x)” denotes if building is fully sprinkled		
Max. Allowable Travel Distance:	200' (250')	200' (300') /150' (250')
Max. Allowable Common Path:	50' (100')	75' (100')
Max. Dead End Corridor Length:	50'	20' (50')
Minimum Egress Corridor Width:	44"/36" if >50 occ	44"/36" if >50 occ.
Minimum Number of Required Exits	2	2 (1 if less than 100 Occupants and less than 100' travel distance to egress floor level exit)
Minimum Horz Egress Enclosure rating:	1 hr (none)	1 hr (none)
Minimum Separation of exits:	0.5 diagonal' (0.33)	Same
Fire Escapes as means of egress:	Allowed (NA)	Allowed (NA)
Minimum Egress Door Width:	36"	36"

Exit Lighting:	Required	Required
Emergency Lighting:	Required	Required
Fire Alarm System:	Required	Required
Fire Sprinkler System:	Not Required	Not Required
Portable Fire Extinguishers:	Required	Required
Exit Devices/Panic Hardware	Required	Required

City of Portland Compliance: NFPA 1 & PFD Technical Standards

2009 International Building Code

“(x)” denotes if building is fully sprinkled

Use Group Classification:	Factory – Use Group F2 Business - Use Group B
Construction:	Type II – Non-Combustible, Unprotected
Occupant Loads:	F2 @ 100 sf/occupant = 521 occupants (40 actual) B @ 100 sf/occupant = 75 occupants (35 actual) M @ 30 sf/occupant = 64 occupants Total calculated load: 658 occupants (actual 139)
Area Use Separation Ratings:	2 hour (1 Hour)
Janitor, Mech & Storage Rooms:	1 hour

Building Limitations

Construction Type:	IIB Unprotected
Maximum Height:	3 story / 55' (+1 story/20') @ F2
Maximum Area / Floor:	23,000 sf (69,000) F2
Actual Area/Height:	59,295 SF & 2 Stories

Fire Resistance Ratings

Load Bearing Exterior Walls:	None
Fire Separation Exits (Stairs):	2 hours (1 hour)
Fire Separation of Uses:	2 hours (1 hour)
Shafts & Elevator Hoistways:	2 hours
Exit Corridors:	1 hour (none)
Minimum Number of Exits:	2 per occupancy type (1 if less than 30 occupants and 75' travel distance to exit from 2 nd floor to exterior)
Maximum Dead End Corridor Length:	20'/50' at system furniture under 6' high
Maximum Common Travel Path:	75' (100')
Maximum Travel Distance:	200' (300') @ B; 300' (400') @ F2
Minimum Corridor Width:	44"/36" if >50 occupants
Minimum Stair Width:	44"/36" if > 50 occupants
Maximum Riser Height:	7"
Minimum Tread Depth:	11"
Minimum Ramp Width:	44"/36" if > 50 occupants
Maximum Ramp Pitch:	1:12
Handrails:	Same as NFPA 101
Minimum Ceiling Height:	7'-6"

Fire Alarm System:	Required
Fire Sprinkler System:	Required
Portable Fire Extinguishers:	Required
Exit Lighting	Required
Emergency Lighting	Required

Exit Lighting:	Required	Required
Emergency Lighting:	Required	Required
Fire Alarm System:	Required	Required
Fire Sprinkler System:	Not Required	Not Required
Portable Fire Extinguishers:	Required	Required
Exit Devices/Panic Hardware	Required	Required

City of Portland Compliance: NFPA 1 & PFD Technical Standards

2009 International Building Code

“(x)” denotes if building is fully sprinkled

Use Group Classification:	Factory – Use Group F2 Business - Use Group B
Construction:	Type II – Non-Combustible, Unprotected
Occupant Loads:	F2 @ 100 sf/occupant = 521 occupants (40 actual) B @ 100 sf/occupant = 75 occupants (35 actual) M @ 30 sf/occupant = 64 occupants Total calculated load: 658 occupants (actual 139)
Area Use Separation Ratings:	2 hour (1 Hour)
Janitor, Mech & Storage Rooms:	1 hour

Building Limitations

Construction Type:	IIB Unprotected
Maximum Height:	3 story / 55' (+1 story/20') @ F2
Maximum Area / Floor:	23,000 sf (69,000) F2
Actual Area/Height:	59,295 SF & 2 Stories

Fire Resistance Ratings

Load Bearing Exterior Walls:	None
Fire Separation Exits (Stairs):	2 hours (1 hour)
Fire Separation of Uses:	2 hours (1 hour)
Shafts & Elevator Hoistways:	2 hours
Exit Corridors:	1 hour (none)
Minimum Number of Exits:	2 per occupancy type (1 if less than 30 occupants and 75' travel distance to exit from 2 nd floor to exterior)
Maximum Dead End Corridor Length:	20'/50' at system furniture under 6' high
Maximum Common Travel Path:	75' (100')
Maximum Travel Distance:	200' (300') @ B; 300' (400') @ F2
Minimum Corridor Width:	44"/36" if >50 occupants
Minimum Stair Width:	44"/36" if > 50 occupants
Maximum Riser Height:	7"
Minimum Tread Depth:	11"
Minimum Ramp Width:	44"/36" if > 50 occupants
Maximum Ramp Pitch:	1:12
Handrails:	Same as NFPA 101
Minimum Ceiling Height:	7'-6"

Fire Alarm System:	Required
Fire Sprinkler System:	Required
Portable Fire Extinguishers:	Required
Exit Lighting	Required
Emergency Lighting	Required

Building Live Loads

Office:	50 psf
Lobbies:	100 psf
Corridors:	80 psf
Storage:	125 psf @ light; 250 psf @ heavy

Maine State Plumbing Code/UPC

Occupancy Classification:	Factory & Ancillary Business/Mercantile
Occupancy Area:	59,295 sf
Occupancy Load:	658 (139 Actual)

Factory:		75 Occupants - 38 male/37 female (#) indicates existing count					
<u>FIXTURES</u>	<u>TOILETS</u>	<u>URINALS</u>		<u>LAVS</u>		<u>SHOWERS</u>	
Men	(3) 3	(1)	0	(3) 4	(1)	0	
Women	(3) 3	(0)	0	(3) 4	(0)	0	
Drinking Fountain:	1/150 OCCUPANTS						
Mercantile:		64 Occupants (32 male/32 female)					
<u>FIXTURES</u>	<u>TOILETS</u>	<u>URINALS</u>		<u>LAVS</u>		<u>SHOWERS</u>	
Men	2	1		1		NR	
Women:	2	0		1		NR	

MUBEC (Maine Uniform Building Energy Code) MINIMUM INSULATION VALUES

Per 2009 IECC; Table 502.1.2, 502.2(1) and 502.3

<u>ZONE 6A</u>	<u>R-VALUE</u>	<u>U-FACTOR</u>	<u>SHGC</u>
Exterior wall	18.5	0.054	NA
Roof (above deck)	20.0	0.048	NA
Slab (24" band)	15.0	0.052	NA
Frost Wall	7.5	0.133	NA
Doors – Opaque	2.0	0.50	NA
Doors – Glazed	1.25	0.80	NR
Windows	2.9	0.35	NR
Storefront	2.2	0.45	NR

End of Analysis

Exhibit 14

Construction Management Plan

Construction Management Plan

The project is anticipated to include an approximate nine month construction schedule commencing upon project approvals in the summer of 2014. The anticipated construction schedule is dependent on approval of the final design plans for the project.

SCHEDULE

1.	Estimated construction time.	9 months
2.	Erosion control measures placed	Week 1
3.	Site clearing and grubbing	Week 1 – Week 2
4.	Construction of parking lot sub-base	Week 2 – Week 4
5.	Stormwater Management Area Construction	Week 2 – Week 5
6.	Utility improvements and site construction	Week 4 – Week 36
7.	Building Addition Construction	Week 4 – Week 36
8.	Mulch Spread for Winter Erosion Control	October 15, 2014
9.	Start final seeding on prepared areas (during growth season)	Spring 2015
10.	Biweekly monitoring of vegetative growth	May 2015
11.	Re-seeding of areas, if needed	May 2015
12.	Removal of erosion control devices	Upon final project completion

* Dates are subject to change at the discretion of the engineer, depending on construction progress.

Exhibit 15

Stormwater Management Plan



STORMWATER MANAGEMENT PLAN

For

**Allagash Brewing Company
Portland, Maine**

prepared for

**50 Industrial Way, LLC
50 Industrial Way
Portland, ME 04103**

July 11, 2014

STORMWATER MANAGEMENT PLAN
Allagash Brewing Company
Portland, Maine

Introduction

This Stormwater Management Plan has been prepared to address the potential impacts associated with this project due to the proposed modification in stormwater runoff characteristics. The stormwater management controls that are outlined in this plan have been designed to best suit the proposed development and to comply with applicable regulatory requirements.

The project site consists of three contiguous lots within the Turnpike Industrial Park with a combined parcel area of 4.407 acres. The applicant currently owns and operates Allagash Brewing Company within one of the existing buildings and utilizes the other existing building for storage. The proposed development will include construction of an 18,800 square foot building addition, a 2,422 square foot building addition, and site improvements associated with the loading dock area. When completed, the developed area will encompass approximately 3.93 acres with approximately 2.71 acres of impervious area.

Based upon the anticipated development, the project will be subject to the Chapter 500 Basic and General standards. Although the threshold for meeting the Chapter 500 Flooding Standards will not be exceeded, the proposed stormwater management plan will meet the stormwater discharge criteria in accordance with the City of Portland requirements. The proposed erosion controls, inspection and maintenance criteria, and the stormwater management system have been designed to meet MDEP and City of Portland requirements.

Existing Conditions

The parcel is currently approximately 60% developed with the undeveloped portion consisting of forested upland. A small pocket of forested and scrub shrub wetland area is located on the northern side of the existing building. Slopes on the site are generally between 0% and 8% with an elevation range between 88 feet and 71 feet, relative to mean sea level. The site is located within the Dole Brook Watershed with surface runoff from the site drains toward the northeast corner of the property and is discharged from the site via existing public drainage infrastructure within Industrial Way.

Soil information for the site was obtained via the U.S. Department of Agriculture and natural Resources Conservation Service's Web Soil Survey. The Hydrologic Soil Group (HSG) of the site soils are classified by Technical Release TR-55 of the Soil Conservation Service as follows:

Soil Type	Symbol	HSG	Drainage Class
Buxton	BuB	C	Silt loam
Scantic	Sn	D	Silt loam
Windsor	WmB	A	Loamy sand

Proposed Development

The applicant proposes to construct an 18,800 square foot building addition, a 2,422 square foot building addition and additional pavement associated with the improvements to the loading docks. Treatment and detention of stormwater runoff from the site will be accomplished by utilizing Stormwater Best Management Practices (BMP) including one wet pond.

The proposed development will result in the following:

Total disturbed/developed area = 3.93 ac.
Total impervious area = 2.71 ac.

Regulatory Requirements

City of Portland and Maine Department of Environmental Protection (MDEP)

MDEP Rule Chapters 500 and 502 describe stormwater management requirements for new development projects. These rules describe performance standards divided into five major categories: Basic Standards, General Standards, Phosphorous Standards, Urban Impaired Stream Standards, and Flooding Standards. The following sections describe how this project will address these stormwater management performance standards.

Basic Standards: A project must meet basic standards if it disturbs an area greater than one (1) acre. As this development will disturb approximately 2.60 acres, it must meet these basic standards. These standards include various erosion and sedimentation controls, inspection and maintenance procedures, and general housekeeping requirements.

General Standards: A project is subject to the general standards if it results in the creation of one (1) or more acres of impervious area or developed areas greater than five (5) acres. As this project will create approximately 1.46 acres of impervious area, it must meet the general standards. These standards require that a minimum of 95% of all impervious areas and at least 80% of all developed areas are designed to be tributary to stormwater BMPs. Standard BMPs have been defined by the

MDEP and are described thoroughly in their publication Stormwater Management for Maine: Best Management Practices manual as revised in January of 2006.

Phosphorous Standards: A project must meet the phosphorous standards if located within a lake watershed. As this project is not tributary to a lake watershed, it is not subject to the phosphorus standards.

Urban Impaired Stream Standards: A project must meet the urban impaired stream standards if located within an urban impaired stream watershed. As this project is not tributary to an Urban Impaired Stream as defined by MDEP Chapter 502, it is not subject to the urban impaired stream standards.

Flooding Standards: A project must meet to the flooding standards if it creates impervious areas greater than three (3) acres, or developed areas greater than twenty (20) acres. The City of Portland requires all Level II Site plan projects to meet the flooding standards.

Methodology

In order to evaluate drainage characteristics as a result of the proposed development activities, a quantitative analysis was performed to determine peak runoff rates in the pre-development and post-development conditions. The evaluation was performed using the methodology outlined in the USDA Soil Conservation Service's "Urban Hydrology for Small Watersheds - Technical Release #55 (TR-55)". HydroCAD computer software was utilized to perform the calculations.

The peak runoff rates were calculated using a 24-hour duration storm event with a Type III rainfall distribution. The rainfall amounts for Cumberland County are as follows:

Storm Frequency	24-hr Duration Rainfall (in.)
2-yr	3.0
10-yr	4.7
25-yr	5.5

2012 Development Watershed

The 2012 development watershed contains one study point and three subcatchments. Study Point (SP1) is identified as the inlet of the existing 15" RCP, which exits the site from the northeast corner.

Subcatchment 11 includes the undeveloped wooded area along the northern property line. Stormwater runoff flows overland via sheet flow and shallow concentrated flow; and is collected in the proposed wet pond.

Subcatchment 12 includes the existing developed area, which is not collected by the proposed wet pond, located along the eastern side of the property. Stormwater runoff flows overland via sheet flow, shallow concentrated flow and channelized flow to SP1.

Subcatchment 21 consists of the remainder of the property. Stormwater runoff is conveyed via overland flow or is captured in catch basins and piped to the proposed wet pond. Treated stormwater from the wet pond is discharged to SP1.

Phase 2 Development Watershed

The Phase 2 development watershed includes the same study point as the previous development watersheds.

Subcatchment 11 includes the undeveloped wooded area along the northern property line and the roof of the existing building. Stormwater runoff is directed to a proposed detention basin and is subsequently routed to the existing wet pond.

Subcatchment 12 includes the existing developed area, which is not collected by the proposed wet pond, located along the eastern side of the property. Stormwater runoff flows overland via sheet flow, shallow concentrated flow and channelized flow to SP1.

Subcatchment 13 includes the proposed building expansion between 50 and 100 Industrial Way. Stormwater runoff is discharged from the roof to the existing wet pond.

Subcatchment 21 consists of the remainder of the property. Stormwater runoff is conveyed via overland flow or is captured in catch basins and piped to the existing wet pond. Treated stormwater from the wet pond is discharged to SP1.

Quality Treatment Results

The project utilizes a wet pond to achieve the required quality treatment. The wet pond must detain a channel protection volume equal to 1.0-inch times the subcatchment's impervious area and 0.4-inch times the subcatchment's tributary landscaped areas. In addition, the permanent pool must have a mean depth of three feet and a length to width ratio of at least two to one.

The existing wet pond has capacity to treat 2.25 acres of impervious area and 0.80 acres of landscaped area. The existing mean depth is approximately 3.0 feet and the length to width ratio is approximately 3.1 to one.

In Phase 2, the wet pond will require expansion in order to treat the anticipated 2.48 acres of impervious area and 0.97 acres of landscaped area. The calculated mean depth will increase to approximately 3.1 feet and the length to width ratio will increase to approximately 3.3 to one.

The attached treatment table summarizes the total impervious and developed areas for the proposed 2014 - Phase 1 and 2014 - Phase 2 developments and indicates the BMP measures proposed for treating the impervious areas. The results of this tabulation indicate the following:

2014 - Phase 1 Development

- The post-development areas requiring treatment include approximately 97,970 square feet of new impervious area and a total of approximately 141,540 square feet of new developed area.
- The general standards require treatment for 95% of the new impervious areas. As such, the site is required to provide treatment for a minimum of 93,072 square feet. Treatment is provided for 97,970 square feet of impervious or 100% of the impervious area requiring treatment.
- The general standards require treatment for 80% of the new developed areas. As such, the site is required to provide treatment for a minimum of 113,232 square feet. Treatment is provided for 136,570 square feet of developed area or 96.5% of the developed area requiring treatment.

2014 - Phase 2 Development

- The post-development areas requiring treatment include approximately 107,750 square feet of new impervious area and a total of approximately 154,920 square feet of new developed area.
- The general standards require treatment for 95% of the new impervious areas. As such, the site is required to provide treatment for a minimum of 102,363 square feet. Treatment is provided for 107,750 square feet of impervious or 100% of the impervious area requiring treatment.
- The general standards require treatment for 80% of the new developed areas. As such, the site is required to provide treatment for a minimum of 123,936 square feet. Treatment is provided for 149,950 square feet of developed area or 96.8% of the developed area requiring treatment.

Peak Flow Analysis

The subcatchment areas and times of concentration of the Phase 1 development and Phase 2 development conditions vary from the 2010 development and 2012 development conditions due to the proposed site development and grading. The following table summarizes the results of the hydrologic analysis of the project during each stage of development.

Stormwater Peak Discharge Summary Table			
	2-Year Storm (cfs)	10-Year Storm (cfs)	25-Year Storm (cfs)
2010	2.92	6.16	8.07
2012	0.94	3.27	7.32
2014 - Phase 1	0.73	4.33	8.04
2014 - Phase 2	0.73	3.89	7.22

The results of the stormwater modeling at Study Point SP1 indicate that the peak rates of runoff in the 2012, Phase 1 and Phase 2 developed conditions are less than the peak rates of runoff in the 2010 developed condition for the 2-year, 10-year and 25-year storm events.

Conclusions

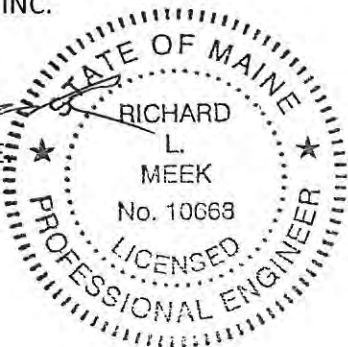
Erosion and sedimentation controls, inspection and maintenance procedures and general housekeeping requirements have been outlined to prevent unreasonable impacts on the site and to the surrounding environment. By utilizing Best Management Practices (wet pond), stormwater quality treatment has been provided for at least 95% of the total site impervious area and at least 80% of the total site developed area. Based on the modeling data, the 2012, 2014-Phase 1 and 2014-Phase 2 development peak flow rates are less than or equal to their corresponding 2010 development peak rates at Study Point SP1 during the 2-year, 10-year and 25-year storm events. It is anticipated that stormwater runoff from the proposed site development will not cause a significant adverse affect to off-site receiving channels or downstream properties.

Prepared by,

SEBAGO TECHNICS, INC.


 Richard L. Meek, P.E.
 Sr. Project Engineer

July 11, 2014



Attachment A

STORMWATER MODELING

Soil Map—Cumberland County and Part of Oxford County, Maine



Sub-catchment ID	Description	Areas Requiring Treatment					TREATMENT BMP		
		Impervious (S.F.)	Landscaping (S.F.)	Total Developed (S.F.)	Receives Treatment (Yes/No)	Impervious Area Treated (S.F.)		Landscaped Area Treated (S.F.)	Developed Area Treated (S.F.)
11	Northern Portion of Site	36770	24800	61570	YES	36770	24800	61570	Wet Pond 10
21	Southern portion of site	61200	13800	75000	YES	61200	13800	75000	Wet Pond 10
12	Eastern Portion of Site	0	4970	4970	No	0	0	0	None
		97 970	43 570	141 540		97 970	38 600	136 570	

2014 - Phase 2 Development

TOTAL IMPERVIOUS AREA (requiring treatment)	107,750	TOTAL DEVELOPED AREA (requiring treatment)	154,920
95% of IMPERVIOUS AREA REQUIRING TREATMENT	102,363	80% of DEVELOPED AREA REQUIRING TREATMENT	123,936
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT	107,750	TOTAL DEVELOPED AREA RECEIVING TREATMENT	149,950
% OF IMPERVIOUS AREA RECEIVING TREATMENT	100.0%	% OF DEVELOPED AREA RECEIVING TREATMENT	96.8%

SEBAGO TECHNICS, INC.

75 John Roberts Road

Suite 1A

South Portland, ME 04106

(207) 200-2100 FAX (207) 856-2206

JOB 02249 - Allagash Brewing Company

SHEET NO. 1 OF 1

CALCULATED BY RLM DATE 7/10/2014

CHECKED BY DATE

FILE NAME 02249.pond.2014 PRNT DATE 7/11/2014

Water Quality Volume Calculations:

Pond 10: Phase 2 Area to Pond = 2.48 acres Impervious
0.97 acres Developed

Channel Protection Volume:

2.48 acres x 1 inch → 9002 ft³ Length : Width Ratio =
0.97 acres x 0.4 inches → 1408 ft³ 140 ft : 42 ft = 3.3:1
10411 ft³

Channel Protection Volume Needed = 10411 ft³

Elevation	Surf. Area	Cum. Store
73.20	5,305	0
74.00	11,580	6,754
74.60	12,620	14,014

Trench Sizing:10,427 ft³/1000 x 3ft = 31 ftTreatment Volume @ Elevation 74.31 → 10,427 ft³**Permanent Pool Volume:**

2.48 acres x 1.5 inches → 13504 ft³
0.97 acres x 0.6 inches → 2113 ft³
15616 ft³

Permanent Pool Vol. Needed = 15616 ft³

Elevation	Surf. Area	Cum. Store
67.70	1,550	0
68.00	1,775	499
69.00	2,290	2,531
70.00	2,830	5,091
71.00	3,395	8,204
72.20	4,105	12,704
73.20	5,305	17,409

Catch Basin Sumps

Area x 500 pounds / 90 pounds x 10 storms =
(acres) acre-storm ft³ year

Annual Sediment Volume = 77 ft³

Elevation	Surf. Area	Cum. Store
0.00	75	0
3.00	75	225

Mean Depth = di

1 ft below permanent pool (Elev 72.2)=

3.1

Volume @ 12" deep in sump

SEBAGO TECHNICS, INC.

75 John Roberts Road

Suite 1A

South Portland, ME 04106

(207) 200-2100 FAX (207) 856-2206

JOB 02249 - Allagash Brewing Company

SHEET NO. 1 OF 1

CALCULATED BY RLM DATE 7/10/2014

CHECKED BY DATE

FILE NAME 02249.pond.2014

PRNT DATE 7/11/2014

Water Quality Volume Calculations:

Pond 10: Phase 1 Area to Pond = 2.25 acres Impervious
0.80 acres Developed

Channel Protection Volume:

2.25 acres x 1 inch → 8168 ft³ Length : Width Ratio =
0.80 acres x 0.4 inches → 1162 ft³ 126 ft : 40 ft = 3.1:1
9329 ft³

Channel Protection Volume Needed = 9329 ft³

Elevation	Surf. Area	Cum. Store
73.20	4,565	0
74.00	11,580	6,458
74.60	12,620	13,718

Trench Sizing:9,407 ft³/1000 x 3ft = 28 ftTreatment Volume @ Elevation 74.25 → 9,407 ft³**Permanent Pool Volume:**

2.25 acres x 1.5 inches → 12251 ft³
0.80 acres x 0.6 inches → 1742 ft³
13994 ft³

Permanent Pool Vol. Needed = 13994 ft³

Elevation	Surf. Area	Cum. Store
67.70	1,230	0
68.00	1,420	397
69.00	1,870	2,043
70.00	2,345	4,150
71.00	2,845	6,745
72.20	3,520	10,564
73.20	4,565	14,607

Catch Basin Sumps

Area x 500 pounds / 90 pounds x 10 storms =
(acres) acre-storm ft³ year

Annual Sediment Volume = 78 ft³

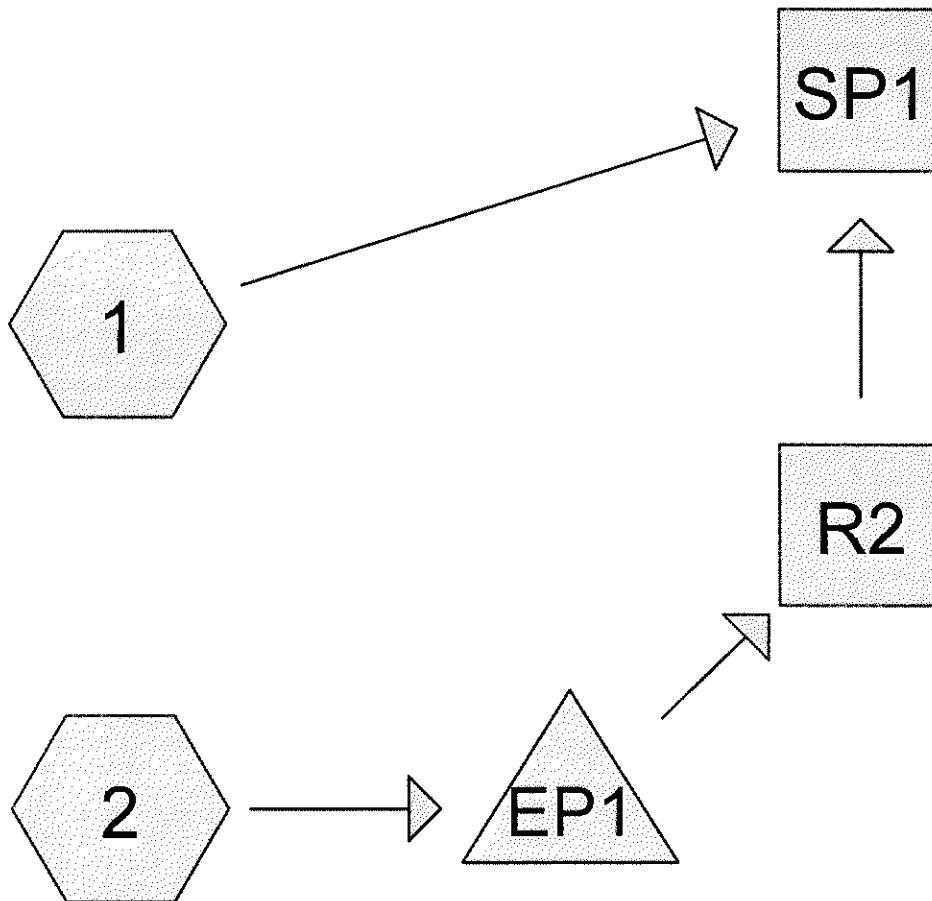
Elevation	Surf. Area	Cum. Store
0.00	75	0
3.00	75	225

Mean Depth = Cum. Store/Surf. Area @

1 ft below permanent pool (Elev 72.2)=

3.0

Volume @ 13" deep in sump



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Type III 24-hr 2-Year Rainfall=3.00"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1:

Runoff Area=3.322 ac 26.97% Impervious Runoff Depth>1.08"
Flow Length=840' Tc=35.7 min CN=79 Runoff=2.35 cfs 0.299 af

Subcatchment 2:

Runoff Area=1.085 ac 69.77% Impervious Runoff Depth>1.94"
Flow Length=375' Tc=18.4 min CN=91 Runoff=1.81 cfs 0.176 af

Reach R2:

Inflow=0.58 cfs 0.175 af
Outflow=0.58 cfs 0.175 af

Reach SP1:

Inflow=2.92 cfs 0.474 af
Outflow=2.92 cfs 0.474 af

Pond EP1:

Peak Elev=77.27' Storage=2,454 cf Inflow=1.81 cfs 0.176 af
Primary=0.58 cfs 0.175 af Secondary=0.00 cfs 0.000 af Outflow=0.58 cfs 0.175 af

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Type III 24-hr 10-Year Rainfall=4.60"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1:

Runoff Area=3.322 ac 26.97% Impervious Runoff Depth>2.27"
Flow Length=840' Tc=35.7 min CN=79 Runoff=4.99 cfs 0.628 af

Subcatchment 2:

Runoff Area=1.085 ac 69.77% Impervious Runoff Depth>3.39"
Flow Length=375' Tc=18.4 min CN=91 Runoff=3.08 cfs 0.306 af

Reach R2:

Inflow=1.22 cfs 0.304 af
Outflow=1.22 cfs 0.304 af

Reach SP1:

Inflow=6.16 cfs 0.932 af
Outflow=6.16 cfs 0.932 af

Pond EP1:

Peak Elev=77.77' Storage=4,248 cf Inflow=3.08 cfs 0.306 af
Primary=1.22 cfs 0.304 af Secondary=0.00 cfs 0.000 af Outflow=1.22 cfs 0.304 af

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Type III 24-hr 25-Year Rainfall=5.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1:

Runoff Area=3.322 ac 26.97% Impervious Runoff Depth>3.00"
Flow Length=840' Tc=35.7 min CN=79 Runoff=6.56 cfs 0.829 af

Subcatchment 2:

Runoff Area=1.085 ac 69.77% Impervious Runoff Depth>4.21"
Flow Length=375' Tc=18.4 min CN=91 Runoff=3.79 cfs 0.381 af

Reach R2:

Inflow=1.55 cfs 0.378 af
Outflow=1.55 cfs 0.378 af

Reach SP1:

Inflow=8.07 cfs 1.208 af
Outflow=8.07 cfs 1.208 af

Pond EP1:

Peak Elev=77.99' Storage=5,226 cf Inflow=3.79 cfs 0.381 af
Primary=1.55 cfs 0.378 af Secondary=0.00 cfs 0.000 af Outflow=1.55 cfs 0.378 af

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Type III 24-hr 25-Year Rainfall=5.50"

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Summary for Subcatchment 1:

Runoff = 6.56 cfs @ 12.50 hrs, Volume= 0.829 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
1.557	70	Woods, Good, HSG C
0.869	74	>75% Grass cover, Good, HSG C
0.896	98	Paved parking & roofs
3.322	79	Weighted Average
2.426		Pervious Area
0.896		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	150	0.0270	0.09		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.00"
3.3	125	0.0160	0.63		Shallow Concentrated Flow, B to C Woodland Kv= 5.0 fps
4.8	290	0.0210	1.01		Shallow Concentrated Flow, C to D Short Grass Pasture Kv= 7.0 fps
0.4	275	0.1500	10.36	51.79	Channel Flow, D to E Area= 5.0 sf Perim= 10.0' r= 0.50' n= 0.035
35.7	840	Total			

Summary for Subcatchment 2:

Runoff = 3.79 cfs @ 12.25 hrs, Volume= 0.381 af, Depth> 4.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.328	74	>75% Grass cover, Good, HSG C
0.757	98	Paved parking & roofs
1.085	91	Weighted Average
0.328		Pervious Area
0.757		Impervious Area

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Type III 24-hr 25-Year Rainfall=5.50"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	20	0.0200	0.08		Sheet Flow, A to B Grass: Dense n= 0.240 P2= 3.00"
0.2	26	0.0200	2.87		Shallow Concentrated Flow, B to C Paved Kv= 20.3 fps
13.1	104	0.0290	0.13		Sheet Flow, C to D Grass: Dense n= 0.240 P2= 3.00"
0.2	20	0.0500	1.57		Shallow Concentrated Flow, D to E Short Grass Pasture Kv= 7.0 fps
0.3	73	0.0070	4.40	5.40	Circular Channel (pipe), E to F Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.5	132	0.0100	4.26	21.28	Channel Flow, F to G Area= 5.0 sf Perim= 10.0' r= 0.50' n= 0.022 Earth, clean & straight
18.4	375	Total			

Summary for Reach R2:

Inflow Area = 1.085 ac, 69.77% Impervious, Inflow Depth > 4.18" for 25-Year event
 Inflow = 1.55 cfs @ 12.62 hrs, Volume= 0.378 af
 Outflow = 1.55 cfs @ 12.62 hrs, Volume= 0.378 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP1:

Inflow Area = 4.407 ac, 37.51% Impervious, Inflow Depth > 3.29" for 25-Year event
 Inflow = 8.07 cfs @ 12.51 hrs, Volume= 1.208 af
 Outflow = 8.07 cfs @ 12.51 hrs, Volume= 1.208 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond EP1:

Inflow Area = 1.085 ac, 69.77% Impervious, Inflow Depth > 4.21" for 25-Year event
 Inflow = 3.79 cfs @ 12.25 hrs, Volume= 0.381 af
 Outflow = 1.55 cfs @ 12.62 hrs, Volume= 0.378 af, Atten= 59%, Lag= 22.7 min
 Primary = 1.55 cfs @ 12.62 hrs, Volume= 0.378 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 77.99' @ 12.62 hrs Surf.Area= 4,793 sf Storage= 5,226 cf

Plug-Flow detention time= 49.1 min calculated for 0.377 af (99% of inflow)
 Center-of-Mass det. time= 46.0 min (811.2 - 765.2)

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Type III 24-hr 25-Year Rainfall=5.50"

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Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	11,720 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.00	1,220	0	0
77.00	2,270	1,745	1,745
78.00	4,830	3,550	5,295
79.00	8,020	6,425	11,720

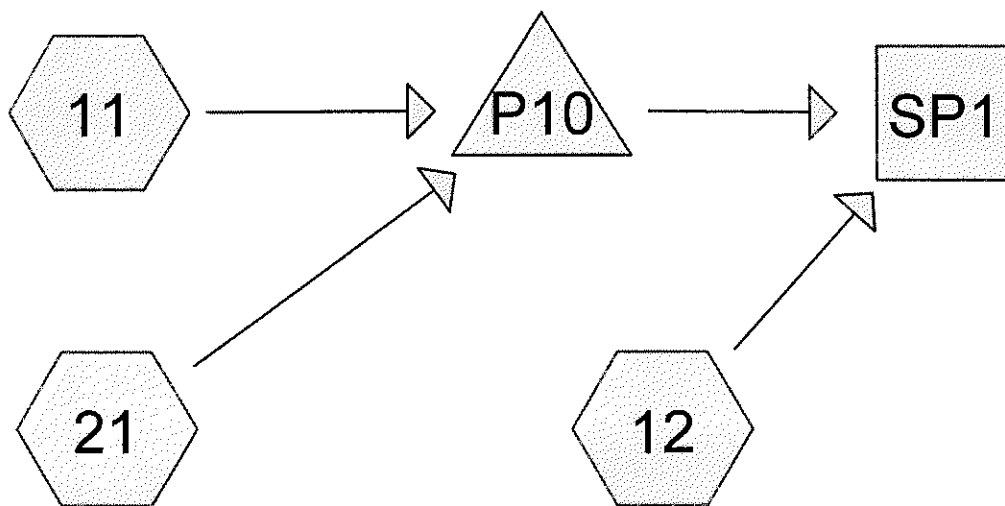
Device	Routing	Invert	Outlet Devices
#1	Primary	75.90'	15.0" x 10.0' long Culvert CMP, square edge headwall, Ke= 0.500 Outlet Invert= 75.85' S= 0.0050 '/' Cc= 0.900 n= 0.011
#2	Device 1	75.90'	4.5" Vert. Orifice/Grate C= 0.600
#3	Device 1	77.25'	0.5' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.7' Crest Height
#4	Device 1	78.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height
#5	Secondary	78.03'	14.0' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.55 cfs @ 12.62 hrs HW=77.98' (Free Discharge)

- ↑1=Culvert (Passes 1.55 cfs of 7.14 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.73 cfs @ 6.63 fps)
- ↑3=Sharp-Crested Rectangular Weir (Weir Controls 0.82 cfs @ 3.16 fps)
- ↑4=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=76.00' (Free Discharge)

- ↑5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)



Drainage Diagram for 02249 - 2012 Development
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Type III 24-hr 2-Year Rainfall=3.00"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=0.774 ac 1.29% Impervious Runoff Depth>0.68"
Flow Length=440' Tc=32.2 min CN=71 Runoff=0.34 cfs 0.044 af

Subcatchment 12:

Runoff Area=0.496 ac 26.81% Impervious Runoff Depth>1.14"
Flow Length=395' Tc=24.5 min CN=80 Runoff=0.44 cfs 0.047 af

Subcatchment 21:

Runoff Area=3.137 ac 65.03% Impervious Runoff Depth>1.78"
Flow Length=774' Tc=14.3 min CN=89 Runoff=5.34 cfs 0.464 af

Reach SP1:

Inflow=0.94 cfs 0.445 af
Outflow=0.94 cfs 0.445 af

Pond P10:

Peak Elev=74.32' Storage=10,252 cf Inflow=5.49 cfs 0.508 af
Primary=0.50 cfs 0.398 af Secondary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.398 af

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=0.774 ac 1.29% Impervious Runoff Depth>1.66"
Flow Length=440' Tc=32.2 min CN=71 Runoff=0.88 cfs 0.107 af

Subcatchment 12:

Runoff Area=0.496 ac 26.81% Impervious Runoff Depth>2.36"
Flow Length=395' Tc=24.5 min CN=80 Runoff=0.91 cfs 0.098 af

Subcatchment 21:

Runoff Area=3.137 ac 65.03% Impervious Runoff Depth>3.19"
Flow Length=774' Tc=14.3 min CN=89 Runoff=9.36 cfs 0.834 af

Reach SP1:

Inflow=3.27 cfs 0.734 af
Outflow=3.27 cfs 0.734 af

Pond P10:

Peak Elev=74.91' Storage=17,707 cf Inflow=9.84 cfs 0.941 af
Primary=0.50 cfs 0.456 af Secondary=2.29 cfs 0.181 af Outflow=2.79 cfs 0.637 af

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Type III 24-hr 25-Year Rainfall=5.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=0.774 ac 1.29% Impervious Runoff Depth>2.29"
Flow Length=440' Tc=32.2 min CN=71 Runoff=1.23 cfs 0.148 af

Subcatchment 12:

Runoff Area=0.496 ac 26.81% Impervious Runoff Depth>3.10"
Flow Length=395' Tc=24.5 min CN=80 Runoff=1.20 cfs 0.128 af

Subcatchment 21:

Runoff Area=3.137 ac 65.03% Impervious Runoff Depth>4.01"
Flow Length=774' Tc=14.3 min CN=89 Runoff=11.62 cfs 1.048 af

Reach SP1:

Inflow=7.32 cfs 0.998 af
Outflow=7.32 cfs 0.998 af

Pond P10:

Peak Elev=75.02' Storage=19,182 cf Inflow=12.32 cfs 1.196 af
Primary=0.50 cfs 0.483 af Secondary=5.85 cfs 0.387 af Outflow=6.35 cfs 0.870 af

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Summary for Subcatchment 11:

Runoff = 1.23 cfs @ 12.46 hrs, Volume= 0.148 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.564	70	Woods, Good, HSG C
0.200	74	>75% Grass cover, Good, HSG C
0.010	98	Paved parking & roofs
0.774	71	Weighted Average
0.764		Pervious Area
0.010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	150	0.0270	0.09		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	45	0.0210	0.72		Shallow Concentrated Flow, B to C
					Woodland Kv= 5.0 fps
4.0	245	0.0210	1.01		Shallow Concentrated Flow, C to D
					Short Grass Pasture Kv= 7.0 fps
32.2	440	Total			

Summary for Subcatchment 12:

Runoff = 1.20 cfs @ 12.34 hrs, Volume= 0.128 af, Depth> 3.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.067	70	Woods, Good, HSG C
0.296	74	>75% Grass cover, Good, HSG C
0.133	98	Paved parking & roofs
0.496	80	Weighted Average
0.363		Pervious Area
0.133		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.6	121	0.0250	0.09		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	65	0.0100	5.26	6.46	Circular Channel (pipe), B to C
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.013 Corrugated PE, smooth interior
0.6	150	0.0080	4.30	12.89	Channel Flow, C to D
					Area= 3.0 sf Perim= 5.0' r= 0.60'
					n= 0.022 Earth, clean & straight
0.1	59	0.0200	7.44	9.14	Circular Channel (pipe), D to E

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Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013

24.5 395 Total

Summary for Subcatchment 21:

Runoff = 11.62 cfs @ 12.19 hrs, Volume= 1.048 af, Depth> 4.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.095	70	Woods, Good, HSG C
2.040	98	Paved parking & roofs
1.002	74	>75% Grass cover, Good, HSG C
3.137	89	Weighted Average
1.097		Pervious Area
2.040		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	55	0.0300	1.39		Sheet Flow, B to C Smooth surfaces n= 0.011 P2= 3.00"
0.8	135	0.0200	2.87		Shallow Concentrated Flow, C to D Paved Kv= 20.3 fps
1.4	314	0.0050	3.72	4.57	Circular Channel (pipe), D to E Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.6	220	0.0170	6.44	32.19	Channel Flow, E to F Area= 5.0 sf Perim= 8.0' r= 0.63' n= 0.022 Earth, clean & straight
14.3	774				Total

Summary for Reach SP1:

Inflow Area = 4.407 ac, 49.53% Impervious, Inflow Depth > 2.72" for 25-Year event

Inflow = 7.32 cfs @ 12.50 hrs, Volume= 0.998 af

Outflow = 7.32 cfs @ 12.50 hrs, Volume= 0.998 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P10:

Inflow Area = 3.911 ac, 52.42% Impervious, Inflow Depth > 3.67" for 25-Year event

Inflow = 12.32 cfs @ 12.20 hrs, Volume= 1.196 af

Outflow = 6.35 cfs @ 12.51 hrs, Volume= 0.870 af, Atten= 48%, Lag= 18.9 min

Primary = 0.50 cfs @ 10.10 hrs, Volume= 0.483 af

Secondary = 5.85 cfs @ 12.51 hrs, Volume= 0.387 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

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Peak Elev= 75.02' @ 12.51 hrs Surf.Area= 13,357 sf Storage= 19,182 cf

Plug-Flow detention time= 109.9 min calculated for 0.867 af (73% of inflow)

Center-of-Mass det. time= 47.7 min (822.1 - 774.5)

Volume	Invert	Avail.Storage	Storage Description
#1	73.20'	27,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.20	4,570	0	0
74.00	11,580	6,460	6,460
74.60	12,620	7,260	13,720
75.00	13,320	5,188	18,908
75.60	14,400	8,316	27,224

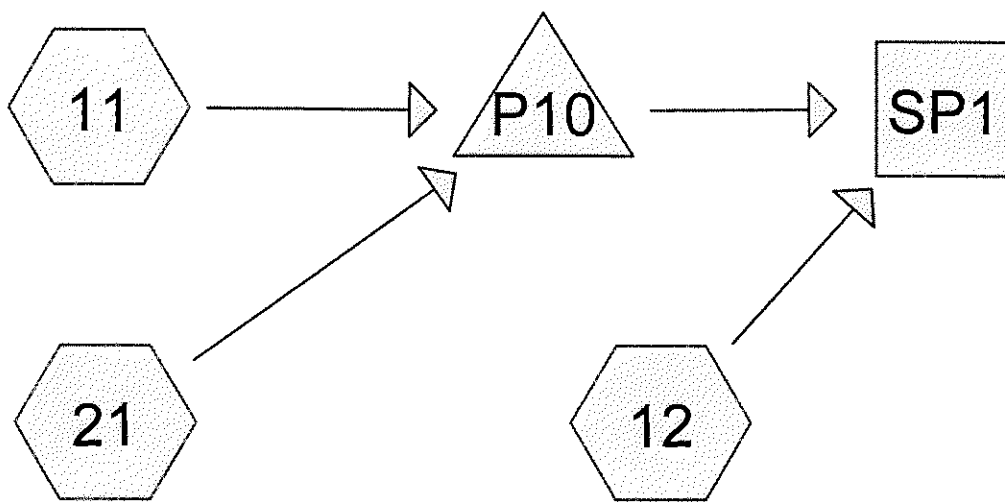
Device	Routing	Invert	Outlet Devices
#1	Primary	73.20'	0.50 cfs Exfiltration when above invert
#2	Secondary	74.78'	20.0' long x 9.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			4.00 4.50 5.00 5.50
			Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64
			2.65 2.65 2.66 2.67 2.69

Primary OutFlow Max=0.50 cfs @ 10.10 hrs HW=73.22' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.50 cfs)

Secondary OutFlow Max=5.80 cfs @ 12.51 hrs HW=75.02' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Weir Controls 5.80 cfs @ 1.21 fps)



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=2.210 ac 48.37% Impervious Runoff Depth>1.47"
Flow Length=395' Tc=31.2 min CN=85 Runoff=2.28 cfs 0.270 af

Subcatchment 12:

Runoff Area=0.380 ac 3.95% Impervious Runoff Depth>0.82"
Flow Length=395' Tc=24.5 min CN=74 Runoff=0.23 cfs 0.026 af

Subcatchment 21:

Runoff Area=1.817 ac 77.33% Impervious Runoff Depth>2.03"
Flow Length=774' Tc=14.3 min CN=92 Runoff=3.47 cfs 0.308 af

Reach SP1:

Inflow=0.73 cfs 0.432 af
Outflow=0.73 cfs 0.432 af

Pond P10:

Peak Elev=74.49' Storage=12,304 cf Inflow=4.95 cfs 0.578 af
Primary=0.50 cfs 0.406 af Secondary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.406 af

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=2.210 ac 48.37% Impervious Runoff Depth>2.79"
Flow Length=395' Tc=31.2 min CN=85 Runoff=4.29 cfs 0.515 af

Subcatchment 12:

Runoff Area=0.380 ac 3.95% Impervious Runoff Depth>1.88"
Flow Length=395' Tc=24.5 min CN=74 Runoff=0.56 cfs 0.060 af

Subcatchment 21:

Runoff Area=1.817 ac 77.33% Impervious Runoff Depth>3.49"
Flow Length=774' Tc=14.3 min CN=92 Runoff=5.79 cfs 0.528 af

Reach SP1:

Inflow=4.33 cfs 0.789 af
Outflow=4.33 cfs 0.789 af

Pond P10:

Peak Elev=74.95' Storage=18,278 cf Inflow=8.72 cfs 1.043 af
Primary=0.50 cfs 0.466 af Secondary=3.53 cfs 0.263 af Outflow=4.03 cfs 0.729 af

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=2.210 ac 48.37% Impervious Runoff Depth>3.58"
Flow Length=395' Tc=31.2 min CN=85 Runoff=5.45 cfs 0.659 af

Subcatchment 12:

Runoff Area=0.380 ac 3.95% Impervious Runoff Depth>2.56"
Flow Length=395' Tc=24.5 min CN=74 Runoff=0.76 cfs 0.081 af

Subcatchment 21:

Runoff Area=1.817 ac 77.33% Impervious Runoff Depth>4.32"
Flow Length=774' Tc=14.3 min CN=92 Runoff=7.09 cfs 0.654 af

Reach SP1:

Inflow=8.04 cfs 1.061 af
Outflow=8.04 cfs 1.061 af

Pond P10:

Peak Elev=75.05' Storage=19,570 cf Inflow=10.85 cfs 1.313 af
Primary=0.50 cfs 0.493 af Secondary=6.98 cfs 0.487 af Outflow=7.48 cfs 0.980 af

Summary for Subcatchment 11:

Runoff = 5.45 cfs @ 12.42 hrs, Volume= 0.659 af, Depth> 3.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.564	70	Woods, Good, HSG C
0.577	74	>75% Grass cover, Good, HSG C
1.069	98	Paved parking & roofs
2.210	85	Weighted Average
1.141		Pervious Area
1.069		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	150	0.0270	0.09		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.00"
4.0	245	0.0210	1.01		Shallow Concentrated Flow, B to C
					Short Grass Pasture Kv= 7.0 fps
31.2	395	Total			

Summary for Subcatchment 12:

Runoff = 0.76 cfs @ 12.35 hrs, Volume= 0.081 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.067	70	Woods, Good, HSG C
0.298	74	>75% Grass cover, Good, HSG C
0.015	98	Paved parking & roofs
0.380	74	Weighted Average
0.365		Pervious Area
0.015		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.6	121	0.0250	0.09		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	65	0.0100	5.26	6.46	Circular Channel (pipe), B to C
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.013 Corrugated PE, smooth interior
0.6	150	0.0080	4.30	12.89	Channel Flow, C to D
					Area= 3.0 sf Perim= 5.0' r= 0.60'
					n= 0.022 Earth, clean & straight
0.1	59	0.0200	8.80	10.80	Circular Channel (pipe), D to E
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
24.5	395	Total			

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Type III 24-hr 25-Year Rainfall=5.50"

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Summary for Subcatchment 21:

Runoff = 7.09 cfs @ 12.19 hrs, Volume= 0.654 af, Depth > 4.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.095	70	Woods, Good, HSG C
1.405	98	Paved parking & roofs
0.317	74	>75% Grass cover, Good, HSG C
1.817	92	Weighted Average
0.412		Pervious Area
1.405		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	55	0.0300	1.39		Sheet Flow, B to C
					Smooth surfaces n= 0.011 P2= 3.00"
0.8	135	0.0200	2.87		Shallow Concentrated Flow, C to D
					Paved Kv= 20.3 fps
1.4	314	0.0050	3.72	4.57	Circular Channel (pipe), D to E
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.013 Corrugated PE, smooth interior
0.6	220	0.0170	6.44	32.19	Channel Flow, E to F
					Area= 5.0 sf Perim= 8.0' r= 0.63'
					n= 0.022 Earth, clean & straight
14.3	774	Total			

Summary for Reach SP1:

Inflow Area = 4.407 ac, 56.48% Impervious, Inflow Depth > 2.89" for 25-Year event

Inflow = 8.04 cfs @ 12.56 hrs, Volume= 1.061 af

Outflow = 8.04 cfs @ 12.56 hrs, Volume= 1.061 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P10:

Inflow Area = 4.027 ac, 61.44% Impervious, Inflow Depth > 3.91" for 25-Year event

Inflow = 10.85 cfs @ 12.24 hrs, Volume= 1.313 af

Outflow = 7.48 cfs @ 12.57 hrs, Volume= 0.980 af, Atten= 31%, Lag= 19.7 min

Primary = 0.50 cfs @ 9.80 hrs, Volume= 0.493 af

Secondary = 6.98 cfs @ 12.57 hrs, Volume= 0.487 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 75.05' @ 12.57 hrs Surf.Area= 13,409 sf Storage= 19,570 cf

Plug-Flow detention time= 101.8 min calculated for 0.980 af (75% of inflow)

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Type III 24-hr 25-Year Rainfall=5.50"

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Center-of-Mass det. time= 41.7 min (817.4 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	73.20'	27,222 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.20	4,565	0	0
74.00	11,580	6,458	6,458
74.60	12,620	7,260	13,718
75.00	13,320	5,188	18,906
75.60	14,400	8,316	27,222

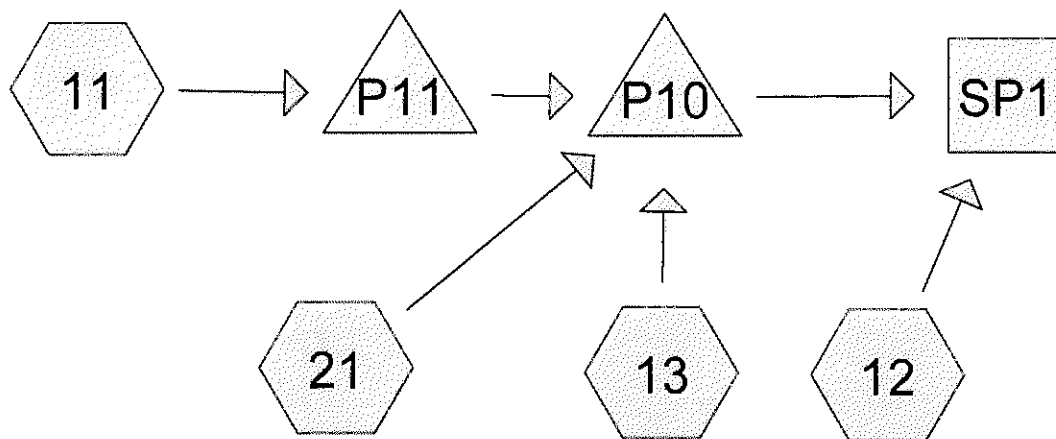
Device	Routing	Invert	Outlet Devices
#1	Primary	73.20'	0.50 cfs Exfiltration when above invert
#2	Secondary	74.78'	20.0' long x 9.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			4.00 4.50 5.00 5.50
			Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64
			2.65 2.65 2.66 2.67 2.69

Primary OutFlow Max=0.50 cfs @ 9.80 hrs HW=73.22' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.50 cfs)

Secondary OutFlow Max=6.92 cfs @ 12.57 hrs HW=75.05' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Weir Controls 6.92 cfs @ 1.29 fps)



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=1.225 ac 48.82% Impervious Runoff Depth>1.47"
Flow Length=305' Tc=29.7 min CN=85 Runoff=1.29 cfs 0.150 af

Subcatchment 12:

Runoff Area=0.380 ac 3.95% Impervious Runoff Depth>0.82"
Flow Length=395' Tc=24.5 min CN=74 Runoff=0.23 cfs 0.026 af

Subcatchment 13:

Runoff Area=1.004 ac 71.12% Impervious Runoff Depth>1.95"
Tc=5.0 min CN=91 Runoff=2.42 cfs 0.163 af

Subcatchment 21:

Runoff Area=1.798 ac 77.09% Impervious Runoff Depth>2.03"
Flow Length=774' Tc=14.3 min CN=92 Runoff=3.43 cfs 0.304 af

Reach SP1:

Inflow=0.73 cfs 0.440 af
Outflow=0.73 cfs 0.440 af

Pond P10:

Peak Elev=74.53' Storage=12,847 cf Inflow=5.18 cfs 0.608 af
Primary=0.50 cfs 0.414 af Secondary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.414 af

Pond P11:

Peak Elev=74.60' Storage=1,813 cf Inflow=1.29 cfs 0.150 af
15.0" x 183.0' Culvert Outflow=0.87 cfs 0.140 af

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=1.225 ac 48.82% Impervious Runoff Depth>2.80"
Flow Length=305' Tc=29.7 min CN=85 Runoff=2.43 cfs 0.285 af

Subcatchment 12:

Runoff Area=0.380 ac 3.95% Impervious Runoff Depth>1.88"
Flow Length=395' Tc=24.5 min CN=74 Runoff=0.56 cfs 0.060 af

Subcatchment 13:

Runoff Area=1.004 ac 71.12% Impervious Runoff Depth>3.40"
Tc=5.0 min CN=91 Runoff=4.10 cfs 0.284 af

Subcatchment 21:

Runoff Area=1.798 ac 77.09% Impervious Runoff Depth>3.49"
Flow Length=774' Tc=14.3 min CN=92 Runoff=5.73 cfs 0.523 af

Reach SP1:

Inflow=3.89 cfs 0.821 af
Outflow=3.89 cfs 0.821 af

Pond P10:

Peak Elev=74.94' Storage=18,076 cf Inflow=9.04 cfs 1.081 af
Primary=0.50 cfs 0.474 af Secondary=3.08 cfs 0.287 af Outflow=3.58 cfs 0.762 af

Pond P11:

Peak Elev=74.86' Storage=2,828 cf Inflow=2.43 cfs 0.285 af
15.0" x 183.0' Culvert Outflow=1.84 cfs 0.274 af

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 11:

Runoff Area=1.225 ac 48.82% Impervious Runoff Depth>3.58"
Flow Length=305' Tc=29.7 min CN=85 Runoff=3.09 cfs 0.366 af

Subcatchment 12:

Runoff Area=0.380 ac 3.95% Impervious Runoff Depth>2.56"
Flow Length=395' Tc=24.5 min CN=74 Runoff=0.76 cfs 0.081 af

Subcatchment 13:

Runoff Area=1.004 ac 71.12% Impervious Runoff Depth>4.22"
Tc=5.0 min CN=91 Runoff=5.03 cfs 0.353 af

Subcatchment 21:

Runoff Area=1.798 ac 77.09% Impervious Runoff Depth>4.32"
Flow Length=774' Tc=14.3 min CN=92 Runoff=7.01 cfs 0.647 af

Reach SP1:

Inflow=7.22 cfs 1.097 af
Outflow=7.22 cfs 1.097 af

Pond P10:

Peak Elev=75.03' Storage=19,255 cf Inflow=11.19 cfs 1.353 af
Primary=0.50 cfs 0.501 af Secondary=6.06 cfs 0.515 af Outflow=6.56 cfs 1.016 af

Pond P11:

Peak Elev=74.99' Storage=3,354 cf Inflow=3.09 cfs 0.366 af
15.0" x 183.0' Culvert Outflow=2.39 cfs 0.353 af

Summary for Subcatchment 11:

Runoff = 3.09 cfs @ 12.40 hrs, Volume= 0.366 af, Depth> 3.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.264	70	Woods, Good, HSG C
0.363	74	>75% Grass cover, Good, HSG C
0.598	98	Paved parking & roofs
1.225	85	Weighted Average
0.627		Pervious Area
0.598		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	150	0.0270	0.09		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	155	0.0210	1.01		Shallow Concentrated Flow, B to C
					Short Grass Pasture Kv= 7.0 fps
29.7	305	Total			

Summary for Subcatchment 12:

Runoff = 0.76 cfs @ 12.35 hrs, Volume= 0.081 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.067	70	Woods, Good, HSG C
0.298	74	>75% Grass cover, Good, HSG C
0.015	98	Paved parking & roofs
0.380	74	Weighted Average
0.365		Pervious Area
0.015		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.6	121	0.0250	0.09		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	65	0.0100	5.26	6.46	Circular Channel (pipe), B to C
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.013 Corrugated PE, smooth interior
0.6	150	0.0080	4.30	12.89	Channel Flow, C to D
					Area= 3.0 sf Perim= 5.0' r= 0.60'
					n= 0.022 Earth, clean & straight
0.1	59	0.0200	8.80	10.80	Circular Channel (pipe), D to E
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
24.5	395	Total			

Summary for Subcatchment 13:

Runoff = 5.03 cfs @ 12.07 hrs, Volume= 0.353 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.290	74	>75% Grass cover, Good, HSG C
0.714	98	Paved parking & roofs
1.004	91	Weighted Average
0.290		Pervious Area
0.714		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Direct

Summary for Subcatchment 21:

Runoff = 7.01 cfs @ 12.19 hrs, Volume= 0.647 af, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description
0.095	70	Woods, Good, HSG C
1.386	98	Paved parking & roofs
0.317	74	>75% Grass cover, Good, HSG C
1.798	92	Weighted Average
0.412		Pervious Area
1.386		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	55	0.0300	1.39		Sheet Flow, B to C Smooth surfaces n= 0.011 P2= 3.00"
0.8	135	0.0200	2.87		Shallow Concentrated Flow, C to D Paved Kv= 20.3 fps
1.4	314	0.0050	3.72	4.57	Circular Channel (pipe), D to E Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.6	220	0.0170	6.44	32.19	Channel Flow, E to F Area= 5.0 sf Perim= 8.0' r= 0.63' n= 0.022 Earth, clean & straight
14.3	774				Total

Summary for Reach SP1:

Inflow Area = 4.407 ac, 61.56% Impervious, Inflow Depth > 2.99" for 25-Year event
 Inflow = 7.22 cfs @ 12.48 hrs, Volume= 1.097 af
 Outflow = 7.22 cfs @ 12.48 hrs, Volume= 1.097 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P10:

Inflow Area = 4.027 ac, 67.00% Impervious, Inflow Depth > 4.03" for 25-Year event
 Inflow = 11.19 cfs @ 12.12 hrs, Volume= 1.353 af
 Outflow = 6.56 cfs @ 12.49 hrs, Volume= 1.016 af, Atten= 41%, Lag= 21.9 min
 Primary = 0.50 cfs @ 9.70 hrs, Volume= 0.501 af
 Secondary = 6.06 cfs @ 12.49 hrs, Volume= 0.515 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 75.03' @ 12.49 hrs Surf.Area= 13,367 sf Storage= 19,255 cf

Plug-Flow detention time= 101.4 min calculated for 1.016 af (75% of inflow)
 Center-of-Mass det. time= 40.7 min (814.7 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1	73.20'	27,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
73.20	4,570	0	0
74.00	11,580	6,460	6,460
74.60	12,620	7,260	13,720
75.00	13,320	5,188	18,908
75.60	14,400	8,316	27,224

Device	Routing	Invert	Outlet Devices
#1	Primary	73.20'	0.50 cfs Exfiltration when above invert
#2	Secondary	74.78'	20.0' long x 9.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50			
4.00 4.50 5.00 5.50			
Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64			
2.65 2.65 2.66 2.67 2.69			

Primary OutFlow Max=0.50 cfs @ 9.70 hrs HW=73.22' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.50 cfs)

Secondary OutFlow Max=6.03 cfs @ 12.49 hrs HW=75.03' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Weir Controls 6.03 cfs @ 1.23 fps)

Summary for Pond P11:

Inflow Area = 1.225 ac, 48.82% Impervious, Inflow Depth > 3.58" for 25-Year event
 Inflow = 3.09 cfs @ 12.40 hrs, Volume= 0.366 af
 Outflow = 2.39 cfs @ 12.62 hrs, Volume= 0.353 af, Atten= 23%, Lag= 13.0 min
 Primary = 2.39 cfs @ 12.62 hrs, Volume= 0.353 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 74.99' @ 12.62 hrs Surf.Area= 3,997 sf Storage= 3,354 cf

Plug-Flow detention time= 42.6 min calculated for 0.352 af (96% of inflow)
 Center-of-Mass det. time= 29.9 min (820.9 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	74.10'	3,375 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
74.10	3,500	0	0
75.00	4,000	3,375	3,375

Device	Routing	Invert	Outlet Devices
#1	Primary	74.10'	15.0" x 183.0' long Culvert CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 73.19' S= 0.0050 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=2.38 cfs @ 12.62 hrs HW=74.99' (Free Discharge)

↑1=Culvert (Inlet Controls 2.38 cfs @ 2.54 fps)

Exhibit 16

Solid Waste

Solid Waste

Solid waste quantities generated by the project will not significantly increase as a result of the proposed addition. Solid waste and recyclables are currently contained on site inside a screened dumpster enclosure. Solid waste and recyclables are currently disposed of by a licensed waste management and recycling company under contract with the owner.

Exhibit 17

Conformance with Design Standards

Conformity with Design Standards

The City of Portland Design Manual is geared toward Commercial, Residential and Institutional zones. As this project is located in the medium intensity industrial zone (I-M), the principals of the design manual are not applicable.

Exhibit 18

Manufacturer's Catalog Package

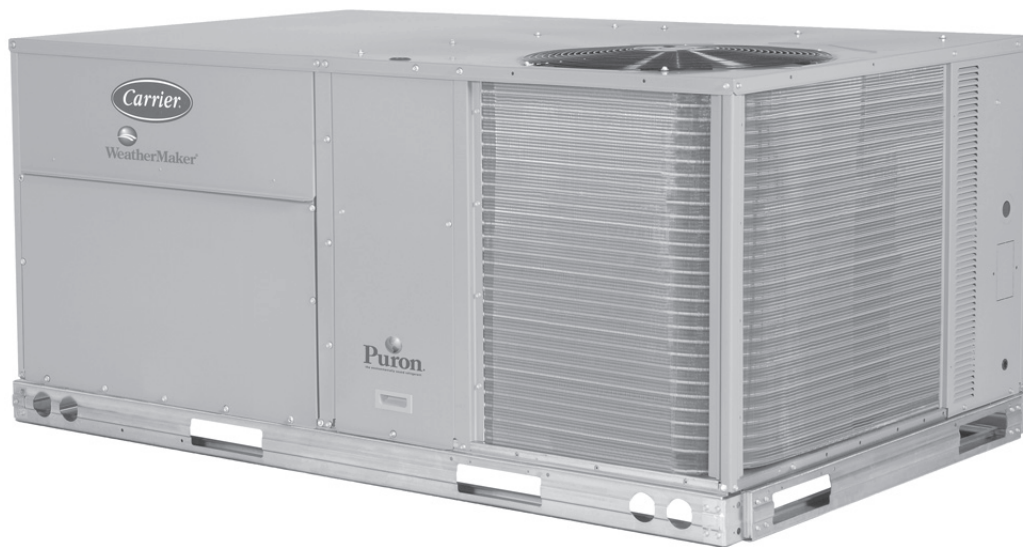
Manufacture's Catalog Package

New rooftop HVAC equipment is proposed for Phase 1 of the 2015 production expansion. The manufacture's catalog data sheets will be provided under separate cover.

**48TC
Gas Heat/Electric Cooling
Packaged Rooftop
3 to 15 Nominal Tons**



Product Data



C08613



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Turn to the Experts™

The Carrier rooftop unit (RTU) was designed by customers for customers. With “no-strip screw” collars, handled access panels, and more we’ve made your unit easy to install, easy to maintain and easy to use.

Easy to install:

All WeatherMaker® units are field-convertible to horizontal air flow which makes it easy to adjust to unexpected job site complications. Lighter units make easy replacement. Most Carrier 48TC rooftops fit on existing Carrier curbs dating back to 1989. Also, our large control box gives you room to work and room to mount Carrier accessory controls.

Easy to maintain:

Easy access handles by Carrier provide quick and easy access to all normally serviced components. Our “no-strip” screw system has superior holding power and guides screws into position while preventing the screw from stripping the unit’s metal. Take accurate pressure readings by reading condenser pressure with panels on. Simply remove the black, composite plug, route your gauge line(s) through the hole, and connect them to the refrigeration service valve(s).

Easy to use:

The newly designed, central terminal board by Carrier puts all your connections and troubleshooting points in one convenient place, standard. Most low voltage connections are made to the same board and make it easy to find what you’re looking for and easy to access it. Carrier rooftops have high and low pressure switches, a filter drier, and 2-in (51mm) filters standard.

FEATURES AND BENEFITS

- Single cooling stage models are available from 3 – 10 ton.
- Two cooling stage models are available from 7.5 – 15 ton.
- SEER up to 13.0.
- EER's up to 11.1.
- IEER's up to 11.8 with single speed indoor fan motor and up to 12.8 with 2-speed/VFD indoor fan motor.
- Up to 28% lighter than similar industry units. Lighter rooftops make easier replacement jobs.
- Utility connections are the same because 3 – 12.5 ton units fit on existing Carrier rooftop curbs. This saves time and money on replacement jobs.
- Standardized components and layout. Standardized components and controls make service and stocking parts easier.
- Scroll compressors on all units. This makes service, stocking parts, replacement, and troubleshooting easier.
- Field convertible airflow (3 – 15 ton). Being able to convert a unit from vertical airflow to horizontal makes it easy to overcome job site complications. 15 ton models require a simple supply duct cover to field convert from factory vertical to horizontal.
- Easy-adjust, belt-drive motor available.
- Provisions for bottom or side condensate drain.
- Capable of thru-the-base or thru-the-curb gas line routing.
- Single-point gas / electrical connection.
- Sloped, composite drain pan sheds water; and won't rust.
- Standardized controls & control box layout. Standardized components & controls make stocking parts & service easier.
- Tool-less filter access door.
- Clean, large, easy to use control box.
- Color-coded wiring.
- Large, laminated wiring and power wiring drawings which are affixed to unit make troubleshooting easy.
- Single, central terminal board for test and wiring connections.
- Fast-access, handled, panels for easy access on normally accessed service panels.
- "No-strip" screw system guides screws into the panel & captures them tightly without stripping the screw, the panel, or the unit.
- Mechanical cooling (115°F to 40°F or 46°C to 4°C) standard on all models. Winter Start Kit allows cooling operation down to 25°F (-4°C) and MotorMaster to -20°F (-29°C).
- High efficiency, gas heat with induced-draft flue exhaust design.
- Induced draft motor ensures no flue gas can escape into the indoor air stream.
- Carrier designed naturally draining heat exchanger, unlike positive pressure heat exchangers, do not need to be periodically, manually drained. This saves labor and maintenance expense.
- 2-in (51mm) disposable filters on all units.
- Refrigerant filter-drier on each circuit.
- Each circuit is protected with a high and low pressure switch.
- Many factory-installed options ranging from air management economizers, 2 position dampers, plus convenience outlets, disconnect switches and smoke detectors.
- Standard (parts only) Warranty: 10 yr. aluminized heat exchanger, 5 yr. compressor, 3 yr. Novation condenser coil, 1 yr. parts.
- Factory-installed Humidi-MiZer® adaptive dehumidification system on all sizes with round tube / plate fin condenser coils, includes MotorMaster I controller.
- Optional Staged Air Volume (SAV) system utilizes a Variable Frequency Drive (VFD) to automatically adjust the indoor fan motor speed between cooling stages. Available on 2-stage cooling models 08-16 with electromechanical controls or RTU Open.

MODEL NUMBER NOMENCLATURE

4 8 T C D A 0 4 A 1 A 5 - 0 A 0 A 0

Unit Heat Type

48 = Gas heat pkg. rooftop

Series Model

TC = Standard Efficiency

Heat Size

D = Low heat
E = Med heat
F = High heat
L = Low NOx, Low heat
M = Low NOx, Med heat
N = Low NOx, High heat
S = Stainless steel, Low heat
R = Stainless steel, Med heat
T = Stainless steel, High heat

Refrigerant Systems Options

A = Standard 1 stage cooling models
B = Standard 1 stg. Cooling w/Humidi-MiZer (04-07 models only)
D = 2 stage cooling models (08-16 models only)
E = 2 stage cooling models w/ Al-CU cond coil & Humidi-MiZer (08-16 models only)

Cooling Tons

04 = 3 Ton 09 = 8.5 Ton
05 = 4 Ton 12 = 10 Ton
06 = 5 Ton 14 = 12.5 Ton
07 = 6 Ton 16 = 15 Ton
08 = 7.5 Ton

Sensor Options

A = None
B = RA smoke detector
C = SA smoke Detector
D = RA + SA smoke detector
E = CO2 sensor
F = RA smoke detector & CO2 sensor
G = SA smoke detector & CO2 sensor
H = RA + SA smoke detector & CO2 sensor

Indoor Fan Options

1 = Standard static option
2 = Medium static option
3 = High static option
C = High Static option w/high efficiency motor (size 16 only)

Note: On single phase (-3 voltage code) models, the following are not available as a factory installed option:

- Humidi-MiZer
- Coated Coils or Cu Fin Coils
- Louvered Hail Guards
- Economizer or 2 Position Damper
- Powered 115 Volt Convenience Outlet

Packaging & Seismic

0 = Standard
1 = LTL
3 = CA seismic compliant
4 = LTL & CA seismic compliant

Electrical Options

A = None
C = Non-fused disconnect
D = Thru the base conn
F = Non fused disc & thru the base
G = 2 speed indoor fan (VFD) contr
J = 2 speed fan cntr (VFD) & non fused disc
K = 2 spd fan cntr (VFD) & thru the base conn
M = 2 speed fan (VFD) & non fused disc & thru the base conn

Service Options

0 = None
1 = Unpowered convenience outlet
2 = Powered convenience outlet
3 = Hinged panels
4 = Hinged panels, unpowered C.O.
5 = Hinged panels, powered C.O.

Intake / Exhaust Options

A = None
B = Temp Economizer w/ barometric relief
F = Enthalpy Econo w/ baro relief
K = 2 position damper
U = Temp ultra low leak econo w/baro relief
W = Enthalpy ultra low leak econo w/baro relief

Base unit controls

0 = Base electromechanical controls
1 = PremierLink Controller
2 = RTU open multi-protocol controller
6 = Electromechanical with 2 speed fan & W7720 econo cntl.

Design Revision

Factory Assigned

Voltage

1 = 575/3/60 5 = 208-230/3/60
3 = 208-230/1/60 6 = 460/3/60

Coil Options for Round Tube/Plate Fin Cond Coil Models Only (outdoor-indoor-hailguard)

A = Al/Cu - Al/Cu	M = Al/Cu - Al/Cu - Louvered hail guard
B = Precoat Al/Cu - Al/Cu	N = Precoat Al/Cu - Al/Cu - Louvered hail guard
C = Ecoat Al/Cu - Al/Cu	P = Ecoat Al/Cu - Al/Cu - Louvered hail guard
D = Ecoat Al/Cu Ecoat Al/Cu	Q = Ecoat Al/Cu - Ecoat Al/Cu louvered hail guard
E = Cu/Cu - Al/Cu	R = Cu/Cu - Al/Cu - Louvered hail guard
F = Cu/Cu - Cu/Cu	S = Cu/Cu - Cu/Cu - Louvered hail guard

Coil Options for All Aluminum Novation Cond Coil Models Only (outdoor-indoor-hailguard)

G = Al/Al - Al/Cu	T = Al/Al - Al/Cu, louvered hail guard
H = Al/Al - Cu/Cu	U = Al/Al - Al/Cu, louvered hail guard
J = Al/Al - Ecoat Al/Cu	V = Al/Al - Ecoat Al/Cu, louvered hail guard
K = Ecoat Al/Al - Al/Cu	W = Ecoat Al/Al - Al/Cu, louvered hail guard
L = Ecoat Al/Al - Ecoat Al/Cu	X = Ecoat Al/Al - Ecoat Al/Cu louvered hail guard

Not all possible options can be displayed above - see price pages or contact your Carrier Expert for more details.

Table 1 – FACTORY-INSTALLED OPTIONS AND FIELD-INSTALLED ACCESSORIES

CATEGORY	ITEM	FACTORY INSTALLED OPTION	FIELD INSTALLED ACCESSORY
Cabinet	Thru – the – base electrical or gas – line connections	X	X
	Supply Duct Cover (16 size only)		X
	California Seismic Compliant Labeling	X	
	Hinged Access Panels	X	
Coil Options	Cu/Cu indoor and/or outdoor coils ^{1, 6}	X	
	Pre – coated outdoor coils ^{1, 6}	X	
	Premium, E – coated outdoor coils ^{1, 6}	X	
Humidity Control	Humidi – MiZer Adaptive Dehumidification System ⁶	X	
Condenser Protection	Condenser coil hail guard (louvered design) ⁶	X	X
Controls	Thermostats, temperature sensors, and subbases		X
	PremierLink DDC communicating controller	X	X
	RTU Open – protocol controller	X	
	Smoke detector (supply and/or return air)	X	
	Time Guard II compressor delay control circuit		X
	Phase Monitor		X
Economizers & Outdoor Air Dampers	EconoMi\$er™ IV (for electro – mechanical controlled RTUs) ⁶	X	X
	EconoMi\$er™ 2 (for DDC controlled RTUs) ⁶	X	X
	Motorized 2 position outdoor air damper ⁶	X	X
	Manual outdoor air damper (25% and 50%)		X
	Barometric relief ²	X	X
	Power exhaust		X
	Ultra Low Leak EconoMi\$er X (for 2 – speed SAV system only 08 to 16 sizes with 2 stages of cooling), vertical supply and return air only.	X	X
Economizer Sensors & IAQ Devices	Single dry bulb temperature sensors ³	X	X
	Differential dry bulb temperature sensors ³		X
	Single enthalpy sensors ³	X	X
	Differential enthalpy sensors ³		X
	Wall or duct mounted CO ₂ sensor ³		X
	Unit mounted CO ₂ sensor ³	X	
Gas Heat	Propane conversion kit		X
	Stainless steel heat exchanger	X	
	High altitude conversion kit		X
	Flue Shield (04 – 14 sizes only)		X
	Flue Discharge Deflector (04 – 14 sizes only)		X
Indoor Motor & Drive	Multiple motor and drive packages	X	
	Staged Air Vol (SAV) system w/VFD controller (2 – stage cool only with electrical mechanical and RTU Open controls)	X	
	Display Kit for SAV system with VFD		X
Low Ambient Control	Winter start kit ⁴		X
	Motormaster® head pressure controller ⁴		X
Power Options	Convenience outlet (powered) ⁶	X	
	Convenience outlet (un – powered)	X	
	Non – fused disconnect ⁵	X	
	Disconnect Switch Bracket (16 size only)		X
Roof Curbs	Roof curb 14 – in (356mm)		X
	Roof curb 24 – in (610mm)		X

NOTES:

1. Novation coated coils only available with E – coat.
2. Included with economizer.
3. Sensors used to optimize economizer performance.
4. See application data for assistance.
5. Available on units with MOCP's of 80 amps or less.
6. Not available as factory installed option on single phase (208/230/1/60) models. Use field – installed accessory where available.

FACTORY OPTIONS AND/OR ACCESSORIES

Economizer (dry-bulb or enthalpy)

Economizers save money. They bring in fresh, outside air for ventilation; and provide cool, outside air to cool your building. This is the preferred method of low ambient cooling. When coupled to CO₂ sensors, economizers can provide even more savings by coupling the ventilation air to only that amount required.

Economizers are available, installed and tested by the factory, with either enthalpy or dry-bulb temperature inputs. There are also models for electromechanical as well as direct digital controllers. Additional sensors are available as accessories to optimize the economizers.

Economizers include gravity controlled, barometric relief which equalizes building pressure and ambient air pressures. This can be a cost effective solution to prevent building pressurization.

CO₂ Sensor

Improves productivity and saves money by working with the economizer to intake only the correct amount of outside air for ventilation. As occupants fill your building, the CO₂ sensor detects their presence through increasing CO₂ levels, and opens the economizer appropriately.

When the occupants leave, the CO₂ levels decrease, and the sensor appropriately closes the economizer. This intelligent control of the ventilation air, called Demand Control Ventilation (DCV) reduces the overall load on the rooftop, saving money.

Smoke Detectors

Trust the experts. Smoke detectors make your application safer and your job easier. Carrier smoke detectors immediately shut down the rooftop unit when smoke is detected. They are available, installed by the factory, for supply air, return air, or both.

Louvered Hail Guards

Sleek, louvered panels protect the condenser coil from hail damage, foreign objects, and incidental contact.

Convenience Outlet (powered or un-powered)

Reduce service and/or installation costs by including a convenience outlet in your specification. Carrier will install this service feature at our factory. Provides a convenient, 15 amp, 115v GFCI receptacle with “Wet in Use” cover. The “powered” option allows the installer to power the outlet from the line side of the disconnect or load side as required by code. The “un-powered” option is to be powered from a separate 115/120v power source.

Non-fused Disconnect

This OSHA-compliant, factory installed, safety switch allows a service technician to locally secure power to the rooftop.

Disconnect Switch Bracket

Provides a pre-engineered and sized mounting bracket for applications requiring a unit mounted fused and non-fused disconnect of greater than 100 amps. Bracket assures that no damage will occur to coils when mounting with screws and other fasteners (16 size only).

Power Exhaust with Barometric Relief

Superior internal building pressure control. This field installed accessory may eliminate the need for costly, external pressure control fans.

PremierLink, DDC Controller

This CCN controller regulates your rooftop’s performance to tighter tolerances and expanded limits, as well as facilitates zoning systems and digital accessories. It also unites your Carrier HVAC equipment together on one, coherent CCN network. The PremierLink can be factory installed, or easily field installed. Not available with 2-speed Staged Air Volume (SAV) system.

RTU Open, Multi-Protocol Controller

Connect the rooftop to an existing BAS without needing complicated translators or adapter modules using the RTU Open controller. This new controller speaks the 4 most common building automation system languages (Bacnet, Modbus, N2, and Lonworks). Use this controller when you have an existing BAS.

Time Guard II Control Circuit

This accessory protects your compressor by preventing short-cycling in the event of some other failure, prevents the compressor from restarting for 30 seconds after stopping. Not required with PremierLink, RTU Open, or authorized commercial thermostats.

Motorized 2-Position Damper

The new Carrier 2-position, motorized outdoor air damper admits up to 100% outside air. Using reliable, gear-driven technology, the 2-position damper opens to allow ventilation air and closes when the rooftop stops, stopping unwanted infiltration.

Manual OA Damper

Manual outdoor air dampers are an economical way to bring in ventilation air. The dampers are available in 25% and 50% versions.

Optional Humidi-MiZer Adaptive Dehumidification System

Carrier’s Humidi-MiZer Adaptive Dehumidification System is an all-inclusive factory installed option that can be ordered with any WeatherMaker 48TC**04-16 rooftop unit.

FACTORY OPTIONS AND/OR ACCESSORIES (cont.)

Opt. Humidi-MiZer Adap. Dehum. Sys. (cont.)

This system expands the envelope of operation of Carrier's WeatherMaker rooftop products to provide unprecedented flexibility to meet year round comfort conditions.

The Humidi-MiZer adaptive dehumidification system has the industry's only dual dehumidification mode setting. The Humidi-MiZer system includes two new modes of operation.

The WeatherMaker 48TC**04-16 rooftop coupled with the Humidi-MiZer system is capable of operating in normal design cooling mode, subcooling mode, and hot gas reheat mode. Normal design cooling mode is when the unit will operate under its normal sequence of operation by cycling compressors to maintain comfort conditions.

Subcooling mode will operate to satisfy part load type conditions when the space requires combined sensible and a higher proportion of latent load control. Hot Gas Reheat mode will operate when outdoor temperatures diminish and the need for latent capacity is required for sole humidity control. Hot Gas Reheat mode will provide neutral air for maximum dehumidification operation.

Staged Air Volume (SAV) Indoor Fan Speed System

Carrier's Staged Air Volume (SAV) system saves energy and installation time by utilizing a Variable Frequency Drive (VFD) to automatically adjust the indoor fan motor speed in sequence with the units cooling operation. Per ASHRAE 90.1 2010 standard section 6.4.3.10.b, during the first stage of cooling operation the VFD will adjust the fan motor to provide 2/3rd of the total cfm established for the unit. When a call for the second stage of cooling is required, the VFD will allow the total cfm for the unit established (100%). During the heating mode the VFD will allow total design cfm (100%) operation and during the ventilation mode the VFD will allow operation to 2/3rd of total cfm.

Compared to single speed indoor fan motor systems, Carrier's SAV system can save substantial energy, 25%+*, versus single speed indoor fan motor systems.

The VFD used in Carrier's SAV system has soft start capabilities to slowly ramp up the speeds, thus eliminating any high inrush air volume during initial start-up. It also has internal over-current protection for the fan motor and a field installed display kit that allows adjustment and in depth diagnostics of the VFD.

This SAV system is available on models with 2-stage cooling operation with electromechanical or RTU Open, Multi Protocol controls. Both space sensor and conventional thermostats/controls can be used to provide accurate control in any application.

The SAV system is very flexible for initial fan performance set up and adjustment. The standard factory shipped VFD is pre-programmed to automatically stage the fan speed between the first and second stage of cooling. The unit fan performance static pressure and cfm can be easily adjusted using the traditional means of pulley adjustments. The other means to adjust the unit static and cfm performance is to utilize the field installed Display Kit and adjust the frequency and voltage in the VFD to performance requirements. In either case, once set up, the VFD will automatically adjust the speed between the cooling stage operations.

*Data based on .10 (\$/kWh) in an office application utilizing Carrier's HAP 4.6 simulation software program

Motormaster Head Pressure Controller

The Motormaster motor controller is a low ambient, head pressure controller kit that is designed to maintain the unit's condenser head pressure during periods of low ambient cooling operation. This device should be used as an alternative to economizer free cooling when economizer usage is either not appropriate or desired. The Motormaster will either cycle the outdoor fan motors or operate them at reduced speed to maintain the unit operation, depending on the model.

Winter Start Kit

The winter start kit by Carrier extends the low ambient limit of your rooftop to 25°F (-4°C). The kit bypasses the low pressure switch, preventing nuisance tripping of the low pressure switch. Other low ambient precautions may still be prudent.

Propane Heating

Convert your gas heat rooftop from standard natural gas operation to propane using this field installed kit.

High Altitude Heating

High altitudes have less oxygen, which means heat exchangers need less fuel. The new gas orifices in this field installed kit make the necessary adjustment for high altitude applications. They restore the optimal fuel to air mixture and maintain healthy combustion at altitudes above 2000 ft (610m). Kits may not be required in all areas.

Hinged Access Panels

Allows access to unit's major components with specifically designed hinged access panels. Panels are: filter, control box, fan motor, and compressor.

FACTORY OPTIONS AND/OR ACCESSORIES (cont.)

Flue Discharge Deflector

The flue discharge deflector is a useful accessory when flue gas recirculation is a concern. By venting the flue discharge upwards, the deflector minimizes the chance for a neighboring unit to intake the flue exhaust (04-14 sizes only).

Optional Stainless Steel Heat Exchanger

The stainless steel heat exchanger option provides the tubular heat exchanger be made out of a minimum 20 gauge type 409 stainless steel for applications where the mixed air to the heat exchanger is expected to drop below 45°F (7°C). Stainless steel may be specified on applications where the presence of airborne contaminants require its use (applications such as paper mills) or in areas with very high outdoor humidity that may result in severe condensation in the heat exchanger during cooling operation.

Flue Discharge Heat Shield

The flue discharge heat shield keeps people from touching the rooftop unit's potentially hot flue discharge. This is especially useful for ground level applications, where more, untrained people could have access to the unit's exterior (04-14 sizes only).

Alternate Motors and Drives

Some applications need larger horsepower motors, some need more airflow, and some need both. Regardless of the case, your Carrier expert has a factory installed combination to meet your application. A wide selection of motors and pulleys (drives) are available, factory installed, to handle nearly any application.

Thru-the-Base Connections

Thru-the-base connections, available as either an accessory or as a factory option, are necessary to ensure proper connection and seal when routing wire and piping through the rooftop's basepan and curb. These couplings eliminate roof penetration and should be considered for gas lines, main power lines, as well as control power.

Supply Duct Cover

This supply duct cover is required when field converting the factory standard vertical duct supply to horizontal duct supply configuration. One required per unit (16 size only).

California OSHPD Seismic Certification Label

Units meet the seismic requirements of the International Code Council Evaluation Service (ICC-ES) document AC156 (Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems) and per International Building Code (IBC 2009) at an SDS (g) value of 2.00 z/h=1.0, Ip=1.5 and certified by independent structural engineers. A certification label is applied to the unit that meets the CA OSHPD Special Seismic Certification pre-approval labeling requirements on the external chassis of the unit.

Table 2 – AHRI COOLING RATING TABLE

UNIT	COOLING STAGES	NOM. CAPACITY (TONS)	NET COOLING CAPACITY (MBH)	TOTAL POWER (KW)	SEER	EER	IEER
A04	1	3	34.6	3.1	13.0	11.00	N/A
A05	1	4	45.0	4.0	13.0	11.00	N/A
A06	1	5	59.0	5.5	13.0	10.75	N/A
A07	1	6	70.0	6.4	N/A	11.00	11.2
A08	1	7.5	88.0	8.0	N/A	11.00	11.2
A09	1	8.5	97.0	8.8	N/A	11.00	11.2
A12	1	10	117.0	10.6	N/A	11.00	11.2

UNIT	COOLING STAGES	NOM. CAPACITY (TONS)	NET COOLING CAPACITY (MBH)	TOTAL POWER (KW)	EER	IEER WITH SINGLE SPEED INDOOR FAN MOTOR	IEER WITH 2 SPEED INDOOR FAN MOTOR
D08	2	7.5	83.0	7.5	11.00	11.7	12.8
D09	2	8.5	97.0	9.0	11.00	11.2	12.8
D12	2	10	114.0	10.3	11.10	11.8	12.8
D14	2	12.5	140.0	12.9	10.80	11.0	11.8
D16	2	15	174.0	16.1	10.80	11.7	12.4

LEGEND

- AHRI – Air Conditioning, Heating and Refrigeration Institute Test Standard
- ASHRAE – American Society of Heating, Refrigerating and Air Conditioning, Inc.
- EER – Energy Efficiency Ratio
- IEER – Integrated Energy Efficiency Ratio
- N/A – Not Applicable
- SEER – Seasonal Energy Efficiency Ratio

NOTES:

1. Rated in accordance with AHRI Standard 210/240 or 340/360, as appropriate.
2. Ratings are based on:
Cooling Standard: 80°F (27°C) db, 67°F (19°C) wb indoor air temp and 95°F (35°C) db outdoor air temp.
IEER Standard: A measure that expresses cooling part-load EER efficiency for commercial unitary air conditioning and heat pump equipment on the basis of weighted operation at various load capacities.
3. All 48TC units comply with ASHRAE 90.1 Energy Standard for minimum SEER and EER requirements.
4. 48TC units comply with US Energy Policy Act (2005). To evaluate code compliance requirements, refer to state and local codes.



Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program. For verification of certification for individual products, go to www.ahridirectory.org.

Table 3 – HEATING RATING TABLE - NATURAL GAS & PROPANE

UNITS		GAS HEAT	AL/SS HEAT EXCHANGER		TEMP RISE (DEG F)	THERMAL EFFICIENCY (%)	AFUE (%)
			INPUT / OUTPUT STAGE 1 (MBH)	INPUT / OUTPUT STAGE 2 (MBH)			
Single Phase	04	LOW	–	72 / 56	25 – 55	82%	79.1%
		MED	–	115 / 89	55 – 85	80%	78.5%
		HIGH	–	–	–	–	–
	05	LOW	–	72 / 56	25 – 55	82%	79.1%
		MED	–	115 / 90	35 – 65	81%	79%
		HIGH	–	150 / 117	50 – 80	80%	78.8%
	06	LOW	–	72 / 56	20 – 55	82%	79.1%
		MED	–	115 / 90	30 – 65	81%	79%
		HIGH	–	150 / 117	40 – 80	80%	78.8%
Three Phase	04	LOW	–	72 / 56	25 – 55	82%	N/A
		MED	82 / 66	115 / 89	55 – 85	80%	N/A
		HIGH	–	–	–	–	–
	05	LOW	–	72 / 56	25 – 55	82%	N/A
		MED	–	115 / 90	35 – 65	81%	N/A
		HIGH	120 / 96	150 / 117	50 – 80	80%	N/A
	06	LOW	–	72 / 56	20 – 55	82%	N/A
		MED	–	115 / 90	30 – 65	81%	N/A
		HIGH	120 / 96	150 / 117	40 – 80	80%	N/A
	07	LOW	–	72 / 59	15 – 55	82%	N/A
		MED	–	115 / 93	25 – 65	81%	N/A
		HIGH	120 / 96	150 / 120	35 – 80	80%	N/A
	08	LOW	–	125 / 103	20 – 50	82%	N/A
		MED	120 / 98	180 / 148	35 – 65	82%	N/A
		HIGH	180 / 147	224 / 184	45 – 75	82%	N/A
	09	LOW	–	125 / 103	20 – 50	82%	N/A
		MED	120 / 98	180 / 148	30 – 65	82%	N/A
		HIGH	180 / 147	224 / 184	40 – 75	82%	N/A
	12	LOW	120 / 98	180 / 148	25 – 65	82%	N/A
		MED	180 / 147	224 / 184	30 – 65	82%	N/A
		HIGH	200 / 160	250 / 205	35 – 70	80%	N/A
	14	LOW	120 / 98	180 / 148	20 – 65	82%	N/A
		MED	180 / 147	224 / 184	25 – 65	82%	N/A
		HIGH	200 / 160	250 / 205	25 – 70	80%	N/A
	16	LOW	144 / 118	180 / 146	15 – 55	81%	N/A
		MED	192 / 156	240 / 195	20 – 60	81%	N/A
		HIGH	280 / 224	350 / 280	35 – 65	80%	N/A

NOTES:

Heat ratings are for natural gas heat exchangers operated at or below 2000 ft (610 m). For information on propane or altitudes above 2000 ft (610 m), see the Application Data section of this book. Accessory Propane/High Altitude kits are also available.

In the USA the input rating for altitudes above 2000 ft (610m) must be derated by 4% for each 1000 ft (305 m) above sea level. In Canada, the input rating must be derated by 10% for altitudes of 2000 ft (610 m) to 4500 ft (1372 m) above sea level.

Table 4 – HEATING RATING TABLE - LOW NO_x¹

UNIT		GAS HEAT	LOW NO _x HEAT EXCHANGER		TEMP RISE (DEG F)	THERMAL EFFICIENCY (%)	AFUE (%)
			INPUT / OUTPUT STAGE 1 (MBH)	INPUT / OUTPUT STAGE 2 (MBH)			
Single Phase	04	LOW	–	60 / 47	20 – 50	81%	80.6%
		MED	–	90 / 72	30 – 60	81%	80.6%
		HIGH	–	–	–	–	–
	05	LOW	–	60 / 47	20 – 50	81%	80.6%
		MED	–	90 / 72	30 – 60	81%	80.6%
		HIGH	–	120 / 97	40 – 70	81%	81.5%
	06	LOW	–	60 / 47	15 – 50	81%	80.6%
		MED	–	90 / 72	25 – 60	80%	80.6%
		HIGH	–	120 / 97	35 – 70	80%	81.5%
Three Phase	04	LOW	–	60 / 47	20 – 50	81%	N/A
		MED	–	90 / 72	30 – 60	81%	N/A
		HIGH	–	–	–	–	–
	05	LOW	–	60 / 47	20 – 50	81%	N/A
		MED	–	90 / 72	30 – 60	81%	N/A
		HIGH	–	120 / 97	40 – 70	81%	N/A
	06	LOW	–	60 / 47	15 – 50	81%	N/A
		MED	–	90 / 72	25 – 60	80%	N/A
		HIGH	–	120 / 97	35 – 70	80%	N/A

NOTE:

- Units meet California's South Coast Air Quality Management District (SCAQMD) Low–NO_x emissions requirement of 40 nanograms per joule or less.
- Not Applicable

Table 5 – SOUND PERFORMANCE TABLE

UNIT	COOLING STAGES	OUTDOOR SOUND (dB)								
		A–WEIGHTED	63	125	250	500	1000	2000	4000	8000
A04	1	80	90.6	80.9	80.2	76	74.6	71.3	68.5	63.9
A05	1	81	90.9	84.6	79.5	77.9	76.5	71.1	66.9	62.5
A06	1	78	84.0	82.2	76.3	74.8	72.5	68.8	65.6	61.8
A07	1	78	88.8	81.8	76.9	74.4	73.3	69.8	66.3	62.7
A08	1	82	90.1	82.6	81.0	79.4	77.0	73.0	70.4	66.7
D08	2	82	85.8	84.3	80.5	78.7	76.4	72.7	68.3	65.1
A09	1	83	91.2	86.4	81.9	81.0	78.3	73.9	71.4	67.3
D09	2	82	88.6	85.0	81.6	79.5	77.4	74.1	71.0	66.3
A12	1	82	88.6	85.0	81.6	79.5	77.4	74.1	71.0	66.3
D12	2	82	89.0	83.1	80.5	78.5	75.5	71.6	69.6	69.3
D14	2	87	87.0	85.2	84.6	84.9	82.2	78.4	75.3	72.9
D16	2	87	87.0	85.2	84.6	84.9	82.2	78.4	75.3	72.9

LEGEND

dB – Decibel


NOTES:

- Outdoor sound data is measure in accordance with AHRI standard 270–2008.
- Measurements are expressed in terms of sound power. Do not compare these values to sound pressure values because sound pressure depends on specific environmental factors which normally do not match individual applications. Sound power values are independent of the environment and therefore more accurate.
- A–weighted sound ratings filter out very high and very low frequencies, to better approximate the response of “average” human ear. A–weighted measurements for Carrier units are taken in accordance with AHRI standard 270–2008.

Table 6 – MINIMUM - MAXIMUM AIRFLOW RATINGS - NATURAL GAS & PROPANE

UNIT	HEAT LEVEL	COOLING				HEATING	
		Minimum Single Speed Fan Motor	Minimum 2-speed Fan Motor (at high speed)	Minimum 2-speed Fan Motor (at low speed)	Maximum	Minimum	Minimum
48TC**04	LOW	900	–	–	1500	990	2190
	MED					1000	1550
	HIGH					–	–
48TC**05	LOW	1200	–	–	2000	990	2190
	MED					1330	2460
	HIGH					1390	2220
48TC**06	LOW	1500	–	–	2500	990	2730
	MED					1330	2880
	HIGH					1390	2780
48TC**07	LOW	1800	–	–	3000	990	3640
	MED					1330	3450
	HIGH					1390	3170
48TC**08	LOW	2250	2250	1485	3750	1900	4750
	MED					2100	3900
	HIGH					2270	3780
48TC**09	LOW	2550	2873	1896	4250	1900	4750
	MED					2100	4560
	HIGH					2270	4250
48TC**12	LOW	3000	3380	2231	5000	2100	5470
	MED					2620	5670
	HIGH					2650	5290
48TC**14	LOW	3600	4225	2789	6000	2100	6830
	MED					2620	6800
	HIGH					2650	7410
48TC**16	LOW	4500	5625	3713	7500	2450	7500
	MED					3000	6750
	HIGH					3990	7200

Table 7 – PHYSICAL DATA

(COOLING)

3 - 6 TONS

		48TC*A04	48TC*A05	48TC*A06	48TC*A07
Refrigeration System					
# Circuits / # Comp. / Type		1 / 1 / Scroll	1 / 1 / Scroll	1 / 1 / Scroll	1 / 1 / Scroll
Puron® refig. (R-410A) (lbs-oz)		5-10	8-8	10-11	14-2
Humidi-MiZer Puron® refig. charge A/B (lbs - oz)		8-11	14-13	16-0	22-5
Metering Device		Acutrol	Acutrol	Acutrol	Acutrol
High-press. Trip / Reset (psig)		630 / 505	630 / 505	630 / 505	630 / 505
Low-press. Trip / Reset (psig)		54 / 117	54 / 117	54 / 117	54 / 117
Compressor Capacity Staging (%)		100%	100%	100%	100%
Evap. Coil					
Material (Tube/Fin)		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8-in RTPF	3/8-in RTPF	3/8-in RTPF	3/8-in RTPF
Rows / FPI		2 / 15	2 / 15	4 / 15	4 / 15
Total Face Area (ft ²)		5.5	5.5	5.5	7.3
Condensate Drain Conn. Size		3/4-in	3/4-in	3/4-in	3/4-in
Evap. Fan and Motor					
Standard Static 1 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	-
	Max BHP	1.2	1.2	1.2	-
	RPM Range	560-854	560-854	770-1175	-
	Motor Frame Size	48	48	48	-
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	-
	Fan Diameter (in)	10 x 10	10 x 10	10 x 10	-
Medium Static 1 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	-
	Max BHP	1.2	1.2	1.5	-
	RPM Range	770-1175	770-1175	1035-1466	-
	Motor Frame Size	48	48	56	-
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	-
	Fan Diameter (in)	10 x 10	10 x 10	10 x 10	-
Standard Static 3 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	1.2	1.2	1.5	2.4
	RPM Range	560-854	560-854	770-1175	1073-1457
	Motor Frame Size	48	48	48	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter (in)	10 x 10	10 x 10	10 x 10	10 x 10
Medium Static 3 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	1.2	1.2	2.4	2.9*
	RPM Range	770-1175	770-1175	1035-1466	1173-1518
	Motor Frame Size	48	48	56	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter (in)	10 x 10	10 x 10	10 x 10	10 x 10
High Static 3 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.4	2.4	2.9	3.7
	RPM Range	1035-1466	1035-1466	1303-1687	1474-1788
	Motor Frame Size	56	56	56	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter (in)	10 x 10	10 x 10	10 x 10	10 x 10
Cond. Coil					
Material (Tube/Fin)		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8-in RTPF	3/8-in RTPF	3/8-in RTPF	3/8-in RTPF
Rows / FPI		1 / 17	2 / 17	2 / 17	2 / 17
Total Face Area (ft ²)		14.6	16.5	16.5	21.3
Humidi-MiZer Coil					
Material (Tube/Fin)		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Rows..Fins/in.		1 / 17	2 / 17	2 / 17	2 / 17
Total Face Area (ft ²)		3.9	3.9	3.9	5.2
Cond. fan / motor					
Qty / Motor Drive Type		1/ Direct	1/ Direct	1/ Direct	1/ Direct
Motor HP / RPM		1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100
Fan diameter (in)		22	22	22	22
Filters					
RA Filter # / Size (in)		2 / 16 x 25 x 2	2 / 16 x 25 x 2	2 / 16 x 25 x 2	4 / 16 x 16 x 2
OA inlet screen # / Size (in)		1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1

NOTE: Humidi-MiZer is not available with Novation condenser coil models, only Round Tube / Plate Fin (RTPF).

* 575V motor utilizes 3.7 BHP.

- Not applicable

Table 8 – PHYSICAL DATA

(HEATING)

3 - 6 TONS

		48TC**04	48TC**05	48TC**06	48TC**07
Gas Connection					
# of Gas Valves		1	1	1	1
Nat. gas supply line press (in. w.g.) / (PSIG)		4 – 13 / 0.18 – 0.47	4 – 13 / 0.18 – 0.47	4 – 13 / 0.18 – 0.47	4 – 13 / 0.18 – 0.47
LP supply line press (in. w.g.) / (PSIG)		11 – 13 / 0.40 – 0.47	11 – 13 / 0.40 – 0.47	11 – 13 / 0.40 – 0.47	11 – 13 / 0.40 – 0.47
Heat Anticipator setting (Amps)					
1st stage		0.14	0.14	0.14	0.14
2nd stage		0.14	0.14	0.14	0.14
Natural Gas Heat					
LOW	# of stages / # of burners (total)	1 / 2	1 / 2	1 / 2	1 / 2
	Connection Size	1/2–in NPT	1/2–in NPT	1/2–in NPT	1/2–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115	195 / 115
	Temperature Rise	25 – 55	25 – 55	20 – 55	15 – 55
MED	# of stages / # of burners (total)	1 or 2 / 3	1 / 3	1 / 3	1 / 3
	Connection Size	1/2–in NPT	1/2–in NPT	1/2–in NPT	1/2–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115	195 / 115
	Temperature Rise	55 – 85	35 – 65	30 – 65	25 – 65
HIGH	# of stages / # of burners (total)	–	1 or 2 / 3	1 or 2 / 3	2 / 3
	Connection Size	–	1/2–in NPT	1/2–in NPT	1/2–in NPT
	Rollout switch opens / closes	–	195 / 115	195 / 115	195 / 115
	Temperature Rise	–	50 – 80	40 – 80	35 – 80
Liquid Propane Heat					
LOW	# of stages / # of burners (total)	1 / 2	1 / 2	1 / 2	1 / 2
	Connection Size	1/2–in NPT	1/2–in NPT	1/2–in NPT	1/2–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115	195 / 115
	Temperature Rise	25 – 55	25 – 55	20 – 55	15 – 55
MED	# of stages / # of burners (total)	1 or 2 / 3	1 / 3	1 / 3	1 / 3
	Connection Size	1/2–in NPT	1/2–in NPT	1/2–in NPT	1/2–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115	195 / 115
	Temperature Rise	55 – 85	35 – 65	30 – 65	25 – 65
HIGH	# of stages / # of burners (total)	–	1 or 2 / 3	1 or 2 / 3	2 / 3
	Connection Size	–	1/2–in NPT	1/2–in NPT	1/2–in NPT
	Rollout switch opens / closes	–	195 / 115	195 / 115	195 / 115
	Temperature Rise	–	50 – 80	40 – 80	35 – 80
Low NOx Gas Heat					
LOW	# of stages / # of burners (total)	1 / 2	1 / 2	1 / 2	–
	Connection Size	1/2–in NPT	1/2–in NPT	1/2–in NPT	–
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115	–
	Temperature Rise	20 – 50	20 – 50	15 – 50	–
MED	# of stages / # of burners (total)	1 / 3	1 / 3	1 / 3	–
	Connection Size	1/2–in NPT	1/2–in NPT	1/2–in NPT	–
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115	–
	Temperature Rise	30 – 60	30 – 60	25 – 60	–
HIGH	# of stages / # of burners (total)	–	1 / 3	1 / 3	–
	Connection Size	–	1/2–in NPT	1/2–in NPT	–
	Rollout switch opens / closes	–	195 / 115	195 / 115	–
	Temperature Rise	–	40 – 70	35 – 70	–

– Not applicable

Table 9 – PHYSICAL DATA

(COOLING)

7.5 – 8.5 TONS

		48TC*A08	48TC*D08	48TC*A09	48TC*D09
Refrigeration System					
# Circuits / # Comp. / Type		1 / 1 / Scroll	2 / 2 / Scroll	1 / 1 / Scroll	2 / 2 / Scroll
RTPF models R-410a charge A/B (lbs – oz)		13 – 12	8 – 5 / 8 – 2	15 – 4	10 – 5 / 10 – 12
Alternate (MCHX) R-410a charge A/B (lbs – oz)			4 – 6 / 4 – 6		
Alternate (Humidi–MiZer) R-410a charge A/B (lbs – oz)			13 – 3 / 13 – 3		16 – 13 / 16 – 13
Metering device		Acutrol	Acutrol	Acutrol	Acutrol
High–press. Trip / Reset (psig)		630 / 505	630 / 505	630 / 505	630 / 505
Low–press. Trip / Reset (psig)		54 / 117	54 / 117	54 / 117	54 / 117
Compressor Capacity Staging (%)		100%	50% / 100%	100%	50% / 100%
Evap. Coil					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8–in RTPF	3/8–in RTPF	3/8–in RTPF	3/8–in RTPF
Rows / FPI		3 / 15	3 / 15	3 / 15	3 / 15
Total face area (ft ²)		8.9	8.9	11.1	11.1
Condensate drain conn. size		3/4–in	3/4–in	3/4–in	3/4–in
Humidi–MiZer Coil					
Material		–	Cu / Al	–	Cu / Al
Coil type		–	3/8–in RTPF	–	3/8–in RTPF
Rows / FPI		–	2 / 17	–	2 / 17
Total face area (ft ²)		–	6.3	–	8.4
Evap. fan and motor					
Standard Static 3 phase	Motor Qty / Drive Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	1.7	1.7	1.7	1.7
	RPM range	489–747	489–747	518–733	518–733
	Motor frame size	56	56	56	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
Medium Static 3 phase	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15
	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.9*	2.9*	2.4	2.4
	RPM range	733–949	733–949	690–936	690–936
	Motor frame size	56	56	56	56
High Static 3 phase	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15
	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	4.7	4.7	3.7	3.7
	RPM range	909–1102	909–1102	838–1084	838–1084
	Motor frame size	14	14	56	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	15 x 15
Cond. Coil					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8–in RTPF	3/8–in RTPF	3/8–in RTPF	3/8–in RTPF
Rows / FPI		2 / 17	2 / 17	2 / 17	2 / 17
Total face area (ft ²)		20.5	20.5	21.4	25.1
Alternate (MCHX) Cond. Coil					
Material		–	Al / Al	–	–
Coil type		–	Novation™	–	–
Rows / FPI		–	1 / 20	–	–
Total face area (ft ²)		–	20.5	–	–
Cond. fan / motor					
Qty / Motor drive type		2 / direct	2 / direct	2 / direct	2 / direct
Motor HP / RPM		1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100
Fan diameter (in)		22	22	22	22
Filters					
RA Filter # / Size (in)		4 / 16 x 20 x 2	4 / 16 x 20 x 2	4 / 16 x 20 x 2	4 / 16 x 20 x 2
OA inlet screen # / Size (in)		1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1

NOTE: Humidi–MiZer is not available with Novation condenser coil models, only Round Tube/Plate Fin (RTPF).

* 575V motor utilizes 3.7 BHP

– Not applicable

Table 10 – PHYSICAL DATA

(COOLING)

10 - 15 TONS

		48TC*A12	48TC*D12	48TC*D14	48TC*D16
Refrigeration System					
# Circuits / # Comp. / Type		1 / 1 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll
RTPF models R-410a charge A/B (lbs – oz)		20 – 0	10 – 5 / 10 – 3	11 – 0 / 11 – 6	15–14/16–12
Alternate (MCHX) R-410a charge A/B (lbs – oz)		–	6 – 0 / 6 – 0	7 – 6 / 8 – 0	–
Alternate (Humidi–MiZer) R-410a charge A/B (lbs – oz)		–	16 – 10 / 16 – 0	17 – 10 / 18 – 3	–
Metering device		Acutrol	Acutrol	Acutrol	Acutrol
High–press. Trip / Reset (psig)		630 / 505	630 / 505	630 / 505	630 / 505
Low–press. Trip / Reset (psig)		54 / 117	54 / 117	54 / 117	54 / 117
Compressor Capacity Staging (%)		100%	50% / 100%	50% / 100%	50% / 100%
Evap. Coil					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8–in RTPF	3/8–in RTPF	3/8–in RTPF	3/8–in RTPF
Rows / FPI		4 / 15	4 / 15	4 / 15	3 / 15
Total face area (ft ²)		11.1	11.1	11.1	17.5
Condensate drain conn. size		3/4–in	3/4–in	3/4–in	3/4–in
Humidi–MiZer Coil					
Material		–	Cu / Al	Cu / Al	Cu / Al
Coil type		–	3/8–in RTPF	3/8–in RTPF	3/8–in RTPF
Rows / FPI		–	2 / 17	2 / 17	1 / 17
Total face area (ft ²)		–	8.4	8.4	13.8
Evap. fan and motor					
Standard Static 3 phase	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.4	2.4	2.9*	2.9*
	RPM range	591–838	591–838	652–843	507–676
	Motor frame size	56	56	56	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	18 x 18
Medium Static 3 phase	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	3.7	3.7	3.7	3.7
	RPM range	838–1084	838–1084	838–1084	627–851
	Motor frame size	56	56	56	56
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	18 x 18
High Static 3 phase	Motor Qty / Drive type	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	4.7	4.7	4.7	6.1
	RPM range	1022–1240	1022–1240	1022–1240	776–955
	Motor frame size	14	14	14	S184T
	Fan Qty / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Diameter (in)	15 x 15	15 x 15	15 x 15	18 x 18
Cond. Coil					
Material		Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8–in RTPF	3/8–in RTPF	3/8–in RTPF	3/8–in RTPF
Rows / FPI		2 / 17	2 / 17	3 / 17	2 / 17
Total face area (ft ²)		25.1	25.1	25.1	2 @ 23.1
Alternate (MCHX) Cond. Coil					
Material		–	Al / Al	Al / Al	–
Coil type		–	Novation™	Novation™	–
Rows / FPI		–	1 / 20	2 / 20	–
Total face area (ft ²)		–	25.1	25.1	–
Cond. fan / motor					
Qty / Motor drive type		2 / direct	2 / direct	1 / direct	3 / direct
Motor HP / RPM		1/4 / 1100	1/4 / 1100	1 / 1175	1/4 / 1100
Fan diameter (in)		22	22	30	22
Filters					
RA Filter # / Size (in)		4 / 20 x 20 x 2	4 / 20 x 20 x 2	4 / 20 x 20 x 2	6 / 18 x 24 x 2 2 / 24 x 27 x 1 (vert.) 1 / 30 x 39 x 1 (horiz)
OA inlet screen # / Size (in)		1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1	

NOTE: Humidi–MiZer is not available with Novation condenser coil models, only Round Tube/Plate Fin (RTPF) up to 16 size.

* 575V motor utilizes 3.7 BHP

– Not applicable

Table 11 – PHYSICAL DATA

(HEATING)

7.5 - 10 TONS

		48TC**08	48TC**09	48TC**12
Gas Connection				
# of Gas Valves		1	1	1
Nat. gas supply line press (in. w.g.) / (PSIG)		4 – 13 / 0.18 – 0.47	4 – 13 / 0.18 – 0.47	4 – 13 / 0.18 – 0.47
LP supply line press (in. w.g.) / (PSIG)		11 – 13 / 0.40 – 0.47	11 – 13 / 0.40 – 0.47	11 – 13 / 0.40 – 0.47
Heat Anticipator setting (Amps)				
1st stage		0.14	0.14	0.14
2nd stage		0.14	0.14	0.14
Natural Gas Heat				
LOW	# of stages / # of burners (total)	1 / 3	1 / 3	2 / 4
	Connection Size	1/2–in NPT	1/2–in NPT	3/4–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115
	Temperature Rise	20 – 50	20 – 50	25 – 65
MED	# of stages / # of burners (total)	2 / 4	2 / 4	2 / 5
	Connection Size	3/4–in NPT	3/4–in NPT	3/4–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115
	Temperature Rise	35 – 65	30 – 65	30 – 65
HIGH	# of stages / # of burners (total)	2 / 5	2 / 5	2 / 5
	Connection Size	3/4–in NPT	3/4–in NPT	3/4–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115
	Temperature Rise	45 – 75	40 – 75	35 – 70
Liquid Propane Heat				
LOW	# of stages / # of burners (total)	1 / 3	1 / 3	2 / 4
	Connection Size	1/2–in NPT	1/2–in NPT	3/4–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115
	Temperature Rise	20 – 50	20 – 50	25 – 65
MED	# of stages / # of burners (total)	2 / 4	2 / 4	2 / 5
	Connection Size	3/4–in NPT	3/4–in NPT	3/4–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115
	Temperature Rise	35 – 65	30 – 65	30 – 65
HIGH	# of stages / # of burners (total)	2 / 5	2 / 5	2 / 5
	Connection Size	3/4–in NPT	3/4–in NPT	3/4–in NPT
	Rollout switch opens / closes	195 / 115	195 / 115	195 / 115
	Temperature Rise	45 – 75	40 – 75	35 – 70
Low NOx Gas Heat				
LOW	# of stages / # of burners (total)	–	–	–
	Connection Size	–	–	–
	Rollout switch opens / closes	–	–	–
	Temperature Rise	–	–	–
MED	# of stages / # of burners (total)	–	–	–
	Connection Size	–	–	–
	Rollout switch opens / closes	–	–	–
	Temperature Rise	–	–	–
HIGH	# of stages / # of burners (total)	–	–	–
	Connection Size	–	–	–
	Rollout switch opens / closes	–	–	–
	Temperature Rise	–	–	–

– Not applicable

Table 12 – PHYSICAL DATA

(HEATING)

12.5 - 15TONS

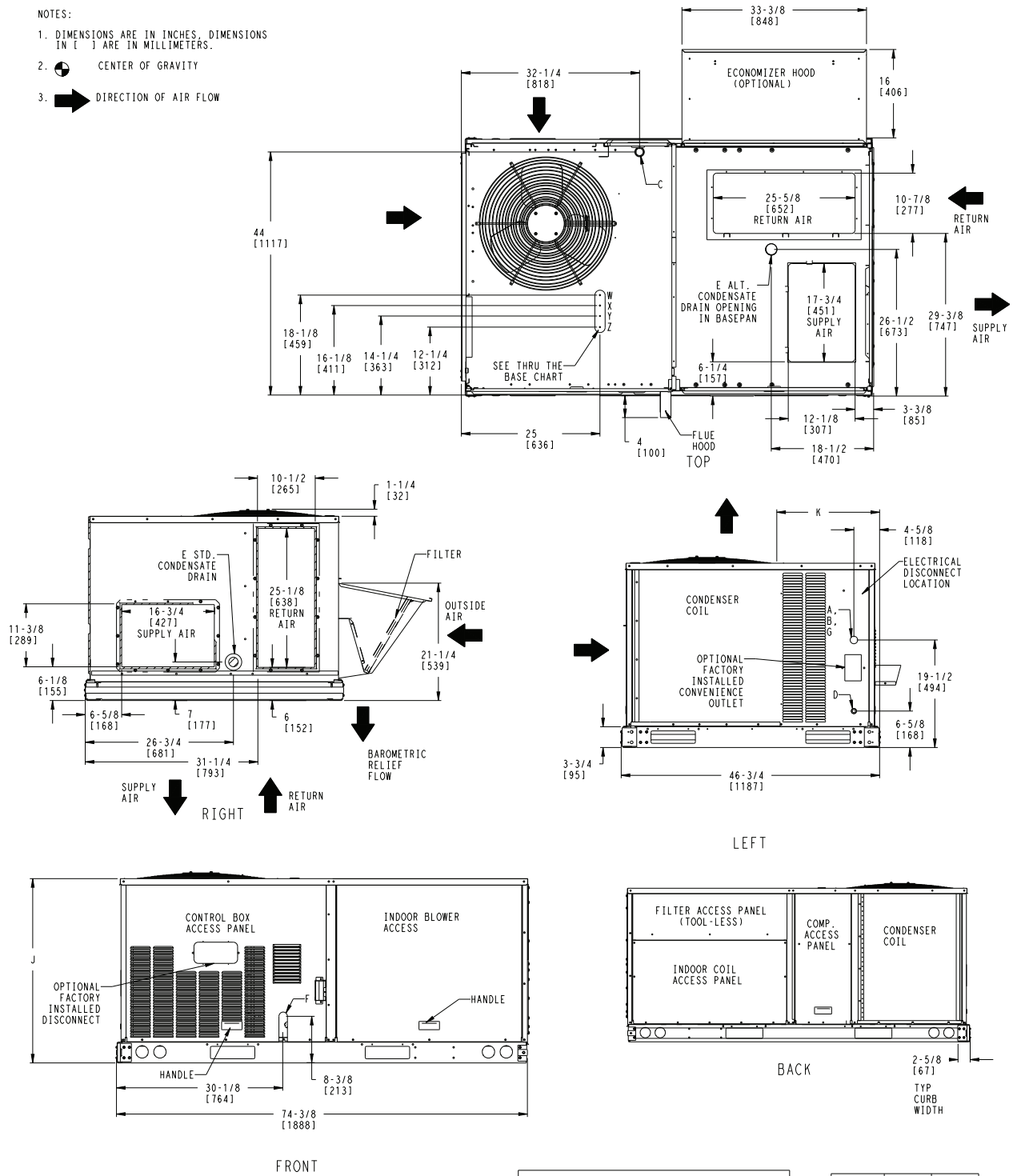
		48TC**14	48TC**16
Gas Connection			
# of Gas Valves		1	1
Nat. gas supply line press (in. w.g.) / (PSIG)		4 – 13 / 0.18 – 0.47	5 – 13 / 0.18 – 0.47
LP supply line press (in. w.g.) / (PSIG)		11 – 13 / 0.40 – 0.47	11 – 13 / 0.40 – 0.47
Heat Anticipator setting (Amps)			
1st stage		0.14	0.14
2nd stage		0.14	0.14
Natural Gas Heat			
LOW	# of stages / # of burners (total)	2 / 4	2 / 6
	Connection Size	3/4-in NPT	3/4-in NPT
	Rollout switch opens / closes	195 / 115	225 / 145
	Temperature Rise	25 – 65	20 – 55
MED	# of stages / # of burners (total)	2 / 5	2 / 8
	Connection Size	3/4-in NPT	3/4-in NPT
	Rollout switch opens / closes	195 / 115	225 / 145
	Temperature Rise	30 – 65	25 – 60
HIGH	# of stages / # of burners (total)	2 / 5	2 / 10
	Connection Size	3/4-in NPT	3/4-in NPT
	Rollout switch opens / closes	195 / 115	225 / 145
	Temperature Rise	35 – 70	35 – 65
Liquid Propane Heat			
LOW	# of stages / # of burners (total)	2 / 4	2 / 6
	Connection Size	3/4-in NPT	3/4-in NPT
	Rollout switch opens / closes	195 / 115	225 / 145
	Temperature Rise	25 – 65	20 – 55
MED	# of stages / # of burners (total)	2 / 5	2 / 8
	Connection Size	3/4-in NPT	3/4-in NPT
	Rollout switch opens / closes	195 / 115	225 / 145
	Temperature Rise	30 – 65	25 – 60
HIGH	# of stages / # of burners (total)	2 / 5	2 / 10
	Connection Size	3/4-in NPT	3/4-in NPT
	Rollout switch opens / closes	195 / 115	225 / 145
	Temperature Rise	35 – 70	35 – 65
Low NOx Gas Heat			
LOW	# of stages / # of burners (total)	–	–
	Connection Size	–	–
	Rollout switch opens / closes	–	–
	Temperature Rise	–	–
MED	# of stages / # of burners (total)	–	–
	Connection Size	–	–
	Rollout switch opens / closes	–	–
	Temperature Rise	–	–
HIGH	# of stages / # of burners (total)	–	–
	Connection Size	–	–
	Rollout switch opens / closes	–	–
	Temperature Rise	–	–

– Not applicable

CURBS, WEIGHTS & DIMENSIONS

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [] ARE IN MILLIMETERS.
2.  CENTER OF GRAVITY
3.  DIRECTION OF AIR FLOW



CONNECTION SIZES	
A	1 3/8" [35] DIA. FIELD POWER SUPPLY HOLE
B	2" [50] DIA. POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA. GAUGE ACCESS PLUG
D	7/8" [22] DIA. FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION
G	2 1/2" [64] DIA. POWER SUPPLY KNOCK-OUT

THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTMPW001A01, 003A01			
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y *	3/4" (001, 003)	POWER	1 1/8" [28.4]
Z **	(003) 1/2" FPT	GAS	1 3/16" [30.0]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED			
* SELECT EITHER 3/4" OR 1/2" FOR POWER, DEPENDING ON WIRE SIZE			
** (001) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.			

UNIT	J	K
48TC-A04	33 3/8 [847]	18 5/8 [472]
48TC-A05	33 3/8 [847]	14 7/8 [377]
48TC-A06	33 3/8 [847]	14 7/8 [377]
48TC-A07	41 3/8 [1051]	14 7/8 [377]

Fig. 1 - Dimensions 48TC 04-07

A10484

CURBS, WEIGHTS & DIMENSIONS (cont.)

UNIT	STD. UNIT WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	
48TC-A04	483	219	111	50	125	57	131	59	116	53	39 [991]	23 [584]	16 3/8 [416]
48TC-A05	537	244	124	56	139	63	145	66	129	59	39 [991]	23 [584]	17 [432]
48TC-A06	569	258	131	59	147	67	154	70	137	62	39 [991]	23 [584]	17 1/4 [438]
48TC-A07	652	296	150	68	169	76	176	80	157	71	39 [991]	23 [584]	20 1/8 [511]

*STANDARD UNIT WEIGHT IS WITH LOW HEAT & WITHOUT PACKAGING.
FOR OPTIONS & ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

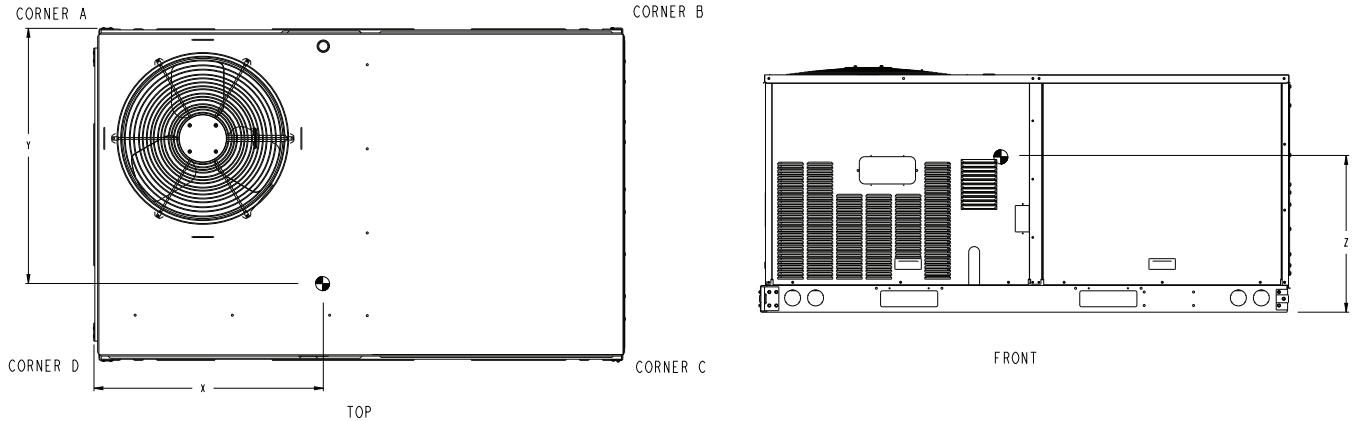


Fig. 2 - Dimensions 48TC 04-07

A10485A

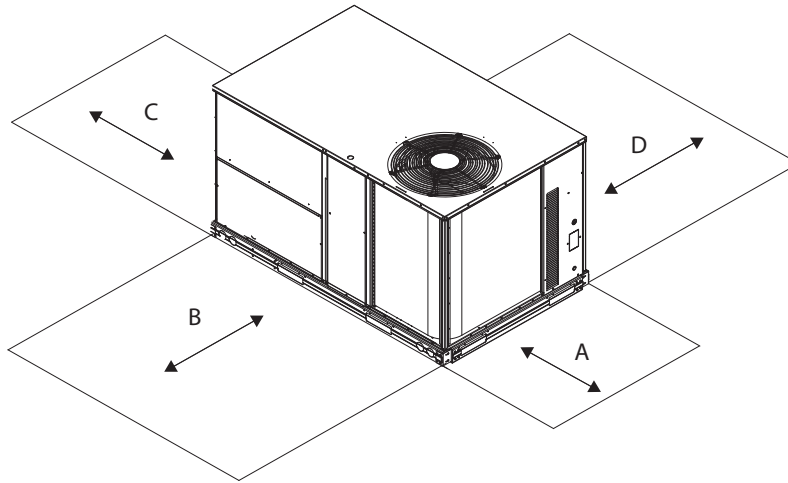


Fig. 3 - Service Clearance

C08337

LOC	DIMENSION	CONDITION
A	48-in (1219 mm)	Unit disconnect is mounted on panel
	18-in (457 mm)	No disconnect, convenience outlet option
	18-in (457 mm)	Recommended service clearance
	12-in (305 mm)	Minimum clearance
B	42-in (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall)
	36-in (914 mm)	Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)
	Special	Check for sources of flue products within 10-ft of unit fresh air intake hood
C	36-in (914 mm)	Side condensate drain is used
	18-in (457 mm)	Minimum clearance
D	48-in (1219 mm)	No flue discharge accessory installed, surface is combustible material
	42-in (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)
	36-in (914 mm)	Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)
	Special	Check for adjacent units or building fresh air intakes within 10-ft of this unit's flue outlet

NOTE: Unit not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or vertical clearances.

CURBS, WEIGHTS & DIMENSIONS (cont.)

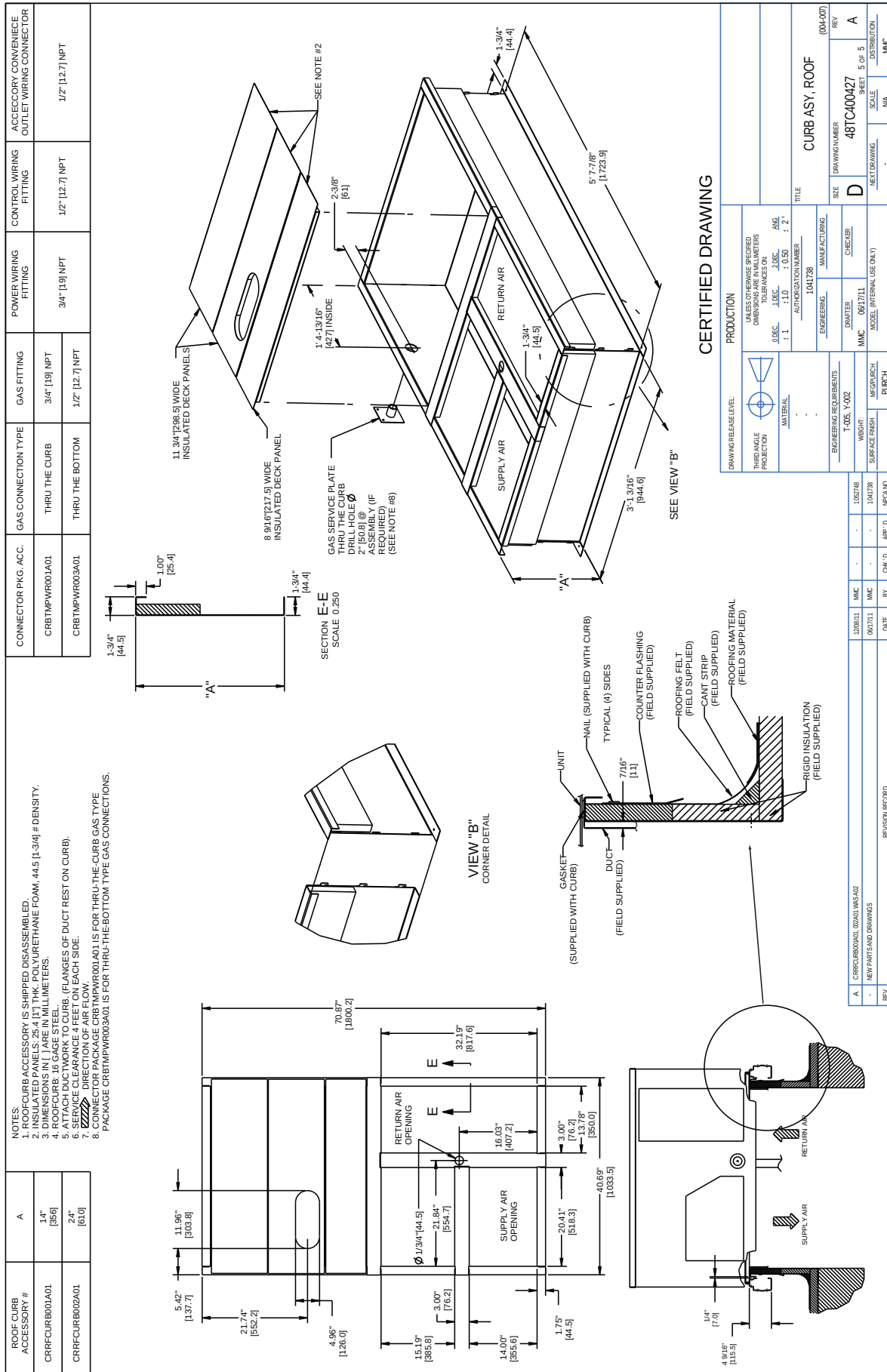


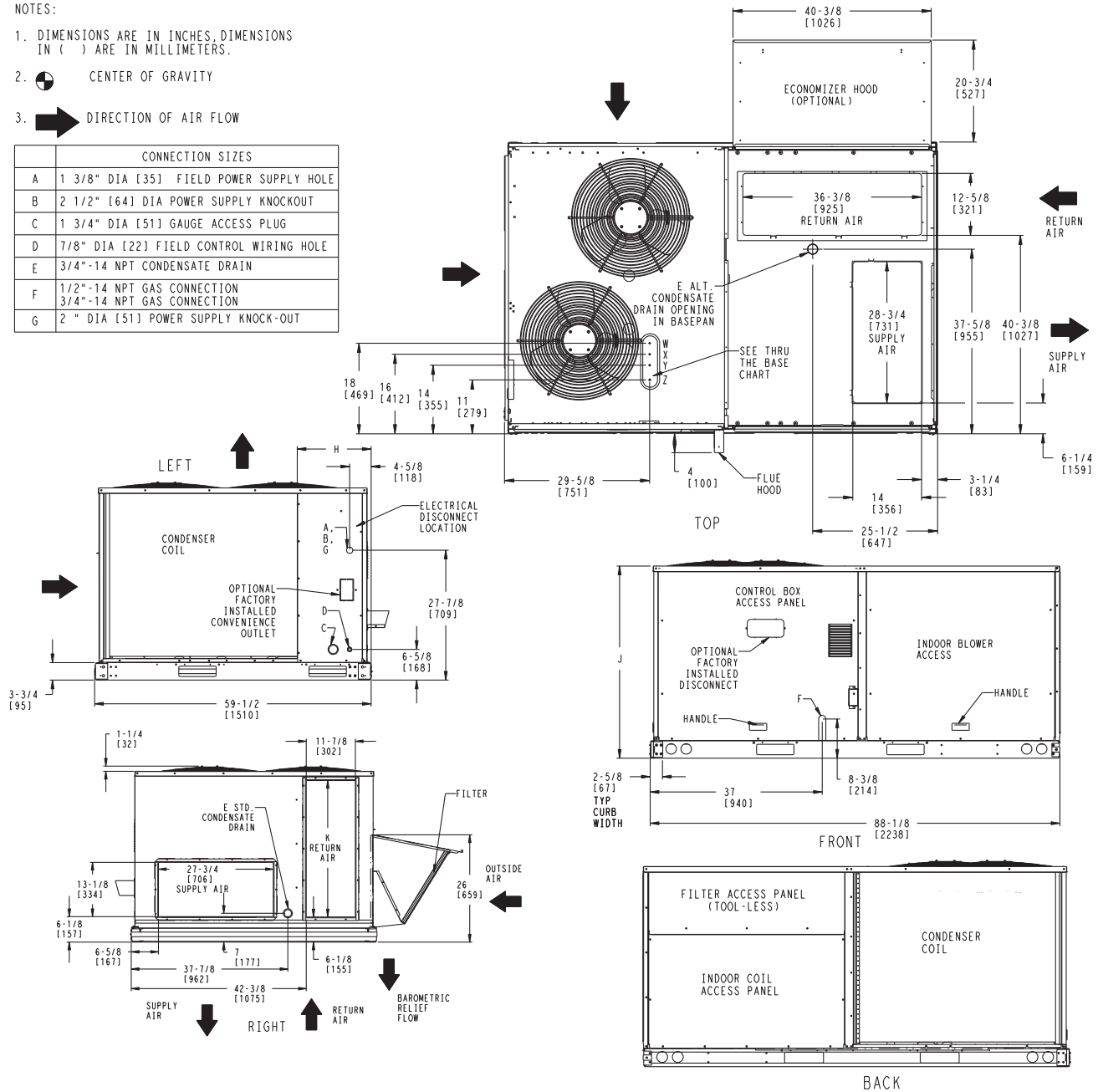
Fig. 4 - Roof Curb Details - 48TC 04-07

CURBS, WEIGHTS & DIMENSIONS (cont.)

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN () ARE IN MILLIMETERS.
2.  CENTER OF GRAVITY
3.  DIRECTION OF AIR FLOW

CONNECTION SIZES	
A	1 3/8" DIA [35] FIELD POWER SUPPLY HOLE
B	2 1/2" [64] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" DIA [51] GAUGE ACCESS PLUG
D	7/8" DIA [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION
G	3/4"-14 NPT GAS CONNECTION
G	2 " DIA [51] POWER SUPPLY KNOCK-OUT



UNIT	OUTDOOR COIL TYPE	J	K	H
48TC-A08	RTPF	41 1/4 [1048]	33 [658]	15 7/8 [403]
48TC-A09	RTPF	49 3/8 [1253]	37 1/4 [946]	27 7/8 [708]
48TC-A12	RTPF	49 3/8 [1253]	37 1/4 [946]	15 7/8 [403]
48TC-D08	RTPF	41 1/4 [1048]	33 [658]	15 7/8 [403]
48TC-D09	RTPF	49 3/8 [1253]	37 1/4 [946]	15 7/8 [403]
48TC-D12	RTPF	49 3/8 [1253]	37 1/4 [946]	15 7/8 [403]
48TC-D08	MCHX	41 1/4 [1048]	33 [658]	23 [584.2]
48TC-D12	MCHX	49 3/8 [1253]	37 1/4 [946]	11 [279.4]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)
MCHX - NOVIATION (ALUM/ALUM)

THRU-THE-BASE CHART (FIELD INST)

THESE HOLES REQUIRED FOR USE WITH ACCY KITS:
CRBTMPWRO02A01: GAS THRU CURB
CRBTMPWRO04A01: GAS THRU BASEPAN

	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	ACC.	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	1 1/4" (002,004)	POWER	1 3/4" [44.4]
Z *	(004) 3/4" FPT	GAS	1 3/4" [44.4]
*	(002) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING. HOLE SIZE: 2" [50.8]		

THRU-THE-BASE CHART (FIOP)

FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED. **

** FOR BELOW LISTED MODELS, A FIELD SUPPLIED 1/2" ADAPTER IS REQUIRED BETWEEN BASE PAN FITTING AND GAS VALVE: 48TCD, S*08,09

Fig. 5 - Dimensions 48TC 08-12

C10298

CURBS, WEIGHTS & DIMENSIONS (cont.)

UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48TC-A08	RTPF	780	354	178	81	158	72	209	95	236	107	41 1/2 [1054]	33 7/8 [860]	20 1/2 [521]
48TC-A09	RTPF	920	418	212	96	183	83	243	110	282	128	40 7/8 [1038]	34 [864]	23 1/8 [587]
48TC-A12	RTPF	930	422	216	98	196	89	247	112	272	123.5	42 [1067]	33 1/8 [841]	24 1/4 [616]
48TC-D08	RTPF	835	379	164	74.5	170	77.2	255	115.8	246	111.7	44 7/8 [1140]	35 5/8 [905]	19 3/8 [492]
48TC-D09	RTPF	930	422	228	103.5	187	85	232	105.3	283	128.5	39 3/4 [1010]	32 7/8 [835]	18 5/8 [473]
48TC-D12	RTPF	940	427	231	104.9	189	85.8	234	106.2	286	129.8	39 3/4 [1010]	33 [838]	18 1/2 [470]
48TC-D08	MCHX	805	365.5	160	72.6	153	69.5	240	109	260	118	43 [1092]	36 3/8 [924]	20 3/8 [517.7]
48TC-D12	MCHX	895	406.3	185	84	176	79.9	260	118	274	124.4	42 7/8 [1089]	35 1/2 [902]	22 7/8 [581]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)
MCHX - NOVATION (ALUM/ALUM)

*** STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

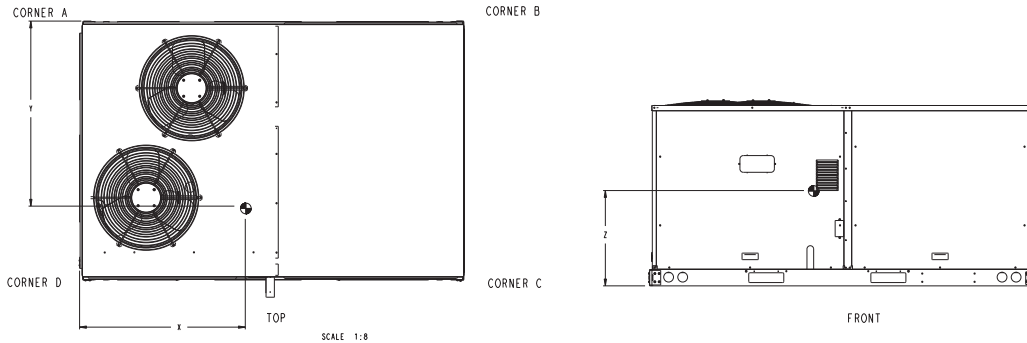


Fig. 6 - 48TC 08-12

C10299

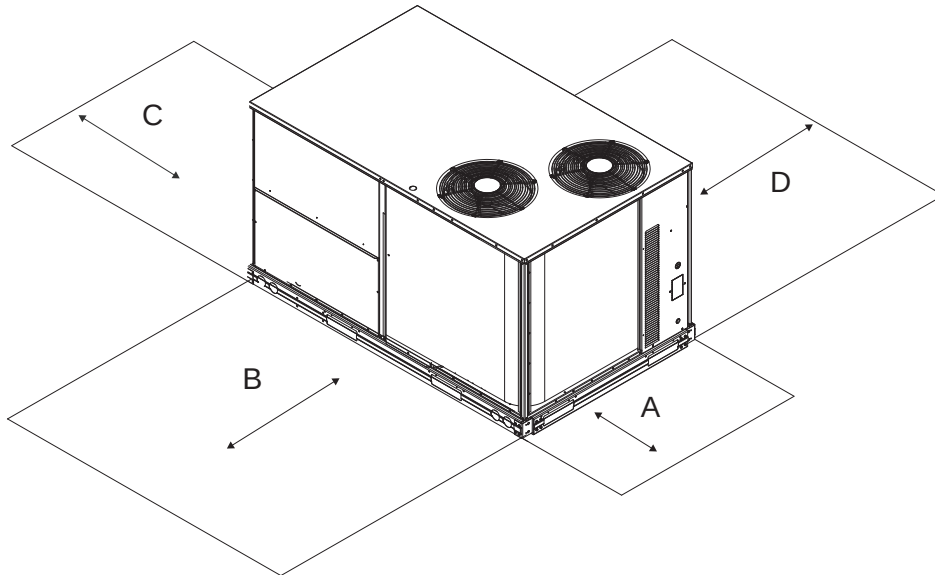


Fig. 7 - Service Clearance

C11247

LOC	DIMENSION	CONDITION
A	48-in (1219 mm)	Unit disconnect is mounted on panel
	36-in (914 mm)	If dimension-B is 12-in (305 mm)
	18-in (457 mm)	No disconnect, convenience outlet option
	18-in (457 mm)	Recommended service clearance (use electric screwdriver)
	12-in (305 mm)	Minimum clearance (use manual ratchet screwdriver)
B	36-in (914 mm)	Unit has economizer
	12-in (305 mm) Special	If dimension-A is 36-in (914 mm) Check for sources of flue products within 10-ft of unit fresh air intake hood
C	36-in (914 mm)	Side condensate drain is used
	18-in (457 mm)	Minimum clearance
D	48-in (1219 mm)	No flue discharge accessory installed, surface is combustible material
	42-in (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)
	36-in (914 mm)	Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)
	Special	Check for adjacent units or building fresh air intakes within 10-ft of this unit's flue outlet

NOTE: Unit not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or vertical clearances.

CURBS, WEIGHTS & DIMENSIONS (cont.)

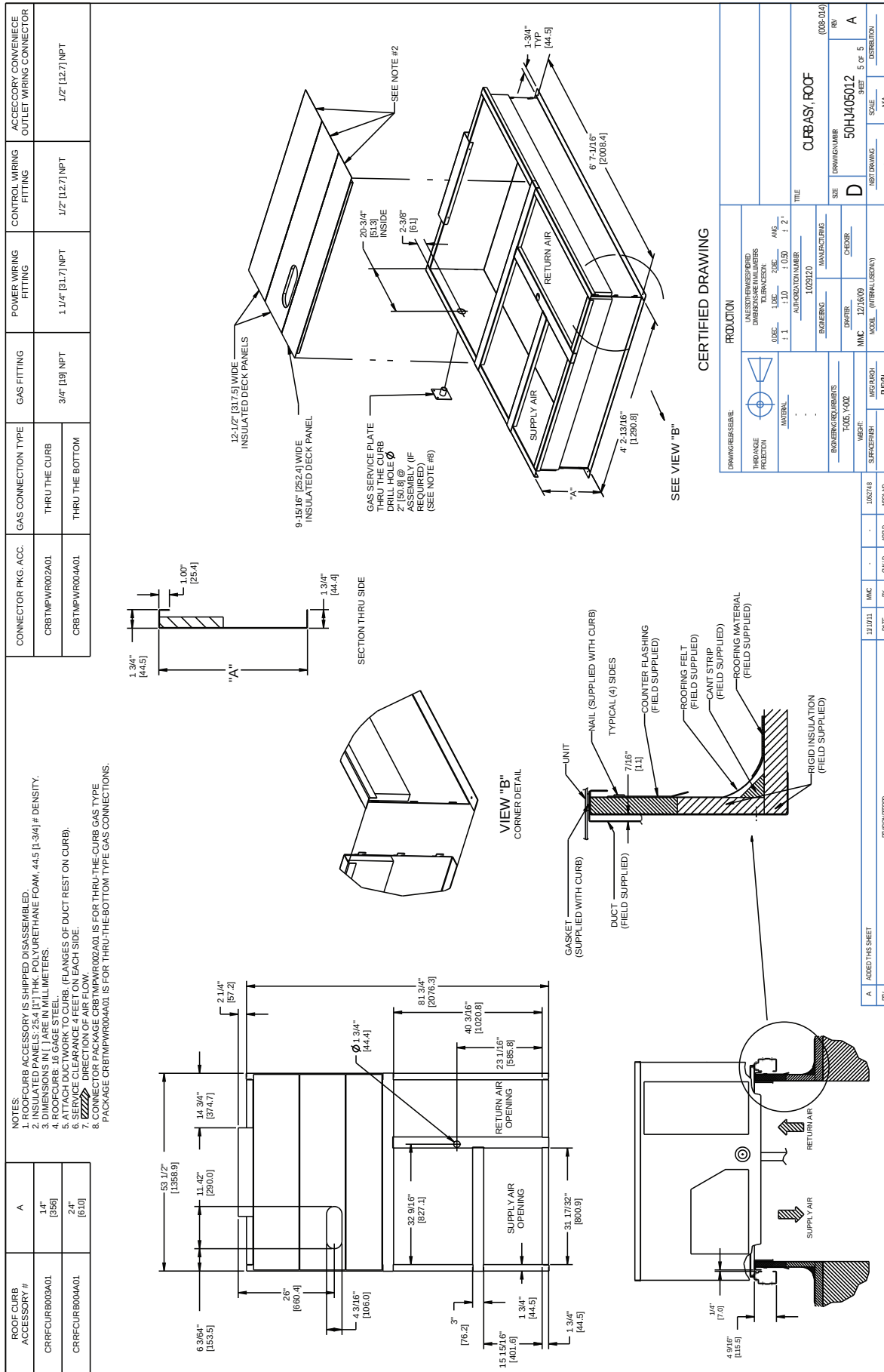


Fig. 8 - Roof Curb Details 48TC 08-14

CURBS, WEIGHTS & DIMENSIONS (cont.)

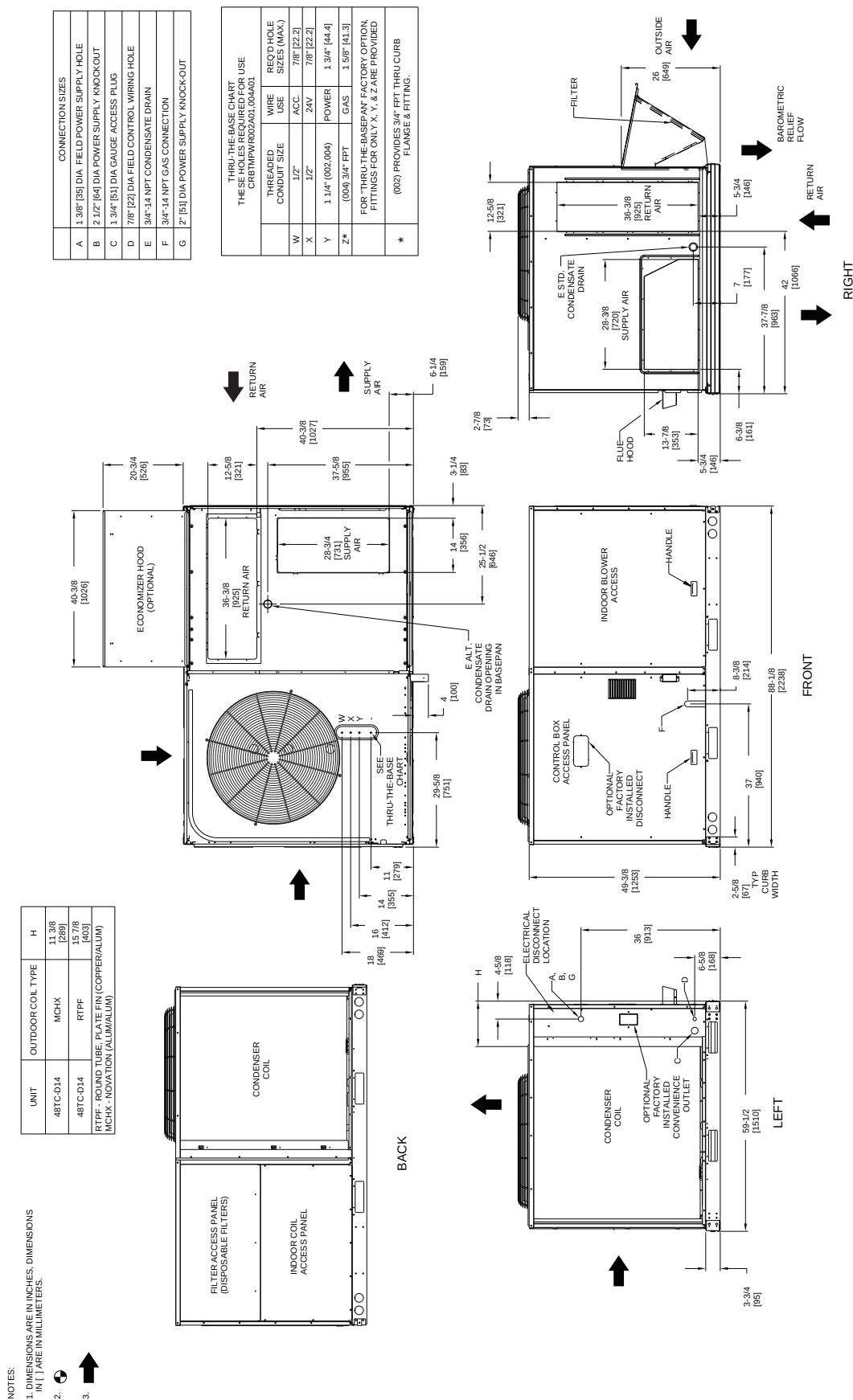


Fig. 9 - Dimensions 48TC 14

CURBS, WEIGHTS & DIMENSIONS (cont.)

UNIT	OUTDOOR COIL TYPE	STD. UNIT WEIGHT***		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48TC-D14	MCHX	1116	506	297	135	157	71	229	104	434	197	29 1/2 [749]	34 1/4 [870]	20 1/4 [514]
48TC-D14	RTPF	1167	530	349	159	167	76	211	96	440	200	31 3/8 [797]	34 3/4 [883]	21 7/8 [556]

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)
MCHX - MICROCHANNEL (ALUM/ALUM)

*STANDARD UNIT WEIGHT IS WITH LOW HEAT & WITHOUT PACKAGING.
FOR OPTIONS & ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

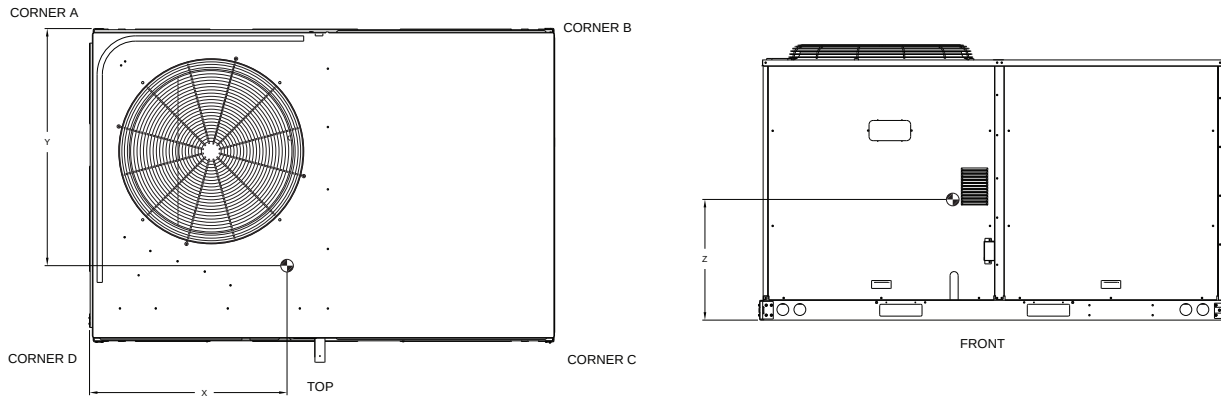


Fig. 10 - Dimensions 48TC 14

A10487A

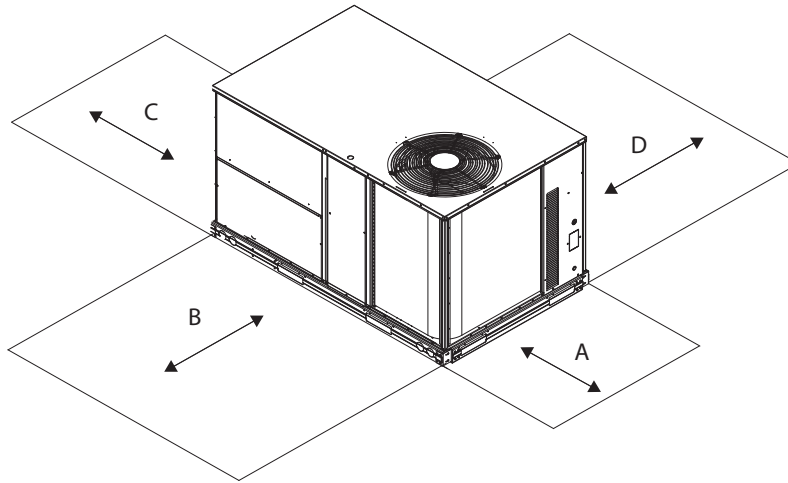


Fig. 11 - Service Clearance

C08337

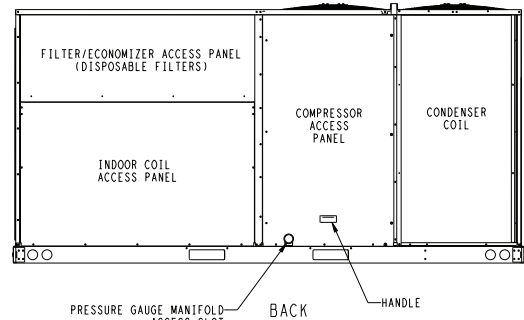
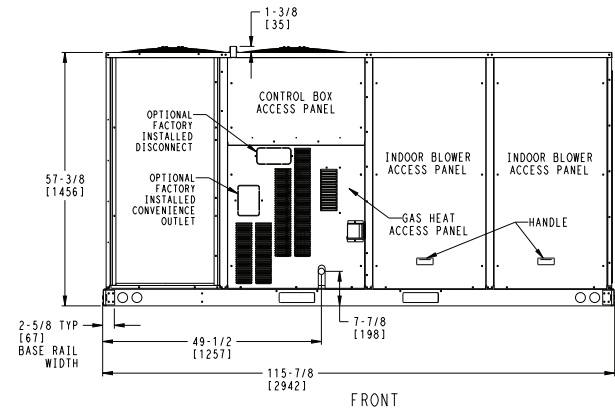
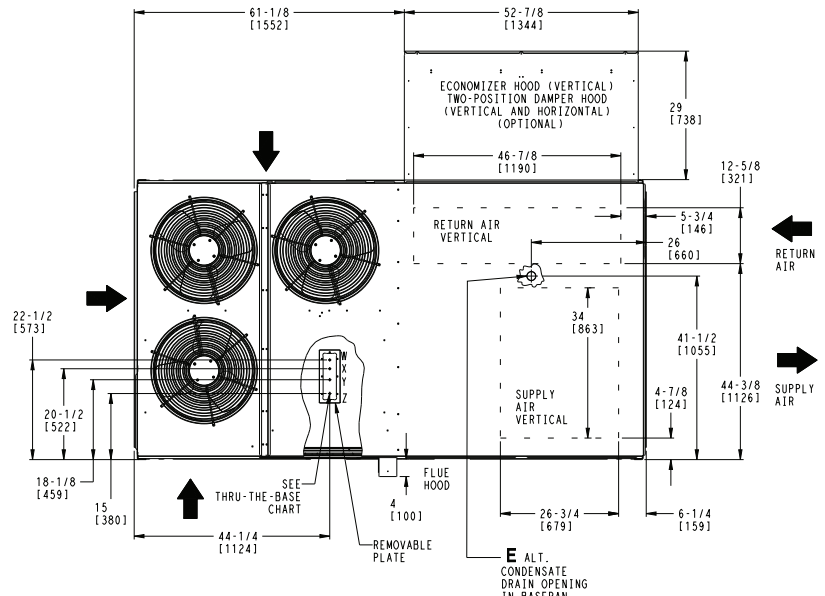
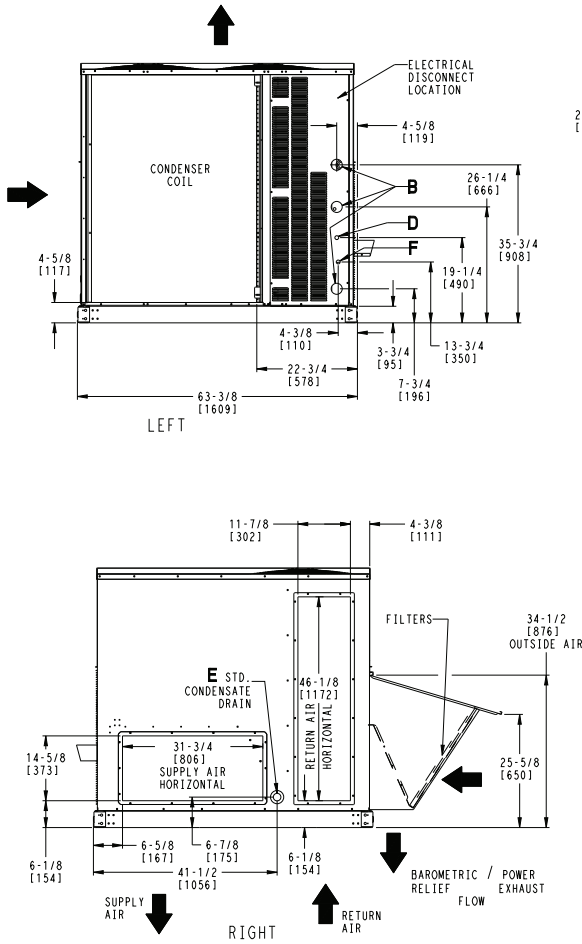
LOC	DIMENSION	CONDITION
A	48-in (1219 mm)	Unit disconnect is mounted on panel
	36-in (914 mm)	If dimension-B is 12-in (305 mm)
	18-in (457 mm)	No disconnect, convenience outlet option
	18-in (457 mm)	Recommended service clearance (use electric screwdriver)
	12-in (305 mm)	Minimum clearance (use manual ratchet screwdriver)
B	36-in (914 mm)	Unit has economizer
	12-in (305 mm)	If dimension-A is 36-in (914 mm)
	Special	Check for sources of flue products within 10-ft of unit fresh air intake hood
C	36-in (914 mm)	Side condensate drain is used
	18-in (457 mm)	Minimum clearance
D	48-in (1219 mm)	No flue discharge accessory installed, surface is combustible material
	42-in (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)
	36-in (914 mm)	Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)
	Special	Check for adjacent units or building fresh air intakes within 10-ft of this unit's flue outlet

NOTE: Unit not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or vertical clearances.

CURBS, WEIGHTS & DIMENSIONS (cont.)

NOTES:

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [] ARE IN MILLIMETERS.
2.  CENTER OF GRAVITY
3.  DIRECTION OF AIR FLOW



THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTMPWR005A00, 006A00, 007A00				
ACCESSORY NO.		THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
005	W	1/2"	ACC.	7/8" [22.2]
	X	1/2"	24V	7/8" [22.2]
	Y	1 1/4"	POWER	1 1/2" [38.1]
	Z	3/4" PIPE	GAS	1 3/4" [44.5]
006	W	1/2"	ACC.	7/8" [22.2]
	X	1/2"	24V	7/8" [22.2]
	Y	1 1/2"	POWER	2" [50.8]
	Z	3/4" PIPE	GAS	1 3/4" [44.5]
007	W	1/2"	ACC.	7/8" [22.2]
	X	1/2"	24V	7/8" [22.2]
	Y	2"	POWER	2 1/2" [63.5]
	Z	3/4" PIPE	GAS	1 3/4" [44.5]
FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR X & Y ARE PROVIDED AS SPECIFIED ON "006".				

CONNECTION SIZES	
B	2 1/2" [64] DIA POWER SUPPLY HOLE
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	7/8" [22] DIA FIELD CONVENIENCE OUTLET HOLE

Fig. 12 - Dimensions 48TC 16

A10488

CURBS, WEIGHTS & DIMENSIONS (cont.)

UNIT	STD UNIT WEIGHT*		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48TC-D16	1380	627	295	134	276	126	342	156	421	191	64 1/4 [1630]	35 [890]	21 1/8 [537]

*STANDARD UNIT WEIGHT IS WITH LOW HEAT & WITHOUT PACKAGING.
FOR OPTIONS & ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.

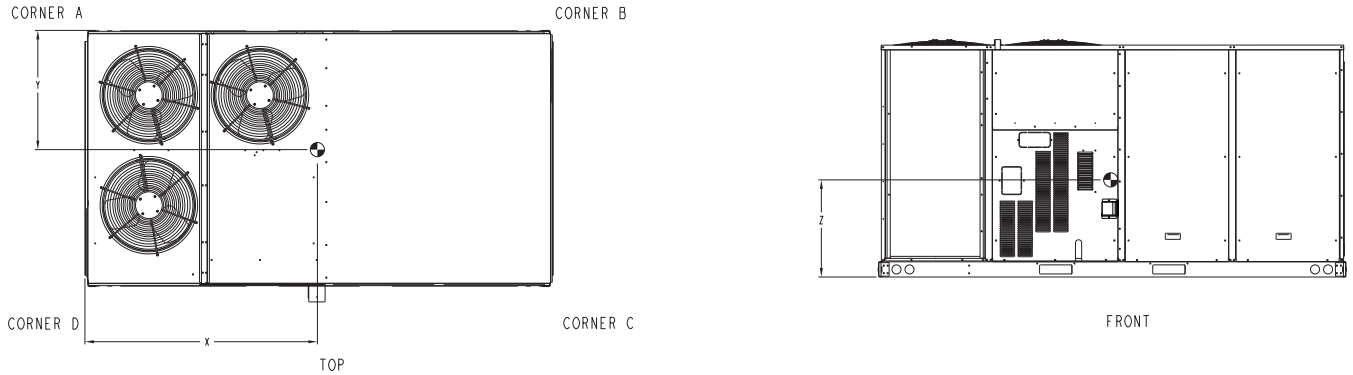


Fig. 13 - Dimensions 48TC 16

C10862B

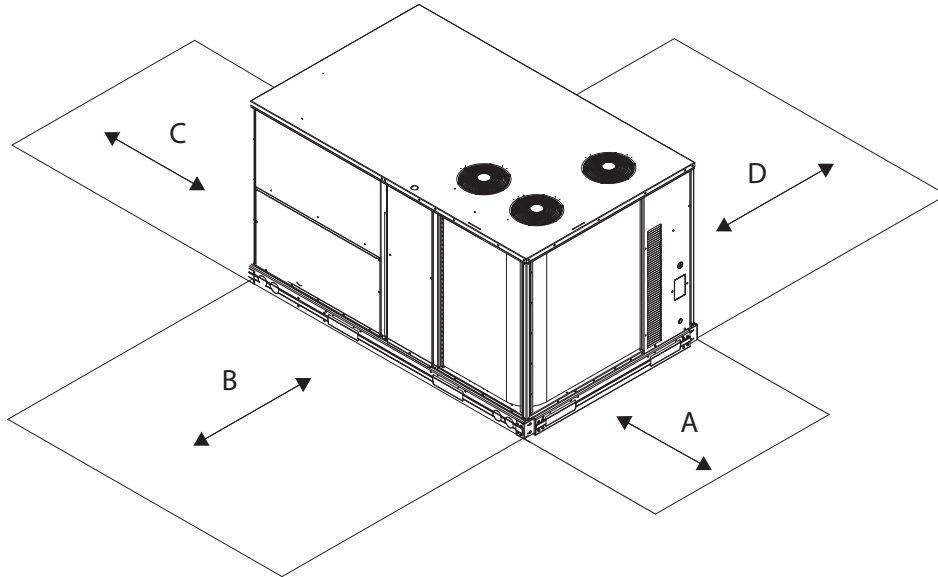


Fig. 14 - Service Clearance

C10578B

LOC	DIMENSION	CONDITION
A	48-in (1219 mm)	Unit disconnect is mounted on panel
	18-in (457 mm)	No disconnect, convenience outlet option
	18-in (457 mm)	Recommended service clearance
	12-in (305 mm)	Minimum clearance
B	42-in (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall)
	36-in (914 mm)	Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)
	Special	Check for sources of flue products within 10-ft of unit fresh air intake hood
C	36-in (914 mm)	Side condensate drain is used
	18-in (457 mm)	Minimum clearance
D	48-in (1219 mm)	No flue discharge accessory installed, surface is combustible material
	42-in (1067 mm)	Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)
	36-in (914 mm)	Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)
	Special	Check for adjacent units or building fresh air intakes within 10-ft of this unit's flue outlet

NOTE: Unit not designed to have overhead obstruction. Contact Application Engineering for guidance on any application planning overhead obstruction or vertical clearances.

CURBS, WEIGHTS & DIMENSIONS (cont.)

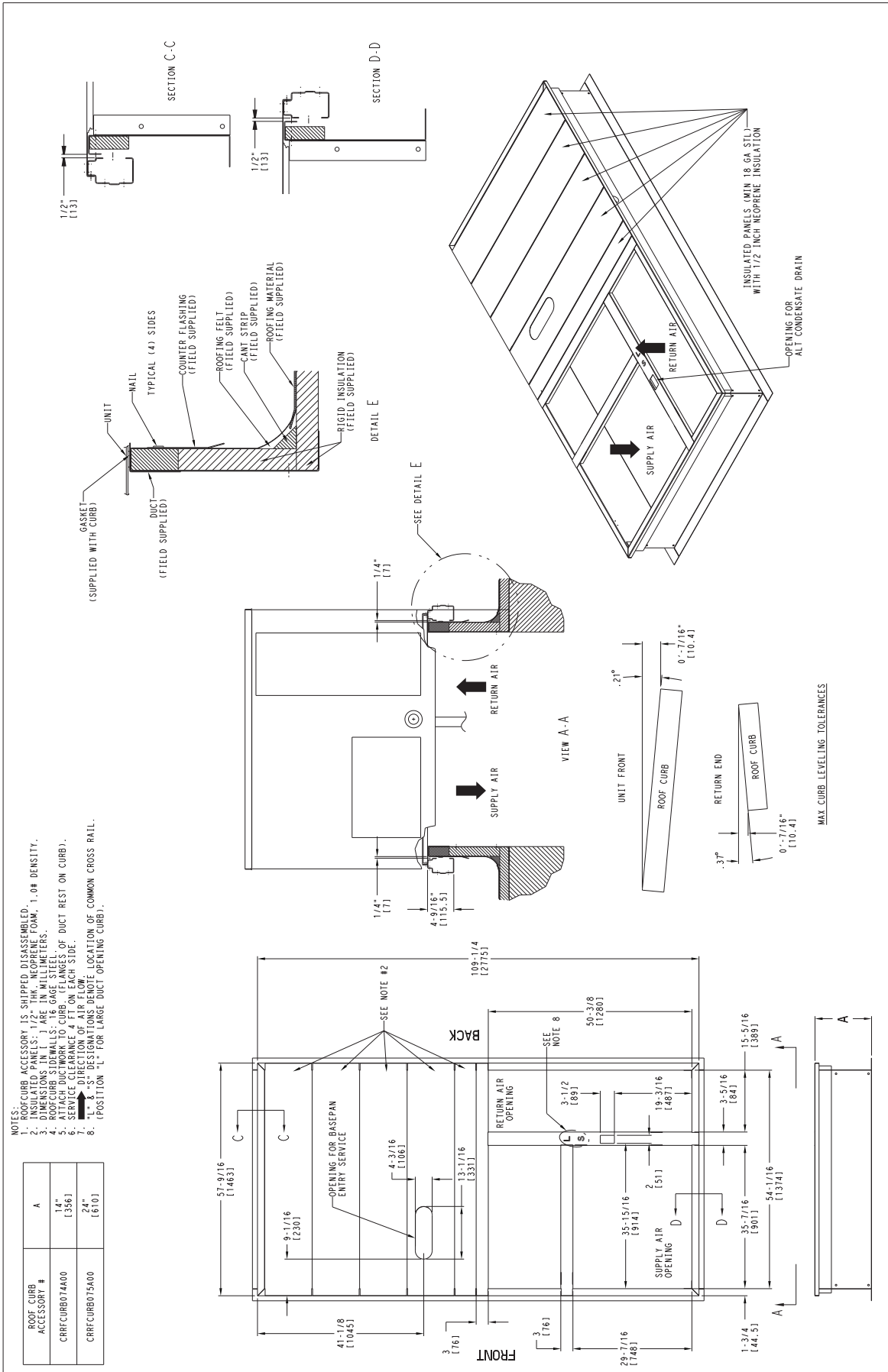


Fig. 15 - Roof Curb Details 48TC 16

C10772B

OPTIONS & ACCESSORY WEIGHTS

OPTION / ACCESSORY	OPTION / ACCESSORY WEIGHTS																	
	04		05		06		07		08		09		12		14		16	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
Humidi – MiZer ¹	15	7	23	10	25	11	29	13	38	17	47	21	47	21	47	21	57	26
Power Exhaust – vertical	50	23	50	23	50	23	50	23	75	34	75	34	75	34	75	34	85	39
Power Exhaust – horizontal	30	14	30	14	30	14	30	14	30	14	30	14	30	14	30	14	75	34
EconoMi\$er(IV, X or 2)	50	23	50	23	50	23	50	23	75	34	75	34	75	34	75	34	115	52
Two Position damper	39	18	39	18	39	18	39	18	58	26	58	26	58	26	58	26	65	29
Manual Dampers	12	5	12	5	12	5	12	5	18	8	18	8	18	8	18	8	25	11
Medium Gas Heat	12	5	9	4	9	4	9	4	15	7	15	7	18	8	18	8	28	13
High Gas Heat	–	–	17	8	17	8	17	8	29	13	29	13	35	16	35	16	50	23
Hail Guard (louvered)	16	7	16	7	16	7	16	7	34	15	34	15	34	15	34	15	45	20
Cu/Cu Condenser Coil ²	6	3	13	6	13	6	15	7	12	5	23	10	23	10	23	10	190	86
Cu/Cu Condenser and Evaporator Coils ²	12	5	19	9	21	10	26	12	25	11	49	22	49	22	49	22	280	127
Roof Curb (14–in. curb)	115	52	115	52	115	52	115	52	143	65	143	65	143	65	143	65	180	82
Roof Curb (24–in. curb)	197	89	197	89	197	89	197	89	245	111	245	111	245	111	245	111	255	116
CO ₂ sensor	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5	2
Flue Discharge Deflector	7	3	7	3	7	3	7	3	7	3	7	3	7	3	7	3	–	–
Optional Indoor Motor/Drive	10	5	10	5	10	5	10	5	15	7	15	7	15	7	15	7	45	20
Motor Master Controller	35	16	35	16	35	16	35	16	35	16	35	16	35	16	40	18	40	18
Return Smoke Detector	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5	2
Supply Smoke Detector	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5	2
Non – Fused Disconnect	15	7	15	7	15	7	15	7	15	7	15	7	15	7	15	7	15	7
Powered Convenience outlet	35	16	35	16	35	16	35	16	35	16	35	16	35	16	35	16	35	16
Non – Powered Convenience outlet	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5	2
Enthalpy Sensor	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
Differential Enthalpy Sensor	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1
SAV System with VFD	–	–	–	–	–	–	–	–	20	9	20	9	20	9	20	9	20	9

NOTE: Where multiple variations are available, the heaviest combination is listed.

– Not Available

¹ For Humidi – MiZer add MotorMaster Controller.

² Where available.

APPLICATION DATA

Min operating ambient temp (cooling):

In mechanical cooling mode, your Carrier rooftop unit can safely operate down to an outdoor ambient temperature of 40°F (4°C) and 25°F (-4°C), with an accessory winter start kit. It is possible to provide cooling at lower outdoor ambient temperatures by using less outside air, economizers, and/or accessory low ambient kits.

Max operating ambient temp (cooling):

The maximum operating ambient temperature for cooling mode is 115°F (46°C). While cooling operation above 115°F (46°C) may be possible, it could cause either a reduction in performance, reliability, or a protective action by the unit's internal safety devices.

Min mixed air temp (heating):

Using the factory settings, the minimum temperatures for the mixed air (the combined temperature of the warm return air and the cold outdoor air) entering the dimpled, gas heat exchangers are:

Aluminized

50°F (10°C) continuous

45°F (7°C) intermittent

Stainless Steel

40°F (4°C) continuous

35°F (2°C) intermittent

Operating at lower mixed-air temperatures may be possible, if a field supplied, outdoor air thermostat initiates both heat stages when the temperature is less than the minimum temperatures listed above. Please contact your local Carrier representative for assistance.

Min and max airflow (heating and cooling):

To maintain safe and reliable operation of your rooftop, operate within the heating airflow limits during heating mode and cooling airflow limits during cooling mode. Operating above the max may cause blow-off, undesired airflow noise, or airflow related problems with the rooftop unit. Operating below the min may cause problems with coil freeze-up and unsafe heating operation. Heating and cooling limitations differ when evaluating operating cfm, the minimum value is the HIGHER of the cooling and heating minimum cfm values published in Table 6 and the maximum value is the LOWER of the cooling and heating maximum values published in Table 6.

Heating-to-cooling changeover:

Your unit will automatically change from heating to cooling mode when using a thermostat with an auto-changeover feature.

Airflow:

All units are draw-through in cooling mode and blow-through in heating mode.

Outdoor air application strategies:

Economizers reduce operating expenses and compressor run time by providing a free source of cooling and a means of ventilation to match application changing needs. In fact, they should be considered for most applications. Also, consider the various economizer control methods and their benefits, as well as sensors required to accomplish your application goals. Please contact your local Carrier representative for assistance.

Motor limits, Brake horsepower (BHP):

Due to internal design of Carrier units, the air path, and specially designed motors, the full horsepower (maximum continuous BHP) band, as listed in Table 8 and 10, can be used with the utmost confidence. There is no need for extra safety factors, as Carrier motors are designed and rigorously tested to use the entire, listed BHP range without either nuisance tripping or premature motor failure.

Propane heating:

Propane has different physical qualities than natural gas. As a result, propane requires different fuel to air mixture. To optimize the fuel/air mixture for propane, Carrier sells different burner orifices in an easy to install accessory kit. To select the correct burner orifices or determine the heat capacity for a propane application, use either the selection software, or the unit's service manual.

High altitude heating:

High altitudes have less oxygen, which affects the fuel/air mixture in heat exchangers. In order to maintain a proper fuel/air mixture, heat exchangers operating in altitudes above 2000 ft (610 m) require different orifices. To select the correct burner orifices or determine the heat capacity for a high altitude application, use either the selection software, or the unit's service manual.

High altitudes have less oxygen, which means heat exchangers need less fuel. The new gas orifices in this field installed kit make the necessary adjustment for high altitude applications. They restore the optimal fuel to air mixture and maintain healthy combustion on altitudes above 2000 ft (610 m).

NOTE: Typical natural gas heating value ranges from 975 to 1050 Btu/ft³ at sea level nationally. The heating value goes down approximately 1.7% per every thousand feet elevation. Standard factory orifices can typically be used up to 2000 ft (610m) elevation without any operational issues.

NOTE: For installations in Canada, the input rating should be derated by 10% for altitudes from 2000 ft (610m) to 4500 ft (1372m) above sea level.

APPLICATION DATA (cont.)

Sizing a rooftop

Bigger isn't necessarily better. While an air conditioner needs to have enough capacity to meet the design loads, it doesn't need excess capacity. In fact, excess capacity typically results in very poor part load performance and humidity control.

Using higher design temperatures than ASHRAE recommends for your location, adding "safety factors" to the calculated load, are all signs of oversizing air conditioners. Oversizing the air conditioner leads to poor humidity control, reduced efficiency, higher utility bills, larger indoor temperature swings, excessive noise, and increased wear and tear on the air conditioner.

Rather than oversizing an air conditioner, engineers should "right size" or even slightly undersize air conditioners. Correctly sizing an air conditioner controls humidity better; promotes efficiency; reduces utility bills; extends equipment life, and maintains even, comfortable temperatures. Please contact your local Carrier representative for assistance.

Low ambient applications

The optional Carrier economizer can adequately cool your space by bringing in fresh, cool outside air. In fact, when so equipped, accessory low ambient kit may not be necessary. In low ambient conditions, unless the outdoor air is excessively humid or contaminated, economizer based "free cooling" is the preferred less costly and energy conscious method.

In low ambient applications where outside air might not be desired (such as contaminated or excessively humid outdoor environments), your Carrier rooftop can operate at ambient temperatures down to -20°F (-29°C) using the recommended accessory Motormaster low ambient controller.

Staged Air Volume (SAV) with Variable Frequency Drive (VFD)

Carrier's Staged Air Volume (SAV) system utilizes a Variable Frequency Drive (VFD) to automatically adjust the indoor fan motor speed in sequence with the units cooling operation. Per ASHRAE 90.1 2010 standard section 6.4.3.10.b, during the first stage of cooling operation the VFD will adjust the fan motor to provide 2/3rd of the total cfm established for the unit. When a call for the second stage of cooling is required, the VFD will allow the total cfm for the unit established (100%). During the heating mode, the VFD will allow total design cfm (100%) operation and during the ventilation mode the VFD will allow operation to 2/3rd of total cfm.

The VFD used in Carrier's SAV system has soft start capabilities to slowly ramp up the speeds, thus eliminating any high inrush air volume during initial start-up. It also has internal over current protection for the fan motor and a field installed display kit that allows adjustment and in depth diagnostics of the VFD.

This SAV system is available on models with 2-stage cooling operation with electrical mechanical or RTU Open (multi Protocol) controls. Both space sensor and conventional thermostats/controls can be used to provide accurate control in any application.

The SAV system is very flexible for initial fan performance set up and adjustment. The standard factory shipped VFD is pre programmed to automatically stage the fan speed between the first and second stage of cooling. The unit fan performance static pressure and cfm can be easily adjusted using the traditional means of pulley adjustments. The other means to adjust the unit static and cfm performance is to utilize the field installed display module and adjust the frequency and voltage in the VFD to required performance requirements. In either case, once set up the VFD will automatically adjust the speed between the cooling stage operation.

SELECTION PROCEDURE (WITH 48TC*A07 EXAMPLE)¹

I. Determine cooling and heating loads.

Given:

Mixed air dry bulb	80°F (27°C)
Mixed air wet bulb	67°F (19°C)
Ambient dry bulb	95°F (35°C)
TC _{Load}	72.0 MBH
SHC _{Load}	54.0 MBH
Vertical supply air	2100 CFM
Heating load	85.0 MBH
External static pressure	0.67 in. wg
Electrical characteristics	230-3-60

II. Make an initial guess at cooling tons.

Refrig. tons = TC_{Load} / 12 MBH per ton
 Refrig. tons = 72.0 / 12 = 6.0 tons
 In this case, start by looking at the 48TC**07.

III. Look up the rooftop's TC and SHC.

Table 19 shows that, at the application's supply air CFM, mixed air and ambient temperatures, the 48TC*A07 supplies:
 TC = 73.7 MBH²
 SHC = 54.4 MBH²

IV. Calculate the building latent heat load.

LC_{Load} = TC_{Load} - SHC_{Load}
 LC_{Load} = 72.0 MBH - 54.0 MBH = 18.0 MBH

V. Calculate RTU latent heat capacity.

LC = TC - SHC
 LC = 73.7 MBH - 54.4 MBH = 19.3 MBH

VI. Compare RTU capacities to loads.³

Compare the rooftop's SHC and LC to the building's sensible and latent heat loads.

VII. Select factory options (FIOP)

Local code requires an economizer for any unit with TC greater than 65.0 MBH.

VIII. Calculate the total static pressure.

External static pressure	0.67 in. wg
Sum of FIOP / Accessory static	+0.13 in. wg
Total Static Pressure	0.80 in. wg

IX. Look up the indoor fan RPM & BHP.

Table 47 shows, at 2100 CFM & ESP= 0.8, RPM = 1358 & BHP = 1.52

X. Convert BHP (Step VIII) into fan motor heat.

Fan motor heat = 2.546* BHP/Motor Eff.⁴
 Fan motor heat = 4.9 MBH

XI. Calculate RTU heating capacity.

Building heating load	85.0 MBH
Fan motor heat	-4.9 MBH
Required heating capacity	80.1 MBH

XII. Select a gas heater.

Table 3 shows the heating capacities of the 48TCEA07 = 93.0 MBH. Select the 48TCEA07

XIII. Determine electrical requirements.

The MCA and MOCP tables show 48TC*A07 (without convenience outlet) as:
 MCA = 30.5 amps & MOCP = 45.0 amps
 Min. disconnect size: FLA = 30 & LRA = 157.

Legend

BHP	— Brake horsepower
FLA	— Full load amps
LC	— Latent capacity
LRA	— Lock rotor amp
MBH	— (1,000) BTUH
MCA	— Min. circuit ampacity
MOCP	— Max. over-current protection
RPM	— Revolutions per minute
RTU	— Rooftop unit
SHC	— Sensible heat capacity
TC	— Total capacity

NOTES:

1. Selection software by Carrier saves time by performing many of the steps above. Contact your Carrier sales representative for assistance.
2. Unit ratings are gross capacities and do not include the effect of evaporator fan motor heat. See Step X. for determining amount of evaporator fan motor heat to subtract from total and sensible capacities to obtain net cooling and net sensible capacities.
3. Selecting a unit with a SHC slightly lower than the SHC_{Load} is often better than oversizing. Slightly lower SHC's will help control indoor humidity, and prevent temperature swings.
4. Indoor fan motor efficiency is available in Table 83. Use the decimal form in the equation, eg. 80% = .8.

Table 13 – COOLING CAPACITIES

1-STAGE COOLING

3 TONS

48TC*A04 (RTPF)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
900 Cfm	EAT (wb)	58	TC	28.1	28.1	31.7	26.3	26.3	29.8	24.5	24.5	27.7	22.6	22.6	25.5
			SHC	24.4	28.1	31.7	22.9	26.3	29.8	21.3	24.5	27.7	19.6	22.6	25.5
		62	TC	30.3	30.3	31.0	27.8	27.8	29.8	25.1	25.1	28.4	22.6	22.6	26.5
			SHC	22.6	26.8	31.0	21.5	25.7	29.8	20.2	24.3	28.4	18.7	22.6	26.5
		67	TC	35.5	35.5	35.5	33.1	33.1	33.1	30.5	30.5	30.5	27.5	27.5	27.5
			SHC	19.5	23.7	27.9	18.5	22.7	26.9	17.4	21.6	25.8	16.2	20.4	24.6
		72	TC	39.0	39.0	39.0	37.1	37.1	37.1	35.1	35.1	35.1	32.7	32.7	32.7
			SHC	15.3	19.5	23.7	14.5	18.8	23.0	13.7	17.9	22.2	12.9	17.1	21.3
		76	TC	–	41.4	41.4	–	39.6	39.6	–	37.6	37.6	–	35.4	35.4
			SHC	–	16.0	21.0	–	15.4	20.2	–	14.6	19.3	–	13.8	18.3
1050 Cfm	EAT (wb)	58	TC	30.2	30.2	34.2	28.4	28.4	32.2	26.5	26.5	30.0	24.5	24.5	27.7
			SHC	26.3	30.2	34.2	24.7	28.4	32.2	23.1	26.5	30.0	21.3	24.5	27.7
		62	TC	31.9	31.9	34.2	29.4	29.4	32.8	26.7	26.7	31.2	24.5	24.5	28.8
			SHC	24.6	29.4	34.2	23.4	28.1	32.8	22.0	26.6	31.2	20.3	24.5	28.8
		67	TC	36.7	36.7	36.7	34.8	34.8	34.8	32.2	32.2	32.2	29.1	29.1	29.1
			SHC	20.6	25.4	30.2	19.8	24.6	29.4	18.8	23.6	28.4	17.6	22.4	27.2
		72	TC	40.1	40.1	40.1	38.2	38.2	38.2	36.1	36.1	36.1	33.7	33.7	33.7
			SHC	15.7	20.5	25.3	15.0	19.8	24.6	14.2	19.0	23.8	13.4	18.2	23.0
		76	TC	–	42.4	42.4	–	40.6	40.6	–	38.5	38.5	–	36.2	36.2
			SHC	–	16.6	22.2	–	15.9	21.3	–	15.2	20.4	–	14.4	19.5
1200 Cfm	EAT (wb)	58	TC	32.2	32.2	36.4	30.4	30.4	34.3	28.4	28.4	32.1	26.3	26.3	29.7
			SHC	28.0	32.2	36.4	26.4	30.4	34.3	24.7	28.4	32.1	22.8	26.3	29.7
		62	TC	33.3	33.3	37.0	30.8	30.8	35.5	28.4	28.4	33.4	26.3	26.3	30.9
			SHC	26.4	31.7	37.0	25.1	30.3	35.5	23.4	28.4	33.4	21.7	26.3	30.9
		67	TC	37.7	37.7	37.7	35.6	35.6	35.6	33.4	33.4	33.4	30.4	30.4	30.4
			SHC	21.7	27.0	32.4	20.9	26.3	31.6	20.0	25.4	30.8	18.8	24.2	29.6
		72	TC	40.9	40.9	40.9	39.0	39.0	39.0	36.9	36.9	36.9	34.4	34.4	34.4
			SHC	16.1	21.5	26.8	15.4	20.8	26.1	14.7	20.0	25.4	13.8	19.2	24.5
		76	TC	–	43.1	43.1	–	41.3	41.3	–	39.1	39.1	–	36.8	36.8
			SHC	–	17.1	23.1	–	16.4	22.3	–	15.7	21.4	–	14.9	20.5
1350 Cfm	EAT (wb)	58	TC	–	–	–	32.1	32.1	36.3	30.0	30.0	34.0	27.9	27.9	31.5
			SHC	–	–	–	27.9	32.1	36.3	26.1	30.0	34.0	24.2	27.9	31.5
		62	TC	28.4	28.4	30.5	32.2	32.2	37.8	30.1	30.1	35.3	27.9	27.9	32.8
			SHC	17.6	24.1	30.5	26.6	32.2	37.8	24.8	30.1	35.3	23.0	27.9	32.8
		67	TC	33.2	33.2	33.2	36.4	36.4	36.4	34.1	34.1	34.1	31.5	31.5	32.0
			SHC	15.0	21.4	27.9	21.9	27.8	33.7	21.0	26.9	32.9	20.0	26.0	32.0
		72	TC	37.5	37.5	37.5	39.7	39.7	39.7	37.5	37.5	37.5	35.0	35.0	35.0
			SHC	11.8	18.3	24.8	15.8	21.7	27.5	15.0	20.9	26.8	14.2	20.1	26.0
		76	TC	–	40.1	40.1	–	41.8	41.8	–	39.6	39.6	–	37.3	37.3
			SHC	–	15.3	22.7	–	16.8	23.2	–	16.1	22.3	–	15.3	21.5
1500 Cfm	EAT (wb)	58	TC	28.1	28.1	34.2	33.7	33.7	38.1	31.6	31.6	35.7	29.3	29.3	33.2
			SHC	21.9	28.1	34.2	29.3	33.7	38.1	27.4	31.6	35.7	25.5	29.3	33.2
		62	TC	30.3	30.3	33.8	33.7	33.7	39.6	31.6	31.6	37.1	29.4	29.4	34.5
			SHC	19.8	26.8	33.8	27.8	33.7	39.6	26.1	31.6	37.1	24.2	29.4	34.5
		67	TC	35.5	35.5	35.5	36.9	36.9	36.9	34.6	34.6	34.9	32.0	32.0	34.0
			SHC	16.7	23.7	30.7	22.8	29.2	35.7	21.9	28.4	34.9	21.0	27.5	34.0
		72	TC	39.0	39.0	39.0	40.2	40.2	40.2	38.0	38.0	38.0	35.5	35.5	35.5
			SHC	12.4	19.5	26.6	16.1	22.5	28.8	15.4	21.7	28.1	14.6	21.0	27.4
		76	TC	–	41.4	41.4	–	42.2	42.2	–	40.0	40.0	–	–	–
			SHC	–	16.0	24.3	–	17.2	24.0	–	16.5	23.2	–	–	–

LEGEND:

–	– Do not operate
Cfm	– Cubic feet per minute (supply air)
EAT(db)	– Entering air temperature (dry bulb)
EAT(wb)	– Entering air temperature (wet bulb)
SHC	– Sensible heat capacity
TC	– Total capacity

Table 14 – COOLING CAPACITIES

1-STAGE COOLING

3 TONS

48TC04 (3 TONS) – UNIT WITH HUMIDI-MIZER SYSTEM IN SUBCOOLING MODE										
Air Entering Evaporator – CFM										
Temp (F) Air Ent Condenser (Edb)		80 dry bulb 72 wet bulb			80 dry bulb 67 wet bulb			80 dry bulb 62 wet bulb		
		900	1200	1500	900	1200	1500	900	1200	1500
75	TC	40.6	43.2	45.3	37.0	39.4	41.3	33.4	35.6	37.4
	SHC	21.6	23.9	25.6	25.6	27.7	29.3	29.6	31.6	33.1
	kW	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
85	TC	37.0	39.6	41.7	33.6	36.0	37.9	30.2	32.3	34.1
	SHC	17.7	20.2	22.2	22.7	25.0	26.9	27.7	29.9	31.6
	kW	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
95	TC	33.5	36.0	38.1	30.2	32.5	34.4	26.9	29.1	30.8
	SHC	13.7	16.6	18.8	19.7	22.4	24.4	25.7	28.2	30.1
	kW	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5
105	TC	29.9	32.4	34.5	26.8	29.1	31.0	23.6	25.8	27.5
	SHC	9.8	12.9	15.3	16.8	19.7	22.0	23.8	26.5	28.6
	kW	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8
115	TC	26.3	28.8	30.9	23.3	25.7	27.5	20.4	22.5	24.2
	SHC	5.8	9.2	11.9	13.8	17.0	19.5	21.9	24.8	27.1
	kW	3.2	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.1

48TC04 (3 TONS) – UNIT WITH HUMIDI-MIZER SYSTEM IN HOT GAS REHEAT MODE										
Air Entering Evaporator – CFM										
Temp (F) Air Ent Condenser (Edb)		75 dry bulb 62.5 wet bulb (50% relative)			75 dry bulb 64 wet bulb (55% relative)			75 dry bulb 65.3 wet bulb (60% relative)		
		1050	1200	1350	1050	1200	1350	1050	1200	1350
80	TC	14.7	15.5	16.2	15.9	16.7	17.4	16.9	17.7	18.4
	SHC	6.7	7.6	8.5	4.8	5.7	6.6	3.2	4.1	5.0
	kW	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
75	TC	15.1	15.8	16.4	16.2	17.0	17.6	17.2	18.0	18.6
	SHC	7.5	8.4	9.2	5.8	6.7	7.5	4.4	5.2	6.0
	kW	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
70	TC	15.5	16.1	16.7	16.6	17.3	17.9	17.5	18.2	18.8
	SHC	8.4	9.3	10.0	6.9	7.7	8.5	5.5	6.4	7.1
	kW	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
60	TC	16.2	16.8	17.3	17.2	17.8	18.3	18.1	18.7	19.2
	SHC	10.2	10.9	11.6	8.9	9.7	10.4	7.8	8.6	9.3
	kW	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9
50	TC	17.0	17.5	17.9	17.9	18.4	18.8	18.7	19.2	19.6
	SHC	11.9	12.6	13.2	11.0	11.6	12.2	10.1	10.8	11.4
	kW	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.8
40	TC	17.7	18.1	18.5	18.6	19.0	19.3	19.3	19.7	20.1
	SHC	13.7	14.3	14.8	13.0	13.6	14.1	12.4	13.0	13.5
	kW	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7

LEGEND

Edb – Entering Dry-Bulb
 Ewb – Entering Wet-Bulb
 kW – Compressor Motor Power Input
 ldb – Leaving Dry-Bulb
 lwb – Leaving Wet-Bulb
 SHC – Sensible Heat Capacity (1000 Btuh) Gross
 TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 15 – COOLING CAPACITIES

1-STAGE COOLING

4 TONS

48TC*A05 (RTPF)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
1200 Cfm	EAT (wb)	58	TC	–	–	–	–	–	–	36.1	36.1	40.7	34.3	34.3	38.6
			SHC	–	–	–	–	–	–	31.5	36.1	40.7	29.9	34.3	38.6
		62	TC	43.1	43.1	43.1	40.8	40.8	40.8	38.4	38.4	39.4	35.9	35.9	38.2
			SHC	31.2	36.4	41.7	30.1	35.3	40.6	28.9	34.1	39.4	27.8	33.0	38.2
		67	TC	47.4	47.4	47.4	45.2	45.2	45.2	42.9	42.9	42.9	40.3	40.3	40.3
			SHC	25.9	31.2	36.4	25.0	30.2	35.5	23.9	29.2	34.4	22.9	28.2	33.4
		72	TC	51.1	51.1	51.1	49.1	49.1	49.1	46.8	46.8	46.8	43.9	43.9	43.9
			SHC	20.1	25.5	30.9	19.4	24.7	30.1	18.4	23.7	29.0	17.4	22.7	28.0
		76	TC	–	53.3	53.3	–	51.5	51.5	–	49.2	49.2	–	45.9	45.9
			SHC	–	20.8	27.4	–	20.2	26.8	–	19.3	25.7	–	18.3	24.6
1400 cfm	EAT (wb)	58	TC	41.9	41.9	47.3	40.1	40.1	45.3	38.2	38.2	43.2	36.3	36.3	41.0
			SHC	36.6	41.9	47.3	35.0	40.1	45.3	33.3	38.2	43.2	31.7	36.3	41.0
		62	TC	44.6	44.6	45.4	42.3	42.3	44.2	39.8	39.8	42.9	37.3	37.3	41.6
			SHC	33.4	39.4	45.4	32.3	38.3	44.2	31.0	37.0	42.9	29.8	35.7	41.6
		67	TC	48.7	48.7	48.7	46.6	46.6	46.6	44.2	44.2	44.2	41.4	41.4	41.4
			SHC	27.3	33.2	39.2	26.4	32.3	38.3	25.3	31.3	37.3	24.2	30.2	36.2
		72	TC	52.2	52.2	52.2	50.3	50.3	50.3	47.8	47.8	47.8	44.8	44.8	44.8
			SHC	20.6	26.7	32.7	19.9	25.9	32.0	18.9	24.9	30.9	17.9	23.8	29.7
		76	TC	–	54.1	54.1	–	52.3	52.3	–	49.9	49.9	–	46.4	46.4
			SHC	–	21.5	29.0	–	20.8	28.0	–	19.9	26.9	–	18.8	25.7
1600 Cfm	EAT (wb)	58	TC	44.0	44.0	49.6	42.1	42.1	47.4	40.1	40.1	45.2	38.1	38.1	43.0
			SHC	38.3	44.0	49.6	36.7	42.1	47.4	34.9	40.1	45.2	33.2	38.1	43.0
		62	TC	45.7	45.7	48.6	43.5	43.5	47.5	41.0	41.0	46.0	38.5	38.5	44.4
			SHC	35.3	42.0	48.6	34.2	40.8	47.5	32.9	39.4	46.0	31.6	38.0	44.4
		67	TC	49.8	49.8	49.8	47.6	47.6	47.6	45.1	45.1	45.1	42.3	42.3	42.3
			SHC	28.4	35.0	41.6	27.6	34.2	40.9	26.5	33.2	39.9	25.4	32.1	38.7
		72	TC	53.0	53.0	53.0	51.1	51.1	51.1	48.6	48.6	48.6	45.4	45.4	45.4
			SHC	21.0	27.6	34.3	20.3	27.0	33.6	19.4	26.0	32.6	18.3	24.8	31.3
		76	TC	–	54.6	54.6	–	52.8	52.8	–	50.4	50.4	–	46.8	46.8
			SHC	–	22.0	29.9	–	21.3	29.0	–	20.3	27.9	–	19.2	26.6
1800 Cfm	EAT (wb)	58	TC	44.0	44.0	50.3	42.1	42.1	48.1	40.1	40.1	45.9	38.0	38.0	43.5
			SHC	37.6	44.0	50.3	36.0	42.1	48.1	34.3	40.1	45.9	32.6	38.0	43.5
		62	TC	45.7	45.7	49.5	43.5	43.5	48.3	41.0	41.0	46.8	38.4	38.4	45.2
			SHC	34.5	42.0	49.5	33.4	40.8	48.3	32.1	39.4	46.8	30.8	38.0	45.2
		67	TC	49.8	49.8	49.8	47.6	47.6	47.6	45.1	45.1	45.1	42.3	42.3	42.3
			SHC	27.6	35.0	42.5	26.8	34.2	41.7	25.7	33.2	40.7	24.6	32.1	39.5
		72	TC	53.0	53.0	53.0	51.1	51.1	51.1	48.6	48.6	48.6	45.4	45.4	45.4
			SHC	20.2	27.6	35.1	19.5	27.0	34.4	18.5	26.0	33.4	17.5	24.8	32.1
		76	TC	–	54.6	54.6	–	52.8	52.8	–	50.4	50.4	–	46.8	46.8
			SHC	–	22.0	30.9	–	21.3	30.0	–	20.3	28.9	–	19.2	27.5
2000 Cfm	EAT (wb)	58	TC	46.9	46.9	52.9	45.0	45.0	50.8	42.9	42.9	48.4	40.7	40.7	45.9
			SHC	40.9	46.9	52.9	39.3	45.0	50.8	37.4	42.9	48.4	35.5	40.7	45.9
		62	TC	47.5	47.5	54.0	45.3	45.3	52.5	43.0	43.0	50.3	40.7	40.7	47.7
			SHC	38.5	46.3	54.0	37.3	44.9	52.5	35.6	43.0	50.3	33.8	40.7	47.7
		67	TC	51.2	51.2	51.2	49.1	49.1	49.1	46.5	46.5	46.5	43.5	43.5	43.5
			SHC	30.5	38.3	46.0	29.8	37.6	45.5	28.7	36.6	44.5	27.5	35.4	43.2
		72	TC	54.0	54.0	54.0	52.1	52.1	52.1	49.7	49.7	49.7	46.2	46.2	46.2
			SHC	21.7	29.2	36.8	21.1	28.7	36.4	20.1	27.8	35.4	18.9	26.4	33.9
		76	TC	–	55.2	55.2	–	53.5	53.5	–	51.0	51.0	–	47.3	47.3
			SHC	–	22.7	31.4	–	22.0	30.6	–	21.1	29.6	–	19.9	28.1

LEGEND:

–	– Do not operate
Cfm	– Cubic feet per minute (supply air)
EAT(db)	– Entering air temperature (dry bulb)
EAT(wb)	– Entering air temperature (wet bulb)
SHC	– Sensible heat capacity
TC	– Total capacity

48TC05 (4 TONS) – UNIT WITH HUMIDI-MIZER SYSTEM IN SUBCOOLING MODE										
Air Entering Evaporator – CFM										
Temp (F) Air Ent Condenser (Edb)		80 dry bulb 72 wet bulb			80 dry bulb 67 wet bulb			80 dry bulb 62 wet bulb		
		1200	1600	2000	1200	1600	2000	1200	1600	2000
75	TC	52.5	55.9	58.6	47.1	50.2	52.7	41.7	44.5	46.8
	SHC	22.6	25.5	27.8	27.1	29.9	32.0	31.6	34.2	36.2
	kW	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
85	TC	48.7	52.2	54.9	43.4	46.5	49.0	38.0	40.8	43.1
	SHC	18.0	21.3	23.9	23.6	26.8	29.2	29.3	32.2	34.4
	kW	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
95	TC	44.9	48.4	51.2	39.6	42.8	45.3	34.3	37.1	39.4
	SHC	13.4	17.2	20.0	20.2	23.7	26.4	27.0	30.2	32.7
	kW	3.4	3.4	3.4	3.3	3.3	3.3	3.3	3.3	3.3
105	TC	41.1	44.7	47.5	35.9	39.1	41.7	30.6	33.5	35.8
	SHC	8.8	13.0	16.1	16.7	20.6	23.6	24.6	28.2	31.0
	kW	3.8	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.7
115	TC	37.4	41.0	43.9	32.1	35.4	38.0	26.8	29.8	32.1
	SHC	4.3	8.8	12.2	13.3	17.5	20.7	22.3	26.2	29.2
	kW	4.2	4.2	4.2	4.2	4.2	4.2	4.1	4.1	4.1

48TC05 (4 TONS) – UNIT WITH HUMIDI-MIZER SYSTEM IN HOT GAS REHEAT MODE										
Air Entering Evaporator – CFM										
Temp (F) Air Ent Condenser (Edb)		75 dry bulb 62.5 wet bulb (50% relative)			75 dry bulb 64 wet bulb (55% relative)			75 dry bulb 65.3 wet bulb (60% relative)		
		1200	1600	2000	1200	1600	2000	1200	1600	2000
80	TC	11.6	13.8	15.5	13.5	15.8	17.6	15.2	17.5	19.3
	SHC	-1.0	1.2	3.0	-3.1	-0.8	0.9	-4.8	-2.6	-0.9
	kW	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
75	TC	12.5	14.6	16.2	14.3	16.4	18.1	15.9	18.1	19.8
	SHC	-0.7	1.4	3.0	-2.7	-0.6	1.1	-4.3	-2.2	-0.6
	kW	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
70	TC	13.4	15.3	16.8	15.1	17.1	18.7	16.6	18.7	20.3
	SHC	-0.5	1.5	3.0	-2.3	-0.3	1.2	-3.8	-1.9	-0.3
	kW	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
60	TC	15.1	16.8	18.1	16.7	18.4	19.8	18.1	19.9	21.2
	SHC	0.0	1.7	3.1	-1.5	0.2	1.5	-2.8	-1.1	0.2
	kW	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
50	TC	16.9	18.3	19.4	18.3	19.8	20.9	19.6	21.0	22.2
	SHC	0.6	2.0	3.1	-0.7	0.7	1.8	-1.8	-0.4	0.7
	kW	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
40	TC	18.7	19.8	20.7	19.9	21.1	22.0	21.0	22.2	23.2
	SHC	1.1	2.2	3.1	0.1	1.2	2.1	-0.8	0.4	1.3
	kW	2.6	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7

LEGEND

Edb – Entering Dry-Bulb
 Ewb – Entering Wet-Bulb
 kW – Compressor Motor Power Input
 ldb – Leaving Dry-Bulb
 lwb – Leaving Wet-Bulb
 SHC – Sensible Heat Capacity (1000 Btuh) Gross
 TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 17 – COOLING CAPACITIES

1-STAGE COOLING

5 TONS

48TC*A06 (RTPF)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
1500 Cfm	EAT (wb)	58	TC	52.9	52.9	60.0	49.9	49.9	56.6	46.6	46.6	52.9	43.1	43.1	48.9
			SHC	45.8	52.9	60.0	43.2	49.9	56.6	40.4	46.6	52.9	37.3	43.1	48.9
		62	TC	56.2	56.2	57.6	52.2	52.2	55.7	47.8	47.8	53.5	43.2	43.2	51.0
			SHC	41.8	49.7	57.6	39.9	47.8	55.7	37.8	45.6	53.5	35.5	43.2	51.0
		67	TC	62.4	62.4	62.4	58.8	58.8	58.8	54.4	54.4	54.4	49.5	49.5	49.5
			SHC	34.8	42.8	50.7	33.2	41.2	49.1	31.4	39.3	47.3	29.4	37.3	45.3
		72	TC	68.2	68.2	68.2	64.8	64.8	64.8	60.8	60.8	60.8	56.2	56.2	56.2
			SHC	27.2	35.2	43.2	25.9	33.9	41.9	24.4	32.4	40.4	22.6	30.6	38.6
		76	TC	–	71.1	71.1	–	69.0	69.0	–	65.4	65.4	–	60.9	60.9
			SHC	–	28.4	36.6	–	27.6	35.9	–	26.3	34.6	–	24.8	33.0
1750 Cfm	EAT (wb)	58	TC	56.5	56.5	64.0	53.3	53.3	60.4	49.8	49.8	56.5	46.1	46.1	52.3
			SHC	48.9	56.5	64.0	46.1	53.3	60.4	43.1	49.8	56.5	39.9	46.1	52.3
		62	TC	58.5	58.5	63.4	54.4	54.4	61.3	49.9	49.9	58.9	46.1	46.1	54.4
			SHC	45.2	54.3	63.4	43.2	52.2	61.3	41.0	49.9	58.9	37.9	46.1	54.4
		67	TC	64.3	64.3	64.3	60.5	60.5	60.5	56.2	56.2	56.2	51.3	51.3	51.3
			SHC	36.9	46.1	55.2	35.3	44.5	53.7	33.6	42.8	51.9	31.6	40.8	49.9
		72	TC	69.5	69.5	69.5	66.5	66.5	66.5	62.4	62.4	62.4	57.7	57.7	57.7
			SHC	27.8	36.9	45.9	26.7	35.9	45.1	25.2	34.5	43.7	23.5	32.8	42.0
		76	TC	–	72.2	72.2	–	70.1	70.1	–	66.6	66.6	–	–	–
			SHC	–	29.3	38.9	–	28.6	38.2	–	27.4	36.8	–	–	–
2000 Cfm	EAT (wb)	58	TC	59.3	59.3	67.3	56.1	56.1	63.6	52.5	52.5	59.5	48.6	48.6	55.1
			SHC	51.4	59.3	67.3	48.6	56.1	63.6	45.4	52.5	59.5	42.1	48.6	55.1
		62	TC	60.1	60.1	68.5	56.2	56.2	66.3	52.5	52.5	62.0	48.7	48.7	57.4
			SHC	48.1	58.3	68.5	46.2	56.2	66.3	43.1	52.5	62.0	39.9	48.7	57.4
		67	TC	65.7	65.7	65.7	61.9	61.9	61.9	57.5	57.5	57.5	52.6	52.6	54.4
			SHC	38.8	49.1	59.5	37.3	47.7	58.1	35.6	46.0	56.4	33.6	44.0	54.4
		72	TC	70.1	70.1	70.1	67.6	67.6	67.6	63.6	63.6	63.6	58.9	58.9	58.9
			SHC	28.3	38.1	48.0	27.4	37.7	48.0	26.0	36.4	46.7	24.3	34.7	45.2
		76	TC	–	72.9	72.9	–	70.8	70.8	–	67.4	67.4	–	–	–
			SHC	–	30.1	40.7	–	29.3	39.9	–	28.2	38.7	–	–	–
2250 Cfm	EAT (wb)	58	TC	61.5	61.5	69.8	58.4	58.4	66.2	54.8	54.8	62.1	50.8	50.8	57.6
			SHC	53.2	61.5	69.8	50.5	58.4	66.2	47.4	54.8	62.1	43.9	50.8	57.6
		62	TC	61.6	61.6	72.6	58.4	58.4	68.9	54.8	54.8	64.6	50.8	50.8	59.9
			SHC	50.6	61.6	72.6	47.9	58.4	68.9	45.0	54.8	64.6	41.7	50.8	59.9
		67	TC	66.8	66.8	66.8	63.0	63.0	63.0	58.5	58.5	60.6	53.6	53.6	58.6
			SHC	40.5	52.0	63.4	39.1	50.7	62.3	37.4	49.0	60.6	35.5	47.0	58.6
		72	TC	70.8	70.8	70.8	68.5	68.5	68.5	64.5	64.5	64.5	59.8	59.8	59.8
			SHC	28.7	39.5	50.2	28.0	39.3	50.5	26.7	38.1	49.6	25.0	36.6	48.1
		76	TC	–	73.4	73.4	–	71.2	71.2	–	67.9	67.9	–	–	–
			SHC	–	30.7	42.1	–	30.0	41.4	–	28.9	40.4	–	–	–
2500 Cfm	EAT (wb)	58	TC	63.3	63.3	71.8	60.1	60.1	68.2	56.5	56.5	64.1	52.6	52.6	59.6
			SHC	54.8	63.3	71.8	52.1	60.1	68.2	49.0	56.5	64.1	45.5	52.6	59.6
		62	TC	63.4	63.4	74.7	60.2	60.2	71.0	56.6	56.6	66.7	52.6	52.6	62.1
			SHC	52.0	63.4	74.7	49.4	60.2	71.0	46.5	56.6	66.7	43.2	52.6	62.1
		67	TC	67.6	67.6	67.6	63.8	63.8	66.2	59.3	59.3	64.6	54.4	54.4	62.5
			SHC	42.1	54.6	67.1	40.9	53.5	66.2	39.2	51.9	64.6	37.2	49.8	62.5
		72	TC	71.3	71.3	71.3	69.0	69.0	69.0	65.1	65.1	65.1	60.4	60.4	60.4
			SHC	29.1	40.7	52.2	28.5	40.7	52.9	27.3	39.7	52.2	25.7	38.3	50.9
		76	TC	–	73.8	73.8	–	71.4	71.4	–	68.3	68.3	–	–	–
			SHC	–	31.2	43.3	–	30.5	42.6	–	29.6	41.9	–	–	–

LEGEND:

–	– Do not operate
Cfm	– Cubic feet per minute (supply air)
EAT(db)	– Entering air temperature (dry bulb)
EAT(wb)	– Entering air temperature (wet bulb)
SHC	– Sensible heat capacity
TC	– Total capacity

48TC06 (5 TONS) – UNIT WITH HUMIDI-MIZER SYSTEM IN SUBCOOLING MODE										
Air Entering Evaporator – CFM										
Temp (F) Air Ent Condenser (Edb)		80 dry bulb 72 wet bulb			80 dry bulb 67 wet bulb			80 dry bulb 62 wet bulb		
		1750	2000	2250	1750	2000	2250	1750	2000	2250
75	TC	73.1	78.7	84.5	63.2	66.9	70.8	53.2	55.1	57.1
	SHC	35.3	37.2	38.8	42.0	43.7	45.3	48.7	50.3	51.8
	kW	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
85	TC	67.6	71.2	75.0	59.1	61.2	63.3	50.6	51.1	51.5
	SHC	27.9	30.0	31.9	36.3	38.3	40.1	44.8	46.6	48.2
	kW	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
95	TC	62.1	63.8	65.5	55.1	55.4	55.8	48.0	47.0	46.0
	SHC	20.5	22.9	24.9	30.7	32.9	34.8	40.9	42.9	44.7
	kW	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
105	TC	56.6	56.3	56.0	51.0	49.6	48.3	45.4	43.0	40.5
	SHC	13.1	15.7	18.0	25.0	27.5	29.6	36.9	39.2	41.2
	kW	4.8	4.8	4.8	4.8	4.8	4.8	4.7	4.7	4.7
115	TC	51.1	48.8	46.5	46.9	43.9	40.7	42.8	39.0	35.0
	SHC	5.8	8.6	11.0	19.4	22.0	24.4	33.0	35.5	37.7
	kW	5.3	5.3	5.3	5.3	5.3	5.3	5.2	5.2	5.2

48TC06 (5 TONS) – UNIT WITH HUMIDI-MIZER SYSTEM IN HOT GAS REHEAT MODE										
Air Entering Evaporator – CFM										
Temp (F) Air Ent Condenser (Edb)		75 dry bulb 62.5 wet bulb (50% relative)			75 dry bulb 64 wet bulb (55% relative)			75 dry bulb 65.3 wet bulb (60% relative)		
		1750	2000	2250	1750	2000	2250	1750	2000	2250
80	TC	23.0	24.4	25.6	24.7	26.2	27.4	26.3	27.7	29.0
	SHC	5.3	6.1	6.8	3.2	4.0	4.7	1.4	2.2	2.9
	kW	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
75	TC	23.3	24.6	25.7	25.0	26.3	27.5	26.4	27.8	29.0
	SHC	5.1	5.8	6.5	3.1	3.9	4.5	1.4	2.2	2.8
	kW	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
70	TC	23.5	24.8	25.9	25.2	26.4	27.5	26.6	27.9	29.0
	SHC	4.8	5.5	6.2	3.0	3.7	4.3	1.4	2.1	2.8
	kW	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
60	TC	24.1	25.2	26.1	25.6	26.7	27.7	26.9	28.0	29.0
	SHC	4.3	5.0	5.5	2.8	3.4	3.9	1.4	2.0	2.6
	kW	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
50	TC	24.7	25.6	26.4	26.1	27.0	27.8	27.2	28.2	29.0
	SHC	3.8	4.4	4.8	2.5	3.1	3.5	1.4	2.0	2.4
	kW	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
40	TC	25.3	26.0	26.7	26.5	27.3	27.9	27.6	28.3	29.0
	SHC	3.3	3.8	4.2	2.3	2.8	3.1	1.4	1.9	2.3
	kW	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.2	3.2

LEGEND

Edb – Entering Dry-Bulb
 Ewb – Entering Wet-Bulb
 kW – Compressor Motor Power Input
 ldb – Leaving Dry-Bulb
 lwb – Leaving Wet-Bulb
 SHC – Sensible Heat Capacity (1000 Btuh) Gross
 TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 19 – COOLING CAPACITIES

1-STAGE COOLING

6 TONS

48TC*A07 (RTPF)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
1800 Cfm	EAT (wb)	58	TC	64.9	64.9	73.3	62.1	62.1	70.0	58.9	58.9	66.4	55.6	55.6	62.7
			SHC	56.6	64.9	73.3	54.1	62.1	70.0	51.4	58.9	66.4	48.5	55.6	62.7
		62	TC	68.7	68.7	70.3	64.9	64.9	68.5	60.8	60.8	66.4	56.4	56.4	64.0
			SHC	51.7	61.0	70.3	49.9	59.2	68.5	47.9	57.2	66.4	45.7	54.9	64.0
		67	TC	75.6	75.6	75.6	71.7	71.7	71.7	67.4	67.4	67.4	62.5	62.5	62.5
			SHC	42.8	52.2	61.5	41.2	50.5	59.8	39.3	48.6	58.0	37.2	46.5	55.8
		72	TC	82.6	82.6	82.6	78.5	78.5	78.5	73.7	73.7	73.7	67.8	67.8	67.8
			SHC	33.5	42.8	52.2	31.9	41.3	50.6	30.0	39.3	48.6	27.8	36.9	45.9
		76	TC	–	87.5	87.5	–	83.3	83.3	–	77.7	77.7	–	70.9	70.9
			SHC	–	35.0	44.9	–	33.5	43.4	–	31.6	41.5	–	29.3	39.1
2100 Cfm	EAT (wb)	58	TC	68.9	68.9	77.7	65.9	65.9	74.3	62.5	62.5	70.5	58.7	58.7	66.2
			SHC	60.1	68.9	77.7	57.4	65.9	74.3	54.5	62.5	70.5	51.2	58.7	66.2
		62	TC	70.9	70.9	76.9	67.1	67.1	75.0	63.0	63.0	72.5	58.7	58.7	68.7
			SHC	55.6	66.3	76.9	53.8	64.4	75.0	51.6	62.1	72.5	48.7	58.7	68.7
		67	TC	77.8	77.8	77.8	73.7	73.7	73.7	69.2	69.2	69.2	64.0	64.0	64.0
			SHC	45.4	56.1	66.8	43.7	54.4	65.2	41.8	52.5	63.2	39.6	50.2	60.7
		72	TC	84.5	84.5	84.5	80.3	80.3	80.3	75.1	75.1	75.1	68.8	68.8	68.8
			SHC	34.5	45.2	55.9	32.9	43.5	54.2	30.9	41.4	52.0	28.5	38.7	48.9
		76	TC	–	89.2	89.2	–	84.7	84.7	–	78.8	78.8	–	71.6	71.6
			SHC	–	36.3	47.8	–	34.7	46.0	–	32.6	43.7	–	30.1	40.9
2400 Cfm	EAT (wb)	58	TC	72.0	72.0	81.2	68.7	68.7	77.5	65.2	65.2	73.5	61.1	61.1	68.9
			SHC	62.8	72.0	81.2	60.0	68.7	77.5	56.9	65.2	73.5	53.3	61.1	68.9
		62	TC	72.8	72.8	82.8	68.9	68.9	80.7	65.2	65.2	76.4	61.2	61.2	71.6
			SHC	59.1	71.0	82.8	57.2	68.9	80.7	54.1	65.2	76.4	50.7	61.2	71.6
		67	TC	79.4	79.4	79.4	75.2	75.2	75.2	70.5	70.5	70.5	65.1	65.1	65.3
			SHC	47.7	59.8	71.8	46.0	58.1	70.2	44.0	56.0	68.1	41.6	53.5	65.3
		72	TC	86.0	86.0	86.0	81.6	81.6	81.6	76.1	76.1	76.1	69.6	69.6	69.6
			SHC	35.3	47.2	59.2	33.7	45.6	57.5	31.7	43.3	55.0	29.1	40.3	51.4
		76	TC	–	90.3	90.3	–	85.7	85.7	–	79.6	79.6	–	72.1	72.1
			SHC	–	37.3	49.8	–	35.6	48.0	–	33.5	45.6	–	30.8	42.5
2700 Cfm	EAT (wb)	58	TC	60.3	60.3	74.1	71.1	71.1	80.2	67.4	67.4	76.0	63.0	63.0	71.1
			SHC	46.4	60.3	74.1	62.0	71.1	80.2	58.8	67.4	76.0	55.0	63.0	71.1
		62	TC	65.4	65.4	69.3	71.2	71.2	83.3	67.5	67.5	79.0	63.1	63.1	73.8
			SHC	41.0	55.1	69.3	59.0	71.2	83.3	55.9	67.5	79.0	52.3	63.1	73.8
		67	TC	72.7	72.7	72.7	76.3	76.3	76.3	71.5	71.5	72.6	65.8	65.8	69.4
			SHC	33.8	48.0	62.2	48.2	61.6	74.9	46.1	59.3	72.6	43.5	56.5	69.4
		72	TC	79.7	79.7	79.7	82.5	82.5	82.5	76.9	76.9	76.9	70.1	70.1	70.1
			SHC	25.8	40.2	54.6	34.5	47.5	60.5	32.3	45.0	57.7	29.7	41.7	53.8
		76	TC	–	85.1	85.1	–	86.4	86.4	–	80.2	80.2	–	72.5	72.5
			SHC	–	33.5	48.4	–	36.5	49.9	–	34.3	47.3	–	31.5	44.0
3000 Cfm	EAT (wb)	58	TC	64.9	64.9	78.8	73.1	73.1	82.5	69.2	69.2	78.0	64.5	64.5	72.7
			SHC	51.1	64.9	78.8	63.8	73.1	82.5	60.3	69.2	78.0	56.2	64.5	72.7
		62	TC	68.7	68.7	76.5	73.2	73.2	85.7	69.2	69.2	81.0	64.5	64.5	75.5
			SHC	45.5	61.0	76.5	60.7	73.2	85.7	57.4	69.2	81.0	53.5	64.5	75.5
		67	TC	75.6	75.6	75.6	77.2	77.2	79.4	72.2	72.2	76.8	66.3	66.3	73.0
			SHC	36.6	52.2	67.7	50.2	64.8	79.4	48.0	62.4	76.8	45.1	59.1	73.0
		72	TC	82.6	82.6	82.6	83.3	83.3	83.3	77.5	77.5	77.5	70.5	70.5	70.5
			SHC	27.2	42.8	58.5	35.1	49.2	63.3	32.9	46.6	60.3	30.2	43.0	55.9
		76	TC	–	87.5	87.5	–	86.9	86.9	–	80.6	80.6	–	72.8	72.8
			SHC	–	35.0	51.5	–	37.3	51.6	–	35.0	48.9	–	32.1	45.3

LEGEND:

- Do not operate in this region
- Cfm – Cubic feet per minute (supply air)
- EAT(db) – Entering air temperature (dry bulb)
- EAT(wb) – Entering air temperature (wet bulb)
- SHC – Sensible heat capacity
- TC – Total capacity

48TC07 (6 TONS) – UNIT WITH HUMIDI-MIZER SYSTEM IN SUBCOOLING MODE										
Air Entering Evaporator – CFM										
Temp (F) Air Ent Condenser (Edb)		80 dry bulb 72 wet bulb			80 dry bulb 67 wet bulb			80 dry bulb 62 wet bulb		
		2100	2400	2700	2100	2400	2700	2100	2400	2700
75	TC	86.7	89.9	92.8	79.3	82.3	84.9	71.9	74.6	77.0
	SHC	40.1	41.8	43.3	46.9	48.5	49.9	53.7	55.2	56.5
	kW	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.2	4.2
85	TC	79.5	82.6	85.4	72.5	75.3	77.9	65.4	68.0	70.3
	SHC	32.1	34.0	35.7	40.7	42.5	44.1	49.4	51.0	52.5
	kW	5.0	5.0	5.0	5.0	5.0	5.0	4.9	4.9	4.9
95	TC	72.4	75.3	78.1	65.6	68.3	70.8	58.8	61.3	63.6
	SHC	24.1	26.3	28.1	34.6	36.6	38.3	45.1	46.9	48.5
	kW	5.8	5.8	5.8	5.7	5.7	5.7	5.6	5.6	5.6
105	TC	65.2	68.1	70.7	58.7	61.4	63.8	52.3	54.7	56.8
	SHC	16.2	18.5	20.5	28.5	30.6	32.6	40.7	42.8	44.6
	kW	6.5	6.5	6.5	6.4	6.4	6.4	6.3	6.3	6.3
115	TC	58.0	60.8	63.3	51.9	54.4	56.7	45.7	48.0	50.1
	SHC	8.2	10.7	13.0	22.3	24.7	26.8	36.4	38.6	40.6
	kW	7.2	7.2	7.2	7.1	7.1	7.1	7.0	7.0	7.0

48TC07 (6 TONS) – UNIT WITH HUMIDI-MIZER SYSTEM IN HOT GAS REHEAT MODE										
Air Entering Evaporator – CFM										
Temp (F) Air Ent Condenser (Edb)		75 dry bulb 62.5 wet bulb (50% relative)			75 dry bulb 64 wet bulb (55% relative)			75 dry bulb 65.3 wet bulb (60% relative)		
		2100	2400	2700	2100	2400	2700	1750	2000	2700
80	TC	16.7	19.8	22.5	18.8	21.9	24.7	16.2	19.4	26.7
	SHC	0.6	0.6	0.6	-0.4	-0.4	-0.4	-1.3	-1.3	-1.3
	kW	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
75	TC	17.7	20.6	23.1	19.6	22.6	25.3	17.3	20.3	27.1
	SHC	0.6	0.6	0.6	-0.3	-0.3	-0.3	-1.2	-1.2	-1.2
	kW	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
70	TC	18.6	21.3	23.7	20.5	23.3	25.8	18.3	21.1	27.6
	SHC	0.7	0.7	0.7	-0.2	-0.2	-0.2	-1.0	-1.0	-1.0
	kW	4.0	4.0	4.0	4.1	4.1	4.1	4.1	4.1	4.1
60	TC	20.5	22.9	25.0	22.2	24.7	26.8	20.4	22.8	28.5
	SHC	0.7	0.7	0.7	-0.0	-0.0	-0.0	-0.7	-0.7	-0.7
	kW	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
50	TC	22.4	24.4	26.2	24.0	26.0	27.9	22.4	24.5	29.3
	SHC	0.8	0.8	0.8	0.1	0.1	0.1	-0.4	-0.4	-0.4
	kW	4.1	4.1	4.1	4.1	4.1	4.1	4.2	4.2	4.2
40	TC	24.3	25.9	27.4	25.7	27.4	28.9	24.5	26.3	30.2
	SHC	0.8	0.8	0.8	0.3	0.3	0.3	-0.1	-0.1	-0.1
	kW	4.1	4.1	4.1	4.2	4.2	4.2	4.2	4.2	4.2

LEGEND

Edb – Entering Dry-Bulb
 Ewb – Entering Wet-Bulb
 kW – Compressor Motor Power Input
 ldb – Leaving Dry-Bulb
 lwb – Leaving Wet-Bulb
 SHC – Sensible Heat Capacity (1000 Btuh) Gross
 TC – Total Capacity (1000 Btuh) Gross

NOTES:

- Direct interpolation is permissible. Do not extrapolate.
- The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 21 – COOLING CAPACITIES

1-STAGE COOLING

7.5 TONS

48TC*A08 (RTPF)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EA (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
2250 Cfm	EAT (wb)	58	TC	81.2	81.2	91.8	77.5	77.5	87.7	73.6	73.6	83.3	69.5	69.5	78.7
			SHC	70.5	81.2	91.8	67.3	77.5	87.7	63.9	73.6	83.3	60.4	69.5	78.7
		62	TC	86.9	86.9	86.9	82.3	82.3	84.0	77.2	77.2	81.5	71.9	71.9	78.8
			SHC	63.6	74.9	86.2	61.4	72.7	84.0	58.9	70.2	81.5	56.3	67.6	78.8
		67	TC	95.2	95.2	95.2	90.7	90.7	90.7	85.7	85.7	85.7	79.9	79.9	79.9
			SHC	52.8	64.2	75.6	50.9	62.2	73.6	48.8	60.1	71.5	46.3	57.6	68.9
		72	TC	103.5	103.5	103.5	98.9	98.9	98.9	93.8	93.8	93.8	87.3	87.3	87.3
			SHC	41.5	53.1	64.6	39.7	51.2	62.7	37.7	49.2	60.6	35.3	46.6	57.8
		76	TC	–	109.6	109.6	–	104.8	104.8	–	99.1	99.1	–	91.6	91.6
			SHC	–	43.7	56.0	–	42.0	54.3	–	40.0	52.4	–	37.4	49.8
2625 Cfm	EAT (wb)	58	TC	85.9	85.9	97.2	82.2	82.2	93.1	78.1	78.1	88.4	73.9	73.9	83.6
			SHC	74.6	85.9	97.2	71.4	82.2	93.1	67.9	78.1	88.4	64.1	73.9	83.6
		62	TC	89.6	89.6	94.1	85.1	85.1	91.7	80.1	80.1	89.1	74.6	74.6	86.0
			SHC	68.1	81.1	94.1	65.9	78.8	91.7	63.4	76.3	89.1	60.6	73.3	86.0
		67	TC	97.9	97.9	97.9	93.2	93.2	93.2	88.1	88.1	88.1	82.0	82.0	82.0
			SHC	55.7	68.7	81.7	53.7	66.7	79.8	51.6	64.6	77.6	49.0	62.0	74.9
		72	TC	106.0	106.0	106.0	101.3	101.3	101.3	95.9	95.9	95.9	89.0	89.0	89.0
			SHC	42.7	55.8	68.9	40.9	53.9	67.0	38.8	51.8	64.7	36.2	48.9	61.7
		76	TC	–	111.8	111.8	–	106.9	106.9	–	100.7	100.7	–	92.7	92.7
			SHC	–	45.3	59.8	–	43.6	58.0	–	41.4	55.6	–	38.7	52.6
3000 Cfm	EAT (wb)	58	TC	89.6	89.6	101.4	85.9	85.9	97.2	81.7	81.7	92.5	77.0	77.0	87.1
			SHC	77.9	89.6	101.4	74.6	85.9	97.2	71.0	81.7	92.5	66.9	77.0	87.1
		62	TC	91.8	91.8	101.1	87.2	87.2	98.6	82.3	82.3	95.5	77.1	77.1	90.6
			SHC	72.2	86.7	101.1	69.9	84.3	98.6	67.2	81.3	95.5	63.5	77.1	90.6
		67	TC	99.9	99.9	99.9	95.2	95.2	95.2	89.9	89.9	89.9	83.6	83.6	83.6
			SHC	58.3	72.9	87.5	56.4	71.0	85.5	54.2	68.8	83.4	51.6	66.1	80.5
		72	TC	107.9	107.9	107.9	103.0	103.0	103.0	97.3	97.3	97.3	90.1	90.1	90.1
			SHC	43.7	58.3	72.8	41.9	56.4	70.9	39.7	54.1	68.4	37.0	51.0	65.0
		76	TC	–	113.8	113.8	–	108.4	108.4	–	102.0	102.0	–	93.4	93.4
			SHC	–	46.7	62.5	–	44.8	60.4	–	42.6	57.9	–	39.6	54.7
3375 Cfm	EAT (wb)	58	TC	92.7	92.7	104.9	88.8	88.8	100.5	84.6	84.6	95.7	79.6	79.6	90.0
			SHC	80.5	92.7	104.9	77.1	88.8	100.5	73.4	84.6	95.7	69.1	79.6	90.0
		62	TC	93.7	93.7	107.3	89.1	89.1	104.7	84.6	84.6	99.5	79.6	79.6	93.6
			SHC	75.8	91.6	107.3	73.5	89.1	104.7	69.8	84.6	99.5	65.6	79.6	93.6
		67	TC	101.5	101.5	101.5	96.7	96.7	96.7	91.3	91.3	91.3	84.8	84.8	85.7
			SHC	60.8	76.9	93.0	58.8	74.9	91.0	56.7	72.8	88.9	53.9	69.8	85.7
		72	TC	109.4	109.4	109.4	104.3	104.3	104.3	98.4	98.4	98.4	90.9	90.9	90.9
			SHC	44.6	60.5	76.4	42.8	58.6	74.4	40.5	56.2	71.8	37.7	52.8	68.0
		76	TC	–	115.1	115.1	–	109.5	109.5	–	102.8	102.8	–	94.0	94.0
			SHC	–	47.8	64.9	–	45.9	62.7	–	43.5	60.1	–	40.4	56.5
3750 Cfm	EAT (wb)	58	TC	95.3	95.3	107.8	91.3	91.3	103.3	86.9	86.9	98.3	81.7	81.7	92.4
			SHC	82.7	95.3	107.8	79.3	91.3	103.3	75.5	86.9	98.3	70.9	81.7	92.4
		62	TC	95.5	95.5	112.2	91.3	91.3	107.4	87.0	87.0	102.2	81.7	81.7	96.0
			SHC	78.7	95.5	112.2	75.3	91.3	107.4	71.7	87.0	102.2	67.4	81.7	96.0
		67	TC	102.8	102.8	102.8	97.9	97.9	97.9	92.3	92.3	94.0	85.7	85.7	90.5
			SHC	63.1	80.6	98.2	61.2	78.7	96.3	59.0	76.5	94.0	56.0	73.2	90.5
		72	TC	110.6	110.6	110.6	105.4	105.4	105.4	99.2	99.2	99.2	91.5	91.5	91.5
			SHC	45.5	62.7	79.9	43.5	60.7	77.8	41.3	58.1	75.0	38.3	54.5	70.7
		76	TC	–	116.1	116.1	–	110.3	110.3	–	103.5	103.5	–	94.5	94.5
			SHC	–	48.9	67.0	–	46.8	64.8	–	44.4	62.0	–	41.1	58.1

LEGEND:

- Do not operate in this region
- Cfm – Cubic feet per minute (supply air)
- EAT(db) – Entering air temperature (dry bulb)
- EAT(wb) – Entering air temperature (wet bulb)
- SHC – Sensible heat capacity
- TC – Total capacity

Table 22 – COOLING CAPACITIES

2-STAGE COOLING

7.5 TONS

48TC*D08 (RTPF & Novation)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EA (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
2250 Cfm	EAT (wb)	58	TC	77.4	77.4	87.8	73.8	73.8	83.8	70.1	70.1	79.5	66.0	66.0	74.9
			SHC	66.9	77.4	87.8	63.9	73.8	83.8	60.6	70.1	79.5	57.1	66.0	74.9
		62	TC	82.2	82.2	83.9	77.5	77.5	81.7	72.6	72.6	79.2	67.3	67.3	76.4
			SHC	60.8	72.4	83.9	58.6	70.1	81.7	56.3	67.7	79.2	53.6	65.0	76.4
		67	TC	90.1	90.1	90.1	86.0	86.0	86.0	81.4	81.4	81.4	75.9	75.9	75.9
			SHC	50.2	61.8	73.3	48.5	60.1	71.6	46.5	58.1	69.7	44.2	55.8	67.4
		72	TC	98.0	98.0	98.0	94.0	94.0	94.0	89.5	89.5	89.5	84.3	84.3	84.3
			SHC	39.1	50.7	62.4	37.5	49.2	60.9	35.8	47.5	59.2	33.8	45.5	57.2
		76	TC	–	104.3	104.3	–	100.4	100.4	–	95.9	95.9	–	90.7	90.7
			SHC	–	41.7	54.0	–	40.3	52.7	–	38.7	51.0	–	36.8	49.0
2625 Cfm	EAT (wb)	58	TC	82.1	82.1	93.2	78.4	78.4	89.0	74.4	74.4	84.4	70.0	70.0	79.5
			SHC	71.0	82.1	93.2	67.8	78.4	89.0	64.3	74.4	84.4	60.6	70.0	79.5
		62	TC	84.9	84.9	91.8	80.4	80.4	89.5	75.4	75.4	86.7	70.2	70.2	82.9
			SHC	65.4	78.6	91.8	63.2	76.3	89.5	60.6	73.7	86.7	57.6	70.2	82.9
		67	TC	92.5	92.5	92.5	88.3	88.3	88.3	83.6	83.6	83.6	78.3	78.3	78.3
			SHC	53.0	66.3	79.5	51.3	64.6	78.0	49.4	62.8	76.1	47.2	60.6	73.9
		72	TC	100.4	100.4	100.4	96.4	96.4	96.4	91.7	91.7	91.7	86.4	86.4	86.4
			SHC	40.2	53.5	66.7	38.7	52.0	65.3	36.9	50.3	63.7	35.0	48.4	61.8
		76	TC	–	106.5	106.5	–	102.6	102.6	–	98.0	98.0	–	92.7	92.7
			SHC	–	43.3	57.6	–	41.8	55.9	–	40.2	54.1	–	38.4	52.2
3000 Cfm	EAT (wb)	58	TC	85.7	85.7	97.3	82.2	82.2	93.3	78.0	78.0	88.6	73.5	73.5	83.4
			SHC	74.1	85.7	97.3	71.1	82.2	93.3	67.5	78.0	88.6	63.6	73.5	83.4
		62	TC	86.9	86.9	98.7	82.8	82.8	96.4	78.2	78.2	92.3	73.6	73.6	86.9
			SHC	69.3	84.0	98.7	67.2	81.8	96.4	64.1	78.2	92.3	60.3	73.6	86.9
		67	TC	94.3	94.3	94.3	90.1	90.1	90.1	85.2	85.2	85.2	79.8	79.8	80.1
			SHC	55.6	70.5	85.4	54.0	68.9	83.9	52.1	67.1	82.2	49.9	65.0	80.1
		72	TC	102.2	102.2	102.2	98.1	98.1	98.1	93.3	93.3	93.3	87.9	87.9	87.9
			SHC	41.2	56.0	70.7	39.7	54.6	69.5	38.0	53.0	68.0	36.0	51.1	66.2
		76	TC	–	108.1	108.1	–	104.2	104.2	–	99.5	99.5	–	94.2	94.2
			SHC	–	44.5	60.2	–	43.2	58.7	–	41.6	57.0	–	39.8	55.2
3375 Cfm	EAT (wb)	58	TC	88.5	88.5	100.4	85.0	85.0	96.4	81.0	81.0	92	76.5	76.5	86.8
			SHC	76.5	88.5	100.4	73.5	85.0	96.4	70.1	81.0	92	66.1	76.5	86.8
		62	TC	88.9	88.9	103.9	85.1	85.1	100.4	81.1	81.1	95.7	76.5	76.5	90.3
			SHC	72.3	88.1	103.9	69.7	85.1	100.4	66.5	81.1	95.7	62.7	76.5	90.3
		67	TC	95.8	95.8	95.8	91.5	91.5	91.5	86.6	86.6	87.9	81.1	81.1	85.8
			SHC	58.0	74.4	90.9	56.4	73.0	89.6	54.6	71.3	87.9	52.4	69.1	85.8
		72	TC	103.6	103.6	103.6	99.4	99.4	99.4	94.6	94.6	94.6	89.1	89.1	89.1
			SHC	42.0	58.3	74.5	40.6	57.0	73.4	38.9	55.5	72.0	37.0	53.7	70.3
		76	TC	–	109.2	109.2	–	105.4	105.4	–	100.7	100.7	–	95.3	95.3
			SHC	–	45.6	62.6	–	44.4	61.3	–	42.8	59.7	–	41.0	58.0
3750 Cfm	EAT (wb)	58	TC	90.8	90.8	103.0	87.3	87.3	99.1	83.3	83.3	94.5	78.8	78.8	89.4
			SHC	78.5	90.8	103.0	75.5	87.3	99.1	72.0	83.3	94.5	68.2	78.8	89.4
		62	TC	90.9	90.9	107.2	87.4	87.4	103.1	83.3	83.3	98.4	78.9	78.9	93.1
			SHC	74.5	90.9	107.2	71.6	87.4	103.1	68.3	83.3	98.4	64.7	78.9	93.1
		67	TC	97.0	97.0	97.0	92.6	92.6	95.1	87.6	87.6	93.4	82.1	82.1	91.2
			SHC	60.3	78.2	96.2	58.8	76.9	95.1	56.9	75.2	93.4	54.8	73.0	91.2
		72	TC	104.7	104.7	104.7	100.5	100.5	100.5	95.6	95.6	95.6	90.1	90.1	90.1
			SHC	42.9	60.5	78.1	41.4	59.3	77.1	39.8	57.8	75.9	37.9	56.1	74.3
		76	TC	–	110.2	110.2	–	106.2	106.2	–	101.6	101.6	–	96.1	96.1
			SHC	–	46.7	64.8	–	45.4	63.6	–	44.0	62.3	–	42.2	60.6

* See Minimum–Maximum Airflow Ratings in Table 6. Do not operate outside these limits.

LEGEND:

- Do not operate in this region
- Cfm – Cubic feet per minute (supply air)
- EAT(db) – Entering air temperature (dry bulb)
- EAT(wb) – Entering air temperature (wet bulb)
- SHC – Sensible heat capacity
- TC – Total capacity

Table 23 – COOLING CAPACITIES

2-STAGE COOLING

7.5 TONS

48TC08 COOLING CAPACITIES, UNIT WITH HUMIDI-MIZER SYSTEM IN SUBCOOLING MODE										
TEMP (F) AIR ENT CONDENSER (Edb)		AIR ENTERING EVAPORATOR – CFM								
		2250/0.05			3000/0.07			3750/0.09		
		Air Entering Evaporator – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	103.05	93.02	83.60	109.77	99.52	90.08	114.01	103.69	95.19
	SHC	43.66	55.34	67.09	50.99	66.29	81.31	57.49	76.27	92.20
	kW	4.90	4.83	4.77	4.82	4.88	4.96	4.99	4.91	4.85
85	TC	95.39	85.83	76.88	101.59	91.89	82.95	105.53	95.76	87.77
	SHC	36.42	48.47	60.60	43.24	58.99	74.40	49.44	68.68	84.90
	kW	5.49	5.42	5.36	5.40	5.47	5.54	5.58	5.50	5.44
95	TC	87.48	78.44	69.97	93.21	84.05	75.61	96.84	87.63	80.14
	SHC	28.98	41.46	53.97	35.32	51.53	67.34	41.21	60.92	77.41
	kW	6.16	6.09	6.03	6.08	6.14	6.21	6.24	6.17	6.11
105	TC	79.35	70.83	62.84	84.57	75.96	68.04	87.88	79.23	72.26
	SHC	21.34	34.26	47.18	27.17	43.86	60.08	32.73	52.95	69.70
	kW	6.93	6.86	6.81	6.85	6.91	6.97	7.00	6.93	6.88
115	TC	70.87	62.89	55.42	75.58	67.54	60.15	78.56	70.51	64.06
	SHC	13.40	26.79	40.14	18.70	35.89	52.54	23.94	44.68	61.67
	kW	7.79	7.74	7.69	7.73	7.78	7.83	7.86	7.80	7.76

48TC08 COOLING CAPACITIES, UNIT WITH HUMIDI-MIZER SYSTEM IN HOT GAS REHEAT MODE										
TEMP (F) AIR ENT CONDENSER (Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (56% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator – Cfm								
		2250	3000	3750	2250	3000	3750	2250	3000	3750
80	TC	27.60	32.75	30.19	40.09	39.43	37.73	45.06	45.25	44.25
	SHC	–3.12	5.20	6.71	3.75	5.24	6.75	3.77	5.26	6.78
	kW	4.56	4.51	4.46	4.63	4.60	4.56	4.70	4.67	4.64
75	TC	35.40	33.78	31.20	41.14	40.51	38.80	46.15	46.37	45.38
	SHC	4.67	6.17	7.69	4.71	6.21	7.73	4.74	6.24	7.76
	kW	4.41	4.36	4.39	4.41	4.36	4.36	4.41	4.39	4.36
70	TC	36.36	34.71	32.18	42.10	41.47	39.77	47.08	47.31	46.32
	SHC	5.63	7.14	8.66	5.67	7.18	8.71	5.70	7.21	8.74
	kW	4.43	4.49	4.41	4.44	4.40	4.39	4.49	4.47	4.44
60	TC	38.25	36.64	34.15	43.97	43.37	41.72	48.98	49.22	48.26
	SHC	7.56	9.09	10.62	7.60	9.13	10.66	7.62	9.15	10.69
	kW	4.56	4.55	4.43	4.57	4.53	4.46	4.56	4.55	4.50
50	TC	40.15	38.60	36.14	45.95	45.37	43.73	50.57	50.97	49.56
	SHC	9.48	11.03	12.58	9.52	11.07	12.62	9.54	11.10	12.64
	kW	4.63	4.52	4.38	4.45	4.41	4.33	5.25	4.91	5.60
40	TC	42.18	40.62	38.11	47.80	47.25	45.43	52.65	52.75	51.83
	SHC	11.41	12.98	14.54	11.45	13.02	14.58	11.47	13.04	14.60
	kW	4.32	4.37	4.37	4.65	4.60	4.89	4.96	5.20	5.12

LEGEND

Edb – Entering Dry–Bulb
 Ewb – Entering Wet–Bulb
 kW – Compressor Motor Power Input
 ldb – Leaving Dry–Bulb
 lwb – Leaving Wet–Bulb
 SHC – Sensible Heat Capacity (1000 Btuh) Gross
 TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 24 – COOLING CAPACITIES

1-STAGE COOLING

8.5 TONS

48TC*A09 (RTPF)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
2550 Cfm	EAT (wb)	58	TC	88.1	88.1	99.9	84.1	84.1	95.3	79.6	79.6	90.3	74.9	74.9	84.9
			SHC	76.4	88.1	99.9	72.8	84.1	95.3	69.0	79.6	90.3	64.9	74.9	84.9
		62	TC	93.9	93.9	95.2	88.6	88.6	92.6	82.8	82.8	89.7	76.6	76.6	86.5
			SHC	69.4	82.3	95.2	66.8	79.7	92.6	64.1	76.9	89.7	61.0	73.8	86.5
		67	TC	103.8	103.8	103.8	98.7	98.7	98.7	93.0	93.0	93.0	86.7	86.7	86.7
			SHC	57.8	70.7	83.6	55.6	68.5	81.4	53.1	66.1	79.0	50.5	63.4	76.4
		72	TC	113.1	113.1	113.1	108.0	108.0	108.0	102.4	102.4	102.4	96.1	96.1	96.1
			SHC	45.2	58.3	71.3	43.2	56.3	69.3	41.1	54.1	67.1	38.7	51.7	64.7
		76	TC	–	119.9	119.9	–	114.7	114.7	–	109.0	109.0	–	102.7	102.7
			SHC	–	47.9	61.9	–	46.0	60.1	–	44.1	58.1	–	41.9	55.8
2975 Cfm	EAT (wb)	58	TC	93.6	93.6	106.1	89.3	89.3	101.2	84.6	84.6	96.0	79.6	79.6	90.3
			SHC	81.1	93.6	106.1	77.4	89.3	101.2	73.3	84.6	96.0	69.0	79.6	90.3
		62	TC	97.5	97.5	104.3	92.0	92.0	101.4	86.1	86.1	98.3	79.8	79.8	94.1
			SHC	74.7	89.5	104.3	72.0	86.7	101.4	69.1	83.7	98.3	65.6	79.8	94.1
		67	TC	106.7	106.7	106.7	101.5	101.5	101.5	95.7	95.7	95.7	89.2	89.2	89.2
			SHC	61.0	75.8	90.6	58.8	73.6	88.5	56.4	71.3	86.1	53.8	68.7	83.6
		72	TC	115.8	115.8	115.8	110.6	110.6	110.6	104.9	104.9	104.9	98.4	98.4	98.4
			SHC	46.5	61.3	76.2	44.5	59.4	74.2	42.3	57.2	72.1	40.0	54.8	69.7
		76	TC	–	122.4	122.4	–	117.0	117.0	–	111.1	111.1	–	104.5	104.5
			SHC	–	49.8	66.1	–	47.8	63.9	–	45.7	61.6	–	43.4	59.0
3400 Cfm	EAT (wb)	58	TC	98.1	98.1	111.3	93.7	93.7	106.2	88.9	88.9	100.8	83.7	83.7	94.9
			SHC	85.0	98.1	111.3	81.2	93.7	106.2	77.0	88.9	100.8	72.5	83.7	94.9
		62	TC	100.0	100.0	112.3	94.9	94.9	108.6	89.1	89.1	104.9	83.8	83.8	98.7
			SHC	79.3	95.8	112.3	76.3	92.5	108.6	73.2	89.1	104.9	68.8	83.8	98.7
		67	TC	109.0	109.0	109.0	103.6	103.6	103.6	97.6	97.6	97.6	91.0	91.0	91.0
			SHC	63.9	80.5	97.2	61.8	78.5	95.2	59.4	76.1	92.9	56.8	73.5	90.3
		72	TC	117.9	117.9	117.9	112.5	112.5	112.5	106.6	106.6	106.6	100.0	100.0	100.0
			SHC	47.6	64.1	80.6	45.6	62.1	78.7	43.4	60.0	76.6	41.1	57.6	74.2
		76	TC	–	124.2	124.2	–	118.6	118.6	–	112.5	112.5	–	105.7	105.7
			SHC	–	51.2	69.0	–	49.2	66.7	–	47.0	64.4	–	44.7	61.9
3825 Cfm	EAT (wb)	58	TC	101.6	101.6	115.1	97.2	97.2	110.1	92.3	92.3	104.6	87.0	87.0	98.6
			SHC	88.0	101.6	115.1	84.2	97.2	110.1	80.0	92.3	104.6	75.4	87.0	98.6
		62	TC	101.9	101.9	120.0	97.3	97.3	114.6	92.4	92.4	108.9	87.1	87.1	102.6
			SHC	83.7	101.8	120.0	79.9	97.3	114.6	75.9	92.4	108.9	71.6	87.1	102.6
		67	TC	110.7	110.7	110.7	105.3	105.3	105.3	99.2	99.2	99.3	92.5	92.5	96.7
			SHC	66.7	85.0	103.4	64.6	83.0	101.5	62.2	80.8	99.3	59.6	78.2	96.7
		72	TC	119.4	119.4	119.4	114.0	114.0	114.0	108.0	108.0	108.0	101.3	101.3	101.3
			SHC	48.5	66.6	84.6	46.6	64.7	82.7	44.4	62.6	80.7	42.1	60.2	78.4
		76	TC	–	125.5	125.5	–	119.8	119.8	–	113.6	113.6	–	106.7	106.7
			SHC	–	52.4	71.5	–	50.4	69.3	–	48.2	67.0	–	45.9	64.4
4250 Cfm	EAT (wb)	58	TC	104.4	104.4	118.3	99.9	99.9	113.2	95.0	95.0	107.6	89.5	89.5	101.5
			SHC	90.4	104.4	118.3	86.6	99.9	113.2	82.3	95.0	107.6	77.6	89.5	101.5
		62	TC	104.4	104.4	123.0	99.9	99.9	117.8	95.0	95.0	112.0	89.6	89.6	105.6
			SHC	85.8	104.4	123.0	82.1	99.9	117.8	78.1	95.0	112.0	73.6	89.6	105.6
		67	TC	112.1	112.1	112.1	106.6	106.6	107.5	100.4	100.4	105.3	93.6	93.6	102.7
			SHC	69.2	89.2	109.2	67.2	87.3	107.5	64.9	85.1	105.3	62.3	82.5	102.7
		72	TC	120.7	120.7	120.7	115.1	115.1	115.1	109.0	109.0	109.0	102.2	102.2	102.2
			SHC	49.4	68.9	88.4	47.4	67.0	86.5	45.3	64.9	84.6	42.9	62.6	82.3
		76	TC	–	126.6	126.6	–	120.8	120.8	–	114.5	114.5	–	107.4	107.4
			SHC	–	53.5	73.9	–	51.5	71.7	–	49.3	69.4	–	46.9	66.8

LEGEND:

- Do not operate in this region
- Cfm – Cubic feet per minute (supply air)
- EAT(db) – Entering air temperature (dry bulb)
- EAT(wb) – Entering air temperature (wet bulb)
- SHC – Sensible heat capacity
- TC – Total capacity

Table 25 – COOLING CAPACITIES

2-STAGE COOLING

8.5 TONS

48TC*D09 (RTPF)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EA (dB)			EA (dB)			EA (dB)			EA (dB)		
				75	80	85	75	80	85	75	80	85	75	80	85
2550 Cfm	EAT (wb)	58	TC	89.7	89.7	101.6	85.2	85.2	96.5	79.6	79.6	90.1	73.8	73.8	83.6
			SHC	77.8	89.7	101.6	73.9	85.2	96.5	69.0	79.6	90.1	64.0	73.8	83.6
		62	TC	94.3	94.3	97.9	88.7	88.7	95.2	81.3	81.3	91.5	74.3	74.3	86.5
			SHC	71.0	84.4	97.9	68.2	81.7	95.2	64.7	78.1	91.5	60.6	73.6	86.5
		67	TC	105.0	105.0	105.0	99.3	99.3	99.3	92.2	92.2	92.2	84.1	84.1	84.1
			SHC	59.0	72.6	86.1	56.6	70.1	83.7	53.6	67.1	80.7	50.3	63.8	77.3
		72	TC	115.9	115.9	115.9	110.4	110.4	110.4	104.2	104.2	104.2	96.0	96.0	96.0
			SHC	46.4	60.0	73.6	44.3	57.9	71.5	41.9	55.5	69.1	38.8	52.4	65.9
		76	TC	–	123.7	123.7	–	118.3	118.3	–	112.4	112.4	–	105.7	105.7
			SHC	–	49.3	63.3	–	47.3	61.4	–	45.3	59.3	–	42.9	56.7
2975 Cfm	EAT (wb)	58	TC	95.3	95.3	107.9	90.7	90.7	102.7	84.8	84.8	96.1	78.7	78.7	89.1
			SHC	82.6	95.3	107.9	78.6	90.7	102.7	73.5	84.8	96.1	68.2	78.7	89.1
		62	TC	97.9	97.9	107.8	92.1	92.1	104.7	85.4	85.4	99.4	78.8	78.8	92.8
			SHC	76.7	92.2	107.8	73.9	89.3	104.7	69.6	84.5	99.4	64.8	78.8	92.8
		67	TC	108.5	108.5	108.5	102.6	102.6	102.6	95.4	95.4	95.4	86.9	86.9	86.9
			SHC	62.8	78.4	94.1	60.4	76.0	91.7	57.4	73.1	88.8	54.0	69.7	85.3
		72	TC	119.1	119.1	119.1	113.5	113.5	113.5	107.2	107.2	107.2	99.2	99.2	99.2
			SHC	47.9	63.5	79.2	45.8	61.5	77.1	43.5	59.2	74.9	40.6	56.3	72.0
		76	TC	–	126.4	126.4	–	120.8	120.8	–	114.8	114.8	–	108.2	108.2
			SHC	–	51.1	67.4	–	49.2	65.3	–	47.0	63.0	–	44.8	60.7
3400 Cfm	EAT (wb)	58	TC	100.0	100.0	113.3	95.2	95.2	107.9	89.3	89.3	101.1	82.9	82.9	93.9
			SHC	86.7	100.0	113.3	82.6	95.2	107.9	77.4	89.3	101.1	71.8	82.9	93.9
		62	TC	101.1	101.1	115.8	95.7	95.7	111.7	89.4	89.4	105.3	83.0	83.0	97.7
			SHC	81.5	98.7	115.8	78.2	94.9	111.7	73.5	89.4	105.3	68.2	83.0	97.7
		67	TC	111.1	111.1	111.1	105.1	105.1	105.1	97.8	97.8	97.8	89.1	89.1	93.0
			SHC	66.2	83.9	101.6	63.9	81.6	99.3	61.0	78.7	96.5	57.5	75.3	93.0
		72	TC	121.3	121.3	121.3	115.6	115.6	115.6	109.4	109.4	109.4	101.5	101.5	101.5
			SHC	49.2	66.7	84.3	47.1	64.7	82.3	44.9	62.5	80.2	42.1	59.9	77.7
		76	TC	–	128.3	128.3	–	122.6	122.6	–	116.3	116.3	–	109.7	109.7
			SHC	–	52.7	70.7	–	50.7	68.6	–	48.6	66.4	–	46.4	64.2
3825 Cfm	EAT (wb)	58	TC	104.0	104.0	117.8	99.1	99.1	112.3	93.2	93.2	105.5	86.5	86.5	97.9
			SHC	90.2	104.0	117.8	86.0	99.1	112.3	80.8	93.2	105.5	75.0	86.5	97.9
		62	TC	104.2	104.2	122.7	99.3	99.3	116.9	93.3	93.3	109.8	86.6	86.6	101.9
			SHC	85.7	104.2	122.7	81.7	99.3	116.9	76.7	93.3	109.8	71.2	86.6	101.9
		67	TC	113.1	113.1	113.1	107.1	107.1	107.1	99.9	99.9	103.8	91.0	91.0	100.3
			SHC	69.4	89.1	108.8	67.1	86.8	106.5	64.3	84.1	103.8	60.9	80.6	100.3
		72	TC	123.0	123.0	123.0	117.2	117.2	117.2	110.9	110.9	110.9	103.3	103.3	103.3
			SHC	50.3	69.7	89.0	48.3	67.7	87.1	46.1	65.6	85.2	43.5	63.3	83.0
		76	TC	–	129.7	129.7	–	124.0	124.0	–	117.5	117.5	–	110.8	110.8
			SHC	–	54.0	73.7	–	52.1	71.7	–	50.0	69.5	–	47.8	67.4
4250 Cfm	EAT (wb)	58	TC	107.4	107.4	121.7	102.5	102.5	116.1	96.5	96.5	109.3	89.5	89.5	101.4
			SHC	93.1	107.4	121.7	88.9	102.5	116.1	83.7	96.5	109.3	77.6	89.5	101.4
		62	TC	107.5	107.5	126.6	102.6	102.6	120.8	96.6	96.6	113.7	89.6	89.6	105.5
			SHC	88.4	107.5	126.6	84.4	102.6	120.8	79.5	96.6	113.7	73.7	89.6	105.5
		67	TC	114.7	114.7	115.6	108.7	108.7	113.5	101.7	101.7	110.8	92.6	92.6	107.2
			SHC	72.5	94.0	115.6	70.2	91.8	113.5	67.5	89.2	110.8	64.0	85.6	107.2
		72	TC	124.3	124.3	124.3	118.5	118.5	118.5	112.1	112.1	112.1	104.7	104.7	104.7
			SHC	51.3	72.4	93.4	49.3	70.5	91.7	47.2	68.5	89.9	44.7	66.4	88.1
		76	TC	–	130.7	130.7	–	125.0	125.0	–	118.5	118.5	–	111.6	111.6
			SHC	–	55.3	76.5	–	53.5	74.6	–	51.3	72.4	–	49.2	70.3

* See Minimum–Maximum Airflow Ratings in Table 6. Do not operate outside these limits.

LEGEND:

- Do not operate in this region
- Cfm – Cubic feet per minute (supply air)
- EAT(db) – Entering air temperature (dry bulb)
- EAT(wb) – Entering air temperature (wet bulb)
- SHC – Sensible heat capacity
- TC – Total capacity

Table 26 – COOLING CAPACITIES

2-STAGE COOLING

8.5 TONS

48TC09 COOLING CAPACITIES, UNIT WITH HUMIDI-MIZER SYSTEM IN SUBCOOLING MODE										
TEMP (F) AIR ENT CONDENSER (Edb)		AIR ENTERING EVAPORATOR – CFM								
		2550/0.04			3400/0.05			4250/0.07		
		Air Entering Evaporator – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	119.20	107.44	96.41	126.95	114.98	103.92	131.87	119.81	109.54
	SHC	50.63	63.94	77.40	59.17	76.72	94.21	66.80	88.44	108.22
	kW	5.67	5.57	5.47	5.54	5.63	5.74	5.79	5.68	5.59
85	TC	110.40	99.22	88.76	117.63	106.26	95.77	122.21	110.77	101.07
	SHC	42.39	56.16	70.07	50.42	68.45	86.38	57.71	79.86	99.95
	kW	6.33	6.23	6.14	6.20	6.30	6.40	6.45	6.34	6.25
95	TC	101.37	90.79	80.86	108.07	97.31	87.39	112.29	101.47	92.38
	SHC	33.97	48.22	62.56	41.46	60.01	78.39	48.40	71.09	91.47
	kW	7.08	6.99	6.90	6.96	7.05	7.16	7.20	7.09	7.01
105	TC	92.04	82.06	72.71	98.19	88.05	78.72	102.07	91.86	83.40
	SHC	25.31	40.06	54.88	32.24	51.33	70.17	38.85	62.06	82.67
	kW	7.94	7.85	7.77	7.83	7.91	8.01	8.06	7.95	7.87
115	TC	82.37	73.01	64.24	87.95	78.45	69.73	91.46	81.90	74.09
	SHC	16.38	31.65	46.95	22.71	42.37	61.69	28.94	52.74	73.52
	kW	8.92	8.84	8.77	8.82	8.89	8.98	9.02	8.93	8.86

48TC09 COOLING CAPACITIES, UNIT WITH HUMIDI-MIZER SYSTEM IN HOT GAS REHEAT MODE										
TEMP (F) AIR ENT CONDENSER (Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (56% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator – Cfm								
		2550	3400	4250	2550	3400	4250	2550	3400	4250
80	TC	37.61	33.13	26.77	44.74	41.60	36.46	50.96	48.99	44.93
	SHC	−0.52	−0.63	−0.73	−0.46	−0.57	−0.67	−0.42	−0.53	−0.62
	kW	5.88	5.68	5.44	6.13	5.97	5.76	6.35	6.24	6.06
75	TC	38.71	34.24	27.86	45.84	42.73	37.59	52.05	50.11	46.06
	SHC	0.45	0.34	0.25	0.50	0.40	0.31	0.54	0.44	0.36
	kW	5.68	5.47	5.22	5.94	5.78	5.56	6.18	6.07	5.88
70	TC	39.70	35.25	28.83	46.80	43.70	38.59	52.97	51.04	47.02
	SHC	1.41	1.32	1.23	1.47	1.37	1.29	1.50	1.41	1.34
	kW	5.65	5.42	5.24	5.97	5.79	5.53	6.26	6.13	5.91
60	TC	41.77	37.33	30.76	48.86	45.80	40.71	55.00	53.10	49.12
	SHC	3.34	3.26	3.18	3.40	3.32	3.25	3.43	3.36	3.29
	kW	5.42	5.15	5.17	5.80	5.59	5.30	6.16	6.01	5.75
50	TC	43.83	39.27	32.61	50.92	47.89	42.70	57.04	55.16	51.22
	SHC	5.27	5.21	5.14	5.32	5.27	5.21	5.36	5.31	5.25
	kW	5.18	5.15	5.17	5.62	5.39	5.05	6.04	5.87	5.59
40	TC	45.75	41.13	34.50	53.08	50.00	44.64	59.24	57.40	53.44
	SHC	7.20	7.15	6.95	7.26	7.21	7.16	7.29	7.25	7.21
	kW	4.79	4.98	4.80	5.25	5.01	5.23	5.68	5.51	5.21

LEGEND

Edb – Entering Dry–Bulb
 Ewb – Entering Wet–Bulb
 kW – Compressor Motor Power Input
 ldb – Leaving Dry–Bulb
 lwb – Leaving Wet–Bulb
 SHC – Sensible Heat Capacity (1000 Btuh) Gross
 TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 27 – COOLING CAPACITIES

1-STAGE COOLING

10 TONS

48TC*A12 (RTPF)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
3000 Cfm	EAT (wb)	58	TC	106.3	106.3	120.5	101.7	101.7	115.2	96.6	96.6	109.4	91.0	91.0	103.1
			SHC	92.2	106.3	120.5	88.2	101.7	115.2	83.8	96.6	109.4	78.9	91.0	103.1
		62	TC	112.5	112.5	115.2	106.5	106.5	112.3	99.9	99.9	109.0	92.7	92.7	105.2
			SHC	83.8	99.5	115.2	81.0	96.6	112.3	77.8	93.4	109.0	74.2	89.7	105.2
		67	TC	123.5	123.5	123.5	117.8	117.8	117.8	111.3	111.3	111.3	104.0	104.0	104.0
			SHC	69.2	85.0	100.7	66.8	82.5	98.3	64.1	79.8	95.5	61.0	76.8	92.5
		72	TC	134.3	134.3	134.3	128.5	128.5	128.5	122.0	122.0	122.0	114.7	114.7	114.7
			SHC	53.8	69.6	85.5	51.6	67.4	83.2	49.1	64.9	80.7	46.3	62.1	77.9
		76	TC	–	142.4	142.4	–	136.3	136.3	–	129.5	129.5	–	121.8	121.8
			SHC	–	56.8	73.3	–	54.7	71.2	–	52.3	68.8	–	49.7	66.2
3500 Cfm	EAT (wb)	58	TC	112.9	112.9	127.8	108.0	108.0	122.3	102.7	102.7	116.3	96.8	96.8	109.7
			SHC	97.9	112.9	127.8	93.6	108.0	122.3	89.0	102.7	116.3	83.9	96.8	109.7
		62	TC	116.3	116.3	126.2	110.5	110.5	123.3	103.8	103.8	119.5	97.1	97.1	114.3
			SHC	90.2	108.2	126.2	87.4	105.3	123.3	84.0	101.8	119.5	79.8	97.1	114.3
		67	TC	126.9	126.9	126.9	120.9	120.9	120.9	114.3	114.3	114.3	106.8	106.8	106.8
			SHC	73.2	91.3	109.4	70.8	88.9	107.1	68.1	86.2	104.4	65.0	83.2	101.3
		72	TC	137.5	137.5	137.5	131.4	131.4	131.4	124.7	124.7	124.7	117.2	117.2	117.2
			SHC	55.3	73.4	91.5	53.1	71.1	89.2	50.6	68.7	86.7	47.8	65.9	83.9
		76	TC	–	145.1	145.1	–	138.8	138.8	–	131.7	131.7	–	123.6	123.6
			SHC	–	59.0	78.2	–	56.7	75.8	–	54.3	73.1	–	51.5	70.0
4000 Cfm	EAT (wb)	58	TC	117.8	117.8	133.5	113.0	113.0	128.0	107.5	107.5	121.8	101.5	101.5	115.0
			SHC	102.2	117.8	133.5	98.0	113.0	128.0	93.3	107.5	121.8	88.0	101.5	115.0
		62	TC	119.1	119.1	136.0	113.5	113.5	132.5	107.7	107.7	126.7	101.6	101.6	119.6
			SHC	95.8	115.9	136.0	92.8	112.6	132.5	88.6	107.7	126.7	83.6	101.6	119.6
		67	TC	129.4	129.4	129.4	123.3	123.3	123.3	116.5	116.5	116.5	108.9	108.9	109.8
			SHC	76.9	97.3	117.7	74.5	95.0	115.4	71.8	92.3	112.8	68.8	89.3	109.8
		72	TC	139.7	139.7	139.7	133.5	133.5	133.5	126.6	126.6	126.6	118.8	118.8	118.8
			SHC	56.7	76.8	97.0	54.4	74.6	94.7	51.9	72.1	92.3	49.1	69.3	89.5
		76	TC	–	147.0	147.0	–	140.5	140.5	–	133.2	133.2	–	124.9	124.9
			SHC	–	60.6	81.7	–	58.4	79.3	–	55.8	76.5	–	53.0	73.5
4500 Cfm	EAT (wb)	58	TC	121.7	121.7	137.9	116.8	116.8	132.3	111.2	111.2	126.0	105.0	105.0	118.9
			SHC	105.6	121.7	137.9	101.3	116.8	132.3	96.4	111.2	126.0	91.0	105.0	118.9
		62	TC	121.8	121.8	143.4	116.9	116.9	137.6	111.3	111.3	131.0	105.1	105.1	123.7
			SHC	100.2	121.8	143.4	96.1	116.9	137.6	91.6	111.3	131.0	86.5	105.1	123.7
		67	TC	131.3	131.3	131.3	125.1	125.1	125.1	118.2	118.2	120.8	110.5	110.5	117.7
			SHC	80.3	102.9	125.5	78.0	100.7	123.3	75.3	98.0	120.8	72.3	95.0	117.7
		72	TC	141.5	141.5	141.5	135.1	135.1	135.1	128.0	128.0	128.0	120.1	120.1	120.1
			SHC	57.9	80.0	102.1	55.6	77.7	99.9	53.1	75.2	97.4	50.3	72.4	94.6
		76	TC	–	148.3	148.3	–	141.8	141.8	–	134.3	134.3	–	125.8	125.8
			SHC	–	62.1	84.9	–	59.8	82.5	–	57.3	79.7	–	54.4	76.6
5000 Cfm	EAT (wb)	58	TC	125.0	125.0	141.6	120.0	120.0	135.9	114.3	114.3	129.5	107.9	107.9	122.3
			SHC	108.4	125.0	141.6	104.0	120.0	135.9	99.1	114.3	129.5	93.6	107.9	122.3
		62	TC	125.1	125.1	147.2	120.1	120.1	141.4	114.4	114.4	134.7	108.0	108.0	127.2
			SHC	102.9	125.1	147.2	98.8	120.1	141.4	94.1	114.4	134.7	88.9	108.0	127.2
		67	TC	132.8	132.8	133.0	126.5	126.5	130.8	119.6	119.6	128.2	111.8	111.8	125.1
			SHC	83.6	108.3	133.0	81.2	106.0	130.8	78.6	103.4	128.2	75.6	100.3	125.1
		72	TC	142.8	142.8	142.8	136.3	136.3	136.3	129.1	129.1	129.1	121.1	121.1	121.1
			SHC	59.0	82.9	106.9	56.7	80.7	104.7	54.1	78.2	102.2	51.3	75.4	99.4
		76	TC	–	149.4	149.4	–	142.8	142.8	–	135.1	135.1	–	126.5	126.5
			SHC	–	63.4	87.9	–	61.2	85.5	–	58.6	82.7	–	55.6	79.4

LEGEND:

- Do not operate in this region
- Cfm Cubic feet per minute (supply air)
- EAT(db) Entering air temperature (dry bulb)
- EAT(wb) Entering air temperature (wet bulb)
- SHC Sensible heat capacity
- TC Total capacity

Table 28 – COOLING CAPACITIES

2-STAGE COOLING

10 TONS

48TC*D12 (RTPF & Novation)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
3000 Cfm	EAT (wb)	58	TC	107.6	107.6	121.9	102.5	102.5	116.2	96.8	96.8	109.7	90.5	90.5	102.6
			SHC	93.2	107.6	121.9	88.8	102.5	116.2	83.9	96.8	109.7	78.4	90.5	102.6
		62	TC	113.6	113.6	116.5	107.1	107.1	113.4	99.7	99.7	109.8	91.8	91.8	104.9
			SHC	84.6	100.6	116.5	81.5	97.4	113.4	78.0	93.9	109.8	73.7	89.3	104.9
		67	TC	124.4	124.4	124.4	118.4	118.4	118.4	111.5	111.5	111.5	103.3	103.3	103.3
			SHC	69.7	85.7	101.7	67.1	83.2	99.2	64.3	80.3	96.3	60.8	76.8	92.8
		72	TC	135.8	135.8	135.8	129.7	129.7	129.7	122.8	122.8	122.8	115	115	115
			SHC	54.3	70.4	86.6	52.0	68.1	84.2	49.3	65.4	81.6	46.4	62.5	78.6
		76	TC	–	145.3	145.3	–	139	139	–	131.9	131.9	–	124.1	124.1
			SHC	–	57.8	74.3	–	55.6	72.1	–	53.1	69.6	–	50.4	66.9
3500 Cfm	EAT (wb)	58	TC	114.2	114.2	129.4	108.9	108.9	123.4	102.9	102.9	116.6	96.3	96.3	109.1
			SHC	98.9	114.2	129.4	94.3	108.9	123.4	89.1	102.9	116.6	83.4	96.3	109.1
		62	TC	117.2	117.2	127.9	111.0	111.0	124.7	104.0	104.0	119.5	96.5	96.5	113.7
			SHC	91.1	109.5	127.9	88.1	106.4	124.7	83.9	101.7	119.5	79.3	96.5	113.7
		67	TC	127.8	127.8	127.8	121.7	121.7	121.7	114.5	114.5	114.5	106.6	106.6	106.6
			SHC	73.8	92.3	110.8	71.3	89.8	108.3	68.4	87.0	105.5	65.2	83.8	102.3
		72	TC	139.4	139.4	139.4	133.0	133.0	133	125.8	125.8	125.8	117.9	117.9	117.9
			SHC	56.0	74.6	93.1	53.7	72.2	90.8	51.0	69.6	88.2	48.1	66.7	85.4
		76	TC	–	148.8	148.8	–	142.2	142.2	–	134.9	134.9	–	126.8	126.8
			SHC	–	60.2	79.5	–	58.0	77.1	–	55.4	74.5	–	52.7	71.6
4000 Cfm	EAT (wb)	58	TC	119.0	119.0	134.9	114.0	114.0	129.2	108.0	108.0	122.4	101.1	101.1	114.6
			SHC	103.1	119.0	134.9	98.7	114.0	129.2	93.6	108.0	122.4	87.6	101.1	114.6
		62	TC	120.3	120.3	137.1	114.7	114.7	132.8	108.2	108.2	127.5	101.3	101.3	119.3
			SHC	96.5	116.8	137.1	93.0	112.9	132.8	88.9	108.2	127.5	83.2	101.3	119.3
		67	TC	130.5	130.5	130.5	124.1	124.1	124.1	116.8	116.8	116.8	108.7	108.7	111.1
			SHC	77.7	98.6	119.5	75.2	96.2	117.2	72.3	93.3	114.4	69.1	90.1	111.1
		72	TC	142.1	142.1	142.1	135.5	135.5	135.5	128.2	128.2	128.2	120.0	120.0	120.0
			SHC	57.6	78.4	99.3	55.2	76.1	97.1	52.5	73.6	94.6	49.7	70.7	91.8
		76	TC	–	151.4	151.4	–	144.7	144.7	–	137.1	137.1	–	–	–
			SHC	–	62.3	83.8	–	60.0	81.4	–	57.5	78.8	–	–	–
4500 Cfm	EAT (wb)	58	TC	123.0	123.0	139.5	117.8	117.8	133.6	111.9	111.9	126.9	105.3	105.3	119.3
			SHC	106.6	123.0	139.5	102.1	117.8	133.6	97.0	111.9	126.9	91.2	105.3	119.3
		62	TC	123.4	123.4	144.4	117.9	117.9	139.0	112.0	112.0	132.0	105.4	105.4	124.2
			SHC	100.9	122.7	144.4	96.9	117.9	139	92.1	112.0	132	86.6	105.4	124.2
		67	TC	132.6	132.6	132.6	126.0	126	126.0	118.7	118.7	122.9	110.4	110.4	119.6
			SHC	81.4	104.6	127.9	78.9	102.3	125.7	76.1	99.5	122.9	72.9	96.2	119.6
		72	TC	144.2	144.2	144.2	137.4	137.4	137.4	129.9	129.9	129.9	121.6	121.6	121.6
			SHC	59.0	82.1	105.2	56.6	79.8	103.1	54.0	77.3	100.7	51.1	74.5	98
		76	TC	–	153.4	153.4	–	146.6	146.6	–	138.9	138.9	–	–	–
			SHC	–	64.1	87.8	–	61.9	85.6	–	59.4	83	–	–	–
5000 Cfm	EAT (wb)	58	TC	126.5	126.5	143.3	121.2	121.2	137.4	115.1	115.1	130.5	108.4	108.4	122.8
			SHC	109.6	126.5	143.3	105.0	121.2	137.4	99.8	115.1	130.5	93.9	108.4	122.8
		62	TC	126.5	126.5	149.1	121.3	121.3	142.9	115.2	115.2	135.8	108.5	108.5	127.8
			SHC	104.0	126.5	149.1	99.7	121.3	142.9	94.7	115.2	135.8	89.1	108.5	127.8
		67	TC	134.2	134.2	135.9	127.5	127.5	133.8	120.1	120.1	131.0	111.9	111.9	127.6
			SHC	84.9	110.4	135.9	82.4	108.1	133.8	79.6	105.3	131	76.4	102.0	127.6
		72	TC	145.8	145.8	145.8	139.0	139.0	139.0	131.3	131.3	131.3	122.9	122.9	122.9
			SHC	60.3	85.6	110.8	57.9	83.4	108.9	55.3	81.0	106.6	52.5	78.2	104
		76	TC	–	155.1	155.1	–	148.2	148.2	–	–	–	–	–	–
			SHC	–	65.9	91.5	–	63.7	89.5	–	–	–	–	–	–

* See Minimum–Maximum Airflow Ratings in Table 6. Do not operate outside these limits.

LEGEND:

- Do not operate in this region
- Cfm Cubic feet per minute (supply air)
- EAT(db) Entering air temperature (dry bulb)
- EAT(wb) Entering air temperature (wet bulb)
- SHC Sensible heat capacity
- TC Total capacity

Table 29 – COOLING CAPACITIES

2-STAGE COOLING

10 TONS

48TC12 COOLING CAPACITIES, UNIT WITH HUMIDI-MIZER SYSTEM IN SUBCOOLING MODE										
TEMP (F) AIR ENT CONDENSER (Edb)		AIR ENTERING EVAPORATOR – CFM								
		3000/0.04			4000/0.06			5000/0.07		
		Air Entering Evaporator – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	142.85	129.44	116.93	152.09	138.44	125.76	157.99	144.23	132.06
	SHC	58.38	74.88	91.58	67.96	89.45	111.02	76.63	102.94	127.93
	kW	7.19	6.97	6.79	6.92	7.12	7.35	7.45	7.22	7.02
85	TC	132.33	119.68	107.86	140.92	128.03	116.10	146.41	133.41	121.98
	SHC	48.44	65.56	82.83	57.37	79.50	101.68	65.65	92.58	118.12
	kW	7.98	7.77	7.58	7.72	7.92	8.14	8.25	8.01	7.82
95	TC	121.41	109.52	98.43	129.35	117.22	106.04	134.43	122.20	111.50
	SHC	38.19	55.92	73.78	46.47	69.22	92.01	54.34	81.92	107.96
	kW	8.87	8.66	8.48	8.61	8.80	9.03	9.14	8.90	8.71
105	TC	110.04	98.92	88.56	117.27	105.94	95.53	121.88	110.46	100.54
	SHC	27.59	45.94	64.39	35.16	58.57	81.98	42.56	70.82	97.40
	kW	9.86	9.66	9.48	9.61	9.79	10.02	10.12	9.89	9.70
115	TC	98.09	87.74	78.13	104.62	94.08	84.45	108.76	98.13	89.01
	SHC	16.52	35.47	54.53	23.37	47.44	71.46	30.32	59.25	86.31
	kW	10.95	10.76	10.60	10.72	10.89	11.10	11.19	10.98	10.81

48TC12 COOLING CAPACITIES, UNIT WITH HUMIDI-MIZER SYSTEM IN HOT GAS REHEAT MODE										
TEMP (F) AIR ENT CONDENSER (Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (56% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator – Cfm								
		3000	4000	5000	3000	4000	5000	3000	4000	5000
80	TC	44.78	39.41	31.89	53.22	49.44	43.38	60.56	58.12	53.32
	SHC	−0.44	−0.57	−0.69	−0.37	−0.51	−0.61	−0.33	−0.46	−0.56
	kW	6.96	6.77	6.52	7.26	7.13	6.91	7.54	7.45	7.27
75	TC	45.84	40.46	32.86	54.28	50.51	44.45	61.61	59.19	54.40
	SHC	0.53	0.40	0.29	0.60	0.47	0.37	0.64	0.52	0.42
	kW	6.77	6.56	6.29	7.11	6.95	6.72	7.41	7.31	7.12
70	TC	46.91	41.48	33.50	55.36	51.59	45.50	62.69	60.28	55.49
	SHC	1.51	1.38	1.27	1.57	1.45	1.35	1.61	1.50	1.40
	kW	6.54	6.32	6.02	6.90	6.74	6.49	7.23	7.13	6.92
60	TC	48.88	43.42	35.76	57.29	53.56	47.48	64.56	62.16	57.42
	SHC	3.44	3.34	3.24	3.51	3.40	3.31	3.55	3.45	3.37
	kW	6.45	6.16	6.70	6.93	6.72	6.39	7.38	7.24	6.96
50	TC	50.83	45.28	37.67	59.22	55.52	49.43	66.05	64.03	59.34
	SHC	5.38	5.29	5.20	5.45	5.36	5.28	5.48	5.40	5.33
	kW	6.46	6.01	6.34	6.98	6.71	6.29	8.15	7.38	7.02
40	TC	52.82	47.29	39.50	61.14	57.48	51.39	68.23	65.88	61.25
	SHC	7.32	7.24	7.20	7.38	7.31	7.24	7.43	7.36	7.29
	kW	6.29	6.09	6.12	7.05	6.72	6.29	7.78	7.55	7.10

LEGEND

Edb – Entering Dry–Bulb
 Ewb – Entering Wet–Bulb
 kW – Compressor Motor Power Input
 ldb – Leaving Dry–Bulb
 lwb – Leaving Wet–Bulb
 SHC – Sensible Heat Capacity (1000 Btuh) Gross
 TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 30 – COOLING CAPACITIES

2-STAGE COOLING

12.5 TONS

48TC*D14 (RTPF & Novation)				AMBIENT TEMPERATURE											
				85			95			105			115		
				EAT (db)			EAT (db)			EAT (db)			EAT (db)		
				75	80	85	75	80	85	75	80	85	75	80	85
3600 Cfm	EAT (wb)	58	TC	127.6	127.6	142.9	121.7	121.7	137.6	115.0	115.0	130	108.3	108.3	122.6
			SHC	110.3	126.6	142.9	105.8	121.7	137.6	99.9	115.0	130	94.1	108.3	122.6
		62	TC	136.1	136.1	136.1	131.1	131.1	131.1	123.8	123.8	124.5	114.9	114.9	120.3
			SHC	96.6	112.8	129.0	94.7	111.2	127.7	91.4	108.0	124.5	87.3	103.8	120.3
		67	TC	146.2	146.2	146.2	142.0	142.0	142.0	136.2	136.2	136.2	128.8	128.8	128.8
			SHC	78.5	94.4	110.3	76.9	93.1	109.2	74.7	91.0	107.3	71.7	88.1	104.6
		72	TC	155.9	155.9	155.9	152.4	152.4	152.4	147.2	147.2	147.2	140.1	140.1	140.1
			SHC	60.1	76.6	93.2	58.7	75.2	91.7	56.8	73.3	89.7	54.2	70.6	87.0
		76	TC	–	163.0	163	–	160.0	160	–	155.1	155.1	–	148.2	148.2
			SHC	–	62.0	81.8	–	61.1	80.9	–	59.5	79.3	–	57.0	76.3
4200 Cfm	EAT (wb)	58	TC	132.2	132.2	149.5	128.2	128.2	144.9	121.9	121.9	137.8	115.0	115.0	130.1
			SHC	115.0	132.2	149.5	111.5	128.2	144.9	106.0	121.9	137.8	99.9	115.0	130.1
		62	TC	139.6	139.6	139.6	134.7	134.7	138	128.0	128.0	135.6	119.1	119.1	131.2
			SHC	102.5	120.8	139	100.8	119.4	138	98.1	116.8	135.6	93.9	112.6	131.2
		67	TC	149.5	149.5	149.5	145.4	145.4	145.4	139.6	139.6	139.6	132.1	132.1	132.1
			SHC	81.8	99.6	117.4	80.6	98.7	116.8	78.5	96.9	115.2	75.7	94.3	112.8
		72	TC	159.0	159.0	159.0	155.5	155.5	155.5	150.3	150.3	150.3	143.1	143.1	143.1
			SHC	61.4	79.6	97.8	60.2	78.5	96.8	58.3	76.7	95	55.8	74.2	92.5
		76	TC	–	165.7	165.7	–	162.8	162.8	–	157.8	157.8	–	150.8	150.8
			SHC	–	64.6	87.7	–	63.5	86.3	–	61.5	83.3	–	58.9	79.9
4800 Cfm	EAT (wb)	58	TC	136.7	136.7	154.5	133.0	133.0	150.3	127.7	127.7	144.3	120.6	120.6	136.4
			SHC	118.9	136.7	154.5	115.7	133.0	150.3	111.0	127.7	144.3	104.9	120.6	136.4
		62	TC	142.2	142.2	147.8	137.4	137.4	147.1	131.0	131.0	144.7	122.8	122.8	140.3
			SHC	107.7	127.8	147.8	106.2	126.7	147.1	103.6	124.2	144.7	99.3	119.8	140.3
		67	TC	152.1	152.1	152.1	148.0	148	148	142.2	142.2	142.2	134.6	134.6	134.6
			SHC	84.8	104.3	123.7	83.8	103.8	123.7	82.0	102.3	122.6	79.4	99.9	120.4
		72	TC	161.3	161.3	161.3	157.8	157.8	157.8	152.5	152.5	152.5	145.4	145.4	145.4
			SHC	62.6	82.2	101.9	61.4	81.4	101.3	59.7	79.7	99.8	57.2	77.3	97.5
		76	TC	–	167.7	167.7	–	164.9	164.9	–	159.9	159.9	–	152.8	152.8
			SHC	–	66.4	91.4	–	65	89.2	–	63.1	86.4	–	60.5	83.1
5400 Cfm	EAT (wb)	58	TC	140.5	140.5	158.8	136.9	136.9	154.7	131.8	131.8	149	125.2	125.2	141.6
			SHC	122.2	140.5	158.8	119	136.9	154.7	114.7	131.8	149	108.9	125.2	141.6
		62	TC	144.3	144.3	155.7	139.6	139.6	155	133.5	133.5	152.4	125.8	125.8	147.8
			SHC	112.2	133.9	155.7	110.9	132.9	155	108.1	130.2	152.4	103.9	125.8	147.8
		67	TC	154.2	154.2	154.2	150.0	150.0	150.0	144.2	144.2	144.2	136.7	136.7	136.7
			SHC	87.6	108.6	129.6	86.8	108.5	130.1	85.2	107.3	129.4	82.8	105.1	127.4
		72	TC	163.1	163.1	163.1	159.7	159.7	159.7	154.3	154.3	154.3	147.1	147.1	147.1
			SHC	63.6	84.6	105.6	62.5	83.9	105.4	60.8	82.5	104.2	58.4	80.2	102
		76	TC	–	169.3	169.3	–	166.5	166.5	–	161.5	161.5	–	154.2	154.2
			SHC	–	67.6	93.7	–	66.4	91.7	–	64.5	89.2	–	61.9	86.1
6000 Cfm	EAT (wb)	58	TC	143.6	143.6	162.3	140.1	140.1	158.3	135.1	135.1	152.7	128.7	128.7	145.5
			SHC	124.9	143.6	162.3	121.8	140.1	158.3	117.5	135.1	152.7	111.9	128.7	145.5
		62	TC	146.1	146.1	162.4	141.7	141.7	161.5	135.6	135.6	159.2	128.8	128.8	151.2
			SHC	116.1	139.3	162.4	114.7	138.1	161.5	112.1	135.6	159.2	106.4	128.8	151.2
		67	TC	155.8	155.8	155.8	151.6	151.6	151.6	145.9	145.9	145.9	138.3	138.3	138.3
			SHC	90.1	112.6	135	89.6	112.8	136	88.3	112.0	135.8	85.9	110.0	134.1
		72	TC	164.5	164.5	164.5	161.2	161.2	161.2	155.8	155.8	155.8	148.5	148.5	148.5
			SHC	64.5	86.7	108.9	63.5	86.3	109.1	61.9	85.1	108.2	59.6	82.9	106.3
		76	TC	–	170.6	170.6	–	167.8	167.8	–	162.8	162.8	–	155.5	155.5
			SHC	–	68.7	95.8	–	67.5	94.1	–	65.7	91.8	–	63.3	88.8

* See Minimum–Maximum Airflow Ratings in Table 6. Do not operate outside these limits.

LEGEND:

- Do not operate in this region
- Cfm – Cubic feet per minute (supply air)
- EAT(db) – Entering air temperature (dry bulb)
- EAT(wb) – Entering air temperature (wet bulb)
- SHC – Sensible heat capacity
- TC – Total capacity

Table 31 – COOLING CAPACITIES

2-STAGE COOLING

12.5 TONS

48TC14 COOLING CAPACITIES, UNIT WITH HUMIDI-MIZER SYSTEM IN SUBCOOLING MODE										
TEMP (F) AIR ENT CONDENSER (Edb)		AIR ENTERING EVAPORATOR – CFM								
		3750/0.02			5000/0.06			6250/0.05		
		Air Entering Evaporator – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	183.66	166.86	151.43	194.90	177.83	162.05	201.97	184.84	170.53
	SHC	79.39	100.52	121.91	91.70	119.42	147.05	102.94	137.00	166.71
	kW	9.82	9.63	9.46	9.58	9.76	9.96	10.04	9.84	9.67
85	TC	172.71	156.78	142.09	183.32	167.13	152.17	189.98	173.73	160.25
	SHC	69.03	90.92	112.95	80.69	109.17	137.51	91.49	126.33	156.65
	kW	10.82	10.63	10.45	10.57	10.76	10.96	11.04	10.84	10.67
95	TC	161.37	146.24	132.38	171.36	156.04	141.86	177.62	162.22	149.50
	SHC	58.44	81.04	103.77	69.42	98.67	127.71	79.83	115.45	146.15
	kW	11.92	11.73	11.56	11.68	11.86	12.05	12.14	11.93	11.77
105	TC	149.57	135.32	122.21	158.89	144.45	131.10	164.74	150.27	138.35
	SHC	47.57	70.92	94.32	57.85	87.91	117.61	67.79	104.26	135.30
	kW	13.12	12.94	12.77	12.89	13.06	13.24	13.32	13.13	12.97
115	TC	137.22	123.88	111.55	145.85	132.33	119.84	151.27	137.71	126.67
	SHC	36.31	60.47	84.57	45.87	76.77	107.19	55.34	92.66	123.98
	kW	14.41	14.25	14.10	14.20	14.35	14.53	14.59	14.42	14.28

48TC14 COOLING CAPACITIES, UNIT WITH HUMIDI-MIZER SYSTEM IN HOT GAS REHEAT MODE										
TEMP (F)AIR ENT CONDENSER(Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (56% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator – Cfm								
		3750	5000	6250	3750	5000	6250	3750	5000	6250
80	TC	52.42	45.88	36.99	62.64	58.07	51.07	71.56	68.64	63.23
	SHC	–0.39	–0.54	–0.67	–0.31	–0.46	–0.58	–0.26	–0.40	–0.52
	kW	9.65	9.39	9.07	9.97	9.77	9.50	10.25	10.11	9.89
75	TC	53.45	46.63	36.10	63.77	59.11	51.87	72.76	69.80	64.31
	SHC	0.59	0.44	0.30	0.67	0.52	0.40	0.72	0.58	0.47
	kW	9.09	8.83	8.49	9.39	9.20	8.94	9.67	9.53	9.32
70	TC	54.33	46.91	37.58	64.77	60.01	52.30	73.80	70.80	65.24
	SHC	1.56	1.41	1.29	1.64	1.50	1.38	1.70	1.56	1.45
	kW	8.81	8.53	8.62	9.15	8.94	8.65	9.46	9.31	9.08
60	TC	55.47	49.48	40.48	66.62	62.07	54.88	75.68	72.76	67.28
	SHC	3.50	3.38	3.27	3.59	3.47	3.36	3.65	3.52	3.42
	kW	8.36	8.84	8.98	9.88	9.56	9.10	9.83	9.64	9.31
50	TC	58.33	51.72	42.81	68.72	63.93	55.84	77.74	74.77	69.24
	SHC	5.47	5.35	5.24	5.54	5.43	5.32	5.60	5.49	5.39
	kW	8.98	9.25	9.43	9.33	8.97	8.73	9.55	9.33	9.70
40	TC	60.33	53.69	46.89	70.67	65.93	49.83	79.46	76.62	71.24
	SHC	7.42	7.31	7.22	7.49	7.39	7.23	7.55	7.45	7.37
	kW	9.16	9.88	9.06	9.50	9.05	9.47	10.31	10.00	9.48

LEGEND

Edb – Entering Dry–Bulb
 Ewb – Entering Wet–Bulb
 kW – Compressor Motor Power Input
 ldb – Leaving Dry–Bulb
 lwb – Leaving Wet–Bulb
 SHC – Sensible Heat Capacity (1000 Btuh) Gross
 TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 32 – COOLING CAPACITIES

2-STAGE COOLING

15 TONS

48TC*D16 (RTPF)				Ambient Temperature											
				85			95			105			115		
				EA (dB)			EA (dB)			EA (dB)			EA (dB)		
				75	80	85	75	80	85	75	80	85	75	80	85
4500 Cfm	EAT (wb)	58	THC	156.6	156.6	175.2	149.4	149.4	169.1	141.6	141.6	160.2	133.3	133.3	150.9
			SHC	134.7	154.9	175.2	129.8	149.4	169.1	123.0	141.6	160.2	115.7	133.3	150.9
		62	THC	166.7	166.7	166.9	158.0	158.0	162.6	147.6	147.6	157.2	136.8	136.8	150.3
			SHC	122.8	144.9	166.9	118.6	140.6	162.6	113.5	135.3	157.2	107.4	128.8	150.3
		67	THC	184.1	184.1	184.1	175.6	175.6	175.6	165.6	165.6	165.6	154.5	154.5	154.5
			SHC	101.6	123.7	145.7	98.1	120.2	142.3	94.0	116.1	138.2	89.4	111.5	133.6
		72	THC	200.3	200.3	200.3	192.0	192.0	192.0	182.9	182.9	182.9	172.2	172.2	172.2
			SHC	78.7	101.1	123.5	75.5	97.9	120.2	72.1	94.4	116.7	68.2	90.5	112.7
		76	THC	-	211.4	211.4	-	203.1	203.1	-	193.8	193.8	-	183.9	183.9
			SHC	-	82.2	107.0	-	79.3	103.8	-	76.0	100.2	-	72.6	96.5
5250 Cfm	EAT (wb)	58	THC	165.2	165.2	186.9	158.2	158.2	179.0	150.0	150.0	169.7	141.3	141.3	160.0
			SHC	143.5	165.2	186.9	137.4	158.2	179.0	130.2	150.0	169.7	122.7	141.3	160.0
		62	THC	172.3	172.3	181.7	163.4	163.4	176.9	153.1	153.1	169.3	143.4	143.4	161.4
			SHC	131.6	156.6	181.7	127.1	152.0	176.9	120.5	144.9	169.3	114.1	137.8	161.4
		67	THC	189.5	189.5	189.5	180.9	180.9	180.9	170.7	170.7	170.7	159.1	159.1	159.1
			SHC	107.2	132.4	157.5	103.8	129.0	154.1	99.9	125.1	150.4	95.3	120.6	145.8
		72	THC	205.0	205.0	205.0	196.5	196.5	196.5	187.1	187.1	187.1	176.4	176.4	176.4
			SHC	80.9	106.1	131.3	77.7	102.9	128.1	74.4	99.5	124.7	70.6	95.8	121.0
		76	THC	-	215.4	215.4	-	206.8	206.8	-	197.1	197.1	-	186.9	186.9
			SHC	-	85.0	113.0	-	82.0	109.8	-	78.8	106.4	-	75.4	102.8
6000 Cfm	EAT (wb)	58	THC	172.7	172.7	195.4	165.5	165.5	187.3	157.1	157.1	177.8	148.1	148.1	167.7
			SHC	150.0	172.7	195.4	143.8	165.5	187.3	136.4	157.1	177.8	128.6	148.1	167.7
		62	THC	176.6	176.6	195.7	168.1	168.1	187.6	158.9	158.9	180.2	148.9	148.9	172.1
			SHC	139.6	167.7	195.7	133.2	160.4	187.6	127.1	153.7	180.2	120.7	146.4	172.1
		67	THC	193.6	193.6	193.6	184.8	184.8	184.8	174.7	174.7	174.7	162.7	162.7	162.7
			SHC	112.3	140.3	168.3	108.9	137.0	165.2	105.2	133.5	161.7	100.7	129.0	157.3
		72	THC	208.4	208.4	208.4	199.6	199.6	199.6	190.2	190.2	190.2	179.5	179.5	179.5
			SHC	82.7	110.5	138.3	79.6	107.3	135.1	76.2	104.0	131.8	72.6	100.6	128.5
		76	THC	-	218.2	218.2	-	209.5	209.5	-	199.5	199.5	-	189.0	189.0
			SHC	-	87.5	118.6	-	84.5	115.2	-	81.1	111.3	-	77.5	107.3
6750 Cfm	EAT (wb)	58	THC	178.8	178.8	202.4	171.6	171.6	194.2	163.1	163.1	184.6	153.8	153.8	174.1
			SHC	155.3	178.8	202.4	149.0	171.6	194.2	141.6	163.1	184.6	133.5	153.8	174.1
		62	THC	181.0	181.0	203.6	173.0	173.0	197.5	163.8	163.8	190.1	153.9	153.9	181.1
			SHC	144.1	173.9	203.6	139.1	168.3	197.5	133.3	161.7	190.1	126.7	153.9	181.1
		67	THC	196.8	196.8	196.8	187.9	187.9	187.9	177.7	177.7	177.7	165.5	165.5	167.9
			SHC	117.0	147.7	178.4	113.7	144.5	175.4	110.1	141.1	172.2	105.6	136.8	167.9
		72	THC	211.0	211.0	211.0	202.2	202.2	202.2	192.5	192.5	192.5	181.8	181.8	181.8
			SHC	84.3	114.5	144.7	81.2	111.5	141.7	77.9	108.1	138.4	74.4	104.9	135.4
		76	THC	-	220.2	220.2	-	211.5	211.5	-	201.3	201.3	-	190.6	190.6
			SHC	-	89.5	122.8	-	86.4	119.4	-	83.0	115.4	-	79.4	111.5
7500 Cfm	EAT (wb)	58	THC	183.9	183.9	208.2	176.6	176.6	199.8	168.2	168.2	190.3	158.6	158.6	179.5
			SHC	159.7	183.9	208.2	153.3	176.6	199.8	146.0	168.2	190.3	137.7	158.6	179.5
		62	THC	185.1	185.1	212.5	177.1	177.1	206.2	168.3	168.3	197.9	158.7	158.7	186.7
			SHC	149.5	181.0	212.5	144.5	175.4	206.2	138.7	168.3	197.9	130.8	158.7	186.7
		67	THC	199.3	199.3	199.3	190.3	190.3	190.3	180.0	180.0	181.7	167.8	167.8	177.8
			SHC	121.3	154.6	187.9	118.1	151.6	185.1	114.4	148.1	181.7	110.1	144.0	177.8
		72	THC	213.0	213.0	213.0	204.1	204.1	204.1	194.2	194.2	194.2	183.5	183.5	183.5
			SHC	85.8	118.2	150.5	82.7	115.2	147.7	79.4	111.9	144.4	76.0	108.8	141.6
		76	THC	-	221.9	221.9	-	213.0	213.0	-	202.7	202.7	-	191.8	191.8
			SHC	-	91.2	126.5	-	88.2	123.1	-	84.7	119.2	-	81.2	115.3

* See Minimum – Maximum Airflow Ratings in Table 6. Do not operate outside these limits.

LEGEND:

- Do not operate in this region
- Cfm – Cubic feet per minute (supply air)
- EAT(db) – Entering air temperature (dry bulb)
- EAT(wb) – Entering air temperature (wet bulb)
- SHC – Sensible heat capacity
- TC – Total capacity

Table 33 – COOLING CAPACITIES

2-STAGE COOLING

15 TONS

48TC*E16 Cooling Capacities, Subcooling Mode										
TEMP (F) AIR ENT CONDENSER (Edb)		AIR ENTERING EVAPORATOR – CFM								
		4500/0.02			6000/0.06			7500/0.05		
		Air Entering Evaporator – Ewb (F)								
		72	67	62	72	67	62	72	67	62
75	TC	204.4	186.3	168.2	218.4	199.6	180.9	229.6	210.4	191.2
	SHC	98.9	118.1	137.2	114.8	133.7	152.6	127.6	146.2	164.9
	kW	11.57	11.22	10.77	11.78	11.45	11.00	12.06	11.64	11.35
85	TC	189.2	171.7	154.1	203.0	184.8	166.7	214.1	195.5	176.9
	SHC	79.5	103.4	127.3	96.5	120.2	144.0	110.2	133.7	157.3
	kW	12.59	12.24	11.81	12.81	12.50	12.03	13.05	12.66	12.47
95	TC	174.0	157.0	140.0	187.6	170.1	152.5	198.6	180.6	162.7
	SHC	60.0	88.7	117.5	78.2	106.8	135.3	92.9	121.3	149.7
	kW	13.68	13.35	12.86	13.91	13.57	13.05	14.15	13.75	13.47
105	TC	158.8	142.3	125.8	172.2	155.3	138.3	183.1	165.7	148.4
	SHC	40.5	74.1	107.7	59.9	93.3	126.7	75.5	108.8	142.0
	kW	14.67	14.41	13.88	14.90	14.55	14.10	15.15	14.73	14.53
115	TC	143.6	127.6	111.7	156.8	140.5	124.1	167.6	150.9	134.2
	SHC	21.0	59.4	97.8	41.6	79.9	118.1	58.1	96.3	134.2
	kW	15.77	15.38	14.88	15.88	15.65	15.10	16.12	15.84	15.54

48TC*E 16 COOLING CAPACITIES, HOT GAS REHEAT MODE										
TEMP (F) AIR ENT CONDENSER Edb)		AIR ENTERING EVAPORATOR – Ewb (F)								
		75 Dry Bulb 62.5 Wet Bulb (50% Relative)			75 Dry Bulb 64 Wet Bulb (56% Relative)			75 Dry Bulb 65.3 Wet Bulb (60% Relative)		
		Air Entering Evaporator – Cfm								
		4500	6000	7500	4500	6000	7500	4500	6000	7500
80	TC	83.75	84.85	88.95	86.65	91.90	92.90	87.90	91.75	96.30
	SHC	37.50	42.80	55.10	30.90	40.40	44.50	24.80	29.30	34.10
	kW	10.50	11.49	11.60	10.56	10.65	11.70	11.60	11.72	11.77
75	TC	85.00	86.00	90.50	88.05	93.60	94.65	89.20	93.45	97.85
	SHC	40.00	45.00	57.30	33.20	42.30	46.90	26.90	31.50	36.30
	kW	10.16	11.15	11.25	10.21	10.31	11.33	11.26	11.35	11.42
70	TC	86.15	87.35	91.50	89.20	94.30	96.10	90.40	94.10	98.95
	SHC	42.10	47.50	59.80	35.50	45.30	49.50	29.50	33.90	38.70
	kW	9.84	10.83	10.94	10.02	10.13	11.03	10.95	11.05	11.12
60	TC	88.90	90.10	94.25	92.00	97.10	98.20	93.20	96.90	101.75
	SHC	46.80	52.30	64.60	40.20	50.10	54.10	34.10	38.60	43.40
	kW	9.37	10.36	10.44	9.42	9.52	10.55	10.45	10.57	10.64
50	TC	91.70	92.80	97.00	94.80	99.90	101.00	96.10	99.70	104.20
	SHC	51.50	57.10	69.40	44.80	54.80	58.90	38.70	43.20	49.00
	kW	9.12	10.09	10.16	9.17	9.28	10.26	10.17	10.26	10.32
40	TC	94.45	95.60	99.80	97.45	102.55	103.70	98.65	102.35	107.00
	SHC	56.30	61.40	73.70	49.70	59.20	63.30	43.60	48.10	52.90
	kW	9.05	10.02	10.10	9.10	9.21	10.18	10.11	10.20	10.26

LEGEND

Edb – Entering Dry–Bulb
Ewb – Entering Wet–Bulb
kW – Compressor Motor Power Input
ldb – Leaving Dry–Bulb
lwb – Leaving Wet–Bulb
SHC – Sensible Heat Capacity (1000 Btuh) Gross
TC – Total Capacity (1000 Btuh) Gross

NOTES:

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet–bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

Table 34 – STATIC PRESSURE ADDERS (IN. WG) (FACTORY OPTIONS AND/OR ACCESSORIES)

Humidi-MiZer

3–6 TONS									
CFM	1000	1250	1500	1750	2000	2250	2500	2750	3000
3 Tons	0.04	0.052	0.07	–	–	–	–	–	–
4 Tons	–	0.106	0.138	0.172	0.21	–	–	–	–
5 Tons	–	–	0.138	0.172	0.21	0.252	0.30	–	–
6 Tons	–	–	–	0.112	0.125	0.161	0.19	0.22	0.25

7.5–12.5 TONS																
CFM	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000	5250	5500	5750	6000
7.5 Tons	0.12	0.14	0.16	0.19	0.21	0.23	0.26	–	–	–	–	–	–	–	–	–
8.5 Tons	–	0.11	0.12	0.13	0.15	0.17	0.18	0.20	0.22	–	–	–	–	–	–	–
10 Tons	–	–	–	0.13	0.15	0.17	0.18	0.20	0.22	0.24	0.26	0.28	–	–	–	–
12.5 Tons	–	–	–	–	–	0.17	0.18	0.20	0.22	0.24	0.26	0.28	0.31	0.33	0.36	0.39

15 TONS														
CFM	4000	4250	4500	4750	5000	5250	5500	5750	6000	6250	6500	6750	7000	7250
15 Tons	0.06	0.07	0.07	0.08	0.08	0.09	0.10	0.10	0.11	0.12	0.12	0.13	0.14	0.15

ECONOMIZER, BAROMETRIC RELIEF AND PE PERFORMANCE

Vertical Application

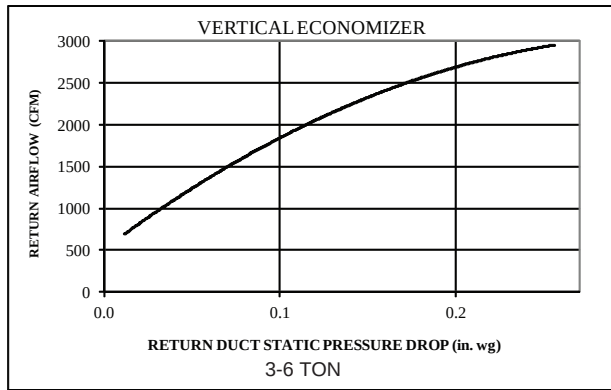


Fig. 16 - Return Air Pressure Drop

C11238

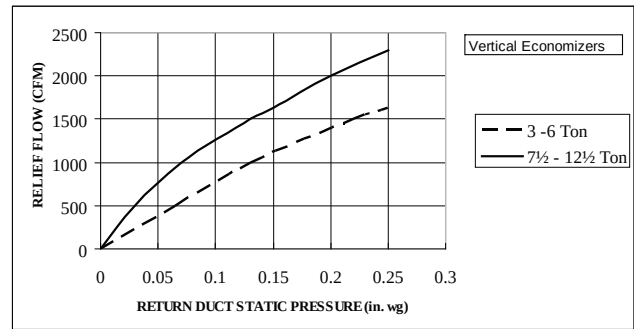


Fig. 19 - Barometric Relief Flow Capacity

C08073

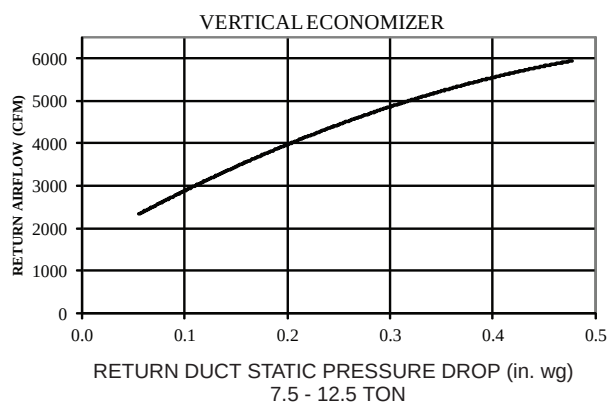


Fig. 17 - Return Air Pressure Drop

C11240

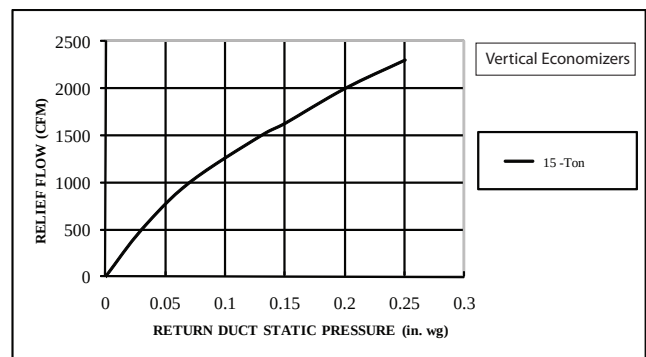


Fig. 20 - Barometric Relief Flow-Vertical 15 Ton

C101122

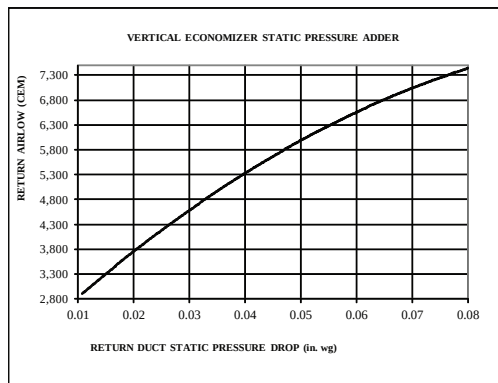


Fig. 18 - Return Air Pressure Drop-Vertical 15 Tons

C11257

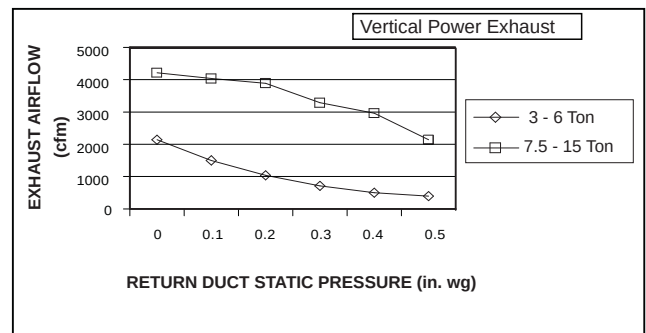


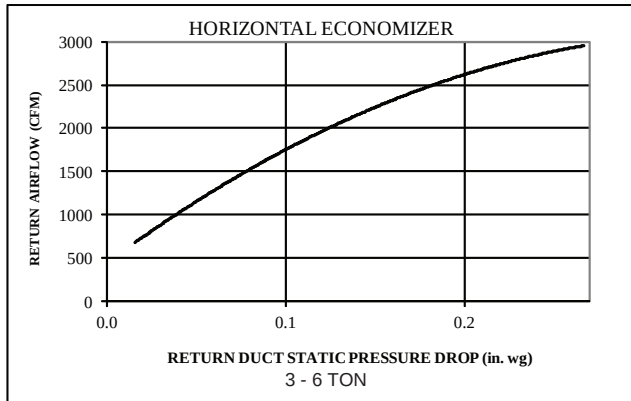
Fig. 21 - Vertical Power Exhaust Performance

C11248

All above data for both standard and ultra low leak models, where available.

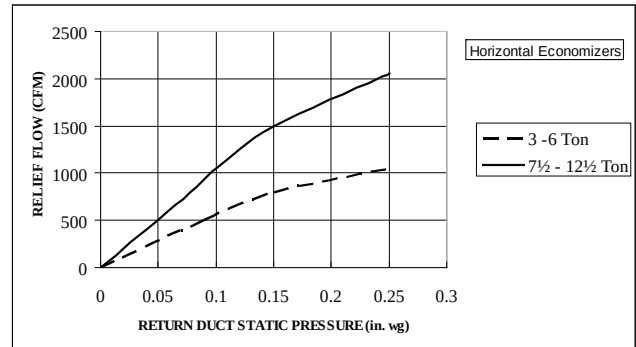
ECONOMIZER, BAROMETRIC RELIEF AND PE PERFORMANCE (cont.)

Horizontal Application



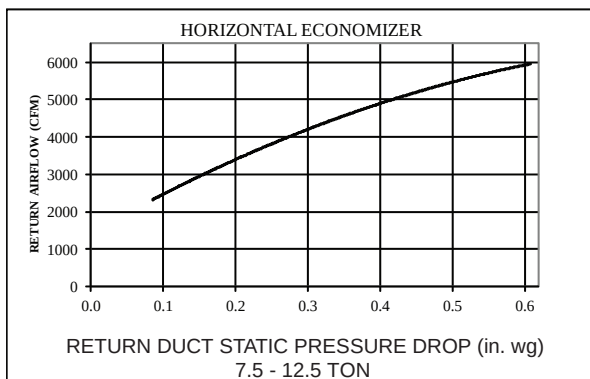
C11239

Fig. 22 - Return Air Pressure Drop



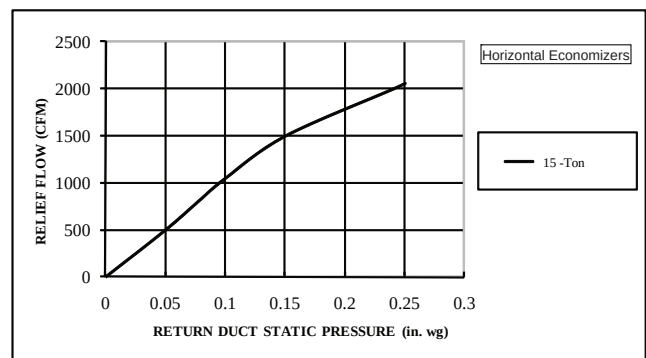
C08070

Fig. 25 - Barometric Relief Flow Capacity



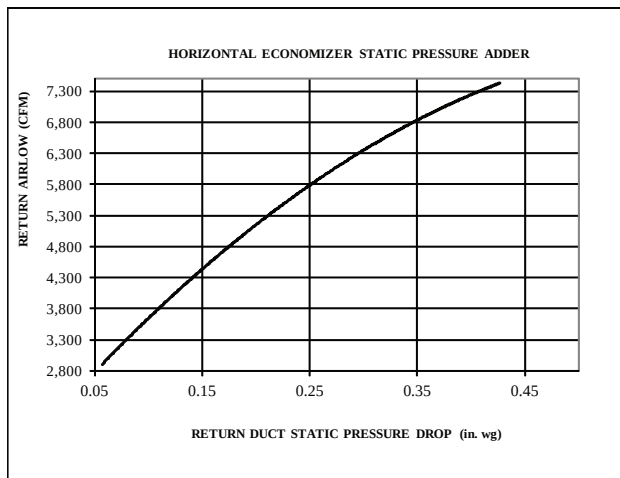
C11241

Fig. 23 - Return Air Pressure Drop



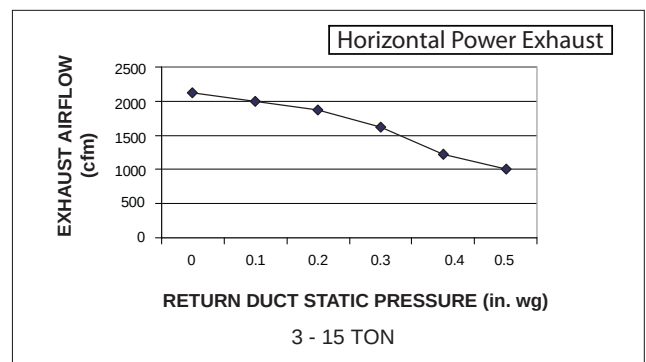
C101120

Fig. 26 - Barometric Relief Flow-Horizontal 15 Ton



C11258

Fig. 24 - Return Air Pressure Drop-Horizontal 15 Ton



C08012

Fig. 27 - Horizontal Power Exhaust Performance

GENERAL FAN PERFORMANCE NOTES

1. Interpolation is permissible. Do not extrapolate.
2. External static pressure is the static pressure difference between the return duct and the supply duct plus the static pressure caused by any FIOPs or accessories.
3. Tabular data accounts for pressure loss due to clean filters, unit casing, and wet coils. Factory options and accessories may add static pressure losses. Selection software is available, through your salesperson, to help you select the best motor/drive combination for your application.
4. The Fan Performance tables offer motor/drive recommendations. In cases when two motor/drive combinations would work, Carrier recommended the lower horsepower option.
5. For information on the electrical properties of Carrier motors, please see the Electrical information section of this book.
6. For more information on the performance limits of Carrier motors, see the application data section of this book.
7. The EPACT (Energy Policy Act of 1992) regulates energy requirements for specific types of indoor fan motors. Motors regulated by EPACT include any general purpose, T-frame (three-digit, 143 and larger), single-speed, foot mounted, polyphase, squirrel cage induction motors of NEMA (National Electrical Manufacturers Association) design A and B, manufactured for use in the United States. Ranging from 1 to 200 Hp, these continuous-duty motors operate on 230 and 460 volt, 60 Hz power. If a motor does not fit into these specifications, the motor does not have to be replaced by an EPACT compliant energy efficient motor. Variable speed motors are exempt from EPACT compliance requirements. Therefore, the indoor fan motors for Carrier 48TC**04-16 units are exempt from these requirements.

FAN PERFORMANCE

Table 35 – 48TC**04

1 PHASE

3 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	0.2		0.4		0.6		0.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field Supplied Drive ¹		Standard Static Option			Medium Static Option		
900	553	0.14	681	0.22	782	0.32	870	0.42
975	575	0.16	700	0.25	801	0.35	888	0.46
1050	597	0.18	720	0.28	820	0.38	906	0.49
1125	620	0.21	741	0.31	839	0.42	925	0.54
1200	643	0.23	762	0.34	859	0.46	944	0.58
1275	667	0.27	783	0.38	879	0.50	963	0.63
1350	691	0.30	805	0.42	900	0.55	983	0.68
1425	715	0.34	827	0.47	920	0.60	1002	0.74
1500	740	0.38	849	0.52	941	0.66	1023	0.80

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	1.2		1.4		1.6		1.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				Field Supplied Drive ²			
900	1019	0.64	1084	0.76	1146	0.89	1203	1.02
975	1036	0.69	1101	0.81	1162	0.94	1219	1.08
1050	1053	0.74	1118	0.86	1179	1.00	1236	1.14
1125	1071	0.79	1135	0.92	1196	1.06	1253	1.20
1200	1089	0.84	1153	0.98	1213	1.12	–	–
1275	1107	0.90	1171	1.04	1231	1.19	–	–
1350	1126	0.96	1189	1.11	–	–	–	–
1425	1144	1.03	1208	1.18	–	–	–	–
1500	1163	1.10	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AG006) and belt (part no. KR30AE039).
2. Recommend using field supplied motor pulley (part no. KR11HY161) and belt (part no. KR30AE035).

Table 36 – 48TC**04

1 PHASE

3 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	0.2		0.4		0.6		0.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field Supplied Drive ¹		Standard Static Option			Medium Static Option		
900	567	0.15	688	0.22	786	0.30	871	0.37
975	591	0.17	710	0.26	807	0.34	891	0.42
1050	615	0.20	732	0.29	828	0.38	911	0.47
1125	641	0.23	755	0.33	849	0.42	931	0.52
1200	666	0.26	778	0.37	871	0.47	952	0.57
1275	693	0.29	802	0.41	893	0.53	974	0.63
1350	719	0.33	826	0.46	916	0.58	995	0.70
1425	746	0.38	850	0.51	939	0.64	1017	0.76
1500	773	0.42	875	0.57	963	0.70	1040	0.84

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	1.2		1.4		1.6		1.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				Field Supplied Drive ²			
900	1016	0.51	1080	0.57	1139	0.64	1195	0.71
975	1034	0.57	1098	0.64	1157	0.72	1213	0.79
1050	1053	0.63	1116	0.71	1176	0.79	1231	0.87
1125	1073	0.70	1135	0.79	1194	0.87	1250	0.96
1200	1093	0.77	1155	0.87	1213	0.96	1268	1.05
1275	1113	0.85	1174	0.95	1232	1.05	1287	1.15
1350	1133	0.92	1194	1.03	1252	1.14	–	–
1425	1154	1.01	1215	1.12	–	–	–	–
1500	1175	1.09	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AG006) and belt (part no. KR30AE039).
2. Recommend using field supplied motor pulley (part no. KR11HY161) and belt (part no. KR30AE035).

FAN PERFORMANCE (cont.)

Table 37 – 48TC**04

3 PHASE

3 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field Supplied Drive ¹		Standard Static Option				Medium Static Option			
900	553	0.14	681	0.22	782	0.32	870	0.42	948	0.53
975	575	0.16	700	0.25	801	0.35	888	0.46	965	0.57
1050	597	0.18	720	0.28	820	0.38	906	0.49	983	0.61
1125	620	0.21	741	0.31	839	0.42	925	0.54	1001	0.66
1200	643	0.23	762	0.34	859	0.46	944	0.58	1020	0.71
1275	667	0.27	783	0.38	879	0.50	963	0.63	1038	0.76
1350	691	0.30	805	0.42	900	0.55	983	0.68	1057	0.82
1425	715	0.34	827	0.47	920	0.60	1002	0.74	1076	0.88
1500	740	0.38	849	0.52	941	0.66	1023	0.80	1096	0.95

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option					High Static Option				
900	1019	0.64	1084	0.76	1146	0.89	1203	1.02	1258	1.16
975	1036	0.69	1101	0.81	1162	0.94	1219	1.08	1274	1.22
1050	1053	0.74	1118	0.86	1179	1.00	1236	1.14	1290	1.28
1125	1071	0.79	1135	0.92	1196	1.06	1253	1.20	1307	1.35
1200	1089	0.84	1153	0.98	1213	1.12	1270	1.27	1324	1.42
1275	1107	0.90	1171	1.04	1231	1.19	1287	1.34	1341	1.50
1350	1126	0.96	1189	1.11	1249	1.26	1305	1.42	1358	1.58
1425	1144	1.03	1208	1.18	1267	1.34	1323	1.50	1376	1.66
1500	1163	1.10	1226	1.25	1285	1.41	1341	1.58	1394	1.75

NOTE: For more information, see General Fan Performance Notes.

1. Recommend using field supplied drive (part no. KR11AG006) and belt (part no. KR30AE039)

Table 38 – 48TC**04

3 PHASE

3 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field Supplied Drive ¹		Standard Static Option				Medium Static Option			
900	567	0.15	688	0.22	786	0.30	871	0.37	947	0.44
975	591	0.17	710	0.26	807	0.34	891	0.42	966	0.49
1050	615	0.20	732	0.29	828	0.38	911	0.47	985	0.55
1125	641	0.23	755	0.33	849	0.42	931	0.52	1005	0.61
1200	666	0.26	778	0.37	871	0.47	952	0.57	1025	0.67
1275	693	0.29	802	0.41	893	0.53	974	0.63	1046	0.74
1350	719	0.33	826	0.46	916	0.58	995	0.70	1067	0.81
1425	746	0.38	850	0.51	939	0.64	1017	0.76	1088	0.89
1500	773	0.42	875	0.57	963	0.70	1040	0.84	1110	0.96

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option					High Static Option				
900	1016	0.51	1080	0.57	1139	0.64	1195	0.71	1249	0.77
975	1034	0.57	1098	0.64	1157	0.72	1213	0.79	1266	0.86
1050	1053	0.63	1116	0.71	1176	0.79	1231	0.87	1284	0.95
1125	1073	0.70	1135	0.79	1194	0.87	1250	0.96	1302	1.04
1200	1093	0.77	1155	0.87	1213	0.96	1268	1.05	1321	1.14
1275	1113	0.85	1174	0.95	1232	1.05	1287	1.15	1339	1.25
1350	1133	0.92	1194	1.03	1252	1.14	1307	1.25	1358	1.35
1425	1154	1.01	1215	1.12	1272	1.24	1326	1.35	1378	1.46
1500	1175	1.09	1235	1.22	1292	1.34	1346	1.46	1397	1.58

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AG006) and belt (part no. KR30AE039).

FAN PERFORMANCE (cont.)

Table 39 – 48TC**05

1 PHASE

4 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option				Medium Static Option					
1200	643	0.23	762	0.34	859	0.46	944	0.58	1020	0.71
1300	675	0.28	790	0.40	886	0.52	969	0.65	1044	0.78
1400	707	0.33	819	0.45	913	0.58	996	0.72	1070	0.86
1500	740	0.38	849	0.52	941	0.66	1023	0.80	1096	0.95
1600	773	0.45	879	0.59	970	0.73	1050	0.88	1123	1.04
1700	807	0.52	910	0.67	999	0.82	1078	0.98	1150	1.14
1800	841	0.59	942	0.75	1029	0.91	1106	1.08	1177	1.25
1900	875	0.68	974	0.85	1059	1.02	1135	1.19	1205	1.37
2000	910	0.77	1006	0.95	1090	1.13	1165	1.31	1234	1.49

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				Field Supplied Drive ¹					
1200	1089	0.84	1153	0.98	1213	1.12	—	—	—	—
1300	1113	0.92	1177	1.06	—	—	—	—	—	—
1400	1138	1.01	1201	1.15	—	—	—	—	—	—
1500	1163	1.10	—	—	—	—	—	—	—	—
1600	1189	1.20	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied motor pulley (part no. KR11HY161) and belt (part no. KR30AE035).

Table 40 – 48TC**05

1 PHASE

4 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option				Medium Static Option					
1200	666	0.26	778	0.37	871	0.47	952	0.57	1025	0.67
1300	701	0.31	810	0.43	901	0.54	981	0.65	1053	0.76
1400	737	0.36	842	0.49	931	0.62	1010	0.74	1081	0.86
1500	773	0.42	875	0.57	963	0.70	1040	0.84	1110	0.96
1600	810	0.49	909	0.65	994	0.79	1070	0.94	1140	1.08
1700	847	0.57	943	0.73	1027	0.89	1101	1.05	1170	1.20
1800	885	0.66	978	0.83	1060	1.00	1133	1.16	1200	1.32
1900	923	0.75	1014	0.94	1093	1.11	1165	1.29	1231	1.46
2000	962	0.85	1049	1.05	1127	1.24	1198	1.42	1263	1.61

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				Field Supplied Drive ¹					
1200	1093	0.77	1155	0.87	1213	0.96	1268	1.05	1321	1.14
1300	1119	0.87	1181	0.98	1239	1.08	1294	1.18	—	—
1400	1147	0.98	1208	1.09	—	—	—	—	—	—
1500	1175	1.09	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied motor pulley (part no. KR11HY161) and belt (part no. KR30AE035).

FAN PERFORMANCE (cont.)

Table 41 – 48TC**05

3 PHASE

4 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option				Medium Static Option					
1200	643	0.23	762	0.34	859	0.46	944	0.58	1020	0.71
1300	675	0.28	790	0.40	886	0.52	969	0.65	1044	0.78
1400	707	0.33	819	0.45	913	0.58	996	0.72	1070	0.86
1500	740	0.38	849	0.52	941	0.66	1023	0.80	1096	0.95
1600	773	0.45	879	0.59	970	0.73	1050	0.88	1123	1.04
1700	807	0.52	910	0.67	999	0.82	1078	0.98	1150	1.14
1800	841	0.59	942	0.75	1029	0.91	1106	1.08	1177	1.25
1900	875	0.68	974	0.85	1059	1.02	1135	1.19	1205	1.37
2000	910	0.77	1006	0.95	1090	1.13	1165	1.31	1234	1.49

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				High Static Option					
1200	1089	0.84	1153	0.98	1213	1.12	1270	1.27	1324	1.42
1300	1113	0.92	1177	1.06	1237	1.21	1293	1.36	1347	1.52
1400	1138	1.01	1201	1.15	1261	1.31	1317	1.47	1370	1.63
1500	1163	1.10	1226	1.25	1285	1.41	1341	1.58	1394	1.75
1600	1189	1.20	1252	1.36	1310	1.53	1365	1.70	1418	1.87
1700	1216	1.31	1277	1.48	1335	1.65	1390	1.83	1442	2.01
1800	1242	1.42	1303	1.60	1361	1.78	1415	1.96	1467	2.15
1900	1270	1.55	1330	1.73	1387	1.92	1441	2.11	1493	2.30
2000	1297	1.68	1357	1.87	1414	2.07	1467	2.26	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AZ506), motor pulley (part no. KR11HY181) and belt (part no. KR30AE041).

Table 42 – 48TC**05

3 PHASE

4 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option				Medium Static Option					
1200	666	0.26	778	0.37	871	0.47	952	0.57	1025	0.67
1300	701	0.31	810	0.43	901	0.54	981	0.65	1053	0.76
1400	737	0.36	842	0.49	931	0.62	1010	0.74	1081	0.86
1500	773	0.42	875	0.57	963	0.70	1040	0.84	1110	0.96
1600	810	0.49	909	0.65	994	0.79	1070	0.94	1140	1.08
1700	847	0.57	943	0.73	1027	0.89	1101	1.05	1170	1.20
1800	885	0.66	978	0.83	1060	1.00	1133	1.16	1200	1.32
1900	923	0.75	1014	0.94	1093	1.11	1165	1.29	1231	1.46
2000	962	0.85	1049	1.05	1127	1.24	1198	1.42	1263	1.61

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				High Static Option					
1200	1093	0.77	1155	0.87	1213	0.96	1268	1.05	1321	1.14
1300	1119	0.87	1181	0.98	1239	1.08	1294	1.18	1346	1.28
1400	1147	0.98	1208	1.09	1265	1.21	1320	1.32	1371	1.43
1500	1175	1.09	1235	1.22	1292	1.34	1346	1.46	1397	1.58
1600	1204	1.21	1263	1.35	1320	1.48	1373	1.61	1424	1.74
1700	1233	1.34	1292	1.49	1348	1.63	1401	1.77	1451	1.91
1800	1262	1.48	1321	1.64	1376	1.79	1428	1.94	1479	2.09
1900	1293	1.63	1350	1.79	1405	1.96	1457	2.12	1506	2.28
2000	1323	1.79	1380	1.96	1434	2.13	1486	2.31	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AZ506), motor pulley (part no. KR11HY181) and belt (part no. KR30AE041).

FAN PERFORMANCE (cont.)

Table 43 – 48TC**06

1 PHASE

5 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option									
1500	800	0.39	904	0.49	999	0.60	1087	0.72	1169	0.85
1625	849	0.48	947	0.59	1038	0.70	1122	0.83	1201	0.96
1750	899	0.59	992	0.70	1078	0.82	1159	0.95	1235	1.08
1875	950	0.70	1038	0.82	1120	0.95	1198	1.08	1271	1.22
2000	1001	0.84	1085	0.96	1163	1.09	1238	1.23	1309	1.38
2125	1053	0.99	1133	1.12	1208	1.26	1280	1.40	–	–
2250	1106	1.16	1182	1.29	1254	1.44	–	–	–	–
2375	1159	1.34	1231	1.49	–	–	–	–	–	–
2500	–	–	–	–	–	–	–	–	–	–

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option									
1500	1247	0.98	1320	1.13	1390	1.28	1457	1.44	–	–
1625	1276	1.10	1348	1.24	1416	1.40	–	–	–	–
1750	1308	1.22	1377	1.38	–	–	–	–	–	–
1875	1342	1.37	–	–	–	–	–	–	–	–
2000	–	–	–	–	–	–	–	–	–	–
2125	–	–	–	–	–	–	–	–	–	–
2250	–	–	–	–	–	–	–	–	–	–
2375	–	–	–	–	–	–	–	–	–	–
2500	–	–	–	–	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Table 44 – 48TC**06

1 PHASE

5 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option									
1500	848	0.42	968	0.55	1069	0.68	1158	0.80	1238	0.94
1625	897	0.51	1013	0.65	1111	0.79	1198	0.93	1277	1.07
1750	947	0.61	1059	0.76	1155	0.91	1240	1.06	1318	1.21
1875	997	0.72	1105	0.89	1199	1.05	1283	1.21	1359	1.37
2000	1048	0.85	1153	1.03	1244	1.20	1326	1.37	–	–
2125	1100	1.00	1201	1.19	1290	1.37	–	–	–	–
2250	1152	1.16	1250	1.36	–	–	–	–	–	–
2375	1205	1.34	–	–	–	–	–	–	–	–
2500	–	–	–	–	–	–	–	–	–	–

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option									
1500	1312	1.07	1380	1.20	1445	1.34	1506	1.48	–	–
1625	1350	1.21	1418	1.35	1482	1.50	–	–	–	–
1750	1390	1.36	–	–	–	–	–	–	–	–
1875	–	–	–	–	–	–	–	–	–	–
2000	–	–	–	–	–	–	–	–	–	–
2125	–	–	–	–	–	–	–	–	–	–
2250	–	–	–	–	–	–	–	–	–	–
2375	–	–	–	–	–	–	–	–	–	–
2500	–	–	–	–	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied motor pulley (part no. KR11HY171) and belt (part no. KR30AE039).

FAN PERFORMANCE (cont.)

Table 45 – 48TC**06

3 PHASE

5 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option									
1500	800	0.39	904	0.49	999	0.60	1087	0.72	1169	0.85
1625	849	0.48	947	0.59	1038	0.70	1122	0.83	1201	0.96
1750	899	0.59	992	0.70	1078	0.82	1159	0.95	1235	1.08
1875	950	0.70	1038	0.82	1120	0.95	1198	1.08	1271	1.22
2000	1001	0.84	1085	0.96	1163	1.09	1238	1.23	1309	1.38
2125	1053	0.99	1133	1.12	1208	1.26	1280	1.40	1348	1.55
2250	1106	1.16	1182	1.29	1254	1.44	1323	1.59	1389	1.74
2375	1159	1.34	1231	1.49	1300	1.64	1367	1.80	1430	1.96
2500	1212	1.55	1281	1.70	1348	1.86	1412	2.02	1473	2.19

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option								High Static Option	
1500	1247	0.98	1320	1.13	1390	1.28	1457	1.44	1522	1.61
1625	1276	1.10	1348	1.24	1416	1.40	1481	1.56	1544	1.73
1750	1308	1.22	1377	1.38	1444	1.53	1507	1.70	1569	1.87
1875	1342	1.37	1409	1.52	1473	1.69	1536	1.86	1596	2.03
2000	1377	1.53	1442	1.69	1505	1.86	1565	2.03	1624	2.21
2125	1414	1.71	1477	1.87	1538	2.04	1597	2.22	1654	2.40
2250	1452	1.91	1514	2.08	1573	2.25	1630	2.43	1686	2.62
2375	1492	2.12	1551	2.30	1609	2.48	1665	2.66	1719	2.85
2500	1533	2.36	1591	2.54	1647	2.73	—	—	—	—

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AZ506), motor pulley (part no. KR11HY191) and belt (part no. KR30AE042).

Table 46 – 48TC**06

3 PHASE

5 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option						Medium Static Option			
1500	848	0.42	968	0.55	1069	0.68	1158	0.80	1238	0.94
1625	897	0.51	1013	0.65	1111	0.79	1198	0.93	1277	1.07
1750	947	0.61	1059	0.76	1155	0.91	1240	1.06	1318	1.21
1875	997	0.72	1105	0.89	1199	1.05	1283	1.21	1359	1.37
2000	1048	0.85	1153	1.03	1244	1.20	1326	1.37	1401	1.54
2125	1100	1.00	1201	1.19	1290	1.37	1370	1.55	1444	1.73
2250	1152	1.16	1250	1.36	1336	1.55	1415	1.75	1487	1.94
2375	1205	1.34	1299	1.55	1384	1.76	1460	1.96	1532	2.17
2500	1258	1.54	1349	1.76	1431	1.98	1506	2.20	1576	2.41

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option						High Static Option			
1500	1312	1.07	1380	1.20	1445	1.34	1506	1.48	1564	1.62
1625	1350	1.21	1418	1.35	1482	1.50	1542	1.64	1600	1.79
1750	1390	1.36	1457	1.51	1520	1.67	1580	1.83	1637	1.98
1875	1430	1.53	1496	1.69	1559	1.86	1618	2.02	1675	2.19
2000	1471	1.72	1536	1.89	1598	2.06	1657	2.24	1713	2.41
2125	1513	1.92	1577	2.10	1638	2.28	1696	2.47	1752	2.65
2250	1555	2.13	1619	2.33	1679	2.52	1736	2.72	—	—
2375	1598	2.37	1661	2.57	1720	2.78	—	—	—	—
2500	1642	2.63	1704	2.84	—	—	—	—	—	—

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AZ506), motor pulley (part no. KR11HY191) and belt (part no. KR30AE042).

FAN PERFORMANCE (cont.)

Table 47 – 48TC**07

3 PHASE

6 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field Supplied Drive ¹		Standard Static Option							
1800	913	0.64	1010	0.80	1098	0.98	1178	1.16	1252	1.35
1950	972	0.78	1065	0.96	1148	1.14	1226	1.34	1298	1.54
2100	1032	0.95	1120	1.14	1200	1.33	1275	1.54	1345	1.75
2250	1093	1.14	1177	1.34	1254	1.55	1325	1.76	1393	1.98
2400	1155	1.36	1234	1.57	1308	1.78	1377	2.01	1443	2.24
2550	1217	1.60	1293	1.82	1363	2.05	1430	2.28	1494	2.53
2700	1280	1.87	1352	2.10	1420	2.34	1484	2.59	1546	2.84
2850	1343	2.17	1412	2.42	1477	2.67	1539	2.93	1599	3.19
3000	1406	2.50	1472	2.76	1535	3.03	1595	3.29	1653	3.57

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option				Medium Static Option				High Static Option	
1800	1322	1.56	1388	1.77	1451	1.98	1510	2.21	1568	2.44
1950	1366	1.75	1430	1.97	1491	2.20	1550	2.43	1606	2.67
2100	1411	1.97	1473	2.20	1533	2.43	1590	2.67	1645	2.92
2250	1457	2.21	1518	2.45	1576	2.69	1632	2.94	1686	3.20
2400	1505	2.48	1564	2.73	1621	2.98	1676	3.24	1729	3.51
2550	1554	2.78	1612	3.03	1667	3.30	1721	3.57	–	–
2700	1604	3.10	1660	3.37	1715	3.64	–	–	–	–
2850	1656	3.46	–	–	–	–	–	–	–	–
3000	–	–	–	–	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field – supplied drive is required.

1. Recommend using field – supplied fan pulley (part no. KR11AZ406), motor pulley (part no. KR11HY151) and belt (part no. KR29AF035).

Table 48 – 48TC**07

3 PHASE

6 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field – Supplied Drive ¹		Standard Static Option							
1800	967	0.63	1075	0.80	1170	0.97	1255	1.13	1333	1.28
1950	1029	0.77	1132	0.96	1223	1.14	1306	1.32	1382	1.49
2100	1091	0.93	1189	1.14	1278	1.33	1358	1.52	1433	1.71
2250	1154	1.11	1248	1.33	1333	1.55	1411	1.75	1484	1.96
2400	1218	1.32	1308	1.55	1390	1.78	1466	2.01	1537	2.23
2550	1283	1.55	1369	1.80	1448	2.05	1521	2.29	1590	2.52
2700	1348	1.80	1431	2.07	1507	2.33	1578	2.59	1645	2.84
2850	1414	2.09	1493	2.37	1566	2.65	1636	2.92	1701	3.19
3000	1479	2.40	1556	2.70	1627	3.00	1694	3.29	1757	3.57

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				High Static Option					
1800	1406	1.43	1475	1.58	1540	1.72	1601	1.87	1660	2.00
1950	1454	1.65	1521	1.82	1585	1.98	1645	2.13	1703	2.29
2100	1502	1.89	1568	2.07	1631	2.25	1690	2.42	1747	2.59
2250	1552	2.15	1617	2.35	1678	2.54	1737	2.73	1793	2.92²
2400	1603	2.44	1666	2.65	1727	2.86	1784	3.06	1839	3.26
2550	1655	2.75	1717	2.98	1776	3.20	1833	3.42	1887	3.64
2700	1709	3.09	1769	3.33	1827	3.57	–	–	–	–
2850	1763	3.45	–	–	–	–	–	–	–	–
3000	–	–	–	–	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AZ406), motor pulley (part no. KR11HY151) and belt (part no. KR29AF035).

2. Recommend using field supplied fan pulley (part no. KR11AZ506), motor pulley (part no. KR11HY191) and belt (part no. KR29AF042).

FAN PERFORMANCE (cont.)

Table 49 – 48TC**08

3 PHASE

7.5 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option								Medium Static Option	
2250	505	0.52	586	0.73	657	0.97	722	1.22	782	1.50
2438	533	0.62	610	0.85	679	1.09	742	1.36	800	1.65
2625	562	0.74	635	0.98	701	1.23	762	1.51	819	1.81
2813	591	0.88	661	1.13	725	1.39	783	1.68	839	1.98
3000	621	1.03	688	1.29	749	1.57	806	1.87	859	2.18
3188	652	1.21	715	1.48	774	1.77	829	2.07	881	2.40
3375	682	1.40	743	1.68	800	1.98	853	2.30	903	2.63
3563	713	1.61	772	1.91	826	2.22	878	2.55	927	2.89
3750	745	1.85	801	2.15	853	2.48	903	2.82	951	3.18

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option					High Static Option				
2250	838	1.81	891	2.12	941	2.46	988	2.82	1033	3.19
2438	854	1.96	906	2.28	955	2.63	1001	2.99	1046	3.37
2625	872	2.12	922	2.46	970	2.81	1016	3.17	1060	3.56
2813	890	2.31	940	2.65	986	3.01	1031	3.38	1074	3.77
3000	910	2.51	958	2.86	1004	3.23	1048	3.61	1090	4.01
3188	930	2.74	977	3.10	1022	3.47	1065	3.86	1107	4.26¹
3375	951	2.99	997	3.35	1041	3.74	1083	4.13	1124	4.54
3563	973	3.26	1018	3.63	1061	4.02	1103	4.43	–	–
3750	996	3.55	1040	3.93	1082	4.34	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AZ002) and belt (part no. KR29AF054).

Table 50 – 48TC**08

3 PHASE

7.5 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option								Medium Static Option	
2250	513	0.54	595	0.76	665	1.01	728	1.27	786	1.56
2438	541	0.65	620	0.89	688	1.14	750	1.42	806	1.71
2625	570	0.77	645	1.02	712	1.29	772	1.58	827	1.88
2813	600	0.91	672	1.18	736	1.46	794	1.76	848	2.07
3000	629	1.07	699	1.35	761	1.64	818	1.95	871	2.28
3188	660	1.25	726	1.54	787	1.85	842	2.17	894	2.51
3375	690	1.45	754	1.75	813	2.07	867	2.41	917	2.76
3563	721	1.67	783	1.98	840	2.32	892	2.67	941	3.03
3750	752	1.91	812	2.24	867	2.59	918	2.95	966	3.32

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option					High Static Option				
2250	839	1.86	889	2.18	935	2.52	980	2.87	1022	3.23
2438	858	2.02	907	2.35	953	2.70	997	3.06	1039	3.43
2625	878	2.20	926	2.54	972	2.89	1015	3.26	1056	3.64
2813	899	2.40	946	2.75	991	3.11	1033	3.49	1074	3.88
3000	920	2.62	966	2.98	1010	3.35	1052	3.74	1093	4.14
3188	942	2.86	987	3.23	1031	3.61	1072	4.01	1112	4.42¹
3375	964	3.12	1009	3.50	1052	3.89	1093	4.30	–	–
3563	988	3.41	1032	3.80	1074	4.20	1114	4.61	–	–
3750	1011	3.71	1054	4.11	1096	4.53	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field-supplied drive is required.

1. Recommend using field-supplied fan pulley (part no. KR11AZ002) and belt (part no. KR29AF054).

FAN PERFORMANCE (cont.)

Table 51 – 48TC09**

3 PHASE

8.5 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	0.2		0.4		0.6		0.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field–Supplied Drive ¹		Standard Static Option				Medium Static Option	
2550	497	0.48	579	0.61	651	0.75	717	0.90
2763	524	0.58	602	0.72	671	0.87	735	1.03
2975	551	0.70	626	0.86	693	1.01	754	1.18
3188	580	0.84	651	1.00	716	1.17	775	1.34
3400	609	1.00	677	1.17	739	1.35	797	1.53
3613	638	1.17	703	1.35	763	1.54	819	1.73
3825	668	1.37	730	1.56	788	1.76	842	1.96
4038	698	1.59	758	1.79	813	2.00	866	2.20
4250	728	1.83	786	2.04	839	2.26	890	2.47

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	1.2		1.4		1.6		1.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				High Static Option			
2550	833	1.21	886	1.38	936	1.56	984	1.74
2763	849	1.36	900	1.53	950	1.72	996	1.90
2975	865	1.52	916	1.70	964	1.89	1010	2.09
3188	883	1.70	933	1.89	980	2.09	1025	2.29
3400	902	1.90	950	2.10	996	2.30	1041	2.51
3613	921	2.13	969	2.33	1014	2.54	1057	2.76
3825	941	2.37	988	2.58	1032	2.80	1075	3.02
4038	963	2.63	1008	2.86	1051	3.08	1093	3.31
4250	984	2.92	1029	3.15	1071	3.39	1112	3.63

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field–supplied drive is required.

1. Recommend using field–supplied fan pulley (part no. KR11AK012) and belt (part no. KR29AF055).
2. Recommend using field–supplied motor pulley (part no. KR11HY310), fan pulley (part no. KR11AZ002) and belt (part no. KR29AF054).

Table 52 – 48TC09**

3 PHASE

8.5 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	0.2		0.4		0.6		0.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option						Medium Static Option	
2550	526	0.51	600	0.65	666	0.79	727	0.93
2763	557	0.62	627	0.77	690	0.92	749	1.08
2975	588	0.75	655	0.91	716	1.08	772	1.24
3188	621	0.90	684	1.07	743	1.25	797	1.42
3400	653	1.06	714	1.25	770	1.44	822	1.62
3613	687	1.25	744	1.45	798	1.65	849	1.84
3825	720	1.45	775	1.67	827	1.88	876	2.09
4038	754	1.69	807	1.91	856	2.13	904	2.35
4250	788	1.94	839	2.17	886	2.41	932	2.64

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)							
	1.2		1.4		1.6		1.8	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option				High Static Option			
2550	836	1.20	886	1.34	934	1.48	979	1.61
2763	855	1.37	904	1.52	950	1.67	995	1.82
2975	875	1.56	923	1.72	968	1.88	1012	2.04
3188	897	1.77	943	1.94	987	2.11	1030	2.29
3400	919	1.99	964	2.18	1007	2.36	1049	2.55
3613	943	2.24	986	2.44	1029	2.63	1069	2.83
3825	967	2.51	1010	2.71	1051	2.92	1090	3.13
4038	992	2.80	1034	3.02	1074	3.24	1112	3.46
4250	1018	3.11	1058	3.34	1097	3.57	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied motor pulley (part no. KR11HY310), fan pulley (part no. KR11AZ002) and belt (part no. KR29AF054).

FAN PERFORMANCE (cont.)

Table 53 – 48TC**12

3 PHASE

10 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Field Supplied Drive ¹		Standard Static Option						Medium Static Option	
3000	579	0.70	660	0.89	732	1.09	799	1.29	860	1.50
3250	613	0.85	690	1.06	760	1.27	823	1.49	883	1.71
3500	648	1.03	721	1.25	788	1.48	850	1.71	907	1.95
3750	683	1.23	753	1.47	817	1.71	877	1.96	933	2.21
4000	719	1.45	786	1.71	848	1.97	905	2.23	959	2.50
4250	756	1.71	819	1.98	879	2.26	934	2.53	987	2.81
4500	792	1.99	853	2.28	910	2.57	964	2.87	1015	3.16
4750	830	2.31	888	2.62	943	2.92	995	3.23	1044	3.54
5000	867	2.66	923	2.98	976	3.30	1026	3.63	1074	3.95

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option						High Static Option			
3000	917	1.70	970	1.91	1021	2.13	1070	2.34	1117	2.56
3250	938	1.93	991	2.16	1041	2.38	1089	2.61	1134	2.85
3500	961	2.18	1013	2.42	1062	2.66	1108	2.91	1153	3.15
3750	985	2.46	1035	2.71	1083	2.97	1129	3.23	1173	3.49
4000	1011	2.76	1059	3.03	1106	3.30	1151	3.58	1194	3.85
4250	1037	3.09	1084	3.38	1130	3.66	1174	3.95	1216	4.24
4500	1064	3.46	1110	3.76	1155	4.06	1198	4.36	1239	4.66
4750	1091	3.85	1137	4.16	1180	4.48	–	–	–	–
5000	1120	4.28	1164	4.61	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

1. Recommend using field supplied fan pulley (part no. KR11AD912) and belt (part no. KR29AF051).

Table 54 – 48TC**12

3 PHASE

10 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option						Medium Static Option			
3000	616	0.79	689	0.97	757	1.16	821	1.36	882	1.57
3250	655	0.96	724	1.16	788	1.37	849	1.58	907	1.80
3500	695	1.17	760	1.38	821	1.60	879	1.83	934	2.06
3750	736	1.41	797	1.63	855	1.86	910	2.10	963	2.35
4000	777	1.68	834	1.91	889	2.16	942	2.41	993	2.67
4250	818	1.98	873	2.23	925	2.49	976	2.75	1025	3.02
4500	860	2.32	912	2.58	962	2.85	1010	3.13	1057	3.41
4750	902	2.69	951	2.97	999	3.26	1046	3.55	1091	3.84
5000	944	3.11	991	3.40	1037	3.70	1082	4.00	1125	4.31

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option						High Static Option			
3000	939	1.79	994	2.01	1047	2.24	1098	2.47	1147	2.71
3250	962	2.03	1015	2.26	1066	2.50	1115	2.75	1163	3.00
3500	987	2.30	1038	2.54	1088	2.80	1135	3.05	1181	3.32
3750	1014	2.60	1063	2.86	1111	3.12	1157	3.39	1202	3.66
4000	1042	2.93	1090	3.20	1136	3.48	1180	3.76	1224	4.04
4250	1072	3.30	1118	3.58	1162	3.87	1205	4.16	–	–
4500	1103	3.70	1147	4.00	1190	4.29	1232	4.60	–	–
4750	1135	4.14	1177	4.45	–	–	–	–	–	–
5000	1167	4.63	–	–	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

FAN PERFORMANCE (cont.)

Table 55 – 48TC**14

3 PHASE

12.5 TON HORIZONTAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option								Medium Static Option	
3438	639	0.98	713	1.20	781	1.43	843	1.65	901	1.88
3750	683	1.23	753	1.47	817	1.71	877	1.96	933	2.21
4063	728	1.52	794	1.78	855	2.04	912	2.31	966	2.57
4375	774	1.85	836	2.13	894	2.41	949	2.70	1001	2.98
4688	820	2.23	879	2.53	935	2.83	987	3.14	1037	3.44
5000	867	2.66	923	2.98	976	3.30	1026	3.63	1074	3.95
5313	914	3.15	967	3.49	1018	3.83	1066	4.17	1112	4.52
5625	962	3.69	1012	4.05	1061	4.42	–	–	–	–
5938	1009	4.30	1058	4.68	–	–	–	–	–	–
6250	–	–	–	–	–	–	–	–	–	–

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option						High Static Option			
3438	955	2.12	1007	2.35	1056	2.59	1103	2.83	1148	3.08
3750	985	2.46	1035	2.71	1083	2.97	1129	3.23	1173	3.49
4063	1017	2.84	1066	3.12	1112	3.39	1157	3.67	1200	3.95
4375	1050	3.27	1097	3.56	1142	3.86	1186	4.15	1228	4.45
4688	1084	3.75	1130	4.06	1174	4.37	1216	4.68	1257	5.00
5000	1120	4.28	1164	4.61	–	–	1248	5.27	1288	5.60
5313	–	–	–	–	–	–	–	–	–	–
5625	–	–	–	–	–	–	–	–	–	–
5938	–	–	–	–	–	–	–	–	–	–
6250	–	–	–	–	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

Table 56 – 48TC**14

3 PHASE

12.5 TON VERTICAL SUPPLY

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Standard Static Option						Medium Static Option			
3438	685	1.12	751	1.32	813	1.54	871	1.76	927	1.99
3750	736	1.41	797	1.63	855	1.86	910	2.10	963	2.35
4063	787	1.75	844	1.99	898	2.24	951	2.49	1001	2.75
4375	839	2.14	892	2.40	943	2.67	993	2.94	1041	3.21
4688	891	2.60	941	2.87	990	3.15	1037	3.44	1082	3.73
5000	944	3.11	991	3.40	1037	3.70	1082	4.00	1125	4.31
5313	997	3.69	1042	4.00	1085	4.32	1128	4.64	–	–
5625	1051	4.34	1093	4.67	–	–	–	–	–	–
5938	–	–	–	–	–	–	–	–	–	–
6250	–	–	–	–	–	–	–	–	–	–

CFM	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
	Medium Static Option						High Static Option			
3438	981	2.23	1032	2.47	1082	2.72	1130	2.97	1177	3.23
3750	1014	2.60	1063	2.86	1111	3.12	1157	3.39	1202	3.66
4063	1049	3.02	1097	3.29	1142	3.57	1186	3.85	1230	4.14
4375	1087	3.49	1132	3.78	1176	4.08	1218	4.37	1260	4.68
4688	1126	4.03	1169	4.33	1211	4.64	–	–	–	–
5000	1167	4.63	–	–	–	–	–	–	–	–
5313	–	–	–	–	–	–	–	–	–	–
5625	–	–	–	–	–	–	–	–	–	–
5938	–	–	–	–	–	–	–	–	–	–
6250	–	–	–	–	–	–	–	–	–	–

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

FAN PERFORMANCE (cont.)

Table 57 – 48TC**16

3 PHASE

15 TON VERTICAL SUPPLY

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	487	0.98	552	1.26	610	1.55	665	1.86	718	2.20
4875	515	1.18	578	1.49	633	1.80	685	2.13	735	2.47
5250	544	1.42	604	1.75	657	2.09	707	2.43	754	2.78
5625	572	1.68	631	2.05	682	2.40	730	2.76	775	3.13
6000	601	1.98	657	2.37	707	2.75	753	3.13	797	3.52
6375	630	2.31	684	2.73	733	3.13	777	3.53	819	3.94
6750	659	2.68	711	3.12	759	3.55	802	3.98	843	4.40
7125	689	3.09	739	3.55	785	4.01	827	4.46	867	4.91
7500	718	3.53	766	4.02	811	4.51	852	4.98	891	5.46

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	769	2.56	819	2.95	866	3.36	912	3.79	957	4.24
4875	784	2.84	831	3.23	877	3.65	921	4.09	964	4.54
5250	800	3.16	845	3.56	889	3.98	932	4.43	974	4.89
5625	819	3.52	862	3.93	903	4.36	944	4.81	985	5.28
6000	839	3.92	880	4.34	920	4.77	959	5.23	997	5.70
6375	860	4.36	899	4.79	937	5.23	975	5.70	—	—
6750	882	4.84	920	5.28	957	5.74	—	—	—	—
7125	904	5.36	941	5.82	—	—	—	—	—	—
7500	928	5.93	—	—	—	—	—	—	—	—

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

Table 58 – 48TC**16

3 PHASE

15 TON HORIZONTAL SUPPLY

CFM	Available External Static Pressure (in. wg)									
	0.2		0.4		0.6		0.8		1.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	479	0.97	540	1.23	596	1.50	651	1.80	703	2.13
4875	508	1.19	566	1.47	619	1.75	670	2.06	719	2.39
5250	537	1.43	592	1.73	643	2.03	691	2.35	737	2.69
5625	566	1.71	619	2.03	667	2.35	713	2.68	757	3.03
6000	596	2.02	646	2.36	692	2.70	736	3.05	778	3.41
6375	625	2.36	674	2.73	718	3.09	760	3.46	800	3.83
6750	655	2.75	701	3.14	744	3.52	785	3.91	824	4.30
7125	685	3.17	729	3.58	771	3.99	810	4.40	848	4.81
7500	715	3.64	758	4.07	798	4.50	836	4.93	872	5.36

CFM	Available External Static Pressure (in. wg)									
	1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4500	755	2.48	805	2.87	853	3.28	900	3.72	945	4.17
4875	768	2.75	815	3.14	862	3.55	907	3.99	951	4.45
5250	783	3.06	828	3.45	872	3.86	916	4.30	958	4.77
5625	800	3.40	843	3.80	885	4.21	926	4.66	967	5.12
6000	819	3.79	860	4.19	900	4.61	939	5.06	978	5.53
6375	840	4.23	878	4.63	916	5.06	954	5.51	991	5.98
6750	861	4.70	898	5.12	935	5.56	971	6.01	—	—
7125	884	5.23	919	5.66	—	—	—	—	—	—
7500	907	5.79	—	—	—	—	—	—	—	—

NOTE: For more information, see General Fan Performance Notes.

Boldface indicates field supplied drive is required.

FAN PERFORMANCE (cont.)

Table 59 – PULLEY ADJUSTMENT

UNIT		MOTOR/DRIVE COMBO	MOTOR PULLEY TURNS OPEN (RPM)										
			0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
04	1 phase	Standard Static	854	825	795	766	736	707	678	648	619	589	560
		Medium Static	1175	1135	1094	1054	1013	973	932	892	851	811	770
		High Static	–	–	–	–	–	–	–	–	–	–	–
	3 phase	Standard Static	854	825	795	766	736	707	678	648	619	589	560
		Medium Static	1175	1135	1094	1054	1013	973	932	892	851	811	770
		High Static	1466	1423	1380	1337	1294	1251	1207	1164	1121	1078	1035
05	1 phase	Standard Static	854	825	795	766	736	707	678	648	619	589	560
		Medium Static	1175	1135	1094	1054	1013	973	932	892	851	811	770
		High Static	–	–	–	–	–	–	–	–	–	–	–
	3 phase	Standard Static	854	825	795	766	736	707	678	648	619	589	560
		Medium Static	1175	1135	1094	1054	1013	973	932	892	851	811	770
		High Static	1466	1423	1380	1337	1294	1251	1207	1164	1121	1078	1035
06	1 phase	Standard Static	1175	1135	1094	1054	1013	973	932	892	851	811	770
		Medium Static	1466	1423	1380	1337	1294	1251	1207	1164	1121	1078	1035
		High Static	–	–	–	–	–	–	–	–	–	–	–
	3 phase	Standard Static	1175	1135	1094	1054	1013	973	932	892	851	811	770
		Medium Static	1466	1423	1380	1337	1294	1251	1207	1164	1121	1078	1035
		High Static	1687	1649	1610	1572	1533	1495	1457	1418	1380	1341	1303
07	3 phase	Standard Static	1457	1419	1380	1342	1303	1265	1227	1188	1150	1111	1073
		Medium Static	1518	1484	1449	1415	1380	1346	1311	1277	1242	1208	1173
		High Static	1788	1757	1725	1694	1662	1631	1600	1568	1537	1505	1474
08	3 phase	Standard Static	747	721	695	670	644	618	592	566	541	515	489
		Medium Static	949	927	906	884	863	841	819	798	776	755	733
		High Static	1102	1083	1063	1044	1025	1006	986	967	948	928	909
09	3 phase	Standard Static	733	712	690	669	647	626	604	583	561	540	518
		Medium Static	936	911	887	862	838	813	788	764	739	715	690
		High Static	1084	1059	1035	1010	986	961	936	912	887	863	838
12	3 phase	Standard Static	838	813	789	764	739	715	690	665	640	616	591
		Medium Static	1084	1059	1035	1010	986	961	936	912	887	863	838
		High Static	1240	1218	1196	1175	1153	1131	1109	1087	1066	1044	1022
14	3 phase	Standard Static	843	824	805	786	767	748	728	709	690	671	652
		Medium Static	1084	1059	1035	1010	986	961	936	912	887	863	838
		High Static	1240	1218	1196	1175	1153	1131	1109	1087	1066	1044	1022
16	3 phase	Standard Static	676	659	642	625	608	592	575	558	541	524	507
		Medium Static	851	829	806	784	761	739	717	694	672	649	627
		High Static	955	937	919	901	883	866	848	830	812	794	776

NOTE: Do not adjust pulley further than 5 turns open.

– Factory settings

ELECTRICAL DATA FOR UNITS PRODUCED ON OR AFTER JULY 30, 2012

NOTE: Check the serial number of unit to verify production date.

To confirm the date of manufacture, locate the unit nameplate and check the first four digits of the Serial Number. If the number listed in the first 4 digits of the Serial Number is 3112 or higher, the unit was produced on or after July 30, 2012.

Position:	1	2	3	4	5	6	7	8	9	10
Example:	3	1	1	2	U	1	2	3	4	5

Week of manufacture
(fiscal calendar)

Sequence number

Year of manufacture
("12" = 2012)

Manufacturing location

C12562A

ELECTRICAL INFORMATION

(UNITS PRODUCED ON OR AFTER JULY 30, 2012)

Table 60 – 48TC04 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 3 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	16.6	79	325	1.5	STD	67%	4.9
					325	1.5	MED	67%	4.9
230-1-60	187	253	16.6	79	325	1.5	STD	67%	4.9
					325	1.5	MED	67%	4.9
208-3-60	187	253	10.4	73	325	1.5	STD	75%	5.2
					325	1.5	MED	75%	5.2
					325	1.5	HIGH	87%	6.9
230-3-60	187	253	10.4	73	325	1.5	STD	75%	5.2
					325	1.5	MED	75%	5.2
					325	1.5	HIGH	87%	6.7
460-3-60	414	506	5.8	38	325	0.8	STD	75%	2.6
					325	0.8	MED	75%	2.6
					325	0.8	HIGH	87%	3.4
575-3-60	518	633	3.8	37	325	0.6	STD	73%	2.4
					325	0.6	MED	73%	2.4
					325	0.6	HIGH	78%	2.0

Table 61 – 48TC05 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 4 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	21.8	117	325	1.5	STD	67%	4.9
					325	1.5	MED	67%	4.9
230-1-60	187	253	21.8	117	325	1.5	STD	67%	4.9
					325	1.5	MED	67%	4.9
208-3-60	187	253	13.7	83	325	1.5	STD	75%	5.2
					325	1.5	MED	75%	5.2
					325	1.5	HIGH	87%	6.9
230-3-60	187	253	13.7	83	325	1.5	STD	75%	5.2
					325	1.5	MED	75%	5.2
					325	1.5	HIGH	87%	6.7
460-3-60	414	506	6.2	41	325	0.8	STD	75%	2.6
					325	0.8	MED	75%	2.6
					325	0.8	HIGH	87%	3.4
575-3-60	518	633	4.8	33	325	0.6	STD	73%	2.4
					325	0.6	MED	73%	2.4
					325	0.6	HIGH	78%	2.0

Table 62 – 48TC06 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 5 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	26.2	134	325	1.5	STD	67%	4.9
					325	1.5	MED	76%	7.0
230-1-60	187	253	26.2	134	325	1.5	STD	67%	4.9
					325	1.5	MED	76%	7.0
208-3-60	187	253	15.6	110	325	1.5	STD	75%	5.2
					325	1.5	MED	87%	6.9
					325	1.5	HIGH	89%	8.4
230-3-60	187	253	15.6	110	325	1.5	STD	75%	5.2
					325	1.5	MED	87%	6.7
					325	1.5	HIGH	89%	8.3
460-3-60	414	506	7.7	52	325	0.8	STD	75%	2.6
					325	0.8	MED	87%	3.4
					325	0.8	HIGH	89%	4.2
575-3-60	518	633	5.8	39	325	0.6	STD	73%	2.4
					325	0.6	MED	78%	2.0
					325	0.6	HIGH	77%	2.8

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Table 63 – 48TC07 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 6 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	19.0	123	325	1.5	STD	87%	6.9
					325	1.5	MED	89%	8.4
					325	1.5	HIGH	87%	10.6
230-3-60	187	253	19.0	123	325	1.5	STD	87%	6.7
					325	1.5	MED	89%	8.3
					325	1.5	HIGH	87%	10.6
460-3-60	414	506	9.7	62	325	0.8	STD	87%	3.4
					325	0.8	MED	89%	4.2
					325	0.8	HIGH	87%	5.3
575-3-60	518	633	7.4	50	325	0.6	STD	78%	2.0
					325	0.6	MED	77%	2.8
					325	0.6	HIGH	77%	2.8

Table 64 – 48TC08 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 7.5 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	25.0	164	325	1.5	STD	87%	5.2
					325	1.5	MED	89%	8.4
					325	1.5	HIGH	83%	13.6
230-3-60	187	253	25.0	164	325	1.5	STD	87%	4.9
					325	1.5	MED	89%	8.3
					325	1.5	HIGH	83%	12.7
460-3-60	414	506	12.2	100	325	0.8	STD	87%	2.5
					325	0.8	MED	89%	4.2
					325	0.8	HIGH	83%	6.4
575-3-60	518	633	9.0	78	325	0.6	STD	72%	1.6
					325	0.6	MED	77%	2.8
					325	0.6	HIGH	81%	5.6

Table 65 – 48TCD08 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 7.5 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	13.6	83	13.6	83	325	1.5	STD	87%	5.2
							325	1.5	MED	89%	8.4
							325	1.5	HIGH	83%	13.6
230-3-60	187	253	13.6	83	13.6	83	325	1.5	STD	87%	4.9
							325	1.5	MED	89%	8.3
							325	1.5	HIGH	83%	12.7
460-3-60	414	506	6.1	41	6.1	41	325	0.8	STD	87%	2.5
							325	0.8	MED	89%	4.2
							325	0.8	HIGH	83%	6.4
575-3-60	518	633	4.2	33	4.2	33	325	0.6	STD	72%	1.6
							325	0.6	MED	77%	2.8
							325	0.6	HIGH	81%	5.6

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(UNITS PRODUCED ON OR AFTER JULY 30, 2012) cont.

Table 66 – 48TC*D08 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR

7.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	13.6	83	13.6	83	325	1.5	STD	0.84	5.8
							325	1.5	MED	0.85	8.6
							325	1.5	HIGH	0.84	13.6
230-3-60	187	253	13.6	83	13.6	83	325	1.5	STD	0.84	5.6
							325	1.5	MED	0.85	7.8
							325	1.5	HIGH	0.84	12.7
460-3-60	414	506	6.1	41	6.1	41	325	0.8	STD	0.79	2.9
							325	0.8	MED	0.85	3.8
							325	0.8	HIGH	0.84	6.4
575-3-60	518	633	4.2	33	4.2	33	325	0.6	STD	0.81	2.8
							325	0.6	MED	0.84	4.5
							325	0.6	HIGH	0.83	6.2

Table 67 – 48TC09 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 8.5 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	29.5	195	325	1.5	STD	87%	5.2
					325	1.5	MED	87%	6.9
					325	1.5	HIGH	87%	10.6
230-3-60	187	253	29.5	195	325	1.5	STD	87%	4.9
					325	1.5	MED	87%	6.7
					325	1.5	HIGH	87%	10.6
460-3-60	414	506	14.7	95	325	0.8	STD	87%	2.5
					325	0.8	MED	87%	3.4
					325	0.8	HIGH	87%	5.3
575-3-60	518	633	12.2	80	325	0.6	STD	72%	1.6
					325	0.6	MED	78%	2.0
					325	0.6	HIGH	77%	2.8

Table 68 – 48TC09 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

8.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	14.5	98	13.7	83	325	1.5	STD	87%	5.2
							325	1.5	MED	87%	6.9
							325	1.5	HIGH	87%	10.6
230-3-60	187	253	14.5	98	13.7	83	325	1.5	STD	87%	4.9
							325	1.5	MED	87%	6.7
							325	1.5	HIGH	87%	10.6
460-3-60	414	506	6.3	55	6.2	41	325	0.8	STD	87%	2.5
							325	0.8	MED	87%	3.4
							325	0.8	HIGH	87%	5.3
575-3-60	518	633	6.0	41	4.8	33	325	0.6	STD	72%	1.6
							325	0.6	MED	78%	2.0
							325	0.6	HIGH	77%	2.8

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Table 69 – 48TC*D09 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR

8.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	14.5	98	13.7	83	325	1.5	STD	0.84	5.8
							325	1.5	MED	0.77	7.1
							325	1.5	HIGH	0.82	10.8
230-3-60	187	253	14.5	98	13.7	83	325	1.5	STD	0.84	5.6
							325	1.5	MED	0.77	6.8
							325	1.5	HIGH	0.82	9.8
460-3-60	414	506	6.3	55	6.2	41	325	0.8	STD	0.79	2.9
							325	0.8	MED	0.77	3.8
							325	0.8	HIGH	0.82	4.9
575-3-60	518	633	6.0	41	4.8	33	325	0.6	STD	0.81	2.8
							325	0.6	MED	0.80	3.5
							325	0.6	HIGH	0.84	4.5

Table 70 – 48TC12 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

10 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	30.1	225	325	1.5	STD	87%	6.9
					325	1.5	MED	87%	10.6
					325	1.5	HIGH	83%	13.6
230-3-60	187	253	30.1	225	325	1.5	STD	87%	6.7
					325	1.5	MED	87%	10.6
					325	1.5	HIGH	83%	12.7
460-3-60	414	506	16.7	114	325	0.8	STD	87%	3.4
					325	0.8	MED	87%	5.3
					325	0.8	HIGH	83%	6.4
575-3-60	518	633	12.2	80	325	0.6	STD	78%	2.0
					325	0.6	MED	77%	2.8
					325	0.6	HIGH	81%	5.6

Table 71 – 48TC12 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

10 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	15.6	110	15.9	110	325	1.5	STD	87%	6.9
							325	1.5	MED	87%	10.6
							325	1.5	HIGH	83%	13.6
230-3-60	187	253	15.6	110	15.9	110	325	1.5	STD	87%	6.7
							325	1.5	MED	87%	10.6
							325	1.5	HIGH	83%	12.7
460-3-60	414	506	7.7	52	7.7	52	325	0.8	STD	87%	3.4
							325	0.8	MED	87%	5.3
							325	0.8	HIGH	83%	6.4
575-3-60	518	633	5.8	39	5.7	39	325	0.6	STD	78%	2.0
							325	0.6	MED	77%	2.8
							325	0.6	HIGH	81%	5.6

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Table 72 – 48TC*D12 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR

10 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	15.6	110	15.9	110	325	1.5	STD	0.77	7.1
							325	1.5	MED	0.82	10.8
							325	1.5	HIGH	0.84	13.6
230-3-60	187	253	15.6	110	15.9	110	325	1.5	STD	0.77	6.8
							325	1.5	MED	0.82	9.8
							325	1.5	HIGH	0.84	12.7
460-3-60	414	506	7.7	52	7.7	52	325	0.8	STD	0.77	3.8
							325	0.8	MED	0.82	4.9
							325	0.8	HIGH	0.84	6.4
575-3-60	518	633	5.8	39	5.7	39	325	0.6	STD	0.80	3.5
							325	0.6	MED	0.84	4.5
							325	0.6	HIGH	0.83	6.2

Table 73 – 48TC14 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

12.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	19.0	123	22.4	149	1070	6.2	STD	89%	8.4
							1070	6.2	MED	87%	10.6
							1070	6.2	HIGH	83%	13.6
230-3-60	187	253	19.0	123	22.4	149	1070	6.2	STD	89%	8.3
							1070	6.2	MED	87%	10.6
							1070	6.2	HIGH	83%	12.7
460-3-60	414	506	9.7	62	10.6	75	1070	3.1	STD	89%	4.2
							1070	3.1	MED	87%	5.3
							1070	3.1	HIGH	83%	6.4
575-3-60	518	633	7.4	50	7.7	54	1070	2.5	STD	77%	2.8
							1070	2.5	MED	77%	2.8
							1070	2.5	HIGH	81%	5.6

Table 74 – 48TC*D14 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR

12.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	19.0	123	22.4	149	1070	6.2	STD	0.85	8.6
							1070	6.2	MED	0.82	10.8
							1070	6.2	HIGH	0.84	13.6
230-3-60	187	253	19.0	123	22.4	149	1070	6.2	STD	0.85	7.8
							1070	6.2	MED	0.82	9.8
							1070	6.2	HIGH	0.84	12.7
460-3-60	414	506	9.7	62	10.6	75	1070	3.1	STD	0.85	3.8
							1070	3.1	MED	0.82	4.9
							1070	3.1	HIGH	0.84	6.4
575-3-60	518	633	7.4	50	7.7	54	1070	2.5	STD	0.84	4.5
							1070	2.5	MED	0.84	4.5
							1070	2.5	HIGH	0.83	6.2

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Table 75 – 48TC*D16 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 15 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	25.0	164	25.0	164	280	1.5	STD	89%	8.4
							280	1.5	MED	87%	10.6
							280	1.5	HIGH	90%	20.4
230-3-60	187	253	25.0	164	25.0	164	280	1.5	STD	89%	8.3
							280	1.5	MED	87%	10.6
							280	1.5	HIGH	90%	20.4
460-3-60	414	506	12.2	100	12.8	100	280	0.8	STD	89%	4.2
							280	0.8	MED	87%	5.3
							280	0.8	HIGH	90%	10.2
575-3-60	518	633	9.8	78	9.6	78	280	0.6	STD	77%	2.8
							280	0.6	MED	77%	2.8
							280	0.6	HIGH	94%	9.0

Table 76 – 48TC*D16 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR 15 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	25.0	164	25.0	164	280	1.5	STD	0.85	8.6
							280	1.5	MED	0.82	10.8
							280	1.5	HIGH	0.90	20.4
230-3-60	187	253	25.0	164	25.0	164	280	1.5	STD	0.85	7.8
							280	1.5	MED	0.82	9.8
							280	1.5	HIGH	0.90	20.4
460-3-60	414	506	12.2	100	12.8	100	280	0.8	STD	0.85	3.8
							280	0.8	MED	0.82	4.9
							280	0.8	HIGH	0.90	10.2
575-3-60	518	633	9.8	78	9.6	78	280	0.6	STD	0.84	4.5
							280	0.6	MED	0.84	4.5
							280	0.6	HIGH	0.94	9

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Table 77 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH SINGLE SPEED INDOOR FAN MOTOR

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.					
			NO P.E.			w/ P.E. (pwrd fr/ unit)			NO P.E.			w/ P.E. (pwrd fr/ unit)		
			MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA	MAX FUSE or HACR BRKR
48TC**04	208/230-1-60	STD	28	40	26	95	97	32	45	32	100	34	50	34
		MED	28	40	26	95	97	32	45	32	100	34	50	34
	208/230-3-60	STD	20	30	20	96	98	25	30	25	101	27	30	27
		MED	20	30	20	96	98	25	30	25	101	27	30	27
		HIGH	22/22	30/30	22/21	134	136	27/26	30/30	27/27	139	29/28	35/35	29/29
		STD	11	15	11	49	50	13	15	13	51	14	20	14
	460-3-60	MED	11	15	11	49	50	13	15	13	51	14	20	14
		HIGH	12	15	12	68	69	14	20	14	70	15	20	15
	575-3-60	STD	8	15	8	46	48	10	15	10	48	12	15	12
		MED	8	15	8	46	48	10	15	10	48	12	15	12
48TC**05	208/230-1-60	HIGH	8	15	7	50	52	10	15	9	52	11	15	12
		STD	34	50	32	133	135	39	60	38	138	41	60	40
	208/230-3-60	MED	34	50	32	133	135	39	60	38	138	41	60	40
		STD	24	30	23	106	108	29	40	29	111	31	40	31
		MED	24	30	23	106	108	29	40	29	111	31	40	31
		HIGH	26/26	30/30	25/25	144	146	31/31	40/40	31/31	149	33/32	45/45	33/33
	460-3-60	STD	12	15	11	52	53	14	15	14	54	15	20	15
		MED	12	15	11	52	53	14	15	14	54	15	20	15
		HIGH	12	15	12	71	72	15	20	14	73	16	20	16
		STD	9	15	9	42	44	11	15	11	44	13	15	13
48TC**05	575-3-60	MED	9	15	9	42	44	11	15	11	44	13	15	13
		HIGH	9	15	9	46	48	11	15	10	48	13	15	13

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Table 77 - UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH SINGLE SPEED INDOOR FAN MOTOR (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.										
			NO P.E.			w/ P.E. (pwrdr fr/ unit)			NO P.E.			w/ P.E. (pwrdr fr/ unit)							
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA					
48TC**06	208/230-1-60	STD	40	60	37	150	42	60	40	152	44	60	43	155	46	60	45	157	
		MED	42	60	40	175	44	60	42	177	47	60	45	180	48	60	48	182	
	208/230-3-60	STD	27	40	26	133	29	40	28	135	31	45	31	138	33	45	33	140	
		MED	28/28	40/40	28/27	171	30/30	45/45	30/30	173	33/33	45/45	33/33	176	35/35	50/50	35/35	178	
		HIGH	30/30	45/40	29/29	186	32/32	45/45	32/31	188	35/35	45/45	35/35	191	37/36	50/50	37/37	193	
	460-3-60	STD	13	20	13	63	14	20	14	64	16	20	15	65	17	20	16	66	
		MED	14	20	14	82	15	20	15	83	16	20	16	84	17	20	17	85	
		HIGH	15	20	15	90	16	20	16	91	17	20	17	92	18	25	18	93	
	575-3-60	STD	11	15	10	48	13	15	12	50	12	15	12	50	14	20	14	52	
		MED	10	15	10	52	12	15	12	54	12	15	12	54	14	15	14	56	
		HIGH	11	15	11	63	13	15	13	65	13	15	13	65	15	20	15	67	
48TC**07	208/230-3-60	STD	33/32	50/50	32/31	184	35/34	50/50	34/33	186	37/37	50/50	37/37	189	39/39	50/50	39/39	191	
		MED	34/34	50/50	33/33	199	36/36	50/50	35/35	201	39/39	50/50	39/39	204	41/41	50/50	41/41	206	
		HIGH	36	50	36	213	38	50	38	215	41	50	41	218	43	60	43	220	
	460-3-60	STD	17	25	16	92	18	25	17	93	19	25	19	94	20	25	20	95	
		MED	18	25	17	100	19	25	18	101	20	25	19	102	21	30	21	103	
		HIGH	19	25	18	107	20	25	19	108	21	30	21	109	22	30	22	110	
	575-3-60	STD	12	15	12	63	14	20	14	65	14	20	13	65	16	20	16	67	
		MED	13	20	12	74	15	20	15	76	15	20	14	76	17	20	17	78	
		HIGH	13	20	12	74	15	20	15	76	15	20	14	76	17	20	17	78	
	48TC*A08	208/230-3-60	STD	40/40	60/60	38/38	208	44/43	60/60	43/42	212	45/44	60/60	44/43	213	49/48	60/60	48/48	217
			MED	43/43	60/60	42/42	244	47/47	60/60	46/46	248	48/48	60/60	47/47	249	52/52	60/60	52/52	253
HIGH			48/47	60/60	48/47	260	52/51	60/60	52/51	264	53/52	60/60	53/52	265	57/56	80/80	58/57	269	
460-3-60		STD	20	30	19	122	22	30	21	124	22	30	21	124	24	30	23	126	
		MED	22	30	21	140	23	30	23	142	24	30	23	142	26	30	25	144	
		HIGH	24	30	23	148	26	30	25	150	26	30	26	150	28	35	28	152	
575-3-60		STD	15	20	14	89	18	25	18	93	16	20	16	91	20	25	20	95	
		MED	16	20	15	104	20	25	19	108	17	25	17	106	21	25	21	110	
		HIGH	19	25	18	118	22	30	23	122	20	25	20	120	24	30	24	124	

ELECTRICAL INFORMATION

(UNITS PRODUCED ON OR AFTER JULY 30, 2012) cont.

Table 77 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH SINGLE SPEED INDOOR FAN MOTOR (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.									
			NO P.E.			w/ P.E. (pwrd fr/ unit)			NO P.E.			w/ PWRD C.O.						
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA				
48TC*D08	208/230-3-60	STD	39/39	50/50	41/40	210	43/43	50/50	45/45	214	44/44	50/50	46/46	215	48/48	60/60	51/50	219
		MED	42/42	50/50	44/44	246	46/46	50/50	49/49	250	47/47	60/60	50/50	251	51/51	60/60	54/54	255
		HIGH	48/47	60/50	50/49	262	51/51	60/60	55/54	266	52/52	60/60	56/55	267	56/55	60/60	60/59	271
	460-3-60	STD	18	20	19	104	20	25	21	106	20	25	21	106	22	25	23	108
		MED	20	25	21	122	22	25	23	124	22	25	23	124	24	30	25	126
		HIGH	22	25	23	130	24	30	25	132	24	30	26	132	26	30	28	134
48TC*A09	575-3-60	STD	13	15	13	77	17	20	17	81	14	15	15	79	18	20	19	83
		MED	14	15	14	92	18	20	19	96	16	20	16	94	19	25	21	98
		HIGH	17	20	17	106	21	25	22	110	19	20	19	108	23	25	24	112
	208/230-3-60	STD	46/45	60/60	43/43	239	49/49	60/60	48/47	243	50/50	60/60	49/49	244	54/54	80/80	53/53	248
		MED	47/47	60/60	45/45	260	51/51	60/60	50/49	264	52/52	60/60	51/51	265	56/56	80/80	55/55	269
		HIGH	51	60	50	289	55	80	54	293	56	80	55	294	60	80	59	298
48TC*D09	460-3-60	STD	23	30	22	117	25	30	24	119	25	30	24	119	27	40	26	121
		MED	24	30	23	127	26	30	25	129	26	30	25	129	28	40	27	131
		HIGH	26	30	25	142	28	40	27	144	28	40	27	144	30	40	29	146
	575-3-60	STD	19	30	17	91	22	30	22	95	20	30	19	93	24	30	24	97
		MED	19	30	18	95	23	30	22	99	21	30	20	97	24	30	24	101
		HIGH	20	30	19	106	24	30	23	110	21	30	21	108	25	30	25	112
48TC*D09	208/230-3-60	STD	40/40	50/50	42/42	225	44/44	50/50	46/46	229	45/45	50/50	47/47	230	49/49	60/60	52/51	234
		MED	42/42	50/50	44/44	246	46/46	60/50	48/48	250	47/47	60/60	49/49	251	51/51	60/60	54/53	255
		HIGH	46	50	48	275	50	60	52	279	51	60	54	280	54	60	58	284
	460-3-60	STD	19	20	19	118	20	25	21	120	21	25	22	120	23	25	24	122
		MED	20	25	20	128	21	25	22	130	22	25	23	130	24	25	25	132
		HIGH	21	25	22	143	23	25	24	145	24	25	25	145	25	30	27	147
575-3-60	STD	16	20	16	85	19	25	20	89	17	20	18	87	21	25	22	91	
	MED	16	20	16	89	20	25	20	93	18	20	18	91	21	25	22	95	
	HIGH	17	20	17	100	21	25	21	104	18	20	19	102	22	25	23	106	

ELECTRICAL INFORMATION

(UNITS PRODUCED ON OR AFTER JULY 30, 2012) cont.

Table 77 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH SINGLE SPEED INDOOR FAN MOTOR (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.					
			NO P.E.			w/ P.E. (pwrd fr/ unit)			NO P.E.			w/ P.E. (pwrd fr/ unit)		
			MAX FUSE or HACR BRKR	DISC. SIZE	MCA	MAX FUSE or HACR BRKR	DISC. SIZE	MCA	MAX FUSE or HACR BRKR	DISC. SIZE	MCA	MAX FUSE or HACR BRKR	DISC. SIZE	MCA
				FLA	LRA		FLA	LRA		FLA	LRA		FLA	LRA
48TC*A12	208/230-3-60	STD	48/48	46/46	290	60/60	50/50	294	60/60	52/51	295	57/56	56/56	299
		MED	52	50	319	80	55	323	80	56	324	60	60	328
		HIGH	55/54	54/53	321	80/80	58/57	325	80/80	59/58	326	63/62	64/63	330
	460-3-60	STD	26	25	146	40	27	148	40	27	148	30	30	150
		MED	28	27	161	45	29	163	45	30	163	32	32	165
		HIGH	29	28	162	45	30	164	45	31	164	33	33	166
48TC*D12	208/230-3-60	STD	19	18	95	30	22	99	30	20	97	24	24	101
		MED	20	19	106	30	23	110	30	21	108	25	25	112
		HIGH	23	22	120	30	26	124	30	24	122	28	28	126
	460-3-60	STD	46/46	48/47	285	60/60	52/52	289	60/60	53/53	290	54/54	58/57	294
		MED	50	52	314	60	56	318	60	57	319	58	62	323
		HIGH	53/52	55/54	316	60/60	60/59	320	70/60	61/60	321	61/60	65/64	325
48TC*D14	208/230-3-60	STD	23	23	136	30	26	138	30	26	138	27	30	140
		MED	25	26	151	30	28	153	30	28	153	29	30	155
		HIGH	26	27	152	30	29	154	30	29	154	30	32	156
	575-3-60	STD	17	17	93	20	21	97	20	19	95	22	23	99
		MED	17	18	104	21	22	108	25	20	106	23	24	110
		HIGH	20	21	118	24	25	122	25	23	120	26	27	124
48TC*D14	208/230-3-60	STD	62/62	64/64	376	80/80	69/69	380	80/80	70/70	381	71/71	74/74	385
		MED	64	67	390	80	71	394	80	72	395	73	77	399
		HIGH	67/66	70/69	392	80/80	75/74	396						
	460-3-60	STD	31	32	189	33	34	191	33	34	191	35	36	193
		MED	32	33	196	34	35	198	34	36	198	36	38	200
		HIGH	33	34	197	35	36	199	35	37	199	37	39	201
48TC*D14	575-3-60	STD	23	23	142	30	28	146	30	25	144	28	30	148
		MED	23	23	142	30	28	146	30	25	144	28	30	148
		HIGH	26	27	156	29	31	160	30	29	158	31	33	162

ELECTRICAL INFORMATION

(UNITS PRODUCED ON OR AFTER JULY 30, 2012) cont.

Table 77 - UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH SINGLE SPEED INDOOR FAN MOTOR (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.									
			NO P.E.			w/ P.E. (pwrdr fr/ unit)			NO P.E.			w/ P.E. (pwrdr fr/ unit)						
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA				
48TC*D16	208/230-3-60	STD	70/70	80/80	72/72	412	73/73	80/80	77/77	416	74/74	90/90	78/78	417	78/78	100/100	82/82	421
		MED	72	80	75	426	76	100	79	430	77	100	80	431	80	100	85	435
		HIGH	82	100	86	432	85	100	91	436	86	100	92	437	90	100	96	441
	460-3-60	STD	35	45	36	242	37	45	38	244	37	45	39	244	39	50	41	246
		MED	36	45	38	249	38	50	40	251	39	50	40	251	40	50	42	253
		HIGH	41	50	43	252	43	50	45	254	43	50	46	254	45	50	48	256
	575-3-60	STD	27	30	28	184	31	40	32	188	29	35	30	186	32	40	34	190
		MED	27	30	28	184	31	40	32	188	29	35	30	186	32	40	34	190
		HIGH	33	40	35	196	37	45	39	200	35	40	37	198	39	45	41	202

LEGEND:

- BRKR Circuit breaker
- CO Convenience outlet
- DISC Disconnect
- FLA Full load amps
- IFM Indoor fan motor
- LRA Locked rotor amps
- MCA Minimum circuit amps
- MOCP MAX FUSE or HACR Breaker
- PE Power exhaust
- PWRD CO Powered convenient outlet
- UNPWR CO Unpowered convenient outlet

NOTES:

- In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
- Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60



AB = 224 V
BC = 231 V
AC = 226 V

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3}$$

$$= \frac{227}{3}$$

Determine maximum deviation from average voltage.

$$(AB) 227 - 224 = 3 \text{ v}$$

$$(BC) 231 - 227 = 4 \text{ v}$$

$$(AC) 227 - 226 = 1 \text{ v}$$

Maximum deviation is 4 v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227} = 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.
IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

ELECTRICAL INFORMATION

(UNITS PRODUCED ON OR AFTER JULY 30, 2012) cont.

Table 78 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH 2 SPEED INDOOR FAN MOTOR

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.					
			NO P.E.			w/ P.E. (pwrd fr/ unit)			NO P.E.			w/ P.E. (pwrd fr/ unit)		
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA
48TC*D08	208/230-3-60	STD	40/40	50/50	41/41	197	44/43	50/50	46/46	201	45/44	48/48	50/50	47/47
		MED	43/42	50/50	45/44	227	46/46	50/50	49/48	231	47/47	50/50	60/60	51/51
		HIGH	48/47	60/50	50/49	262	51/51	60/60	55/54	266	52/52	60/60	60/60	55/54
	460-3-60	STD	19	20	19	97	20	25	21	99	21	23	25	24
		MED	20	25	20	113	21	25	22	115	22	24	25	25
		HIGH	22	25	23	130	24	30	25	132	24	26	30	28
48TC*D09	575-3-60	STD	14	15	14	79	18	20	19	83	16	19	20	16
		MED	16	20	16	92	19	25	21	96	17	20	25	18
		HIGH	18	20	18	106	22	25	23	110	20	23	25	20
	208/230-3-60	STD	41/41	50/50	43/42	212	45/45	50/50	47/47	216	46/46	50/50	60/60	48/48
		MED	42/42	50/50	44/44	216	46/46	60/50	48/48	220	47/47	60/60	60/60	50/49
		HIGH	46/45	60/50	48/47	266	50/49	60/60	53/52	270	51/50	60/60	60/60	54/53
48TC*D12	460-3-60	STD	19	25	20	111	21	25	22	113	21	23	25	22
		MED	20	25	21	114	22	25	23	116	22	24	30	23
		HIGH	21	25	22	139	23	25	24	141	23	25	30	24
	575-3-60	STD	17	20	17	87	21	25	21	91	18	22	25	19
		MED	17	20	18	91	21	25	22	95	19	23	25	20
		HIGH	18	20	19	100	22	25	23	104	20	24	30	21
48TC*D12	208/230-3-60	STD	46/46	60/60	48/47	255	50/50	60/60	52/52	259	51/51	60/60	60/60	53/53
		MED	50/49	60/60	52/51	305	54/53	60/60	56/55	309	55/54	60/60	70/70	58/56
		HIGH	53/52	60/60	55/54	316	56/55	60/60	60/59	320	57/56	70/60	70/70	61/60
	460-3-60	STD	23	30	24	122	25	30	26	124	25	27	30	26
		MED	24	30	25	147	26	30	27	149	26	28	30	28
		HIGH	26	30	27	152	28	30	29	154	28	30	35	29
48TC*D12	575-3-60	STD	18	20	19	95	22	25	23	99	20	24	25	21
		MED	19	25	20	104	23	25	24	108	21	25	30	22
		HIGH	21	25	22	118	25	30	26	122	23	26	30	24

ELECTRICAL INFORMATION

(UNITS PRODUCED ON OR AFTER JULY 30, 2012) cont.

Table 78 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH 2 SPEED INDOOR FAN MOTOR (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.									
			NO P.E.			w/ P.E. (pwrdr fr/ unit)			NO P.E.			w/ P.E. (pwrdr fr/ unit)						
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE	
				FLA	LRA			FLA	LRA			FLA	LRA			FLA	LRA	
48TC*D14	208/230-3-60	STD	62/61	80/80	65/64	357	66/65	80/80	69/68	361	80/80	70/69	362	71/70	80/80	75/74	366	
		MED	64/63	80/80	67/66	381	68/67	80/80	72/70	385	80/80	73/72	386	73/72	80/80	77/76	390	
		HIGH	67/66	80/80	70/69	392	71/70	80/80	75/74	396	Model not available due to high amperage draw.							
	STD	30	40	31	180	32	40	33	182	33	40	34	182	34	40	36	184	
	MED	31	40	33	192	33	40	35	194	34	40	35	194	35	45	37	196	
	HIGH	33	40	34	197	35	40	36	199	35	45	37	199	37	45	39	201	
	STD	24	30	25	142	28	30	30	146	26	30	27	144	30	35	32	148	
	MED	24	30	25	142	28	30	30	146	26	30	27	144	30	35	32	148	
	HIGH	26	30	27	156	30	35	32	160	28	30	29	158	32	35	34	162	
	STD	70/69	80/80	73/72	393	74/73	80/80	77/76	397	75/74	90/80	78/77	398	78/78	100/100	82/82	402	
48TC*D16	208/230-3-60	MED	72/71	80/80	75/74	417	76/75	100/90	79/78	421	77/76	100/100	81/79	422	81/80	100/100	85/84	426
		HIGH	82	100	86	432	85	100	91	436	86	100	92	437	90	100	96	441
		STD	35	45	36	233	37	45	38	235	37	45	38	235	39	50	40	237
	MED	36	45	37	245	38	50	39	247	38	50	40	247	40	50	42	249	
	HIGH	41	50	43	252	43	50	45	254	43	50	46	254	45	50	48	256	
	STD	29	35	30	184	32	40	34	188	30	35	32	186	34	40	36	190	
	MED	29	35	30	184	32	40	34	188	30	35	32	186	34	40	36	190	
	HIGH	33	40	35	196	37	45	39	200	35	40	37	198	39	45	41	202	

ELECTRICAL INFORMATION

(UNITS PRODUCED ON OR AFTER JULY 30, 2012) cont.

Table 79 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA FOR 2 STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.									
			NO PE.			w/ P.E. (pwrdr fr/ unit)			NO PE.			w/ P.E. (pwrdr fr/ unit)						
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA				
48TC*D08	208/ 230-3-60	STD	39.4/39.2	50/50	41/41	197	43.2/43.0	50/50	46/46	201	44.2/44.0	50/50	47/47	202	48.0/47.8	60/60	51/51	206
		MED	42.2/41.4	50/50	45/44	227	46.0/45.2	50/50	49/48	231	47.0/46.2	60/50	50/49	232	50.8/50.0	60/60	55/54	236
		HIGH	47.2/46.3	60/50	50/49	262	51.0/50.1	60/60	55/54	266	52.0/51.1	60/60	56/55	267	55.8/54.9	60/60	60/59	271
	460-3-60	STD	18.2	20	19	97	20.0	25	21	99	20.4	25	22	99	22.2	25	24	101
		MED	19.1	25	20	113	20.9	25	22	115	21.3	25	23	115	23.1	25	25	117
		HIGH	21.8	25	23	130	23.6	30	25	132	24.0	30	26	132	25.8	30	28	134
48TC*D09	575-3-60	STD	13.5	15	14	79	17.3	20	19	83	15.2	20	16	81	19.0	25	21	85
		MED	15.2	20	16	92	19.0	25	21	96	16.9	20	18	94	20.7	25	23	98
		HIGH	17.4	20	18	106	21.2	25	23	110	19.1	25	20	108	22.9	25	24	112
	208/ 230-3-60	STD	40.6/40.4	50/50	43/42	212	44.4/44.2	50/50	47/47	216	45.4/45.2	50/50	48/48	217	49.2/49.0	60/60	52/52	221
		MED	41.9/41.6	50/50	44/44	216	45.7/45.4	60/50	48/48	220	46.7/46.4	60/60	50/49	221	50.5/50.2	60/60	54/54	225
		HIGH	45.6/44.6	60/50	48/47	266	49.4/48.4	60/60	53/52	270	50.4/49.4	60/60	54/53	271	54.2/53.2	60/60	58/57	275
48TC*D12	460-3-60	STD	18.6	25	20	111	20.4	25	22	113	20.8	25	22	113	22.6	25	24	115
		MED	19.5	25	21	114	21.3	25	23	116	21.7	25	23	116	23.5	30	25	118
		HIGH	20.6	25	22	139	22.4	25	24	141	22.8	25	24	141	24.6	30	26	143
	575-3-60	STD	16.3	20	17	87	20.1	25	21	91	18.0	20	19	89	21.8	25	23	93
		MED	17.0	20	18	91	20.8	25	22	95	18.7	25	20	93	22.5	25	24	97
		HIGH	18.0	20	19	100	21.8	25	23	104	19.7	25	21	102	23.5	30	25	106
48TC*D12	208/ 230-3-60	STD	45.6/45.3	60/60	48/47	255	49.4/49.1	60/60	52/52	259	50.4/50.1	60/60	53/53	260	54.2/53.9	60/60	58/57	264
		MED	49.3/48.3	60/60	52/51	305	53.1/52.1	60/60	56/55	309	54.1/53.1	60/60	58/56	310	57.9/56.9	70/70	62/61	314
		HIGH	52.1/51.2	60/60	55/54	316	55.9/55.0	60/60	60/59	320	56.9/56.0	70/60	61/60	321	60.7/59.8	70/70	65/64	325
	460-3-60	STD	22.7	30	24	122	24.5	30	26	124	24.9	30	26	124	26.7	30	29	126
		MED	23.8	30	25	147	25.6	30	27	149	26.0	30	28	149	27.8	30	30	151
		HIGH	25.3	30	27	152	27.1	30	29	154	27.5	30	29	154	29.3	35	32	156
575-3-60	STD	17.7	20	19	95	21.5	25	23	99	19.4	25	21	97	23.2	25	25	101	
	MED	18.7	25	20	104	22.5	25	24	108	20.4	25	22	106	24.2	30	26	110	
	HIGH	20.5	25	22	118	24.3	30	26	122	22.2	25	24	120	26.0	30	28	124	

ELECTRICAL INFORMATION

(UNITS PRODUCED ON OR AFTER JULY 30, 2012) cont.

Table 79 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA FOR 2 STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.									
			NO PE.			w/ PE. (pwrd fr/ unit)			NO PE.			w/ PE. (pwrd fr/ unit)						
			MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	
48TC*D14	208/ 230-3-60	STD	61.8/61.0	80/80	65/64	357	65.6/64.8	80/80	69/68	361	66.6/65.8	80/80	70/69	362	70.4/69.6	80/80	75/74	366
		MED	64.0/63.0	80/80	67/66	381	67.8/66.8	80/80	72/70	385	68.8/67.8	80/80	73/72	386	72.6/71.6	80/80	77/76	390
		HIGH	66.8/65.9	80/80	70/69	392	70.6/69.7	80/80	75/74	396	Model not available due to high amperage draw.							
	STD	29.9	40	31	180	31.7	40	33	182	32.1	40	34	182	33.9	40	36	184	
	MED	31.0	40	33	192	32.8	40	35	194	33.2	40	35	194	35.0	45	37	196	
	HIGH	32.5	40	34	197	34.3	40	36	199	34.7	45	37	199	36.5	45	39	201	
48TC*D16	575-3-60	STD	24.0	30	25	142	27.8	30	30	146	25.7	30	27	144	29.5	35	32	148
		MED	24.0	30	25	142	27.8	30	30	146	25.7	30	27	144	29.5	35	32	148
		HIGH	25.7	30	27	156	29.5	35	32	160	27.4	30	29	158	31.2	35	34	162
	STD	69.4/68.6	80/80	73/72	393	73.2/72.4	80/80	77/76	397	74.2/73.4	90/80	78/77	398	78.0/77.2	100/100	82/82	402	
	MED	71.6/70.6	80/80	75/74	417	75.4/74.4	100/90	79/78	421	76.4/75.4	100/100	81/79	422	80.2/79.2	100/100	85/84	426	
	HIGH	81.2	100	86	432	85.0	100	91	436	86.0	100	92	437	89.8	100	96	441	
48TC*D16	460-3-60	STD	34.4	45	36	233	36.2	45	38	235	36.6	45	38	235	38.4	50	40	237
		MED	35.5	45	37	245	37.3	50	39	247	37.7	50	40	247	39.5	50	42	249
		HIGH	40.8	50	43	252	42.6	50	45	254	43.0	50	46	254	44.8	50	48	256
	STD	28.2	35	30	184	32.0	40	34	188	29.9	35	32	186	33.7	40	36	190	
	MED	28.2	35	30	184	32.0	40	34	188	29.9	35	32	186	33.7	40	36	190	
	HIGH	32.7	40	35	196	36.5	45	39	200	34.4	40	37	198	38.2	45	41	202	

ELECTRICAL DATA FOR UNITS PRODUCED PRIOR TO JULY 30, 2012

NOTE: Check the serial number of unit to verify production date.

To confirm the date of manufacture, locate the unit nameplate and check the first four digits of the Serial Number. If the number listed in the first 4 digits of the Serial Number is 3111 or lower, the unit was produced prior to July 30, 2012.

Position:	1	2	3	4	5	6	7	8	9	10
Example:	3	1	1	2	U	1	2	3	4	5

Week of manufacture
(fiscal calendar)

Sequence number

Year of manufacture
("12" = 2012)

Manufacturing location

C12562A

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012)

Table 80 – 48TC04 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 3 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	16.6	79	325	1.5	STD MED	70% 70%	4.9 4.9
230-1-60	187	253	16.6	79	325	1.5	STD MED	70% 70%	4.9 4.9
208-3-60	187	253	10.4	73	325	1.5	STD MED HIGH	70% 70% 80%	4.9 4.9 5.2
230-3-60	187	253	10.4	73	325	1.5	STD MED HIGH	70% 70% 80%	4.9 4.9 5.2
460-3-60	414	506	5.8	38	325	0.8	STD MED HIGH	70% 70% 80%	2.1 2.1 2.6
575-3-60	518	633	3.8	37	325	0.6	STD MED HIGH	71% 71% 80%	1.9 1.9 2.0

Table 81 – 48TC05 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 4 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	21.8	117	325	1.5	STD MED	70% 78%	4.9 7.0
230-1-60	187	253	21.8	117	325	1.5	STD MED	70% 78%	4.9 7.0
208-3-60	187	253	13.7	83	325	1.5	STD MED HIGH	70% 70% 80%	4.9 4.9 5.2
230-3-60	187	253	13.7	83	325	1.5	STD MED HIGH	70% 70% 80%	4.9 4.9 5.2
460-3-60	414	506	6.2	41	325	0.8	STD MED HIGH	70% 70% 80%	2.1 2.1 2.6
575-3-60	518	633	4.8	37	325	0.6	STD MED HIGH	71% 71% 80%	1.9 2.1 2.0

Table 82 – 48TC*06 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	26.2	134	325	1.5	STD MED	70% 78%	4.9 7.0
230-1-60	187	253	26.2	134	325	1.5	STD MED	70% 78%	4.9 7.0
208-3-60	187	253	15.6	110	325	1.5	STD MED HIGH	70% 80% 81%	4.9 5.2 7.5
230-3-60	187	253	15.6	110	325	1.5	STD MED HIGH	70% 80% 81%	4.9 5.2 7.5
460-3-60	414	506	7.7	52	325	0.8	STD MED HIGH	70% 80% 81%	2.1 2.6 3.4
575-3-60	518	633	5.8	39	325	0.6	STD MED HIGH	71% 81% 81%	1.9 2.0 2.8

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 83 – 48TC07 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 6 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
			RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	19.0	123	325	1.5	STD	80%	5.2
							MED	81%	7.5
							HIGH	81%	7.5
230-3-60	187	253	19.0	123	325	1.5	STD	80%	5.2
							MED	81%	7.5
							HIGH	81%	7.5
460-3-60	414	506	9.7	62	325	0.8	STD	80%	2.6
							MED	81%	3.4
							HIGH	81%	4.4
575-3-60	518	633	7.4	50	325	0.6	STD	80%	2.0
							MED	81%	2.8
							HIGH	81%	2.8

Table 84 – 48TC*A08 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 7.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
			RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	25.0	164	325	1.5	STD	80%	5.2
							MED	81%	7.5
							HIGH	81%	15.0
230-3-60	187	253	25.0	164	325	1.5	STD	80%	5.2
							MED	81%	7.5
							HIGH	81%	15.0
460-3-60	414	506	12.2	100	325	0.8	STD	80%	2.6
							MED	81%	3.4
							HIGH	81%	7.4
575-3-60	518	633	9.0	78	325	0.6	STD	80%	2.4
							MED	81%	2.8
							HIGH	81%	5.6

Table 85 – 48TC08 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 7.5 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
			RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	13.6	83	13.6	83	325	1.5	STD	80%	5.2
									MED	81%	7.5
									HIGH	81%	15.0
230-3-60	187	253	13.6	83	13.6	83	325	1.5	STD	80%	5.2
									MED	81%	7.5
									HIGH	81%	15.0
460-3-60	414	506	6.1	41	6.1	41	325	0.8	STD	80%	2.6
									MED	81%	3.4
									HIGH	81%	7.4
575-3-60	518	633	4.2	33	4.2	33	325	0.6	STD	80%	2.4
									MED	81%	2.8
									HIGH	81%	5.6

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 86 – 48TC08 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR**

7.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	13.6	83	13.6	83	325	1.5	STD	84%	5.8
							325	1.5	MED	85%	8.6
							325	1.5	HIGH	84%	13.6
230-3-60	187	253	13.6	83	13.6	83	325	1.5	STD	84%	5.6
							325	1.5	MED	85%	7.8
							325	1.5	HIGH	84%	12.7
460-3-60	414	506	6.1	41	6.1	41	325	0.8	STD	79%	2.9
							325	0.8	MED	85%	3.8
							325	0.8	HIGH	84%	6.4
575-3-60	518	633	4.2	33	4.2	33	325	0.6	STD	81%	2.8
							325	0.6	MED	84%	4.5
							325	0.6	HIGH	83%	6.2

Table 87 – 48TC09 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 8.5 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	29.5	195	325	1.5	STD	80%	5.2
							MED	80%	5.2
							HIGH	80%	10.0
230-3-60	187	253	29.5	195	325	1.5	STD	80%	5.2
							MED	80%	5.2
							HIGH	80%	10.0
460-3-60	414	506	14.7	95	325	0.8	STD	80%	2.6
							MED	80%	2.6
							HIGH	80%	4.4
575-3-60	518	633	12.2	80	325	0.6	STD	80%	2.4
							MED	80%	2.0
							HIGH	81%	2.8

Table 88 – 48TC09 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

8.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	14.5	98	13.7	83	325	1.5	STD	80%	5.2
									MED	80%	5.2
									HIGH	80%	10.0
230-3-60	187	253	14.5	98	13.7	83	325	1.5	STD	80%	5.2
									MED	80%	5.2
									HIGH	80%	10.0
460-3-60	414	506	6.3	55	6.2	41	325	0.8	STD	80%	2.6
									MED	80%	2.6
									HIGH	80%	4.4
575-3-60	518	633	6.0	41	4.8	33	325	0.6	STD	80%	2.4
									MED	80%	2.0
									HIGH	81%	2.8

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 89 – 48TC09 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR**

8.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	14.5	98	13.7	83	325	1.5	STD	84%	5.8
							325	1.5	MED	77%	7.1
							325	1.5	HIGH	82%	10.8
230-3-60	187	253	14.5	98	13.7	83	325	1.5	STD	84%	5.6
							325	1.5	MED	77%	6.8
							325	1.5	HIGH	82%	9.8
460-3-60	414	506	6.3	55	6.2	41	325	0.8	STD	79%	2.9
							325	0.8	MED	77%	3.8
							325	0.8	HIGH	82%	4.9
575-3-60	518	633	6.0	41	4.8	33	325	0.6	STD	81%	2.8
							325	0.6	MED	80%	3.5
							325	0.6	HIGH	84%	4.5

Table 90 – 48TC12 SINGLE STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

10 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	30.1	225	325	1.5	STD	80%	5.2
							MED	81%	10.0
							HIGH	81%	15.0
230-3-60	187	253	30.1	225	325	1.5	STD	80%	5.2
							MED	81%	10.0
							HIGH	81%	15.0
460-3-60	414	506	16.7	114	325	0.8	STD	80%	2.6
							MED	81%	4.4
							HIGH	81%	7.4
575-3-60	518	633	12.2	80	325	0.6	STD	80%	2.0
							MED	81%	2.8
							HIGH	81%	5.6

Table 91 – 48TC12 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

10 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	15.6	110	15.9	110	325	1.5	STD	80%	5.2
									MED	81%	10.0
									HIGH	81%	15.0
230-3-60	187	253	15.6	110	15.9	110	325	1.5	STD	80%	5.2
									MED	81%	10.0
									HIGH	81%	15.0
460-3-60	414	506	7.7	52	7.7	52	325	0.8	STD	80%	2.6
									MED	81%	4.4
									HIGH	81%	7.4
575-3-60	518	633	5.8	39	5.7	39	325	0.6	STD	80%	2.0
									MED	81%	2.8
									HIGH	81%	5.6

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 92 – 48TC12 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR**

10 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	15.6	110	15.9	110	325	1.5	STD	77%	7.1
							325	1.5	MED	82%	10.8
							325	1.5	HIGH	84%	13.6
230-3-60	187	253	15.6	110	15.9	110	325	1.5	STD	77%	6.8
							325	1.5	MED	82%	9.8
							325	1.5	HIGH	84%	12.7
460-3-60	414	506	7.7	52	7.7	52	325	0.8	STD	77%	3.8
							325	0.8	MED	82%	4.9
							325	0.8	HIGH	84%	6.4
575-3-60	518	633	5.8	39	5.7	39	325	0.6	STD	80%	3.5
							325	0.6	MED	84%	4.5
							325	0.6	HIGH	83%	6.2

Table 93 – 48TC14 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR**

12.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	19.0	123	22.4	149	1288	6.2	STD	81%	7.5
									MED	81%	10.0
									HIGH	81%	15.0
230-3-60	187	253	19.0	123	22.4	149	1288	6.2	STD	81%	7.5
									MED	81%	10.0
									HIGH	81%	15.0
460-3-60	414	506	9.7	62	10.6	75	1288	3.1	STD	81%	3.4
									MED	81%	4.4
									HIGH	81%	7.4
575-3-60	518	633	7.4	50	7.7	54	1288	2.5	STD	81%	2.8
									MED	81%	2.8
									HIGH	81%	5.6

Table 94 – 48TC14 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR**

12.5 TONS

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	19.0	123	22.4	149	1070	6.2	STD	85%	8.6
							1070	6.2	MED	82%	10.8
							1070	6.2	HIGH	84%	13.6
230-3-60	187	253	19.0	123	22.4	149	1070	6.2	STD	85%	7.8
							1070	6.2	MED	82%	9.8
							1070	6.2	HIGH	84%	12.7
460-3-60	414	506	9.7	62	10.6	75	1070	3.1	STD	85%	3.8
							1070	3.1	MED	82%	4.9
							1070	3.1	HIGH	84%	6.4
575-3-60	518	633	7.4	50	7.7	54	1070	2.5	STD	84%	4.5
							1070	2.5	MED	84%	4.5
							1070	2.5	HIGH	83%	6.2

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 95 – 48TC16 2-STAGE COOLING WITH SINGLE SPEED INDOOR FAN MOTOR 15 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
			RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	25.0	164	25.0	164	1288	1.5	STD	81%	7.5
									MED	81%	10.0
									HIGH	89.5%	20.4
230-3-60	187	253	25.0	164	25.0	164	1288	1.5	STD	81%	7.5
									MED	81%	10.0
									HIGH	89.5%	20.4
460-3-60	414	506	12.2	100	12.8	100	1288	0.8	STD	81%	3.4
									MED	81%	4.4
									HIGH	89.5%	10.2
575-3-60	518	633	9.8	78	9.6	78	1288	0.6	STD	81%	2.8
									MED	81%	2.8
									HIGH	89.5%	9.0

Table 96 – 48TC16 2-STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR 15 TONS**

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
			RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	25.0	164	25.0	164	280	1.5	STD	85%	8.6
							280	1.5	MED	82%	10.8
							280	1.5	HIGH	90%	20.4
230-3-60	187	253	25.0	164	25.0	164	280	1.5	STD	85%	7.8
							280	1.5	MED	82%	9.8
							280	1.5	HIGH	90%	20.4
460-3-60	414	506	12.2	100	12.8	100	280	0.8	STD	85%	3.8
							280	0.8	MED	82%	4.9
							280	0.8	HIGH	90%	10.2
575-3-60	518	633	9.8	78	9.6	78	280	0.6	STD	84%	4.5
							280	0.6	MED	84%	4.5
							280	0.6	HIGH	94%	9.0

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 97 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.					
			NO PE.			w/ P.E. (pwrdr fr/ unit)			NO PE.			w/ P.E. (pwrdr fr/ unit)		
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA	MCA	MAX FUSE or HACR BRKR	DISC. SIZE FLA LRA
48TC*A04	208/230-1-60	STD	27.2	40	26 95	29.1	45	29 97	32.0	45	32 100	33.9	50	34 102
		MED	27.2	40	26 95	29.1	45	29 97	32.0	45	32 100	33.9	50	34 102
		STD	19.4	25	19 89	21.3	30	22 91	24.2	30	25 94	26.1	30	27 96
	208/230-3-60	MED	19.4	25	19 89	21.3	30	22 91	24.2	30	25 94	26.1	30	27 96
		HIGH	19.7	30	20 107	21.6	30	22 109	24.5	30	25 112	26.4	30	27 114
		STD	10.2	15	10 46	11.2	15	11 47	12.4	15	13 48	13.4	15	14 49
	460-3-60	MED	10.2	15	10 46	11.2	15	11 47	12.4	15	13 48	13.4	15	14 49
		HIGH	10.7	15	11 55	11.7	15	12 56	12.9	15	13 57	13.9	20	14 58
		STD	7.3	15	7 44	9.2	15	9 46	9.0	15	9 46	10.9	15	11 48
	575-3-60	MED	7.3	15	7 44	9.2	15	9 46	9.0	15	9 46	10.9	15	11 48
		HIGH	7.4	15	7 50	9.3	15	10 52	9.1	15	9 52	11.0	15	12 54
		STD	33.7	50	32 133	35.6	50	35 135	38.5	60	38 138	40.4	60	40 140
48TC*A05	208/230-1-60	MED	33.7	50	32 133	35.6	50	35 135	38.5	60	38 138	40.4	60	40 140
		STD	23.5	30	23 99	25.4	30	25 101	28.3	40	29 104	30.2	40	31 106
		MED	23.5	30	23 99	25.4	30	25 101	28.3	40	29 104	30.2	40	31 106
	208/230-3-60	HIGH	23.8	30	23 117	25.7	30	26 119	28.6	40	29 122	30.5	40	31 124
		STD	10.7	15	10 49	11.7	15	12 50	12.9	15	13 51	13.9	20	14 52
		MED	10.7	15	10 49	11.7	15	12 50	12.9	15	13 51	13.9	20	14 52
	460-3-60	HIGH	11.2	15	11 58	12.2	15	12 59	13.4	15	14 60	14.4	20	15 61
		STD	8.5	15	8 40	10.4	15	11 42	10.2	15	10 42	12.1	15	13 44
		MED	8.5	15	8 40	10.4	15	11 42	10.2	15	10 42	12.1	15	13 44
	575-3-60	HIGH	8.6	15	9 46	10.5	15	11 48	10.3	15	10 48	12.2	15	13 50

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 97 - UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA (cont)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.					
			NO PE.			w/ PE. (pwrdr fr/ unit)			NO PE.			w/ PE. (pwrdr fr/ unit)		
			MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE LRA
48TC*A06	208/230-1-60	STD	39.2	60	37	150	41.1	60	40	152	44.0	60	43	155
		MED	41.3	60	40	175	43.2	60	42	177	46.1	60	45	180
	208/230-3-60	STD	25.9	30	25	126	27.8	40	27	128	30.7	45	31	131
		MED	26.2	40	26	144	28.1	40	28	146	31.0	45	31	149
		HIGH	28.5	40	28	170	30.4	45	30	172	33.3	45	34	175
		STD	12.5	20	12	60	13.5	20	13	61	14.7	20	15	62
	460-3-60	MED	13.0	20	13	69	14.0	20	14	70	15.2	20	15	71
		HIGH	13.8	20	14	82	14.8	20	15	83	16.0	20	16	84
	575-3-60	STD	9.8	15	10	46	11.7	15	12	48	11.5	15	12	48
		MED	9.9	15	10	52	11.8	15	12	54	11.6	15	12	54
48TC*A07	208/230-3-60	HIGH	10.7	15	11	63	12.6	15	13	65	12.4	15	13	65
		STD	30.5	45	30	157	32.4	50	32	159	35.3	50	35	162
		MED	32.8	50	32	183	34.7	50	34	185	37.6	50	38	188
		HIGH	32.8	50	32	183	34.7	50	34	185	37.6	50	38	188
	460-3-60	STD	15.5	25	15	79	16.5	25	16	80	17.7	25	18	81
		MED	16.3	25	16	92	17.3	25	17	93	18.5	25	19	94
	575-3-60	HIGH	17.3	25	17	101	18.3	25	18	102	19.5	25	20	103
		STD	11.9	15	12	63	13.8	20	14	65	13.6	20	13	65
		MED	12.7	20	12	74	14.6	20	15	76	14.4	20	14	76
		HIGH	12.7	20	12	74	14.6	20	15	76	14.4	20	14	76
48TC*A08	208/230-3-60	STD	39.5	60	38	191	43.3	60	43	195	44.3	60	44	196
		MED	41.8	60	41	228	45.6	60	45	232	46.6	60	46	233
		HIGH	49.3	60	49	254	53.1	60	54	258	54.1	70	55	259
		STD	19.5	30	19	113	21.3	30	21	115	21.7	30	21	115
	460-3-60	MED	20.3	30	20	132	22.1	30	22	134	22.5	30	22	134
		HIGH	24.3	30	24	145	26.1	30	26	147	26.5	30	27	147
	575-3-60	STD	14.9	20	14	89	18.7	25	19	93	16.6	25	16	91
		MED	15.3	20	15	104	19.1	25	19	108	17.0	25	17	106
		HIGH	18.1	25	18	118	21.9	30	23	122	19.8	25	20	120

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 97 - UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.				w/ PWRD C.O.			
			NO RE.		w/ P.E. (pwrdr fr/ unit)		NO RE.		w/ P.E. (pwrdr fr/ unit)	
			MCA	FUSE or HACR BRKR	FLA	DISC. SIZE LRA	MCA	FUSE or HACR BRKR	FLA	DISC. SIZE LRA
48TC*A09	208/230-3-60	STD	45.1	60	43	222	48.9	60	48	226
		MED	45.1	60	43	233	48.9	60	48	237
		HIGH	49.9	60	49	276	53.7	80	53	280
	460-3-60	STD	22.6	30	22	108	24.4	30	24	110
		MED	22.6	30	22	114	24.4	30	24	116
		HIGH	24.4	30	24	136	26.2	30	26	138
48TC*A12	208/230-3-60	STD	18.9	30	18	91	22.7	30	23	95
		MED	18.5	30	18	95	22.3	30	23	99
		HIGH	19.3	30	19	106	23.1	30	23	110
	460-3-60	STD	45.8	60	44	263	49.6	60	48	267
		MED	50.6	60	50	306	54.4	80	54	310
		HIGH	55.6	80	55	315	59.4	80	60	319
48TC*A12	208/230-3-60	STD	25.1	30	24	133	26.9	40	26	135
		MED	26.9	40	26	155	28.7	45	28	157
		HIGH	29.9	45	30	159	31.7	45	32	161
	460-3-60	STD	18.5	30	18	95	22.3	30	22	99
		MED	19.3	30	19	106	23.1	30	23	110
		HIGH	22.1	30	22	120	25.9	30	26	124

LEGEND:

- BRKR - Circuit breaker
- CO - Convenience outlet
- DISC - Disconnect
- FLA - Full load amps
- IFM - Indoor fan motor
- LRA - Locked rotor amps
- MCA - Minimum circuit amps
- MOCP - MAX FUSE or HACR Breaker
- PE - Power exhaust
- PWRD CO - Powered convenient outlet
- UNPWR CO - Unpowered convenient outlet



Example: Supply voltage is 230-3-60

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3} = 227$$

Determine maximum deviation from average voltage.

$$(AB) 227 - 224 = 3 \text{ v}$$

$$(BC) 231 - 227 = 4 \text{ v}$$

$$(AC) 227 - 226 = 1 \text{ v}$$

Maximum deviation is 4 v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{227} = 1.76\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.

2. Unbalanced 3-Phase Supply Voltage

Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 98 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH 2 SPEED INDOOR FAN MOTOR

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.					
			NO PE.			w/ P.E. (pwrdr fr/ unit)			NO PE.			w/ P.E. (pwrdr fr/ unit)		
			MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE LRA
48TC*D08	208/230-3-60	STD	38.8	50	41	193	42.6	50	45	197	43.6	50	46	198
		MED	41.1	50	43	230	44.9	50	48	234	45.9	50	49	235
		HIGH	49.0	60	52	256	52.8	60	56	260	53.8	60	58	261
	460-3-60	STD	17.9	20	19	95	19.7	25	21	97	20.1	25	21	97
		MED	18.7	25	20	114	20.5	25	22	116	20.9	25	22	116
		HIGH	23.1	30	24	127	24.9	30	26	129	25.3	30	27	129
48TC*D09	575-3-60	STD	13.1	15	14	77	16.9	20	18	81	14.8	20	16	79
		MED	13.5	15	14	92	17.3	20	19	96	15.2	20	16	94
		HIGH	16.6	20	17	106	20.4	25	22	110	18.3	20	19	108
	208/230-3-60	STD	40.0	50	42	208	43.8	50	46	212	44.8	50	47	213
		MED	40.0	50	42	219	43.8	50	46	223	44.8	50	47	224
		HIGH	44.8	50	47	262	48.6	60	52	266	49.6	60	53	267
48TC*D12	460-3-60	STD	18.3	20	19	109	20.1	25	21	111	20.5	25	22	111
		MED	18.3	20	19	115	20.1	25	21	117	20.5	25	22	117
		HIGH	20.1	25	21	137	21.9	25	23	139	22.3	25	24	139
	575-3-60	STD	15.9	20	17	85	19.7	25	21	89	17.6	20	19	87
		MED	15.5	20	16	89	19.3	25	20	93	17.2	20	18	91
		HIGH	16.3	20	17	100	20.1	25	21	104	18.0	20	19	102
48TC*D12	208/230-3-60	STD	43.7	50	46	258	47.5	60	50	262	48.5	60	51	263
		MED	48.5	60	51	301	52.3	60	56	305	53.3	60	57	306
		HIGH	53.5	60	57	310	57.3	70	61	314	58.3	70	62	315
	460-3-60	STD	21.5	25	23	123	23.3	30	25	125	23.7	30	25	125
		MED	23.3	30	25	145	25.1	30	27	147	25.5	30	27	147
		HIGH	26.3	30	28	149	28.1	35	30	151	28.5	35	31	151
48TC*D12	575-3-60	STD	16.2	20	17	93	20.0	25	21	97	17.9	20	19	95
		MED	17.0	20	18	104	20.8	25	22	108	18.7	25	20	106
		HIGH	19.8	25	21	118	23.6	30	25	122	21.5	25	23	120

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 98 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA WITH 2 SPEED INDOOR FAN MOTOR (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.					
			NO PE.			w/ P.E. (pwrdr fr/ unit)			NO PE.			w/ P.E. (pwrdr fr/ unit)		
			MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA
48TC*D14	208/230-3-60	STD	60.7	80	63	360	364	64.5	65.5	80	69	365	365	69.3
		MED	63.2	80	66	377	381	67.0	68.0	80	72	382	382	71.8
		HIGH	68.2	80	72	386	390	72.0	73.5	80	76	390	390	76.5
	460-3-60	STD	29.5	40	31	181	183	31.3	31.7	40	33	183	183	33.5
		MED	30.5	40	32	190	192	32.3	32.7	40	34	192	192	34.5
		HIGH	33.5	40	35	194	196	35.3	35.7	45	37	196	196	37.5
48TC*D16	208/230-3-60	STD	22.3	30	23	142	146	26.1	24.0	30	25	144	144	27.8
		MED	22.3	30	23	142	146	26.1	24.0	30	25	144	144	27.8
		HIGH	25.1	30	27	156	160	28.9	26.8	35	29	158	158	30.6
	460-3-60	STD	68.3	80	71	396	400	72.1	73.1	80	77	401	401	76.9
		MED	70.8	80	74	413	417	74.6	75.6	90	79	417	417	79.4
		HIGH	81.2	100	86	432	436	85.0	86.0	100	92	437	437	89.8
48TC*D16	460-3-60	STD	34.0	45	35	234	236	35.8	36.2	45	38	236	236	38.0
		MED	35.0	45	37	243	245	36.8	37.2	50	39	245	245	39.0
		HIGH	40.8	50	43	252	254	42.6	43.0	50	46	254	254	44.8
	575-3-60	STD	26.5	30	28	184	188	30.3	28.2	35	30	186	186	32.0
		MED	26.5	30	28	184	188	30.3	28.2	35	30	186	186	32.0
		HIGH	32.7	40	35	196	200	36.5	34.4	40	37	198	198	38.2

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 99 – UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA FOR 2 STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.										w/ PWRD C.O.									
			NO PE.					w/ PE. (pwrd fr/ unit)					NO PE.					w/ PE. (pwrd fr/ unit)				
			MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA	MCA	MAX FUSE or HACR BRKR	FLA	DISC. SIZE	LRA
48TC*D08	208/ 230-3-60	STD	39.4/39.2	50/50	41/41	197	43.2/43.0	50/50	46/46	201	44.2/44.0	50/50	47/47	202	48.0/47.8	60/60	51/51	206				
		MED	42.2/41.4	50/50	45/44	227	46.0/45.2	50/50	49/48	231	47.0/46.2	60/50	50/49	232	50.8/50.0	60/60	55/54	236				
		HIGH	47.2/46.3	60/50	50/49	262	51.0/50.1	60/60	55/54	266	52.0/51.1	60/60	56/55	267	55.8/54.9	60/60	60/59	271				
	460-3-60	STD	18.2	20	19	97	20.0	25	21	99	20.4	25	22	99	22.2	25	24	101				
		MED	19.1	25	20	113	20.9	25	22	115	21.3	25	23	115	23.1	25	25	117				
		HIGH	21.8	25	23	130	23.6	30	25	132	24.0	30	26	132	25.8	30	28	134				
48TC*D09	575-3-60	STD	13.5	15	14	79	17.3	20	19	83	15.2	20	16	81	19.0	25	21	85				
		MED	15.2	20	16	92	19.0	25	21	96	16.9	20	18	94	20.7	25	23	98				
		HIGH	17.4	20	18	106	21.2	25	23	110	19.1	25	20	108	22.9	25	24	112				
	208/ 230-3-60	STD	40.6/40.4	50/50	43/42	212	44.4/44.2	50/50	47/47	216	45.4/45.2	50/50	48/48	217	49.2/49.0	60/60	52/52	221				
		MED	41.9/41.6	50/50	44/44	216	45.7/45.4	60/50	48/48	220	46.7/46.4	60/60	50/49	221	50.5/50.2	60/60	54/54	225				
		HIGH	45.6/44.6	60/50	48/47	266	49.4/48.4	60/60	53/52	270	50.4/49.4	60/60	54/53	271	54.2/53.2	60/60	58/57	275				
48TC*D09	460-3-60	STD	18.6	25	20	111	20.4	25	22	113	20.8	25	22	113	22.6	25	24	115				
		MED	19.5	25	21	114	21.3	25	23	116	21.7	25	23	116	23.5	30	25	118				
		HIGH	20.6	25	22	139	22.4	25	24	141	22.8	25	24	141	24.6	30	26	143				
	575-3-60	STD	16.3	20	17	87	20.1	25	21	91	18.0	20	19	89	21.8	25	23	93				
		MED	17.0	20	18	91	20.8	25	22	95	18.7	25	20	93	22.5	25	24	97				
		HIGH	18.0	20	19	100	21.8	25	23	104	19.7	25	21	102	23.5	30	25	106				
48TC*D12	208/ 230-3-60	STD	45.6/45.3	60/60	48/47	255	49.4/49.1	60/60	52/52	259	50.4/50.1	60/60	53/53	260	54.2/53.9	60/60	58/57	264				
		MED	49.3/48.3	60/60	52/51	305	53.1/52.1	60/60	56/55	309	54.1/53.1	60/60	58/56	310	57.9/56.9	70/70	62/61	314				
		HIGH	52.1/51.2	60/60	55/54	316	55.9/55.0	60/60	60/59	320	56.9/56.0	70/60	61/60	321	60.7/59.8	70/70	65/64	325				
	460-3-60	STD	22.7	30	24	122	24.5	30	26	124	24.9	30	26	124	26.7	30	29	126				
		MED	23.8	30	25	147	25.6	30	27	149	26.0	30	28	149	27.8	30	30	151				
		HIGH	25.3	30	27	152	27.1	30	29	154	27.5	30	29	154	29.3	35	32	156				
575-3-60	575-3-60	STD	17.7	20	19	95	21.5	25	23	99	19.4	25	21	97	23.2	25	25	101				
		MED	18.7	25	20	104	22.5	25	24	108	20.4	25	22	106	24.2	30	26	110				
		HIGH	20.5	25	22	118	24.3	30	26	122	22.2	25	24	120	26.0	30	28	124				

ELECTRICAL INFORMATION

(UNITS PRODUCED PRIOR TO JULY 30, 2012) cont.

Table 99 - UNIT WIRE/FUSE OR HACR BREAKER SIZING DATA FOR 2 STAGE COOLING WITH 2 SPEED INDOOR FAN MOTOR (cont.)

UNIT	NOM. V-Ph-Hz	IFM TYPE	NO C.O. or UNPWR C.O.						w/ PWRD C.O.										
			NO PE.			w/ PE. (pwrd fr/ unit)			NO PE.			w/ PE. (pwrd fr/ unit)							
			MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		MCA	MAX FUSE or HACR BRKR	DISC. SIZE		
	208/ 230-3-60	STD	61.8/61.0	80/80	65/64	357	65.6/64.8	80/80	69/68	361		66.6/65.8	80/80	70/69	362	70.4/69.6	80/80	75/74	366
		MED	64.0/63.0	80/80	67/66	381	67.8/66.8	80/80	72/70	385		68.8/67.8	80/80	73/72	386	72.6/71.6	80/80	77/76	390
		HIGH	66.8/65.9	80/80	70/69	392	70.6/69.7	80/80	75/74	396	Model not available due to high amperage draw.								
48TC*D14	460-3-60	STD	29.9	40	31	180	31.7	40	33	182		32.1	40	34	182	33.9	40	36	184
		MED	31.0	40	33	192	32.8	40	35	194		33.2	40	35	194	35.0	45	37	196
		HIGH	32.5	40	34	197	34.3	40	36	199		34.7	45	37	199	36.5	45	39	201
		STD	24.0	30	25	142	27.8	30	30	146		25.7	30	27	144	29.5	35	32	148
		MED	24.0	30	25	142	27.8	30	30	146		25.7	30	27	144	29.5	35	32	148
		HIGH	25.7	30	27	156	29.5	35	32	160		27.4	30	29	158	31.2	35	34	162
48TC*D16	208/ 230-3-60	STD	69.4/68.6	80/80	73/72	393	73.2/72.4	80/80	77/76	397		74.2/73.4	90/80	78/77	398	78.0/77.2	100/100	82/82	402
		MED	71.6/70.6	80/80	75/74	417	75.4/74.4	100/90	79/78	421		76.4/75.4	100/100	81/79	422	80.2/79.2	100/100	85/84	426
		HIGH	81.2	100	86	432	85.0	100	91	436		86.0	100	92	437	89.8	100	96	441
		STD	34.4	45	36	233	36.2	45	38	235		36.6	45	38	235	38.4	50	40	237
		MED	35.5	45	37	245	37.3	50	39	247		37.7	50	40	247	39.5	50	42	249
		HIGH	40.8	50	43	252	42.6	50	45	254		43.0	50	46	254	44.8	50	48	256
48TC*D16	460-3-60	STD	28.2	35	30	184	32.0	40	34	188		29.9	35	32	186	33.7	40	36	190
		MED	28.2	35	30	184	32.0	40	34	188		29.9	35	32	186	33.7	40	36	190
		HIGH	32.7	40	35	196	36.5	45	39	200		34.4	40	37	198	38.2	45	41	202

SEQUENCE OF OPERATION

General

The sequence below describes the sequence of operation for an electromechanical unit with and without a factory installed EconoMi\$er IV and X (called “economizer” in this sequence). For information regarding a direct digital controller, see the start-up, operations, and troubleshooting manual for the applicable controller.

Electromechanical units with no economizer

Cooling (Single speed indoor fan motor) —

When the thermostat calls for cooling, terminals G and Y1 are energized. As a result, the indoor fan contactor (IFC) and the compressor contactor (C1) are energized, causing the indoor fan motor (IFM), compressor #1, and outdoor fan to start. If the unit has 2 stages of cooling, the thermostat will additionally energize Y2. The Y2 signal will energize compressor contactor #2 (C2), causing compressor #2 to start. Regardless of the number of stages, the outdoor fan motor runs continuously while unit is cooling. When SAV system is utilized, indoor fan motor runs at design CFM (full speed) during the heating operation.

Cooling (2-speed indoor fan motor) —

Per ASHRAE 90.1 2010 standard section 6.4.3.10.b, during the first stage of cooling operation the VFD will adjust the fan motor to provide 2/3rd of the total cfm established for the unit. When a call for the second stage of cooling is required, the VFD will allow the total cfm for the unit established (100%).

Heating (Single or 2-speed indoor fan motor) —

NOTE: WeatherMaker (48TC) units have either 1 or 2 stages of gas heat. When SAV system is utilized, indoor fan motor runs at design cfm (full speed) during the heating operation.

When the thermostat calls for heating, power is sent to W on the Integrated Gas Controller (IGC) board. An LED (light-emitting diode) on the IGC board turns on and remains on during normal operation. A check is made to ensure that the rollout switch and limit switch are closed. If the check was successful, the induced-draft motor is energized, and when its speed is satisfactory, as proven by the “hall effect” sensor, the ignition activation period begins. The burners will ignite within 5 seconds. If the burners do not light, there is a 22-second delay before another 5-second attempt. This sequence is repeated for 15 minutes or until the burners light. If, after the 15 minutes, the burners still have not lit, heating is locked out. To reset the control, break 24-v power to the thermostat.

When ignition occurs, the IGC board will continue to monitor the condition of the rollout switch, the limit switches, the “hall effect” sensor, as well as the flame sensor. 45 seconds after ignition occurs, assuming the unit is controlled through a room thermostat set for fan auto, the indoor fan motor will energize (and the outdoor air dampers will open to their minimum position). If, for

some reason, the over-temperature limit opens prior to the start of the indoor fan blower, the unit will shorten the 45-second delay to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once the fan-on delay has been modified, it will not change back to 45 seconds until power is reset to the control.

On units with 2 stages of heat, when additional heat is required, W2 closes and initiates power to the second stage of the main gas valve. When the thermostat is satisfied, W1 and W2 open and the gas valve closes, interrupting the flow of gas to the main burners.

If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto, the indoor fan motor will continue to operate for an additional 45 seconds then stop. If the over-temperature limit opens after the indoor motor is stopped, but within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control. A LED indicator is provided on the IGC to monitor operation.

Electromechanical units with an economizer

Cooling —

When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor air damper is modulated by the EconoMi\$er IV and X control to provide a 50°F (10°C) to 55°F (13°C) mixed air temperature into the zone. As the mixed air temperature fluctuates above 55°F (13°C) or below 50°F (10°C) dampers will be modulated (open or close) to bring the mixed air temperature back within control. If mechanical cooling is utilized with free cooling, the outdoor air damper will maintain its current position at the time the compressor is started. If the increase in cooling capacity causes the mixed air temperature to drop below 45°F (7°C), then the outdoor air damper position will be decreased to the minimum position. If the mixed air temperature continues to fall, the outdoor air damper will close. Control returns to normal once the mixed air temperature rises above 48°F (9°C). The power exhaust fans will be energized and de-energized, if installed, as the outdoor air damper opens and closes.

If field installed accessory CO₂ sensors are connected to the EconoMi\$er IV and X control, a demand controlled ventilation strategy will begin to operate. As the CO₂ level in the zone increases above the CO₂ setpoint, the minimum position of the damper will be increased proportionally. As the CO₂ level decreases because of the increase in fresh air, the outdoor air damper will be proportionally closed. For EconoMi\$er IV and X operation, there must be a thermostat call for the fan (G).

SEQUENCE OF OPERATION (cont.)

If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

If field installed accessory CO₂ sensors are connected to the EconoMi\$er IV and X control, a demand controlled ventilation strategy will begin to operate. As the CO₂ level in the zone increases above the CO₂ setpoint, the minimum position of the damper will be increased proportionally. As the CO₂ level decreases because of the increase in fresh air, the outdoor air damper will be proportionally closed. For EconoMi\$er IV and X operation, there must be a thermostat call for the fan (G). If the unit is occupied and the fan is on, the damper will operate at minimum position. Otherwise, the damper will be closed.

When the EconoMi\$er IV and X control is in the occupied mode and a call for cooling exists (Y1 on the thermostat), the control will first check for indoor fan operation. If the fan is not on, then cooling will not be activated. If the fan is on, then the control will open the EconoMi\$er IV and X damper to the minimum position.

On the initial power to the EconoMi\$er IV and X control, it will take the damper up to 2 1/2 minutes before it begins to position itself. After the initial power-up, further changes in damper position can take up to 30 seconds to initiate. Damper movement from full closed to full open (or vice versa) will take between 1 1/2 and 2 1/2 minutes. If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), then the control will modulate the dampers open to maintain the mixed air temperature setpoint at 50°F (10°C) to 55°F (13°C). If there is a further demand for cooling (cooling second stage - Y2 is energized), then the control will bring on compressor stage 1 to maintain the mixed air temperature setpoint. The EconoMi\$er IV and X damper will be open at maximum position.

2-Speed Note: When operating in ventilation mode only, the indoor fan motor will automatically adjust to 2/3rd of the total cfm established.

Heating

The sequence of operation for the heating is the same as an electromechanical unit with no economizer. The only difference is how the economizer acts. The economizer will stay at the Economizer Minimum Position while the evaporator fan is operating. The outdoor air damper is closed when the indoor fan is not operating.

Optional Humidi-MiZer Dehumidification System

Units with the factory equipped Humidi-MiZer option are capable of providing multiple modes of improved dehumidification as a variation of the normal cooling cycle. The Humidi-MiZer option includes additional valves in the liquid line and discharge line of each refrigerant circuit, a small reheat condenser coil downstream of the evaporator, and Motormaster variable-speed control of some or all outdoor fans. Operation of the revised refrigerant circuit for each mode is described below.

The Humidi-MiZer system provides three sub-modes of operation: Cool, Reheat1, and Reheat2.

Cool mode - provides a normal ratio of Sensible and Latent Cooling effect from the evaporator coil.

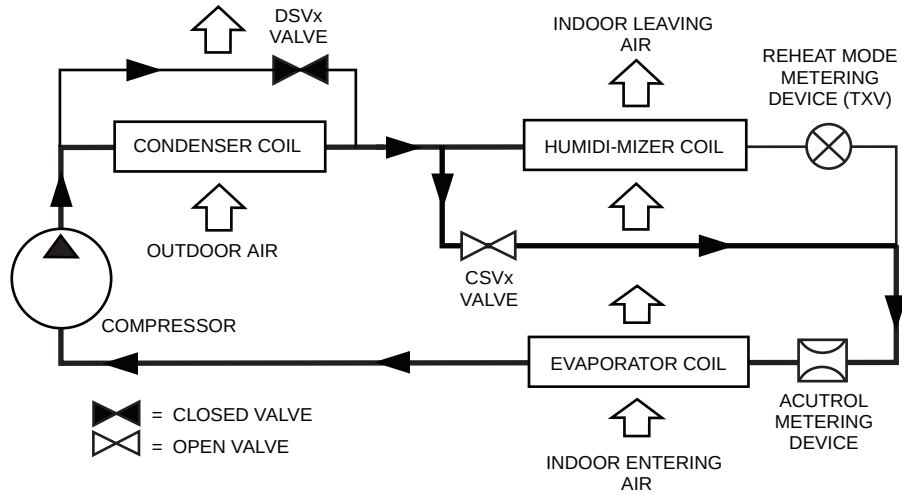
Reheat1 - provides increased Latent Cooling while slightly reducing the Sensible Cooling effect.

Reheat2 - provides normal Latent Cooling but with null or minimum Sensible Cooling effect delivered to the space.

The Reheat1 and Reheat2 modes are available when the unit is not in a Heating mode and when the Low Ambient Lockout switch is closed.

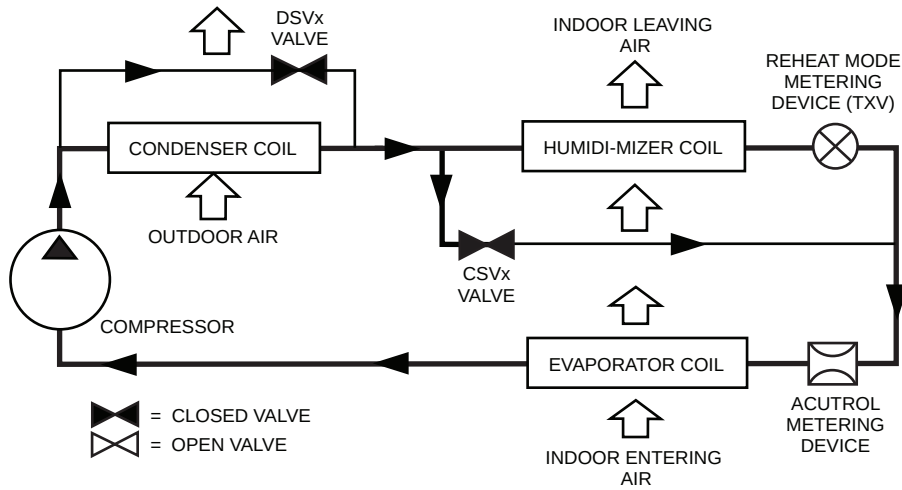
The following diagrams depict piping for Single Stage cooling units.

SEQUENCE OF OPERATION (cont.)



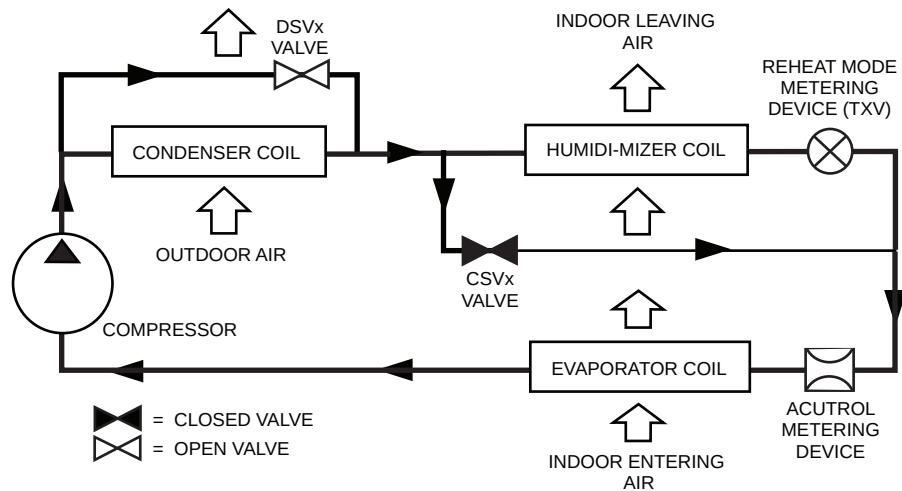
C12647

Normal Cooling Mode - Humidi-MiZer System with Single Stage Cooling



C12648

Subcooling Mode (Reheat 1) - Humidi-MiZer System with Single Stage Cooling



C12649

Hot Gas Reheat Mode (Reheat 2) - Humidi-MiZer System with Single Stage Cooling

Gas Heat/Electric Cooling Packaged Rooftop

HVAC Guide Specifications

Size Range: 3 to 15 Nominal Tons



<u>Section</u>	<u>Description</u>
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23 06 80	Schedules for Decentralized HVAC Equipment
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23 06 80.13 Decentralized Unitary HVAC Equipment Schedule

23 06 80.13.A. Rooftop unit schedule

1. Schedule is per the project specification requirements.

23 07 16	HVAC Equipment Insulation
-----------------	----------------------------------

23 07 16.13 Decentralized, Rooftop Units:

23 07 16.13.A. Evaporator fan compartment:

1. Interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, minimum 1 1/2 lb density, flexible fiberglass insulation bonded with a phenolic binder, neoprene coated on the air side.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 07 16.13.B. Gas heat compartment:

1. Aluminum foil-faced fiberglass insulation shall be used.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

23 09 13	Instrumentation and Control Devices for HVAC
-----------------	---

23 09 13.23 Sensors and Transmitters

23 09 13.23.A. Thermostats

1. Thermostat must
 - a. energize both "W" and "G" when calling for heat.
 - b. have capability to energize 2 different stages of cooling, and 2 different stages of heating.
 - c. include capability for occupancy scheduling.

23 09 23	Direct-digital Control system for HVAC
-----------------	---

23 09 23.13 Decentralized, Rooftop Units:

23 09 23.13.A. PremierLink controller

1. Shall be ASHRAE 62-2001 compliant.
2. Shall accept 18-32 VAC input power.
3. Shall have an operating temperature range from -40°F (-40°C) to 158°F (70°C), 10% - 95% RH (non-condensing).
4. Shall include an integrated economizer controller to support an economizer with 4 to 20 mA actuator input and no microprocessor controller.
5. Controller shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, indoor relative humidity, compressor lock-out, fire shutdown, enthalpy, fan status, remote time clock/door switch.
6. Shall accept a CO₂ sensor in the conditioned space, and be Demand Control Ventilation (DCV) ready.
7. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, heat stage 3/ exhaust/ reversing valve/ dehumidify/ occupied.
8. Unit shall provide surge protection for the controller through a circuit breaker.
9. Shall be Internet capable, and communicate at a Baud rate of 38.4K or faster
10. Shall have an LED display independently showing the status of activity on the communication bus, and processor operation.
11. Shall include an EIA-485 protocol communication port, an access port for connection of either a computer or a Carrier technician tool, an EIA-485 port for network communication to intelligent space sensors and displays, and a port to connect an optional LonWorks plug-in communications card.
12. Shall have built-in Carrier Comfort Network™ (CCN) protocol, and be compatible with other CCN devices, including ComfortLink™ and ComfortVIEW™ controllers.
13. Shall have built-in support for Carrier technician tool.

14. Software upgrades will be accomplished by local download. Software upgrades through chip replacements are not allowed.
15. Shall be shock resistant in all planes to 5G peak, 11ms during operation, and 100G peak, 11ms during storage.
16. Shall be vibration resistant in all planes to 1.5G @ 20–300 Hz.
17. Shall support a bus length of 4000 ft (1219m) max, 60 devices per 1000 ft (305m) section, and 1 RS-485 repeater per 1000 ft (305m) sections.

23 09 23.13.B. RTU Open - Open protocol, direct digital controller:

1. Shall be ASHRAE 62–2001 compliant.
2. Shall accept 18–30VAC, 50–60Hz, and consumer 15VA or less power.
3. Shall have an operating temperature range from –40°F (–40°C) to 130°F (54°C), 10% - 90% RH (non-condensing).
4. Shall include built-in protocol for BACNET (MS/TP and PTP modes), Modbus (RTU and ASCII), Johnson N2 and LonWorks. LonWorks Echelon processor required for all Lon applications shall be contained in separate communication board.
5. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers.
6. Baud rate Controller shall be selectable using a dipswitch.
7. Shall have an LED display independently showing the status of serial communication, running, errors, power, all digital outputs, and all analog inputs.
8. Shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, compressor lock-out, fire shutdown, enthalpy switch, and fan status/filter status/humidity/ remote occupancy.
9. Shall provide the following outputs: economizer, variable frequency drive, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, exhaust reversing valve/high fan speed.
10. Shall have built-in surge protection circuitry through solid state polyswitches. Polyswitches shall be used on incoming power and network connections. Polyswitches will return to normal when the “trip” condition clears.
11. Shall have a battery back-up capable of a minimum of 10,000 hours of data and time clock retention during power outages.
12. Shall have built-in support for Carrier technician tool.
13. Shall include an EIA-485 protocol communication port, an access port for connection of either a computer or a Carrier technician tool, an EIA-485 port for network communication to intelligent space sensors and displays, and a port to connect an optional LonWorks communications card.
14. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.

23 09 33 Electric and Electronic Control System for HVAC

23 09 33.13 Decentralized, Rooftop Units:

23 09 33.13.A. General:

1. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 75VA capability.
2. Shall utilize color-coded wiring.
3. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, gas controller, economizer, thermostat, DDC control options, and low and high pressure switches.
4. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor. See heat exchanger section of this specification.
5. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.

23 09 33.23.B. Safeties:

1. Compressor over-temperature, over-current. High internal pressure differential.
2. Low pressure switch.
 - a. Units with 2 compressors shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
 - b. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.

3. High pressure switch.
 - a. Units with 2 compressors shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
 - b. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
4. Automatic reset, motor thermal overload protector.
5. Heating section shall be provided with the following minimum protections:
 - a. High temperature limit switches.
 - b. Induced draft motor speed sensor.
 - c. Flame rollout switch.
 - d. Flame proving controls.

23 09 93 Sequence of Operations for HVAC Controls

23 09 93.13 Decentralized, Rooftop Units:

23 09 93.13 INSERT SEQUENCE OF OPERATION

23 40 13 Panel Air Filters

23 40 13.13 Decentralized, Rooftop Units:

23 40 13.13.A. Standard filter section

1. Shall consist of factory installed, low velocity, disposable 2-in. thick fiberglass filters of commercially available sizes.
2. Unit shall use only one filter size. Multiple sizes are not acceptable.
3. Filters shall be accessible through an access panel with “no-tool” removal as described in the unit cabinet section of this specification (23 81 19.13.H).

23 81 19 Self-Contained Air Conditioners

23 81 19.13 Small-Capacity Self-Contained Air Conditioners (48TC**04-16)

23 81 19.13.A. General

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic scroll compressor(s) for cooling duty and gas combustion for heating duty.
2. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
3. Unit shall use environmentally sound, Puron refrigerant.
4. Unit shall be installed in accordance with the manufacturer’s instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

23 81 19.13.B. Quality Assurance

1. Unit meets ASHRAE 90.1 minimum efficiency requirements.
2. Unit shall be rated in accordance with AHRI Standards 210/240 and 340/360.
3. Unit shall be designed to conform to ASHRAE 15, 2001.
4. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.
5. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
6. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
7. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 5000-hour salt spray.
8. Unit shall be designed in accordance with ISO 9001, and shall be manufactured in a facility registered by ISO 9001.
9. Roof curb shall be designed to conform to NRCA Standards.
10. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.
11. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain.
12. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
13. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.
14. High Efficient Motors listed shall meet section 313 of the Energy Independence and Security Act of 2007 (EISA 2007)

23 81 19.13.C. Delivery, Storage, and Handling

1. Unit shall be stored and handled per manufacturer's recommendations.
2. Lifted by crane requires either shipping top panel or spreader bars.
3. Unit shall only be stored or positioned in the upright position.

23 81 19.13.E. Project Conditions

1. As specified in the contract.

23 81 19.13.F. Operating Characteristics

1. Unit shall be capable of starting and running at 115°F (46°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 340/360 at ± 10% voltage.
2. Compressor with standard controls shall be capable of operation down to 40°F (4°C), ambient outdoor temperatures. Accessory winter start kit is necessary if mechanically cooling at ambient temperatures down to 25°F (-4°C).
3. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
4. Unit shall be factory configured for vertical supply & return configurations.
5. Unit shall be field convertible from vertical to horizontal airflow on all models. No special kit required on 04-14 models. Supply duct kit required for 16 size model only.
6. Unit shall be capable of mixed operation: vertical supply with horizontal return or horizontal supply with vertical return.

23 81 19.13.G. Electrical Requirements

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

23 81 19.13.H. Unit Cabinet

1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
2. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60°F / 16°C): 60, Hardness: H-2H Pencil hardness.
3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210/240 or 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
4. Base of unit shall have a minimum of four locations for thru-the-base gas and electrical connections (factory installed or field installed), standard.
5. Base Rail
 - a. Unit shall have base rails on a minimum of 2 sides.
 - b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
 - c. Holes shall be provided in the base rail for moving the rooftop by fork truck.
 - d. Base rail shall be a minimum of 16 gauge thickness.
6. Condensate pan and connections:
 - a. Shall be a sloped condensate drain pan made of a non-corrosive material.
 - b. Shall comply with ASHRAE Standard 62.
 - c. Shall use a 3/4" -14 NPT drain connection, possible either through the bottom or side of the drain pan. Connection shall be made per manufacturer's recommendations.
7. Top panel:
 - a. Shall be a single piece top panel on 04 thru 12 sizes, two piece on 14 and 16 sizes.
8. Gas Connections:
 - a. All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on side of unit (horizontal plane).
 - b. Thru-the-base capability
 - (1.) Standard unit shall have a thru-the-base gas-line location using a raised, embossed portion of the unit basepan.
 - (2.) Optional, factory approved, water-tight connection method must be used for thru-the-base gas connections.
 - (3.) No basepan penetration, other than those authorized by the manufacturer, is permitted.
9. Electrical Connections
 - a. All unit power wiring shall enter unit cabinet at a single, factory prepared, knockout location.

- b. Thru-the-base capability.
 - (1.) Standard unit shall have a thru-the-base electrical location(s) using a raised, embossed portion of the unit basepan.
 - (2.) Optional, factory approved, water-tight connection method must be used for thru-the-base electrical connections.
 - (3.) No basepan penetration, other than those authorized by the manufacturer, is permitted.
- 10. Component access panels (standard)
 - a. Cabinet panels shall be easily removable for servicing.
 - b. Unit shall have one factory installed, tool-less, removable, filter access panel.
 - c. Panels covering control box, indoor fan, indoor fan motor, gas components (where applicable), and compressors shall have molded composite handles.
 - d. Handles shall be UV modified, composite. They shall be permanently attached, and recessed into the panel.
 - e. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.
 - f. Collars shall be removable and easily replaceable using manufacturer recommended parts.

23 81 19.13.I. Gas Heat

- 1. General
 - a. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
 - b. Shall incorporate a direct-spark ignition system and redundant main gas valve.
 - c. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.
- 2. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor.
 - a. IGC board shall notify users of fault using an LED (light-emitting diode).
 - b. The LED shall be visible without removing the control box access panel.
 - c. IGC board shall contain algorithms that modify evaporator fan operation to prevent future cycling on high temperature limit switch.
 - d. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high temperature limit switch. Fault indication shall be made using an LED.
- 3. Standard Heat Exchanger construction
 - a. Heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gauge steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
 - b. Burners shall be of the in-shot type constructed of aluminum-coated steel.
 - c. Burners shall incorporate orifices for rated heat output up to 2000 ft (610m) elevation. Additional accessory kits may be required for applications above 2000 ft (610m) elevation, depending on local gas supply conditions.
 - d. Each heat exchanger tube shall contain multiple dimples for increased heating effectiveness.
- 4. Optional Stainless Steel Heat Exchanger construction
 - a. Use energy saving, direct-spark ignition system.
 - b. Use a redundant main gas valve.
 - c. Burners shall be of the in-shot type constructed of aluminum-coated steel.
 - d. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
 - e. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20-gauge type 409 stainless steel.
 - f. Type 409 stainless steel shall be used in heat exchanger tubes and vestibule plate.
 - g. Complete stainless steel heat exchanger allows for greater application flexibility.
- 5. Optional Low NO_x Heat Exchanger construction
 - a. Low NO_x reduction shall be provided to reduce nitrous oxide emissions to meet California's Air Quality Management District (SCAQMD) low-NO_x emissions requirement of 40 nanograms per joule or less.
 - b. Primary tubes and vestibule plates on low NO_x units shall be 409 stainless steel. Other components shall be aluminized steel.
- 6. Induced draft combustion motor and blower
 - a. Shall be a direct-drive, single inlet, forward-curved centrifugal type.
 - b. Shall be made from steel with a corrosion-resistant finish.
 - c. Shall have permanently lubricated sealed bearings.
 - d. Shall have inherent thermal overload protection.

- e. Shall have an automatic reset feature.

23 81 19.13.J. Coils

1. Standard Aluminum Fin – Copper Tube Coils:
 - a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
 - b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
 - c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
2. Optional Pre-coated aluminum-fin condenser coils (3 Phase Models Only):
 - a. Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments.
 - b. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.
 - c. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
3. Optional Copper-fin evaporator and condenser coils (3 Phase Models Only):
 - a. Shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets.
 - b. Galvanized steel tube sheets shall not be acceptable.
 - c. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan.
4. Optional E-coated aluminum-fin evaporator and condenser coils (3 Phase Models Only):
 - a. Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins.
 - b. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.
 - c. Color shall be high gloss black with gloss per ASTM D523-89.
 - d. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges.
 - e. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93.
 - f. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93).
 - g. Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92).
 - h. Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.
5. Standard All Aluminum Novation Coils:
 - a. Standard condenser coils shall have all aluminum NOVATION Heat Exchanger Technology design consisting of aluminum multi port flat tube design and aluminum fin. Coils shall be a furnace brazed design and contain epoxy lined shrink wrap on all aluminum to copper connections.
 - b. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
6. Optional E-coated aluminum-fin, aluminum tube condenser coils:
 - a. Shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers.
 - b. Coating process shall ensure complete coil encapsulation, including all exposed fin edges.
 - c. E-coat thickness of 0.8 to 1.2 mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided.
 - d. Shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02.
 - e. Shall have superior impact resistance with no cracking, chipping or peeling per NSF/ANSI 51-2002 Method 10.2.

23 81 19.13.K. Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
 - a. Fixed orifice metering system shall prevent mal-distribution of two-phase refrigerant by including multiple fixed orifice devices in each refrigeration circuit. Each orifice is to be optimized to the coil circuit it serves.
 - b. Refrigerant filter drier – Solid core design.
 - c. Service gauge connections on suction and discharge lines.
 - d. Pressure gauge access through a specially designed access port in the top panel of the unit.

2. There shall be gauge line access port in the skin of the rooftop, covered by a black, removable plug.
 - a. The plug shall be easy to remove and replace.
 - b. When the plug is removed, the gauge access port shall enable maintenance personnel to route their pressure gauge lines.
 - c. This gauge access port shall facilitate correct and accurate condenser pressure readings by enabling the reading with the compressor access panel on.
 - d. The plug shall be made of a leak proof, UV-resistant, composite material.
3. Compressors
 - a. Unit shall use fully hermetic, scroll compressor for each independent refrigeration circuit.
 - b. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
 - c. Compressors shall be internally protected from high discharge temperature conditions.
 - d. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
 - e. Compressor shall be factory mounted on rubber grommets.
 - f. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
 - g. Crankcase heaters shall not be required for normal operating range, unless required by compressor manufacturer due to refrigerant charge limits.

23 81 19.13.L. Filter Section

1. Filters access is specified in the unit cabinet section of this specification.
2. Filters shall be held in place by a pivoting filter tray, facilitating easy removal and installation.
3. Shall consist of factory installed, low velocity, throw-away 2-in. thick fiberglass filters.
4. Filters shall be standard, commercially available sizes.
5. Only one size filter per unit is allowed.

23 81 19.13.M. Evaporator Fan and Motor

1. Evaporator fan motor:
 - a. Shall have permanently lubricated bearings.
 - b. Shall have inherent automatic-reset thermal overload protection or circuit breaker.
 - c. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.
2. Belt-driven Evaporator Fan:
 - a. Belt drive shall include an adjustable pitch motor pulley.
 - b. Shall use sealed, permanently lubricated ball-bearing type.
 - c. Blower fan shall be double-inlet type with forward-curved blades.
 - d. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

23 81 19.13.N. Condenser Fans and Motors

1. Condenser fan motors:
 - a. Shall be a totally enclosed motor.
 - b. Shall use permanently lubricated bearings.
 - c. Shall have inherent thermal overload protection with an automatic reset feature.
 - d. Shall use a shaft-down design on 04 to 12 and 16 models and shaft-up on 14 size with rain shield.
2. Condenser Fans:
 - a. Shall be a direct-driven propeller type fan.
 - b. Shall have galvalum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

23 81 19.13.O. Special Features Options and Accessories

1. Staged Air Volume System (SAV) for 2-stage cooling models only:
 - a. Evaporator fan motor:
 - (1.) Shall have permanently lubricated bearings.
 - (2.) Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating.
 - (3.) Shall be Variable Frequency duty and 2-speed control.
 - (4.) Shall contain motor shaft grounding ring to prevent electrical bearing fluting damage by safely diverting harmful shaft voltages and bearing currents to ground.

2. Variable Frequency Drive (VFD). Only available on 2-speed indoor fan motor option (SAV):
 - a. Shall be installed inside the unit cabinet, mounted, wired and tested.
 - b. Shall contain Electromagnetic Interference (EMI) frequency protection.
 - c. Insulated Gate Bi-Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
 - d. Self diagnostics with fault and power code LED indicator. Field accessory Display Kit available for further diagnostics and special setup applications.
 - e. RS485 capability standard.
 - f. Electronic thermal overload protection.
 - g. 5% swinging chokes for harmonic reduction and improved power factor.
 - h. All printed circuit boards shall be conformal coated.
3. Standard Integrated Economizers (Factory installed on 3 Phase Models Only. Field installed on all 3 and 1 Phase Models):
 - a. Integrated, gear-driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.
 - b. Independent modules for vertical or horizontal return configurations shall be available. Vertical return modules shall be available as a factory installed option.
 - c. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable.
 - d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.
 - e. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
 - f. Standard models shall be equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential. Economizer controller on electromechanical units shall be Honeywell W7212 that provides:
 - (1.) Combined minimum and DCV maximum damper position potentiometers with compressor staging relay.
 - (2.) Functions with solid state analog enthalpy or dry bulb changeover control sensing.
 - (3.) Contain LED indicates for:
 - when free cooling is available
 - when module is in DCV mode
 - when exhaust fan contact is closed
 - g. Ultra low leak EconoMi\$er X system shall be available on models with SAV 2-speed Variable Frequency Drive (VFD) systems. Only available on 2-speed indoor fan motor systems with electromechanical controls or RTU Open.
 - (1.) Maximum damper leakage rate to be equal to or less than 4.0 cfm/sq. ft. at 1.0 in. w.g., meeting or exceeding ASHRAE 90.1 requirements. Economizer controller on electromechanical units shall be Honeywell W7220 that provides:
 - (2.) 2-line LCD interface screen for setup, configuration and troubleshooting
 - (3.) On-board fault detection and diagnostics
 - (4.) Sensor failure loss of communication identification
 - (5.) Automatic sensor detection
 - (6.) Capabilities for use with multiple-speed indoor fan systems
 - (7.) Utilize digital sensors: Dry bulb and Enthalpy
 - h. Shall be capable of introducing up to 100% outdoor air.
 - i. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
 - j. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
 - k. Dry bulb outdoor air temperature sensor shall be provided as standard. Outdoor air sensor setpoint shall be adjustable and shall range from 40 to 100°F / 4 to 38°C. Additional sensor options shall be available as accessories.
 - l. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.
 - m. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy. A remote potentiometer may be used to override the damper setpoint.

- n. Dampers shall be completely closed when the unit is in the unoccupied mode.
 - o. Economizer controller shall accept a 2-10 Vdc CO₂ sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
 - p. Compressor lockout sensor shall open at 35°F (2°C) and close closes at 50°F (10°C).
 - q. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
 - r. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
4. Two-Position Damper (Factory installed on 3 Phase Models Only. Field installed on all 3 and 1 Phase Models)
 - a. Damper shall be a Two-Position Damper. Damper travel shall be from the full closed position to the field adjustable %-open setpoint.
 - b. Damper shall include adjustable damper travel from 25% to 100% (full open).
 - c. Damper shall include single or dual blade, gear driven dampers and actuator motor.
 - d. Actuator shall be direct coupled to damper gear. No linkage arms or control rods shall be acceptable.
 - e. Damper will admit up to 100% outdoor air for applicable rooftop units.
 - f. Damper shall close upon indoor (evaporator) fan shutoff and/or loss of power.
 - g. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.
 - h. Outside air hood shall include aluminum water entrainment filter.
 5. Manual damper
 - a. Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to admit up to 25 or 50% outdoor air for year round ventilation.
 6. Humidi-MiZer Adaptive Dehumidification System (3 Phase Models Only):
 - a. The Humidi-MiZer Adaptive Dehumidification System shall be factory installed in single stage 48TC04-07 and 2-stage 48TC08-16 models with RTPF (round tube plate tin) condenser coils, and shall provide greater dehumidification of the occupied space by two modes of dehumidification operations in addition to its normal design cooling mode:
 - (1.) Subcooling mode further sub cools the hot liquid refrigerant leaving the condenser coil when both temperature and humidity in the space are not satisfied.
 - (2.) Hot gas reheat mode shall mix a portion of the hot gas from the discharge of the compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, resulting in a neutral leaving air temperature when only humidity in the space is not satisfied.
 - (3.) Includes head pressure controller.
 7. Head Pressure Control Package
 - a. Controller shall control coil head pressure by condenser fan speed modulation or condenser fan cycling and wind baffles.
 - b. Shall consist of solid-state control and condenser coil temperature sensor to maintain condensing temperature between 90°F (32°C) and 110°F (43°C) at outdoor ambient temperatures down to -20°F (-29°C).
 8. Propane Conversion Kit
 - a. Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane, up to 2000 ft (610m) elevation.
 - b. Additional accessory kits may be required for applications above 2000 ft (610m) elevation.
 9. Flue Shield (04-14 sizes only)
 - a. Flue shield shall provide protection from the hot sides of the gas flue hood.
 10. Condenser Coil Hail Guard Assembly (Factory installed on 3 Phase Models Only. Field installed on all 3 and 1 Phase Models)
 - a. Shall protect against damage from hail.
 - b. Shall be either hood style or louvered.
 11. Unit-Mounted, Non-Fused Disconnect Switch (Available on units with MOCPS of 80 amps or less):
 - a. Switch shall be factory installed, internally mounted.
 - b. National Electric Code (NEC) and UL approved non-fused switch shall provide unit power shutoff.
 - c. Shall be accessible from outside the unit.
 - d. Shall provide local shutdown and lockout capability.
 12. Convenience Outlet:
 - a. Powered convenience outlet. (3 Phase Models Only)
 - (1.) Outlet shall be powered from main line power to the rooftop unit.

- (2.) Outlet shall be powered from line side or load side of disconnect by installing contractor, as required by code. If outlet is powered from load side of disconnect, unit electrical ratings shall be UL certified and rated for additional outlet amperage.
 - (3.) Outlet shall be factory installed and internally mounted with easily accessible 115-v female receptacle.
 - (4.) Outlet shall include 15 amp GFI receptacles with independent fuse protection.
 - (5.) Voltage required to operate convenience outlet shall be provided by a factory installed step-down transformer.
 - (6.) Outlet shall be accessible from outside the unit.
 - (7.) Outlet shall include a field installed "Wet in Use" cover.
- b. Non-Powered convenience outlet.
 - (1.) Outlet shall be powered from a separate 115/120v power source.
 - (2.) A transformer shall not be included.
 - (3.) Outlet shall be factory installed and internally mounted with easily accessible 115-v female receptacle.
 - (4.) Outlet shall include 15 amp GFI receptacles with independent fuse protection.
 - (5.) Outlet shall be accessible from outside the unit.
 - (6.) Outlet shall include a field installed "Wet in Use" cover.
- 13. Flue Discharge Deflector (04-14 sizes only):
 - a. Flue discharge deflector shall direct unit exhaust vertically instead of horizontally.
 - b. Deflector shall be defined as a "natural draft" device by the National Fuel and Gas (NFG) code.
- 14. Thru-the-Base Connectors:
 - a. Kits shall provide connectors to permit gas and electrical connections to be brought to the unit through the unit basepan.
 - b. Minimum of four connection locations per unit.
- 15. Supply Duct Cover: (16 size only.)
 - a. Required when field converting the factory standard vertical duct supply to horizontal duct supply configuration. One required per unit.
- 16. Propeller Power Exhaust:
 - a. Power exhaust shall be used in conjunction with an integrated economizer.
 - b. Independent modules for vertical or horizontal return configurations shall be available.
 - c. Horizontal power exhaust is shall be mounted in return ductwork.
 - d. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0-100% adjustable setpoint on the economizer control.
- 17. Roof Curbs (Vertical):
 - a. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
 - b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
 - c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
- 18. High Altitude Gas Conversion Kit:
 - a. Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit to operate from 2000-7000 ft (610 to 2134m) elevation with natural gas or from 0-7000 ft (90-2134m) elevation with liquefied propane.
- 19. Outdoor Air Enthalpy Sensor:
 - a. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.
- 20. Return Air Enthalpy Sensor:
 - a. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.
- 21. Indoor Air Quality (CO₂) Sensor:
 - a. Shall be able to provide demand ventilation indoor air quality (IAQ) control.
 - b. The IAQ sensor shall be available in duct mount, wall mount, or wall mount with LED display. The set-point shall have adjustment capability.
- 22. Smoke detectors (factory installed only):
 - a. Shall be a Four-Wire Controller and Detector.
 - b. Shall be environmental compensated with differential sensing for reliable, stable, and drift-free sensitivity.

- c. Shall use magnet-activated test/reset sensor switches.
- d. Shall have tool-less connection terminal access.
- e. Shall have a recessed momentary switch for testing and resetting the detector.
- f. Controller shall include:
 - (1.) One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel.
 - (2.) Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment.
 - (3.) One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
 - (4.) Capable of direct connection to two individual detector modules.
 - (5.) Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications
- 23. Winter start kit
 - a. Shall contain a bypass device around the low pressure switch.
 - b. Shall be required when mechanical cooling is required down to 25°F (-4°C).
 - c. Shall not be required to operate on an economizer when below an outdoor ambient of 40°F (4°C).
- 24. Time Guard
 - a. Shall prevent compressor short-cycling by providing a 5-minute delay (±2 minutes) before restarting a compressor after shutdown for any reason.
 - b. One device shall be required per compressor.
- 25. Disconnect Switch Bracket (16 size only)
 - a. Provides a pre-engineered and sized mounting bracket for applications requiring a unit mounted fused and non-fused disconnect of greater than 100 amps. Bracket assures that no damage will occur to coils when mounting with screws and other fasteners.
- 26. California OSHPD Seismic Certification Label
 - a. Units meet the seismic capacity requirements of the International Code Council Evaluation Service (ICC-ES) document AC156 (Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems) and per International Building Code (IBC 2009) at an SDS (g) value of 2.00 z/h=1.0, Ip=1.5 and certified by independent structural engineers.
 - b. Units shall include a certification label that meets the CA OSHPD Special Seismic Certification pre-approval labeling requirements on the external chassis of the unit.
- 27. Hinged Access Panels
 - a. Shall provide easy access through integrated quarter turn latches.
 - b. Shall be on major panels of: filter, control box, fan motor, and compressor.
- 28. Display Kit for Variable Frequency Drive
 - a. Kit allows the ability to access the VFD controller programs to provide special setup capabilities and diagnostics.
 - b. Kit contains display module, mounting bracket and communication cable.
 - c. Display Kit can be permanently installed in the unit or used on any SAV system VFD controller as needed.

Unit Report For 6 ton

Project: ~Untitled5
Prepared By:

12/03/2012
05:06PM

Unit Parameters

Unit Model:.....48TCEA07A2A6-0A2C0
Unit Size:.....07 (6 Tons)
Volts-Phase-Hertz:.....460-3-60
Heating Type:.....Gas
Duct Cfg:.....Vertical Supply / Vertical Return
Medium Heat
Round Tube Plate Fin Coils

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length:.....6' 2.375"
Unit Width:.....3' 8"
Unit Height:.....3' 5.375"
*** Total Operating Weight:.....721 lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Gas Line Size:.....1/2
Condensate Drain Line Size:.....3/4
Return Air Filter Type:.....Throwaway
Return Air Filter Quantity:.....4
Return Air Filter Size:.....16 x 16 x 2

Unit Configuration

Medium Static Option
Al/Cu - Al/Cu
Base Electromechanical Controls
Powered Convenience Outlet
Non-Fused Disconnect
Standard Packaging

Warranty Information

1-Year parts(std.)
5-Year compressor parts(std.)
10-Year heat exchanger - Aluminized(std.)

No optional warranties were selected.

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

Ordering Information

Part Number	Description	Quantity
48TCEA07A2A6-0A2C0	Rooftop Unit	1
	Base Unit	
	Medium Static Option	
	Powered Convenience Outlet	
	Electromechanical control, No intake or exhaust option	
	Non-Fused Disconnect	

Performance Summary For 6 ton

Project: ~Untitled5
Prepared By:

12/03/2012
05:06PM

Part Number:48TCEA07A2A6-0A2C0

ARI EER: 11.00
IEER: 11.2

Base Unit Dimensions

Unit Length: 74.4 in
Unit Width: 44.0 in
Unit Height: 41.4 in

Operating Weight

Base Unit Weight: 652 lb
Medium Heat: 9 lb
Medium Static Option: 10 lb
Powered Convenience Outlet: 35 lb
Non-Fused Disconnect: 15 lb

Total Operating Weight: 721 lb

Unit

Unit Voltage-Phase-Hertz: 460-3-60
Air Discharge: Vertical
Fan Drive Type: Belt
Actual Airflow: 2100 CFM
Site Altitude: 0 ft

Cooling Performance

Condenser Entering Air DB: 95.0 F
Evaporator Entering Air DB: 80.0 F
Evaporator Entering Air WB: 67.0 F
Entering Air Enthalpy: 31.44 BTU/lb
Evaporator Leaving Air DB: 56.0 F
Evaporator Leaving Air WB: 55.8 F
Evaporator Leaving Air Enthalpy: 23.64 BTU/lb
Gross Cooling Capacity: 73.68 MBH
Gross Sensible Capacity: 54.42 MBH
Compressor Power Input: 5.10 kW
Coil Bypass Factor: 0.070

Heating Performance

Heating Airflow: 2100 CFM
Entering Air Temp: 70.0 F
Leaving Air Temp: 111.0 F
Gas Input Capacity: 115.0 MBH
Gas Heating Capacity: 93.00 MBH
Temperature Rise: 41.0 F

Supply Fan

External Static Pressure: 1.00 in wg
Fan RPM: 1432
Fan Power: 1.71 BHP
NOTE: Selected IFM RPM Range: 1173 - 1518

Electrical Data (Before July 30, 2012)

Minimum Voltage: 414
Maximum Voltage: 506
Compressor #1 RLA: 9.7
Compressor #1 LRA: 62
Outdoor Fan Motor Qty: 1
Outdoor Fan FLA (ea): 0.8
Indoor Fan Motor Type: MED

Performance Summary For 6 ton

Project: ~Untitled5
Prepared By:

12/03/2012
05:06PM

Indoor Fan Motor FLA:.....**3.4**
Combustion Fan Motor FLA (ea):.....**0.25**
Power Supply MCA:.....**19**
Power Supply MOCP (Fuse or HACR):.....**25**
Min. Unit Disconnect FLA:.....**19**
Min. Unit Disconnect LRA:.....**94**
Electrical Convenience Outlet:.....**Yes**
NOTE: Convenience outlet must be field connected to the line/load side of the unit disconnect per local code.

Electrical Data (July 30, 2012 and Beyond)

Indoor Fan Motor FLA:.....**4.2**
Power Supply MCA:.....**20**
Power Supply MOCP:.....**25**
Disconnect Size FLA:.....**19**
Disconnect Size LRA:.....**102**

July 30th and beyond units can be identified by serial number 3112XXXXXXXXXX and higher

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

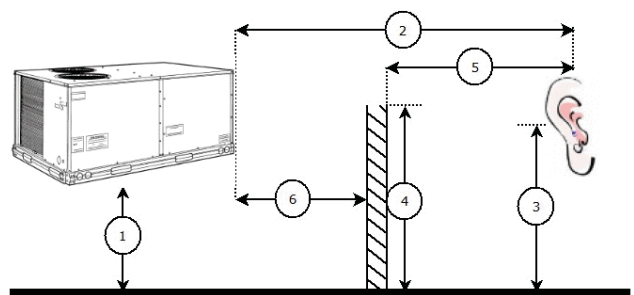
Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	89.5	88.4	88.8
125 Hz	84.7	81.9	81.8
250 Hz	78.4	69.5	76.9
500 Hz	74.0	66.0	74.4
1000 Hz	70.2	65.2	73.3
2000 Hz	64.9	59.6	69.8
4000 Hz	66.8	55.4	66.3
8000 Hz	62.6	48.8	62.7
A-Weighted	77.2	71.3	78.0

Advanced Acoustics

Advanced Accoustics Parameters

1. Unit height above ground:.....**30.0** ft
2. Horizontal distance from unit to receiver:.....**50.0** ft
3. Receiver height above ground:.....**5.7** ft
4. Height of obstruction:.....**0.0** ft
5. Horizontal distance from obstruction to receiver:.....**0.0** ft
6. Horizontal distance from unit to obstruction:.....**0.0** ft



Detailed Acoustics Information

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
1. Sound Power Levels at Unit's Acoustic Center, Lw	88.8	81.8	76.9	74.4	73.3	69.8	66.3	62.7	90.1 Lw
2. A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA	62.6	65.7	68.3	71.2	73.3	71.0	67.3	61.6	78.2 LwA
3. Sound Pressure Levels at Specific Distance from Unit, Lp	56.4	49.4	44.5	42.0	40.9	37.4	33.9	30.3	57.7 Lp
4. A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA	30.2	33.3	35.9	38.8	40.9	38.6	34.9	29.2	45.8 LpA

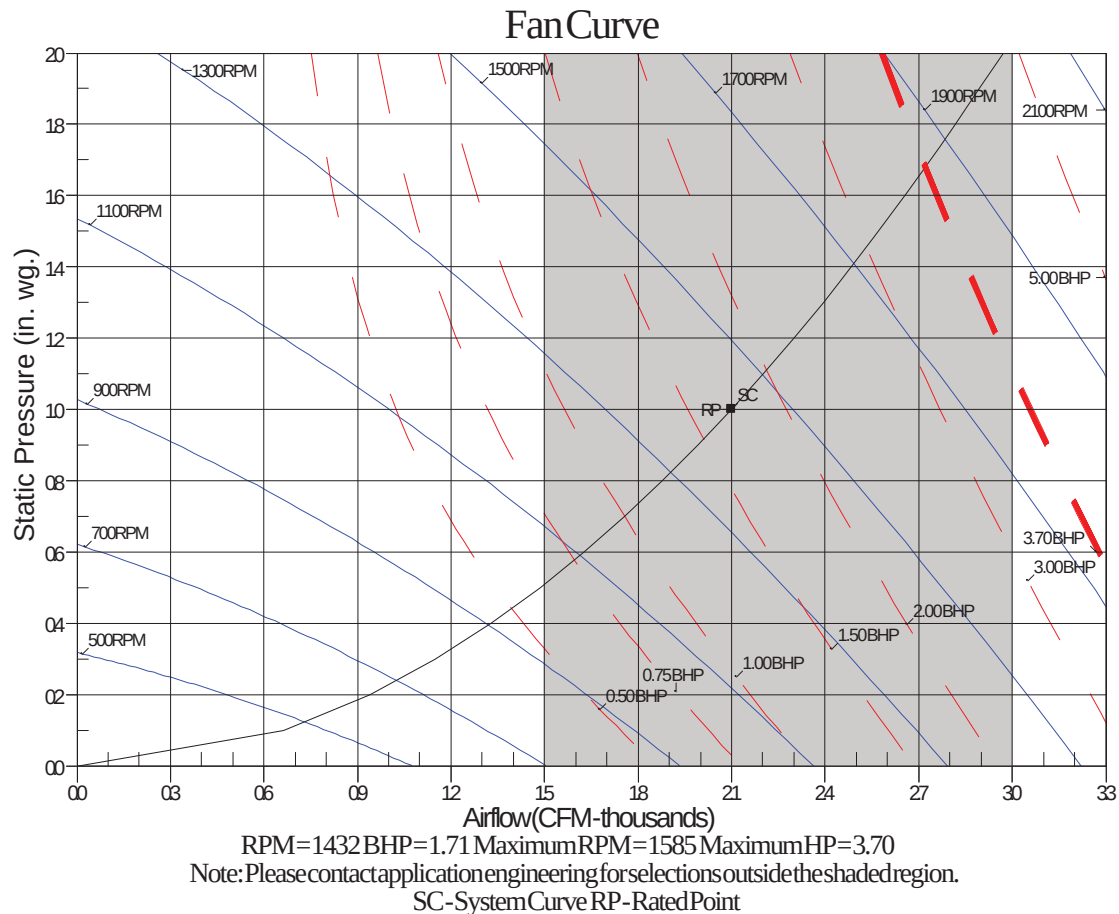
Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI

Performance Summary For 6 ton

Project: ~Untitled5
Prepared By:

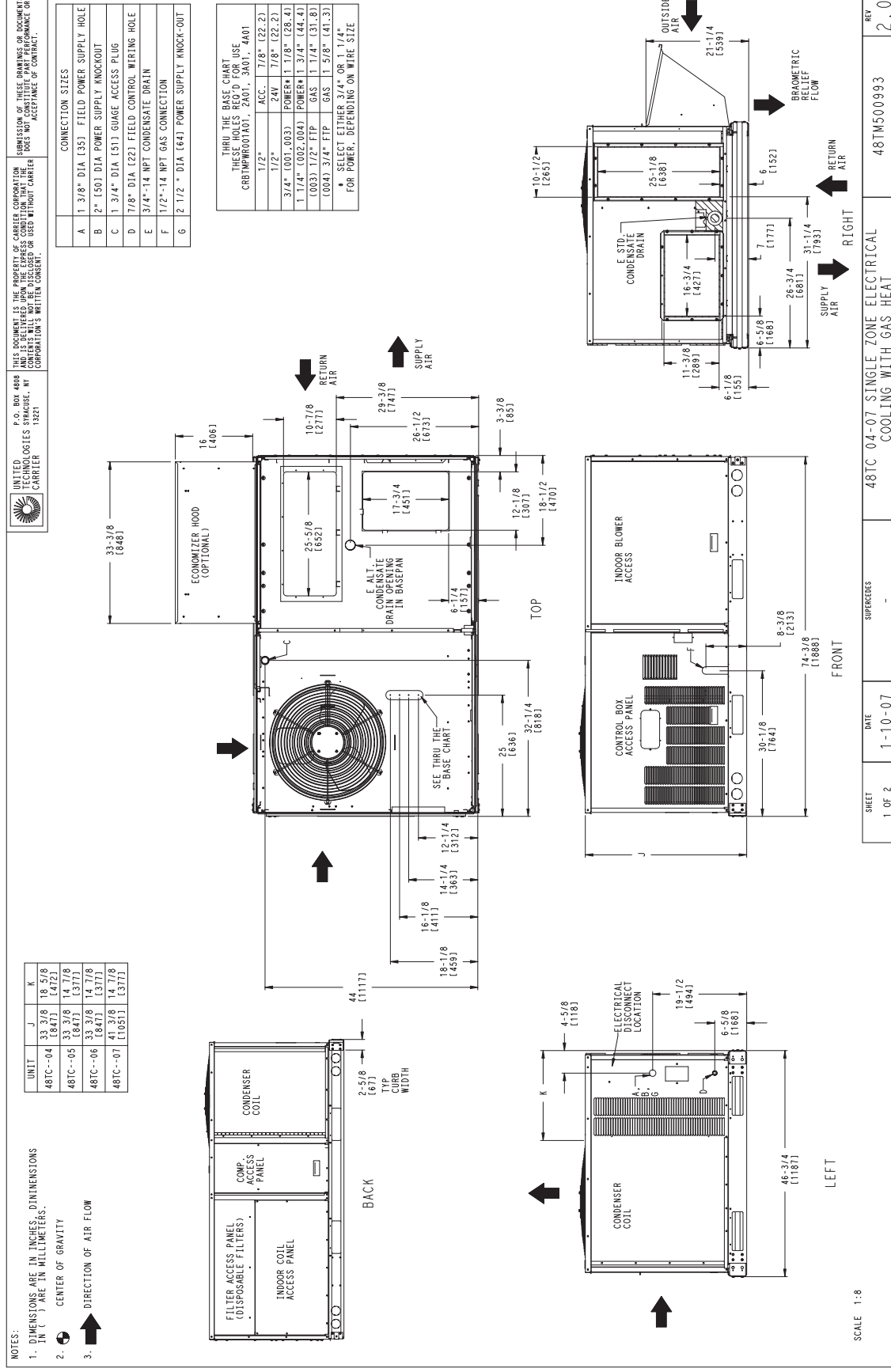
12/03/2012
05:06PM

Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



Project: ~Untitled5
Prepared By:

12/03/2012 05:06PM



Project: ~Untitled5 Prepared By:	Certified Drawing for 6 ton	12/03/2012 05:06PM
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12/03/2012

05:06PM

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TECHNOLOGIES
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UNIT	STD. UNIT WEIGHT	CORNER WEIGHT (A)	CORNER WEIGHT (B)	CORNER WEIGHT (C)	CORNER WEIGHT (D)	C.G.	HEIGHT										
	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z								
48TC--04	483	219	111	50	125	57	131	59	116	53	39	[991]	[23	[584]	16	3/8	[416]
48TC--05	537	244	124	56	139	63	145	66	129	59	39	[991]	[23	[584]	17	1/4	[432]
48TC--06	569	258	131	59	147	67	154	70	137	62	39	[991]	[23	[584]	17	1/4	[438]
48TC--07	652	296	150	68	169	76	176	80	157	71	39	[991]	[23	[584]	20	1/8	[511]

CORNER A

CORNER B

CORNER C

CORNER D

Y

X

Z

TOP

BACK

48TC 04-07 SINGLE ZONE ELECTRICAL
COOLING WITH GAS HEAT

48TM500993

2.0

SCALE

5:32

SHEET

2 OF 2

DATE

1-10-07

SUPERCEDS

-

REV

2.0



194 Merrow Road
Auburn, Maine 04210
Phone [207] 782-0727

Fax [207] 784-9816
www.nasonmechanical.com

Landry/French Construction
68 Mussey Road
Scarborough, ME 04074
Attn: Mason Rowell

March 6, 2013

Re: Allagash Brewery 6 Ton A/C unit warranty

Mason:

To help provide temporary heat, we started the gas-fired 6 ton rooftop unit at Allagash brewery on March 5, 2013. We have taken the proper safeguards to protect our equipment, but because the A/C unit is essentially serving a construction zone, Nason Mechanical Systems cannot be held responsible if the unit is compromised as a result of construction activity. Let this letter represent the start of our One Year Parts and Labor Warranty for the heating and blower portion of the 6 ton air handler serving the new retail area. The warranty will begin on March 5, 2013 and will terminate on March 5, 2014. The warranty for the cooling portion of the air handler will commence when we are able to do a full startup at a later date.

If you have any questions or concerns, please feel free to give me a call

Sincerely,

A handwritten signature in black ink, appearing to read 'Mark Morin', is written over the typed name and title.

Mark Morin
Project Engineer

Cc. Rick Murphy, Nason Mechanical Systems

Supplemental Manual: Complete Wiring Schematics for RenewAire ERV Models with Factory-Installed Optional Dampers and Variable Frequency Drives

Purpose of this Manual: Installation and Operation Manuals for individual RenewAire ERV models include Wiring Schematics only for the basic units. When these models are fitted with factory-installed Dampers and/or Variable Frequency Drives, the wiring schematics are found in this Manual.

⚠ WARNING

RISK OF FIRE, ELECTRIC SHOCK, OR INJURY. OBSERVE ALL CODES AND THE FOLLOWING:

1. Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lockout/ tag-out to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
2. This installation manual shows the suggested installation methods. Additional measures may be required by local codes and standards.
3. Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
4. This unit must be grounded.
5. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
6. Do not re-wire the VFD(s) to control more than one motor per VFD.

CAUTION

Do not remove or disable the wiring interconnection between the Overload Relays and the Contactors. Without this interconnection the motor(s) will not be protected against overload.

CAUTION

Do not change the Maximum Current Parameter in VFDs from the factory default setting, which should be equal to the motor nameplate FLA. This parameter controls the Motor OVERLOAD PROTECTION provided by the VFD.

Where to find information about wiring and controls for your specific ERV:

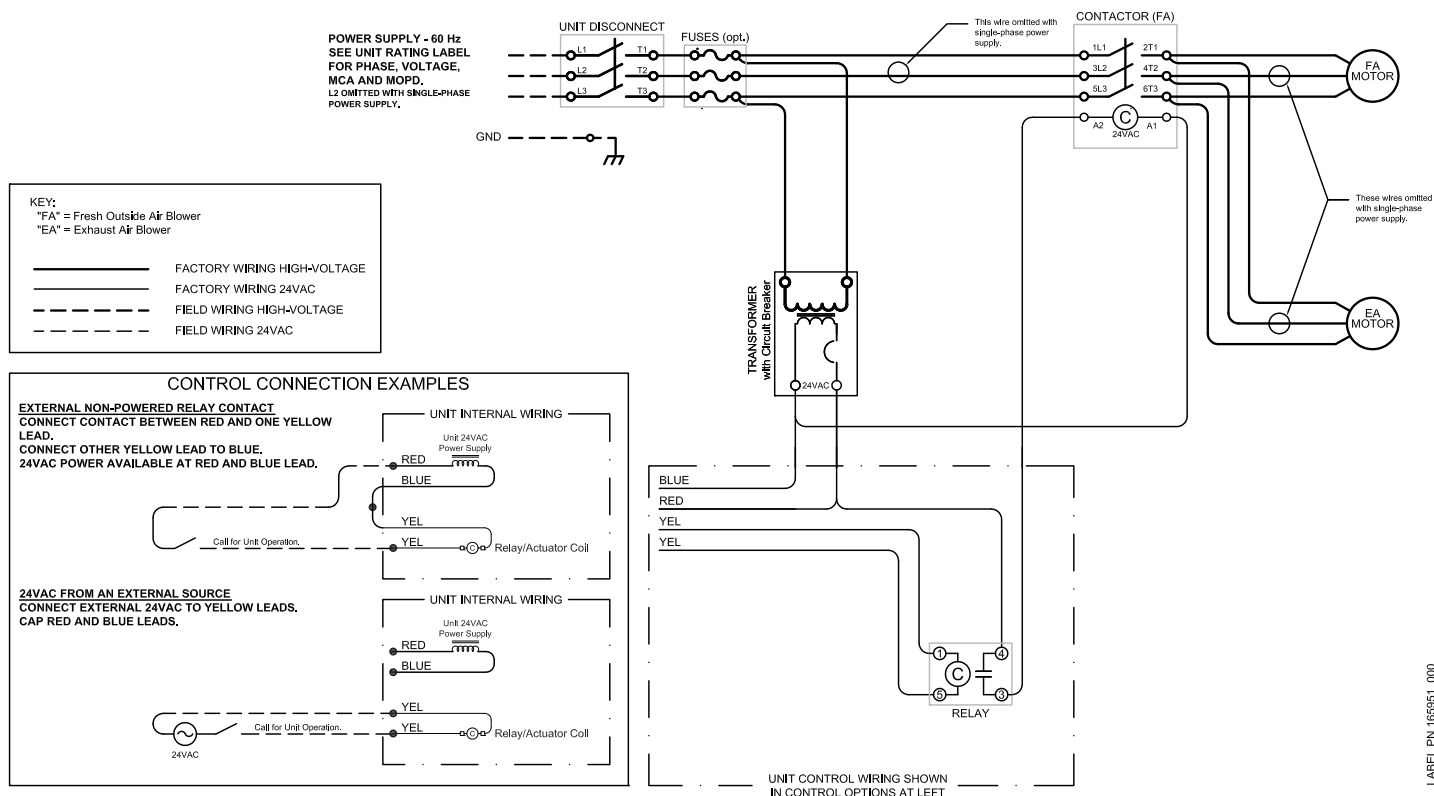
Type of Information	Type of ERV	Where to Find the Information
Factory-installed Wiring Schematics	Basic unit without factory-installed Dampers and/or Variable Frequency Drives	I&O Manual supplied with Unit (Applicable Schematics are also provided in This Manual)
	Unit fitted with factory-installed Dampers and/or Variable Frequency Drives	This Manual
Field-connected Control Application Schematics	Unit without Variable Frequency Drives	I&O Manual supplied with Unit
	Unit with Variable Frequency Drives	Supplemental I&O Manual for Units with Variable Frequency Drive(s)
Electrical Ratings (Volts, Phase, HP, MCA, MOPD)	All Units	Label on Unit
Configuration Code	All Units	Label on Unit
Internal Settings for Variable Frequency Drives	Unit fitted with factory-installed Dampers and/or Variable Frequency Drives	Supplemental I&O Manual for Units with Variable Frequency Drive(s)

Residential models, EV450 models, and RD models are not covered by This Manual.

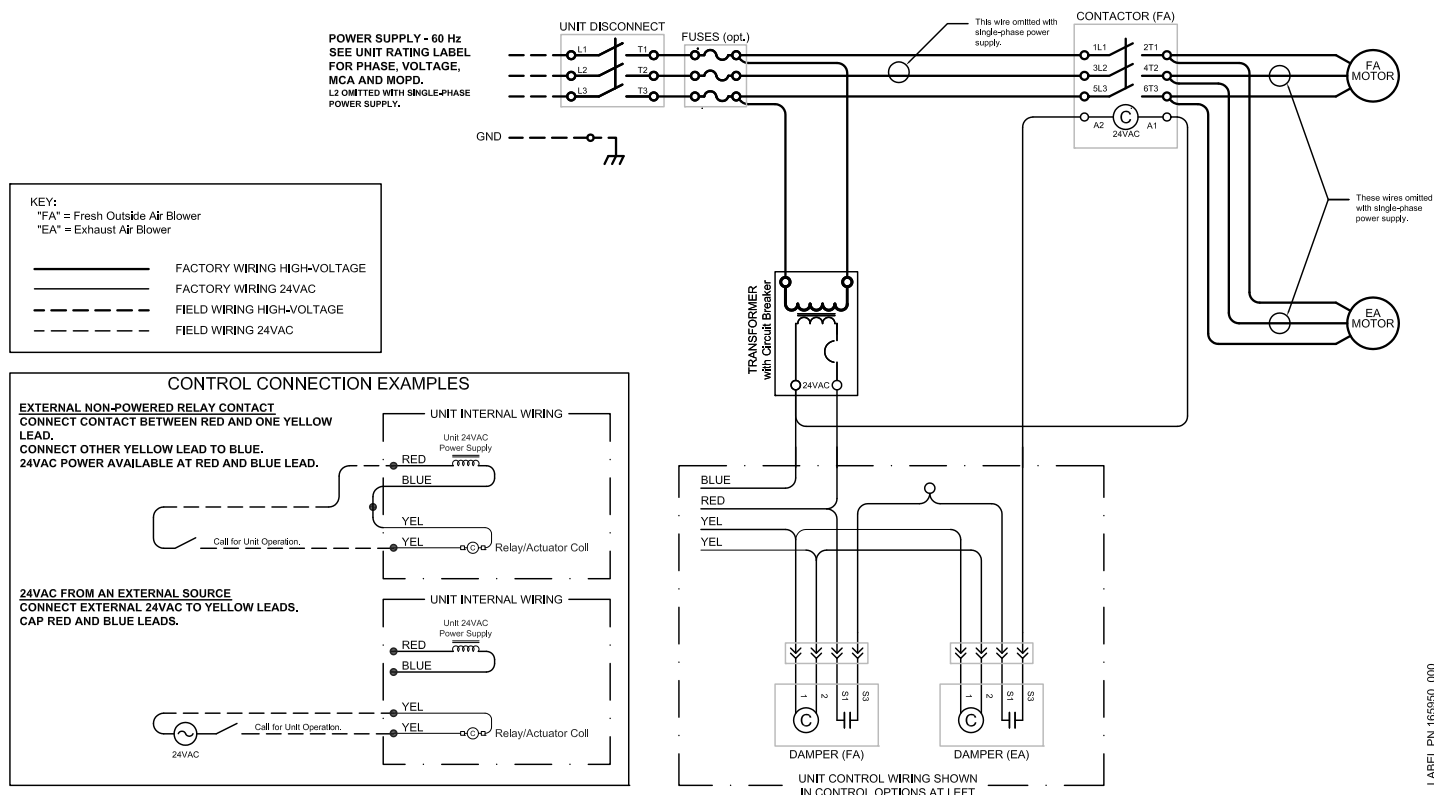
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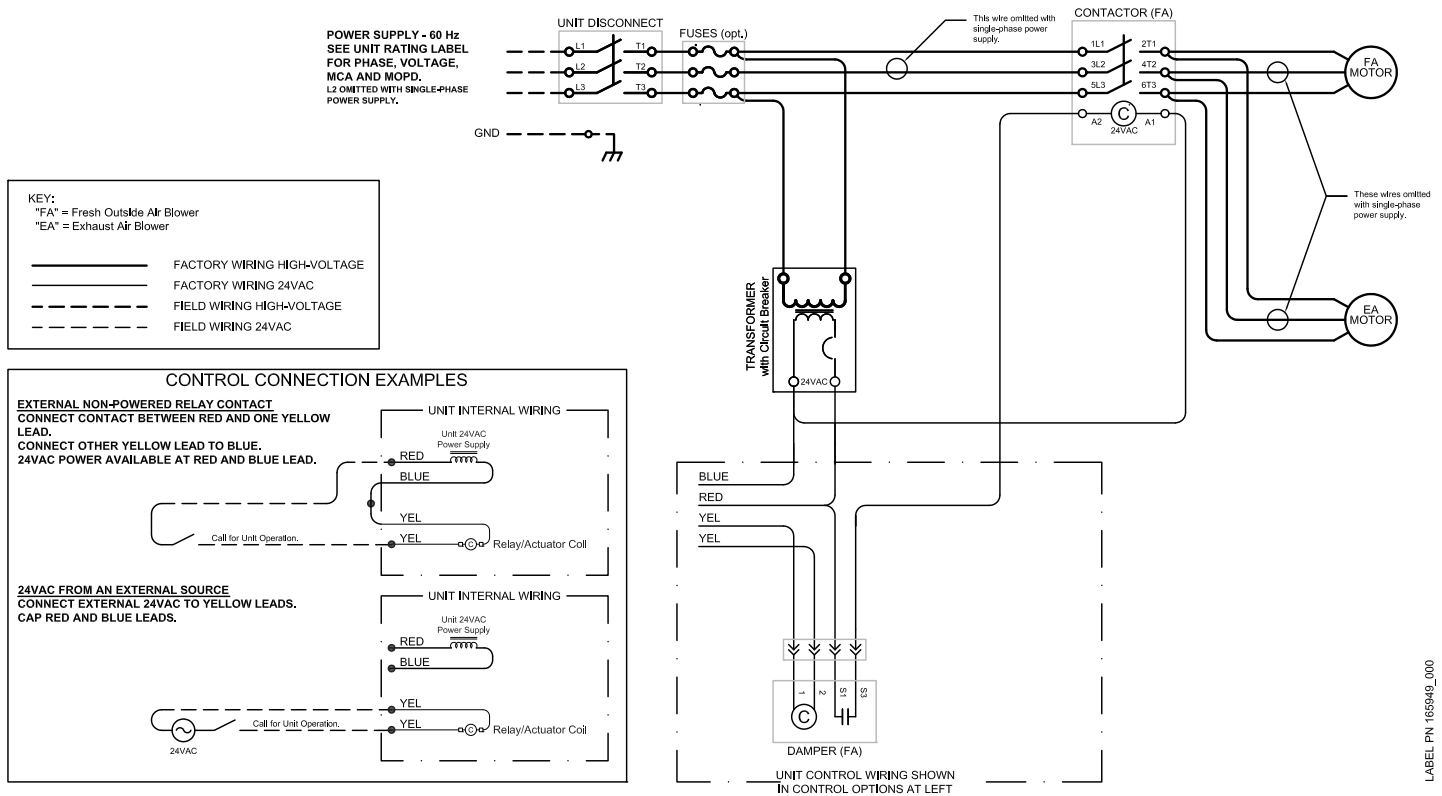
SCHEMATIC 165951 - HE1XIN Models, Single-phase or Three-phase Supply, No Dampers



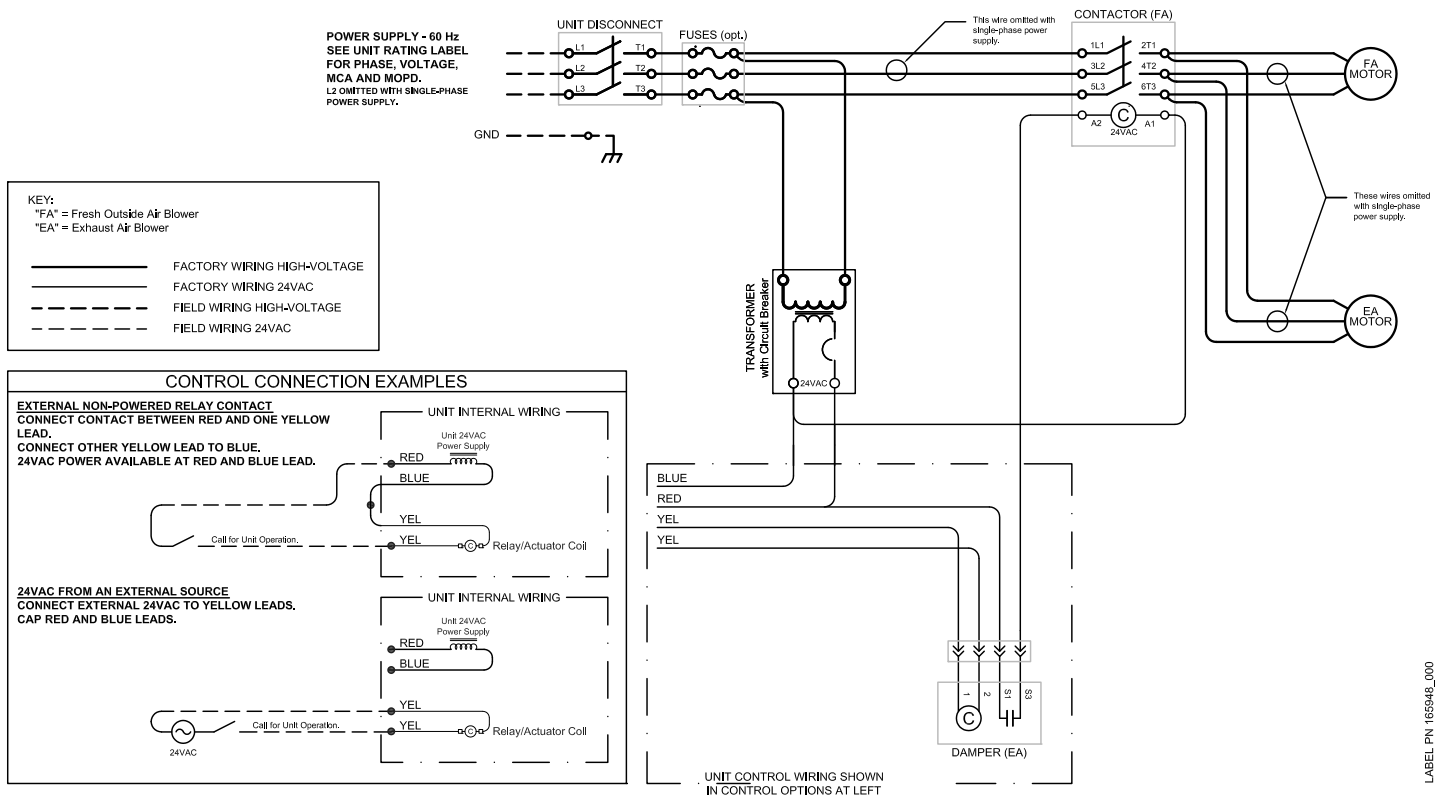
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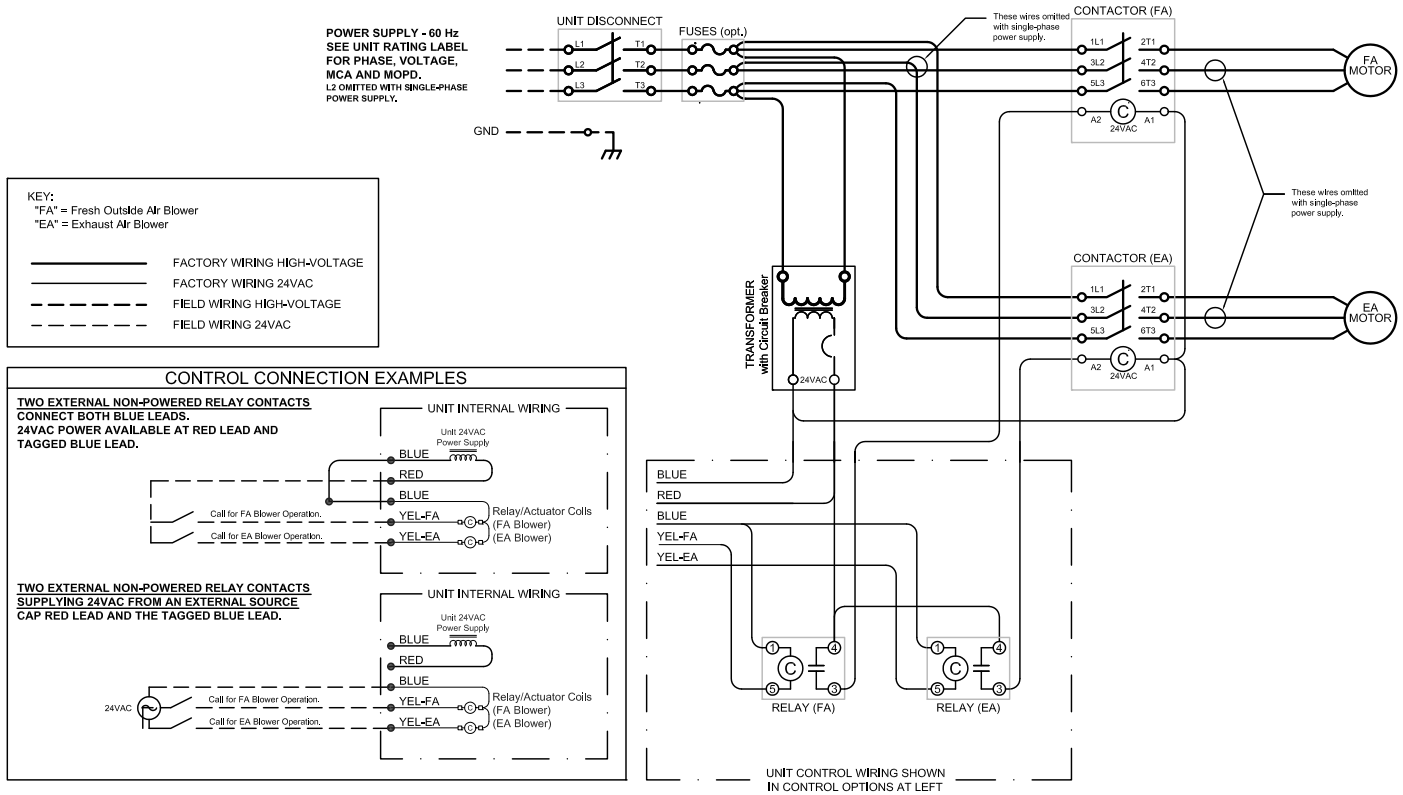
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SCHEMATIC 165948 - HE1XIN Models, Single-phase or Three-phase Supply, EA Damper

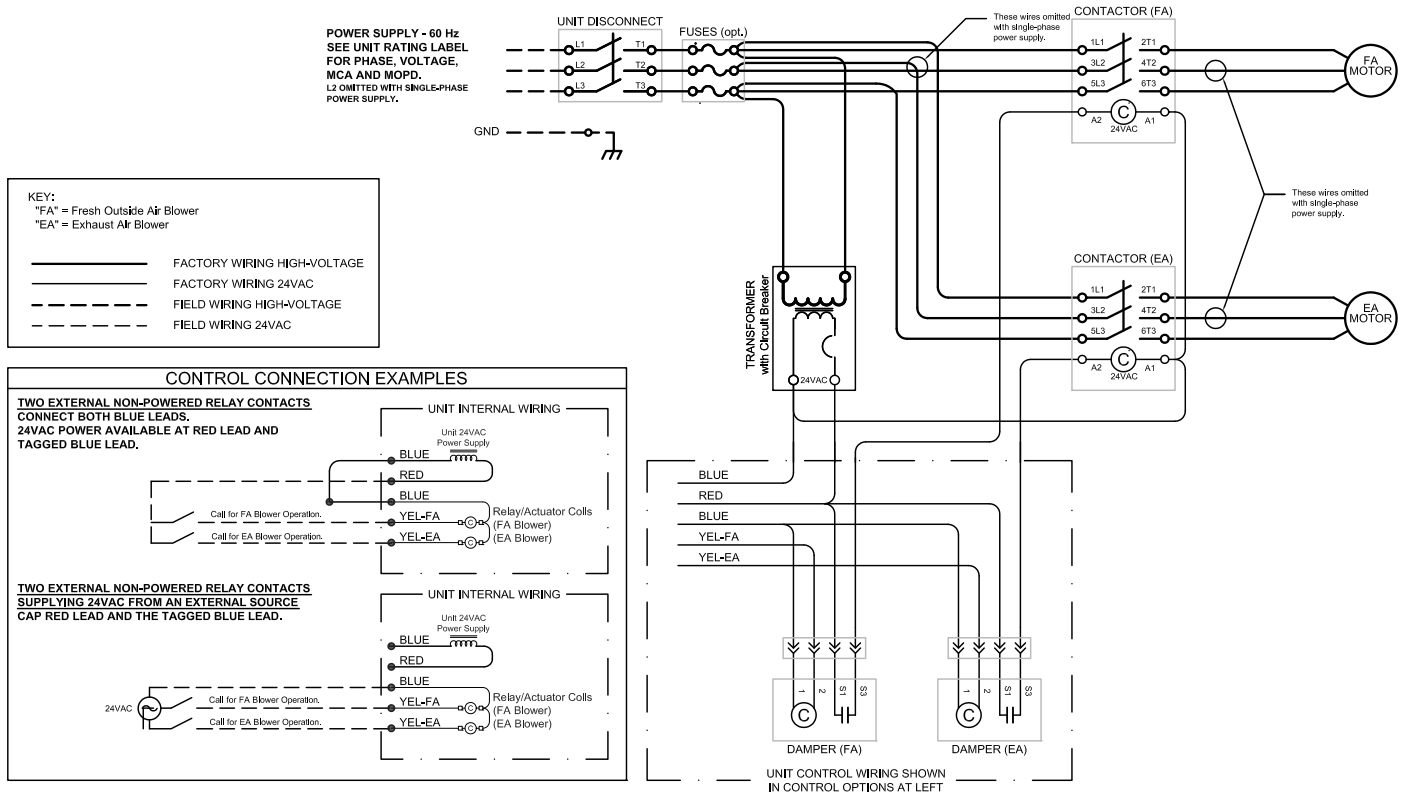


SCHEMATIC 165955 - HE1XIN Models, Single-phase or Three-phase Supply, Independent Blower Control, No Dampers



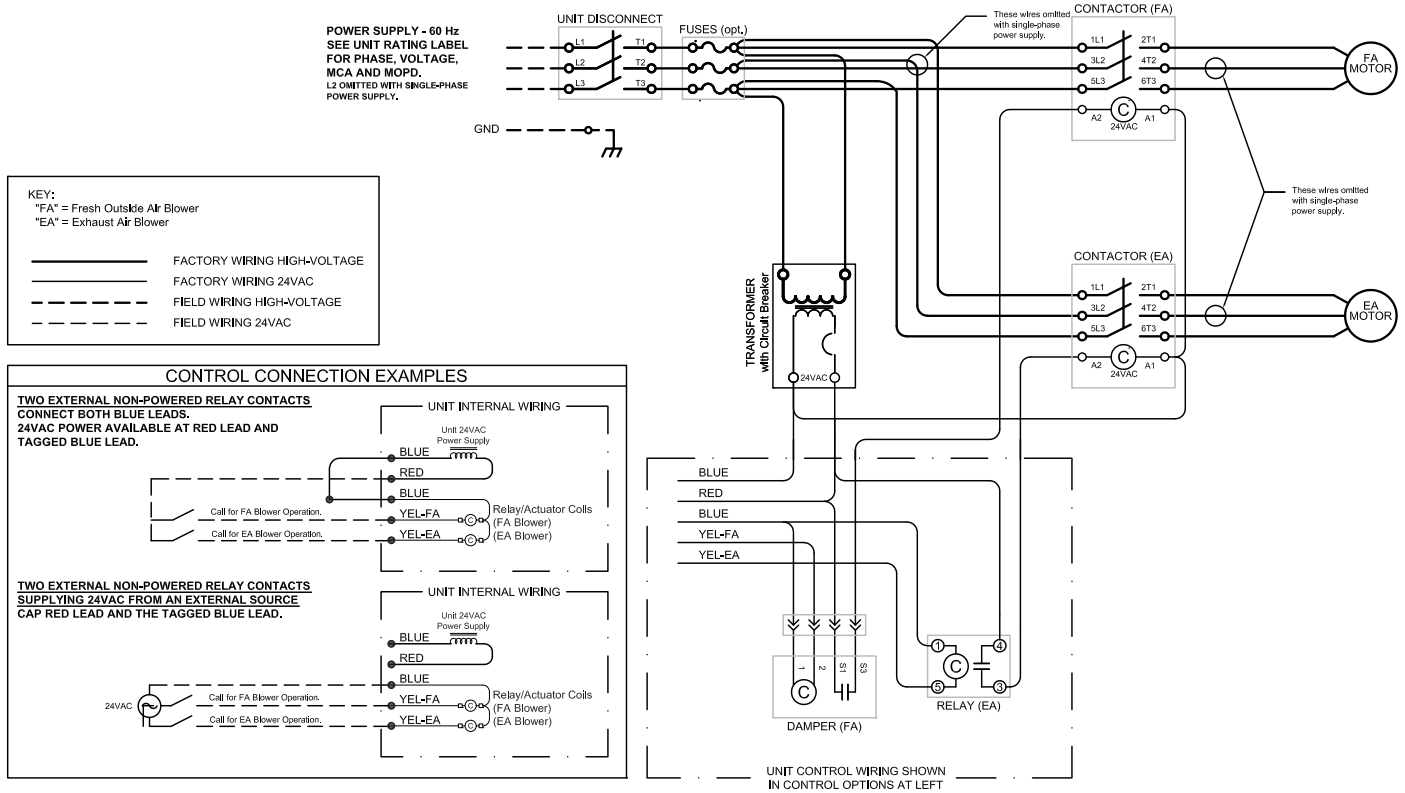
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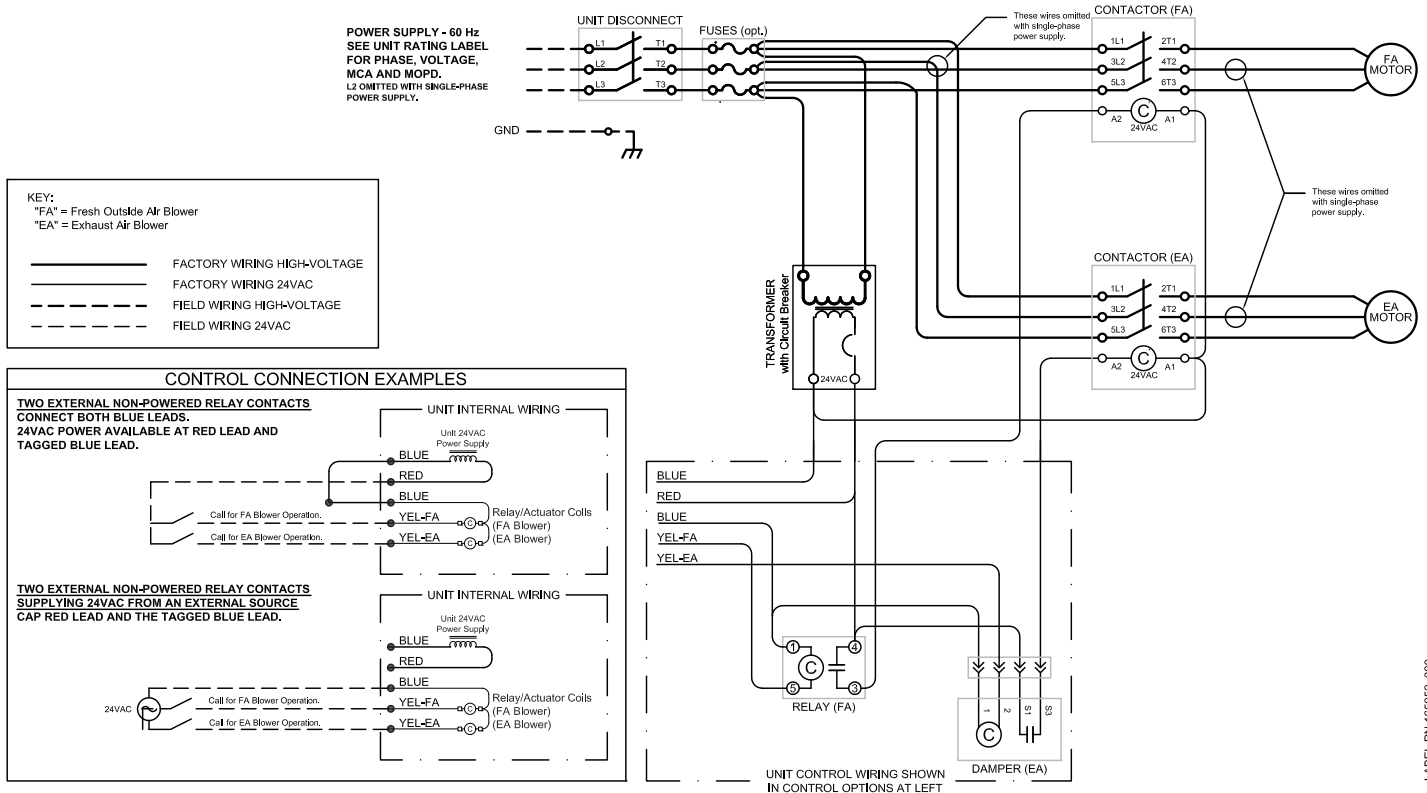
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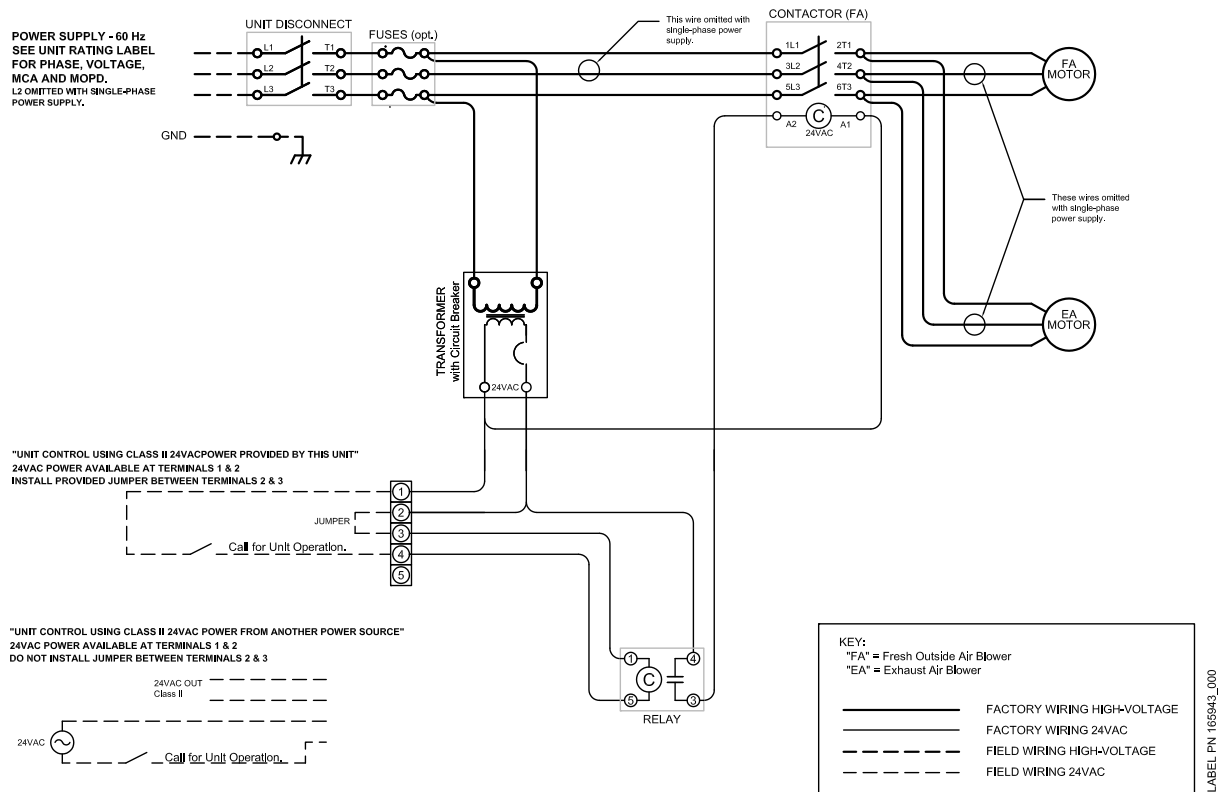
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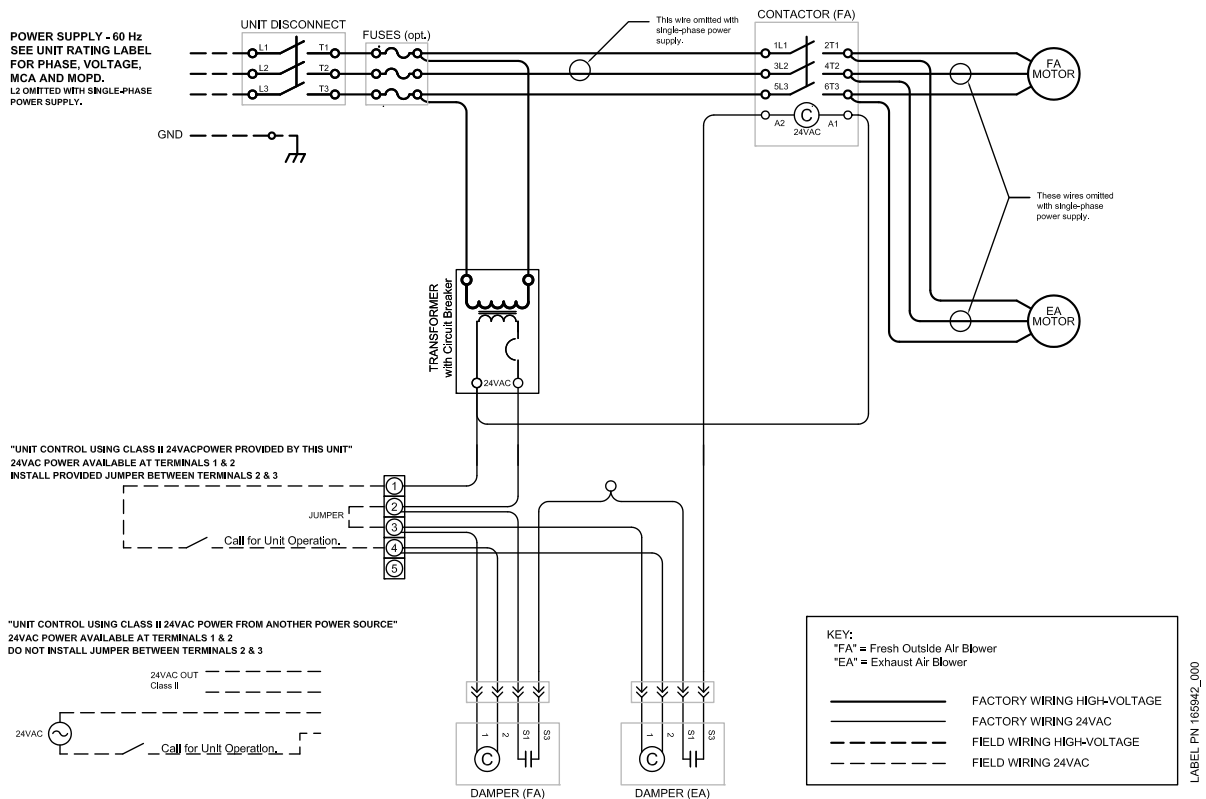


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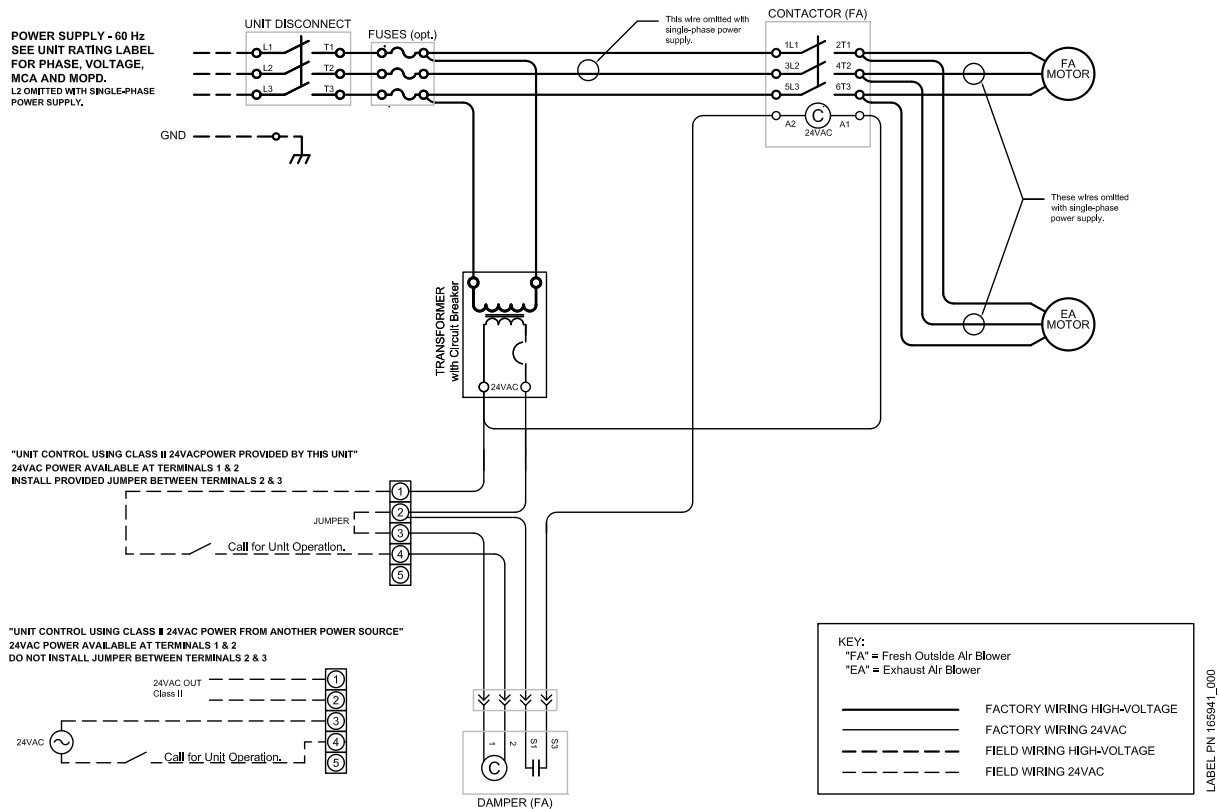
SCHEMATIC 165943 - HE1XRT Models, Single-phase or Three-phase Supply, No Dampers



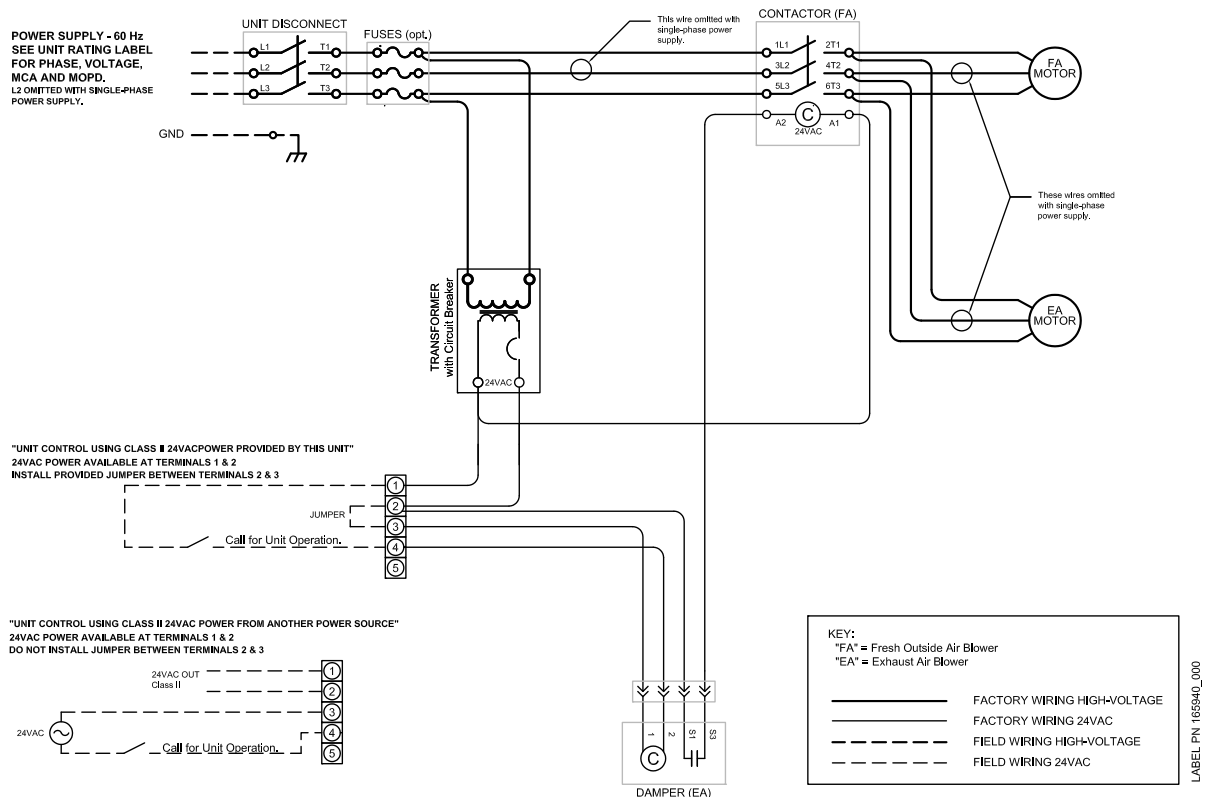
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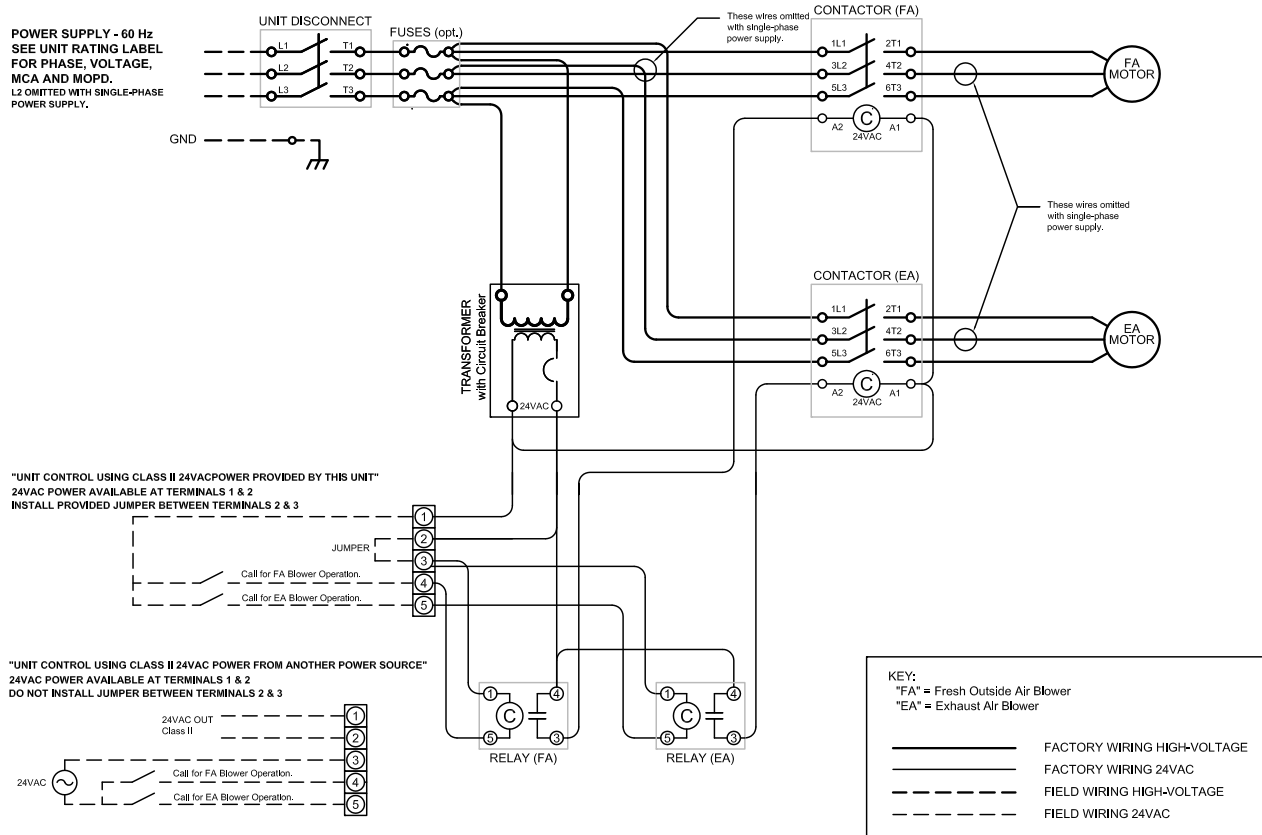
SCHEMATIC 165941 - HE1XRT Models, Single-phase or Three-phase Supply, FA Damper



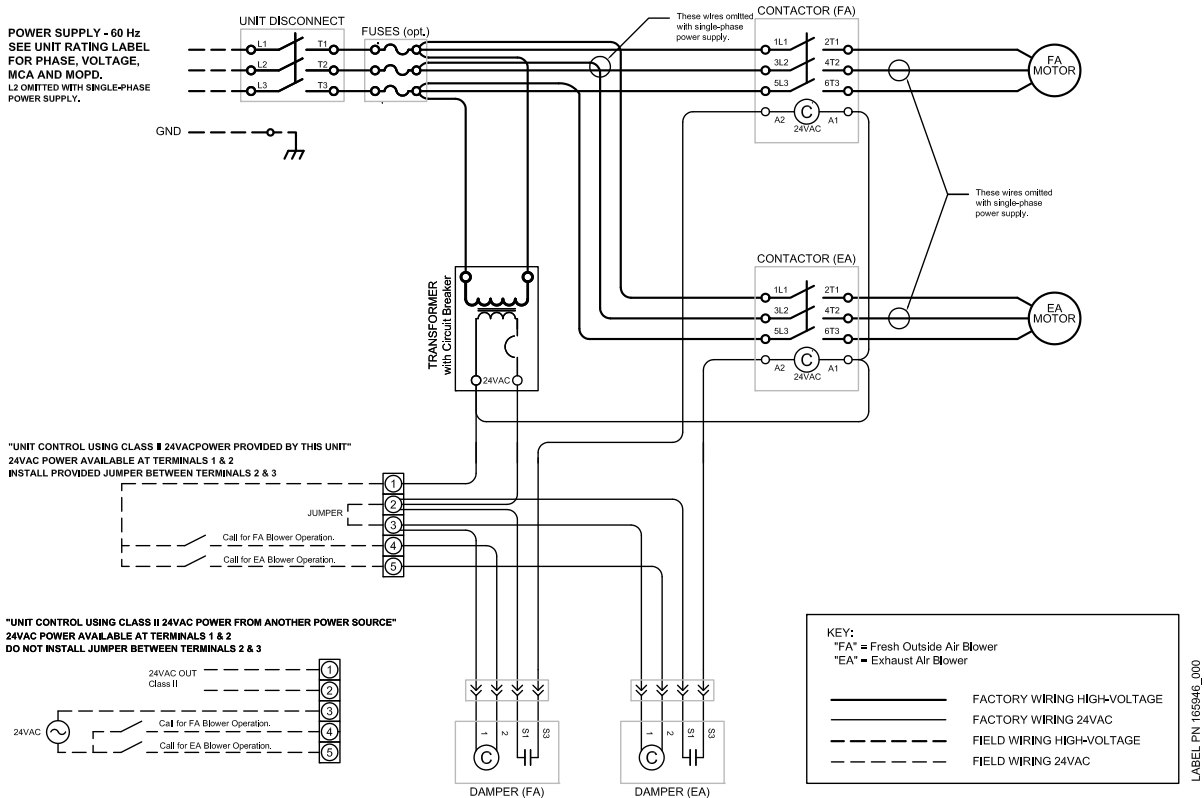
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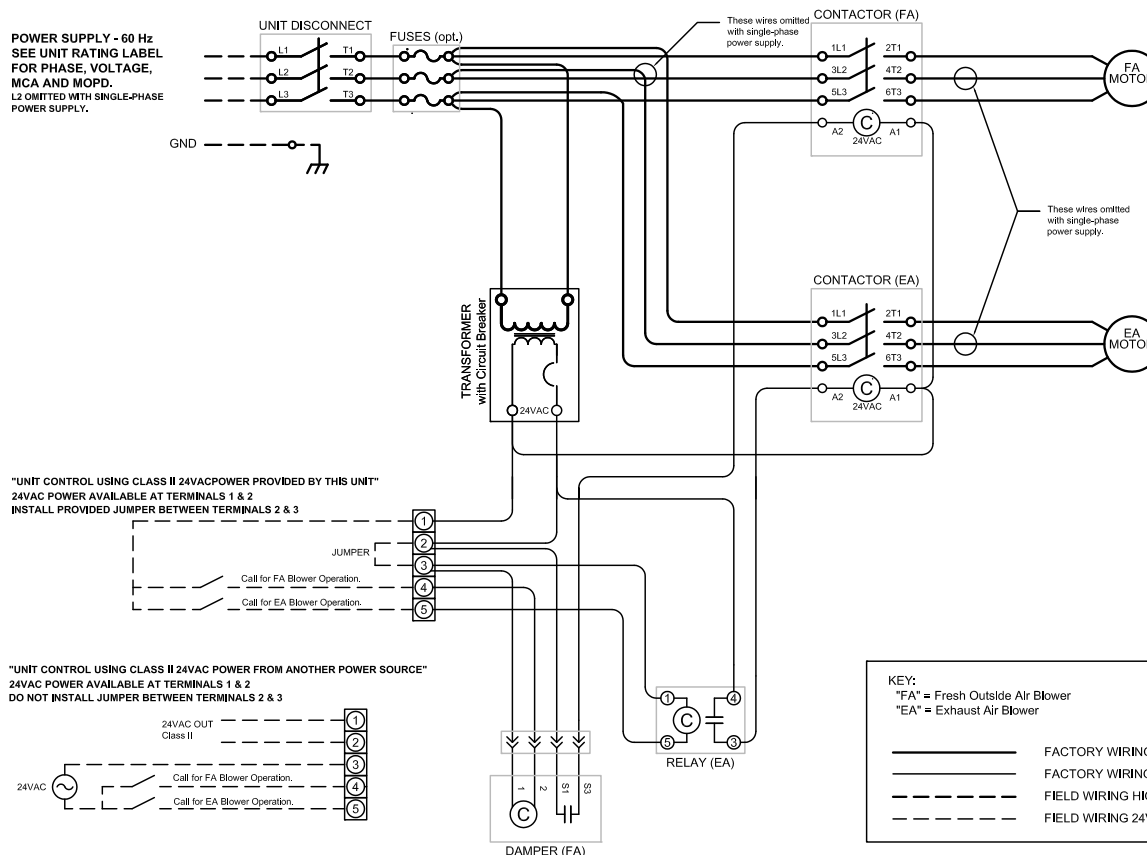
SCHEMATIC 165947 - HE1XRT Models, Single-phase or Three-phase Supply, Independent Blower Control, No Dampers



SCHEMATIC 165946 - HE1XRT Models, Single-phase or Three-phase Supply, Independent Blower Control, 2 Dampers

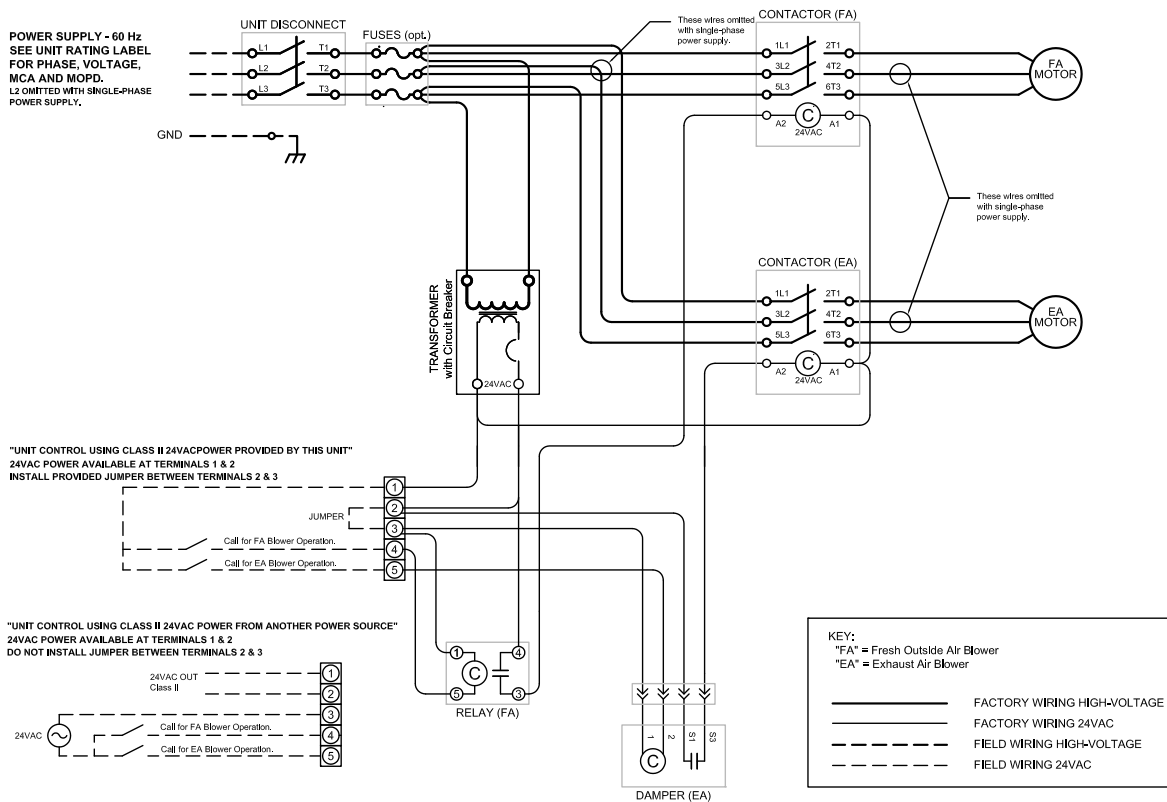


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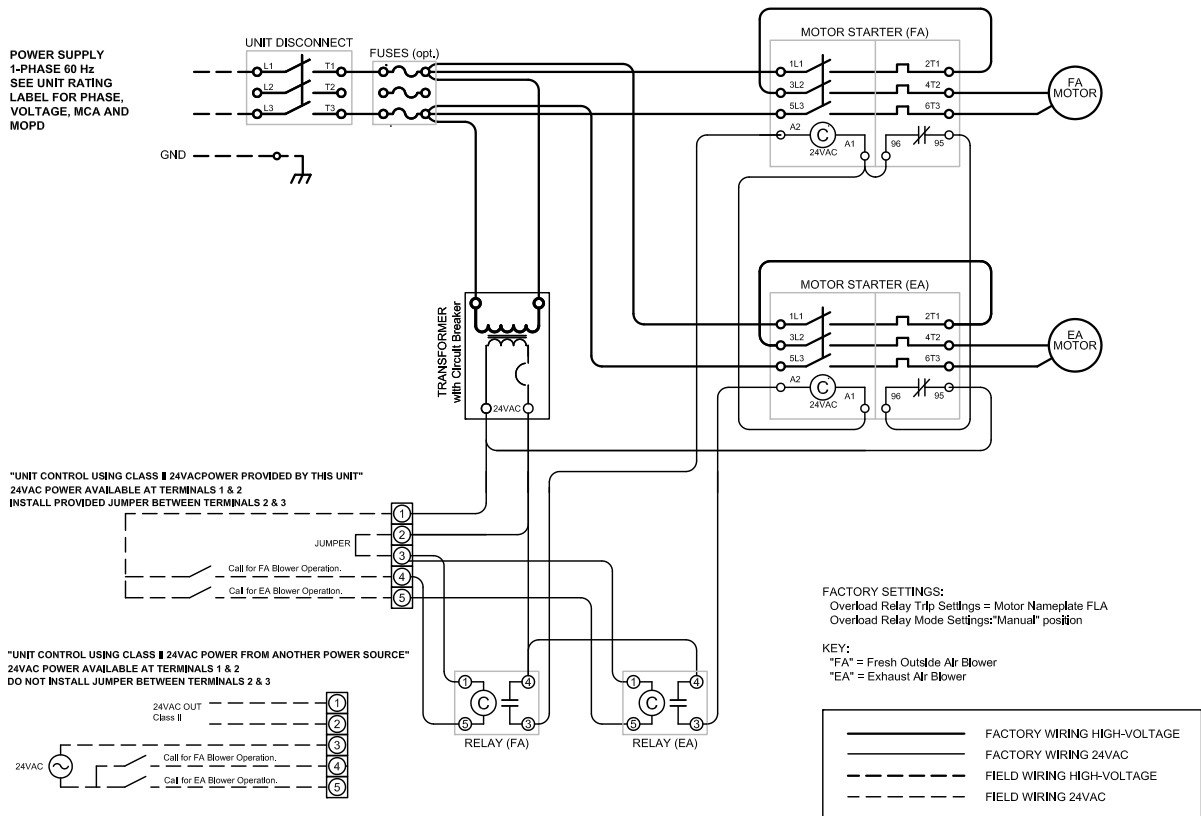
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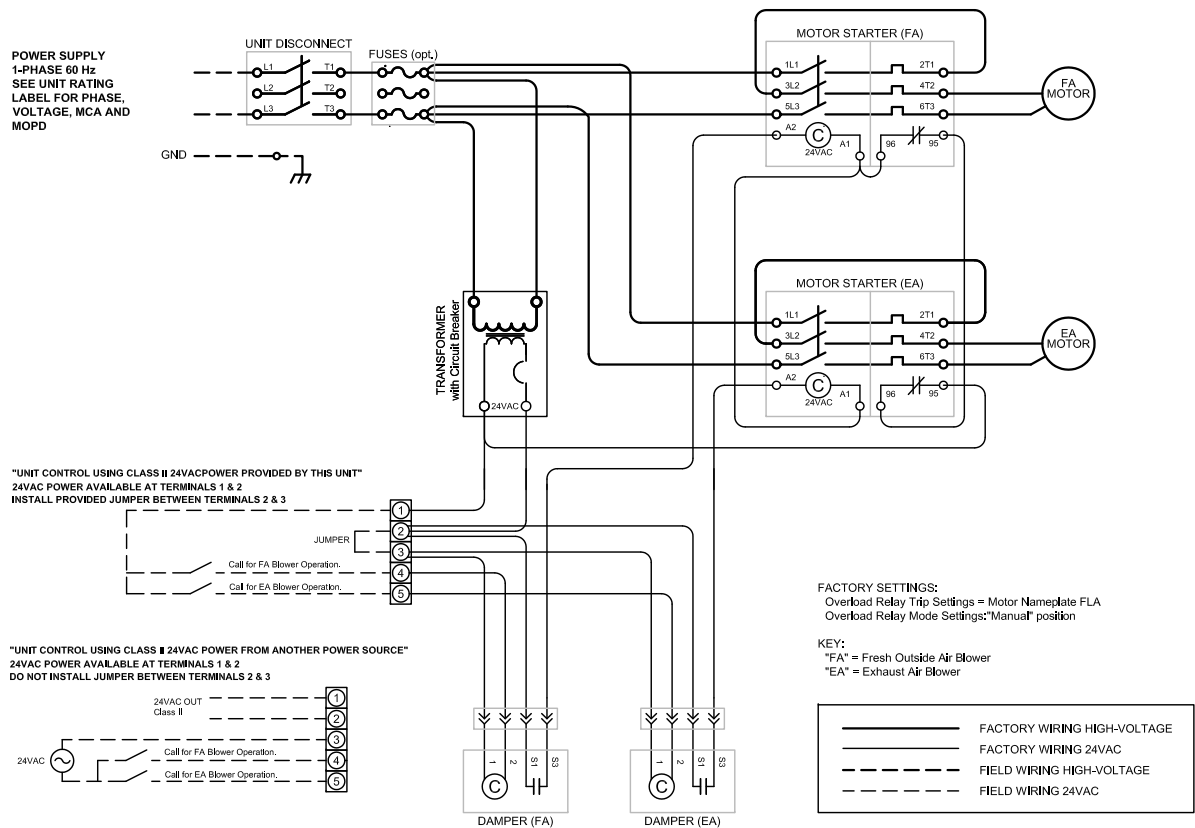


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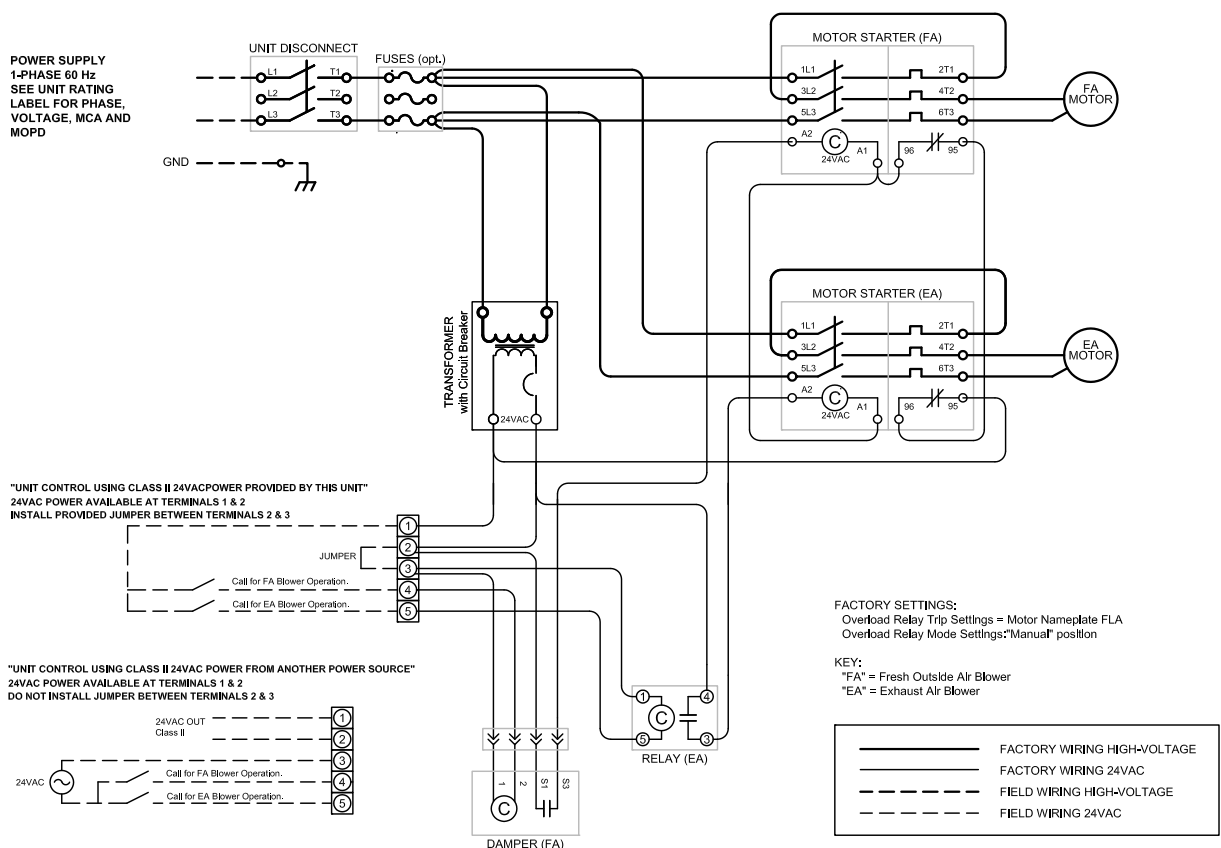
SCHEMATIC 165919 - HE2X through HE4X Models, Single-phase Supply, No Dampers, No VFDs



SCHEMATIC 165918 - HE2X through HE4X Models, Single-phase Supply, 2 Dampers, No VFDs

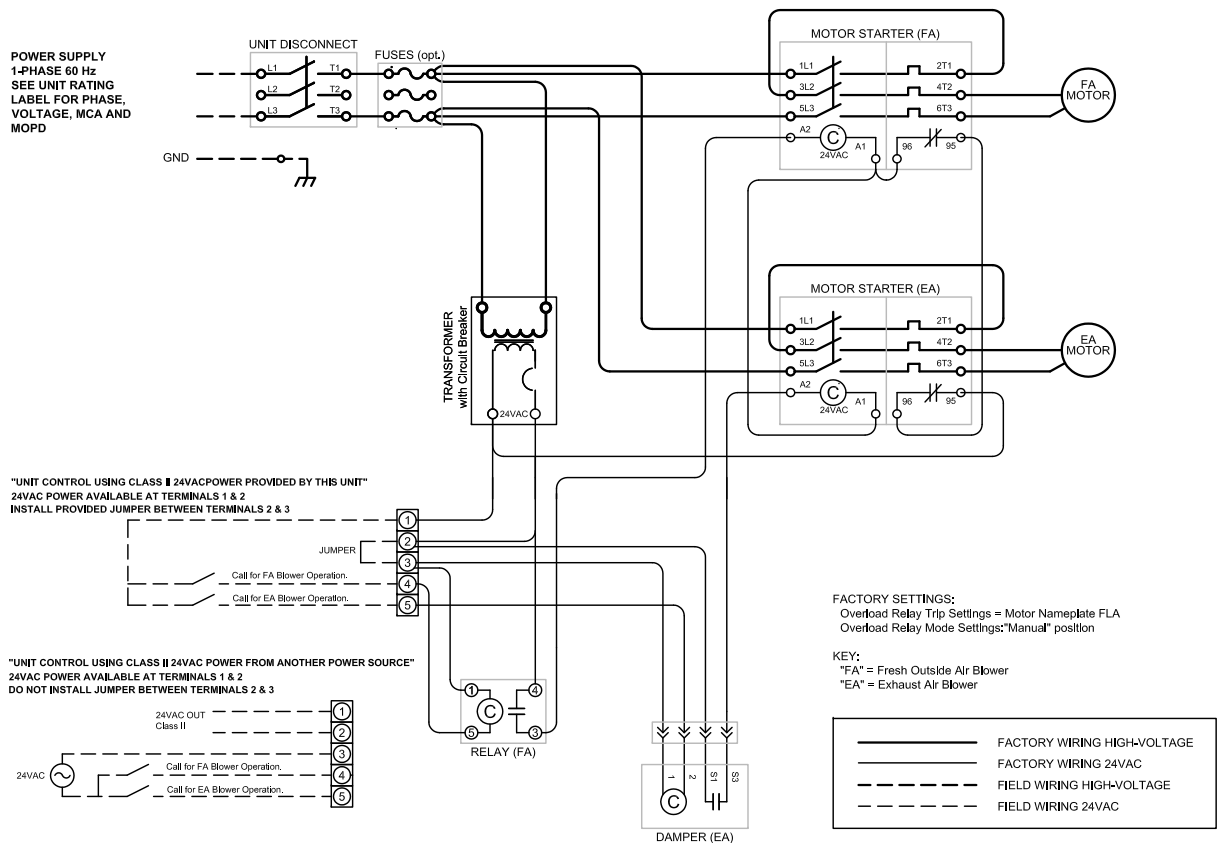


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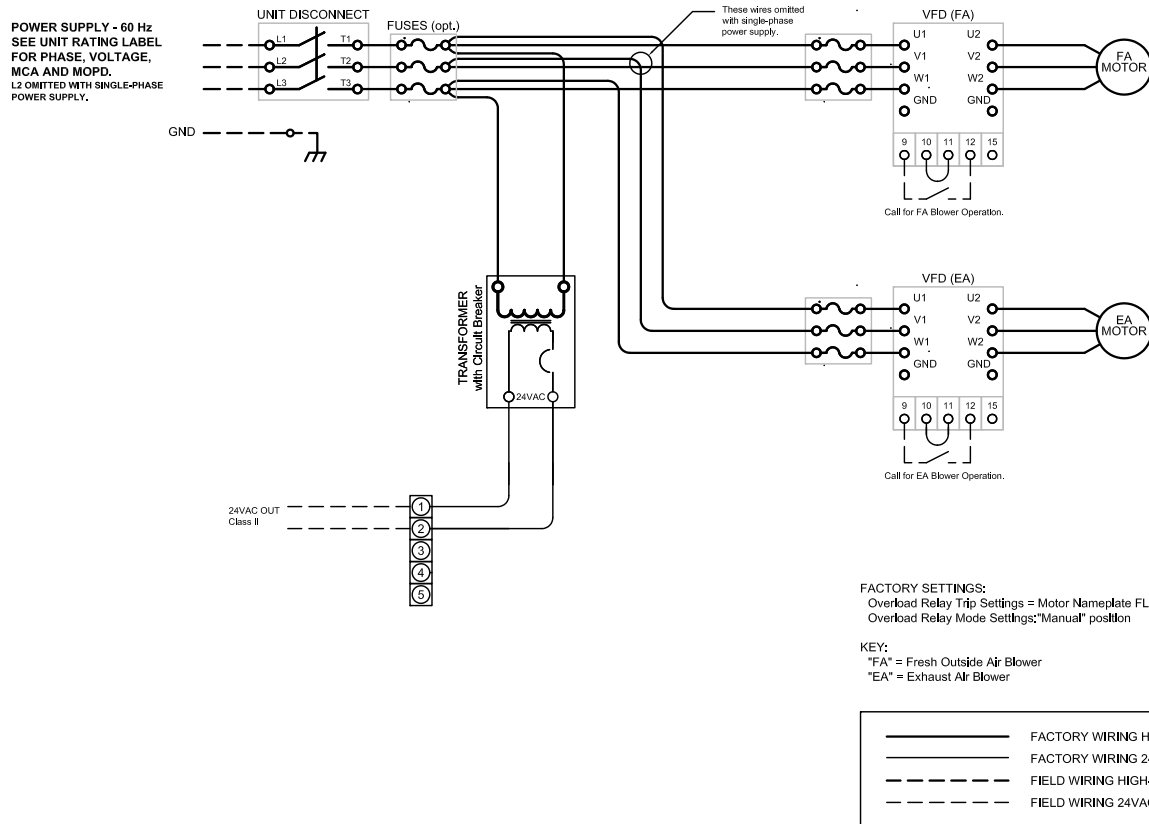
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SCHEMATIC 165916 - HE2X through HE4X Models, Single-phase Supply, EA Damper, No VFDs

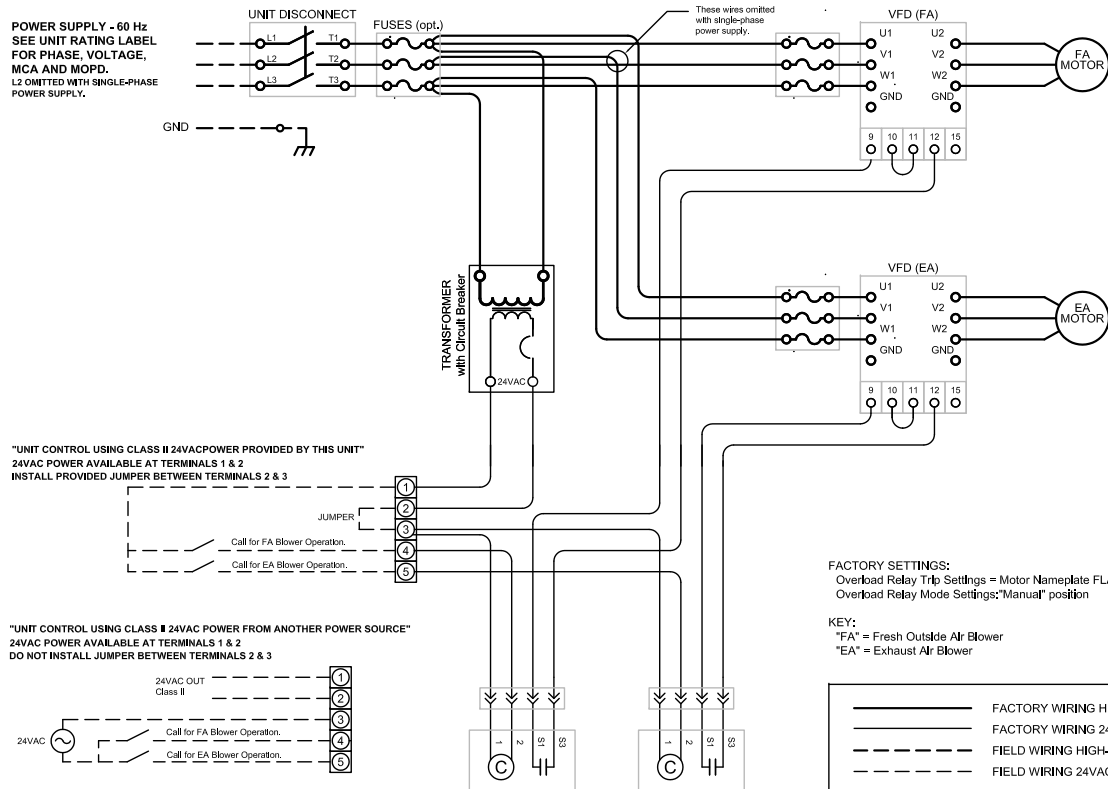


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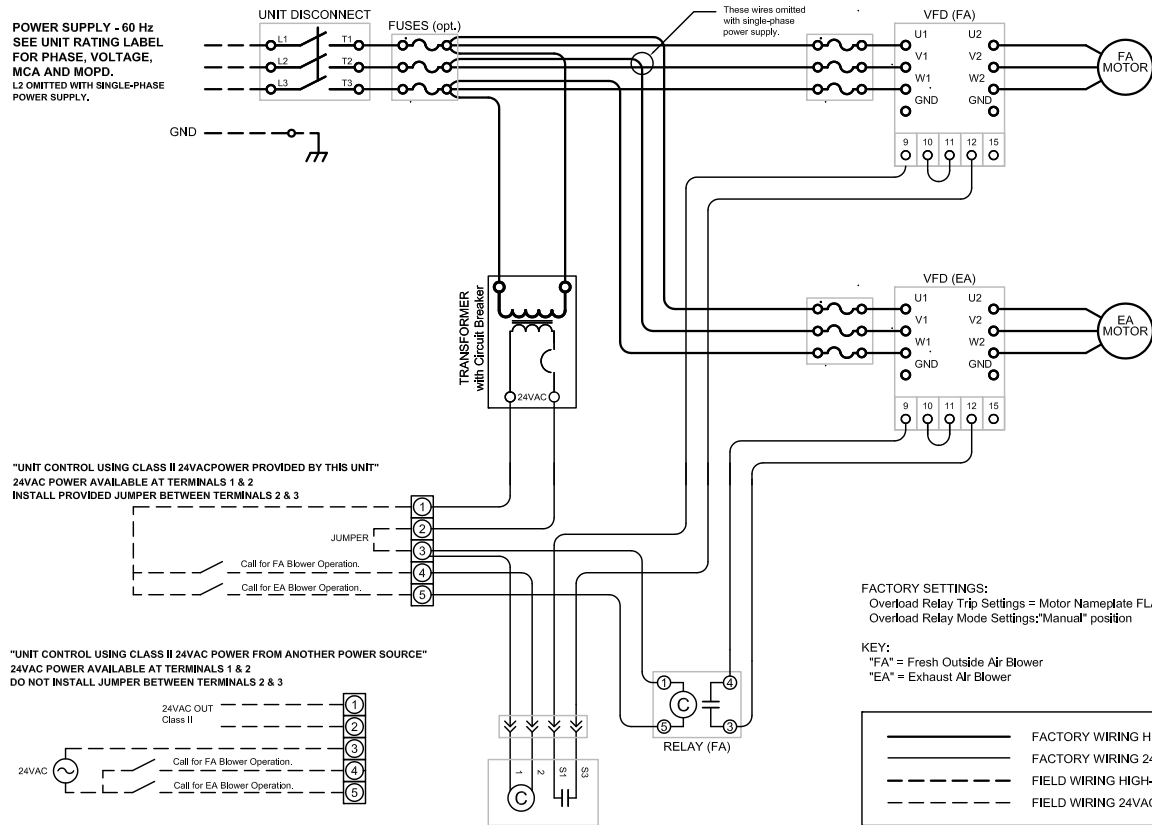
SCHEMATIC 165907 - HE2X through HE4X Models, Single or Three-phase Supply, No Dampers, 2 VFDs



SCHEMATIC 165906 - HE2X through HE4X Models, Single or Three-phase Supply, 2 Dampers, 2 VFDs

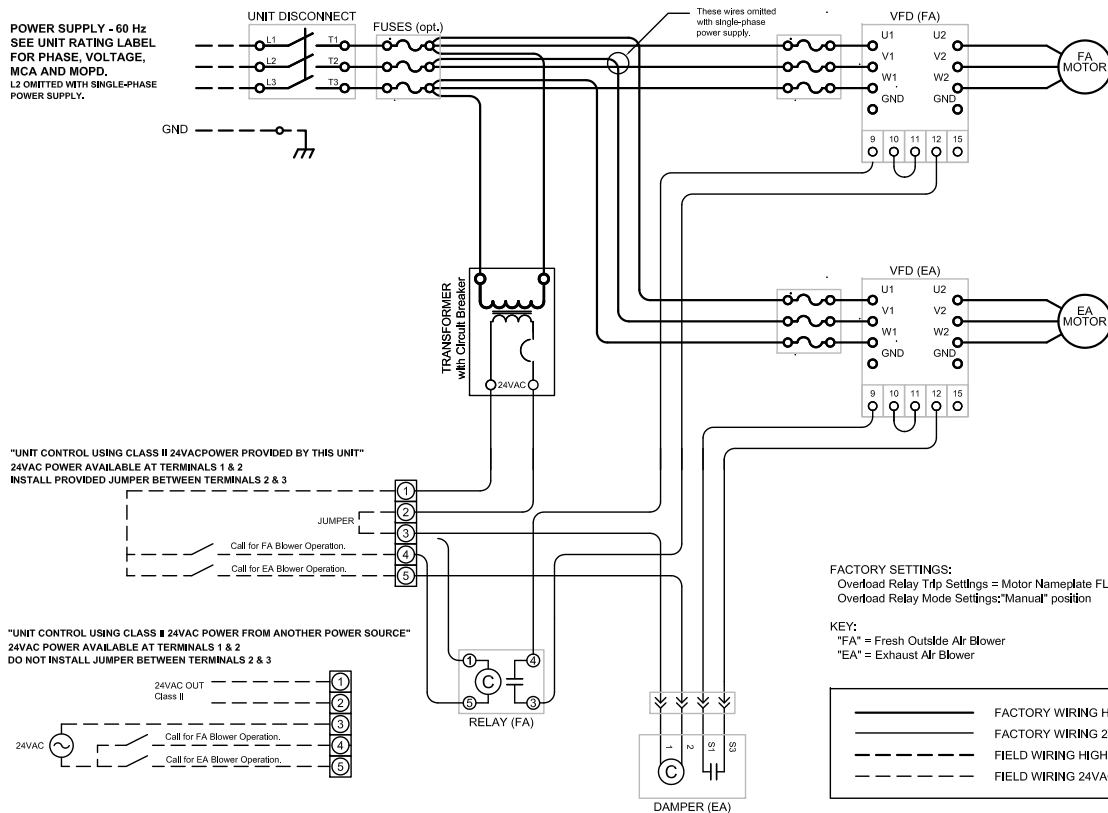


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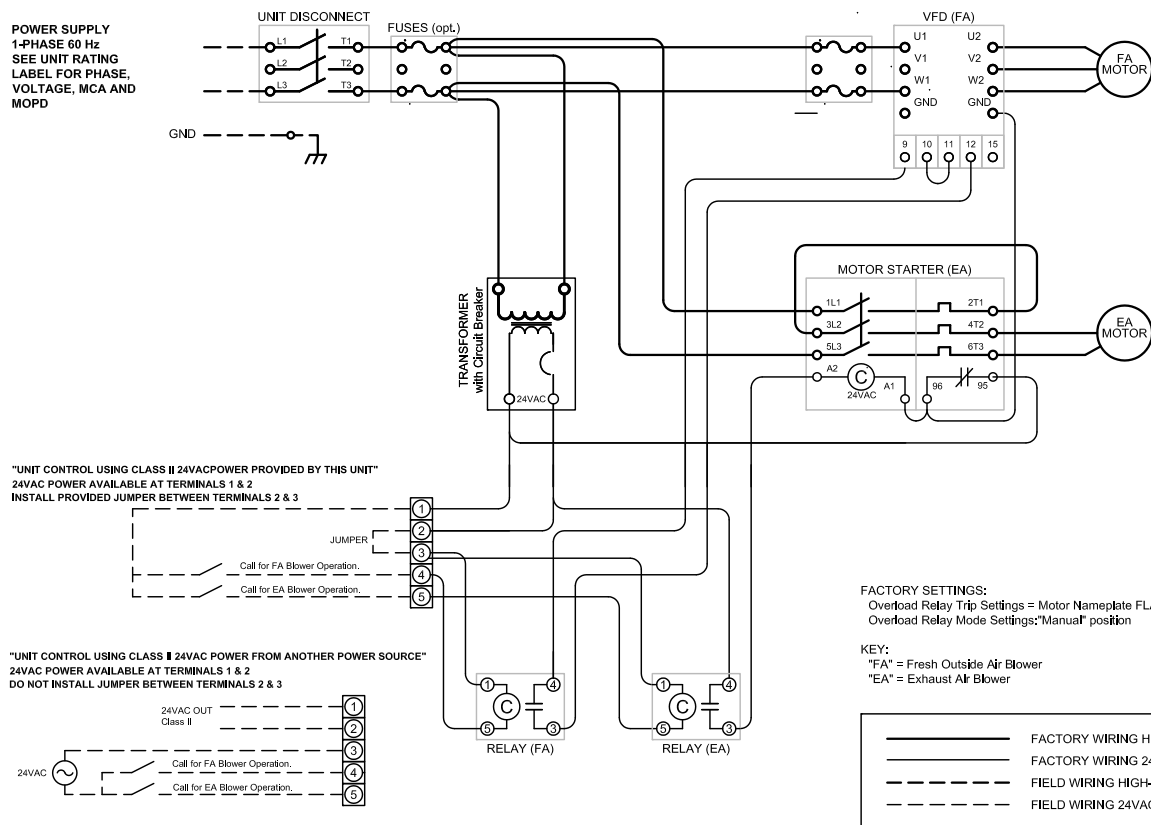
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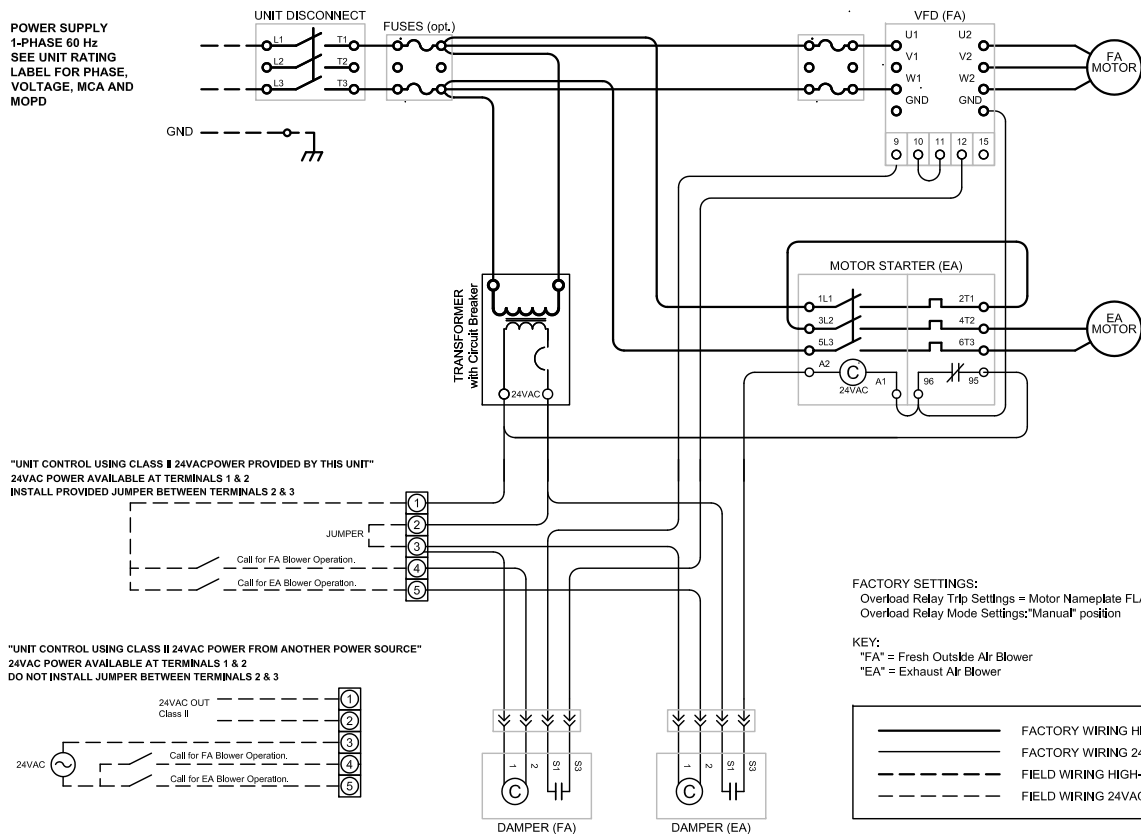


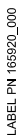
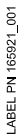
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SCHEMATIC 165923 - HE2X through HE4X Models, Single-phase Supply, No Dampers, FA VFD

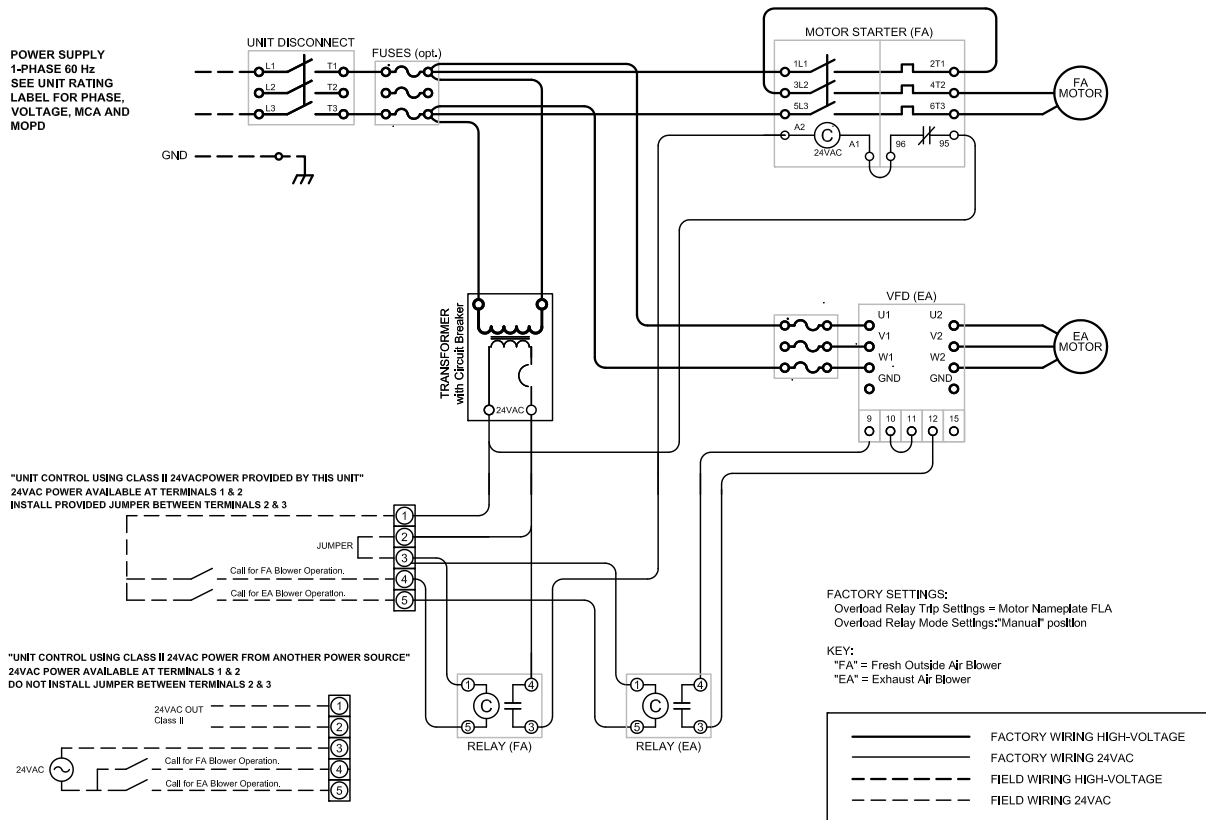


SCHEMATIC 165922 - HE2X through HE4X Models, Single-phase Supply, 2 Dampers, FA VFD

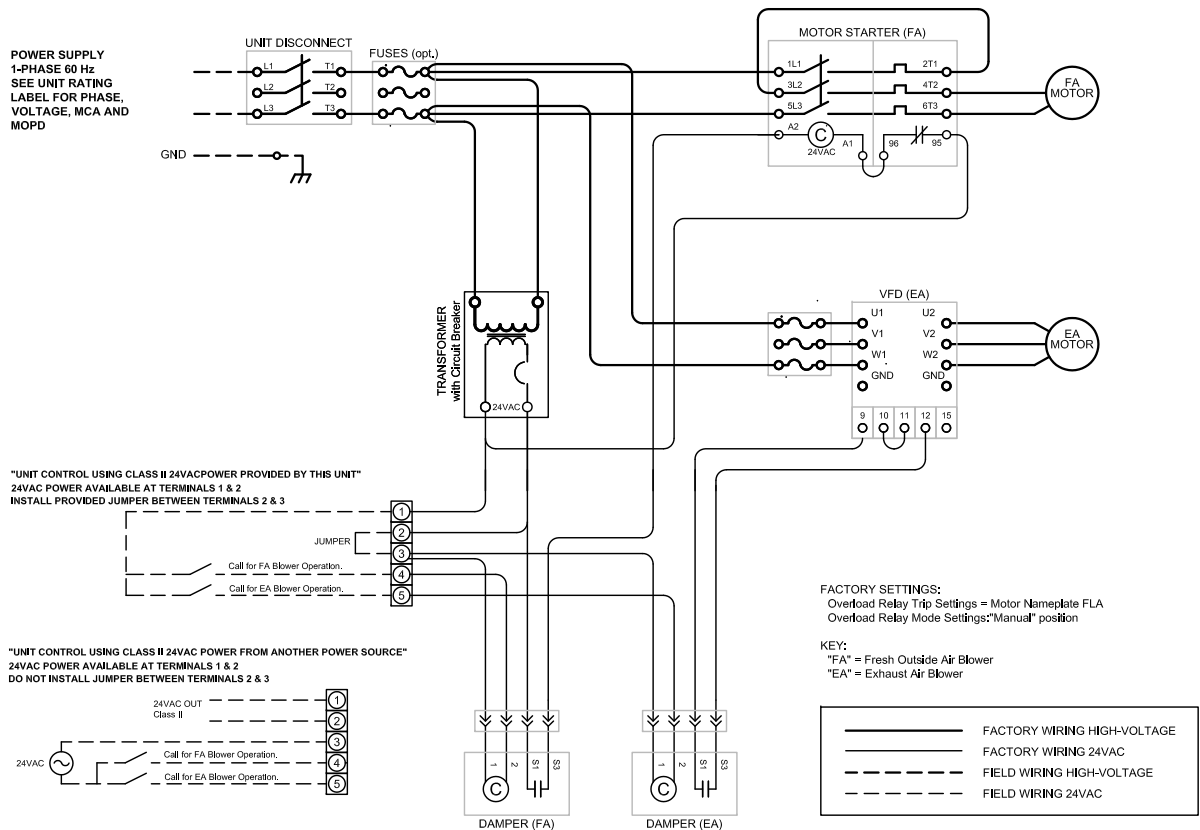




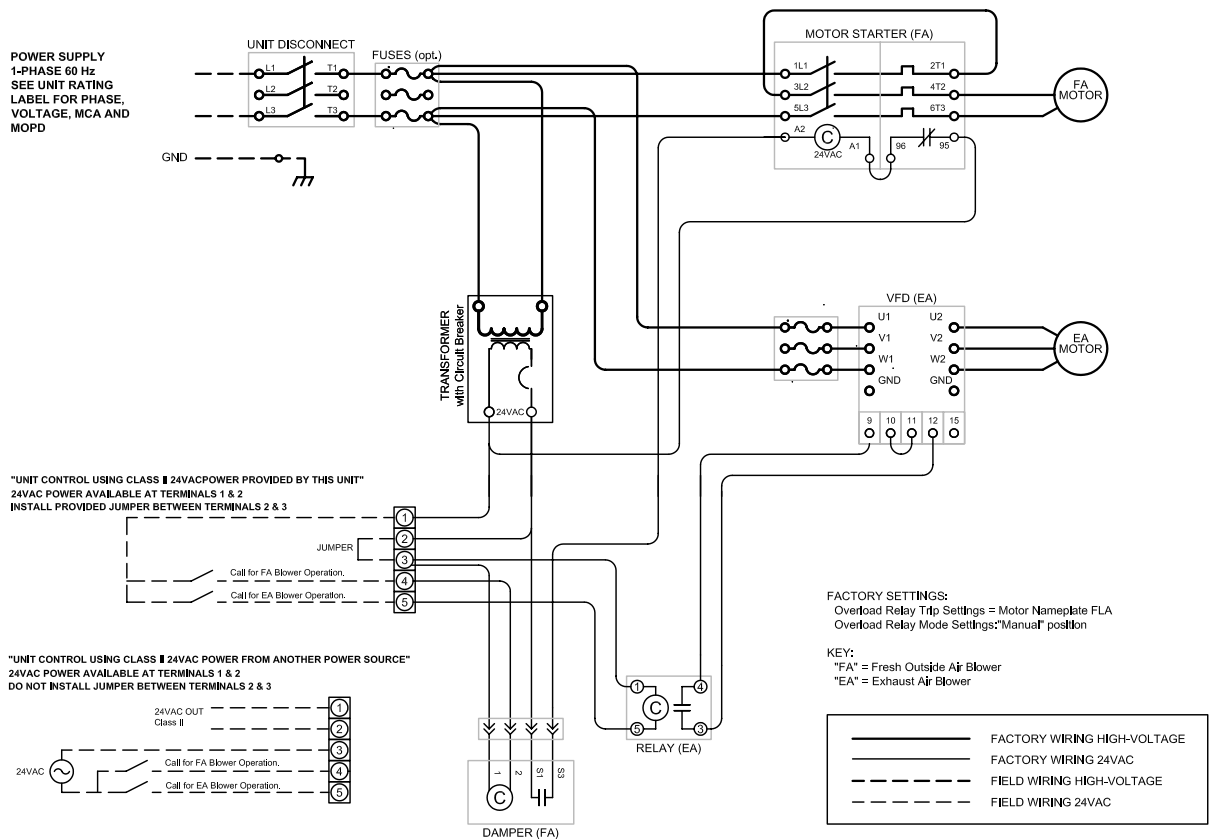
SCHEMATIC 165927 - HE2X through HE4X Models, Single-phase Supply, No Dampers, EA VFD



SCHEMATIC 165926 - HE2X through HE4X Models, Single-phase Supply, 2 Dampers, EA VFD

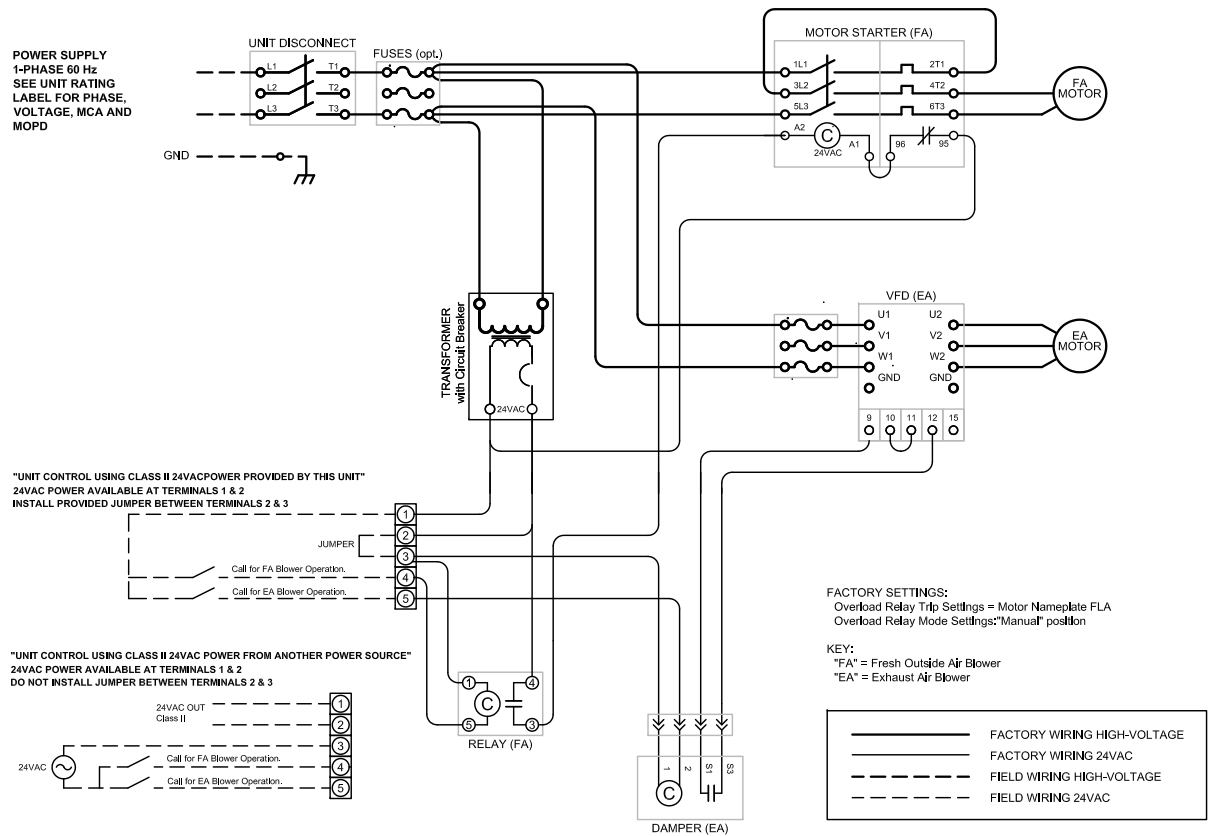


SCHEMATIC 165925 - HE2X through HE4X Models, Single-phase Supply, FA Damper, EA VFD



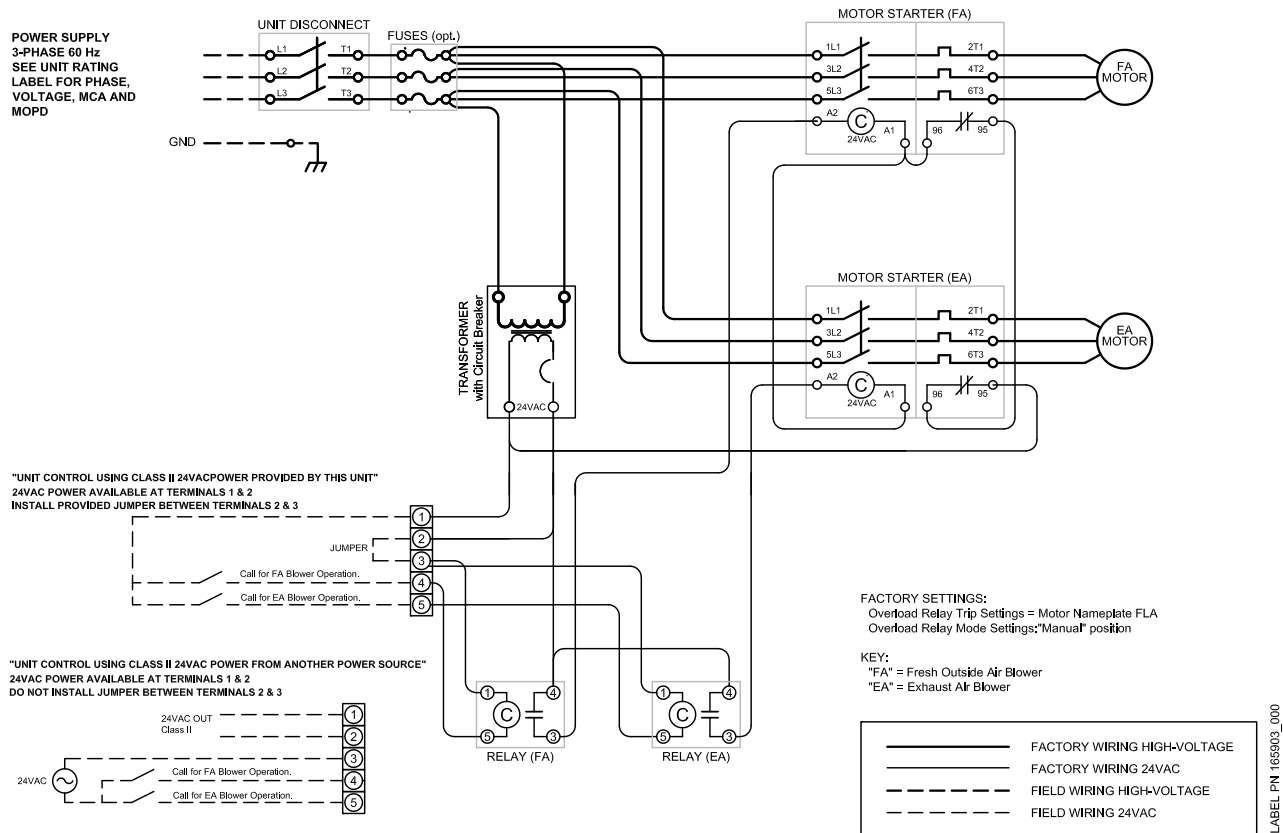
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SCHEMATIC 165924 - HE2X through HE4X Models, Single-phase Supply, EA Damper, EA VFD

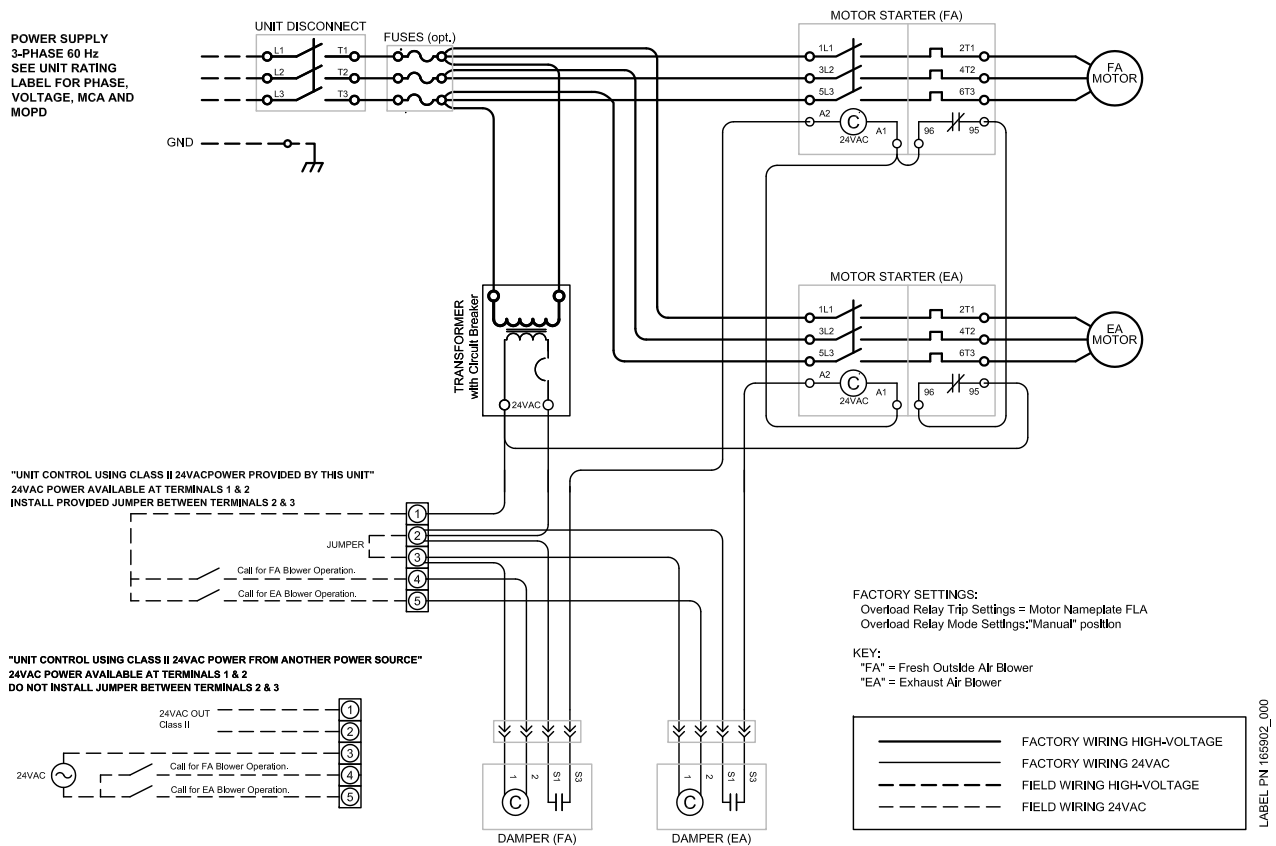


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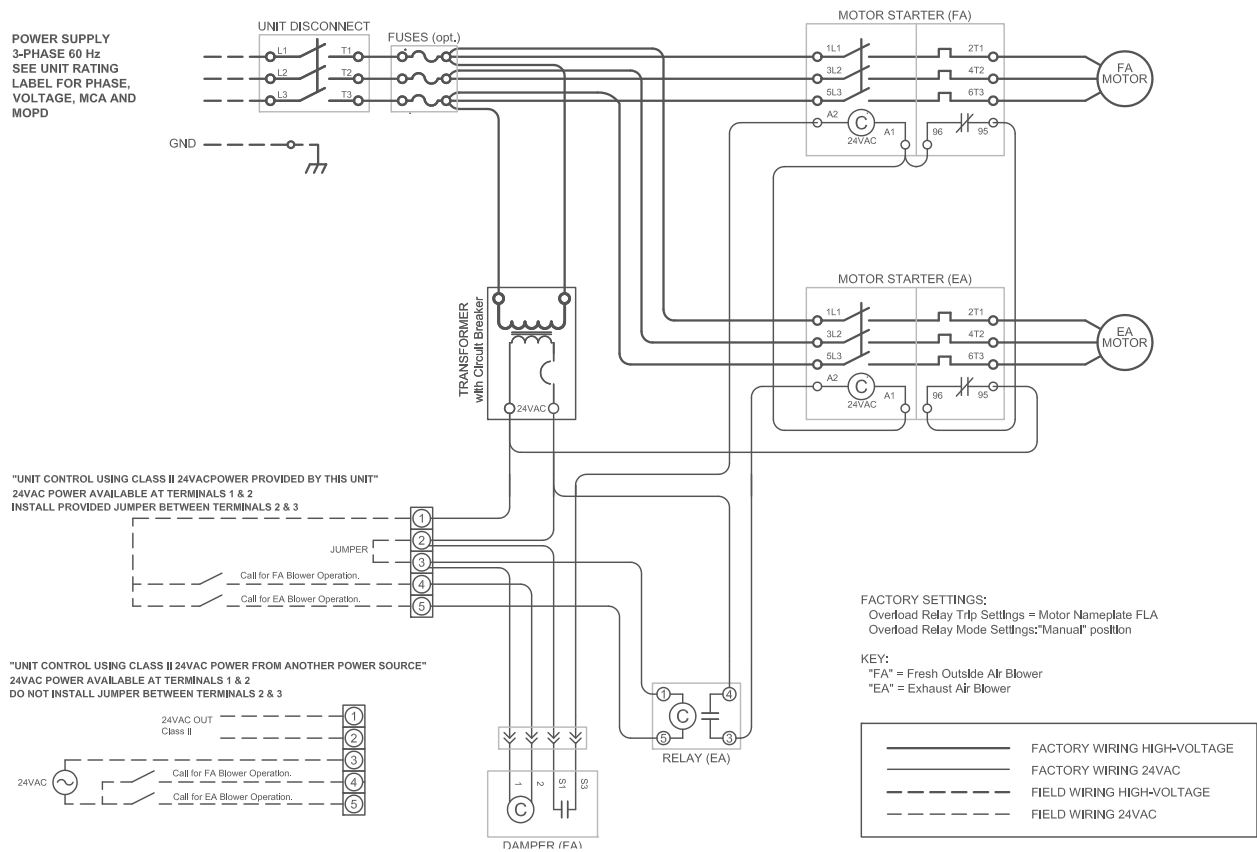
SCHEMATIC 165903 - HE2X through HE4X Models, Three-phase Supply, No Dampers, No VFDs



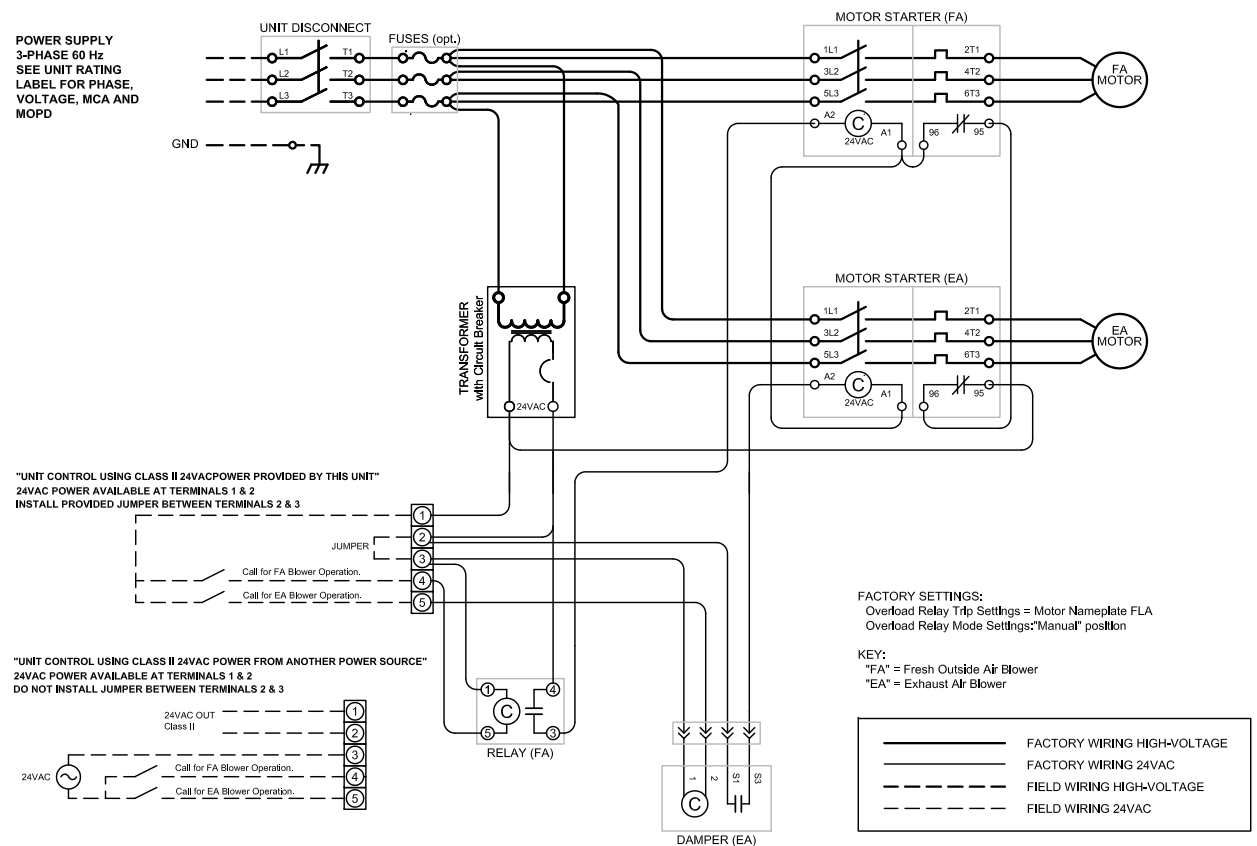
SCHEMATIC 165902 - HE2X through HE4X Models, Three-phase Supply, 2 Dampers, No VFDs



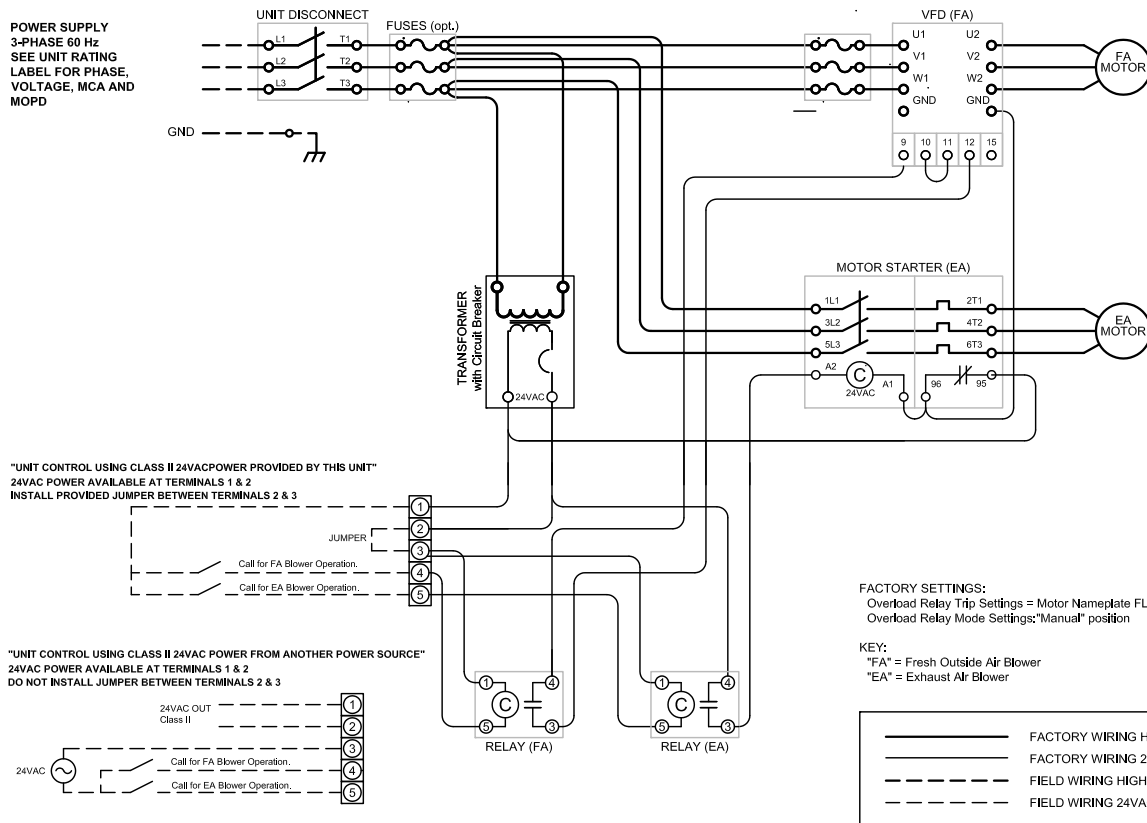
SCHEMATIC 165901 - HE2X through HE4X Models, Three-phase Supply, FA Damper, No VFDs



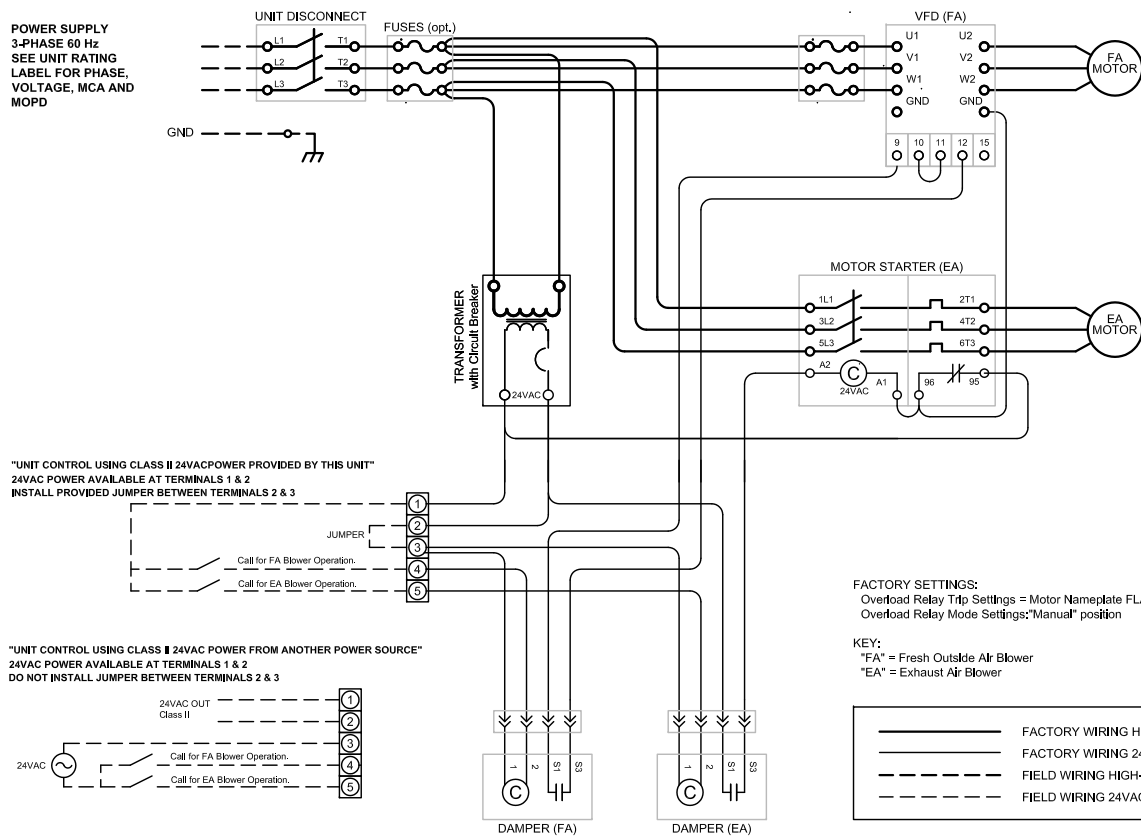
SCHEMATIC 165900 - HE2X through HE4X Models, Three-phase Supply, EA Damper, No VFDs



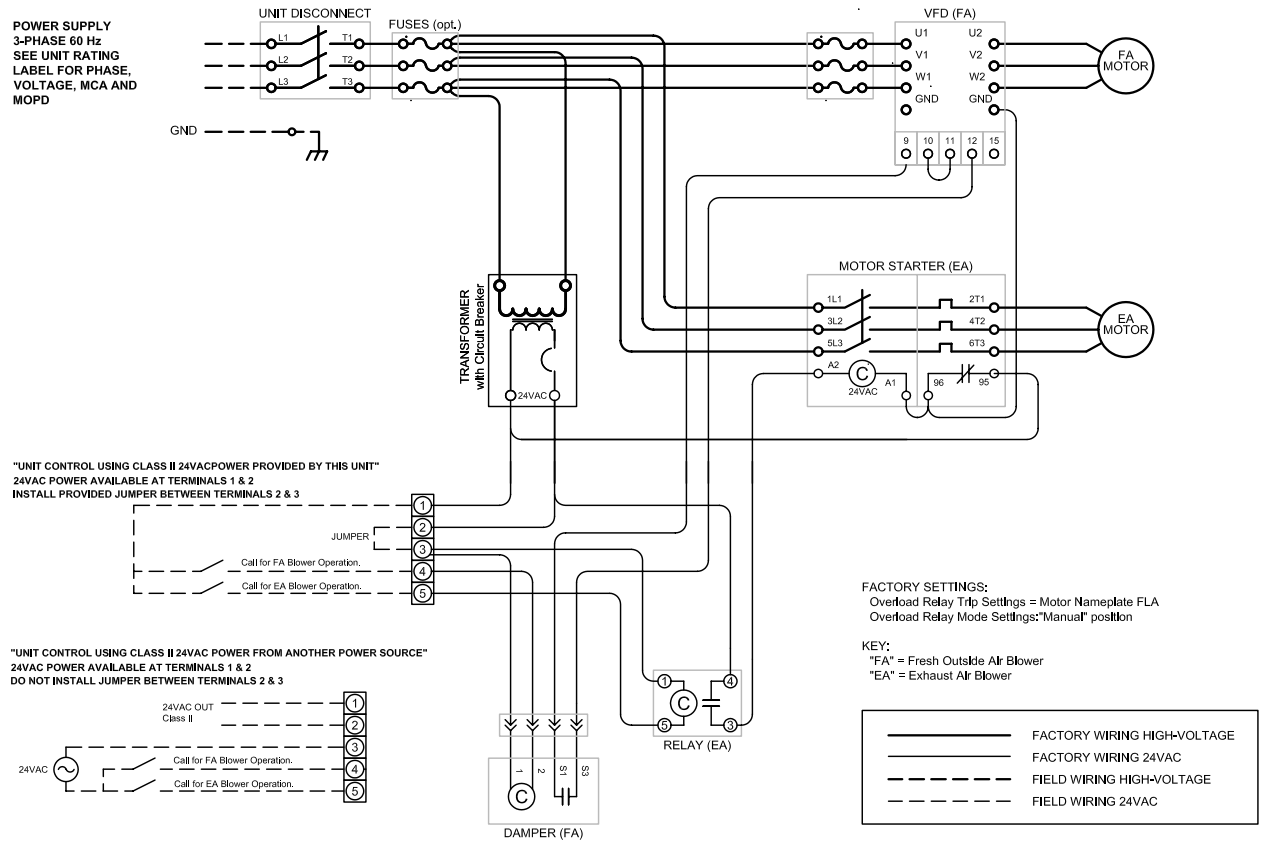
SCHEMATIC 165911 - HE2X through HE4X Models, Three-phase Supply, No Dampers, FA VFD



SCHEMATIC 165910 - HE2X through HE4X Models, Three-phase Supply, 2 Dampers, FA VFD

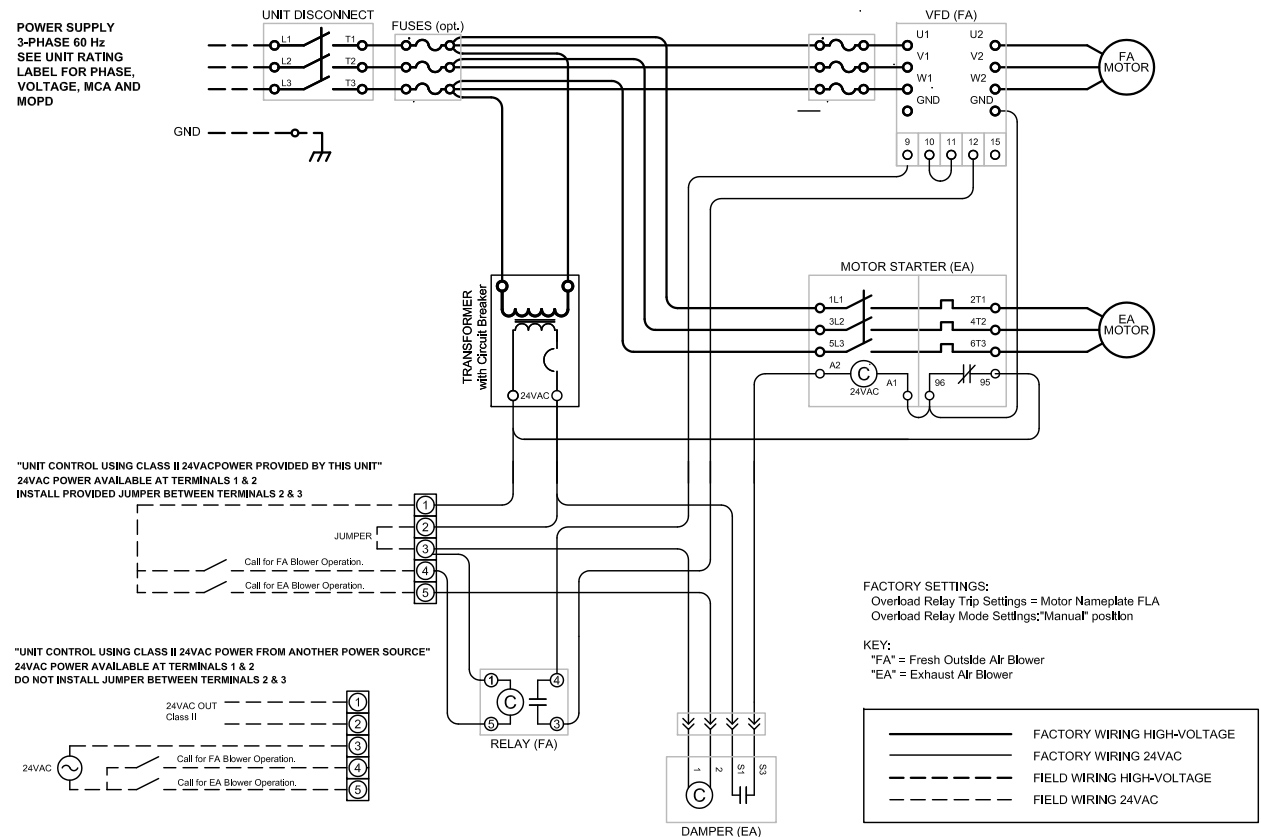


SCHEMATIC 165909 - HE2X through HE4X Models, Single-phase Supply, FA Damper, FA VFD



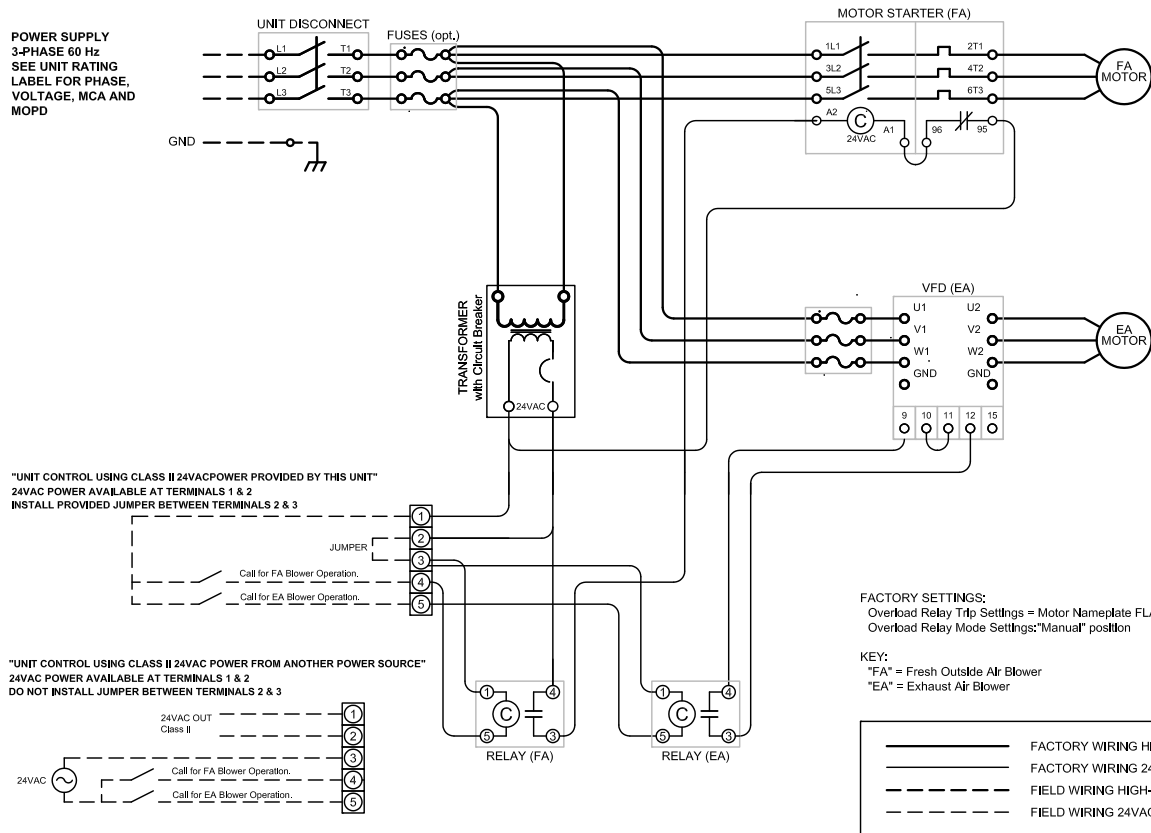
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SCHEMATIC 165908 - HE2X through HE4X Models, Single-phase Supply, EA Damper, FA VFD



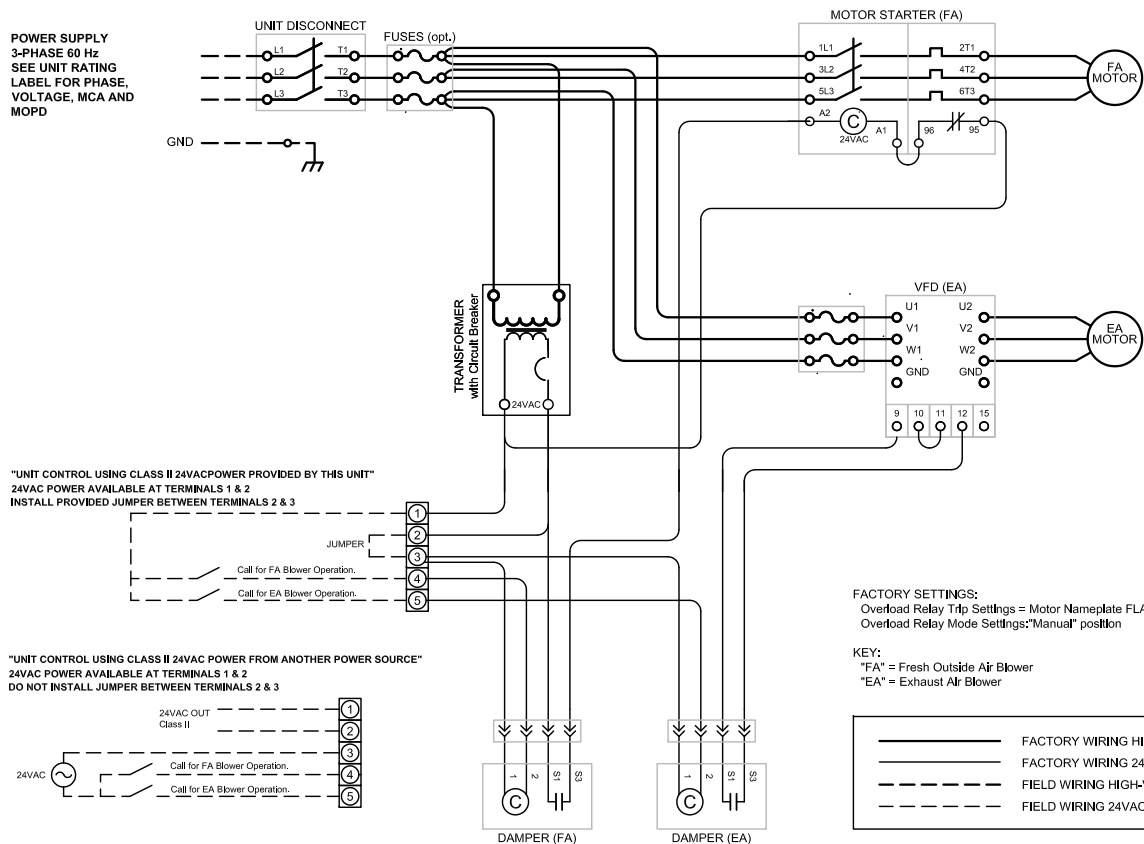
LABEL PN 165908_000

SCHEMATIC 165915 - HE2X through HE4X Models, Three-phase Supply, No Dampers, EA VFD



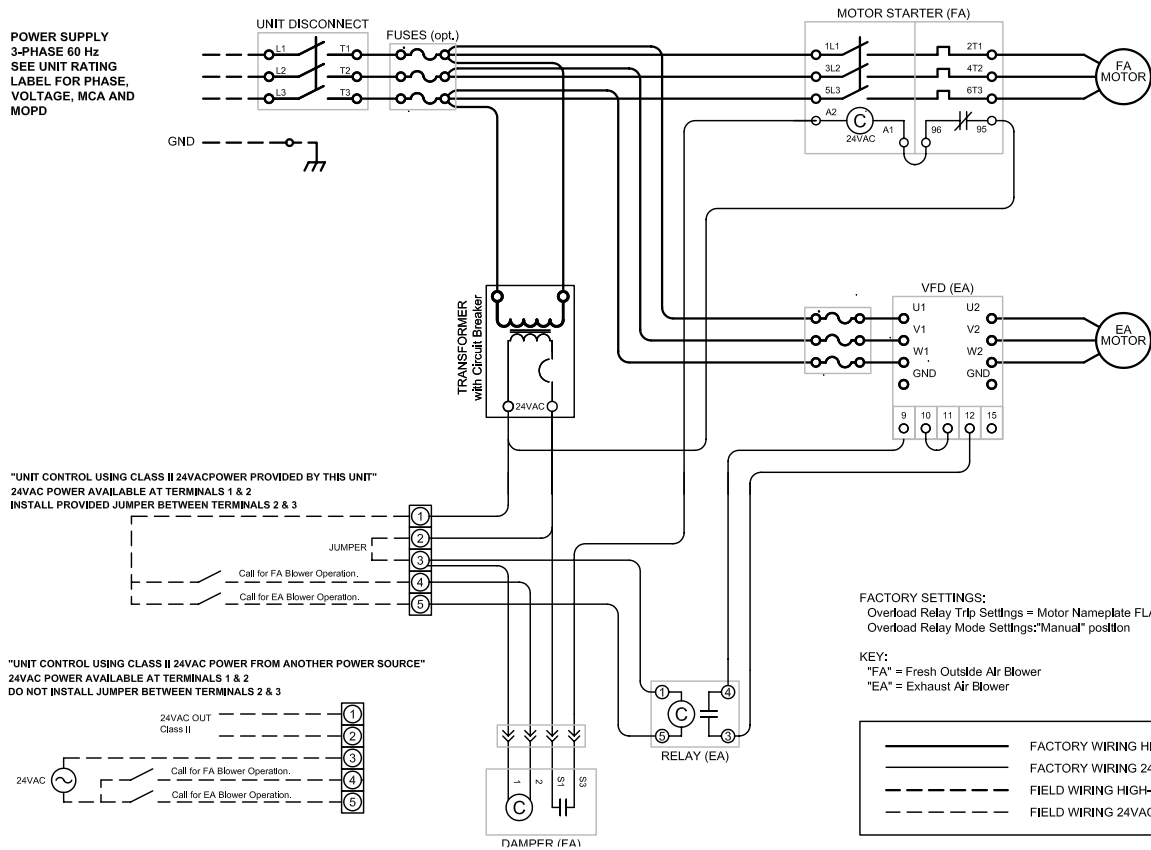
LABEL PN 165915_000

SCHEMATIC 165914 - HE2X through HE4X Models, Three-phase Supply, 2 Dampers, EA VFD

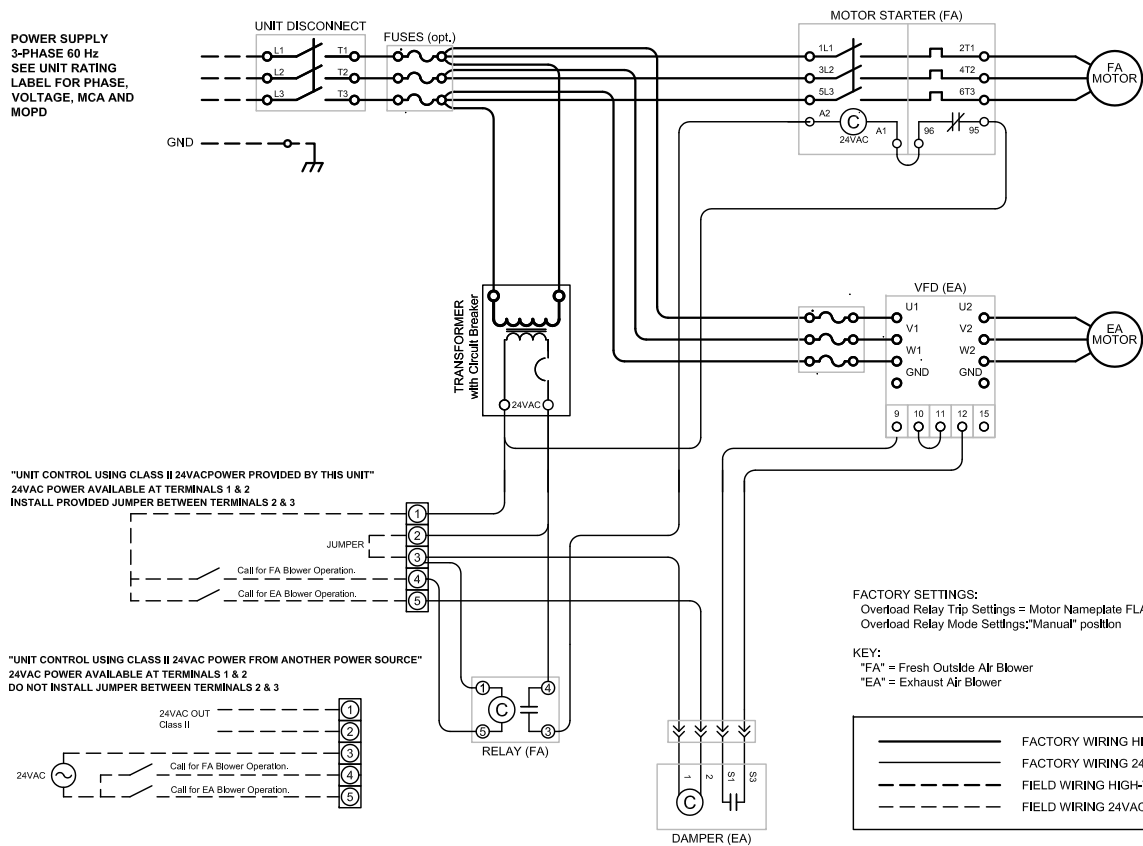


LABEL PN 165914_000

SCHEMATIC 165913 - HE2X through HE4X Models, Three-phase Supply, FA Damper, EA VFD



SCHEMATIC 165912 - HE2X through HE4X Models, Three-phase Supply, EA Damper, EA VFD



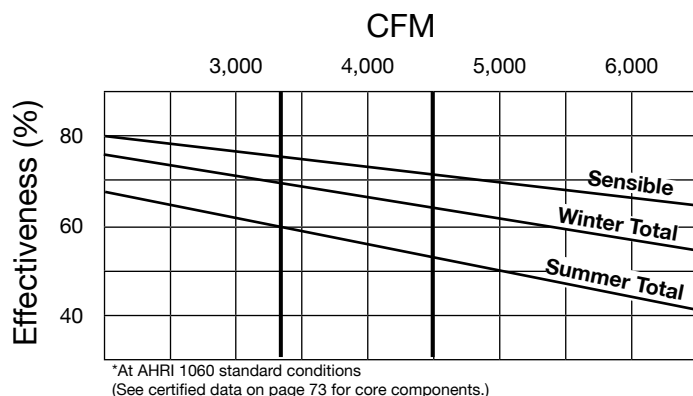
HE6XRT



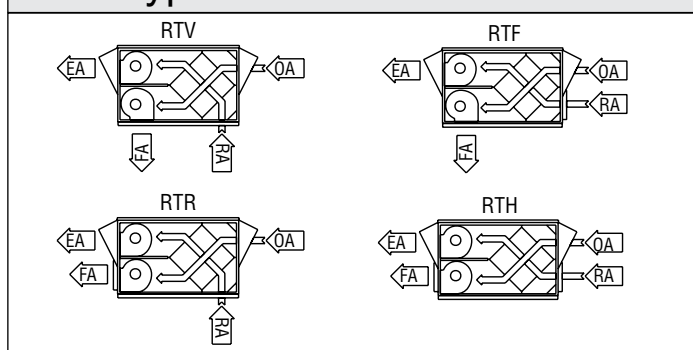
Outdoor Unit



G5 Performance



Base Type/Airflow Orientations



Airflow Performance

Motor HP	Blower RPM	Turns Open	External Static Pressure (in. w.g.)																	
			0.00		0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
5	1460	4.5	5005	2.5	4800	2.5	4650	2.3	4475	2.1	4200	1.9	4000	1.7	3750	1.7	3400	1.5	3100	1.1
	1610	2	5550	4.0	5375	4.0	5250	3.9	5100	3.9	4900	3.7	4650	3.6	4500	3.4	4250	3.3	4000	3.1
	1725	0							5525	5.0	5475	5.0	5200	4.9	5050	4.8	4800	4.6	4600	4.5
7.5	1560	4.5	5275	2.7	5200	2.5	4900	2.3	4775	2.3	4550	2.1	4350	1.9	4125	1.9	3875	1.7	3575	1.5
	1740	2	5950	4.7	5825	4.7	5625	4.6	5490	4.6	5325	4.5	5125	4.3	4950	4.3	4750	4.2	4525	4.0
	1865	0	6500	6.5	6350	6.5	6225	6.4	6125	6.4	5910	6.3	5825	6.2	5625	6.1	5410	6.1	5300	6.0

Note: Brake Horse Power (BHP) is for one blower motor package only.

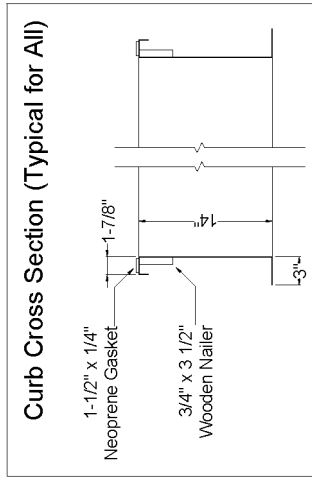
Operation in this zone will likely exceed FLA limits.

Specifications

Ventilation Type: Static Plate, Heat and Humidity Transfer						
Typical Airflow Range: 1,500-6,500 CFM						
AHRI 1060 Certified Core: Six L125-00						
Airflow Rating Points (for AHRI): 4,500 CFM and 3,375 CFM						
Number Motors: Two belt drive blower/motor packages with adjustable sheaves						
HP	Volts	HZ	Phase	FLA (per motor)	Min. Cir. Amps	Max. Overcurrent Protection Device
5	208-230	60	Three	15.0-13.6	33.8	45
	460	60	Three	6.8	15.3	20
	575	60	Three	5.3	11.9	15
7.5	208-230	60	Three	21.1-19.1	47.5	60
	460	60	Three	9.5	21.4	30
	575	60	Three	7.6	17.1	20
Optional Factory Installed VFD Electrical Specifications						
5	208-230	60	Three	15.0-13.6	37.1	45
	460	60	Three	6.8	16.8	20
	575	60	Three	5.3	13.1	15
7.5	208-230	60	Three	21.1-19.1	52.2	60
	460	60	Three	9.5	23.5	30
	575	60	Three	7.6	18.8	20
Standard Features: Totally Enclosed Premium Efficiency Motors Motor Starters, Non-fused Disconnect 24 VAC Transformer/Relay Package						
Filters: Twelve total, MERV 8, 2" pleated, 20" x 20" nominal size						
Weight: 2,400 lbs (unit), 2,700 lbs (shipping weight, on pallet)						
Shipping Dimensions: 116" L x 96" W x 90" H						
Options:						
Fused disconnect						
Double wall construction						
Factory supplied and mounted Variable Frequency Drives (VFDs) – one or both airstreams						
Motorized isolation dampers, OA, EA or both airstreams						
Factory mounted Filter Alarms (2)						
Exterior paint – white standard – custom colors available						

HE6XRT Unit Dimensions

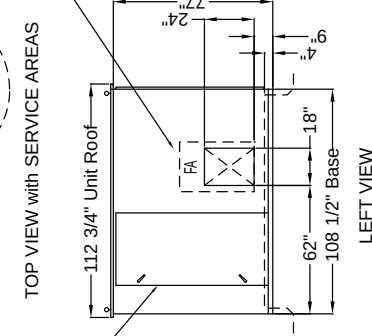
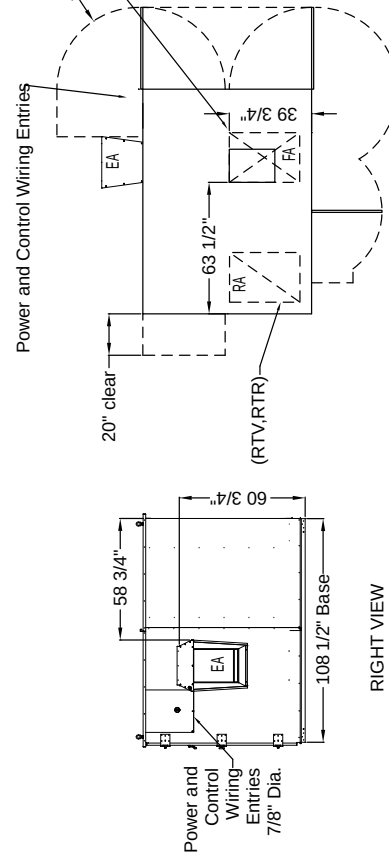
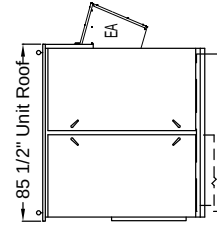
EA: Exhaust Air to outdoors
OA: Outdoor Air intake
RA: Room Air to be exhausted
FA: Fresh Air to inside



RTV, RTF UNITS ONLY:
FA Blower Outlet is 16" x 22".
Curb accepts up to 24" x 36" duct;
see separate Curb drawing.

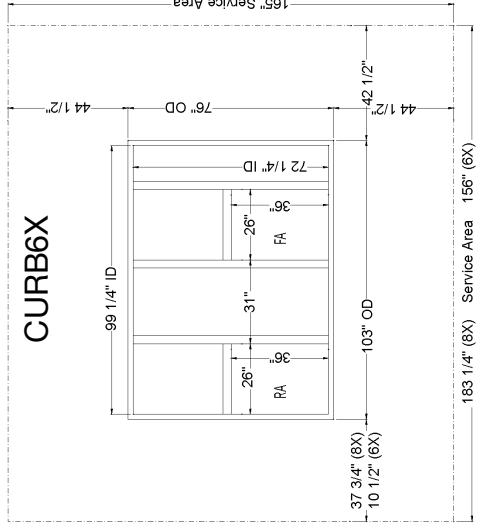
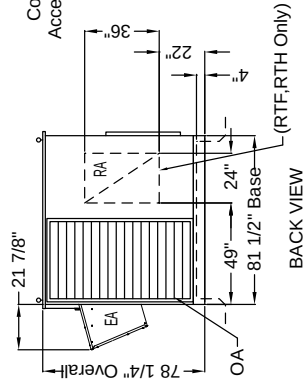


RTH, RTR UNITS ONLY:
FA Blower Outlet is 18" x 24".
24" x 36" Duct Flange is also supplied.
Field install only in location shown.



RIGHT VIEW

Note:
All units have an integral
exhaust air backdraft damper.



Factory-Installed Variable Frequency Drives (VFD) in RenewAire (ERV) Ventilators

⚠ WARNING

RISK OF FIRE, ELECTRIC SHOCK, OR INJURY. OBSERVE ALL CODES AND THE FOLLOWING:

1. Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lock-out/tag-out to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
2. This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
3. Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
4. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.
5. This unit must be grounded.
6. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
7. When cutting or drilling into unit, wall or ceiling, do not damage electrical wiring and other hidden utilities.
8. Do not re-wire the VFD(s) to control more than one motor per VFD.
9. Do not operate the motors in this unit above the motor's rated full load amps (FLA) as indicated on the unit's nameplate.

NOTE: VFD(s) in this unit can be operated in many ways. This Manual provides only an outline of common methods.

HOW TO USE THIS MANUAL

IN THIS MANUAL YOU WILL FIND:

- **Orientation** – basic concepts including ON and SPEED signals, Parameters and Keypad.
- **Simple Startup** – how to make the unit run temporarily for testing and start-up.
- **Control Connections** – examples of control system wiring connections to the ERV and the VFD(s).
- **VFD Parameters** – information about the most commonly used Parameters
- **Scaling and Response to Analog Inputs** – step-by-step approach to scaling VFD speed so that it responds correctly to an analog input from the external control system.

FOR COMPLETE ERV INSTALLATION YOU WILL ALSO NEED:

- **Standard Installation and Operation Manual for the ERV** – physical installation and duct connection, maintenance procedures, etc.
- **Supplemental Wiring Schematic Manual** – complete unit wiring diagrams.
- **Short Form User's Manual ACS320** – ABB's user's/installer's manual. More detailed information is available online in the Document Library at www.abb.com/drives.

⚠ WARNING

DO NOT OPERATE VFD IN CONDITIONS OUTSIDE OF TEMPERATURE LIMITS:

The manufacturer's ambient temperature limits for the VFDs are 14 to 122 °F. It is not recommended that the VFDs be used under conditions above or below these temperature limits. Operate outdoor ERV units continuously if outdoor design conditions are not within the VFD operating temperature range or make other provisions to bring the VFD operating condition into the acceptable ambient temperature range. RenewAire commercial ERVs are VFD ready, in extreme climates consider field installing VFDs in a climate controlled indoor electrical cabinet.

ORIENTATION

“ON” AND “SPEED” SIGNALS

VFD operation in this unit is dependent on two signals: an ON signal and a SPEED (or REFERENCE) signal. The sources and types of these signals can vary. If the ERV is equipped with dampers the ON signal to the VFD comes from the end switch on the damper. If the ERV is not equipped with dampers, the ON signal comes from an external control connected directly to the VFD. When an ON signal is received by the VFD, it starts the motor. The VFD then operates the blower at the speed established by the SPEED signal. The SPEED signal is often provided by an external control, but in some applications “pre-set” speeds are set inside the VFD and are selected by external switches or relays.

PRINCIPLES OF EXTERNAL CONTROL

This ERV can be operated by various external control devices including remote switch or relay, digital time clock with relay, occupancy sensor with relay, and carbon dioxide sensor with relay and analog output. These devices are commonly known as 2-wire, 3-wire, and 4-wire devices. A Building Management System (BMS) can control this ERV through relay contacts and with 0-10vdc or 4-20mA analog inputs.

The external control devices can be connected to this ERV to operate each blower independently or for one blower to act as leader and the other blower to act as follower. In leader-follower mode, a single external switch or relay calls for operation and the leader VFD sets SPEED to internal presets, or in response to an analog input signal. The follower VFD then operates at either exactly the same speed, at an offset above or below the leader's speed, or at a scaled speed.

The VFD's are pre-programmed at the factory so only a few parameters need change for a specific installation.

CONNECTING EXTERNAL CONTROLS

If this ERV is equipped with damper(s), the ON signal is connected to the terminal strip in the electrical enclosure (“E-box”).

If this ERV is not equipped with damper(s), and has 2 VFDs, the ON signal is connected directly to the VFDs.

The SPEED signals are always connected directly to the VFD(s).

WIRE ROUTING

Route input power cables, motor cables and control cables separately to decrease electromagnetic interference caused by the rapid changes in the drive output voltage. Where control cables must cross power cables make sure that they are arranged at an angle as near to 90 degrees as possible. See the ABB VFD manual for more detailed wire routing instructions.

Power cables and control cables can be brought into the bottom of the electrical box attached to the ERV unit or through the bottom of the unit itself. There are plugged holes to run control wires and power wires between the electrical box and the unit interior, marked on the interior of the ERV unit and another plugged hole in the unit compartment divider to run wires to VFDs in the other airstream compartment if needed.

In some configurations the VFD and/or VFD protective guard may need to be removed to access the control wire hole plug to run wires. A label is located in the ERV on the left interior wall indicating the power and control wire hole plug locations. Bring wires out from the top or bottom of the VFD mounting bracket and not through the mounting bracket window when routing wires if the VFD is mounted over the hole plug.

After the wires are run, apply caulk around the wires at wire bushings used between the electrical box and ERV unit and between compartments in the unit to prevent air leakage between these compartments.

PURPOSE OF PROVIDED KEYPAD

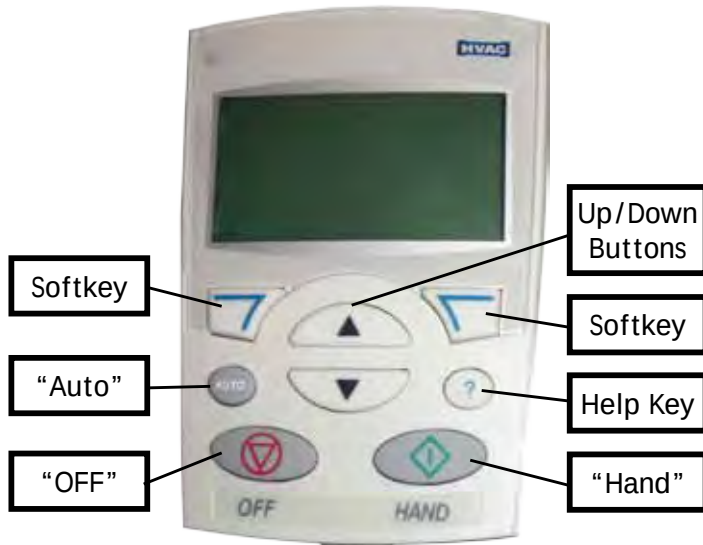
Each VFD has a keypad which is accessible at the E-box while the unit is operating.

You can check the status of the VFD at the keypad, and make changes to the VFD parameters at the keypad. You can manually control the VFD from the keypad during start-up and commissioning.

(VFD is factory programmed to cover most needs but some parameters will need to be set to interact with the external control system.)

Access the keypad(s) through the removable cover to the E-box.

ABB Key Pad Buttons



The function of each Softkey changes and is shown just above the Softkey in the display.

SIMPLE STARTUP

CAUTION

230V Power Supplies

ERVs rated for 208-230VAC power supplies are shipped with VFD parameters set for 208V operation. For 230VAC operation, change the following Parameters:

2003 MAX CURRENT Change to no more than 125% of motor FLA for 230V, as listed on the unit nameplate.

9905 MOTOR NOM VOLT Change from 208V to 230V.

9906 MOTOR NOM CURR Change to match the motor FLA for 230V, as listed on the unit nameplate.

TO START ERV

1) Turn off power to the ERV at its Disconnect Switch.

- Make sure the ERV is wired to provide an ON signal. (See Control Wiring Schematics later in this Manual.) You may need to install a temporary jumper at the ERV or VFD low-voltage terminal strip.
- VFDs are set at the factory to respond to the keypad. If an external controller providing an analog input is connected to the VFD, you may want to temporarily disconnect it.
- Close ERV doors and main cover for the E-box; leave keypads accessible.

2) Turn on power to the ERV at its Disconnect Switch.

- Wait for keypad display to appear.

3) For each VFD:

- Press the HAND button on the keypad. Motor should start running at about 425 RPM.
- Use the UP/DOWN buttons to set motor speed as desired. Confirm the motor amps are no greater than the motor FLA as listed on the unit nameplate.

4) To transfer control of the VFD to a control system:

- Press the OFF button on the keypad. Motor should stop running.
- Change the VFD parameters as required for the specific controls system (see "Control Connections" and "VFD Parameters", below, for examples; see also the ABB Manuals.)
- Press the AUTO switch on the keypad.

MOTOR PROTECTION BY THE VFD(s)

Each VFD in this unit protects one motor against overload. It is critical that the VFD MAX CURRENT be properly set at no more than 125% of the Full Load Amps (FLA) of the motor. The following Parameters must be set correctly and individually for each VFD to match the characteristics of the motor attached to it:

2003 MAX CURRENT 9905 MOTOR NOM VOLT
9906 MOTOR NOM CURR 9909 MOTOR NOM POWER
These parameters are set at RenewAire to match the motor controlled by the VFD. In most cases they should not be changed.

CAUTION

Capacitors in VFDs retain Charge

Allow 2 minutes after shutting off power to the VFDs to allow the capacitors in the VFD to fully discharge. Do not connect or disconnect wires at the VFD without waiting 2 minutes.

CONTROL CONNECTIONS

“ON” SIGNAL CONNECTIONS

If the ERV is equipped with Damper(s) and/or with just one VFD, the ON Signal control wires are connected to the low-voltage terminal strip in the ERV E-box. See Fig. 1.

Install a jumper between terminals 2 and 3 to use the ERV's on-board 24VAC power. Do this when the external control(s) have isolated contacts that don't provide any voltage, as in the top two examples.

Make no connections between terminals 1&2 and terminals 3-5 if the external control has a voltage output to provide the ON signal. This voltage must be 24VAC.

With ERVs equipped with no dampers and 2 VFDs, the ON signal control wires are connected directly to the VFD. See Fig. 2 & 3.

“SPEED” SIGNAL CONNECTIONS

Any SPEED Signal connections are made directly to the VFD (see Figures 4, 6 & 7). The VFDs can accept 4-20mA or 0-10vdc analog control signals to operate at varying speeds. The VFDs also can accept momentary-contact inputs to operate at up to three pre-set speeds. VFD Parameters must be properly set to accept and act on Speed signals. Wiring for analog control signals should be twisted-pair, single- or double-shielded cable, with shield (and drain if provided) grounded at only one end of the cable.

LEADER-FOLLOWER CONNECTIONS

ON and SPEED signals can be passed from the LEADER VFD to a FOLLOWER VFD. See Figures 3 & 5.

Fig. 1: Connection of ON signals to low-voltage terminal strip in ERV E-box.

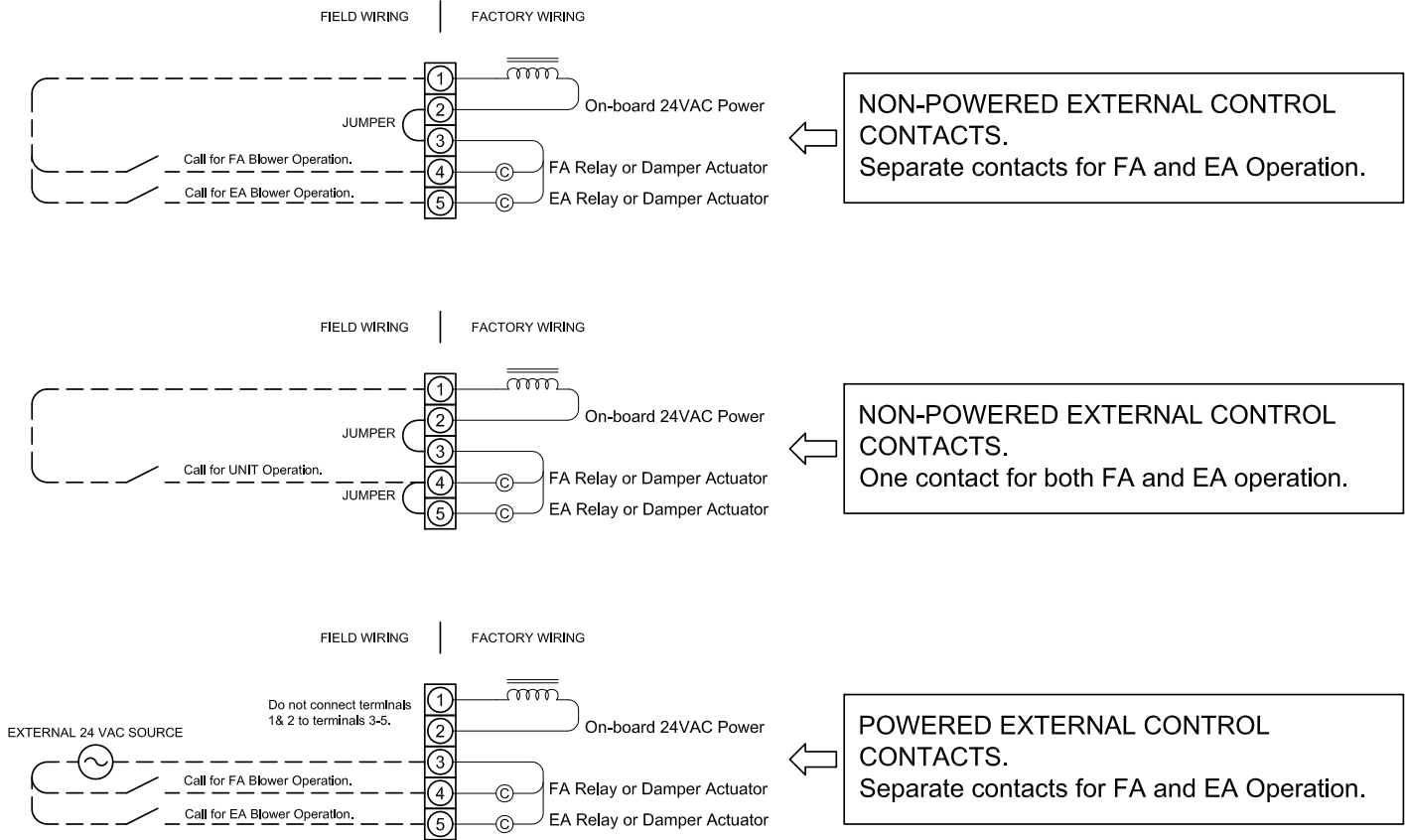


Fig. 2 (ERVs with 2 VFDs and NO Dampers only): Separate ON Signals connected to each VFD.

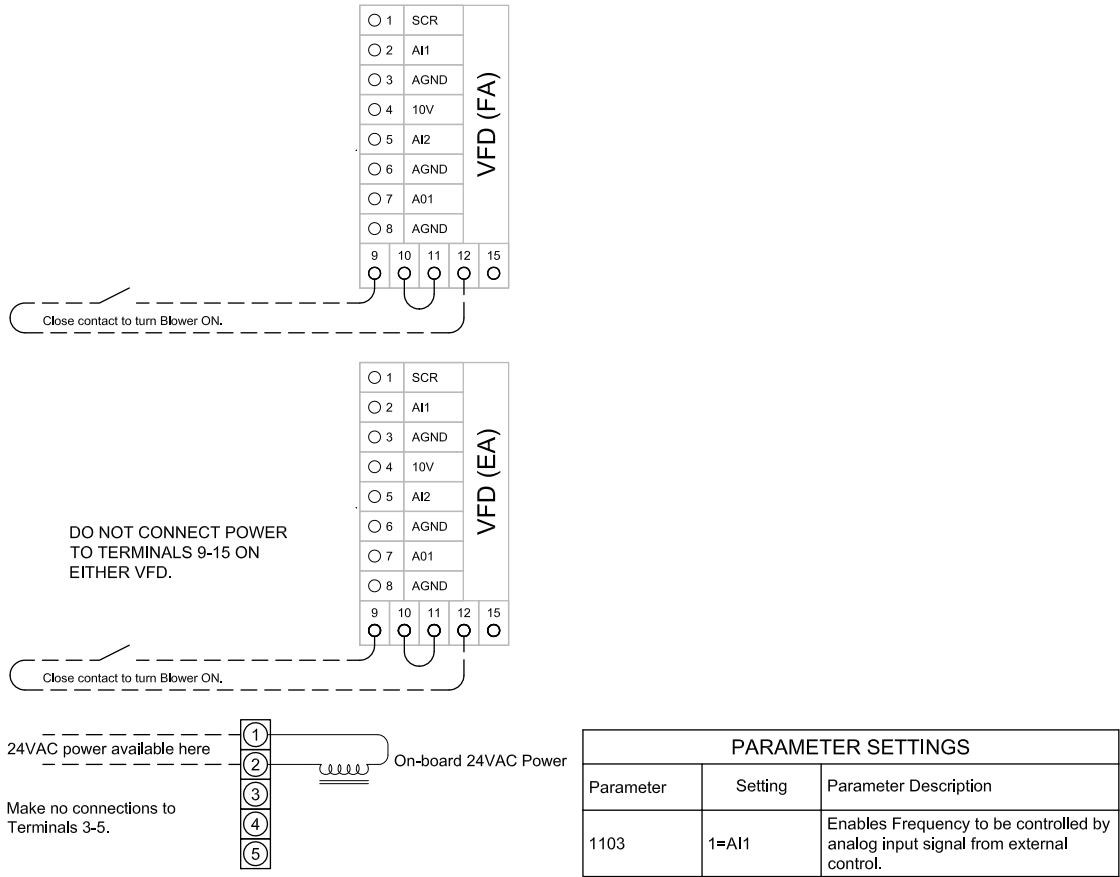
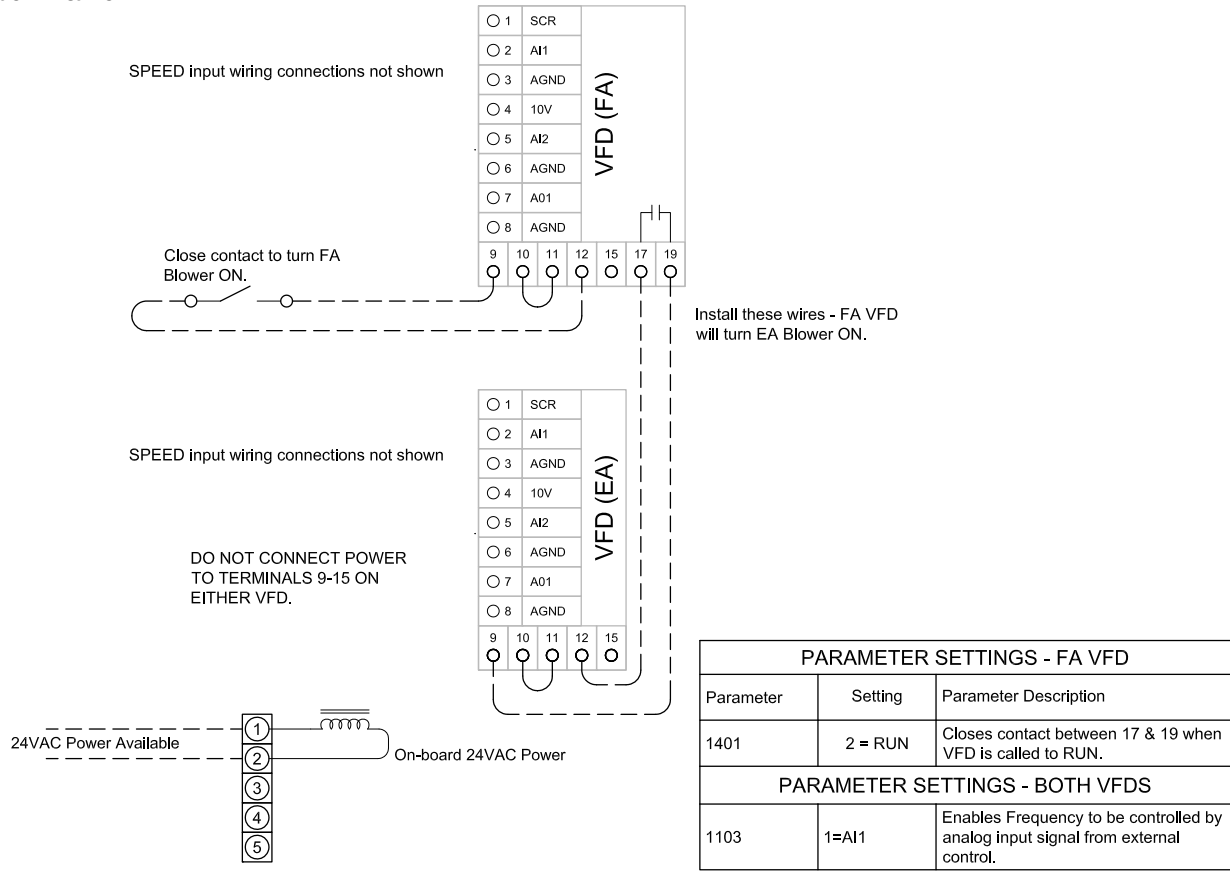


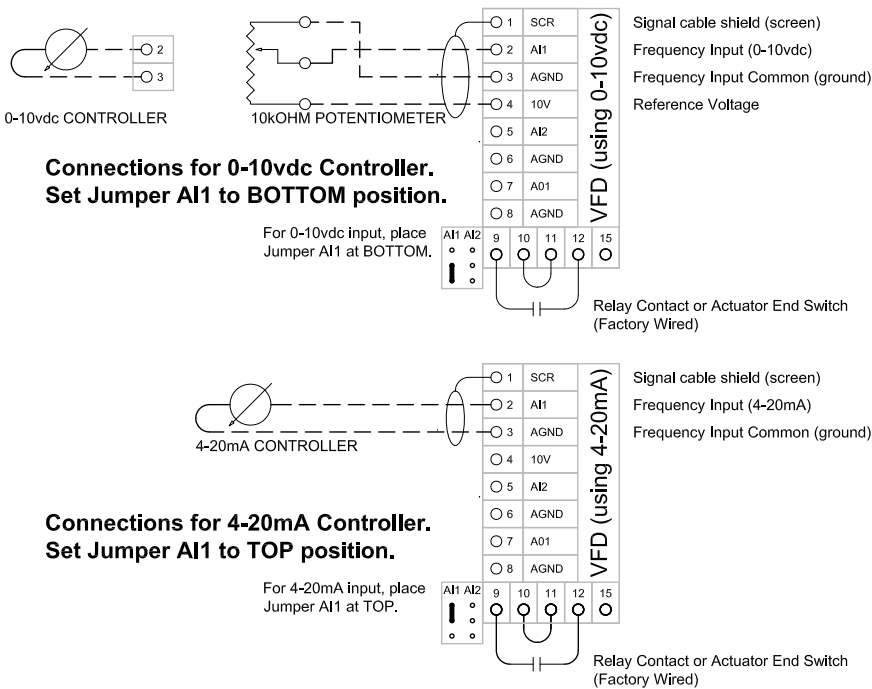
Fig. 3 (ERVs with 2 VFDs and NO Dampers only): ON Signal connected directly to one VFD, passed to second VFD from terminals 17 & 19.



ANALOG INPUTS TO PROVIDE THE SPEED SIGNAL

Analog inputs are connected to terminals 2-4 as shown below. It may be necessary to scale the response of the VFD to the analog SPEED signal. See “Scaling and Response to VFD Parameters”, below.

Fig. 4: Examples of Analog Input Connections.



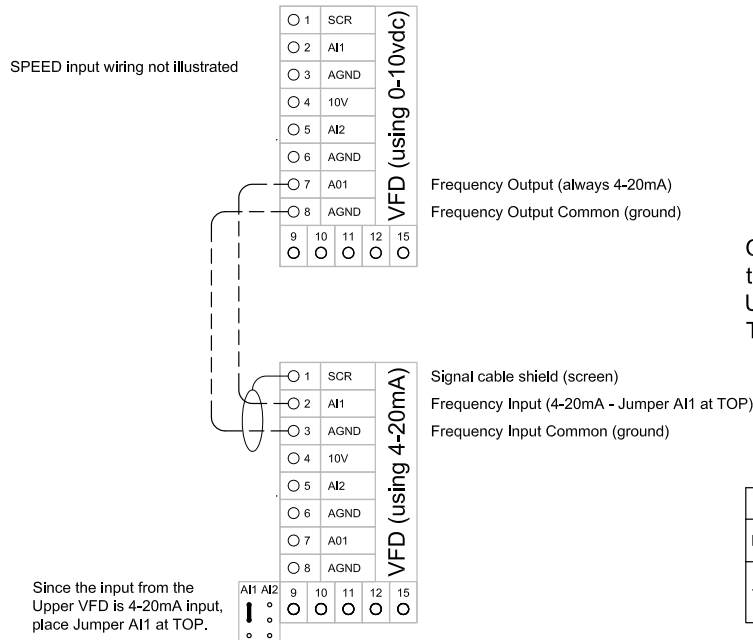
PARAMETER SETTINGS - GENERAL		
Parameter	Setting	Parameter Description
1103	1=AI1	Enables Frequency to be controlled by analog input signal from external control.
PARAMETER SETTINGS - 0-10vdc ANALOG INPUT		
3416	0%	Properly scales display of input.
3419	V	Sets display units as Volts.
3420	0V	Properly scales display of input.
3421	10V	Properly scales display of input.
PARAMETER SETTINGS - 4-20mA ANALOG INPUT		
3416	20%	Properly scales display of input.
3419	mA	Sets display units as mAmps.
3420	4mA	Properly scales display of input.
3421	20mA	Properly scales display of input.

NOTE: All wiring for analog signals connected to the VFDs should be double- or single-shielded twisted-pair cable. Ground the shield at one end of the cable only.

WIRING TWO VFDS FOR LEADER-FOLLOWER OPERATION

One VFD can provide the SPEED signal to a second VFD, as shown below.

Fig. 5: Leader-Follower Connection.



Connect VFDs as shown - FA VFD will pass the Frequency (Speed) Signal to the EA VFD. Use shielded cable and ground the shield to Terminal 1 on either VFD.

PARAMETER SETTINGS		
Parameter	Setting	Parameter Description
1103	1=AI1	Enables Frequency to be controlled by analog input signal from external control.

NOTE: Parameters 1501 and 1502 can be used to scale the Analog Output of the Leader VFD in order to offset or correct the speed of the Follower VFD.

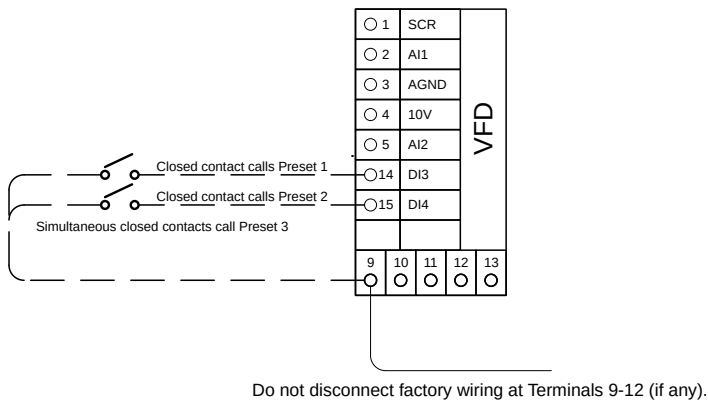
NOTE: If the FA VFD is controlled by an analog input signal, it is likely that the FA VFD's response to the analog input will need to be scaled, using parameters 1104, 1105, 1301 and 1302. See "Scaling and Response to VFD Parameters", below.

If both VFDs are to run at the same speed, no scaling parameters need be applied to the EA VFD since it is controlled as a "Follower".

USING VFD PRESETS FOR THE SPEED SIGNALS

The VFD can be programmed with 3 pre-set speeds. Contact switches can then be used to direct the VFD to operate at one of those speeds. See ABB manuals for additional options. Leader-follower wiring can also be used to make a second VFD operate at the same speed as the first VFD.

Fig. 6: Use of 2 Switches to command the VFD to operate at any of 3 pre-set speeds.



Pre-set speeds over-ride any Frequency (Speed) inputs.

Use switches across terminals 9-14 and 9-15 on the VFD.

Install Leader-Follower connection wiring if desired to operate 2nd VFD at the same speeds.

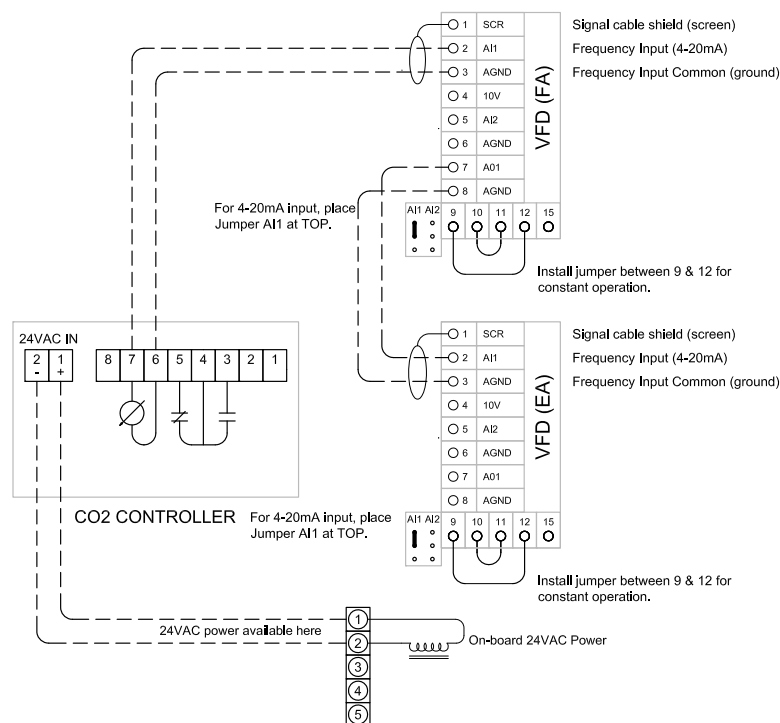
14	15	TERMINAL
DI 3	DI 4	STATUS
0	0	No constant speed
1	0	Constant Speed 1 (1202)
0	1	Constant Speed 2 (1203)
1	1	Constant Speed 3 (1204)

PARAMETER SETTINGS		
Parameter	Setting	Parameter Description
1201	DI 3,4	Enables combinations of inputs at DI3 and DI4 to select 3 presets.
1202	Speed 1 (hz)	Setting in hz for Preset Speed 1
1203	Speed 2 (hz)	Setting in hz for Preset Speed 2
1204	Speed 3 (hz)	Setting in hz for Preset Speed 3

USE WITH A CO2 CONTROLLER

The example below corresponds to the example in the section “Scaling and Response to Analog Inputs”. The scaling parameters for the FA VFD in your application are likely to be different.

Fig. 7: Example of Operation of 2 VFDs by a CO2 Controller.



NOTE: If the ERV is equipped with dampers, wiring is somewhat different. Install jumpers at the low-voltage terminal strip in the ERV Ebox between terminals 1&4 and 4&5 for constant operation (rather than at 9&12 on the VFDs)

PARAMETER SETTINGS - BOTH VFDs		
Parameter	Setting	Parameter Description
1103	1=AI1	Enables Frequency to be controlled by analog Input signal from external control.
3416	20%	Properly scales display of input.
3419	mA	Sets display units as mAmps.
3420	4mA	Properly scales display of input.
3421	20mA	Properly scales display of input.
PARAMETER SETTINGS - FA VFD		
1104	20Hz	Sets Minimum Speed of VFD
1105	50 Hz	Sets Maximum Speed of VFD
1301	55%	Scales the response of the VFD to the CO2 Controller Output
1302	91%	Scales the response of the VFD to the CO2 Controller Output

If both VFDs are to run at the same speed, no scaling parameters need be applied to the EA VFD in this example since it is controlled as a “Follower”.

If it is desired that the VFDs should shut off when CO2 levels drop below a setpoint, connect the Normally Open contacts of the CO2 controller (terminals 3&4) to terminals 9 & 12 of the FA VFD. Adjust the operating parameters of the CO2 controller to set the relay setpoint.

USE WITH A BUILDING MANAGEMENT SYSTEM

The ABB ACS320 drive can be connected to an external control system via embedded fieldbus. The embedded fieldbus supports Modbus RTU, BACnet®, Metasys® N2 and APOGEE® FLN Protocols. See the ABB ACS320 Drives User’s Manual for details on connecting to an external control system.

VFD PARAMETERS

VFD PARAMETER OVERVIEW

“VFD Parameters” are instructions that the Variable Frequency Drives follow. They can be adjusted by using the keypads on the VFDs. In some control configurations, they will need to be changed from the settings as shipped in the unit to interface with your control system.

To view the VFD's Parameters from the keypad, press the MENU softkey. Press up/down arrows to highlight PARAMETERS, then select it by pressing the ENTER softkey.

TO VIEW ALL VFD PARAMETERS

VFD must be powered up – something will be showing on the LED display.

If EXIT is displayed above the left softkey, press softkey repeatedly until MENU appears above the right softkey.

Press the MENU softkey.

Use the UP/DOWN arrows to scroll the display until PARAMETERS is selected, then press the ENTER softkey.

You will see a numbered list of Parameter “groups” – those numbers are the first two digits of the Parameters in each group.

Press the SEL softkey to view all the Parameters in each Group. Use the UP/DOWN buttons to scroll through the parameters. As each Parameter is selected, its value will be displayed.

TO CHANGE VFD PARAMETERS

Select the Parameter you want to edit (see above). Press the EDIT softkey.

Use the UP/DOWN arrows to scroll through the available settings for that Parameter.

Press the SAVE softkey to set the Parameter to the selected value.

TO VIEW ONLY CHANGED VFD PARAMETERS

If EXIT is displayed above the left softkey, press softkey repeatedly until MENU appears above the right softkey.

Press the MENU softkey.

Use the UP/DOWN arrows to scroll the display until CHANGED PAR is selected, then press the ENTER softkey.

All Parameters that have been changed from the HVAC Application Macro default values are displayed. Use the UP/DOWN buttons to view them all.

SUMMARY TABLE OF COMMONLY USED PARAMETERS

Note: Parameters not listed in this Table are shipped in ABB's defaults for the HVAC Application Macro.

* by parameter number indicates it is not visible in Short View.

	Name/Selection	ABB HVAC Default	Settings as Shipped BY RenewAire	FUNCTION
9902	APPLIC MACRO	HVAC	HVAC	Pressing SAVE softkey when USER 1 LOAD is selected returns the VFD to the parameters as shipped from RenewAire. Pressing SAVE softkey when HVAC DEFAULT is selected returns the VFD to the ABB defaults.
9901	LANGUAGE	ENGLISH	ENGLISH (AM)	Sets language displayed to English with US units. Others available include Espanol, Francais.
9905	MOTOR NOM VOLT	VFD rating	Equal to Motor Voltage	Must be set equal to wired motor voltage.
9906	MOTOR NOM CURR	VFD rating	Equal to Motor FLA	Must be set equal to motor nameplate FLA. CRITICAL FOR SAFETY.
9907	MOTOR NOM FREQ	60.0 Hz	60.0 Hz	Must be set 60.0 Hz
9908	MOTOR NOM SPEED	Size Dependent	Set per motor	Usually 1750.
9909	MOTOR NOM POWER	VFD rating	Equal to Motor HP	Must be set to Motor nameplate HP.
1001*	EXT1 COMMANDS	1=DI1	1=DI1	Enables 2-wire start-stop when closing contact between 9&12. (Jumper req'd between 10&11.)
1103*	REF1 SEL	1=A11	0=KEYPAD	Selects signal source for external reference REF 1. Change to 1=A11 for operation by an external control signal.
1104*	REF1 MIN	0.0 Hz	0.0 Hz	Sets minimum value for speed reference. Used for scaling and offsetting the input to the VFD output.
1105	REF1 MAX	60.0 Hz	60.0 Hz	Sets maximum value for speed reference. Used for scaling and offsetting the input to the VFD output.
1201*	CONST SPEED SEL	3=DI3	9=DI3,4	Enables three-speed operation at three preset speeds using two switches between 9&13 and 9&14.
1202	CONST SPEED 1	6.0 (Hz ?)	30.0 Hz	Determines preset speed 1.
1203	CONST SPEED 2	12.0 (Hz ?)	45.0 Hz	Determines preset speed 2.
1204	CONST SPEED 3	18.0 (Hz ?)	60.0 Hz	Determines preset speed 3.
1301	MINIMUM AI1	20%	20%	Sets minimum value for analog input. Used for scaling and offsetting the input to the VFD output.
1302	MAXIMUM AI1	100%	100%	Sets maximum value for analog input. Used for scaling and offsetting the input to the VFD output.
1401	RELAY OUTPUT 1	1=READY	2=RUN	Energizes Relay 1 when drive is running. Terminal 17=COM, 18=N.C., 19= N.O.
1501	AO 1 CONTENT SEL	103=OUTPUT FREQ	103=OUTPUT FREQ	Sets the Analog Output of the VFD equal to the Output Frequency at which it is driving its Motor.
1502	AO 1 CONTENT MIN	0.0 Hz	0.0 Hz	Scales the minimum value of the analog output with respect to the VFDs Output Frequency.
1503	AO 1 CONTENT MAX	60.0 Hz	60.0 Hz	Scales the maximum value of the analog output with respect to the VFDs Output Frequency.
1504	MINIMUM AO 1	4.0 mA	4.0 mA	Sets the minimum current for the Analog Output.
1505	MAXIMUM AO 1	20.0 mA	20.0 mA	Sets the maximum current for the Analog Output.
1602*	PARAMETER LOCK	1=OPEN	0=LOCKED	Allows you to lock or change parameters from the keypad.
1603*	PASS CODE	0	0	Entering pass code 358 allows you to change parameter 1602 once. The entry reverts back to 0 automatically.
1607*	PARAM.SAVE	0 = DONE	0 = DONE	Saves parameters to permanent memory
1608*	START ENABLE 1	4=DI4	1=DI1	Enables DI1 as the source of the Start Enable Signal.
1611	PARAMETER VIEW	SHORT VIEW	LONG VIEW	Hides less commonly used parameters
2003*	MAX CURRENT	1.1*I2N	Set to 125% motor FLA	CRITICAL PARAMETER. Defines motor protection level.
2007*	MINIMUM FREQ	0.0 Hz	15.0 Hz	Determines minimum frequency of VFD output
2008	MAXIMUM FREQ	60.0 Hz	60.0 Hz	Determines maximum frequency of VFD output
2101*	START FUNCTION	1=AUTO	6=SCAN START	Selects the motor start method. SCAN START provides a frequency-scanning flying start, and corrects backwards rotation.
2102	STOP FUNCTION	1=COAST	1=COAST	Sets motor to coast to a halt. Can be set to ramp down to a halt, following the deceleration time set at 2203.
2202	ACCELER TIME 1	30.0 s	30.0 s	Sets acceleration time.
2203	DECELER TIME 1	30.0 s	30.0 s	Sets deceleration time. This is ignored when 2102 STOP FUNCTION = COAST.
3401*	SIGNAL 1 PARAM	103=OUTPUT FREQUENCY	101=SPEED AND DIR	Sets top line of keypad display to show motor speed in rpm.
3408*	SIGNAL 2 PARAM	104=CURRENT	104=CURRENT	Sets middle line of keypad display to show motor current in Amps.
3415*	SIGNAL 3 PARAM	120=AI 1	120=AI 1	Sets bottom line of keypad display to show value of analog signal input.

* This parameter is not visible in the "short view". To be able to view all signals and parameters, set parameter 1611 PARAMETER VIEW to 3 (LONG VIEW).

NOTE: SPEED-SKIPPING is a function available through Parameters 2501-2507. It allows up to 3 critical speeds to be skipped as the VFD ramps speed up and down. If noise problems occur at specific frequencies, Speed-Skipping may help. See the VFD manual for details.

TO LOCK OR UNLOCK PARAMETERS

VFDs are shipped locked to prevent accidental changes to parameter settings. If changes to factory parameter settings are desired, the VFD will need to be unlocked for editing the settings.

To unlock all Parameters if Parameter 1602 reads LOCKED:

1. Select Parameter 1603 PASS CODE: press EDIT softkey.
2. Use the UP / DOWN buttons to scroll to 358: press SAVE softkey (the entry will automatically revert back to 0); press EXIT softkey.
3. Scroll up to Parameter 1602 PARAMETER LOCK which reads LOCKED; press EDIT softkey.
4. Scroll to OPEN; press SAVE softkey; press EXIT softkey.

Parameters are now unlocked. You can view and change them.

To lock Parameters after changes are made if Parameter 1602 reads OPEN:

1. Select Parameter 1603 PASS CODE: press EDIT softkey.
2. Use the UP / DOWN buttons to scroll to 358: press SAVE softkey (the entry will automatically revert back to 0); press EXIT softkey.
3. Scroll up to Parameter 1602 PARAMETER LOCK which reads OPEN; press EDIT softkey.
4. Scroll to LOCKED; press SAVE softkey; press EXIT softkey.

Parameters are now locked. You can view them but you cannot change them.

TO RESET VFD PARAMETERS TO FACTORY SETTINGS USING KEYPAD

The VFD will need to be unlocked as described above to reset Parameters to RenewAire factory or ABB defaults.

To return to RenewAire's defaults, select parameter 9902 APPLIC MACRO and press EDIT softkey. Scroll down to USER 1 LOAD (Not USER 1 SAVE as this will overwrite the factory settings saved under USER 1 in the VFD base memory). Press the SAVE softkey.

Alternatively, to return to RenewAire's defaults, select PAR BACKUP in the keypad menu; scroll to and select DOWNLOAD FULL SET (not UPLOAD TO PANEL as this will overwrite the factory settings saved in the keypad memory).

To return to ABB's defaults, select parameter 9902 APPLIC MACRO and press EDIT softkey. Scroll up or down to select HVAC DEFAULT. Press the SAVE softkey. If HVAC DEFAULT was displayed without scrolling after pressing EDIT in parameter 9902, you will need to scroll up to another macro numbered 2 through 15 and press SAVE, then scroll back down to 1=HVAC DEFAULT and press SAVE again to get the settings to revert back to the original ABB defaults.

To save an edited parameter set for possible restoration, select parameter 9902 APPLIC MACRO and press EDIT softkey. Scroll down to USER 2 SAVE (Not USER 1 SAVE as this will overwrite the factory settings saved under USER 1 in the VFD base memory). Press the SAVE softkey. This edited parameter set can now be reset using USER 2 LOAD.

The VFD should be relocked as described above after the desired parameter settings are entered to avoid further, accidental changes to parameter settings.

NOTE: VFD Manufacturer instructions list many other parameters. Copies of the complete manufacturer's instructions for the VFD are shipped with this unit, and are also available on-line in the Document Library at www.abb.com/drives.

⚠ WARNING

DANGER OF MOTOR OVERLOAD LEADING TO SMOKE AND FIRE!

Do not change PARAMETER 2003 MAX CURRENT from RenewAire default setting, which should be set to no more than 125% of the motor nameplate FLA. This parameter controls the Motor OVERLOAD PROTECTION provided by the VFD.

SCALING AND RESPONSE TO ANALOG INPUTS

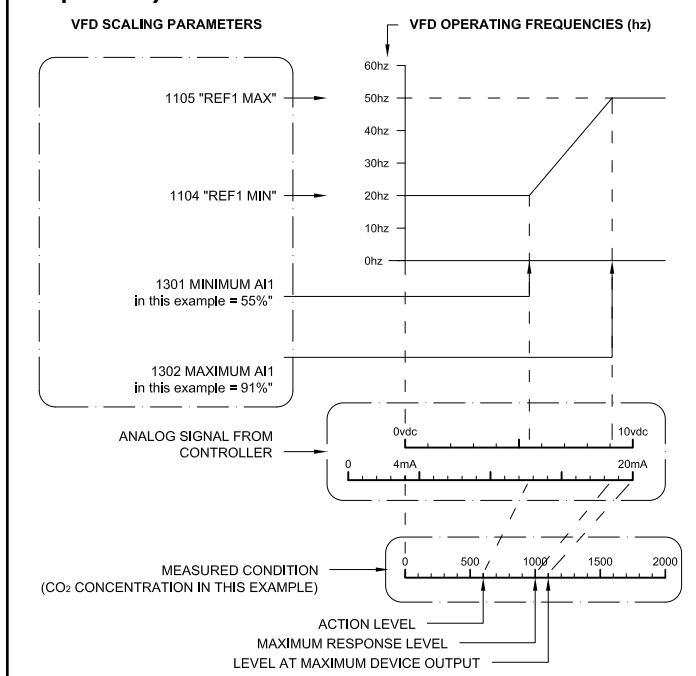
The most likely reason to control the VFD from an analog signal is to automatically change the amount of outside air ventilation to meet the actual needs for each time period.

If one or both of the VFDs will be controlled by an analog input from an external Control Device (e.g. a CO2 controller or a Building Management System), you may need to "scale" the rate of response of the VFD(s) to the rate of change of the analog signal.

We need to introduce two concepts relating to the amount of outside air ventilation needed in the building:

- The "ACTION LEVEL" is the level of measurement of indoor air quality or occupancy at which the ERV should start to deliver more than the "Design Minimum Supply Airflow";
- The "MAXIMUM RESPONSE LEVEL" is the level of measurement of indoor air quality or occupancy at which the ERV should be operating at the "Design Maximum Supply Airflow".

Fig.8: Schematic Relationship between Measurement by a Controller, the Analog Signal from the Controller, the VFD Scaling Parameters and the Motor Speed (VFD Operating Frequencies).



THEREFORE:

ACTION LEVEL = 600ppm

MAXIMUM RESPONSE LEVEL = 1000ppm

MAXIMUM SPEED = 50Hz

MINIMUM SPEED = 20Hz

ANALOG SIGNAL TYPE = mA.

MINIMUM SIGNAL VALUE = 4mA

MAXIMUM SIGNAL VALUE = 20mA

SIGNAL RANGE = 16mA

MEASUREMENT RANGE of the controller = 1100ppm

CALCULATIONS AND SETTING THE PARAMETERS

1. Set the VFD parameters for the minimum and maximum SPEEDS of the VFD:

- Set Parameter 1104 REF1 MIN to "20Hz". The motors will never run below this speed.
- Set Parameter 1105 REF1 MAX to "50Hz". The motors will never run above this speed.

2. Next calculate the ACTION LEVEL SIGNAL, the value of the analog signal from the controller when CO2 = 600ppm:

$$\text{Action Level Signal} = \text{Minimum Signal} + \left[\frac{\text{Action Level}}{\text{Measurement Range}} \times \text{Signal Range} \right]$$

Therefore:

$$\text{Action Level Signal} = 4(\text{mA}) + \frac{600(\text{ppm})}{1100(\text{ppm})} \times 16(\text{mA}) = 12.72(\text{mA})$$

3. The calculated ACTION LEVEL SIGNAL now needs to be expressed as a percentage of the SIGNAL RANGE, but since the MINIMUM SIGNAL VALUE = 4.0, calculate as follows:

$$\left[\frac{12.7(\text{mA}) - 4.0(\text{mA})}{16.0(\text{mA})} \times 100 \right] = 54.5\%$$

4. Calculate the MAXIMUM RESPONSE LEVEL SIGNAL: the value of the analog signal from the controller when CO2 = 1000ppm:

$$\text{Maximum Response Level Signal} = \text{Minimum Signal} + \left[\frac{\text{Maximum Response Level}}{\text{Measurement Range}} \times \text{Signal Range} \right]$$

Therefore:

$$\text{Maximum Response Level Signal} = 4(\text{mA}) + \left[\frac{1000(\text{ppm})}{1100(\text{ppm})} \times 16(\text{mA}) \right] = 18.54(\text{mA})$$

5. This calculated MAXIMUM RESPONSE LEVEL SIGNAL now needs to be expressed as a percentage of the SIGNAL RANGE, but since the MINIMUM SIGNAL VALUE = 4.0, calculate as follows:

$$\left[\frac{18.54(\text{mA}) - 4.0(\text{mA})}{16.0(\text{mA})} \times 100 \right] = 90.9\%$$

6. Set the parameters that will scale the response of the VFD to the inputs from the CO2 controller:

- Set Parameter 1301 MINIMUM AI 1 to "55%" (the MINIMUM SIGNAL VALUE).
- Set Parameter 1302 MAXIMUM AI 1 to "91%" (the MAXIMUM SIGNAL VALUE).

ADDITIONAL JOB INFORMATION NEEDED:

- MEASUREMENT RANGE: the range of the values that can be measured by the Controller (e.g. a controller set to measure CO2 from 0ppm to 1100ppm).²
- ANALOG SIGNAL TYPE: vdc or mA.
- MINIMUM SIGNAL VALUE of the analog signal: e.g. 0vdc or 4mA. This is the signal that the controller puts out when it is measuring at the bottom of its measurement range.
- MAXIMUM SIGNAL VALUE of the analog signal: e.g. 10vdc, 20mA. This is the signal that the controller puts out when it is measuring at the top of its measurement range.
- SIGNAL RANGE: the difference between the maximum and minimum signal values from the controller. In the case of a 0-10vdc controller the Signal Range is 10vdc. In the case of a 4-20mA Controller the Signal Range is 16mA.
- ACTION LEVEL SIGNAL: the value of the analog signal corresponding to the "Action Level".
- MAXIMUM RESPONSE LEVEL SIGNAL: the value of the analog signal corresponding to the "Maximum Response Level".

APPLICATION EXAMPLE: CO2 CONTROLLER

The engineer wants the ERV to:

- Run at a minimum of 700 CFM, regardless of CO2 levels, in order to control the level of indoor air pollutants generated by the furnishings.
- Start to increase airflow when CO2 levels rise above 600ppm.
- As CO2 levels continue to rise, the ERV should increase airflow, hitting a maximum of 1500 CFM at 1000 ppm CO2 level.

The CO2 controller is set up to deliver a linear 4-20mA signal over a measurement range of 0 to 1100ppm.

During the test and balance process, the ERV is found to deliver 700 CFM at 20Hz, and 1500CFM at 50Hz.

² This does not mean the range of values that will be measured. For example, a CO2 controller might be set so that it can measure from 0ppm to 1100ppm. The Measurement Range is therefore 0-1100ppm. In the field the controller might never read a value below 400ppm or above 1000ppm, but this is not the meaning of Measurement Range.

TECHNICAL SUPPORT

For questions about applications not covered in this manual, and for questions specific to the ABB Drives, contact ABB Technical Support at 800-HELP-365 (800-435-7365).

A listing of ABB support and service contacts can be found on the Internet at www.abb.com/drives and selecting Sales, Support and Service Network.

ABB manuals are available as pdfs at www.abb.com/drives; select Document Library.

ABB offers training courses on their VFDs; navigate to www.abb.com/drives and select Training Courses.

For questions about applications covered in this manual, and for questions about how the VFDs are installed in your RenewAire ERV unit, contact RenewAire Customer Support at 800-627-4499.

Features

- Vitreous china
- Elongated bowl
- Class Five® flushing system
- Polished chrome trip lever
- Less seat and supply
- 12" (305 mm) rough-in
- 1.28 gpf (4.8 lpf)
- 2-1/8" (54 mm) glazed trapway
- 11-3/8" (289 mm) x 8" (203 mm) water area
- 29-3/4" (756 mm) x 18" (457 mm) x 31-1/4" (794 mm)

CLASS FIVE® TOILET K-3999

ADA

CSA B651

OBC



Codes/Standards Applicable

Specified model meets or exceeds the following:

- ADA
- ICC/ANSI A117.1
- CSA B651
- OBC
- ASME A112.19.2/CSA B45.1
- EPA WaterSense®

Colors/Finishes

- 0: White
- Other: Refer to Price Book for additional colors/finishes

Specified Model

Model	Description	Trip Lever	Colors/Finishes	
K-3999	Class Five toilet	left-hand	☐ 0	☐ Other _____
K-3999-RA	Class Five toilet	right-hand	☐ 0	☐ Other _____
K-3999-RZ	Class Five toilet with Insuliner® and tank cover locks	right-hand	☐ 0	☐ Other _____
K-3999-T	Class Five toilet with tank cover locks	left-hand	☐ 0	☐ Other _____
K-3999-TR	Class Five toilet with tank cover locks	right-hand	☐ 0	☐ Other _____
K-3999-U	Class Five toilet with Insuliner	left-hand	☐ 0	☐ Other _____
K-3999-UR	Class Five toilet with Insuliner	right-hand	☐ 0	☐ Other _____
K-3999-UT	Class Five toilet with Insuliner and tank cover locks	left-hand	☐ 0	☐ Other _____

Recommended Accessories

K-4636	Cachet® Quiet-Close™ seat with Quick-Release™ functionality	☐ 0	☐ Other _____
K-4688	Cachet elongated toilet seat with cover	☐ 0	☐ Other _____
K-4731	Stronghold® elongated open-front toilet seat – for Accessibility compliance	☐ 0	☐ Other _____

Product Specification

The elongated bowl toilet shall be made of vitreous china. Toilet shall be 29-3/4" (756 mm) in length, 18" (457 mm) in width, and 31-1/4" (794 mm) in height with a 11-3/8" (289 mm) x 8" (203 mm) water area. Toilet shall be 1.28 gpf (4.8 lpf) with Class Five flushing system. Toilet shall include polished chrome trip lever. Toilet shall have 2-1/8" (54 mm) glazed trapway. Toilet shall be 12" (305 mm) rough-in. Toilet shall be less seat and supply. Toilet shall be Kohler Model K-3999-_____-_____.

HIGHLINE®

Recommended Accessories (Cont.)

K-7637 Angle supply with stop – 3/8" NPT

☐ Other _____

Technical Information

Fixture:	
Configuration	Two-piece, elongated
Water per flush	1.28 gpf (4.8 lpf)
Passageway	2-1/8" (54 mm)
Water area	11-3/8" (289 mm) x 8" (203 mm)
Water depth from rim	5-3/8" (137 mm)
Seat post hole centers	5-1/2" (140 mm)

Included components:	
Bowl	K-4199
Tank	K-4467
Tank cover	1138565
Trip lever	K-9379
Bolt cap accessory pack	1013092

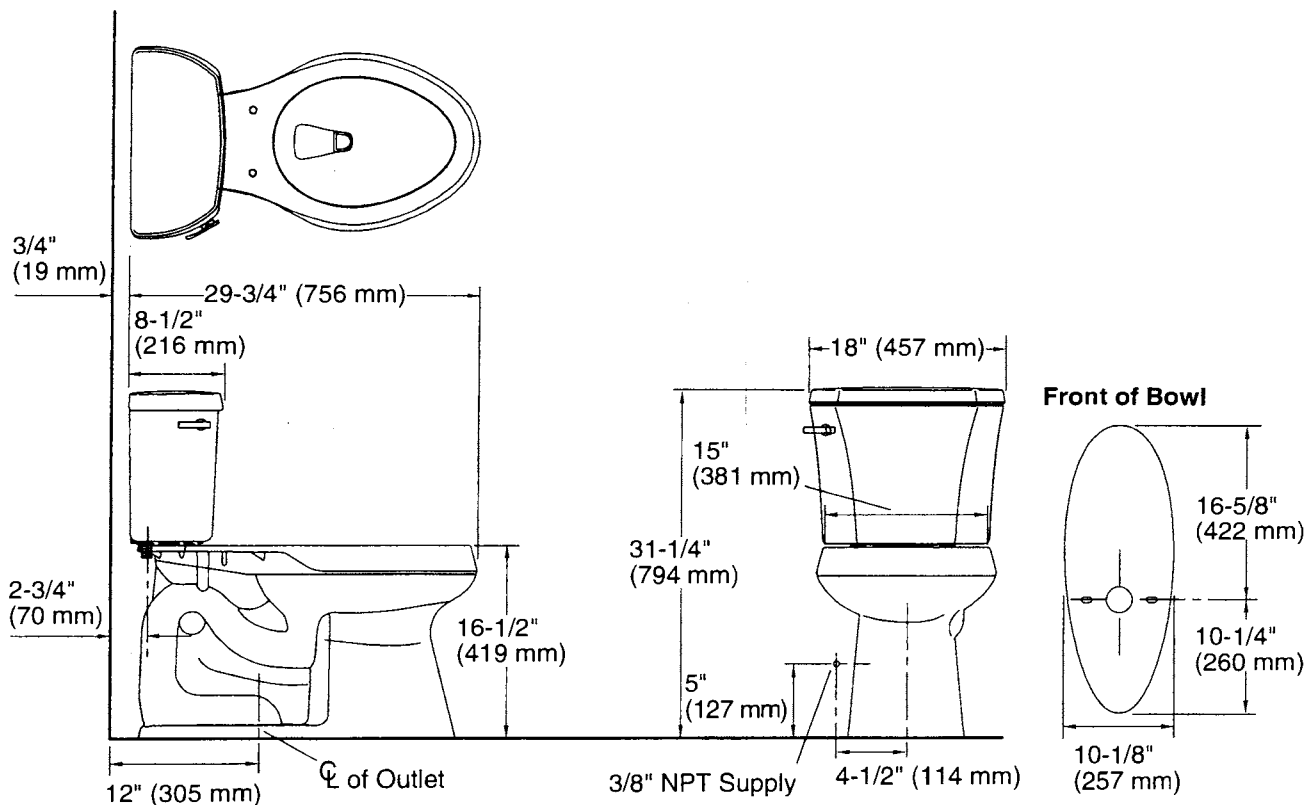
Installation Notes

Install this product according to the installation guide.

Will comply with the American Disabilities Act (**ADA**) when installed per the requirements of the Accessibility Guidelines, Section 604 Water Closets, of the Act. The Model Plumbing Codes require the installation of elongated open-front toilet seats in public bathrooms.

Will comply with **CSA B651** when installed per Clause 4.3.6 of the standard.

Will comply with **OBC** when installed per Clause 3.8.3.8 and 3.8.3.9.

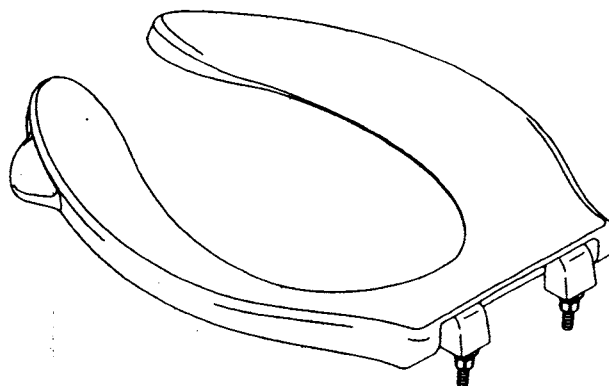


Product Diagram

Features

- Solid polypropylene plastic
- Elongated open-front
- Ergonomic contour adds additional comfort
- Integrated handle allows user to easily raise and lower the ring
- Stainless steel hinge arms and hardware
- Heavy duty
- Less cover
- ADA compliant when installed with an ADA compliant toilet
- Anti-microbial agent inhibits growth of odor-causing bacteria, mold, and mildew [-CA, -GA, -SA]
- Check hinge stops seat from leaning back and applying pressure on tank/flushometer [-C, -CA]
- Self-sustaining check hinge prevents slamming with check hinge functionality [-SC, -SA]
- Quiet-Close™ check hinge will slowly close with check hinge functionality [-GC, -GA]

COMMERCIAL HEAVY-DUTY TOILET SEAT K-4731



Codes/Standards Applicable

Specified model meets or exceeds the following:

- ANSI Z124.5

Colors/Finishes

- 0: White
- 7: Black Black™
- Other: Refer to Price Book for additional colors/finishes

Specified Model

Model	Description	Colors/Finishes		
K-4731-C	Elongated open-front seat – check hinge	☐ 0	☐ 7	☐ Other_____
K-4731-CA	Elongated open-front seat – check hinge and anti-microbial agent	☐ 0		
K-4731-GC	Elongated open-front seat – Quiet-Close™ check hinge	☐ 0	☐ 7	☐ Other_____
K-4731-GA	Elongated open-front seat – Quiet-Close™ check hinge and anti-microbial agent	☐ 0		
K-4731-SC	Elongated open-front seat – self-sustaining check hinge	☐ 0	☐ 7	☐ Other_____
K-4731-SA	Elongated open-front seat – self-sustaining check hinge and anti-microbial agent	☐ 0		

Product Specification

The elongated open-front toilet seat shall be made of solid polypropylene plastic. Product shall be less cover. Product shall have stainless steel hinge arms and hardware. Product shall feature an ergonomic contour which adds additional comfort. Product shall feature an integrated handle which allows the user to easily raise and lower the ring. Product shall feature an anti-microbial agent which inhibits growth of odor-causing bacteria, mold, and mildew [-CA, -GA, -SA]. Product shall feature a check hinge which stops the seat from leaning back and applying pressure on the tank/flushometer [-C, -CA]. Product shall feature a self-sustaining check hinge which prevents slamming with check hinge functionality [-SC, -SA]. Product shall feature a Quiet-Close™ check hinge which will slowly close with check hinge functionality [-GC, -GA]. Toilet seat shall be Kohler Model K-4731-_____-_____.

SLOAN® Waterfree

Waterfree
Urinal
Model

WES-1000

► **Description**

Wall hung, wall outlet, Waterfree Vitreous China Urinal.

► **Features**

- Touch-free operation
- Uses no water
- Mechanical-free design
- Patented, Sealed Locking Cartridge
- Smooth, non-porous surfaces

► **Benefits**

- Improved hygiene and safety
- Reduced water and sewer costs
- Water supply piping not required
- Odor-free
- Vandal resistant
- Minimal care and easy cleaning

► **Specifications**

Wall hung, wall outlet, waterfree, Vitreous China Urinal with the following features:

- Vitreous China Fixture
- Cartridge Housing (H-1, Mod. 3)
- Cartridge Kit † — Engineered to last for an average of 7000 uses
- One piece Wall Bracket with Anchors Included
- Uni-coupler (for new and retrofit installations)
- Drain Line Test Cap
- Professional Cartridge Change Key

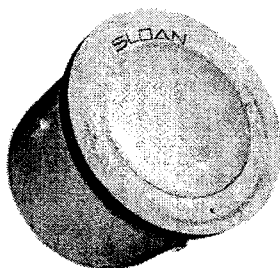
† Additional Cartridges sold separately

► **Colors**

☐ Standard White

Consult Sloan for optional colors.

► **Cartridge Filter**

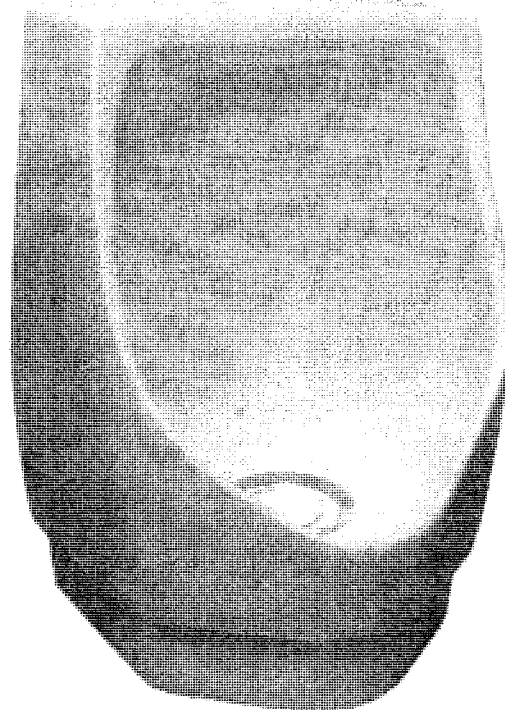


Patented, Sealed Cartridge uses a Biodegradable Sealant Liquid to control odors.

The patented Cartridge is engineered to last for an average of 7000 uses and to receive waste through drain holes. Waste passes through an immiscible layer of biodegradable Sealant, continues through a Trap System, and flows over a Baffle to prevent the loss of Sealant. A Discharge Tube in the housing directs the flow of waste into the building drain system. The Cartridge is designed as a replaceable component when its function has been exhausted.



Featuring Falcon Waterfree Technology



*The New Sloan Waterfree Urinal —
Preserves our Natural Resources and
saves costs*

Sloan Waterfree Urinals reduce water and sewer costs, maintenance and repair bills, and create more hygienic, odor-free restrooms. A Patented, Sealed Cartridge eliminates the need for water, typically conserving 40,000 gallons per unit per year. Installing Waterfree Urinals along with other Sloan Conservation Products ensures meaningful water savings. In addition, Sloan Waterfree Urinals do not require costly supply piping to fixture.

ANSI/ASME A112.19.19-2006



MEETS THE AMERICAN DISABILITIES ACT
GUIDELINES AND ANSI A117.1 ACCESSIBLE
AND USABLE BUILDINGS AND FACILITIES -
CHECK LOCAL CODES.



® Certified

This space for Architect/Engineer approval

Job Name _____ Date _____

Model Specified _____ Quantity _____

Variations Specified _____

Customer/Wholesaler _____

Contractor _____

Architect _____

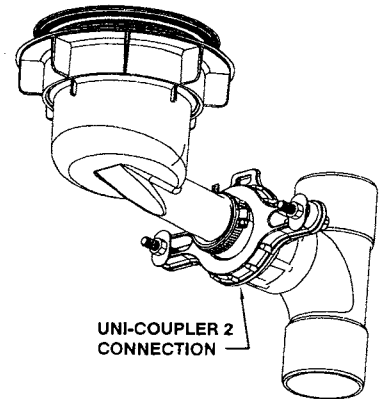
SLOAN® Waterfree

Waterfree Urinal Model

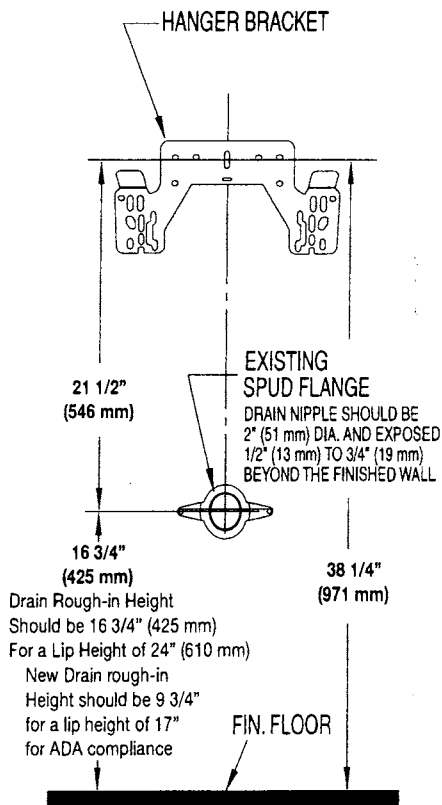
WES-1000

- ▶ **Description**
Wall hung, wall outlet, Waterfree Vitreous China Urinal.
- ▶ **Dimensions**
19 3/8" (492 mm) x 25 7/8" (657 mm) x 14 3/8" (366 mm)
- ▶ **Approximate Weight**
63 lbs.
- ▶ **Mounting For ADA Compliance**
For lip height of 17" (432 mm), distance from finished floor to drain centerline must be 9 3/4" (248 mm).
- ▶ **Drain Connection and Material**
Installs on standard 2-inch drain connections with spud flange or threaded nipple. Suitable DWV materials include cast iron, galvanized steel, ABS and PVC. Waterfree urinals are not recommended for installation with copper DWV due to copper's susceptibility to corrosion.

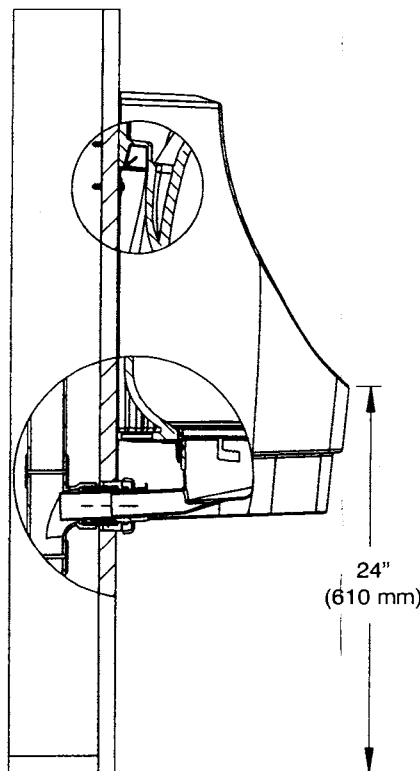
Uni-Coupler
The Uni-coupler connects the urinal housing to the building drain system and conforms to NSF 14 for plastic pipes and fittings. It is designed for use in both new and retrofit applications and offers a variety of configurations to meet most existing drain openings.



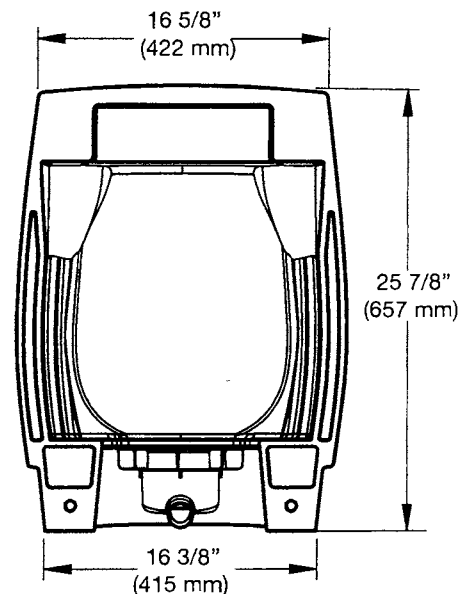
Rough-in & Bracket Location



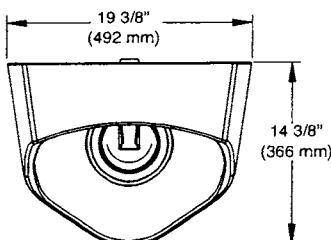
Side View



Back View



Top View



MAINTENANCE AND CLEANING

- Perform cleaning once a day, or as needed
- Remove any litter in the bowl and clear cartridge drain slots
- Use mild disinfectant cleaner on a cloth to wipe the bowl
- DO NOT use aggressive/concentrated detergents or any other chemicals
- DO NOT dispose of water into the urinal

SLOAN VALVE COMPANY • 10500 SEYMOUR AVENUE • FRANKLIN PARK, IL 60131

Phone: 1-800-982-5839 or 1-847-671-4300 • Fax: 1-800-447-8329 or 1-847-671-4380 • www.sloanvalve.com

TRAP PRIMER DISTRIBUTION UNITS



FLOOR DRAIN TRAP PRIMER DISTRIBUTION CHART

Max. Water Delivery	Primer Model	No. of Drains	Supply Tube	Distribution Units
Water delivery based upon pressure drop.	PR-500 PRIME-RITE	1	N/A	N/A
		2	N/A	DU-4/DU-U
		3	N/A	DU-4/DU-U
		4	N/A	DU-4/DU-U

NOTE: Air gap supply (AG-500) optional.

SPECIFICATIONS: Distribution Units DU-4 & DU-U.

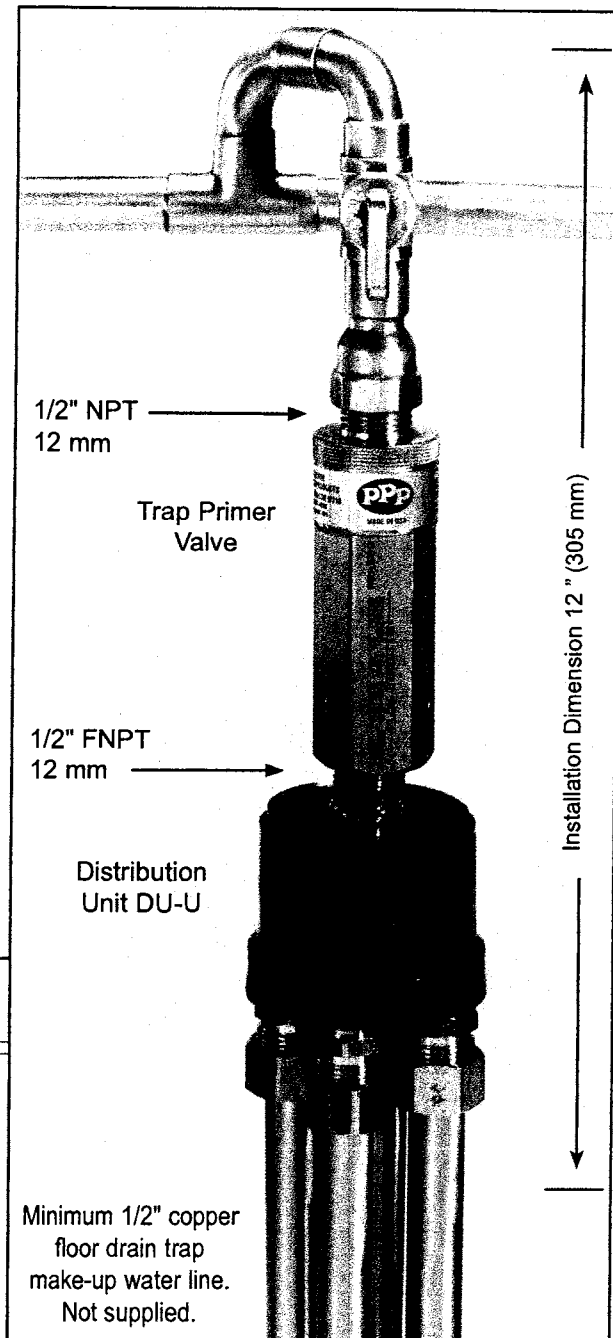
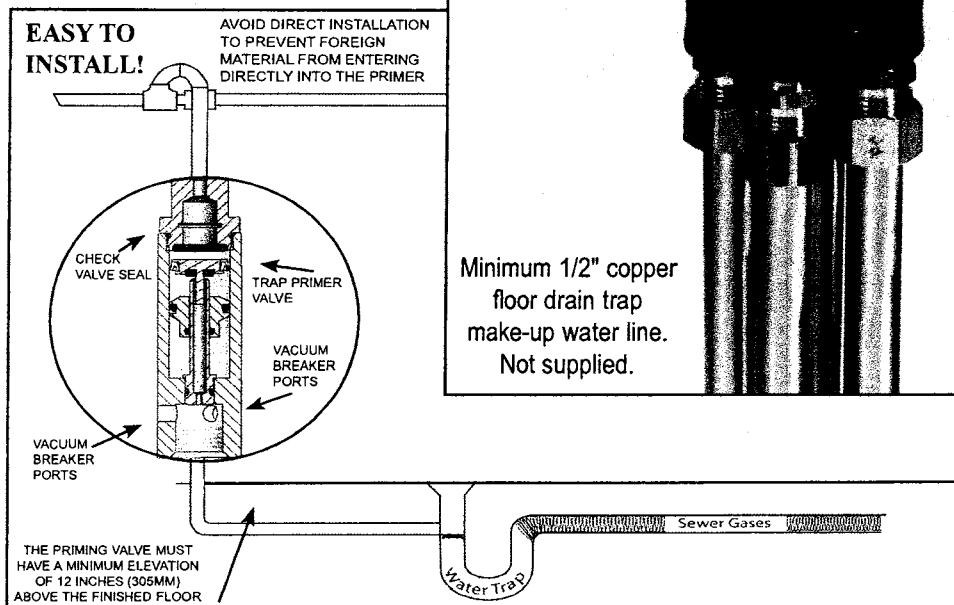
A metered amount of water from the floor drain trap primer is distributed to as many as four (4) floor drain traps by means of the patent distribution unit.

The distribution units are fully guaranteed on a money back basis when installed per manufacturers recommendations.

The priming valve must have a minimum elevation of 12" inches (305mm) above the finished floor.

DISTRIBUTION UNIT INSTALLATION:

- Must be installed level.
- Must be installed with clear plastic cover.
- Must be installed with access for periodic inspection.
- For further detail see information sheet specific for the distribution units.



NOTE: Consult plumbing inspector prior to installing distribution units.

"Specify with confidence - Install with pride"

PRECISION PLUMBING PRODUCTS

Division of JL industries, inc.

Airport Business Center • 6807 N.E. 79th Court Suite E

Portland, Oregon 97218 • (503) 256-4010

FAX: (503) 253-8165

DISTRIBUTED BY:



FLOOR DRAIN TRAP PRIMER

PRIME-RITE

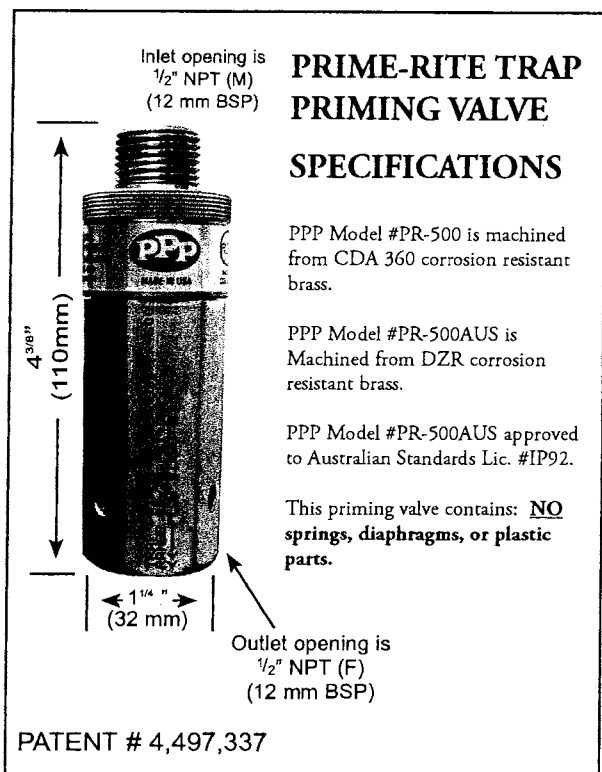


P/N - PR-500

P/N - PR-500AUS

NO Adjustment Required

PROJECT SUBMITTAL



Project: _____

Contractor: _____

Engineer: _____

Date Submitted: _____

Prepared By: _____

This innovative trap priming system automatically primes up to four floor drain traps using our patented water distribution system. The **PRIME-RITE** requires no adjustment but **must be installed on a cold water line** of 1 1/2" (38mm) diameter or less. The priming valve is automatically activated when it senses a pressure drop of 5 to 10 P.S.I.G. (35 to 70 kpa). The valve's operating range is 35 to 75 P.S.I.G. (245 to 525 kpa). All PR-500 Valves include integral vacuum breaker ports. Must install on water lines serving a frequently used fixture such as a urinal or a water closet.

AUTOMATICALLY ADJUST TO LINE PRESSURE.

THE PRIMING VALVE MUST HAVE A MINIMUM ELEVATION OF 12 INCHES (305mm) ABOVE THE FINISHED FLOOR.

ONE PRIMING VALVE WILL PRIME 1 TO 4 FLOOR DRAIN TRAPS, USING THE WATER DISTRIBUTION SYSTEM.

Specify with confidence - Install with pride.®



Made in the U.S.A.
We Do Not Export Jobs.

PRECISION PLUMBING PRODUCTS

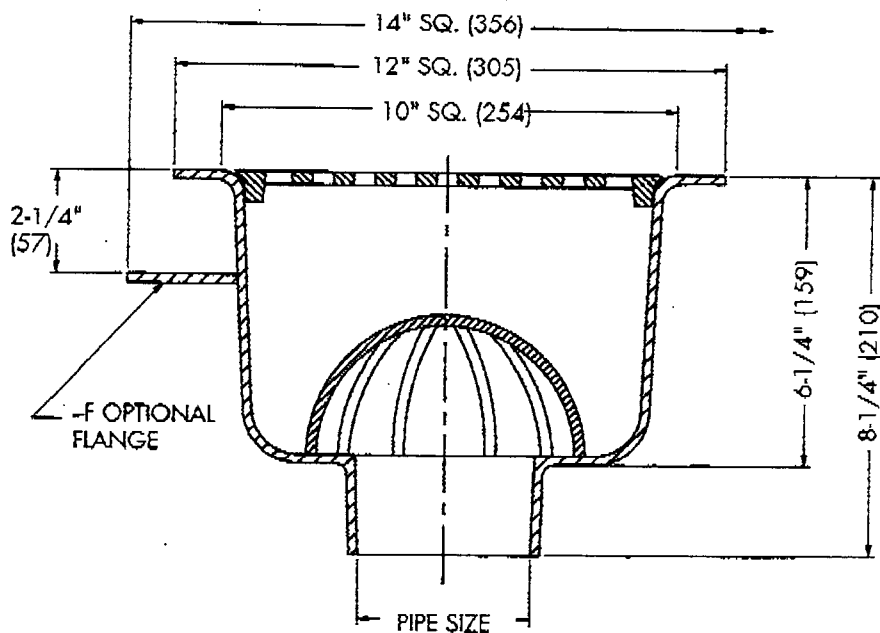
Division of JL industries, inc.
 Airport Business Center • 6807 N.E. 79th Court Suite E
 Portland, Oregon 97218 • (503) 256-4010
 FAX: (503) 253-8165

WATTS®**FS-780**

Tag: _____

**12" Square x 6" Deep
Stainless Steel Sanitary
Floor Sink**

SPECIFICATION: Watts Drainage FS-780 12" (305) square x 6" (152) deep 14ga. type 304 stainless steel sanitary floor sink with loose set cast stainless steel grate, dome bottom strainer, and no hub (standard) outlet.



Pipe Size (Select One)		
2	3	4
2" (51) Pipe Size	☐	☐
3" (76) Pipe Size	☐	☐
4" (102) Pipe Size	☒	☐

Outlet Type (Select One)	
NH	P
No Hub (MJ)	☒
Push On	☐

Options (Select One or More)										
-F	-FC	-S	-6	-21	-22	-150	-175	-F4-1	-F6-1	-G-1
Flange with Weepholes	Flange w/ Weepholes & Flashing Clamp	Sediment Bucket	Vandal Proof	Secondary Strainer	Less Grate	1/2" (13) Grate	3/4" (19) Grate	4" Round Nickel Bronze Funnel	6" Round Nickel Bronze Funnel	4x9" Oval Nickel Bronze Funnel
☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐

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Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

WATTS Drainage reserves the right to modify or change product design or construction without prior notice and without incurring any obligation to make similar changes and modifications to products previously or subsequently sold. See your WATTS Drainage representative for any clarification. Dimensions are subject to manufacturing tolerances.

WATTS®

Specification Drainage Products

USA: 100 Watts Road, Spindale, NC, 28160-2298; TEL: 828-288-2179 TOLL-FREE: 1-800-338-2581 www.watts.com

ES-WD-FS-780 USA 0530

FS-780

INSTALLATION AND OPERATION MANUAL

HE6X



NOTE: Disconnect Switch and 24V Transformer Standard

In 2012, these ERVs may be ordered with new factory-installed features including Isolation Dampers and Variable Frequency Drives. Consult the supplemental Installation and Operation Manual(s) for these features if supplied.



⚠ WARNING

**RISK OF FIRE, ELECTRIC SHOCK, OR INJURY.
OBSERVE ALL CODES AND THE FOLLOWING:**

1. Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lock-out/tag-out to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
2. This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
3. Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
4. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.
5. This unit must be grounded.
6. Danger of severe injury to bystanders and damage to unit or property if high winds move this unit. Secure this unit to the building!
7. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment that might be installed in the area affected by this equipment. If this unit is exhausting air from a space in which chimney-vented fuel burning equipment is located, take steps to assure that combustion air supply is not affected. Follow the heating equipment manufacturer's requirements and the combustion air supply requirements of applicable codes and standards.
8. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
9. This unit is intended for general ventilating only. Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this unit to range hoods, fume hoods or collection systems for toxics.
10. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
11. If installed indoors this unit must be properly ducted to the outdoors.

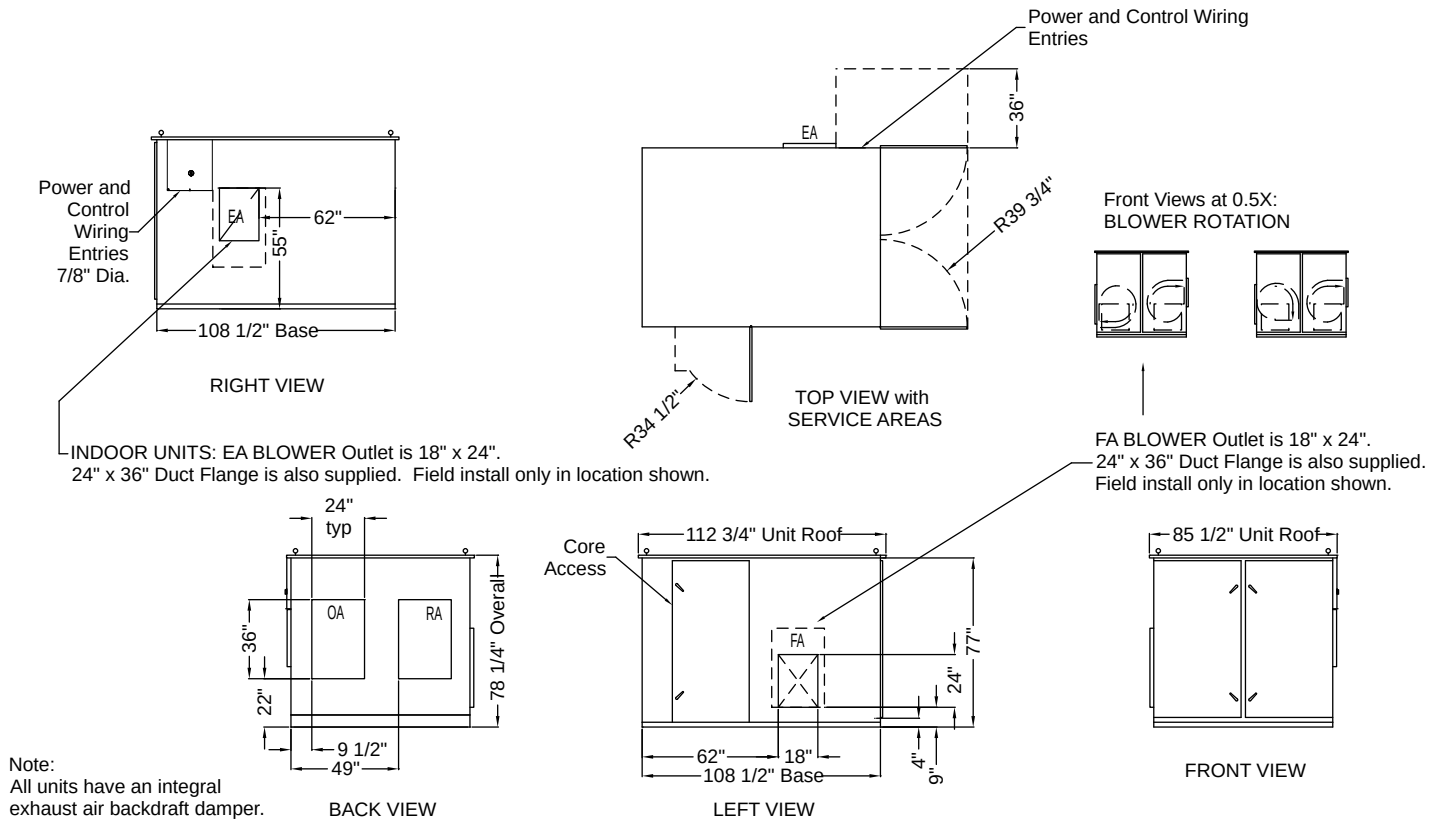
CAUTION

To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc., out of unit.

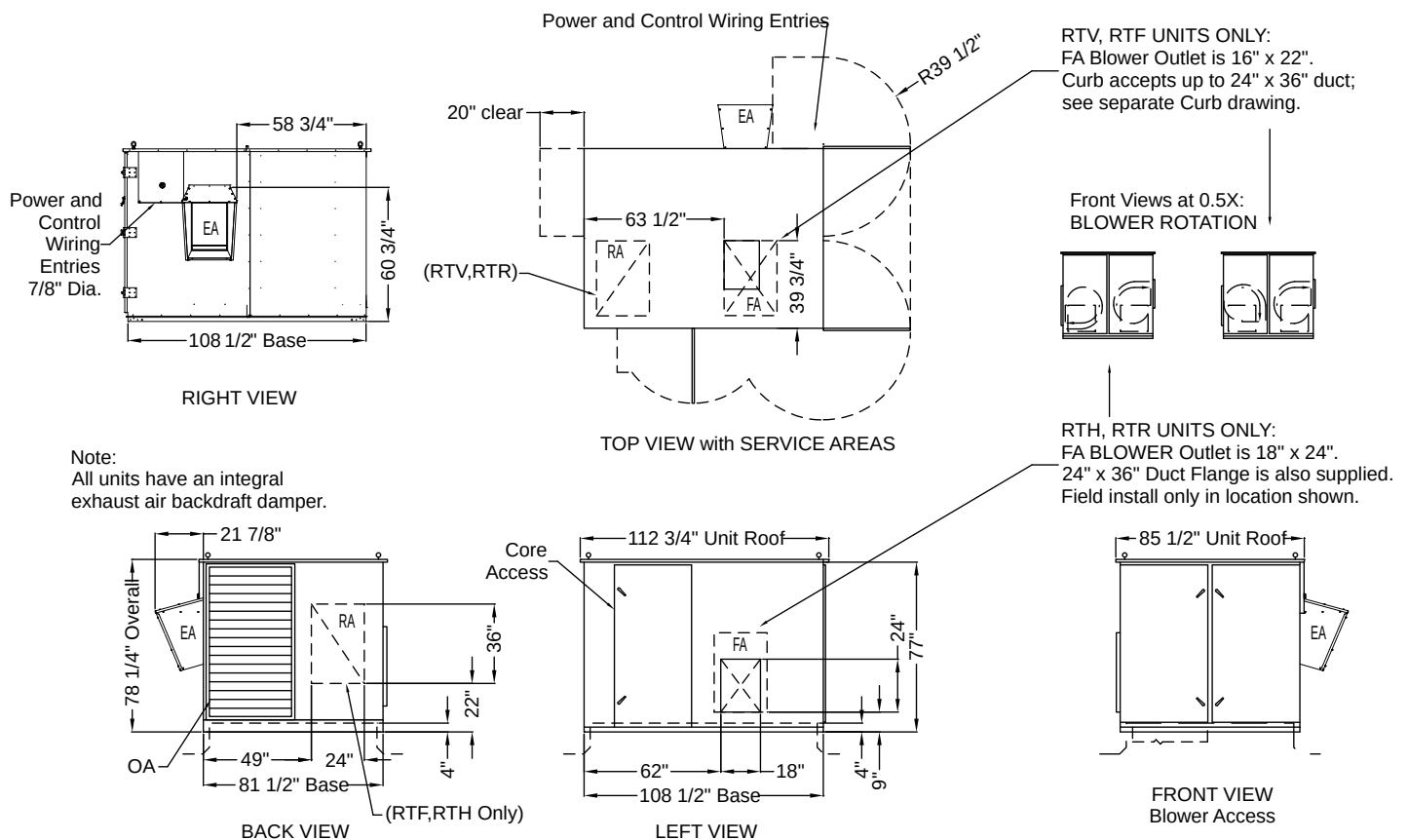
CAUTION

Do not remove or disable the wiring interconnection between the Overload Relays and the Contactors. Without this interconnection the motor(s) will not be protected against overload.

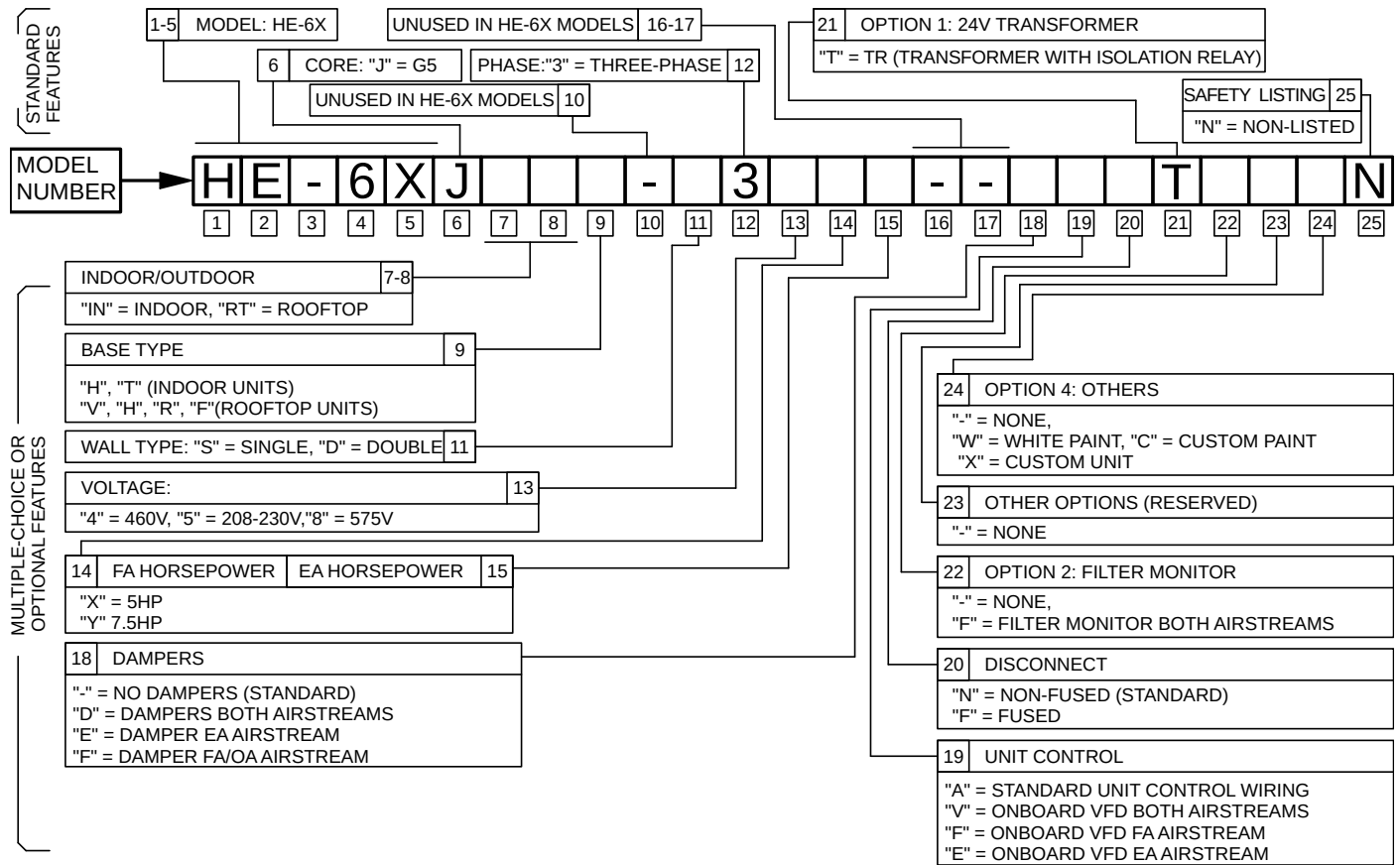
HE6XIN Dimensions



HE6XRT Dimensions



HE6XIN Product Configuration Chart



Basic Order of Installation

1. PREPARE ROOF CURB OR EQUIPMENT RAIL
2. LIFT UNIT INTO POSITION ON CURB OR RAIL
3. SECURE UNIT TO CURB OR RAIL
4. INSTALL EXHAUST HOOD
5. INSTALL EXTERNAL DUCTWORK IF APPLICABLE
6. MAKE ELECTRICAL CONNECTIONS
7. PERFORM START-UP AND CHECK-OUT PROCEDURES

Step 1: Prepare Roof Curb or Equipment Rail

Complete the installation of the curb or equipment rail before installing the unit.

Curbs or equipment rails should be attached to the structure sufficiently to transfer wind loads on the unit to the structure itself. See warning under Step 3.

Curbs or equipment rails should be installed where the structure is able to carry the weight of the unit.

Dimensioned drawings of RenewAire's standard roof curbs are available at www.renewaire.com.

On Roof Curbs:

Curb should be insulated. Apply roofing and counterflashing to curb as per standard practice.

Install appropriate gasket on top of Roof Curb around the perimeter and around the edges of ducts.

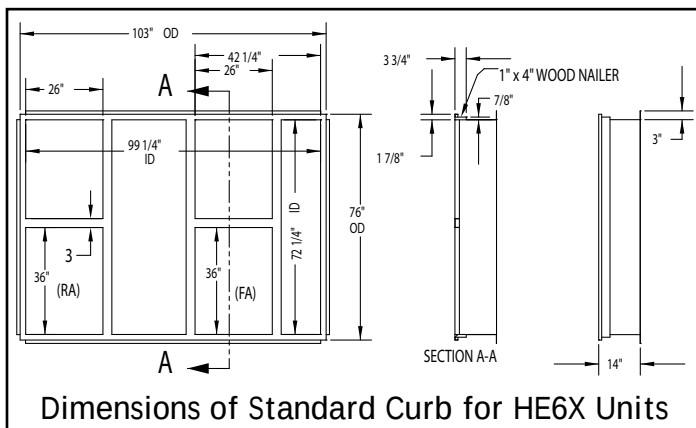
If unit is ducted through the curb the ducts should be installed before the unit is placed on the curb.

Ducts should be insulated.

Vibration Isolation Curbs: Corner weights are available for design purposes at www.renewaire.com.

On Equipment Rails:

Before installing the unit, apply roofing and counterflashing to Equipment Rails as per standard practice.



CAUTION

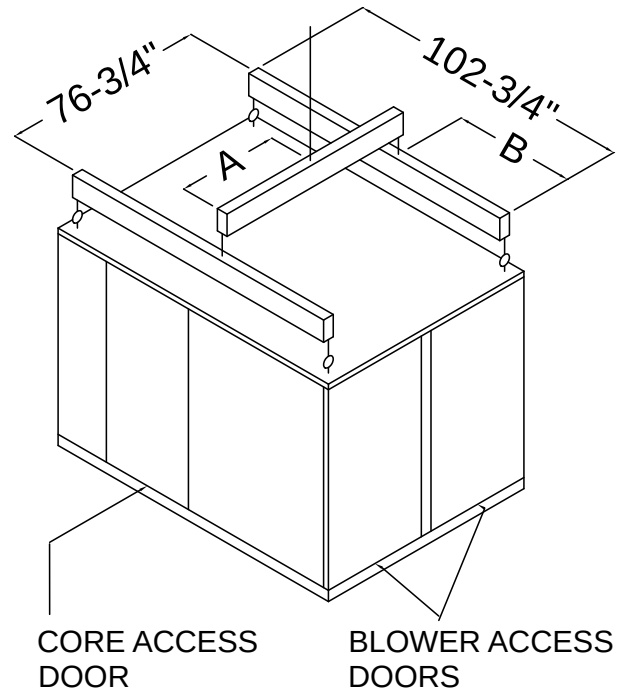
Air leakage from the conditioned space below the roof into the space between inside the curb can cause problems including:

- Condensation inside the curb in cold weather, to the point that water drips into the building and damages duct insulation or furnishings.
 - Leakage of noise from the unit into the space below.
- Holes through the roof deck for the ducts should be cut close to the ducts and the gaps should be sealed.

Step 2: Lift Unit Into Position on Curb or Rail

Remove the shipping straps that hold the unit to its pallet before lifting.

NOTICE TO RIGGERS USE SPREADER BARS!



HE6XIN UNIT CENTER OF GRAVITY (in) AND WEIGHT (POUNDS)

HP	WEIGHT	A	B
SINGLE WALL			
(2) 5HP	2235	37-3/4	45-1/4
(2) 7.5HP	2336		44
DOUBLE WALL			
(2) 5HP	2659	37-1/4	46
(2) 7.5HP	2760		44-3/4

⚠ WARNING

Risk of severe injury or death when unit is being lifted!
Lifting must be performed by qualified personnel only!

Step 3: Secure Unit to Curb or Rail

RenewAire strongly recommends that you secure rooftop units properly to the curb or equipment rails, and thus to the building structure. Strong winds, tornados, and hurricanes can and do displace or remove rooftop equipment from rails or curbs. When this happens, the equipment, adjacent roof structure, and even vehicles parked near the building can be damaged, and rain typically enters the building. The equipment is put out of service and the collateral damage can be very expensive.

At a minimum, observe locally applicable codes, but note that even if local codes require some attachment means that may not be enough to withstand common wind occurrences.

Step 4: Install Exhaust Air Hood (Rooftop Units Only)

To Install the Exhaust Air Hood:

Exhaust Air Hood is shipped in the Exhaust Air Blower compartment, along with a bag of screws. Install Hood over exhaust air outlet using pre-drilled holes.

⚠ WARNING

Danger of damage or severe injury if high winds move this unit. Secure unit to structure! Observe local code requirements at a minimum!

Step 5: Install External Ductwork (if applicable)

Outside units:

Any exposed ductwork attached to the unit must be properly insulated and weatherproofed.

Units ordered in RTH, RTR or RTF configurations have side openings for connection of ductwork.

Room Air (air returning to the unit to be exhausted):

Units are shipped with 24" wide by 36" high duct flanges installed.

Fresh Air (air leaving the unit to be ducted into the building):

24" x 36" duct flanges are shipped loose. For best airflow performance, install this duct flange even with the bottom of the Fresh Air blower outlet, and centered side-to-side.

Alternately, duct flanges as small as 18" x 24" (the blower outlet size) can be used along with transitions to the final duct size.

Inside units:

Ducts between the unit and the outside air must be insulated. See caution to right.

Select locations for the outside air intake weatherhood and exhaust weatherhood carefully. See caution to right.

Outside Wall Caps:

Wall caps should be designed to exclude animals and rain. Size wall caps to minimize pressure drop.

To keep rain out, select the outside air intake weatherhood so inlet velocity is below 500 feet per minute (or less, if so dictated by local codes or practices).

Install catches for rubber Door Restraints:

Doors for the Fresh Air Blower and the Core and Filter compartments are equipped with rubber Door Restraints. For units with a Fresh Air Outlet duct fitted to the side, the catches for these Door Restraints are mounted on the duct.

Sound Attenuation

General Practices

Take these simple steps to attenuate noise from the unit.

Outside the building:

The exhaust hood is the primary source of noise outside the building. When practical, orient the exhaust air hood to point away from houses or public areas.

At the Curb: (Rooftop units)

Cut the holes in the roof deck to fit closely around the duct(s) passing through the roof deck. Seal all gaps around the duct(s) at the roof deck.

Ducts:

Make sure the ductwork at the unit outlets is stiff enough to resist the flexure and resulting booming associated with system start-up and shut-off, as well as the turbulent flow conditions at the blower outlets.

In general, provide smooth transitions from the ERV's outlets to the duct. The ducts connecting to the outlets should be straight for a sufficient distance, with gradual transitions to the final duct size.

These guidelines are consistent with SMACNA recommended duct layout practices for efficient and quiet air movement. Follow SMACNA guidelines.

Radiated Noise

The HE6X is insulated with high-density fiberglass. This provides significant attenuation of radiated sound from the unit itself.

The outlet ducts can be significant sources of radiated sound as well. The Outlet ducts should be insulated for sound control. This insulation should start at the unit. At a minimum the first ten feet of duct should be insulated. All parts of the FA and RA ducts located in a mechanical space with noise-generating equipment also should be insulated for sound control, both to minimize sound radiation out of the FA duct, and also to control sound radiation into both ducts.

Aerodynamic (Velocity) Noise

When sound attenuation is a design concern, the primary consideration is velocity noise at the unit's Air blower outlets. The average velocity at the ducted blower outlet is 1090 FPM when the unit is operating at 6500 CFM. The average velocity at the Exhaust Hood outlet is 1765 FPM when the unit is operating at 6500 CFM.

CAUTION

Ducts connecting the unit to the outside air must be insulated with sealed vapor barriers inside and out. Otherwise condensation and/or freezing may occur in the insulation, causing damage and/or allowing mold growth.

⚠ WARNING

Danger of carbon monoxide poisoning!

Outside air intake should be at least 10' away from sources of carbon monoxide or other toxic gasses; chimneys, furnace and water heater exhausts, or fume hood outlets.

Do not locate outside air intake where vehicles may be serviced or left idling.

Never locate the outside air inlet inside a structure.

⚠ WARNING

Danger of electrical shock when wiring or servicing this unit.

Always disconnect power source before servicing. More than one disconnect switch may be required to de-energize unit.

Operation

Principal of Operation

The HE6X has one basic purpose: to exhaust air from a structure and bring in fresh air from outside, while transferring heating or cooling energy from the exhaust air to the fresh air.

The HE6X is a very simple device, and will accomplish this purpose as long as the blowers for both airstreams are able to move air through the energy-exchange core.

Checking that Unit is Operating

Air Flow

Airflow should be occurring in both airstreams. Sometimes the easiest place to confirm that air is moving is at the weatherhoods.

If exact airflow is critical, it may be desirable to permanently install flow measuring stations and manometers in the ductwork connected to the unit. These also can be used to determine when filters should be cleaned or changed.

Use Static Taps in Doors to Measure Airflow Rates

See "Cross-Core Static Drop" in MEASURING AIRFLOW table. These may be used to directly measure airflow in the unit.

Energy Exchange

Precise determination of installed sensible energy exchange effectiveness requires careful measurement of temperatures and air flows in all four air streams, and in practice is somewhat difficult.

It is possible to confirm that energy is being exchanged simply by feeling the ducts. If the Fresh Air duct from the unit into the room is closer to room temperature than to the outside temperature, energy is being recovered.

Operating Controls

A wide variety of control schemes may be selected by the engineer, installer, or owner to meet the ventilation needs of the facility. These may include timer clocks, occupancy sensors, dehumidistats (for cool-weather operation), carbon dioxide sensors, and others. DDC systems may also control the unit. Most control schemes will operate the unit only when needed.

Continuous Operation

Continuous operation is acceptable in virtually all conditions. Unit will not be damaged by continuous operation as long as air flow occurs. Blower motors may overheat if filters become completely blocked due to lack of maintenance. Motors are thermally protected. With continuous operation, some external frosting may occur in very cold weather (see below).

Operation in Extreme Cold Weather

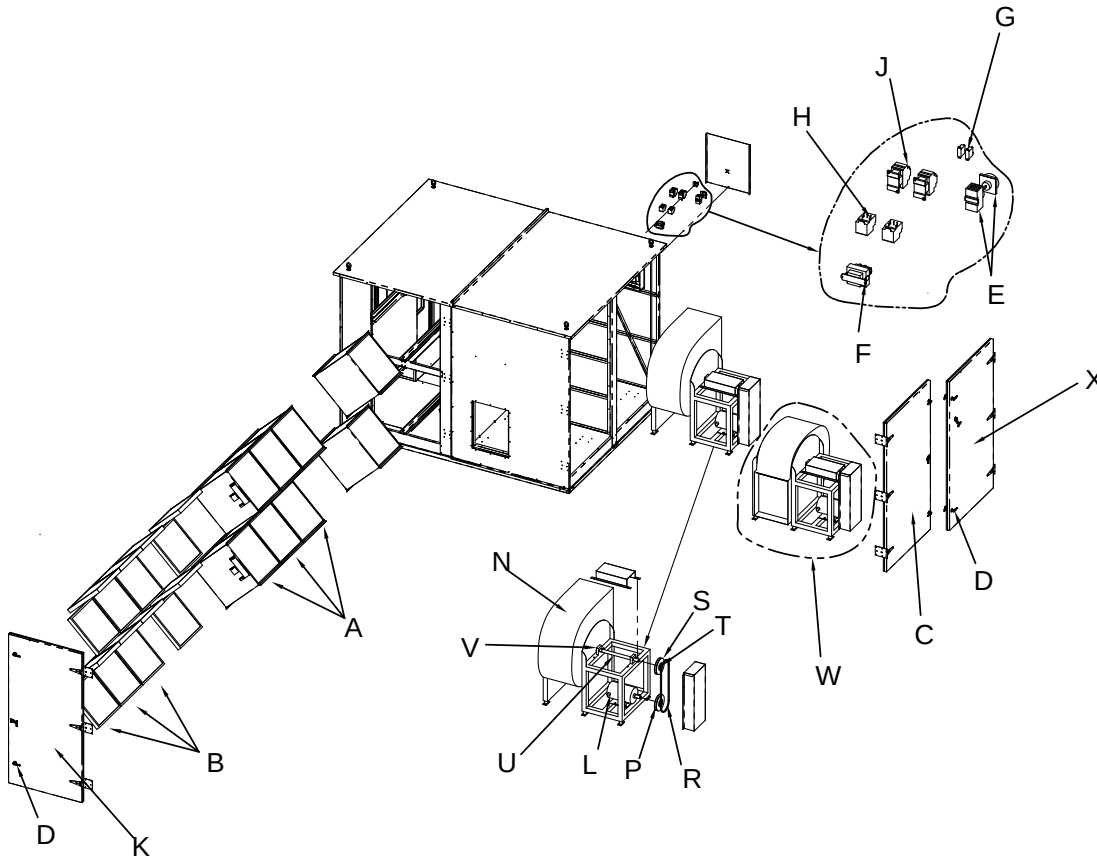
Unit is capable of operating at outside temperatures down to -10°F, with indoor humidities below 40%, without any internal frosting. Unit can operate at more severe conditions occasionally with little or no impact on its performance. At lower humidities, it can operate at lower outside temperatures without freezing the energy-exchange core.

Step 6: Electrical Connections

Proper selection, sizing and installation of supply wiring and branch circuit protection is required and must be performed by a qualified professional.

- All wiring must comply with applicable local and national electrical codes.
- Always provide a dedicated Disconnect Switch for this unit (available as a pre-installed option.)
- Minimum Circuit Ampacity (MCA) and Maximum Fuse Size (MFS) for this unit are marked on its Electrical Rating Label, near its electrical box.

HE6X Replacement Parts

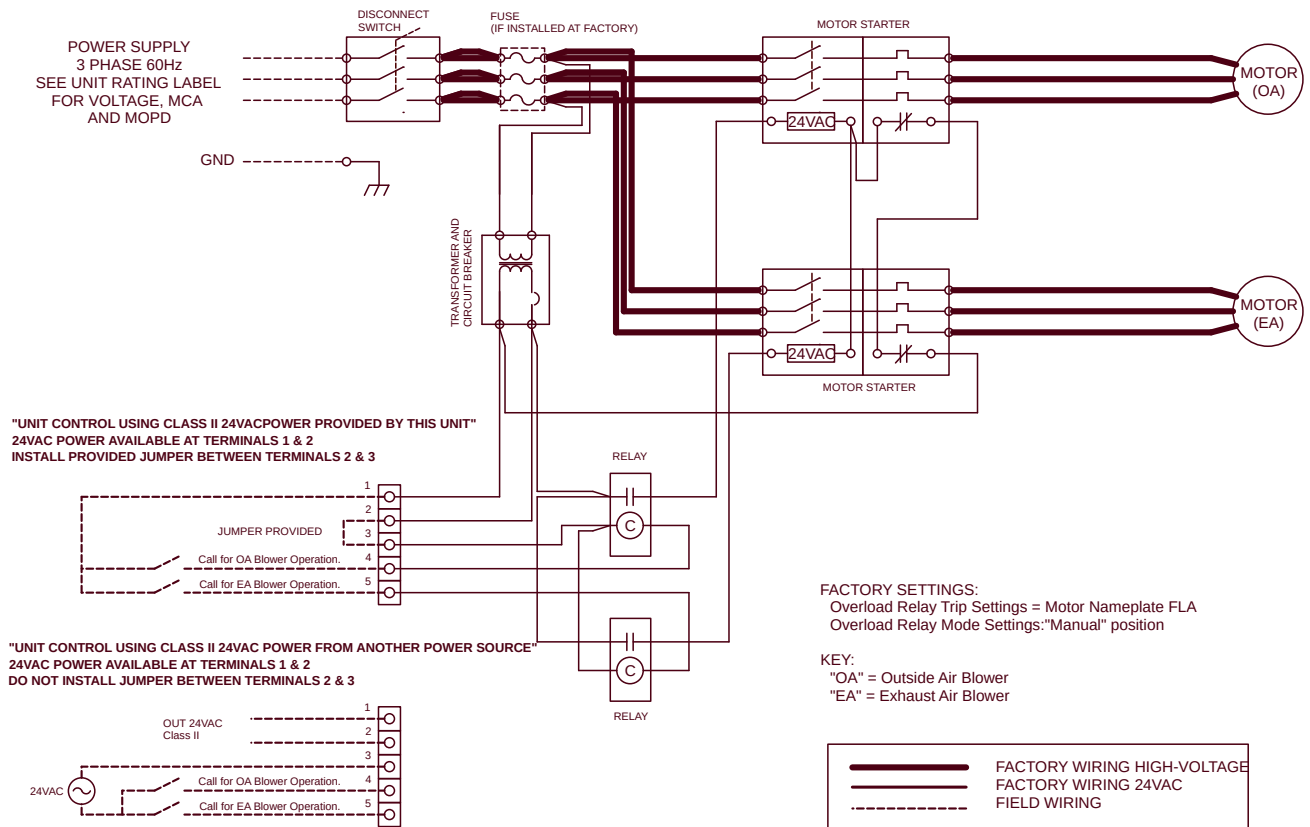


A	CORES
B	FILTERS
C	LEFT BLOWER DOOR
D	TURN LATCH
E	DISCONNECT SWITCH
F	TRANSFORMER
G	ISOLATION RELAY
H	OVERLOAD RELAY
J	CONTACTOR
K	CORE DOOR
L	MOTOR
N	BLOWER
P	MOTOR SHEAVE
R	BELT
S	BLOWER SHEAVE
T	BLOWER BUSHING
U	BLOWER SHAFT
V	BLOWER BEARINGS
W	BLOWER MOTOR KIT
X	RIGHT BLOWER DOOR

HE6X Airflow Performance

Motor HP	Blower RPM	Turns Open	External Static Pressure (in. w.g.)																	
			0.00		0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
5	1460	4.5	5005	2.5	4800	2.5	4650	2.3	4475	2.1	4200	1.9	4000	1.7	3750	1.7	3400	1.5	3100	1.1
	1610	2	5550	4.0	5375	4.0	5250	3.9	5100	3.9	4900	3.7	4650	3.6	4500	3.4	4250	3.3	4000	3.1
	1725	0							5525	5.0	5475	5.0	5200	4.9	5050	4.8	4800	4.6	4600	4.5
7.5	1560	4.5	5275	2.7	5200	2.5	4900	2.3	4775	2.3	4550	2.1	4350	1.9	4125	1.9	3875	1.7	3575	1.5
	1740	2	5950	4.7	5825	4.7	5625	4.6	5490	4.6	5325	4.5	5125	4.3	4950	4.3	4750	4.2	4525	4.0
	1865	0	6500	6.5	6350	6.5	6225	6.4	6125	6.4	5910	6.3	5825	6.2	5625	6.1	5410	6.1	5300	6.0

HE6X P3 Wiring Schematics with Independent Blower Control



24VAC Power Supply Provided with this ERV Unit

This ERV is provided with a Class II 24VAC power supply system that operates the unit's contactor(s) for EV450 and HE1X. The ERV's 24VAC Power Supply can also be used to power the externally-installed controls system: up to 8VA of power is available.

The unit's power supply system includes isolation relay(s) so you can use external controls whose contact ratings are as low as 50mA (1.2VA). Also, it is possible to operate the isolation relays with 24VAC power from an external source (with proper wiring connections).

A built-in circuit-breaker prevents damage to the transformer and other low-voltage components in the event of a short-circuit or overload. In extreme cases, the transformer itself is designed to fail safely.

CAUTION

1. Connect only to components intended for use with 24VAC power.
2. Do not undersize the low-voltage wires connected to this device. Observe the wire length and gauge limits indicated in this manual.
3. Do not overload this unit's 24VAC power supply system. Confirm that the power requirements of devices you connect to this power supply system do not exceed 8VA in total.
4. If an external source of 24VAC power is used to control the unit, consult the wiring schematics and connect the external power only to the specified terminals in order to avoid damaging the unit or external controls. Connect only CLASS II power to the control terminals of this unit.
5. Unit is not equipped to receive analog signals (such as 1-10vdc or 4-20mA).
6. Unit is not equipped to communicate directly with Building Management Systems (such as BACNET, LONWORKS, etc.). However, the unit can be controlled by powered or non-powered contacts operated by any kind of control system.

Specifications

- Nominal Output Voltage under load: 24VAC
- Typical Output Voltage at no load: 29-31V
- Minimum contact rating for connected control device: (50mA (1.2VA)
- Circuit Breaker Trip Point: 3A

How to Reset the 24VAC Circuit Breaker

If the transformer is subjected to an excessive load or a short circuit, the circuit breaker will trip to prevent the failure of the transformer. When it trips the circuit breaker's button pops up. Shut off the primary-side power to the unit, and remove the excessive load or the short. The circuit breaker can be reset about fifteen seconds after it trips by pressing in the button.

NOTE: INSTALLING CONTRACTOR:

If primary-side voltage is 230VAC, move black primary-side lead from transformer's "208V" terminal to the transformer's terminal marked "240V" ("230V" in some units).

Do not move the black primary-side lead that is connected to the transformer's "COM" terminal.

Limits of Power Output

If limits on wire gauge and length are observed, you may connect control devices that draw up to 8VA to the blue and red wires. More than one device can be connected as long as total steady-state load does not exceed 8VA.

OBSERVE THESE LIMITS TO WIRE LENGTH AND GAUGE, in order to ensure reliable operation of the control system.

Wire Gauge	#22	#20	#18	#16	#14	#12
Circuit Length	100'	150'	250'	400'	700'	1000'

"Circuit Length" is distance from ERV to Control Device.

Motor Starters

This unit uses IEC-style motor starters to protect the motors against overload.

IEC-style motor starters use Overload Relays to detect excessive current and interrupt the control circuit that engages the motor's contactors.

⚠WARNING

The Overload Relay output contacts 95 & 96 must remain in series with the low-voltage control circuit! Altering this will create a hazardous situation in which the motor is not protected against overload!

⚠WARNING

Adhere to applicable local codes when adjusting the dial setting of the overload relays.

Overload Relays are sized to Full Load Amp (FLA) rating of the protected motor. The Overload Relays can be adjusted to trip (interrupt the control circuit) at a specific setting within a range.

Overload Relays should initially be set at the FLA rating of the motor (see Unit Rating Label). If necessary to prevent nuisance tripping at start-up, the Relays can be adjusted to trip no higher than 115% of the motor's FLA rating.

For safest operation, the overload relays should also be used in manual reset mode with trip test capability.

NOTE: As factory-wired, if one blower motor is shut down due to overload by its Motor Starter, the other motor will also be shut down.

NOTE: Terminals 96 & 97 of the Overload Relays and terminals 14 & 13 of the Contactors are normally-open dry contacts that may be used to signal that the contactors are closed and/or that the Overload Relays have tripped.

⚠WARNING

DANGER OF INJURY OR DAMAGE.

The motors in this unit must not be run at an amperage that exceeds the motor's rated full load amps and overload relays on the motor starters must be set at or below motor full load amps. For safest operation, the overload relays should also be used in hand reset mode with trip test capability.

It is the installer's responsibility to measure the operating amperage of each motor. If the full load amp rating is exceeded, the amp draw must be reduced by substituting a smaller motor pulley or by adjusting the variable sheave. Continue these adjustments until the actual amperage is no more than the motor's faceplate full load amps.

Failure to make this adjustment may result in unsafe motor winding temperatures or tripping of the supplied motor starter's overload relay motor protection devices set at full load amps.

⚠WARNING

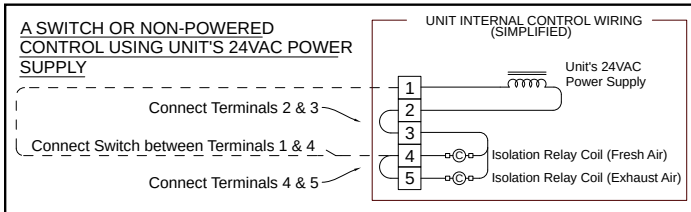
DANGER OF INJURY OR DAMAGE.

The relay must be set for correct FLA rating depending on the motor horsepower. See Unit Rating Label on motor for HP and FLA specifications.

Control Wiring Schematics

NOTE: The simplified schematics below show only the relevant portions of the low-voltage control circuit in the ERV unit and representational external control approaches. See the complete unit schematics elsewhere in this manual.

- A. **Single 2-wire Control, unpowered:** Use schematic below if the control requires no power from the unit to operate and acts like a simple on/off switch. The control must not supply any power to the ERV unit. Install jumper (provided) between terminals 2 & 3. Connect the control's contacts to terminals 1 & 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper (provided) between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.

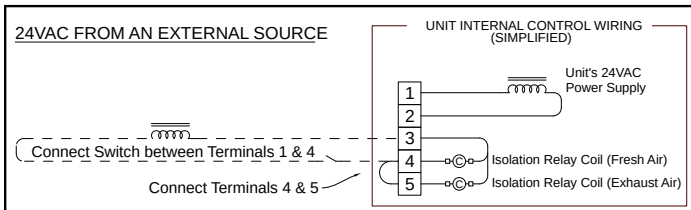


- B. **Single 2-wire Control on separate Power Supply, no power present at Control Output:** Wire as shown for the Single 2-wire control (A. above).

CAUTION

Make sure the control provides no voltage or current at its output terminals.

- C. **Control Sending 24VAC "On" Signal (from an external power source) to ERV:** Make sure jumper is NOT installed between terminals 2 & 3. Now you safely can apply 24VAC to the Terminals 3 & 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper (provided) between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.

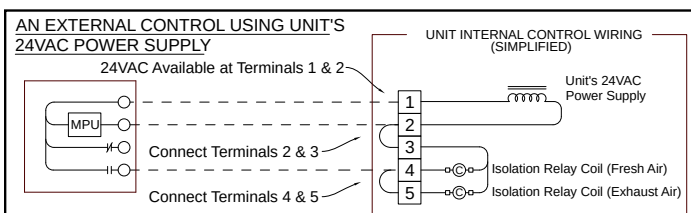


CAUTION

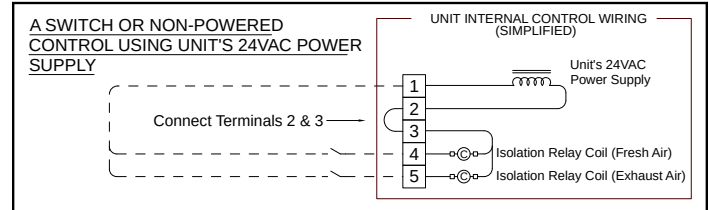
Supply only 24VAC (not VDC) from a Class II Power Source.

- D. **Control operating on Unit's 24VAC Power Supply:** 24VAC power is available at the Terminals 1 & 2. **CAUTION:** external control system should not draw more than 8VA. Install jumper (provided) between terminals 2 & 3.

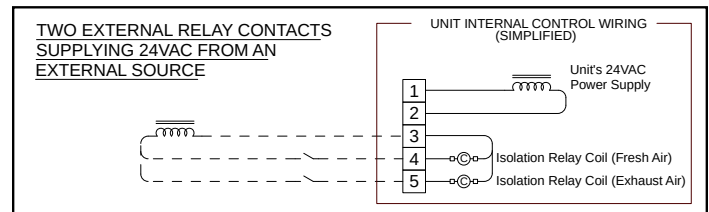
Connect the switched output of the Control to Terminal 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper (provided) between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.



- E. **Control System with 2 Non-powered Relay Contacts:** Use this schematic if the external control system provides no voltage or current at its output contacts. Install jumper (provided) between terminals 2 & 3. Connect one side of each of the output contacts to Terminal 1. Connect the other side of the output contact to control the FA Blower to Terminal 4, and the output contacts to control the EA Blower to Terminal 5.



- F. **Control System Sending two 24VAC "On" Signals from an external power source:** Make sure the jumper is NOT installed between Terminals 2 & 3. Now you safely can apply one of the 24VAC signals to Terminals 3 & 4 to operate the ERV's isolation relay for the Fresh Air Blower. Apply the second 24VAC signal to Terminals 3 & 5 to operate the ERV's isolation relay for the Exhaust Blower (make sure the polarity of each wire connected to Terminal 3 is the same).



CAUTION

Supply only 24VAC (not VDC) from a Class II Power Source.

- G. **Control System Operating Isolation Dampers with End Switches:** Use Isolation Dampers with electrically separate end switches. The end switches are used to separately control the ERV unit's Isolation Relays. This ensures that each damper is open before the respective blower starts up.

NOTE: Because the ERV's Motor Starters will only be operating once the Dampers are open, the power draw of the Damper Actuators is allowed to be as much as 35VA while opening (including power draw of the external control system, if any). However, the power draw of the fully-opened (stalled) Actuators (and external control system if any) must be less than 8VA. (Most damper actuators have much lower power draws.)

Step 7: Start-Up and Check-Out Procedures

Before placing unit in service:

- Check belt tension (see Blower Maintenance Information)
- Inspect blower (see Blower Maintenance Information)
- Blower bearings are pre-lubricated at factory and do not require initial lubrication (however, scheduled lubrication is required, see Maintenance Section.)

As part of first start-up:

- Check running amps of each motor.
- Confirm the motor starter overload relays are properly set.

After 24 - 36 hours of unit operation:

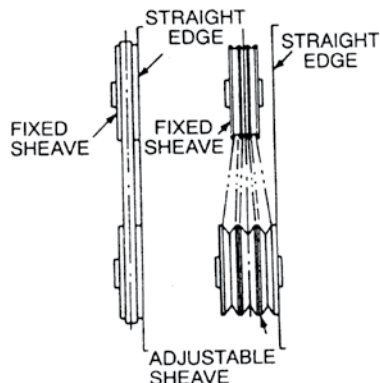
- Re-torque bearing setscrews to 75 inch-pounds. Use 1/8" hex bit with a separate extension shaft (use of long hex bits may cause inaccurate torque readings.)

Test and Balance Procedures

Test and Balance Procedures are outside the scope of this Manual, and should be performed by qualified personnel.

If sheaves are adjusted in order to adjust air flow, belts should be re-tensioned following the procedure on page 11.

Sheaves should also be adjusted so that belts run straight, as shown below:



CAUTION

Failure to follow start-up procedures may cause early equipment failure!

Service Information

Blower bearing replacement:

1. Wheel and shaft must be supported before any dismantling is attempted.
2. Remove drives, loosen and remove bearing bolts. Next loosen the retaining set screws on the bearing collars. Remove the bearings from the shaft only after the wheel and shaft are securely supported.
3. Shaft Removal: After following the steps listed for the removal of the bearings, loosen the set screws in the wheel hub. With the wheel securely blocked, pull the shaft from the wheel.
4. Wheel Replacement: Remove the bolts on the inlet upright support. Loosen set screws on wheel hub and lift wheel from housing.

Blower Vibration Isolator Specifications:

Height: 1.5"
Deflection Range: 0.20 - 0.040"
Weight Range: 40 - 75 pounds
Cap Screw: 5/16-18

CAUTION

Improperly aligned belts can cause early sheave or bearing failure.

Maintenance (cont. from page 12)

Blower Belt Tension

- Check belt tension every time you lubricate bearings:
- Belt tension must be properly maintained.
- Remove belt guard. Check and if necessary adjust belt tension.
- Inspect belt(s) for cracking or uneven wear.
- Check that sheaves are properly aligned so that belt runs straight (see Illustration on page 6).
- Re-install belt guard.

Properly tensioned belt will deflect 0.25" when pressed at the center point with the following force:

5 HP BLOWER - 6 pounds

7.5 HP BLOWER - 4 pounds

GENERAL CLEANING AND INSPECTION

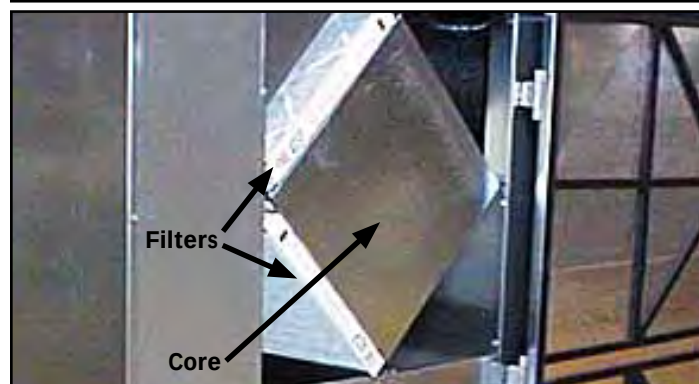
Perform general cleaning and inspection when changing filters.

- Remove dust from blower wheels periodically.
- Remove paper, leaves, etc. from inlet and outlet screens.
- Inspect for insect nests.

TO CLEAN THE ENERGY EXCHANGE CORE

Clean the core annually.

- Remove the filters.
- Vacuum the exposed faces of the energy exchange core with a soft brush.
- Vacuum out dust from the rest of the unit case.
- Install new filters.
- DO NOT WASH THE ENERGY EXCHANGE CORE. Always handle the core carefully. Keep it away from water or fire to avoid damaging it. The energy exchange core can be replaced, but is expensive.



Maintenance

SUMMARY MAINTENANCE REQUIREMENTS

Change Filters
Lubricate Blower Bearings
Inspect Blower
Tension Blower Belt
General Cleaning and Inspection
Clean Energy Exchange Cores

CHANGING THE FILTERS

Inspect and/or replace filters every two or three months when the unit is in regular use, or as needed.

The upper and lower banks filter the Return Air entering the unit to be exhausted and protect the cores and exhaust blower from dust build-up.

The center banks filter the Outside Air which the unit will deliver to the conditioned space; these filters remove particulate from the ventilation air in addition to protecting the cores and fresh-air blower.

- Turn off unit completely! Lock-out and tag-out the unit disconnect switch.
- Open the Core Access Door and secure it in the open position with the rubber Door Restraint.
- The door is secured with turn-type latches, plus one Phillips-head securing screw. Keep the securing screw. NOTE: Always replace securing screw when reinstalling door.
- Remove and dispose of all (12) filters. The filters in each bank are connected by small clips for easier removal.
- Replace all (12) filters, re-installing the connecting clips. NOTE: See "Service Information" for information on the initial resistance of the filters originally supplied with this unit. If replacement filters have higher resistance, the airflow of the system will be lower.
- Close door; reinstall securing screw.

BLOWER BEARING LUBRICATION

Scheduled lubrication is mandatory.

LUBRICATION INTERVAL

5 & 7.5 HP Blowers - 2200 operating hours or 6 months, whichever comes first.

Lubrication Procedure:

- Clean zerk fittings on bearings and the end of the grease gun.
- Turn on the blower being serviced.
- For both bearings, pump in a small amount of lubricating grease until a thin bead appears around the bearing.
- Turn off blower.
- Clean excess grease from bearing and zerk fitting.

Approved Lubricants:

- Recommended: Exxon/Mobil Polyrex EM
- Alternate: Shell Oil Alvania RL2
- Minimum requirement: NLGI #2 compatible grease, with lithium thickener, mineral base oil and operating range of at least -10 to +260F.

Blower Inspection

Inspect Blowers every time you lubricate bearings.

- Confirm bearings are still secure to blower shaft. It should not be possible to move the blower shaft back and forth along its length.
- Confirm blower wheel is not rubbing against the blower inlet or housing.

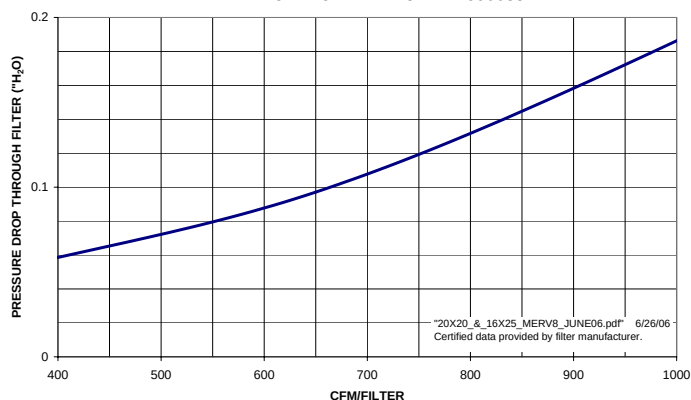
⚠ WARNING

Danger of severe injury if unit starts unexpectedly during maintenance!

Before opening unit doors, always switch power off at service disconnect. Lock-out/tag-out the disconnect switch.

Initial Resistance of Filters supplied with this unit:

INITIAL PRESSURE DROP 20" x 20" MERV 8 FILTERS
RENEWAIRE SERVICE PART NUMBER 990083



Filter Specifications:

(12) 20" x 20" x 2"(nominal) pleated filters

Actual size: 19.5" x 19.5" x 1.75"

Unit shipped with MERV-8 Filters

Minimum recommended effectiveness: MERV-6

CAUTION

Filters must be used or the energy exchange core will become blocked by dust and the unit will not do its job. In extreme cases components may be damaged.

CAUTION

Bearings must be lubricated properly to avoid early blower failure!

⚠ WARNING

Danger of Injury due to moving parts!

The blower, motor and belts will be running as you lubricate the blowers.

Use extreme caution!

CAUTION

Incorrect Belt Tension will damage this blower!

CAUTION

DO NOT WASH THE ENERGY EXCHANGE CORE. Keep it away from water or fire to avoid damaging it. Always handle the core carefully.

MAINTENANCE INFORMATION CONTINUED ON PAGE 11

INSTALLATION AND OPERATION MANUAL

HE6X



NOTE: Disconnect Switch and 24V Transformer Standard

In 2012, these ERVs may be ordered with new factory-installed features including Isolation Dampers and Variable Frequency Drives. Consult the supplemental Installation and Operation Manual(s) for these features if supplied.



⚠ WARNING

**RISK OF FIRE, ELECTRIC SHOCK, OR INJURY.
OBSERVE ALL CODES AND THE FOLLOWING:**

1. Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lock-out/tag-out to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
2. This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
3. Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
4. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.
5. This unit must be grounded.
6. Danger of severe injury to bystanders and damage to unit or property if high winds move this unit. Secure this unit to the building!
7. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment that might be installed in the area affected by this equipment. If this unit is exhausting air from a space in which chimney-vented fuel burning equipment is located, take steps to assure that combustion air supply is not affected. Follow the heating equipment manufacturer's requirements and the combustion air supply requirements of applicable codes and standards.
8. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
9. This unit is intended for general ventilating only. Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this unit to range hoods, fume hoods or collection systems for toxics.
10. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
11. If installed indoors this unit must be properly ducted to the outdoors.

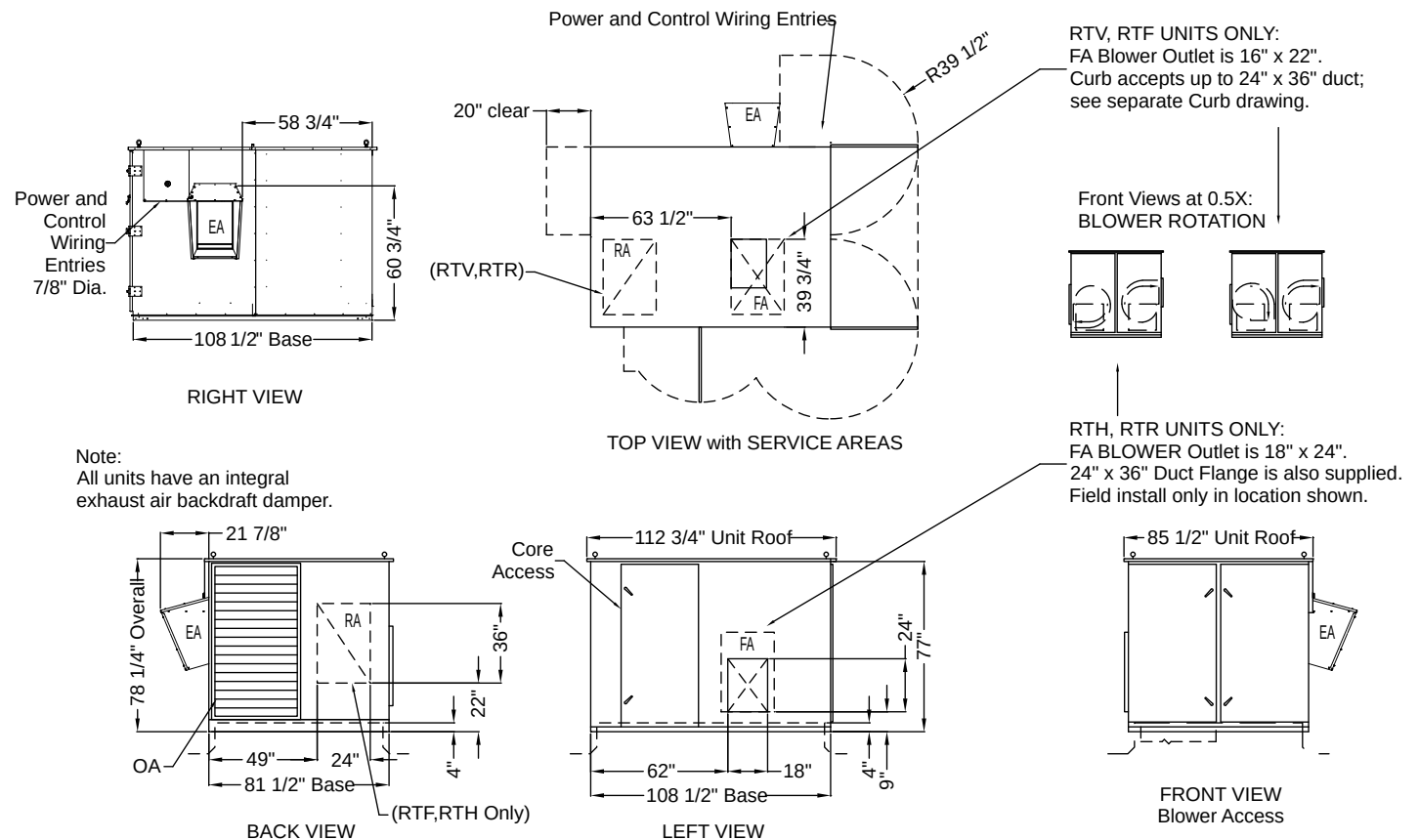
CAUTION

To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc., out of unit.

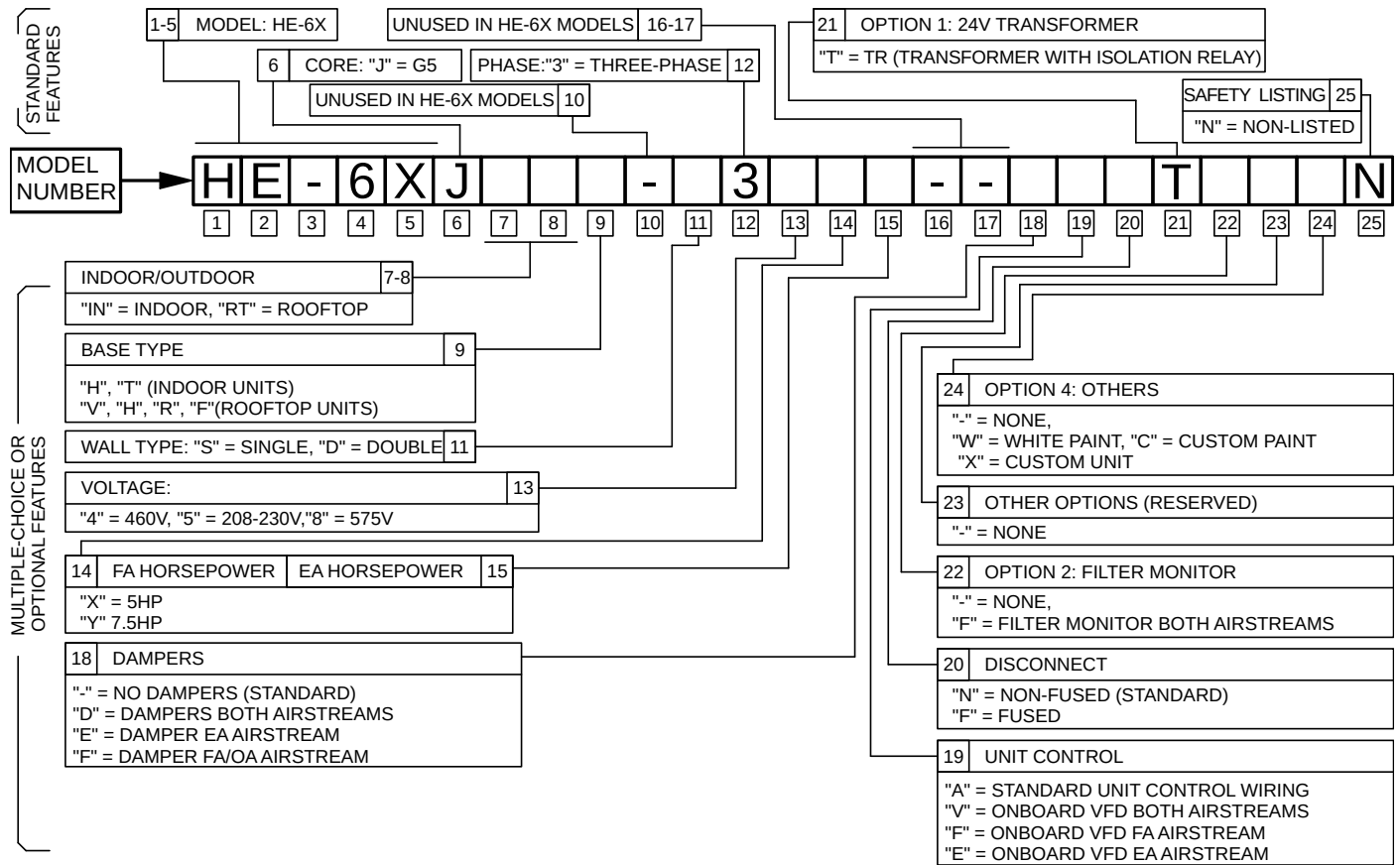
CAUTION

Do not remove or disable the wiring interconnection between the Overload Relays and the Contactors. Without this interconnection the motor(s) will not be protected against overload.

HE6XRT Dimensions



HE6XIN Product Configuration Chart



Basic Order of Installation

1. PREPARE ROOF CURB OR EQUIPMENT RAIL
2. LIFT UNIT INTO POSITION ON CURB OR RAIL
3. SECURE UNIT TO CURB OR RAIL
4. INSTALL EXHAUST HOOD
5. INSTALL EXTERNAL DUCTWORK IF APPLICABLE
6. MAKE ELECTRICAL CONNECTIONS
7. PERFORM START-UP AND CHECK-OUT PROCEDURES

Step 1: Prepare Roof Curb or Equipment Rail

Complete the installation of the curb or equipment rail before installing the unit.

Curbs or equipment rails should be attached to the structure sufficiently to transfer wind loads on the unit to the structure itself. See warning under Step 3.

Curbs or equipment rails should be installed where the structure is able to carry the weight of the unit.

Dimensioned drawings of RenewAire's standard roof curbs are available at www.renewaire.com.

On Roof Curbs:

Curb should be insulated. Apply roofing and counterflashing to curb as per standard practice.

Install appropriate gasket on top of Roof Curb around the perimeter and around the edges of ducts.

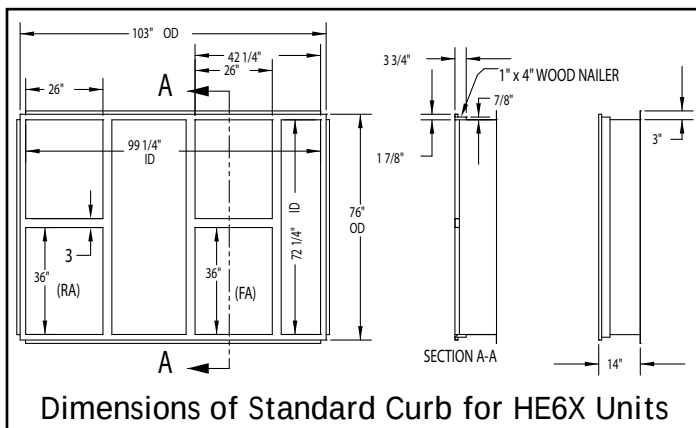
If unit is ducted through the curb the ducts should be installed before the unit is placed on the curb.

Ducts should be insulated.

Vibration Isolation Curbs: Corner weights are available for design purposes at www.renewaire.com.

On Equipment Rails:

Before installing the unit, apply roofing and counterflashing to Equipment Rails as per standard practice.



CAUTION

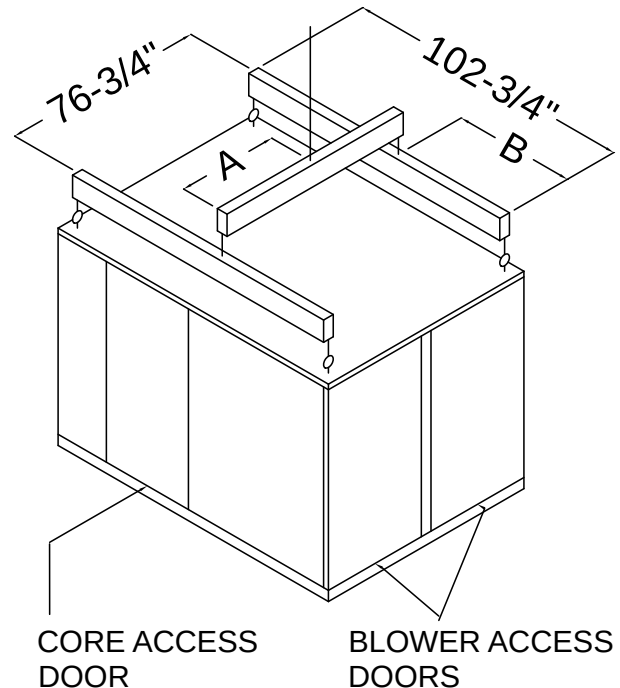
Air leakage from the conditioned space below the roof into the space between inside the curb can cause problems including:

- Condensation inside the curb in cold weather, to the point that water drips into the building and damages duct insulation or furnishings.
 - Leakage of noise from the unit into the space below.
- Holes through the roof deck for the ducts should be cut close to the ducts and the gaps should be sealed.

Step 2: Lift Unit Into Position on Curb or Rail

Remove the shipping straps that hold the unit to its pallet before lifting.

NOTICE TO RIGGERS USE SPREADER BARS!



HE6XIN UNIT CENTER OF GRAVITY (in) AND WEIGHT (POUNDS)

HP	WEIGHT	A	B
SINGLE WALL			
(2) 5HP	2235	37-3/4	45-1/4
(2) 7.5HP	2336		44
DOUBLE WALL			
(2) 5HP	2659	37-1/4	46
(2) 7.5HP	2760		44-3/4

⚠ WARNING

Risk of severe injury or death when unit is being lifted!
Lifting must be performed by qualified personnel only!

Step 3: Secure Unit to Curb or Rail

RenewAire strongly recommends that you secure rooftop units properly to the curb or equipment rails, and thus to the building structure. Strong winds, tornados, and hurricanes can and do displace or remove rooftop equipment from rails or curbs. When this happens, the equipment, adjacent roof structure, and even vehicles parked near the building can be damaged, and rain typically enters the building. The equipment is put out of service and the collateral damage can be very expensive.

At a minimum, observe locally applicable codes, but note that even if local codes require some attachment means that may not be enough to withstand common wind occurrences.

Step 4: Install Exhaust Air Hood (Rooftop Units Only)

To Install the Exhaust Air Hood:

Exhaust Air Hood is shipped in the Exhaust Air Blower compartment, along with a bag of screws. Install Hood over exhaust air outlet using pre-drilled holes.

⚠WARNING

Danger of damage or severe injury if high winds move this unit. Secure unit to structure! Observe local code requirements at a minimum!

Step 5: Install External Ductwork (if applicable)

Outside units:

Any exposed ductwork attached to the unit must be properly insulated and weatherproofed.

Units ordered in RTH, RTR or RTF configurations have side openings for connection of ductwork.

Room Air (air returning to the unit to be exhausted):

Units are shipped with 24" wide by 36" high duct flanges installed.

Fresh Air (air leaving the unit to be ducted into the building):

24" x 36" duct flanges are shipped loose. For best airflow performance, install this duct flange even with the bottom of the Fresh Air blower outlet, and centered side-to-side.

Alternately, duct flanges as small as 18" x 24" (the blower outlet size) can be used along with transitions to the final duct size.

Inside units:

Ducts between the unit and the outside air must be insulated. See caution to right.

Select locations for the outside air intake weatherhood and exhaust weatherhood carefully. See caution to right.

Outside Wall Caps:

Wall caps should be designed to exclude animals and rain. Size wall caps to minimize pressure drop.

To keep rain out, select the outside air intake weatherhood so inlet velocity is below 500 feet per minute (or less, if so dictated by local codes or practices).

Install catches for rubber Door Restraints:

Doors for the Fresh Air Blower and the Core and Filter compartments are equipped with rubber Door Restraints. For units with a Fresh Air Outlet duct fitted to the side, the catches for these Door Restraints are mounted on the duct.

Sound Attenuation

General Practices

Take these simple steps to attenuate noise from the unit.

Outside the building:

The exhaust hood is the primary source of noise outside the building. When practical, orient the exhaust air hood to point away from houses or public areas.

At the Curb: (Rooftop units)

Cut the holes in the roof deck to fit closely around the duct(s) passing through the roof deck. Seal all gaps around the duct(s) at the roof deck.

Ducts:

Make sure the ductwork at the unit outlets is stiff enough to resist the flexure and resulting booming associated with system start-up and shut-off, as well as the turbulent flow conditions at the blower outlets.

In general, provide smooth transitions from the ERV's outlets to the duct. The ducts connecting to the outlets should be straight for a sufficient distance, with gradual transitions to the final duct size.

These guidelines are consistent with SMACNA recommended duct layout practices for efficient and quiet air movement. Follow SMACNA guidelines.

Radiated Noise

The HE6X is insulated with high-density fiberglass. This provides significant attenuation of radiated sound from the unit itself.

The outlet ducts can be significant sources of radiated sound as well. The Outlet ducts should be insulated for sound control. This insulation should start at the unit. At a minimum the first ten feet of duct should be insulated. All parts of the FA and RA ducts located in a mechanical space with noise-generating equipment also should be insulated for sound control, both to minimize sound radiation out of the FA duct, and also to control sound radiation into both ducts.

Aerodynamic (Velocity) Noise

When sound attenuation is a design concern, the primary consideration is velocity noise at the unit's Air blower outlets. The average velocity at the ducted blower outlet is 1090 FPM when the unit is operating at 6500 CFM. The average velocity at the Exhaust Hood outlet is 1765 FPM when the unit is operating at 6500 CFM.

CAUTION

Ducts connecting the unit to the outside air must be insulated with sealed vapor barriers inside and out. Otherwise condensation and/or freezing may occur in the insulation, causing damage and/or allowing mold growth.

⚠WARNING

Danger of carbon monoxide poisoning!

Outside air intake should be at least 10' away from sources of carbon monoxide or other toxic gasses; chimneys, furnace and water heater exhausts, or fume hood outlets.

Do not locate outside air intake where vehicles may be serviced or left idling.

Never locate the outside air inlet inside a structure.

⚠WARNING

Danger of electrical shock when wiring or servicing this unit.

Always disconnect power source before servicing. More than one disconnect switch may be required to de-energize unit.

Operation

Principal of Operation

The HE6X has one basic purpose: to exhaust air from a structure and bring in fresh air from outside, while transferring heating or cooling energy from the exhaust air to the fresh air.

The HE6X is a very simple device, and will accomplish this purpose as long as the blowers for both airstreams are able to move air through the energy-exchange core.

Checking that Unit is Operating

Air Flow

Airflow should be occurring in both airstreams. Sometimes the easiest place to confirm that air is moving is at the weatherhoods.

If exact airflow is critical, it may be desirable to permanently install flow measuring stations and manometers in the ductwork connected to the unit. These also can be used to determine when filters should be cleaned or changed.

Use Static Taps in Doors to Measure Airflow Rates

See "Cross-Core Static Drop" in MEASURING AIRFLOW table. These may be used to directly measure airflow in the unit.

Energy Exchange

Precise determination of installed sensible energy exchange effectiveness requires careful measurement of temperatures and air flows in all four air streams, and in practice is somewhat difficult.

It is possible to confirm that energy is being exchanged simply by feeling the ducts. If the Fresh Air duct from the unit into the room is closer to room temperature than to the outside temperature, energy is being recovered.

Operating Controls

A wide variety of control schemes may be selected by the engineer, installer, or owner to meet the ventilation needs of the facility. These may include timer clocks, occupancy sensors, dehumidistats (for cool-weather operation), carbon dioxide sensors, and others. DDC systems may also control the unit. Most control schemes will operate the unit only when needed.

Continuous Operation

Continuous operation is acceptable in virtually all conditions. Unit will not be damaged by continuous operation as long as air flow occurs. Blower motors may overheat if filters become completely blocked due to lack of maintenance. Motors are thermally protected. With continuous operation, some external frosting may occur in very cold weather (see below).

Operation in Extreme Cold Weather

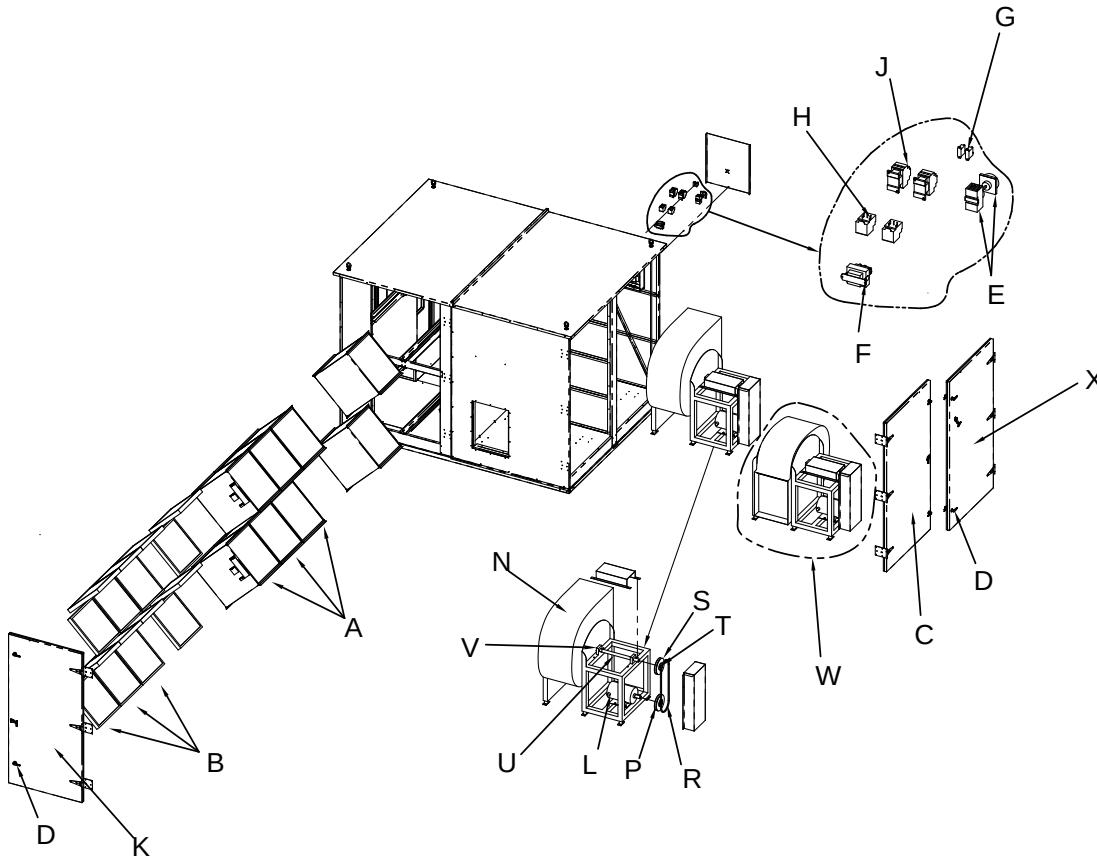
Unit is capable of operating at outside temperatures down to -10°F, with indoor humidities below 40%, without any internal frosting. Unit can operate at more severe conditions occasionally with little or no impact on its performance. At lower humidities, it can operate at lower outside temperatures without freezing the energy-exchange core.

Step 6: Electrical Connections

Proper selection, sizing and installation of supply wiring and branch circuit protection is required and must be performed by a qualified professional.

- All wiring must comply with applicable local and national electrical codes.
- Always provide a dedicated Disconnect Switch for this unit (available as a pre-installed option.)
- Minimum Circuit Ampacity (MCA) and Maximum Fuse Size (MFS) for this unit are marked on its Electrical Rating Label, near its electrical box.

HE6X Replacement Parts

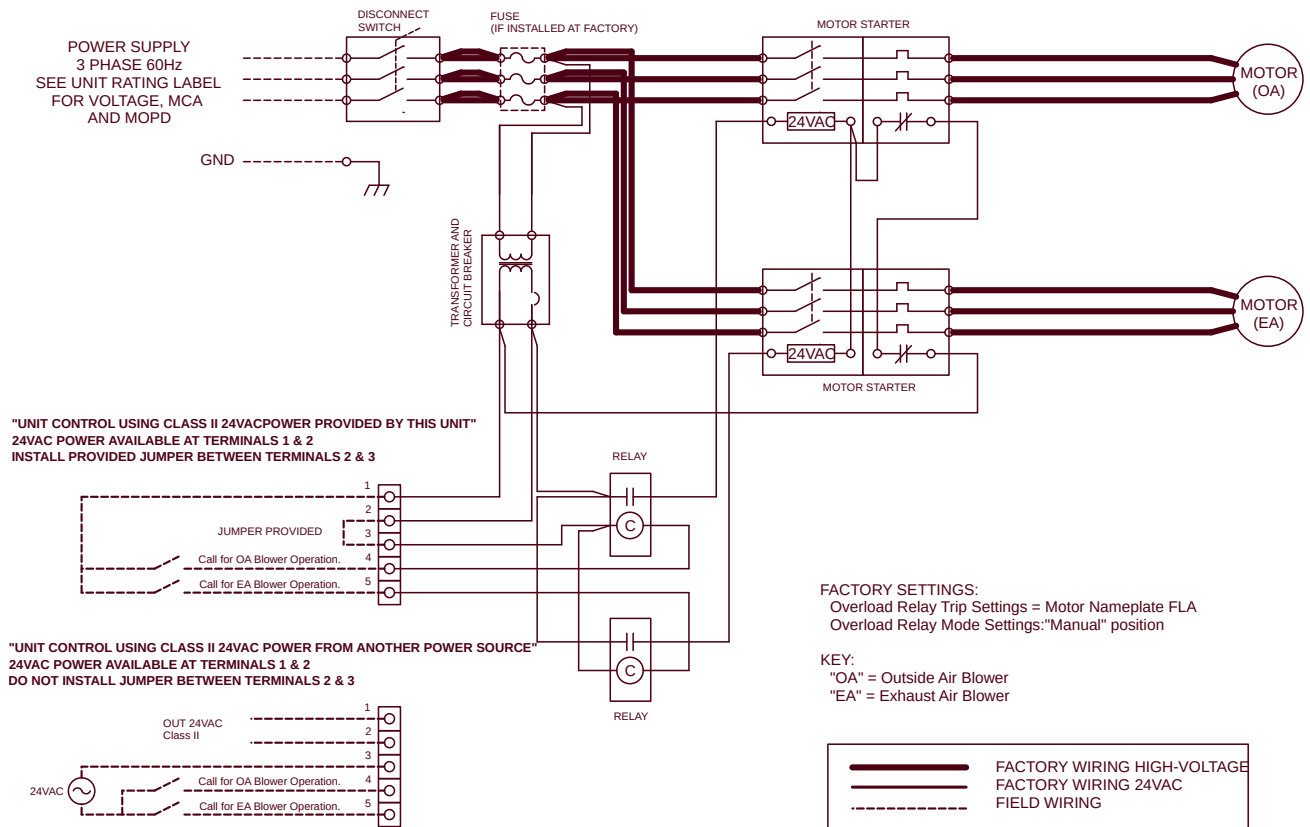


A	CORES
B	FILTERS
C	LEFT BLOWER DOOR
D	TURN LATCH
E	DISCONNECT SWITCH
F	TRANSFORMER
G	ISOLATION RELAY
H	OVERLOAD RELAY
J	CONTACTOR
K	CORE DOOR
L	MOTOR
N	BLOWER
P	MOTOR SHEAVE
R	BELT
S	BLOWER SHEAVE
T	BLOWER BUSHING
U	BLOWER SHAFT
V	BLOWER BEARINGS
W	BLOWER MOTOR KIT
X	RIGHT BLOWER DOOR

HE6X Airflow Performance

Motor HP	Blower RPM	Turns Open	External Static Pressure (in. w.g.)																	
			0.00		0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
5	1460	4.5	5005	2.5	4800	2.5	4650	2.3	4475	2.1	4200	1.9	4000	1.7	3750	1.7	3400	1.5	3100	1.1
	1610	2	5550	4.0	5375	4.0	5250	3.9	5100	3.9	4900	3.7	4650	3.6	4500	3.4	4250	3.3	4000	3.1
	1725	0							5525	5.0	5475	5.0	5200	4.9	5050	4.8	4800	4.6	4600	4.5
7.5	1560	4.5	5275	2.7	5200	2.5	4900	2.3	4775	2.3	4550	2.1	4350	1.9	4125	1.9	3875	1.7	3575	1.5
	1740	2	5950	4.7	5825	4.7	5625	4.6	5490	4.6	5325	4.5	5125	4.3	4950	4.3	4750	4.2	4525	4.0
	1865	0	6500	6.5	6350	6.5	6225	6.4	6125	6.4	5910	6.3	5825	6.2	5625	6.1	5410	6.1	5300	6.0

HE6X P3 Wiring Schematics with Independent Blower Control



24VAC Power Supply Provided with this ERV Unit

This ERV is provided with a Class II 24VAC power supply system that operates the unit's contactor(s) for EV450 and HE1X. The ERV's 24VAC Power Supply can also be used to power the externally-installed controls system: up to 8VA of power is available.

The unit's power supply system includes isolation relay(s) so you can use external controls whose contact ratings are as low as 50mA (1.2VA). Also, it is possible to operate the isolation relays with 24VAC power from an external source (with proper wiring connections).

A built-in circuit-breaker prevents damage to the transformer and other low-voltage components in the event of a short-circuit or overload. In extreme cases, the transformer itself is designed to fail safely.

CAUTION

1. Connect only to components intended for use with 24VAC power.
2. Do not undersize the low-voltage wires connected to this device. Observe the wire length and gauge limits indicated in this manual.
3. Do not overload this unit's 24VAC power supply system. Confirm that the power requirements of devices you connect to this power supply system do not exceed 8VA in total.
4. If an external source of 24VAC power is used to control the unit, consult the wiring schematics and connect the external power only to the specified terminals in order to avoid damaging the unit or external controls. Connect only CLASS II power to the control terminals of this unit.
5. Unit is not equipped to receive analog signals (such as 1-10vdc or 4-20mA).
6. Unit is not equipped to communicate directly with Building Management Systems (such as BACNET, LONWORKS, etc.). However, the unit can be controlled by powered or non-powered contacts operated by any kind of control system.

Specifications

- Nominal Output Voltage under load: 24VAC
- Typical Output Voltage at no load: 29-31V
- Minimum contact rating for connected control device: (50mA (1.2VA)
- Circuit Breaker Trip Point: 3A

How to Reset the 24VAC Circuit Breaker

If the transformer is subjected to an excessive load or a short circuit, the circuit breaker will trip to prevent the failure of the transformer. When it trips the circuit breaker's button pops up. Shut off the primary-side power to the unit, and remove the excessive load or the short. The circuit breaker can be reset about fifteen seconds after it trips by pressing in the button.

NOTE: INSTALLING CONTRACTOR:

If primary-side voltage is 230VAC, move black primary-side lead from transformer's "208V" terminal to the transformer's terminal marked "240V" ("230V" in some units).

Do not move the black primary-side lead that is connected to the transformer's "COM" terminal.

Limits of Power Output

If limits on wire gauge and length are observed, you may connect control devices that draw up to 8VA to the blue and red wires. More than one device can be connected as long as total steady-state load does not exceed 8VA.

OBSERVE THESE LIMITS TO WIRE LENGTH AND GAUGE, in order to ensure reliable operation of the control system.

Wire Gauge	#22	#20	#18	#16	#14	#12
Circuit Length	100'	150'	250'	400'	700'	1000'

"Circuit Length" is distance from ERV to Control Device.

Motor Starters

This unit uses IEC-style motor starters to protect the motors against overload.

IEC-style motor starters use Overload Relays to detect excessive current and interrupt the control circuit that engages the motor's contactors.

⚠WARNING

The Overload Relay output contacts 95 & 96 must remain in series with the low-voltage control circuit! Altering this will create a hazardous situation in which the motor is not protected against overload!

⚠WARNING

Adhere to applicable local codes when adjusting the dial setting of the overload relays.

Overload Relays are sized to Full Load Amp (FLA) rating of the protected motor. The Overload Relays can be adjusted to trip (interrupt the control circuit) at a specific setting within a range.

Overload Relays should initially be set at the FLA rating of the motor (see Unit Rating Label). If necessary to prevent nuisance tripping at start-up, the Relays can be adjusted to trip no higher than 115% of the motor's FLA rating.

For safest operation, the overload relays should also be used in manual reset mode with trip test capability.

NOTE: As factory-wired, if one blower motor is shut down due to overload by its Motor Starter, the other motor will also be shut down.

NOTE: Terminals 96 & 97 of the Overload Relays and terminals 14 & 13 of the Contactors are normally-open dry contacts that may be used to signal that the contactors are closed and/or that the Overload Relays have tripped.

⚠WARNING

DANGER OF INJURY OR DAMAGE.

The motors in this unit must not be run at an amperage that exceeds the motor's rated full load amps and overload relays on the motor starters must be set at or below motor full load amps. For safest operation, the overload relays should also be used in hand reset mode with trip test capability.

It is the installer's responsibility to measure the operating amperage of each motor. If the full load amp rating is exceeded, the amp draw must be reduced by substituting a smaller motor pulley or by adjusting the variable sheave. Continue these adjustments until the actual amperage is no more than the motor's faceplate full load amps.

Failure to make this adjustment may result in unsafe motor winding temperatures or tripping of the supplied motor starter's overload relay motor protection devices set at full load amps.

⚠WARNING

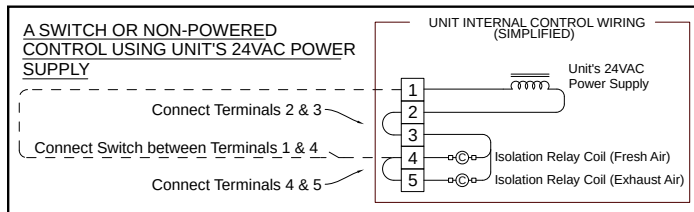
DANGER OF INJURY OR DAMAGE.

The relay must be set for correct FLA rating depending on the motor horsepower. See Unit Rating Label on motor for HP and FLA specifications.

Control Wiring Schematics

NOTE: The simplified schematics below show only the relevant portions of the low-voltage control circuit in the ERV unit and representational external control approaches. See the complete unit schematics elsewhere in this manual.

- A. **Single 2-wire Control, unpowered:** Use schematic below if the control requires no power from the unit to operate and acts like a simple on/off switch. The control must not supply any power to the ERV unit. Install jumper (provided) between terminals 2 & 3. Connect the control's contacts to terminals 1 & 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper (provided) between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.

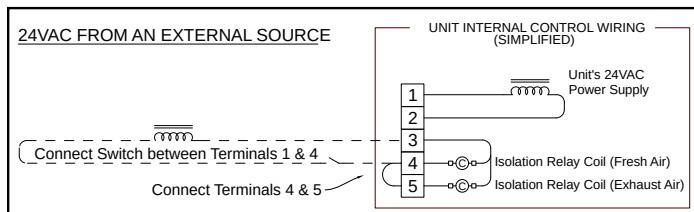


- B. **Single 2-wire Control on separate Power Supply, no power present at Control Output:** Wire as shown for the Single 2-wire control (A. above).

CAUTION

Make sure the control provides no voltage or current at its output terminals.

- C. **Control Sending 24VAC "On" Signal (from an external power source) to ERV:** Make sure jumper is NOT installed between Terminals 2 & 3. Now you safely can apply 24VAC to the Terminals 3 & 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper (provided) between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.

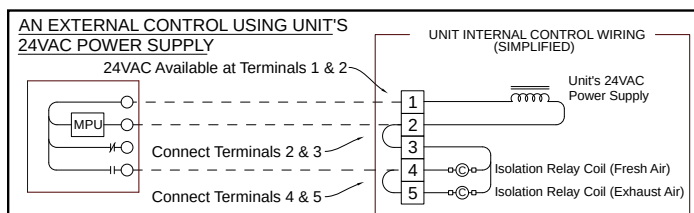


CAUTION

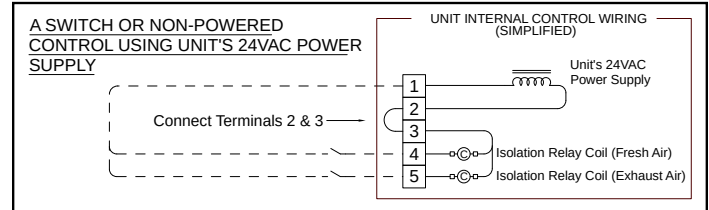
Supply only 24VAC (not VDC) from a Class II Power Source.

- D. **Control operating on Unit's 24VAC Power Supply:** 24VAC power is available at the Terminals 1 & 2. **CAUTION:** external control system should not draw more than 8VA. Install jumper (provided) between terminals 2 & 3.

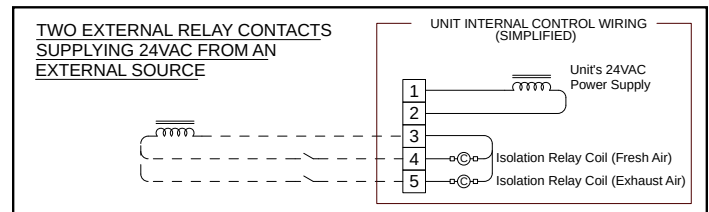
Connect the switched output of the Control to Terminal 4 to operate the ERV's Isolation Relay for OA/FA Blower. Install jumper (provided) between terminals 4 & 5 to operate the ERV's Isolation Relay for the RA/EA Blower.



- E. **Control System with 2 Non-powered Relay Contacts:** Use this schematic if the external control system provides no voltage or current at its output contacts. Install jumper (provided) between terminals 2 & 3. Connect one side of each of the output contacts to Terminal 1. Connect the other side of the output contact to control the FA Blower to Terminal 4, and the output contacts to control the EA Blower to Terminal 5.



- F. **Control System Sending two 24VAC "On" Signals from an external power source:** Make sure the jumper is NOT installed between Terminals 2 & 3. Now you safely can apply one of the 24VAC signals to Terminals 3 & 4 to operate the ERV's isolation relay for the Fresh Air Blower. Apply the second 24VAC signal to Terminals 3 & 5 to operate the ERV's isolation relay for the Exhaust Blower (make sure the polarity of each wire connected to Terminal 3 is the same).



CAUTION

Supply only 24VAC (not VDC) from a Class II Power Source.

- G. **Control System Operating Isolation Dampers with End Switches:** Use Isolation Dampers with electrically separate end switches. The end switches are used to separately control the ERV unit's Isolation Relays. This ensures that each damper is open before the respective blower starts up.

NOTE: Because the ERV's Motor Starters will only be operating once the Dampers are open, the power draw of the Damper Actuators is allowed to be as much as 35VA while opening (including power draw of the external control system, if any). However, the power draw of the fully-opened (stalled) Actuators (and external control system if any) must be less than 8VA. (Most damper actuators have much lower power draws.)

Step 7: Start-Up and Check-Out Procedures

Before placing unit in service:

- Check belt tension (see Blower Maintenance Information)
- Inspect blower (see Blower Maintenance Information)
- Blower bearings are pre-lubricated at factory and do not require initial lubrication (however, scheduled lubrication is required, see Maintenance Section.)

As part of first start-up:

- Check running amps of each motor.
- Confirm the motor starter overload relays are properly set.

After 24 - 36 hours of unit operation:

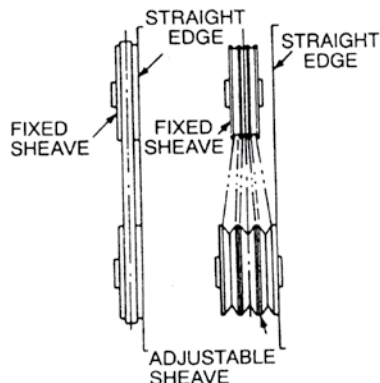
- Re-torque bearing setscrews to 75 inch-pounds. Use 1/8" hex bit with a separate extension shaft (use of long hex bits may cause inaccurate torque readings.)

Test and Balance Procedures

Test and Balance Procedures are outside the scope of this Manual, and should be performed by qualified personnel.

If sheaves are adjusted in order to adjust air flow, belts should be re-tensioned following the procedure on page 11.

Sheaves should also be adjusted so that belts run straight, as shown below:



CAUTION

Failure to follow start-up procedures may cause early equipment failure!

Service Information

Blower bearing replacement:

1. Wheel and shaft must be supported before any dismantling is attempted.
2. Remove drives, loosen and remove bearing bolts. Next loosen the retaining set screws on the bearing collars. Remove the bearings from the shaft only after the wheel and shaft are securely supported.
3. Shaft Removal: After following the steps listed for the removal of the bearings, loosen the set screws in the wheel hub. With the wheel securely blocked, pull the shaft from the wheel.
4. Wheel Replacement: Remove the bolts on the inlet upright support. Loosen set screws on wheel hub and lift wheel from housing.

Blower Vibration Isolator Specifications:

Height: 1.5"
Deflection Range: 0.20 - 0.040"
Weight Range: 40 - 75 pounds
Cap Screw: 5/16-18

CAUTION

Improperly aligned belts can cause early sheave or bearing failure.

Maintenance (cont. from page 12)

Blower Belt Tension

- Check belt tension every time you lubricate bearings:
- Belt tension must be properly maintained.
- Remove belt guard. Check and if necessary adjust belt tension.
- Inspect belt(s) for cracking or uneven wear.
- Check that sheaves are properly aligned so that belt runs straight (see Illustration on page 6).
- Re-install belt guard.

Properly tensioned belt will deflect 0.25" when pressed at the center point with the following force:

5 HP BLOWER - 6 pounds

7.5 HP BLOWER - 4 pounds

GENERAL CLEANING AND INSPECTION

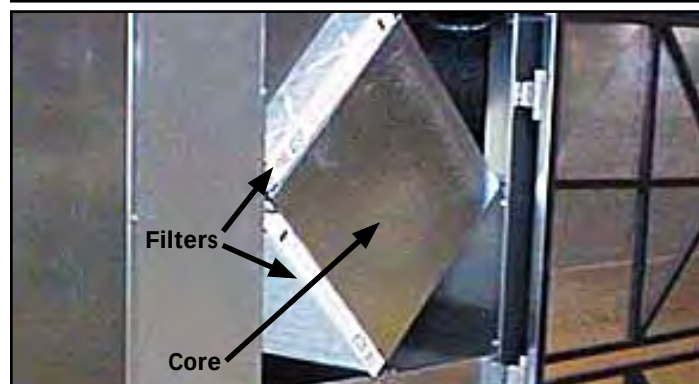
Perform general cleaning and inspection when changing filters.

- Remove dust from blower wheels periodically.
- Remove paper, leaves, etc. from inlet and outlet screens.
- Inspect for insect nests.

TO CLEAN THE ENERGY EXCHANGE CORE

Clean the core annually.

- Remove the filters.
- Vacuum the exposed faces of the energy exchange core with a soft brush.
- Vacuum out dust from the rest of the unit case.
- Install new filters.
- DO NOT WASH THE ENERGY EXCHANGE CORE. Always handle the core carefully. Keep it away from water or fire to avoid damaging it. The energy exchange core can be replaced, but is expensive.



Maintenance

SUMMARY MAINTENANCE REQUIREMENTS

Change Filters
Lubricate Blower Bearings
Inspect Blower
Tension Blower Belt
General Cleaning and Inspection
Clean Energy Exchange Cores

CHANGING THE FILTERS

Inspect and/or replace filters every two or three months when the unit is in regular use, or as needed.

The upper and lower banks filter the Return Air entering the unit to be exhausted and protect the cores and exhaust blower from dust build-up.

The center banks filter the Outside Air which the unit will deliver to the conditioned space; these filters remove particulate from the ventilation air in addition to protecting the cores and fresh-air blower.

- Turn off unit completely! Lock-out and tag-out the unit disconnect switch.
- Open the Core Access Door and secure it in the open position with the rubber Door Restraint.
- The door is secured with turn-type latches, plus one Phillips-head securing screw. Keep the securing screw. NOTE: Always replace securing screw when reinstalling door.
- Remove and dispose of all (12) filters. The filters in each bank are connected by small clips for easier removal.
- Replace all (12) filters, re-installing the connecting clips. NOTE: See "Service Information" for information on the initial resistance of the filters originally supplied with this unit. If replacement filters have higher resistance, the airflow of the system will be lower.
- Close door; reinstall securing screw.

BLOWER BEARING LUBRICATION

Scheduled lubrication is mandatory.

LUBRICATION INTERVAL

5 & 7.5 HP Blowers - 2200 operating hours or 6 months, whichever comes first.

Lubrication Procedure:

- Clean zerk fittings on bearings and the end of the grease gun.
- Turn on the blower being serviced.
- For both bearings, pump in a small amount of lubricating grease until a thin bead appears around the bearing.
- Turn off blower.
- Clean excess grease from bearing and zerk fitting.

Approved Lubricants:

- Recommended: Exxon/Mobil Polyrex EM
- Alternate: Shell Oil Alvania RL2
- Minimum requirement: NLGI #2 compatible grease, with lithium thickener, mineral base oil and operating range of at least -10 to +260F.

Blower Inspection

Inspect Blowers every time you lubricate bearings.

- Confirm bearings are still secure to blower shaft. It should not be possible to move the blower shaft back and forth along its length.
- Confirm blower wheel is not rubbing against the blower inlet or housing.

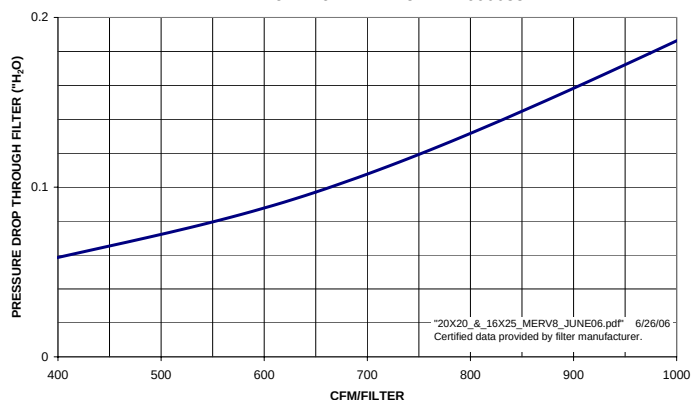
⚠ WARNING

Danger of severe injury if unit starts unexpectedly during maintenance!

Before opening unit doors, always switch power off at service disconnect. Lock-out/tag-out the disconnect switch.

Initial Resistance of Filters supplied with this unit:

INITIAL PRESSURE DROP 20" x 20" MERV 8 FILTERS
RENEWAIRE SERVICE PART NUMBER 990083



Filter Specifications:

(12) 20" x 20" x 2"(nominal) pleated filters

Actual size: 19.5" x 19.5" x 1.75"

Unit shipped with MERV-8 Filters

Minimum recommended effectiveness: MERV-6

CAUTION

Filters must be used or the energy exchange core will become blocked by dust and the unit will not do its job. In extreme cases components may be damaged.

CAUTION

Bearings must be lubricated properly to avoid early blower failure!

⚠ WARNING

Danger of Injury due to moving parts!

The blower, motor and belts will be running as you lubricate the blowers.

Use extreme caution!

CAUTION

Incorrect Belt Tension will damage this blower!

CAUTION

DO NOT WASH THE ENERGY EXCHANGE CORE. Keep it away from water or fire to avoid damaging it. Always handle the core carefully.

MAINTENANCE INFORMATION CONTINUED ON PAGE 11

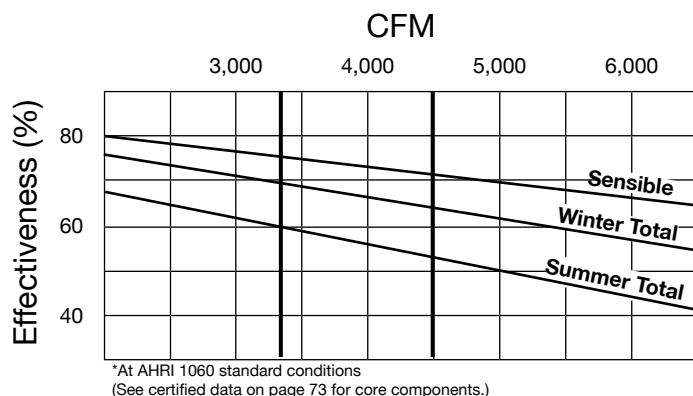
HE6XRT



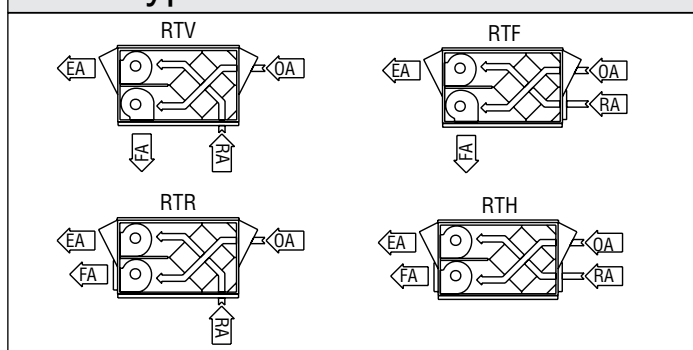
Outdoor Unit



G5 Performance



Base Type/Airflow Orientations



Specifications

Ventilation Type: Static Plate, Heat and Humidity Transfer						
Typical Airflow Range: 1,500-6,500 CFM						
AHRI 1060 Certified Core: Six L125-00						
Airflow Rating Points (for AHRI): 4,500 CFM and 3,375 CFM						
Number Motors: Two belt drive blower/motor packages with adjustable sheaves						
HP	Volts	HZ	Phase	FLA (per motor)	Min. Cir. Amps	Max. Overcurrent Protection Device
5	208-230	60	Three	15.0-13.6	33.8	45
	460	60	Three	6.8	15.3	20
	575	60	Three	5.3	11.9	15
7.5	208-230	60	Three	21.1-19.1	47.5	60
	460	60	Three	9.5	21.4	30
	575	60	Three	7.6	17.1	20
Optional Factory Installed VFD Electrical Specifications						
5	208-230	60	Three	15.0-13.6	37.1	45
	460	60	Three	6.8	16.8	20
	575	60	Three	5.3	13.1	15
7.5	208-230	60	Three	21.1-19.1	52.2	60
	460	60	Three	9.5	23.5	30
	575	60	Three	7.6	18.8	20
Standard Features: Totally Enclosed Premium Efficiency Motors Motor Starters, Non-fused Disconnect 24 VAC Transformer/Relay Package						
Filters: Twelve total, MERV 8, 2" pleated, 20" x 20" nominal size						
Weight: 2,400 lbs (unit), 2,700 lbs (shipping weight, on pallet)						
Shipping Dimensions: 116" L x 96" W x 90" H						
Options:						
Fused disconnect						
Double wall construction						
Factory supplied and mounted Variable Frequency Drives (VFDs) – one or both airstreams						
Motorized isolation dampers, OA, EA or both airstreams						
Factory mounted Filter Alarms (2)						
Exterior paint – white standard – custom colors available						

Airflow Performance

Motor HP	Blower RPM	Turns Open	External Static Pressure (in. w.g.)																	
			0.00		0.25		0.50		0.75		1.00		1.25		1.50		1.75		2.00	
			CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP	CFM	BHP
5	1460	4.5	5005	2.5	4800	2.5	4650	2.3	4475	2.1	4200	1.9	4000	1.7	3750	1.7	3400	1.5	3100	1.1
	1610	2	5550	4.0	5375	4.0	5250	3.9	5100	3.9	4900	3.7	4650	3.6	4500	3.4	4250	3.3	4000	3.1
	1725	0							5525	5.0	5475	5.0	5200	4.9	5050	4.8	4800	4.6	4600	4.5
7.5	1560	4.5	5275	2.7	5200	2.5	4900	2.3	4775	2.3	4550	2.1	4350	1.9	4125	1.9	3875	1.7	3575	1.5
	1740	2	5950	4.7	5825	4.7	5625	4.6	5490	4.6	5325	4.5	5125	4.3	4950	4.3	4750	4.2	4525	4.0
	1865	0	6500	6.5	6350	6.5	6225	6.4	6125	6.4	5910	6.3	5825	6.2	5625	6.1	5410	6.1	5300	6.0

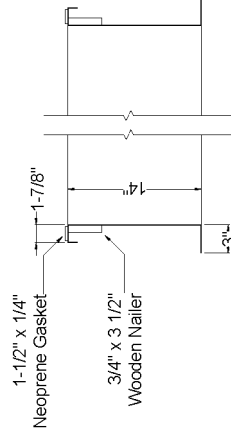
Note: Brake Horse Power (BHP) is for one blower motor package only.

Operation in this zone will likely exceed FLA limits.

HE6XRT Unit Dimensions

EA: Exhaust Air to outdoors
OA: Outdoor Air intake
RA: Room Air to be exhausted
FA: Fresh Air to inside

Curb Cross Section (Typical for All)

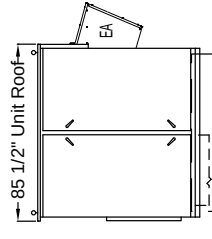


RTV, RTF UNITS ONLY:
FA Blower Outlet is 16" x 22".
Curb accepts up to 24" x 36" duct;
see separate Curb drawing.

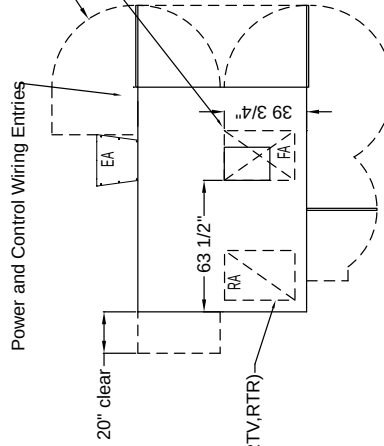
Front Views at 0.5X:
BLOWER ROTATION



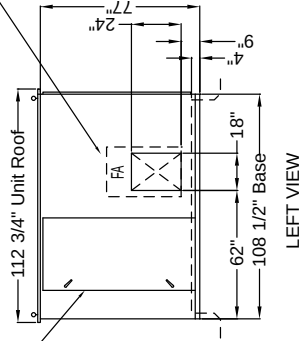
RTH, RTR UNITS ONLY:
FA Blower Outlet is 18" x 24".
24" x 36" Duct Flange is also supplied.
Field install only in location shown.



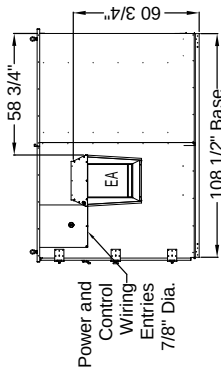
FRONT VIEW
Blower Access



TOP VIEW with SERVICE AREAS

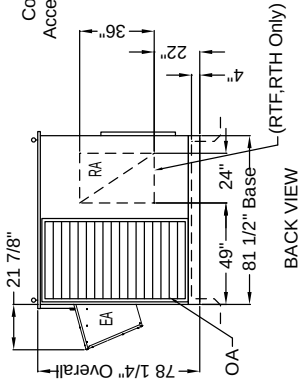


LEFT VIEW

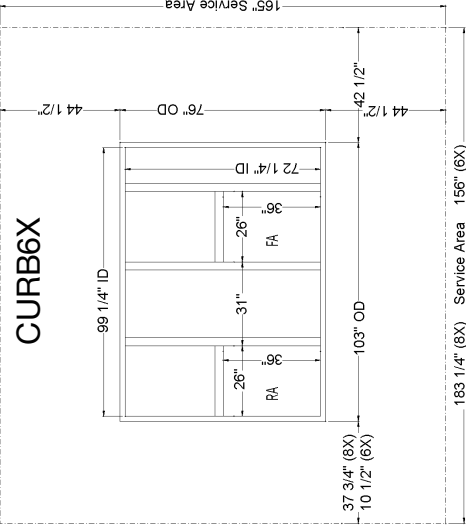


RIGHT VIEW

Note:
All units have an integral
exhaust air backdraft damper.

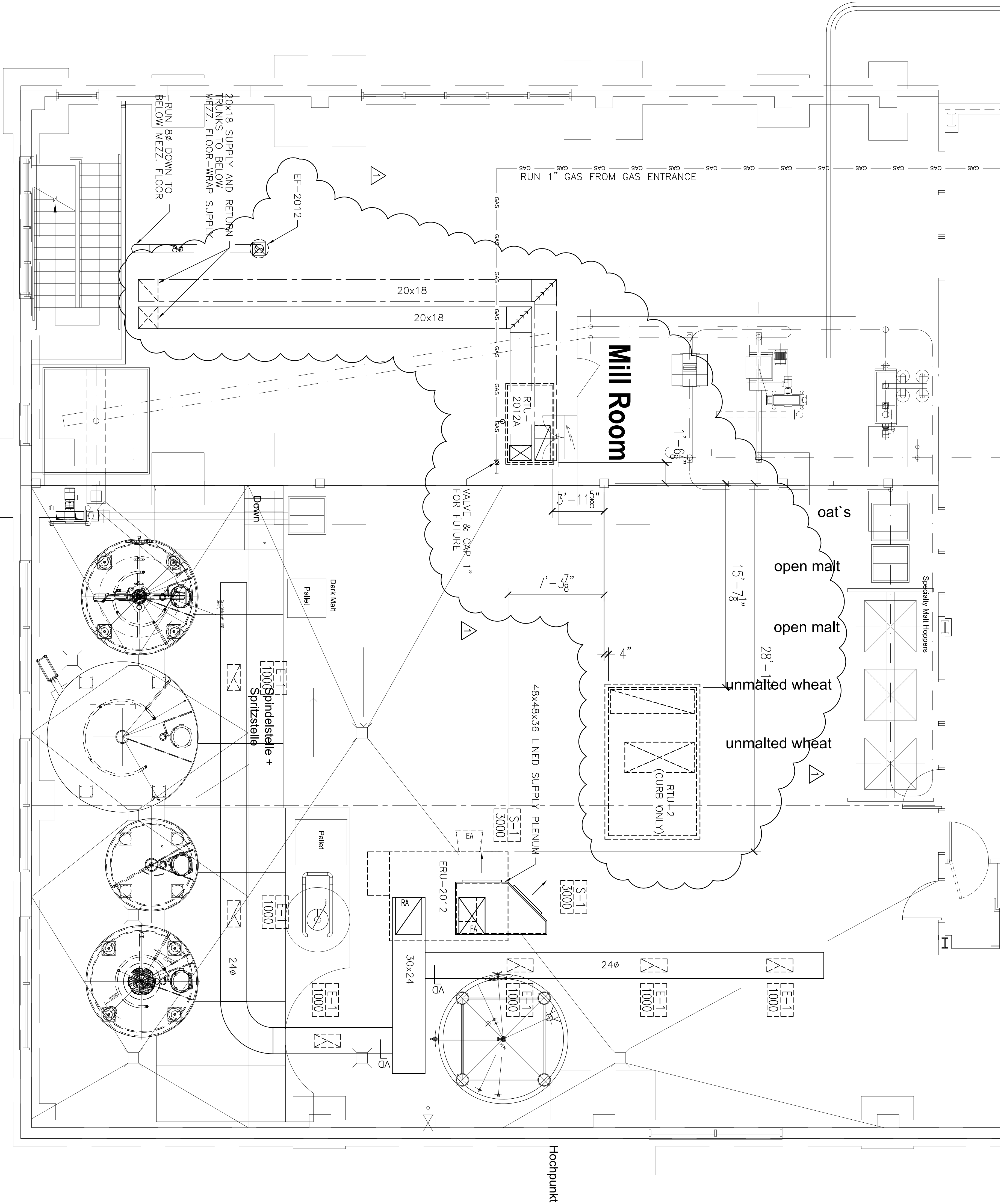


BACK VIEW
(RTF, RTH Only)



CURB6X

REVISIONS	
NO.	DATE REMARKS
0	11-30-12 PRELIMINARY DESIGN DEVELOPMENT
00	12-10-12 ISSUED FOR CONSTRUCTION
1	12-19-12 REVISIONS PER ROOF STEEL PLAN



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Nason
MECHANICAL SYSTEMS
Auburn, Maine 207-782-0727

PROJECT:

ALLAGASH BREWERY

PORTLAND, MAINE

DUCT PLAN

SHEET TITLE:

SCALE: AS NOTED DATE: 11-30-12

ENGINEER: MEW GRAPHIC SCALE: 0" = 1"

DRAWN: MEW SHEET No.

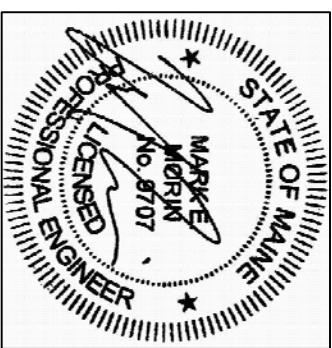
CAD FILE: PROJECT No.

MH-101

MH-101 MECHANICAL PLAN

SCALE: 1/4"=1'-0"

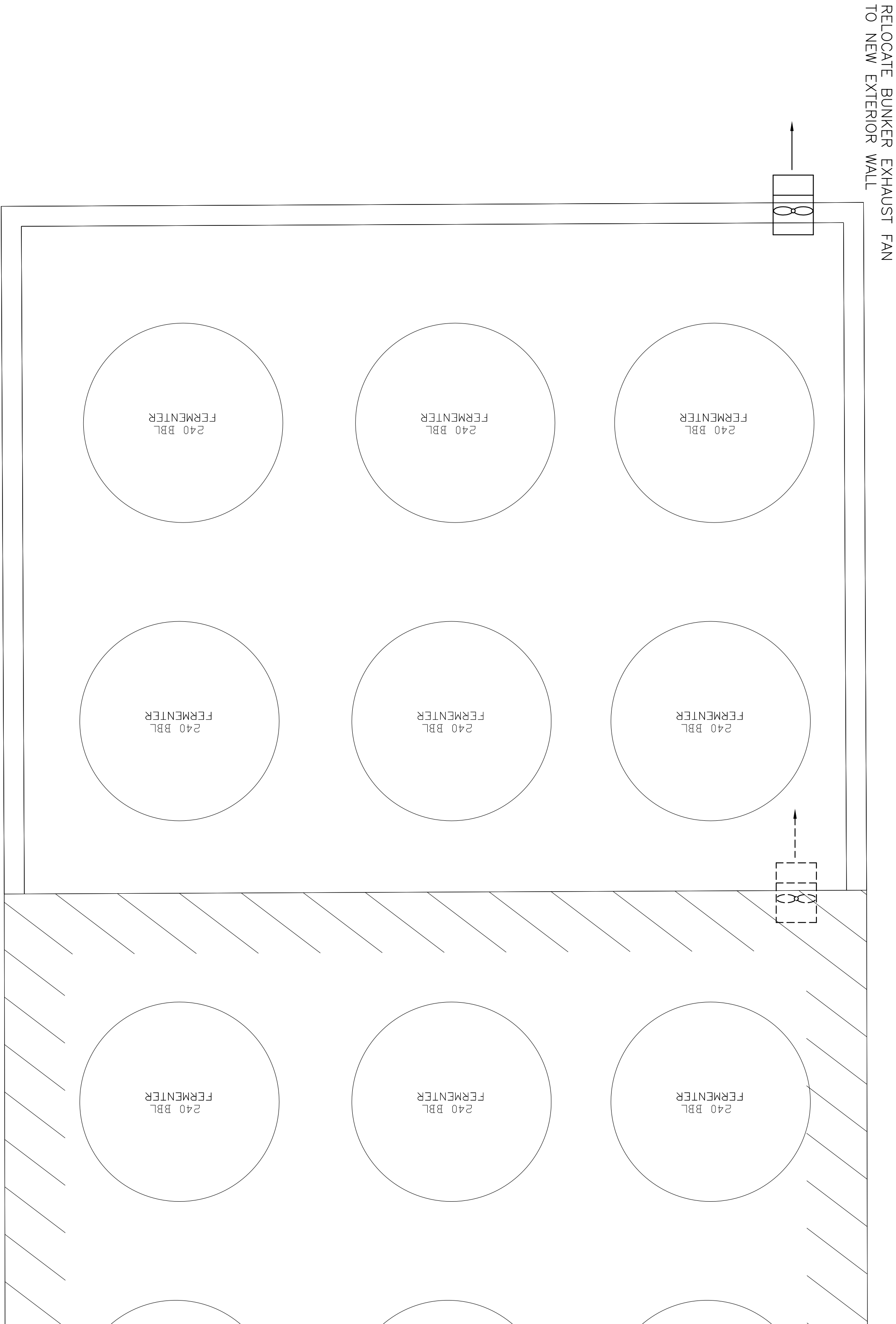
*



HVAC UNIT SCHEDULE																			
TAG	MANUF.	MODEL	COOLING CAP (TONS)	HEATING CAP (TONS)	OUTDOOR AIR FLOW (CFM)	EXTERNAL STATIC PRESS. (IN.W.G.)	TOTAL FAN DEL. FLOW (CFM)	FAN RPM	MOTOR HP	WIRING	WIRING	WIRING	WIRING	WIRING	WIRING	WIRING	WIRING	WIRING	WIRING
ERU-2012A	CARRIER	44TC72AC45	2100	2100	300	0.5	---	1432	1.71	2.0	54.4	73.7	80/67	57/55.5	45	95	115	61	108
ERU-2012	RENAME	HEART	---	---	6000	0.5	---	1865	6.5	(2) 7.5	---	---	---	---	---	---	---	---	---

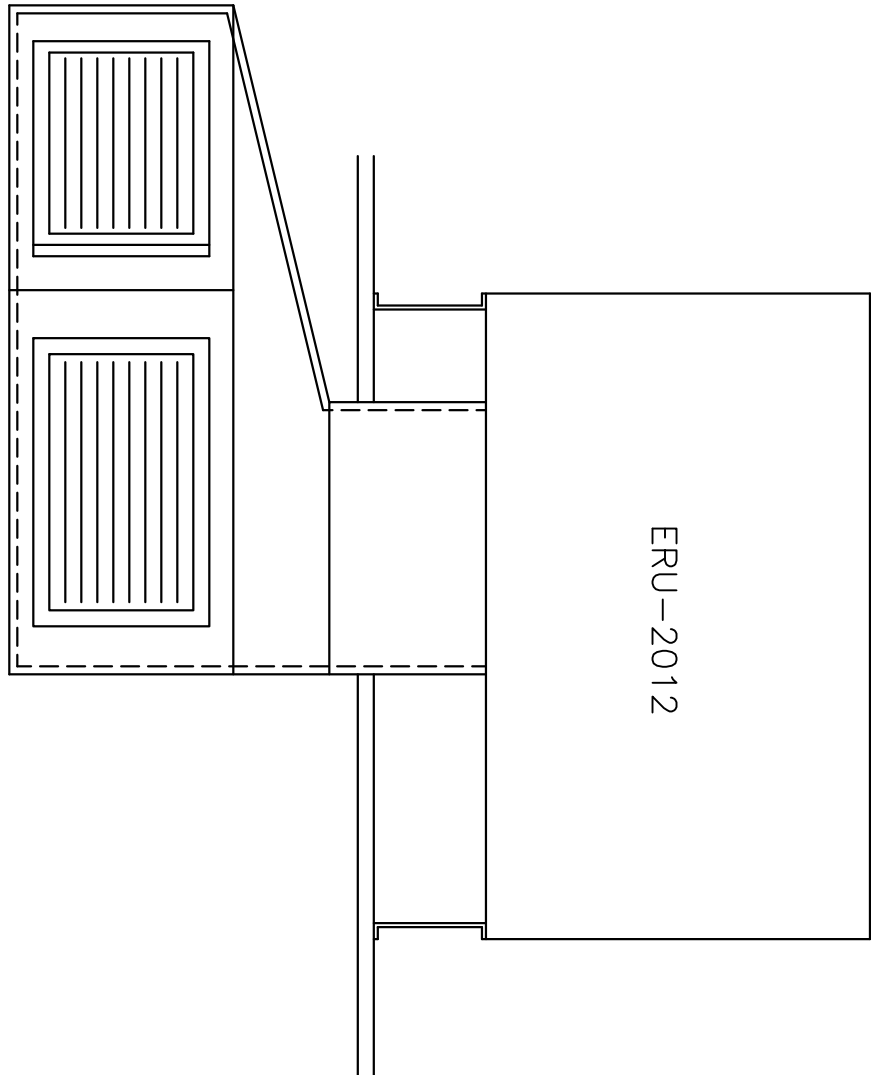
EXHAUST FAN SCHEDULE									
ITEM	SERIES	MANUFACTURER ~ MODEL	CFM	EXTERNAL STATIC PRESS. (IN.W.G.)	SONES	VOLTS	AMPS	PHASE	REMARKS
EF-2012	BATHROOMS	GREENHECK	300	0.5	---	115	---	1	W/SPEED CONTROL, NOOT CURB, BARIOMETRIC DAMPER

G.R.D./LOUVER SCHEDULE			
ITEM	CFM	FRAME	REMARKS
S-1	3000	---	AMENDST 2X10 SURF. MT. TO SUPPLY PLENUM 36X22
S-2	400	---	AMENDST 2X10 SURF. MT. ON DUCT SHOLE W/DAMPER 20x8
S-3	100	---	AMENDST 2X1 SURF. MT. ON DUCT SHOLE W/DAMPER 12x6
S-4	100	---	AMENDST E-1 12x12 4-WAY SURFACE MOUNT, 6" NECK
R-1	2000	---	AMENDST 3HS SURF. MT. 36X24
E 1	4000	---	AMENDST 2X10 SURF. MT. ON DUCT SHOLE 7x10



BUNKER EXHAUST FAN
SCALE: 1/4" = 1'-0"

REVISIONS		
NO.	DATE	REMARKS
0	11-30-12	PRELIMINARY DESIGN DEVELOPMENT
1	12-10-12	ISSUED FOR CONSTRUCTION



ERU SUPPLY PLENUM

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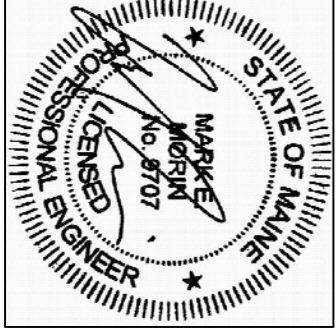
Nason
MECHANICAL SYSTEMS
Auburn, Maine 207-782-0727

PROJECT: ALLAGSH BREWERY

PORTLAND, MAINE

PARTIAL PLANS, SCHEDULES
AND DETAILS

SHEET TITLE:	AS NOTED	DATE:	4-16-2012
ENGINEER:	MEW	GRAPHIC SCALE:	0" = 1"
DRAWN:	MEW	CHECKED BY:	THG
CAD FILE:	PROJECT No. 12-117	SHEET No.	MH-601



MH-601 MECHANICAL SCHEDULES AND DETAILS

SCALE: AS NOTED

Single – Package Rooftop Unit (RTU) Gas Heating / Electric Cooling Units With R – 410A Refrigerant

User's Information Manual

NOTE: Read the entire instruction manual before starting the installation.

WARNING

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in dangerous operation, serious injury, death or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- Before servicing, disconnect all electrical power to the unit.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing.

NOTE TO INSTALLER:

This manual should be left with the equipment owner.

TABLE OF CONTENTS

	PAGE
SAFETY CONSIDERATIONS	1
TO LIGHT UNIT	3
TO SHUT UNIT OFF	4
ROUTINE MAINTENANCE & CARE FOR THE EQUIPMENT OWNER	5
BEFORE YOU CALL FOR SERVICE	7
REGULAR DEALER MAINTENANCE	8

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying

this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes and wear safety glasses. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local and state building codes and Sheet Metal and Air Conditioning National Association (SMACNA) for special installation requirements.

Recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit or in instructions and manuals, be alert to the potential for personal injury. Understand the signal words **DANGER**, **WARNING**, and **CAUTION**. These words are used with the safety-alert symbol. **DANGER** identifies the most serious hazards, which will result in severe personal injury or death. **WARNING** signifies hazards, which could result in personal injury or death. **CAUTION** is used to identify unsafe practices, which may result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace (see Fig. 15) before shutting off the electrical supply

WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in personal injury or death.

What to do if you smell gas:

- Leave the building.
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in personal injury, death and/or property damage.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury, death and/or property damage.

Before performing maintenance, be sure main power switch to unit is turned off and lockout tag is installed. There may be more than one power switch.

WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury, death and/or property damage.

Do not use this equipment if any part has been under water. A flood-damaged equipment is extremely dangerous. Attempts to use the equipment can result in fire or explosion. A qualified service agency should be contacted to inspect the equipment and to replace all gas controls, control system parts, electrical parts that have been wet or the equipment if deemed necessary.

Your rooftop heating/cooling unit is equipped with an automatic, direct spark ignitor and an induced-draft, combustion blower.

WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could result in personal injury.

Burners will light automatically. Do not attempt to light by hand.

IMPORTANT FACTS

- DO: READ AND UNDERSTAND THIS MANUAL.
- DO: Have your equipment and vent system inspected annually by a qualified service technician.
- DO: Inspect your filter monthly and clean or replace when needed.
- DO: Provide adequate airflow to the equipment for efficient combustion and safe ventilation.

- DO Make sure:

1. All flue and vent connections are clear and free of obstructions, are leak free, and not damaged.
2. Duct connections are leak free and physically sound.
3. The unit base support is free of cracks, gaps, etc.
4. There are no signs of furnace deterioration.
5. Burners are aligned correctly.
6. Follow routine maintenance inspection.

- DO NOT: Keep combustible materials, gasoline, and other flammable liquids or vapors around your equipment.

- DO NOT: Cover your equipment in any manner.

- DO NOT: Store anything (including trash or debris) near your equipment.

- DO NOT: In any way block or restrict airflow around your equipment.

- DO NOT: Contaminate the air used for combustion of your equipment with any kind of chemical or fumes. This could also cause heat exchangers, metal vent systems or components to deteriorate.

WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in personal injury, death and/or property damage.

1. Do not turn off the electrical power to unit without first turning off the gas supply.
2. Before attempting to start the gas heating section, familiarize yourself with all the procedures that must be followed.
3. Never attempt to manually light the burners on the unit with a match, lighter, or any other flame. If the electric sparking device fails to light the burners, refer to the shutdown procedures, then call your dealer as soon as possible.

CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

When removing access panels or performing maintenance functions inside your unit, be aware of sharp sheet metal parts and screws. Although special care has been taken to reduce sharp edges inside the unit, be extremely careful when handling parts or reaching into the unit.

TO LIGHT UNIT

Step 1 — Set room thermostat/unit controller to the lowest temperature setting and set the SYSTEM switch to HEAT or AUTO position. See Fig. 1.

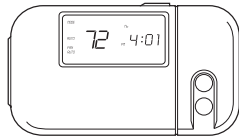
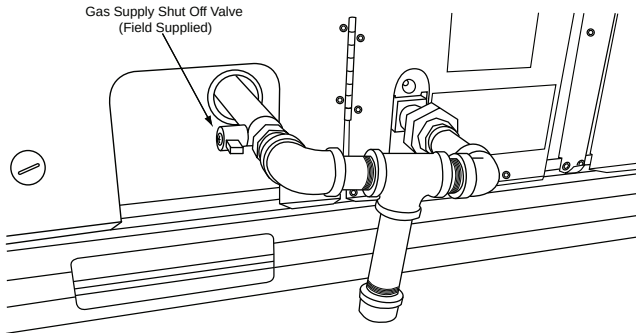


Fig. 1 - Thermostat/Unit Controller

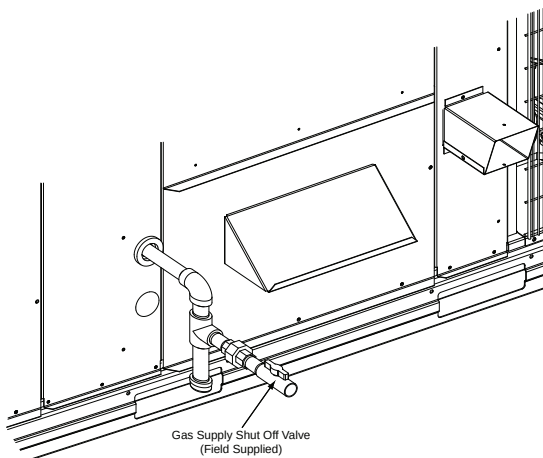
C07381

Step 2 — Turn off the gas supply by closing the gas supply shut-off valve (external to RTU unit). See Fig. 2 or 3 (depending on the size of the unit) for location.



**Fig. 2 - Gas Supply Shut-Off Valve Location
3 to 12½ Ton Units
(Thru the base gas supply shown.)**

C07358



**Fig. 3 - Gas Supply Shut-Off Valve Location
15 to 28 Ton Units**

C08485

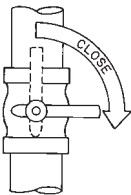


Fig. 4 - Gas Supply Shut Off Valve

C07330

Step 3 — Turn off the electrical supply to the unit by switching the RTU main disconnect to OFF. Then, ensure personal safety by installing a lockout tag on the disconnect.

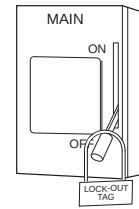
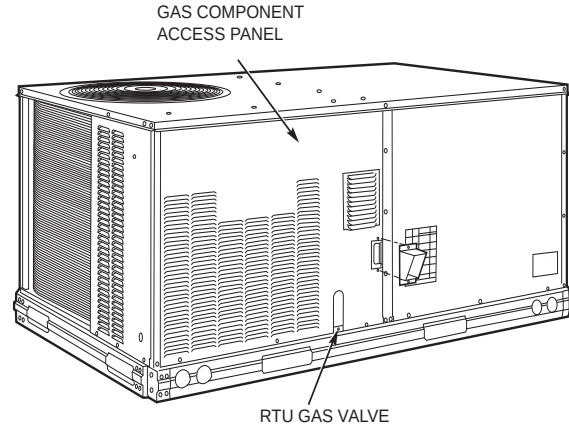


Fig. 5 - RTU Main Disconnect - Electrical Supply

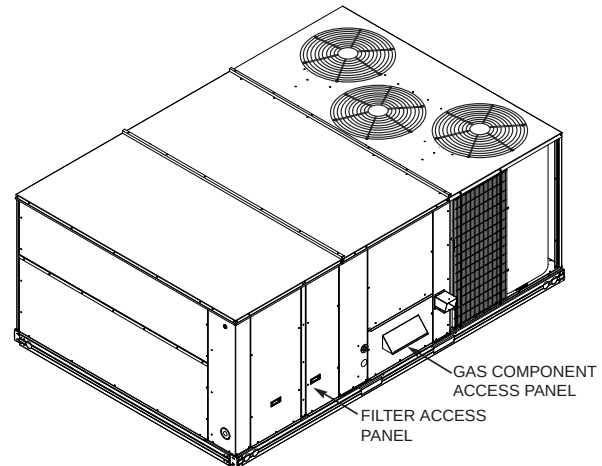
C07331

Step 4 — Remove the gas component access panel. For location of the gas component access panel, see Fig. 6 or Fig. 7 (depending on the size of the unit).



**Fig. 6 - Gas Component Access Panel
and RTU Gas Valve Location**

C08397



**Fig. 7 - Gas Component Access and Filter Access
Panels - 15 to 28 Ton Units**

C08486

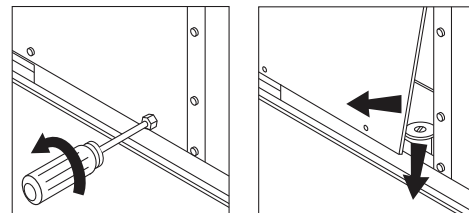


Fig. 8 - Gas Component Access Panel Removal

C08487

Step 5 — Move the RTU gas valve on/off switch to the OFF position and wait 5 minutes. See Fig. 6 or Fig. 7, depending on the type of unit, for location of RTU gas valve.

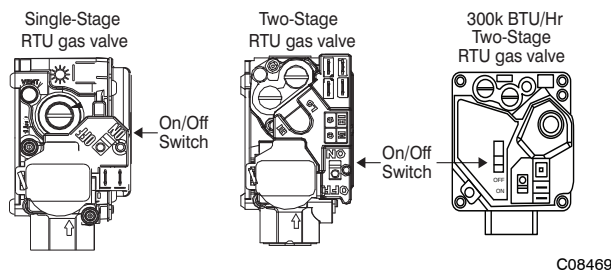


Fig. 9 - Single- and Two-Stage RTU Gas Valves

C08469

Step 6 — Move the RTU gas valve on/off switch to the ON position.

Step 7 — Replace the gas component access panel.

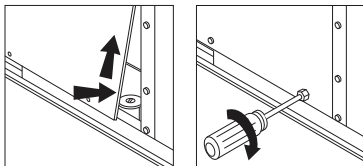


Fig. 10 - Replacing the Gas Component Access Panel

C08490

Step 8 — Remove disconnect lockout tag and restore power to the unit by switching the RTU main disconnect to ON.

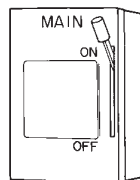


Fig. 11 - RTU Main Disconnect - Electrical Supply

C07336

Step 9 — Turn on the gas supply by opening the gas supply shut-off valve.

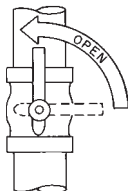


Fig. 12 - Gas Supply Shut Off Valve

C07337

Step 10 — To start unit, set room thermostat/unit controller heat setpoint to slightly above room temperature. The induced-draft combustion air fan will start. The RTU gas valve will open and main burners should ignite within 5 seconds. If the burners do not light, there is a 22-second delay. Burners will attempt to ignite within 5-seconds. Each time the burner fails to light, the 22-second time delay is repeated. If the burner does not light within 15 minutes, the unit will lockout the gas heat. To reset after a lockout, turn off the main electrical supply to the unit by switching the RTU main disconnect to OFF for a minimum of five seconds. Repeat Steps 1-10. If burners still do not light, call for service.

Step 11 — Set the room thermostat/unit controller heating setpoint to desired temperature setting.

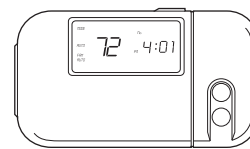


Fig. 13 - Thermostat/Unit Controller

C07381

⚠ WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in personal injury, death or property damage.

If the main burners fail to light, or the blower fails to come on, shut down gas heating section and call your dealer for service.

TO SHUT UNIT OFF

⚠ WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in personal injury, death and/or property damage.

1. Turn off gas supply by closing the gas line supply valve. Then, turn off the electrical power supply to the unit by switching the disconnect to off. Install lockout tag before servicing or performing maintenance.
2. Do not turn off the electrical power to unit without first turning off the gas supply.

Should overheating occur, or the gas supply fail to shut off, shut off the gas valve in the unit (by moving on/off switch to off) before shutting off the electrical supply.

Step 1 — Set room thermostat/unit controller heat setpoint to the lowest temperature setting and set the SYSTEM switch to OFF.

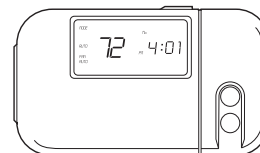


Fig. 14 - Thermostat/Unit Controller

C07381

Step 2 — Turn off gas supply by closing the gas supply shut-off valve (external to RTU unit). See Fig. 3 or Fig. 4 (depending on the size of the unit) for location.

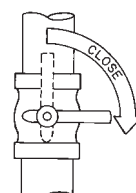


Fig. 15 - Gas Supply Shut Off Valve

C07330

Step 3 — Turn off the electrical supply to the unit by switching the RTU main disconnect to off. Then, ensure personal safety by installing a lockout tag on the disconnect.

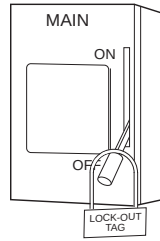


Fig. 16 - RTU Main Disconnect - Electrical Supply

C07331

Step 4 — Remove the gas component access panel. For location of the gas component access panel, see Fig. 6 or Fig. 7 (depending on the size of the unit).

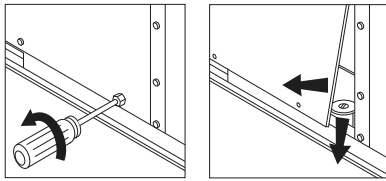


Fig. 17 - Gas Component Access Panel Removal

C08487

Step 5 — Move the RTU gas valve on/off switch to the OFF position and wait 5 minutes.

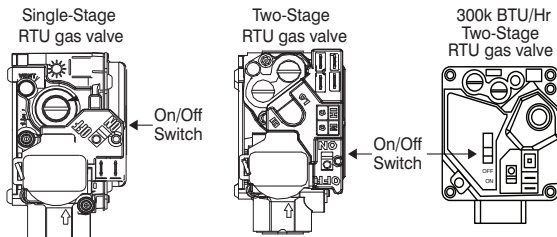


Fig. 18 - Single- and Two-Stage Gas Valves

C08469

Step 6 — Replace the gas component access panel.

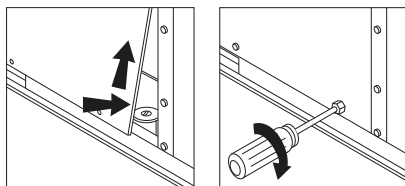


Fig. 19 - Replacing the Gas Component Access Panel

C08490

Step 7 — If the unit is being shut down because of a malfunction, contact your dealer as soon as possible. DO NOT proceed to step 8.

Step 8 — If the unit is being shut down because the heating season has ended, remove the disconnect lockout tag and restore electrical power to the unit by switching the RTU main disconnect to ON and then set thermostat/unit controller to the COOL position to ensure operation of the cooling system during the cooling season.

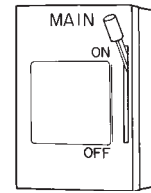


Fig. 20 - RTU Main Disconnect - Electrical Supply

C07336

ROUTINE MAINTENANCE & CARE FOR THE EQUIPMENT OWNER

While some maintenance can be performed by laymen, most should be performed by skilled, experienced personnel. Follow the recommended service maintenance schedule, and modify it as necessary for your application/environment. For instance, dusty areas may require more frequent filter changes.

After performing any maintenance or service on the unit, be sure all panels are securely fastened in place to prevent rain from entering unit cabinet and to prevent disruption of the correct unit airflow pattern.

⚠ WARNING

FIRE AND EQUIPMENT DAMAGE HAZARD

Failure to follow this warning could result in personal injury and damage to equipment.

Do not use this unit if any part has been under water. Immediately call a qualified service technician to inspect the unit and to replace any part of the control system and gas control that has been under water.

To ensure proper functioning of the unit, flow of combustion and ventilating air must not be obstructed from reaching the unit. Follow service and performance clearances as listed in the product data.

Consider the following information before maintaining or servicing equipment:

Compressor

All compressors are factory supplied with a normal charge of the correct type refrigeration-grade oil in them and should not require additional oil.

Indoor Air Filter(s)

⚠ WARNING

FIRE AND EQUIPMENT DAMAGE HAZARD

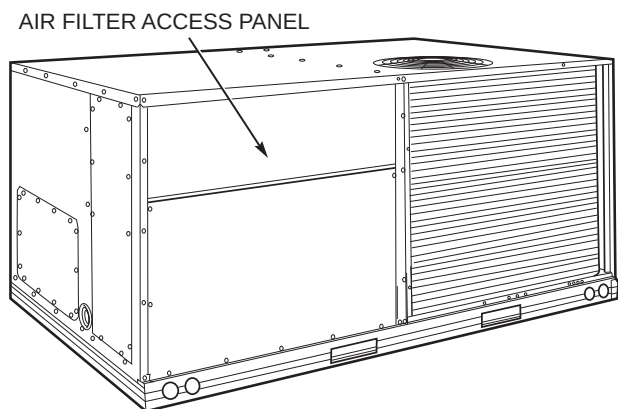
Failure to follow this warning could result in personal injury and damage to equipment.

Never operate unit without filters in place. The accumulation of dirt, dust or lint on the internal parts of your unit can cause fire or a loss of efficiency. Damage to the blower motor and/or compressors could also result.

Indoor air filter(s) should be checked every 3 or 4 weeks (application dependant) and changed or cleaned when necessary. See Fig. 21 or Fig. 22 (depending on the size of the unit) for air filter access panel location. See Tables 1 and 2 for replacement filter dimensions.

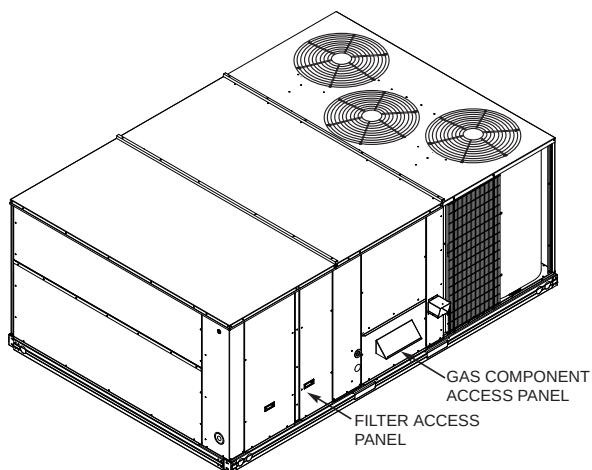
- Lift up and remove air filter access panel (3 to 12¹/₂ ton units) or remove the screws securing the filter access panel (15 to 25 ton units).
- While holding filters, tilt upper filter rack.
- Remove filters by pulling up and out toward you from the track.
- Inspect filters. Clean or replace as necessary.
- Follow direction of airflow arrows as noted on filter frame when returning filters to rack.
- Reinstall air filter access panel.

If you have difficulty in locating your air filter or if you have questions concerning proper filter maintenance, contact your dealer for instructions. When replacing your unit filters, always use the same size and type of filter that was originally supplied by the installer.



C07359

Fig. 21 - Air Filter Access Panel — 3 to 12¹/₂ ton units



C08486

Fig. 22 - Air Filter Access Panel — 15 to 25 Ton Units

Table 1 – Replacement Filters - Size and Quantity

Size	Capacity	48TC/580J	48HC/581J
04	3 tons	16 x 25 (2)	16 x 25 (2)
05	4 tons		16 x 16 (4)
06	5 tons		
07	6 tons	16 x 16 (4)	16 x 20 (4)
08	7.5 tons	16 x 20 (4)	20 x 20 (4)
09	8.5 tons	20 x 20 (4)	
12	10 tons		
14	12.5 tons	18 x 24 (6)	18 x 24 (6)
16	15 tons		18 x 24 (6)
17	15 tons	20 x 25 (6)	20 x 25 (6)
20	17.5 tons		
24	20 tons		
28	25 tons	16 x 25 (9)	16 x 25 (9)
30	27.5 tons		—

NOTE: Filter sizes in Table 1 are in inches. Numbers in () denote filter quantity. See Table 2 (on page 8) for additional unit listings.

Units with outdoor air capability have a cleanable filter for the outdoor air. This filter should be checked semi-annually and cleaned as necessary with steam or hot water and a mild detergent. Do not use throwaway filters in place of cleanable filters.

Condenser Fan

⚠ WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could result in personal injury.

Do not poke sticks, screwdrivers, or other object into revolving fan blades.

Electrical Controls and Wiring

Ensure wires do not contact refrigerant tubing or sharp edges. Electrical controls are difficult to check without proper instrumentation. If inadequate cooling is suspected, contact your qualified local dealer for service.

Combustion Area and Vent System

The combustion area and vent system should be visually inspected before each heating season.

⚠ WARNING

FIRE HAZARD

Failure to follow this warning could result in personal injury equipment damage.

If your unit makes any unusual or especially loud noises during heating, shut down the heating section and call your qualified service technician.

Proceed as follows to inspect the combustion area and power-venting system of your unit.

- Turn off gas supply to your unit.
- Turn off electrical power to your unit; install lockout tag.
- Remove gas component access panel.
- Using a flashlight, carefully inspect the burner areas for dirt, soot, or scale.

CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in damage to equipment.

If dirt, soot, rust or scale accumulations are found, call your service technician and do not operate your heating section.

- When you have completed your inspection, follow the start-up procedures in this manual to restore your unit to operation.

WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could result in personal injury.

Components in heat section may be hot after unit has been started up. When observing flame, be careful not to get close to or touch heating components.

- Observe unit heating operation. Watch the burner flame to see if it is bright blue. If you observe a suspected malfunction or that the burner flame is not bright blue, shut down the unit and call your dealer.
- Replace gas component access panel.

Integrated Gas Controller (IGC)

The IGC board incorporates an LED that emits a flashing light to indicate an alarm code. If the furnace section will not operate and the LED is flashing a code (1 to 9 flashes in succession), contact your dealer and request service.

NOTE: Make note of the flash code before powering off the unit. The alarm codes clear after power cycle.

Unit Panels

After performing any maintenance or service on the unit, be sure all panels are securely fastened in place to prevent rain from entering unit cabinet and to prevent disruption of the correct unit airflow pattern.

BEFORE YOU CALL FOR SERVICE, CHECK FOR PROBLEMS THAT CAN BE EASILY SOLVED

If insufficient heating or cooling is suspected:

() Check for sufficient airflow. Check the air filter for dirt. Check for blocked return- or supply-air grilles. Be sure they are open and unobstructed. If these checks do not reveal the cause, call your servicing dealer.

If your unit is not operating at all, check the following list for easy solutions:

() Check to be sure that your thermostat/unit controller temperature selector is set above the indoor temperature during the heating season, or below the indoor temperature during the cooling season. Be sure the SYSTEM switch in the proper HEAT or COOL position and not in the OFF position.

() Is the electrical supply switch ON? Are any fuses blown, or has the circuit breaker tripped?

() During the heating season, check the external manual shutoff valve. Is this lever parallel with the pipe, indicating that the valve is open? Or is the lever at the right angle, indicating that the valve is closed? If closed, has the gas been shut off for safety reasons? Otherwise, you may open the valve and follow the start-up procedures listed in this manual.

NOTE: Before proceeding with the next check, turn OFF the electrical power supply to the unit. Remove the gas component access panel.

() During the heating season, check the control switch on the gas valve. Is it in the ON position? If it is not, be sure it has not been turned off for the purpose of safety. If no safety hazards are present, follow the start-up procedures in this manual.

() If your unit still fails to operate, call your servicing dealer for troubleshooting and repairs. Specify the model and serial numbers of your unit. (Record them in this manual in the space provided.) If the dealer knows exactly which unit you have, he may be able to offer suggestions over the phone, or save valuable time through knowledgeable preparation for the service call.

IN CASE OF TROUBLE

If, after performing the above checks, unit performance is unsatisfactory, shut off the unit and call your dealer.

Dealer's Name _____

Telephone No. _____

Unit Model _____

Unit Serial Number _____

REGULAR DEALER MAINTENANCE

Heat Exchanger

NOTE: To ensure dependable and efficient heating operation, the heat exchanger should be checked by a qualified maintenance person before each heating season, and cleaned when necessary.

CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in damage to equipment.

This checkout should not be attempted by anyone not having the required expertise and equipment to do the job properly.

Checking and/or cleaning the heat exchanger involves removing the gas controls assembly and the flue collector box cover. When finished, the gas controls must be reinstalled for proper operation. Also, the flue collector box cover must be replaced correctly, with “red” RTV, so that a proper seal is maintained. Contact your dealer for the required periodic maintenance. At the beginning of each cooling/heating season and as conditions require.

Fans and Belts, and Fan Motor

Check quarterly the condition of fan wheels and housings, belt tension and fan motor shaft bearings. No lubrication of condenser or evaporator fan bearings or motors is required or recommended.

Evaporator and Condenser Coils

Cleaning of the coils should be done by qualified service personnel. This procedure should be performed prior to cooling operation or more frequently should conditions require. Contact you dealer for the required annual maintenance.

Condensate Drain

The drain pan and condensate drain line should be checked and cleaned at the same time the cooling coils are checked by your dealer.

In addition to the type of routine maintenance you might be willing to perform, your unit should be inspected regularly by a properly trained and qualified service technician. An inspection (preferably each heating/cooling season, but at least every year) should include the following:

- Inspection of all flue product passages, including the burners, heat exchanger, and flue collector box.
- Inspection of all combustion- and ventilation-air passages and openings.
- Close inspection of all gas pipes leading to and inside your unit.
- Inspection and if required, cleaning of the condenser and evaporator coils.
- Inspection, and if required, cleaning of the condensate drain pan.
- Inspection and cleaning of blower wheel housing and motor.
- Inspection of all supply- and return-air ducts for leaks, obstructions, and insulation integrity. Any problems found should be resolved at the time of inspection.
- Inspection of the unit base for cracks, gaps, etc., which may cause a hazardous condition.
- Inspection of the unit casing for signs of deterioration.
- Inspection of all electrical wiring and components to ensure proper connection.
- Inspection for leaks in the refrigerant circuit. Pressure check to determine appropriate refrigerant charge.
- Inspection of fan wheels and housings, belt tension, and fan motor shaft bearings.
- Operational check of the unit to determine working conditions. Repair or adjustment should be made at the time of inspection.

Your servicing dealer may offer an economical service contract that covers seasonal inspections. Ask for further details.

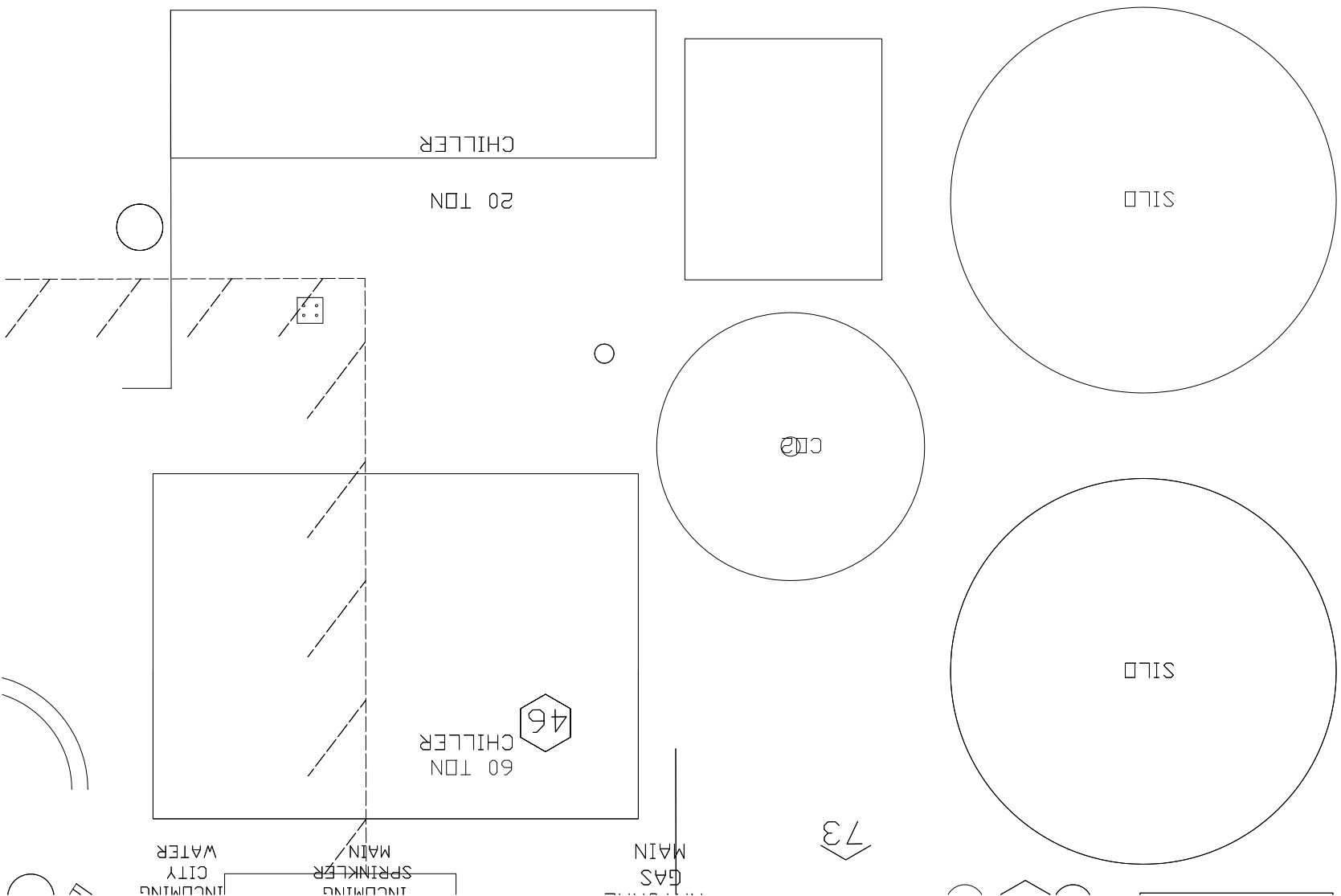
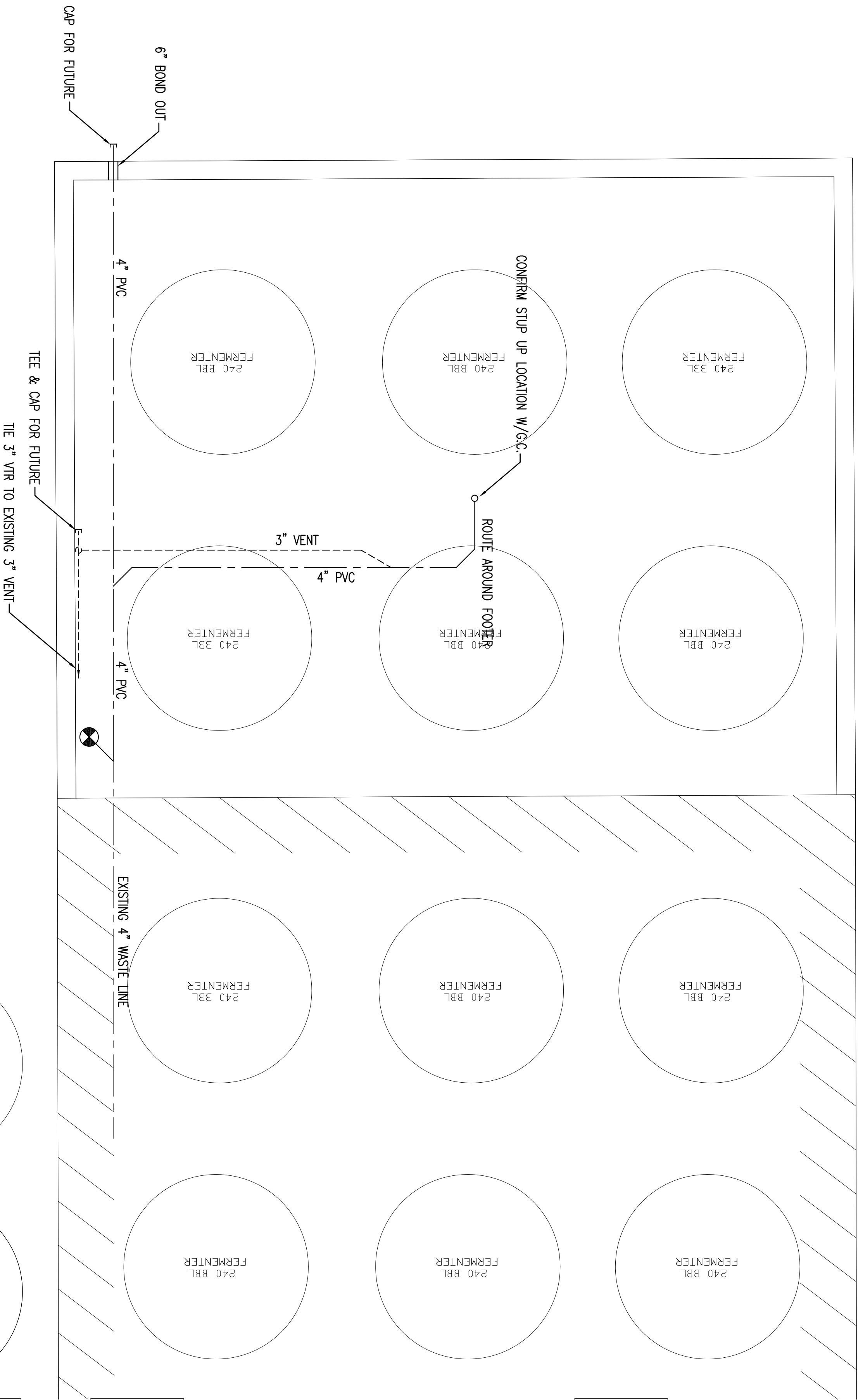
Complete service instructions can be found in the unit Installation, Start-Up and Service Instructions.

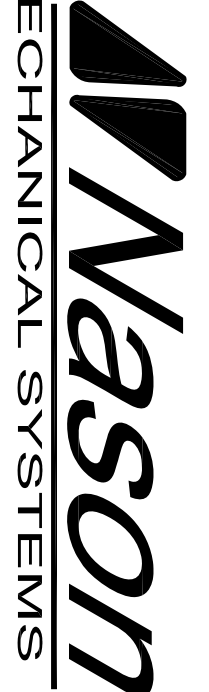
Table 2 – Replacement Filters – Size and Quantity (cont)

Capacity	RGS Series	RGH Series
3 tons	16 x 25 (2)	16 x 25 (2)
4 tons		16 x 16 (4)
5 tons		
6 tons	16 x 16 (4)	16 x 20 (4)
7.5 tons	16 x 20 (4)	20 x 20 (4)
8.5 tons	20 x 20 (4)	
10 tons		
12.5 tons		
15 tons	18 x 24 (6)	—
15 tons	20 x 25 (6)	20 x 25 (6)
17.5 tons		
20 tons		16 x 25 (9)
25 tons	16 x 25 (9)	

NOTE: Filter sizes in Table 2 are in inches. Numbers in () denote filter quantity.

REVISIONS			
NO.	DATE	REMARKS	
0	11-7-12	ISSUED FOR CONSTRUCTION	





Nason
MECHANICAL SYSTEMS
Auburn, Maine 207-782-0727

PROJECT: ALLAGASH BREWING

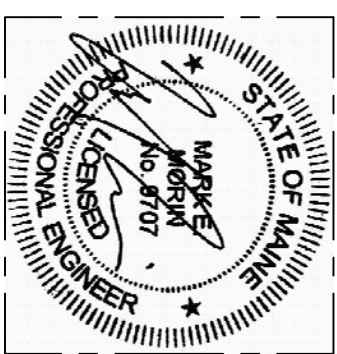
PORTLAND, MAINE

FERMENTATION TANK STRUCTURE
WASTE PIPING

SHEET TITLE: AS NOTED DATE: 06-23-2010

SCALE: ENGINEER: MEM DRAWN: MEM CHECKED BY: THG

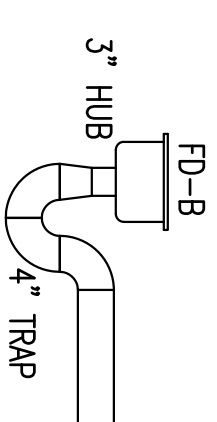
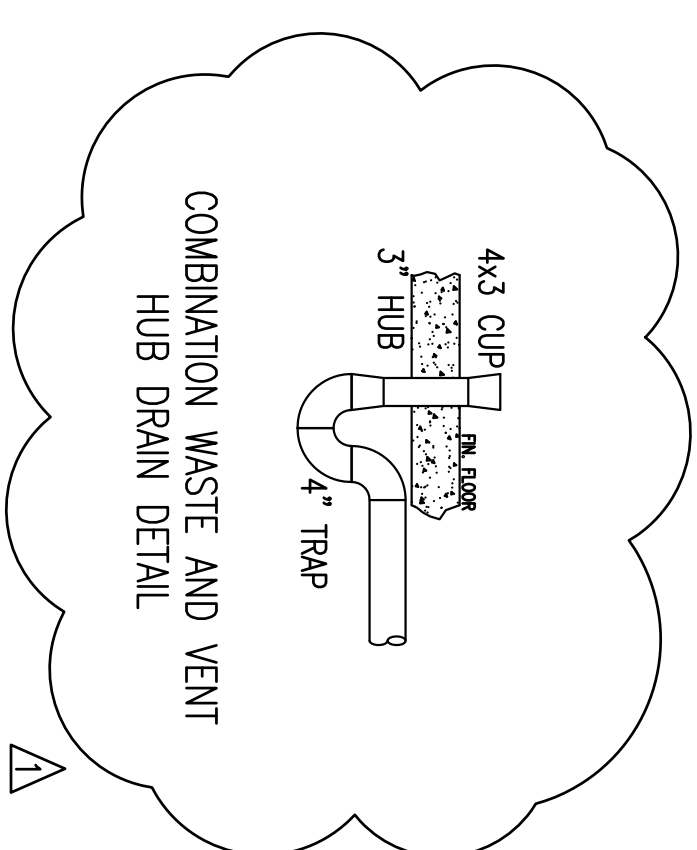
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REVISIONS		
NO.	DATE	REMARKS
0	11-30-12	PRELIMINARY DESIGN DEVELOPMENT
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1	12-19-12	MODIFICATIONS PER UPDATED SLAB PLAN

COMBINATION WASTE AND VENT
FORCED WASTE
SANITARY DRAINAGE
VENT

FLOOR DRAIN SCHEDULE		
DESIG.	MFGR & MODEL	SIZE
FD-A	NOT USED	--
FD-B	AWI MANUFACTURING, SANITARY FLOOR DRAIN	3"

COMBINATION WASTE AND VENT
FD DETAIL

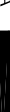
Auburn, Maine 207-782-0727

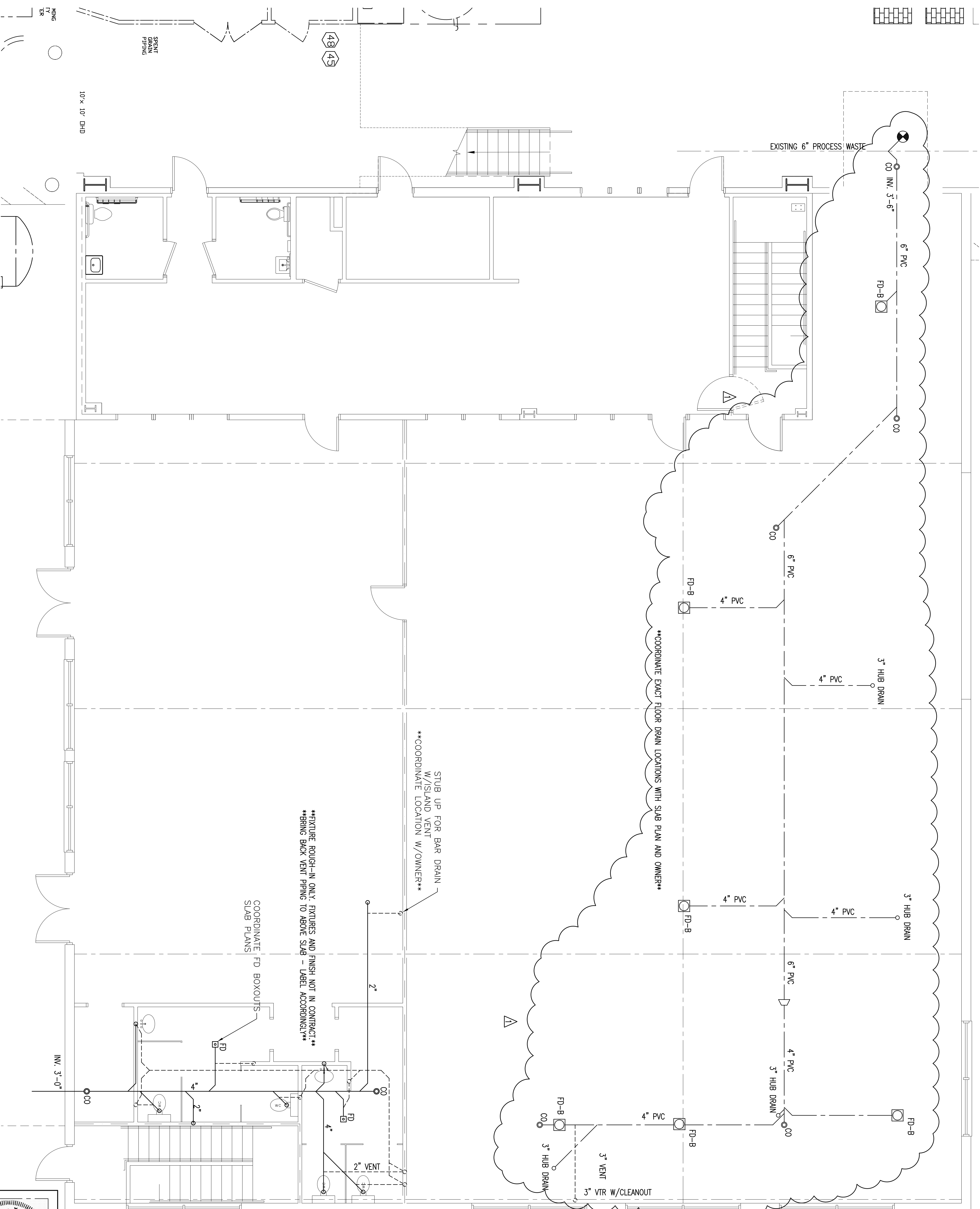
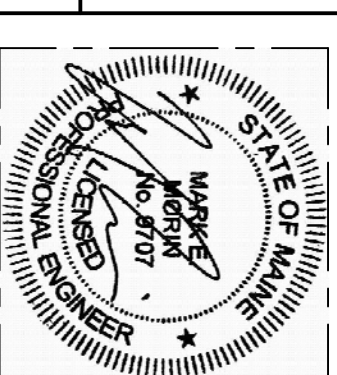
PROJECT

ALLAGASH BREWING

PORTLAND, MAINE

RETAIL AND BREWING AREA WASTE PIPING

SHEET TITLE:		WASTE PIPING	
SCALE:	AS NOTED	DATE:	06-23-2010
ENGINEER:	MEM	GRAPHIC SCALE: 0" = 1' A 	
DRAWN:	MEM		
CHECKED BY:	THG		
CAD FILE:	P-101	SHEET NO.	
PROJECT NO.	12-1117	P-102	



P-102

SANITARY PIPING PLAN

SCALE: 1/4"=1'-0"

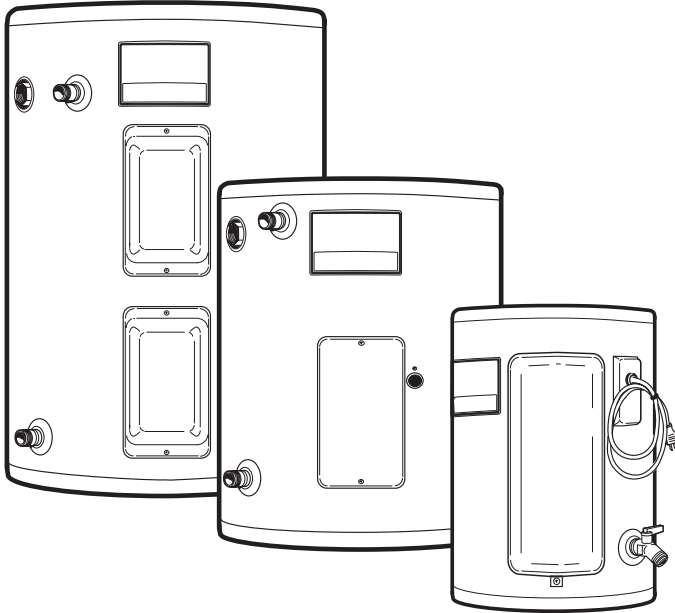
Use & Care Manual

With Installation Instructions for the Installer

Electric Point of Use

Water Heaters

2½ through 30 Gallon Capacity 120 and 240 Volt Models



The purpose of this manual is twofold: one, to provide the installer with the basic directions and recommendations for the proper installation and adjustment of the water heater; and two, for the owner-operator, to explain the features, operation, safety precautions, maintenance and troubleshooting of the water heater. This manual also includes a parts list.

It is imperative that all persons who are expected to install, operate or adjust this water heater read the instructions carefully so they may understand how to perform these operations. If you do not understand these instructions or any terms within it, seek professional advice.

Any questions regarding the operation, maintenance, service or warranty of this water heater should be directed to the seller from whom it was purchased. If additional information is required, refer to the section on "If you need service."

Do not destroy this manual. Please read carefully and keep in a safe place for future reference.



Recognize this symbol as an indication of Important Safety Information!



California Proposition 65 Warning: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

IMPORTANT SAFETY INSTRUCTIONS

WARNING—When using electrical appliances, basic safety precautions to reduce the risk of fire, electric shock, or injury to persons should be followed, including:

- 1 READ ALL INSTRUCTIONS BEFORE USING THIS WATER HEATER.**
- 2** The cord and plug connected water heater covered in this manual (2½ gallon models) must be grounded. Connect only to properly grounded outlet. See "Electrical Connections" section on page 8.
- 3** Install or locate this water heater in accordance with the provided installation instructions.
- 4** Use this water heater only for its intended use as described in this manual.
- 5** As with any appliance, close supervision is necessary when used by children.
- 6** Do Not use an extension cord set with this water heater. If no receptacle is available adjacent to the water heater, contact a qualified electrician to have one properly installed.
- 7** Do Not operate this water heater if it has a damaged cord or plug, if it is not working properly, or if it has been damaged or dropped.
- 8** This water heater should be serviced only by qualified service personnel. Contact nearest authorized service center for examination, repair or adjustment.

**SAVE THESE
INSTRUCTIONS**

Safety Information

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FOR YOUR RECORDS

Write the model and serial numbers here:

You can find them on a label on the appliance.

Staple sales slip or cancelled check here.

Proof of the original purchase date is needed to obtain service under the warranty.



READ THIS MANUAL

Inside you will find many helpful hints on how to use and maintain your water heater properly. Just a little preventive care on your part can save you a great deal of time and money over the life of your water heater.

You'll find many answers to common problems in the Before You Call For Service section. If you review our chart of Troubleshooting Tips first, you may not need to call for service at all.



READ THE SAFETY INFORMATION

Your safety and the safety of others are very important. There are many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol. Recognize this symbol as an indication of Important Safety Information! This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word “DANGER”, “WARNING”, “CAUTION” or “NOTICE”.

These words mean:

⚠ DANGER

An imminently hazardous situation that will result in death or serious injury.

⚠ WARNING

A potentially hazardous situation that could result in death or serious injury and/or damage to property.

⚠ CAUTION

A potentially hazardous situation that may result in minor or moderate injury.

Notice:

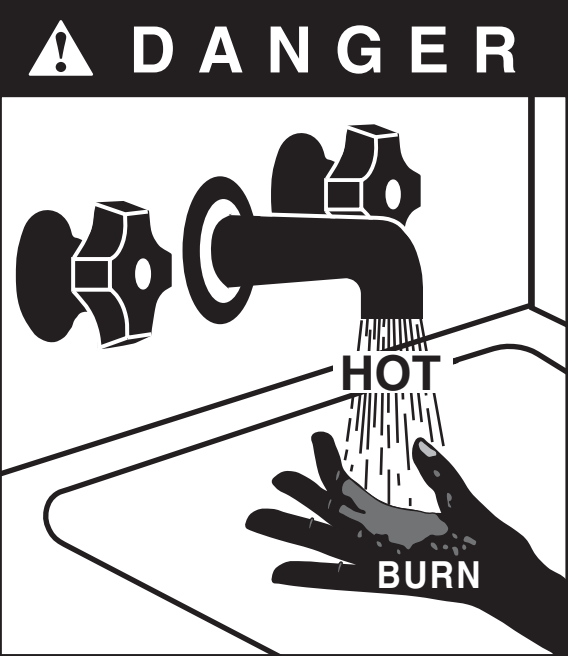
Attention is called to observe a specified procedure or maintain a specific condition.

IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

⚠ WARNING!

WATER TEMPERATURE ADJUSTMENT

Safety and energy conservation are factors to be considered when selecting the water temperature setting of water heater's thermostat. Water temperatures above 125°F can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined on the label pictured below. This label is also located on the water heater near the thermostat access panel.



Water temperature over 125°F can cause severe burns instantly or death from scalds.

Children, disabled and elderly are at highest risk of being scalded.

See instruction manual before setting temperature at water heater.

Feel water before bathing or showering.

Temperature limiting valves are available, see manual.

NOTICE: Mixing valves are available for reducing point of use water temperature by mixing hot and cold water in branch water lines. Contact a licensed plumber or the local plumbing authority for further information.

Time/Temperature Relationship in Scalds

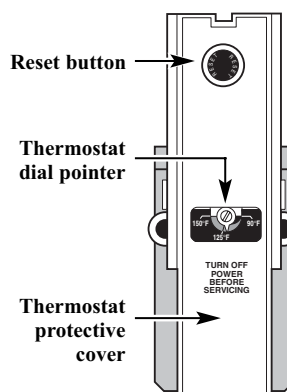
Temperature	Time To Produce a Serious Burn
120°F	More than 5 minutes
125°F	1½ to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1½ seconds
155°F	About 1 second

Table courtesy of Shriners Burn Institute

The chart shown above may be used as a guide in determining the proper water temperature for your home.

NOTICE: Households with small children, disabled, or elderly persons may require a 120°F or lower thermostat setting to prevent contact with “HOT” water.

The temperature of the water in the heater is regulated by the adjustable surface mounted thermostat(s) located behind the jacket access panel(s). Dual element heaters have two thermostats. To comply with safety regulations the thermostat(s) were set at 120°F before the water heater was shipped from the factory.



The illustration at the left shows the temperature adjustment dial used for setting the water temperature.

Refer to the Operating Instructions in this manual for detailed instructions in how to adjust the thermostat(s).

⚠ DANGER: Hotter water increases the potential for Hot Water SCALDS.

IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

WARNING!

For your safety, the information in this manual must be followed to minimize the risk of fire or explosion, electric shock, or to prevent property damage, personal injury, or loss of life.

Be sure to read and understand the entire Use and Care Manual before attempting to install or operate this water heater. It may save you time and cost. Pay particular attention to the Safety Instructions. Failure to follow these warnings could result in serious bodily injury or death. Should you have problems understanding the instructions in this manual, or have any questions, STOP, and get help from a qualified service technician, or the local electric utility.



FOR INSTALLATIONS IN THE STATE OF CALIFORNIA

California Law requires that residential water heaters must be braced, anchored or strapped to resist falling or horizontal displacement due to earthquake motions. For residential water heaters up to 52 gallon capacity, a brochure with generic earthquake bracing instructions can be obtained from: Office of the State Architect, 400 P Street, Sacramento, CA 95814 or you may call 916-324-5315 or ask a water heater dealer.

However, applicable local codes shall govern installation. For residential water heaters of a capacity greater than 52 gallons, consult the local building jurisdiction for acceptable bracing procedures.



SAFETY PRECAUTIONS

Have the installer show you the location of the circuit breaker and how to shut it off if necessary. Turn off the circuit breaker if the water heater has been subjected to overheating, fire, flood, physical damage or if the ECO fails to shut off.

- Read this manual entirely before installing or operating the water heater.
- Use this appliance only for its intended purpose as described in this Use and Care Manual.
- Be sure your appliance is properly installed in accordance with local codes and the provided installation instructions.
- **Do not** attempt to repair or replace any part of your water heater unless it is specifically recommended in this manual. All other servicing should be referred to a qualified technician.



**READ AND FOLLOW THIS SAFETY INFORMATION
CAREFULLY.**

SAVE THESE INSTRUCTIONS

Installing the water heater.

The location chosen for the water heater must take into consideration the following:

Local Installation Regulations

This water heater must be installed in accordance with these instructions, local codes, utility codes, utility company requirements or, in the absence of local codes, the latest edition of the National

Electrical Code. It is available from some local libraries or can be purchased from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269 as booklet ANSI/NFPA 70.

Location

This water heater is designed to meet a wide range of applications. It fulfills a demand for a small water heater that can be installed in a limited space such as under countertops, in cabinets or in a closet.

Locate the water heater in a clean dry area as near as practical to hot water fixtures, or close to the water faucet most frequently used.

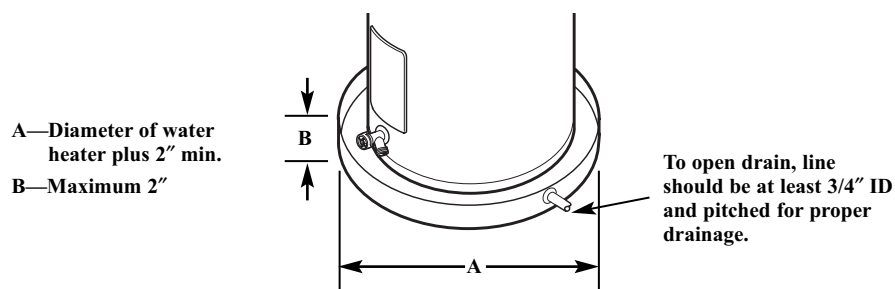
Locate the water heater in a clean dry area as near as practical to the area of greatest heated water demand. Long uninsulated hot water lines can waste energy and water.

Place the water heater in such a manner that the thermostat and element access panels can be removed to permit inspection and servicing such as removal of elements or checking controls.

The water heater and water lines should be protected from freezing temperatures. Do not install the water heater in outdoor, unprotected areas.

Make certain the floor underneath the water heater is strong enough to sufficiently support the weight of the water heater once it is filled with water.

⚠ CAUTION: The water heater should not be located in an area where leakage of the tank or connections will result in damage to the area adjacent to it or to lower floors of the structure. Where such areas cannot be avoided, it is recommended that a suitable catch pan, adequately drained, be installed under the water heater.



NOTICE: Auxiliary catch pan **MUST** conform to local codes.

Catch Pan Kits are available from the store where the water heater was purchased, or any water heater distributor.

Inspect Shipment

Inspect the water heater for possible damage. Check the markings on the rating plate of the water heater to be certain the power supply corresponds to the water heater requirements.

Installing the water heater.

Thermal Expansion

Determine if a check valve exists in the inlet water line. It may have been installed in the cold water line as a separate back flow preventer, or it may be part of a pressure reducing valve, water meter or water softener. A check valve located in the cold water inlet line can cause what is referred to as a **“closed water system.”** A cold water inlet line with no check valve or back flow prevention device is referred to as an **“open”** water system.

As water is heated, it expands in volume and creates an increase in pressure within the water system. This action is referred to as **“thermal expansion.”** In an **“open”** water system, expanding water which exceeds the capacity of the water heater flows back into the city main where the pressure is easily dissipated.

A **“closed water system,”** however, prevents the expanding water from flowing back into the main supply line, and the result of **“thermal expansion”** can create a rapid and dangerous pressure increase in the water heater and the system piping. This rapid pressure increase can quickly reach the safety setting of the relief

valve, causing it to operate during each heating cycle. Thermal expansion, and the resulting rapid and repeated expansion and contraction of components in the water heater and piping system can cause premature failure of the relief valve, and possibly the heater itself. Replacing the relief valve will not correct the problem.

The suggested method of controlling thermal expansion is to install an expansion tank in the cold water line between the water heater and the check valve. The expansion tank is designed with an air cushion built in that compresses as the system pressure increases, thereby relieving the over pressure condition and eliminating the repeated operation of the relief valve. Other methods of controlling thermal expansion are also available. Contact your installing contractor, water supplier, or plumbing inspector for additional information regarding this subject.

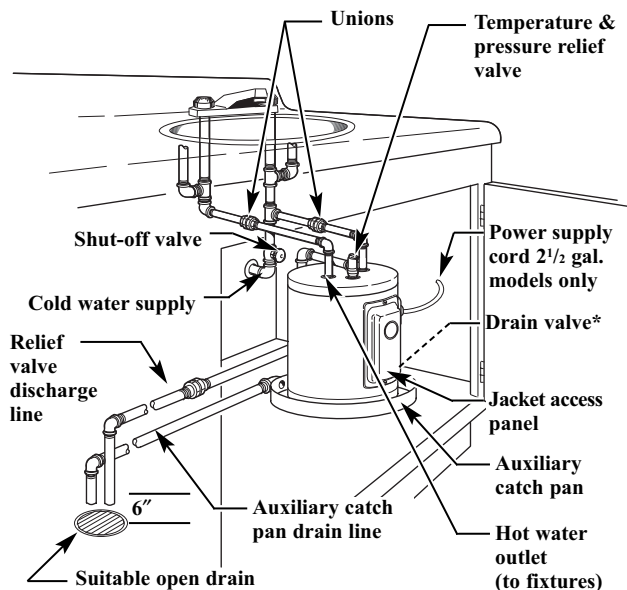
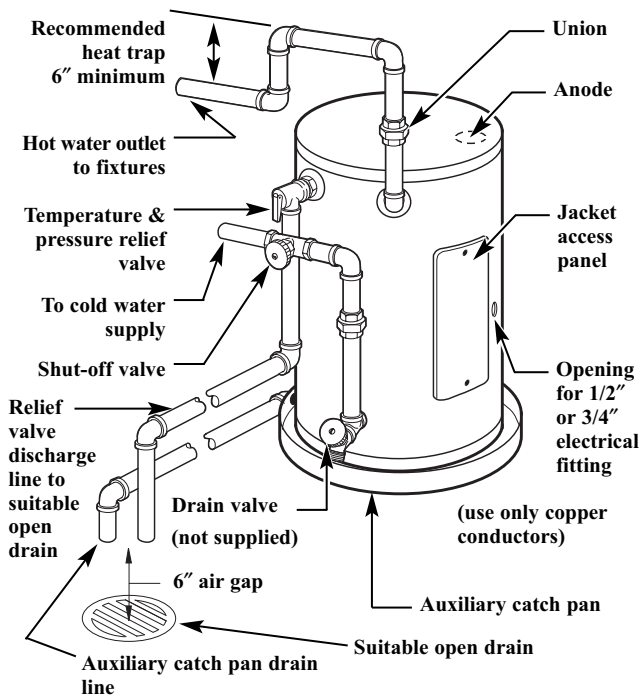
NOTICE: Do not apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to adapter before fitting adapter to the water connections on heater. Any heat applied to the water supply fittings will permanently damage the dip tube and/or heat traps.

Water Supply Connections

Refer to the illustrations on the following page for suggested typical installation. The installation of unions or flexible copper connectors is recommended on the hot and cold water connections so that the water heater may be easily disconnected for servicing. Connect cold water supply line to 3/4” pipe connection near bottom of water heater on the 6 gallon and 20 gallon models. Install a shut-off valve and a drain valve (not supplied with heater, except 2 1/2 gal.

models) in cold water line near water heater. Connect hot water line to 3/4” pipe connection marked HOT on side near top of water heater. On the 2 1/2 gallon models, the hot and cold water connections are 1/2” pipe connections and are located on top of the heater. Local codes may require an anti-siphon device on the water inlet of a side connect water heater.

Typical Installation



*The drain valve is located below and to the right of jacket access panel and is not visible in this view.

A new combination temperature and pressure relief valve, complying with the Standard for Relief Valves and Automatic Gas Shut-Off Devices for Hot Water Supply Systems, ANSI Z21.22, is supplied and must be installed in the opening provided and marked for the purpose on the water heater. No valve of any type should be installed between the relief valve and the tank. Local codes shall govern the installation of relief valves.

Relief Valve

⚠ WARNING: The pressure rating of the relief valve must not exceed 150 PSI, the maximum working pressure of the water heater as marked on the rating plate.

The Btuh rating of the relief valve must not be less than the input rating of the water heater as indicated on the rating label located on the front of the heater (1 watt=3.412 Btuh).

Connect the outlet of the relief valve to a suitable open drain so that the discharge water cannot contact live electrical parts or persons and to eliminate potential water damage.

Piping used should be of a type approved for hot water distribution. The discharge line must be no smaller than the outlet of the valve and must pitch downward from the valve to allow complete drainage (by gravity) of the relief valve and discharge line. The end of the discharge line should not be threaded or concealed and should be protected from freezing. No valve of any type, restriction or reducer coupling should be installed in the discharge line.

To Fill the Water Heater

⚠ WARNING: The tank must be full of water before heater is turned on. The water heater warranty does not cover damage or failure resulting from operation with an empty or partially empty tank.

Make certain the drain valve is completely closed.

Open the shut-off valve in the cold water supply line.

Open each hot water faucet slowly to allow the air to vent from the water heater and piping.

A steady flow of water from the hot water faucet(s) indicates a full water heater.

Installing the water heater.

Condensation

Condensation can form on the tank when it is first filled with water. Condensation might also occur with a heavy water draw and very cold inlet water temperature.

This condition is not unusual, and will disappear after the water becomes heated. If, however, the condensation continues, examine the piping and fittings for possible leaks.

Additional information on this subject may be found at www.rheem.com under “Library”. Scroll down to the Technical Service Bulletins 1300 Series Section and choose Bulletin #1303.

⚠ CAUTION: The presence of water in the piping and water heater does not provide sufficient conduction for a ground. Non-metallic piping, dielectric unions, flexible connectors etc. can cause the water heater to be electrically isolated.

Electrical Connections

All wiring must conform to local codes or latest edition of National Electrical Code ANSI/NFPA 70.

The voltage requirements and wattage load for the water heater are specified on the rating plate on the front of the water heater.

2½ gallon models are supplied with a plug connected power supply cord for use only in 120 VAC applications. The cord must be connected to a properly grounded receptacle on a branch circuit with copper conductors, an over current protection device and a suitable disconnect means. If desired, straight field wiring connections can be made to these models by removing the access cover on front of heater and disconnecting the cord set from the thermostat and the grounding plug. Remove the cord set and strain relief bushing from the junction bracket. The hole in the junction bracket will accommodate 1/2” or 3/4” electrical fittings. Refer to wiring diagrams in the back of this manual for wiring connections.

6 through 30 gallon models are completely wired to the junction bracket inside jacket at front of water heater. An opening for 1/2” or 3/4” electrical fitting is provided for field wiring connections. A separate branch circuit with copper conductors, overcurrent protective device and suitable disconnecting means must be provided by a qualified electrician. Refer to wiring diagrams in the back of this manual for wiring connections.

The branch circuit wiring should include either:

- 1 Metallic conduit or metallic sheathed cable approved for use as a grounding conductor and installed with fittings approved for the purpose.
- 2 Non-metallic sheathed cable, metallic conduit or metallic sheathed cable not approved for use as a ground conductor shall include a separate conductor for grounding. It should be attached to the ground terminals of the water heater and the electrical distribution box.

NOTICE: This guide recommends minimum branch circuit sizing and wire size based on National Electric Code. Refer to wiring diagrams in this manual for field wiring connections.

Branch Circuit Sizing and Wire Size Guide

Total Water Heater Wattage	Recommended Over Current Protection (fuse or circuit breaker amperage rating)			Copper Wire Size AWG Based on N.E.C. Table 310-16 (75°C.)		
	120V	208V	240V	120V	208V	240V
1500*	20	15	15	12	14	14
1700	20	15	15	12	14	14
2000	25	15	15	10	14	14
2500	30	15	15	10	14	14
3000	35	20	20	8	12	12
3500	—	25	20	—	10	12
3800	—	25	20	—	10	12
4000	—	25	25	—	10	10
4500	—	30	25	—	10	10
5000	—	30	30	—	10	10
5500	—	35	30	—	8	10
6000	—	40	35	—	8	8
9000	—	—	50	—	—	8

*Less than 1500 watts may be wired 14 gauge with 15 amp protection. Check Local Electrical Codes, as they will also apply.

⚠ WARNING: If local codes require external application of insulation blanket kits the manufacturer's instructions included with the kit must be carefully followed.

Insulation Blankets

Insulation blankets, available to the general public, for external use on electric water heaters are not necessary. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. This water heater meets or exceeds the National Appliance Energy Conservation Act standards with respect to insulation and standby loss requirements making an insulation blanket unnecessary.

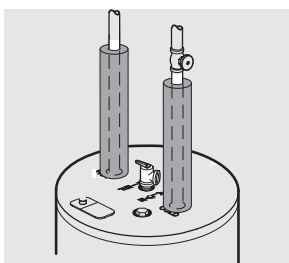
The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving devices may shorten the life of the water heater and may endanger life and property.

The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices.

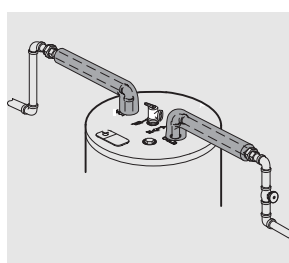
⚠ CAUTION: If local codes require the application of an external insulation blanket to this water heater, pay careful attention to the following so as not to restrict the proper function and operation of the water heater:

- Do not cover the operating or warning labels attached to the water heater or attempt to relocate them on the exterior of insulation blanket.
- Do not apply insulation to the top of the water heater. this could interfere with the safe operation of the electrical junction box.
- Do not cover the jacket access panel(s) to the thermostat(s) and heating element(s), or pressure and temperature relief valve.
- Inspect the insulation blanket frequently.

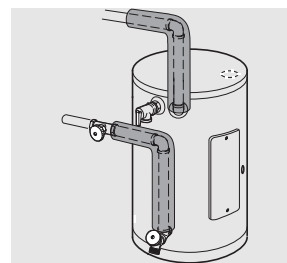
Hot and Cold Pipe Insulation Installation



Typical vertical piping arrangement



Typical horizontal piping arrangement



Typical side piping arrangement

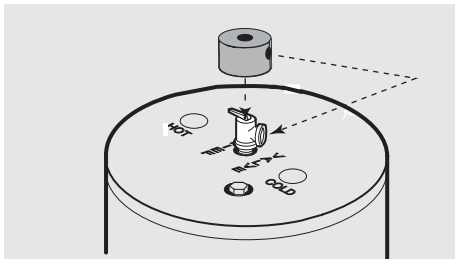
For increased energy efficiency, some water heaters have been supplied with two 24" sections of pipe insulation.

Please install the insulation, according to the illustrations above, that best meets your requirements.

Installing the water heater.

Relief Valve Insulation Installation

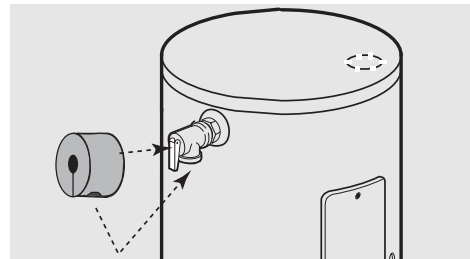
⚠ CAUTION: Ensure the T&P Valve opening is not obstructed by the insulation.



Typical top connection arrangement

For increased energy efficiency, some water heaters have been supplied with a 2-3/8" section of pipe insulation.

Please install the insulation, according to the illustrations above, that best meets your requirements.



Typical side connection arrangement

Slip the insulation cover over the T&P Valve through the center hole and align the hole in the side with the opening of the T&P Valve.

Heat Trap

For increased energy efficiency, some water heaters have been supplied with factory installed internal or external heat traps in the hot outlet and cold water inlet openings.

NOTICE: Do not apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to adapter before fitting adapter to the water connections on heater. Any heat applied to the water supply fittings will permanently damage the dip tube and/or heat traps.

Installation Checklist

A. Water Heater Location

- ☐ Close to area of heated water demand.
- ☐ Indoors and protected from freezing temperatures.
- ☐ Area free of flammable vapors.
- ☐ Provisions made to protect area from water damage.
- ☐ Sufficient room to service heater.

B. Water Supply

- ☐ Water heater completely filled with water.
- ☐ Air purged from water heater and piping.
- ☐ Water connections tight and free of leaks.

C. Relief Valve

- ☐ Temperature and Pressure Relief Valve properly installed and discharge line run to open drain.
- ☐ Discharge line protected from freezing.

D. Wiring

- ☐ Power Supply voltage agrees with water heater rating plate.
- ☐ Branch circuit wire and fusing or circuit breaker of proper size.
- ☐ Electrical connections tight and unit properly grounded.

Operating the water heater.

⚠ CAUTION: Hydrogen gas can be produced in a hot water system served by this water heater that has not been used for a long period of time (generally two weeks or more). **HYDROGEN GAS IS EXTREMELY FLAMMABLE!!** To dissipate such gas and to reduce risk of injury, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will be an unusual sound such as air escaping through the pipe as the water begins to flow. Do not smoke or use an open flame near the faucet at the time it is open.

Safety Precautions

- A** Do turn off power to water heater if it has been subjected to over heating, fire, flood, physical damage.
- B** Do Not turn on water heater unless it is filled with water.
- C** Do Not turn on water heater if cold water supply shut-off valve is closed.
- D** If there is any difficulty in understanding or following the Operating Instructions or the Care and Cleaning section, it is recommended that a qualified person or serviceman perform the work.

Safety Controls

⚠ CAUTION: The cause of the high temperature condition must be investigated by qualified service technician and corrective action must be taken before placing the water heater in service again.

The water heater is equipped with a combination thermostat and temperature limiting control (ECO) that is located above the heating element in contact with the tank surface. If for any reason the water temperature becomes excessively high, the temperature limiting control (ECO) breaks the power circuit to the heating element. Once the control opens, it must be reset manually.

To reset the temperature limiting control:

- 1** Turn off the power to the water heater.
- 2** Remove the jacket access panel(s) and insulation.

The thermostat protective cover should not be removed.
- 3** Press the red RESET button.
- 4** Replace the insulation and jacket access panel(s) before turning on the power to the water heater.

Emergency Instructions

⚠ WARNING: If the water heater has been subjected to flood, fire, or physical damage, turn off power and water to the water heater.

Do not operate the water heater again until it has been thoroughly checked by qualified service personnel.

⚠ DANGER: There is a hot water scald potential if the thermostat is set too high. Households with small children, disabled, or elderly persons may require a 120°F or lower thermostat setting to prevent contact with HOT water.

Water Temperature Setting

The temperature of the water in the water heater can be regulated by setting the temperature dial of the adjustable surface mounted thermostat(s) located behind the jacket access panel(s).

Dual element heaters have two thermostats.

Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater's thermostat(s). The lower the temperature setting, the greater the savings in energy and operating costs.

To comply with safety regulations the thermostat(s) are factory set at 120°F or less where local codes require. This is the recommended starting point.

Water temperatures above 125°F can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined in this manual and on the label on the water heater. This label is located on the water heater near the thermostat access panel.

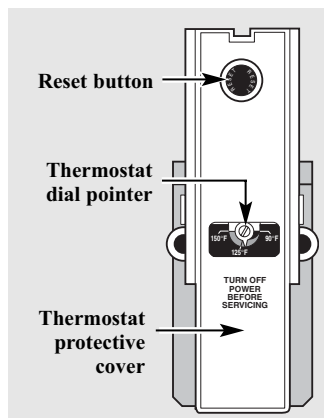
Mixing valves are available for reducing point of use water temperature by mixing hot and cold water in branch water lines. Contact a licensed plumber or the local plumbing authority for further information.

The chart below may be used as a guide in determining the proper water temperature for your home.

Time/Temperature Relationship in Scalds

Temperature	Time To Produce a Serious Burn
120°F	More than 5 minutes
125°F	1½ to 2 minutes
130°F	About 30 seconds
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155°F	About 1 second

Table courtesy of Shriners Burn Institute

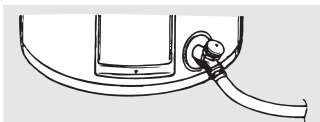


Type 59T thermostat and protective cover.

If adjustment is necessary...

- 1 Turn off the power to the water heater.
- 2 Remove the jacket access panel(s) and insulation exposing the thermostat(s).
The thermostat protective cover(s) should not be removed.
- 3 Using a small screwdriver, set the thermostat(s) dial pointer(s) to the desired temperature.
- 4 Replace the insulation and jacket access panel(s). Turn on the power to the water heater.

Care and cleaning of the water heater.



Draining the Water Heater

⚠ CAUTION: Shut off power to the water heater before draining water.

⚠ DANGER: Before manually operating the relief valve, make certain no one will be exposed to the hot water released by the valve. The water drained from the tank may be hot enough to present a scald hazard and should be directed to a suitable drain to prevent injury or damage.

In order to drain the water heater, turn off the cold water supply. Open a hot water faucet or lift the handle on the relief valve to admit air to the tank.

Attach a garden hose to the drain valve on the water heater and direct the stream of water to a drain. Open the valve.

⚠ DANGER: Before manually operating the relief valve, make certain no one will be exposed to the danger of coming in contact with the hot water released by the valve. The water may be hot enough to create a scald hazard. The water should be released into a suitable drain to prevent injury or property damage.

NOTICE: If the temperature and pressure relief valve on the hot water heater discharges periodically, this may be due to thermal expansion in a closed water system. Contact the water supplier or your plumbing contractor on how to correct this. Do not plug the relief valve outlet.

Routine Preventative Maintenance

Properly maintained, your water heater will provide years of dependable trouble-free service.

It is suggested that a routine preventive maintenance program be established and followed by the user.

It is further recommended that a periodic inspection of the operating controls, heating element and wiring should be made by service personnel qualified in electric appliance repair.

Most electrical appliances, even when new, make some sound when in operation. If the hissing or singing sound level increases excessively, the electric heating element may require cleaning. Contact a qualified installer or plumbing contract to inspect.

At least once a year, lift and release the lever handle on the temperature pressure relief valve, located near the top of the water heater, to make certain the valve operates freely. Allow several gallons to flush through the discharge line to an open drain.

A water heater's tank can act as a settling basin for solids suspended in the water. It is therefore not uncommon for hard water deposits to accumulate in the bottom of the tank. It is suggested that a few quarts of water be drained from the water heater's tank every month to clean the tank of these deposits.

Rapid closing of faucets or solenoid valves in automatic water using appliances can cause a banging noise heard in a water pipe. Strategically located risers in the water pipe system or water hammer arresting devices can be used to minimize the problem.

The anode rod should be removed from the water heater's tank annually for inspection and replaced when more than 6" of core wire is exposed at either end of the rod.

Make sure the cold water supply is turned off before removing anode rod.

NOTICE: Do not remove the anode rod from the water heater's tank, except for inspection and/or replacement, as operation with the anode rod removed will shorten the life of the glass lined tank and will exclude warranty coverage.

Vacation and Extended Shut-Down

NOTICE: Refer to the Hydrogen Gas Caution in the Operating Instructions.

If the water heater is to remain idle for an extended period of time, the power and water to the appliance should be turned off to conserve energy and prevent a build-up of dangerous hydrogen gas.

The water heater and piping should be drained if they might be subjected to freezing temperatures.

After a long shut-down period, the water heater's operation and controls should be checked by qualified service personnel. Make certain the water heater is completely filled again before placing it in operation.

Before You Call For Service...



Troubleshooting Tips

Save time and money! Review the chart on this page first and you may not need to call for service.

Problem	Possible Causes	What To Do
Rumbling noise	Water conditions in your home caused a build up of scale or mineral deposits on the heating elements.	● Remove and clean the heating elements.
Relief valve producing popping noise or draining	Pressure build up caused by thermal expansion in a closed system.	● This is an unacceptable condition and must be corrected. Contact the water supplier or plumbing contractor on how to correct this. Do not plug the relief valve outlet.
Rattling noise during periods of water usage	Internal heat trap fittings in operation.	● This is normal for heat trap fittings when in operation and does not indicate a need for service.
Not enough or no hot water	Water usage may have exceeded the capacity of the water heater.	● Wait for the water heater to recover after an abnormal demand.
	A fuse is blown or a circuit breaker tripped.	● Replace fuse or reset circuit breaker.
	Electric supply may be off.	● Make sure electric supply to water heater and disconnect switch, if used, are in the ON position.
	The thermostat may be set too low.	● See the Temperature regulation of the water heater section of this manual.
	Leaking or open hot water faucets.	● Make sure all faucets are closed.
	Electric service to your home may be interrupted.	● Contact the local electric utility.
	Improper wiring.	● See the Installing the water heater section of this manual.
	Manual reset limit (ECO)	● See the Temperature regulation of the water heater section of this manual.
	Cold water inlet temperature may be colder during the winter months.	● This is normal. The colder inlet water takes longer to heat.
Water is too hot	The thermostat is set too high.	● See the Temperature regulation of the water heater section of this manual.

⚠ CAUTION: For your safety **DO NOT** attempt repair of electrical wiring, thermostats, heating elements or other safety devices. Refer repairs to qualified service personnel.

Replacement Parts.

For 2½ gallon models with single elements.

Instructions For Placing a Parts Order

Address parts orders to the distributor or store where the heater was purchased.

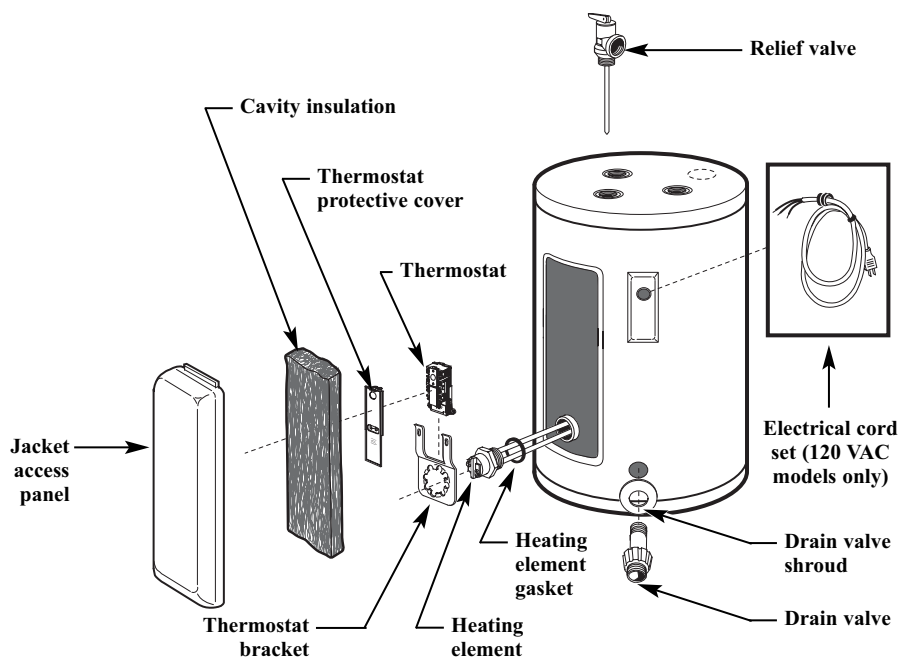
All parts orders should include:

- 1** The model and serial number of the water heater from the rating plate.
- 2** Specify voltage and wattage as marked on the rating plate.

- 3** Part description (as noted below) and number of parts desired.

⚠ CAUTION: For your safety **DO NOT** attempt repair of electrical wiring, thermostat(s), heating elements or other operating controls. Refer repairs to qualified service personnel.

2½ Gallon Models



For 6, 10, 20 gallon models with single elements.

Instructions For Placing a Parts Order

Address parts orders to the distributor or store where the heater was purchased.

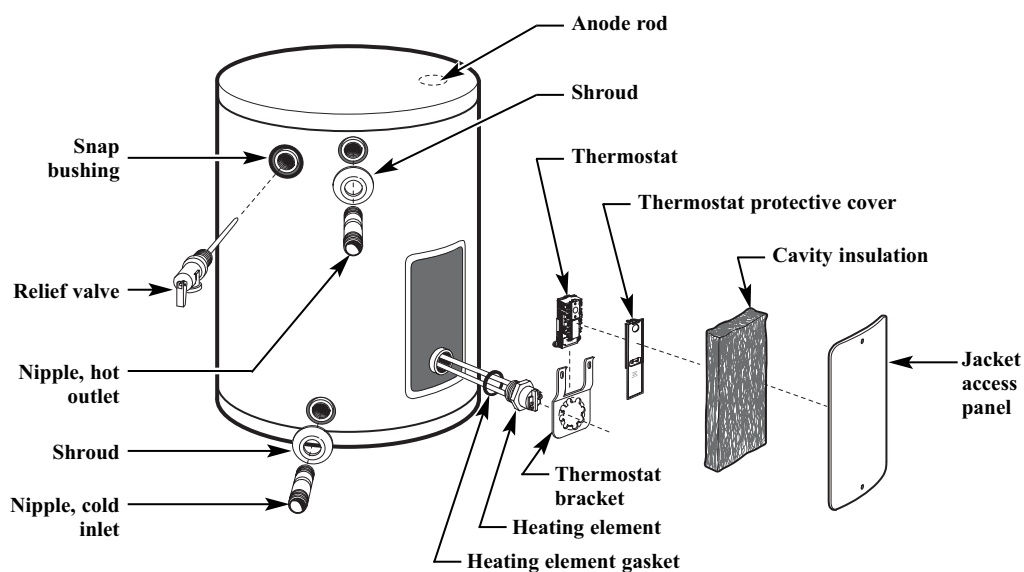
All parts orders should include:

- 1** The model and serial number of the water heater from the rating plate.
- 2** Specify voltage and wattage as marked on the rating plate.

- 3** Part description (as noted below) and number of parts desired.

⚠ CAUTION: For your safety **DO NOT** attempt repair of electrical wiring, thermostat(s), heating elements or other operating controls. Refer repairs to qualified service personnel.

6, 10 and 20 Gallon Models



Replacement Parts

For 30 gallon models with single and double elements.

Instructions For Placing a Parts Order

Address parts orders to the distributor or store where the heater was purchased.

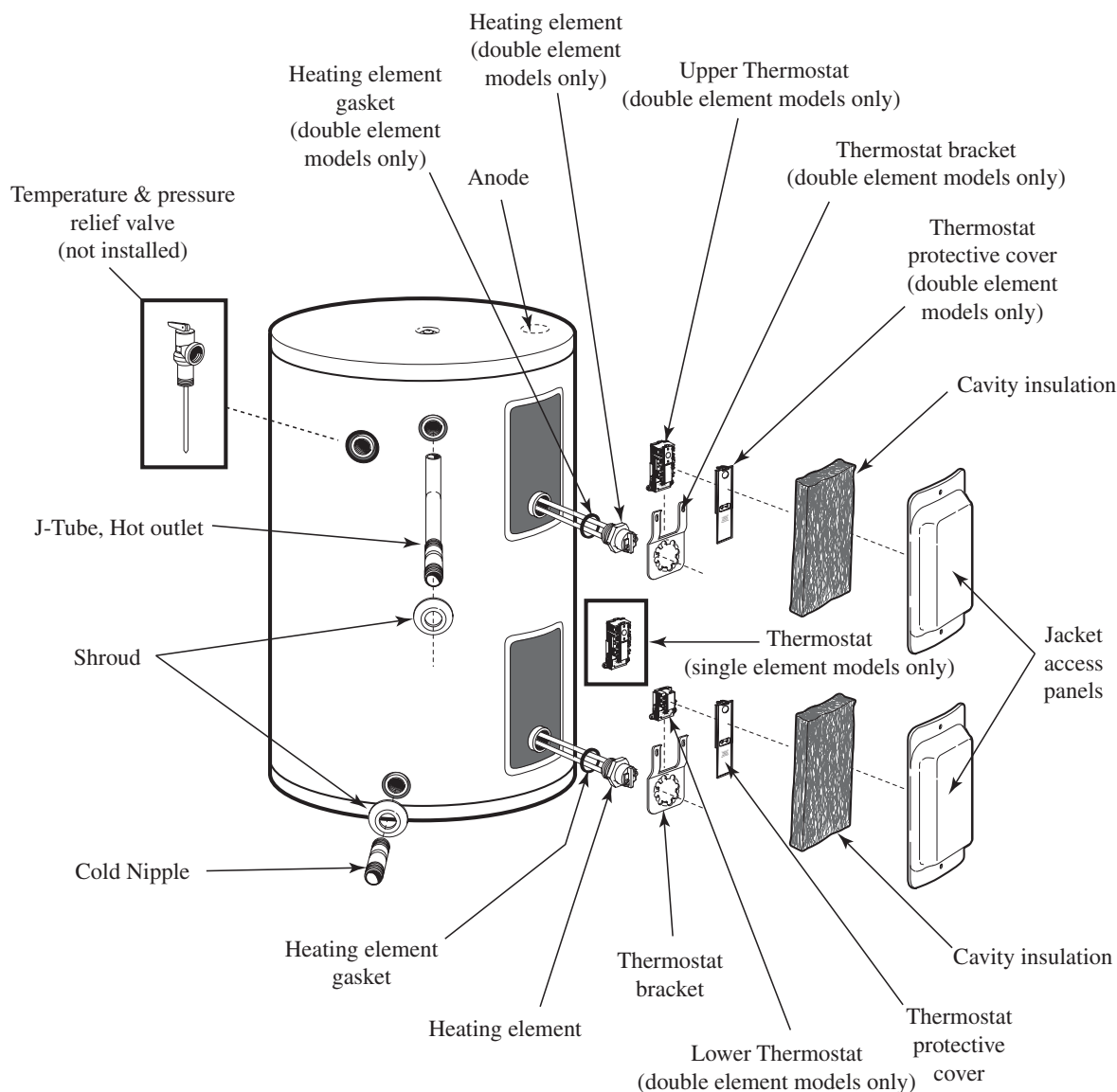
All parts orders should include:

- 1** The model and serial number of the water heater from the rating plate.
- 2** Specify voltage and wattage as marked on the rating plate.

- 3** Part description (as noted below) and number of parts desired.

⚠ CAUTION: For your safety **DO NOT** attempt repair of electrical wiring, thermostat(s), heating elements or other operating controls. Refer repairs to qualified service personnel.

30 Gallon Models



IF YOU NEED SERVICE



1. Should you have any questions about your new water heater, or if it requires adjustment, repair, or routine maintenance, it is suggested that you first contact your installer, plumbing contractor or previously agreed upon service agency. In the event the firm has moved, or is unavailable, refer to the telephone directory, commercial listings or local utility for qualified service assistance.
2. Should your problem not be solved to your complete satisfaction, you should then contact the Manufacturer's National Service Department at the following address:

2600 Gunter Park Drive
Montgomery, Alabama 36109-1413
Phone: 1-800-432-8373.

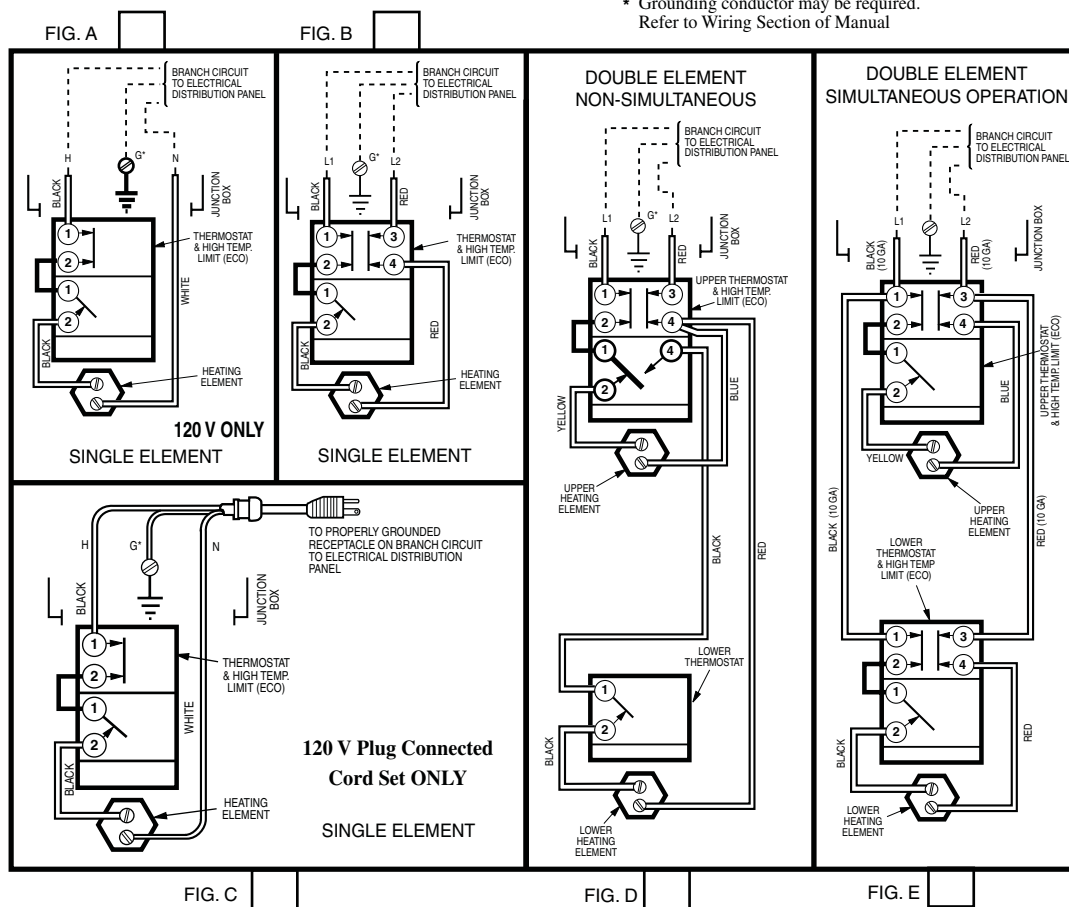
When contacting the manufacturer, the following information will be requested:

- a. Model and serial number of the water heater as shown on the rating plate attached to the jacket of the heater.
- b. Address where the water heater is located and physical location.
- c. Name and address of installer and any service agency who performed service on the water heater.
- d. Date of original installation and dates any service work was performed.
- e. Details of the problems as you can best describe them.
- f. List of people, with dates, who have been contacted regarding your problem.

Wiring diagrams.

Therm-O-Disc Thermostats (Type 59T)

* Grounding conductor may be required.
Refer to Wiring Section of Manual



THIS ELECTRIC WATER HEATER IS WIRED AS INDICATED ABOVE



2-1/2 Gallon



6, 10, 15, 20 and 30 Gallon

Available in 2-1/2, 6, 10, 15, 20 and 30 Gallon Models

► 6-Year Limited Tank and Parts Warranty*

- Space-saving design for installation in limited spaces
- High efficiency heating element
- Temperature and pressure relief valve included
- Over-temperature protector cuts off power in excess temperature situations
- Automatic thermostat keeps water at desired temperature
- Meets or exceeds National Appliance Energy Conservation Act (NAECA) requirements

2-1/2 gallon model features:

- 120 volt model with 3 prong cord set...simply plug it in! 240 volt model includes a junction box for easy installation of 1/2" or 3/4" conduit
- Wall bracket for easy wall mount installations
- Corrosion resistant 1/4 turn drain valve

*See Residential Warranty Information Brochure for complete warranty information.

Energy Factor and Average Annual Operating Costs based on D.O.E. (Department of Energy) test procedures. D.O.E. national average fuel rate electricity 8.6¢/KWH.



DESCRIPTION		ROUGHING IN DIMENSIONS (SHOWN IN INCHES)						ENERGY INFORMATION	
GAL. CAP.	MODEL NUMBER	HEIGHT A	HT. TO HOT WATER OUTLET B	DIAMETER C	HT. TO SIDE T&P D	HT. TO COLD WATER INLET E	APPROX. SHIP WT. (LBS.)	ENERGY FACTOR	AVERAGE ANNUAL OPER. COST
2.5	81VP2S	14	14	9-3/4	—	—	22	N/A	N/A
6	81VP6S	15-1/4	12-1/2	15-3/4	11-1/2	4-1/4	36	N/A	N/A
10	81VP10S	23	20-1/2	15-3/4	19-1/2	4-1/4	46	N/A	N/A
15	81VP15S	24-1/4	22	17-3/4	21	4-1/2	54	N/A	N/A
20	81VP20S	25-1/4	22-3/4	19-3/4	21-3/4	5	69	N/A	N/A
30	82VP30-1*	30	23	21-3/4	23	2-3/4	91	0.93	\$406

* For double element, substitute "-2" suffix for "-1". Not available in 120 volt. Available with 2-wire (single phase) outlet only. (6000 watt max.).

• **2.5 gallon model:** 1/2" N.P.T. inlet and outlet. Relief valve connection 3/4".

Available with 120 or 240 volt AC single phase only, 120v (1440w) 240v (1500w)

Power cord supplied with 120 volt models only.

Optional 14" diameter safety catch pan with 1" side drain outlet available (Part No. AS-21990A-G).

• **6 through 30 gallon models:** 3/4" N.P.T. outlet, inlet, anode rod. T & P valve connections. Not available with 3 phase wiring.

Water heaters furnished standard with 120 volt AC, 2000 watt single element.

Special wiring options – a limited number of wiring options are available. Consult factory for price and availability.

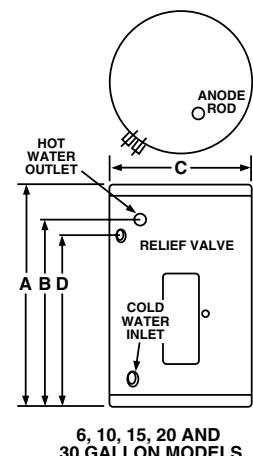
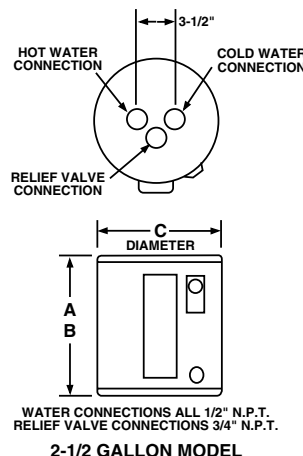
CONSTRUCTION DETAILS: The cold water enters the tank a few inches from the bottom. Both hot and cold water lines may be connected directly to the water heater without special nipples or tees. The relief valve simply screws into the opening provided.

These units are designed to meet or exceed ANSI (American National Standards Institute) requirements and have been tested according to D.O.E. test procedures and meet or exceed the energy efficiency requirements of NAECA, ASHRAE standard 90, ICC Code and all state energy efficiency performance criteria for energy consuming appliances.

Before purchasing this appliance, read important energy cost and efficiency information available from your supplier.

Rheem Point-of-Use

A convenient, compact size water heater that installs almost anywhere a small amount of hot water is required! These units are U.L. listed and comply with Underwriter's Laboratories Specifications 174.



In keeping with its policy of continuous progress and product improvement, Rheem reserves the right to make changes without notice.



194 Merrow Road
Auburn, Maine 04210
Phone [207] 782-0727

Fax [207] 784-9816
www.nasonmechanical.com

Landry/French Construction
68 Mussey Road
Scarborough, ME 04074
Attn: Mason Rowell

June 20, 2013

Re: Allagash Brewery Plumbing and Mechanical Warranty

Mason:

To help provide temporary heat, we started the gas-fired 6 ton rooftop unit at Allagash brewery on March 5, 2013. We have taken the proper safeguards to protect our equipment, but because the A/C unit is essentially serving a construction zone, Nason Mechanical Systems cannot be held responsible if the unit is compromised as a result of construction activity. Let this letter represent the start of our One Year Parts and Labor Warranty for the heating and blower portion of the 6 ton air handler serving the new retail area. The warranty will begin on March 5, 2013 and will terminate on March 5, 2014.

Our records show that the startup of the cooling on the 6 ton unit and the ERU was done on June 3, 2013. As a result, the warranty period for the remainder of the equipment will begin on June 3, 2013 and will terminate on June 3, 2014.

If you have any questions or concerns, please feel free to give me a call

Sincerely,

A handwritten signature in black ink, appearing to read 'Mark Morin', written over a horizontal line.

Mark Morin
Project Engineer

Cc. Rick Murphy, Nason Mechanical Systems

CIMARRON LED

Cat.#

Job

Type



Approvals

Att. T

SPECIFICATIONS

Construction:

- Stylish vertically finned die-cast solid top housing for maximum heat dissipation; Stops collection of unsightly debris from gathering on top of the housing
- Rugged lower die-cast aluminum heat sink accelerates thermal management and optimizes PCB and optical performance
- Separate optical and electrical compartment for optimum component operation
- One piece die cut silicone gasket ensures weather proof seal around each individual LED for IP65 rating
- Backlight Control (BC) option available for 85% spill light reduction, doesn't change fixture appearance or EPA, recommended for Type III and Type IV distributions
- Stamped bezel provides mechanical compression to seal the optical assembly
- Complements the Hubbell Southwest series of outdoor fixtures
- Weight - 45.0 pounds, EPA - 1.3 ft²
- Features exclusive wiHUBB technology
 - Wireless system for On/Off and 0-10VDC full range dimming control
 - Programmable autonomous operation
- Suitable for applications requiring 3G testing prescribed by ANSI C136.31

Optics:

- Choice of 72 high brightness LED configurations with individual acrylic lenses specially designed for IES Type II, III, IV and V distributions
- CCT: 3000K (80 CRI), 4200K (70 CRI), 5100K (67 CRI), and turtle friendly Amber LED options
- CRI: 70

Electrical:

- Universal input voltage 120-277 VAC, 50/60 Hz
- Integral step-down transformer for 347V & 480V
- Ambient operating temperature -40° C to 40° C
- Automatic thermal self-protection
- Drivers have greater than 90% power factor and less than 10% THD

- Optional continuous dimming to 10% or dual circuitry available
- LED drivers have output power over-voltage, over-current protection and short circuit protection with auto recovery
- 1050 mA driver available with 90L configuration for increased lumen output
- LED electrical assembly, including PR devices, consumes no power in the 'off' state
- Surge protection of 10KA 8/20 µSec wave; clamping voltage of 320V & surge rating of 273J

Lumen maintenance:

- L90 at 60,000 hours (Projected per IESNA TM-21-11)

Installation:

- Two die-cast aluminum arm designs: The decorative arm offers a sleek upswept look while the straight arm follows the housing's contoured lines for continuity of style
- Fixture ships with arm installed for ease of installation and mounts to #2 drill pattern
- Wall bracket, mast arm fitter and pole accessories are also available allowing easy mounting for virtually any application

Finish:

- TGIC thermoset polyester powder paint finish applied at nominal 2.5 mil thickness

Warranty:

Five year limited warranty (for more information visit: <http://www.hubbelloutdoor.com/resources/warranty/>)

Listings:

- Listed to UL1598 and CSA C22.2#250.0-24 for wet locations
- Models meet DesignLights Consortium (DLC) qualifications, consult DLC website for more details: <http://www.designlights.org/QPL>
- IDA approved • IP65

PRODUCT IMAGE(S)



90 LED 3/4 VIEW



30 LED

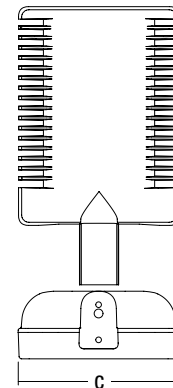
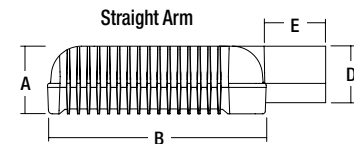
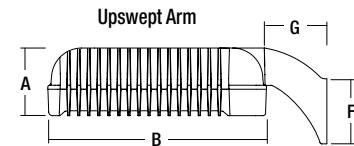


60 LED



90 LED

DIMENSIONS



A	B	C	D	E	F	G
6 3/4" 171mm	21 3/4" 552mm	16" 406mm	6 5/8" 168mm	6 5/16" 160mm	5 5/8" 143mm	6 1/8" 155mm

CERTIFICATIONS/LISTINGS



ORDERING INFORMATION SEE NEXT PAGE



Spaulding Lighting • 701 Millennium Boulevard • Greenville, SC 29607 • Phone: 864-678-1000
Due to our continued efforts to improve our products, product specifications are subject to change without notice.

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ORDERING INFORMATION ORDERING EXAMPLE: CL1-A-90LU-5K-3-DB-RPA3

SERIES	NO. OF LEDs	VOLTAGE	CCT	DRIVE CURRENT	OPTIONS
CL1 Cimarron LED	90L 90 High brightness LEDs 60L 60 High brightness LEDs 30L 30 High brightness LEDs	U³ Universal 120V-277V, 50/60 Hz 1⁷ 120V 2⁷ 208V 3⁷ 240V 4⁷ 277V 5 480V, 60 Hz F 347V, 60 Hz E⁴ 220V, 50 Hz	3K 3000K 4K 4200K 5K 5100K AM⁸ Amber (590 nm available for "Turtle Friendly" applications (consult factory))	Leave blank for 700mA (standard) 035 350mA Amber CCT only 105 1050 mA (use with 90L only for higher lumen output)	BC⁶ Backlight control BL^{1,2,5} Bi-level control CD² Continuous dimming WB Wall bracket RPA3 3" Round pole adapter RPA4 4" Round pole adapter RPA5 5" Round pole adapter RPA6 6" Round pole adapter F(X)^{3,4} Fusing (replace X with voltage: 1-120V, 2-208V, 3-240V, 4-277V, 5-480V, 6-347V) SSB Stainless steel LED bezel VG Vandal guard
MOUNTING		DISTRIBUTION			
A Arm mount construction (6" straight rigid arm included & acceptable for 90° configurations)		2 Type II	COLOR DB Dark Bronze BL Black WH White GR Gray PS Platinum Silver RD Red (premium color) FG Forest Green (premium color) CC Custom Color		
AD Decorative arm mount const. (6" decorative upswept arm incl. & acceptable for 90° configurations)		3 Type III			
MAF Mast arm fitter for mounting to standard 2 3/8" mast arm bracket, includes 6" straight rigid arm		4 Type IV	CONTROL OPTIONS SCO Motion sensor On/Off control, No light output when no motion detected SCP Programmable motion control, factory default is 50% PR(X)⁵ NEMA Photo cell receptacle (replace X with voltage: U=120-277, 5=480, 6=347) WIH⁷ In-fixture wireless control module (120, 277, 347 & 480V)		
		5M Type V Medium			
		5S Type V Short			
		5W Type V Wide			
		2L Type II Rotated 90° left			
		3L Type III Rotated 90° left			
		4L Type IV Rotated 90° left			
		2R Type II Rotated 90° right			
		3R Type III Rotated 90° right			
		4R Type IV Rotated 90° right			

Notes: 1- For BL option 90L and 60L; N/A 347V & 480V
2- BL & CD cannot be combined
3- Fuse option not available with universal voltage
4- Select F3 fusing option for 220V
5- Photocell receptacle not available with BL option
6- Recommended for Type III and IV distributions only
7- Select only when using voltage specific option (F or WIH)
8- Available in 350mA drive current only Type IV, 5M

ENERGY SAVING DATA

ENERGY DATA		INPUT WATTS		LUMENS DELIVERED						DRIVERS
Power Factor	>.9	120V-277V	347V-480V	TYPE 2	TYPE 3	TYPE 4	TYPE 5M	TYPE 5S	TYPE 5W	CURRENT
Total Harmonic Distortion	<10%									
30L-5K		70	87	6384	6164	6641	7108	6999	6619	2@700mA
60L-5K		140	157	13300	12842	13125	13185	13675	12954	4@700mA
90L-5K		210	227	19684	19006	19202	20592	19610	18973	6@700mA
90L-5K-105		336	363	26974	25351	26548	25793	27445	25195	6@1050mA
30L-4K		70	87	6089	6109	6104	6417	6439	6046	2@700mA
60L-4K		140	157	11583	11468	12036	12038	12581	11807	4@700mA
90L-4K		210	227	17143	16973	17648	18521	20220	17394	6@700mA
90L-4K-105		336	363	23896	23912	24199	24583	25357	23128	6@1050mA
30L-3K		70	87	4606	4668	4686	4858	4902	4601	2@700mA
60L-3K		140	157	9013	9175	9216	9409	9461	8844	4@700mA
90L-3K		210	227	13360	13601	13575	13923	14004	13902	6@700mA
90L-3K-105		336	363	17645	17612	17469	17950	18271	17330	6@1050mA

ACCESSORIES SEE NEXT PAGE



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ACCESSORIES

Catalog Number	Description
CR-RPA3-XX ¹	Round pole adapter for straight arm (3¼ - 3¾")
CR-RPA4-XX ¹	Round pole adapter for straight arm (3¾ - 4½")
CR-RPA5-XX ¹	Round pole adapter for straight arm (5")
CR-RPA6-XX ¹	Round pole adapter for straight arm (6")
CRD-RPA2-XX ¹	Round pole adapter for upswept arm (2¾ - 3½")
CRD-RPA3-XX ¹	Round pole adapter for upswept arm (3¼ - 3¾")
CRD-RPA4-XX ¹	Round pole adapter for upswept arm (3¾ - 4½")
CRD-RPA5-XX ¹	Round pole adapter for upswept arm (5")
CRD-RPA6-XX ¹	Round pole adapter for upswept arm (6")
WB-CR-XX ¹	Wall bracket
TPLB-XX ¹	Twin parallel luminaire bracket
MAF-CL-XX ³	Horizontal mast arm fitter for 2 3/8" OD arm. Mounts to standard 6" arm (ordered with fixture)

¹ Replace XX with color choice, eg.: DB for Dark Bronze

² When ordering poles, specify Pole Drill Pattern #2

³ Fixture must include standard 6" arm

MOUNTING ACCESSORIES

Catalog Number	Description
ARM-CL-K-TA-XX ¹	Adjustable mounting arm for single fixture (2-3/8 tenon) – 5 lbs. 2.3 kgs.
ARM-CL-TK-TA-XX ¹	Adjustable mounting arm for two fixtures at 180° (2-3/8 tenon) – 7 lbs. 3.2 kgs.
ARM-CL-K-S-XX ¹	10" adjustable arm – .5 lbs. .05 kgs. – 5.75 lbs. 2.6 kgs.

¹ Replace XX with color choice, eg.: DB for Dark Bronze

² Fixture must include standard 6" straight arm

ARM-CL-K-TA-XX
ARM-CL-TK-TA-XX



ARM-CL-K-S-XX



TENON TOP POLE BRACKET ACCESSORIES

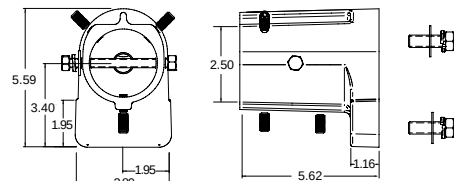
(2 3/8" OD tenon) (RSS version requires 4" round pole adapter)

Catalog Number	Description
SETA-XX ¹	Square pole tenon adapter (4 at 90 degrees)
RETA-XX ¹	Round pole tenon adapter (4 at 90 degrees)
TETA-XX ¹	Hexagonal pole tenon adapter (3 at 120 degrees)

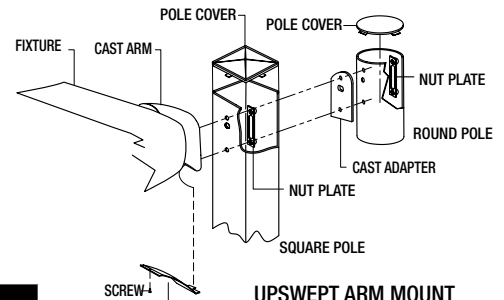
¹ Replace XX with color choice, eg.: DB for Dark Bronze

PHOTOCONTROL EQUIPMENT

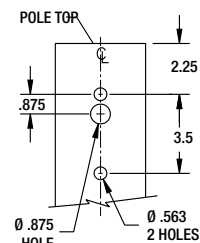
Catalog Number	Description
PTL-1	Photocontrol - twist-lock cell (120V)
PTL-8	Photocontrol - twist-lock cell (120-277V)
PTL-5	Photocontrol - twist-lock cell (480V)
PTL-6	Photocontrol - twist-lock cell (347V)
PSC	Shorting cap - twist-lock



MAF – HORIZONTAL MAST ARM FITTER

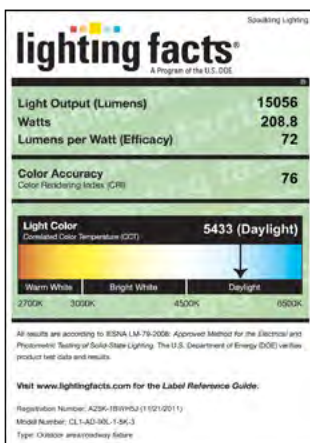
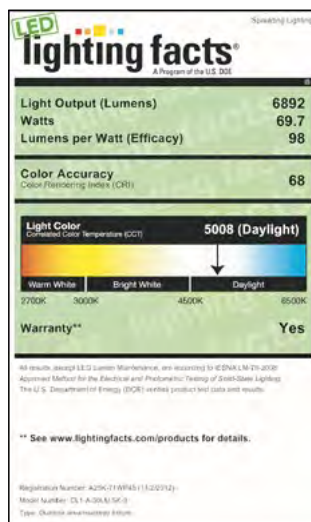


UPSWEPT ARM MOUNT
SQUARE & ROUND POLES



#2 DRILL PATTERN FOR POLES

LIGHTING FACTS



WPLEDFC52/BL

LED 52W Wallpacks. 3 cutoff options. Patent Pending thermal management system. 100,000 hour L70 lifespan. 5 Year Warranty.

Color: Bronze

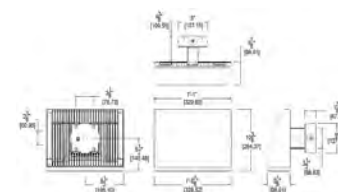
Weight: 17.6 lbs

LED Info

Watts: 52W
 Color Temp: 5000K (Cool)
 Color Accuracy: 65
 L70 Lifespan: 100000
 LM79 Lumens: 5,905
 Efficacy: 97 LPW

Driver Info

Type: Constant Current
 120V: 0.51A
 208V: 0.33A
 240V: 0.29A
 277V: 0.24A
 Input Watts: 61W
 Efficiency: 86%



Technical Specifications

UL Listing:

Suitable for wet locations.

Bi-Level Operation:

Allows 50% and 100% output modes.

Lumen Maintenance:

100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations.

LEDs:

Two (2) multi-chip, high-output, long-life LEDs.

Drivers:

Two drivers, constant current, 720mA, Class 2, 100 - 277V, 50 - 60 Hz, 100 - 277VAC .8 Amps

THD:

8.3% at 120V, 11% at 277V

Ambient Temperature:

Suitable for use in 40°C ambient temperatures.

Surge Protection:

6kV

Cold Weather Starting:

The minimum starting temperature is -40°F/-40°C.

Thermal Management:

Cast aluminum Thermal Management system for optimal heat sinking. The WPLED is designed for cool operation, most efficient output and maximum LED life by minimizing LED junction temperature.

Housing:

Precision die cast aluminum housing, lens frame.

Mounting:

Die-cast aluminum wall bracket with (5) 1/2" conduit openings with plugs. Two-piece bracket with tether for ease of installation and wiring.

Arm:

Die-cast aluminum with wiring access plate.

Color Consistency:

7-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color.

Color Stability:

LED color temperature is warrantied to shift no more than 200K in CCT over a 5 year period.

Color Uniformity:

RAB's range of CCT (Correlated color temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2008.

Reflector:

Specular vacuum-metallized polycarbonate

Gaskets:

High temperature silicone.

Lens:

Tempered glass

Finish:

Our environmentally friendly polyester powder coatings are formulated for high-durability and long-lasting color, and contains no VOC or toxic heavy metals.

Green Technology:

WPLEDs are Mercury and UV free.



IESNA LM-79 & IESNA LM-80 Testing:

RAB LED luminaires have been tested by an independent laboratory in accordance with IESNA LM-79 and 80, and have received the Department of Energy "Lighting Facts" label.

Replacement:

The WPLEDFC52 replaces 250W HID Wallpacks.

California Title 24:

WPLEDFC52/BL with bi-level operation complies with 2013 California Title 24 building and electrical codes as a commercial outdoor pole-mounted fixture > 30 Watts mounted up to 24 feet when used with a RAB photo/motion control. Select a photo/motion control using catalog number STL110, STL200 or STL360. Mounting heights greater than 24 feet require only a photocell. See WPLEDFC52/PCS or WPLEDFC52/PCS2 (277V) for photocell versions.

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Patents:

The WPLED design is protected by patents in the U.S. Pat D653,377, Canada Pat. 142252, China Pat. ZL201130356930.8, and Mexico Pat. 36921 and pending patent in TW.

For use on LEED Buildings:

IDA Dark Sky Approval means that this fixture can be used to achieve LEED Credits for Light Pollution Reduction.

Dark Sky Approved:

The International Dark Sky Association has approved this product as a full cutoff, fully shielded luminaire.

Country of Origin:

Designed by RAB in New Jersey and assembled in the USA by RAB's IBEW Local 3 workers.

Buy American Act Compliant:

This product is a COTS item manufactured in the United States, and is compliant with the Buy American Act.

Recovery Act (ARRA) Compliant:

This product complies with the 52.225-21 "Required Use of American Iron, Steel, and Manufactured Goods-- Buy American Act-- Construction Materials (October 2010).

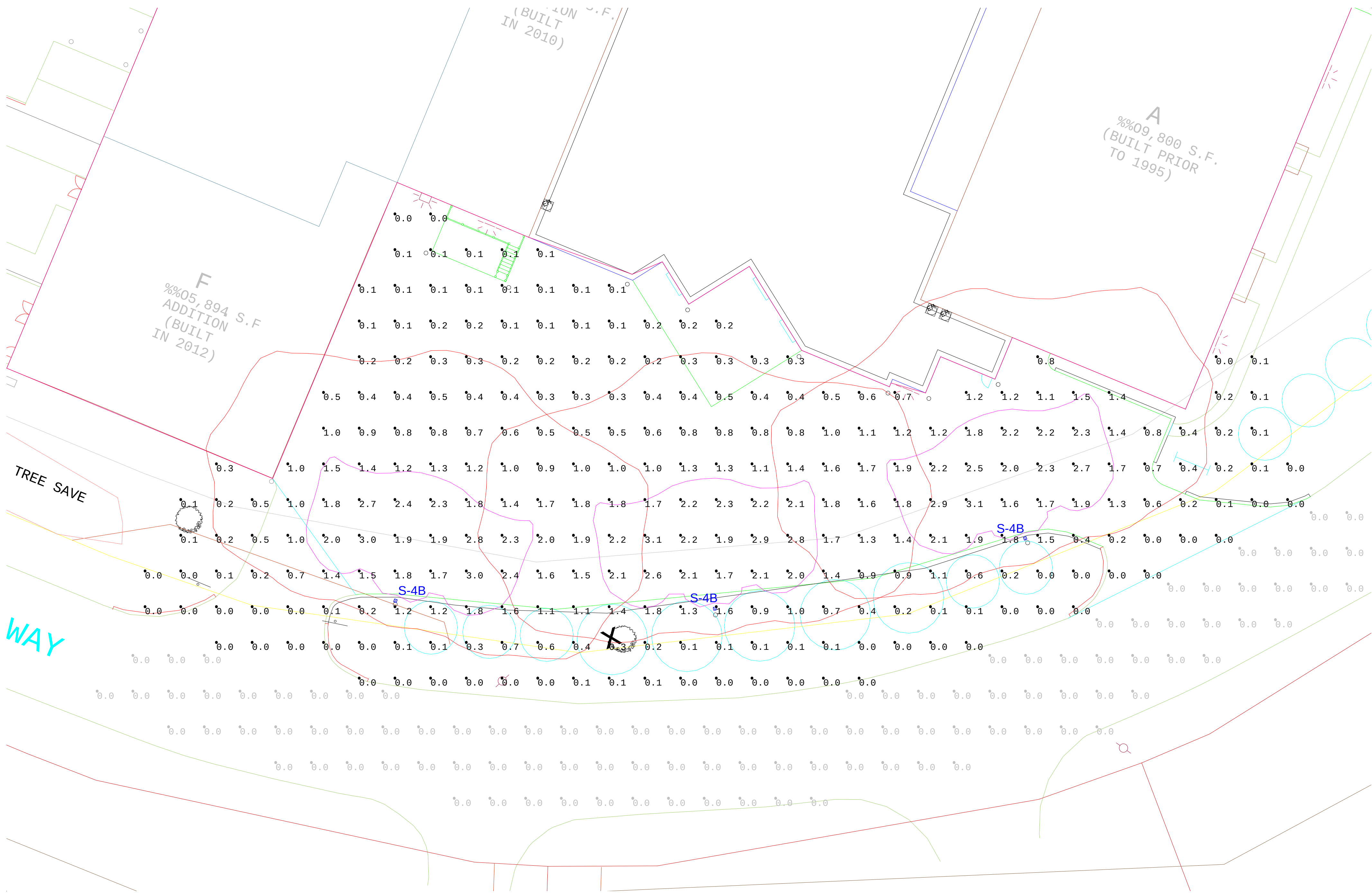
Trade Agreements Act Compliant:

This product is a COTS item manufactured in the United States, and is compliant with the Trade Agreements Act.

GSA Schedule:

Suitable in accordance with FAR Subpart 25.4.





Luminaire Schedule								
Symbol	Tag	Qty	Lamp Lumens	LLF	Lum. Eff.(%)	Lum. Lumens	Lum. Watts	Description
	S-4B	3	N.A.	0.900	N.A.	9656	140.3	CL1-x-60L-1-4K-4-BC

Calculation Summary				
Label			Avg	Max
Parking			0.85	3.1
Road			0.00	0.0



15 Pleasant Hill Rd
P.O. Box 1597
Scarborough, Maine 04070
email: swaneylighting.com
ph: 207-883-7100
fax: 207-885-9605

#	Date	Comments
1	7/15/14	Preliminary
Revisions		

Drawn By: SDW				
Not to Scale				

PARTIAL SITE LIGHTING PLAN LED FIXTURE	
	Allagash Brewing Portland, Maine

Micucci

Traditional Products • Smart Distribution

July 08, 2014

Planning and Urban Development Department
Planning Division, 4th Floor
389 Congress Street
Portland, Maine 04101

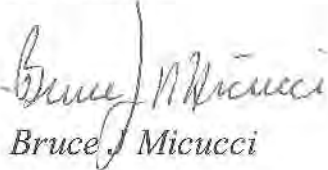
Re: Allagash Brewery Expansion

Please accept this letter as a 100% endorsement of the expansion of Allagash Brewing Company at 100 Industrial Way.

While I still hope to attend the July 15th neighborhood meeting I did not want to miss the opportunity to support Allagash on their continuing investment in the City of Portland and the area business community.

Allagash Brewing Company is a business model for all that is good, congratulations on your success and best of luck as you move forward.

Sincerely,


Bruce J. Micucci

rec'd 7-14-14



Neighborhood Meeting Certification
Allagash Brewing Company

I, Richard Meek, PE hereby attest that a neighborhood meeting for Allagash Brewing Company was held on Tuesday July 15, 2014 at 100 Industrial Way at 5:30 p.m.

I also attest that on July 3, 2014, invitations were mailed to the following:

1. All addresses on the mailing list provided by the Planning Division which includes property owners within 500 feet of the proposed development.
2. Residents on the "interested parties" list.
3. A digital copy of the notice was also provided to the Planning Division (jmy@portlandmaine.gov and ldobson@portlandmaine.gov) and the assigned planner to be forwarded to those on the interested citizen list who receive e-mail notices.

Signed,



7/16/14 (date)

Attached to this certification are:

1. Copy of the invitation sent
2. Sign-in-sheet
3. Meeting minutes



July 1, 2014
02249

Notice to Neighbors of
Allagash Brewing Company
Portland, Maine

Dear Neighbor:

Please join us for a neighborhood meeting to discuss plans for expansion of the existing Allagash Brewing Company facility located at 50 and 100 Industrial Way.

Meeting Location: 100 Industrial Way
Meeting Date: July 15, 2014
Meeting Time: 5:30 p.m.

The City requires that property owners within 500 feet of the proposed development and residents on an "interested parties list", be invited to participate in the neighborhood meeting. A sign-in sheet will be circulated and minutes of the meeting will be taken. Both the sign-in sheet and minutes will be submitted to the Planning Board.

If you have questions, please call Richard Meek, Sebago Technics, Inc. 207-200-2075

Sincerely,

SEBAGO TECHNICS, INC.

Richard Meek, P.E.
Senior Project Engineer

Note:

Under Section 1-32(C) and 14-52(a)d of the City Code of Ordinances, an applicant for a Level III development is required to hold a neighborhood meeting. The meeting must be held at least seven days prior to the Planning Board public hearing on the proposal. Should you wish to offer additional comments on this proposed development, you may contact the Planning Division at 874-8721 or send written correspondence to the Planning and Urban Development Department, Planning Division 4th Floor, 389 Congress Street Portland, ME 04101 or by email: to bab@portlandmaine.gov

RLM:llg

Neighborhood Meeting Attendance

Allagash Brewing Company

Tuesday, July 15, 2014

Name

Address

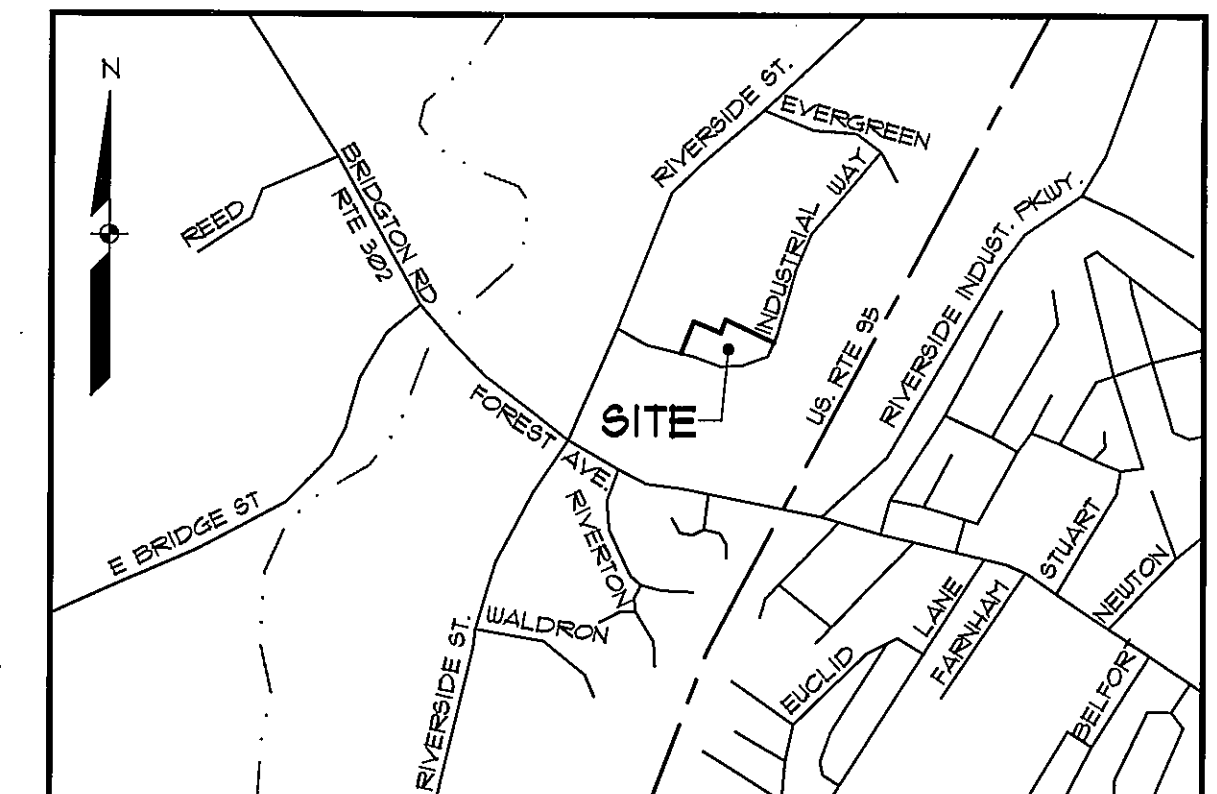
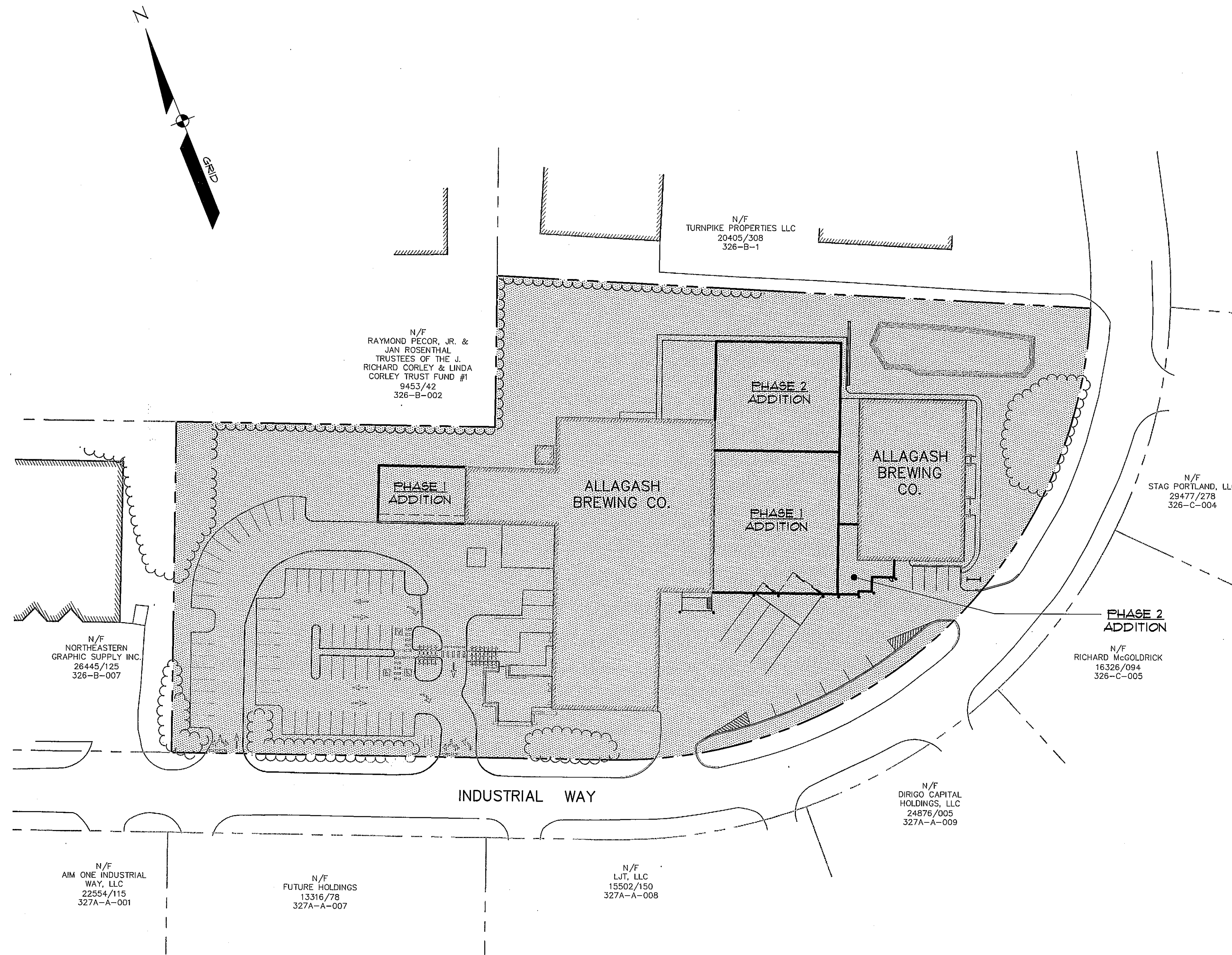
Neighborhood Meeting Minutes

Allagash Brewing Company

- Opened the meeting
- As there were no attendees, the meeting was adjourned.

ALLAGASH BREWING COMPANY

PORTLAND, MAINE



LOCATION MAP

N.T.S.

APPLICANT:
50 INDUSTRIAL WAY, LLC
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

ENGINEER / SURVEYOR:

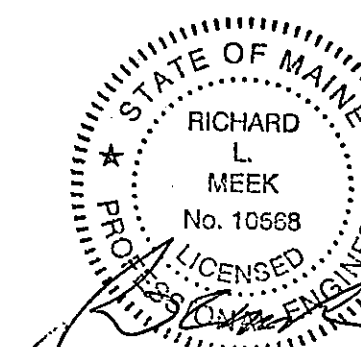
SEBAGO
TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd. - Suite 1A South Portland, ME 04106
250 Goddard Rd. - Suite B Lewiston, ME 04240
Tel. 207-200-2100 Tel. 207-783-6666

ARCHITECT:
GRANT HAYS ASSOCIATES
P.O. BOX 6179
FALMOUTH, MAINE 04105

SCALE: 1" = 50'

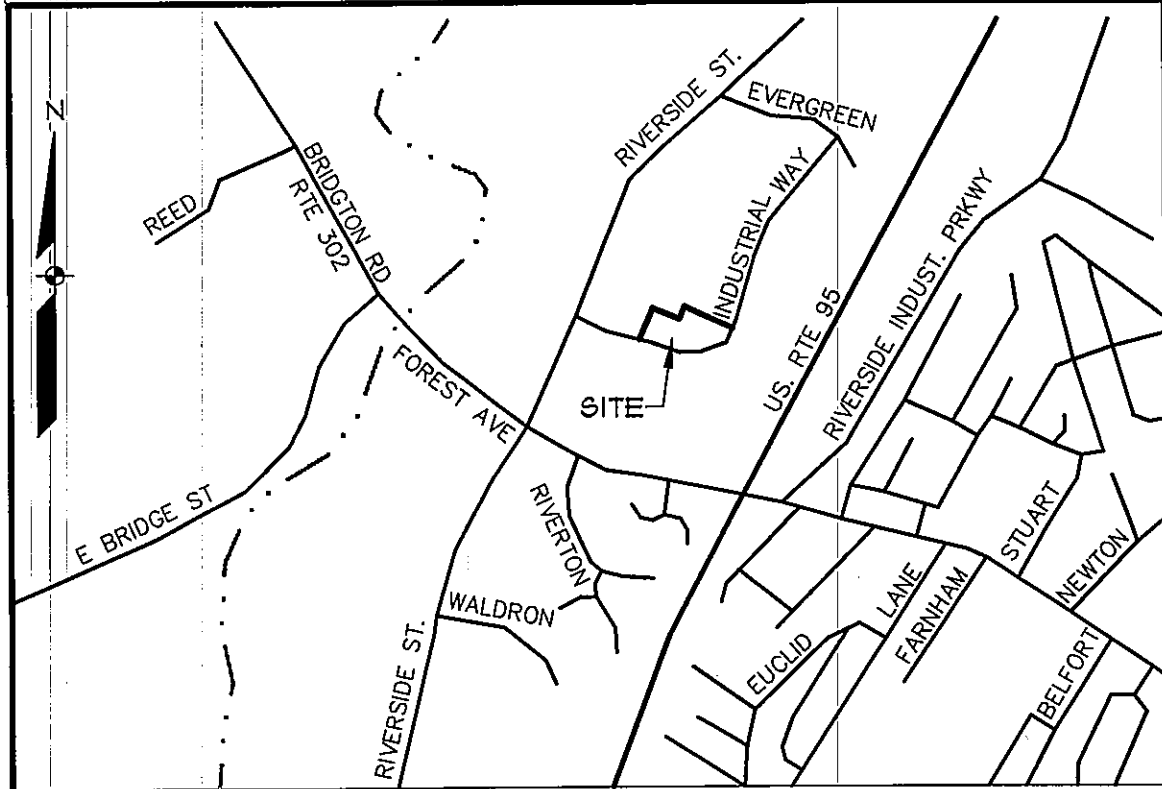
SHEET INDEX

SHEET	DESCRIPTION
C1	COVER SHEET
C2	EXISTING CONDITIONS PLAN
C3.1	DEMOLITION PLAN-PHASE 1
C3.2	DEMOLITION PLAN-PHASE 2
C4	PHASING PLAN
C5.1	SITE PLAN-PHASE 1
C5.2	SITE PLAN-PHASE 2
C6.1	GRADING AND UTILITY PLAN-PHASE 1
C6.2	GRADING AND UTILITY PLAN-PHASE 2
C7.1	LANDSCAPE AND LIGHTING PLAN-PHASE 1
C7.2	LANDSCAPE AND LIGHTING PLAN-PHASE 2
C8	DETAILS
C9	DETAILS

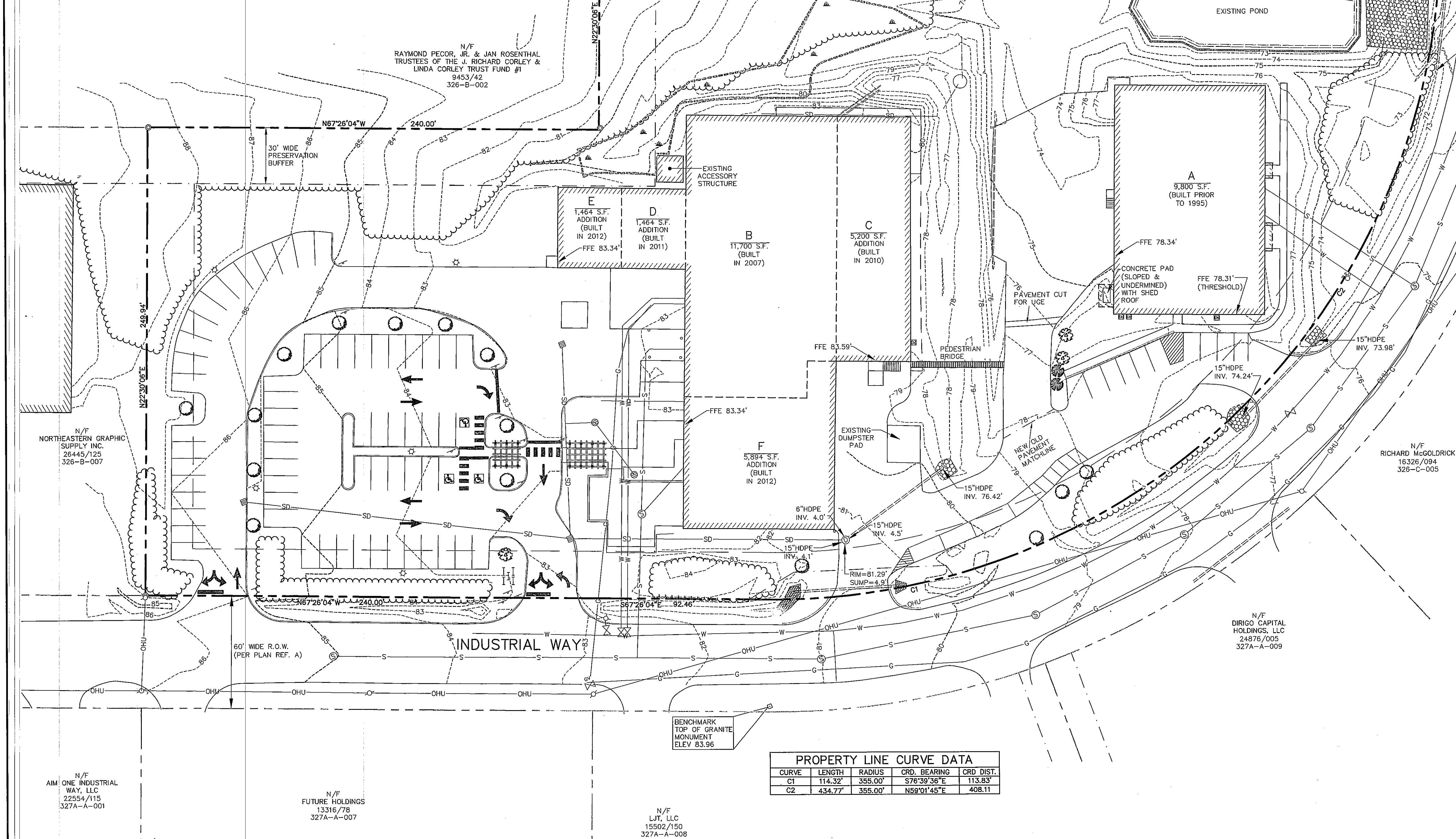


B	RLM	07-11-14	FINAL SITE PLAN SUBMISSION TO CITY
A	RLM	06-03-14	SITE PLAN SUBMISSION TO CITY
REV:	BY:	DATE:	STATUS:

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.



LOCATION MAP

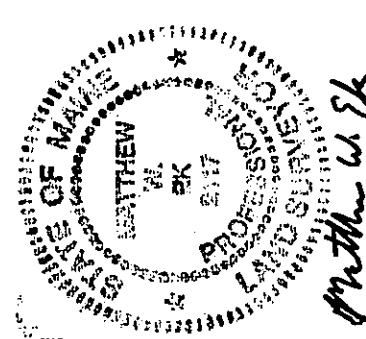


PROPERTY LINE CURVE DATA				
CURVE	LENGTH	RADIUS	CRD. BEARING	CRD. DIST.
C1	114.32'	355.00'	S76°39'38"E	113.83'
C2	434.77'	355.00'	N59°01'45"E	408.11'

LEGEND	
EXISTING	DESCRIPTION
---	BOUNDARY LINE/R.O.W.
---	ABUTTER LINE/R.O.W.
---	SETBACK
---	EASEMENT
---	MONUMENT
---	IRON PIPE/ROD
---	CURVE/LINE NO.
---	BENCHMARK
---	CI/L1
---	BUILDING
---	WETLANDS
---	EDGE WETLAND
---	SIGN
---	EDGE PAVEMENT
---	EDGE CONCRETE
---	PAVEMENT PAINT
---	GRAVEL
---	CURBLINE
---	TREELINE
---	CONTOURS
---	CHAIN LINK FENCE
---	DECIDUOUS TREE
---	CONIFEROUS TREE
---	SHRUB
---	BOLLARD
---	GAS
---	GAS GATE VALVE
---	GAS METER
---	WATER
---	WATER GATE VALVE
---	WATER SHUT OFF
---	HYDRANT
---	SEWER
---	SEWER MH
---	STORM DRAIN
---	UNDERDRAIN
---	CATCH BASIN
---	DRAINAGE MH
---	OVERHEAD UTILITY
---	UNDERGROUND UTILITY
---	TRANSFORMER PAD
---	WATER MANHOLE
---	LIGHT POLE/WALL
---	UTILITY POLE
---	GUY
---	RIPRAP

GENERAL NOTES

- THE RECORD OWNER OF THE PARCELS IS 50 INDUSTRIAL WAY LLC, 50 INDUSTRIAL WAY, PORTLAND, MAINE 04103 BY DEEDS RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) IN THE FOLLOWING: LOT 17 BOOK 29167 PAGE 291, DATED NOVEMBER 30, 2011 LOT 18 BOOK 18385 PAGE 348, DATED NOVEMBER 14, 2002 LOT 19 BOOK 28650 PAGE 237, DATED APRIL 26, 2011
- THE PROPERTY IS SHOWN ON THE CITY OF PORTLAND TAX MAP 326 BLOCK B AS LOT 10 (SUBDIVISION LOT 17), LOT 9 (SUBDIVISION LOT 18) AND LOT 8 (SUBDIVISION LOT 19) AND IS LOCATED IN THE IM ZONE.
- SPACE AND BULK CRITERIA FOR THE IM ZONE ARE AS FOLLOWS:
MINIMUM FRONT YARD: 1 FOOT/FOOT OF BUILDING HEIGHT
MINIMUM SIDE & REAR YARD: 25' MIN. & 1 FOOT/FOOT OF BUILDING HEIGHT
NO PAVEMENT WITHIN 10 FEET OF PROPERTY LINE
* SEE ORDINANCE FOR MORE PARTICULAR INFORMATION
- TOTAL AREA OF PARCELS ARE AS FOLLOWS:
LOT 17 ±58,920 SQUARE FEET
LOT 18 ±73,073 SQUARE FEET
LOT 19 ±59,985 SQUARE FEET
- BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED UPON BOUNDARY, TOPOGRAPHIC AND AS-BUILT SURVEYS PERFORMED BY SEBAGO TECHINCS, INC. FROM 2002 THROUGH 2014.
- PLAN REFERENCES:
A. RECORDING PLAT OF THE TURNPIKE INDUSTRIAL PARK, BY LAND USE CONSULTANTS, DATED MARCH 25, 1986 AND LAST REVISED SEPTEMBER 9, 1986, BEING RECORDED IN THE CCRD IN PLAN BOOK 157 PAGE 61.
B. SITE PLAN SET OF PLANS OF LOT 18, TURNPIKE INDUSTRIAL PARK FOR ALLAGASH BREWING, BY SEBAGO TECHINCS, INC. (PROJECT 05057).
- PLAN ORIENTATION IS GRID NORTH, MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE 1802-NAD83.
- UTILITY INFORMATION DEPICTED HEREON IS COMPILED USING PHYSICAL EVIDENCE LOCATED IN THE FIELD. UTILITIES DEPICTED HEREON MAY NOT NECESSARILY REPRESENT ALL EXISTING UTILITIES. CONTRACTORS NEED TO CONTACT DIG-SAFE SYSTEMS, INC. (1-888-DIG-SAFE) AND FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION AND/OR EXCAVATION.



REV.	BY	DATE	STATUS
B	RLM	07-11-14	FINAL SITE PLAN SUBMISSION TO CITY
A	RLM	06-03-14	SITE PLAN SUBMISSION TO CITY

PROJECT NO.	FIELD BOOK	DESIGN	CHKD	DRAWN
02249	847			KWD

EXISTING CONDITIONS PLAN	DATE	SCALE
ALLAGASH BREWING COMPANY	05-20-14	1" = 30'
INDUSTRIAL WAY		
PORTLAND, MAINE		
FOR: 50 INDUSTRIAL WAY, LLC		
50 INDUSTRIAL WAY		
PORTLAND, MAINE 04103		

DATE	SCALE
05-20-14	1" = 30'

	B	R/LM	07-11-14	FINAL SITE PLAN SUBMISSION TO CITY
	A	R/LM	06-03-14	SITE PLAN SUBMISSION TO CITY
	REV:	BY:	DATE:	STATUS:
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNIQS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNIQS, INC.				



SEBAGO
 T E C H N I C S
 WWW.SEBAGOTECHNICS.COM

75 John Roberts Rd. - Suite 1A 250 Goddard Rd. - Suite B
 South Portland, ME 04108 Lewiston, ME 04240
 Tel. 207-200-2100 Tel. 207-793-9595

PROJECT NO.	FIELD BOOK	DESIGN	CHKD	RLM	MAL
02249	847				

DEMOLITION PLAN - PHASE 1

OF:

ALLAGASH BREWING COMPANY
INDUSTRIAL WAY
PORTLAND, MAINE

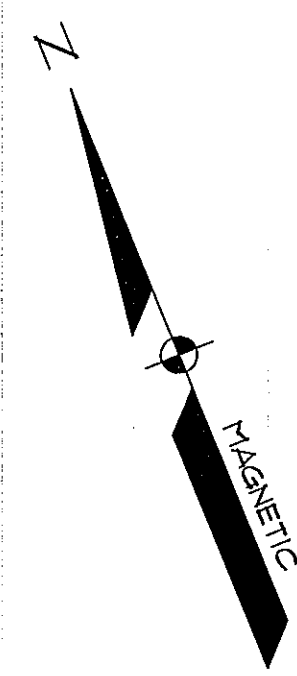
FOR:

50 INDUSTRIAL WAY, LLC
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

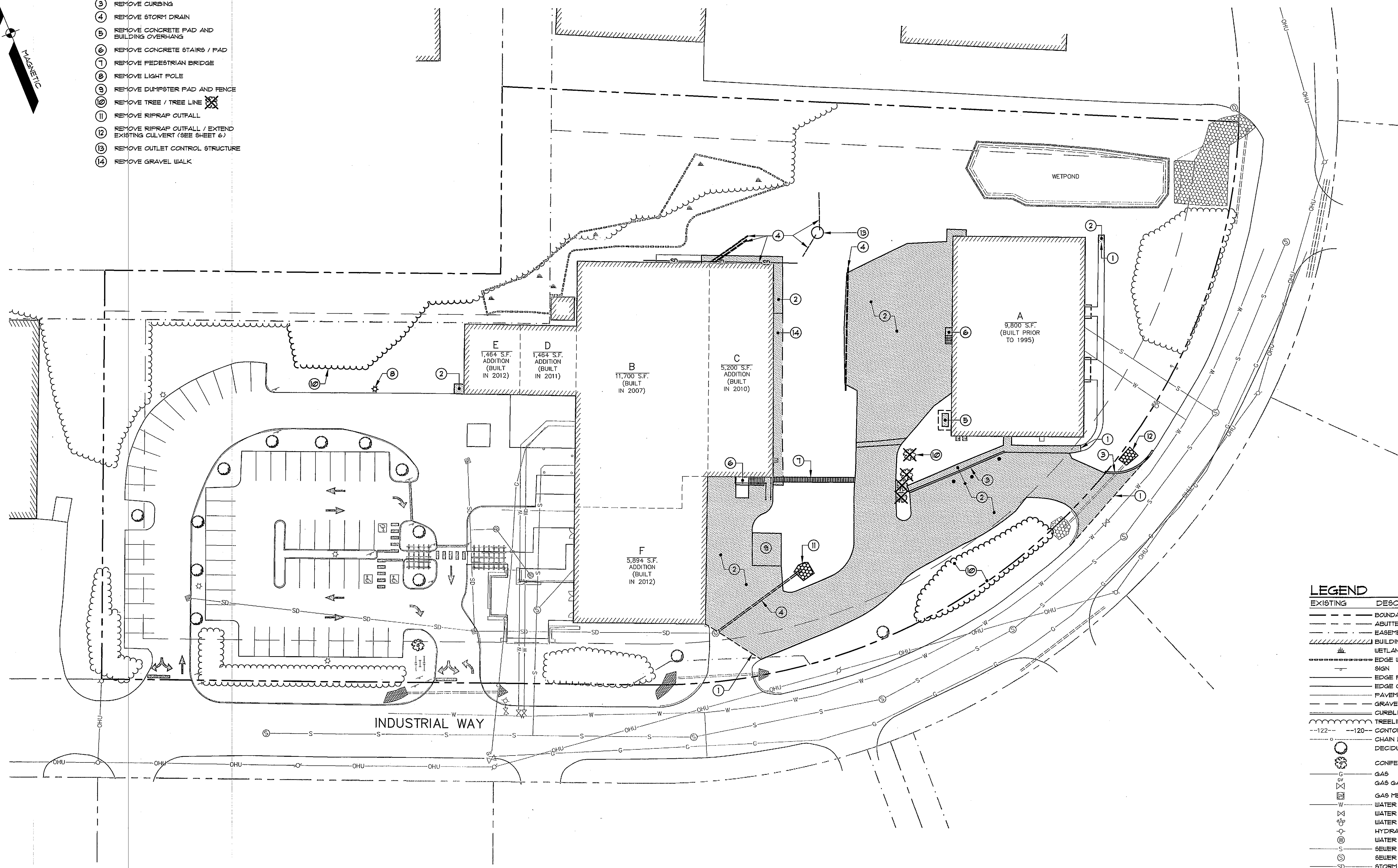
DATE	SCALE
05-20-14	1" = 30'

SHEET C3.1

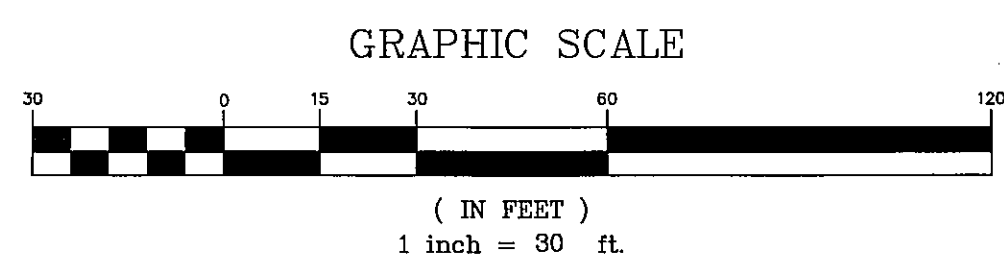
02249DEMO-PHASE 1.dwg, TAB: DEMO-PH 1

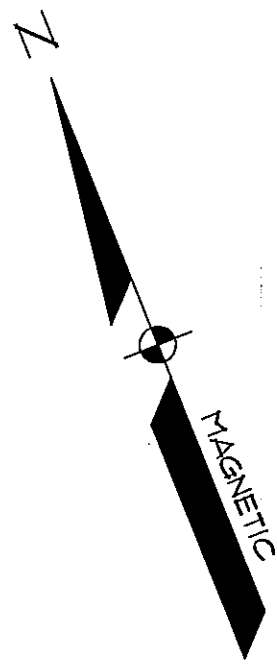


- 1 SAW CUT PAVEMENT
- 2 REMOVE PAVEMENT / SIDEWALK
- 3 REMOVE CURBING
- 4 REMOVE STORM DRAIN
- 5 REMOVE CONCRETE PAD AND BUILDING OVERHANG
- 6 REMOVE CONCRETE STAIRS / PAD
- 7 REMOVE PEDESTRIAN BRIDGE
- 8 REMOVE LIGHT POLE
- 9 REMOVE DUMPFSTER PAD AND FENCE
- 10 REMOVE TREE / TREE LINE
- 11 REMOVE RIPRAP OUTFALL
- 12 REMOVE RIPRAP OUTFALL / EXTEND EXISTING CULVERT (SEE SHEET 6)
- 13 REMOVE OUTLET CONTROL STRUCTURE
- 14 REMOVE GRAVEL WALK



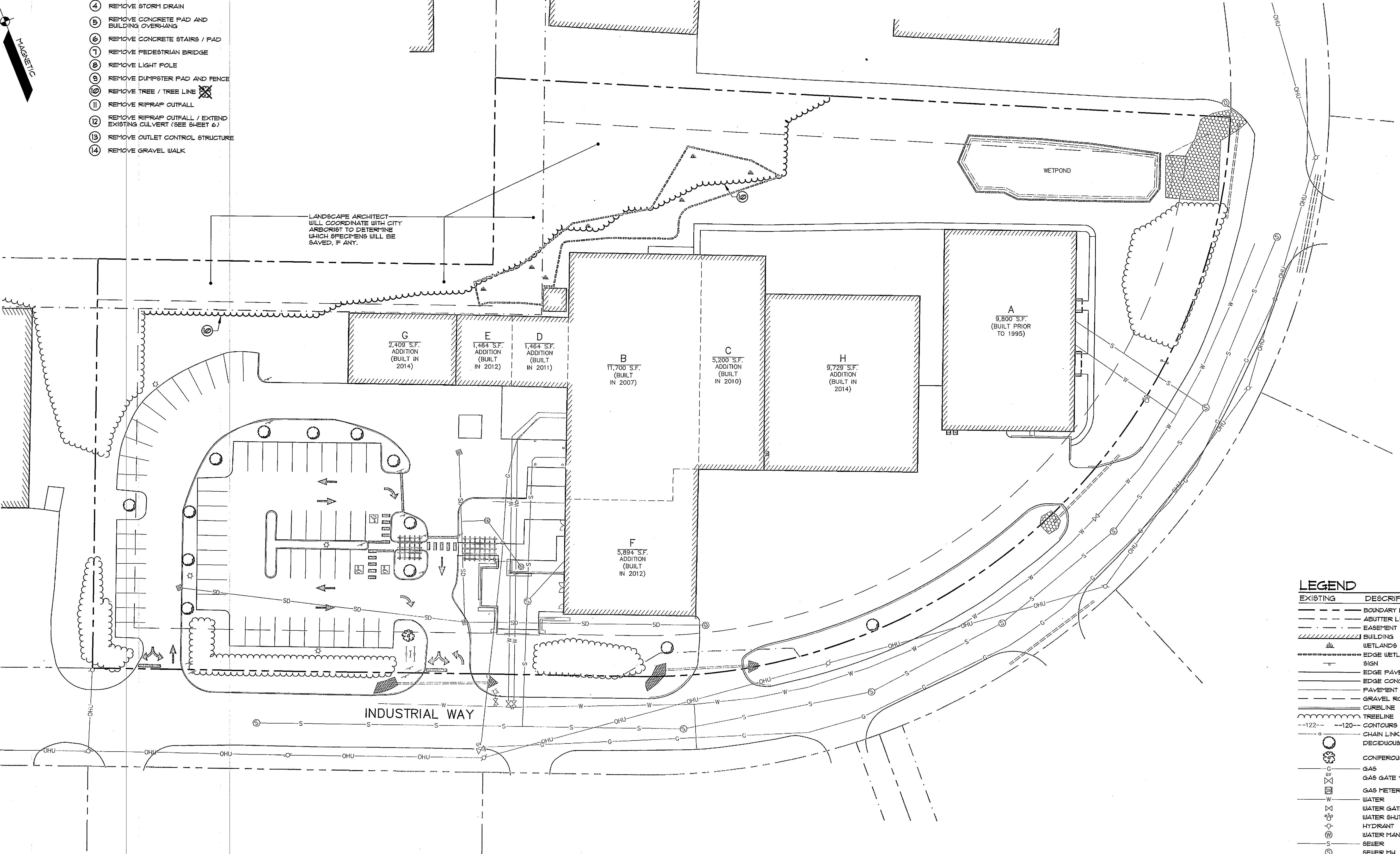
EXISTING	DESCRIPTION
_____	BOUNDARY LINE/ROW
_____	ABUTTER LINE/ROW
_____	EASEMENT
	BUILDING
	WETLANDS
	EDGE WETLAND
	SIGN
_____	EDGE PAVEMENT
_____	EDGE CONCRETE
_____	PAVEMENT FAINT
_____	GRAVEL ROAD
_____	CURBLINE
	TREELINE
- - - 12' - - - 12' - - -	CONTOURS
_____	CHAIN LINK FENCE
	DECIDUOUS TREE
	CONIFEROUS TREE
_____	GAS
	GAS GATE VALVE
	GAS METER
_____	WATER
	WATER GATE VALVE
	WATER SHUT OFF
	HYDRANT
	WATER MANHOLE
_____	SEWER
	SEWER MH
_____	STORM DRAIN
_____	UNDERDRAIN
	CATCH BASIN
	DRAINAGE MH
	CULVERT
_____	OVERHEAD UTILITY
_____	UNDERGROUND UTILITY
	TRANSFORMER PAD
	LIGHT POLE/WALL
_____	UTILITY POLE
	GUY
	RIPRAP





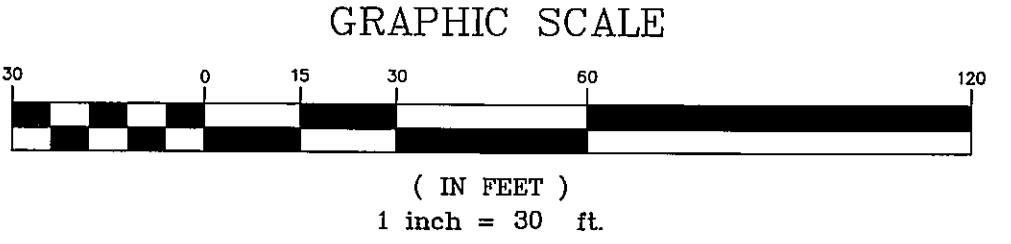
SITE DEMOLITION INDEX

- 1 SAW CUT PAVEMENT
- 2 REMOVE PAVEMENT / SIDEWALK
- 3 REMOVE CURBING
- 4 REMOVE STORM DRAIN
- 5 REMOVE CONCRETE PAD AND BUILDING OVERHANG
- 6 REMOVE CONCRETE STAIRS / PAD
- 7 REMOVE PEDESTRIAN BRIDGE
- 8 REMOVE LIGHT POLE
- 9 REMOVE DUMPSTER PAD AND FENCE
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- 12 REMOVE RIPRAP OUTFALL / EXTEND EXISTING CULVERT (SEE SHEET 6)
- 13 REMOVE OUTLET CONTROL STRUCTURE
- 14 REMOVE GRAVEL WALK



LANDSCAPE ARCHITECT
WILL COORDINATE WITH CITY
ARBORIST TO DETERMINE
WHICH SPECIMENS WILL BE
SAVED, IF ANY.

LEGEND	
EXISTING	DESCRIPTION
---	BOUNDARY LINE/ROW
---	ABUTTER LINE/ROW
---	EASEMENT
---	BUILDING
---	WETLANDS
---	EDGE WETLAND
---	SIGN
---	EDGE PAVEMENT
---	EDGE CONCRETE
---	PAVEMENT PAINT
---	GRAVEL ROAD
---	CURBLINE
---	TREELINE
---	CHAINS LINK FENCE
---	DECIDUOUS TREE
---	CONIFEROUS TREE
---	GAS
---	GAS GATE VALVE
---	GAS METER
---	WATER
---	WATER GATE VALVE
---	WATER SHUT OFF
---	HYDRANT
---	WATER MANHOLE
---	SEWER
---	SEWER MH
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---	UNDERDRAIN
---	CATCH BASIN
---	DRAINAGE MH
---	CULVERT
---	OVERHEAD UTILITY
---	UNDERGROUND UTILITY
---	TRANSFORMER PAD
---	LIGHT POLE/WALL
---	UTILITY POLE
---	GUY
---	RIPRAP



P4

STATE OF MAINE
REGISTERED PROFESSIONAL ENGINEER
RICHARD WEEK
No. 10668

DATE	05-20-14	SCALE	1" = 30'
------	----------	-------	----------

02249DEMO-PHASE 2.dwg, TAB: DEMO-PH 2

DATE: 07-11-14
BY: RLM
STATUS: FINAL SITE PLAN SUBMISSION TO CITY

DATE: 06-03-14
BY: A
STATUS: SITE PLAN SUBMISSION TO CITY

SEBAGO TECHNICALS
75 John Roberts Rd. - Suite 1A
South Portland, ME 04106
Tel: 207-733-2100
Fax: 207-733-2665
WWW.SEBAGOTECHNICALS.COM

DEMOLITION PLAN - PHASE 2
OF:
ALLAGASH BREWING COMPANY
INDUSTRIAL WAY
PORTLAND, MAINE
FOR:
50 INDUSTRIAL WAY, LLC
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

PROJECT NO. 02249
FIELD BOOK 847
DESIGN RLM
CHECK RLM
DRAWN MAL

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICALS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICALS, INC.

[illegible]

S=BAGO

T E C H N I C S

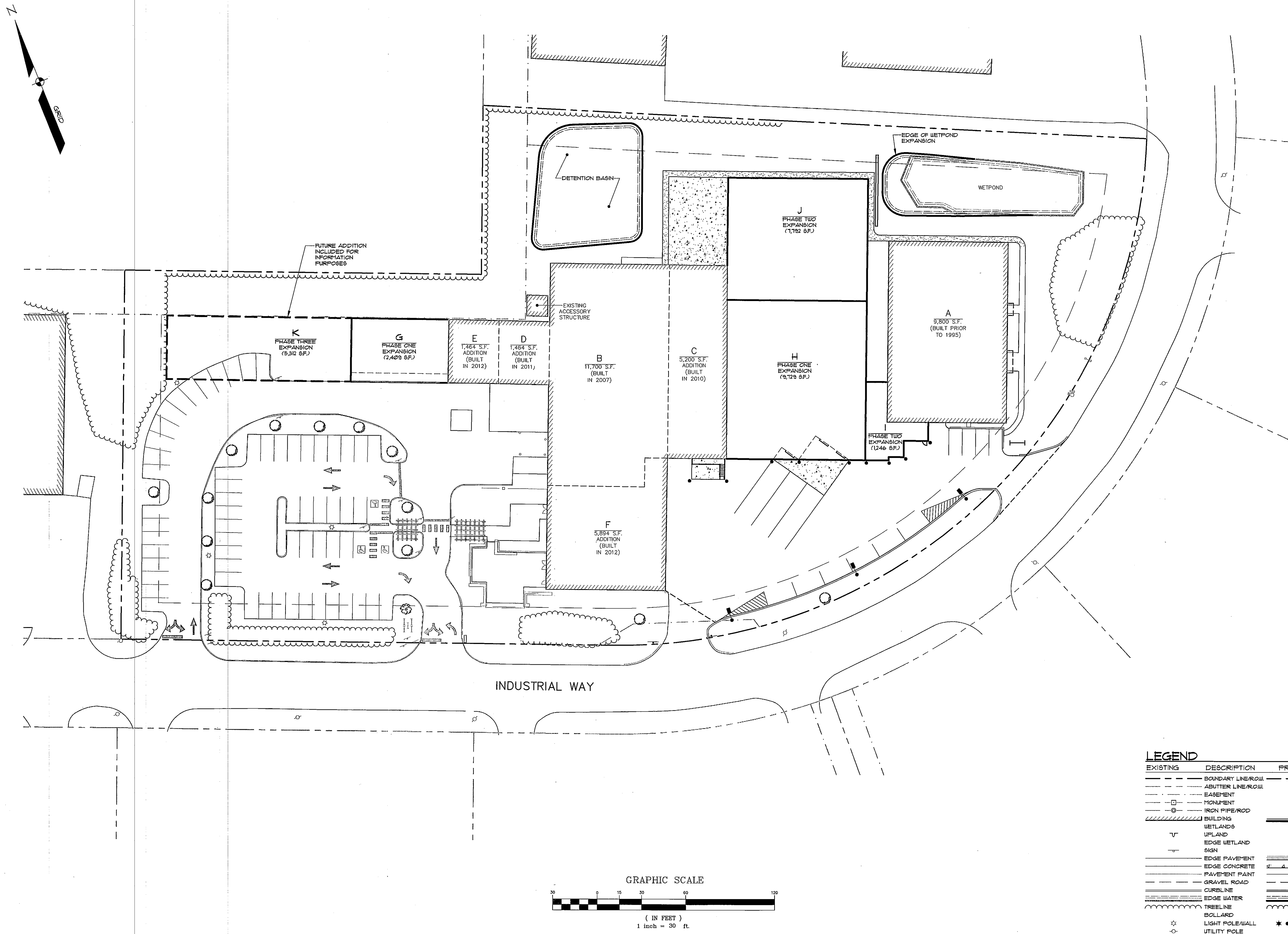
WWW.SBAGOTECHNICS.COM

75 John Rubenstein Blvd. - Suite B
 23rd Street - 'A'
 South Portland, ME 04106

Tel. 207-202-2100 Tel. 207-783-6656

PROJECT NO.	FIELD BOOK	DESIGN	CHKD	DRAWN
02249	847	R/LM	R/LM	MAL

PHASING PLAN	
OF:	ALLAGASH BREWING COMPANY INDUSTRIAL WAY PORTLAND, MAINE
FOR:	50 INDUSTRIAL WAY, LLC 50 INDUSTRIAL WAY PORTLAND, MAINE 04103
DATE	SCALE
05-20-14	1" = 30'
SHEET	C4

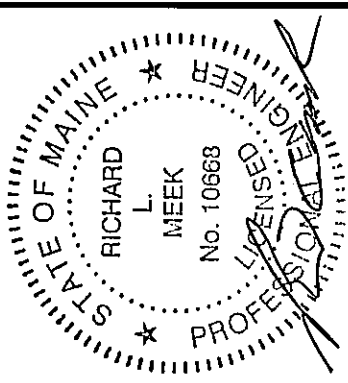
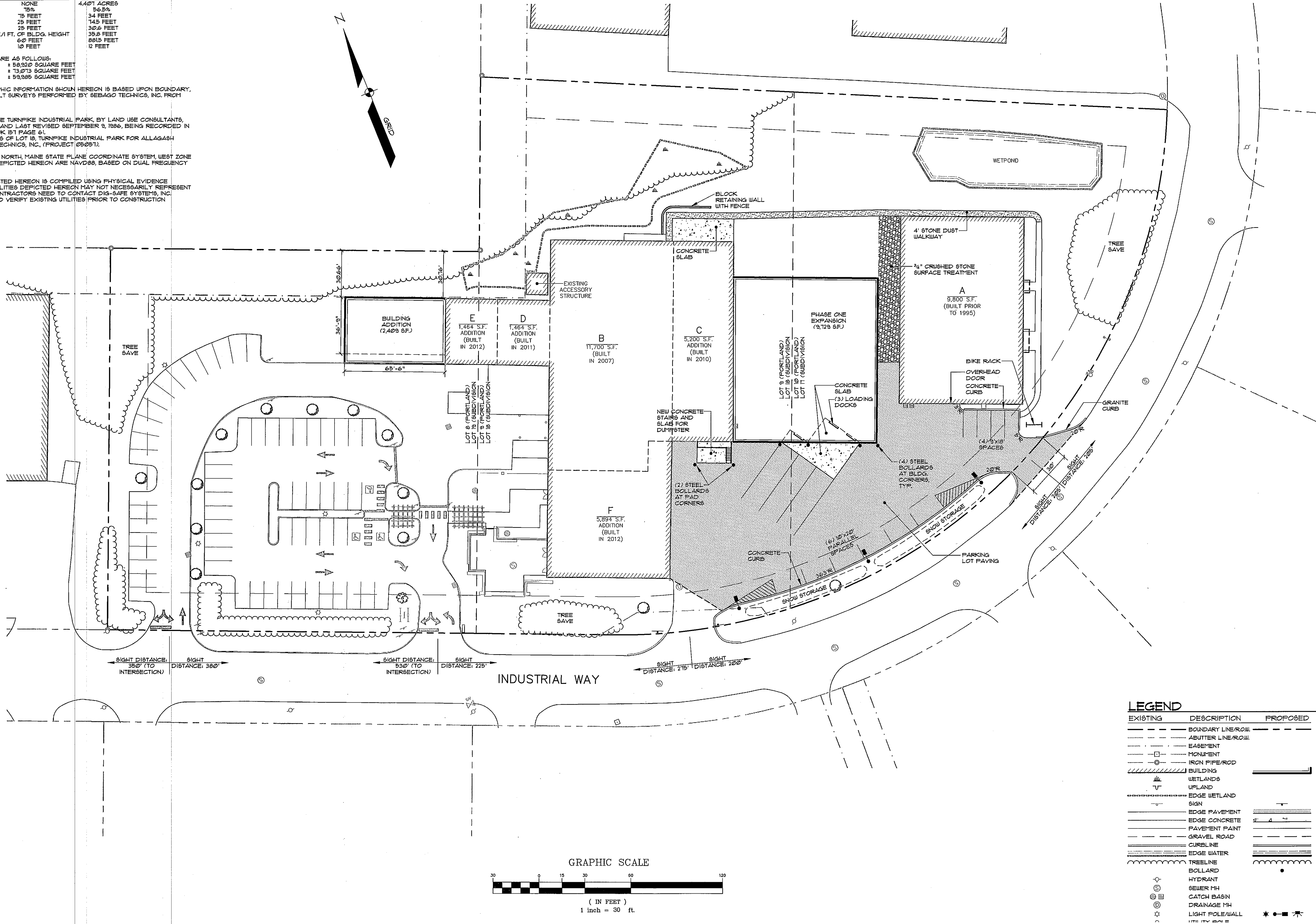


GENERAL NOTES:

1. THE RECORD OWNER OF THE PARCELS IS 50 INDUSTRIAL WAY LLC, 50 INDUSTRIAL WAY, PORTLAND, MAINE 04103 BY DEEDS RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) IN THE FOLLOWING:
LOT 11 BOOK 28161 PAGE 281 DATED NOVEMBER 30, 2011
LOT 18 BOOK 18385 PAGE 348, DATED NOVEMBER 14, 2002
LOT 19 BOOK 28660 PAGE 231, DATED APRIL 26, 2011
2. THE PROPERTY IS SHOWN AS ON THE CITY OF PORTLAND TAX MAP 326 BLOCK B AS LOT 10 (SUBDIVISION LOT 11), LOT 9 (SUBDIVISION LOT 18) AND LOT 8 (SUBDIVISION LOT 19) IS LOCATED IN THE 1M ZONE.
3. SPACE AND BULK CRITERIA FOR THE 1M ZONE ARE AS FOLLOWS:
- | ORDINANCE REQUIREMENT | PROVIDED |
|-----------------------|-----------------------------|
| MIN LOT SIZE | NONE |
| MAX IMPERVIOUS RATIO | 75% |
| MAX BUILDING HEIGHT | 15 FEET |
| MIN SIDE YARD | 25 FEET |
| MIN REAR YARD | 25 FEET |
| MIN FRONT YARD | 1 FT./1 FT. OF BLDG. HEIGHT |
| MIN STREET FRONTAGE | 60 FEET |
| PAVEMENT SETBACK | 10 FEET |
4. TOTAL AREA OF PARCELS ARE AS FOLLOWS:
LOT 11 : 59,320 SQUARE FEET
LOT 18 : 13,073 SQUARE FEET
LOT 19 : 59,995 SQUARE FEET
5. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED UPON BOUNDARY, TOPOGRAPHIC AND AS-BUILT SURVEYS PERFORMED BY SEBAGO TECHNICS, INC. FROM 2002 THROUGH 2014.
6. PLAN REFERENCES:
A. RECORDING PLAT OF THE TURNPIKE INDUSTRIAL PARK, BY LAND USE CONSULTANTS, DATED MARCH 25, 1986 AND LAST REVISED SEPTEMBER 9, 1986, BEING RECORDED IN THE CORD IN PLAT BOOK 871 PAGE 61.
B. SITE PLAN SET OF PLANS OF LOT 18, TURNPIKE INDUSTRIAL PARK FOR ALLAGASH BREWING, BY SEBAGO TECHNICS, INC. (PROJECT 05051).
7. PLAN ORIENTATION IS GRID NORTH, MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE 1802-NAD83, ELEVATIONS DEPICTED HEREON ARE NAVD83, BASED ON DUAL FREQUENCY GPS OBSERVATIONS.
8. UTILITY INFORMATION DEPICTED HEREON IS COMPILED USING PHYSICAL EVIDENCE LOCATED IN THE FIELD. UTILITIES DEPICTED HEREON MAY NOT NECESSARILY REPRESENT ALL EXISTING UTILITIES. CONTRACTORS NEED TO CONTACT DIG-SAFE SYSTEMS, INC. (1-888-DIG-SAFE) AND FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION AND/OR EXCAVATION.

PARKING SUMMARY:

50 INDUSTRIAL WAY	
RETAIL	1,136 S.F. 1 SPACE/200 S.F. (OVER 2,000 S.F.)
OFFICE	1,336 S.F. 1 SPACE/400 S.F.
PRODUCTION	44,100 S.F. 1 SPACE/1,000 S.F.
TOTAL REQUIRED:	64 SPACES
TOTAL PROVIDED:	14 SPACES



REV.	BY	DATE	STATUS
B	RLM	07-11-14	FINAL SITE PLAN SUBMISSION TO CITY
A	RLM	06-08-14	SITE PLAN SUBMISSION TO CITY

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

SEBAGO TECHNICS	75 John Roberts Rd. - Suite 1A Scarborough, ME 04106 Tel: 207-755-5555	DESIGN	CHKD	DRAWN
		RLM	RLM	ML

PROJECT NO. 02249 FIELD BOOK 847

SITE PLAN - PHASE 1	
OF: ALLAGASH BREWING COMPANY	
INDUSTRIAL WAY PORTLAND, MAINE	
FOR: 50 INDUSTRIAL WAY, LLC	
50 INDUSTRIAL WAY PORTLAND, MAINE 04103	
DATE	SCALE
05-20-14	1" = 30'
SHEET	C5.1

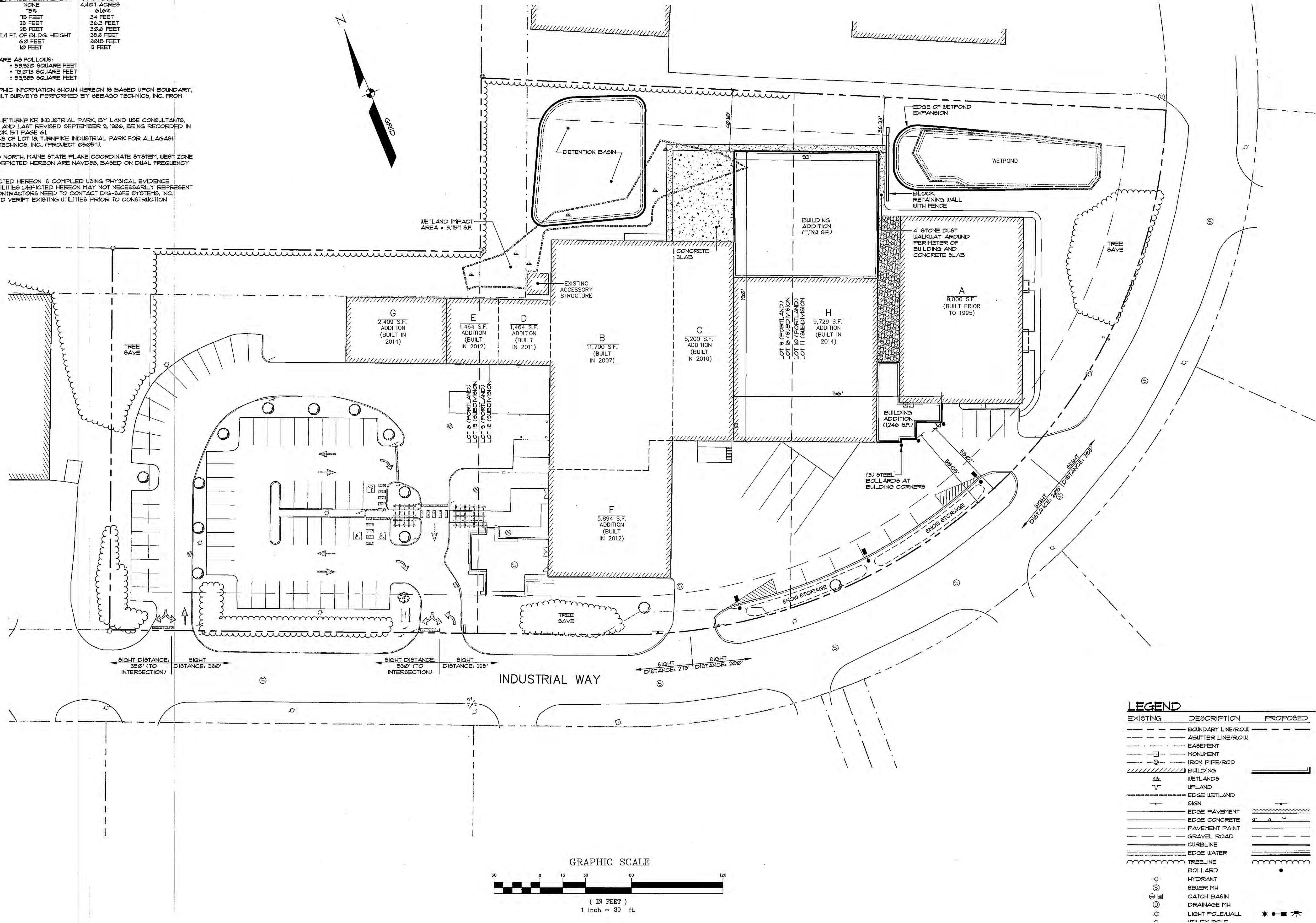
GENERAL NOTES:

- THE RECORD OWNER OF THE PARCELS IS 50 INDUSTRIAL WAY LLC, 50 INDUSTRIAL WAY, PORTLAND, MAINE 04103 BY DEEDS RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CORD) IN THE FOLLOWING:
LOT 11 BOOK 2861 PAGE 291, DATED NOVEMBER 30, 2011
LOT 18 BOOK 18385 PAGE 348, DATED NOVEMBER 14, 2002
LOT 19 BOOK 28660 PAGE 231, DATED APRIL 26, 2011
- THE PROPERTY IS SHOWN AS ON THE CITY OF PORTLAND TAX MAP 326 BLOCK B, AS LOT 10 (SUBDIVISION LOT 11), LOT 9 (SUBDIVISION LOT 18) AND LOT 8 (SUBDIVISION LOT 19) IS LOCATED IN THE 1M ZONE.
- SPACE AND BULK CRITERIA FOR THE 1M ZONE ARE AS FOLLOWS:

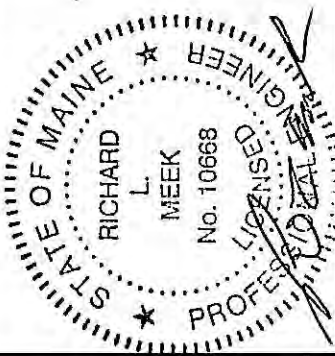
ORDINANCE REQUIREMENT	PROVIDED
MIN. LOT SIZE	NONE
MAX. IMPERVIOUS RATIO	15%
MAX. BUILDING HEIGHT	34 FEET
MIN. SIDE YARD	25 FEET
MIN. REAR YARD	25 FEET
MIN. FRONT YARD	1 FT./1 FT. OF BLDG. HEIGHT
MIN. STREET FRONTAGE	60 FEET
PAVEMENT SETBACK	10 FEET
- TOTAL AREA OF PARCELS ARE AS FOLLOWS:
LOT 11: 58,320 SQUARE FEET
LOT 18: 15,013 SQUARE FEET
LOT 19: 59,395 SQUARE FEET
- BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED UPON BOUNDARY, TOPOGRAPHIC AND AS-BUILT SURVEYS PERFORMED BY SEBAGO TECHNICS, INC. FROM 2002 THROUGH 2014.
- PLAN REFERENCES:
A. RECORDING PLAT OF THE TURNPIKE INDUSTRIAL PARK, BY LAND USE CONSULTANTS, DATED MARCH 25, 1986 AND LAST REVISED SEPTEMBER 9, 1986, BEING RECORDED IN THE CORD IN PLAT BOOK 151 PAGE 61.
B. SITE PLAN SET OF PLANS OF LOT 19, TURNPIKE INDUSTRIAL PARK FOR ALLAGASH BREWING, BY SEBAGO TECHNICS, INC. (PROJECT 050251).
- PLAN ORIENTATION IS GRID NORTH, MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE 1802-NAD83, ELEVATIONS DEPICTED HEREON ARE NAVD83, BASED ON DUAL FREQUENCY GPS OBSERVATIONS.
- UTILITY INFORMATION DEPICTED HEREON IS COMPILED USING PHYSICAL EVIDENCE LOCATED IN THE FIELD. UTILITIES DEPICTED HEREON MAY NOT NECESSARILY REPRESENT ALL EXISTING UTILITIES. CONTRACTORS NEED TO CONTACT DIG-SAFE SYSTEMS, INC. (1-888-DIG-SAFE) AND FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION AND/OR EXCAVATION.

PARKING SUMMARY:

50 INDUSTRIAL WAY		
RETAIL	1,136 SF	1 SPACE/200 SF (OVER 2,000 SF)
OFFICE	1,336 SF	1 SPACE/400 SF
PRODUCTION	53,750 SF	1 SPACE/1,000 SF
TOTAL REQUIRED:		13 SPACES
TOTAL PROVIDED:		14 SPACES



P7

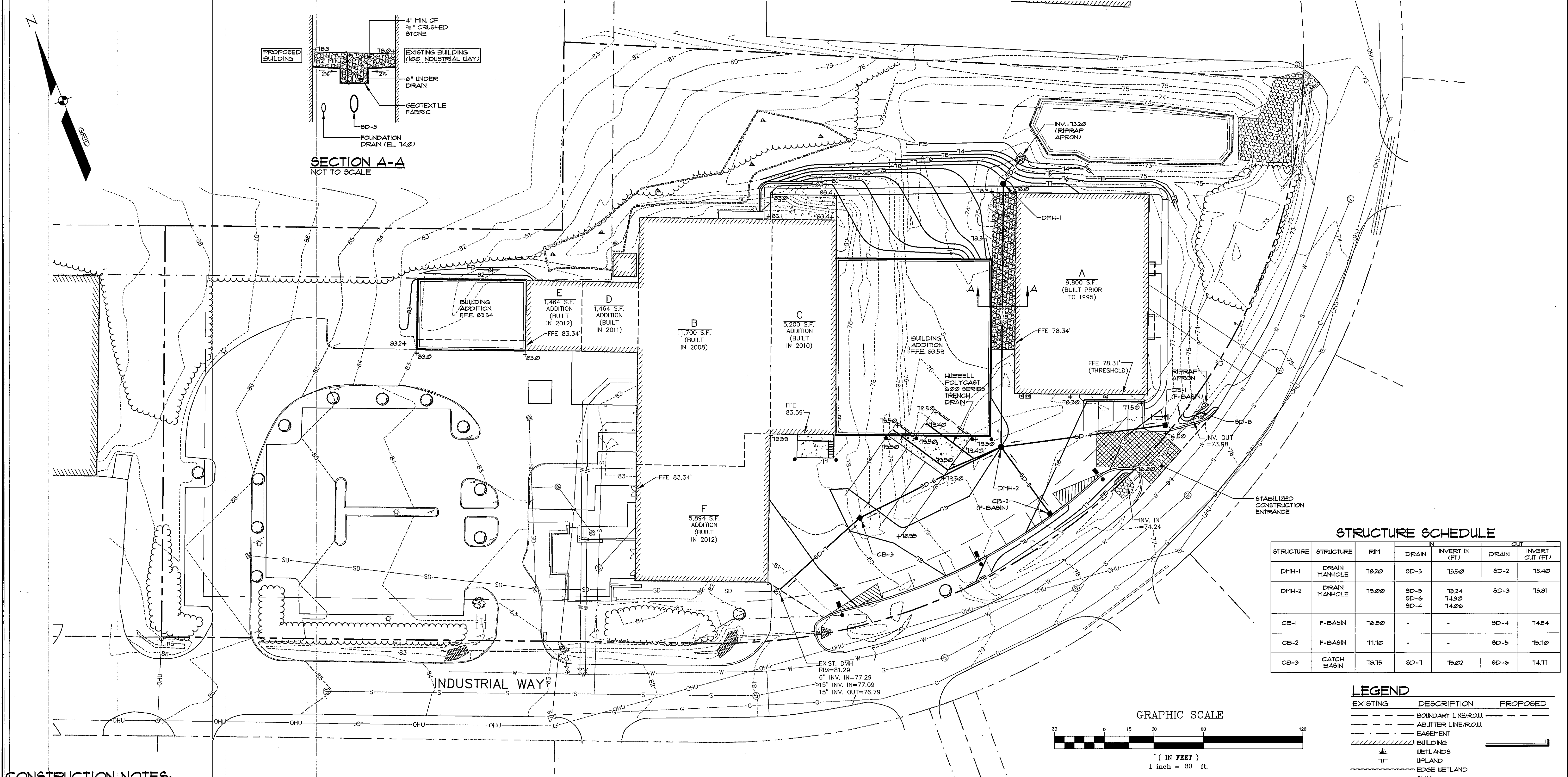


DATE	BY	STATUS	REVISION
07-11-14	RLM	FINAL SITE PLAN SUBMISSION TO CITY	
06-05-14	RLM	SITE PLAN SUBMISSION TO CITY	
	A	REV.	

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SEBAGO TECHNICS WWW.SEAGOTECHNICS.COM 75 John Roberts Rd. - Suite 1A South Portland, ME 04086 Tel. 207-282-2100 250 Goodspeed Rd. - Suite B Lewiston, ME 04240 Tel. 207-683-8686					
PROJECT NO.	FIELD BOOK	DESIGN	CHKD	RLM	MAL
02249	847				

SITE PLAN - PHASE 2	DATE	SCALE
OF: ALLAGASH BREWING COMPANY INDUSTRIAL WAY PORTLAND, MAINE FOR: 50 INDUSTRIAL WAY, LLC 50 INDUSTRIAL WAY PORTLAND, MAINE 04103	05-20-14	1" = 30'
SHEET C5.2		



STRUCTURE SCHEDULE						
STRUCTURE	STRUCTURE	RIM	DRAIN	INVERT IN (FT)	DRAIN	INVERT OUT (FT)
DMH-1	DRAIN MANHOLE	18.20	SD-3	13.50	SD-2	13.40
DMH-2	DRAIN MANHOLE	19.00	SD-5 SD-6 SD-4	15.24 14.30 14.06	SD-3	13.81
CB-1	F-BASIN	16.50	-	-	SD-4	14.54
CB-2	F-BASIN	11.10	-	-	SD-5	15.10
CB-3	CATCH BASIN	18.15	SD-1	15.02	SD-6	14.11

LEGEND		
EXISTING	DESCRIPTION	PROPOSED
---	BOUNDARY LINE/ROW	---
---	ABUTTER LINE/ROW	---
---	EASEMENT	---
	BUILDING	
	WETLANDS	
	UPLAND	
	EDGE WETLAND	
	SIGN	
	EDGE PAVEMENT	
	EDGE CONCRETE	
	PAVEMENT PAINT	
	GRAVEL ROAD	
	CURBLINE	
	TREELINE	
	CONTOURS	
	CHAIN LINK FENCE	
	DECIDUOUS TREE	
	CONIFEROUS TREE	
	BOLLARD	
	GAS	
	GAS GATE VALVE	
	GAS METER	
	WATER	
	WATER GATE VALVE	
	WATER SHUT OFF	
	HYDRANT	
	WATER MANHOLE	
	SEWER	
	SEWER MH	
	STORM DRAIN	
	UNDERDRAIN	
	CATCH BASIN	
	DRAINAGE MH	
	CULVERT	
	OVERHEAD UTILITY	
	UNDERGROUND UTILITY	
	TRANSFORMER PAD	
	LIGHT POLE/WALL	
	UTILITY POLE	
	GUY	
	RIPRAP	
	FILTER BARRIER	

STORM DRAIN SCHEDULE					
PIPE ID	LENGTH (FT)	DIAMETER (IN)	SLOPE (FT/FT)	INVERT IN (FT)	INVERT OUT (FT)
SD-2	16	24	0.0125	13.40	13.20
SD-3	156	24	0.0021	13.81	13.50
SD-4	36	12	0.0025	14.54	14.06
SD-5	46	12	0.010	15.10	15.24
SD-6	32	18	0.005	14.11	14.31
SD-7	63	15	0.018	11.19	15.02
SD-8	8	15	0.005	13.98	13.94

CONSTRUCTION NOTES:

- ALL WORK SHALL CONFORM TO THE APPLICABLE CODES AND ORDINANCES.
- CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIM OR HERSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIM OR HERSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
- CONTRACTOR SHALL NOTIFY ENGINEER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND IN THE FIELD.
- INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND OWNER'S REQUIREMENTS UNLESS SPECIFICALLY OTHERWISE INDICATED OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE ENGINEER.
- CONTRACTOR SHALL CLEAN AND REMOVE DEBRIS AND SEDIMENT DEPOSITED ON PUBLIC STREETS, SIDEWALKS, ADJACENT AREAS, OR OTHER PUBLIC WAYS DUE TO CONSTRUCTION.
- CONTRACTOR SHALL INCORPORATE PROVISIONS AS NECESSARY IN CONSTRUCTION TO PROTECT EXISTING STRUCTURES, PHYSICAL FEATURES, AND MAINTAIN SITE STABILITY DURING CONSTRUCTION. CONTRACTOR SHALL RESTORE ALL AREAS TO ORIGINAL CONDITION AND AS DIRECTED BY DESIGN DRAWINGS.
- SITE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.
- ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH "MAINE EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES" PUBLISHED BY THE CUMBERLAND AND COUNTY SOIL AND WATER CONSERVATION DISTRICT AND MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION, MARCH 1991 OR LATEST EDITION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO POSSESS A COPY OF THE EROSION CONTROL PLAN AT ALL TIMES.
- THE CONTRACTOR IS HEREBY CAUTIONED THAT ALL SITE FEATURES SHOWN HEREON ARE BASED ON FIELD OBSERVATIONS BY THE SURVEYOR AND BY INFORMATION PROVIDED BY UTILITY COMPANIES. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT DIG SAFE (1-888-DIGSAFE) AT LEAST THREE (3) BUT NOT MORE THAN THIRTY (30) DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION TO VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES.
- CONTRACTOR SHALL BE AWARE THAT DIG SAFE ONLY NOTIFIES ITS "MEMBER" UTILITIES ABOUT THE DIG. WHEN NOTIFIED, DIG SAFE WILL ADVISE CONTRACTOR OF MEMBER UTILITIES IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND LOCATING NON-MEMBER UTILITIES DIRECTLY. NON-MEMBER UTILITIES MAY INCLUDE TOWN OR CITY WATER AND SEWER DISTRICTS AND SHALL LOCAL UTILITIES, AS WELL, AS USG PUBLIC WORKS SYSTEMS.
- CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE REQUIREMENTS OF 23 MRSA 336.02-A. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE APPROPRIATE UTILITIES TO OBTAIN AUTHORIZATION PRIOR TO RELOCATION OF ANY EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS. IF A UTILITY CONFLICT ARISES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER, THE MUNICIPALITY AND APPROPRIATE UTILITY COMPANY PRIOR TO PROCEEDING WITH ANY RELOCATION.
- ALL PAVEMENT MARKINGS AND DIRECTIONAL SIGNAGE SHOWN ON THE PLAN SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) STANDARDS.
- ALL PAVEMENT JOINTS SHALL BE SAUCUT PRIOR TO PAVING TO PROVIDE A DURABLE AND UNIFORM JOINT.
- NO HOLES, TRENCHES OR STRUCTURES SHALL BE LEFT OPEN OVERNIGHT IN ANY EXCAVATION ACCESSIBLE TO THE PUBLIC OR IN PUBLIC RIGHTS-OF-WAY.
- ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY SHALL REQUIRE A M.D.O.T. PERMIT AS WELL AS PERMITS FROM THE TOWN AS APPLICABLE.
- IMMEDIATELY UPON COMPLETION OF CUTS/FILLS, THE CONTRACTOR SHALL STABILIZE DISTURBED AREAS IN ACCORDANCE WITH EROSION CONTROL NOTES AND AS SPECIFIED ON PLANS.
- THE CONTRACTOR SHALL BE FULLY AND SOLELY RESPONSIBLE FOR THE REMOVAL, REPLACEMENT AND RECTIFICATION OF ALL DAMAGED AND DEFECTIVE MATERIAL AND WORKMANSHIP IN CONNECTION WITH THE CONTRACT WORK. THE CONTRACTOR SHALL REPLACE OR REPAIR AS DIRECTED BY THE OWNER ALL SUCH DAMAGED OR DEFECTIVE MATERIALS WHICH APPEAR WITHIN A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION.
- ALL WORK PERFORMED BY THE GENERAL CONTRACTOR AND/OR TRADE SUBCONTRACTOR SHALL CONFORM TO THE REQUIREMENTS OF LOCAL, STATE OR FEDERAL LAWS, AS WELL AS ANY OTHER GOVERNING REQUIREMENTS, WHETHER OR NOT SPECIFIED ON THE DRAWINGS.
- WHERE THE TERM "APPROVED, EQUAL", "OTHER APPROVED", "EQUAL TO", "ACCEPTABLE" OR OTHER GENERAL QUALIFYING TERMS ARE USED IN THESE NOTES, IT SHALL BE UNDERSTOOD THAT REFERENCE IS MADE TO THE RULING AND JUDGMENT OF SEBAGO TECHNICS, INC.
- THE GENERAL CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTION FOR THE WORK UNTIL TURNED OVER TO THE OWNER.
- THE GENERAL CONTRACTOR SHALL MAINTAIN A CURRENT AND COMPLETE SET OF CONSTRUCTION DRAWINGS ON SITE DURING ALL PHASES OF CONSTRUCTION FOR USE OF ALL TRADES.
- THE CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ANY CHANGES AND DEVIATION OF APPROVED PLANS NOT AUTHORIZED BY THE ARCHITECT/ENGINEER AND/OR CLIENT/OWNER.
- DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. ANY MODIFICATION TO SUIT FIELD DIMENSION AND CONDITION SHALL BE SUBMITTED TO THE ENGINEER AND THE CITY OF PORTLAND FOR REVIEW AND APPROVAL PRIOR TO ANY WORK.
- BEFORE THE FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT AND MATERIALS, REPAIR OR REPLACE PRIVATE OR PUBLIC PROPERTY WHICH MAY HAVE BEEN DAMAGED OR DESTROYED DURING CONSTRUCTION, CLEAN THE AREAS WITHIN AND ADJACENT TO THE PROJECT WHICH HAVE BEEN OBSTRUCTED BY HIS/HER OPERATIONS, AND LEAVE THE PROJECT AREA NEAT AND PRESENTABLE.
- ALL SUBSURFACE UTILITY LINES SHOWN HEREON ARE BASED SOLELY ON THE FIELD LOCATION OF VISIBLE STRUCTURES, SMH'S, CB'S, HYDRANTS, ETC. IN CONJUNCTION WITH DESIGN AND/OR AS-BUILT PLANS SUPPLIED TO SEBAGO TECHNICS INC. BY OTHERS. PRIOR TO ANY CONSTRUCTION, EXCAVATION, TEST BORINGS, DRILLING, ETC., DIG SAFE MUST BE NOTIFIED AND A SITE IDENTIFICATION NUMBER ALONG WITH A SAFE TO DIG DATE OBTAINED. THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE LOCATION, DEPTH AND MATERIAL OF ALL SUBSURFACE UTILITY LINES SHOWN HEREON AND ANY AND ALL OTHERS LOCATED ON SITE WITHIN THE CONSTRUCTION AREA.
- AN APPROVED SPRINKLER SYSTEM SHALL BE INSTALLED PER NFPA 13 AND MONITORED BY AN APPROVED CENTRAL MONITORING STATION.
- ALL STORM DRAIN PIPES SHALL BE SMOOTH BORE HDPE UNLESS OTHERWISE NOTED.
- ALL TREE SAVE AREAS MUST BE IDENTIFIED IN THE FIELD PRIOR TO SITE WORK.
- PROTECTIVE MEASURES WILL BE REQUIRED IN TREE SAVE AREAS IN ORDER TO PREVENT THE STORAGE OF MATERIALS AND EQUIPMENT.
- IN THE CASE THAT TREE SAVE AREAS ARE AFFECTED DURING CONSTRUCTION, ADDITIONAL TREES/SHRUBS MAY BE NEEDED.



REV.	BY	DATE	STATUS	FINAL SITE PLAN SUBMISSION TO CITY	SITE PLAN SUBMISSION TO CITY
B	RLM	07-11-14			
A	RLM	06-05-14			

SEBAGO TECHNICS
75 John Roberts Rd., Suite 1A
South Portland, ME 04106
Tel. 207-202-2100

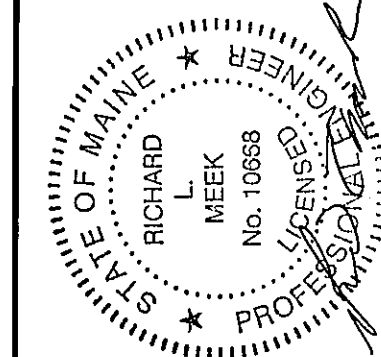
PROJECT NO. 10224960-1
FIELD BOOK 847
DESIGN CHND
DRAWN RLM
MAL

OF: **ALLAGASH BREWING COMPANY**
INDUSTRIAL WAY
PORTLAND, MAINE

FOR: **50 INDUSTRIAL WAY, LLC**
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

DATE: 05-20-14
SCALE: 1" = 30'

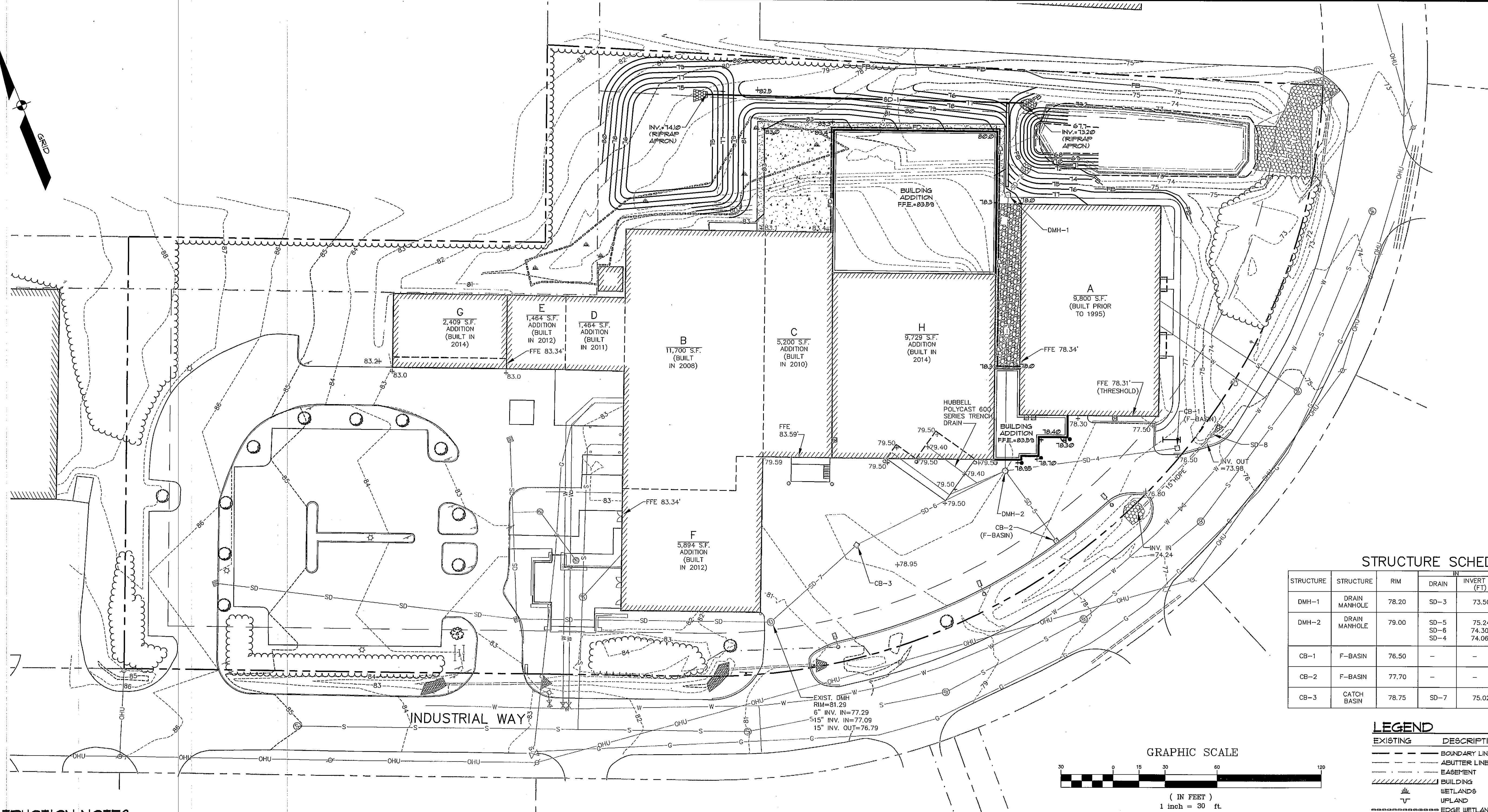
SHEET C6.1



DATE	07-11-14	FINAL SITE PLAN SUBMISSION TO CITY
REV.	06-03-14	SITE PLAN SUBMISSION TO CITY
BY	DATE	STATUS
REV.	DATE	STATUS

PROJECT NO.	02249	DESIGN	CHOK	DRAWN	MAL
NO.	02249	DESIGN	CHOK	DRAWN	MAL

DATE	06-20-14	SCALE	1" = 30'
SHEET	C6.2		



STRUCTURE SCHEDULE

STRUCTURE	STRUCTURE	RIM	INVERT IN (FT)	INVERT OUT (FT)
DMH-1	DRAIN MANHOLE	78.20	SD-3 73.50	SD-2 73.40
DMH-2	DRAIN MANHOLE	79.00	SD-5 75.24 SD-6 74.30 SD-4 74.06	SD-3 73.81
CB-1	F-BASIN	76.50	-	SD-4 74.54
CB-2	F-BASIN	77.70	-	SD-5 75.70
CB-3	CATCH BASIN	78.75	SD-7 75.02	SD-6 74.77

LEGEND

EXISTING	DESCRIPTION	PROPOSED
---	BOUNDARY LINE/ROW	---
---	ABUTTER LINE/ROW	---
---	EASEMENT	---
---	BUILDING	---
---	WETLANDS	---
---	UPLAND	---
---	EDGE PAVEMENT	---
---	EDGE CONCRETE	---
---	PAVEMENT PAINT	---
---	GRAVEL PAINT	---
---	CURBLINE	---
---	TREELINE	---
---	CONTOURS	---
---	CHAIN LINK FENCE	---
---	DECIDUOUS TREE	---
---	CONIFEROUS TREE	---
---	BOLLARD	---
---	GAS	---
---	GAS GATE VALVE	---
---	GAS METER	---
---	WATER	---
---	WATER GATE VALVE	---
---	WATER SHUT OFF	---
---	HYDRANT	---
---	WATER MANHOLE	---
---	SEWER	---
---	SEWER MH	---
---	STORM DRAIN	---
---	UNDERDRAIN	---
---	CATCH BASIN	---
---	DRAINAGE MH	---
---	CULVERT	---
---	OVERHEAD UTILITY	---
---	UNDERGROUND UTILITY	---
---	TRANSFORMER PAD	---
---	LIGHT POLE/WALL	---
---	UTILITY POLE	---
---	GUY	---
---	RIFRAP	---
---	FILTER BARRIER	---

STORM DRAIN SCHEDULE

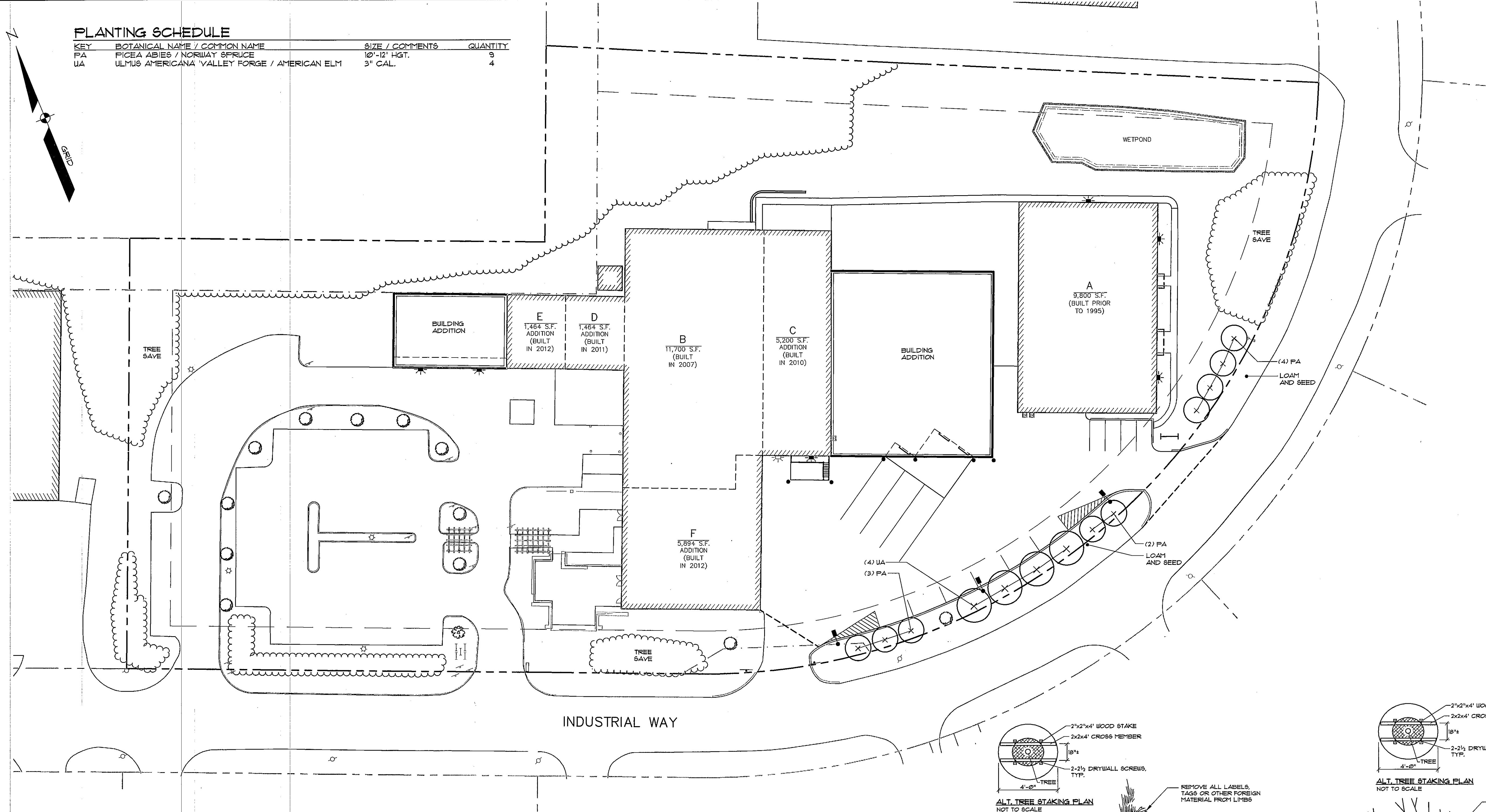
PIPE ID	LENGTH (FT)	DIAMETER (IN)	SLOPE (FT/FT)	INVERT IN (FT)	INVERT OUT (FT)
SD-1	103	15	0.0005	74.10	73.20
SD-2	16	24	0.0125	73.40	73.20
SD-3	156	24	0.002	73.81	73.50
SD-4	96	12	0.005	74.54	74.06
SD-5	46	12	0.010	75.70	75.24
SD-6	92	18	0.005	74.77	74.31
SD-7	63	15	0.028	77.79	75.02
SD-8	8	15	0.005	73.98	73.94

CONSTRUCTION NOTES:

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- INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND OWNER'S REQUIREMENTS UNLESS SPECIFICALLY OTHERWISE INDICATED OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
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- CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE REQUIREMENTS OF 23 MRS.A 3360-A. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE APPROPRIATE UTILITIES TO OBTAIN AUTHORIZATION PRIOR TO RELOCATION OF ANY EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS. IF A UTILITY CONFLICT ARISES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER, THE MUNICIPALITY AND APPROPRIATE UTILITY COMPANY PRIOR TO PROCEEDING WITH ANY RELOCATION.
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- WHERE THE TERMS "APPROVED EQUAL", "OTHER APPROVED", "EQUAL TO", "ACCEPTABLE" OR OTHER GENERAL QUALIFYING TERMS ARE USED IN THESE NOTES, IT SHALL BE UNDERSTOOD THAT REFERENCE IS MADE TO THE RULING AND JUDGMENT OF SEBAGO TECHNICS, INC.
- THE GENERAL CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTION FOR THE WORK UNTIL TURNED OVER TO THE OWNER.
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- DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. ANY MODIFICATION TO SUIT FIELD DIMENSION AND CONDITION SHALL BE SUBMITTED TO THE ENGINEER AND THE CITY OF PORTLAND FOR REVIEW AND APPROVAL PRIOR TO ANY WORK.
- BEFORE THE FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT AND MATERIALS, REPAIR OR REPLACE PRIVATE OR PUBLIC PROPERTY WHICH MAY HAVE BEEN DAMAGED OR DESTROYED DURING CONSTRUCTION, CLEAN THE AREAS WITHIN AND ADJACENT TO THE PROJECT WHICH HAVE BEEN OBSTRUCTED BY HIS/HER OPERATIONS, AND LEAVE THE PROJECT AREA NEAT AND PRESENTABLE.
- ALL SUBSURFACE UTILITY LINES SHOWN HEREON ARE BASED SOLELY ON THE FIELD LOCATION OF VISIBLE STRUCTURES, S.M.'S, CB'S, HYDRANTS, ETC. IN CONJUNCTION WITH DESIGN AND/OR AS-BUILT PLANS SUPPLIED TO SEBAGO TECHNICS INC. BY OTHERS. PRIOR TO ANY CONSTRUCTION, EXCAVATION, TEST BORINGS, DRILLING, ETC. DIG SAFE MUST BE NOTIFIED AND A SITE IDENTIFICATION NUMBER ALONG WITH A SAFE TO DIG DATE OBTAINED. THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE LOCATION, DEPTH AND MATERIAL OF ALL SUBSURFACE UTILITY LINES SHOWN HEREON AND ANY AND ALL OTHERS LOCATED ON SITE WITHIN THE CONSTRUCTION AREA.
- AN APPROVED SPRINKLER SYSTEM SHALL BE INSTALLED PER NFPA 13 AND MONITORED BY AN APPROVED CENTRAL MONITORING STATION.
- ALL STORM DRAIN PIPES SHALL BE SMOOTH BORE HDPE UNLESS OTHERWISE NOTED.
- ALL TREE SAVE AREAS MUST BE IDENTIFIED IN THE FIELD PRIOR TO SITE WORK.
- PROTECTIVE MEASURES WILL BE REQUIRED IN TREE SAVE AREAS IN ORDER TO PREVENT THE STORAGE OF MATERIALS AND EQUIPMENT.
- IN THE CASE THAT TREE SAVE AREAS ARE AFFECTED DURING CONSTRUCTION, ADDITIONAL TREES/SHRUBS MAY BE NEEDED.

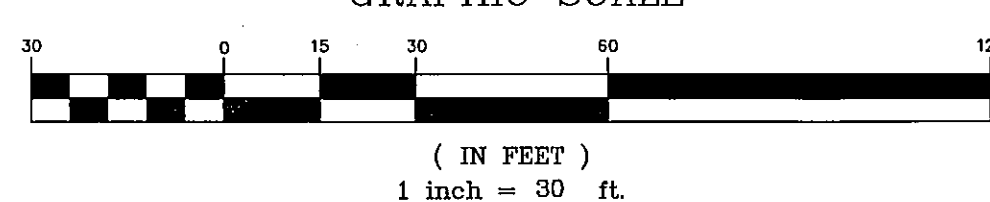
PLANTING SCHEDULE

KEY	BOTANICAL NAME / COMMON NAME	SIZE / COMMENTS	QUANTITY
FA	FICIA ABIES / NORWAY SPRUCE	10'-12' HGT.	3
UA	ULMUS AMERICANA / VALLEY FORGE / AMERICAN ELM	3" CAL.	4



INDUSTRIAL WAY

GRAPHIC SCALE



NOTES:

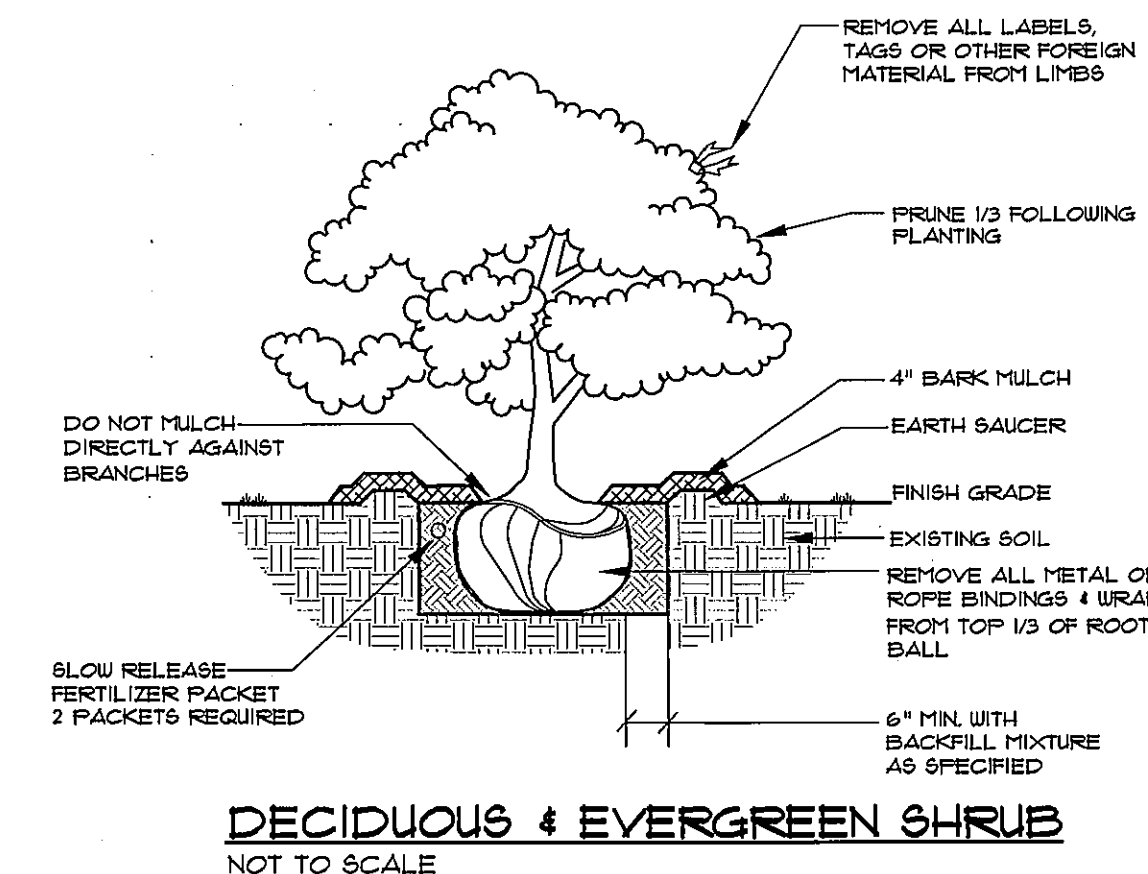
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LIGHTING LEGEND

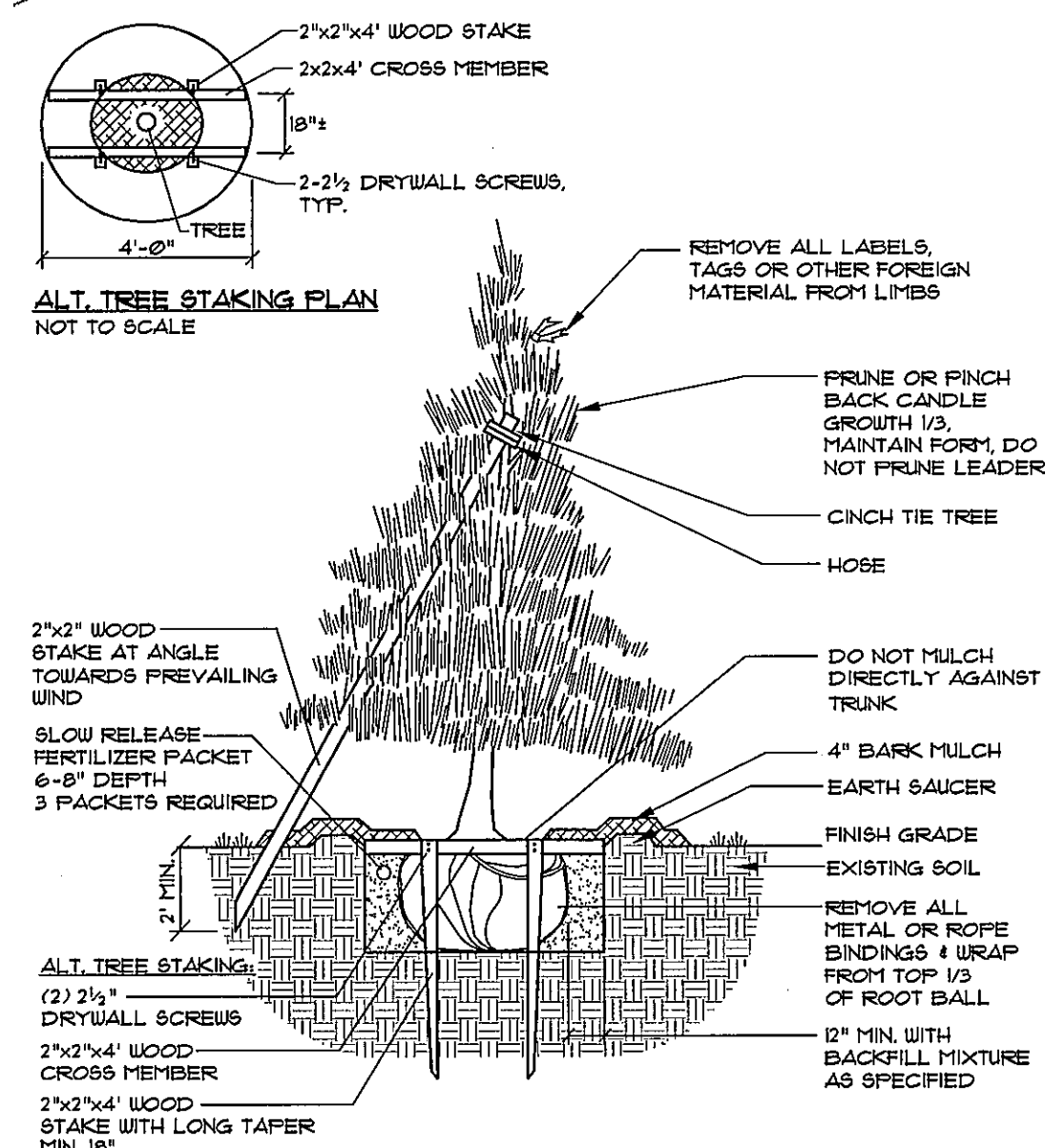
- KIM LIGHTING - 1A/EKG-401-4/2000HP8120/DB-F/H8/SQ_POLE
- RAAB

LEGEND

EXISTING	DESCRIPTION	PROPOSED
---	BOUNDARY LINE/ROW	---
---	ABUTTER LINE/ROW	---
---	SETBACK	---
---	EASEMENT	---
---	BUILDING	---
---	SIGN	---
---	EDGE PAVEMENT	---
---	EDGE CONCRETE	---
---	CURBLINE	---
---	TREELINE	---
○	DECIDUOUS TREE	○
●	CONIFEROUS TREE	●
---	MULCH LINE	---
---	SCREENING FENCE	---
○	BOLLARD	○
☆	LIGHT POLE/WALL	☆
○	UTILITY POLE	○

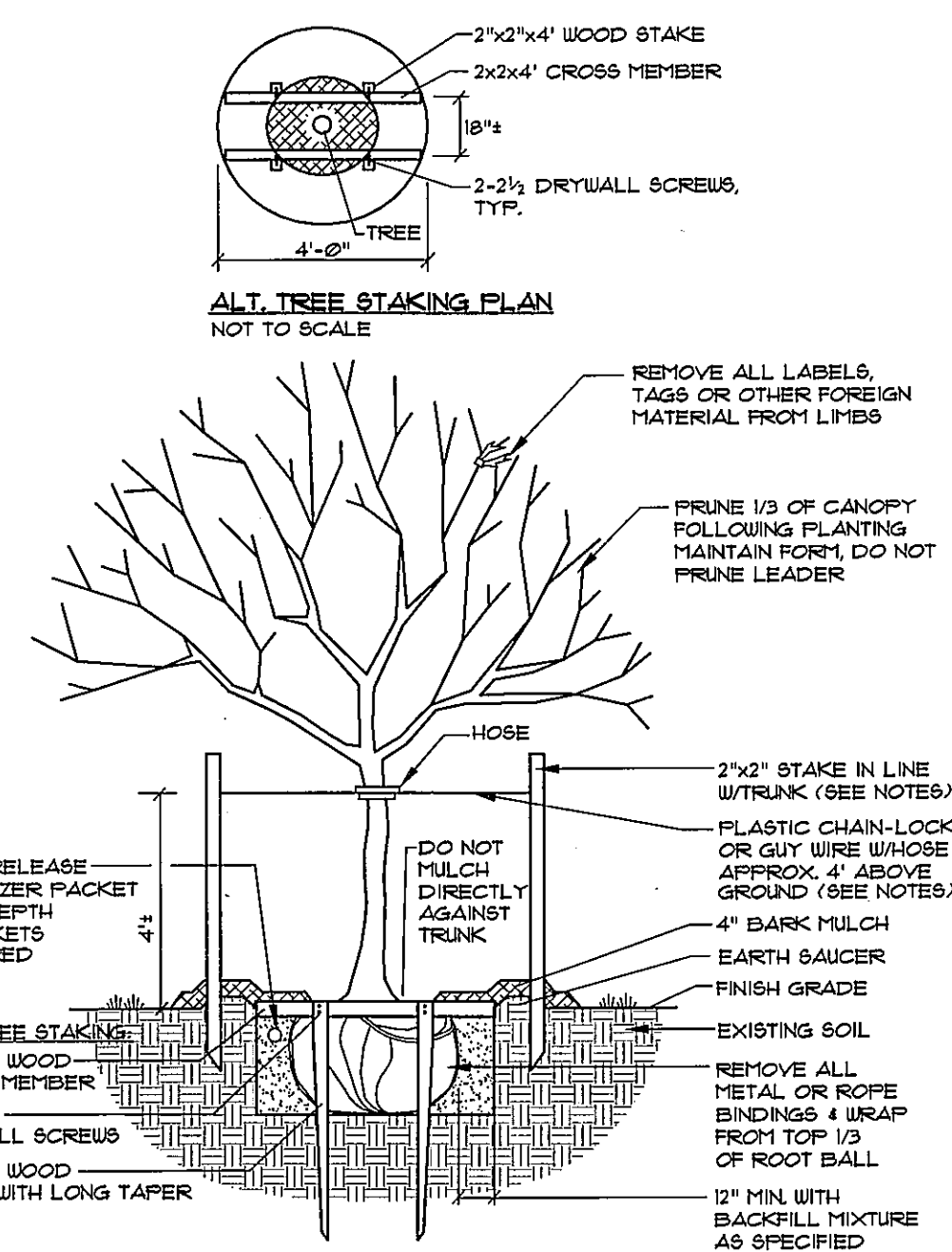


DECIDUOUS & EVERGREEN SHRUB
NOT TO SCALE



- NOTES:
- INSTALL STAKES AND GUYS TO TREES IF THE FOLLOWING APPLY:
 - THE TREE IS OF SUBSTANTIAL SIZE.
 - THE PLANTING LOCATION IS EXTREMELY WINDY, AS ON OPEN UNDEVELOPED SITES.
 - IF STAKES AND GUYS ARE REQUIRED, REMOVE AFTER ONE YEAR TIME.

DECIDUOUS TREES
EVERGREEN TREES
NOT TO SCALE



- NOTES:
- INSTALL STAKES AND GUYS TO TREES IF THE FOLLOWING APPLY:
 - THE TREE IS OF SUBSTANTIAL SIZE.
 - THE PLANTING LOCATION IS EXTREMELY WINDY, AS ON OPEN UNDEVELOPED SITES.
 - IF STAKES AND GUYS ARE REQUIRED, REMOVE AFTER ONE YEAR TIME.

DECIDUOUS TREES
NOT TO SCALE

P10

SEBAGO
TECHNICALS

PROJECT NO.	FIELD BOOK	DESIGN	CHD	DRAWN
02249	847	WTC	WTC	MAL

LANDSCAPE AND LIGHTING PLAN - PHASE 1

OF:
ALLAGASH BREWING COMPANY
INDUSTRIAL WAY
PORTLAND, MAINE

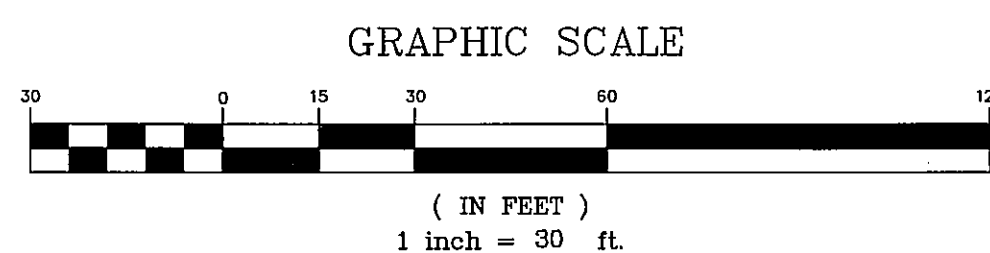
FOR:
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

DATE	SCALE
05-20-14	1" = 30'

SHEET C7.1

02249L-PHASE 1.dwg TAB:L-PH1

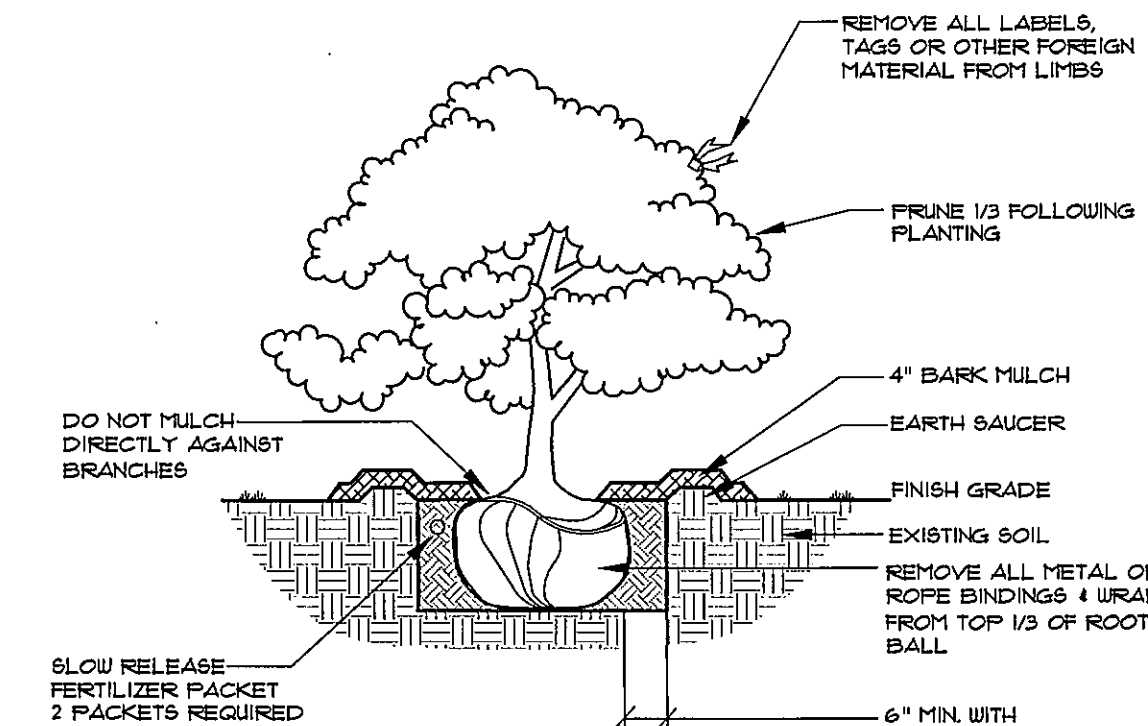
KEY	BOTANICAL NAME / COMMON NAME	SIZE / COMMENTS	QUANTITY
PA	PICEA ABIES / NORWAY SPRUCE	10'-12' HGT.	4
UA	ULMUS AMERICANA 'VALLEY FORGE / AMERICAN ELM	3" CAL.	4



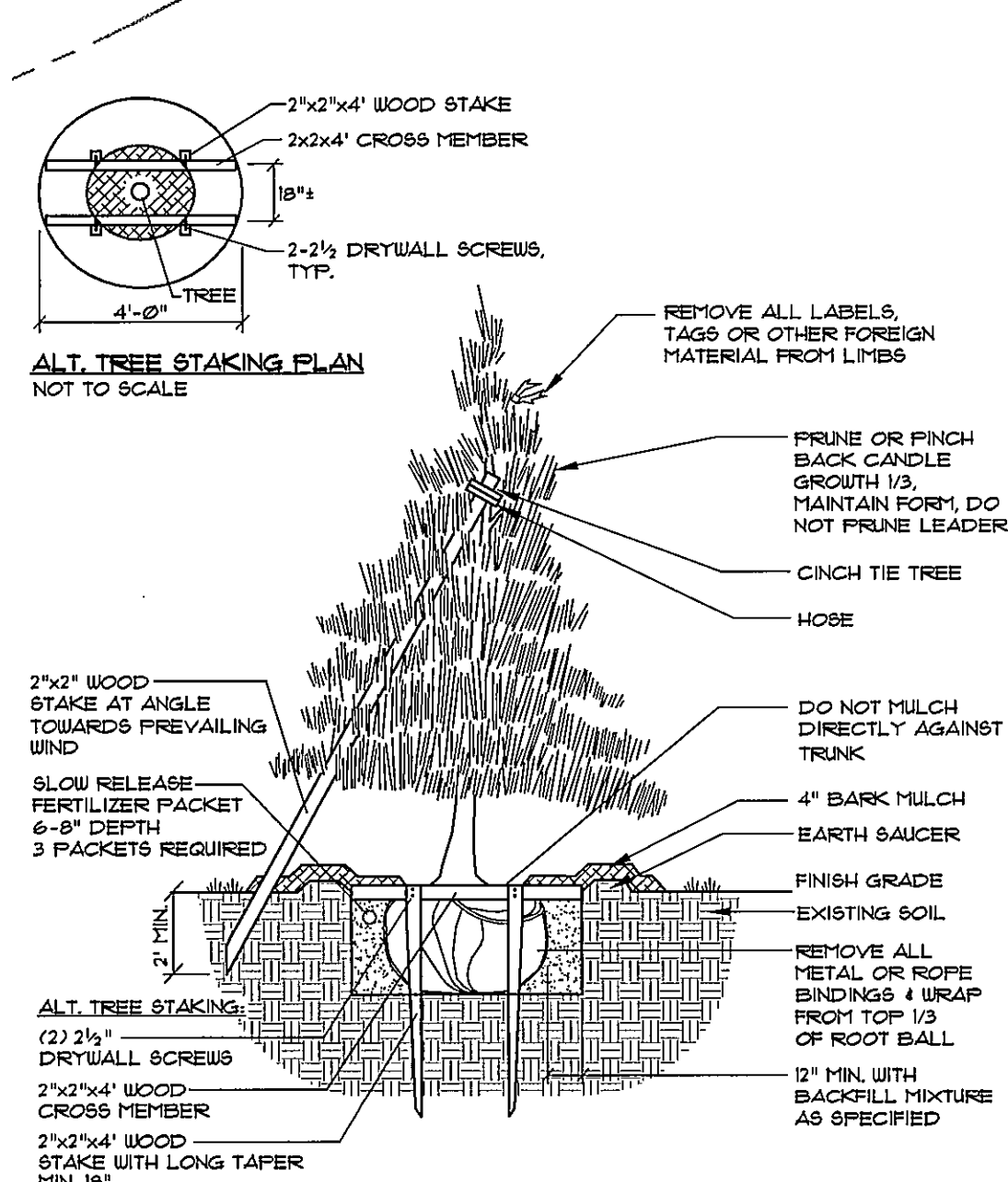
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 RAAB

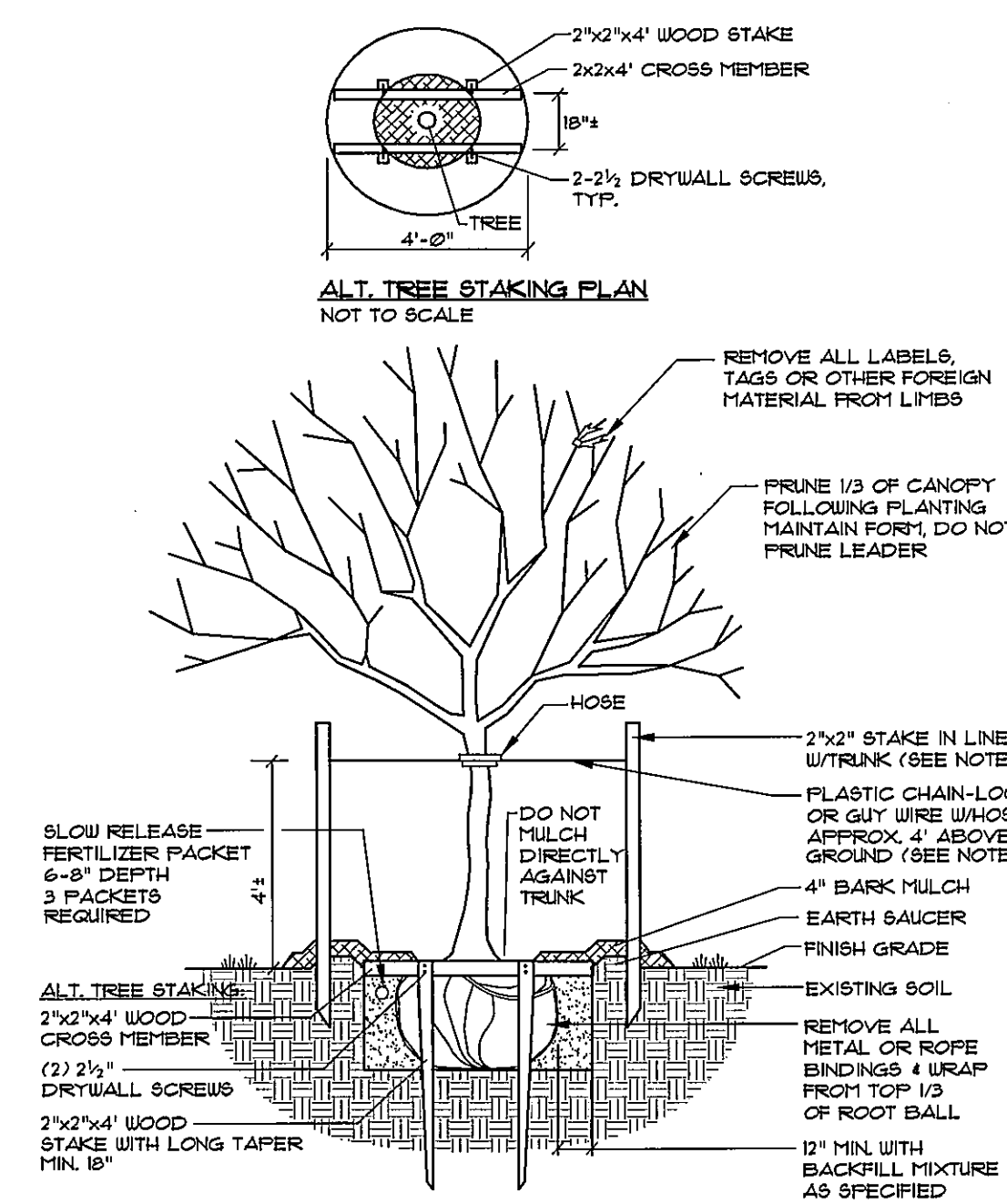
EXISTING	DESCRIPTION	PROPOSED
	BOUNDARY LINE/ROW	
	ABUTTER LINE/ROW	
	SETBACK	
	EASEMENT	
	BUILDING	
	SIGN	
	EDGE PAVEMENT	
	EDGE CONCRETE	
	CURBLINE	
	TREELINE	
	DECIDUOUS TREE	
	CONIFEROUS TREE	
	MULCH LINE	
	SCREENING FENCE	
	BOLLARD	
	LIGHT POLE/WALL	
	UTILITY POLE	



DECIDUOUS & EVERGREEN SHRUB
NOT TO SCALE



DECIDUOUS TREES	UNDER 2" CALIFER OR UNDER 8' IN HEIGHT
EVERGREEN TREES	1'-0" IN HEIGHT & UNDER
NOT TO SCALE	



DECIDUOUS TREES 2" TO 4" CALIPER
NOT TO SCALE

EROSION CONTROL MEASURES

PRE-CONSTRUCTION PHASE

PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, SEDIMENT BARRIERS (SILT FENCE) WILL BE STAKED/INSTALLED ACROSS THE SLOPE(S) ON THE CONTOUR AT OR JUST BELOW THE LIMITS OF CLEARING OR GRUBBING, AND/OR JUST ABOVE ANY ADJACENT WATERCOURSE TO PROTECT AGAINST CONSTRUCTION RELATED EROSION. THE PLACEMENT OF SEDIMENT BARRIERS SHALL BE COMPLETED IN ACCORDANCE WITH GUIDELINES ESTABLISHED IN BEST MANAGEMENT PRACTICES AND IN ACCORDANCE WITH THIS EROSION CONTROL PLAN AND DETAILS IN THIS PLAN SET. THIS NETWORK IS TO BE MAINTAINED BY THE CONTRACTOR UNTIL ALL EXPOSED SLOPES HAVE AT LEAST 85%-90% VIGOROUS PERENNIAL VEGETATIVE COVER TO PREVENT EROSION. TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER PERMANENT STABILIZATION IS ATTAINED.

PRIOR TO ANY CLEARING OR GRUBBING, A CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED AT THE INTERSECTION OF THE PROPOSED ENTRANCES AND EXISTING ROADWAY TO AVOID TRACKING OF MUD, DUST AND DEBRIS FROM THE SITE.

PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL PREPARE A DETAILED SCHEDULE AND MARKED UP PLAN INDICATING AREAS AND COMPONENTS OF THE WORK AND KEY DATES SHOWING DATE OF DISTURBANCE AND COMPLETION OF THE WORK. THE CONTRACTOR SHALL SCHEDULE A FREE-CONSTRUCTION MEETING WITH THE MUNICIPAL STAFF. THREE COPIES OF THE SCHEDULE AND MARKED UP PLAN SHALL BE PROVIDED TO THE MUNICIPALITY THREE DAYS PRIOR TO THE SCHEDULED PRE-CONSTRUCTION MEETING. SPECIAL ATTENTION SHALL BE GIVEN TO THE 14 DAY LIMIT OF DISTURBANCE IN THE SCHEDULE ADDRESSING TEMPORARY AND PERMANENT VEGETATION MEASURES.

CONSTRUCTION AND POST-CONSTRUCTION PHASE

AREAS UNDERGOING ACTUAL CONSTRUCTION SHALL ONLY EXPOSE THAT AMOUNT OF MINERAL SOIL NECESSARY FOR PROGRESSIVE AND EFFICIENT CONSTRUCTION. AN AREA CONSIDERED OPEN IS ANY AREA NOT STABILIZED WITH PAVEMENT, VEGETATION, MULCHING OR OTHER EROSION CONTROL MEASURES. OPEN AREAS SHALL BE ANCHORED WITH TEMPORARY EROSION CONTROL, AS SHOWN ON THE DESIGN PLANS AND AS DESCRIBED WITHIN THIS EROSION CONTROL PLAN WITHIN 14 DAYS OF DISTURBANCE. AREAS LOCATED WITHIN 100' OF STREAMS SHALL BE ANCHORED WITH TEMPORARY EROSION CONTROL WITHIN SEVEN (7) DAYS. REFER TO WINTER EROSION CONTROL NOTES FOR THE TREATMENT OF OPEN AREAS AFTER OCTOBER 1ST OF THE CONSTRUCTION YEAR.

THE CONTRACTOR MUST INSTALL ANY ADDED MEASURES WHICH MAY BE NECESSARY TO CONTROL EROSION/SEDIMENTATION FROM THE SITE DEPENDENT UPON THE ACTUAL SITE AND WEATHER CONDITIONS. CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED, IN ORDER TO MINIMIZE AREAS WITHOUT EROSION CONTROL PROTECTION.

EROSION CONTROL APPLICATIONS & MEASURES

THE PLACEMENT OF EROSION CONTROL MEASURES SHALL BE COMPLETED IN ACCORDANCE WITH GUIDELINES ESTABLISHED IN BEST MANAGEMENT PRACTICES AND IN ACCORDANCE WITH THE EROSION CONTROL PLAN AND DETAILS IN THE PLAN SET.

1. TEMPORARY MULCHING:

ALL DISTURBED AREAS SHALL BE MULCHED WITH MATERIALS SPECIFIED BELOW PRIOR TO ANY STORM EVENT. ALL DISTURBED AREAS NOT FINAL GRADED WITHIN 14 DAYS SHALL BE MULCHED. ALSO, AREAS WHICH HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDED, SHALL BE MULCHED IMMEDIATELY FOLLOWING SEEDING. EROSION CONTROL BLANKETS ARE RECOMMENDED TO BE USED AT THE BASE OF GRASSED WATERWAYS AND ON SLOPES GREATER THAN 15%. MULCH ANCHORING SHOULD BE USED ON SLOPES GREATER THAN 5% AFTER SEPTEMBER 5TH OF THE CONSTRUCTION YEAR (SEE WINTER EROSION CONTROL NOTES).

HAY OR STRAW SHALL BE APPLIED AT A RATE OF 15 LBS/1000 SF. (15 TONS PER ACRE).

EROSION CONTROL MIX SHALL BE PLACED EVENLY AND MUST PROVIDE 100% SOIL COVERAGE. EROSION CONTROL MIX SHALL BE APPLIED SUCH THAT THE THICKNESS ON SLOPES BETWEEN 3:1 OR LESS IS 12 INCH PER 20 FEET OF SLOPE UP TO 100 FEET. THE THICKNESS ON SLOPES BETWEEN 3:1 AND 2:1 SHALL BE 4 INCHES PLUS 1/2 INCH PER 20 FEET OF SLOPE UP TO 100 FEET. THIS SHALL NOT BE USED ON SLOPES GREATER THAN 2:1.

EROSION CONTROL BLANKET SHALL BE INSTALLED SUCH THAT CONTINUOUS CONTACT BETWEEN THE MAT AND THE SOIL IS OBTAINED. INSTALL BLANKETS AND STAPLE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

2. SOIL STOCKPILES:

STOCKPILES OF SOIL OR SUBSOIL SHALL BE MULCHED WITH HAY OR STRAW AT A RATE OF 15 LBS/1000 SF. (15 TONS PER ACRE) WITHIN 24 HOURS OF EXPOSURE. STOCKPILES SHALL BE COVERED WITH A MINIMUM OF 85%-90% OF AREAS VEGETATED WITH VIGOROUS GROWTH. RE-ESTABLISHED PRIOR TO ANY RAINFALL, ANY SOIL STOCKPILE WILL NOT BE PLACED (EVEN COVERED WITH HAY OR STRAW) WITHIN 100 FEET FROM ANY NATURAL RESOURCES.

3. NATURAL RESOURCES PROTECTION:

ANY AREAS WITHIN 100 FEET FROM ANY NATURAL RESOURCES, IF NOT STABILIZED WITH A MINIMUM OF 75% MATURE VEGETATION CATCH, SHALL BE TEMPORARILY MULCHED AS DESCRIBED IN PART 4 OF THIS SECTION WITHIN 14 DAYS OF EXPOSURE OR PRIOR TO ANY STORM EVENT. SEDIMENT BARRIERS (AS DESCRIBED IN PART 4. OF THIS SECTION) SHALL BE PLACED BETWEEN ANY NATURAL RESOURCE AND THE DISTURBED AREA. PROJECTS CROSSING THE NATURAL RESOURCE SHALL BE PROTECTED A MINIMUM DISTANCE OF 100 FEET ON EITHER SIDE FROM THE RESOURCE.

4. SEDIMENT BARRIERS:

PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, SEDIMENT BARRIERS SHALL BE STAKED ACROSS THE SLOPE(S) ON THE CONTOUR AT OR JUST BELOW THE LIMITS OF CLEARING OR GRUBBING, AND/OR JUST ABOVE ANY ADJACENT PROPERTY LINE OR WATERCOURSE TO PROTECT AGAINST CONSTRUCTION RELATED EROSION. SEDIMENT BARRIERS SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL ALL EXPOSED SLOPES HAVE AT LEAST 85%-90% VIGOROUS PERENNIAL VEGETATIVE COVER TO PREVENT EROSION.

SILT FENCE SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. THE EFFECTIVE HEIGHT OF THE FENCE SHALL NOT EXCEED 36 INCHES. IT IS RECOMMENDED THAT SILT FENCE BE REMOVED BY CUTTING THE FENCE MATERIALS AT GROUND LEVEL, SO AS TO AVOID ADDITIONAL SOIL DISTURBANCE.

HAY BALES SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. BALES SHALL BE WIRE-BOUND OR STRING-TIED AND THESE BINDINGS MUST REMAIN PARALLEL WITH THE GROUND SURFACE DURING INSTALLATION TO PREVENT DETERIORATION OF THE BINDINGS. BALES SHALL BE INSTALLED WITHIN A MINIMUM 4 INCH DEEP TRENCH LINE WITH ENDS OF ADJACENT BALES TIGHTLY ADJUTING ONE ANOTHER.

EROSION CONTROL MIX SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. THE MIX SHALL CONSIST PRIMARILY OF ORGANIC MATERIAL AND CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4 INCHES IN DIAMETER. THE MIX COMPOSITION SHALL MEET THE STANDARDS DESCRIBED WITHIN THE MDEP BEST MANAGEMENT PRACTICES. NO TRENCHING IS REQUIRED FOR INSTALLATION OF THIS BARRIER.

CONTINUOUS CONTAINED BERM SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. THIS SEDIMENT BARRIER IS EROSION CONTROL MIX PLACED WITHIN A SYNTHETIC TUBULAR NETTING AND PERFORMS AS A STURDY SEDIMENT BARRIER THAT WORKS WELL ON HARD GROUND SUCH AS FROZEN CONDITIONS, TRAVELED AREAS OR PAVEMENT. NO TRENCHING IS REQUIRED FOR INSTALLATION OF THIS BARRIER.

5. TEMPORARY CHECK DAMS:

SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. CHECK DAMS ARE TO BE PLACED WITHIN DITCHES/ SWALES AS SPECIFIED ON THE DESIGN PLANS IMMEDIATELY AFTER FINAL GRADING. CHECK DAMS SHALL BE 2 FEET HIGH. TEMPORARY CHECK DAMS MAY BE REMOVED ONLY AFTER THE ROADWAYS ARE PAVED AND THE VEGETATED SWALE ARE ESTABLISHED WITH AT LEAST 85%-90% OF VIGOROUS PERENNIAL GROWTH. THE AREA BENEATH THE CHECK DAM MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER REMOVAL OF THE CHECK DAM.

STONE CHECK DAMS SHOULD BE CONSTRUCTED OF 2 TO 3 INCH STONE AND PLACED SUCH THAT COMPLETE COVERAGE OF THE SWALE IS OBTAINED AND THAT THE CENTER OF THE DAM IS 6 INCHES LOWER THAN THE OUTER EDGES.

HAY BALE CHECK DAMS: WE DO NOT RECOMMEND THE USE OF HAY BALES AS CHECK DAMS.

MANUFACTURED CHECK DAMS: MANUFACTURED CHECK DAMS AS SPECIFIED IN THE DETAIL ON THE PLANS, MAY BE USED IF AUTHORIZED BY THE PROPER LOCAL, STATE OR FEDERAL REGULATING AGENCIES. THESE UNITS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

6. STORMDRAIN INLET PROTECTION:

INLET PROTECTION SHALL BE PLACED AROUND A STORMDRAIN DROP INLET OR CURB INLET PRIOR TO PERMANENT STABILIZATION OF THE IMMEDIATE AND UPSTREAM DISTURBED AREAS. THEY SHALL BE CONSTRUCTED IN A MANNER THAT WILL FACILITATE CLEAN-OUT AND DISPOSAL OF TRAPPED SEDIMENTS AND MINIMIZE INTERFERENCE WITH CONSTRUCTION ACTIVITIES. ANY RESULTANT PONDING OF WATER FROM THE PROTECTION METHOD MUST NOT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES.

HAY BALE DROP INLET PROTECTION: WE DO NOT RECOMMEND THE USE OF HAY BALES AS INLET PROTECTION.

CONCRETE BLOCK AND STONE INLET SEDIMENT FILTER (DROP OR CURB INLET) SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. THE HEIGHT OF THE CONCRETE BLOCK BARRIER CAN VARY BUT MUST BE BETWEEN 12 AND 24 INCHES TALL. A MINIMUM OF 1 INCH CRUSHED STONE SHALL BE USED.

MANUFACTURED SEDIMENT BARRIERS AND FILTER (DROP OR CURB INLET): MANUFACTURED FILTERS, AS SPECIFIED IN THE DETAIL ON THE PLANS, MAY BE USED IF INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

7. STABILIZED CONSTRUCTION ENTRANCE/EXIT:

PRIOR TO CLEARING AND/OR GRUBBING THE SITE A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED WHEREVER TRAFFIC WILL EXIT THE SITE ONTO A PAVED ROADWAY IN ORDER TO PREVENT TRACKING OF MUD, DUST AND DEBRIS FROM THE CONSTRUCTION SITE ONTO PUBLIC ROADWAYS. THE ENTRANCES AND ADJACENT ROADWAY AREAS SHALL BE PERIODICALLY SUPT OR WASHED TO FURTHER MINIMIZE THE TRACKING OF MUD, DUST OR DEBRIS FROM THE CONSTRUCTION AREA. STABILIZED CONSTRUCTION EXITS SHALL BE CONSTRUCTED IN AREAS SPECIFIED ON THE PLANS AND AS DETAILED ON THE PLANS.

8. DUST CONTROL:

DUST CONTROL DURING CONSTRUCTION SHALL BE ACHIEVED BY THE USE OF A WATERING TRUCK TO PERIODICALLY SPRINKLE THE EXPOSED ROADWAY AREAS AS NECESSARY TO REDUCE DUST DURING THE DRY MONTHS. APPLYING OTHER DUST CONTROL PRODUCTS SUCH AS CALCULATED OR OTHER MANUFACTURED PRODUCTS ARE ALLOWED IF AUTHORIZED BY THE PROPER LOCAL, STATE AND/OR FEDERAL REGULATING AGENCIES. HOWEVER, IT IS THE CONTRACTOR'S ULTIMATE RESPONSIBILITY TO MITIGATE DUST AND SOIL LOSS FROM THE SITE.

9. TRENCH DEWATERING AND TEMPORARY STREAM DIVERSION:

WATER FROM CONSTRUCTION TRENCH DEWATERING OR TEMPORARY STREAM DIVERSION WILL PASS FIRST THROUGH A FILTER BAG OR SECONDARY STRUCTURE PRIOR TO DISCHARGE. THE FILTER BAG OR SECONDARY STRUCTURE SHALL BE SELECTED TO AVOID FLOODING AND SEDIMENT DISCHARGES TO A PROTECTED RESOURCE. IN NO CASE SHALL THE FILTER BAG OR CONTAINMENT STRUCTURE BE LOCATED WITHIN 100 FEET OF A PROTECTED NATURAL RESOURCE.

10. TEMPORARY VEGETATION:

TEMPORARY VEGETATION SHALL BE APPLIED TO DISTURBED AREAS THAT WILL NOT RECEIVE FINAL GRADING FOR PERIODS UP TO 12 MONTHS. THIS PROCEDURE SHOULD BE USED EXTENSIVELY IN AREAS ADJACENT TO NATURAL RESOURCES. SEEDBED PREPARATION AND APPLICATION OF SEED SHALL BE CONDUCTED AS INDICATED IN THE PERMANENT VEGETATION SECTION OF THIS NARRATIVE. SPECIFIC SEEDS (FAST GROWING AND SHORT LIVING) SHALL BE SELECTED FROM THE MAINE EROSION AND SEDIMENT CONTROL BMP MANUAL DATED 3/2003 OR LATER. ALTERNATIVE EROSION CONTROL MEASURES SHOULD BE USED IF SEEDING CAN NOT BE DONE BEFORE SEPTEMBER 15TH OF THE CONSTRUCTION YEAR.

II. PERMANENT VEGETATION:

REVEGETATION MEASURES SHALL COMMENCE IMMEDIATELY UPON COMPLETION OF FINAL GRADING OF AREAS TO BE LOAMED AND SEEDED. THE APPLICATION OF SEED SHALL BE CONDUCTED BETWEEN APRIL 1ST AND OCTOBER 1ST OF THE CONSTRUCTION YEAR. PLEASE REFER TO THE WINTER EROSION CONTROL NOTES FOR MORE DETAIL. REVEGETATION MEASURES SHALL CONSIST OF THE FOLLOWING:

SEEDBED PREPARATION:

A. FOUR (4) INCHES OF LOAM SHALL BE SPREAD OVER DISTURBED AREAS AND SMOOTHED TO A UNIFORM SURFACE. LOAM SHALL BE FREE OF SUBSOIL, CLAY LUMPS, STONES AND OTHER OBJECTS OVER 2 INCHES OR LARGER IN ANY DIMENSION, AND WITHOUT WEEDS, ROOTS OR OTHER OBJECTIONABLE MATERIAL.

B. SOILS TESTS SHALL BE TAKEN AT THE TIME OF SOIL STRIPPING TO DETERMINE FERTILIZATION REQUIREMENTS. SOILS TESTS SHALL BE TAKEN PROMPTLY AS TO NOT INTERFERE WITH THE 14-DAY LIMIT ON SOIL EXPOSURE. BASED UPON TEST RESULTS, SOIL AMENDMENTS SHALL BE INCORPORATED INTO THE SOIL PRIOR TO FINAL SEEDING. IN LIEU OF SOIL TESTS, SOIL AMENDMENTS MAY BE APPLIED AS FOLLOWS:

ITEM	APPLICATION RATE
10-20-20 FERTILIZER (N-P2O5-K2O OR EQUAL)	18.4 LBS/1000 SF.
GROUND LIME/STONE (50% CALCULI + MAGNESIUM OXIDE)	138 LBS/1000 SF.

C. WORK LIME AND FERTILIZER INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH PROPER EQUIPMENT. WORK THE AREA TO FIRM THE SEEDBED EXCEPT ON CLAY OR SILTY SOILS OR COARSE SAND.

APPLICATION OF SEED:

A. SEEDING SHALL BE CONDUCTED BETWEEN APRIL 1ST AND OCTOBER 1ST OF THE CONSTRUCTION YEAR. GENERALLY A SEED MIXTURE MAY BE APPLIED AS FOLLOWS: (MDEP SEED MIX 2 IS DISPLAYED)

SEED TYPE	APPLICATION RATE
CREeping RED FESCUE	0.46 LBS/1000 SF. (20 LBS/ACRE)
RECTOP	0.09 LBS/1000 SF. (7 LBS/ACRE)
TALL FESCUE	0.46 LBS/1000 SF. (20 LBS/ACRE)
TOTAL	0.91 LBS/1000 SF. (42 LBS/ACRE)

NOTE: A SPECIFIC SEED MIXTURE SHOULD BE CHOSEN TO MATCH THE SOILS CONDITION OF THE SITE. VARIOUS AGENCIES CAN RECOMMEND SEED MIXTURES. MDEP RECOMMENDED SEED MIXTURES ARE IN THE EROSION AND SEDIMENT CONTROL BMP MANUAL DATED 3/2003 OR LATER.

B. HYDROSEEDING: SHALL BE CONDUCTED ON PREPARED AREAS WITH SLOPES LESS THAN 2:1. LIME AND FERTILIZER MAY BE APPLIED SIMULTANEOUSLY WITH THE SEED. RECOMMENDED SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.

C. MULCHING: SHALL COMMENCE IMMEDIATELY AFTER SEED IS APPLIED. REFER TO THE TEMPORARY MULCHING SECTION OF THIS NARRATIVE FOR DETAILS.

SODDING: FOLLOWING SEEDBED PREPARATION SOD CAN BE APPLIED IN LIEU OF SEEDING IN AREAS WHERE IMMEDIATE VEGETATION IS MOST BENEFICIAL SUCH AS DITCHES, AROUND STORMWATER DROP INLETS AND AREAS OF AESTHETIC VALUE. SOD SHOULD BE LAID AT RIGHT ANGLES TO THE DIRECTION OF FLOW. SOD SHOULD BE ROLLED OR TAMPED DOWN TO EVEN OUT THE JOINTS ONCE LAID DOWN. WHERE FLOW IS PREVALENT THE SOD MUST BE PROPERLY ANCHORED DOWN. IRRIGATE THE SOD IMMEDIATELY AFTER INSTALLATION. IN MOST CASES, SOD CAN BE ESTABLISHED BETWEEN APRIL 1ST AND NOVEMBER 15TH OF THE CONSTRUCTION YEAR. HOWEVER, REFER TO THE WINTER EROSION CONTROL NOTES FOR ANY ACTIVITIES AFTER OCTOBER 1ST.

CONSTRUCTION SCHEDULE

SITE IMPROVEMENTS WILL MOST LIKELY BEGIN IN SUMMER 2014 DEPENDING UPON FINAL PROJECT APPROVAL. THE FOLLOWING SCHEDULE IS ANTICIPATED FOR CONSTRUCTION.

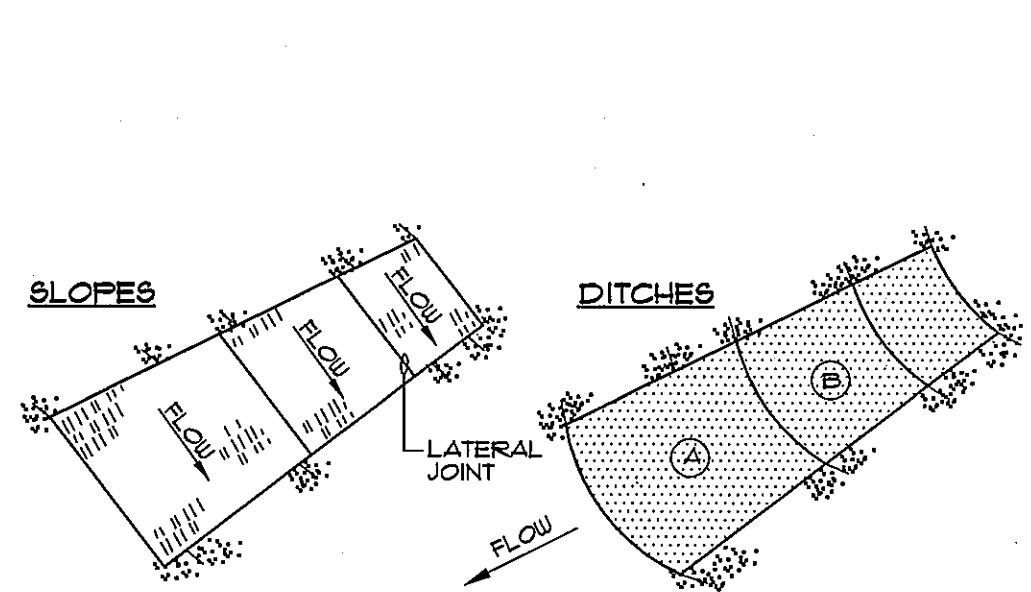
SCHEDULE:

1. ESTIMATED CONSTRUCTION TIME:	1 MONTHS
2. EROSION CONTROL MEASURES PLACED:	WEEK 1
3. SITE CLEARING AND GRUBBING:	WEEK 1 - WEEK 2
4. CONSTRUCTION OF PARKING LOT SUBBASE:	WEEK 2 - WEEK 4
5. STORMWATER MANAGEMENT AREA CONSTRUCTION:	WEEK 2 - WEEK 5
6. UTILITY IMPROVEMENTS AND SITE CONSTRUCTION:	WEEK 4 - WEEK 28
7. BUILDING ADDITION CONSTRUCTION:	WEEK 4 - WEEK 28
8. MULCH SPREAD FOR WINTER EROSION CONTROL:	OCTOBER 15, 2014
9. START FINAL SEEDING ON PREPARED AREAS: (DURING GROWING SEASON)	SPRING, 2015
10. BIWEEKLY MONITORING OF VEGETATIVE GROWTH:	MAY, 2015
11. RE-SEEDING OF AREAS, IF NEEDED:	MAY, 2015
12. REMOVAL OF EROSION CONTROL DEVICES:	UPON FINAL PROJECT COMPLETION
* DATES ARE SUBJECT TO CHANGE DEPENDING ON CONSTRUCTION PROGRESS.	

INSPECTIONS/MONITORING:

MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION CYCLE. AFTER EACH RAINFALL, SNOW STORM OR PERIOD OF THAWING AND RUNOFF, THE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES. THE CONTRACTOR SHALL PERFORM REPAIRS AS NEEDED TO ALLOW CONTINUED PROPER FUNCTIONING OF THE EROSION CONTROL MEASURE. THE CONTRACTOR SHALL PROVIDE THE NECESSARY REGULATING AGENCIES WITH WRITTEN DOCUMENTATION DESCRIBING DATES OF INSPECTIONS AND NECESSARY FOLLOW-UP WORK TO MAINTAIN EROSION CONTROL MEASURES MEETING THE REQUIREMENTS OF THIS PLAN.

FOLLOWING THE TEMPORARY AND/OR FINAL SEEDING, THE CONTRACTOR SHALL INSPECT THE WORK AREA SEMIMONTHLY UNTIL THE SEEDINGS HAVE BEEN ESTABLISHED. ESTABLISHED IS DEFINED AS A MINIMUM OF 85%-90% OF AREAS VEGETATED WITH VIGOROUS GROWTH. RESEEDING SHALL BE CARRIED OUT BY THE CONTRACTOR WITH FOLLOW-UP INSPECTIONS IN THE EVENT OF ANY FAILURES UNTIL VEGETATION IS ADEQUATELY ESTABLISHED.



NOTES:

- BURY THE TOP END OF THE MESH MATERIAL IN A 6" TRENCH AND BACKFILL, AND TAMP TRENCHING SECURE END WITH STAPLES AT 6" SPACING. 4" DOWN FROM EXPOSED END.
- FLOW DIRECTION JOINTS TO HAVE UPPER END OF LOWER STRIP BURIED WITH UPPER LAYERS OVERLAPPED 4" AND STAPLED. OVERLAP 8" OVER A.
- LATERAL JOINTS TO HAVE 4" OVERLAP OF STRIPS. STAPLE 18" ON CENTER.
- STAPLE OUTSIDE LATERAL EDGE 2" ON CENTER.
- WIRE STAPLES TO BE MIN. OF #11 WIRE 6" LONG AND 1-1/2" WIDE.
- USE NORTH AMERICAN GREEN D8 150 OR APPROVED EQUAL.

EROSION CONTROL BLANKET
NOT TO SCALE

WINTER EROSION CONTROL MEASURES

THE WINTER CONSTRUCTION PERIOD IS FROM NOVEMBER 1 THROUGH APRIL 15. IF THE CONSTRUCTION SITE IS NOT STABILIZED WITH PAVEMENT, A ROAD GRAVEL BASE, 75% MATURE VEGETATION COVER OR RIPRAP BY NOVEMBER 15 THEN THE SITE NEEDS TO BE PROTECTED WITH OVER-WINTER STABILIZATION. AN AREA CONSIDERED OPEN IS ANY AREA NOT STABILIZED WITH PAVEMENT, VEGETATION, MULCHING, EROSION CONTROL MATS, RIPRAP OR GRAVEL BASE ON A ROAD.

WINTER EXCAVATION AND EARTHWORK SHALL BE COMPLETED SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME. LIMIT THE EXPOSED AREA TO THOSE AREAS IN WHICH WORK IS EXPECTED TO BE UNDER TAKEN DURING THE PROCEEDING 15 DAYS AND THAT CAN BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT.

ALL AREAS SHALL BE CONSIDERED TO BE DENIED UNTIL THE SUBBASE GRAVEL IS INSTALLED IN ROADWAY AREAS OR THE AREAS OF FUTURE LOAM AND SEED HAVE BEEN LOAMED, SEEDED AND MULCHED. HAY AND STRAW MULCH RATE SHALL BE A MINIMUM OF 150 LBS/1000 SF. (3 TONS/ACRE) AND SHALL BE PROPERLY ANCHORED.

THE CONTRACTOR MUST INSTALL ANY ADDED MEASURES WHICH MAY BE NECESSARY TO CONTROL EROSION/SEDIMENTATION FROM THE SITE DEPENDENT UPON THE ACTUAL SITE AND WEATHER CONDITIONS. CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED, IN ORDER TO MINIMIZE AREAS WITHOUT EROSION CONTROL PROTECTION.

1. SOIL STOCKPILES:

STOCKPILES OF SOIL OR SUBSOIL WILL BE MULCHED FOR OVER WINTER PROTECTION WITH HAY OR STRAW AT TWICE THE NORMAL RATE OR AT 150 LBS/1000 SF. (3 TONS PER ACRE) OR WITH A FOUR-INCH LAYER OF WOOD WASTE EROSION CONTROL MIX. THIS WILL BE DONE WITHIN 24 HOURS OF STOCKING AND RE-ESTABLISHED PRIOR TO ANY RAINFALL OR SNOWFALL. ANY SOIL STOCKPILE WILL NOT BE PLACED (EVEN COVERED WITH HAY OR STRAW) WITHIN 100 FEET FROM ANY NATURAL RESOURCES.

2. NATURAL RESOURCES PROTECTION:

ANY AREAS WITHIN 100 FEET FROM ANY NATURAL RESOURCES, IF NOT STABILIZED WITH A MINIMUM OF 75% MATURE VEGETATION CATCH, SHALL BE MULCHED BY DECEMBER 1 AND ANCHORED WITH PLASTIC NETTING OR PROTECTED WITH EROSION CONTROL MATS. DURING WINTER CONSTRUCTION, A DOUBLE LINE OF SEDIMENT BARRIERS (IE SILT FENCE BACKED WITH HAY BALES OR EROSION CONTROL MIX) WILL BE PLACED BETWEEN ANY NATURAL RESOURCE AND THE DISTURBED AREA. PROJECTS CROSSING THE NATURAL RESOURCE SHALL BE PROTECTED A MINIMUM DISTANCE OF 100 FEET ON EITHER SIDE FROM THE RESOURCE. EXISTING PROJECTS NOT STABILIZED BY DECEMBER 1 SHALL BE PROTECTED WITH THE SECOND LINE OF SEDIMENT BARRIER TO ENSURE FUNCTIONALITY DURING THE SPRING THAW AND RAINS.

3. SEDIMENT BARRIERS:

DURING FROZEN CONDITIONS, SEDIMENT BARRIERS SHALL CONSIST OF WOOD WASTE FILTER BERRS AS FROZEN SOIL PREVENTS THE PROPER INSTALLATION OF HAY BALES AND SEDIMENT SILT FENCES.

4. MULCHING:

ALL AREAS SHALL BE CONSIDERED TO BE DENIED UNTIL THE SUBBASE GRAVEL IS INSTALLED IN ROADWAY AREAS OR THE AREAS OF FUTURE LOAM AND SEED HAVE BEEN LOAMED, SEEDED AND MULCHED. HAY AND STRAW MULCH SHALL BE APPLIED AT A RATE OF 150 LBS PER 1000 SQUARE FEET OR 3 TONS/ACRE (TWICE THE NORMAL ACCEPTED RATE OF 75-LBS/1000 SF. OR 15 TONS/ACRE) AND SHALL BE PROPERLY ANCHORED. MULCH SHALL NOT BE SPREAD ON TOP OF SNOW. THE SNOW WILL BE REMOVED DOWN TO A ONE-INCH DEPTH OR LESS PRIOR TO EACH DAY OF FINAL GRADING. THE AREA WILL 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 WITH STRAW OR HAY, AT A RATE OF 150 LB. PER 1000 SQUARE FEET, (3 TONS/ACRE) AND ADEQUATELY ANCHORED THAT GROUND SURFACE IS NOT VISIBLE THOUGH THE MULCH.

BETWEEN THE DATES OF NOVEMBER 15 AND APRIL 15, ALL MULCH SHALL BE ANCHORED BY EITHER PEG LINE, MULCH NETTING, ASPHALT EMULSION CHEMICAL, TRACK OR WOOD CELLULOSE FIBER WHEN GROUND SURFACE IS NOT VISIBLE THOUGH THE MULCH THEN COVER IS SUFFICIENT. AFTER NOVEMBER 1ST, MULCH AND ANCHORING OF ALL BARE SOIL SHALL OCCUR AT THE END OF EACH FINAL GRADING WORK DAY.

5. MULCHING ON SLOPES AND DITCHES

SLOPES SHALL NOT BE LEFT EXPOSED FOR ANY EXTENDED TIME OF WORK SUSPENSION UNLESS FULLY MULCHED AND ANCHORED WITH PEG AND NETTING OR WITH EROSION CONTROL BLANKETS. MULCHING SHALL BE APPLIED AT A RATE OF 230 LBS/1000 SF. ON ALL SLOPES GREATER THAN 8%. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPES EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GREATER THAN 8%. EROSION CONTROL BLANKETS SHALL BE USED IN LIEU OF MULCH IN ALL DRAINAGE WAYS WITH SLOPES 8% OR GREATER. EROSION CONTROL MIX CAN BE USED TO SUBSTITUTE EROSION CONTROL BLANKETS ON ALL SLOPES EXCEPT DITCHES.

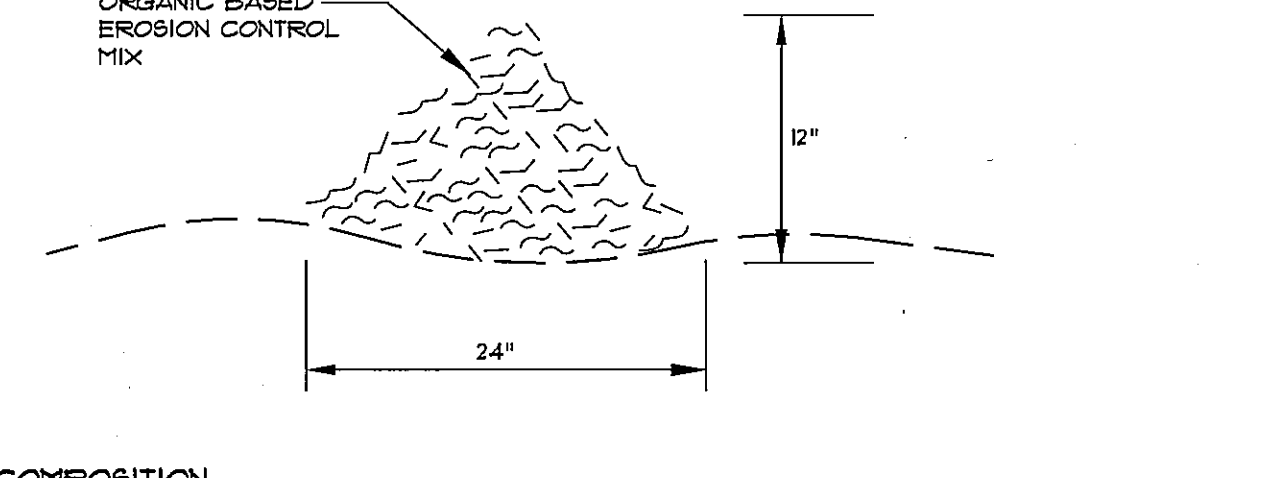
6. SEEDING

BETWEEN THE DATES OF OCTOBER 15 AND APRIL 15T, LOAM OR SEED WILL 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 SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 15T AND IF THE EXPOSED AREA HAS BEEN LOAMED, FINAL GRADED WITH A UNIFORM SURFACE, THEN THE AREA MAY BE DORMANT SEEDING AT A RATE OF 3 TIMES HIGHER THAN SPECIFIED FOR PERMANENT SEED AND THEN MULCHED.

DORMANT SEEDING MAY BE SELECTED TO BE PLACED PRIOR TO THE PLACEMENT OF MULCH AND FABRIC NETTING ANCHORED WITH STAPLES. IF DORMANT SEEDING IS USED FOR THE SITE, ALL DISTURBED AREAS SHALL RECEIVE 4" OF LOAM AND SEED AT AN APPLICATION RATE OF 550LBS/1000 SF. ALL AREAS SEEDED DURING THE WINTER WILL BE INSPECTED IN THE SPRING FOR ADEQUATE CATCH. ALL AREAS NOT SUFFICIENTLY 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.

7. TRENCH DEWATERING AND TEMPORARY STREAM DIVERSION

WATER FROM CONSTRUCTION TRENCH DEWATERING OR TEMPORARY STREAM DIVERSION WILL PASS FIRST THROUGH A FILTER BAG OR SECONDARY CONTAINMENT STRUCTURE (EG HAY BALE LINED POOL) PRIOR TO DISCHARGE. THE DISCHARGE SITE SHALL BE SELECTED TO AVOID FLOODING, ICING, AND SEDIMENT DISCHARGES TO A PROTECTED RESOURCE. IN NO CASE SHALL THE FILTER BAG OR CONTAINMENT STRUCTURE BE LOCATED WITHIN 100 FEET OF A PROTECTED NATURAL RESOURCE.



COMPOSITION

EROSION CONTROL MIX SHALL BE MANUFACTURED ON OR OFF THE PROJECT SITE SUCH THAT ITS COMPOSITION IS IN ACCORDANCE WITH THE MDEP MAINE EROSION AND SEDIMENT CONTROL BMP MANUAL, LAST REVISED 3/2003 OR LATER. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL, SEPARATED AT THE POINT OF GENERATION, AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS, WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSSED WOOD PRODUCTS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.

INSTALLATION:

- THE BARRIER MUST BE PLACED ACROSS THE SLOPE, ALONG THE CONTOUR.
- EXISTING GROUND SHALL BE PREPARED SUCH THAT THE BARRIER MAY LIE NEARLY FLAT AGAINST THE GROUND TO AVOID FLOODING AND BRIDGES IN ORDER TO MINIMIZE THE POTENTIAL OF WASH OUTS UNDER THE BARRIER.
- THE BARRIER SHALL BE A MINIMUM OF 1 FOOT HIGH (AS MEASURED ON THE UPHILL SIDE) AND 2 FEET WIDE FOR SLOPES LESS THAN 5% IN GRADE AND SHALL BE WIDER TO ACCOMMODATE THE ADDITIONAL RUNOFF.
- EROSION CONTROL MIX CAN BE INSTALLED WHERE SILT FENCE IS ILLUSTRATED ON THE DESIGN PLANS IN AREAS EXCEPT WHERE NOT LIMITED TO THE ADDITIONAL RUNOFF AND CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY.

EROSION CONTROL MIX BERM
NOT TO SCALE

8. INSPECTION AND MONITORING

MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION SEASON. AFTER EACH RAINFALL, SNOW STORM OR PERIOD OF THAWING AND RUNOFF, THE SITE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES AND PERFORM REPAIRS AS NEEDED TO INSURE THEIR CONTINUOUS FUNCTION.

FOLLOWING THE TEMPORARY AND OR FINAL SEEDING AND MULCHING, THE CONTRACTOR SHALL, IN THE SPRING INSPECT AND REPAIR ANY DAMAGES AND/ OR UNESTABLISHED SPOTS. ESTABLISHED VEGETATIVE COVER MEANS A MINIMUM OF 85 TO 90% OF AREAS VEGETATED WITH VIGOROUS GROWTH.

STANDARDS FOR TIMELY STABILIZATION OF CONSTRUCTION SITES DURING WINTER

1. STANDARD FOR THE TIMELY STABILIZATION OF DITCHES AND CHANNELS -- THE APPLICANT WILL CONSTRUCT AND STABILIZE ALL STONE-LINED DITCHES AND CHANNELS ON THE SITE BY NOVEMBER 15. THE APPLICANT WILL CONSTRUCT AND STABILIZE ALL GRASS-LINED DITCHES AND CHANNELS ON THE SITE BY SEPTEMBER 15. IF THE APPLICANT FAILS TO STABILIZE A DITCH OR CHANNEL TO BE GRASS-LINED BY SEPTEMBER 15, THEN THE APPLICANT WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE DITCH FOR LATE FALL AND WINTER.

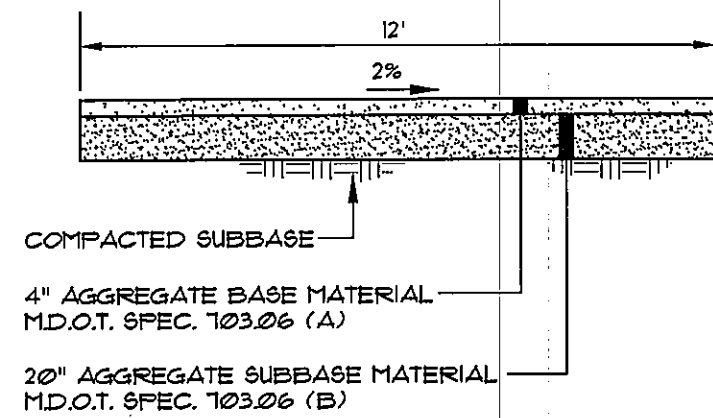
INSTALL A SOD LINING IN THE DITCH -- THE APPLICANT WILL LINE THE DITCH WITH PROPERLY INSTALLED SOD BY OCTOBER 1. PROPER INSTALLATION INCLUDES THE APPLICANT FINNING THE SOD ONTO THE SOIL WITH WIRE PINS, ROLLING THE SOD TO GUARANTEE CONTACT BETWEEN THE SOD AND UNDERLYING SOIL, WATERING THE SOD TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL, AND ANCHORING THE SOD WITH JUTE OR PLASTIC MESH TO PREVENT THE SOD STRIPS FROM SLOUGHING DURING FLOW CONDITIONS.

INSTALL A STONE LINING IN THE DITCH -- THE APPLICANT WILL LINE THE DITCH WITH STONE RIPRAP BY NOVEMBER 15. THE APPLICANT WILL HIRE A REGISTERED PROFESSIONAL ENGINEER TO DETERMINE THE STONE SIZE AND LINING THICKNESS NEEDED TO WITHSTAND THE ANTICIPATED FLOW VELOCITIES AND FLOW DEPTHS WITHIN THE DITCH. IF NECESSARY, THE APPLICANT WILL REGRADE THE DITCH PRIOR TO PLACING THE STONE LINING SO TO PREVENT THE STONE LINING FROM REDUCING THE DITCH'S CROSS-SECTIONAL AREA.

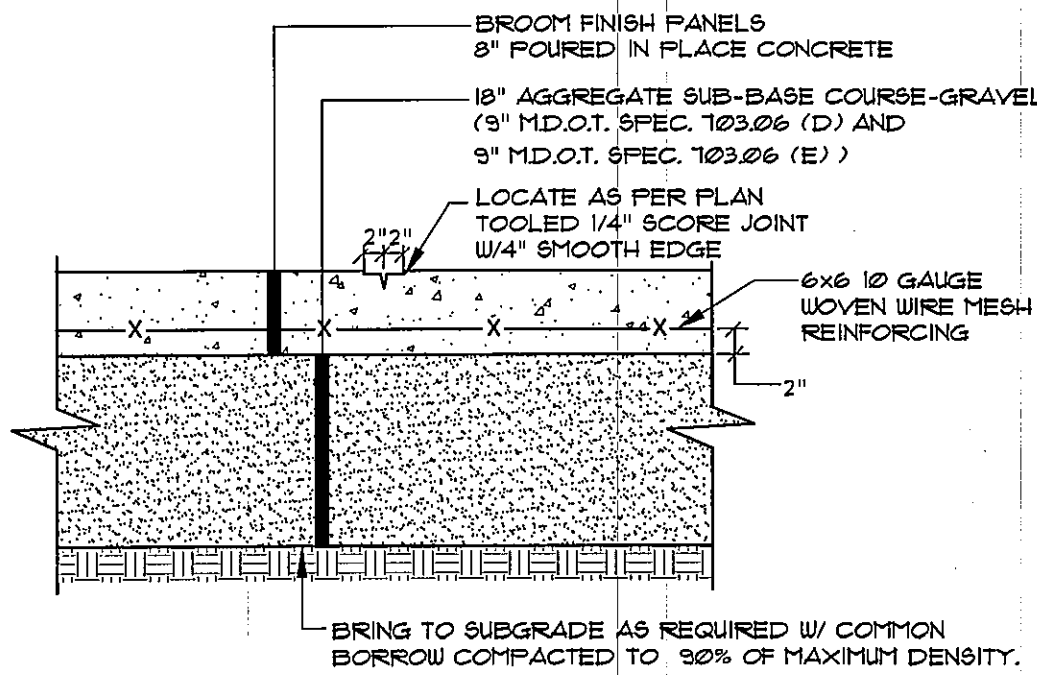
2. STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SLOPES -- THE APPLICANT WILL CONSTRUCT AND STABILIZE STONE-COVERED SLOPES BY NOVEMBER 15. THE APPLICANT WILL SEED AND MULCH ALL SLOPES TO BE GREATER THAN 15% (2H:1V) TO 1:1. THE DEPARTMENT WILL CONSIDER ANY AREA HAVING A GRADE GREATER THAN 15% (2H:1V) TO BE A SLOPE. IF THE APPLICANT FAILS TO STABILIZE ANY SLOPE TO BE VEGETATED BY SEPTEMBER 15, THEN THE APPLICANT WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SLOPE FOR LATE FALL AND WINTER.

STABILIZE THE SOIL WITH TEMPORARY VEGETATION AND EROSION CONTROL MATS -- BY OCTOBER 1 THE APPLICANT WILL SEED THE DISTURBED SLOPE WITH WINTER RYE AT A SEEDING RATE OF 3 POUNDS PER 1000 SQUARE FEET AND APPLY EROSION CONTROL MATS OVER THE MULCHED SLOPE. THE APPLICANT WILL MONITOR GROWTH OF THE RYE OVER THE NEXT 30 DAYS. IF THE RYE FAILS TO GROW AT LEAST THREE INCHES OR COVER AT LEAST 75% OF THE DISTURBED SLOPE BY NOVEMBER 1, THEN THE APPLICANT WILL COVER THE SLOPE WITH A LAYER OF WOOD WASTE COMPOST AS DESCRIBED IN ITEM III OF THIS CONDITION OR WITH STONE RIPRAP AS DESCRIBED IN ITEM IV OF THIS CONDITION.

STABILIZE THE SLOPE WITH SOD -- THE APPLICANT WILL STABILIZE THE DISTURBED SLOPE WITH PROPERLY INSTALLED SOD BY OCTOBER 1. PROPER INSTALLATION INCLUDES THE APPLICANT FINNING THE SOD ONTO THE SLOPE WITH WIRE PINS, ROLLING THE SOD TO GUARANTEE CONTACT BETWEEN THE SOD AND UNDERLYING SOIL,

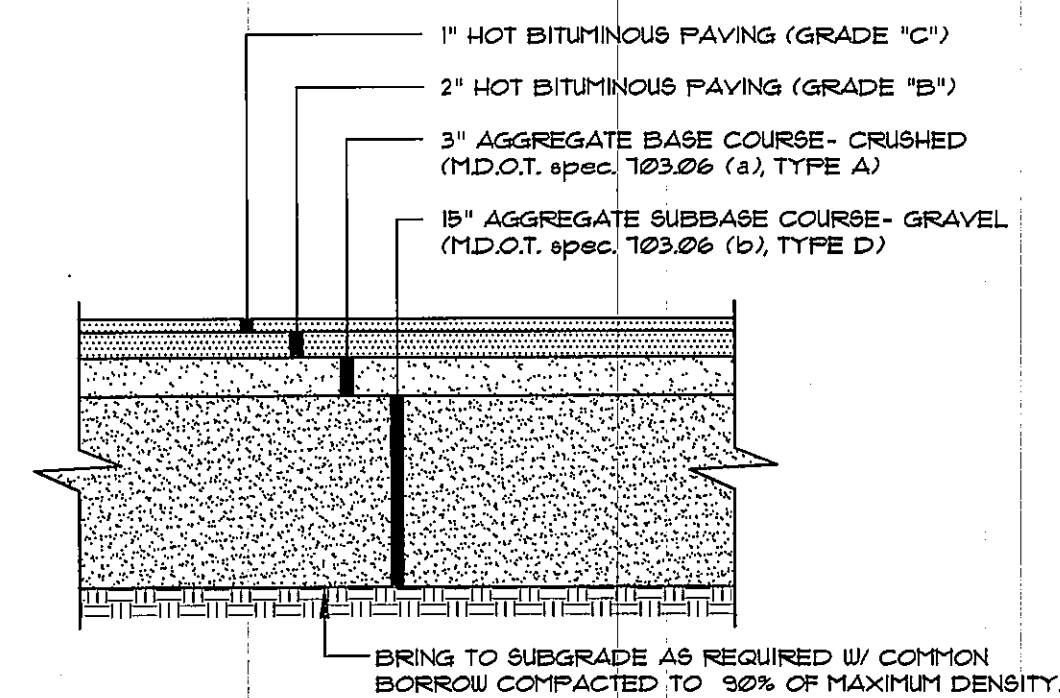


GRAVEL DRIVE SECTION
NOT TO SCALE



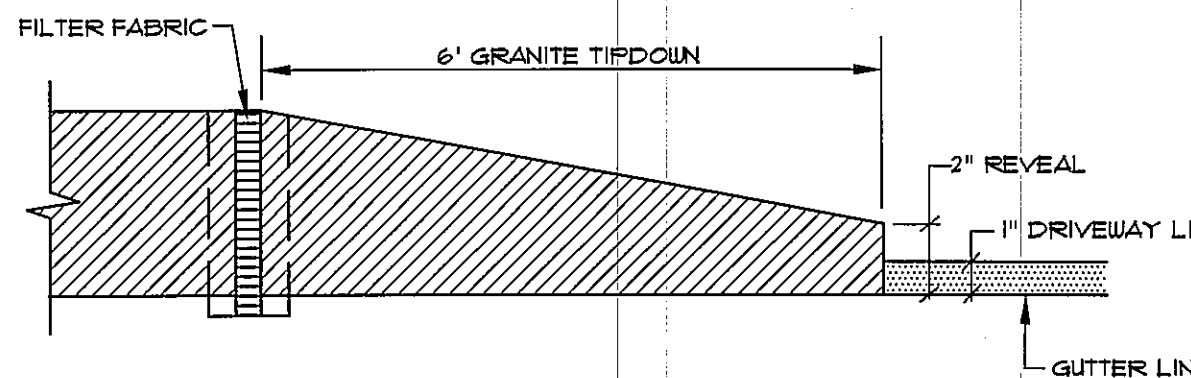
- NOTES:**
1. COMPACT GRAVEL SUB-BASE, BASE COURSE TO 92% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
 2. CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

HEAVY DUTY CONCRETE PAVEMENT
NOT TO SCALE

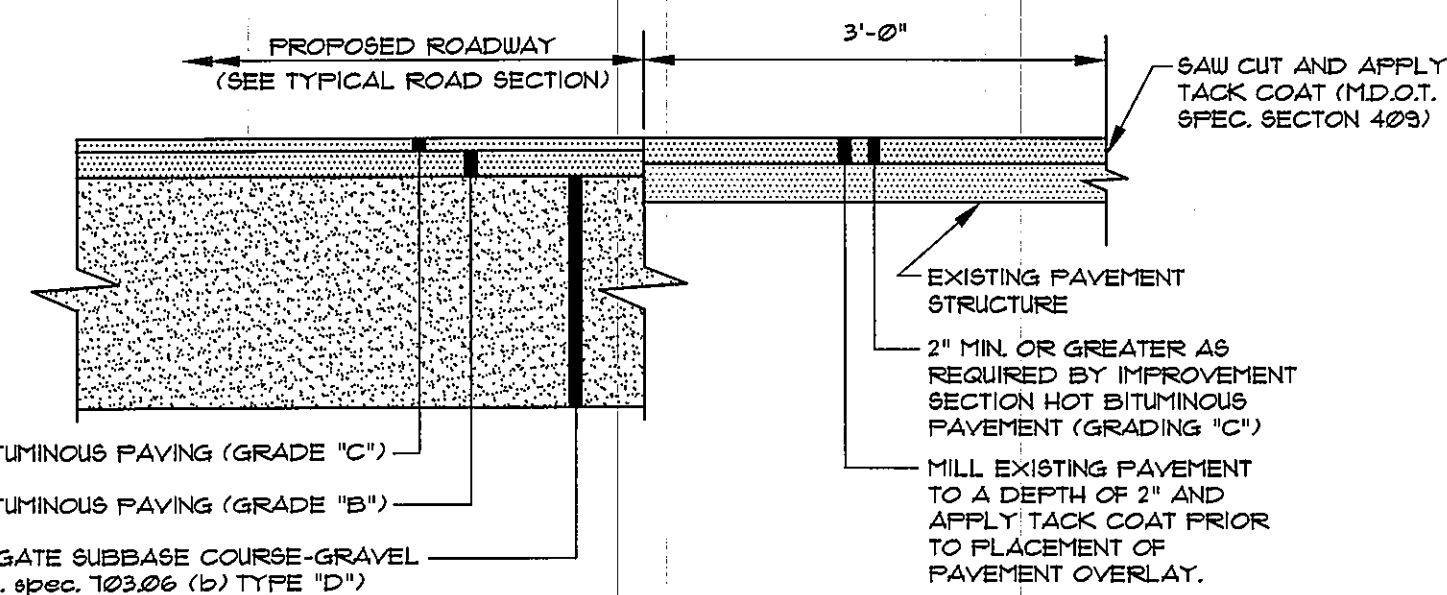


- NOTES:**
1. COMPACT GRAVEL SUBBASE, BASE COURSE TO 92% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
 2. CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

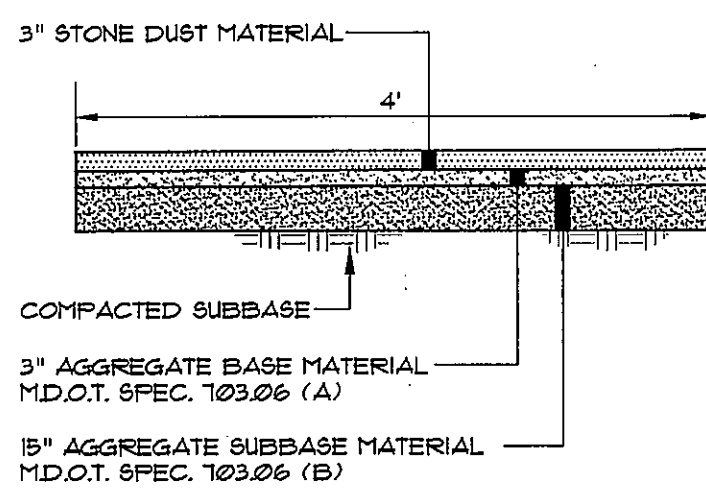
TYP. PAVED PARKING LOT SECTION
NOT TO SCALE



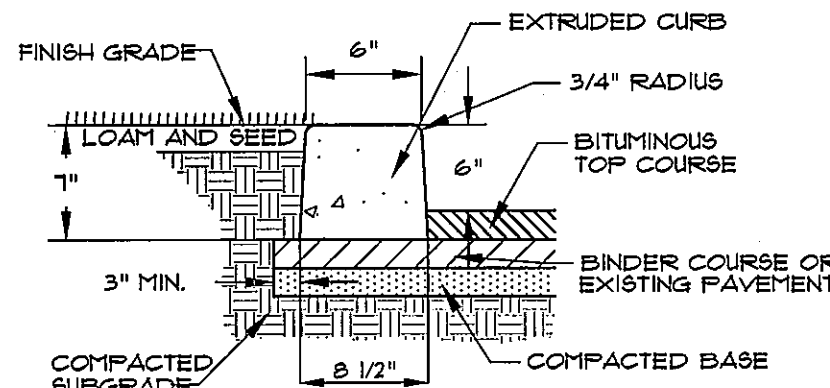
TYPICAL TIPDOWN CURB INSTALLATION
NOT TO SCALE



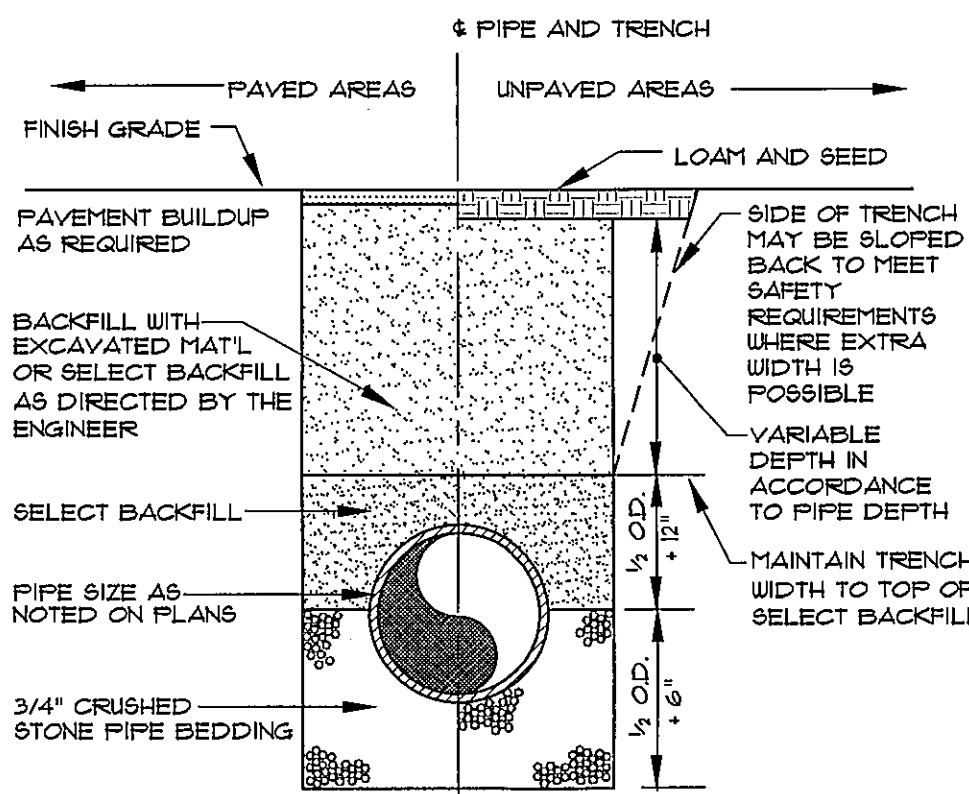
TYPICAL PAVEMENT JOINT
NOT TO SCALE



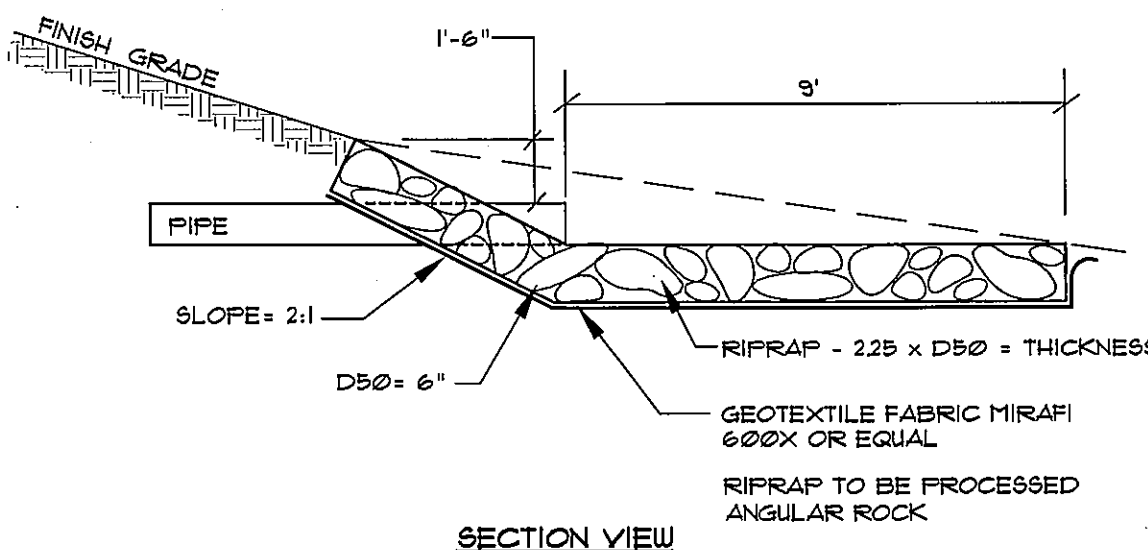
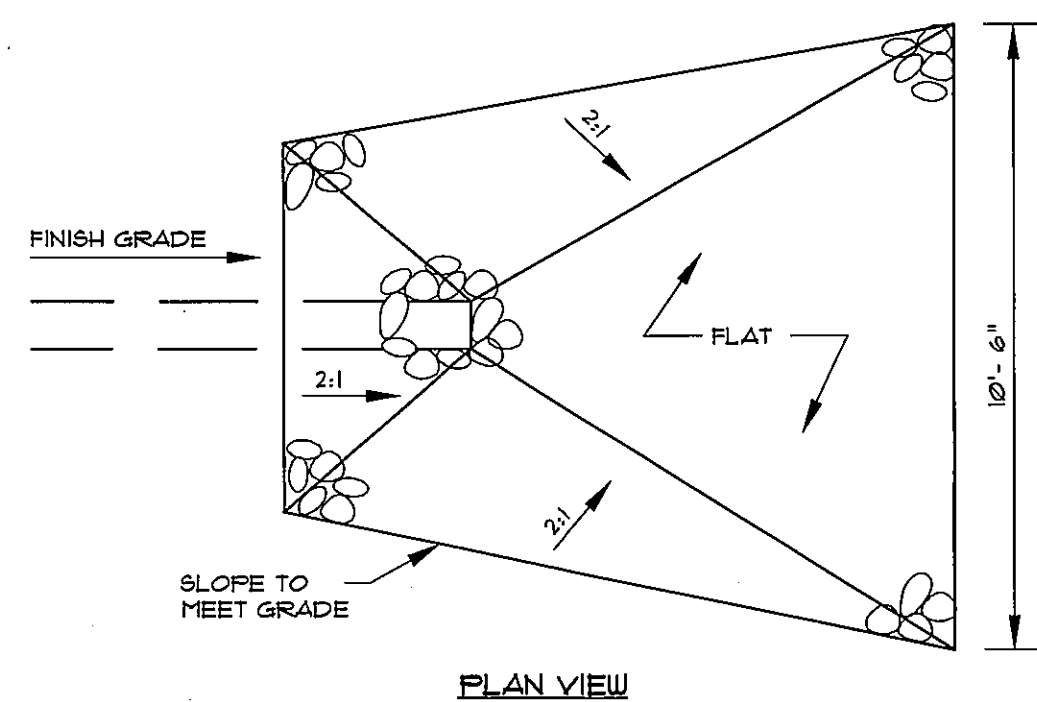
STONE DUST WALK SECTION
NOT TO SCALE



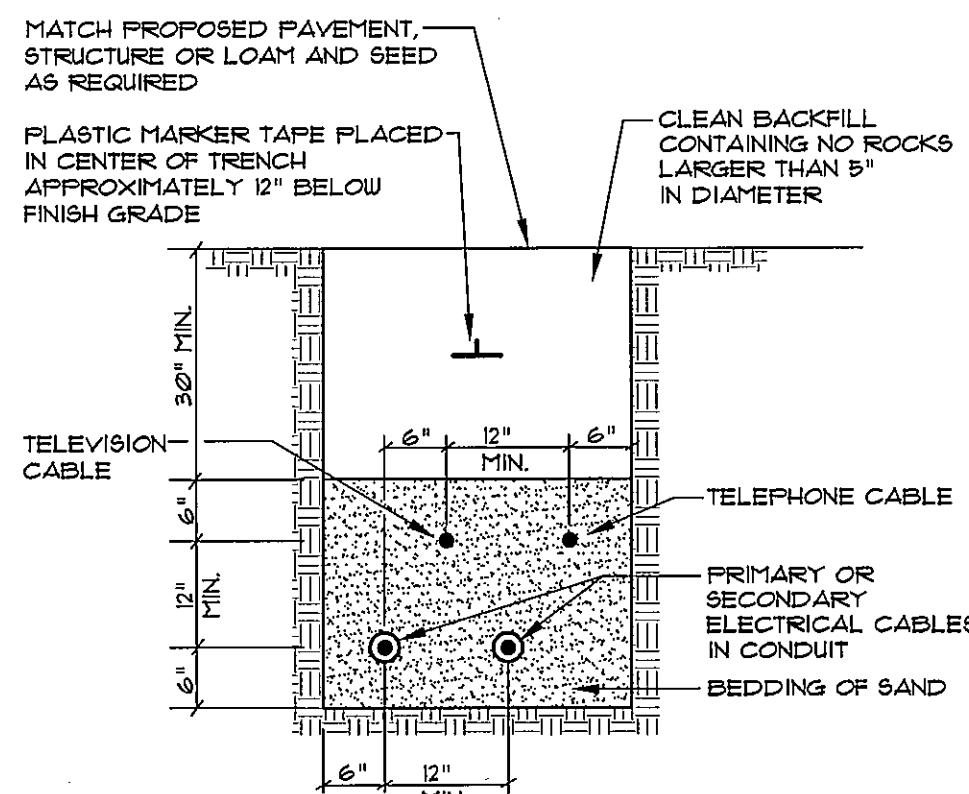
SLIPFORM CONCRETE CURB
NOT TO SCALE



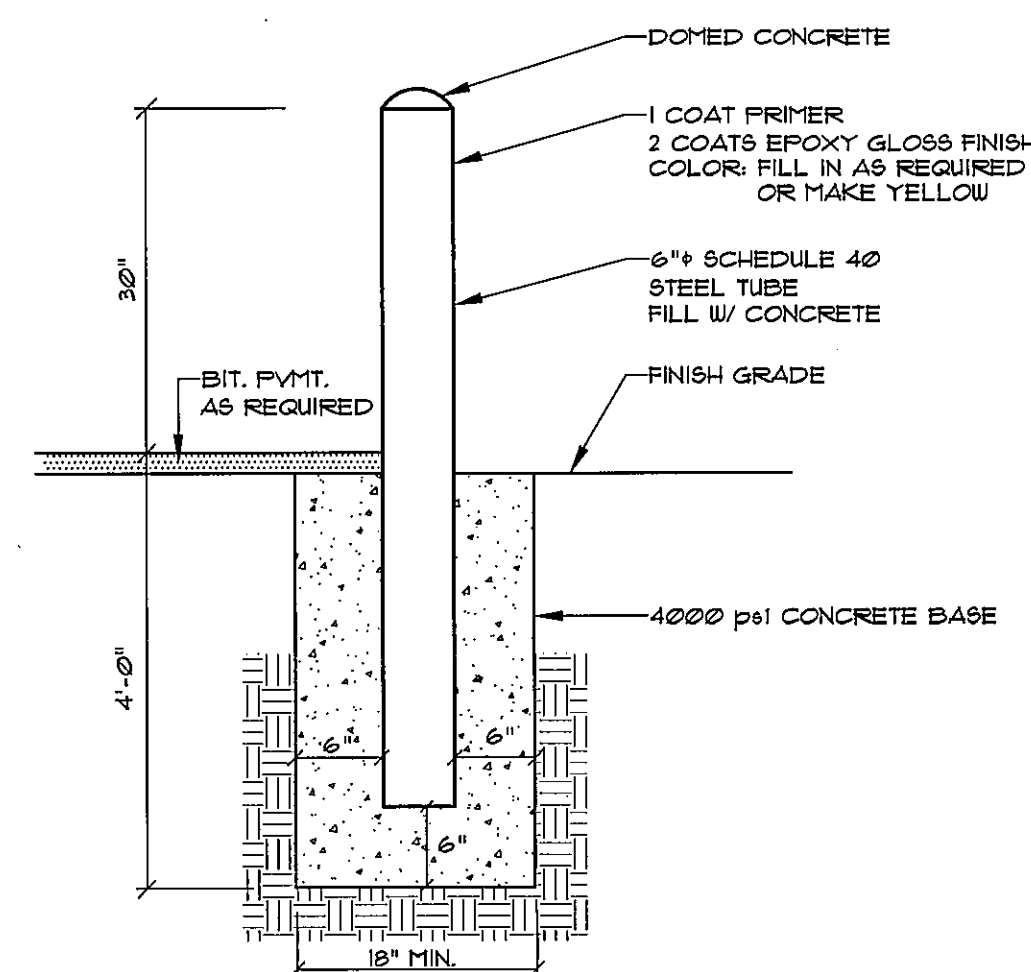
TYPICAL TRENCH SECTION
NOT TO SCALE



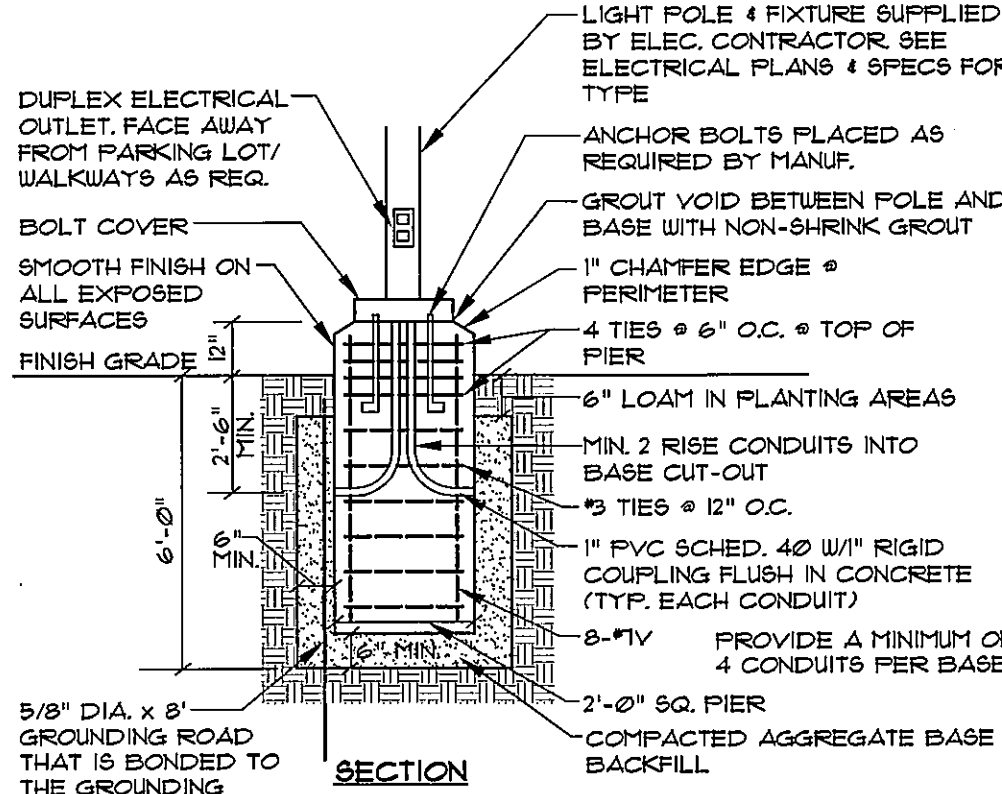
RIPRAP APRON
NOT TO SCALE



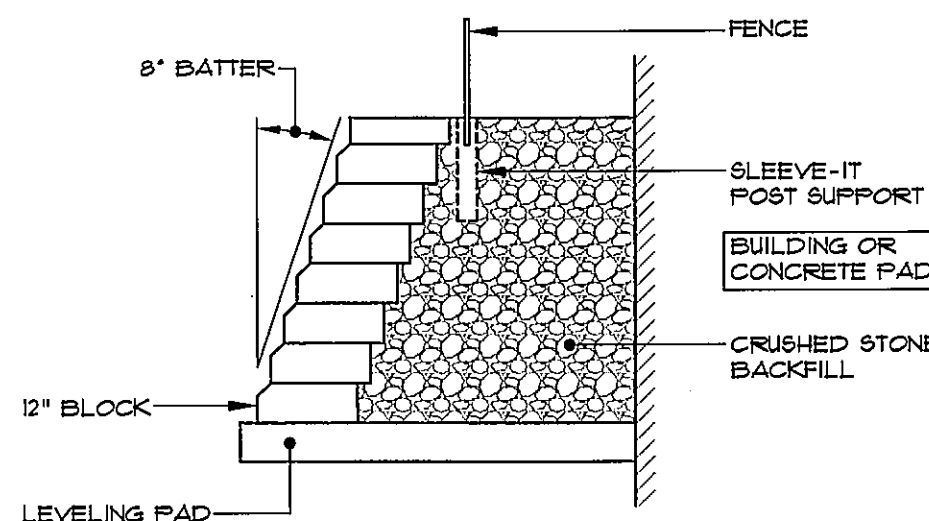
TYPICAL UNDERGROUND CABLE INSTALLATION
NOT TO SCALE



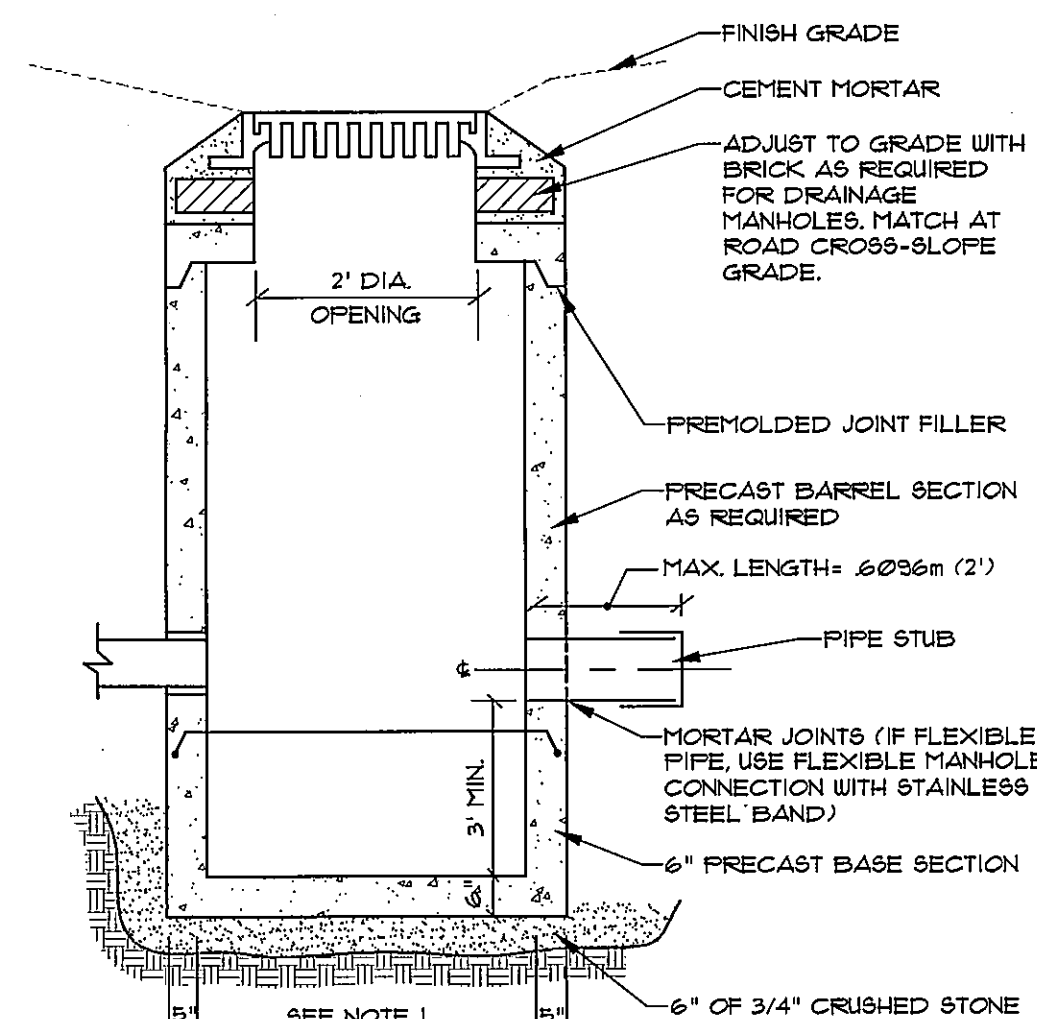
METAL BOLLARD
NOT TO SCALE



LIGHT POLE BASE
NOT TO SCALE

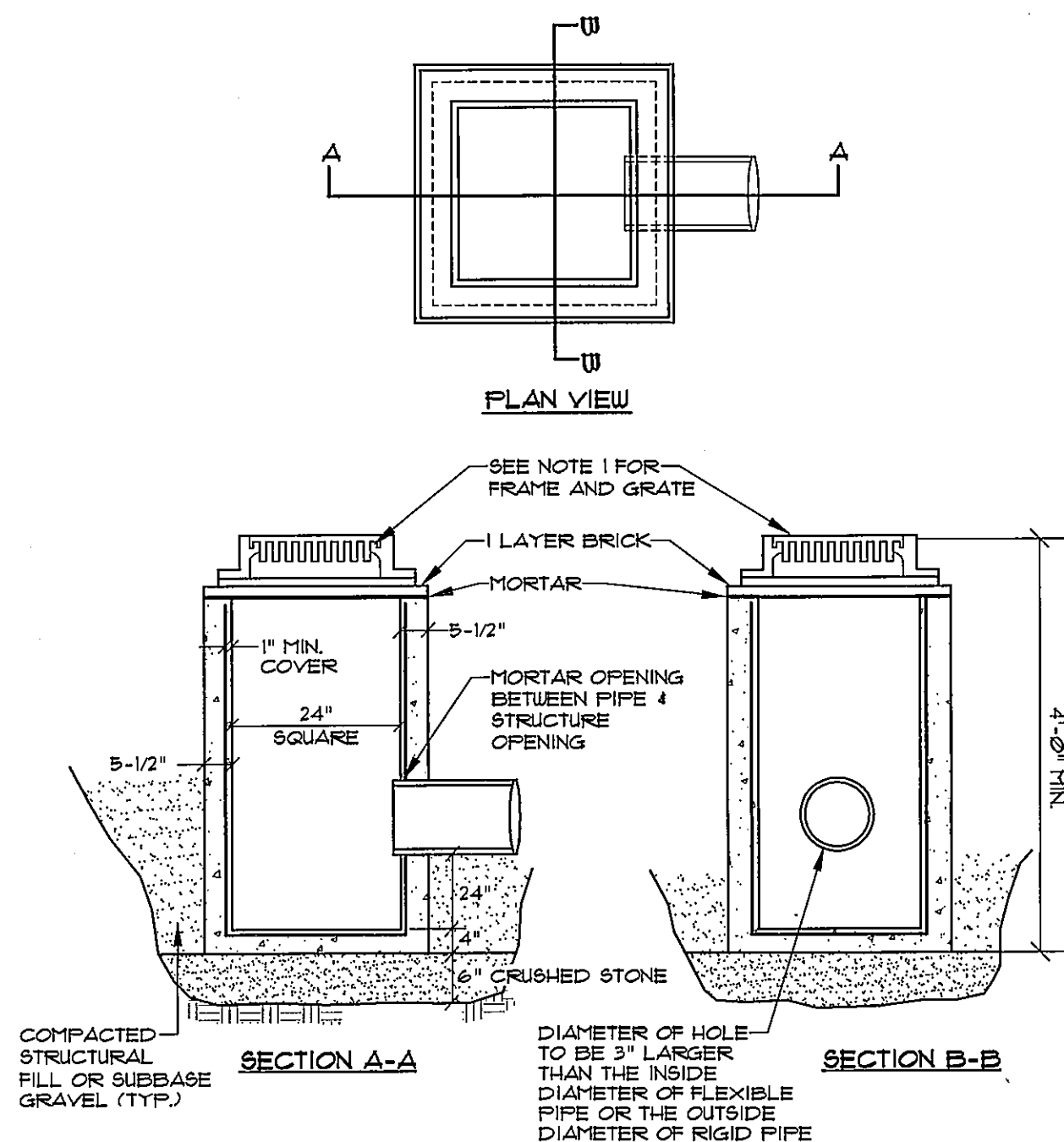


BLOCK RETAINING WALL
NOT TO SCALE



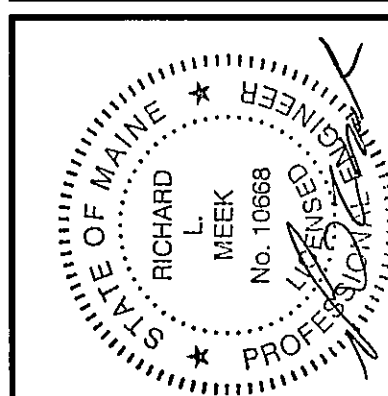
- NOTES:**
1. 4'-0" I.D. TYPICAL. SOME STRUCTURES MAY REQUIRE LARGER I.D. PROVIDE SHOP DRAWINGS.
 2. DRAINAGE STRUCTURES TO BE DESIGNED FOR H-20 LOADING.
 3. PIPE SIZES AND INVERTS AS NOTED ON PLANS.
 4. CATCH BASIN FRAME AND GRATE TO BE GENERAL FOUNDRY 12462 OR APPROVED EQUAL. LOW PROFILE FRAMES AND COVERS MAY BE USED AS A SUBSTITUTE.
 5. DRAINAGE MANHOLE FRAME AND COVER TO BE GENERAL FOUNDRY 12462 OR APPROVED EQUAL.

TYP. DRAINAGE STRUCTURE & CATCH BASIN
NOT TO SCALE



- NOTES:**
1. FRAME SHALL BE FOR 24" SQUARE GRATE - LEBARON TYPE 18" SQUARE FRAME (LF 249) 4" FLANGE OR ETHERIDGE SQUARE FRAME 5249. GRATE SHALL BE 24"x24" CAST IRON.
 2. ENTIRE CATCH BASIN WITH EXCEPTION OF LEVELING BRICK FRAME AND GRATE TO BE PRECAST AS SINGLE PORTLAND CEMENT CONCRETE UNIT.

TYP. TYPE "F" CATCH BASIN
NOT TO SCALE



DATE	07-11-14	BY	RLM	STATUS	FINAL SITE PLAN SUBMISSION TO CITY
REV.	06-03-14	BY	RLM	STATUS	SITE PLAN SUBMISSION TO CITY
REV.	06-03-14	BY	RLM	STATUS	SITE PLAN SUBMISSION TO CITY
REV.	06-03-14	BY	RLM	STATUS	SITE PLAN SUBMISSION TO CITY
REV.	06-03-14	BY	RLM	STATUS	SITE PLAN SUBMISSION TO CITY
REV.	06-03-14	BY	RLM	STATUS	SITE PLAN SUBMISSION TO CITY
REV.	06-03-14	BY	RLM	STATUS	SITE PLAN SUBMISSION TO CITY
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REV.	06-03-14	BY	RLM	STATUS	SITE PLAN SUBMISSION TO CITY
REV.	06-03-14	BY	RLM	STATUS	SITE PLAN SUBMISSION TO CITY

PROJECT NO.	02249	DESIGN	RLM	CHECK	RLM	DRAWN	RLM	MAILED	RLM
PROJECT NO.	02249	DESIGN	RLM	CHECK	RLM	DRAWN	RLM	MAILED	RLM
PROJECT NO.	02249	DESIGN	RLM	CHECK	RLM	DRAWN	RLM	MAILED	RLM
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PROJECT NO.	02249	DESIGN	RLM	CHECK	RLM	DRAWN	RLM	MAILED	RLM

DATE	05-20-14	SCALE	N.T.S.
DATE	05-20-14	SCALE	N.T.S.
DATE	05-20-14	SCALE	N.T.S.
DATE	05-20-14	SCALE	N.T.S.
DATE	05-20-14	SCALE	N.T.S.



GRANT HAYS
ASSOCIATES

ARCHITECTURE & INTERIOR DESIGN
P.O. BOX 6179 FALMOUTH MAINE 04103
207.871.5900 www.granthays.com

1/2" = 1'

REVISIONS

DRAWING NAME

1/2" = 1'

DATE

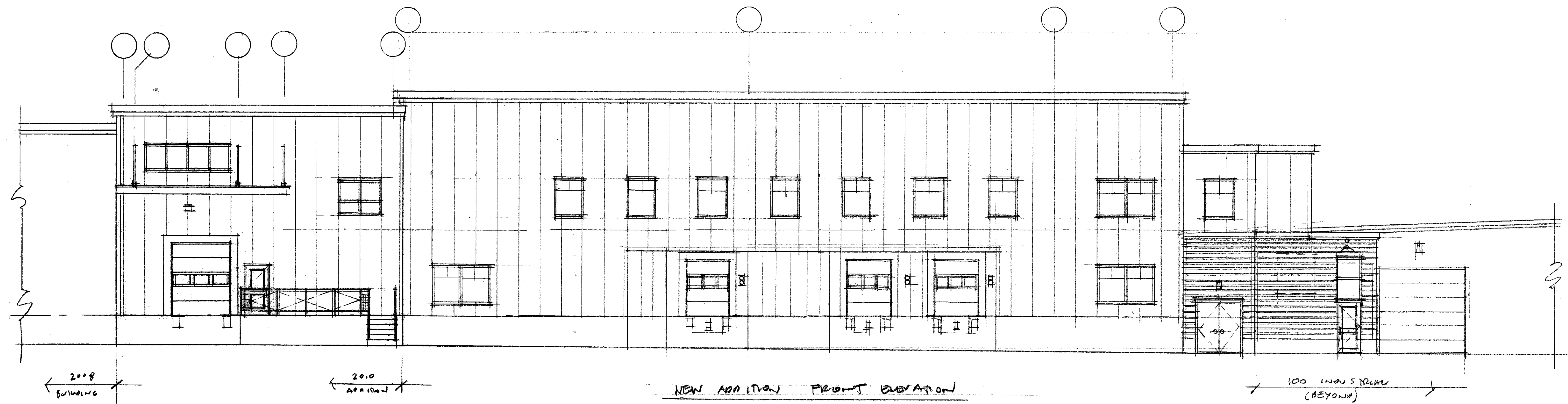
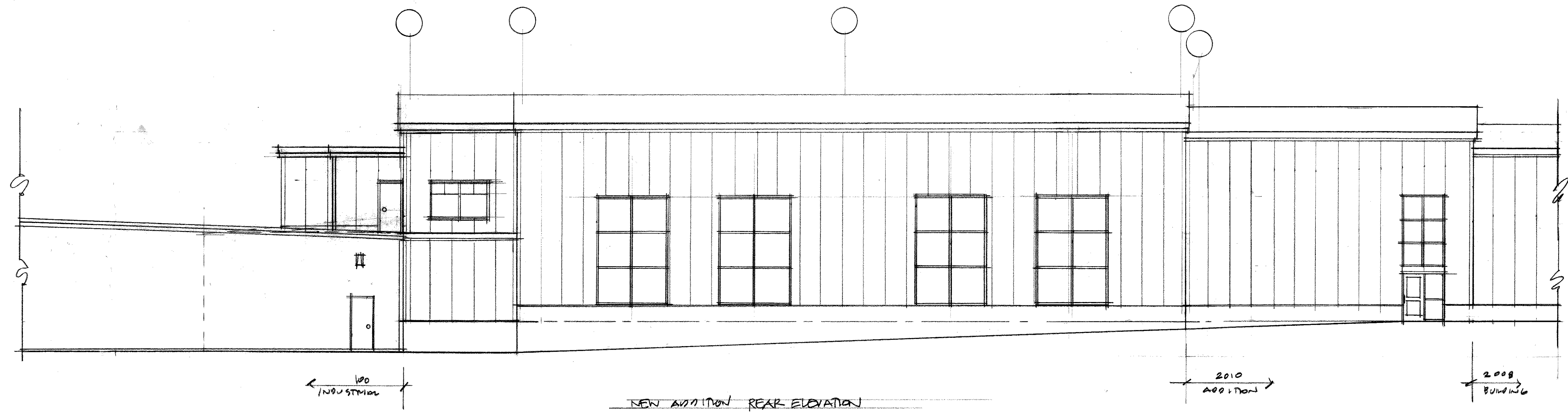
SCALE

DRAWN

JOB NO.

1/2" = 1'

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1/2" = 1'

REV. NO. /

DRAWING NAME

1/2" = 1'

DATE

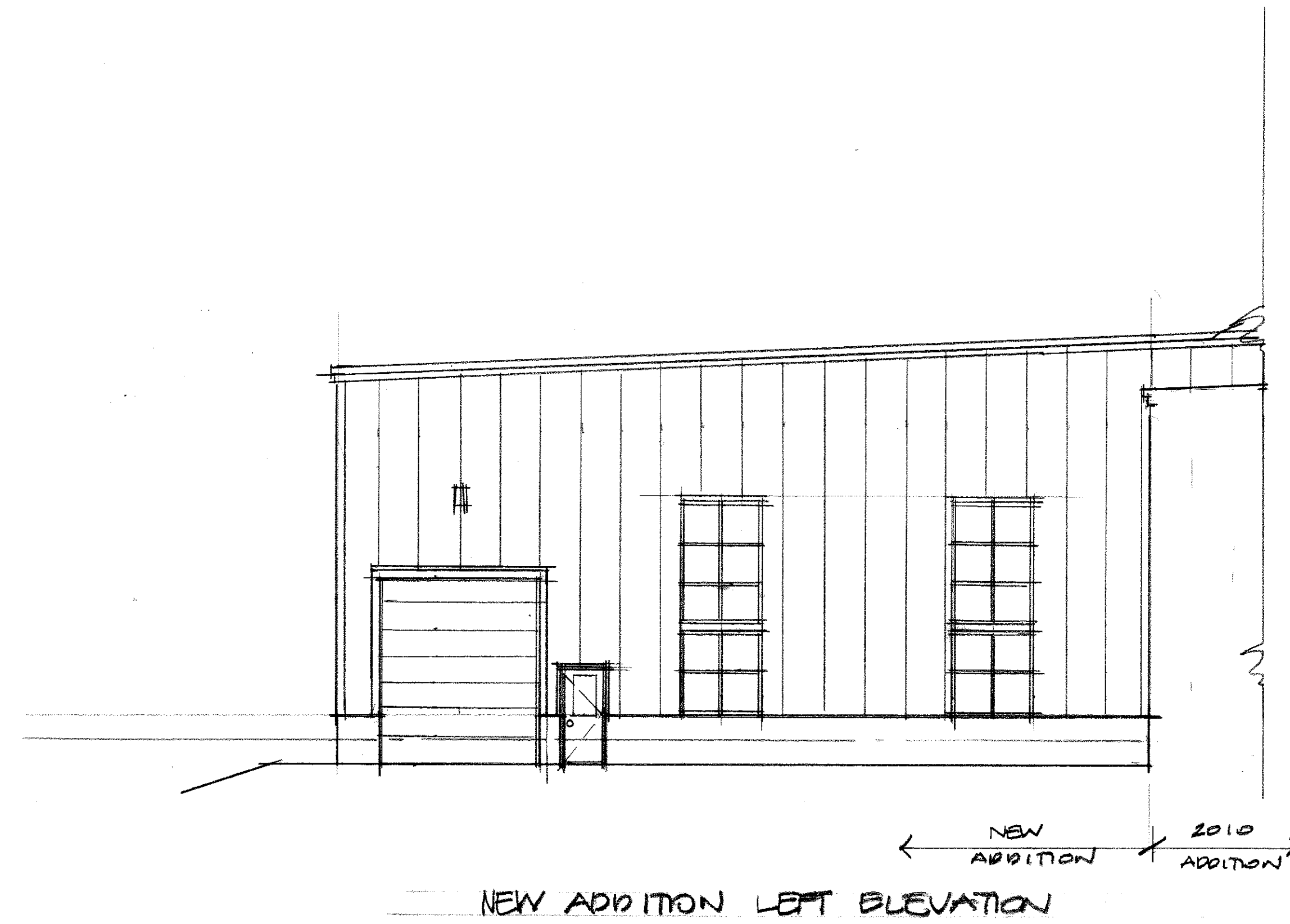
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DRAWN

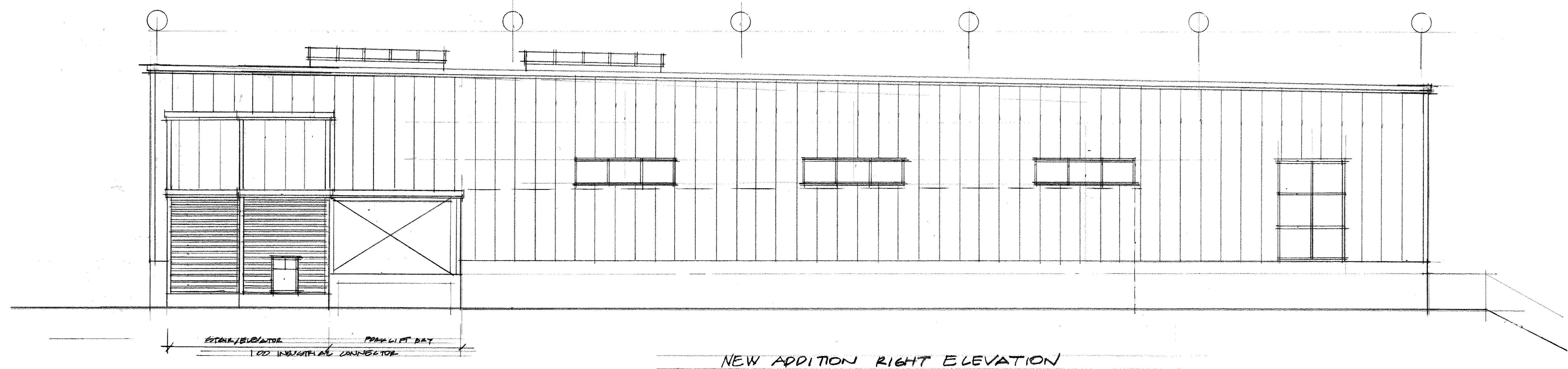
JOB NO.

1/2" = 1'

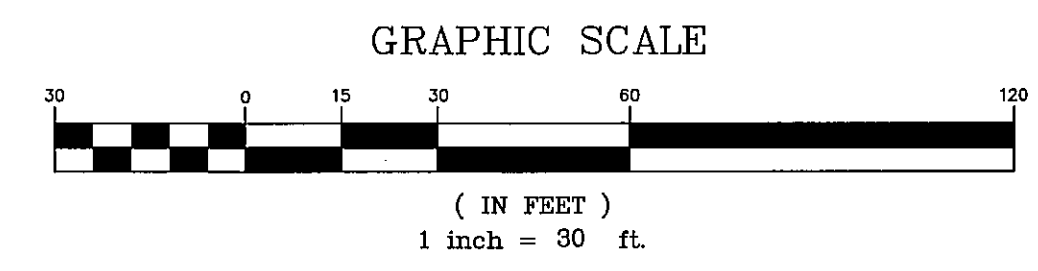
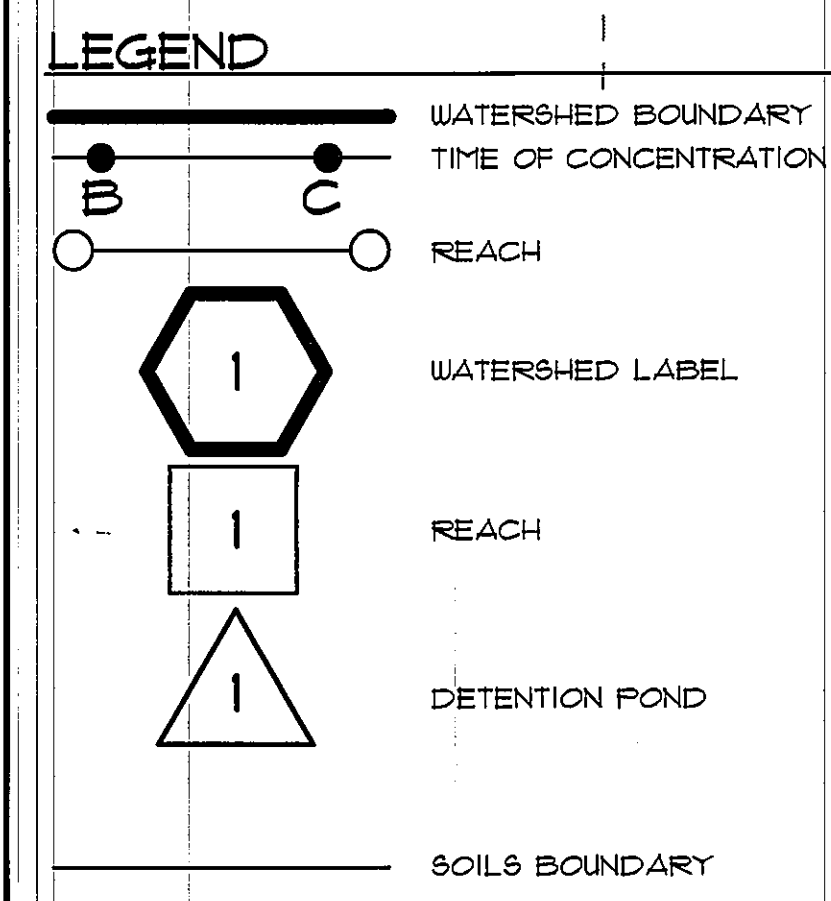
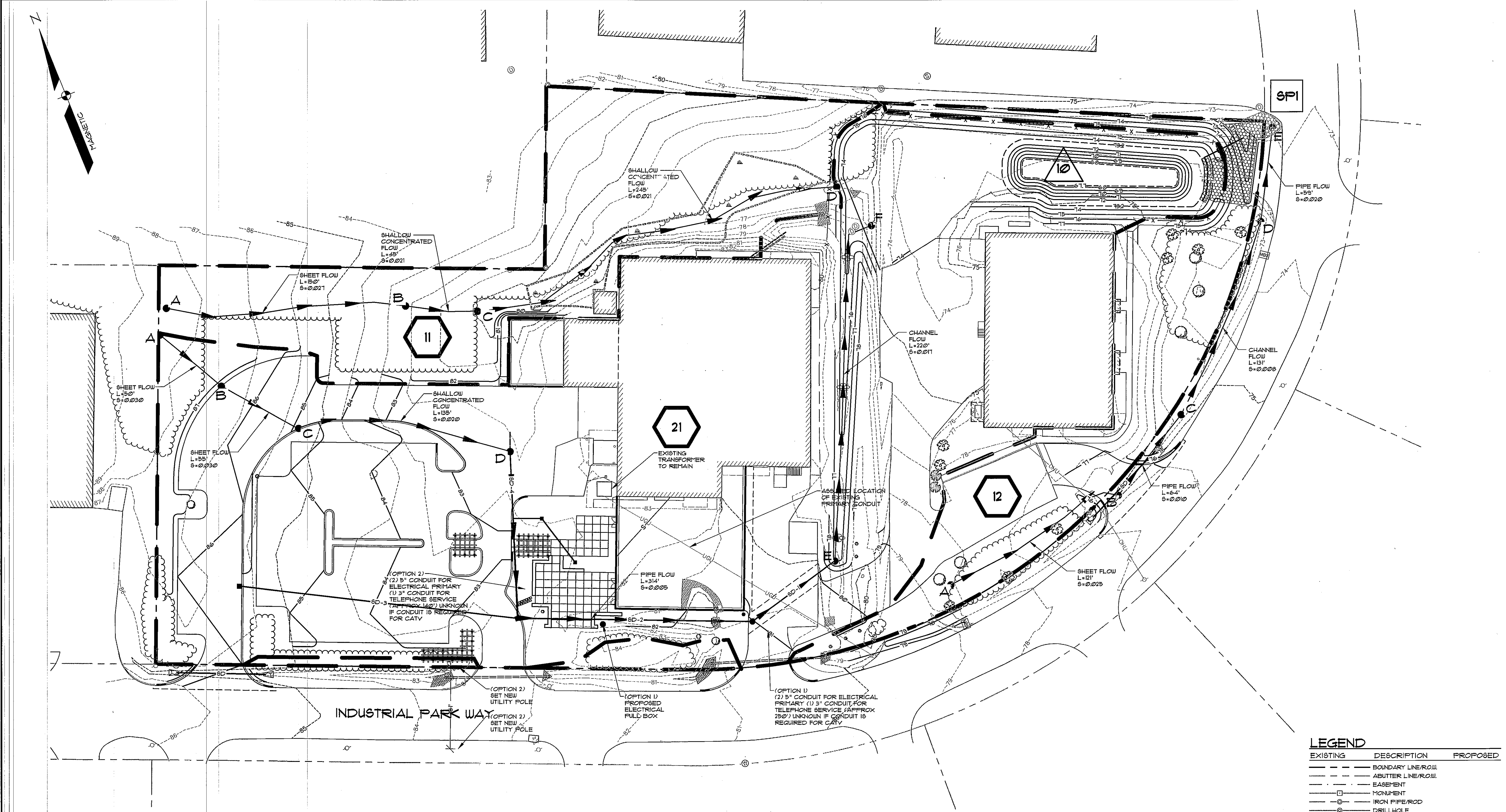
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NEW ADDITION LEFT ELEVATION



NEW ADDITION RIGHT ELEVATION



LEGEND

EXISTING	DESCRIPTION	PROPOSED
---	BOUNDARY LINE/ROW	---
---	ABUTTER LINE/ROW	---
---	EASEMENT	---
---	MONUMENT	---
---	IRON PIPE/ROD	---
---	DRILLHOLE	---
---	CURVE/LINE NO.	---
---	BENCHMARK	---
---	BUILDING	---
---	SIGN	---
---	EDGE PAVEMENT	---
---	EDGE CONCRETE	---
---	PAVEMENT PAINT	---
---	GRAVEL ROAD	---
---	CURBLINE	---
---	TREELINE	---
---	CONTOURS	---
---	SPOT GRADE	---
---	CHAIN LINK FENCE	---
---	DECIDUOUS TREE	---
---	CONIFEROUS TREE	---
---	BOLLARD	---
---	STORM DRAIN	---
---	UNDERDRAIN	---
---	CATCH BASIN	---
---	DRAINAGE MH	---
---	CULVERT	---
---	UTILITY POLE	---
---	GUY	---
---	RIPRAP	---

P16

STATE OF MAINE
REGISTERED PROFESSIONAL ENGINEER
RICHARD L. MEEK
No. 10668

REV.	BY	DATE	STATUS
B	RLM	07/11/14	FINAL SITE PLAN SUBMISSION TO CITY

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNIQS, INC. ANY ALTERATIONS AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNIQS, INC.

SEBAGO
TECHNIQS

75 John Roberts Rd., Suite 1A
South Portland, ME 04106
Tel. 207-282-2100 Fax 207-282-5600

WWW.SEAGOTECHNIQS.COM

250 Goddard Rd., Suite B
Lewiston, ME 04240
Tel. 207-785-5600

PROJECT NO.	FIELD BOOK	DESIGN	CHKD	DRAWN
02249	847	RLM	-	RLM

2012-DEVELOPMENT WATERSHED

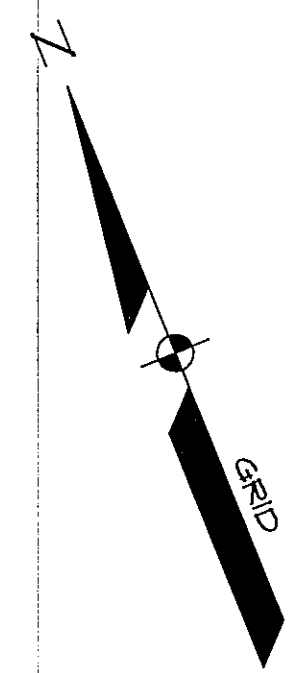
OF:
ALLAGASH BREWING COMPANY
INDUSTRIAL WAY
PORTLAND, MAINE

FOR:
50 INDUSTRIAL WAY, LLC
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

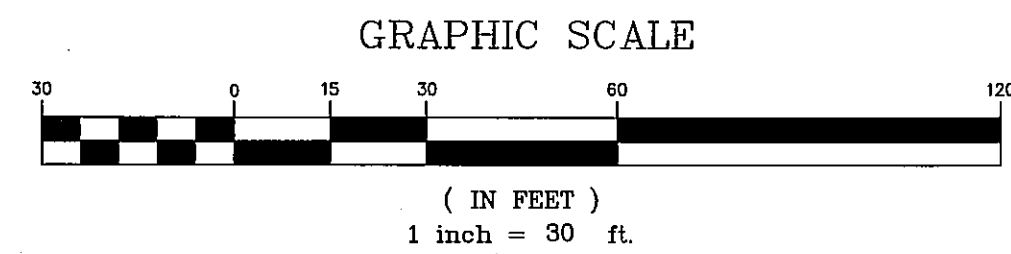
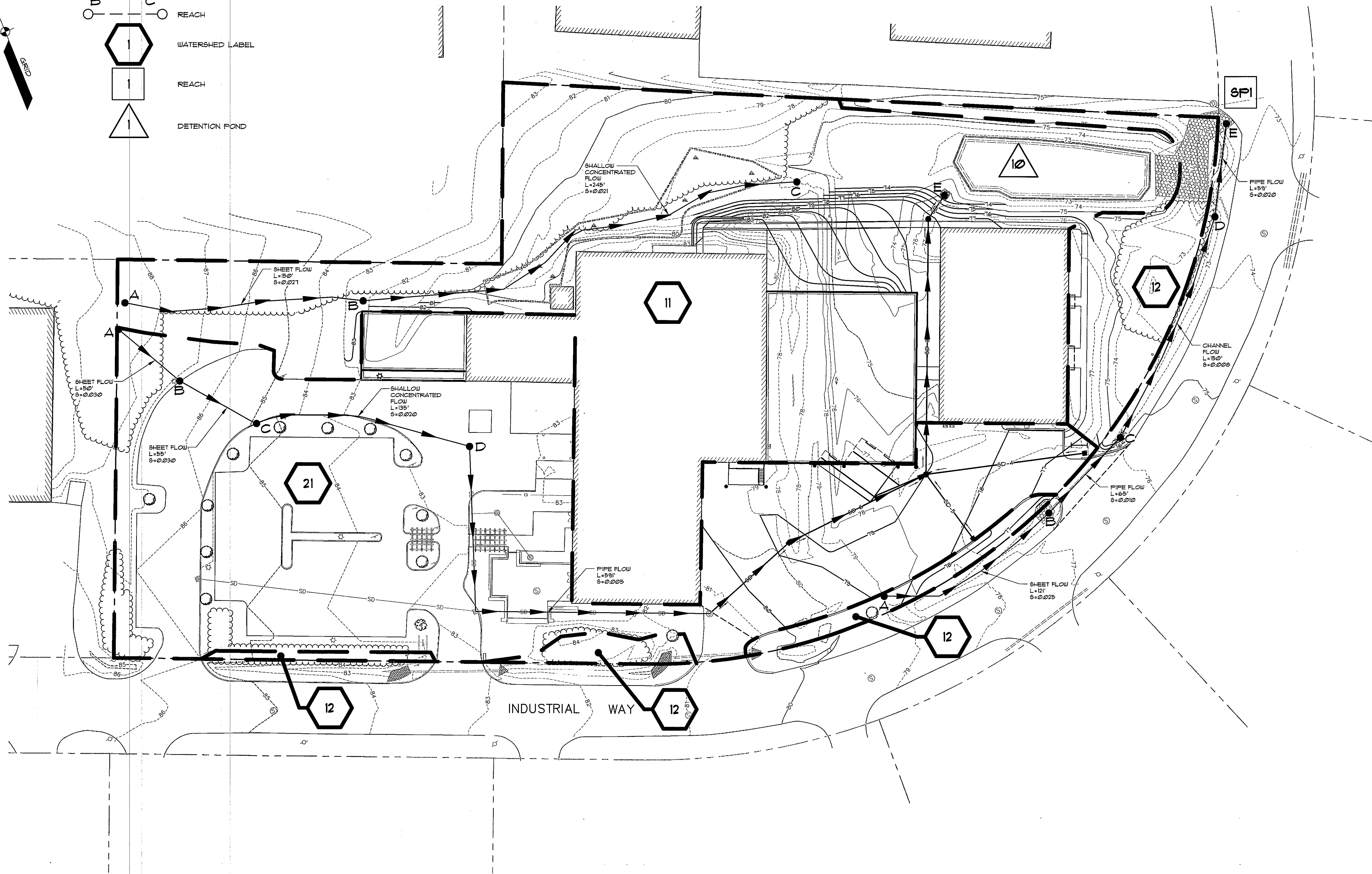
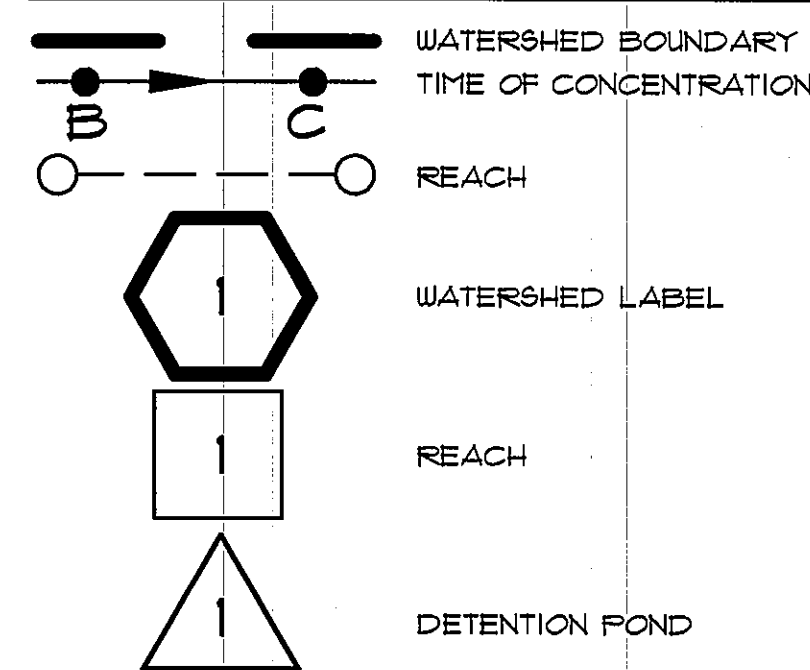
02249SWP-PRE.dwg, TAB: 2012

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07/10/14	1" = 30'

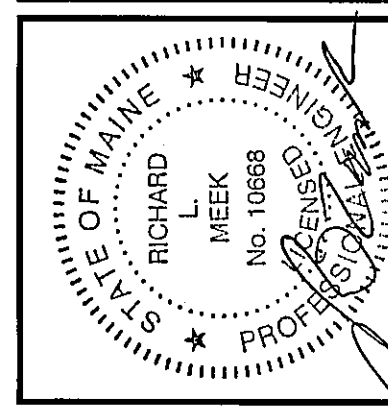
SHEET C10.2



LEGEND



P17



REV.	BY	DATE	STATUS
B	RLM	07-11-14	FINAL SITE PLAN SUBMISSION TO CITY
A	RLM	06-03-14	SITE PLAN SUBMISSION TO CITY

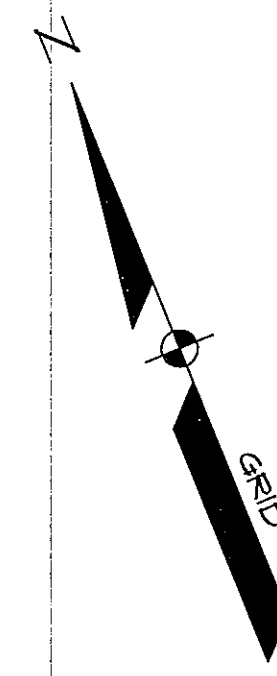
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS AUTHORIZED OR OTHERWISE SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

PROJECT NO.	FIELD BOOK	DESIGN	CHKD	DRAWN
02249	847	RLM	RLM	MAL

2014-DEVELOPMENT WATERSHED - PHASE 1
OF: ALLAGASH BREWING COMPANY
INDUSTRIAL WAY
PORTLAND, MAINE
FOR: 50 INDUSTRIAL WAY, LLC
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

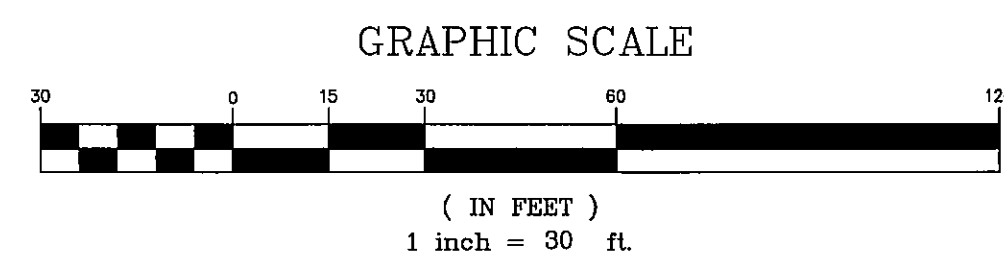
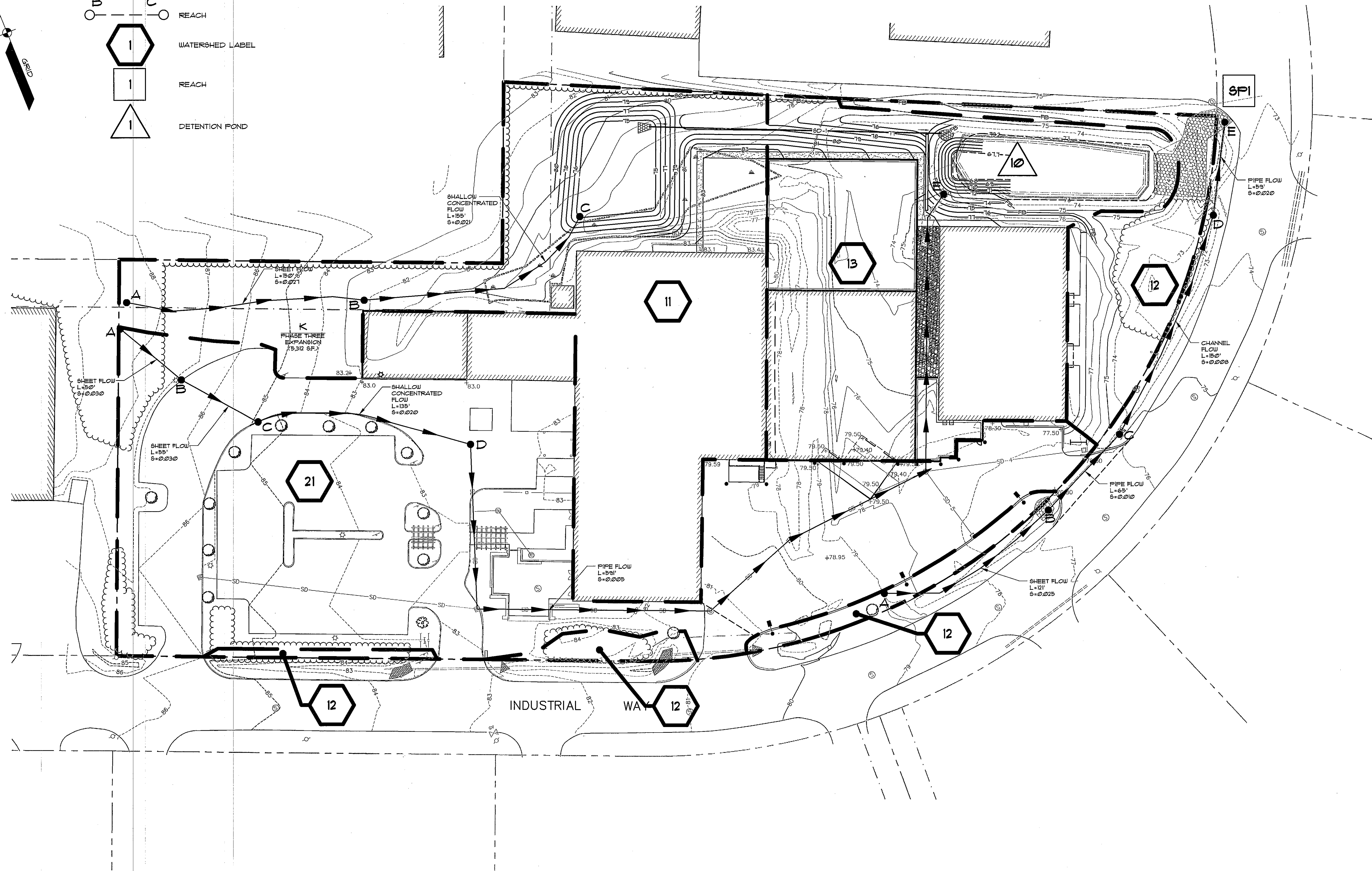
DATE: 05-20-14
SCALE: 1" = 30'

SHEET C10.3

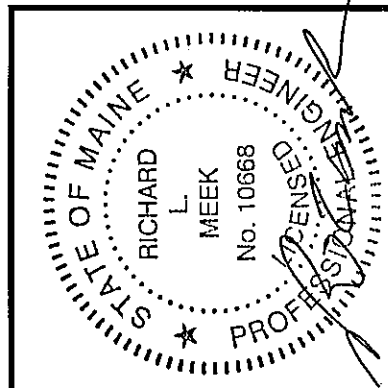


LEGEND

WATERSHED BOUNDARY
TIME OF CONCENTRATION
REACH
WATERSHED LABEL
REACH
DETENTION POND



P18



REV.	BY	DATE	STATUS
B	RLM	07-11-14	FINAL SITE PLAN SUBMISSION TO CITY
A	RLM	06-03-14	SITE PLAN SUBMISSION TO CITY
REV.	BY	DATE	STATUS
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.			

SEBAGO
TECHNICS
75 John Roberts Rd. - Suite 1A
South Portland, ME 04106
Tel: 207-282-5100 Fax: 207-282-5355
WWW.SEAGOTECHNICS.COM

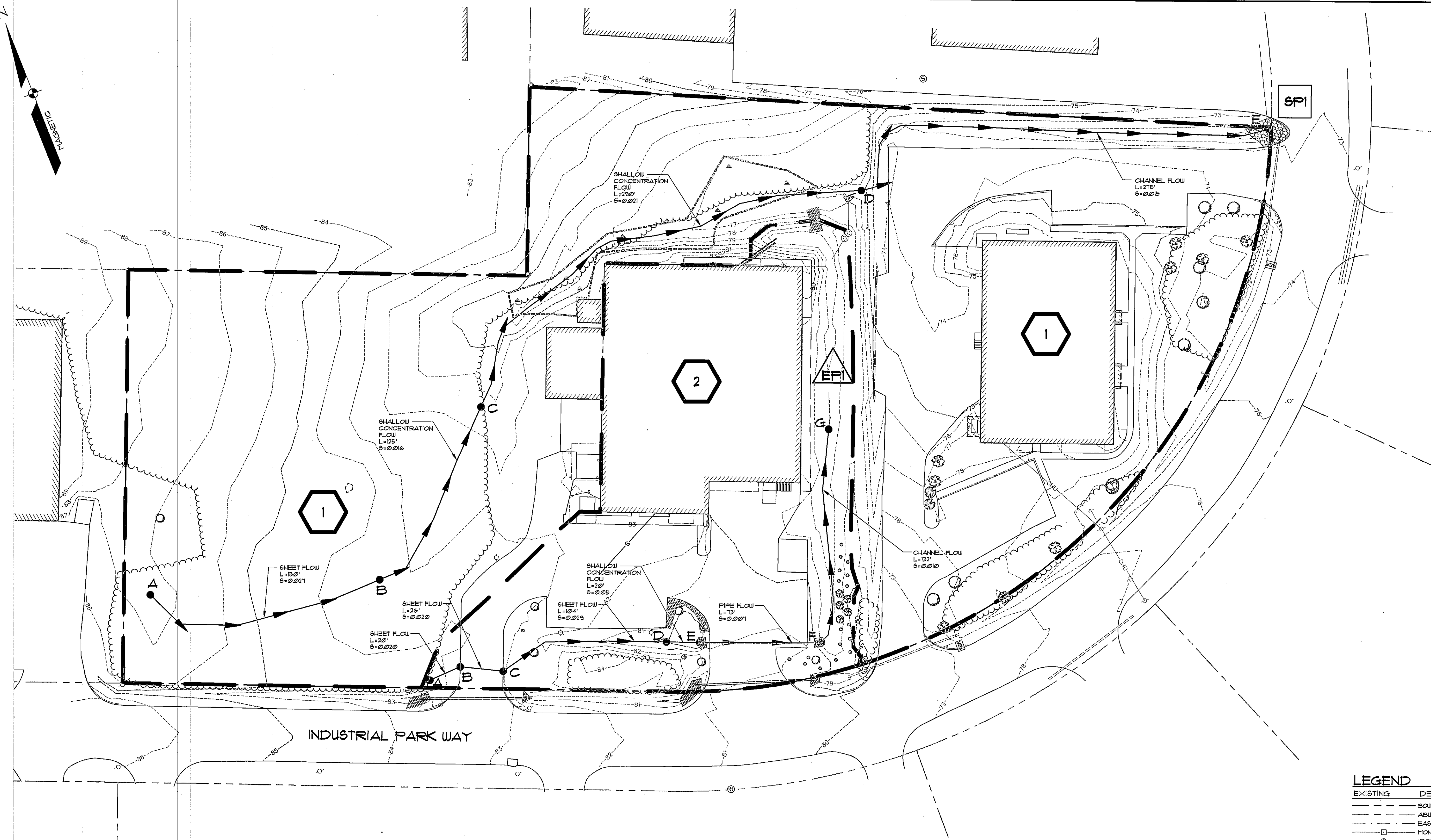
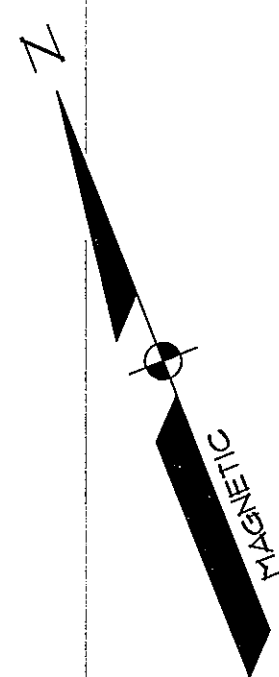
PROJECT NO. 02249
FIELD BOOK 847
DESIGN RLM
CHECK RLM
DRAWN MAL

POST-DEVELOPMENT WATERSHED
OF: ALLAGASH BREWING COMPANY
INDUSTRIAL WAY
PORTLAND, MAINE
FOR: 50 INDUSTRIAL WAY, LLC
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

DATE	SCALE
05-20-14	1" = 30'

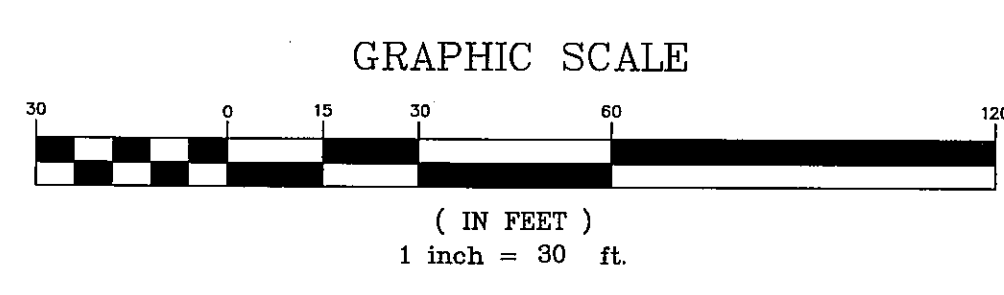
SHEET C10.4

02249SWP-phase2.dwg, TAB: 2014-Phase 2



LEGEND

	WATERSHED BOUNDARY
	TIME OF CONCENTRATION
	REACH
	WATERSHED LABEL
	REACH
	DETENTION POND
	SOILS BOUNDARY



LEGEND

EXISTING	DESCRIPTION
	BOUNDARY LINE/ROW
	ABUTTER LINE/ROW
	EASEMENT
	MONUMENT
	IRON PIPE/ROD
	CURVE/LINE NO.
	BENCHMARK
	BUILDING
	SIGN
	EDGE PAVEMENT
	EDGE CONCRETE
	PAVEMENT PAINT
	GRAVEL ROAD
	CURBLINE
	TREELINE
	CONTOURS
	CHAIN LINK FENCE
	DECIDUOUS TREE
	CONIFEROUS TREE
	BOLLARD
	CULVERT
	OVERHEAD UTILITY
	UNDERGROUND UTILITY
	TRANSFORMER PAD
	LIGHT POLE/WALL
	UTILITY POLE
	GUY
	RIPRAP

P19

MAINE PROFESSIONAL ENGINEER
RICHARD L. MEEK
No. 10666

REV: B	BY: RLM	DATE: 07/11/14	STATUS: FINAL SITE PLAN SUBMISSION TO CITY
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.			

SEBAGO TECHNICS
75 Joint Roberts Rd., Suite 1A
Scarborough, ME 04075
Tel: 207-203-2100 Fax: 207-203-2559
WWW.SEBAGOTECHNICS.COM

PROJECT NO. 02249 FIELD BOOK DESIGN CHKD DRAWN
02249 847 RLM

2010-DEVELOPMENT WATERSHED
OF:
ALLAGASH BREWING COMPANY
INDUSTRIAL WAY
PORTLAND, MAINE
FOR:
50 INDUSTRIAL WAY, LLC
50 INDUSTRIAL WAY
PORTLAND, MAINE 04103

DATE	SCALE
07/10/14	1" = 30'

SHEET C10.1

02246SWP-PRE.dwg, TAB: 2010



PLANNING BOARD REPORT PORTLAND, MAINE

GET AIR PORTLAND, Applicant
921 RIVERSIDE STREET
LEVEL III SITE PLAN REVIEW

Submitted to: Portland Planning Board Public Hearing Date July 22, 2014	Prepared by: Stephanie Carver, GPCOG Planner for the City of Portland Date July 17, 2014
Applicant: Get Air Portland	Project No.2014.-109 CBL: 329 B006001

I. INTRODUCTION

Get Air Sports is leasing a building located at 921 Riverside Street and wishes to renovate the existing warehouse structure located in an I-M zone to house an indoor trampoline park. The existing building is approximately 25, 087 square feet with 20,000 in the warehouse portion of the building and the remaining in the office portion. In the new use, the office portions of the building would be converted to “party rooms,” bathrooms, and customer service space. The remainder of the building will be used to house the trampolines. As part of the interior renovations, wood framed platforms will be constructed upon which to place trampolines. Minimum exterior renovations are proposed including upgrading existing lighting to full cut off shields and demarcation of parking.

Applicant: Jacob Goodell, Get Air Portland
Applicant Representative, Benjamin Murray, P.E., E.S. Coffin

II. PUBLIC NOTICING

Notices were sent to 103 property owners and the interested citizen list. The legal ad appeared in the Portland Press Herald on July 14, 2014 and July 15th. A workshop was not held on this project and the required neighborhood meeting will be held on July 17, 2014 and the packet will be provided to the Board as part of the applicant’s submission. At this date, no public comment has been received.

Required Reviews and Waivers:

Applicant Standards	Applicant’s Proposal
Level III Site Plan (Article V)	This application qualifies as a Level III Site Plan as the applicant is requesting a change of use for a structure of more than 20,000 square feet.

III. PROJECT DATA

Zoning:	
Existing Zoning:	Moderate Impact Industrial Zone (I-M)
Existing Use:	Warehouse Facility- vacant
Proposed Use:	Indoor Recreational Trampoline Park
Lots:	
Existing number of lots:	one

Proposed number of lots:	one
Parcel Size:	6.38 acres
Impervious Surface:	
Existing Impervious Surface Area:	59,634 square
Proposed Impervious Surface Area:	unchanged
Building Area:	
Building Area:	25,087 sq. ft.
Building Footprint:	unchanged
Building Height(s):	Single story -unchanged
Parking:	
Parking Spaces Existing:	25
Parking Spaces proposed:	1 space/400 sq. ft.=63
Number of Handicapped Spaces:	3
Bicycle Parking Spaces Proposed:	7
Other:	
Estimated Cost of Project:	\$1,000,000
Uses in Vicinity:	Industrial

IV. EXISTING CONDITIONS

The existing building is located at 921 Riverside Street in an I-M industrial zone and consists of approximately 25,087 sq. ft. with 20,000 sq. ft. in the warehouse portion, and 5000 in the office portion. RPZ and ROS zones are the nearest zones, but do not directly border the site. The site consists of a total of 6.38 acres, of which almost 60,000 is impervious surface. It currently has 25 parking spaces.

The existing facility is served by electrical, water, and sewerage utilities, with no changes to capacity proposed by the applicant.



Figures 1: Existing view from corner of Riverside Street



V. PROPOSED DEVELOPMENT

Get Air Sports is proposing to renovate the existing warehouse/office space at 921 Riverside Street into an indoor trampoline park. The existing building is approximately 25,087 square feet with 20,000 sf of warehouse space and 5,000 sf of office space. The office portion of the building is proposed to be used for party rooms, bathrooms, and customer service and the remainder of the building to be used for recreation apparatus such as multiple trampolines, jumps and foam pits. All recreational activities will take place inside of the building with no activities on the exterior. Proposed hours of operation vary from facility to facility, but are expected to be from 10:00 AM to 12:00 AM. Minimum exterior renovations are proposed including upgrading existing lighting which will remain in its current location to full cut off shields. The proposal also shows restriping of the existing paved area to increase the number of parking from 25 to 63 spaces.



VI. RIGHT, TITLE AND INTEREST AND FINANCIAL/TECHNICAL CAPACITY

- a. The owner of the property is Kowabunga LLC. The applicant, Get Air Sports is leasing the property and has provided a copy of a lease and a Warranty Deed, recorded at the Cumberland County Registry of Deeds (Book 13872, Page 218), which demonstrates their right, title and interest in the property.
- b. The estimated cost of the development is \$1,000,000. The applicant has submitted documentation from Wells Fargo bank as demonstration of their financial and technical capacity to complete the proposed development.

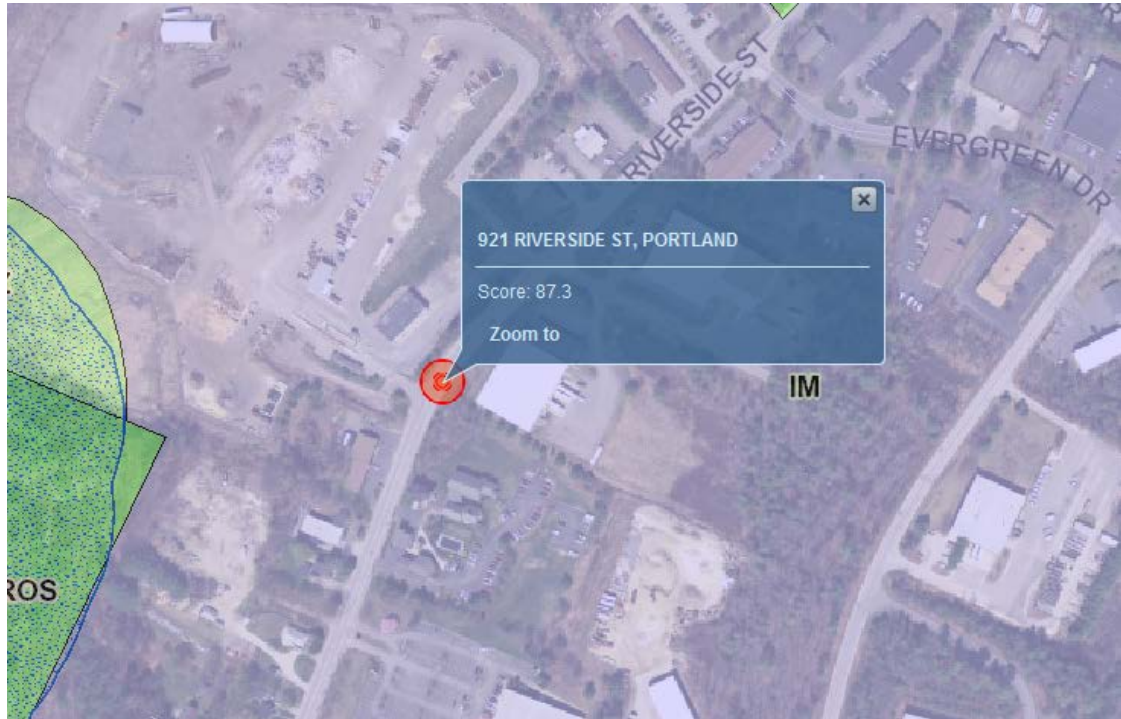


Figure 2: Zoning Boundaries.

VII. ZONING ASSESSMENT

The following comments are from Marge Schmuckal, Zoning Administrator, 7-3-14:

This change of use for the intire building is an allowable use under the "Indoor Amusement & Recreation" use. The site plan shows the required 63 parking spaces. There is no exterior work being proposed. Separate permits will be required for any new signage.

VIII. DEVELOPMENT REVIEW

A. SITE PLAN SUBMISSION REQUIREMENTS (Section 14-527)

The application is complete

B. SITE PLAN STANDARDS (Section 14-526)

The proposed development has been reviewed by staff for conformance with the relevant review standards of Portland's site plan ordinance and applicable regulations. Staff comments are listed below.

1. Transportation Standards-

Traffic Review (comments submitted by Tom Errico with T.Y. Lin):

- a. **Impact on Surrounding Street Systems-** Tom states that in his "professional opinion the project will not generate in excess of 100 passenger-car equivalents (particularly when a traffic credit is available for the prior use). I concur with the applicant that a Traffic Movement Permit is not required for the project."
- b. **Access and Circulation-** Tom has commented that the vehicular access to the site remains the same. There is a public sidewalk along Riverside Street; however, the plan does include an internal connection from the public sidewalk to the entrance. He suggests that the applicant design and construct for pedestrian accessibility a sidewalk connection between the Riverside Drive sidewalk and the building entrance. This is proposed as a condition of approval.
- c. **Public Transit Access-** Not applicable.
- d. **Parking-** The applicant has provided a parking calculation based on the proposed use. The site design accommodates these spaces. 7 Bicycle spaces have been added to the front of the site as required by the ordinance.
- e. **Snow Storage-** A location for snow storage is noted on the plans.
- f. **Transportation Demand Management (TDM)-** Not applicable.

2. Environmental Quality Standards

- a. **Preservation of Significant Natural Features** – landscaping is mature and in good shape. It would remain the same with the proposed use. Street trees (6 inch Ash) line the Riverside Street frontage. Jeff Tarling, City Arborist, finds the existing vegetation meets the City's standards.
- b. **Water Quality, Storm Water Management and Erosion Control** –David Senus PE (Woodard Curran, Inc.) has confirmed at review meetings that the site plan as proposed does not require a stormwater management review under the City's stormwater regulations.

3. Public Infrastructure and Community Safety Standards

- a. **Consistency with Master Plans-** The proposal is consistent with the City's master plans.
- b. **Public Safety and Fire Prevention** – No changes to site access have been proposed. Captain Chris Pirone has noted there is adequate access to the site from the site plan perspective and will be reviewing internal access through the building permit process.
- c. **Availability and Adequate Capacity of Public Utilities** – David Margolis-Pineo has confirmed that the Department of Public Services finds the site plan to be acceptable and has not comments.

4. Site Design Standards

- a. **Massing, Ventilation and Wind Impact-** no major exterior renovations are proposed to the site. Therefore this is not considered an issue in this proposal.
- b. **Shadows-** no major exterior renovations are proposed to the site. Therefore this is not considered an issue in this proposal.
- c. **Snow and Ice Loading-** This is not considered an issue in this proposal.

- d. **View Corridors-** There are no designated corridors in this area.
- e. **Historic Resources** – There are no historic resources located on or adjacent to the site.
- f. **Exterior Lighting-** Exterior lighting will be changed to shielded lights but located in the same locations. The change will meet City standards.
- g. **Noise and Vibration** – This had not been identified as an issue in this proposal.
- h. **Signage and Wayfinding-** This had not been identified as an issue in this proposal; however Marge Schmuckal has noted that separate sign permits will be required for any new signage.
- i. **Zoning Related Design Standards-** The project is not subject to design standards.

IX. STAFF RECOMMENDATION

Subject to the proposed motions and conditions of approval listed below, the Planning Division staff recommends that the Planning Board approve the proposed change of use.

X. PROPOSED MOTIONS

SITE PLAN REVIEW

On the basis of the application, plans, reports and other information submitted by the applicant, findings and recommendations contained in the July 17, 2014 Planning Board Report for application #2014-109 relevant to the Site Plan standards and other regulations, and the testimony presented at the Planning Board hearing, the Planning Board finds the following:

The plan **(is/is not)** in conformance with the site plan standards of the Land Use Code, subject to the following conditions of approval:

- 1) The applicant shall submit a final revised site plan that shows a sidewalk connecting the existing sidewalk on Riverside Street to the front entrance of the facility.
- 2) Separate building permits will be required for any new signage.

Attachments:

Report Attachments

- 1. Traffic Engineer Review Comments dated 7-2-14

Applicant's Submittal

- A. Table of Contents
- B. Cover Letter
- C. Application
- D. Letter of Authorization
- E. Traffic Report
- F. Deed
- G. Financial Capability Statement

Plans

- P1. Proposed Site Plan
- P2. Boundary Survey
- P3. Site Details
- P4. Details

P5. Floor Plan

From: Stephanie Carver <scarver@gpcog.org>
To: "Shukria Wiar (SHUKRIAW@portlandmaine.gov)" <SHUKRIAW@portlandmaine.gov>
Date: 7/17/2014 11:35 AM
Subject: FW: 921 Riverside Traffic Report

Stephanie Carver
Senior Planner
Greater Portland Council of Governments
970 Baxter Blvd., 2nd Floor, Portland, ME 04103
(207) 774-9891 (Phone), (207) 774-7149 (Fax)
scarver@gpcog.org<mailto:scarver@gpcog.org>
www.gpcog.org

From: Tom Errico [mailto:thomas.errico@tylin.com]
Sent: Wednesday, July 02, 2014 4:36 PM
To: Stephanie Carver
Cc: David Margolis-Pineo; Katherine Earley; Jeff Tarling (JST@portlandmaine.gov); Jeremiah Bartlett
Subject: RE: 921 Riverside Traffic Report

Hi Stephanie - I reviewed the traffic information provided by the applicant. In my professional opinion the project will not generate in excess of 100 passenger-car equivalents (particularly when a traffic credit is available for the prior use). I concur with the applicant that a Traffic Movement Permit is not required for the project. Accordingly, I find the project to be acceptable from a traffic perspective. I would note that for pedestrian accessibility a sidewalk connection should be constructed between the Riverside Drive sidewalk and the building entrance.

If you have any questions, please contact me.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
[cid:image001.gif@01CF9613.22C3DC40]T.Y. Lin International
12 Northbrook Drive
Falmouth, ME 04105
207.781.4721 (main)
207.347.4354 (direct)
207.400.0719 (mobile)
207.781.4753 (fax)
thomas.errico@tylin.com<mailto:thomas.errico@tylin.com>
Visit us online at www.tylin.com<http://www.tylin.com>
Twitter | Facebook | LinkedIn | YouTube

"One Vision, One Company"

Please consider the environment before printing.

From: Stephanie Carver [mailto:scarver@gpcog.org]
Sent: Wednesday, July 02, 2014 3:40 PM
To: Tom Errico
Subject: RE: 921 Riverside Traffic Report

Tom,
Did you have a chance to read what the applicant submitted on this one? As I said at this point they were not planning on submitting any additional information. Let me know if you have any specific concerns or need any additional information.

Stephanie Carver
Senior Planner
Greater Portland Council of Governments
970 Baxter Blvd., 2nd Floor, Portland, ME 04103
(207) 774-9891 (Phone), (207) 774-7149 (Fax)
scarver@gpcog.org<mailto:scarver@gpcog.org>
www.gpcog.org<http://www.gpcog.org>

From: Tom Errico [mailto:thomas.errico@tylin.com]
Sent: Thursday, June 26, 2014 4:27 PM
To: Stephanie Carver
Subject: Re: 921 Riverside Traffic Report

Ok, thanks

Sent from my iPhone

On Jun 26, 2014, at 4:25 PM, "Stephanie Carver" <scarver@GPCOG.org<mailto:scarver@GPCOG.org>> wrote:

Tom,

I think you misread my previous email. They are NOT planning to submit anything further. Also, Barbara has them on the agenda now for 22nd.

Stephanie Carver
Senior Planner
Greater Portland Council of Governments
970 Baxter Blvd., 2nd Floor, Portland, ME 04103
(207) 774-9891 (Phone), (207) 774-7149 (Fax)
scarver@GPCOG.org<mailto:scarver@GPCOG.org>
www.GPCOG.org<http://www.GPCOG.org>

From: Tom Errico [mailto:thomas.errico@tylin.com]
Sent: Thursday, June 26, 2014 12:49 PM
To: Stephanie Carver
Subject: Re: 921 Riverside Traffic Report

Yes - I wasn't sure if was you emailed yesterday was it. I will wait for the new information.
Thanks

Sent from my iPhone

On Jun 26, 2014, at 12:04 PM, "Stephanie Carver" <scarver@GPCOG.org<mailto:scarver@GPCOG.org>> wrote:

Tom,

Apparently you were waiting on something additional from Get Air Portland on this? I just got off the phone with the engineer and he said that they will not be forwarding any additional historic data as you originally discussed. Their headquarters has nothing on file.

Stephanie Carver
Senior Planner
Greater Portland Council of Governments
970 Baxter Blvd., 2nd Floor, Portland, ME 04103
(207) 774-9891 (Phone), (207) 774-7149 (Fax)
scarver@GPCOG.org<mailto:scarver@GPCOG.org>
www.GPCOG.org<http://www.GPCOG.org>

From: Stephanie Carver
Sent: Wednesday, June 25, 2014 1:54 PM
To: Thomas A. Errico (thomas.errico@tylin.com<mailto:thomas.errico@tylin.com>)
(thomas.errico@tylin.com<mailto:thomas.errico@tylin.com>)
Subject: 162 Traffic Report

Tom,

I was looking through this file and in my notes we discussed the need for a traffic report. This is what the applicant had submitted. Perhaps you haven't seen it, or it is insufficient. Either way, let me know your thoughts. If you still need more info I will contact the applicant and advise them of this issue.

Steph

TABLE OF CONTENTS

<u>TITLE</u>	<u>SECTION NUMBER</u>
WRITTEN SUBMISSION	1
LEVEL III APPLICATION	2
LETTER OF AUTHORIZATION	3
TRAFFIC REPORT	4
DEED	5
LEASE AGREEMENT	6
FINANCIAL CAPABILITY STATEMENT	7

432 Cony Road
P.O. Box 4687
Augusta, ME 04330



(207) 623-9475
Fax (207) 623-0016
1-800-244-9475

June 16, 2014

Ms. Barbara Barhydt
Planning Division
City of Portland
389 Congress Street 4th Floor
Portland, Maine

**Subject: Level III Final Site Plan Submission
Get Air Portland
921 Riverside Street
Portland, Maine**

Dear Ms. Barhydt:

Thank you for meeting and coordinating with our office and our client to review this proposed project. Please find enclosed our submission of the Level III Final Site Plan materials. Please let us know when the abutter addresses are ready so we can coordinate the required neighborhood meeting.

If you have any questions, please feel free to call me at 623-9475.

Sincerely,

Benjamin Murray, P.E.
Project Engineer
E.S. Coffin Engineering & Surveying, Inc.

APPLICATION FORM AND FEES

See the attached application form. The application fee will be paid with a phone call to the Inspections Office.

PROJECT NARRATIVE

Get Air Sports (Lessor) is a national franchise that is looking to renovate the existing warehouse/office space at 921 Riverside Street into Maine's first indoor trampoline park. The existing building is approximately 25,087 square feet with 20,000 in the warehouse portion and 5,000 in the office portion. With the office portion of the building proposed to be used for party rooms, bathrooms, and customer service; the remainder of the building will be used for the multiple trampolines, jumps and foam pits. The trampoline fixtures will be steel framed structures of various designs and difficulties at a minimum elevation off from the existing floor of 3'-0". This will require the formation of wood framed interior platforms around the different fixtures for access. Proposed hours of operation vary from facility to facility, but are expected to be from 10:00 AM to 12:00 AM. Minimum exterior renovations are proposed including upgrading existing lighting to full cut off shields and showing the required number of parking spaces required.

EVIDENCE OF RIGHT, TITLE AND INTEREST

Copies of the owner's deed and a lease agreement with the Lessor have been provided.

EVIDENCE OF STATE AND/OR FEDERAL PERMITS

The only state permit required for this project is a construction and barrier free permit with the State Fire Marshal's Office. This permit will be submitted for after acquiring planning board approval. No federal permits are required.

ZONING REQUIREMENTS ASSESSMENT

We feel that the proposed location of the facility fits perfectly with current zoning. The project is located in the I-M Industrial Zone, in which indoor amusement parks is an allowed use. This type of business does not need to be located in the center of mercantile districts, because customers will travel the required distance to this facility. Minimal changes are proposed to the exterior of the building including, but are not limited to, the striping of the parking lot for the required number of spaces, the addition of bicycle parking spaces and the replacement of exterior wall lighting with compliant cut-off fixtures. The site is also well landscaped with mature trees and shrubs. We do not plan to add or take away any landscaping. The following is a summation of each section requirement:

Section 14-250 Dimensional Requirements

The site meets all of the current required dimensional requirements. The required setbacks have been shown on the enclosed site plan.

Section 14-251 Other Requirements

- A) Additional parking spaces have been shown on the site plan to meet the required 1 parking spot per 400 square feet requirement without adding any additional impervious area.

- B) No off-street loading is proposed for the change of use. The existing warehouse doors will remain to be used by a future tenant.
- C) The existing sign on site will be used as well as a sign on the existing building. A permit application will be submitted for each sign.
- D) The lot is not located in a Shoreland or floodplain zone.
- E) All of the trampoline activities will take place within the building with no exterior use.
- F) No storage is proposed on the exterior of the building.
- G) No liquid waste storage is proposed.
- H) No food processing waste is proposed.
- I) A shielded dumpster is proposed in the rear of the building on an existing concrete slab.
- J) No outdoor storage is proposed.

EASEMENTS, COVENANTS, ETC.

The easements, covenants, public or private rights of way, or other burdens on the site have been shown on the attached site plan. None of them will be impacted by this project.

EVIDENCE OF FINANCIAL AND TECHNICAL CAPACITY

See the attached statement from the owner's lending institution.

CONSTRUCTION MANAGEMENT PLAN

A general contractor will be hired for the proposed project to oversee the renovations to the building. The fixtures will be manufactured off site, transported to the site and assembled. Once they are assembled, the platforms will be constructed around them. While the platforms are being assembled, the few interior and exterior renovations will take place.

TRAFFIC STUDY

See the attached traffic report.

SIGNIFICANT NATURAL FEATURES

The proposed project does not create any additional impervious areas including additions or parking. We are also proposing not to remove any of the existing landscaping. Therefore, no existing natural features will be disturbed.

The proposed dumpster location will be screened with fencing as shown on the site plan.

STORMWATER

There are no proposed impervious areas with the change of use and therefore, no additional stormwater will be created. The existing stormwater for the site drains to the rear of the property through level spreaders, culverts and drainage swales.

MASTER PLAN

The proposed change of use fits well into the Comprehensive Plan for the City by locating a new business in an existing vacant building. The proposed use also fits well into the surrounding area by adding another recreational use to the area that already includes the Riverside Golf Course and Spare Time Recreational.

UTILITY CAPACITY

The existing facility has ample electrical, water and sewerage capacity for the proposed usage. One new bath room is proposed in the building.

SOLID WASTE GENERATION

Solid waste generation from the proposed operation will be low due to the nature of the business. A dumpster will be provided in the rear of the building to handle the waste generated. A larger temporary dumpster will also be provided during construction.

LIFE SAFETY SUMMARY

The building usage will be classified as Assembly under the NFPA 101 Life Safety Code. The existing building is fully sprinkled with a NFPA 13 system and will be modified as needed for the proposed use and renovation. The concealed space under the platforms will be enclosed, inaccessible and not used for storage. We have verified with Gerald Leach from the State Fire Marshal's Office that the space does not need to be sprinkled per NFPA 13 Section 8.15.1.2.11, which is an exemption for concealed space framed with either fire retardant wood framing or non-combustible. All of the platform, ramp, wall and floor sheathing will be comprised of fire retardant wood sheathing supported by cold form steel studs.

The platforms will be enclosed with fire rated gypsum sheathing at the perimeter. The building has an ample number of exits that are remotely located from one another. However, it is difficult to equate the occupancy loading charts to this facility. The occupant load for each area is restricted to the number of people that Get Air allows on each piece of equipment. This is explained further in the attached Traffic Report. The nearest occupant load per NFPA factor would be an exercise room with equipment of 1 person per 50 square feet. For this 20,000 square foot facility, that would equate to 400 people. As described on the Traffic Report, Get Air proposes a total of approximately 165 people with a total of 189 based on the parking spaces required. The egress door capacity for the trampoline facility is 540 people.

Under the 2009 International Building Code, the proposed use will be classified as Assembly (A-2). Given that the building will contain wood sheathing, the construction type will go from a Type II to a Type V. The base allowable building area per story is 6,000 square feet. With the building being sprinkled and having open space on both the north and east walls, the allowable building area can be increased to over 25,000 square feet. See the equation below:

$$\text{Allowable Building Area} = \{6,000 + [6,000[(311/671) - .25] (30/30)] + (6,000) (3)\} = \mathbf{25,281 \text{ SF}}$$

Therefore, based on this life safety assessment, we feel that the building meets the requirements of the NFPA 101 and IBC 2009 code.

DESIGN STANDARDS

Based on our proposed change of use of the site and the elements described in the design standards, we find that the following apply to this project. Due to the project being located in an existing building and there is no proposed addition to the building, a majority of the design standards aren't applicable to this project.

(a) Transportation Standards

4. Parking:

- a. The required number of parking spaces has been shown on the site plan.
- b. Total of (7) new bicycle parking spaces have been provided.
- c. The site current has access for motorcycle and scooter parking.
- d. The snow storage area has been shown on the plan.

6. Exterior Lighting:

- a. The exterior wall lighting on the building is proposed to be replaced with full cutoff light fixtures in the same locations.

8. Signage and Wayfinding:

- a. The existing sign in the front of the building will be reused and a new sign will be placed on the building meeting all of the design standards. A permit application will be submitted for each.

HVAC EQUIPMENT

There is no proposed HVAC equipment for the renovation.

Portland, Maine



Yes. Life's good here.

Jeff Levine, AICP, Director
Planning & Urban Development Department

Electronic Signature and Fee Payment Confirmation

Notice: Your electronic signature is considered a legal signature per state law.

By digitally signing the attached document(s), you are signifying your understanding this is a legal document and your electronic signature is considered a **legal signature** per Maine state law. You are also signifying your intent on paying your fees by the opportunities below.

I, the undersigned, intend and acknowledge that no Site Plan or Historic Preservation Applications can be reviewed until payment of appropriate application fees are ***paid in full*** to the Inspections Office, City of Portland Maine by method noted below:

- ☒ Within 24-48 hours, once my complete application and corresponding paperwork has been electronically delivered, I intend to **call the Inspections Office** at 207-874-8703 and speak to an administrative representative and provide a credit/debit card over the phone.
- ☐ Within 24-48 hours, once my application and corresponding paperwork has been electronically delivered, I intend to **call the Inspections Office** at 207-874-8703 and speak to an administrative representative and provide a credit/debit card over the phone.
- ☐ I intend to deliver a payment method through the U.S. Postal Service mail once my application paperwork has been electronically delivered.

Applicant Signature: _____

Date: _____

I have provided digital copies and sent them on: _____

Date: _____

NOTE:

All electronic paperwork must be delivered to buildinginspections@portlandmaine.gov or by physical means i.e. a thumb drive or CD to the Inspections Office, City Hall, 3rd Floor, Room 315.



Level III – Preliminary and Final Site Plans Development Review Application Portland, Maine

Planning and Urban Development Department
Planning Division

Portland's Planning and Urban Development Department coordinates the development review process for site plan, subdivision and other applications under the City's Land Use Code. Attached is the application form for a Level III: Preliminary or Final Site Plan. Please note that Portland has delegated review from the State of Maine for reviews under the Site Location of Development Act, Chapter 500 Stormwater Permits, and Traffic Movement Permits.

Level III: Site Plan Development includes:

- New structures with a total floor area of 10,000 sq. ft. or more except in Industrial Zones.
- New structures with a total floor area of 20,000 sq. ft. or more in Industrial Zones.
- New temporary or permanent parking area(s) or paving of existing unpaved parking areas for more than 75 vehicles.
- Building addition(s) with a total floor area of 10,000 sq. ft. or more (cumulatively within a 3 year period) except in Industrial Zones.
- Building addition(s) with a total floor area of 20,000 sq. ft. or more in Industrial Zones.
- A change in the use of a total floor area of 20,000 sq. ft. or more in any existing building (cumulatively within a 3 year period).
- Multiple family development (3 or more dwelling units) or the addition of any additional dwelling unit if subject to subdivision review.
- Any new major or minor auto business in the B-2 or B-5 Zone, or the construction of any new major or minor auto business greater than 10,000 sq. ft. of building area in any other permitted zone.
- Correctional prerelease facilities.
- Park improvements: New structures greater than 10,000 sq. ft. and/or facilities encompassing 20,000 sq. ft. or more (excludes rehabilitation or replacement of existing facilities); new nighttime outdoor lighting of sports, athletic or recreation facilities not previously illuminated.
- Land disturbance of 3 acres or more (includes stripping, grading, grubbing, filling or excavation).

Portland's development review process and requirements are outlined in the Land Use Code (Chapter 14) which is available on our website:

Land Use Code: <http://me-portland.civicplus.com/DocumentCenter/Home/View/1080>

Design Manual: <http://me-portland.civicplus.com/DocumentCenter/View/2355>

Technical Manual: <http://me-portland.civicplus.com/DocumentCenter/View/2356>

Planning Division
Fourth Floor, City Hall
389 Congress Street
(207) 874-8719

Office Hours
Monday thru Friday
8:00 a.m. – 4:30 p.m.

PROJECT NAME: GET AIR PORTLAND

PROPOSED DEVELOPMENT ADDRESS:

921 RIVERSIDE STREET

PROJECT DESCRIPTION:

Change of use of existing warehouse/office into proposed trampoline park.

CHART/BLOCK/LOT: 329 B006001

PRELIMINARY PLAN

FINAL PLAN

 (date)
6/16/14 (date)

CONTACT INFORMATION:

Applicant – must be owner, Lessee or Buyer Name: <u>Jacob Goodell</u> Business Name, if applicable: <u>Get Air Portland</u> Address: <u>4074S 1900W Suite 100</u> City/State: <u>Roy, UT</u> Zip Code: <u>84067</u>	Applicant Contact Information Work # Home# Cell # Fax# e-mail:
Owner – (if different from Applicant) Name: <u>Kowabunga, LLC</u> Address: <u>100 Silver Street</u> City/State: <u>Portland, ME</u> Zip Code: <u>04101</u>	Owner Contact Information Work # <u>774-1885</u> Home# Cell # Fax# e-mail: <u>dcahill@commercialpropertiesinc.com</u>
Agent/ Representative Name: <u>E.S. Coffin Engineering</u> Address: <u>P.O. Box 4687</u> City/State: <u>Augusta, ME</u> Zip Code: <u>04330</u>	Agent/Representative Contact information Work # <u>623-9475</u> Cell # <u>242-1119</u> e-mail: <u>bmurray@coffineng.com</u>
Billing Information Name: <u>Jacob Goodell</u> Address: <u>4074S 1900W Suite 100</u> City/State: <u>Roy, UT</u> Zip Code: <u>84067</u>	Billing Information Work # Cell # Fax# e-mail:

Engineer <u>E.S. COFFIN ENGINEERING</u> Name: Address: <u>SAME</u> City/State : Zip Code:	Engineer Contact Information Work # Cell # Fax# e-mail:
Surveyor Name: <u>E.S. COFFIN ENGINEERING</u> Address: <u>SAME</u> City/State : Zip Code:	Surveyor Contact Information Work # Cell # Fax# e-mail:
Architect Name: <u>N/A</u> Address: City/State : Zip Code:	Architect Contact Information Work # Cell # Fax# e-mail:
Attorney Name: Address: City/State : Zip Code:	Attorney Contact Information Work # Cell # Fax# e-mail:

APPLICATION FEES:

Check all reviews that apply. (Payment may be made by Credit Card, Cash or Check payable to the City of Portland.)

Level III Development (check applicable reviews) ___ Less than 50,000 sq. ft. (\$500.00) ___ 50,000 - 100,000 sq. ft. (\$1,000) ___ 100,000 - 200,000 sq. ft. (\$2,000) ___ 200,000 - 300,000 sq. ft. (\$3,000) ___ over 300,00 sq. ft. (\$5,000) ___ Parking lots over 11 spaces (\$1,000) ___ After-the-fact Review (\$1,000.00 plus applicable application fee) Plan Amendments (check applicable reviews) ___ Planning Staff Review (\$250) ___ Planning Board Review (\$500) The City invoices separately for the following: • Notices (\$.75 each) • Legal Ad (% of total Ad) • Planning Review (\$40.00 hour) • Legal Review (\$75.00 hour) Third party review fees are assessed separately. Any outside reviews or analysis requested from the Applicant as part of the development review, are the responsibility of the Applicant and are separate from any application or invoice fees.	Other Reviews (check applicable reviews) ___ Traffic Movement (\$1,000) ___ Stormwater Quality (\$250) ___ Subdivisions (\$500 + \$25/lot) # of Lots ___ x \$25/lot = ___ ___ Site Location (\$3,000, except for residential projects which shall be \$200/lot) # of Lots ___ x \$200/lot = ___ ___ Other _____ X Change of Use ___ Flood Plain ___ Shoreland ___ Design Review ___ Housing Replacement ___ Historic Preservation
--	---

APPLICATION SUBMISSION:

1. All site plans and written application materials must be submitted electronically on a CD or thumb drive with each plan submitted as separate files, with individual file which can be found on the **Electronic Plan and Document Submittal** page of the City's website at <http://me-portland.civicplus.com/764/Electronic-Plan-and-Document-Submittal>
2. In addition, one (1) paper set of the plans (full size), one (1) paper set of plans (11 x 17), paper copy of written materials, and the application fee must be submitted to the Building Inspections Office to start the review process.

The application must be complete, including but not limited to the contact information, project data, application checklists, wastewater capacity, plan for fire department review, and applicant signature. The submissions shall include one (1) paper packet with folded plans containing the following materials:

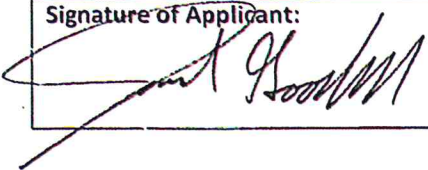
1. One (1) full size site plans that must be folded.
2. One (1) copy of all written materials or as follows, unless otherwise noted:
 - a. Application form that is completed and signed.
 - b. Cover letter stating the nature of the project.
 - c. All Written Submittals (Sec. 14-525 2. (c), including evidence of right, title and interest.
3. A stamped standard boundary survey prepared by a registered land surveyor at a scale not less than one inch to 50 feet.
4. Plans and maps based upon the boundary survey and containing the information found in the attached sample plan checklist.
5. One (1) set of plans reduced to 11 x 17.

Please refer to the application checklist (attached) for a detailed list of submission requirements.

APPLICANT SIGNATURE:

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Planning Authority and Code Enforcement's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for a Level II Site Plan review. It is not a permit to begin construction. An approved site plan, a Performance Guarantee, Inspection Fee, Building Permit, and associated fees will be required prior to construction. Other Federal, State or local permits may be required prior to construction, which are the responsibility of the applicant to obtain.

Signature of Applicant: 	Date: 6-6-14
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PROJECT DATA

The following information is required where applicable, in order to complete the application.

Total Area of Site	282,105 ⁷ sq. ft.
Proposed Total Disturbed Area of the Site	0 sq. ft.
If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with DEP and a Stormwater Management Permit, Chapter 500, with the City of Portland.	
Impervious Surface Area	
Impervious Area (Total Existing)	59,103 ⁴ sq. ft.
Impervious Area (Total Proposed)	0 sq. ft.
Building Ground Floor Area and Total Floor Area	
Building Footprint (Total Existing)	25,087 sq. ft.
Building Footprint (Total Proposed)	0 sq. ft.
Building Floor Area (Total Existing)	25,087 sq. ft.
Building Floor Area (Total Proposed)	0 sq. ft.
Zoning	
Existing	FM
Proposed, if applicable	
Land Use	
Existing	
Proposed	WAREHOUSE / OFFICE INDOOR TRAMPOLINE PARK
Residential, If applicable	
# of Residential Units (Total Existing)	
# of Residential Units (Total Proposed)	
# of Lots (Total Proposed)	
# of Affordable Housing Units (Total Proposed)	
Proposed Bedroom Mix	
# of Efficiency Units (Total Proposed)	
# of One-Bedroom Units (Total Proposed)	
# of Two-Bedroom Units (Total Proposed)	
# of Three-Bedroom Units (Total Proposed)	
Parking Spaces	
# of Parking Spaces (Total Existing)	25
# of Parking Spaces (Total Proposed)	63
# of Handicapped Spaces (Total Proposed)	5
Bicycle Parking Spaces	
# of Bicycle Spaces (Total Existing)	0
# of Bicycle Spaces (Total Proposed)	7
Estimated Cost of Project	\$ 1,000,000

PRELIMINARY PLAN (Optional) - Level III Site Plan			
Applicant Checklist	Planner Checklist	# of Copies	GENERAL WRITTEN SUBMISSIONS CHECKLIST
		1	Completed Application form
		1	Application fees
		1	Written description of project
		1	Evidence of right, title and interest
		1	Evidence of state and/or federal approvals, if applicable
		1	Written assessment of proposed project's compliance with applicable zoning requirements
		1	Summary of existing and/or proposed easement, covenants, public or private rights-of-way, or other burdens on the site
		1	Written requests for waivers from site plan or technical standards, if applicable.
		1	Evidence of financial and technical capacity
		1	Traffic Analysis (may be preliminary, in nature, during the preliminary plan phase)
Applicant Checklist	Planner Checklist	# of Copies	SITE PLAN SUBMISSIONS CHECKLIST
		1	Boundary Survey meeting the requirements of Section 13 of the City of Portland's Technical Manual
		1	Preliminary Site Plan including the following: (information provided may be preliminary in nature during preliminary plan phase)
			Proposed grading and contours;
			Existing structures with distances from property line;
			Proposed site layout and dimensions for all proposed structures (including piers, docks or wharves in Shoreland Zone), paved areas, and pedestrian and vehicle access ways;
			Preliminary design of proposed stormwater management system in accordance with Section 5 of the Technical Manual (note that Portland has a separate applicability section);
			Preliminary infrastructure improvements;
			Preliminary Landscape Plan in accordance with Section 4 of the Technical Manual;
			Location of significant natural features (including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features) located on the site as defined in Section 14-526 (b) (1);
			Proposed buffers and preservation measures for significant natural features, as defined in Section 14-526 (b) (1);
			Location , dimensions and ownership of easements, public or private rights of way, both existing and proposed;
			Exterior building elevations.

FINAL PLAN - Level III Site Plan			
Applicant Checklist	Planner Checklist	# of Copies	GENERAL WRITTEN SUBMISSIONS CHECKLIST (* If applicant chooses to submit a Preliminary Plan, then the * items were submitted for that phase and only updates are required)
✓		1	* Completed Application form
✓		1	* Application fees
✓		1	* Written description of project
✓		1	* Evidence of right, title and interest
✓		1	* Evidence of state and/or federal permits
✓		1	* Written assessment of proposed project's specific compliance with applicable Zoning requirements
✓		1	* Summary of existing and/or proposed easements, covenants, public or private rights-of-way, or other burdens on the site
✓		1	* Evidence of financial and technical capacity
✓		1	Construction Management Plan
✓		1	A traffic study and other applicable transportation plans in accordance with Section 1 of the technical Manual, where applicable.
✓		1	Written summary of significant natural features located on the site (Section 14-526 (b) (a))
✓		1	Stormwater management plan and stormwater calculations
✓		1	Written summary of project's consistency with related city master plans
✓		1	Evidence of utility capacity to serve
✓		1	Written summary of solid waste generation and proposed management of solid waste
✓		1	A code summary referencing NFPA 1 and all Fire Department technical standards
		1	Where applicable, an assessment of the development's consistency with any applicable design standards contained in Section 14-526 and in City of Portland Design Manual
✓		1	Manufacturer's verification that all proposed HVAC and manufacturing equipment meets applicable state and federal emissions requirements.

Applicant Checklist	Planner Checklist	# of Copies	SITE PLAN SUBMISSIONS CHECKLIST (* If applicant chooses to submit a Preliminary Plan, then the * items were submitted for that phase and only updates are required)
✓		1	* Boundary Survey meeting the requirements of Section 13 of the City of Portland's Technical Manual
✓		1	Final Site Plans including the following:
✓			Existing and proposed structures, as applicable, and distance from property line (including location of proposed piers, docks or wharves if in Shoreland Zone);
			Existing and proposed structures on parcels abutting site;
✓			All streets and intersections adjacent to the site and any proposed geometric modifications to those streets or intersections;
✓			Location, dimensions and materials of all existing and proposed driveways, vehicle and pedestrian access ways, and bicycle access ways, with corresponding curb lines;
✓			Engineered construction specifications and cross-sectional drawings for all proposed driveways, paved areas, sidewalks;
✓			Location and dimensions of all proposed loading areas including turning templates for applicable design delivery vehicles;
✓			Existing and proposed public transit infrastructure with applicable dimensions and engineering specifications;
✓			Location of existing and proposed vehicle and bicycle parking spaces with applicable dimensional and engineering information;
✓			Location of all snow storage areas and/or a snow removal plan;
✓			A traffic control plan as detailed in Section 1 of the Technical Manual;
✓			Proposed buffers and preservation measures for significant natural features, where applicable, as defined in Section 14-526(b)(1);
✓			Location and proposed alteration to any watercourse;
✓			A delineation of wetlands boundaries prepared by a qualified professional as detailed in Section 8 of the Technical Manual;
✓			Proposed buffers and preservation measures for wetlands;
✓			Existing soil conditions and location of test pits and test borings;
✓			Existing vegetation to be preserved, proposed site landscaping, screening and proposed street trees, as applicable;
✓			A stormwater management and drainage plan, in accordance with Section 5 of the Technical Manual;
✓			Grading plan;
✓			Ground water protection measures;
✓			Existing and proposed sewer mains and connections;

- Continued on next page -

✓		Location of all existing and proposed fire hydrants and a life safety plan in accordance with Section 3 of the Technical Manual;
✓		Location, sizing, and directional flows of all existing and proposed utilities within the project site and on all abutting streets;
✓		Location and dimensions of off-premises public or publicly accessible infrastructure immediately adjacent to the site;
✓		Location and size of all on site solid waste receptacles, including on site storage containers for recyclable materials for any commercial or industrial property;
✓		Plans showing the location, ground floor area, floor plans and grade elevations for all buildings;
✓		A shadow analysis as described in Section 11 of the Technical Manual, if applicable;
✓		A note on the plan identifying the Historic Preservation designation and a copy of the Application for Certificate of Appropriateness, if applicable, as specified in Section Article IX, the Historic Preservation Ordinance;
✓		Location and dimensions of all existing and proposed HVAC and mechanical equipment and all proposed screening, where applicable;
✓		An exterior lighting plan in accordance with Section 12 of the Technical Manual;
✓		A signage plan showing the location, dimensions, height and setback of all existing and proposed signs;
✓		Location, dimensions and ownership of easements, public or private rights of way, both existing and proposed.



**PORTLAND FIRE DEPARTMENT
SITE REVIEW
FIRE DEPARTMENT CHECKLIST**



A separate drawing[s] shall be provided as part of the site plan application for the Portland Fire Department's review.

1. Name, address, telephone number of applicant
- 2.
3. Name address, telephone number of architect
4. Proposed uses of any structures [NFPA and IBC classification]
- 5.
6. Square footage of all structures [total and per story]
7. Elevation of all structures
8. Proposed fire protection of all structures
 - **As of September 16, 2010 all new construction of one and two family homes are required to be sprinkled in compliance with NFPA 13D. This is required by City Code. (NFPA 101 2009 ed.)**
9. Hydrant locations
10. Water main[s] size and location
11. Access to all structures [min. 2 sides]
12. A code summary shall be included referencing NFPA 1 and all fire department. Technical standards.

Some structures may require Fire flows using annex H of NFPA 1

CITY OF PORTLAND WASTEWATER CAPACITY APPLICATION

Department of Public Services,
55 Portland Street,
Portland, Maine 04101-2991



Mr. Frank J. Brancely,
Senior Engineering Technician,
Phone #: (207) 874-8832,
Fax #: (207) 874-8852,
E-mail: fjb@portlandmaine.gov

Date: 6/16/14

1. Please, Submit Utility, Site, and Locus Plans.

Site Address: 921 RIVERSIDE ST.

Chart Block Lot Number: 329 B006001

Proposed Use: TRAMPOLINE PARK

Previous Use: WAREHOUSE / OFFICE

Existing Sanitary Flows: NOT KNOWN GPD

Existing Process Flows: NONE GPD

Description and location of City sewer that is to receive the proposed building sewer lateral.

EXISTING BUILDING CONNECTION
WITH NO REVISIONS

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: BARBARA BARKHDT Phone: 874-8699

Owner/Developer Name: GET AIR PORTLAND

Owner/Developer Address: 4074 S 1900th SOITE 100

Phone: (601) 906-9386

Fax: _____ E-mail: briantrampolinepark24@gmail.com

Engineering Consultant Name: E.S. COFFIN ENGINEERING

Engineering Consultant Address: P.O. Box 4087 AUGUSTA, ME 04330

Phone: (207) 623-9475

Fax: 623-0016 E-mail: bmurray@coffineering.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: 189 people (1090l) = 1,890 GPD

Peaking Factor/ Peak Times: 12-4 pm

Specify the source of design guidelines: (i.e. ☒ "Handbook of Subsurface Wastewater Disposal in Maine,"
☐ "Plumbers and Pipe Fitters Calculation Manual," ☐ Portland Water District Records, ☐ Other (specify)

(Note: Please submit calculations showing the derivation of your design flows, either on the following page, in the space provided, or attached, as a separate sheet)

4. Please, Submit External Grease Interceptor Calculations.

Total Drainage Fixture Unit (DFU) Values:

Size of External Grease Interceptor:

Retention Time:

Peaking Factor/ Peak Times:

No cooking or prep at site

(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:

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 below, or attached, as a separate sheet)

Notes, Comments or Calculation

June 6, 2014

Mr. Benjamin Murray, P.E.
E.S. Coffin Engineering & Surveying
P.O. Box 4687
Augusta, Maine 04330

Subject: Agent Authorization
Get Air Sports
Portland, Maine

Dear Mr. Murray,

The intent of this letter is to authorize E.S. Coffin Engineering & Surveying, Inc. to act as our agent in submitting applications and answering questions regarding our submission to the City of Portland for the proposed project located 921 Riverside Street in Portland, Maine.

Sincerely,

 owner

432 Cony Road
P.O. Box 4687
Augusta, ME 04330



(207) 623-9475
Fax (207) 623-0016
1-800-244-9475

June 13, 2014

Ms. Barbara Barhydt
Planning Division
City of Portland
389 Congress Street 4th Floor
Portland, Maine

Subject: Traffic Report
Get Air Portland
921 Riverside Street
Portland, Maine

Dear Ms. Barhydt:

Get Air Portland (Lessor) is a national franchise that is looking to renovate the existing warehouse/office space at 921 Riverside Street into Maine's first indoor trampoline park. The existing building is approximately 25,000 square feet (sf) with 20,000 in the warehouse portion and 5,000 in the office portion. With the office portion of the building, it is proposed to be used for party rooms, bathrooms, and service; the remainder of the building will be used for the multiple trampolines, jumps and foam pits. The trampoline fixtures will be steel framed structures of various designs and difficulties at a minimum elevation off from the existing floor of 3'-0". This will require the formation of wood framed interior platforms around the different fixtures for access. Proposed hours of operation vary from facility to facility, but are expected to be from 10:00 AM to 12:00 AM.

For this particular use, the City of Portland's Land Use Ordinance (LUO) requires one parking space per 400 sf of building area. This building is 25,000 sf; so 62.5 parking spaces are required per the LUO. The proposed Site Plan (C-1) by E.S. Coffin Engineering & Surveying depicts 63 parking spaces. Based on their other facilities and parking studies that have been performed; it has been found that each vehicle has an average of 3 people. Based on the required number of spaces, this would equate to 189 people, if all 63 parking spaces are being utilized.

Get Air is required to follow ASTM F2970-13 Standard Practice for Design, Manufacture, Installation, Operation, Maintenance, Inspection and Major Modification of Trampoline Courts. This standard states that the rated capacity of a trampoline court shall not exceed one participant per 60 sf based on the overall footprint of the trampoline court. The proposed interior footprint of the space includes a total of 9,121 sf of trampoline courts, which equates to 152 participants.

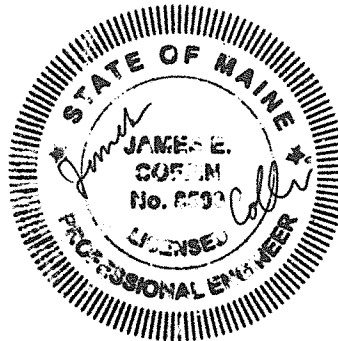
However the 5,000 sf office portion of the facility would have an additional occupant load equal to 1 space per 400 sf or 13 people. This would result in 165 people being in the facility at capacity. This number of occupants is less than, but similar to, the 189 calculated above utilizing 3 people per vehicle for the required 63 parking spots.

The ITE Trip Generation Manual (8th Edition) doesn't have any use that is similar to a trampoline park. The participants at the facility pay at an hourly rate and come and go from the facility at no set time intervals. So based on this assessment of the allowable occupancy for the trampolines, we recommend utilizing the 63 vehicles as the design volume per hour entering and exiting the facility as the estimated trip generation for the development. Since this number is less than 100 passenger car equivalents (PCE), a Traffic Movement Permit (TMP) is not required. If you have any questions, please feel free to call me at 623-9475.

Sincerely,



PE, Vice President



BK 13872 PG 218

033610

**CORRECTIVE
WARRANTY DEED**

KNOW ALL MEN BY THESE PRESENTS, that RICHARD J. McGOLDRICK, of the Town of Cape Elizabeth, County of Cumberland and State of Maine in consideration of one dollar and other valuable considerations paid by KOWABUNGA LLC, a Maine limited liability company with a mailing address of 100 Silver Street, Portland, Maine 04101 (hereinafter the "Grantee"), the receipt whereof he does hereby acknowledge, does hereby give, grant, bargain, sell and convey, unto the said Grantee, its successors and assigns forever, the property situated in the City of Portland, County of Cumberland and State of Maine, more particularly described as follows:

Lot No. 13 as depicted on a certain Site Plan of "Turnpike Industrial Park" dated March 25, 1986 and recorded at the Cumberland County Registry of Deeds at Plan Book 157, Page 61; including within this conveyance an easement to use in common with others, the 420 foot by 175 foot "Water Detention Basin" at the southeastern side of Lots 10 & 11 and abutting the Maine Turnpike Authority property so as to conform the boundaries of the property with said Site Plan. Together with and subject to certain easements as more particularly described in a deed from the Portland Venture Partners III to Micucci Brothers dated September 6, 1996 and recorded at Book 12711, Page 4 of said Registry of Deeds.

Excepting and reserving the premises described in a Notice of Layout and Taking in favor of the State of Maine dated April 1, 1998 and recorded in said Registry of Deeds at Book 13755, Page 184.

The purpose of this deed is to correct the Warranty Deed from Richard J. McGoldrick to Kowabunga LLC dated April 29, 1998 and recorded in said Registry of Deeds at Book 13778, Page 280.

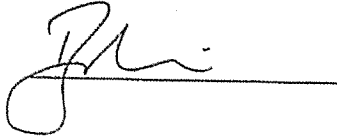
TO HAVE AND TO HOLD the aforesaid and bargained premises, with all privileges and appurtenances thereof to the said Grantee, its successors and assigns, to it and its use and behoof forever.

And he does covenant with the Grantee, its successors and assigns, that he is lawfully seized in fee of the premises; that he is free of all encumbrances, except as aforesaid; that he has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that he and his heirs and assigns, shall and will WARRANT AND DEFEND the same to the said

Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

IN WITNESS WHEREOF, RICHARD J. McGOLDRICK, has caused this instrument to be signed this 29 day of May, 1998.

WITNESS:


RICHARD J. McGOLDRICK

STATE OF MAINE
County of Cumberland, ss.

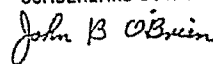
May 29, 1998

Personally appeared before me Richard J. McGoldrick and acknowledged the above instrument to be his free act and deed.

Before me,


Maine Attorney-at-Law
Notary Public (seal)
Printed Name: Bruce H. Tompkins

tip dealkow.doc
05/20/98 11:49 AM

RECEIVED
RECORDED REGISTRY OF DEEDS
1998 JUN -3 PH 4: 03
CUMBERLAND COUNTY


BK13879PG052

STATE OF MAINE
Cumberland, ss.

5/13, 1998

Personally appeared the above named Norman L. Whiteside, Vice President of Fleet Bank of Maine, and acknowledged the foregoing to be his free act and deed in his said capacity and the free act and deed of Fleet Bank of Maine.

Before me,

Barbara G. Tweedia

Notary Public (seal)

Maine Attorney-at-Law

SEAL

Printed Name:

Barbara G. Tweedia
Notary Public, Maine
My Commission Expires August 2, 1998

Knowdeed.doc
05/06/98 3:50 PM

RECEIVED
RECORDED REGISTRY OF DEEDS

1998 JUN -8 AM 10: 57

CUMBERLAND COUNTY

John B O'Brien



Ogden Business Banking Center
MAC U1322-012
2389 Washington Blvd.
Suite 110
Ogden, UT 84401

Date: 06/09/2014

Re: Get Air Portland ME, LLC

To Whom It May Concern:

This letter is to confirm that the Get Air Portland ME, LLC and Get Air Management relationship in it's entirety has maintained a highly-valued current financial relationship with Wells Fargo Bank. The company maintains a deposit account with large balances with our bank which is currently purposed as a holding account for the establishment and startup costs for the Get Air Portland Maine location.

The account details are as follows:

Account entity is Get air Portland ME, LLC
Type of account is Checking
Account open date is 03/28/2014
Balance as of current is \$211,646.42
All of the accounts are performing satisfactorily

If you have further questions, Please contact me at 801-626-9601.

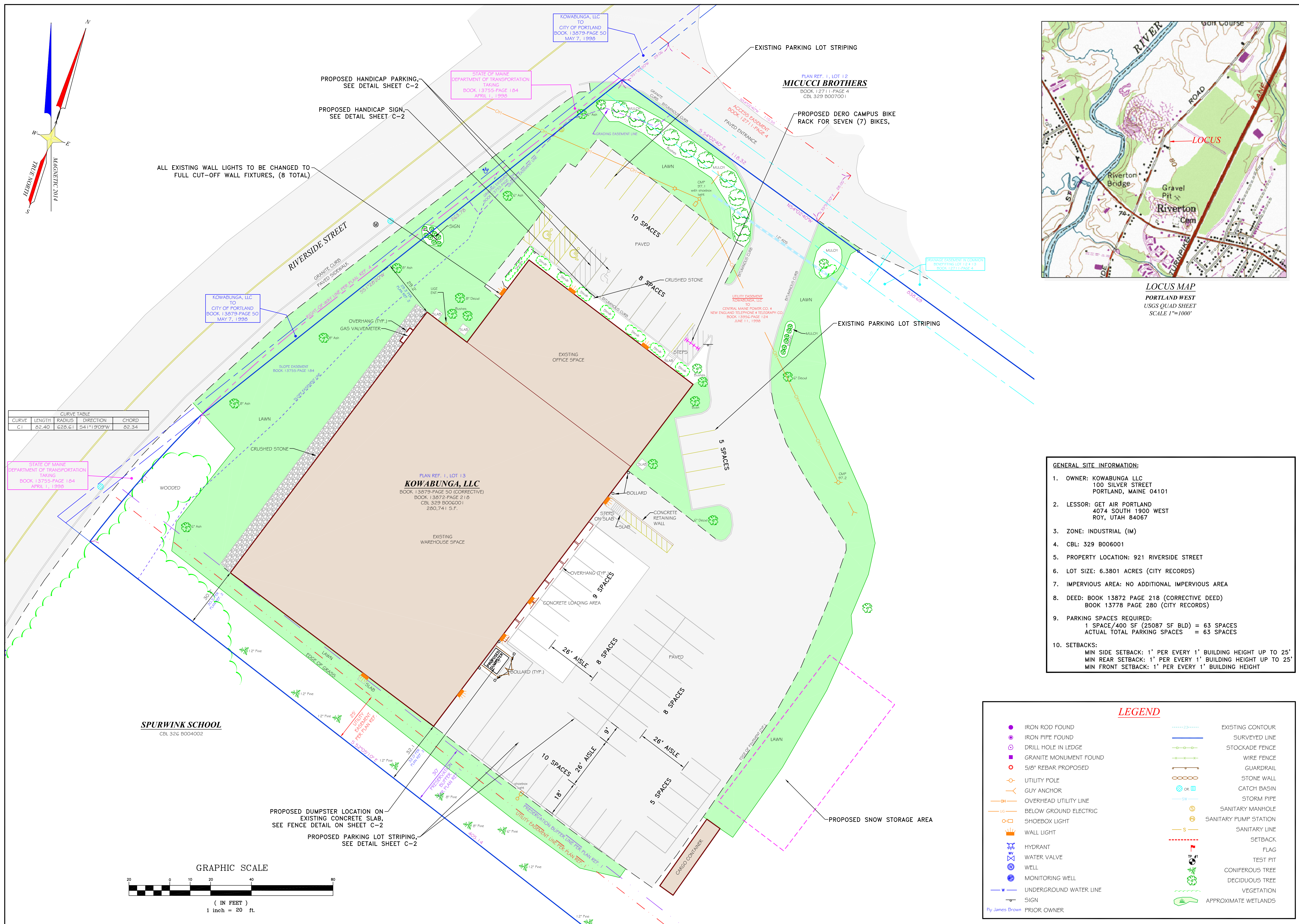
Thanks,

A handwritten signature in black ink, appearing to read "Ryan Olsen", with a stylized flourish at the end.

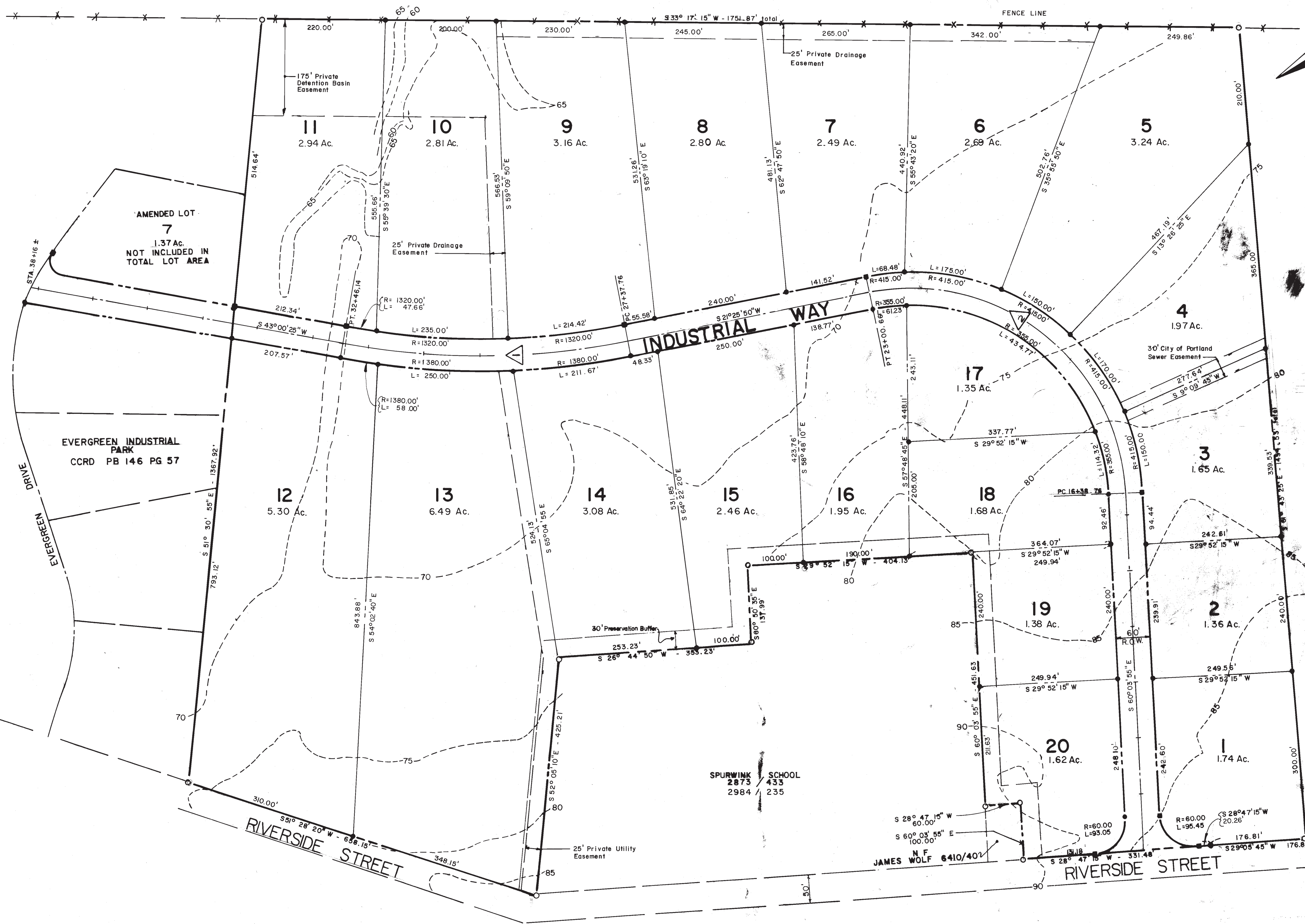
Ryan Olsen
Business Relationship Manager
Ogden Business Banking

Together we'll go far





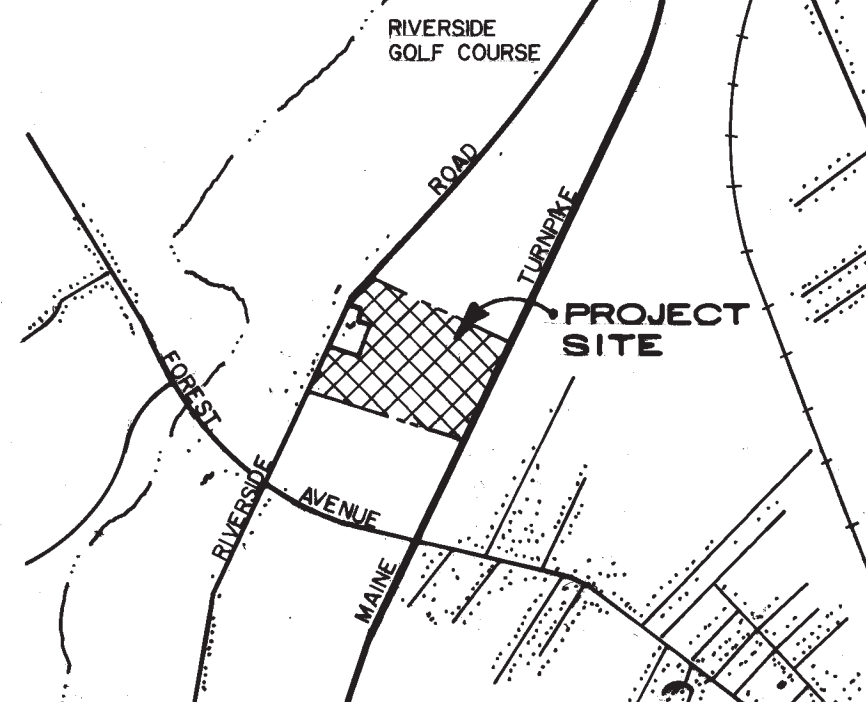
MAINE TURNPIKE AUTHORITY
MAINE TPK SECTION 2 - PORTLAND TO AUGUSTA



See Map entitled "ESTATE OF
RUPUS H. BROWN & W. H. & E. C.
JORDAN SURVEYORS dated JUNE
10, 1977 recorded CCRD Plan Book
116 Page 99.

N/F
J.B. BROWN & SONS
4088/181

LOCATION MAP
SCALE 1" = 2000'



GENERAL NOTES

- RECORD OWNERS ARE PORTLAND VENTURE PARTNERS & RIVERSIDE INDUSTRIAL PARK, INC. RECORDED IN CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 6952 PAGE 327 AND BOOK 2806 PAGE 441, RESPECTIVELY.
- PROJECT IS LOCATED IN THE "I-1" ZONING DISTRICT
- PROJECT AREA :
LOTS = 52.01 Ac.
ROAD R.O.W. = 3.57 Ac.
TOTAL = 55.58 Ac.
EXISTING LOT 7 = 1.88 Ac.
ADD'L ROAD R.O.W. = 0.51 Ac.
AMENDED LOT 7 = 1.37 Ac.
- TOPOGRAPHIC INFORMATION PREPARED BY LAND USE CONSULTANTS FROM ON SITE FIELD SURVEY
- PERMETER BOUNDARY FROM A SURVEY FOR DELTA REALTY CO. INC. BY LAND USE CONSULTANTS JEFFREY H. McALLISTER, R.L.S. #263.
- GRANITE RIGHT OF WAY MONUMENTS TO BE SET 3' INSIDE THE RIGHT OF WAY PER CITY OF PORTLAND STANDARDS.
- ALL TELEPHONE & ELECTRIC SERVICE LINES SHALL BE INSTALLED ABOVE GROUND. ALL ELECTRIC UTILITY LINES FROM THE SERVICE POLE TO ANY BUILDINGS IN SUBDIVISION SHALL BE LOCATED UNDERGROUND.

LEGEND

- PROPERTY LINE
- IRON PIPE FOUND
- 5/8" IRON REBAR TO BE SET
- GRANITE MON. FOUND
- GRANITE MON. TO BE SET

CURVE DATA

	Δ	R	T	L	CH
1	21° 34' 34"	1350.00'	257.24'	508.38'	505.38'
2	98° 30' 15"	385.00'	446.85'	661.90'	583.34'

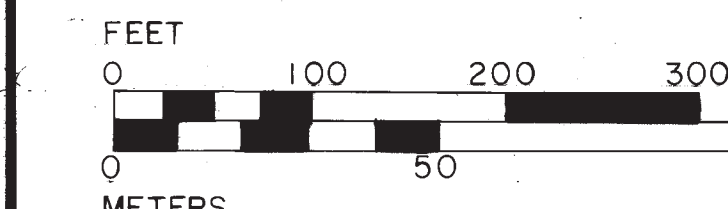
SEPT. 9, 1986	Revise note one
AUGUST 26, 1986	Added 30' Preservation Buffer around Spurwink School
AUGUST 26, 1986	Added Underground Electrical Utility Line (note General Note no. 7)
DATE:	REVISIONS:

TURNPIKE
INDUSTRIAL PARK
RIVERSIDE STREET, PORTLAND ME.

RECORDING PLAT

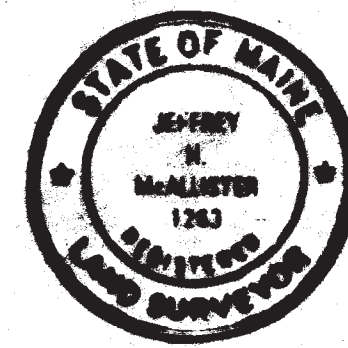
PORTLAND VENTURE PARTNERS
100 SILVER ST.
PORTLAND ME.

DATE: MARCH 25, 1986	JOB NO: 1531
DRN:KVN.	CHK: JHM
SCALE: 1"=100'	SHEET 1 OF 1



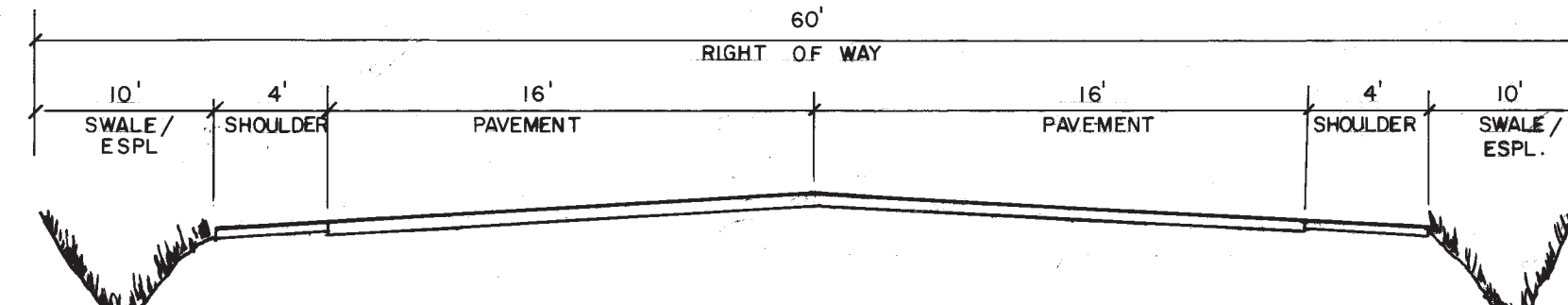
LAND USE CONSULTANTS
Land Planners • Engineers • Surveyors
17 Commercial Street, Portland, Maine 04101
207-772-8392

State of Maine, Cumberland ss.
Registry of Deeds
Received September 17, 1986
at 8:30 a.m. and recorded in
Plan Book 1157 Page 161
Attest: *James H. Walsh*
Register



4/23/86
Date

Jeffrey H. McAllister
Maine Registered Land Surveyor No. 1263
Land Use Consultants, Inc.
Portland, Maine



TYPICAL ROAD SECTION
NO SCALE

APPROVED

CITY OF PORTLAND PLANNING BOARD DATE 9/14/86

Jack Hamilton
Barbara V. Vasil
Michael J. Costa
James R. O'Brien
James R. O'Brien

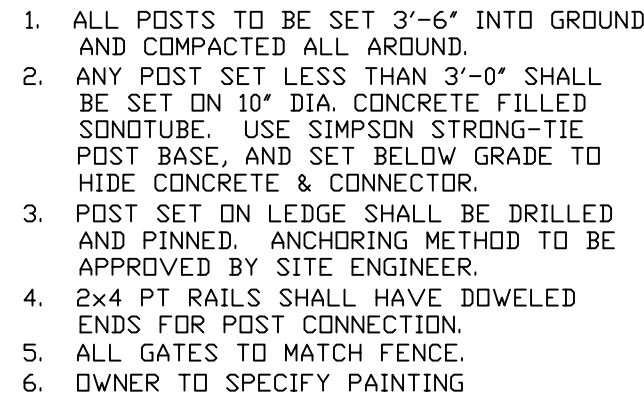


PAVEMENT MARKING PAINT FOR FINAL AND TEMPORARY PAVEMENT MARKINGS SHALL MEET THE REQUIREMENTS OF AASHTO M248. EITHER TYPE N (REGULAR TRAFFIC PAINT) OR TYPE F (FAST DRY TRAFFIC PAINT) MAY BE USED.

ALL PAVEMENT LINES AND MARKINGS SHALL BE APPLIED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

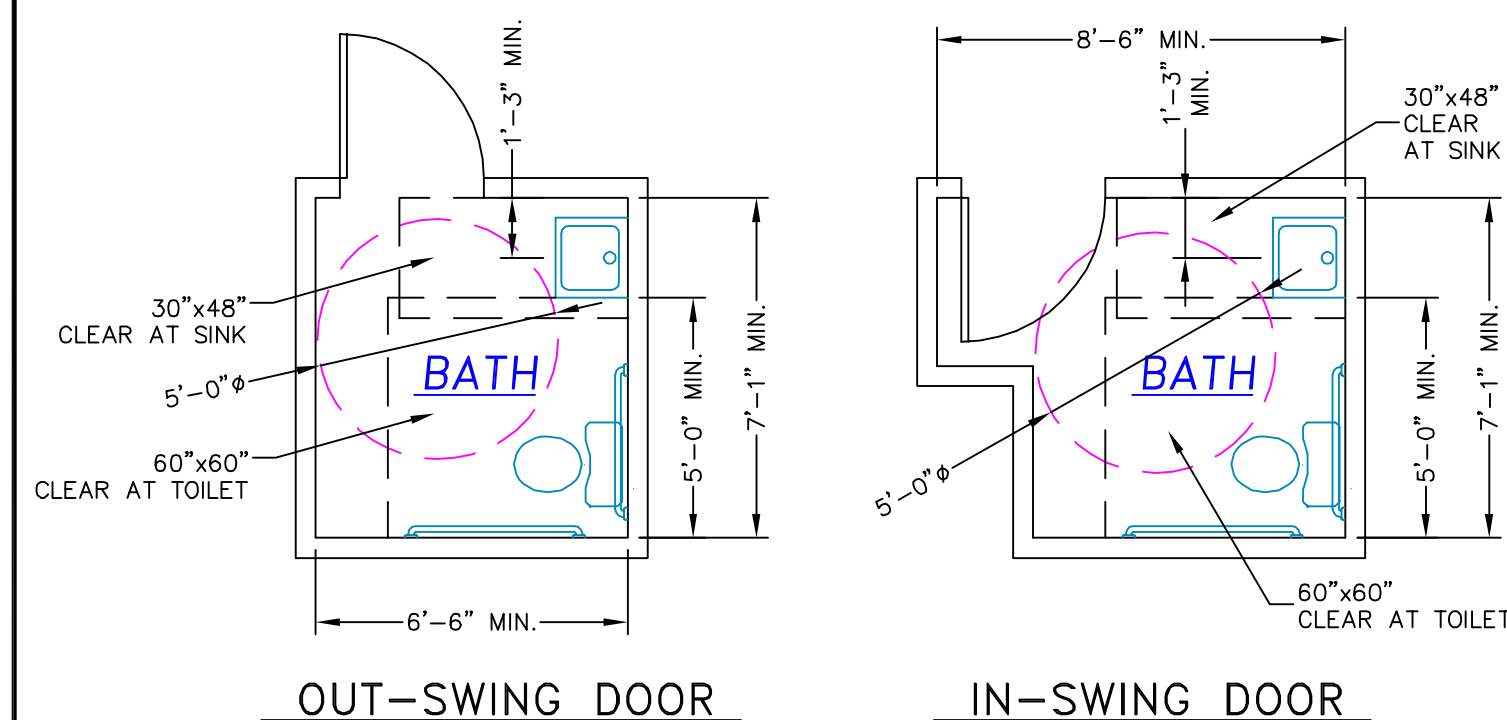
IMMEDIATELY BEFORE APPLYING THE PAVEMENT PAINT TO THE PAVEMENT OR CURB, THE SURFACE SHALL BE DRY AND ENTIRELY FREE FROM DIRT, GREASE, OIL OR OTHER FOREIGN MATTER.

PAVEMENT MARKING DETAIL & SPECIFICATION



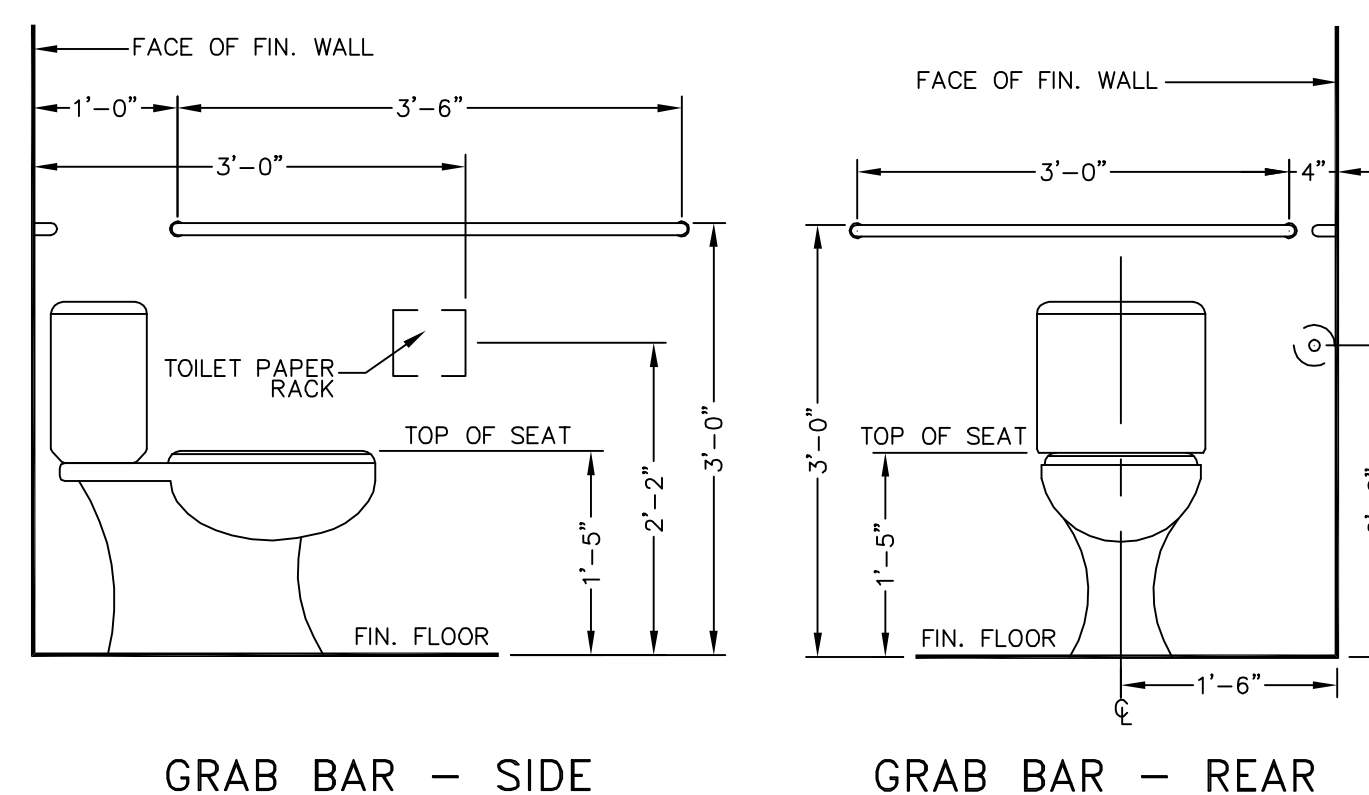
NDT TO SCALE

C-2

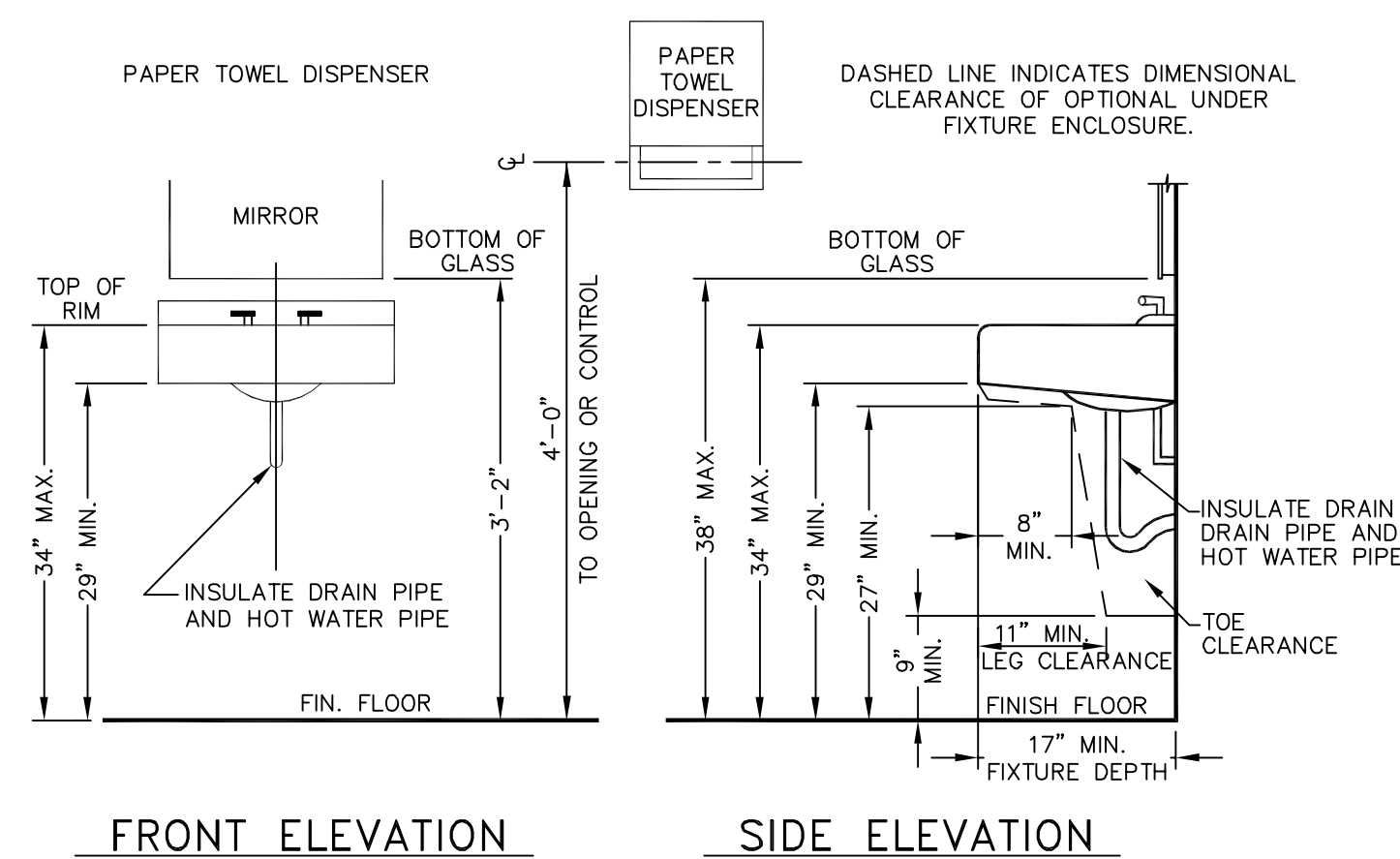


HANDICAP BATHROOM DETAIL

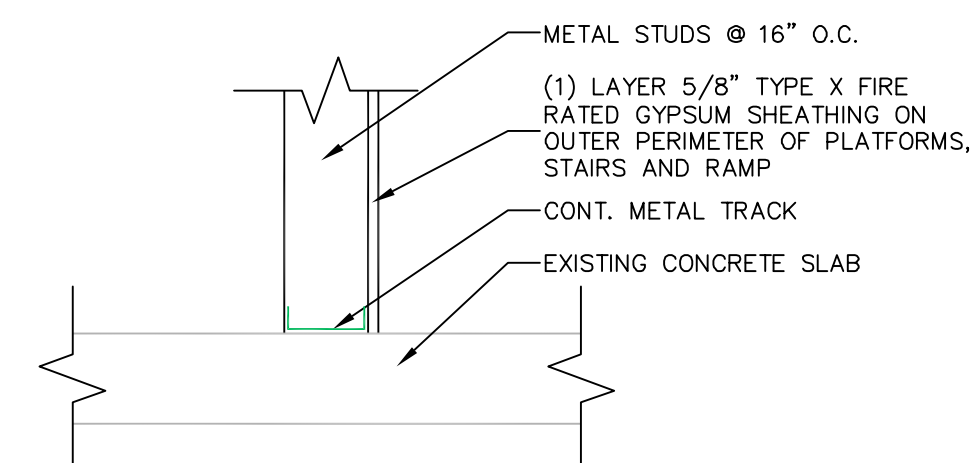
NO SCALE



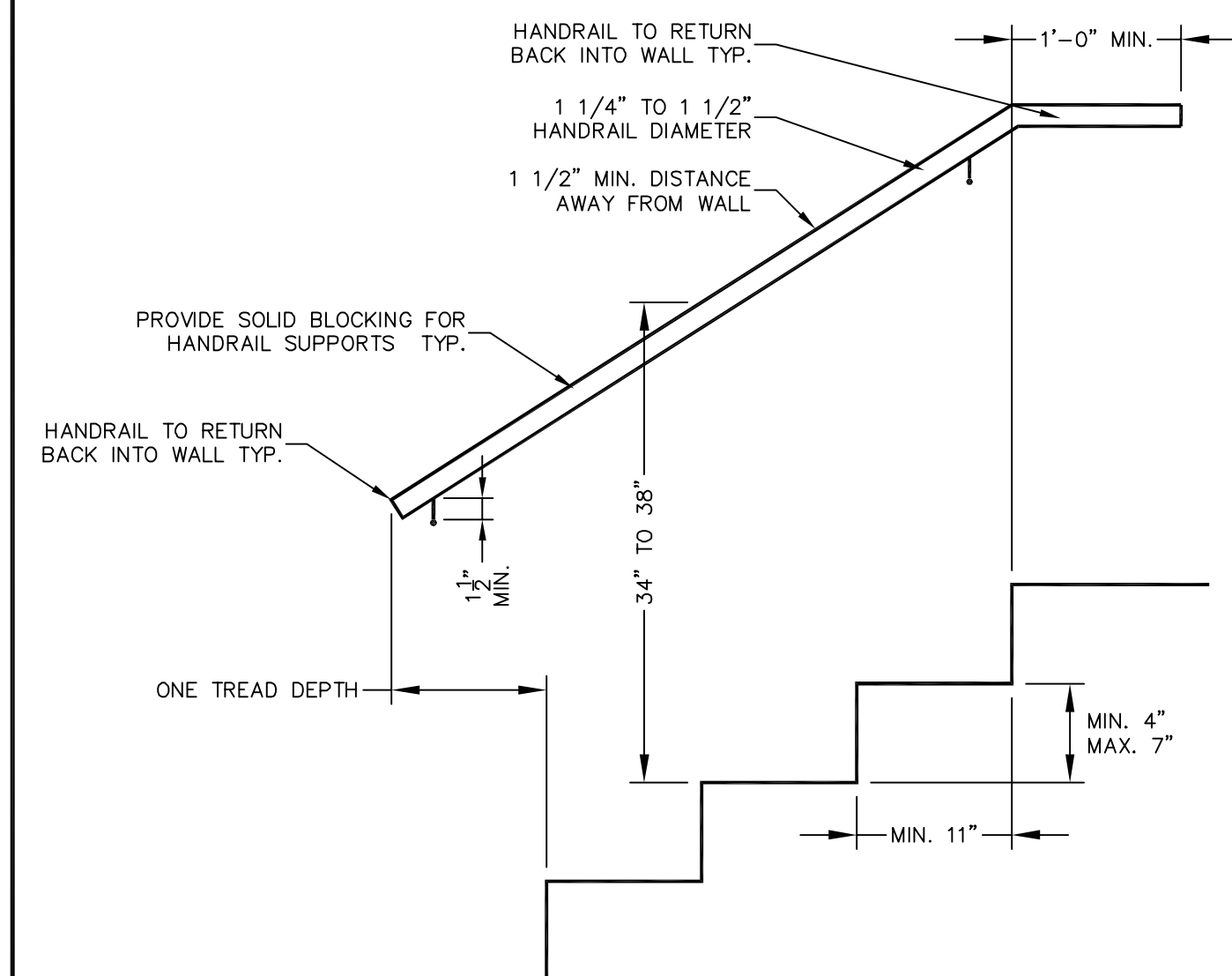
BARRIER FREE TOILET DIMENSIONAL REQUIREMENTS



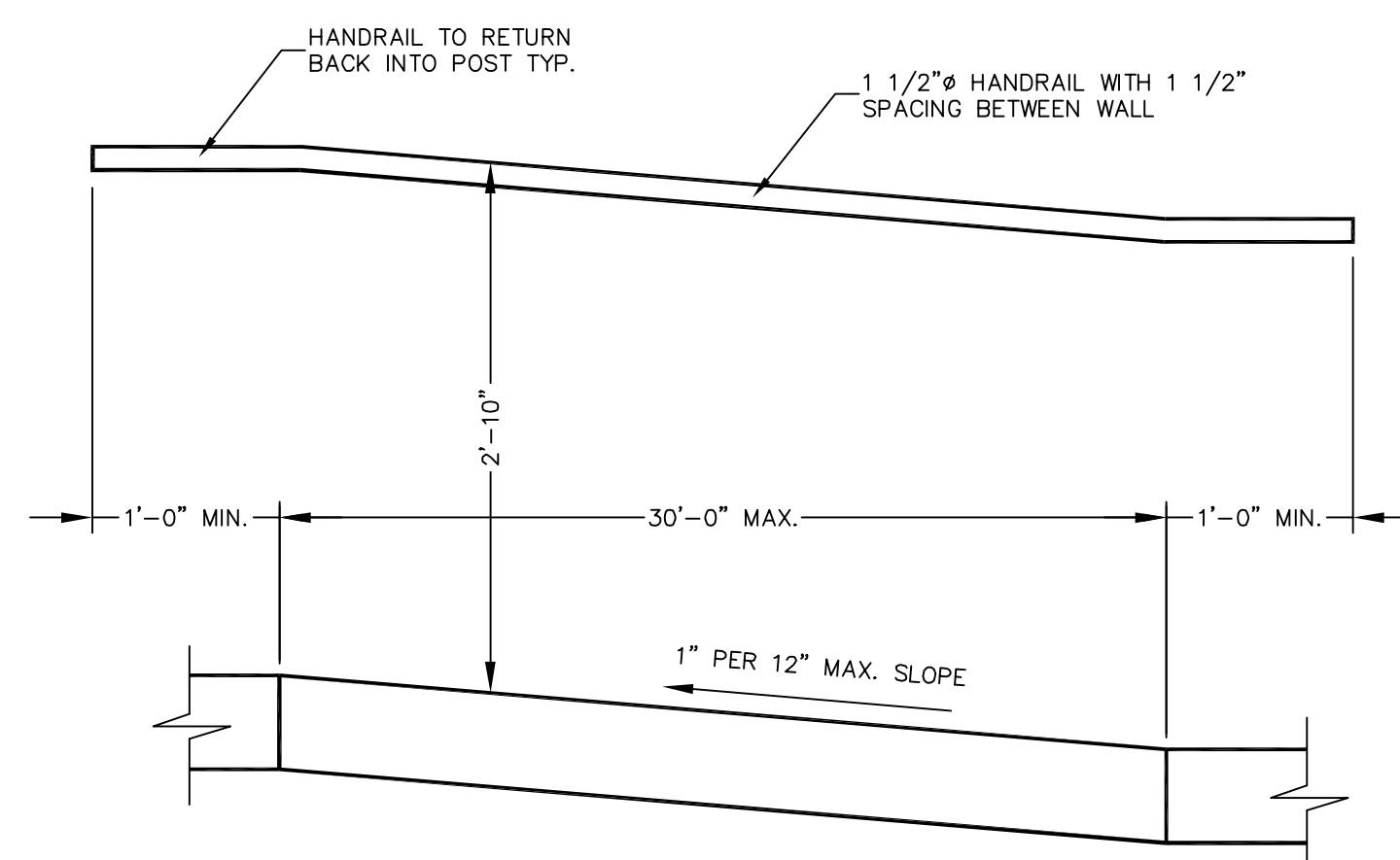
BARRIER FREE LAVATORY DIMENSIONAL REQUIREMENTS



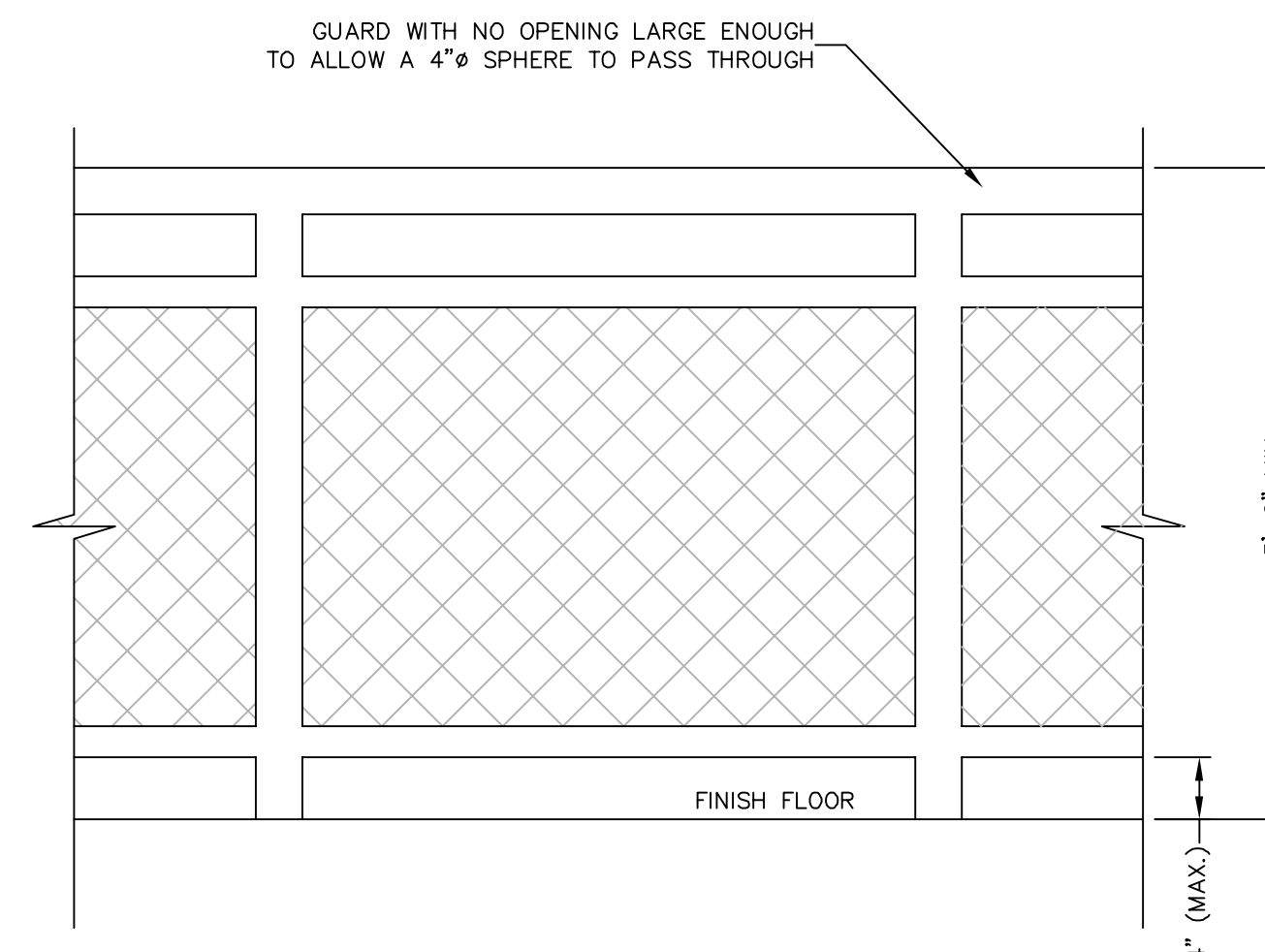
TYPICAL WALL DETAIL
NO SCALE



STAIR & HANDRAIL DETAIL
NO SCALE

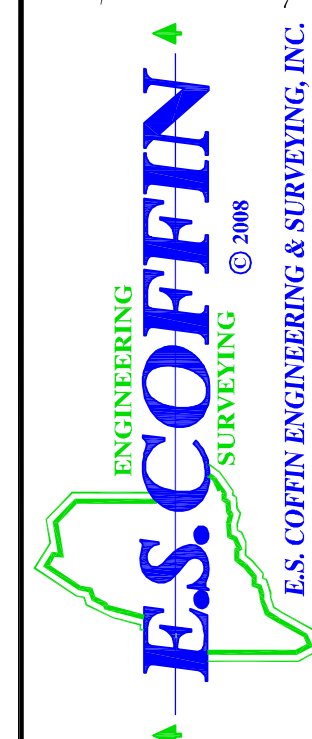


ADA RAMP & HANDRAIL DETAIL
NO SCALE



GUARD DETAIL
NO SCALE

A circular professional engineer seal for the State of Maine. The outer ring contains the text "STATE OF MAINE" at the top and "PROFESSIONAL ENGINEER" at the bottom, separated by two stars. The center of the seal contains the name "BENJAMIN E. MURRAY" and the license number "NO. 10128". Below the license number, the word "LICENSED" is written in a smaller font. The seal is surrounded by a decorative border of small dots.

[illegible]

SHEET TITLE	
DETAILS	
SCALE	AS SHOWN
DRAWN BY:	JPK
CHECKED BY:	BEM
DATE:	JUNE 16, 2014

CLIENT & PROJECT: **GET AIR PORTLAND
FITUP PLAN**

LOCATION: **921 RIVERSIDE STREET**

TOWN: **PORTLAND** COUNTY: **CUMBERLAND** STATE: **MAINE**

DOOR SCHEDULE					
NO.	QUANTITY	SIZE	TYPE	FRAME	REMARKS
①	2	EXISTING 3'-0" x 7'-0"	EXISTING FULL GLASS STOREFRONT	METAL	HINGES, PUSH BAR, D-RING PULL HANDLE, CLOSER, ENTRY LOCKSET
②	4	EXISTING 3'-0" x 6'-8"	EXISTING SOLID WOOD	METAL	HINGES, LEVER HARDWARE, ENTRY LOCKSET
③	2	EXISTING 3'-0" x 6'-8"	EXISTING SOLID WOOD	METAL	HINGES, PUSH PLATE, PULL HANDLE, CLOSER
④	1	EXISTING 3'-0" x 6'-8"	EXISTING HOLLOW METAL	METAL	HINGES, LEVER HARDWARE, PRIVACY LOCKSET
⑤	3	EXISTING 3'-0" x 7'-0"	EXISTING METAL INSULATED	METAL	HINGES, EXTERIOR LEVER HARDWARE, INTERIOR PANIC HARDWARE, ENTRY LOCKSET, CLOSER
⑥	3	EXISTING VARIES	EXISTING STALL	METAL	HINGES, LEVER HARDWARE, PRIVACY LOCKSET
⑦	1	EXISTING 3'-0" x 6'-8"	EXISTING HOLLOW METAL	METAL	HINGES, LEVER HARDWARE, ENTRY LOCKSET, CLOSER, INTERIOR PANIC HARDWARE
⑧	1	EXISTING 3'-0" x 6'-8"	EXISTING HALF GLASS SOLID WOOD	METAL	HINGES, LEVER HARDWARE
⑨	2	3'-0" x 6'-8"	HOLLOW METAL	METAL	HINGES, LEVER HARDWARE, ENTRY LOCKSET
⑩	1	3'-0" x 6'-8"	EXISTING HOLLOW METAL	METAL	HINGES, LEVER HARDWARE, CHANGE TO PRIVACY LOCKSET
⑪	2	3'-0" x 6'-8"	HOLLOW METAL	METAL	HINGES, LEVER HARDWARE

WINDOW SCHEDULE				
NO.	QUANTITY	UNIT DIMENSION	TYPE	FRAME
①	1	5'-0" x 5'-0"	STOREFRONT	METAL

LEGEND	
	EXISTING WALL
	PROPOSED WALL
	EXIT SIGN
	EMERGENCY LIGHTING
	FIRE EXTINGUISHER
	BRAILLE SIGNAGE

- PLAN SUBMISSION NOTES
& CODE SUMMARY
1. THIS PLAN IS FOR CITY OF PORTLAND BUILDING CODE, LIFE SAFETY CODE, ADA, FIRE MARSHAL AND OCCUPANCY APPROVAL ONLY.

2. PLAN BASED ON PLAN PROVIDED BY THE LESSOR.

3. THE PLUMBING, ELECTRICAL, AND MECHANICAL DESIGN OF THE BUILDING IS BY THE OWNER.

4. IBC USE GROUP: ASSEMBLY (A-3)

5. NFPA LIFE SAFETY OCCUPANCY: ASSEMBLY

6. CONSTRUCTION TYPE: TYPE V B (UNPROTECTED) PRE-ENGINEERED METAL BUILDING EXTERIOR WITH INTERIOR FIRE RETARDANT WOOD SHEATHING FOR PLATFORMS WITH METAL STUD FRAMING

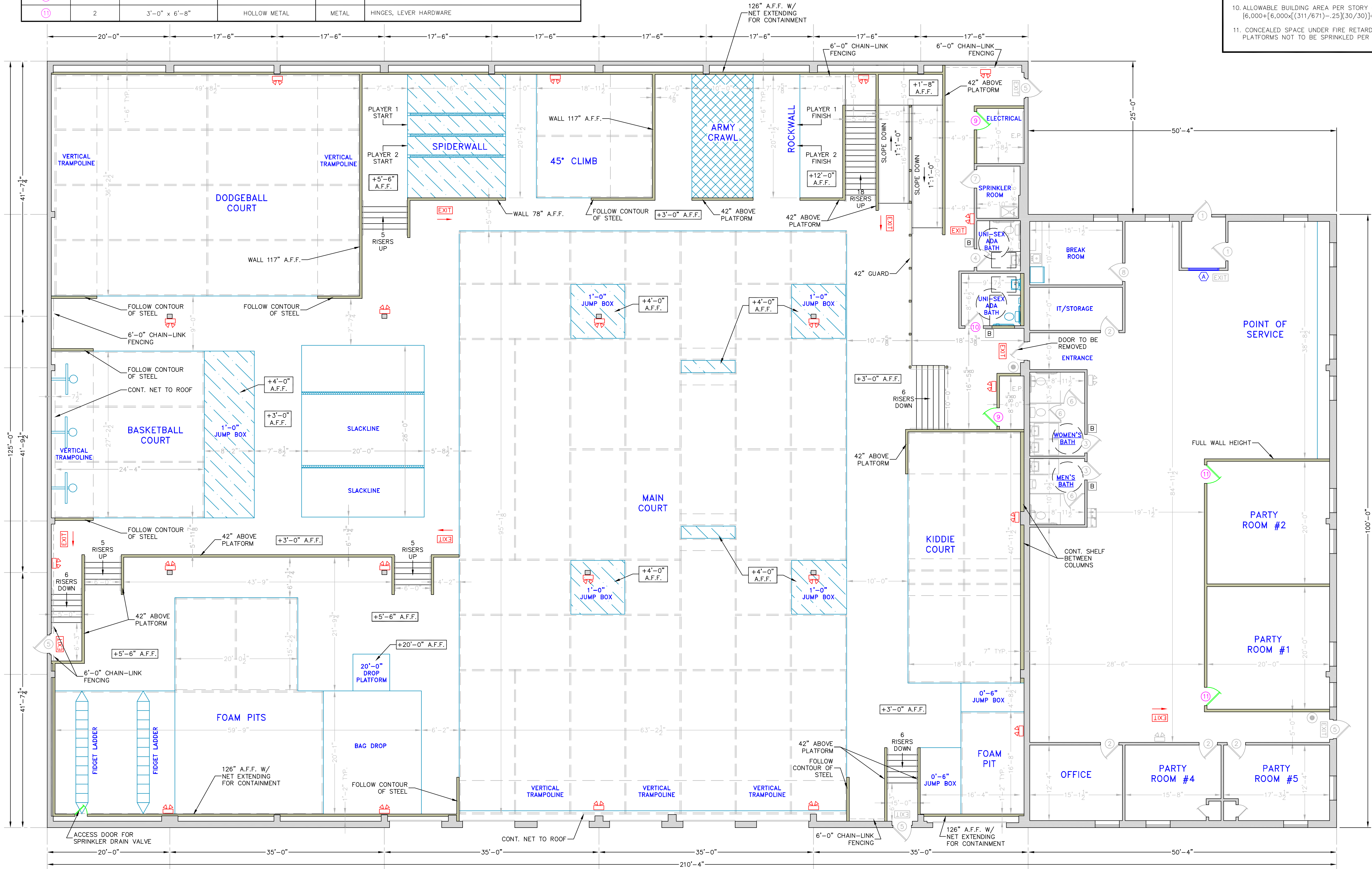
7. BUILDING FULLY EQUIPPED WITH NFPA 13 SPRINKLED SYSTEM

8. ALLOWABLE BUILDING HEIGHT = (2) STORIES (SPRINKLED)

9. TABULAR BUILDING AREA PER STORY = 6,000 SF

10. ALLOWABLE BUILDING AREA PER STORY = $[6,000 + \{6,000 \times [(311/671) - .25] \times (30/30)\}] + (6,000 \times .5) = 25,281$ SF

11. CONCEALED SPACE UNDER FIRE RETARDANT WOOD FRAMED PLATFORMS NOT TO BE SPRINKLED PER NFPA 13 SECTION 8.15.1.2.11



FLOOR PLAN
SCALE 1/4" = 1'-0"

STATE OF MAINE
BENJAMIN MURRAY
NO. 10128
LICENSED PROFESSIONAL ENGINEER

ENGINEERING SURVEYING
E.S. COFFIN ENGINEERING & SURVEYING, INC.
432 Com Road P.O. Box 4687 Augusta, Maine 04330
Ph. (207) 623-9475 Fax (207) 623-0016 Toll Free 1-800-244-9475

SHEET TITLE:		FLOOR PLAN	
CLIENT & PROJECT:		GET AIR PORTLAND FITUP PLAN	
LOCATION:		921 RIVERSIDE STREET	
TOWN:		PORTLAND	
COUNTY:		CUMBERLAND	
STATE:		MAINE	
SCALE:		1/8" = 1'-0"	
DATE:		JUNE 16, 2014	
DRAWN BY:		JPK	
CHECKED BY:		BEM	
PROJ. NO.		2014-112	
REVISIONS:		NO.	
DATE:		DATE	