72 Bishop Street

Site Plan and Subdivision Plan
Application

April 10, 2015

APPLICANT:
AVESTA 72 Bishop Street, L.P.
307 Cumberland Avenue
Portland, Maine 04101

AGENT:
MITCHELL & ASSOCIATES
70 Center Street
Portland, Maine 04101

Mitchell & Associates
LANDSCAPE ARCHITECTS

The Staples School
70 Center Street
Portland, Maine 04101
P: 207.774.4427
F: 207.874.2460
www.mitchellassociates.biz

April 10, 2015

Mr. Alexander Jaegerman,
Director of the Portland Planning Division
and Planning Board Members
City of Portland
389 Congress Street
Portland, Maine 04101

Re: Bishop Street Apartments
72 Bishop Street
Site Plan and Subdivision Plan Review

Dear Alex:

On behalf of Avesta 72 Bishop Street, LP, we are pleased to submit the following Site Plan and Subdivision Application for the proposed "72 Bishop Street Efficiencies" located at 72-78 Bishop Street in Portland. This submission has been prepared in compliance with requirements of the City of Portland Zoning, Site Plan and Subdivision Ordinance. The project is intended to provide housing options and needed support services for the chronically homeless.

The Site

72 Bishop Street consists of a single family residence and a vacant lot. The combined property is a 52,383 square foot lot with 50 feet of frontage on Bishop Street. The property has an 826 +/- square foot (footprint) residence with a small gravel driveway. The rear of the property is primary woodland growth with 14,203 square feet of forested and shrub scrub wetland. Abutting properties include a single story, 3 unit professional office building, to the east at 68 Bishop Street and a Masonic Hall to the west. To the south is the University of New England athletic field.

Project Description

Avesta Housing proposes to develop the combined lots of 72 & 78 Bishop Street to create 30 efficiency units at 72 Bishop Street in Portland for chronically homeless individuals, using a "housing first" approach. As was the case at Logan

Place and Florence House, Avesta's two prior 'housing first' projects, Avesta anticipates partnering with Preble Street for the provision of 24-hour, on-site support services and Portland Housing Authority for project-based rental assistance. Bishop Street Apartments will provide housing and support services for those chronically homeless individuals who are currently most vulnerable due to their significant medical conditions.

The proposed facility is in close proximity to employment opportunities, public transportation services, retail and amenities, yet beyond the high paced downtown urban environment. Avesta's vision for the property is to create a high quality housing resource for the neediest population within the City of Portland that combines the best features of affordable housing and quality design.

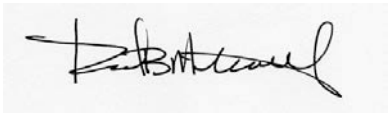
During the zoning amendment process, the applicant and the Planning Board discussed the need to provide a public sidewalk along Bishop Street. We have prepared a sidewalk plan that extends a new bituminous sidewalk, esplanade and granite curb, extending approximately 500 linear feet to meet the existing sidewalk near the intersection with Forest and Stevens Avenues.

This submission includes the following information:

1. Cover letter, dated April 10, 2015
2. Site Plan and Subdivision Application & Checklist
3. Application Fee: $1,500 (Per Sec 14-486 Affordable Housing Reduction)
4. Submission Booklet of required documentation and exhibits
5. One set of plans (24" x 36")
6. One set of plans (11"x17")

We trust that the Planning Board will consider this a complete application for a workshop meeting. If you desire any additional information, please do not hesitate to contact us. We look forward to our meeting with the Board at its earliest convenience.

Sincerely,
Mitchell & Associates



Robert Metcalf, Principal
Maine Licensed Landscape Architect

Enclosure

cc. Brooks More, Avesta
Ben Walter, CWS Architect

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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.

Updated: April 23, 2014

PROJECT NAME: 72 Bishop Street

PROPOSED DEVELOPMENT ADDRESS:

72 & 78 Bishop Street, Portland

PROJECT DESCRIPTION:

Plan to develop 30 housing units with. 12 parking spaces

CHART/BLOCK/LOT: 293-C-2 & 3

PRELIMINARY PLAN _____ (date)
FINAL PLAN _____ (date)

CONTACT INFORMATION:

Applicant – must be owner, Lessee or Buyer Name: Avesta 72 Bishop, L.P., Brooks More Business Name, if applicable: Address: 307 Cumberland Ave City/State : Portland, ME Zip Code: 04101	**Applicant Contact Information** Work # 207. 553 7780 Home# Cell # Fax# e-mail: bmore@avestahousing.org
Owner – (if different from Applicant) Name: Address: City/State : Zip Code:	**Owner Contact Information** Work # Home# Cell # Fax# e-mail:
Agent/ Representative Name: Mitchell & Associates, Bob Metcalf 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: Avesta 72 Bishop , L.P. Address: 307 Cumberland Ave City/State : Portland, ME Zip Code: 04101	**Billing Information** Work # 207.553.7780 Cell # Fax# e-mail: bmore@avestahousing.org

Engineer Name: Ransom Consulting Engineers, Stephen Bradstreet, PE Address: 400 Commercial Street City/State : Portland, ME Zip Code: 04101	**Engineer Contact Information** Work # 207.772.2891 Cell # Fax# e-mail: stephen.bradstreet@ransomenv.com
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 # 207.774.4424 Cell # Fax# e-mail: www.owenhaskell.com
Architect Name: CWS Architects, Ben Walter Address: 434 Cumberland Avenue City/State : Portland, ME Zip Code: 04101	**Architect Contact Information** Work # 207.774.4441 Cell # Fax# e-mail: bwalter@cwsarch.com
Attorney Name: Cito Selinger, Curtis Thaxter Address: 1 Canal Plaza Suite 1000 City/State : Portland, ME Zip Code: 04101	**Attorney Contact Information** Work # 207.774.9000 Cell # Fax# e-mail: mselinger@curtisthaxter.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)
_X 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)
_X_ Stormwater Quality ($250)
_X_ Subdivisions ($500 + $25/lot)
# of Lots _30_ x $25/lot = 750
___ 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:** April 10, 2015

PROJECT DATA

The following information is required where applicable, in order to complete the application.

Total Area of Site	52,383 sq. ft.
Proposed Total Disturbed Area of the Site	28,446 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)	1,340 sq. ft.
Impervious Area (Total Proposed)	18,686 sq. ft.
Building Ground Floor Area and Total Floor Area	
Building Footprint (Total Existing)	826 sq. ft.
Building Footprint (Total Proposed)	7,804 sq. ft.
Building Floor Area (Total Existing)	1,600 sq. ft.
Building Floor Area (Total Proposed)	21,374 sq. ft.
Zoning	
Existing	B-2c
Proposed, if applicable	
Land Use	
Existing	Residential
Proposed	Multi-family Low Income Residential
Residential, If applicable	
# of Residential Units (Total Existing)	1 Single family residence
# of Residential Units (Total Proposed)	30 units
# of Lots (Total Proposed)	1
# of Affordable Housing Units (Total Proposed)	30 units
Proposed Bedroom Mix	
# of Efficiency Units (Total Proposed)	30 efficiency units
# 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)	2
# of Parking Spaces (Total Proposed)	10
# of Handicapped Spaces (Total Proposed)	2
Bicycle Parking Spaces	
# of Bicycle Spaces (Total Existing)	0
# of Bicycle Spaces (Total Proposed)	12
Estimated Cost of Project	$5,586,058

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**
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;	
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
X		1	* Application fees
X		1	* Written description of project
X		1	* Evidence of right, title and interest
*		1	* Evidence of state and/or federal permits
X		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
X		1	* Evidence of financial and technical capacity
*		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
**		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
N/A		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.

* Temporary Waiver requested.

** CMP, UNITIL and PWD Ability to Serve letters have been submitted; City of Portland Wastewater Ability to Serve letter has been requested.

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;	
X		A traffic control plan as detailed in Section 1 of the Technical Manual;	
X		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;	
X		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;	
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;
*		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.

* Temporary Waiver requested.

RIGHT, TITLE OR INTEREST

Please see attached Quitclaim Deed recorded in the Cumberland County Registry of Deeds, Book 31827, Page 271.

SHORT FORM QUITCLAIM DEED WITH COVENANT

KNOW ALL PERSONS BY THESE PRESENTS, THAT WILLIAM F. DIXON, of Cumberland County, Maine, and J. WESLEY WRIGHT, JR., of Cumberland County, Maine, each individually and together doing business as Hed/Way Development, FOR CONSIDERATION PAID, grant to AVESTA BISHOP STREET LP, a Maine limited partnership with a mailing address of 307 Cumberland Avenue, Portland, ME 04101, WITH QUITCLAIM COVENANT, the following described real property located in Portland, Cumberland County, State of Maine:

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

MAINE REAL ESTATE TAX PAID

Beginning on the southerly sideline of Bishop Street at the northwesterly corner of land conveyed by George Wilson to Eri A. Mowatt by deed dated March 12, 1949 and recorded in Cumberland County Registry of Deeds in Book 1952, Page 227; thence North 82° 18' West by Bishop Street fifty (50) feet to the easterly corner of land conveyed by Tilcon-Warren Minerals Inc. to Tilcon Minerals Inc. by deed dated August 17, 1981 and recorded in said Registry of Deeds in Book 4942, Page 143; thence southwesterly by said land of Tilcon-Minerals Inc. four hundred seventy-five (475) feet, more or less, to an angle in the line of land conveyed by the City of Portland to Westbrook College by deed dated November 8, 1973 and recorded in said Registry of Deeds in Book 3481, Page 255; thence South 5° East by said land of Westbrook College forty-two and twenty-four hundredths (42.24) feet to an angle; thence North 76° 24' East by said land of Westbrook College to the southwesterly corner of said Mowatt land; thence North 7° 42' East by said Mowatt land one hundred fifty-five and twenty-two hundredths (155. 22} feet to the point of beginning.

Being the same premises conveyed to William F. Dixon and J. Wesley Wright, Jr. d/b/a Hed/Way Development by deed dated November 30, 1988 and recorded in said Registry of Deeds in Book 8575, Page 272.

The undersigned certify that they are the only partners of a general partnership called Hed/Way Development

IN WITNESS WHEREOF, William F. Dixon and J. Wesley Wright, Jr., individually and together doing business as Hed/Way Development, have hereunto set their hands and seals this 6th day of October, 2014.

WITNESS:

William F. Dixon, individually and as Partner of Hed/Way Development

J. Wesley Wright, Jr. individually and as
Partner of Hed/Way Development

STATE OF MAINE
COUNTY OF CUMBERLAND, SS. October 6, 2014

Personally appeared the above-named William F. Dixon, in his said capacities as aforesaid, and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of said Hed/Way Development.

Before me,

~~Notary Public~~/Attorney-at-Law
Print name: MA SELINGER

STATE OF MAINE
COUNTY OF CUMBERLAND, SS. October 6, 2014

Personally appeared the above-named J. Wesley Wright, in his said capacities as aforesaid, and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of said Hed/Way Development.

Before me,

~~Notary Public~~/Attorney-at-Law
Print name: MA SELINGER

O:\MAS\99475 Avesta\Bishop Street\Transfer documents\Quitclaim Deed With Covenant-Short.docx

Received
Recorded Register of Deeds
Oct 06,2014 11:58:25A
Cumberland County
Pamela E. Lovley

PROJECT DESCRIPTION

Housing Objective of the Project

Avesta Housing proposes to develop the combined lots of 72 & 78 Bishop Street to create 30 efficiency units at 72 Bishop Street in Portland for chronically homeless individuals, using a "housing first" approach. As was the case at Logan Place and Florence House, Avesta's two prior 'housing first' projects, Avesta anticipates partnering with Preble Street for the provision of 24-hour, on-site support services and Portland Housing Authority for project-based rental assistance. In addition to the 30 apartments, the property will include common space for residents as well as office space for Avesta and Preble Street staff. Bishop Street Apartments will provide housing and support services for those chronically homeless individuals who are currently most vulnerable due to their significant medical conditions. The project will likely include a partnership with a health care provider, to both address specific health concerns and ensure that residents have access to the health and/or personal care services that medically compromised individuals typically benefit from in their homes.

The proposed facility is in close proximity to employment opportunities, public transportation services, retail and amenities, yet beyond the high paced downtown urban environment. Avesta's vision for the property is to create a high quality housing resource for the neediest population within the City of Portland that combines the best features of affordable housing and quality design.

The Site

72-78 Bishop Street consists of a single family residence with 50 feet of frontage on Bishop Street. The (combined) lot is 52,383 square feet. Abutting properties include a single story 3 unit professional office building to the east at 68 Bishop Street and a Masonic Hall to the west. The property was recently re-zoned as B2c (Business Community). The lot slopes gently to the southwest and has forested/ scrub-shrub wetlands within the southeast portion of the lot.

Building Program

Avesta proposes to demolish the existing single family residence and construct a 3 story apartment building. The main entrance vestibule and reception will be accessed from the first floor as well as building services including community

rooms and offices. Six efficiency units will be located on the first level along with laundry, staff rooms and mechanical and electrical facilities. The remaining 24 efficiency units will be located on the upper second and third levels. The complex will contain 30 total efficiency units. The gross square footage of the proposed building is 21,374 square feet with a 7,804 square foot building footprint.

A driveway with access off of Bishop Street will accommodate a 12 space surface parking lot. A small outdoor recreation space will be located on the south side of the building and a landscaped seating area will be located on the northeast side of the building near the main entrance.

Stormwater Management

The current site is a single family residence with 2 percent of the lot impervious. The proposed building cover and site improvements will cover approximately 40 percent of the property. The project is within the Capisic Brook Watershed and shall adhere to the Urban Impaired Stream Standard for development. Stormwater runoff generated by the site will be treated in an underground treatment system below the parking lot. The majority of runoff will be from the paved driveway and will be designed to flow into the treatment system prior to being discharged. More detail on the stormwater system can be found in the included stormwater management plan.

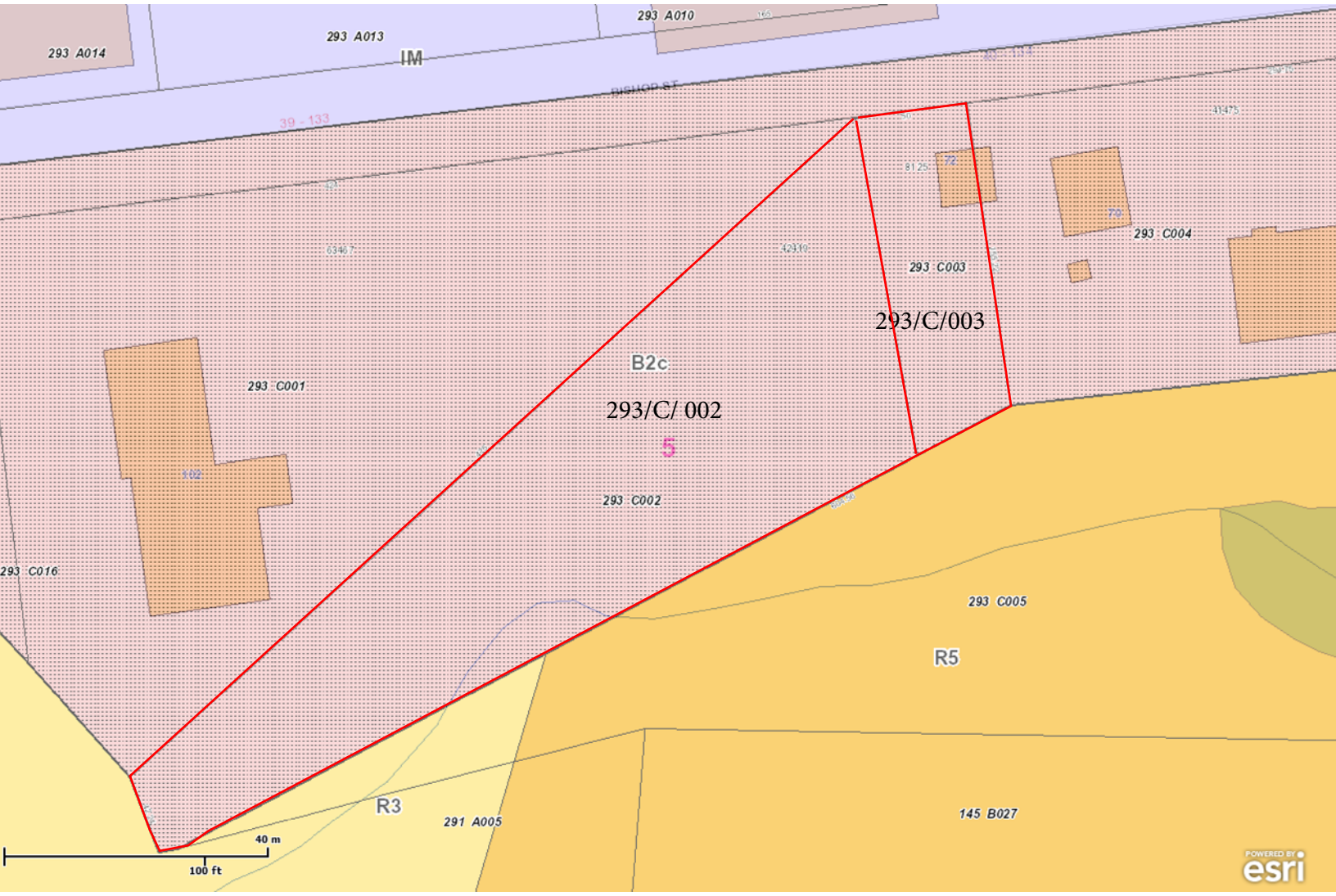
PROJECT DATA

Applicant	Avesta 72 Bishop Street, LP c/o AVESTA Housing 307 Cumberland Avenue Portland, Maine 04101
Owner	Avesta 72 Bishop Street, LP c/o AVESTA Housing 307 Cumberland Avenue Portland, Maine 04101
Existing Zone	B2c –Business Community Zone
Tax Map & Lot Number	Map 293, Block C, Lots 2 & 3
Land Area	52,383 SF, or 1.20 Acres
Existing Land Use	Single Family Residence & Undeveloped Area
Proposed Land Use	30 unit SRO Housing for Homeless
Water	12 inch main in Bishop Street
Sanitary Sewer	8 inch main in Bishop Street
Storm Drainage	18 in storm drain in Bishop Street

Natural Gas	8 inch line in Bishop Street
Electric	Overhead Service on Bishop Street.
Telephone & Cable TV	Overhead services on Bishop Street. To be extended underground

72 Bishop St

Tax & Zoning Map



ABUTTING PROPERTY OWNERS

Map 293, Block C, Lot 1
Deering Lodge Building Corp.
651 Forest Avenue
Portland, ME 04101

Map 293, Block C, Lot 5
University of New England
11 Beach Road
Biddeford, ME 04005

Map 293, Block C, Lot 4
Bishop Street L.L.C.
70 Bishop Street
Portland, ME 04103

EXISTING SOIL CONDITIONS

Soils on the site are representative of the urban environment.

The following tests results are included in our submission:

- Test borings by S.W.Cole performed on site in February 2015 revealed fill material, relic topsoil and glaciomarine deposits including silty clay. Refer to the attached geotechnical report prepared March 11, 2015.

REPORT

March 11, 2015
14-0696 S

Geotechnical Engineering Services

Proposed Apartment Building
72 Bishop Street
Portland, Maine

PREPARED FOR:
Avesta Housing
Attn: Gregory Payne
Director of Real Estate Development
307 Cumberland Avenue
Portland, ME 04101

PREPARED BY:
S. W. Cole Engineering, Inc.
286 Portland Road
Gray, ME 04039
T: (207) 657-2866

S.W.COLE ENGINEERING, INC.

- *Geotechnical Engineering*
- *Construction Materials Testing*
- *GeoEnvironmental Services*
- *Ecological Services*

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14-0696 S

March 11, 2015

Avesta Housing
Attn: Gregory Payne
Director of Real Estate Development
307 Cumberland Avenue
Portland, ME 04101

Subject: Explorations and Geotechnical Engineering Services
Proposed Apartment Building
72 Bishop Street
Portland, Maine

Dear Greg:

In accordance with our Agreement, dated January 21, 2015, we have completed subsurface explorations for the subject project. This report summarizes our findings and geotechnical recommendations and its contents are subject to the limitations set forth in Attachment A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information in order to develop geotechnical recommendations relative to foundations, earthwork and pavement associated with the proposed construction. Our scope of services included five test boring explorations, a geotechnical analysis of the subsurface findings and preparation of this report.

1.2 Site and Proposed Construction

The site is located at 72 Bishop Street in Portland, Maine. We understand development plans call for construction of a three-story, 30-unit apartment building with a footprint of 7,097 square-feet. Based on the "Concept Site Plan" prepared by Mitchell & Associates (landscape architects), we understand the proposed site generally slopes to the south

with about 3 feet of surface relief ranging from about elevation 96 to 99 feet within the proposed building footprint.

We anticipate the building will be wood framed with spread footing foundations and on-grade floor slabs. We understand preliminary column loads of 20 to 60 kips and wall loads of 2.5 to 3.5 kips/foot are anticipated for the proposed three-story structure. A new access road off Bishop Street and paved parking is planned on the south side of the proposed building. Detailed site grading information is not available at this time.

Proposed and existing site features are shown on the "Exploration Location Plan" attached as Sheet 1.

2.0 EXPLORATION AND TESTING

2.1 Explorations

Five test borings (B-1 through B-5) were made at the site on February 23, 2015 by S. W. Cole Explorations, LLC. The exploration locations were selected and established in the field by S. W. Cole Engineering, Inc. (S.W.COLE) using a mapping grade GPS receiver and taped measurements from existing site features. The approximate exploration locations are shown on the "Exploration Location Plan" attached as Sheet 1. Logs of the test borings are attached as Sheets 2 through 6. A key to the notes and symbols used on the logs is attached as Sheet 7.

2.2 Testing

The test borings were drilled using hollow-stem auger drilling techniques. The soils were sampled at 2 to 5 foot intervals using a split spoon sampler and Standard Penetration Testing (SPT) techniques. Pocket Penetrometer Testing (PPT) was performed where stiffer silty clay soils were encountered. SPT blow counts and PPT results are shown on the logs.

Soil samples obtained from the explorations were returned to our laboratory for further classification and testing. The results of one grain-size test on a combined sample of the existing fill soils from borings B-2, B-3 and B-5 is attached as Sheet 8.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Surficial

The site is an irregular shaped lot at 72 Bishop Street in Portland, Maine with an existing residential structure in the northeast corner of the site. The northern and central portions of the site are generally flat and slope gently downward from northwest to southeast. The southern and western edges of the site drop about 6 feet to a wetland area. The site is generally open lawn area with lightly wooded areas on the western and southern edges.

3.2 Soil and Bedrock

Underlying a surficial layer of topsoil, test borings B-1 through B-5 encountered a soils profile generally consisting of loose to medium dense granular fill overlying a relic topsoil layer overlying glaciomarine deposits of silt, clay and sand overlying refusal surfaces (probable bedrock) at depths of 6.6 to 24.2 feet.

In borings B-1, B-2, B-3 and B-5 (proposed building footprint), the glaciomarine deposits generally consisted of stiff to very stiff silty clay with sandy silt seams becoming silty sand with silty clay layers. At boring B-4 (proposed pavement area), the stiffer silty clay was followed by a relatively thin layer of softer, compressible silty clay between a depth interval of approximately 13 to 19 feet overlying glacial outwash sands and gravel.

Not all the strata were encountered at each exploration; refer to the attached logs for more detailed subsurface information.

3.3 Groundwater

The soils encountered at the test borings generally were moist to wet from the ground surface. Saturated soils were encountered at depths varying from 4 to 8 feet. Groundwater was encountered at borings B-2 and B-5 at depths of about 6 and 4.5 feet. Groundwater likely becomes perched on the relatively impervious silty clay and bedrock encountered at the test borings. Long term groundwater information is not available. It should be anticipated that seasonal groundwater levels will fluctuate, particularly following during periods of snowmelt and precipitation.

3.4 Frost and Seismic

The 100-year Air Freezing Index for the Portland, Maine area is about 1,410-Fahrenheit degree-days, which corresponds to a frost penetration depth on the order of 4.5 feet. Based on the subsurface findings, we interpret the site soils to correspond to Seismic Soil Site Class D according to 2009 IBC.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General Findings

Based on the subsurface findings, the proposed construction appears feasible from a geotechnical standpoint. The principle geotechnical considerations are as follows:

- The proposed building footprint is underlain by uncontrolled fills and relic topsoil. We recommend complete removal of the uncontrolled fills and relic topsoil to exposed undisturbed non-organic native soils and then backfilling the building pad with compacted Granular Borrow up to the bottom of slab base gravel.

- Portions of the proposed site are also occupied by existing structures. We recommend complete removal of existing foundations and utilities and backfilling with compacted Granular Borrow.

- Spread footing foundations and on-grade floor slabs bearing on properly prepared subgrades, as recommended herein, appear suitable for the proposed building. Perimeter footings should be underlain with at least 6 inches of Crushed Stone wrapped in geotextile fabric with a perimeter foundation drain on the outside edge of crushed stone mat. Interior footings are anticipated to be founded on compacted Granular Borrow. On-grade floor slabs should bear on at least 12-inches of compacted Structural Fill underlain by properly prepared subgrades.

- Uncontrolled fills and relic topsoil are problematic for support of pavements and utilities. We recommend removal and replacement of uncontrolled fills to at least 1 foot below pavement subbase gravels. We recommend the complete removal of fills and relic topsoil below gravity utilities.

- The site soils are sensitive to moisture and frost. Earthwork and grading activities should occur during drier Spring, Summer and Fall seasons. Rubber tired construction equipment should not operate directly on the native silt and clays.

- Imported Granular Borrow, Structural Fill, and Crushed Stone are recommended for fill and backfill. The existing fills and native non-organic soils are unsuitable for reuse below building areas, but may be suitable for reuse as fills to raise paved and landscape areas.

4.2 Site and Subgrade Preparation

We recommend site preparation begin with the construction of an erosion control system to protect adjacent drainage ways and areas outside the construction limits. Surficial organics, uncontrolled fills, relic topsoil, and foundations should be completely removed from areas of proposed fill and construction. As much vegetation as possible should remain outside the construction areas to lessen the potential for erosion.

Building Pad and Footings: As discussed, the site has been previously developed with uncontrolled fills overlying relic topsoil encountered to depths of about 4 to 7 feet. The uncontrolled fills and relic topsoil must be completely removed from beneath the proposed buildings. The extent of removal should extend 1 foot laterally outward from outside edge of perimeter footings for every 1-foot of excavation depth (1H:1V bearing splay). The overexcavated area should be backfilled with compacted Granular Borrow up to the bottom of slab base gravel. General details of uncontrolled fill removal and Granular Borrow backfill are attached as Sheet 9.

In general, native subgrades for the proposed building will consist of stiff to very stiff silty clay with areas of shallow bedrock. We recommend that excavation to subgrades be completed with a smooth-edged bucket to lessen disturbance of subgrade soils. If bedrock is encountered, we recommend removal to 6 inches below footing subgrade.

We recommend that perimeter foundations be underlain with 6 inches of Crushed Stone wrapped in geotextile fabric, such as Mirafi 180N or approved equivalent, overlying compacted Granular Borrow, stable native non-organic soils or bedrock. We anticipate that interior footings will be founded on compacted Granular Borrow.

Paved Areas and Utilities: Uncontrolled fills encountered beneath proposed paved areas should be removed to a depth of at least 1 foot below pavement gravels and then proof-rolled and densified with a 10-ton vibratory roller compactor. Areas that become soft or continue to yield after densification should be removed and replaced with compacted Structural Fill.

The uncontrolled fills and relic topsoil must be completely removed from beneath gravity utilities. The overexcavated area should be backfilled with compacted Granular Borrow up to the bottom of customary bedding materials.

Segmental Retaining Wall: Uncontrolled fills and relic topsoil must be completely removed from beneath the wall facing blocks. The extent of removal should extend 1 foot laterally outward from inner and outside edge of the facing block for every 1-foot of excavation depth (1H:1V bearing splay). The overexcavated area should be backfilled with compacted Granular Borrow to within 1 foot of the bottom of wall.

4.3 Excavation, Blasting and Dewatering

Excavation work will generally encounter uncontrolled fill, relic topsoil, native silty clay and bedrock. Care must be exercised during construction to limit disturbance of the native bearing soils. Earthwork and grading activities should occur during drier Spring, Summer and Fall seasons. Rubber tired construction equipment should not operate directly on the native silt and clays. Low ground pressure tracked equipment will be needed and temporary haul roads overlying geotextile fabric may be necessary. Final cuts to subgrade should be performed with a smooth-edged bucket to help minimize soil disturbance.

Based on the subsurface findings, we anticipate bedrock removal may be necessary, particularly in the vicinity of boring B-1 where bedrock was encountered at depths of 4 to 7 feet below the ground surface. Bedrock may be removed by hoe-ramming or blasting. If blasting is necessary, we recommend that a licensed drilling and blasting contractor be engaged to provide rock removal and pre-blast surveys should be completed on surrounding structures and infrastructure prior to commencing blasting activities. Vibrations due to blasting should be monitored during construction.

Sumping and pumping dewatering techniques should be adequate to control groundwater in excavations. Controlling the water levels to at least one foot below planned excavation

depths will help stabilize subgrades during construction. Excavations must be properly shored or sloped in accordance with OSHA regulations to prevent sloughing and caving of the sidewalls during construction. The design and planning of excavations, excavation support and dewatering is the responsibility of the contractor.

4.4 Foundations

We recommend the proposed building be supported on spread footings. Perimeter spread footings should be founded on at least 6 inches of Crushed Stone wrapped in non-woven geotextile fabric, such as Mirafi 180N, bearing on compacted Granular Borrow, stiff silty clay or bedrock. Blasted bedrock surfaces should be cleaned of loose blast rock and backfilled with compacted crushed stone. Interior spread footings are anticipated to be founded on compacted Granular Borrow underlain by stable native soils.

For foundations bearing on properly prepared subgrades, we recommend the following geotechnical parameters for design consideration:

Geotechnical Parameters for Spread Footings and Foundation Walls	
Design Frost Depth	4.5 feet
Net Allowable Soil Bearing Pressure	3.0 ksf or less
Base Friction Factor	0.35
Total Unit Weight of Backfill (compacted Structural Fill)	130 pcf
Internal Friction Angle of Backfill (compacted Structural Fill)	30°
At-Rest Lateral Earth Pressure Coefficient	0.5
Active Lateral Earth Pressure Coefficient	0.3
Total Post-Construction Settlement	1 inch or less
Differential Post-Construction Settlement	½ inch or less

Based on the subsurface findings, we interpret the site soils to correspond to Seismic Soil Site Class D according to IBC 2009/ASCE 7. We recommend the following seismic design parameters for the 2,500-year design earthquake:

RECOMMENDED SEISMIC DESIGN PARAMETERS (2,500-year Design Earthquake)		
Peak Ground Acceleration (PGA)	0.2-second Spectral Acceleration (S_s)	1-second Spectral Acceleration (S_1)
0.173 g	0.319 g	0.078 g

NOTE: Seismic design parameters from USGS accessed March 10, 2015 (http://geohazards.usgs.gov/deaggint/2002).

Liquefiable soils typically consist of loose, fine sands and non-plastic silts below the groundwater table. Based on the subsurface findings, it is our opinion the soils at the site are not susceptible to liquefaction during a seismic event and therefore the risk of lateral spread and seismic induced settlement are negligible.

4.5 Foundation Drainage

We recommend a foundation underdrain pipe be installed within the 6-inch layer of Crushed Stone wrapped in geotextile filter fabric recommended below perimeter footings. The underdrain pipe should consist of a 4-inch diameter, perforated SDR-35 foundation drain pipe bedded in Crushed Stone surrounded with non-woven geotextile fabric. The underdrain pipe must be connected to a positive gravity outlet protected from freezing, clogging and backflow. Surface grades should be sloped away from the building for positive surface water drainage. General underdrain details are shown on Sheet 9.

4.6 Slab-On-Grade

On-grade floor slabs in heated areas may be designed using a subgrade reaction modulus of 100 pci (pounds per cubic inch) provided the slab is underlain by at least 12-inches of compacted Structural Fill overlying properly prepared subgrades. The structural engineer or concrete consultant must design steel reinforcing and joint spacing appropriate to slab thickness and function.

We recommend a sub-slab vapor retarder particularly in areas of the building where the concrete slab will be covered with an impermeable surface treatment or floor covering that may be sensitive to moisture vapors. The vapor retarder must have a permeance that is less than the floor cover or surface treatment that is applied to the slab. The vapor retarder must have sufficient durability to withstand direct contact with the sub-slab base material and construction activity. The vapor retarder material should be placed according to the manufacturer's recommended method, including the taping and lapping of all joints and wall connections. The architect and/or flooring consultant should select the vapor retarder products compatible with flooring and adhesive materials.

The floor slab should be appropriately cured using moisture retention methods after casting. Typical floor slab curing methods should be used for at least 7 days. The architect or flooring consultant should assign curing methods consistent with current

applicable American Concrete Institute (ACI) procedures with consideration of curing method compatibility to proposed surface treatments, flooring and adhesive materials.

4.7 Entrance Slabs and Sidewalks

Entrance slabs and sidewalks adjacent to the building must be designed to reduce the effects of differential frost action between adjacent pavement, doorways, and entrances. We recommend that non-frost susceptible Structural Fill be provided to a depth of at least 4.5 feet (2.5 feet over bedrock) below the top of entrance slabs. This thickness of Structural Fill should extend the full width of the entrance slab and outward at least 4.5 feet, thereafter transitioning up to the bottom of the adjacent sidewalk or pavement gravels at a 3H:1V or flatter slope. General details of this frost transition zone are attached as Sheet 9.

4.8 Segmental Retaining Wall

We anticipate an exterior segmental retaining wall (SRW), such as Redi-Scape, will be needed on the southerly edge of the proposed paved area to retain up to 8 feet of soil. We recommend the facing blocks be founded on a minimum 12-inch thick leveling course of compacted Crushed Stone overlying undisturbed stiff silty clay or compacted Granular Borrow overlying native undisturbed stiff silty clay. We anticipate it will be necessary remove and replace uncontrolled fills and relic topsoil below the wall.

Based on the site soils and our understanding of the proposed construction, we provide the following soil parameters for use by a wall design engineer in their design of the segmental retaining wall:

Geotechnical Parameters of Segmental Block Retaining Wall			
Wall Segment	**Friction Angle**	**Cohesion**	**Unit Weight**
Retained Backfill (Granular Borrow)	30 degrees	0 psf	125 pcf
Retained Backfill (Crushed Stone)	34 degrees	0 psf	100 pcf
Foundation (Brown Silty Clay)	0 degrees	1,500 psf	120 pcf
Foundation (Granular Borrow)	30 degrees	0 psf	125 pcf
Net Allowable Bearing Capacity	2 ksf (properly prepared subgrade)		
Anticipated Settlement	up to 1 inch (during construction) up to 1 inch (post-construction)		
Seismic Soil Site Class	D (IBC 2009)		

Design of the retaining wall and evaluation of base sliding, overturning and internal stability of the wall are the responsibility of the wall design engineer. The wall designer must account for construction surcharge loads and future live load conditions. S.W.COLE is available to provide SRW design.

S.W.COLE should be retained to perform a global stability analysis of the SRW and to review the SRW submittal if designed by others.

4.9 Backfill and Compaction

The native soils and existing fills are unsuitable for reuse in building areas, but may be suitable as Common Borrow for compacted fill in paved and landscape areas. We recommend the following fill and backfill materials:

Common Borrow: Fill to raise grades in paved and landscape areas should be non-organic, mineral soils meeting the requirements of MaineDOT 703.18 Common Borrow.

Granular Borrow: Fill to raise grades in building areas and backfill of excavations from removal of existing foundations and utilities should be sand or silty sand meeting the requirements for MaineDOT 703.19 Granular Borrow. A 1-foot lift of Granular Borrow is also recommended below pavement subbase gravel.

Structural Fill: Fill to repair soft areas, backfill for foundations, slab base material and material below exterior entrances and sidewalks should be clean, non-frost susceptible sand and gravel meeting the gradation requirements for Structural Fill as given below:

Structural Fill	
Sieve Size	**Percent Finer by Weight**
4 inch	100
3 inch	90 to 100
¼ inch	25 to 90
#40	0 to 30
#200	0 to 5

Crushed Stone: Crushed Stone, used beneath perimeter foundations and for underdrain aggregate, should meet the gradation requirements of ASTM No. 57 Stone. A nominally sized ¾-inch washed crushed stone usually meets this requirement.

Placement and Compaction: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose lift thicknesses for grading, fill and backfill activities should not exceed 12 inches. We recommend that fill and backfill in building and paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. Crushed Stone should be compacted with 3 to 5 passes of a vibratory plate compactor having a static weight of at least 500 pounds.

4.10 Paved Areas

We anticipate paved areas will be subjected primarily to passenger and light delivery truck traffic. Considering the site soils and proposed usage, we offer the following pavement section for consideration. Materials are based on Maine Department of Transportation Standard Specifications.

Asphalt Pavement Section	
Material	**Thickness (inches)**
9.5 mm Hot Mix Asphalt (50 Gyration Design)	1 ¼
19.0 mm Hot Mix Asphalt (50 Gyration Design)	2 ¼
MaineDOT 703.06 Type A, Crushed Aggregate Base	3
MaineDOT 703.06 Type D, Crushed Aggregate Subbase	15
MaineDOT 703.19 Granular Borrow, Granular Subbase	12

Pavement subgrades should be densified with 3 to 5 passes of a vibratory roller. The base and subbase materials should be compacted to at least 95 percent of their maximum dry density as determined by ASTM D-1557. Hot mix asphalt pavement should be compacted to 92 to 97 percent of its theoretical maximum density as determined by ASTM D-2041. A tack coat should be used between successive lifts of bituminous pavement.

It should be understood that frost penetration can be on the order of 4.5 feet in the project area. In the absence of full depth excavation of frost susceptible soils and subsequent replacement with non-frost susceptible compacted fill, frost penetration into the subgrade will occur and some heaving and distress of pavement must be anticipated.

4.11 Weather Considerations

Earthwork and foundation construction should be completed during non-freezing Spring, Summer and Fall weather. The site soils may require drying before construction activities may occur and the contractor should anticipate the need for water to temper fills in order to facilitate compaction during dry weather.

If construction takes place during cold weather, subgrades, foundations and floor slabs must be protected during freezing conditions. Concrete and fill must not be placed on frozen soil; and once placed, the concrete and soil beneath the structure must be protected from freezing.

4.12 Design Review and Construction Testing

S.W.COLE should be retained to review the construction documents to determine that our foundation, earthwork and pavement recommendations have been properly interpreted and implemented.

A soils and concrete testing program should be implemented during construction to observe compliance with the design concepts, plans, and specifications. S.W.COLE is available to provide geotechnical observations during earthwork, provide subgrade observations for foundations and pavements as well as provide and testing and special inspection services for soils, concrete, asphalt, steel and spray-applied fireproofing construction materials.

5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the construction phase of the project.

Sincerely,

S. W. Cole Engineering, Inc.

Timothy J. Boyce, P.E.
Senior Geotechnical Engineer

MAS:tjb

Attachment A
Limitations

This report has been prepared for the exclusive use of Avesta Housing for specific application to the Proposed Apartment Building at 72 Bishop Street in Portland, Maine. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

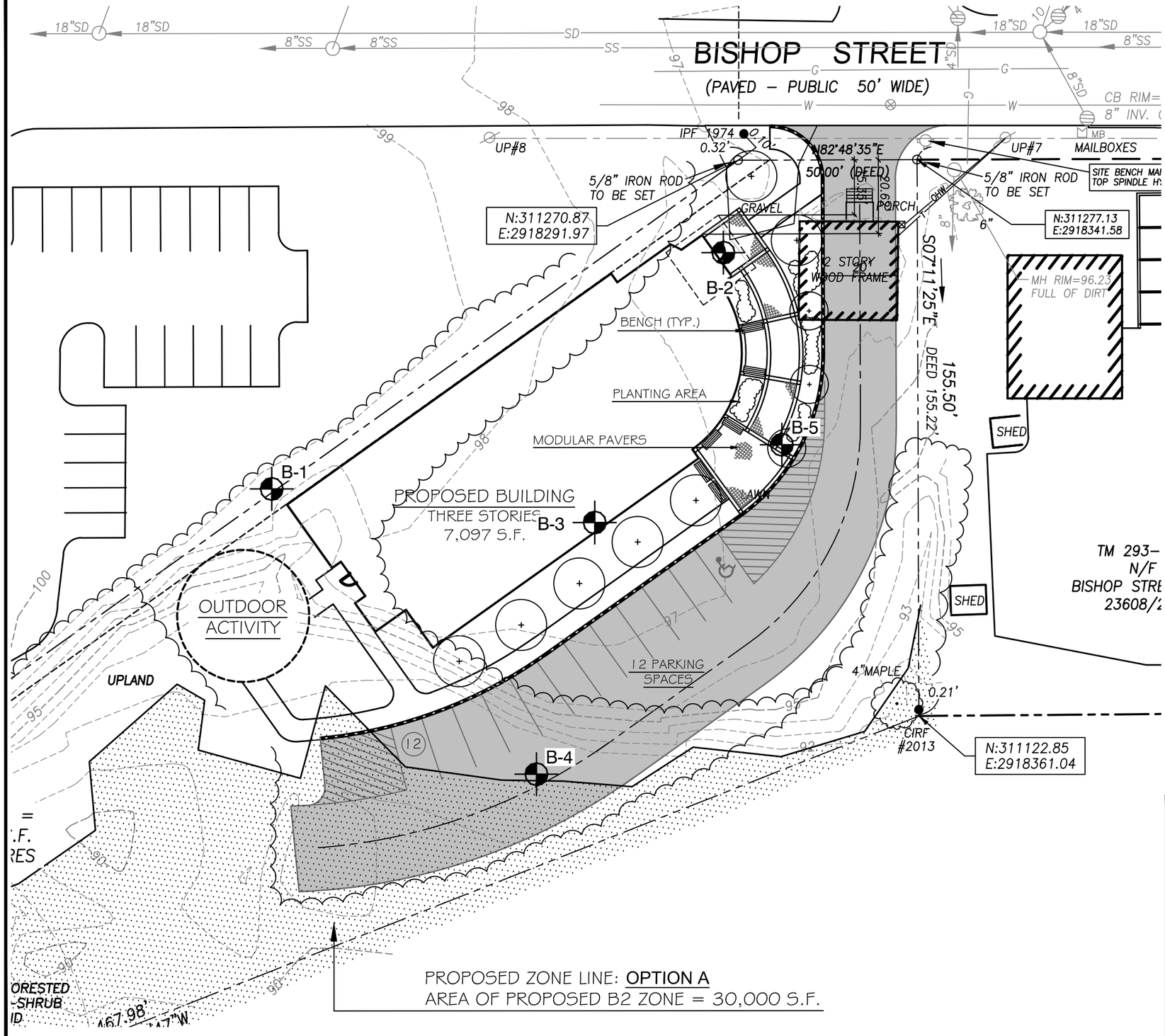
The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of services has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.



LEGEND:

APPROXIMATE BORING LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN WAS PREPARED FROM A 1"=20' SCALE PLAN OF THE SITE ENTITLED "CONCEPT SITE PLAN," PREPARED BY MITCHELL & ASSOCIATES, DATED JUNE 17, 2014, REVISED AUGUST 1, 2014.
2. THE BORINGS WERE LOCATED IN THE FIELD BY GPS SURVEY BY S. W. COLE ENGINEERING, INC. USING A MAPPING GRADE GPS RECEIVER.
3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

0 30 60 Feet

S.W.COLE ENGINEERING, INC.

AVESTA HOUSING

EXPLORATION LOCATION PLAN

PROPOSED 3-STORY APARTMENT BUILDING
72 BISHOP STREET
PORTLAND, MAINE

Job No.:	14-0696	Scale:	1" = 30'
Date :	03/11/2015	Sheet:	1

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-1**
SHEET: 1 OF 1
PROJECT NO.: 14-0696

PROJECT: PROPOSED APARTMENT BUILDING
CLIENT: AVESTA HOUSING-MAINE AFFORDABLE HOUSING COLLABORATION
LOCATION: 72 & 78 BISHOP STREET, PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC. DRILLER: BOB MARCOUX

DATE START: 2/23/2015
DATE FINISH: 2/23/2015
ELEVATION: 98' +/-
S.W.COLE REP: M. ST. PIERRE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.6'	TOPSOIL OVER BROWN FINE SANDY SILT WITH ROOTLETS
	1D	24"	12"	2.0'	4	7	13	15		BROWN GRAVELLY SAND, SOME SILT (FILL)
	2D	2"	0"	4.2'	50/2"					<<REFUSAL AT 4.2'; BORING OFFSET 5' WEST>>
									6.6'	
										REFUSAL AT 6.6'
										PROBABLE BEDROCK
										±6"OF FROST

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-1**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-2**
SHEET: 1 OF 1
PROJECT NO.: 14-0696

PROJECT: PROPOSED APARTMENT BUILDING
CLIENT: AVESTA HOUSING-MAINE AFFORDABLE HOUSING COLLABORATION
LOCATION: 72 & 78 BISHOP STREET, PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC. DRILLER: BOB MARCOUX

DATE START: 2/23/2015
DATE FINISH: 2/23/2015
ELEVATION: 97' +/-
S.W.COLE REP: M. ST. PIERRE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	4 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT ±6'
SOILS WET BELOW 4'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										BROWN SAND AND GRAVEL, SOME SILT OCCASIONAL COBBLES (FILL)
	1D	14"	14"	1.2'	36	72	50/2"			<<BLOW COUNT OVERSTATED DUE TO FROST>>
									3.5'	
									4.0'	DARK BROWN ORGANIC FINE SANDY SILT (RELIC TOPSOIL)
										BROWN SILTY CLAY WITH FREQUENT FINE SANDY SILT SEAMS
	2D	24"	10"	6.0'	3	4	5	6		~STIFF~ q_p = 3.5 - 4 ksf
										…BECOMING
										BROWN SILTY FINE TO MEDIUM SAND WITH OCCASIONAL SILTY CLAY LAYERS
	3D	22"	13"	10.8'	3	2	1	30/4"	10.8'	~LOOSE~
										REFUSAL AT 10.8'
										PROBABLE BEDROCK
										±3' OF FROST

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-2**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-3**
SHEET: 1 OF 1
PROJECT NO.: 14-0696

PROJECT: PROPOSED APARTMENT BUILDING
CLIENT: AVESTA HOUSING-MAINE AFFORDABLE HOUSING COLLABORATION
LOCATION: 72 & 78 BISHOP STREET, PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC. DRILLER: BOB MARCOUX

DATE START: 2/23/2015
DATE FINISH: 2/23/2015
ELEVATION: 97.5' +/-
S.W.COLE REP: M. ST. PIERRE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET BELOW ±6'
SOILS SATURATED BELOW ±7.5'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.5'	TOPSOIL OVER BROWN FINE SANDY SILT WITH ROOTLETS
	1D	24"	22"	2.0'	4	6	7	9	2.0'	BROWN AND GRAY SAND, SOME SILT WITH FINE ASPHALT FRAGMENTS (FILL)
										BROWN SILTY SAND, SOME GRAVEL (FILL)
									4.5'	~LOOSE TO MEDIUM DENSE~
										DARK BROWN ORGANIC SILT, SOME FINE SAND (RELIC TOPSOIL)
	2D	24"	12"	6.0'	1	1	1	1	5.5'	~VERY LOOSE~
										MOTTLED SILTY CLAY WITH OCCASIONAL SILTY FINE SAND SEAMS
	3D	24"	24"	8.0'	4	4	6	8		~VERY STIFF~ q_p = 6.5 - 7 ksf
										...BECOMES
										BROWN SILTY CLAY WITH FREQUENT SILTY FINE SAND LAYERS
	4D	24"	24"	11.0'	3	4	5	5		~STIFF~ q_p = 3.5 - 5 ksf
									11.9'	
										REFUSAL AT 11.9'
										PROBABLE BEDROCK
										±6" OF FROST

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-3**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-4**
SHEET: 1 OF 1
PROJECT NO.: 14-0696

PROJECT: PROPOSED APARTMENT BUILDING
CLIENT: AVESTA HOUSING-MAINE AFFORDABLE HOUSING COLLABORATION
LOCATION: 72 & 78 BISHOP STREET, PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC. DRILLER: BOB MARCOUX

DATE START: 2/23/2015
DATE FINISH: 2/23/2015
ELEVATION: 92' +/-
S.W.COLE REP: M. ST. PIERRE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED BELOW ±8'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.7'	2" OF TOPSOIL OVER BROWN SILTY FINE SAND WITH ROOTLETS
	1D	24"	20"	2.0'	3	1	2	4		BROWN FINE SANDY SILT, SOME FINE GRAVEL (FILL) ~MEDIUM DENSE~
									4.0'	
	2D	24"	10"	6.0'	2	2	2	2	6.5'	BROWN SILTY SAND, SOME GRAVEL, TRACE BRICK FRAGMENTS (FILL) ~LOOSE~
									7.2'	DARK BROWN ORGANIC FINE SANDY SILT (RELIC TOPSOIL)
	3D	24"	24"	8.0'	3	2	5	5		MOTTLED SILTY CLAY WITH FREQUENT FINE SANDY SILT SEAMS ~VERY STIFF~
	4D	24"	24"	11.0'	2	4	6	8		…BECOMES OLIVE-GRAY q_p = 6 - 8 ksf
	5D	24"	24"	16.0'	2	2	2	2		…BECOMES GRAY ~MEDIUM~
									19.0'	
	6D	18"	18"	20.5'	5	13	15			BROWN FINE TO MEDIUM SAND, SOME SILT WITH FREQUENT SILTY CLAY LAYERS ~MEDIUM DENSE~
	7D	2"	2"	24.2'	50/2"				24.2'	…BECOMES BROWN SAND, SOME SILT AND FINE GRAVEL
										REFUSAL AT 24.2' PROBABLE BEDROCK
										±6" OF FROST

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-4**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-5**
SHEET: 1 OF 1
PROJECT NO.: 14-0696

PROJECT: PROPOSED APARTMENT BUILDING
CLIENT: AVESTA HOUSING-MAINE AFFORDABLE HOUSING COLLABORATION
LOCATION: 72 & 78 BISHOP STREET, PORTLAND, MAINE
DRILLING CO. : S.W.COLE EXPLORATIONS, LLC. DRILLER: BOB MARCOUX

DATE START: 2/23/2015
DATE FINISH: 2/23/2015
ELEVATION: 96' +/-
S.W.COLE REP: M. ST. PIERRE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	4 1/4"		
SAMPLER:	SS	1 3/8"	140 LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT ±4.5'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.5'	1" OF TOPSOIL OVER BROWN SILTY FINE TO MEDIUM SAND WITH ROOTLETS
	1D	24"	15"	2.0'	5	3	3	2		BROWN GRAVELLY SAND, SOME SILT (FILL)
										~LOOSE~
									4.2'	
									4.5'	DARK BROWN ORGANIC SILT, SOME FINE SAND (RELIC TOPSOIL)
	2D	24"	10"	6.0'	3	1	1	2		BROWN SILTY CLAY WITH FREQUENT FINE SANDY SILT SEAMS
										~MEDIUM TO STIFF~ q_p = 2.5 ksf
										…BECOMING
										BROWN SILTY FINE TO MEDIUM SAND WITH OCCASIONAL SILTY CLAY LAYERS
	3D	20"	18"	10.7'	3	3	13	50/2"	10.7'	~MEDIUM DENSE~
										REFUSAL AT 10.7'
										PROBABLE BEDROCK
										±8" OF FROST

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:

	DRILLER - VISUALLY
X	SOIL TECH. - VISUALLY
	LABORATORY TEST

REMARKS:

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-5**

KEY TO THE NOTES & SYMBOLS
Test Boring and Test Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q_u	-	unconfined compressive strength, kips/sq. ft. - laboratory test
S_v	-	field vane shear strength, kips/sq. ft.
L_v	-	lab vane shear strength, kips/sq. ft.
q_p	-	unconfined compressive strength, kips/sq. ft. – pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W_L	-	liquid limit - Atterberg test
W_P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass.
γ_T	-	total soil weight
γ_B	-	buoyant soil weight

Description of Proportions:

Trace:	0 to 5%
Some:	5 to 12%
"Y"	12 to 35%
And	35+%
With	Undifferentiated

Description of Stratified Soils

Parting:	0 to 1/16" thickness
Seam:	1/16" to 1/2" thickness
Layer:	½" to 12" thickness
Varved:	Alternating seams or layers
Occasional:	one or less per foot of thickness
Frequent:	more than one per foot of thickness

REFUSAL: **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

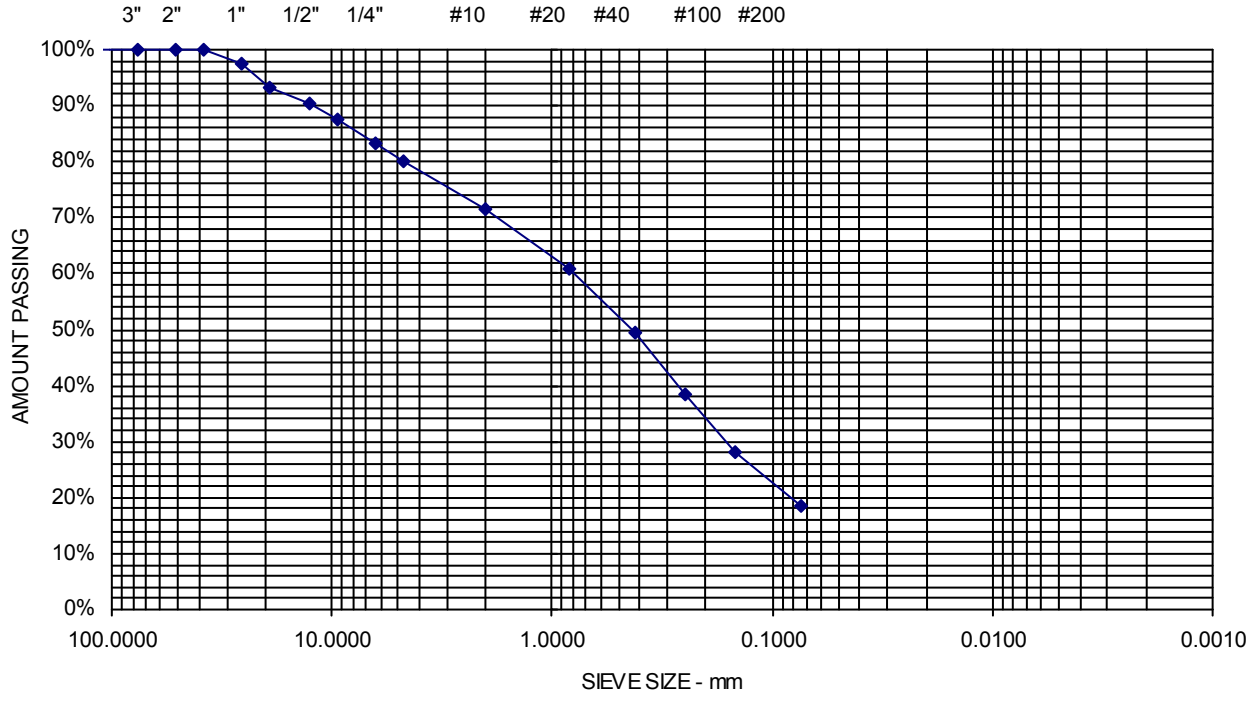
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

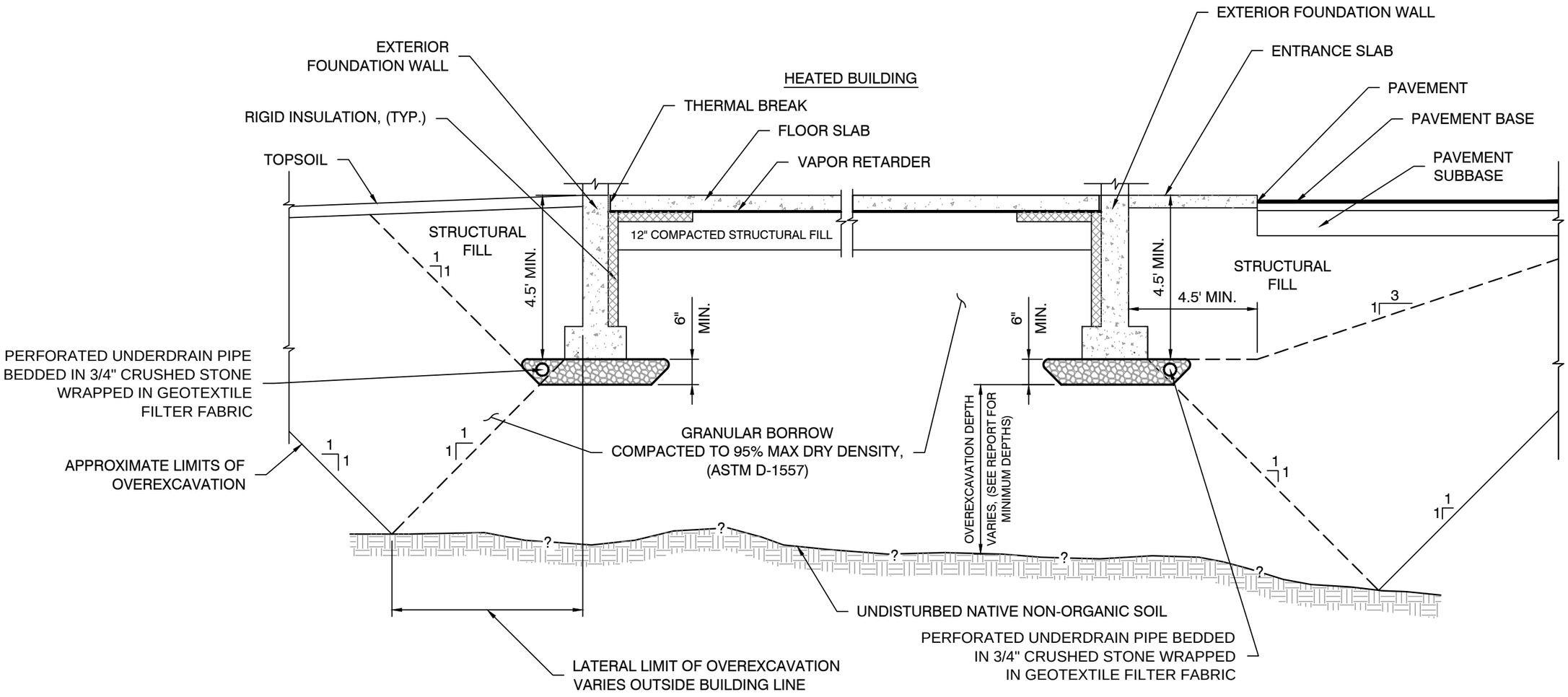
Project Name	PORTLAND ME - PROPOSED BISHOP STREET APARTMENT BUILDING - GEOTECHNICAL ENGINEERING SERVICES	Project Number	14-0696
Client	AVESTA HOUSING	Lab ID	8784A
Exploration	**B-2, B-3 & B-5**	Date Received	3/2/2015
Material Source	**BLENDED SAMPLE 0-2'**	Date Completed	3/2/2015
		Tested By	NEIL DAVIS

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
125 mm	**5"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**97**	
19.0 mm	**3/4"**	**93**	
12.5 mm	**1/2"**	**91**	
9.5 mm	**3/8"**	**88**	
6.3 mm	**1/4"**	**83**	
4.75 mm	**No. 4**	**80**	20% Gravel
2.00 mm	**No. 10**	**71**	
850 um	**No. 20**	**61**	
425 um	**No. 40**	**49**	61.7% Sand
250 um	**No. 60**	**38**	
150 um	**No. 100**	**28**	
75 um	**No. 200**	**18.3**	18.3% Fines



Comments:

Sheet



NOTE:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.

2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.

S.W.COLE ENGINEERING, INC.

AVESTA HOUSING

UNDERDRAIN DETAIL

PROPOSED 3-STORY APARTMENT BUILDING
72 BISHOP STREET
PORTLAND, MAINE

Job No.:	14-0696	Scale:	Not to Scale
Date :	03/11/2015	Sheet:	9

PUBLIC UTILITIES

72 Bishop Street will be served by existing utility services located in Bishop Street. There is no moratorium for excavation on this street. The following public utilities are available:

Water

Water for both fire suppression and domestic service will be supplied from an existing 12 inch water main located in Bishop Street. Proposed service connections include 6 inch fire service and 2 inch domestic service. Refer to the attached letter from Portland Water District stating their ability to service this project.

Sanitary Sewer

Sanitary sewer will be supplied from an existing 8 inch public sewer main located in Bishop Street. Proposed service connection will be a 6 inch line. A Wastewater Capacity Application has been filed with this Site Plan Application.

Natural Gas

Natural gas will be supplied from an existing 8 inch HDPE gas main located in Bishop Street. A 2 inch service will connect to the building. Refer to the attached letter from Unitil.

Electric

Electric service will be connected from an existing pole along Bishop Street. Service will be routed underground to the project site. Refer to the attached letter from Central Maine Power

Telephone and Cable TV

Telephone and cable TV will be connected from the existing utility pole along Bishop Street. Service will be routed underground to the project site.

Unitil
ME GAS OPERATIONS

February 17, 2015

Ms. Sashie Misner
Mitchell & Associates
The Staples School
70 Center Street
Portland, ME 04106

Re: 72 Bishop Street Efficiencies

Dear Ms. Misner:

Thank you for your interest in using natural gas for the above referenced project.

Unitil has natural gas in the vicinity of this project to provide service. The main in this vicinity is 8" HDPE plastic intermediate pressure. The evaluation to complete the design, costs and determining what the customer contribution is can be completed once Unitil receives the completed design and load information. Unitil welcomes the opportunity for further discussions regarding this project.

If you have any further questions or require additional information, please contact me directly at (207) 541-2536 or at Harmon@unitil.com.

Sincerely,

Bridget L. Harmon
Business Development Representative
Unitil Corporation
(o) 207-541-2536 (f) 207-541-2586

Portland Water District
FROM SEBAGO LAKE TO CASCO BAY

March 30, 2015

Mitchell & Associates
The Staples School
70 Center Street
Portland, ME 04101

Attn: Sashie Misner
Re: 72 Bishop Street Efficiencies, Portland
Ability to Serve with PWD Water

Dear Ms. Misner:

The Portland Water District has received your request for an Ability to Serve determination for the noted site submitted on February 16, 2015. 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.

Conditions of Service

The following conditions of service apply:

- Our records show that the site is currently served with a ¾-inch domestic water service; please note that the size of this service is below our minimum service size of 1-inch. This existing ¾-inch water service must be terminated by shutting the corporation valve and cutting the pipe from the water main.

- New service(s) may be installed from the water main in Bishop Street. The services(s) should enter through the properties frontage at least 10-feet from side property lines. Please note that only one meter and one bill will be associated to each domestic service line. This one master meter would be located in a common space that all tenants could gain access to if necessary.

- Approval of plans will be required for the project prior to construction. As your project progresses, we advise that you submit any preliminary design plans to MEANS for review of the water service line configuration. We will work with you to ensure that the design meets our current standards.

Existing Site Service

According to District records, the project site does currently have existing water service. A 3/4-inch diameter copper water service line, located as shown on the attached water service card, provides water service to this site. Please refer to the "Conditions of Service" section of this letter for requirements related to the use of this service.

225 DOUGLASS STREET P.O. BOX 3553 PORTLAND, MAINE 04104-3553
PHONE: 207.774.5961 FAX: 207.761.8307 WEB: WWW.PWD.ORG

Water System Characteristics

According to District records, there is a 12-inch diameter cast iron, cement lined water main on the south side of Bishop Street 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:	Bishop Street 550' west of Mayfield Street	
Hydrant Number:	POD-HYD01616	
Last Tested:	2/14/2013	7/19/2006
Static Pressure:	74 psi	70 psi
Residual Pressure:	Not Measured	Not Measured
Flow:	Not Measured	1,255 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

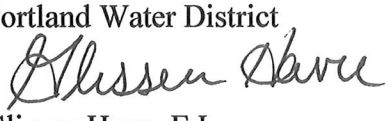
The data noted above indicates there should be adequate pressure and volume of water to serve the domestic water needs of your proposed project.

Private Fire Protection Water Needs

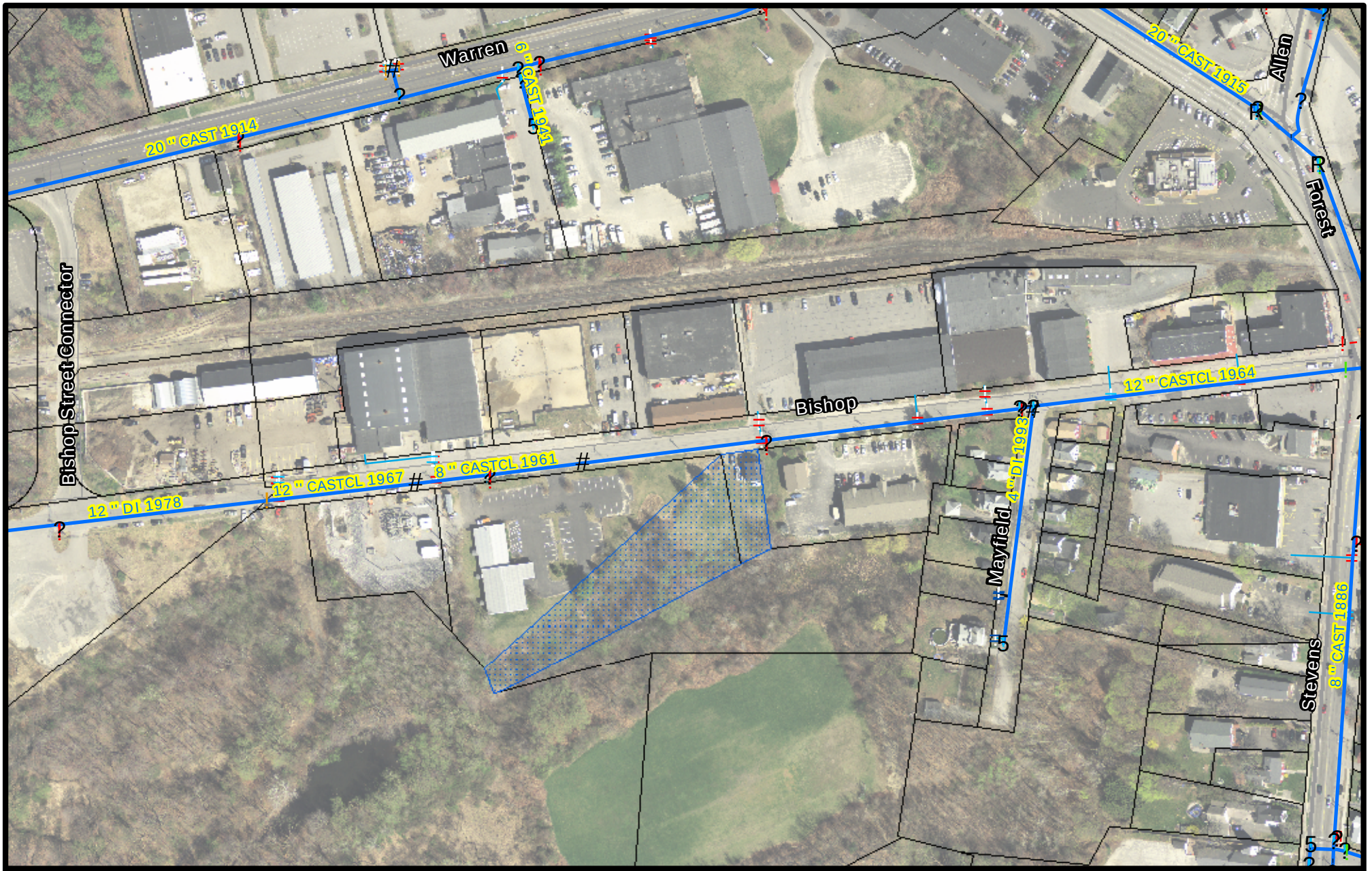
It is anticipated that this project will require water service to provide private fire protection to the site. Please note that the District does not guarantee any quantity of water or pressure through a fire protection service. Please share these results with your sprinkler system designer so that they 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.

As your project progresses, please remain in contact with the District to ensure that the design meets our current standards. 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



72 Bishop Street

Portland

PORTLAND WATER DISTRICT
225 Douglass Street
Portland, ME 04104

Scale 0 50 100 200 300 400 Feet — 1 inch = 200 feet

Legend

!	Air Valve	●	Connection	=	Combined Service	!	Manhole
5	Blow Off	!	Attribute Change	=	Domestic Service	(	CSO
R	By Pass	#	Reducer	=	Fire Service	→	Gravity
?	Distribution	!	Hydrant	(	Private Hydrants	→	Force
?	Transmission	?	Hydrant Control	(	Meter Pits		

Disclaimer: This map is suitable for preliminary study and analysis and is based on PWD record information. PWD is not liable for any damages whatsoever resulting from inaccurate data or from errors made in the location and marking of its infrastructure.

Drawn By: GJH	Prepared For: Mitchell & Associates
Scale: As Noted	Date: March 30, 2015

2/17/2015

Sashie Misner
Mitchell and Associates
70 Center Street
Portland, ME 04101
Sent via email to: SMisner@MitchellAssociates.biz

RE: Ability to Serve Letter for Avesta Housing 72 Bishop Street, Portland, ME.

Dear Ms. Misner:

CMP has the ability to serve the proposed project located at 72 Bishop in Portland, Maine, in accordance with our CMP Handbook (web link below). We can provide you the desired pad or pole mounted transformers per your request and city approval, in accordance with our CMP Standards Handbook. If you have any questions on the process, or need help in completion of the documents, please feel free to contact me. Should the process be single phase, you will work directly with our Portland Service Center.

New Service Milestones

- Call 1-800-565-3181 to establish a new account and an SAP work order.
- Submit any electronic drawings (PDF (preferred) or DWG files) of the site layout and proposed electrical connections if you have them.
- Submit Load information. Please complete this CMP spreadsheet using load information
- Submit the easement information worksheet. Please complete this CMP form and either email or fax back to us.
- Preliminary meetings with CMP to determine the details of job
- Field planner design appointment to cost out job and develop CMP Invoice.
- Submit invoice for payment.
- Easements signed and payment received.
- Job scheduled for completion after the electrical inspection has been received.

This process can take several months, depending upon several factors including transformer delivery, potential substation upgrades, return of completed paperwork, and other jobs in the system that may be ahead of yours. In addition, contact with the other utilities, including telephone and cable, should be commenced as soon as practical. They may have additional work or charges in addition to the CMP work required to bring your project on line.

162 Canco Road Portland, ME 04103
Tel (800) 750-4000
207-842-2367 office
207-458-0382 cell
207-626-4082 fax

www.cmpco.com

For your convenience, here is a link to the CMP Website which contains our Handbook with details on most service requirements:

CMP Handbook of Standard Requirements
(http://www.cmpco.com/MediaLibrary/3/6/Content%20Management/YourAccount/PDFs%20and%20Docs/handbook.pdf)

If you have any questions, please contact me.

Regards,

Jamie Cough
Energy Services Advisor
Central Maine Power Company
162 Canco Road
Portland, ME 04103
207-842-2367 office
207-458-0382 cell
207-626-4082 fax

AVESTA HOUSING

Quality Affordable Living

To: Interested Parties

From: Greg Payne, Development Officer

Re: Statement of Technical Capability

Avesta Housing is Maine's largest and most sophisticated non-profit housing developer and manager. Incorporated in 1972, Avesta is driven by the vision that decent, affordable housing should be available to all Mainers, without exception. Avesta owns and manages 56 properties containing over 1,500 affordable apartments. These apartments serve low-income seniors and families, as well as persons with special needs, primarily in York and Cumberland Counties.

Avesta Housing is chartered as a nonprofit corporation in the state of Maine and is tax exempt under Section 501(c)3 of the federal Internal Revenue Code. Avesta is governed by a 15-member board of directors representing a variety of banking, business, public, community, social service and housing organizations. Its administrative headquarters is in Portland, Maine. It has a staff of 90 full-time and part-time employees.

307 Cumberland Avenue Portland, Maine 04101
207-553-7777 1-800-339-6516 Voice/TTY 207-553-7778 Fax | www.avestahousing.org

NeighborWorks® CHARTERED MEMBER

Gorham
SAVINGS BANK

February 17, 2015

City of Portland
389 Congress Street
Portland, ME 04101

RE: Avesta Housing, Bishop Street Apartments, Portland, Maine

Dear Sir or Madam,

It is a pleasure to confirm for you that Avesta Housing is a valued customer of Gorham Savings Bank in good standing. We believe, based on our relationship with them, that they have the financial and managerial capability to successfully complete the above project.

While this is not a commitment to lend, we welcome the opportunity to assist Avesta Housing with their financing needs for this project.

Sincerely,

Matthew W. Early
Senior Vice President

MWE/ckb

10 Wentworth Drive, Gorham, ME 04038 • Tel. (207) 839-3342
Customer Service Center (207) 839-4796 • www.gorhamsavingsbank.com

AVESTA HOUSING

LETTER OF AUTHORIZATION

June 17, 2014

To: City of Portland Planning Department

This letter authorizes Robert Metcalf, Michael King and/or Sashie Misner of Mitchell & Associates and Ben Walter of CWS Architects to act as agents on behalf of Avesta Housing Development Corporation in public meetings and the submission of any and all application materials that relate to our proposed development of Bishop Street Apartments on Bishop Street in Portland.

Sincerely,

Greg Payne
Development Officer

307 Cumberland Avenue • Portland, Maine 04101
207-553-7777 • 1-800-339-6516 Voice/TTY
207-553-7778 Fax • www.avestahousing.org

COMPLIANCE WITH APPLICABLE ZONING REQUIREMENTS

The proposed development will be located within the Community Business District (B-2-C zone). A mix of business, industry and single family residences exists within this Bishop Street neighborhood. The proposed 30 efficiency units at 72 Bishop Street will provide housing for chronically homeless individuals, using a “housing first” approach. The project is close to Forest Avenue and will provide much needed housing in urban neighborhoods along arterials. The proposed development intends to meld with the neighborhood and be a positive addition to the surrounding services provided.

The B-2-C zone supports moderate to high density residential uses located in close proximity to business uses. 72 Bishop Street will replace the single family residence with 30 efficiency units and providing residential development similar in scale to the surrounding structures. The height of the proposed 3-level building is 39 feet. While B-2-C zone encourages active street frontages, the irregular shape of the lot and program do not allow for the building to be located 10 feet from the front property line. The building will be angled and located as close as possible to the front property line (18’). No parking is proposed within the front of the building. Onsite parking consists of ten parking spaces and two handicap parking spaces.

The proposed development is in compliance with the applicable zoning requirements set-forth the Portland Land Use Ordinance conforming to provisions of the Site Plan and Subdivision Regulations and the zoning provisions of the B-2-C designated district with the following exceptions.

The applicant is requesting a waiver from Section 14-188 Active Street Frontages and 14-185 Dimensional Requirements (Front Yard Maximum). The request is based on the limitations the irregular shaped lot offers in regards to building location. The property is 50 feet wide at the property line and does not offer the ability to locate a 24 foot driveway and the primary building façade towards the street. Because of the low traffic volume entering the site and to allow the building to be as close to the road as possible, the driveway was designed as 20’ wide. The building is located as close as possible to the front property line (18’) to achieve the appearance of an Active Street Front.

The applicant is requesting a waiver from Section 14-332 (4) (a) multi-family residential parking requirement of one parking space per dwelling unit. The applicant is proposing to provide 12 parking spaces (10 spaces and 2 handicap spaces). The proposed reduced amount of parking is based on prior experience serving the target homeless population whom do not typically own vehicles as well as an understanding of future employee parking needs.

WAIVER REQUEST

1. Waiver request from Section 14-185 Dimensional Requirements (Front Yard Maximum). The request is based on the limitations the irregular shaped lot offers in regards to building location. The property is 50 feet wide at the property line and does not offer the ability to locate a 24 foot driveway and the primary building façade within the ten (10) foot setback at the street. To locate the structure as close as possible to the street, we have reduced the width of the access drive from 24 feet to 20 feet allowing the closest point of the building to be 18 feet from the property line. The driveway width for the parking meets the required 24 foot width.

2. Waiver request from Section 14-332 (4) (a) multi-family residential parking requirement of one parking space per dwelling unit. The applicant is proposing to provide 12 parking spaces (10 spaces and two handicap spaces). The proposed reduced amount of parking is based on prior experience serving the target homeless population whom do not typically own vehicles, as well as, an understanding of future employee parking needs.

3. Waiver request from Section 14-526 2.b.iii. a. & Technical Design Manual 4.6.1, Multi-family residential street tree requirement of one street tree per unit spaced 30'-45' within the right of way. The facility proposes 30 units although has only 50 feet of road frontage. Due to the irregular shape of the site and driveway and sidewalk requirements the applicant is not proposing any street trees within the right of way. The applicant would like planning staff to consider the three trees located along the front of the building to apply towards the 30 required trees. The applicant is requesting a waiver for the remaining 27 trees and will provide the fee in lieu.

Temporary Waiver Request

The applicant requests the following temporary waivers:

1. Construction Management Plan. At this stage in development we are unable to provide a detailed construction management plan. We request the ability to provide this at a later time.

2. Lighting Photometric Plan. We have selected the attached fixtures for site lighting. We are requesting a temporary waiver for the submission of the

photometric plan, a plan will be provided before a scheduled public hearing.

3. Manufacturers' Verification of Mechanical Systems, HVAC equipment will be mounted on the roof. Sizing and selection of equipment is currently being developed. Appropriate documentation will be submitted for staff review. We request the ability to provide at a later date.

4. Sign Plan. The Sign Plan will be in conformance with city zoning. We have shown the intended signage location and request the ability to provide the detailed sign information at a later time for staff review.

5. Easements. The location of electric and communication services has not been finalized. Option one shown on plan sheet L3 will require an easement from the abutting masonic lodge. The applicant is pursuing this and will provide any easements as may be required.

CONSISTENCY WITH CITY'S COMPREHENSIVE PLAN

The Project is consistent with the City's Comprehensive Plan and, more specifically, the housing component of that plan, *Housing: Sustaining Portland's Future*.

Housing: Sustaining Portland's Future lays out six major policy objectives to achieve the City's housing goals and address Portland's housing shortage. Each of these primary policies outlines a number of secondary policy goals. The proposed Project is consistent with many of the housing policy goals detailed in the city comprehensive housing plan;

Policy #1: Ensure an Adequate and Diverse Supply of Housing for All

i. *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.*

Homelessness is an issue that plagues many urban communities. This project will provide housing for the chronically homeless contributing long term solutions to this greater community issue. The project is located within a business district along an arterial.

ii. *A variety of housing choices should be available such that no one should have to spend more than 30% of their income for housing.*

This 'housing first' project will provide 30 efficiency apartment units. Avesta will partner with Preble Street for the provision of 24-hour, on-site support services and Portland Housing Authority for project-based rental assistance. This housing project will provide quality services and living space for Portland's neediest population.

iii. Encourage higher density housing located near services, such as schools, businesses, institutions, employers, and public transportation.

The Project is a moderate density development near Forest Avenue the services and facilities listed above.

iv. 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.

The Project will bring 30 efficiency apartments to the neediest of Portland. In addition to providing housing, the project includes counselling services for homeless individuals with mental disorders. This step is aimed at providing not just a living space but support to establish stability and a hopeful future.

v. Identify vacant land and redevelopment opportunities throughout the City to facilitate the construction of new housing.

The Project involves replacing a single family residence located on the edge of an industrial zone and within a business zone. This redevelopment opportunity will create higher density housing similar in scale to the surrounding neighborhood.

Policy #3: Neighborhood Stability and Integrity

i. *Encourage innovative new housing development, which is designed to be compatible with the scale, character, and traditional development patterns of the City's residential neighborhoods.*

The Project involves replacing a single family residence located on the edge of an industrial zone and within a business zone. This project will create building architecture similar in scale to the surrounding neighborhood.

ii. Encourage new housing development in proximity to neighborhood assets such as open space, schools, community services and public transportation.

The Project is located in close proximity to the neighborhood assets listed above.

Policy #5: Sustainable Development

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

The Project will provide diverse housing choices that are close in proximity to services and employment.

ii. *Maximize development where public infrastructure and amenities, such as schools, parks, public/alternative transportation, sewer lines and roads, exist of may be expanded at minimal costs.*

As documented previously, the Project is located in an urban setting that is serviced by the public infrastructure and amenities listed above.

iii. Locate and design housing to reduce impacts on environmentally sensitive areas.

As an urban infill development with a goal to contribute positively on surrounding neighborhood, the Project is designed to reduce environmental impacts associated with new development.

iv. Design housing to use new technologies and materials that reduce costs and increase energy efficiency.

The Project is being designed to achieve maximum energy efficiency.

Policy #6: Freedom of Choice

a. Increase and ensure equal access to housing opportunities for minorities, low-income people and persons with disabilities and special needs.

As documented, the Project will increase access to high quality housing for the chronically homeless.

i. *Ensure that an adequate supply of new and existing housing is accessible to persons with physical disabilities.*

The project provides fully-ADA compliant units as required under state and federal building codes.

FIRE DEPARTMENT CHECKLIST

1. Name, address, telephone number of applicant

   Avesta 72 Bishop Street, LP
   307 Cumberland Avenue
   Portland, Maine 04101
   Contact: Brooks More
   Phone: 207.553.7777

2. Name, address, telephone number of architect

   CWS Architects
   434 Cumberland Avenue
   Portland, Maine 04101
   Contact: Ben Walter
   Phone: 207.774.4441

3. Proposed uses of any structures [NFPA and IBC classification]

   IBC: R-2 Apartments

   NFPA: Residential – New Apartment Building

4. Square footage of all structures [total and per story]

First Floor:	7,804 SF
Second Floor:	7,035 SF
Third Floor:	6,535 SF
Total:	21,374 SF

5. Elevation of all structures

   Building Height is 36.0 feet as measured by IBC definitions

6. Proposed fire protection of all structures
   NFPA 13R system throughout.

7. Hydrant locations:

   There is a hydrant adjacent to the proposed driveway on Bishop Street.

8. A 12 inch water main is located within Bishop Street. Two water services are proposed for the building, one 6 inch service for fire and one 2 inch service for domestic.

9. Access to all structures [min. 2 sides]

   The proposed structure is accessible from Bishop Street and a driveway along the east side of the building.

10. A code summary shall be included referencing NFPA 1 and all fire department Technical standards.

    Preliminary Code Summary provided to PFD under separate cover (CWS to review details with Portland Fire Department).

11. The elevator shall be sized to fit an 80" x 24" stretcher and two personnel

    Elevator Cab Size to meet PFD Requirements (CWS to review details with Portland Fire Department).

12. Some structures may require Fire flows using annex H of NFPA 1

    Fire Flows to meet PFD Requirements (CWS to review details with Portland Fire Department).

GORRILL PALMER

PO Box 1237, 15 Shaker Road
Gray, Maine 04039
207.657.6910

April 7, 2015

Robert B. Metcalf, Principal
Maine Licensed Landscape Architect
Mitchell & Associates
70 Center Street
Portland, Maine 04101

Subject: Trip Generation, Crash History and Access Review
Avesta Housing Project on Bishop St.

Dear Bob:

Gorrill Palmer (GP) has completed a trip generation forecast, crash history review, access review and on-site parking forecast per your request for the proposed Avesta Housing project at 72 Bishop Street in Portland. The project will be similar to the Logan Place at Frederick Street in Portland which has 30 units. The Bishop Street project will be a first housing project for the homeless and will consist of 30 units and twelve parking spaces. It is our understanding that the housing is to be targeted for low-income, formerly-homeless individuals, some with medical disability. We understand they will tend to be an older population than Logan Place and less likely to own a car.

Background Data

GP based the study on the following information:

- A layout and lighting plan, L2, prepared by Mitchell & Associates dated April 10, 2015.
- Crash data for 2011-2013 provided by the Maine Department of Transportation (MaineDOT).
- Memo to the City Planning Board from Mark Swann dated August 1, 2014.

Sight Distance Evaluation

The Maine Department of Transportation has guidelines for sight distances at driveways within urban compacts. The sight line standards for driveways in an urban compact are as follows:

Maine DOT Standards for Sight Distance

Posted Speed (mph)	Sight Distance
25	200
30	250
35	305
40	360

GP has evaluated the available sight lines at the proposed 72 Bishop Street driveway in accordance with Maine DOT standards.

The Maine DOT standards are as follows:

Driveway observation point:	10 feet off major street travelway
Height of eye at driveway:	3 ½ feet above ground
Height of approaching vehicle:	4 ¼ feet above road surface

The posted speed on Bishop Street in the vicinity of the site driveway is 25 mph. The results of this sight line analysis exiting the site drive is summarized in the following table:

72 Bishop Street Apartments Driveway Sight Line Evaluation

Direction	Posted Speed (mph)	Recommended Sight Line (ft)	Actual Sight Line (ft)
Exiting onto Bishop Street Looking			
Left	25	200	+300
Right	25	200	+300

As shown, the sight lines for the driveway exceeds MaineDOT requirements. GP recommends that all plantings, which will be located within the right of way, not exceed 3 feet in height and be maintained at or below that height. Signage should not interfere with sight lines. In addition, we recommend that during construction, when heavy equipment is entering and exiting into the site, that appropriate measures, such as signage and flag persons, be utilized in accordance with the Manual on Uniform Traffic Control Devices.

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 2011-2013 crash data in this area and found there were no high crash locations in the immediate area of the project site on Bishop Street. A copy of the collision history is included in the Appendix.

Trip Generation

Forecast based on ITE. Traffic engineers traditionally use the Institute of Transportation Engineers (ITE) publication *Trip Generation*, 9th Edition to estimate the potential trip generation for the proposed project. Based on Land Use Code (LUC) 220, Apartment, with 30 units, the proposed site would be forecast to generate the following trips during the peak hour of the adjacent street traffic:

AM Peak Hour 15 trip ends
PM Peak Hour 19 trip ends

A trip end is either an entering or exiting vehicle, thus a round trip equals two trip ends. ITE trip rates are based on surveys of predominantly suburban locations rather than urban and does not reflect the type of tenant proposed for this project and therefore is not appropriate for use in this project.

Data based in Preble Street Memo: Given these results, the fact that the project is in an urban area, and that the housing is to be targeted for low-income, formerly-homeless individuals with some disability, most of the traffic for the project is anticipated to come from staff, outside medical providers and social workers. GP has utilized a memo dated August 1, 2014 to the Portland Planning board from Mark Swann of Preble Street concerning staffing at the proposed project. A copy of the memo has been included with this letter. The following peak hour trips are estimated based on that memo.

Project staff- a maximum of 4 staff members are anticipated to be on site at any one time between the hours of 8 AM and 8 PM along with a maximum of 3 management staff. Assuming these staff all arrive in the same hour which is very conservative yields 7 trips into the site. Assuming two overnight staff leaving within the same hour yields a combined total of 9 trip ends for staff during the AM peak hour. For the PM peak hour, we have assumed 2 staff arrive and 2 leave and that 3 management staff leave for a total of 7 trip ends.

Service and healthcare providers- up to 12 individuals visit the site to provide case management, assistance with daily activities or a follow-up to a medical appointment. The attached memo from Preble Street states that there were an average of 4 service workers visit clients each day at Logan Place with a typical appointment lasting 60 minutes with the maximum number on site at the same time of 2. GP has estimated 2 trip ends in both the morning and afternoon peak hours based on this information.

Non-service guest visits- The Preble Street memo estimates a total number of non-service guest visits of approximately 6 per day. GP has estimated 2 trip ends in both the morning and afternoon peak hours based on this information.

Based on the information presented in the memo from Preble Street, GP estimates the following peak hour trip ends:

AM Peak hour: 13 trip ends
PM Peak hour: 11 trip ends

Pedestrian Circulation

The Applicant is proposing to construct approximately 600 feet of 5 foot sidewalk along the southerly side of Bishop Street from the site easterly to match into the existing 300 foot sidewalk at the easterly end of Bishop Street. This will enable tenants to access Metro Route 3 which stops on Stevens Ave approximately 350 feet south of Bishop Street in front of Bogusha', or Metro Route 2 which stops on Forest Avenue approximately 375 feet southerly of Bishop Street near Meineke. Since some of the residents may have medical issues, case managers from several organizations including Maine Health, Catholic Charities, and Preble Street can transport tenants for shopping. These resources are also available to assist able individuals in learning how to use the Metro.

Parking Evaluation

The City ordinance suggests one parking space per housing unit which would result in the Applicant needing to provide a total of 30 spaces. Providing more parking than needed to meet the demand would result in loss of open space, increases stormwater impacts, and underutilization of 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. It is the opinion of GP that the parking needs for this project will be far less than one space per unit based on the following information. First, Logan Place, the most similar project to the proposed project, has had only one tenant since they have been leasing that owned a car. Secondly, the parking needs for the project is most likely to come from staff, outside medical providers and social workers. The Preble Street memo referenced earlier in this letter in the trip generation discussion, states that for Logan Place (30 units), it is rare for there to be more than 5 cars on site at any one time. Based on the staffing and visitation information presented in the trip generation discussion, we anticipate the parking demand to be as follows:

Staff: 4 spaces
Supervisors: 3 spaces
Service and healthcare providers: 2 spaces
Visitors: 2 spaces
Total: 11

There are 12 spaces planned as part of the project which should be adequate based on this forecast.

Closure

In summary, it is our opinion that the project should generate 11 and 13 trip ends during the AM and PM peak hours respectively and that the proposed 12 on site spaces should adequately serve the project.

Please contact us with any questions.

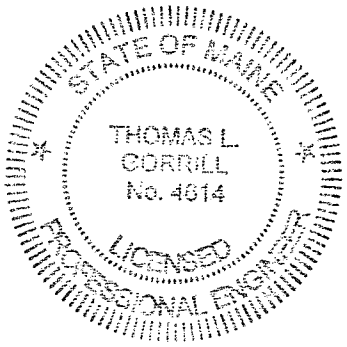
Sincerely,

Gorrill-Palmer Consulting Engineers, Inc.

Thomas L Gorrill, P.E., PTOE

Enc.

TLG/tlg/JN2976 /Trip generation and parking study 4-7-15.doc



Preble Street

Turning Hunger and Homelessness into Opportunity and Hope

Anti-Trafficking Coalition
Clinical Intervention Program
First Place
Florence House
Food Programs
Joe Kreisler Teen Shelter
Logan Place
Maine Hunger Initiative & Advocacy
Resource Center
Teen Center
Veterans Housing Services

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Yemaya St. Clair
James Sterling
Lannie Welch
Edie White

Mark R. Swann
Executive Director

38 Preble Street
Portland, ME 04101
207.775.0026 Phone
info@preblestreet.org
www.preblestreet.org

Memo to: City of Portland Planning Board
From: Mark R. Swann
Date: August 1, 2014
Re: Zoning Changing for 72 Bishop Street

Thank you for your consideration of this important addition to the Portland community. We look forward to being a valuable and contributing neighbor on Bishop Street. We hope the information below will assist in your assessment.

We remain available to answer any questions you may have.

Staffing Requirements on site at any one time:
A minimum of two staff members will be on duty at all times, with as many as four on-site between the hours of 8 a.m. and 8 p.m. We expect to have 10 full time employees: one coordinator, one supervisor, and one team leader managing seven housing support workers. Full-time staff will be supplemented by as-needed staff to cover vacations and sick days. Management personnel will be onsite during daytime hours, and overnight shifts will have a team leader on site. Preble Street's Chief Program Officer will oversee the program, and Preble Street provides a 24-hour on-call system, staffed by a clinical manager, to address clinically challenging situations. Additional staffing will include social work, counseling, and occupational therapy interns, as well as trained volunteers.

Staff/service traffic volume:
The staff/service traffic volume at Logan Place, the first housing development of this kind in Portland, varies greatly from day to day. Service and healthcare providers make individual appointments with tenants, and there may be a dozen individuals coming to provide case management or assistance with activities of daily living or a follow up to a medical appointment in a given day. Over a two month period from May 1, 2014, through June 30, 2014, Logan Place had an average of four service workers visiting clients each day. This number is slightly inflated due to one tenant being seriously ill and requiring daily hospice visits. A typical service appointment usually lasts 60 minutes or less. These visits are spread throughout the day, sometimes into the evening. The volume at any one time of day is typically one or two, maximum. It is rare for there to be more than five cars in the Logan Place parking lot at any one time. Non-service guest visits total approximately six per day.

Potential number of outside medical providers that would visit residents, including frequency:
As noted above, the average number of outside medical visits at Logan Place, is one or two a day. At the Bishop Street facility, because the target population is individuals who are medically compromised, we anticipate this number will be slightly higher. However, we anticipate being able to mitigate this factor by engaging with a healthcare partner and having medically credentialed staff as part of the program. This will lead to increased efficiency due to coordination of visits.

Transportation options provided to residents:
Transportation is a critical part of service planning for each tenant. Case managers from several organizations including Maine Health, Catholic Charities, and Preble Street can transport individuals for shopping and assist individuals in learning to be comfortable

with available public transportation. All tenants can get bus passes. Preble Street has an account with Elite Taxi service for emergency use. Additionally, most clients in the Bishop Street building will qualify for Medicaid assistance for rides to appointments. Preble Street is working closely with Maine's new Mainecare ride contractor, Logisticare, to transport clients to scheduled medical, case management, mental health, substance abuse counseling or treatment appointments. Tenants and Preble Street staff make these arrangements, which include pick up and return after any appointment. Many tenants who are mobile will be able to walk to local convenience stores and grocers.

Services provided by Preble Street and other partners:
Preble Street provides case management services to all tenants to ensure that individuals succeed in making the transition from chronic homelessness to permanent housing. A key role of Preble Street staff is working alongside tenants to develop service plans for improving independent living skills such as cooking or budgeting, meeting vocational or school goals, or beginning treatment for mental illnesses. Preble Street staff collaborate with tenants to reach goals, and establish new ones over time, making referrals to other providers and organizations as needed to assist tenant in achieving those goals and maintaining health and stability. Outside agencies are welcome at any time to visit and work with tenants, at tenants' discretion. Many tenants routinely receive services ranging from behavioral health to personal care attendants to housekeeping assistance.

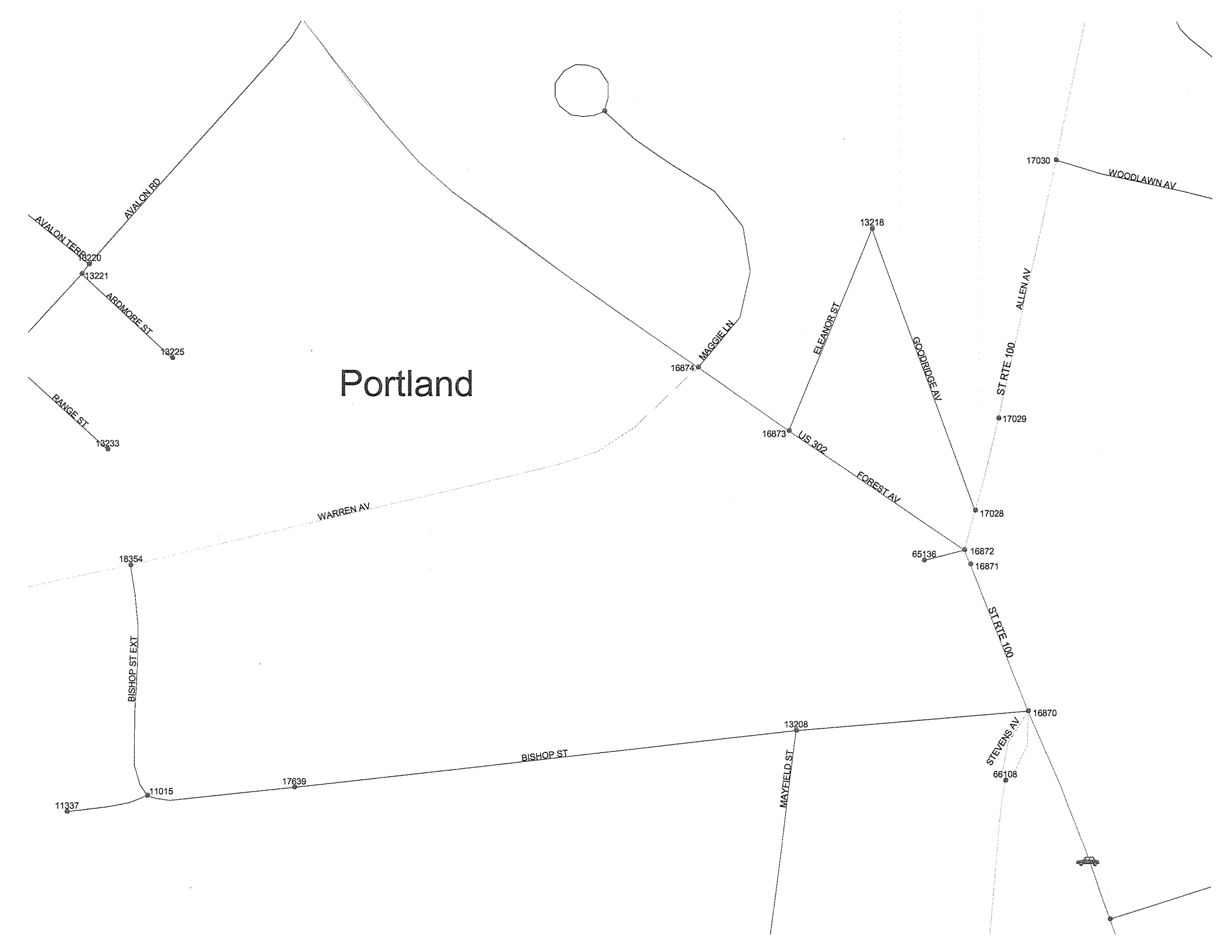
Because many long term homeless individuals need assistance with household responsibilities, such as cleaning and cooking, staff often focus on these issues, and for disabled tenants, will find resources from the community to assist with these tasks.

How the facility will be managed:
Avesta Housing provides building maintenance and is the landlord for all tenants. Preble Street staff work closely with the building manager, facilitating communication and supporting clients with maintaining stable housing.

Preble Street takes building management and security very seriously. Staff provide on-site monitoring and support to deal with any crisis that emerges and to ensure tenant safety. Each residential site has a front desk that is staffed 24 hours a day. The doors to each building are locked and visitors are required to check in at the front desk and produce identification which is copied and filed by staff. The staff member at the front desk monitors the building exterior through strategically placed cameras. The front desk is also the place where can tenants seek assistance if they have a question or concern. An intercom in each room allows tenants to contact the desk, and makes it easy for staff to check in with tenants regarding visitors.

Tenants are allowed a maximum of five overnight visits per month in accordance with public housing leases, and staff maintains a visitor log noting every guest entry and exit. Staff members do regular rounds, ensuring the security of the building and monitoring living spaces. Preble Street offers 24-hour clinical support through an on-call system staffed by managers, and staff are trained to call for medical or law enforcement support in the case of any disturbance.

Tenants at Logan Place have created a strong community, supported by staff and volunteers. Tenants at Logan Place prepare communal dinners, participate in regular house meetings to address their concerns and issues, and enjoy activities and outings such as hikes, cooking contests, and game tournaments.


Portland
AVALON RD
AVALON TERR
13220
13221
ARDMORE ST
13225
RANGE ST
13233
MAGGIE LN
16874
ELEANOR ST
13218
GOODRIDGE AV
ALLEN AV
ST RTE 100
17030
WOODLAWN AV
17029
16873
US 302
FOREST AV
17028
WARREN AV
18354
65136
16872
16871
BISHOP ST EXT
ST RTE 100
16870
13208
STEVENS AV
66108
BISHOP ST
MAYFIELD ST
17639
11015
11337

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

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

Bishop St area

REPORT PARAMETERS

Year 2011, Start Month 1 through Year 2013 End Month: 12

Route: **0560062**	Start Node: **11015**	Start Offset: **0**	☐ Exclude First Node
	End Node: **16870**	End Offset: **0**	☐ Exclude Last Node
Route: **0561237**	Start Node: **11015**	Start Offset: **0**	☑ Exclude First Node
	End Node: **18354**	End Offset: **0**	☐ Exclude Last Node
Route: **0100X**	Start Node: **16870**	Start Offset: **0**	☑ Exclude First Node
	End Node: **17030**	End Offset: **0**	☑ Exclude Last Node
Route: **0560767**	Start Node: **18354**	Start Offset: **0**	☑ Exclude First Node
	End Node: **16874**	End Offset: **0**	☐ Exclude Last Node
Route: **0302X**	Start Node: **16872**	Start Offset: **0**	☑ Exclude First Node
	End Node: **16874**	End Offset: **0**	☑ Exclude Last Node
Route: **0560249**	Start Node: **13218**	Start Offset: **0**	☐ Exclude First Node
	End Node: **16873**	End Offset: **0**	☑ Exclude Last Node
Route: **0560320**	Start Node: **13218**	Start Offset: **0**	☑ Exclude First Node
	End Node: **17028**	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	Injury Crashes K	A	B	C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
11015	0560062 - 0.03	0501427 POR,BISHOP ST,BISHOP ST EXT	2	1	0	0	0	0	1	0.0	0.404	0.83	0.60	1.37
												Statewide Crash Rate:	0.14	
17639	0560062 - 0.09	0508057 POR,BISHOP ST,.22W/O MAYFIELD	2	0	0	0	0	0	0	0.0	0.425	0.00	0.60	0.00
												Statewide Crash Rate:	0.14	
13208	0560062 - 0.31	0503622 POR,MAYFIELD,BISHOP ST.	2	0	0	0	0	0	0	0.0	0.601	0.00	0.58	0.00
												Statewide Crash Rate:	0.14	
16870	0560062 - 0.40	Int of BISHOP ST FOREST AV STEVENS AV	9	30	0	0	2	7	21	30.0	12.739	0.78	0.97	0.00
												Statewide Crash Rate:	0.65	
18354	0561237 - 0.10	Int of BISHOP ST EXT WARREN AV	2	2	0	0	0	1	1	50.0	5.153	0.13	0.35	0.00
												Statewide Crash Rate:	0.14	
16871	0100X - 2.80	Non Int FOREST AV	2	0	0	0	0	0	0	0.0	5.970	0.00	0.30	0.00
												Statewide Crash Rate:	0.12	
16872	0100X - 2.81	Int of ALLEN AV ENTRANCE TO MCDONALDS Z RD FORE	9	53	0	0	4	17	32	39.6	15.378	1.15	0.94	1.22
												Statewide Crash Rate:	0.65	
17028	0100X - 2.83	Int of ALLEN AV GOODRIDGE AV	2	3	0	0	0	1	2	33.3	6.998	0.14	0.33	0.00
												Statewide Crash Rate:	0.14	
17029	0100X - 2.87	Non-Int ALLEN AV	2	1	0	0	0	1	0	100.0	6.934	0.05	0.33	0.00
												Statewide Crash Rate:	0.14	
16874	0560767 - 1.89	Int of FOREST AV MAGGIE LN WARREN AV	9	29	0	0	0	8	21	27.6	11.834	0.82	0.98	0.00
												Statewide Crash Rate:	0.65	
16873	0302X - 2.40	Int of ELEANOR ST, FOREST AV	2	2	0	0	0	1	1	50.0	11.411	0.06	0.26	0.00
												Statewide Crash Rate:	0.12	
13218	0560249 - 0	0503632 POR,GOODRIDGE AVE,PW AHD.	2	0	0	0	0	0	0	0.0	0.024	0.00	-3.31	0.00
												Statewide Crash Rate:	0.14	
Study Years: 3.00		**NODE TOTALS:**		121	0	0	6	36	79	34.7	77.871	0.52	0.50	1.03

Crash Summary I

Sections

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section Length	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF
11015	17639	184811	0 - 0.06	0560062 - 0.03	0.06	2	0	0	0	0	0	0	0.0	0.00019	0.00	1478.63	0.00
0501427 POR,BISHOP ST,BISHOP ST EXT				RD INV 05 60062											Statewide Crash Rate: 346.93		
13208	17639	187890	0 - 0.22	0560062 - 0.09	0.22	2	2	0	0	0	0	2	0.0	0.00117	570.21	1014.53	0.00
0503622 POR,MAYFIELD,BISHOP ST.				RD INV 05 60062											Statewide Crash Rate: 346.93		
13208	16870	187889	0 - 0.09	0560062 - 0.31	0.09	2	1	0	0	0	0	1	0.0	0.00054	614.98	1229.30	0.00
0503622 POR,MAYFIELD,BISHOP ST.				RD INV 05 60062											Statewide Crash Rate: 346.93		
11015	18354	184812	0 - 0.10	0561237 - 0	0.10	2	0	0	0	0	0	0	0.0	0.00039	0.00	1319.62	0.00
0501427 POR,BISHOP ST,BISHOP ST EXT				RD INV 05 61237											Statewide Crash Rate: 346.93		
16870	16871	3106426	0 - 0.07	0100X - 2.73	0.07	2	10	0	0	0	4	6	40.0	0.00836	398.84	366.48	1.09
Int of BISHOP ST FOREST AV STEVENS AV				ST RTE 100											Statewide Crash Rate: 172.66		
16871	16872	3120028	0 - 0.01	0100X - 2.80	0.01	2	0	0	0	0	0	0	0.0	0.00119	0.00	598.64	0.00
Non Int FOREST AV				ST RTE 100											Statewide Crash Rate: 172.66		
16872	17028	3120112	0 - 0.02	0100X - 2.81	0.02	2	3	0	0	0	0	3	0.0	0.00140	715.22	610.28	1.17
Int of ALLEN AV ENTRANCE TO MCDONALDS Z RD FOREST AV				ST RTE 100											Statewide Crash Rate: 186.42		
17028	17029	3106523	0 - 0.04	0100X - 2.83	0.04	2	2	0	0	0	1	1	50.0	0.00278	239.55	511.45	0.00
Int of ALLEN AV GOODRIDGE AV				ST RTE 100											Statewide Crash Rate: 186.42		
17029	17030	3106524	0 - 0.11	0100X - 2.87	0.11	2	5	0	0	0	4	1	80.0	0.00760	219.24	397.39	0.00
Non-Int ALLEN AV				ST RTE 100											Statewide Crash Rate: 186.42		
16874	18354	3106429	0 - 0.26	0560767 - 1.63	0.26	2	8	0	1	1	2	4	50.0	0.01246	214.01	354.96	0.00
Int of FOREST AV MAGGIE LN WARREN AV				RD INV 05 60767											Statewide Crash Rate: 186.42		
16872	16873	3106427	0 - 0.09	0302X - 2.31	0.09	2	11	0	0	1	2	8	27.3	0.01023	358.44	349.59	1.03
Int of ALLEN AV ENTRANCE TO MCDONALDS Z RD FOREST AV				US 302											Statewide Crash Rate: 172.66		
16873	16874	3119258	0 - 0.05	0302X - 2.40	0.05	2	5	0	0	0	2	3	40.0	0.00570	292.16	402.19	0.00
Int of ELEANOR ST, FOREST AV				US 302											Statewide Crash Rate: 172.66		
13218	16873	187898	0 - 0.08	0560249 - 0	0.08	2	0	0	0	0	0	0	0.0	0.00004	0.00	435.87	0.00
0503632 POR,GOODRIDGE AVE,PW AHD.				RD INV 05 60249											Statewide Crash Rate: 346.93		
13218	17028	187899	0 - 0.10	0560320 - 0	0.10	2	1	0	0	0	0	1	0.0	0.00005	7079.40	844.29	8.39
0503632 POR,GOODRIDGE AVE,PW AHD.				RD INV 05 60320											Statewide Crash Rate: 346.93		
Study Years: 3.00				**Section Totals:**	1.30		48	0	1	2	15	30	37.5	0.05211	307.04	272.92	1.13
				Grand Totals:	1.30		169	0	1	8	51	109	35.5	0.05211	1081.04	391.52	2.76

Crash Summary

Section Details

Start Node	End Node	Element	Offset Begin - End	Route - MP	Total Crashes	Injury Crashes K	A	B	C	PD	Crash Report	Crash Date	Crash Mile Point	Injury Degree
11015	17639	184811	0 - 0.06	0560062 - 0.03	0	0	0	0	0	0				
13208	17639	187890	0 - 0.22	0560062 - 0.09	2	0	0	0	0	2	2012-49919	11/18/2012	0.11	PD
											2011-952C	01/20/2011	0.13	PD
13208	16870	187889	0 - 0.09	0560062 - 0.31	1	0	0	0	0	1	2011-14828	11/06/2011	0.38	PD
11015	18354	184812	0 - 0.10	0561237 - 0	0	0	0	0	0	0				
16870	16871	3106426	0 - 0.07	0100X - 2.73	10	0	0	0	4	6	2012-36460	08/24/2012	2.76	C
											2013-25544	10/14/2013	2.76	C
											2012-36610	08/26/2012	2.76	PD
											2012-41209	10/16/2012	2.77	C
											2013-16294	07/05/2013	2.77	PD
											2011-8015	08/16/2011	2.77	PD
											2012-29274	05/29/2012	2.77	PD
											2011-7939C	04/30/2011	2.79	C
											2012-40747	10/10/2012	2.79	PD
											2012-47725	12/13/2012	2.79	PD
16871	16872	3120028	0 - 0.01	0100X - 2.80	0	0	0	0	0	0				
16872	17028	3120112	0 - 0.02	0100X - 2.81	3	0	0	0	0	3	2013-22613	09/11/2013	2.82	PD
											2013-3646	02/12/2013	2.82	PD
											2011-5719C	03/22/2011	2.82	PD
17028	17029	3106523	0 - 0.04	0100X - 2.83	2	0	0	0	1	1	2011-8543C	05/18/2011	2.85	PD
											2011-6139C	04/01/2011	2.86	C
17029	17030	3106524	0 - 0.11	0100X - 2.87	5	0	0	0	4	1	2011-5964	07/28/2011	2.90	C
											2013-33044	12/12/2013	2.92	C
											2013-33241	12/08/2013	2.94	C
											2011-12770	10/14/2011	2.95	C
											2011-8667C	06/09/2011	2.96	PD
16874	18354	3106429	0 - 0.26	0560767 - 1.63	8	0	1	1	2	4	2011-1710C	01/29/2011	1.64	PD
											2011-5315C	03/03/2011	1.75	PD
											2012-26093	04/11/2012	1.76	PD
											2013-14899	06/21/2013	1.79	PD
											2013-1666	01/20/2013	1.84	A
											2013-4581	02/19/2013	1.84	C
											2013-6821	03/12/2013	1.84	C
											2013-9426	04/13/2013	1.87	B

Crash Summary

Section Details

Start Node	End Node	Element	Offset Begin - End	Route - MP	Total Crashes	Injury Crashes K	A	B	C	PD	Crash Report	Crash Date	Crash Mile Point	Injury Degree
16872	16873	3106427	0 - 0.09	0302X - 2.31	11	0	0	1	2	8	2012-31797	06/26/2012	2.32	C
											2012-35127	08/09/2012	2.35	PD
											2013-13399	06/04/2013	2.35	PD
											2012-38683	09/14/2012	2.36	B
											2013-29142	11/19/2013	2.36	C
											2013-21392	08/27/2013	2.36	PD
											2013-31149	12/03/2013	2.37	PD
											2012-29378	05/30/2012	2.37	PD
											2013-2143	01/26/2013	2.37	PD
											2011-5215	07/19/2011	2.39	PD
											2013-26365	10/23/2013	2.39	PD
16873	16874	3119258	0 - 0.05	0302X - 2.40	5	0	0	0	2	3	2013-2937	02/04/2013	2.43	C
											2013-19733	08/12/2013	2.43	PD
											2011-39C	01/03/2011	2.44	C
											2013-29987	11/22/2013	2.44	PD
											2012-23666	03/08/2012	2.44	PD
13218	16873	187898	0 - 0.08	0560249 - 0	0	0	0	0	0	0				
13218	17028	187899	0 - 0.10	0560320 - 0	1	0	0	0	0	1	2012-34503	08/07/2012	0.09	PD
				Totals:	48	0	1	2	15	30				

Crash Summary II - Characteristics

Crashes by Day and Hour

	AM												PM												
	Hour of Day																								
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	1	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	0	0	0	2	3	0	0	0	11
MONDAY	0	0	0	0	0	0	0	6	3	3	1	1	1	5	0	2	1	2	1	0	0	0	0	0	0	26
TUESDAY	0	0	0	0	0	1	0	1	2	2	1	2	2	3	2	3	3	3	1	2	0	0	1	0	0	29
WEDNESDAY	0	0	0	0	0	0	2	6	2	1	0	3	2	2	2	3	2	4	0	0	1	0	0	0	0	30
THURSDAY	0	0	0	0	0	0	0	1	3	5	4	2	0	2	1	0	6	2	1	0	1	0	1	0	0	29
FRIDAY	0	0	0	0	1	1	0	3	1	1	3	1	5	0	1	2	1	5	0	1	1	0	0	0	0	27
SATURDAY	0	0	0	0	0	0	0	2	1	1	2	2	3	0	2	0	1	0	0	1	0	1	1	0	0	17
Totals	0	1	0	0	1	2	2	19	13	14	11	11	14	13	8	10	15	16	3	4	5	4	3	0	0	**169**

Vehicle Counts by Type

Unit Type	Total
1-Passenger Car	224
2-(Sport) Utility Vehicle	55
3-Passenger Van	7
4-Cargo Van (10K lbs or Less)	3
5-Pickup	42
6-Motor Home	1
7-School Bus	0
8-Transit Bus	0
9-Motor Coach	0
10-Other Bus	1
11-Motorcycle	0
12-Moped	1
13-Low Speed Vehicle	0
14-Autocycle	0
15-Experimental	0
16-Other Light Trucks (10,000 lbs or Less)	1
17-Medium/Heavy Trucks (More than 10,000 lbs)	4
18-ATV - (4 wheel)	0
20-ATV - (2 wheel)	0
21-Snowmobile	0
22-Pedestrian	4

Unit Type	Total
23-Bicyclist	3
24-Witness	17
25-Other	7
Total	**370**

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	68	65	12	1	0	0	146
Ran Off Roadway	6	0	0	0	0	0	6
Failed to Yield Right-of-Way	25	11	0	0	0	0	36
Ran Red Light	0	1	1	0	0	0	2
Ran Stop Sign	0	0	0	0	0	0	0
Disregarded Other Traffic Sign	0	0	1	0	0	0	1
Disregarded Other Road Markings	1	0	0	0	0	0	1
Exceeded Posted Speed Limit	3	2	0	0	0	0	5
Drove Too Fast For Conditions	3	3	0	0	0	0	6
Improper Turn	2	2	0	0	0	0	4
Improper Backing	1	1	0	0	0	0	2
Improper Passing	0	4	0	0	0	0	4
Wrong Way	0	0	0	0	0	0	0
Followed Too Closely	21	29	6	0	0	0	56
Failed to Keep in Proper Lane	2	4	0	0	0	0	6
Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	1	1	1	0	0	0	3
Swerved or Avoided Due to Wind, Slippery Surface, Motor Vehicle, Object, Non-Motorist in Roadway	1	0	0	0	0	0	1
Over-Correcting/Over-Steering	0	0	0	0	0	0	0
Other Contributing Action	4	3	1	0	0	0	8
Unknown	3	4	1	0	0	0	8
Total	141	130	23	1	0	0	295

Crashes by Apparent Physical Condition And Driver

Apparent Physical Condition	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
Apparently Normal	155	144	23	1	0	4	327
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)	1	0	0	0	0	0	1
Asleep or Fatigued	0	0	0	0	0	0	0
Under the Influence of Medications/Drugs/Alcohol	4	0	0	0	0	2	6
Other	3	3	0	0	0	0	6
Total	163	147	23	1	0	6	340

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	23	0	0	0	0	23
20-24	39	0	0	0	0	39
25-29	39	0	0	0	0	39
30-39	65	0	0	0	0	65
40-49	67	0	0	0	0	67
50-59	51	0	0	0	0	51
60-69	31	0	0	0	0	31
70-79	13	0	0	0	0	13
80-Over	5	0	0	0	0	5
Unknown	13	3	0	4	0	20
Total	346	3	0	4	0	353

Crash Summary II - Characteristics

Most Harmful Event

Most Harmful Event	Total	Most Harmful Event	Total
1-Overturn / Rollover	3	38-Other Fixed Object (wall, building, tunnel, etc.)	0
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**	**278**
6-Fell / Jumped from Motor Vehicle	0		
7-Thrown or Falling Object	0		
8-Other Non-Collision	2		
9-Pedestrian	1		
10-Pedalcycle	0		
11-Railway Vehicle - Train, Engine	0		
12-Animal	1		
13-Motor Vehicle in Transport	249		
14-Parked Motor Vehicle	4		
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	2		
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	3		
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)	132
2-Traffic Signals (Flashing)	2
3-Advisory/Warning Sign	0
4-Stop Signs - All Approaches	0
5-Stop Signs - Other	5
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	1
12-No Passing Zone	0
13-None	28
14-Other	1
Total	**169**

Injury Data

Severity Code	Injury Crashes	Number Of Injuries
K	0	0
A	1	1
B	8	10
C	51	58
PD	109	0
Total	**169**	**69**

Road Character

Road Grade	Total
1-Level	158
2-On Grade	11
3-Top of Hill	0
4-Bottom of Hill	0
5-Other	0
Total	**169**

Light

Light Condition	Total
1-Daylight	132
2-Dawn	3
3-Dusk	2
4-Dark - Lighted	32
5-Dark - Not Lighted	0
6-Dark - Unknown Lighting	0
7-Unknown	0
Total	**169**

Crash Summary II - Characteristics

Crashes by Year and Month

Month	2011	2012	2013	Total
JANUARY	9	6	5	20
FEBRUARY	6	3	8	17
MARCH	7	2	3	12
APRIL	5	4	3	12
MAY	3	4	2	9
JUNE	3	5	6	14
JULY	6	3	3	12
AUGUST	5	6	4	15
SEPTEMBER	3	5	2	10
OCTOBER	2	6	7	15
NOVEMBER	2	3	5	10
DECEMBER	7	11	5	23
Total	**58**	**58**	**53**	**169**

Report is limited to the last 10 years of data.

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

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	27	0	1	86	1	7	0	0	0	0	0	0	1	123
Head-on / Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intersection Movement	0	0	5	13	0	10	0	0	0	0	0	0	0	28
Pedestrians	0	0	0	4	0	0	0	0	0	0	0	0	0	4
Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Went Off Road	4	1	1	4	0	0	0	0	0	0	0	0	0	10
All Other Animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle	0	0	0	2	0	1	0	0	0	0	0	0	0	3
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	1	0	0	0	0	0	0	0	0	0	1
Total	**31**	**1**	**7**	**110**	**1**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**169**

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

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	19	0	0	0	0	0	0	1	0	0	2	22
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	2	1	0	0	0	0	0	0	0	0	0	3
Daylight	89	2	0	0	0	0	1	1	0	0	3	96
Dusk	1	0	0	0	0	0	0	0	0	0	0	1
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Cloudy												
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	10	0	0	0	0	0	0	0	0	0	4	14
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

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

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	1	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
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	5	5
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	14	14
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
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	1	0	0	0	0	0	1	0	0	0	2
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	2	0	0	0	0	0	4	0	0	1	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
TOTAL	**124**	**6**	**0**	**0**	**0**	**0**	**1**	**7**	**0**	**0**	**0**	**169**

RANSOM Consulting, Inc.

Consulting Engineers and Scientists

Bishop Street Stormwater Management Narrative

Date:	April 10, 2015
To:	City of Portland
From:	Stephen J. Bradstreet, P.E.
Peer Review:	Maureen P. McGlone, P.E.
Location:	72 Bishop Street, Portland, Maine

List of Appendices:

Appendix A: Post Construction Stormwater Management Plan
Appendix B: Stormwater BMP Inspection and Maintenance Requirements
Appendix C: Pre Development Hydro CAD Calculations
Appendix D: Post Development Hydro CAD Calculations

Existing Conditions:

The site is a 52,383 SF (1.203 acre) lot located on the south side of 72 Bishop Street, west of Mayfield Street and adjacent to the Masonic Lodge. The parcel is trapezoidal in shape and is primarily vegetated (wooded/scrub brush) on the southern 2/3 of the site and grass on the northern 1/3 of the site adjacent to Bishop Street. The northern portion appears to be a fill area and fairly flat though sloping in a south-southeasterly direction into a wetland area. The southern portion of the site is primarily wetlands with some upland area sloping steeply up to the adjacent Masonic Lodge site. The parcel is at the headwaters of the Capisic Brook which is an impaired stream. Stormwater runoff from the site flows into the on-site wetlands and then off-site and onto the abutting property of the University of New England.

Proposed Development:

The applicant, Avesta Housing proposes to construct a 7,811 SF, 3 story building, and housing for the homeless. The site will have 12 spaces of parking, access aisle, sidewalk, outdoor sitting spaces and landscaped areas. The proposed building, pavement and sidewalk areas will increase the impervious area from 1,206 SF to 18,588 SF.

Stormwater Management – Basic Standards:

Erosion and sedimentation control measures are detailed within the design plans. Good housekeeping practices will be in accordance with Maine DEP Best Management Practices. 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:

The existing site is currently a mix of grass and vegetated (wooded/scrub brush) upland areas and wetlands with a small area of impervious (1,206 SF). The site currently drains to the wetlands on site which is also the headwaters of the Capisic Brook, an impaired stream. The site's new impervious area is now 18,588 SF. For water quality treatment, the site design incorporates a 5 foot wide paver drain system along the retaining wall on the southeast side of the parking area. This will capture the sidewalk and parking area runoff, with only a small area exiting the site toward Bishop Street. The paver drain system is comprised of the pavers underlain by a layer of 3/8" stone, then a layer of 3/4" crushed stone and finally a layer of bio-filter media for filtration for the stormwater runoff. The paver drain system overlays an R-Tank system that will be used for detention during larger storm events. The roof will drain internal to the building and will be filtered through filter cartridges. The roof drains will then outlet into a separate set of R-Tanks for detention.

Stormwater Management - Quantity:

The use of the R-Tanks will detain the stormwater runoff to below pre-development conditions. The proposed detention system consists of a 5 foot wide row of R-Tanks adjacent to the retaining wall and under the paver drains. These R-Tanks are then connected into a supplemental R-Tank system at the end of the parking area. The additional storage is required for site stormwater capacity reasons. The roof drains outlet at the south end of the building into a separate set of R-Tanks for detention. The parking lot R-Tanks and roof drain R-Tanks are connected with an equalizing pipe. Stormwater from the downstream roof drain R-Tanks will flow into an outlet control structure that will control the flow with orifices and a weir. The stormwater then discharges into the upland area at the southwest area of the developed site. During larger storm events there is a catch basin in the southern most area of the parking lot that will collect the additional stormwater and direct it into the R-Tank system for detention.

Hydraulic Analysis:

Stormwater runoff calculations for quantity were made using the HydroCAD 10.0 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 to simulate 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 hydro-geological soil type D. Times of concentration were developed based on runoff flow paths for each subarea and shown on the Pre and Post-Development plans. A minimum Tc of 6 minutes was set in the HydroCAD model.

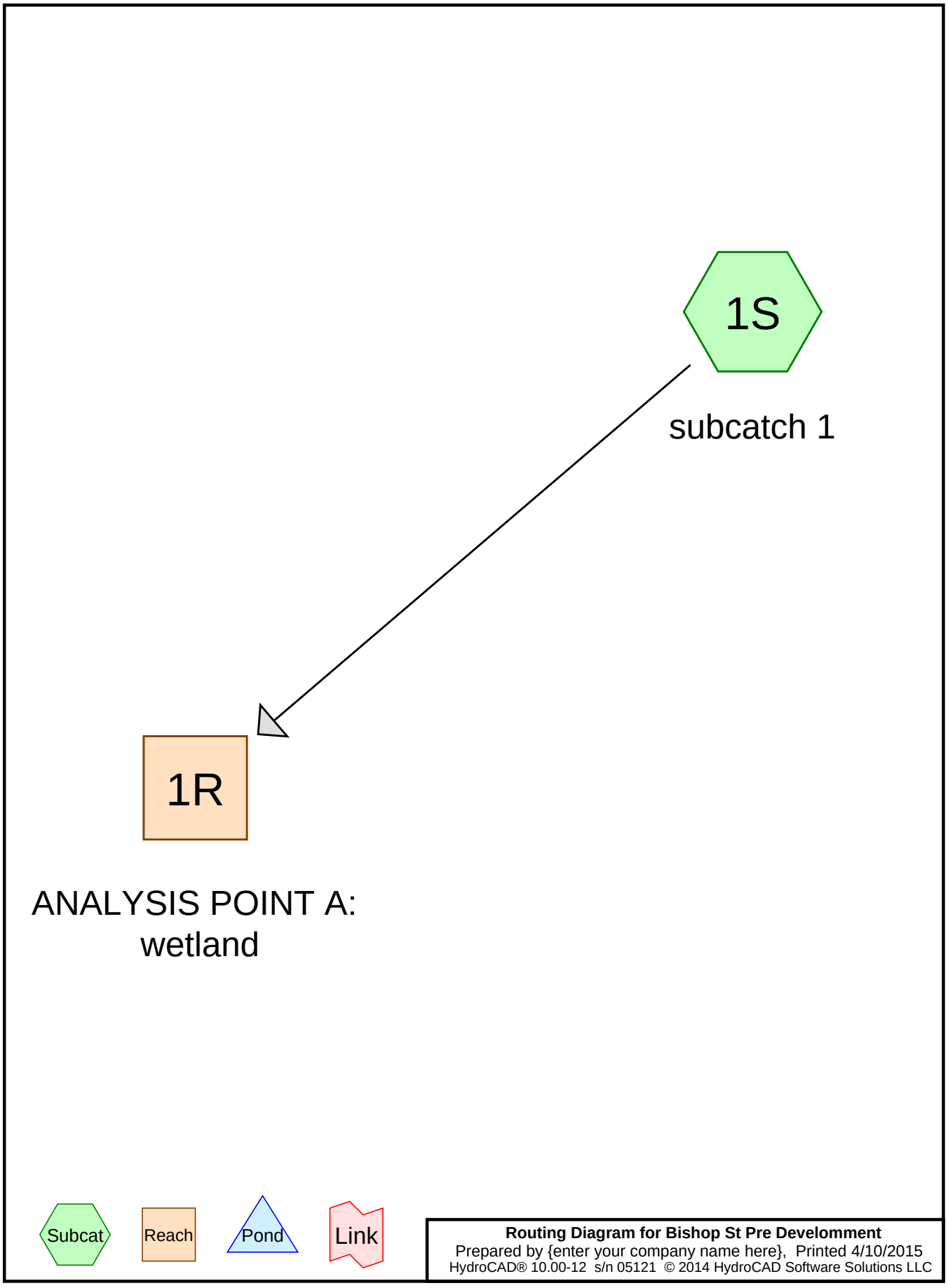
Peak runoff flow rates and runoff volumes are provided at the analysis point, which is identified on the Pre and Post-Development plans.

Storm Event	PRE-Development Peak Runoff RATES cubic feet per second (CFS)
	Analysis Point A Upland
1" Storm	0.25
2 Year Frequency Storm	1.99
10 Year Frequency Storm	3.65
25 Year Frequency Storm	4.44
100 Year Frequency Storm	5.61

Storm Event	POST-Development Peak Runoff RATES cubic feet per second (CFS)
	Analysis Point A Upland
1" Storm	0.25
2 Year Frequency Storm	1.34
10 Year Frequency Storm	2.89
25 Year Frequency Storm	4.03
100 Year Frequency Storm	5.71

Storm Event	PRE-Development Runoff VOLUMES acre feet (AF) volume of water 1' deep over one acre
	Analysis Point A Upland
1" Storm	0.02
2 Year Frequency Storm	0.17
10 Year Frequency Storm	0.32
25 Year Frequency Storm	0.39
100 Year Frequency Storm	0.50

Storm Event	POST-Development Runoff VOLUMES acre feet (AF) volume of water 1' deep over one acre
	Analysis Point A Upland
1" Storm	0.017
2 Year Frequency Storm	0.134
10 Year Frequency Storm	0.287
25 Year Frequency Storm	0.360
100 Year Frequency Storm	0.471


1S
subcatch 1
1R
ANALYSIS POINT A:
wetland
Subcat
Reach
Pond
Link
Routing Diagram for Bishop St Pre Develomment
Prepared by {enter your company name here}, Printed 4/10/2015
HydroCAD® 10.00-12 s/n 05121 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.336	79	50-75% Grass cover, Fair, HSG C (1S)
0.009	96	Gravel surface, HSG C (1S)
0.019	98	Paved parking & roofs (1S)
0.839	92	wooded wetlands area (1S)
1.203	**88**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.345	HSG C	1S
0.000	HSG D	
0.858	Other	1S
1.203		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.336	0.000	0.000	0.336	50-75% Grass cover, Fair	1S
0.000	0.000	0.009	0.000	0.000	0.009	Gravel surface	1S
0.000	0.000	0.000	0.000	0.019	0.019	Paved parking & roofs	1S
0.000	0.000	0.000	0.000	0.839	0.839	wooded wetlands area	1S
0.000	**0.000**	**0.345**	**0.000**	**0.858**	**1.203**	**TOTAL AREA**	

Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: subcatch1 Runoff Area=52,383 sf 1.58% Impervious Runoff Depth>0.23"
Flow Length=213' Tc=14.0 min CN=88 Runoff=0.24 cfs 0.023 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=0.24 cfs 0.023 af
Outflow=0.24 cfs 0.023 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.023 af Average Runoff Depth = 0.23"
98.42% Pervious = 1.184 ac 1.58% Impervious = 0.019 ac

Summary for Subcatchment 1S: subcatch 1

Runoff = 0.24 cfs @ 12.21 hrs, Volume= 0.023 af, Depth> 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-inch Rainfall=1.00"

	Area (sf)	CN	Description
	826	98	Paved parking & roofs
	380	96	Gravel surface, HSG C
	14,646	79	50-75% Grass cover, Fair, HSG C
*	36,531	92	wooded wetlands area
	52,383	88	Weighted Average
	51,557		98.42% Pervious Area
	826		1.58% 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-B** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	27	0.1110	1.67		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.6	38	0.0530	1.15		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.3	98	0.0200	0.71		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.0	213	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.203 ac, 1.58% Impervious, Inflow Depth > 0.23" for 1-inch event
Inflow = 0.24 cfs @ 12.21 hrs, Volume= 0.023 af
Outflow = 0.24 cfs @ 12.21 hrs, Volume= 0.023 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

Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: subcatch1 Runoff Area=52,383 sf 1.58% Impervious Runoff Depth>1.70"
Flow Length=213' Tc=14.0 min CN=88 Runoff=1.99 cfs 0.170 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=1.99 cfs 0.170 af
Outflow=1.99 cfs 0.170 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.170 af Average Runoff Depth = 1.70"
98.42% Pervious = 1.184 ac 1.58% Impervious = 0.019 ac

Summary for Subcatchment 1S: subcatch 1

Runoff = 1.99 cfs @ 12.19 hrs, Volume= 0.170 af, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
	826	98	Paved parking & roofs
	380	96	Gravel surface, HSG C
	14,646	79	50-75% Grass cover, Fair, HSG C
*	36,531	92	wooded wetlands area
	52,383	88	Weighted Average
	51,557		98.42% Pervious Area
	826		1.58% 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-B** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	27	0.1110	1.67		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.6	38	0.0530	1.15		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.3	98	0.0200	0.71		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.0	213	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.203 ac, 1.58% Impervious, Inflow Depth > 1.70" for 2-Year event
Inflow = 1.99 cfs @ 12.19 hrs, Volume= 0.170 af
Outflow = 1.99 cfs @ 12.19 hrs, Volume= 0.170 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

Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: subcatch1 Runoff Area=52,383 sf 1.58% Impervious Runoff Depth>3.18"
Flow Length=213' Tc=14.0 min CN=88 Runoff=3.65 cfs 0.319 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=3.65 cfs 0.319 af
Outflow=3.65 cfs 0.319 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.319 af Average Runoff Depth = 3.18"
98.42% Pervious = 1.184 ac 1.58% Impervious = 0.019 ac

Summary for Subcatchment 1S: subcatch 1

Runoff = 3.65 cfs @ 12.18 hrs, Volume= 0.319 af, Depth> 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

	Area (sf)	CN	Description
	826	98	Paved parking & roofs
	380	96	Gravel surface, HSG C
	14,646	79	50-75% Grass cover, Fair, HSG C
*	36,531	92	wooded wetlands area
	52,383	88	Weighted Average
	51,557		98.42% Pervious Area
	826		1.58% 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-B** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	27	0.1110	1.67		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.6	38	0.0530	1.15		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.3	98	0.0200	0.71		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.0	213	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.203 ac, 1.58% Impervious, Inflow Depth > 3.18" for 10-Year event
Inflow = 3.65 cfs @ 12.18 hrs, Volume= 0.319 af
Outflow = 3.65 cfs @ 12.18 hrs, Volume= 0.319 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

Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: subcatch 1 Runoff Area=52,383 sf 1.58% Impervious Runoff Depth>3.91"
Flow Length=213' Tc=14.0 min CN=88 Runoff=4.44 cfs 0.391 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=4.44 cfs 0.391 af
Outflow=4.44 cfs 0.391 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.391 af Average Runoff Depth = 3.91"
98.42% Pervious = 1.184 ac 1.58% Impervious = 0.019 ac

Summary for Subcatchment 1S: subcatch 1

Runoff = 4.44 cfs @ 12.18 hrs, Volume= 0.391 af, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

	Area (sf)	CN	Description
	826	98	Paved parking & roofs
	380	96	Gravel surface, HSG C
	14,646	79	50-75% Grass cover, Fair, HSG C
*	36,531	92	wooded wetlands area
	52,383	88	Weighted Average
	51,557		98.42% Pervious Area
	826		1.58% 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-B** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	27	0.1110	1.67		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.6	38	0.0530	1.15		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.3	98	0.0200	0.71		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.0	213	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.203 ac, 1.58% Impervious, Inflow Depth > 3.91" for 25-Year event
Inflow = 4.44 cfs @ 12.18 hrs, Volume= 0.391 af
Outflow = 4.44 cfs @ 12.18 hrs, Volume= 0.391 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

Time span=2.00-20.00 hrs, dt=0.01 hrs, 1801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: subcatch1 Runoff Area=52,383 sf 1.58% Impervious Runoff Depth>5.01"
Flow Length=213' Tc=14.0 min CN=88 Runoff=5.61 cfs 0.502 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=5.61 cfs 0.502 af
Outflow=5.61 cfs 0.502 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.502 af Average Runoff Depth = 5.01"
98.42% Pervious = 1.184 ac 1.58% Impervious = 0.019 ac

Summary for Subcatchment 1S: subcatch 1

Runoff = 5.61 cfs @ 12.18 hrs, Volume= 0.502 af, Depth> 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.70"

	Area (sf)	CN	Description
	826	98	Paved parking & roofs
	380	96	Gravel surface, HSG C
	14,646	79	50-75% Grass cover, Fair, HSG C
*	36,531	92	wooded wetlands area
	52,383	88	Weighted Average
	51,557		98.42% Pervious Area
	826		1.58% Impervious Area

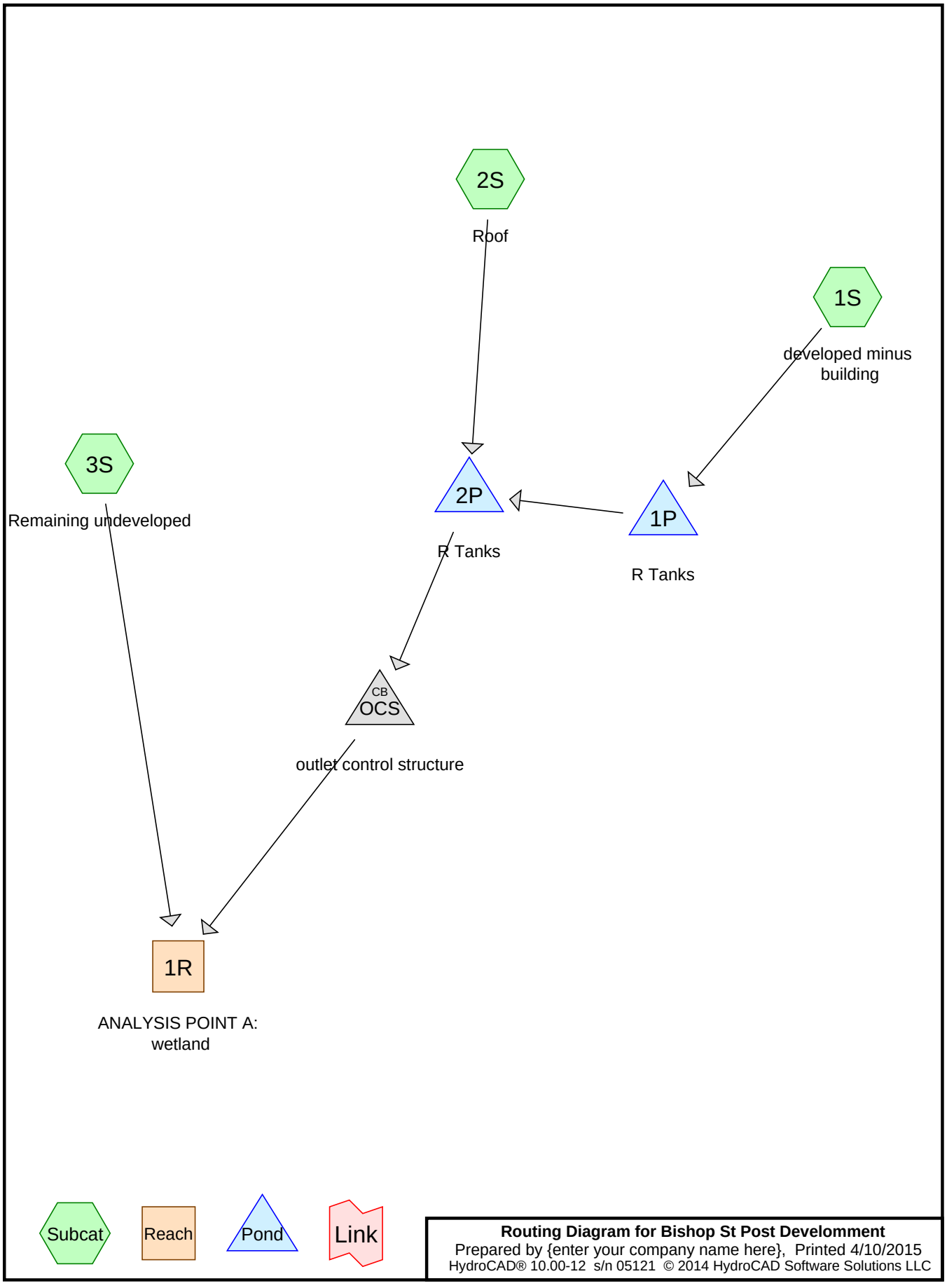
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	27	0.1110	1.67		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.6	38	0.0530	1.15		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
2.3	98	0.0200	0.71		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
14.0	213	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.203 ac, 1.58% Impervious, Inflow Depth > 5.01" for 100-Year event
Inflow = 5.61 cfs @ 12.18 hrs, Volume= 0.502 af
Outflow = 5.61 cfs @ 12.18 hrs, Volume= 0.502 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



Routing Diagram for Bishop St Post Develomment
Prepared by {enter your company name here}, Printed 4/10/2015

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.225	74	>75% Grass cover, Good, HSG C (1S)
0.247	98	Paved parking & roofs (1S)
0.179	98	Unconnected roofs, HSG C (2S)
0.550	92	wooded wetland (3S)
1.203	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.405	HSG C	1S, 2S
0.000	HSG D	
0.798	Other	1S, 3S
1.203		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.225	0.000	0.000	0.225	>75% Grass cover, Good	1S
0.000	0.000	0.000	0.000	0.247	0.247	Paved parking & roofs	1S
0.000	0.000	0.179	0.000	0.000	0.179	Unconnected roofs	2S
0.000	0.000	0.000	0.000	0.550	0.550	wooded wetland	3S
0.000	**0.000**	**0.405**	**0.000**	**0.798**	**1.203**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1S	0.00	0.00	85.0	0.0050	0.010	12.0	0.0	0.0
2	1P	92.63	92.63	60.0	0.0000	0.013	12.0	0.0	0.0
3	2P	93.35	93.35	20.0	0.0000	0.013	12.0	0.0	0.0

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: developed minus Runoff Area=20,596 sf 52.33% Impervious Runoff Depth>0.20"
Flow Length=410' Tc=6.0 min CN=87 Runoff=0.11 cfs 0.008 af

Subcatchment2S: Roof Runoff Area=7,811 sf 100.00% Impervious Runoff Depth>0.75"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.011 af

Subcatchment3S: Remaining undeveloped Runoff Area=23,976 sf 0.00% Impervious Runoff Depth>0.37"
Flow Length=90' Slope=0.0300 '/' Tc=6.5 min CN=92 Runoff=0.25 cfs 0.017 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=0.25 cfs 0.017 af
Outflow=0.25 cfs 0.017 af

Pond 1P: R Tanks Peak Elev=92.45' Storage=344 cf Inflow=0.11 cfs 0.008 af
12.0" Round Culvert n=0.013 L=60.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Pond 2P: R Tanks Peak Elev=92.53' Storage=487 cf Inflow=0.16 cfs 0.011 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Pond OCS: outlet control structure Peak Elev=92.80' Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.036 af Average Runoff Depth = 0.36"
64.52% Pervious = 0.776 ac 35.48% Impervious = 0.427 ac

Summary for Subcatchment 1S: developed minus building

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 0.008 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
10,777	98	Paved parking & roofs
9,819	74	>75% Grass cover, Good, HSG C
20,596	87	Weighted Average
9,819		47.67% Pervious Area
10,777		52.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0130	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.5	130	0.0050	1.44		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.3	85	0.0050	4.17	3.28	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
1.8	95	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
5.1	410	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Roof

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.011 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-inch Rainfall=1.00"

Area (sf)	CN	Description
7,811	98	Unconnected roofs, HSG C
7,811		100.00% Impervious Area
7,811		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Remaining undeveloped

Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.017 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-inch Rainfall=1.00"

	Area (sf)	CN	Description
*	23,976	92	wooded wetland
	23,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	20	0.0300	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	70	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	90	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

Inflow Area = 1.203 ac, 35.48% Impervious, Inflow Depth > 0.17" for 1-inch event
Inflow = 0.25 cfs @ 12.10 hrs, Volume= 0.017 af
Outflow = 0.25 cfs @ 12.10 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: R Tanks

Inflow Area = 0.473 ac, 52.33% Impervious, Inflow Depth > 0.20" for 1-inch event
Inflow = 0.11 cfs @ 12.10 hrs, Volume= 0.008 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 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= 92.45' @ 20.00 hrs Surf.Area= 1,209 sf Storage= 344 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	918 cf	**9.25'W x 130.67'L x 2.69'H Field A** 3,256 cf Overall - 960 cf Embedded = 2,296 cf x 40.0% Voids
#2A	92.19'	912 cf	**ACF R-Tank HD 1.0** x 216 Inside #1 Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 4 Rows of 54 Chambers
		1,830 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	92.63'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.63' / 92.63' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.94' TW=91.94' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 2P: R Tanks

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 0.21" for 1-inch event
Inflow = 0.16 cfs @ 12.08 hrs, Volume= 0.011 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 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= 92.53' @ 20.00 hrs Surf.Area= 1,273 sf Storage= 487 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	886 cf	**25.00'W x 50.92'L x 3.42'H Field A** 4,347 cf Overall - 2,133 cf Embedded = 2,214 cf x 40.0% Voids
#2A	92.19'	2,026 cf	**ACF R-Tank HD 1.5** x 320 Inside #1 Inside= 15.7"W x 26.0"H => 2.70 sf x 2.35'L = 6.3 cf Outside= 15.7"W x 26.0"H => 2.84 sf x 2.35'L = 6.7 cf 16 Rows of 20 Chambers
		2,912 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	93.35'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.35' / 93.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.94' TW=92.80' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond OCS: outlet control structure

Inflow Area = 0.652 ac, 65.43% 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
Primary = 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= 92.80' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	94.30'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	93.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	93.30'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	92.80'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=92.80' TW=0.00' (Dynamic Tailwater)
- **1=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Orifice/Grate** (Controls 0.00 cfs)

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: developed minus Runoff Area=20,596 sf 52.33% Impervious Runoff Depth>1.62"
Flow Length=410' Tc=6.0 min CN=87 Runoff=0.96 cfs 0.064 af

Subcatchment2S: Roof Runoff Area=7,811 sf 100.00% Impervious Runoff Depth>2.64"
Tc=6.0 min CN=98 Runoff=0.52 cfs 0.039 af

Subcatchment3S: Remaining undeveloped Runoff Area=23,976 sf 0.00% Impervious Runoff Depth>2.04"
Flow Length=90' Slope=0.0300 '/' Tc=6.5 min CN=92 Runoff=1.34 cfs 0.093 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=1.34 cfs 0.134 af
Outflow=1.34 cfs 0.134 af

Pond 1P: R Tanks Peak Elev=93.62' Storage=1,337 cf Inflow=0.96 cfs 0.064 af
12.0" Round Culvert n=0.013 L=60.0' S=0.0000 '/' Outflow=0.48 cfs 0.036 af

Pond 2P: R Tanks Peak Elev=93.62' Storage=1,631 cf Inflow=0.88 cfs 0.075 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0000 '/' Outflow=0.13 cfs 0.041 af

Pond OCS: outlet control structure Peak Elev=92.97' Inflow=0.13 cfs 0.041 af
Outflow=0.13 cfs 0.041 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.197 af Average Runoff Depth = 1.96"
64.52% Pervious = 0.776 ac 35.48% Impervious = 0.427 ac

Summary for Subcatchment 1S: developed minus building

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.064 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
10,777	98	Paved parking & roofs
9,819	74	>75% Grass cover, Good, HSG C
20,596	87	Weighted Average
9,819		47.67% Pervious Area
10,777		52.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0130	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.5	130	0.0050	1.44		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.3	85	0.0050	4.17	3.28	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
1.8	95	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
5.1	410	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Roof

Runoff = 0.52 cfs @ 12.08 hrs, Volume= 0.039 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
7,811	98	Unconnected roofs, HSG C
7,811		100.00% Impervious Area
7,811		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Remaining undeveloped

Runoff = 1.34 cfs @ 12.09 hrs, Volume= 0.093 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	23,976	92	wooded wetland
	23,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	20	0.0300	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	70	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	90	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

Inflow Area = 1.203 ac, 35.48% Impervious, Inflow Depth > 1.34" for 2-Year event
Inflow = 1.34 cfs @ 12.09 hrs, Volume= 0.134 af
Outflow = 1.34 cfs @ 12.09 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: R Tanks

Inflow Area = 0.473 ac, 52.33% Impervious, Inflow Depth > 1.62" for 2-Year event
Inflow = 0.96 cfs @ 12.09 hrs, Volume= 0.064 af
Outflow = 0.48 cfs @ 12.15 hrs, Volume= 0.036 af, Atten= 50%, Lag= 3.8 min
Primary = 0.48 cfs @ 12.15 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 93.62' @ 13.09 hrs Surf.Area= 1,209 sf Storage= 1,337 cf

Plug-Flow detention time= 158.8 min calculated for 0.036 af (56% of inflow)
Center-of-Mass det. time= 80.6 min (867.3 - 786.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	918 cf	**9.25'W x 130.67'L x 2.69'H Field A** 3,256 cf Overall - 960 cf Embedded = 2,296 cf x 40.0% Voids
#2A	92.19'	912 cf	**ACF R-Tank HD 1.0** x 216 Inside #1 Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 4 Rows of 54 Chambers
		1,830 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	92.63'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.63' / 92.63' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.15 hrs HW=93.20' TW=93.09' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.43 cfs @ 1.34 fps)

Summary for Pond 2P: R Tanks

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 1.39" for 2-Year event
Inflow = 0.88 cfs @ 12.14 hrs, Volume= 0.075 af
Outflow = 0.13 cfs @ 13.08 hrs, Volume= 0.041 af, Atten= 86%, Lag= 56.5 min
Primary = 0.13 cfs @ 13.08 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 93.62' @ 13.08 hrs Surf.Area= 1,273 sf Storage= 1,631 cf

Plug-Flow detention time= 225.9 min calculated for 0.041 af (55% of inflow)
Center-of-Mass det. time= 117.7 min (913.2 - 795.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	886 cf	**25.00'W x 50.92'L x 3.42'H Field A** 4,347 cf Overall - 2,133 cf Embedded = 2,214 cf x 40.0% Voids
#2A	92.19'	2,026 cf	**ACF R-Tank HD 1.5** x 320 Inside #1 Inside= 15.7"W x 26.0"H => 2.70 sf x 2.35'L = 6.3 cf Outside= 15.7"W x 26.0"H => 2.84 sf x 2.35'L = 6.7 cf 16 Rows of 20 Chambers
		2,912 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	93.35'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.35' / 93.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.13 cfs @ 13.08 hrs HW=93.62' TW=92.97' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.13 cfs @ 1.11 fps)

Summary for Pond OCS: outlet control structure

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 0.76" for 2-Year event
Inflow = 0.13 cfs @ 13.08 hrs, Volume= 0.041 af
Outflow = 0.13 cfs @ 13.08 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.13 cfs @ 13.08 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 92.97' @ 13.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	94.30'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	93.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	93.30'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	92.80'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=0.13 cfs @ 13.08 hrs HW=92.97' TW=0.00' (Dynamic Tailwater)
- **1=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Orifice/Grate** (Orifice Controls 0.13 cfs @ 1.41 fps)

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: developed minus Runoff Area=20,596 sf 52.33% Impervious Runoff Depth>3.09"
Flow Length=410' Tc=6.0 min CN=87 Runoff=1.79 cfs 0.122 af

Subcatchment2S: Roof Runoff Area=7,811 sf 100.00% Impervious Runoff Depth>4.26"
Tc=6.0 min CN=98 Runoff=0.82 cfs 0.064 af

Subcatchment3S: Remaining undeveloped Runoff Area=23,976 sf 0.00% Impervious Runoff Depth>3.59"
Flow Length=90' Slope=0.0300 '/' Tc=6.5 min CN=92 Runoff=2.29 cfs 0.165 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=2.89 cfs 0.287 af
Outflow=2.89 cfs 0.287 af

Pond 1P: R Tanks Peak Elev=94.26' Storage=1,649 cf Inflow=1.79 cfs 0.122 af
12.0" Round Culvert n=0.013 L=60.0' S=0.0000 '/' Outflow=1.08 cfs 0.093 af

Pond 2P: R Tanks Peak Elev=94.18' Storage=2,217 cf Inflow=1.86 cfs 0.157 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0000 '/' Outflow=1.20 cfs 0.122 af

Pond OCS: outlet control structure Peak Elev=93.97' Inflow=1.20 cfs 0.122 af
Outflow=1.20 cfs 0.122 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.350 af Average Runoff Depth = 3.50"
64.52% Pervious = 0.776 ac 35.48% Impervious = 0.427 ac

Summary for Subcatchment 1S: developed minus building

Runoff = 1.79 cfs @ 12.09 hrs, Volume= 0.122 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
10,777	98	Paved parking & roofs
9,819	74	>75% Grass cover, Good, HSG C
20,596	87	Weighted Average
9,819		47.67% Pervious Area
10,777		52.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0130	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.5	130	0.0050	1.44		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.3	85	0.0050	4.17	3.28	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
1.8	95	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
5.1	410	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Roof

Runoff = 0.82 cfs @ 12.08 hrs, Volume= 0.064 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
7,811	98	Unconnected roofs, HSG C
7,811		100.00% Impervious Area
7,811		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Remaining undeveloped

Runoff = 2.29 cfs @ 12.09 hrs, Volume= 0.165 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

	Area (sf)	CN	Description
*	23,976	92	wooded wetland
	23,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	20	0.0300	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	70	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	90	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

Inflow Area = 1.203 ac, 35.48% Impervious, Inflow Depth > 2.86" for 10-Year event
Inflow = 2.89 cfs @ 12.12 hrs, Volume= 0.287 af
Outflow = 2.89 cfs @ 12.12 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: R Tanks

Inflow Area = 0.473 ac, 52.33% Impervious, Inflow Depth > 3.09" for 10-Year event
Inflow = 1.79 cfs @ 12.09 hrs, Volume= 0.122 af
Outflow = 1.08 cfs @ 12.12 hrs, Volume= 0.093 af, Atten= 40%, Lag= 2.3 min
Primary = 1.08 cfs @ 12.12 hrs, Volume= 0.093 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 94.26' @ 12.25 hrs Surf.Area= 1,209 sf Storage= 1,649 cf

Plug-Flow detention time= 105.6 min calculated for 0.093 af (76% of inflow)
Center-of-Mass det. time= 47.3 min (818.8 - 771.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	918 cf	**9.25'W x 130.67'L x 2.69'H Field A** 3,256 cf Overall - 960 cf Embedded = 2,296 cf x 40.0% Voids
#2A	92.19'	912 cf	**ACF R-Tank HD 1.0** x 216 Inside #1 Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 4 Rows of 54 Chambers
		1,830 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	92.63'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.63' / 92.63' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.91 cfs @ 12.12 hrs HW=94.09' TW=93.99' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.91 cfs @ 1.16 fps)

Summary for Pond 2P: R Tanks

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 2.88" for 10-Year event
Inflow = 1.86 cfs @ 12.10 hrs, Volume= 0.157 af
Outflow = 1.20 cfs @ 12.26 hrs, Volume= 0.122 af, Atten= 36%, Lag= 9.7 min
Primary = 1.20 cfs @ 12.26 hrs, Volume= 0.122 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 94.18' @ 12.26 hrs Surf.Area= 1,273 sf Storage= 2,217 cf

Plug-Flow detention time= 117.4 min calculated for 0.122 af (78% of inflow)
Center-of-Mass det. time= 56.9 min (836.3 - 779.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	886 cf	**25.00'W x 50.92'L x 3.42'H Field A** 4,347 cf Overall - 2,133 cf Embedded = 2,214 cf x 40.0% Voids
#2A	92.19'	2,026 cf	**ACF R-Tank HD 1.5** x 320 Inside #1 Inside= 15.7"W x 26.0"H => 2.70 sf x 2.35'L = 6.3 cf Outside= 15.7"W x 26.0"H => 2.84 sf x 2.35'L = 6.7 cf 16 Rows of 20 Chambers
		2,912 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	93.35'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.35' / 93.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.20 cfs @ 12.26 hrs HW=94.18' TW=93.97' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.20 cfs @ 2.34 fps)

Summary for Pond OCS: outlet control structure

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 2.24" for 10-Year event
Inflow = 1.20 cfs @ 12.26 hrs, Volume= 0.122 af
Outflow = 1.20 cfs @ 12.26 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.20 cfs @ 12.26 hrs, Volume= 0.122 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 93.97' @ 12.26 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	94.30'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	93.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	93.30'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	92.80'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=1.20 cfs @ 12.26 hrs HW=93.97' TW=0.00' (Dynamic Tailwater)
- **1=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)
- **2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.40 fps)
- **3=Orifice/Grate** (Orifice Controls 0.30 cfs @ 3.41 fps)
- **4=Orifice/Grate** (Orifice Controls 0.84 cfs @ 4.82 fps)

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: developed minus Runoff Area=20,596 sf 52.33% Impervious Runoff Depth>3.81"
Flow Length=410' Tc=6.0 min CN=87 Runoff=2.19 cfs 0.150 af

Subcatchment2S: Roof Runoff Area=7,811 sf 100.00% Impervious Runoff Depth>5.02"
Tc=6.0 min CN=98 Runoff=0.97 cfs 0.075 af

Subcatchment3S: Remaining undeveloped Runoff Area=23,976 sf 0.00% Impervious Runoff Depth>4.34"
Flow Length=90' Slope=0.0300 '/' Tc=6.5 min CN=92 Runoff=2.74 cfs 0.199 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=4.03 cfs 0.360 af
Outflow=4.03 cfs 0.360 af

Pond 1P: R Tanks Peak Elev=94.78' Storage=1,830 cf Inflow=2.19 cfs 0.150 af
12.0" Round Culvert n=0.013 L=60.0' S=0.0000 '/' Outflow=1.57 cfs 0.121 af

Pond 2P: R Tanks Peak Elev=94.57' Storage=2,511 cf Inflow=2.41 cfs 0.196 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0000 '/' Outflow=2.15 cfs 0.161 af

Pond OCS: outlet control structure Peak Elev=94.41' Inflow=2.15 cfs 0.161 af
Outflow=2.15 cfs 0.161 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.424 af Average Runoff Depth = 4.23"
64.52% Pervious = 0.776 ac 35.48% Impervious = 0.427 ac

Summary for Subcatchment 1S: developed minus building

Runoff = 2.19 cfs @ 12.09 hrs, Volume= 0.150 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
10,777	98	Paved parking & roofs
9,819	74	>75% Grass cover, Good, HSG C
20,596	87	Weighted Average
9,819		47.67% Pervious Area
10,777		52.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0130	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.5	130	0.0050	1.44		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.3	85	0.0050	4.17	3.28	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
1.8	95	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
5.1	410	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Roof

Runoff = 0.97 cfs @ 12.08 hrs, Volume= 0.075 af, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
7,811	98	Unconnected roofs, HSG C
7,811		100.00% Impervious Area
7,811		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Remaining undeveloped

Runoff = 2.74 cfs @ 12.09 hrs, Volume= 0.199 af, Depth> 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

	Area (sf)	CN	Description
*	23,976	92	wooded wetland
	23,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	20	0.0300	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	70	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	90	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

Inflow Area = 1.203 ac, 35.48% Impervious, Inflow Depth > 3.59" for 25-Year event
Inflow = 4.03 cfs @ 12.10 hrs, Volume= 0.360 af
Outflow = 4.03 cfs @ 12.10 hrs, Volume= 0.360 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: R Tanks

Inflow Area = 0.473 ac, 52.33% Impervious, Inflow Depth > 3.81" for 25-Year event
Inflow = 2.19 cfs @ 12.09 hrs, Volume= 0.150 af
Outflow = 1.57 cfs @ 12.18 hrs, Volume= 0.121 af, Atten= 28%, Lag= 5.6 min
Primary = 1.57 cfs @ 12.18 hrs, Volume= 0.121 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 94.78' @ 12.20 hrs Surf.Area= 1,209 sf Storage= 1,830 cf

Plug-Flow detention time= 94.9 min calculated for 0.121 af (81% of inflow)
Center-of-Mass det. time= 43.1 min (809.6 - 766.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	918 cf	**9.25'W x 130.67'L x 2.69'H Field A** 3,256 cf Overall - 960 cf Embedded = 2,296 cf x 40.0% Voids
#2A	92.19'	912 cf	**ACF R-Tank HD 1.0** x 216 Inside #1 Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 4 Rows of 54 Chambers
		1,830 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	92.63'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.63' / 92.63' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.46 cfs @ 12.18 hrs HW=94.77' TW=94.53' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.46 cfs @ 1.86 fps)

Summary for Pond 2P: R Tanks

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 3.61" for 25-Year event
Inflow = 2.41 cfs @ 12.10 hrs, Volume= 0.196 af
Outflow = 2.15 cfs @ 12.22 hrs, Volume= 0.161 af, Atten= 11%, Lag= 6.9 min
Primary = 2.15 cfs @ 12.22 hrs, Volume= 0.161 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 94.57' @ 12.21 hrs Surf.Area= 1,273 sf Storage= 2,511 cf

Plug-Flow detention time= 101.7 min calculated for 0.161 af (82% of inflow)
Center-of-Mass det. time= 50.1 min (825.1 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	886 cf	**25.00'W x 50.92'L x 3.42'H Field A** 4,347 cf Overall - 2,133 cf Embedded = 2,214 cf x 40.0% Voids
#2A	92.19'	2,026 cf	**ACF R-Tank HD 1.5** x 320 Inside #1 Inside= 15.7"W x 26.0"H => 2.70 sf x 2.35'L = 6.3 cf Outside= 15.7"W x 26.0"H => 2.84 sf x 2.35'L = 6.7 cf 16 Rows of 20 Chambers
		2,912 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	93.35'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.35' / 93.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.21 cfs @ 12.22 hrs HW=94.57' TW=94.40' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.21 cfs @ 1.54 fps)

Summary for Pond OCS: outlet control structure

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 2.96" for 25-Year event
Inflow = 2.15 cfs @ 12.22 hrs, Volume= 0.161 af
Outflow = 2.15 cfs @ 12.22 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min
Primary = 2.15 cfs @ 12.22 hrs, Volume= 0.161 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 94.41' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	94.30'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	93.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	93.30'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	92.80'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=2.13 cfs @ 12.22 hrs HW=94.40' TW=0.00' (Dynamic Tailwater)
- **1=Sharp-Crested Rectangular Weir**(Weir Controls 0.44 cfs @ 1.06 fps)
- **2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 3.18 fps)
- **3=Orifice/Grate** (Orifice Controls 0.41 cfs @ 4.66 fps)
- **4=Orifice/Grate** (Orifice Controls 1.01 cfs @ 5.77 fps)

Time span=0.00-20.00 hrs, dt=0.01 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: developed minus Runoff Area=20,596 sf 52.33% Impervious Runoff Depth>4.90"
Flow Length=410' Tc=6.0 min CN=87 Runoff=2.78 cfs 0.193 af

Subcatchment2S: Roof Runoff Area=7,811 sf 100.00% Impervious Runoff Depth>6.17"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.092 af

Subcatchment3S: Remaining undeveloped Runoff Area=23,976 sf 0.00% Impervious Runoff Depth>5.47"
Flow Length=90' Slope=0.0300 '/' Tc=6.5 min CN=92 Runoff=3.40 cfs 0.251 af

Reach 1R: ANALYSISPOINT A: wetland Inflow=5.71 cfs 0.471 af
Outflow=5.71 cfs 0.471 af

Pond 1P: R Tanks Peak Elev=96.32' Storage=1,830 cf Inflow=2.78 cfs 0.193 af
12.0" Round Culvert n=0.013 L=60.0' S=0.0000 '/' Outflow=3.60 cfs 0.164 af

Pond 2P: R Tanks Peak Elev=95.31' Storage=2,889 cf Inflow=4.77 cfs 0.256 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0000 '/' Outflow=2.73 cfs 0.221 af

Pond OCS: outlet control structure Peak Elev=94.48' Inflow=2.73 cfs 0.221 af
Outflow=2.73 cfs 0.221 af

Total Runoff Area = 1.203 ac Runoff Volume = 0.536 af Average Runoff Depth = 5.35"
64.52% Pervious = 0.776 ac 35.48% Impervious = 0.427 ac

Summary for Subcatchment 1S: developed minus building

Runoff = 2.78 cfs @ 12.09 hrs, Volume= 0.193 af, Depth> 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
10,777	98	Paved parking & roofs
9,819	74	>75% Grass cover, Good, HSG C
20,596	87	Weighted Average
9,819		47.67% Pervious Area
10,777		52.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0130	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.5	130	0.0050	1.44		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.3	85	0.0050	4.17	3.28	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
1.8	95	0.0300	0.87		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
5.1	410	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 2S: Roof

Runoff = 1.18 cfs @ 12.08 hrs, Volume= 0.092 af, Depth> 6.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (sf)	CN	Description
7,811	98	Unconnected roofs, HSG C
7,811		100.00% Impervious Area
7,811		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**
5.0	0	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 3S: Remaining undeveloped

Runoff = 3.40 cfs @ 12.09 hrs, Volume= 0.251 af, Depth> 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.70"

	Area (sf)	CN	Description
*	23,976	92	wooded wetland
	23,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	20	0.0300	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	70	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.5	90	Total			

Summary for Reach 1R: ANALYSIS POINT A: wetland

Inflow Area = 1.203 ac, 35.48% Impervious, Inflow Depth > 4.70" for 100-Year event
Inflow = 5.71 cfs @ 12.12 hrs, Volume= 0.471 af
Outflow = 5.71 cfs @ 12.12 hrs, Volume= 0.471 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: R Tanks

Inflow Area = 0.473 ac, 52.33% Impervious, Inflow Depth > 4.90" for 100-Year event
Inflow = 2.78 cfs @ 12.09 hrs, Volume= 0.193 af
Outflow = 3.60 cfs @ 12.09 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.3 min
Primary = 3.60 cfs @ 12.09 hrs, Volume= 0.164 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 96.32' @ 12.13 hrs Surf.Area= 1,209 sf Storage= 1,830 cf

Plug-Flow detention time= 83.0 min calculated for 0.164 af (85% of inflow)
Center-of-Mass det. time= 38.6 min (799.0 - 760.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	918 cf	**9.25'W x 130.67'L x 2.69'H Field A** 3,256 cf Overall - 960 cf Embedded = 2,296 cf x 40.0% Voids
#2A	92.19'	912 cf	**ACF R-Tank HD 1.0** x 216 Inside #1 Inside= 15.7"W x 17.3"H => 1.80 sf x 2.35'L = 4.2 cf Outside= 15.7"W x 17.3"H => 1.89 sf x 2.35'L = 4.4 cf 4 Rows of 54 Chambers
		1,830 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	92.63'	**12.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.63' / 92.63' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.41 cfs @ 12.09 hrs HW=96.12' TW=94.82' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 3.41 cfs @ 4.34 fps)

Summary for Pond 2P: R Tanks

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 4.71" for 100-Year event
Inflow = 4.77 cfs @ 12.09 hrs, Volume= 0.256 af
Outflow = 2.73 cfs @ 12.16 hrs, Volume= 0.221 af, Atten= 43%, Lag= 4.5 min
Primary = 2.73 cfs @ 12.16 hrs, Volume= 0.221 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 95.31' @ 12.17 hrs Surf.Area= 1,273 sf Storage= 2,889 cf

Plug-Flow detention time= 86.4 min calculated for 0.221 af (86% of inflow)
Center-of-Mass det. time= 43.7 min (813.0 - 769.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.94'	886 cf	**25.00'W x 50.92'L x 3.42'H Field A** 4,347 cf Overall - 2,133 cf Embedded = 2,214 cf x 40.0% Voids
#2A	92.19'	2,026 cf	**ACF R-Tank HD 1.5** x 320 Inside #1 Inside= 15.7"W x 26.0"H => 2.70 sf x 2.35'L = 6.3 cf Outside= 15.7"W x 26.0"H => 2.84 sf x 2.35'L = 6.7 cf 16 Rows of 20 Chambers
		2,912 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	93.35'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.35' / 93.35' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.72 cfs @ 12.16 hrs HW=95.31' TW=94.48' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.72 cfs @ 3.47 fps)

Summary for Pond OCS: outlet control structure

Inflow Area = 0.652 ac, 65.43% Impervious, Inflow Depth > 4.06" for 100-Year event
Inflow = 2.73 cfs @ 12.16 hrs, Volume= 0.221 af
Outflow = 2.73 cfs @ 12.16 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min
Primary = 2.73 cfs @ 12.16 hrs, Volume= 0.221 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 94.48' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	94.30'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	93.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	93.30'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Primary	92.80'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Primary OutFlow Max=2.72 cfs @ 12.16 hrs HW=94.48' TW=0.00' (Dynamic Tailwater)
- **1=Sharp-Crested Rectangular Weir**(Weir Controls 0.97 cfs @ 1.38 fps)
- **2=Orifice/Grate** (Orifice Controls 0.30 cfs @ 3.44 fps)
- **3=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.84 fps)
- **4=Orifice/Grate** (Orifice Controls 1.03 cfs @ 5.92 fps)

SOLID WASTE DISPOSAL

72 Bishop Street will contract with a private hauler for removal of solid waste generated within the building. A waste management room is located on the first floor of the building and accessible from an exterior door along the southwest side of the building. The trash hauler will back into the driveway off of Bishop Street. The hauler will wheel container units to the truck. These units will provide recycling and solid waste disposal.

Please refer to the trash demand analysis for estimated needs.

SNOW REMOVAL

72 Bishop Street will contract with a snow plow company to maintain driveway and sidewalk access after snow storms. Snow can be piled at the edge of the parking lot as shown on the plan or, in extreme situations, hauled off site. Snow will not be placed in wetland areas.

72 Bishop Street TRASH ANALYSIS

The following analysis is based on MaineHousing guideline of 0.25 cubic yards per week per bedroom. Recycling based on experience of PineTree Waste and Avesta.

NEEDED TRASH CAPACITY	
	Cubic Yards
# Bedrooms	30
times 0.25 cu. yd. per BR	7.5
TOTAL NEEDED (rounded up)	
without recycling program	**8**

NEEDED RECYCLE CAPACITY	
Max 45% of trash volume	3.6
Max Recycling Capacity	**4**
Min 30% of trash volume	2.4
Minimum Recycling Capacity	**2**
Total Yards Trash with recycling	**6**

PROPOSED DUMPSTER CAPACITY	
Weekly Collection	
TRASH	4 yards
RECYCLING	2 yards
TOTAL CAPACITY	6 yards

LIGHT FIXTURES

Site lighting locations are identified on Sheet L2, Layout Plan. Fixture cut sheets are included in this submission.

SSS SERIES POLES

SQUARE STRAIGHT STEEL

Cat. #		Approvals
Job	Type	

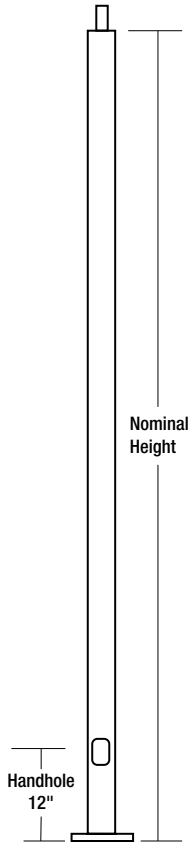
SPAULDING LIGHTING

APPLICATIONS

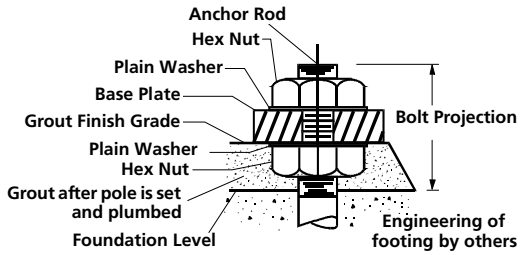
- Lighting installations for side and top mounting of luminaires with effective projected area (EPA) not exceeding maximum allowable loading of the specified pole in its installed geographic location.

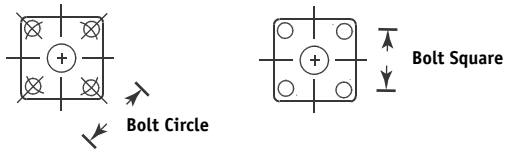
FEATURES

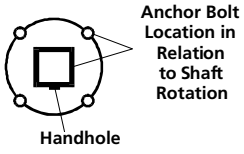
- SHAFT: One-piece straight steel with square cross section, flat sides and minimum 0.36" radius on all corners. Minimum yield of 46,000 psi (ASTM-A500, Grade B). Longitudinal weld seam to appear flush with shaft side wall. Steel base plate with axial bolt circle slots welded flush to pole shaft having minimum yield of 36,000 psi (ATM-A36).
- BASE COVER: Two-piece square aluminum base cover included standard.
- POLE CAP: Pole shaft covered with removable non-metallic cover when applicable. Tenon and post-top configurations also available.
- HAND HOLE: Rectangular steel-reinforced hand hole (2.5" x 4.5"). Pole grounding lug located behind gasketed cover.
- ANCHOR BOLTS: Four galvanized anchor bolts provided per pole with minimum yield of 55,000 psi (modified ASTM-A36). Galvanized hardware with two washers/nuts per bolt for leveling meet or exceed bolt strength.
- FINISH: Durable Lektrocote® TGIC thermoset polyester powder coat paint finish with nominal 3.0 mil thickness. Zinc-rich powder paint prime applied over "white metal" steel substrate cleaned via mechanical shot blast method. Decorative finish coat available in seven standard colors. Custom colors available. RAL number preferable. Internal protective coating available.



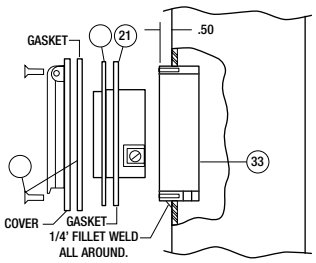
BASE DETAIL







15 AMP GFCI RECEPTACLE & COVER



Q18 OPTION

ORDERING INFORMATION

S	-	S	-	S	-	25	-	40	-	1	-	TA	-	DB
Cross Section		Style		Material		Nominal Length		Nominal Shaft Dia.		Shaft Thickness		Mounting Type		Finish

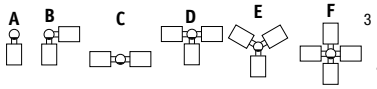
Catalog Number	Pole Ht. ft	Pole Ht. m	Nominal Shaft Dim.	Wind Load Rating[1] 70 MPH	80 MPH	90 MPH	100 MPH	120 MPH	Wall Thick.	Bolt Circle (Sug.)	Bolt Circle	Bolt Sq.	Base Plate (sq.)	Anchor Bolt Size	Bolt Proj.	Pole Wt (lbs)
SSS-10-40-1-XX-XX	10	3.0	4"	25	25	22	17	11.8	.119"	11"	8 - 11"	5.6 - 7.8"	10.25 x 0.75"	3/4 x 30 x 3"	4"	91
SSS-10-50-1-XX-XX	10	3.0	5"	25	25	25	23	15	.119"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	3/4 x 30 x 3"	4"	106
SSS-12-40-1-XX-XX	12	3.7	4"	25	21	16	13.0	8.8	.119"	11"	8 - 11"	5.6 - 7.8"	10.25 x 0.75"	3/4 x 30 x 3"	4"	104
SSS-12-50-1-XX-XX	12	3.7	5"	25	25	23	18	11.8	.119"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	3/4 x 30 x 3"	4"	122
SSS-14-40-1-XX-XX	14	4.3	4"	24	18	14.2	11.0	6.8	.119"	11"	8 - 11"	5.6 - 7.8"	10.25 x 0.75"	3/4 x 30 x 3"	4"	116
SSS-14-40-7-XX-XX	14	4.3	4"	25	25	23	18	12.2	.179"	11"	8 1/2 - 12"	6 - 8.4"	11 x 1"	3/4 x 30 x 3"	4"	158
SSS-14-50-1-XX-XX	14	4.3	5"	25	24	19	14.4	9.0	.119"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	3/4 x 30 x 3"	4"	138
SSS-16-40-1-XX-XX	16	4.9	4"	16	12.2	9.0	6.8	3.8	.119"	11"	8 - 11"	5.6 - 7.8"	10.25 x 0.75"	3/4 x 30 x 3"	4"	128
SSS-16-40-7-XX-XX	16	4.9	4"	25	20	15	12.2	7.6	.179"	11"	8 1/2 - 12"	6 - 8.4"	11 x 1"	3/4 x 30 x 3"	4"	176
SSS-16-50-1-XX-XX	16	4.9	5"	22	16	12.2	9.2	5.2	.119"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	3/4 x 30 x 3"	4"	153
SSS-16-50-7-XX-XX	16	4.9	5"	25	25	24	19	12.4	.179"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	3/4 x 30 x 3"	4"	214
SSS-18-40-1-XX-XX	18	5.5	4"	13.8	10.0	7.2	5.2	2.4	.119"	11"	8 - 11"	5.6 - 7.8"	10.25 x 0.75"	3/4 x 30 x 3"	4"	147
SSS-18-40-7-XX-XX	18	5.5	4"	23	17	13.0	10.0	6.0	.179"	11"	10 - 13.5"	7.1 - 9.5"	11 x 1"	3/4 x 30 x 3"	4"	201
SSS-18-50-1-XX-XX	18	5.5	5"	18	13.2	9.6	7.0	3.4	.119"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	3/4 x 30 x 3"	4"	175
SSS-18-50-7-XX-XX	18	5.5	5"	25	25	20	16	9.8	.179"	11"	8 1/2 - 12"	6 - 8.4"	12 x 1"	3/4 x 30 x 3"	4"	243
SSS-20-40-1-XX-XX	20	6.1	4"	11.4	8.0	5.6	3.8	1.4	.119"	11"	8 - 11"	5.6 - 7.8"	10.25 x 0.75"	3/4 x 30 x 3"	4"	160
SSS-20-40-7-XX-XX	20	6.1	4"	19	14.6	10.8	8.0	4.4	.179"	11"	8 1/2 - 12"	6 - 8.4"	11 x 1"	3/4 x 30 x 3"	4"	225
SSS-20-50-1-XX-XX	20	6.1	5"	15	10.8	7.6	5.2	2.0	.119"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	3/4 x 30 x 3"	4"	191
SSS-20-50-7-XX-XX	20	6.1	5"	25	23	17	13.2	7.6	.179"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	3/4 x 30 x 3"	4"	266
SSS-20-60-7-XX-XX	20	6.1	6"	25	25	24	18	11.2	.179"	12"	11 - 13.5"	7.8 - 9.5"	12 x 1"	1 x 36 x 4"	4"	312
SSS-25-40-1-XX-XX	25	7.6	4"	7.0	4.2	2.2	NR	NR	.119"	11"	8 - 11"	5.6 - 7.8"	10.25 x 0.75"	3/4 x 30 x 3"	4"	190
SSS-25-40-7-XX-XX	25	7.6	4"	13.4	9.4	6.4	4.2	1.4	.179"	11"	8.5 - 12"	6 - 8.4"	11 x 1"	3/4 x 30 x 3"	4"	266
SSS-25-50-1-XX-XX	25	7.6	5"	9.6	6.0	3.4	1.4	NR	.119"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	1 x 36 x 4"	4"	231
SSS-25-50-7-XX-XX	25	7.6	5"	22	15	11.2	7.8	3.4	.179"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	1 x 36 x 4"	4"	324
SSS-25-50-3-XX-XX	25	7.6	5"	25	22	16	12.4	6.6	.250"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	1 x 36 x 4"	4"	437
SSS-25-60-7-XX-XX	25	7.6	6"	25	22	16	11.6	5.6	.179"	12"	11 - 13.5"	7.8 - 9.5"	12 x 1"	1 x 36 x 4"	4"	404
SSS-27-40-7-XX-XX	27	8.2	4"	11.4	7.8	5.0	3.0	NR	.179"	11"	8.5 - 12"	6 - 8.4"	11 x 1"	1 x 36 x 4"	4"	290
SSS-30-40-7-XX-XX	30	9.1	4"	8.2	5.0	2.8	1.2	NR	.179"	11"	8.5 - 12"	6 - 8.4"	11 x 1"	1 x 36 x 4"	4"	313
SSS-30-50-7-XX-XX	30	9.1	5"	14.2	9.4	6.0	3.4	NR	.179"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	1 x 36 x 4"	4"	398
SSS-30-50-3-XX-XX	30	9.1	5"	20	14.6	10.2	6.8	2.4	.250"	11"	10 - 13.5"	7.1 - 9.5"	12 x 1"	1 x 36 x 4"	4"	537
SSS-30-60-7-XX-XX	30	9.1	6"	20	13.8	9.2	5.8	1.2	.179"	12"	11 - 13.5"	7.8 - 9.5"	12 x 1"	1 x 36 x 4"	4"	467
SSS-30-60-3-XX-XX	30	9.1	6"	25	24	17	12.8	6.2	.250"	12"	11 - 13.5"	7.8 - 9.5"	12 x 1"	1.25 x 42 x 6"	4"	630
SSS-35-60-7-XX-XX	35	10.7	6"	14.2	8.4	4.6	1.6	NR	.179"	12"	11 - 13.5"	7.8 - 9.5"	12 x 1"	1 x 36 x 4"	4"	538
SSS-35-60-3-XX-XX	35	10.7	6"	25	17	11.6	7.4	1.8	.250"	12"	11 - 13.5"	7.8 - 9.5"	12 x 1"	1.25 x 42 x 6"	4"	726
SSS-40-60-7-XX-XX	40	12.2	6"	9.0	4.0	NR	NR	NR	.179"	12"	11 - 13.5"	7.8 - 9.5"	12 x 1"	1 x 36 x 4"	4"	614
SSS-40-60-3-XX-XX	40	12.2	6"	18	11.8	6.8	3.2	NR	.250"	12"	11 - 13.5"	7.8 - 9.5"	12 x 1"	1.25 x 42 x 6"	4"	802

1 Allowable EPA with 1.3 gust factor. To determine max. pole loading weight, multiply allowable EPA by 30 lbs.
NOTE Factory supplied template must be used when setting anchor bolts. Hubbell Lighting will deny any claim for incorrect anchorage placement resulting from failure to use factory supplied template and anchor bolts.

COMPLETE PART NUMBER REQUIRES SHAFT ABOVE PLUS MOUNTING TYPE, FINISH & APPROPRIATE OPTIONS BELOW

MOUNTING TYPE

AX[1]	Side - Single
BX[1]	Side - Double at 90°
CX[1]	Side - Double at 180°
DX[1]	Side - Triple at 90°
FX[1]	Side - Quad at 90°
P1	Pad Mount - Spider Type
P2	Pad Mount - Yoke Type
P3	Pad Mount - Yoke Type (Proformer XL only)
TA	Tenon (2.375" OD)
TB	Tenon (2.875" OD)
TR[2]	Removable Tenon (2.375 x 4.25)
CD	Concord Luminaire
OT	No drilling (includes pole cap)



FINISH

DB	Dark Bronze
BL	Black
WH	White
GR	Gray
PS	Platinum Silver
RD	Red (Premium Color)
FG	Forest Green (Premium Color)
CC	Custom Color (Consult Factory)
PR	Primer Only

1 DRILL PATTERNS: Replace **X** with
1 = Spaulding luminaires with a straight pole (4-bolt),
2 = Cimarron CR1, MSV and Raven Series luminaires.
4 = MSS & DS luminaires,
5 = Spaulding Detroit III luminaires,
6 = DM luminaires
2 Removable tenon used in conjunction with side arm mounting. First specify desired arm configuration followed by the "**TR**" notation. Example: **SSS-25-40-7-C6-TR-DB**
3 Specify option location using logic found on cover.

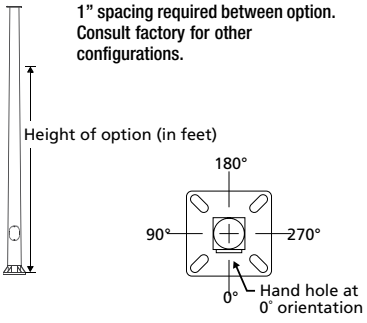
Denotes handhole location

OPTIONS

Q55	Internal Coating (Hubbell Seal)
Q18[3]	15 Amp GFCI Receptacle and Cover
Q22[3]	Extra Handhole
Q26[3]	.5" Coupling
Q27[3]	.75" Coupling
Q30[3]	2" Coupling
Q32[3]	Mid-pole Luminaire Bracket
Q40	Vibration Damper
LAB	Less Anchor Bolts
CSA	CSA Certified (consult factory)

OPTION ORIENTATION

Follow the logic below when ordering location specific options. For each option, include its orientation (in degrees) and its height (in feet). Example: Option Q26 should be ordered as:
SSS-20-40-1-TA-DB-Q26-0-15
(.5" coupling on the handhole/arm side of pole, 15 feet up from the pole base)
1" spacing required between option. Consult factory for other configurations.



Due to our continued efforts to improve our products, product specifications are subject to change without notice.

SPAULDING LIGHTING

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For more information visit our web site: **www.spauldinglighting.com**

Ordering

rev 10.08.2012

Type:

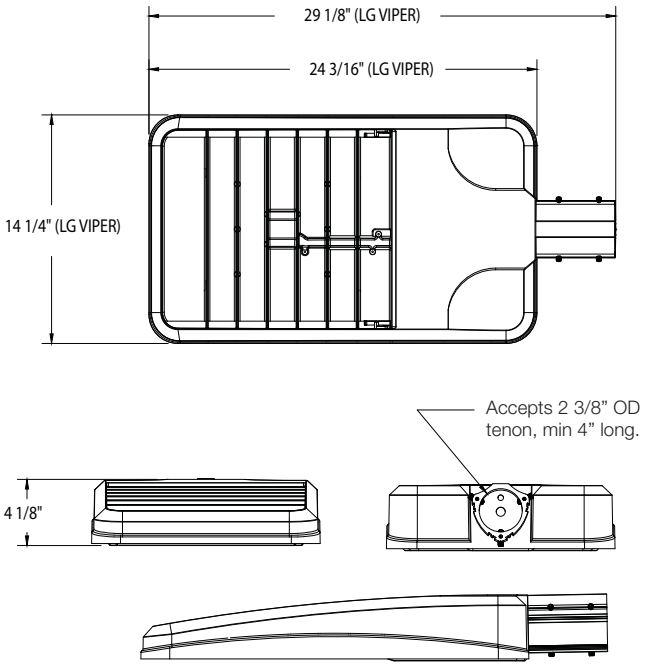
Ordering Code:

Job Name:

Notes:

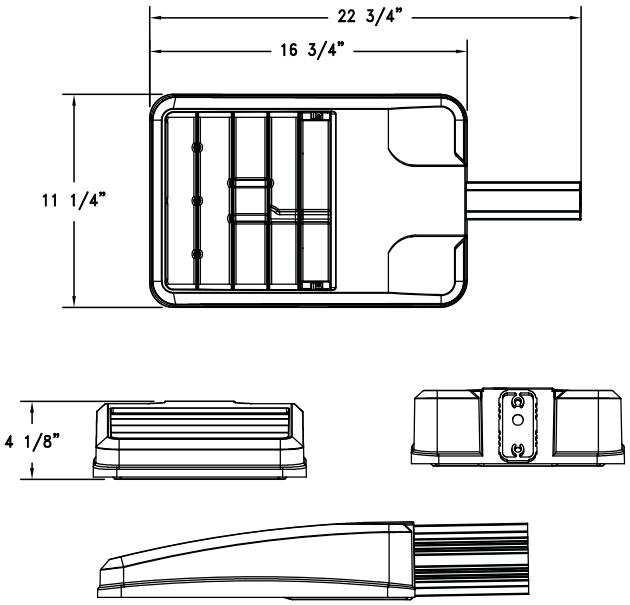
VIPER

VP-L (Viper - Large) - *shown with 2" slip fitter (SF2)*



weight: 25lbs **epa:** 1 ft²

VP-S (Viper - Small) - *shown with rectangular arm (RA)*

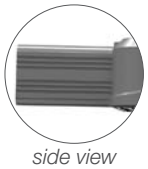


weight: 15lbs **epa:** 0.67 ft²

ORDERING EXAMPLE: VP-L / 96NB-280 / T5R / UNV / PEC-TL / SF2 / BB

model	engine-watts	optics	voltage	electrical options	mounting	color
VP-S *(small)*	**22NB-50**	**T2** type II	**UNV** 120-277	**PEC-TL** twistlock photocell *(spefiy voltage)*	**SF2** 2-3/8" OD slip-fitter	**BB** black
	22NB-70	**T3** type III	**347**		**PK2** 2-3/8" adjustable knuckle	**BZ** bronze
	30NB-70	**T4** type IV	**480**	**2PF** dual power feed	**RA** rectangular arm	**BW** white
	30NB-90	**T5R** rectangular	**12VDC** *(consult factory)*	**standard electrical options**	**USA** upswept arm	**BG** green
VP-L *(large)*	**64NB-135**	**T5QW** square wide		LifeShield™ thermal protection	**WB** wall bracket	**BY** gray
	64NB-190	**T5QM** square medium		20k-Surge protection		**MB** metallic bronze
	80NB-180	**T5W** round wide		Dimming Drivers		**MT** metallic titanium
	80NB-235					**___ RAL**
	96NB-220					**___ OTHER**
	96NB-280					

RECTANGULAR ARM

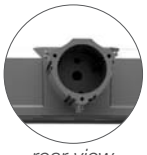


side view

rear view

2" SLIPFITTER

side view



rear view

GENERAL: The Beacon Viper luminaire is available in two sizes with a wide choice of different LED wattage configurations and optical distributions designed to replace HID lighting up to 1000W MH or HPS and with 5 different mounting options for application in a wide variety of new and existing installations. Luminaires are suitable for wet locations.

BEZEL OPTICAL SYSTEM: Each Viper luminaire is supplied with an one piece optical cartridge system consisting of an LED engine, LED lamps, optics, gasket and stainless steel bezel. The cartridge is held together with internal brass standoffs soldered to the board so that it can be field replaced as a one piece optical system. Two-piece silicone and microcellular polyurethane foam gasket ensures a weather-proof seal around each individual LED.
The optical cartridge is secured to the die cast housing with fasteners. The optics are held in place without the use of adhesives. The cartridge assembly is available in various lighting distributions using TIR designed acrylic optical lenses over each LED.

LIFESHIELD™ CIRCUIT: Thermal circuit shall protect the luminaire from excessive temperature by interfacing with the 0-10V dimmable drivers to reduce drive current as necessary. The factory-preset temperature limits shall be designed to ensure maximum hours of operation to assure L70 rated lumen maintenance. The device shall activate at a specific, factory-preset temperature, and progressively reduce power over a finite temperature range.

A luminaire equipped with the device may be reliably operated in any ambient temperature up to 55ºC (131ºF). The thermal circuit will allow higher maximum wattages than would be permissible on an unregulated luminaire (if some variation in light output is permissible), without risk of premature LED failure or lumen depreciation. Operation shall be smooth and undetectable to the eye. Thermal circuit shall directly measure the temperature at the LED solder point. Thermal circuit shall consist of surface mounted components mounted on the LED engine (printed circuit board). For maximum simplicity and reliability, the device shall have no dedicated enclosure, circuit board, wiring harness, gaskets, or hardware. Device shall have no moving parts, and shall operate entirely at low voltage. The device shall be located in an area of the luminaire that is protected from the elements. Thermal circuit shall be designed to “fail on”, allowing the luminaire to revert to full power in the event of an interruption of its power supply, or faulty wiring connection to the drivers.
Device shall be able to co-exist with other 0-10V control devices (occupancy sensors, external dimmers, etc.). The device will effectively control the solder point temperature as needed; otherwise it will allow the other control device(s) to function unimpeded.

PRINTED CIRCUIT BOARD (PCB): Aluminum thermal clad board with 0.062” thick aluminum base layer, thermally conductive dielectric layer, 0.0014” thick copper circuit layer circuit layer designed with copper pours to minimize thermal impedance across dielectric. Board will be mounted to the heat sink using minimum 12 #4-40 screws to ensure contact with thermal pad and heat sink. Use of thermal grease will not be allowed.

HOUSING AND LED THERMAL MANAGEMENT: The Viper’ monolithic housing design creates over 4.5 square feet (small Viper) or 7.7 square feet (large Viper) of heat-sinking surface area. Vertical fins, combined with flow-thru openings prevent sediment and moisture buildup on critical heat sinking surfaces without the need for grates, screens or other debris control tactics. The Viper housing, electrical compartment and fitter are made from die cast aluminum that is pre-treated and powder-coated to meet the most rugged industry standards. The finish is corrosion resistant to meet ASTMB-117, resists cracking or loss of adhesion per ASTM D522, resists surface impacts of up to 160 inch-pound. All external hardware is corrosion resistant. The housing serves as a heat-sink for the LED bezel with a separate compartment for the drivers.

ELECTRICAL ASSEMBLY: The fixture electrical compartment shall contain all LED driver components and shall be provided with a push-button terminal block for AC power connections. The housing is designed for an optional twist lock photo control receptacle.

ACCESSIBILITY: Although the Viper luminaire is designed to operate for many years without maintenance, accessibility is a key component in its design. The Drivers are mounted on a removable door that is secured with keyslotted screws and hinges down for convenient access. The drivers are field replaceable using quick disconnects.

DRIVERS: Luminaires are equipped with an LED driver that accepts 100V through 277V, 50 Hz to 60 Hz (UNIV), or a driver that accepts 347V or 480V input. Power factor is .92 at full load. All electrical components are rated at 50,000 hours at full load and 25°C ambient conditions per MIL- 217F Notice 2. Dimming drivers are standard, with connections for external dimming equipment available upon request. Component-to-component wiring within the luminaire may carry no more than 80% of rated load and is listed by UL for use at 600VAC at 50°C or higher. Plug disconnects are listed by UL for use at 600 VAC, 13A or higher. 13A rating applies to primary (AC) side only.

SURGE PROTECTOR: The onboard surge protector shall be a UL recognized component for the United States and Canada and have a surge current rating of 20,000 Amps using the industry standard 8/20 pSec wave. The LSP shall have a clamping voltage of 925V and surge rating of 540J. The case shall be a high-temperature, flame resistant plastic enclosure.

FASTENERS: All fasteners shall be stainless steel. When tamper resistant fasteners are required, spanner HD (snake eye) style shall be provided (special tool required, consult factory).

AGENCY CERTIFICATION: The luminaire shall bear a CSA label and be marked suitable for wet locations.

WARRANTY: Beacon luminaires feature a 5 year limited warranty. Beacon LED luminaires with LED arrays feature a 5 year limited warranty covering the LED arrays. LED drivers are covered by a 5 year limited warranty. PIR sensors carry a 5 year limited warranty from the sensor manufacturer. See Warranty Information on www.beaconproducts.com complete details and exclusions.

Power/Lumens & Distrubutions

Engine	nominal wattage	lumen output (500k) varies by optic	delivered LPW	TM21 reported L95/85C	TM21 calculated L70/85C
VP-S					
VP-S-22NB	50	4700-5300	93-103	60,000	215,000
VP-S-22NB	70	5780-6540	82-93	60,000	215,000
VP-S-30NB	70	6408-7250	91-103	60,000	215,000
VP-S-30NB	90	7700-8717	85-97	60,000	215,000
VP-L					
VP-L-64NB	135	12500-13900	93-103	60,000	215,000
VP-L-64NB	190	16500-18000	86-95	60,000	215,000
VP-L-80NB	180	17000-19000	93-103	60,000	215,000
VP-L-80NB	235	20000-22500	86-95	60,000	215,000
VP-L-96NB	220	20500-22460	93-103	60,000	215,000
VP-L-96NB	280	24700-27000	88-96	60,000	215,000

TM21 is the framework for taking LM-80 data and making useful LED lifetime projections.
Reported and calculated lifetimes shown are based on hours at the time of this printing.
For current Reported and Calculated hours please contact factory of Beacon’s web site.

Environmental Quality Standards

The property is a 52,383 square foot lot with 14,203 SF of forested and shrub scrub wetlands that encumber the southwest portion of the parcel. A small tributary stream begins in the southwest corner of the site that flows southwest. The stream is tributary to Capisic Brook, which has been defined by Maine Department of Environmental Protection (MDEP) as an urban impaired stream. In addition, the City has a watershed management plan in place to protect the watershed.

The project has been developed to minimize the wetland impact and provide a stormwater management plan that responds to the water quality requirements for an urban impaired stream. The total wetland impact will be 3,105 SF. To limit the amount of impact, a retaining wall will be constructed to the extent necessary to construct the limited parking, circulation, underground stormwater treatment infrastructure and safety guard rail. Temporary wetland impacts associated with construction of the wall will be restored to wetland conditions by using saved wetland soils and planting of wetland vegetation.