019-A-001-001

1-1 India St, Portland, ME

The Longfellow at Ocean Gateway

Riverwalk, LLC

CITY OF PORTLAND, MAINE
DEVELOPMENT REVIEW APPLICATION
PLANNING DEPARTMENT PROCESSING FORM
Planning Copy

2005-0271
Application I. D. Number

12/19/2005
Application Date

Riverwalk, LLC
Applicant

2 Market Street, Suite 500, Portland, ME 04101
Applicant's Mailing Address

The Longfellow at Ocean Gateway
Project Name/Description

Consultant/Agent

1 - 1 India St, Portland, Maine
Address of Proposed Site

Applicant Ph: (207) 775-2464 Agent Fax:
Applicant or Agent Daytime Telephone, Fax

019 A001001
Assessor's Reference: Chart-Block-Lot

Proposed Development (check all that apply): ☑ New Building ☐ Building Addition ☑ Change Of Use ☑ Residential ☑ Office ☑ Retail
☐ Manufacturing ☐ Warehouse/Distribution ☑ Parking Lot ☐ Other (specify)

530,260 s.f.
Proposed Building square Feet or # of Units

Acreage of Site

B6 & B5b
Zoning

Check Review Required:

☑ Site Plan (major/minor)
☑ Subdivision # of lots 116
☐ PAD Review
☐ 14-403 Streets Review
☐ Flood Hazard
☐ Shoreland
☐ HistoricPreservation
☐ DEP Local Certification
☐ Zoning Conditional Use (ZBA/PB)
☐ Zoning Variance
☐ Other

Fees Paid: Site Pla Subdivision Engineer Review Date

Planning Approval Status:

Reviewer

☐ **Approved**
☐ **Approved w/Conditions** See Attached
☐ **Denied**

Approval Date Approval Expiration Extension to ☐ Additional Sheets Attached

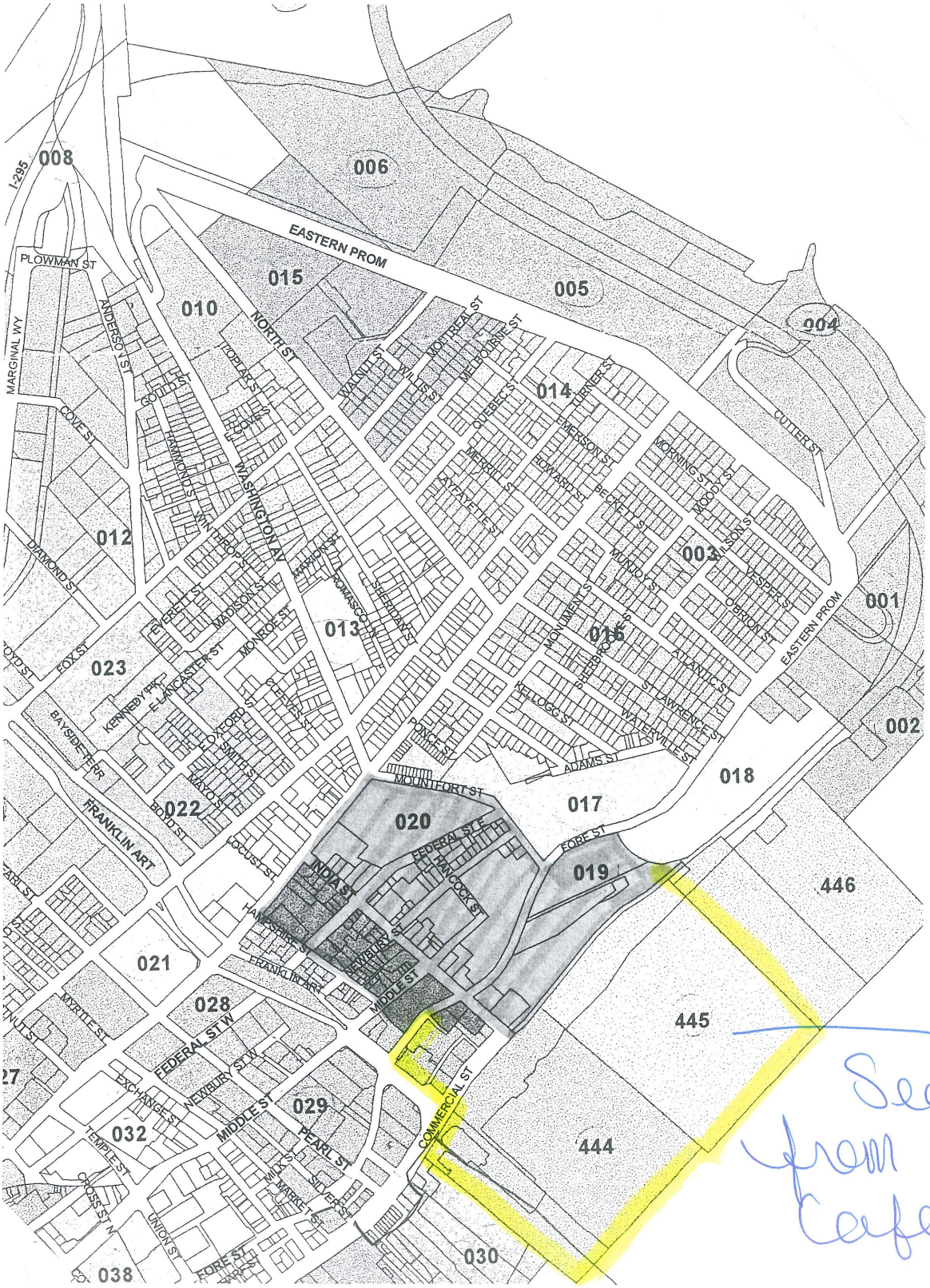
☐ OK to Issue Building Permit
signature date

Performance Guarantee ☐ **Required*** ☐ **Not Required**

* No building permit may be issued until a performance guarantee has been submitted as indicated below

☐ Performance Guarantee Accepted	date	amount	expiration date
☐ Inspection Fee Paid	date	amount	
☐ Building Permit Issue	date		
☐ Performance Guarantee Reduced	date	remaining balance	signature
☐ Temporary Certificate of Occupancy	date	☐ Conditions (See Attached)	expiration date
☐ Final Inspection	date	signature	
☐ Certificate Of Occupancy	date		
☐ Performance Guarantee Released	date	signature	
☐ Defect Guarantee Submitted	submitted date	amount	expiration date
Defect Guarantee Released	date	signature	

The longfellow at Ocean Gateway
#2005-0271
major SP
notice sent to 500'



Yellow Section added from the Village Cafe plan

City of Portland Site Plan Application

If you or the property owner owes real estate taxes, personal property taxes or user charges on any property within the City, payment arrangements must be made before permit applications can be received by the Inspections Division.

Address of Proposed Development: 86 Newbury St, 33 India St, 1 India St, 185 Fore St **Zone:** B6 & B5b	
Total Square Footage of Proposed Structure: 296,530 + 204,270 + 29,460 = 530,260 sq. Ft.	**Square Footage of Lot:** 24,390 + 46,170 + 8,280 + 56,630 = 135,470 sq. Ft.

Tax Assessor's Chart, Block & Lot: Chart# 19 / 19 / 20 / 20 Block# A / A / C / C Lot# 1 / 14 / 23 / 9	**Property owner's mailing address:** Riverwalk, LLC 2 Market Street, Suite 500 Portland, ME 04101	**Telephone #:** (207) 775-2464
Consultant/Agent, mailing address, phone # & contact person: Woodard & Curran, Inc. 41 Hutchins Drive Portland, ME 04102 Attn: David Senus (207) 774-2112	**Applicant's name, mailing address, telephone #/Fax#/Pager#:** Riverwalk, LLC 2 Market Street, Suite 500 Portland, ME 04101	**Project name:** The Longfellow at Ocean Gateway

Fee For Service Deposit (all applications) X **($200.00)**

Proposed Development (check all that apply)

X New Building ___ Building Addition X Change of Use X Residential X Office X Retail
___ Manufacturing ___ Warehouse/Distribution X Parking lot
X Subdivision ($500.00) + amount of lots 116 ($25.00 per lot) $2900.00 + major site plan fee if applicable
___ Site Location of Development ($3,000.00)
___ (except for residential projects which shall be $200.00 per lot_____)
X Traffic Movement ($1,000.00) ___ Storm water Quality ($250.00)
___ Section 14-403 Review ($400.00 + $25.00 per lot)
___ Other_____

Major Development (more than 10,000 sq. ft.) 9600.00

___ Under 50,000 sq. ft. ($500.00)
___ 50,000 - 100,000 sq. ft. ($1,000.00)
___ Parking Lots over 100 spaces ($1,000.00)
___ 100,000 - 200,000 sq. ft. ($2,000.00)
___ 200,000 - 300,000 sq. ft. ($3,000.00)
X Over 300,000 sq. ft. ($5,000.00)
___ After-the-fact Review ($1,000.00 + applicable application fee)

Minor Site Plan Review

___ Less than 10,000 sq. ft. ($400.00)
___ After-the-fact Review ($1,000.00 + applicable application fee)

Plan Amendments

___ Planning Staff Review ($250.00)
___ Planning Board Review ($500.00)

~ Please see next page ~

Who billing will be sent to: (Company, Contact Person, Address, Phone #)

Riverwalk, LLC
c/o Drew Swenson
2 Market Street, Suite 500
Portland, ME 04101

(207) 775-2464

Submittals shall include (9) separate **folded** packets of the following:

a. copy of application
b. cover letter stating the nature of the project
c. site plan containing the information found in the attached sample plans checklist
d. 1 set of 11 x 17 plans

Amendment to Plans: **Amendment applications should include 6 separate packets of the above (a, b, & c)**

ALL PLANS MUST BE FOLDED NEATLY AND IN PACKET FORM

Section 14-522 of the Zoning Ordinance outlines the process which is available on our web site: **portlandmaine.gov**

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 Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature of applicant:	**Date:**
Drew E Swenson	12/19/05

This application is for site review ONLY; a building Permit application and associated fees will be required prior to construction.

WOODARD & CURRAN
Engineering · Science · Operations

CORPORATE OFFICES: Maine, Massachusetts,
New Hampshire, Connecticut, Florida
Operational offices throughout the U.S

December 28, 2005

Bill Needelman
City of Portland
389 Congress Street
Portland, ME 04101

Re: The Longfellow at Ocean Gateway
Major Site Plan Review - Additional Information

Dear Bill:

On behalf of Riverwalk, LLC, we are submitting 9 copies of additional information in support of the Major Site Plan and Subdivision Application for The Longfellow at Ocean Gateway, originally submitted December 16, 2005, to be used in Planning Board review. These documents were prepared in accordance with Chapter 14, Land Use, of the Code of Ordinances of the City of Portland, Maine, and meet the applicable sections of the City of Portland, Maine, Technical and Design Standards and Guidelines adopted September 1987, last amended March 2000. The additional information that follows has been organized by section within the Application.

Section 1 – Development Description

Section 1.5 – Attachments: The application originally stated that a Landscape Design Plan for the project is in process of being developed by a Professional Landscape Architect, Pat Carroll of Carroll Associates. This plan has been developed, copies of which are included with this letter. Please insert the Landscaping Plan, L-1.0, within the attachments binder (Attachment A) of the application.

Section 5 – Off-Site Facilities

Section 5.1 – Wastewater Disposal: The Portland Water District (PWD) and City of Portland Public Works Department were contacted to ensure both had adequate capacity to handle wastewater flow from the site. The PWD has responded that there is sufficient capacity to handle flow at their India Street Pumping Station and adequate capacity to handle and treat wastewater flow at their wastewater treatment facility. A response has not yet been received form the City, but will be forwarded upon receipt. A response letter from the PWD, dated December 16, 2005, is enclosed with this letter.

Section 5.2 – Water Supply: The PWD responded to Woodard & Curran confirming the district's ability to serve the facility through the municipal water distribution system. As design progresses, Woodard & Curran will continue to work with the PWD to ensure adequate water supply to the project. The letter to Woodard & Curran from the PWD, dated December 21, 2005, is enclosed with this letter.

Please insert the enclosed letter responses at the end of Section 5 of the Application.

We look forward to continuing our work with your office and the Planning Board on this project. Please do not hesitate to contact Woodard & Curran if you have any questions or comments.

Sincerely,
WOODARD & CURRAN INC.

David Senus, PE
Project Engineer

DAS/das
203555.05

Enclosures:
- Landscaping Plan (L-1.0), 9 copies
- Letter from PWD to Woodard & Curran, Ability to Serve wastewater flow, dated December 16, 2005, 9 copies
- Letter from PWD to Woodard & Curran, Ability to Serve water demand, dated December 21, 2005, 9 copies

cc: Drew Swenson, Riverwalk, LLC

Bill—

As request, I have provided some initial traffic/parking comments for the above project. Formal comments will be provided upon receipt of the traffic impact study.

1. An evaluation of the parking garage entrance/exit location should be performed to ensure it will operate safely with current and future conditions on Middle Street. Additionally, a review of Middle Street as it relates to on-street parking impacts and its proposed conditions should be provided.

2. A review of Fore Street in the vicinity of the project should be performed relative to on-street parking and travel lane alignment.

3. The applicant should provide justification for the curb cuts on Commercial Street. The project should minimize the number of driveways into and out of the site.

4. As you know, a project traffic scoping meeting was held on January 19, 2006. The key conclusions of that study include:

a. Traffic conditions should be assessed assuming full-occupancy of the garage.

b. The study will assess conditions at the India/Fore, India/Middle, and Franklin/Middle intersections and at their site driveways. In addition the study will need to address impacts to Mountfort Street.

c. The study will include an assessment of pedestrian facility conditions.

Please call me if you have any questions.

Thomas A. Errico, P.E.

Senior Transportation Engineer

Wilbur Smith Associates

59 Middle Street

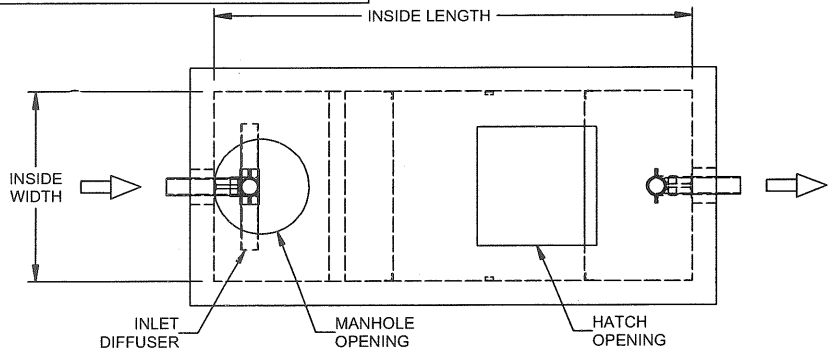
Portland, Maine 04101

(207) 871-1785 Phone

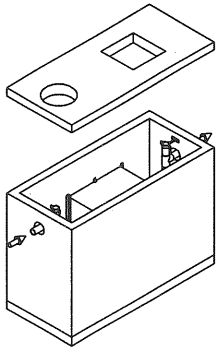
(207) 871-5825 Fax

THE VORTCLAREX SYSTEM SHALL BE STENCILED WITH THE CONTECH STORMWATER SOLUTIONS NAME AND LOGO. PIPE OPENINGS SHALL BE STENCILED "INLET" OR "OUTLET" AS APPROPRIATE

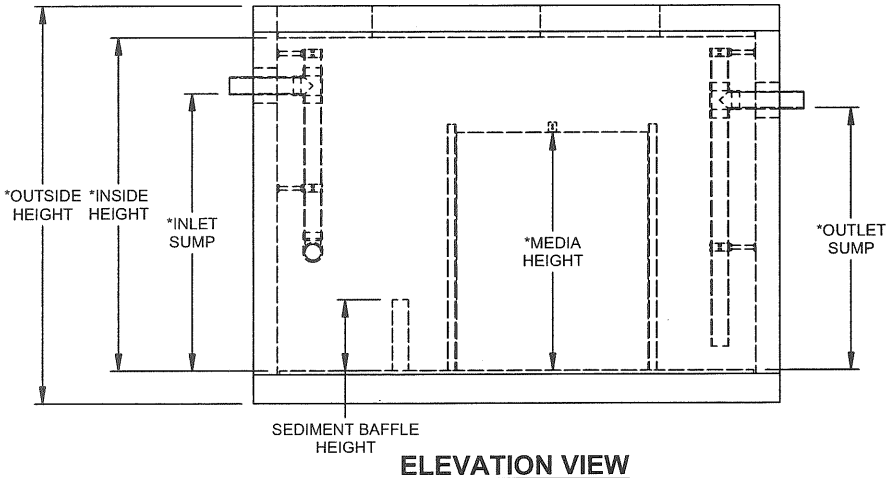
FOR INFORMATIONAL PURPOSES ONLY - NOT INTENDED FOR CONSTRUCTION



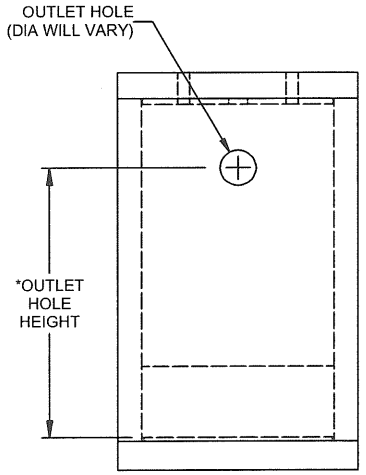
PLAN VIEW



ASSEMBLY VIEW



ELEVATION VIEW



RIGHT SIDE VIEW

GENERAL NOTES:

1. INLET INVERT TO BE 4" HIGHER THAN OUTLET INVERT. OUTLET INVERT TO BE 6" HIGHER THAN THE TOP OF THE MEDIA PACK.
2. MANUFACTURER SHALL BE RESPONSIBLE FOR ASSEMBLY OF INTERNAL COMPONENTS.
3. MANHOLE FRAME(S), COVER(S) AND HATCH(S) SUPPLIED WITH SYSTEM, NOT INSTALLED.
4. MANHOLE RISERS, GRADE RINGS OR BLOCK REQUIRED BETWEEN THE TOP OF THE VORTCLAREX SYSTEM AND BASE OF THE MANHOLE FRAMES SHALL BE IN ACCORDANCE WITH ALL APPLICABLE LOCAL STANDARDS. NOT SUPPLIED BY CONTECH STORMWATER SOLUTIONS.
5. PURCHASER TO PREPARE EXCAVATION, PROVIDE LIFTING EQUIPMENT AND SET STRUCTURE.
6. VORTCLAREX BY CONTECH STORMWATER SOLUTIONS; PORTLAND, OR (800) 548-4667; SCARBOROUGH, ME (877) 907-8676; ELKRIDGE, MD (866) 740-3318
7. SOME HIDDEN LINES MAY BE OMITTED FOR CLARITY.
8. INLET/OUTLET PIPE DIAMETER AND LOCATION WILL VARY.
9. THE VORTCLAREX SHALL REMOVE ESSENTIALLY ALL FREE AND DISPERSED NON-EMULSIFIED OIL FROM THE WATER STREAM AND PRODUCE A DESIRED EFFLUENT BASED ON AN OIL DROPLET TYPICAL OF THE SITE.
10. THE VORTCLAREX SHALL BE DESIGNED BASED ON A MAXIMUM AVERAGE FLOW.
11. THE VORTCLAREX SHALL BE DESIGNED IN ACCORDANCE WITH STOKES LAW AND API BULLETIN NO. 421.

* THESE DIMENSIONS WILL VARY DEPENDING ON SITE SPECIFIC INFORMATION AND REQUIREMENTS.

Model	Approximate Dimensions (Inside LxW)		Typical Maximum Flow	
	ft	mm	gpm	l/s
VCL40	10 x 4	3100 x 1200	300	19
VCL50	11 x 5	3400 x 1500	475	30
VCL60	12 x 6	3700 x 1800	650	41
VCL70	13 x 7	4000 x 2100	770	49
VCL80	14 x 8	4300 x 2400	875	55
VCL90	15 x 9	4600 x 2700	990	62
VCL100	16 x 10	4900 x 3000	1100	69
VCL120	18 x 12	5500 x 3700	1300	82

TYPICAL DETAIL WITH SIZING TABLE OIL/WATER SEPARATION SYSTEM VORTCLAREX™

CONTECH® STORMWATER SOLUTIONS™
contechstormwater.com

SCALE: NONE
DRAWN: JBS
CHECKED: NDG
FILE NAME: STDVCL
DATE: 4/4/06

Available models

Use this table to identify the appropriate configuration for your site. Engineers in our Technical Sales department are available to assist with your project.

VortClarex	Dimensions ft	Dimensions m	Typical Depth (below invert) ft	Typical Depth (below invert) m	Peak Treatment Flow gpm	Peak Treatment Flow lps	Max. Size Inlet/Outlet in	Max. Size Inlet/Outlet mm
VCL40	10 x 4	3.0 x 1.2	4	1.22	300	18.9	18	457
VCL50	11 x 5	3.4 x 1.5	4	1.22	475	30.0	24	610
VCL60	12 x 6	3.7 x 1.8	4	1.22	650	41.0	27	686
VCL70	13 x 7	4.0 x 2.1	4	1.22	770	48.6	30	762
VCL80	14 x 8	4.3 x 2.4	4	1.22	875	55.2	36	914
VCL90	15 x 9	4.6 x 2.7	4	1.22	990	62.4	48	1220
VCL100	16 x 10	4.9 x 3.0	4	1.22	1100	69.4	48	1220
VCL120	18 x 12	5.5 x 3.7	4	1.22	1300	82.0	60	1520

Oil Stop Valve	Diameter ft	Diameter m	Typical Depth (below invert) ft	Typical Depth (below invert) m	Treatment Capacity gpm	Treatment Capacity lps	Max. Size Inlet/Outlet in	Max. Size Inlet/Outlet mm
OSV100†	–	–			100	6.3		
OSV148	4	1.22	4	1.22	100	6.3	4	102
OSV160	5	1.52	4	1.22	100	6.3	4	102
OSV300†	–	–			280	17.7		
OSV360	5	1.52	5	1.52	280	17.7	6	152
OSV372	6	1.83	5	1.52	280	17.7	6	152
OSV500†	–	–			500	31.5		
OSV560	5	1.52	5	1.52	500	31.5	8	203
OSV572	6	1.83	5	1.52	500	31.5	8	203

†This model includes valve only, no structure.

Support & Maintenance

Our goal: to remove stormwater pollutants

- Drawings and specifications are available at www.stormwater360.com.
- Design support is available from our Technical Sales engineers, to provide site-specific solutions.
- Full maintenance services are available to maximize performance and ensure long-term product viability.

CONTECH® CONSTRUCTION PRODUCTS INC.

From: Marge Schmuckal
To: William Needleman
Date: 4/19/2006 4:20:32 PM
Subject: Longfellow Residences - Longfellow Garage & 25 India Street

Bill,

I have further reviewed the plans for these three major buildings as part of the Longfellow project.

25 India Street is meeting the B-5b requirements for height, setbacks, and other zoning requirements.

1 India Street/Commercial Street extension is meeting the B-6 requirements for height, setbacks and other zoning requirements.

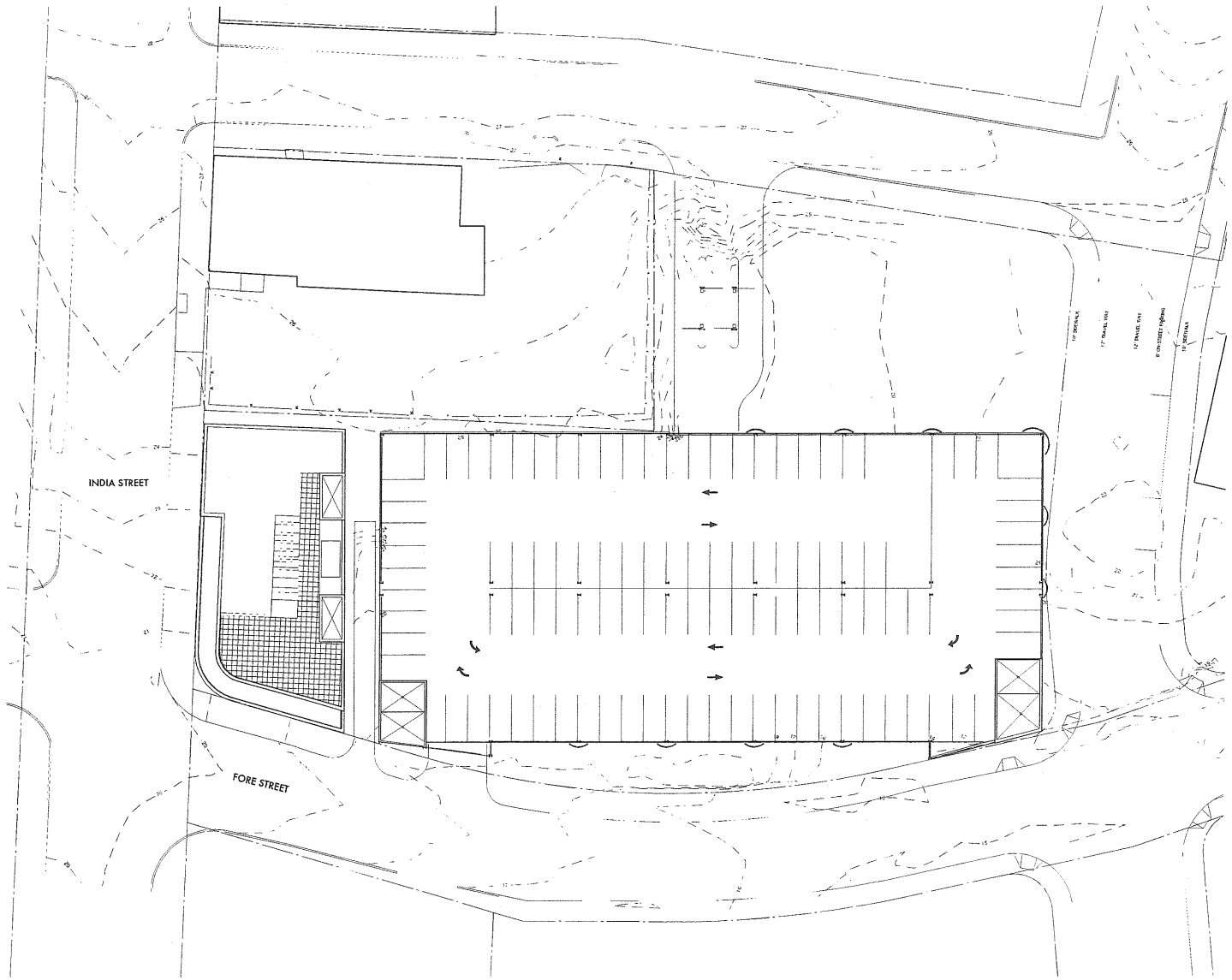
Fore Street- Longfellow Garage: the final build out is meeting the B-5b requirements for height, setbacks and other zoning requirements. The key to this approval is the second phase build out for the retail component along Fore Street. There needs to be a condition of approval as to when this retail component will be completed, or the City will have approved a building in violation of the required maximum front yard setback in the B-5b zone of ten (10) feet. Certainly a resonable time to begin phase 2 after the parking garage completion can be determined at this time so as not to create a nonconformity.

I would also like specific figures to back up the general information given on the height calculations for all three buildings. The parking garage information is the weakest given. The recent information submitted by Woodard & Curran 15.4.2.2 Height just states that the building was designed to meet the average height not to exceed 65'. This office will need to review the method of average grade determined for use of scaling submitted plans for the maximum height requirement. This will be required prior to the issuance of any building permit.

Marge Schmuckal
Zoning Administrator


SSA
Scott Simons Architects


SSA
Scott Simons Architects



1 SITE PLAN
E01 SCALE: 1/16"=1'-0"

Scott Simons Architects

ARCHITECT:
Scott Simons Architects
75 York St
Portland, Maine 04101
phone 207 772 4656
fax 207 828 4656
http://www.simonsarchitects.com

CONSULTANTS:

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41 Hutchins Drive
Portland, ME
phone 207 774 2112
fax 207 774 4171

Landscape Architect:
Carroll Associates
75 Market St
Portland, ME
phone 207 772 1552
fax 207 772 0712

Structural Engineer:
Becker Structural Eng, Inc
75 York Street
Portland, ME 04101
phone 207 879 1838
fax 207 879 1822

SEAL:

REVISION DATE:

PHASE	DATE

PROJECT NAME:
LONGFELLOW OFFICES
INDIA STREET
PORTLAND, ME

DRAWING SCALE:

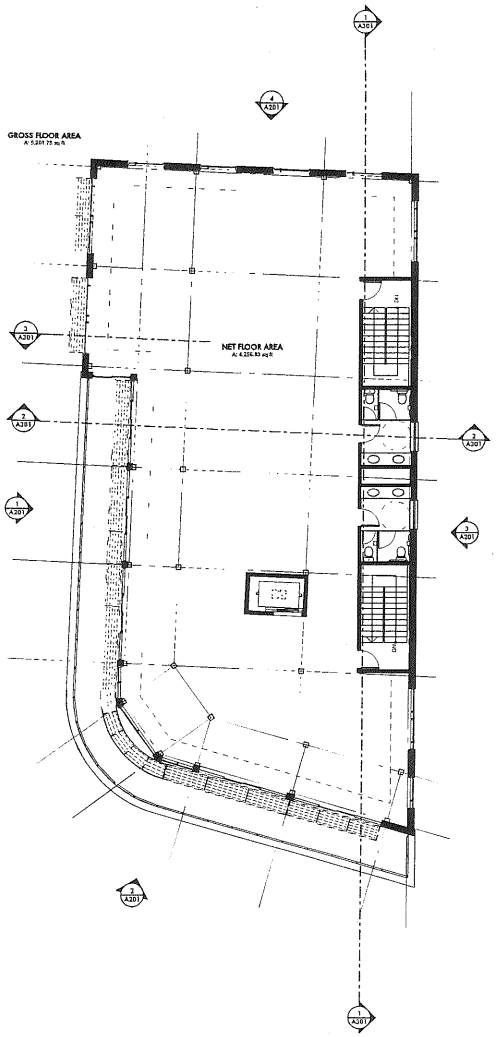
DATE OF ISSUE: 11/29/2005

PROJECT NUMBER: 2005-0162

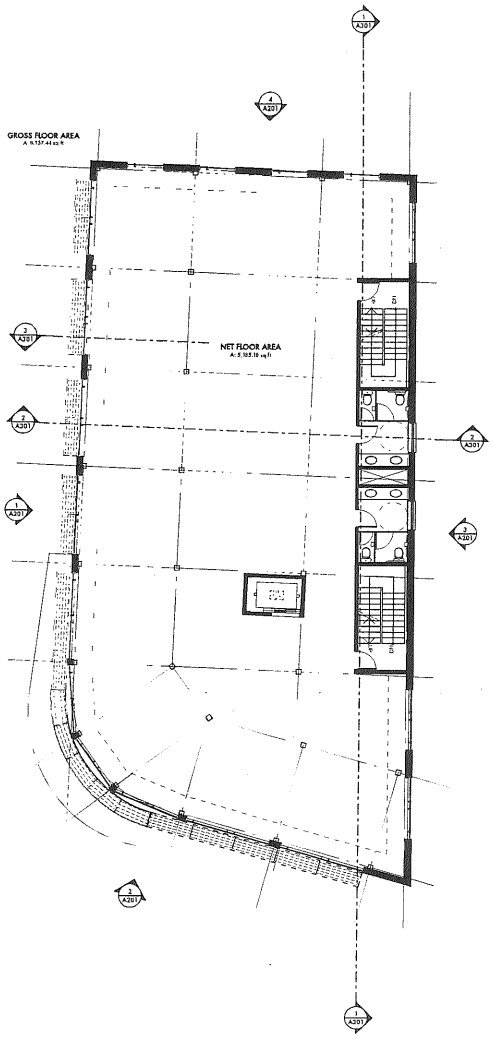
STATUS:
SCHEMATIC DESIGN

TITLE:
SITE PLAN

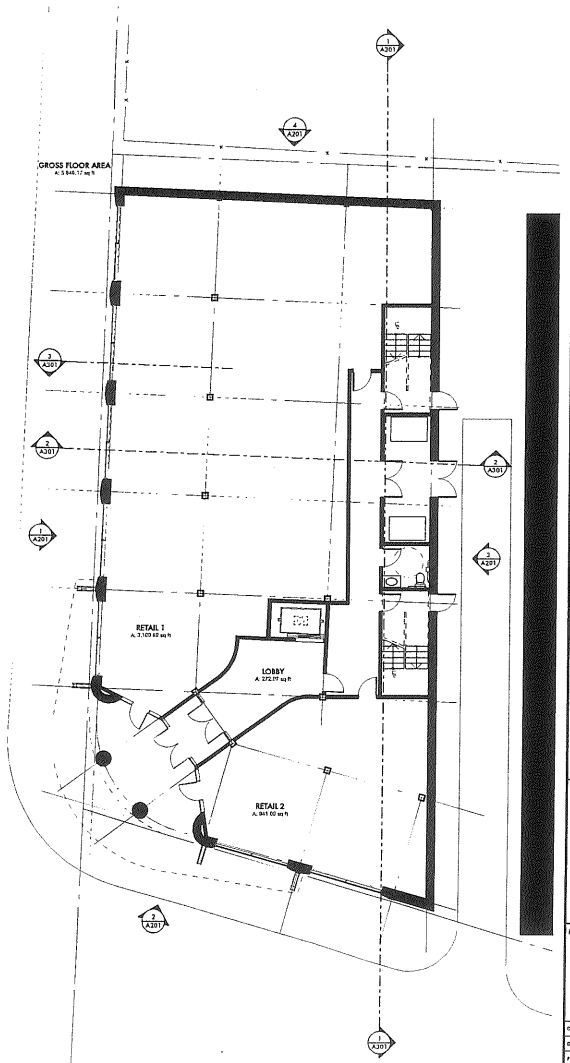
DWG NO:
001



1 A101 FLOOR 5: PENTHOUSE OFFICE
SCALE: 1/8" = 1'-0"



2 A101 FLOOR 2: TYPICAL OFFICE
SCALE: 1/8" = 1'-0"



3 A101 FLOOR 1: RETAIL & LOBBY
SCALE: 1/8" = 1'-0"

Scott Simons Architects

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Structural Engineer:
Becker Structural Eng, Inc
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Portland, ME 04101
phone 207 879 1838
fax 207 879 1822

SEAL:

REVISION DATE:

PHASE	DATE

PROJECT NAME:
LONGFELLOW OFFICES
INDIA STREET
PORTLAND, ME

DRAWING SCALE:

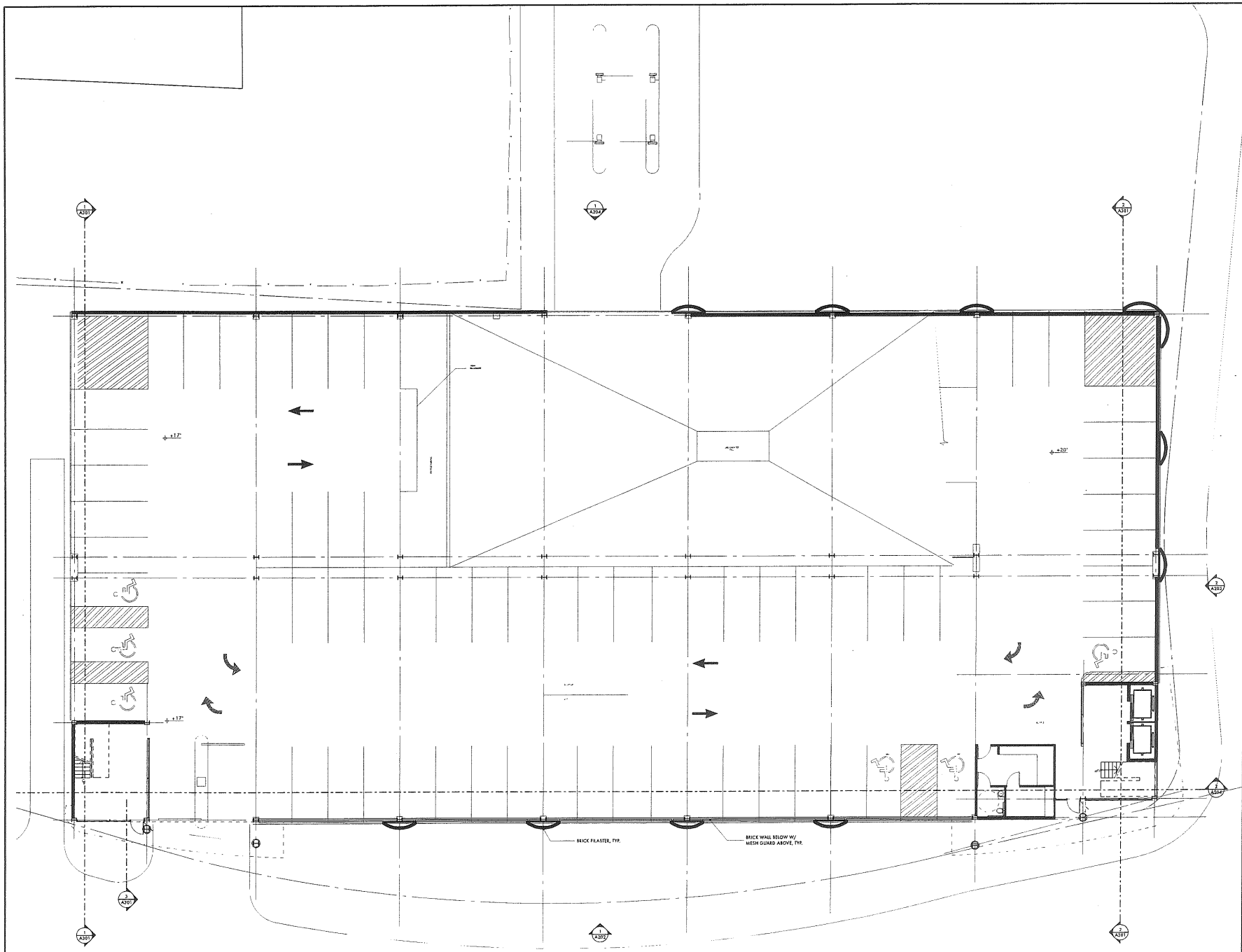
DATE OF ISSUE: 11/20/2002

PROJECT NUMBER: 2003-0162

STATUS:
SCHEMATIC DESIGN

TITLE:
FLOOR PLANS

DWG NO:
A101



1 A101 GROUND FLOOR
SCALE: 1/8" = 1'-0"

Scott Simons Architects

ARCHITECT:
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phone 207 772 4656
fax 207 828 4656
http://www.simonsarchitects.com

CONSULTANTS:

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Simon Design Engineering
44 Washington Street
Wellesley, MA 02481
phone 781 237 2226

Site Engineer:
Woodard and Curran, Inc.
41 Hutchins Dr
Portland, Me 04102
phone 207 774 2112

Landscape Architect:
Carroll Associates
75 Market Street
Portland, ME 04101
phone 207 772 1552

SEAL:

REVISION DATE:

PHASE	DATE

PROJECT NAME:
LONGFELLOW GARAGE
MIDDLE STREET
PORTLAND, ME

DRAWING SCALE:

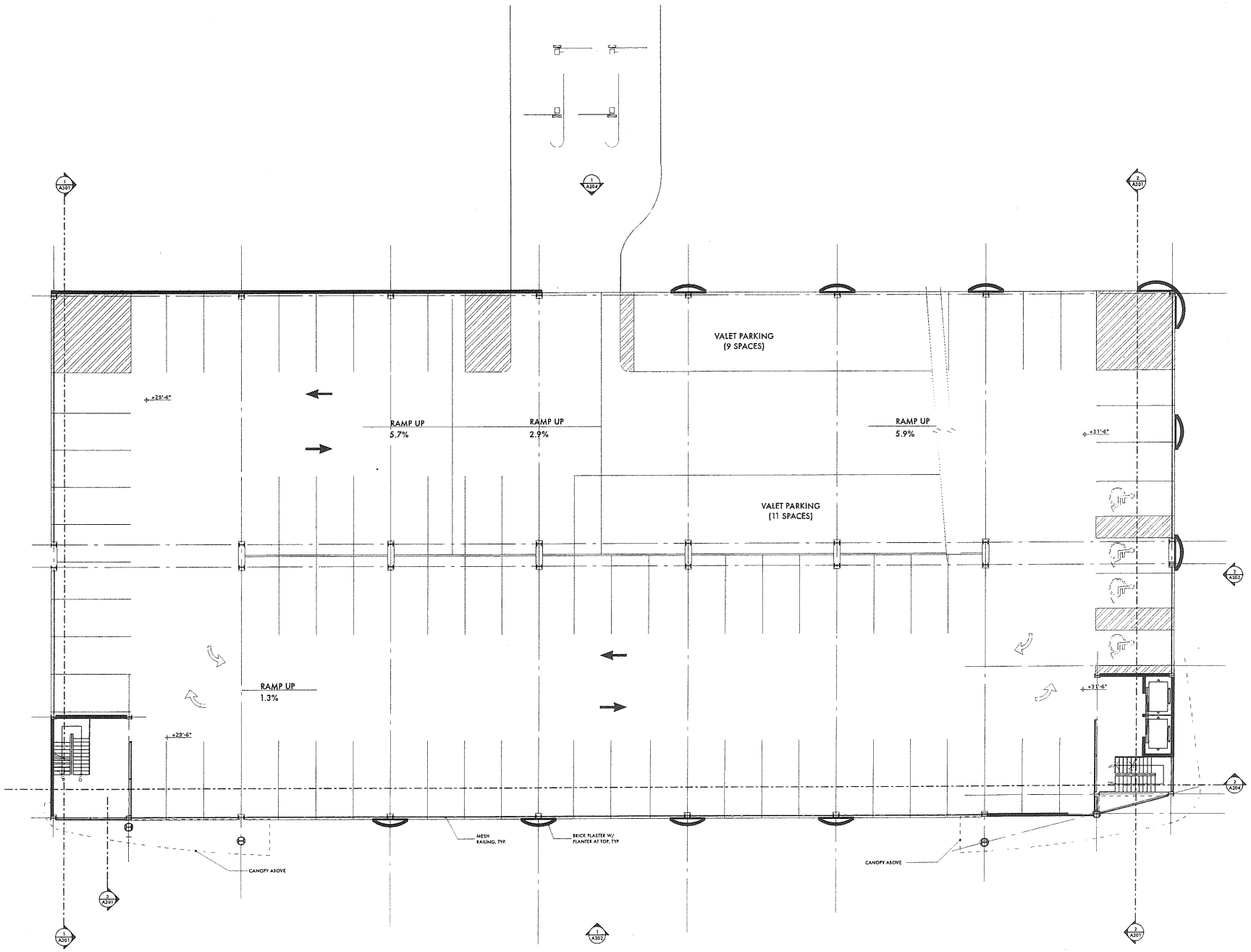
DATE OF ISSUE: 11/28/2005

PROJECT NUMBER: 2005.0161

STATUS:
SCHEMATIC DESIGN

TITLE:
GROUND FLOOR PLAN

DWG NO:
A101



1 A102 FLOOR 01
SCALE: 1/8" = 1'-0"

Scott Simons Architects

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http://www.simonsarchitects.com

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phone 781 237 2226

Site Engineer:
Woodard and Curran, Inc.
41 Hutchins Dr
Portland, Me 04102
phone 207 774 2112

Landscape Architect:
Carroll Associates
75 Market Street
Portland, ME 04101
phone 207 772 1552

SEAL:

REVISION DATE:

PHASE	DATE

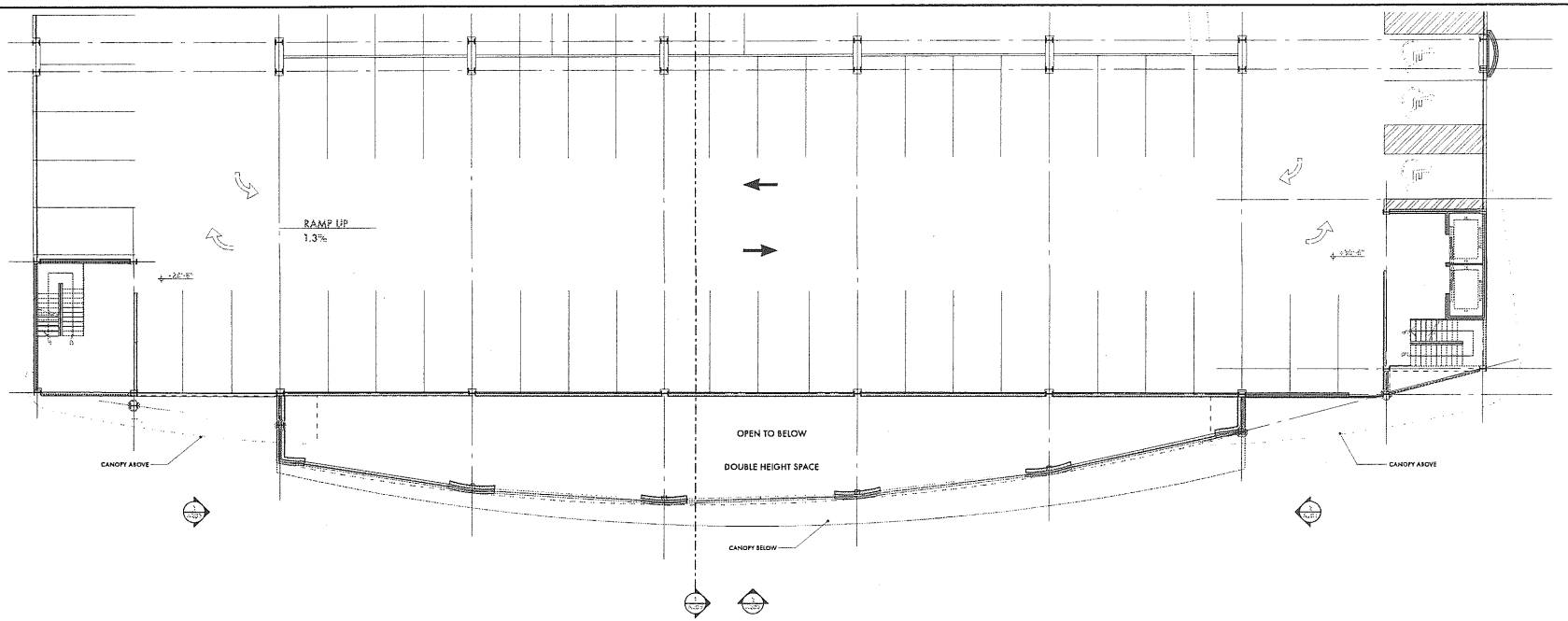
PROJECT NAME:
LONGFELLOW GARAGE
MIDDLE STREET
PORTLAND, ME

DRAWING SCALE:	
DATE OF ISSUE:	11/20/2005
PROJECT NUMBER:	2005-016.1

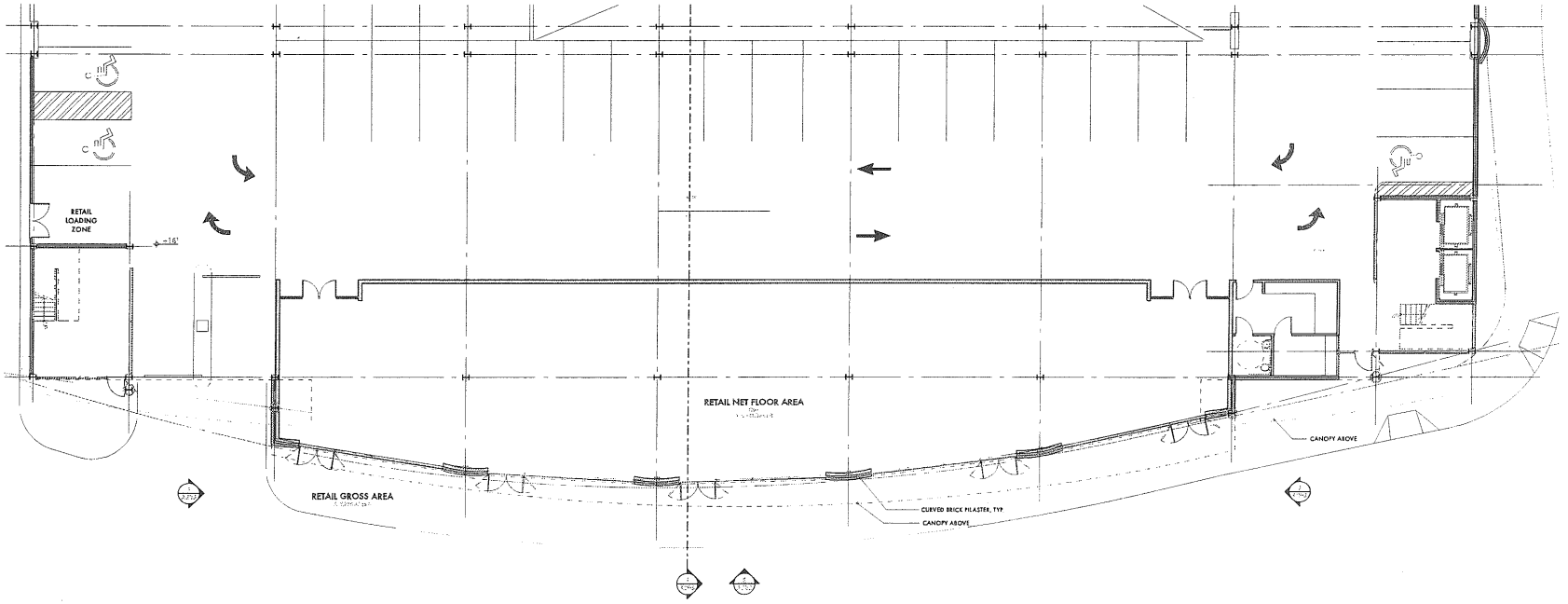
STATUS:
SCHEMATIC DESIGN

TITLE:
FLOOR 1

DWG NO:
A102



2 FLOOR 1 W/ RETAIL
A106 / SCALE: 1/8" = 1'-0"



1 GROUND FLOOR W/ RETAIL
A106 / SCALE: 1/8" = 1'-0"

Scott Simons Architects

ARCHITECT:
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fax 207 828 4656
http://www.simonsarchitects.com

CONSULTANTS:

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phone 781 237 2224

Site Engineer:
Woodard and Curran, Inc.
41 Hutchins Dr
Portland, Me 04102
phone 207 774 2112

Landscape Architect:
Carroll Associates
75 Market Street
Portland, ME 04101
phone 207 772 1552

SEAL:

REVISION DATE:

PHASE	DATE

PROJECT NAME:
LONGFELLOW GARAGE
MIDDLE STREET
PORTLAND, ME

DRAWING SCALE:

DATE OF ISSUE: 11/30/2005

PROJECT NUMBER: 2005-0161

STATUS:
SCHEMATIC DESIGN

TITLE:
RETAIL FLOOR PLANS

DWG NO:
A106

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NOTICE OF NEIGHBORHOOD

MEETING, TUESDAY,

APRIL 18TH, 2006.

(1 COPY)

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Certified Fee	
Return Reciept Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: James Cohen, Mayor
Street, Apt. No.; or PO Box No.:
City, State, ZIP+4:

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7003 3110 0004 6022 3783

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Certified Fee	
Return Reciept Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Henry Leclair
Street, Apt. No.; or PO Box No.:
City, State, ZIP+4:

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7003 3110 0004 6022 3332

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Certified Fee	
Return Reciept Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Karen Geraghty, City Council

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3363

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Certified Fee	
Return Reciept Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Jill Duson, City Councilor

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3318

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Simba Inc

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City, State, ZIP+4:

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7003 3110 0004 6022 3325

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Return Reciept Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Snyder Nicole

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3295

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Roman Catholic Bishop

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3301

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Sent To: Sangilla Frank

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3271

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Restricted Delivery Fee (Endorsement Required)	
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Sent To Jonathan Preston
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7003 3110 0004 6022 3288

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Sent To Mary Ann Ricci
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City, State, ZIP+4

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Sent To OWEN PICKUS
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Sent To Port City Glass, Inc
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City, State, ZIP+4

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Sent To Sunenblick Stephen
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City, State, ZIP+4

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7003 3110 0004 6022 3240

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Sent To Village Cafe
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Sent To: Shipyard Brewing Company
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: SNDF LLC
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Bishop of Roman Catholic
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Salt of the Earth
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City, State, ZIP+4:

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Portland Water District
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7003 3110 0004 6022 3189

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Real Frank
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Kathleen Spahn

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3158

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Pomroy, Betty

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3165

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Marc Foster

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3134

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Total Postage & Fees	$

Postmark Here

Sent To: Linda Rokemueller

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3141

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Mrs. Kimmel

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3097

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Gary Marcisso

Street, Apt. No.; or PO Box No.:

City, State, ZIP+4:

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7003 3110 0004 6022 3127

7003 3110 0004 6022 3103

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Total Postage & Fees	$

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Sent To James Clouther, City Counselor
Street, Apt. No.; or PO Box No.
City, State, ZIP+4

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Restricted Delivery Fee (Endorsement Required)	
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Sent To Elizabeth Hoglund
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Restricted Delivery Fee (Endorsement Required)	
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Sent To Meredith Springer
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Restricted Delivery Fee (Endorsement Required)	
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Sent To Michael Pizzo
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Sent To Lynn Clarkson
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Total Postage & Fees	$

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Sent To Mark Sengelman
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Kate Bucklin
Street, Apt. No.; or PO Box No.:
City, State, ZIP+4:

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7003 3110 0004 6022 3042

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Len Anderson
Street, Apt. No.; or PO Box No.:
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7003 3110 0004 6022 2472

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Return Reciept Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Jaime Parker
Street, Apt. No.; or PO Box No.:
City, State, ZIP+4:

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7003 3110 0004 6022 2496

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Joe Gary, City Manager
Street, Apt. No.; or PO Box No.:
City, State, ZIP+4:

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7003 3110 0004 6022 2465

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Restricted Delivery Fee (Endorsement Required)	
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Sent To: Mike Morse
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Return Reciept Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Janice Carpenter
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City, State, ZIP+4:

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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7003 3110 0004 6022 1574

Sent To Mary Griffith
Street, Apt. No.; or PO Box No.
City, State, ZIP+4

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Restricted Delivery Fee (Endorsement Required)	
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7003 3110 0004 6022 2458

Sent To Michael Patterson
Street, Apt. No.; or PO Box No.
City, State, ZIP+4

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7003 3110 0004 6022 1673

Sent To Lee Urban
Street, Apt. No.; or PO Box No.
City, State, ZIP+4

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Total Postage & Fees	$

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7003 3110 0004 6022 1680

Sent To Mark Reilly
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City, State, ZIP+4

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Total Postage & Fees	$

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7003 3110 0004 6022 3738

Sent To Peaks Island Land Pers
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City, State, ZIP+4

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Total Postage & Fees	$

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Sent To ~~Lee Urban~~ Liz Holton
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City, State, ZIP+4

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7003 3110 0004 6022 3714

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Nan Cummings
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Pam Burnside
Street, Apt. No.; or PO Box No.
City, State, ZIP+4

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7003 3110 0004 6022 3691

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Tom Foran
Street, Apt. No.; or PO Box No.
City, State, ZIP+4

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7003 3110 0004 6022 3707

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7003 3110 0004 6022 3677

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7003 3110 0004 6022 2304

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Sent To: McElrath, Sabina E.
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7003 3110 0004 6022 2311

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Sent To: MAlone Joseph M & AnnMarie JT
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Sent To: Kendleish Jason P
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7003 3110 0004 6022 2250

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Sent To: Ron Spinella
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Sent To: Sunenblick, Stephen P & Mary
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Sent To REP Benjamin Dudley

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Sent To REP Herb Adams

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Certified Fee	
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To Paul Ouellette

Street, Apt. No.; or PO Box No.

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Restricted Delivery Fee (Endorsement Required)	
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Restricted Delivery Fee (Endorsement Required)	
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Sent To Nancy Bartlett

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Sent To Nicholas Mavodones

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7003 3110 0004 6022 2175

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Sent To: Alfred Waxler

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7003 3110 0004 6018 2219

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Sent To: John Leavitt

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City, State, ZIP+4

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7003 3110 0004 6018 1922

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Brandan Reilly

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City, State, ZIP+4

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Total Postage & Fees	$

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Sent To: Barb Wood

Street, Apt. No.; or PO Box No.

City, State, ZIP+4

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7003 3110 0004 6018 2202

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Dan & Victoria Burke

Street, Apt. No.; or PO Box No.

City, State, ZIP+4

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7003 3110 0004 6018 2172

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Certified Fee	
Return Reciept Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Cheryl Lerman, Cty Convictor

Street, Apt. No.; or PO Box No.

City, State, ZIP+4

PS Form 3800, June 2002 — See Reverse for Instructions

7003 3110 0004 6018 2189

7003 3110 0004 6018 2158

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Certified Fee	
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Deb Keenan
Street, Apt. No.; or PO Box No.:
City, State, ZIP+4:

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7003 3110 0004 6018 2165

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: David Rowlin
Street, Apt. No.; or PO Box No.:
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7003 3110 0004 6018 2134

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Ethan Stirling
Street, Apt. No.; or PO Box No.:
City, State, ZIP+4:

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7003 3110 0004 6018 2141

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: Edward Kearney
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7003 3110 0004 6018 2110

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Anne Weigel
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7003 3110 0004 6018 2127

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Greater Portland Council of Govts
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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To Bruce Campbell

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7003 3110 0004 6018 2103

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To Betsy Sawyer - Manter

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To Dan Anderson

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Restricted Delivery Fee (Endorsement Required)	
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Sent To Chris Busby

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7003 3110 0004 6021 6082

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Restricted Delivery Fee (Endorsement Required)	
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Sent To FRED Dillon

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Restricted Delivery Fee (Endorsement Required)	
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Sent To Greg McNally

Street, Apt. No.; or PO Box No.

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7003 3110 0004 6021 6068

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Total Postage & Fees	$

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Sent To: Marhos Miller
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7003 3110 0004 6021 6075

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Sent To: Jennifer Dorr
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7003 3110 0004 6021 6044

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Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

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Sent To: Mike & Sandy Conroy
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Sent To: Michael Cary
Street, Apt. No.; or PO Box No.
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7003 3110 0004 6021 6037

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Sent To: Muirfield Hill Neigh Assoc
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Appendix B
Capacity and Queuing Analyses Results

March '06
Traffic Calcs - Not in Board memo

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			1%			-1%	
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00		1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85		0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1598	1693			1837	1550		3485		1777	3530	
Flt Permitted	0.57	1.00			0.86	1.00		0.92		0.25	1.00	
Satd. Flow (perm)	952	1693			1593	1550		3212		476	3530	
Volume (vph)	235	173	46	37	110	178	22	672	37	140	539	25
Peak-hour factor, PHF	0.82	0.82	0.82	0.81	0.81	0.81	0.79	0.79	0.79	0.84	0.84	0.84
Adj. Flow (vph)	287	211	56	46	136	220	28	851	47	167	642	30
RTOR Reduction (vph)	0	11	0	0	0	82	0	3	0	0	3	0
Lane Group Flow (vph)	287	256	0	0	182	138	0	923	0	167	669	0
Confl. Peds. (#/hr)	5		5	5		5	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	31.3	31.3			31.3	31.3		60.7		60.7	60.7	
Effective Green, g (s)	31.3	31.3			31.3	31.3		60.7		60.7	60.7	
Actuated g/C Ratio	0.31	0.31			0.31	0.31		0.61		0.61	0.61	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	298	530			499	485		1950		289	2143	
v/s Ratio Prot		0.15									0.19	
v/s Ratio Perm	c0.30				0.11	0.09		0.29		c0.35		
v/c Ratio	0.96	0.48			0.36	0.29		0.47		0.58	0.31	
Uniform Delay, d1	33.8	27.8			26.6	25.9		10.8		11.9	9.5	
Progression Factor	1.00	1.00			1.00	1.00		0.91		1.00	1.00	
Incremental Delay, d2	41.9	0.7			0.5	0.3		0.7		8.2	0.4	
Delay (s)	75.7	28.5			27.1	26.2		10.6		20.1	9.9	
Level of Service	E	C			C	C		B		C	A	
Approach Delay (s)		52.9			26.6			10.6			11.9	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			3%			3%			-3%	
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frt		0.99			0.97		1.00	0.95			0.98	
Flt Protected		0.98			0.99		0.95	1.00			0.98	
Satd. Flow (prot)		1853			1782		1743	1752			1837	
Flt Permitted		0.79			0.85		0.57	1.00			0.68	
Satd. Flow (perm)		1489			1528		1047	1752			1267	
Volume (vph)	125	232	42	71	180	64	32	232	100	111	138	43
Peak-hour factor, PHF	0.83	0.83	0.83	0.80	0.80	0.80	0.92	0.92	0.92	0.87	0.87	0.87
Adj. Flow (vph)	151	280	51	89	225	80	35	252	109	128	159	49
RTOR Reduction (vph)	0	9	0	0	19	0	0	33	0	0	13	0
Lane Group Flow (vph)	0	473	0	0	375	0	35	328	0	0	323	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.9			16.9		14.3	14.3			14.3	
Effective Green, g (s)		16.9			16.9		14.3	14.3			14.3	
Actuated g/C Ratio		0.43			0.43		0.36	0.36			0.36	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		642			659		382	639			462	
v/s Ratio Prot								0.19				
v/s Ratio Perm		c0.32			0.25		0.03				c0.26	
v/c Ratio		0.74			0.57		0.09	0.51			0.70	
Uniform Delay, d1		9.3			8.4		8.2	9.7			10.6	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		4.4			1.1		0.1	0.7			4.6	
Delay (s)		13.7			9.5		8.3	10.4			15.2	
Level of Service		B			A		A	B			B	
Approach Delay (s)		13.7			9.5			10.2			15.2	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		-1%			1%			3%			-3%	
Volume (veh/h)	123	52	175	38	114	40	100	343	55	23	188	111
Peak Hour Factor	0.87	0.87	0.87	0.83	0.83	0.83	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	141	60	201	46	137	48	111	381	61	26	209	123
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								265				
pX, platoon unblocked	0.94	0.94		0.94	0.94	0.94				0.94		
vC, conflicting volume	1072	986	271	1187	1017	412	332			442		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1077	985	271	1199	1018	373	332			405		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	71	74	43	31	92	91			98		
cM capacity (veh/h)	70	208	773	81	198	634	1227			1087		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	402	231	553	358
Volume Left	141	46	111	26
Volume Right	201	48	61	123
cSH	157	173	1227	1087
Volume to Capacity	2.57	1.34	0.09	0.02
Queue Length 95th (ft)	875	341	7	2
Control Delay (s)	768.6	236.3	2.5	0.8
Lane LOS	F	F	A	A
Approach Delay (s)	768.6	236.3	2.5	0.8
Approach LOS	F	F		

Intersection Summary			
Average Delay	236.6		
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			1%			-1%	
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00	0.98		1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00		1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85		0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1598	1697			1837	1550		3485		1777	3530	
Flt Permitted	0.57	1.00			0.83	1.00		0.92		0.25	1.00	
Satd. Flow (perm)	952	1697			1542	1550		3212		476	3530	
Volume (vph)	235	187	46	37	110	178	22	672	37	171	539	25
Peak-hour factor, PHF	0.82	0.82	0.82	0.81	0.81	0.81	0.79	0.79	0.79	0.84	0.84	0.84
Adj. Flow (vph)	287	228	56	46	136	220	28	851	47	204	642	30
RTOR Reduction (vph)	0	10	0	0	0	82	0	3	0	0	3	0
Lane Group Flow (vph)	287	274	0	0	182	138	0	923	0	204	669	0
Confl. Peds. (#/hr)	5		5	5		5	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	31.3	31.3			31.3	31.3		60.7		60.7	60.7	
Effective Green, g (s)	31.3	31.3			31.3	31.3		60.7		60.7	60.7	
Actuated g/C Ratio	0.31	0.31			0.31	0.31		0.61		0.61	0.61	
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	298	531			483	485		1950		289	2143	
v/s Ratio Prot		0.16									0.19	
v/s Ratio Perm	c0.30				0.12	0.09		0.29		c0.43		
v/c Ratio	0.96	0.52			0.38	0.29		0.47		0.71	0.31	
Uniform Delay, d1	33.8	28.1			26.8	25.9		10.8		13.5	9.5	
Progression Factor	1.00	1.00			1.00	1.00		0.91		1.00	1.00	
Incremental Delay, d2	41.9	0.8			0.5	0.3		0.7		13.6	0.4	
Delay (s)	75.7	29.0			27.2	26.2		10.6		27.1	9.9	
Level of Service	E	C			C	C		B		C	A	
Approach Delay (s)		52.4			26.7			10.6			13.9	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			3%			3%			-3%	
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frt		0.99			0.97		1.00	0.96			0.98	
Flt Protected		0.98			1.00		0.95	1.00			0.98	
Satd. Flow (prot)		1853			1793		1743	1754			1831	
Flt Permitted		0.80			0.98		0.58	1.00			0.64	
Satd. Flow (perm)		1502			1766		1059	1754			1192	
Volume (vph)	131	234	42	9	208	64	32	239	100	120	123	45
Peak-hour factor, PHF	0.83	0.83	0.83	0.80	0.80	0.80	0.92	0.92	0.92	0.87	0.87	0.87
Adj. Flow (vph)	158	282	51	11	260	80	35	260	109	138	141	52
RTOR Reduction (vph)	0	9	0	0	22	0	0	32	0	0	14	0
Lane Group Flow (vph)	0	482	0	0	329	0	35	337	0	0	317	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.1			17.1		14.7	14.7			14.7	
Effective Green, g (s)		17.1			17.1		14.7	14.7			14.7	
Actuated g/C Ratio		0.43			0.43		0.37	0.37			0.37	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		645			759		391	648			440	
v/s Ratio Prot								0.19				
v/s Ratio Perm		c0.32			0.19		0.03				c0.27	
v/c Ratio		0.75			0.43		0.09	0.52			0.72	
Uniform Delay, d1		9.5			8.0		8.2	9.8			10.8	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		4.7			0.4		0.1	0.8			5.7	
Delay (s)		14.3			8.4		8.3	10.6			16.5	
Level of Service		B			A		A	B			B	
Approach Delay (s)		14.3			8.4			10.4			16.5	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	39.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		-1%			1%			3%			-3%	
Volume (veh/h)	118	103	178	42	133	60	98	332	81	38	179	109
Peak Hour Factor	0.87	0.87	0.87	0.83	0.83	0.83	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	136	118	205	51	160	72	109	369	90	42	199	121
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			4									
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								265				
pX, platoon unblocked	0.93	0.93		0.93	0.93	0.93				0.93		
vC, conflicting volume	1128	1021	259	1137	1036	414	320			459		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1138	1022	259	1148	1039	369	320			417		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	39	74	11	15	89	91			96		
cM capacity (veh/h)	39	193	782	57	189	632	1246			1065		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	459	283	568	362
Volume Left	136	51	109	42
Volume Right	205	72	90	121
cSH	113	153	1246	1065
Volume to Capacity	4.05	1.85	0.09	0.04
Queue Length 95th (ft)	Err	532	7	3
Control Delay (s)	Err	457.4	2.4	1.4
Lane LOS	F	F	A	A
Approach Delay (s)	Err	457.4	2.4	1.4
Approach LOS	F	F		

Intersection Summary			
Average Delay	2821.6		
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↖		↗		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			0%			0%	
Volume (veh/h)	50	41	115	3	15	15	166	0	3	9	0	34
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	56	46	128	3	17	17	184	0	3	10	0	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	33			173			290	261	109	256	316	25
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	33			173			290	261	109	256	316	25
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			70	100	100	99	100	96
cM capacity (veh/h)	1585			1409			622	622	947	677	579	1054

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	229	37	184	3	48
Volume Left	56	3	184	0	10
Volume Right	128	17	0	3	38
cSH	1585	1409	622	947	944
Volume to Capacity	0.04	0.00	0.30	0.00	0.05
Queue Length 95th (ft)	3	0	31	0	4
Control Delay (s)	2.0	0.7	13.2	8.8	9.0
Lane LOS	A	A	B	A	A
Approach Delay (s)	2.0	0.7	13.1		9.0
Approach LOS			B		A

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		-1%	1%		0%	
Volume (veh/h)	0	453	323	2	0	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	503	359	2	0	37
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		164	54			
pX, platoon unblocked					0.95	
vC, conflicting volume	361				863	360
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	361				856	360
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	95
cM capacity (veh/h)	1203				313	687

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	503	361	37
Volume Left	0	0	0
Volume Right	0	2	37
cSH	1700	1700	687
Volume to Capacity	0.30	0.21	0.05
Queue Length 95th (ft)	0	0	4
Control Delay (s)	0.0	0.0	10.5
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	27.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	-1%			1%	0%	
Volume (veh/h)	443	10	1	317	8	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	492	11	1	352	9	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	218					
pX, platoon unblocked			0.99		0.99	0.99
vC, conflicting volume			503		852	498
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			498		851	492
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1059		328	572

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	503	353	10
Volume Left	0	1	9
Volume Right	11	0	1
cSH	1700	1059	344
Volume to Capacity	0.30	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	15.8
Lane LOS		A	C
Approach Delay (s)	0.0	0.0	15.8
Approach LOS			C

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		33.9%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰		↱		↕	
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			0%			0%	
Volume (veh/h)	50	41	235	6	15	15	339	0	6	9	0	34
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	56	46	261	7	17	17	377	0	7	10	0	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	33			307			363	334	176	332	456	25
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	33			307			363	334	176	332	456	25
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			32	100	99	98	100	96
cM capacity (veh/h)	1585			1260			556	564	870	599	482	1054

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	362	40	377	7	48
Volume Left	56	7	377	0	10
Volume Right	261	17	0	7	38
cSH	1585	1260	556	870	910
Volume to Capacity	0.04	0.01	0.68	0.01	0.05
Queue Length 95th (ft)	3	0	128	1	4
Control Delay (s)	1.4	1.3	24.0	9.2	9.2
Lane LOS	A	A	C	A	A
Approach Delay (s)	1.4	1.3	23.8		9.2
Approach LOS			C		A

Intersection Summary				
Average Delay	12.1			
Intersection Capacity Utilization	57.5%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		-1%	1%		0%	
Volume (veh/h)	0	453	323	4	0	67
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	503	359	4	0	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		164				
pX, platoon unblocked					0.95	
vC, conflicting volume	363				864	361
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	363				858	361
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	89
cM capacity (veh/h)	1201				313	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	503	363	74
Volume Left	0	0	0
Volume Right	0	4	74
cSH	1700	1700	686
Volume to Capacity	0.30	0.21	0.11
Queue Length 95th (ft)	0	0	9
Control Delay (s)	0.0	0.0	10.9
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.9
Approach LOS			B

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		28.1%	ICU Level of Service A
Analysis Period (min)		15	

Appendix C

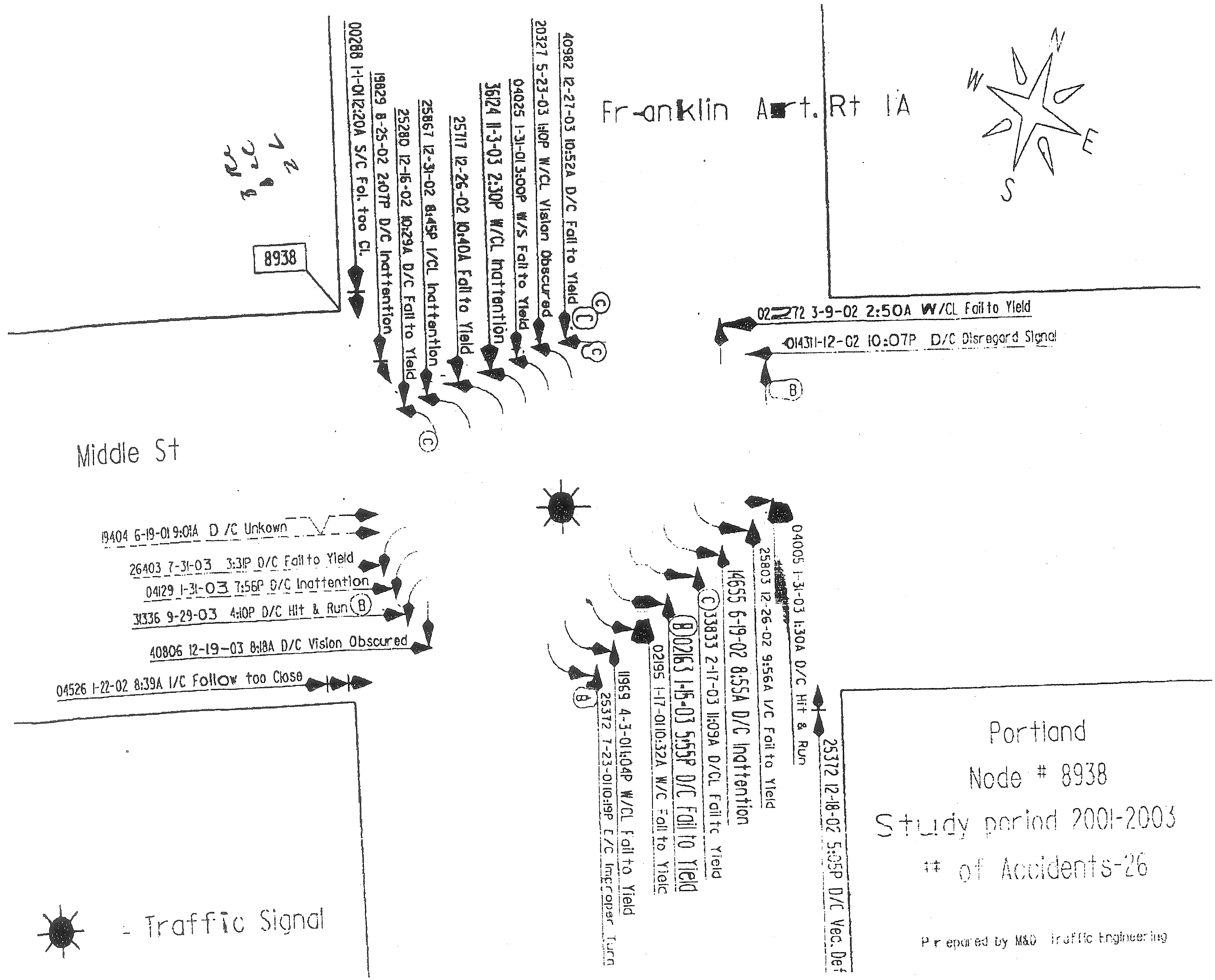
MaineDOT Crash Data

MaineDOT Historic Count Data

Trip Generation Calculations

U.S. Census Data

Signal Warrant Data


Franklin A[redacted]rt. Rt 1A
Middle St
8938
00288 1-1-01 12:20A S/C Fol. too Cl.
19829 8-25-02 2:07P D/C Inattention
25280 12-16-02 10:29A D/C Fail to Yield
25867 12-31-02 8:45P I/CL Inattention
25717 12-26-02 10:40A Fail to Yield
36124 11-3-03 2:30P W/CL Inattention
04025 1-31-01 3:00P W/S Fail to Yield
20327 5-23-03 1:10P W/CL Vision Obscured
40982 12-27-03 10:52A D/C Fail to Yield
02[redacted]72 3-9-02 2:50A W/CL Fail to Yield
01431 1-12-02 10:07P D/C Disregard Signal
19404 6-19-01 9:01A D/C Unkown
26403 7-31-03 3:31P D/C Fail to Yield
04129 1-31-03 7:56P D/C Inattention
31336 9-29-03 4:10P D/C Hit & Run
40806 12-19-03 8:18A D/C Vision Obscured
04526 1-22-02 8:39A I/C Follow too Close
04005 1-31-03 1:30A D/C Hit & Run
25803 12-26-02 9:56A I/C Fail to Yield
14655 6-19-02 8:55A D/C Inattention
33833 2-17-03 11:09A D/CL Fail to Yield
02163 1-15-03 5:55P D/C Fail to Yield
02195 1-17-01 10:32A W/C Fail to Yield
11969 4-3-01 1:04P W/CL Fail to Yield
25372 7-23-01 10:19P E/C Improper Turn
25372 12-18-02 5:05P D/C Vec. Def
N
E
S
W
- Traffic Signal
Portland
Node # 8938
Study period 2001-2003
# of Accidents-26
Prepared by M&D Traffic Engineering

DEC 8,2005 AT 09:34

TINACC30

MAINE DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING, ACCIDENT RECORDS SECTION

ACCIDENT SUMMARY INPUT

TYPE OF STUDY: NODES AND LINKS TYPE OF REQUEST: ACCIDENT I & II WITH LINK DETAIL
STUDY PERIOD: FROM MONTH 01 YEAR 2002 TO MONTH 12 YEAR 2004

INPUT COMMENTS

REQUEST: EASTERN WATERFRONT AREA
TOWN: PORTLAND

INPUT DATA

ROUTE	COUNTY	FIRST NODE	EXCLUDE FIRST	DISTANCE	SECOND NODE	LAST NODE	EXCLUDE LAST	DISTANCE
0001A	05	05812	0	0.00	08937	09420	0	0.00
61001		05812	1	0.00	09241	09241	0	0.00
61000		09241	1	0.00	09242	09243	1	0.00
60286		08937	1	0.00	09242	09242	1	0.00
		09242	1	0.00	09240	09240	0	0.00
60524		09240	1	0.00	09222	09239	0	0.00
61002		09239	1	0.00	09462	09462	1	0.00
0026X		08940	1	0.00	09339	09138	0	0.00
0026S		09137	1	0.00	09375	09375	0	0.00
0001A		09420	1	0.00	09371	09620	0	0.00
60232		09620	1	0.00	09378	09379	0	0.00
60160		08939	1	0.00	09219	09239	1	0.00
60505		08938	1	0.00	09221	09237	1	0.00
		09237	1	0.00	09238	09238	0	0.00
60344		09238	1	0.00	09223	09217	1	0.00
60531		09225	0	0.00	09220	09224	1	0.00
		09224	1	0.00	09223	09223	1	0.00
		09223	1	0.00	09222	09222	1	0.00
61110		09214	0	0.00	09215	09216	1	0.00
		09216	1	0.00	09217	09218	1	0.00
60342		09221	1	0.00	09220	09220	1	0.00
		09220	1	0.00	09215	09215	1	0.00
		09215	1	0.00	09219	09219	1	0.00
60451		09330	1	0.00	09331	09331	1	0.00
60510		09332	1	0.00	09333	09333	1	0.00
60069		09339	1	0.00	09340	09341	0	0.00
60493		09342	1	0.00	09343	09344	0	0.00
60834		09344	1	0.00	09338	09338	0	0.00
60666		09338	1	0.00	09337	09335	1	0.00
		09335	1	0.00	09334	09334	1	0.00
60847		09885	1	0.00	09886	09375	1	0.00
60235		09353	0	0.00	09354	09886	1	0.00
		09886	1	0.00	09336	09336	1	0.00
		09336	1	0.00	09343	09343	1	0.00

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MAINE DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING, ACCIDENT RECORDS SECTION

ACCIDENT SUMMARY INPUT

INPUT DATA

ROUTE	COUNTY	FIRST NODE	EXCLUDE FIRST	DISTANCE	SECOND NODE	LAST NODE	EXCLUDE LAST	DISTANCE
		09343	1	0.00	09340	09340	1	0.00
60561		09353	1	0.00	09356	09356	1	0.00
60139		09354	1	0.00	09357	09357	1	0.00
60234		09337	1	0.00	09352	09352	1	0.00
60333		09353	1	0.00	09359	09358	1	0.00
60509		09359	1	0.00	09360	09360	1	0.00
60470		09351	1	0.00	09358	09361	1	0.00
60804		09362	1	0.00	09364	09366	1	0.00
60257		09364	1	0.00	09363	09350	1	0.00
60540		09363	1	0.00	09365	09365	1	0.00
60293		08941	1	0.00	09373	09349	1	0.00
		09349	1	0.00	09888	09380	1	0.00
60537		09373	1	0.00	09374	09374	0	0.00
60215		09371	1	0.00	09372	09372	1	0.00
60167		09370	1	0.00	09348	09348	1	0.00
		09348	1	0.00	09888	09888	1	0.00
60341		09367	1	0.00	09368	09368	1	0.00
60322		09347	1	0.00	09367	09369	0	0.00
60585		09346	1	0.00	09620	09620	1	0.00

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MAINE DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING, ACCIDENT RECORDS SECTION

ACCIDENT SUMMARY I

COUNTY TOWN#	LOW NODE	HIGH NODE	STREET NAME OR ROUTE #	U/R	TOTAL ACCTS	LINK LENGTH	INJURY ACCIDENTS K	A	B	C	PD	PERCENT INJURY	ANNUAL HM VEH-MILES	ANNUAL M ENT-VEHS	ACCIDENT-RATES LINK	NODE	CRITI RATE	CRF
05	05812	POR,COMMERCIAL ST,STATE		9	3		0	0	0	1	2	33.3		4.763		0.21	1.14	0.00
05	08937	POR,FRANKLIN ST,ART,FOR		9	9		0	0	0	2	7	22.2		5.113		0.59	1.12	0.00
05	08938	POR,FRANKLIN ART.,MIDDL		9	27		0	2	3	5	17	37.0		6.533		1.38	1.07	1.29
05	08939	POR,FRANKLIN ART,CONGRE		9	52		0	1	6	14	31	40.4		10.320		1.68	0.98	1.71
05	08940	POR,FRANKLIN ART,CUMBER		9	20		0	2	3	4	11	45.0		9.562		0.70	0.99	0.00
05	08941	POR,FOX,FRANKLIN ST.ART		9	28		0	0	1	7	20	28.6		10.252		0.91	0.98	0.00
05	08942	POR,FRANKLIN ART,RR ING		2	0		0	0	0	0	0	0.0		9.184		0.00	0.34	0.00
05	09420	POR,FRANKLIN ART,MARGIN		9	28		0	1	2	9	16	42.9		13.034		0.72	0.94	0.00
05	09241	POR,INDIA,COMMERCIAL ST		2	0		0	0	0	0	0	0.0		2.271		0.00	0.48	0.00
05	09242	POR,FORE,INDIA ST.		2	1		0	0	0	1	0	100.0		4.615		0.07	0.40	0.00
05	09237	POR,MIDDLE,INDIA ST.		2	3		0	0	0	0	3	0.0		3.764		0.27	0.42	0.00
05	09224	POR,INDIA,NEWBURY ST.1		2	1		0	0	0	1	0	100.0		2.454		0.14	0.47	0.00
05	09216	POR,INDIA,FEDERAL ST.2		2	1		0	0	0	0	1	0.0		2.605		0.13	0.46	0.00
05	09240	POR,FORE,MOUNTFORT ST.		2	3		0	0	0	0	3	0.0		2.943		0.34	0.43	0.00
05	09222	POR,MOUNTFORT,NEWBURY S		2	0		0	0	0	0	0	0.0		0.948		0.00	0.50	0.00
05	09218	POR,MOUNTFORT,FEDERAL S		2	1		0	0	0	0	1	0.0		1.116		0.30	0.49	0.00
05	09239	POR,CONGRESS,WASHINGTON		9	10		0	1	0	1	8	20.0		4.852		0.69	1.13	0.00
05	09339	POR,CUMBERLAND AVE,BOYD		2	1		0	0	0	0	1	0.0		2.425		0.14	0.47	0.00
05	09330	POR,CUMBERLAND AVE,LOCU		2	1		0	0	0	0	1	0.0		2.377		0.14	0.48	0.00
05	09342	POR,MAYO ST,CUMBERLAND		2	2		0	0	0	0	2	0.0		2.272		0.29	0.48	0.00
05	09335	POR,CUMBERLAND AVE,SMIT		2	4		0	0	0	1	3	25.0		2.230		0.60	0.48	1.25
05	09885	POR,CUMBERLAN AVE,ANDER		2	0		0	0	0	0	0	0.0		2.051		0.00	0.49	0.00
05	P09332	POR,MONTGOMERY ST,CUMBE		2	0		0	0	0	0	0	0.0		3.987		0.00	0.42	0.00
05	A09357	POR,CUMBERLAND AVE,CLEE			0		0	0	0	0	0	0.0		0.000		0.00	0.00	0.00*
05	09462	POR,WASHINGTON,CUMBERLA		9	13		0	0	0	2	11	15.4		4.798		0.90	1.13	0.00
05	09356	POR,E.OXFORD ST.EXT,RTE		2	4		0	0	0	1	3	25.0		4.062		0.33	0.41	0.00
05	09360	POR,WASHINGTON AVE,MONR		2	1		0	0	0	0	1	0.0		4.075		0.08	0.41	0.00
05	P09295	POR,WASHINGTON AVE,MARI		2	3		0	0	0	1	2	33.3		8.187		0.12	0.35	0.00
05	A09361	POR,MADISON ST,WASHINGT			0		0	0	0	0	0	0.0		0.000		0.00	0.00	0.00*
05	A09380	POR,WASHINGTON AVE,FOX			0		0	0	0	0	0	0.0		0.000		0.00	0.00	0.00*
05	P09299	POR,WASHINGTON AVE,WALN		2	6		0	0	0	2	4	33.3		8.396		0.24	0.35	0.00
05	09301	POR,EAST COVE ST,WASHIN		2	0		0	0	0	0	0	0.0		3.946		0.00	0.42	0.00
05	09382	POR,WASHINGTON,EASTERN		2	1		0	0	0	1	0	100.0		4.469		0.07	0.40	0.00
05	09137	POR,WASH AVE,NB,SB		2	0		0	0	0	0	0	0.0		4.050		0.00	0.41	0.00
05	09138	POR,WASHINGTON AVE,I-29		2	3		0	0	0	0	3	0.0		15.162		0.07	0.21	0.00
05	09375	POR,RTE 26 SB,ANDERSON		2	0		0	0	0	0	0	0.0		2.431		0.00	0.47	0.00
05	09371	POR,MARGINAL WAY,DIAMON		2	1		0	0	0	0	1	0.0		1.897		0.18	0.48	0.00
05	09370	POR,MARGINAL WAY,COVE S		2	0		0	0	0	0	0	0.0		1.276		0.00	0.53	0.00
05	09620	POR,RTE 1A,COMMERCIAL S		2	1		0	0	0	0	1	0.0		0.647		0.52	0.61	0.00
05	09378	POR,COMMERCIAL ST.E,BR.		2	0		0	0	0	0	0	0.0		0.111		0.00	0.24	0.00
05	09379	POR,COMMERCIAL ST.E,END		2	0		0	0	0	0	0	0.0		0.111		0.00	0.24	0.00
05	09219	POR,CONGRESS,HAMPSHIRE		2	0		0	0	0	0	0	0.0		4.786		0.00	0.40	0.00
05	09331	POR,CONGRESS,LOCUST ST.		2	1		0	0	0	1	0	100.0		6.036		0.06	0.37	0.00
05	09243	POR,CONGRESS,INDIA ST.		9	4		0	0	0	1	3	25.0		7.277		0.18	1.04	0.00

* - AADT IS ZERO FOR THIS LINK | NODE

TINACC30

MAINE DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING, ACCIDENT RECORDS SECTION

ACCIDENT SUMMARY I

COUNTY TOWN#	LOW NODE	HIGH NODE	STREET NAME OR ROUTE #	U/R	TOTAL ACCTS	LINK LENGTH	INJURY ACCIDENTS K	A	B	C	PD	PERCENT INJURY	ANNUAL HM VEH-MILES	ANNUAL M ENT-VEHS	ACCIDENT-RATES LINK	NODE	CRITI RATE	CRF
05	09334	POR,SMITH,CONGRESS ST.		2	0		0	0	0	0	0	0.0		5.295		0.00	0.39	0.00
05	09333	POR,CONGRESS,MONTGOMERY		2	1		0	0	0	0	1	0.0		4.219		0.08	0.41	0.00
05	09221	POR,MIDDLE,HAMPSHIRE ST		2	0		0	0	0	0	0	0.0		2.509		0.00	0.40	0.00
05	09238	POR,HANCOCK,MIDDLE ST.		2	0		0	0	0	0	0	0.0		0.557		0.00	0.55	0.00
05	09223	POR,HANCOCK,NEWBURY ST.		2	0		0	0	0	0	0	0.0		0.502		0.00	0.55	0.00
05	09225	POR,NEWBURY ST.1,END		2	0		0	0	0	0	0	0.0		0.014		0.00	7.23	0.00
05	09220	POR,HAMPSHIRE,NEWBURY S		2	0		0	0	0	0	0	0.0		0.684		0.00	0.53	0.00
05	09214	POR,FEDERAL ST.2,END		2	0		0	0	0	0	0	0.0		0.014		0.00	7.23	0.00
05	09215	POR,HAMPSHIRE,FEDERAL S		2	0		0	0	0	0	0	0.0		0.711		0.00	0.53	0.00
05	09217	POR,FEDERAL ST.2,HANCOC		2	0		0	0	0	0	0	0.0		0.628		0.00	0.54	0.00
05	09340	POR,BOYD,E,OXFORD ST.		2	1		0	0	0	0	1	0.0		0.195		1.71	0.49	3.49
05	09341	POR,LANCASTER 1,BOYD ST		2	0		0	0	0	0	0	0.0		0.056		0.00	0.57	0.00
05	09343	POR,MAYO,E.OXFORD ST.		2	1		0	0	0	0	1	0.0		0.335		1.00	0.56	1.79
05	09344	POR,KENNEDY,MAYO ST.		2	0		0	0	0	0	0	0.0		0.111		0.00	0.24	0.00
05	09338	POR,KENNEDY,SMITH ST.		2	0		0	0	0	0	0	0.0		0.111		0.00	0.24	0.00
05	09337	POR,SMITH,E.LANCASTER S		2	0		0	0	0	0	0	0.0		0.195		0.00	0.49	0.00
05	09336	POR,SMITH,E.OXFORD ST.		2	2		0	0	0	0	2	0.0		0.376		1.77	0.56	3.16
05	09886	POR,ANDERSON ST,E.OXFOR		2	0		0	0	0	0	0	0.0		0.477		0.00	0.56	0.00
05	09352	POR,E.LANCASTER,ANDERSO		2	1		0	0	0	0	1	0.0		0.252		1.32	0.54	2.44
05	09351	POR,ANDERSON,MADISON ST		2	0		0	0	0	0	0	0.0		0.306		0.00	0.55	0.00
05	09350	POR,ANDERSON,EVERETT ST		2	0		0	0	0	0	0	0.0		0.376		0.00	0.56	0.00
05	09349	POR,ANDERSON,FOX ST.		2	5		0	0	0	1	4	20.0		3.375		0.49	0.37	1.32
05	09348	POR,ANDERSON,COVE ST.		2	0		0	0	0	0	0	0.0		1.049		0.00	0.49	0.00
05	09347	POR,ANDERSON,GOULD ST.		2	0		0	0	0	0	0	0.0		0.892		0.00	0.51	0.00
05	P09346	POR,ANDERSON,PLOWMAN ST		2	0		0	0	0	0	0	0.0		1.690		0.00	0.44	0.00
05	A09376	POR,TUKEY,PLOWMAN ST.			0		0	0	0	0	0	0.0		0.000		0.00	0.00	0.00*
05	P09353	POR,E.OXFORD,GREENLEAF		2	0		0	0	0	0	0	0.0		1.003		0.00	0.50	0.00
05	A09354	POR,CLEEVE,E.OXFORD ST.			0		0	0	0	0	0	0.0		0.000		0.00	0.00	0.00*
05	09359	POR,MONROE,GREENLEAF ST		2	1		0	0	0	1	0	100.0		0.293		1.14	0.55	2.07
05	09358	POR,GREENLEAF,MADISON S		2	0		0	0	0	0	0	0.0		0.251		0.00	0.54	0.00
05	09362	POR,WINTHROP,MADISON ST		2	0		0	0	0	0	0	0.0		0.307		0.00	0.55	0.00
05	09364	POR,WINTHROP,EVERETT ST		2	0		0	0	0	0	0	0.0		0.293		0.00	0.55	0.00
05	09363	POR,EVERETT,N.GREENLEAF		2	0		0	0	0	0	0	0.0		0.208		0.00	0.50	0.00
05	09373	POR,N.BOYD,FOX ST.		2	0		0	0	0	0	0	0.0		2.845		0.00	0.39	0.00
05	09372	POR,FOX,DIAMOND ST.		2	3		1	0	0	0	2	33.3		3.138		0.32	0.38	0.00
05	09888	POR,FOX STREET,COVE STR		2	0		0	0	0	0	0	0.0		2.890		0.00	0.39	0.00
05	09365	POR,FOX,N.GREENLEAF ST.		2	0		0	0	0	0	0	0.0		2.859		0.00	0.39	0.00
05	A09368	POR,FOX,HAMMOND ST.			0		0	0	0	0	0	0.0		0.000		0.00	0.00	0.00*
05	P09366	POR,FOX,WINTHROP ST.		2	0		0	0	0	0	0	0.0		5.802		0.00	0.32	0.00
05	09374	POR,N.BOYD ST,PW AHD		2	0		0	0	0	0	0	0.0		0.056		0.00	0.57	0.00
05	09367	POR,HAMMOND,GOULD ST.		2	0		0	0	0	0	0	0.0		0.167		0.00	0.44	0.00
05	09369	POR,GOULD ST,END		2	0		0	0	0	0	0	0.0		0.056		0.00	0.57	0.00
		NODE SUBTOTALS-			248		1	7	15	57	168	32.3		236.485			0.35	0.36	0.00

TINACC30

MAINE DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING, ACCIDENT RECORDS SECTION

ACCIDENT SUMMARY I

COUNTY TOWN#	LOW NODE	HIGH NODE	STREET NAME OR ROUTE #	U/R	TOTAL ACCTS	LINK LENGTH	INJURY ACCIDENTS K	A	B	C	PD	PERCENT INJURY	ANNUAL HM VEH-MILES	ANNUAL M ENT-VEHS	ACCIDENT-RATES LINK	NODE	CRITI RATE	CRF
05170	05812	08937	FRANKLIN ST ART	2	0	0.09	0	0	0	0	0	0.0	0.00212		0.00		564.21	0.00
	08937	08938		2	0	0.06	0	0	0	0	0	0.0	0.00194		0.00		577.29	0.00
	08938	08939		2	1	0.15	0	0	0	0	1	0.0	0.00680		49.02		419.87	0.00
	08939	08940		2	1	0.10	0	0	0	1	0	100.0	0.00664		50.20		422.29	0.00
	08940	08941		2	4	0.23	0	0	1	1	2	50.0	0.01698		78.52		342.45	0.00
	08941	08942		2	2	0.08	0	0	0	0	2	0.0	0.00670		99.50		421.37	0.00
	08942	09420		2	2	0.01	0	0	0	1	1	50.0	0.00100		666.67		681.06	0.00
	05812	09241	COMMERCIAL ST	2	1	0.10	0	0	0	0	1	0.0	0.00231		144.30		574.03	0.00
	09241	09242	INDIA ST	2	1	0.06	0	0	0	0	1	0.0	0.00134		248.76		660.16	0.00
	09237	09242		2	1	0.04	0	0	0	1	0	100.0	0.00089		374.53		729.05	0.00
	09224	09237		2	4	0.05	0	0	1	0	3	25.0	0.00112		1190.48		690.18	1.72
	09216	09224		2	1	0.05	0	0	0	0	1	0.0	0.00112		297.62		690.18	0.00
	09216	09243		2	1	0.08	0	0	0	0	1	0.0	0.00183		182.15		609.71	0.00
	08937	09242	FORE ST	2	5	0.12	0	0	0	1	4	20.0	0.00301		553.71		499.74	1.11
	09240	09242		2	1	0.17	0	0	1	0	0	100.0	0.00384		86.81		469.36	0.00
	09222	09240	MOUNTFORT ST	2	0	0.05	0	0	0	0	0	0.0	0.00042		0.00		1319.07	0.00
	09218	09222		2	4	0.03	0	0	0	0	4	0.0	0.00025		5333.33		1452.90	3.67
	09218	09239		2	1	0.14	0	0	0	0	1	0.0	0.00117		284.90		1027.04	0.00
	09239	09462	WASHINGTON AVE	2	2	0.05	0	0	0	0	2	0.0	0.00128		520.83		667.78	0.00
	08940	09339	CUMBERLAND AVE	2	1	0.08	0	0	0	0	1	0.0	0.00188		177.30		605.48	0.00
	09330	09339		2	3	0.01	0	0	0	1	2	33.3	0.00023		4347.83		880.48	4.94
	09330	09342		2	0	0.04	0	0	0	0	0	0.0	0.00088		0.00		730.96	0.00
	09335	09342		2	3	0.02	0	0	0	0	3	0.0	0.00043		2325.58		841.15	2.76
	09335	09885		2	0	0.02	0	0	0	0	0	0.0	0.00040		0.00		849.81	0.00
	09332	09885		2	0	0.02	0	0	0	0	0	0.0	0.00038		0.00		855.47	0.00
	09332	09357		2	1	0.01	0	0	0	0	1	0.0	0.00018		1851.85		861.87	2.15
	09357	09462		2	0	0.03	0	0	0	0	0	0.0	0.00059		0.00		796.36	0.00
	09356	09462	WASHINGTON AVE	2	1	0.11	0	0	0	0	1	0.0	0.00404		82.51		497.13	0.00
	09356	09360		2	1	0.04	0	0	0	0	1	0.0	0.00160		208.33		631.12	0.00
	09295	09360		2	1	0.03	0	0	0	0	1	0.0	0.00120		277.78		678.57	0.00
	09295	09361		2	0	0.02	0	0	0	0	0	0.0	0.00080		0.00		746.98	0.00
	09361	09380		2	6	0.08	0	0	0	0	6	0.0	0.00321		623.05		527.20	1.18
	09299	09380		2	3	0.01	0	0	0	0	3	0.0	0.00039		2564.10		852.66	3.01
	09299	09301		2	4	0.05	0	0	0	2	2	50.0	0.00201		663.35		595.11	1.11
	09301	09382		2	2	0.16	0	0	0	0	2	0.0	0.00619		107.70		447.24	0.00
	09137	09382		2	1	0.09	0	0	0	0	1	0.0	0.00365		91.32		510.13	0.00
	09137	09138		2	0	0.19	0	0	0	0	0	0.0	0.00386		0.00		502.91	0.00
	09137	09375	WASH AVE-SB	2	1	0.06	0	0	0	0	1	0.0	0.00121		275.48		677.18	0.00
	09371	09420	MARGINAL WAY	2	1	0.18	0	0	0	0	1	0.0	0.00304		109.65		498.46	0.00
	09370	09371		2	0	0.13	0	0	0	0	0	0.0	0.00183		0.00		568.39	0.00
	09370	09620		2	1	0.15	0	0	0	0	1	0.0	0.00138		241.55		610.50	0.00
	09378	09620	COMMERCIAL ST E	2	0	0.19	0	0	0	0	0	0.0	0.00000		0.00		0.00	0.00*
	09378	09379		2	0	0.03	0	0	0	0	0	0.0	0.00007		0.00		1310.73	0.00
	08939	09219	CONGRESS ST	2	0	0.04	0	0	0	0	0	0.0	0.00128		0.00		667.78	0.00

* - AADT IS ZERO FOR THIS LINK | NODE

TINACC30

MAINE DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING, ACCIDENT RECORDS SECTION

ACCIDENT SUMMARY I

COUNTY TOWN#	LOW NODE	HIGH NODE	STREET NAME OR ROUTE #	U/R	TOTAL ACCTS	LINK LENGTH	INJURY ACCIDENTS K	A	B	C	PD	PERCENT INJURY	ANNUAL HM VEH-MILES	ANNUAL M ENT-VEHS	ACCIDENT-RATES LINK	NODE	CRITI RATE	CRF
	09219	09331		2	1	0.04	0	0	0	0	1	0.0	0.00233		143.06		572.75	0.00
	09243	09331		2	0	0.04	0	0	0	0	0	0.0	0.00241		0.00		567.75	0.00
	09243	09334		2	0	0.03	0	0	0	0	0	0.0	0.00187		0.00		606.32	0.00
	09333	09334		2	1	0.05	0	0	1	0	0	100.0	0.00209		159.49		589.12	0.00
	09239	09333		2	0	0.03	0	0	0	0	0	0.0	0.00119		0.00		679.98	0.00
	08938	09221	MIDDLE ST	2	3	0.06	0	0	0	0	3	0.0	0.00134		746.27		991.55	0.00
	09221	09237		2	2	0.06	0	1	0	0	1	50.0	0.00134		497.51		991.55	0.00
	09237	09238		2	1	0.08	0	0	0	0	1	0.0	0.00067		497.51		1183.27	0.00
	09223	09238	HANCOCK ST	2	0	0.05	0	0	0	0	0	0.0	0.00014		0.00		1523.27	0.00
	09217	09223		2	0	0.04	0	0	0	0	0	0.0	0.00011		0.00		1501.15	0.00
	09220	09225	NEWBURY ST NO 1	2	0	0.03	0	0	0	0	0	0.0	0.00001		0.00		7480.02	0.00
	09220	09224		2	1	0.08	0	0	0	0	1	0.0	0.00018		1851.85		1509.03	1.23
	09223	09224		2	1	0.08	0	0	0	0	1	0.0	0.00018		1851.85		1509.03	1.23
	09222	09223		2	1	0.08	0	0	0	0	1	0.0	0.00018		1851.85		1509.03	1.23
	09214	09215	FEDERAL ST NO 2	2	0	0.02	0	0	0	0	0	0.0	0.00001		0.00		7480.02	0.00
	09215	09216		2	0	0.08	0	0	0	0	0	0.0	0.00022		0.00		1478.61	0.00
	09216	09217		2	0	0.10	0	0	0	0	0	0.0	0.00042		0.00		1319.07	0.00
	09217	09218		2	0	0.10	0	0	0	0	0	0.0	0.00056		0.00		1235.65	0.00
	09220	09221	HAMPSHIRE ST	2	0	0.05	0	0	0	0	0	0.0	0.00028		0.00		1427.00	0.00
	09215	09220		2	0	0.05	0	0	0	0	0	0.0	0.00028		0.00		1427.00	0.00
	09215	09219		2	1	0.06	0	0	0	0	1	0.0	0.00034		980.39		1377.59	0.00
	09330	09331	LOCUST ST	2	0	0.07	0	0	0	0	0	0.0	0.00016		0.00		1519.59	0.00
	09332	09333	MONTGOMERY ST	2	0	0.05	0	0	0	0	0	0.0	0.00014		0.00		1523.27	0.00
	09339	09340	BOYD ST	2	1	0.08	0	0	0	0	1	0.0	0.00013		2564.10		1520.82	1.69
	09340	09341		2	2	0.07	0	0	0	0	2	0.0	0.00008		8333.33		1392.70	5.98
	09342	09343	MAYO ST	2	3	0.08	0	0	1	0	2	33.3	0.00018		5555.56		1509.03	3.68
	09343	09344		2	2	0.08	0	0	0	0	2	0.0	0.00013		5128.21		1520.82	3.37
	09338	09344	KENNEDY ST	2	1	0.04	0	0	0	1	0	100.0	0.00002		16666.67		1734.06	9.61
	09337	09338	SMITH ST	2	1	0.01	0	0	0	0	1	0.0	0.00002		16666.67		1734.06	9.61
	09336	09337		2	0	0.07	0	0	0	0	0	0.0	0.00012		0.00		1514.02	0.00
	09335	09336		2	3	0.08	0	0	0	0	3	0.0	0.00013		7692.31		1520.82	5.06
	09334	09335		2	1	0.06	0	0	0	0	1	0.0	0.00010		3333.33		1479.64	2.25
	09885	09886	ANDERSON ST	2	3	0.09	0	0	0	0	3	0.0	0.00020		5000.00		1494.77	3.34
	09352	09886		2	1	0.06	0	0	0	0	1	0.0	0.00014		2380.95		1523.27	1.56
	09351	09352		2	0	0.03	0	0	0	0	0	0.0	0.00007		0.00		1310.73	0.00
	09350	09351		2	0	0.03	0	0	0	0	0	0.0	0.00008		0.00		1392.70	0.00
	09349	09350		2	0	0.04	0	0	0	0	0	0.0	0.00013		0.00		1520.82	0.00
	09348	09349		2	2	0.13	0	0	0	0	2	0.0	0.00109		611.62		1046.02	0.00
	09347	09348		2	0	0.08	0	0	0	0	0	0.0	0.00067		0.00		1183.27	0.00
	09346	09347		2	1	0.16	0	0	0	0	1	0.0	0.00134		248.76		991.55	0.00
	09346	09376		2	0	0.01	0	0	0	0	0	0.0	0.00005		0.00		970.08	0.00
	09375	09376		2	0	0.11	0	0	0	0	0	0.0	0.00046		0.00		1292.96	0.00
	09353	09354	E OXFORD ST	2	0	0.01	0	0	0	0	0	0.0	0.00003		0.00		102.53	0.00
	09354	09886		2	0	0.06	0	0	0	0	0	0.0	0.00015		0.00		1522.58	0.00
	09336	09886		2	0	0.02	0	0	0	0	0	0.0	0.00005		0.00		970.08	0.00
	09336	09343		2	2	0.05	0	0	0	0	2	0.0	0.00008		8333.33		1392.70	5.98

TINACC30

MAINE DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERING, ACCIDENT RECORDS SECTION

ACCIDENT SUMMARY I

COUNTY TOWN#	LOW NODE	HIGH NODE	STREET NAME OR ROUTE #	U/R	TOTAL ACCTS	LINK LENGTH	INJURY ACCIDENTS K	A	B	C	PD	PERCENT INJURY	ANNUAL HM VEH-MILES	ANNUAL M ENT-VEHS	ACCIDENT-RATES LINK	NODE	CRITI RATE	CRF
	09340	09343		2	0	0.05	0	0	0	0	0	0.0	0.00006		0.00		1181.42	0.00
	09353	09356	E OXFORD ST EXT	2	0	0.04	0	0	0	0	0	0.0	0.00018		0.00		1509.03	0.00
	09354	09357	CLEEVE ST	2	1	0.08	0	0	0	0	1	0.0	0.00013		2564.10		1520.82	1.69
	09337	09352	E LANCASTER ST	2	0	0.04	0	0	0	0	0	0.0	0.00002		0.00		1734.06	0.00
	09353	09359	GREENLEAF ST	2	0	0.05	0	0	0	0	0	0.0	0.00011		0.00		1501.15	0.00
	09358	09359		2	0	0.03	0	0	0	0	0	0.0	0.00007		0.00		1310.73	0.00
	09359	09360	MONROE ST	2	1	0.06	0	0	0	0	1	0.0	0.00008		4166.67		1392.70	2.99
	09351	09358	MADISON ST	2	0	0.06	0	0	0	0	0	0.0	0.00007		0.00		1310.73	0.00
	09358	09362		2	0	0.05	0	0	0	0	0	0.0	0.00008		0.00		1392.70	0.00
	09361	09362		2	0	0.02	0	0	0	0	0	0.0	0.00004		0.00		603.05	0.00
	09362	09364	WINTHROP ST	2	0	0.04	0	0	0	0	0	0.0	0.00009		0.00		1445.56	0.00
	09364	09366		2	0	0.03	0	0	0	0	0	0.0	0.00007		0.00		1310.73	0.00
	09363	09364	EVERETT ST	2	0	0.05	0	0	0	0	0	0.0	0.00007		0.00		1310.73	0.00
	09350	09363		2	0	0.05	0	0	0	0	0	0.0	0.00007		0.00		1310.73	0.00
	09363	09365	NO GREENLEAF ST	2	0	0.03	0	0	0	0	0	0.0	0.00004		0.00		603.05	0.00
	08941	09373	FOX ST	2	0	0.06	0	0	0	0	0	0.0	0.00167		0.00		936.58	0.00
	09372	09373		2	1	0.10	0	0	0	0	1	0.0	0.00279		119.47		821.93	0.00
	09349	09372		2	1	0.05	0	0	0	0	1	0.0	0.00139		239.81		982.17	0.00
	09349	09888		2	0	0.04	0	0	0	0	0	0.0	0.00112		0.00		1038.71	0.00
	09365	09888		2	0	0.01	0	0	0	0	0	0.0	0.00028		0.00		1427.00	0.00
	09365	09368		2	1	0.04	0	0	0	0	1	0.0	0.00112		297.62		1038.71	0.00
	09366	09368		2	0	0.01	0	0	0	0	0	0.0	0.00028		0.00		1427.00	0.00
	09366	09380		2	4	0.05	0	0	0	0	4	0.0	0.00139		959.23		982.17	0.00
	09373	09374	NORTH BOYD ST	2	0	0.08	0	0	0	0	0	0.0	0.00009		0.00		1445.56	0.00
	09371	09372	DIAMOND ST	2	1	0.15	0	0	0	0	1	0.0	0.00105		317.46		1056.16	0.00
	09348	09370	COVE ST	2	0	0.17	0	0	0	0	0	0.0	0.00038		0.00		1347.24	0.00
	09348	09888		2	0	0.09	0	0	0	0	0	0.0	0.00018		0.00		1509.03	0.00
	09367	09368	HAMMOND ST	2	1	0.15	0	0	0	0	1	0.0	0.00017		1960.78		1514.93	1.29
	09347	09367	GOULD ST	2	0	0.02	0	0	0	0	0	0.0	0.00002		0.00		1734.06	0.00
	09367	09369		2	0	0.04	0	0	0	0	0	0.0	0.00004		0.00		603.05	0.00
	09346	09620	PLOWMAN ST	2	0	0.06	0	0	0	0	0	0.0	0.00022		0.00		1478.61	0.00
			LINK SUBTOTALS-		108	8.03	0	1	5	9	93	13.9	0.13676		263.23		288.36	0.00
			GRAND TOTALS-		356	8.03	1	8	20	66	261	26.7	0.13676	236.485	867.70		432.31	2.01

Town	Sta	Road	Location	Type	Group	1992	1993	1994	1995	1996
PORTLAND	025		CONGRESS ST E/O US 1 (NB) (VALLEY ST)	C	I	18180	.	.	17160	.
PORTLAND	028		CONGRESS ST W/O US 1 (SB) (ST JOHN ST)	P	I	.	.	.	15870	.
PORTLAND	029		ST JOHN ST N/O SR 22 (PARK AVE)	C	I	9470	.	.	.	.
PORTLAND	031		ST JOHN ST S/O SR 25 (BRIGHTON AVE)	S	I	.	6900	.	.	.
PORTLAND	033		SAUNDERS ST W/O SR 100/US 302 (FOREST)	S	I	740	.	.	.	.
PORTLAND	037		COYLE ST W/O DEERING AVE	S	I	700	.	.	.	.
PORTLAND	038		DEERING AVE S/O SR 100/US 302 (FOREST)	C	I	.	.	.	5420	.
PORTLAND	055		ALLEN AVE NE/O SR 26 (WASHINGTON AVE)	C	I	10160	.	.	9120	.
PORTLAND	070		DEERING AVE S/O US 1/SR 22/25 (PARK AVE)	C	I	10260	.	.	.	.
PORTLAND	071		DARTMOUTH ST SW/O SR 25 (BRIGHTON AVE)	S	I	.	990	.	.	.
PORTLAND	119		PRESUMPSCOT ST SE/O SR 9 (OCEAN AVE)	C	I	2420	.	.	2760	.
PORTLAND	146		DEERING AVE NW/O WILLIAMS ST	S	I	.	4570	.	.	.
PORTLAND	147		DEERING AVE SE/O NOYES ST	S	I	.	4840	.	.	.
PORTLAND	176		CUMBERLAND AVE W/O SR 77 (STATE ST)	C	I	3050	.	.	.	.
PORTLAND	182		LINCOLN ST W/O DEERING AVE	S	I	770	.	.	.	.
PORTLAND	204		DAVIS FARM RD NE/O RIVERSIDE ST	S	I	.	.	.	.	2060
PORTLAND	206		PREBLE ST EXT NW/O MARGINAL WAY	P	I	.	17330	.	16720	.
PORTLAND	001	0001X	US 1 (VETERANS BR) (EB) @ S PORTLAND TL	P	I	.	12000	11720	.	.
PORTLAND	001	0001W	US 1 (VETERANS BR) (WB) @ S PORTLAND TL	P	I	11050	11170	10820	.	.
PORTLAND	002	0001A	US 1A (W COMMERCL) E/O FORE RV BR RAMP J	C	I	16730	.	.	.	.
PORTLAND	007	0001A	US 1A (COMMERCL) SW/O US 1A (FRANK ART)	C	I	.	.	.	12750	.
PORTLAND	007	0001A	US 1A (FRANK ART)(NB) NW/O COMMERCIAL ST	C	I	.	.	.	6470	.
PORTLAND	007	0001A	US 1A (FRANK ART)(SB) NW/O COMMERCIAL ST	C	I	.	.	.	3350	.
PORTLAND	010	0001S	US 1(SB)(STATE) N/O DEERING OAKS UNN RD	C	I	.	.	.	16870	.
PORTLAND	017	0001X	US 1 (STATE) SW/O SR 100 (FOREST AVE)	C	I	14290	.	.	.	.
PORTLAND	025	0001X	US 1 (NB) (VALLEY ST) S/O CONGRESS ST	C	I	4770	.	.	3910	.
PORTLAND	028	0001S	US 1 (SB) (ST JOHN ST) S/O CONGRESS ST	C	I	19020	.	.	.	.
PORTLAND	029	0001S	US 1 (SB)(ST JOHN ST) S/O SR 22 (PARK)	C	I	19570	.	.	18470	.
PORTLAND	034	0001X	US 1 (BAXTER BLVD) NE/O SR 100/US 302	C	I	10650	.	.	.	.
PORTLAND	034	0001X	US 1/SR 100/302 (FOREST) SE/O US 1(BXTR)	C	I	39870	.	.	41550	.
PORTLAND	070	0001X	US 1/SR 22/25 (PARK) E/O SR 25 (DEERING)	C	I	15970	.	.	.	.
PORTLAND	070	0001X	US 1/SR 22/25 (PARK) W/O SR 25 (DEERING)	C	I	12560	.	.	.	.
PORTLAND	136	0001A	US 1A (FRANK ART) (NB) SE/O MARGINAL WAY	P	I	.	14620	.	14890	.
PORTLAND	136	0001A	US 1A (FRANK ART) (SB) SE/O MARGINAL WAY	P	I	.	.	.	12980	.
PORTLAND	148	0001X	US 1/SR 22 (PARK) E/O US 1(NB)(VALLEY)	C	I	12240	.	.	.	.
PORTLAND	166	0001X	US 1 (BAXTER BLVD) N/O VANNAH AVE	C	I	.	.	.	9400	.
PORTLAND	030	0009X	SR 9 (STEVENS AVE) N/O SR 22 (CONGRESS)	C	I	13200	.	.	14710	.
PORTLAND	030	0009X	SR 9/22 (CONGRESS ST) W/O SR 9 (STEVENS)	C	I	19970	.	.	20040	.
PORTLAND	042	0009X	SR 9 (WALTON) SE/O SR 100/US 302(FOREST)	C	I	4720	.	.	4520	.

Cumberland

	TOWN	STATION	ROAD	LOCATION	TYPE	GROUP	AADT00	AADT01	AADT02	AADT03	AADT04	
05	NORTH YARMOUTH	51204	00402	IR 402 (MONTFORT RD) SE/O SR 9	C	I	450	.	.	.	.	
05	NORTH YARMOUTH	51708	00404	IR 404 (NORTH RD) NW/O SR 9	C	I	.	.	2230	.	.	
05	NORTH YARMOUTH	51803	00404	IR 404(NORTH RD) E/O IR 317(MILLIKEN RD)	C	I	1970	.	.	.	.	
05	NORTH YARMOUTH	51807	00404	IR 404 (MILL RD) W/O SR 231	C	I	1350	.	1370	.	.	
05	NORTH YARMOUTH	52001	0115X	SR 115 N/O IR 404 (MILL RD)	C	II	.	.	4410	.	.	
05	NORTH YARMOUTH	52106	0115X	SR 115 SW/O SR 231	C	I	5250	.	5490	.	.	
05	NORTH YARMOUTH	52107	0115X	SR 115 W/O SR 231	C	II	3840	.	.	.	.	
05	NORTH YARMOUTH	52408	0115X	SR 115 NW/O SR 9 (N JCT)	S	I	.	.	.	6140	.	
05	NORTH YARMOUTH	52504	0115X	SR 115 SE/O SR 9	S	I	3990	.	4160	4520	.	
05	NORTH YARMOUTH	51504	02091	IR 2091(NORTH) SE/O IR 2731 @YARMOUTH TL	C	I	3090	.	3450	.	.	
05	NORTH YARMOUTH	51704	02091	IR 2091 (NORTH RD) SE/O SR 9	C	I	2790	.	3100	.	.	
05	NORTH YARMOUTH	51805	0231X	SR 231 S/O IR 404 (MILL RD)	C	I	1250	.	1410	.	.	
05	NORTH YARMOUTH	51808	0231X	SR 231 NW/O IR 404 (MILL RD)	C	I	1900	.	2240	.	.	
05	NORTH YARMOUTH	52101	0231X	SR 231 N/O SR 115	C	I	2100	.	.	.	.	
05	PORTLAND	00203	0001A	US 1A (COMMERCIAL) E/O W COMMERCIAL ST	C	I	18120	.	.	.	.	
05	PORTLAND	00208	0001A	US 1A (COMMERCIAL) NW/O W COMMERCIAL ST	C	I	16650	.	18740	.	.	
05	PORTLAND	00602	0001A	US 1A (COMMERCIAL ST) NE/O HIGH ST	C	I	35060	.	71280	.	.	
05	PORTLAND	00606	0001A	US 1A (COMMERCIAL ST) SW/O HIGH ST	C	I	.	.	17430	.	.	
05	PORTLAND	00706	0001A	US 1A (COMMERCIAL) SW/O US 1A (FRANKLIN)	C	I	11540	.	.	.	.	-2%/y
05	PORTLAND	00708	0001A	US 1A (FRANKLIN) NW/O COMMERCIAL ST	C	I	6120	.	6430	.	.	0%/y
05	PORTLAND	01304	0001A	US 1A (FRANKLIN NB) SE/O SR 26(CUMBRLND)	C	I	19820	.	18110	.	.	
05	PORTLAND	01308	0001A	US 1A (FRANKLIN NB) NW/O SR 26(CUMBRLND)	C	I	.	.	20150	.	.	
05	PORTLAND	13602	0001A	MARGINAL WAY NE/O US 1A (FRANKLIN ART)	C	I	.	.	4610	.	.	
05	PORTLAND	13604	0001A	US 1A (NB)(FRANKLIN) SE/O MARGINAL WAY	P	I	.	27850	.	27510	.	
05	PORTLAND	16904	0001A	US 1A (NB)(FRANKLIN) SE/O CONGRESS ST	C	I	.	.	12380	.	.	
05	PORTLAND	01001	0001S	US 1 (SB)(STATE) N/O BOWLING GREEN DR	C	I	.	.	15240	.	.	
05	PORTLAND	00100	0001X	US 1 (VETERANS BR) @ S PORTLAND TL	P	I	23500	24520	24550	24290	.	
05	PORTLAND	02505	0001X	US 1 (VALLEY ST) S/O CONGRESS ST	C	I	.	.	3530	.	.	
05	PORTLAND	02605	0001X	US 1 (VALLEY ST) S/O "D" ST		I	.	.	5360	.	.	
05	PORTLAND	03402	0001X	US 1 (BAXTER BLVD) NE/O SR 100/US 302	C	I	7360	.	7920	.	.	
05	PORTLAND	03501	0001X	US 1 (BAXTER BLVD) N/O PREBLE ST EXT	C	I	.	.	13840	.	.	
05	PORTLAND	03607	0001X	US 1 (BAXTER BLVD) W/O DARTMOUTH ST	C	I	.	.	13820	12590	.	
05	PORTLAND	05207	0001X	US 1 (BAXTER BLVD) W/O BATES ST @ BR	C	I	.	.	8870	.	.	
05	PORTLAND	07003	0001X	US 1/SR 22 (PARK AV) E/O SR 25 (DEERING)	C	I	.	.	13950	.	.	

JN: 934
Project Description: 127 and 158 Fore Street
Project Location: Portland, Maine
Date: February 22, 2006

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

Warehousing
Land Use Code (LUC) 150

Gross Floor Area (ft^2): 3,748

Average Rate

Time Period	ITE Trip Rate	Trip Ends	Sample Size	Directional Split* IN	Directional Split* OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 4.96 (X)	19	16	50%	50%	10	9	---
AM Peak Adjacent Street	**T = 0.45 (X)**	**2**	**19**	**80%**	**20%**	**2**	**0**	---
PM Peak Adjacent Street	**T = 0.47 (X)**	**2**	**26**	**25%**	**75%**	**1**	**1**	---
AM Peak of Generator	T = 0.57 (X)	2	19	60%	40%	1	1	---
PM Peak of Generator	T = 0.61 (X)	2	18	10%	90%	0	2	---
Saturday	T = 1.22 (X)	5	2	50%	50%	3	2	---
Saturday Peak Hour of Gen.	T = 0.12 (X)	0	2	65%	35%	0	0	---

*Percentages rounded to nearest 5%

Note: Also includes 858 s.f. office storage at 1 India Street

JN: 934
Project Description: 33 India Street
Project Location: Portland, Maine
Date: February 22, 2006

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

Apartment
Land Use Code (LUC) 220

Dwelling Units: 8

Average Rate

Time Period	ITE Trip Rate	Sample Size	Trip Ends		Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 6.72 (X)	86	54		50%	50%	27	27	N/A
AM Peak Hour of Adj. Street Traffic	**T = 0.51 (X)**	**78**	**4**		**20%**	**80%**	**1**	**3**	**N/A**
PM Peak Hour of Adj. Street Traffic	**T = 0.62 (X)**	**90**	**5**		**65%**	**35%**	**3**	**2**	**N/A**
AM Peak Hour of Generator	T = 0.55 (X)	81	4		30%	70%	1	3	N/A
PM Peak Hour of Generator	T = 0.67 (X)	83	5		60%	40%	3	2	N/A
Saturday	T = 6.39 (X)	15	51		50%	50%	26	25	N/A
Saturday Peak Hour of Gen.	T = 0.52 (X)	14	4	**	50%	50%	2	2	N/A

* Percentages rounded to nearest 5%
** Not Available (Assumption)

Fitted Curve Equation

Time Period	ITE Trip Rate	Sample Size	Trip Ends		Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 6.01 (X) + 150.35	86	198		50%	50%	99	99	0.88
AM Peak Hour of Adj. Street Traffic	T = 0.49 (X) + 3.73	78	8		20%	80%	2	6	0.83
PM Peak Hour of Adj. Street Traffic	T = 0.55 (X) + 17.65	90	22		65%	35%	14	8	0.77
AM Peak Hour of Generator	T = 0.53 (X) + 4.21	81	8		30%	70%	3	5	0.82
PM Peak Hour of Generator	T = 0.60 (X) + 17.52	83	22		60%	40%	13	9	0.80
Saturday	T = 7.85 (X) - 256.19	15	-193		50%	50%	-97	-96	0.85
Saturday Peak Hour of Gen.	T = 0.41 (X) + 19.23	14	23	**	50%	50%	11	12	0.56

* Percentages rounded to nearest 5%
** Not Available (Assumption)

JN: 934
Project Description: 1 India Street
Project Location: Portland, Maine
Date: February 22, 2006

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

General Office Building
Land Use Code (LUC) 710

Gross Floor Area 11,992

Trip Ends Based on Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	Ln (T) = 0.77 Ln (X) + 3.65	261	78	50%	50%	131	130	0.80
AM Peak Hour	**Ln (T) = 0.80 Ln (X) + 1.55**	**34**	**217**	**90%**	**10%**	**31**	**3**	**0.83**
PM Peak Hour	T = 1.12 (X) + 78.81	92	235	15%	85%	14	78	0.82
Saturday	T = 2.14 (X) + 18.47	44	17	50%	50%	22	22	0.66
Peak Hour of Generator	Ln (T) = 0.81 Ln (X) - 0.12	7	10	55%	45%	4	3	0.59

* Percentages rounded to nearest 5%

Trip Ends Based on Average Rate

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 11.01 (X)	132	78	50%	50%	66	66	---
AM Peak Hour	T = 1.55 (X)	19	217	90%	10%	17	2	---
PM Peak Hour	T = 1.49 (X)	18	235	15%	85%	3	15	---
Saturday	T = 2.37 (X)	28	17	50%	50%	14	14	---
Saturday Peak Hour of Gen.	T = 0.41 (X)	5	10	50%	50%	3	2	---

* Percentages rounded to nearest 5%

PM Peak Hour:	**T = 1.49/1.55 (AM Peak)**	**33**		**15%**	**85%**	**5**	**28**	**0.82**

JN: 934
Project Description: 33 India Street
Project Location: Portland, Maine
Date: 12/15/2005

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

Quality Restaurant
Land Use Code (LUC) 931

Gross Floor Area (ft^2): 3,800

Time Period	ITE Trip Rate (Average Rate)	Trip Ends	Directional Split IN	Directional Split OUT	Directional Distribution IN	Directional Distribution OUT
Weekday	T = 89.95 (X)	342	50%	50%	171	171
AM Peak Adjacent Street	**T = 0.81 (X)**	**3**	**50%**	**50%**	**2**	**1**
PM Peak Adjacent Street	**T = 7.49 (X)**	**28**	**65%**	**35%**	**18**	**10**
AM Peak of Generator	T = 5.57 (X)	21	80%	20%	17	4
PM Peak of Generator	T = 9.02 (X)	34	60%	40%	20	14
Saturday	T = 94.36 (X)	359	50%	50%	180	179
Saturday Peak Hour of Gen.	**T = 10.82 (X)**	**41**	**60%**	**40%**	**25**	**16**

JN: 934
Project Description: The Longfellow
Project Location: Portland, Maine
Date: February 22, 2006

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

Residential Condominium/Townhouse
Land Use Code (LUC) 230

Dwelling Units: 116

Average Rate

Time Period	ITE Trip Rate	Sample Size	Trip Ends	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 5.86 (X)	54	680	50%	50%	340	340	N/A
Peak Hour of Adjacent Street Traffic 7-9 AM	T = 0.44 (X)	59	51	15%	85%	8	43	N/A
Peak Hour of Adjacent Street Traffic 4-6 PM	T = 0.52 (X)	62	60	65%	35%	39	21	N/A
AM Peak Hour of Generator	T = 0.44 (X)	52	51	20%	80%	10	41	N/A
PM Peak Hour of Generator	T = 0.52 (X)	50	60	65%	35%	39	21	N/A
Saturday	T = 5.67 (X)	30	658	50%	50%	329	329	N/A
Saturday Peak Hour of Gen.	T = 0.47 (X)	27	55	55%	45%	30	25	N/A

* Percentages rounded to nearest 5%

Fitted Curve Equation

Time Period	ITE Trip Rate	Sample Size	Trip Ends	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	Ln(T) = 0.85 Ln(X) + 2.55	54	728	50%	50%	364	364	0.83
Peak Hour of Adjacent Street Traffic 7-9 AM	Ln(T) = 0.80 Ln(X) + 0.26	59	58	15%	85%	9	49	0.76
Peak Hour of Adjacent Street Traffic 4-6 PM	Ln(T) = 0.82 Ln(X) + 0.32	62	68	65%	35%	44	24	0.80
AM Peak Hour of Generator	**Ln(T) = 0.82 Ln(X) + 0.17**	**52**	**58**	**20%**	**80%**	**12**	**46**	**0.80**
PM Peak Hour of Generator	**T = 0.34 (X) + 38.31**	**50**	**78**	**65%**	**35%**	**51**	**27**	**0.83**
Saturday	T = 3.62 (X) + 427.93	30	848	50%	50%	424	424	0.84
Saturday Peak Hour of Gen.	**T = 0.29 (X) + 42.63**	**27**	**76**	**55%**	**45%**	**42**	**34**	**0.84**

* Percentages rounded to nearest 5%

JN: 934
Project Description: The Longfellow
Project Location: Portland, Maine
Date: February 22, 2006

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

Health/Fitness Club
Land Use Code (LUC) 492

Gross Floor Area (ft^2): 14,500

Average Rate

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 32.93 (X)	477	1	50%	50%	239	238	---
Peak Hour of Adjacent Street Traffic 7-9 AM*	**T = 1.21 (X)**	**18**	**3**	**40%**	**60%**	**7**	**11**	
Peak Hour of Adjacent Street Traffic 4-6 PM	**T = 4.05 (X)**	**59**	**3**	**50%**	**50%**	**30**	**29**	**---**
AM Peak Hour of Generator	T = 1.41 (X)	20	3	40%	60%	8	12	---
PM Peak Hour of Generator	T = 4.06 (X)	59	3	50%	50%	30	29	---
Saturday	T = 20.87 (X)	303	3	50%	50%	152	151	---
Saturday Peak Hour of Gen.* **	**T = 2.60 (X)**	**38**	**3**	**50%**	**50%**	**19**	**19**	**---**

* Percentages rounded to nearest 5%

JN: 934
Project Description: The Longfellow
Project Location: Portland, Maine
Date: February 22, 2006

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

General Office Building
Land Use Code (LUC) 710

Gross Floor Area 19,800

Trip Ends Based on Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	Ln (T) = 0.77 Ln (X) + 3.65	383	78	50%	50%	192	191	0.80
AM Peak Hour	**Ln (T) = 0.80 Ln (X) + 1.55**	**51**	**217**	**90%**	**10%**	**46**	**5**	**0.83**
PM Peak Hour	T = 1.12 (X) + 78.81	101	235	15%	85%	15	86	0.82
Saturday	T = 2.14 (X) + 18.47	61	17	50%	50%	31	30	0.66
Peak Hour of Generator	Ln (T) = 0.81 Ln (X) - 0.12	10	10	55%	45%	6	4	0.59

* Percentages rounded to nearest 5%

Trip Ends Based on Average Rate

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 11.01 (X)	218	78	50%	50%	109	109	---
AM Peak Hour	T = 1.55 (X)	31	217	90%	10%	28	3	---
PM Peak Hour	T = 1.49 (X)	30	235	15%	85%	5	25	---
Saturday	T = 2.37 (X)	47	17	50%	50%	24	23	---
Saturday Peak Hour of Gen.	T = 0.41 (X)	8	10	50%	50%	4	4	---

* Percentages rounded to nearest 5%

PM Peak Hour:	**T = 1.49/1.55 (AM Peak)**	**49**		**15%**	**85%**	**7**	**42**	**0.82**

JN: 934
Project Description: The Longfellow
Project Location: Portland, Maine
Date: February 22, 2006

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

Specialty Retail Center
Land Use Code (LUC) 814

Gross Floor Area (ft^2): 11,700

Average Rate

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 44.32 (X)	519	4	50%	50%	260	259	---
Peak Hour of Adjacent Street Traffic 7-9 AM**	T = 0.74 (X)	9	N/A	60%	40%	5	4	
Peak Hour of Adjacent Street Traffic 4-6 PM	T = 2.71 (X)	32	5	45%	55%	14	18	---
AM Peak Hour of Generator	T = 6.84 (X)	80	4	50%	50%	40	40	---
PM Peak Hour of Generator	T = 5.02 (X)	59	3	55%	45%	32	27	---
Saturday	T = 42.04 (X)	492	3	50%	50%	246	246	---
Saturday Peak Hour of Gen.* **	**T = 6.63 (X)**	**78**	**3**	**50%**	**50%**	**39**	**39**	**---**

**Based on ratio of AM/PM traffic for LUC 820, Shopping Center and applied to 814 PM rate.
***Saturday Peak Hour comes from a ratio of PM to Saturday trip rates from LUC 820 - Shopping Center
* Percentages rounded to nearest 5%

Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 42.78 (X) + 37.66	538	538	50%	50%	269	269	0.69
Peak Hour of Adjacent Street Traffic 7-9 AM	---	---	---	---	---	---	---	---
Peak Hour of Adjacent Street Traffic 4-6 PM	**T = 2.40 (X) + 21.48**	**50**	**50**	**45%**	**55%**	**23**	**27**	**0.98**
AM Peak Hour of Generator	T = 4.91 (X) + 115.59	173	173	50%	50%	87	86	0.90
PM Peak Hour of Generator	---	---	---	---	---	---	---	---
Saturday	---	---	---	---	---	---	---	---
Saturday Peak Hour of Gen.	---	---	---	---	---	---	---	---

* Percentages rounded to nearest 5%
(---) Not Given

AM Peak of Adjacent Street 7-9 AM* **	**T = 0.275 (PM Peak Hour)**	14	**60%**	**40%**	**8**	**6**
Saturday Peak Hour**	T = 1.325 (PM Peak Hour)	66	50%	50%	33	33

**Saturday Peak Hour comes from a ratio of PM to Saturday trip rates from LUC 820 - Shopping Center
***AM Peak Hour of Adjacent Street comes from a ration of PM to AM trip rates from LUC 820 - Shopping Center

JN: 934
Project Description: The Longfellow
Project Location: Portland, Maine
Date: February 22, 2006

Gorrill-Palmer Consulting Engineers, Inc.
P.O. Box 1237
15 Shaker Road
Gray, Maine 04039

Quality Restaurant
Land Use Code (LUC) 931

Gross Floor Area (ft^2): 5,400

Time Period	ITE Trip Rate (Average Rate)	Trip Ends	Directional Split IN	Directional Split OUT	Directional Distribution IN	Directional Distribution OUT
Weekday	T = 89.95 (X)	486	50%	50%	243	243
AM Peak Adjacent Street	**T = 0.81 (X)**	**4**	**50%**	**50%**	**2**	**2**
PM Peak Adjacent Street	**T = 7.49 (X)**	**40**	**65%**	**35%**	**26**	**14**
AM Peak of Generator	T = 5.57 (X)	30	80%	20%	24	6
PM Peak of Generator	T = 9.02 (X)	49	60%	40%	29	20
Saturday	T = 94.36 (X)	510	50%	50%	255	255
Saturday Peak Hour of Gen.	**T = 10.82 (X)**	**58**	**60%**	**40%**	**35**	**23**

Table 5.4
Pass-By Trips and Diverted Linked Trips
Weekday, P.M. Peak Period

Land Use 820—Shopping Center

SIZE (1,000 SQ. FEET GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PRIMARY TRIP (%)	NON-PASS-BY TRIP (%)	DIVERTED LINKED TRIP (%)	PASS-BY TRIP (%)	ADJ. STREET PEAK HOUR VOLUME	AVERAGE DAILY TRAFFIC	SOURCE
53	Port Orange, FL	1993	162	2-6 P.M.	-	41	-	59	n/a	n/a	TPD, Inc.
9	Kissimmee, FL	1994	107	2-6 P.M.	20	-	14	66	n/a	n/a	TPD, Inc.
77	Edgewater, FL	1992	365	2-6 P.M.	-	54	-	46	n/a	n/a	TPD, Inc.
82	Deltona, FL	1992	336	2-6 P.M.	-	66	-	34	n/a	n/a	TPD, Inc.
78	Orlando, FL	1991	702	2-6 P.M.	23	-	22	55	n/a	n/a	TPD, Inc.
45	Orlando, FL	1992	844	2-6 P.M.	24	-	20	56	n/a	n/a	TPD, Inc.
50	Orlando, FL	1992	555	2-6 P.M.	41	-	18	41	n/a	n/a	TPD, Inc.
52	Orlando, FL	1995	665	2-6 P.M.	33	-	25	42	n/a	n/a	TPD, Inc.
17	Orlando, FL	1994	196	2-6 P.M.	-	34	-	66	n/a	n/a	TPD, Inc.
60	Orlando, FL	1995	1,583	3-7 P.M.	38	-	22	40	n/a	n/a	TPD, Inc.
158	Crestwood, KY	Jun. 1993	129	4-6 P.M.	39	-	25	36	759	n/a	Barton-Aschman Assoc.
118	Louisville area, KY	Jun. 1993	133	4-6 P.M.	51	-	27	22	3,555	n/a	Barton-Aschman Assoc.
74	Louisville, KY	Jun. 1993	187	4-6 P.M.	43	-	27	30	922	n/a	Barton-Aschman Assoc.
59	Louisville area, KY	Jun. 1993	247	4-6 P.M.	52	-	17	31	2,659	n/a	Barton-Aschman Assoc.
145	Louisville area, KY	Jun. 1993	210	4-6 P.M.	30	-	17	53	2,636	n/a	Barton-Aschman Assoc.
104	Louisville area, KY	Jun. 1993	281	4-6 P.M.	50	-	22	28	2,111	n/a	Barton-Aschman Assoc.
235	Louisville, KY	Jun. 1993	211	4-6 P.M.	29	-	36	35	2,593	n/a	Barton-Aschman Assoc.
71	Louisville, KY	Jun. 1993	109	4-6 P.M.	42	-	33	25	1,559	n/a	Barton-Aschman Assoc.
350	Worcester, MA	Apr. 1994	224	4-6 P.M.	45	-	37	18	2,112	n/a	ICSC
738	East Brunswick, NJ	Apr. 1994	283	4-6 P.M.	79	-	7	14	8,059	n/a	ICSC
294	Philadelphia, PA	Apr. 1994	213	4-6 P.M.	51	-	24	25	4,055	n/a	ICSC
256	Hamden, CT	Apr. 1994	208	4-6 P.M.	51	-	22	27	3,422	n/a	ICSC
418	Glen Burnie, MD	Apr. 1994	281	4-6 P.M.	51	-	29	20	5,610	n/a	ICSC
560	Harrisonburg, VA	Apr. 1994	437	4-6 P.M.	49	-	32	19	3,051	n/a	ICSC
					Avg	42	49	24	37		

Table 5.4 (Cont'd)
Pass-By Trips and Diverted Linked Trips
Weekday, P.M. Peak Period

Land Use 820—Shopping Center

SIZE (1,000 SQ. FEET GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PRIMARY TRIP (%)	NON-PASS-BY TRIP (%)	DIVERTED LINKED TRIP (%)	PASS-BY TRIP (%)	ADJ. STREET PEAK HOUR VOLUME	AVERAGE DAILY TRAFFIC	SOURCE
361	Glen Allen, VA	Apr. 1994	315	4-6 P.M.	54	-	29	17	2,034	n/a	ICSC
375	Shelby, NC	May 1994	214	4-6 P.M.	48	-	22	30	3,053	n/a	ICSC
413	Texas City, TX	May 1994	228	4-6 P.M.	52	-	20	28	589	n/a	ICSC
488	Texas City, TX	May 1994	257	4-6 P.M.	75	-	13	12	1,094	n/a	ICSC
293	Berwyn, IL	May 1994	282	4-6 P.M.	70	-	6	24	4,606	n/a	ICSC
667	Bourbonais, IL	May 1994	200	4-6 P.M.	53	-	31	16	2,770	n/a	ICSC
225	Belleville, IL	May 1994	264	4-6 P.M.	32	-	33	35	1,970	n/a	ICSC
255	Bettendorf, IA	May 1994	222	4-6 P.M.	37	-	39	24	3,706	n/a	ICSC
808	Laguna Hills, CA	Jun. 1994	240	4-6 P.M.	73	-	14	13	4,035	n/a	ICSC
450	Hanford, CA	May 1994	321	4-6 P.M.	49	-	28	23	2,787	n/a	ICSC
800	San Jose, CA	May 1994	205	4-6 P.M.	51	-	28	21	7,474	n/a	ICSC
598	Greeley, CO	May 1994	205	4-6 P.M.	55	-	28	17	3,840	n/a	ICSC
581	Pueblo, CO	May 1994	296	4-6 P.M.	53	-	29	18	2,939	n/a	ICSC
476	Bellevue, WA	May 1994	234	4-6 P.M.	54	-	20	26	3,427	n/a	ICSC
720	Framingham, MA	Dec. 1982	92	3:30-7 P.M.	39	-	38	23	n/a	73,628	Raymond Keyes Assoc.
890	Newark, DE	Jul. 1984	179	3-8 P.M.	49	-	39	12	n/a	n/a	Raymond Keyes Assoc.
402	Manassas, VA	Jun. 1984	87	4-6 P.M.	25	-	27	48	n/a	n/a	Raymond Keyes Assoc.
462	Ross, PA	Jun. 1980	175	5:30-7 P.M.	-	64	-	36	n/a	27,200	Raymond Keyes Assoc.
234	Huntington LI, NY	Nov. 1985	181	4-7 P.M.	21	-	33	46	n/a	34,630	Raymond Keyes Assoc.
658	Wayne, NJ	Sept. 1984	243	3-6 P.M.	61	-	12	27	n/a	85,600	Raymond Keyes Assoc.
1,200	Washington, D.C.	1980	364	4-6 P.M.	35	-	40	25	n/a	n/a	Gorove-Slade
800	Southern CA	n/a	1,000	4-6 P.M.	45	-	43	12	n/a	n/a	Frischer
451	Portland, OR	n/a	n/a	5-6 P.M.	-	75	-	25	n/a	n/a	Buttke
113	Portland, OR	n/a	n/a	5-6 P.M.	-	83	-	17	n/a	n/a	Buttke
				AVG	49	74	27	24			

Table 5.4 (Cont'd)
Pass-By Trips and Diverted Linked Trips
Weekday, P.M. Peak Period

Land Use 820—Shopping Center

SIZE (1,000 SQ. FEET GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PRIMARY TRIP (%)	NON-PASS-BY TRIP (%)	DIVERTED LINKED TRIP (%)	PASS-BY TRIP (%)	ADJ. STREET PEAK HOUR VOLUME	AVERAGE DAILY TRAFFIC	SOURCE
622	Ramsey, MN	Nov. 1985	46	4-9 P.M.	26	-	30	44	n/a	36,370	Raymond Keyes Assoc.
736	Pensacola, FL	Oct. 1985	383	3-7 P.M.	35	-	39	26	n/a	n/a	Raymond Keyes Assoc.
84	Dover, DE	Jul. 1985	218	3:30-7 P.M.	6	-	44	50	n/a	n/a	Raymond Keyes Assoc.
500	Meriden, CT	Apr. 1985	n/a	4-6 P.M.	-	92	-	8	n/a	n/a	Connecticut DOT
660	Enfield, CT	Apr. 1985	n/a	4-6 P.M.	-	78	-	22	n/a	n/a	Connecticut DOT
845	Waterford, CT	Apr. 1985	n/a	4-6 P.M.	-	86	-	14	n/a	n/a	Connecticut DOT
1,060	West Hartford, CT	Apr. 1985	n/a	4-6 P.M.	-	83	-	17	n/a	n/a	Connecticut DOT
131	Pr Georges Co., MD	1982/83	88	4-6 P.M.	-	11	-	89	n/a	n/a	JHK
181	Pr Georges Co., MD	1982/83	105	4-6 P.M.	-	64	-	36	n/a	n/a	JHK
100	Pr Georges Co., MD	1982/83	93	4-6 P.M.	-	64	-	36	n/a	n/a	JHK
475	Pr Georges Co., MD	1982/83	130	4-6 P.M.	-	80	-	20	n/a	n/a	JHK
60	Pr Georges Co., MD	1982/83	72	4-6 P.M.	-	18	-	82	n/a	n/a	JHK
90	Pr Georges Co., MD	1982/83	91	4-6 P.M.	-	42	-	58	n/a	n/a	JHK
78	Pr Georges Co., MD	1982/83	113	4-6 P.M.	-	41	-	59	n/a	n/a	JHK
44	Pr Georges Co., MD	1982/83	97	4-6 P.M.	-	49	-	51	n/a	n/a	JHK
467	Pr Georges Co., MD	1982/83	99	4-6 P.M.	-	44	-	56	n/a	n/a	JHK
352	W Orange, NJ	Mar. 1986	149	4-6 P.M.	19	-	43	38	n/a	21,520	Raymond Keyes Assoc.
176	Tarpon Springs, FL	May 1986	124	3-7 P.M.	28	-	35	37	n/a	34,080	Raymond Keyes Assoc.
762	Orlando, FL	Fall 1985	182	4-6 P.M.	52	-	23	25	n/a	n/a	Kimley Horn
166	Orlando, FL	Fall 1985	124	4-6 P.M.	48	-	25	27	n/a	n/a	Kimley Horn
129	Orlando, FL	Fall 1985	116	4-6 P.M.	50	-	22	28	n/a	n/a	Kimley Horn
71	Orlando, FL	Fall 1985	81	4-6 P.M.	44	-	6	50	n/a	n/a	Kimley Horn
				AVG	34	58	30	40			

Riverwalk, LLC Long Fellow at Ocean Gateway

Summary of Changes Related to Internal Reconfiguration of the Longfellow Residences for Consideration as Minor Amendments to Site Plan and Subdivision Approvals Issued May 5, 2006

1. Minor increase in number of residential units-- (116 approved – updated proposal 125)

The approved submission was designed with a larger number of multi-bedroom units. The current proposal offers a larger selection of different sized units which better reflect the current market demand. The reconfiguration results in an increase in the number of one bedroom units and a decrease in number of three bedroom units. There is no change in the building size and volume. It is anticipated that the other impacts due to the reconfiguration will be de minimis if at all detectable.

2. Increase in parking spots for Longfellow Residences--Underground Parking (75 approved – new proposal 105)

The approved submission included a ground level pool and large storage rooms for all residents. The current proposal has removed the pool and the storage rooms have been reduced in size. The circulation scheme has been revised in order to make the parking as efficient as possible. The net result is an increase in 30 spaces.

3. Minor changes to the approved building footprint.

The approved submission had shown the new construction on Fore Street as being built out almost to the property line for the entire length. The current proposal indicates the massing pulled back from that original proposal. The proposed setback from the property line will range from 3'-6" on the South-Westerly edge to 9'-6" at the corner of Fore Street and Hancock Street. The set-back will provide for more generous sidewalks and will allow for larger species of trees to be utilized.

4. Minor changes to building design due to structural reconfiguration, comments from Planning and Historic Preservation Board Staff.

a. Contemporary Detailing: In response to the feedback received during the initial approvals, we have toned down the traditional detailing of various building elements so that it the vocabulary produces a more contemporary look. These aesthetic changes are also in conformance with the order of conditions stated in the Historic Preservation Boards approval.

b. Balconies and Bays: The approved submission included a coupled balcony/window bay at each Living Room. The approved submission also had a 60'-0" floor plate width. These two elements combined to limit flexibility of the overall unit designs. The proposed submission increases the floor plate width to 63'-0" and provides independent

balconies at all living rooms and separate bays to be used at Bedroom locations only. By changing these two elements, we have increased the design flexibility of the units.

c. Fore Street: In the approved submission, the building had a single-loaded corridor along Fore Street. The units opened up to the waterfront views and four of the floors along Fore Street had corridor and elevator lobby walls fronting the street. The proposed scheme currently changes this entire wing to a double loaded corridor. The result is a more residential feel to the Fore Street Elevation as well as greater efficiency in the building floor plan.

d. Pavilion redesign: The approved submission contained two paired symmetrical pavilions that were approximately 24'-0" feet tall. The current proposal seeks to reduce the overall pavilion height in order to open up the views into and out of the interior courtyard. This design maintains the general footprint, building setback and entrance locations of that in the approved scheme.

WOODARD & CURRAN
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CORPORATE OFFICES: Maine, Massachusetts,
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Operational offices throughout the U.S.

November 15, 2006

Bill Needelman
Senior Planner
City of Portland
389 Congress Street
Portland, ME 04101

Re: The Longfellow at Ocean Gateway, Stormwater Quantity Standard Condition Compliance

Dear Bill:

On behalf of Riverwalk, LLC, we are submitting information related to condition compliance for the Major Site Plan for The Longfellow at Ocean Gateway, originally submitted December 19, 2005, and approved by the Planning Board on May 5, 2006.

The purpose of this information is to address Planning Board Motion C-Waivers, 1-Stormwater Quantity Standard, Condition (i). Specifically, the Condition states "[t]hat the applicant shall design and fund a stormwater bypass at the Ocean Gateway stormwater quality unit to mitigate increased flow through the City stormwater system resulting from the subject project. The design of the bypass shall be presented to the Public Works Department for review and approval prior to issuance of the building permit."

After approval by the Board, and during site design of the Longfellow project, it was thought that a bypass structure could be constructed at the Ocean Gateway stormwater quality unit that would allow an increase in the peak runoff rate from the upstream areas without exceeding the capacity of the unit. However, during construction of the Ocean Gateway project, piping to the stormwater treatment unit was modified to accommodate utility conflicts thus limiting bypass options at the treatment device. With the new configuration, stormwater will not build up in the upstream manhole enough to allow the use of a conventional bypass technique such as a weir wall or secondary (higher) outlet pipe. We further considered a parallel stormdrain system and new outfall options. With study, each of these options were determined not to be feasible given cost implication, physical impossibilities, or permittability.

As an alternative to the bypass structure, the Applicant proposes the use of subsurface stormwater detention structures at the Longfellow Residences and Retail complex and at the Parking Garage to mitigate the increased flow through the City stormwater system. As you know, we have held preliminary discussions with Eric Labelle, City Engineer, regarding this and he generally supports the proposal. The subsurface detention structures have been indicated on Sheet C201A Stormwater Detention Plan, attached to this submission.

The subsurface detention structures will detain runoff to decrease the post-development peak runoff rate to less than the pre-development condition by nearly 40% (see Table 6.2 in attached Section 6-Stormwater Management). Stormwater runoff from the Longfellow project will subsequently be treated by the Ocean Gateway Treatment Unit #2 without impacting the hydraulic or treatment capacity of the unit. The proposed stormwater detention structures are described in further detail in Section 6-Stormwater Management, revised November 3, 2006 and attached to this submission with appropriate sizing calculations.

With this, we are seeking confirmation that this submission satisfies Condition (i) of the Board approval. Thank you for your continued assistance with this project. Please do not hesitate to contact me if you have any questions or comments.

Sincerely,
WOODARD & CURRAN INC.

Barry Sheff, PE
Project Manager

BSS
203555.05

Enclosure

cc: Drew Swenson, Riverwalk LLC
Eric Labelle, City Engineer

Haley & Aldrich, Inc.
75 Washington Avenue
Suite 203
Portland, ME 04101-2617

Tel: 207.482.4 600
Fax: 207.775.7666
HaleyAldrich.com

HALEY & ALDRICH

MEMORANDUM

29 March 2006
File No. 30322-000

TO: Riverwalk, LLC
Drew Swenson, Manager

C: Becker Structural Engineers, Inc.; Attn.: Timothy Prince

FROM: Haley & Aldrich, Inc.
Bryan C. Steinert, Wayne A. Chadbourne, P.E., James W. Weaver, P.E.

SUBJECT: Foundation Design Recommendations
Eastern Waterfront Development
Proposed Office Building
Portland, Maine

This memorandum presents design recommendations for the proposed Longfellow Office Building (office building) to be constructed as part of the proposed Eastern Waterfront Development project in Portland, Maine. Haley & Aldrich performed subsurface explorations for the project in 2004 and 2005 and presented a report on subsurface explorations and foundation design recommendations for the Parking Garage portion of the project dated 8 November 2005.

This design memorandum has been prepared based on the design loading information provided to us by Becker Structural Engineers, Inc. (BSE) by electronic mail between 1 and 8 February 2006. Please refer to our 8 November 2005 report for a detailed description of our exploration program.

SUMMARY

We recommend that the proposed office building structure be supported on steel H-piles, driven to bearing in the underlying bedrock. We recommend that the ground floor slab be designed as a concrete slab-on-grade supported on a minimum 1-ft thick layer of crushed stone placed after removal of all topsoil, debris and organic matter. We recommend that a permanent foundation drainage system consisting of a network of perimeter and underslab drains be installed adjacent to, and beneath the slab-on-grade, as outlined herein.

To insure the recommendations stated herein are incorporated into the design as intended, we recommend that Haley & Aldrich be involved in preparing the geotechnical Contract Documents, reviewing geotechnical related submittals, and performing on-site monitoring of

the geotechnical construction activities in the field on behalf of the Owner. Specific recommendations for foundation design and construction are presented below.

ELEVATION DATUM

The project elevation datum and elevations referenced herein are in feet and reference Portland City Datum (PCD). Portland City Datum relates to the National Geodetic Vertical Datum of 1929 (NGVD 29) as follows:

Elevation in feet (PCD) = Elevation in ft (NGVD 29) + 0.02 ft

SITE LOCATION, PROPOSED DEVELOPMENT & DESIGN PARAMETERS

It is our understanding that an office building is planned to be constructed in the southwest corner of the proposed Eastern Waterfront Development. The proposed building site is located at the northeast corner of the intersection of Fore and India Streets, as shown on the Site & Subsurface Exploration Location Plan, Figure 1. The proposed building footprint is currently occupied by the Breakaway Tavern building. The Breakaway Tavern is a three-story brick building with ground floor slab at El. 24 to El. 24.5 (based on an optical survey performed by Haley & Aldrich). The existing ground surface generally slopes down from north to south within the limits of the proposed office building. Ground surface varies from El. 26 on the north side of the building, to El. 19 along the south side of the building (adjacent to Fore Street).

Based on the site development plans provided by BSE, we understand that the proposed office building will consist of a six-story structure with no below grade space. The structure will be approximately 60 ft by 120 ft in plan, and the FFE of the lowest level floor slab is proposed to be constructed at El. 21.0 (approximately 3 ft lower than the level of the ground floor slab in the existing Breakaway Tavern building). An elevator pit is planned in the central portion of the building. We anticipate that the bottom of the pit will be at approximately El. 17. Column bay spacing will be variable throughout the building, ranging between approximately 10 and 20 ft.

Maximum design column loads were provided by BSE for the structure. The maximum column loads are 270 kips for gravity loads, 320 kips for gravity plus short-term seismic loads, and 95 kips for net uplift loads. These values do not include loads related to construction of a structural slab for the lowest level floor. BSE estimates that construction of a structural slab would increase these values by 70 to 80 kips.

SUBSURFACE EXPLORATIONS AND CONDITIONS

Due to site restrictions, a site-specific subsurface exploration program was not performed for the proposed office building. However, subsurface explorations performed for the proposed parking garage and the Portland Water District wastewater pumping station (south of Fore Street) were used to formulate the geotechnical recommendations provided herein.

A description of the subsurface conditions encountered at the site was provided in our 8 November 2005 report. The elevation of the top of bedrock varies significantly within the

area of the proposed office. Bedrock was encountered as shallow as El. -20 south and west of the building, and deeper than El. -50 adjacent to the southeast corner of the building. Please refer to Table I for a summary of test borings drilled in the vicinity of the proposed office building.

We have also obtained information from a test boring drilled approximately 80 ft west of the project site. We understand that this boring, located northwest of the intersection of Fore and India Streets, encountered refusal on possible bedrock at a depth of 44 ft BGS (approximately El. -23).

GEOTECHNICAL ENGINEERING RECOMMENDATIONS

Geotechnical design recommendations provided below for the office building were formulated in accordance with the requirements of the 2003 International Building Code (IBC). The recommendations were prepared based on the design parameters presented by BSE, as described previously in this memorandum.

Foundation Design Recommendations

Based on the magnitude of the axial compression design loads provided by BSE and the nature/density of the marine soils beneath the proposed building, it is our opinion that supporting the building on shallow foundations bearing in marine deposits is not feasible, both in terms of allowable bearing capacity and tolerable building settlements. We therefore recommend that the proposed office be supported on pile foundations.

As part of our analyses, we considered supporting the garage structure using both closed-ended, concrete-filled, steel pipe piles driven to refusal in the glacial till (displacement piles), and steel H-piles driven to refusal in bedrock. Based on the available subsurface information, it is our opinion that the glacial till does not achieve sufficient density to result in practicable driving refusal for closed-ended pipe piles until the pile tip is about 10 ft above of the top of rock. Therefore, the total lineal footage for steel H-piles would not be considerably longer than the footage for pipe piles. Based on the current local market, steel H-piles are generally less expensive on a lineal foot basis than pipe piles. Therefore, we recommend the proposed office building be supported on steel H-piles driven to refusal in bedrock.

Static pile capacity analyses were performed to determine the geotechnical capacity of several different sizes of H-piles. Based on the condition of the bedrock, the magnitude of the design loads and pile availability, we recommend that the following pile sections may be considered to support the design axial compression and uplift loads. We recommend the following axial design capacities be used in final design.

Steel H-pile Section	Axial Design Capacity - Compression	Axial Design Capacity - Uplift
HP8x36	120 kips	15 kips
HP10x42	150 kips	23 kips
HP12x53	180 kips	30 kips

Please note that these design capacity values (compression) do not include an allowance for downdrag loading. We do not anticipate that downdrag will be an issue for the piles supporting the office building. However, proposed site grading information for the area adjacent to the office building was not available at the time this report was prepared. If significant raises in grade are planned, these design capacities should be reevaluated.

The design uplift capacity values shown above do not include the dead weight of the pile caps/grade beams, assume a minimum pile length of 50 ft, and are based on a factor of safety of 1.5 (seismic uplift loads).

The capacity values are gross values and do not take into account a reduction in pile cross sectional area for steel degradation since the soils and groundwater at the site are not considered to be corrosive/saline.

Based on the allowable capacities presented above and the maximum design loads, we conclude any of the pile types presented above could be used to support the proposed structure with a maximum of three piles per pile cap. BSE should determine which pile size will be the most efficient based on the range in column loads.

Piles should be fabricated from Grade 50 (50 ksi) steel and should be outfitted with steel driving shoes/points in order to protect the pile tips from damage during driving in the glacial till/rock. The piles should be installed to a minimum ultimate geotechnical capacity equal to the design capacity multiplied by 2.25 (270 kips for HP8x36, 338 kips for HP10x42 and 405 kips for HP12x53). For short-term seismic loading conditions, the design axial compression capacities can be increased by 15 percent. Per the requirements of IBC, three or more piles should be installed at discrete pile cap locations to provide lateral stability in all directions.

We anticipate that piles will advance through the glacial till and up to 5 ft into bedrock prior to achieving end bearing. Based on this and an average, assumed pile cut-off level equal to El. 18, we estimate that pile lengths will vary between 40 and 80 ft, with pile lengths generally increasing from north to south. Based on these anticipated pile lengths, some pile splicing will be required. Piles should be spaced at least 3 ft on center when groups are required. The bottoms of pile caps should be founded a minimum of 4.5 ft below the lowest surface exposed to freezing.

The installation/driving criterion for the piles is a function of pile hammer selected by the Contractor to install the piles. This criterion should the determined by the Contractor's engineer (using wave equation analysis; WEAP) and reviewed/approved by Haley & Aldrich prior to construction. The requirements of this analysis should be outlined in the pile specification. The installation/driving criterion provided by the Contractor will determine the number of hammer blows required to drive the pile over the final 6 in. of driving, which will result in the pile achieving the required minimum ultimate geotechnical capacity (2.25 x pile design capacity). If abrupt refusal is encountered, driving should be terminated when the pile penetration is less than ½-in. for 10 consecutive hammer blows.

Prior to installation, one of the H-piles could be statically load tested to twice the pile design capacity. However, it is our opinion that dynamic pile testing could be used in lieu of a static

pile load test. Dynamic testing is more cost effective than static load testing, provides reliable pile capacity information and is accepted by the IBC Code. We recommend that the Contractor monitor the installation of a minimum of three production piles (i.e., indicator piles) using the Case-Goble Pile Driving Analyzer (PDA) equipment. The dynamic testing will: 1.) verify that the required minimum ultimate geotechnical capacity is achieved; 2.) confirm the bearing capacity value for rock used in the pile design; and 3.) confirm that the stresses in the pile do not exceed allowable limits during driving (i.e., $0.90f_y$, or 45 ksi for grade 50 steel piles). CAPWAP analysis should be performed on at least two of the indicator piles installed during the PDA testing program. Use of dynamic testing alone will likely require approval from the City of Portland building official.

We recommend that the indicator piles be clearly identified on the structural foundation drawings and be located as follows: one pile each in the northern, southern and central portions of the building footprint.

It should be noted that the estimated pile length information presented above is based on limited subsurface data, with no test borings conducted within the footprint of the proposed building. Therefore, pile lengths could vary from those mentioned above. If it is desirable to refine pile lengths prior to construction, we could drill additional soil borings adjacent to India Street that would provide additional information regarding the elevation of the top of rock.

Please note that installation of driven piles is a vibration and noise producing activity. If the potential vibration and noise caused by driving piles is not acceptable to City of Portland officials, then the use of drilled shafts could become a more feasible option, since shaft installation is a relatively low vibration and low noise-producing activity.

Ground Floor Slab

Based on the design information discussed previously, it is anticipated that the proposed ground floor slab will be constructed between 2 and 3 ft lower than the level of the of the floor slab in the existing Breakaway Tavern building. Therefore, the proposed floor slab grading will result in a net unloading condition on the underlying marine clay, and settlement of the new floor slab is anticipated to be ¼ in. or less. Therefore, we conclude it is appropriate to design the ground floor slab as an soil-supported, concrete slab-on-grade. The floor slab should bear directly on a minimum 12-in. thick layer of crushed stone as outlined below in the foundation drainage section of this report.

All construction debris (e.g., foundation walls, slabs, footings and underground utilities) should be removed from within the building limits prior to construction.

Resistance of Lateral Design Building Loads

We recommend that structure lateral loads be resisted by passive earth pressures acting against pile caps and grade beams. The net passive resistance (passive minus active) provided by the fill surrounding grade beams and pile caps can be calculated using an equivalent fluid weight (triangular distribution) of 300 pounds per cubic foot (pcf). The soil within 1 ft of ground surface should be ignored unless it is confined by a slab or bituminous

concrete. If the horizontal distance between adjacent grade beams or walls is less than twice the height of the subject structural element (measured from bottom of element to bottom of slab/ground surface), the passive pressure must be discounted proportionately to the distance (full pressure at twice the height away) to accommodate for interaction of the elements.

If passive earth pressures are not enough to provide adequate lateral resistance, we will need to conduct more detailed analyses of the lateral load carrying capacity of the piles at the site. Installation of battered piles may also be considered. A minimum factor of safety for sliding equal to 2.0 should be achieved for resistance of permanent lateral loads.

Sidewalks

Bituminous concrete sidewalks proposed around the exterior of the buildings should be supported on a minimum of 1.5 ft of compacted granular fill (CGF). The surficial soils at the site are considered to be frost susceptible. The purpose of placing free-draining granular soil below the sidewalks is to help control the potential for post-construction differential heaving and cracking, especially at building entrances.

Foundation Drainage System

Due to the proximity of the water table to the proposed floor slab level (see our 8 November 2005 report), we recommend that a permanent foundation drainage system be installed to protect the below grade portions of the building and the bituminous concrete slab from hydrostatic pressures and infiltration of surface water or groundwater. The foundation drainage system for the building should discharge by gravity where practicable into an appropriate receptor (possibly the local storm drain system).

The system should include underslab drains installed below the ground floor slab. The system should consist of separation filter fabric placed on the prepared, approved soil subgrade, a minimum 12 in. thickness of ¾-in. crushed stone placed above the fabric, and a network of 4 in. diameter perforated PVC or corrugated HDPE drain pipes (laid flat) embedded mid-height in the crushed stone layer. We recommend that at least one section of pipe be installed in each north-south column bay (three pipe sections total). We estimate that the invert of the pipes would be approximately 12 in. below the finish floor elevation (approximately El. 20).

The system should also include perimeter foundation drains installed along the backfilled side of below-grade building foundation walls where the interior floor level is below the exterior finished grades (at a minimum along the north, east and west sides of the building). The drain should consist of a 4-in. diameter continuous perforated PVC or corrugated HDPE drain pipes (laid flat), surrounded by a minimum of 6-in. of ¾-in. crushed stone and a filter/separation fabric, placed outside of the foundation wall. Pipe perforations should be oriented downward. The invert of the drain pipe should be positioned above the bearing level of pile caps/grade beams, and at least 12 in. below the adjacent floor slab surface. Per the requirements of the IBC Code, the perimeter drain (including the pipe, crushed stone and filter fabric) should extend a minimum of 12 in. beyond the outside edge of the pile cap. We recommend that free-draining granular backfill (e.g., CGF) be placed within 3 ft (in plan) of below-grade portions of foundation walls.

Perimeter and underslab drain pipes should be installed at roughly the same invert elevation and should be laid flat. The underslab and perimeter drain pipes should be connected by constructing "wall-through" or "box-out" penetrations at discrete locations in the foundation wall. The foundation drainage system should be designed to discharge by gravity where practicable into an appropriate receptor (e.g., new or existing storm drain system). It may be necessary to install a sump pit with pumps to discharge the effluent from the system if an appropriate receptor is not present near the building. If pumping the effluent is required, sump pits should be equipped with dual pumps with alternating cycles, and a back up power system should be installed. The sump pit could be constructed either on the interior of the building, or on the outside of the building adjacent to the foundation wall.

Pipe cleanouts should be provided at system corners (for both perimeter and underslab drain piping) to allow for future maintenance. We will assist the design team in preparing plan and details of the foundation drainage system for inclusion in the Contract Documents. The location and invert level of the drains, wall through penetrations and sump location/ orientation should be coordinated with the Plumbing Consultant, Site Civil Engineer and Structural Engineer.

As an additional measure, surface runoff should be directed away from the building. In general, the finished ground surface immediately around the building should be sloped downward away from the structure to divert surface runoff. To limit surface water infiltration into the drainage system, it is recommended that the upper 8 in. of backfill within 10 ft of the building, in unpaved areas, consist of topsoil or other soil having low permeability.

We can provide a foundation drainage plan along with the appropriate drain system details for inclusion in the contract documents once the site grading, location and elevations of the grade beams, pile caps, below slab utilities and sump (if required) are finalized.

Dampproofing/Waterproofing

In general, we recommend that dampproofing be placed on the outside face of foundation walls where the adjacent interior space is below the level of the exterior ground surface.

If the base slab for the elevator is above El. 16, we recommend that the walls and slab be damp-proofed. If the base slab for the elevator pit is below El. 16, it should either be designed to resist hydrostatic uplift loads based on a groundwater level at El. 16, or should be permanently drained. If the slab is designed to resist uplift loads, we recommend that the walls and slab for the elevator pit be waterproofed up to El. 16 and damp-proofed above El. 16. If the slab is not designed to resist uplift loads, an underslab drainage system should be constructed beneath the pit slab. The system should consist of a minimum of 6 in. of crushed stone placed over a separation fabric. The drain system should provide a discharge outlet for the water collected in the system (e.g., connection to the storm drain system or a sump inside/outside the building).

We recommend that a vapor barrier be installed below the ground floor slab. Evaluations for the need to control humidity to prevent the formation of mold or other organisms within the

building were not within the scope of work of this evaluation. If vapor barriers are used, the floor slab design and construction must be coordinated with the vapor barrier installation, as the barriers may impact concrete curing and curling.

Seismic Design Considerations

We recommend that the office building be designed in accordance with the seismic requirements of the latest edition of the IBC Code as outlined below. Due to the nature and thickness of overburden soils and the depth to bedrock, the site is considered to be "Site Class C". We recommend the following values be used by the project structural engineer to determine the design spectral response acceleration parameters (S_{DS} and S_{D1}) and to calculate the base shear for purposes of seismic design.

- Mapped Spectral Response Accelerations for Short Periods: S_S = 0.37 g
- Mapped Spectral Response Accelerations for 1-second Periods: S_1 = 0.10 g
- Site Coefficient for Short Periods: F_a = 1.2
- Site Coefficient for 1-second Periods: F_V = 1.7

Please note that "g" refers to acceleration due to gravity.

We do not consider the soils present at this site to be liquefaction susceptible.

Lateral Earth Pressures on Below-Grade Foundation Walls/Retaining Walls

We recommend that any exterior below-grade foundation walls retaining soil on one side and restrained at the top should be designed for static lateral earth pressures using an equivalent fluid unit weight of 60 lbs. per cubic foot (pcf). Cantilever walls (i.e., walls that are free to rotate at the top) should be designed using an equivalent fluid unit weight of 40 pcf. These fluid weights assume a free-draining granular backfill is placed adjacent to the wall (with moist unit weight equal to 120 pcf) and that a perimeter foundation drain system is installed recommended herein (i.e., no unbalanced hydrostatic pressures exist; "drained condition").

In particular, we anticipate that the northern office building wall will need to be designed to resist permanent lateral earth pressures up to approximately El. 26.

CONSTRUCTION CONSIDERATIONS FOR PILE INSTALLATION

The primary purpose of this section is to comment on items related to pile driving and related geotechnical aspects of proposed construction. It is written primarily for the geotechnical engineer having responsibility for preparation of geotechnical related plans and specifications. Since it identifies potential construction problems related to foundations, it will also aid personnel who monitor the construction activity. Prospective contractors for this project must evaluate the construction problems on the basis of their own knowledge and experience in the Portland, Maine area, and on the basis of similar projects in other localities, taking into account their proposed construction methods, procedures, equipment and personnel.

Please note that construction considerations discussed herein do not include comments on excavation and earthwork. We anticipate the excavation, earthwork and dewatering

discussion provided in our 8 November 2005 report for the proposed parking garage are also generally appropriate for the proposed office building.

Building Demolition

The Breakaway Tavern building will need to be demolished prior to construction activities. Foundation support for this building is not known, but we anticipate that the building is supported on concrete spread footing foundations. We recommend that all below grade portions of this building (e.g., foundation walls, footings, slabs, grade beams, pile caps) be excavated and removed prior to pile driving and earthwork activities. If the Breakaway Tavern building is found to be pile-supported, the presence of the existing piles may interfere with the installation of the new piles.

In an effort to avoid potential contractor claims, we recommend that an Owner's Representative be present at the site to observe and document the removal of below ground portions of the existing building. We also recommend that the Owner's Representative observe and document the conditions of the soils exposed beneath the demolished slabs for environmental/health and safety reasons.

Pile Load Testing Program

A static pile load test would normally be performed for piles with the design capacities required for this project if they were being driven to bearing in soil. However, we anticipate that the piles will be driven to practicable refusal in the bedrock. Therefore, we do not believe that a static load test is needed. Additionally, we have pile installation records from other projects in the vicinity of the site which confirm similar pile capacities were achieved in similar subsurface and pile bearing conditions.

We do however recommend that a dynamic load testing program be implemented. A minimum of three pre-selected piles should be monitored during installation with a pile driving analyzer (PDA) to evaluate hammer system efficiencies, driving stresses in the pile and pile capacities. The selected piles should be allowed to stand a minimum of 24 hours after completion of initial driving and should then be re-driven (restrike) while being monitored with the PDA to assess the set-up/relaxation characteristics of the rock. If the results of a PDA/CAPWAP analysis show that the minimum safety factor of 2.25 has been achieved using the driving criteria established by the WEAP analysis, then this driving criteria would be used for the remainder of the production piles without the use of PDA, and would be considered sufficient "evidence" that the piles have developed the required design capacity. If the results indicate the factor of safety is below 2.25, the PDA/CAPWAP results should be re-evaluated to provide driving criteria that are appropriate to achieve the minimum required factor of safety.

Pile Installation

Obstructions (i.e., concrete foundation walls, footings, slabs and boulders in the naturally deposited soils) could be encountered during pile installation. If encountered, obstructions will likely be located at shallow depths within the in-situ fill soils near existing ground surface and should be removed by the Contractor at no additional cost to the Owner.

As previously stated, pile driving is a noise and vibration inducing activity. We recommend that seismographs be used to monitor vibrations and noise levels during pile driving and other vibration inducing activities (e.g., hoe-ramming, if needed). We also recommend that an existing conditions video survey of structures and buildings of concern within 50 ft of the site be conducted prior to the start of construction. A complete record of the condition of both the interior and exterior walls/facades of adjacent structures can be useful to help mitigate potential damage claims (from abutters) that may arise during construction activities.

Preparation of Contract Documents and Submittal Reviews

The contract drawings and specifications should be written so that the requirements of the documents are consistent with the design intent of the geotechnical recommendations outlined herein. Therefore, we recommend that Haley & Aldrich be retained to prepare the specifications and contract drawings related to the following topics:

- Earthwork
- Construction Dewatering
- Pile Installation and Testing
- Foundation Drainage System Plan and Details

The contract specifications will require the Contractor and the Contractor's engineer to perform analyses and submit results to the designers for review. We recommend that Haley & Aldrich be allowed to review the geotechnical-related submittals to ensure that the Contractor's analyses/submittals are in accordance with the intent of the design.

Construction Monitoring

The foundation and earthwork recommendations contained herein are based on the known and predictable behavior of a properly engineered and constructed foundation. Monitoring of the foundation construction is required to enable the geotechnical engineer to keep in contact with procedures and techniques used in construction, and to comply with Section 1808.2.10 of the IBC Code. Therefore, it is recommended that an individual representing the Owner (Owner's Rep.), qualified by geotechnical training and experience be present at the site to provide full-time monitoring during the earthwork and foundation construction activities listed below.

- Dynamic testing of the indicator piles and review of the PDA results.
- Installation of the production piles.
- Installation of the foundation drainage system.
- Backfilling adjacent to foundation walls and beneath the building slab.
- Inspection of the slab and pavement subgrade prior to slab construction/pavement installation.
- Excavation to subgrade levels within the footprint of the building prior to placement of engineered fills.
- Placement and compaction testing of engineered fills.

We plan on providing these services.

Closure

We trust this provides sufficient information to proceed with design development. Please do not hesitate to contact us if you require additional information.

Attachments:
Table I – Subsurface Explorations
Figure 1 – Site & Subsurface Exploration Location Plan
Appendix A – Logs of Recent Test Borings
Appendix B – Logs of Previous Test Borings

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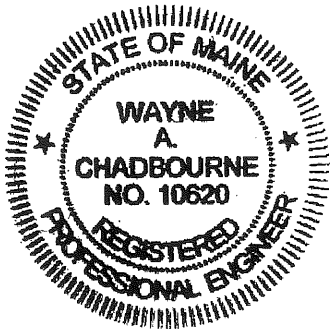
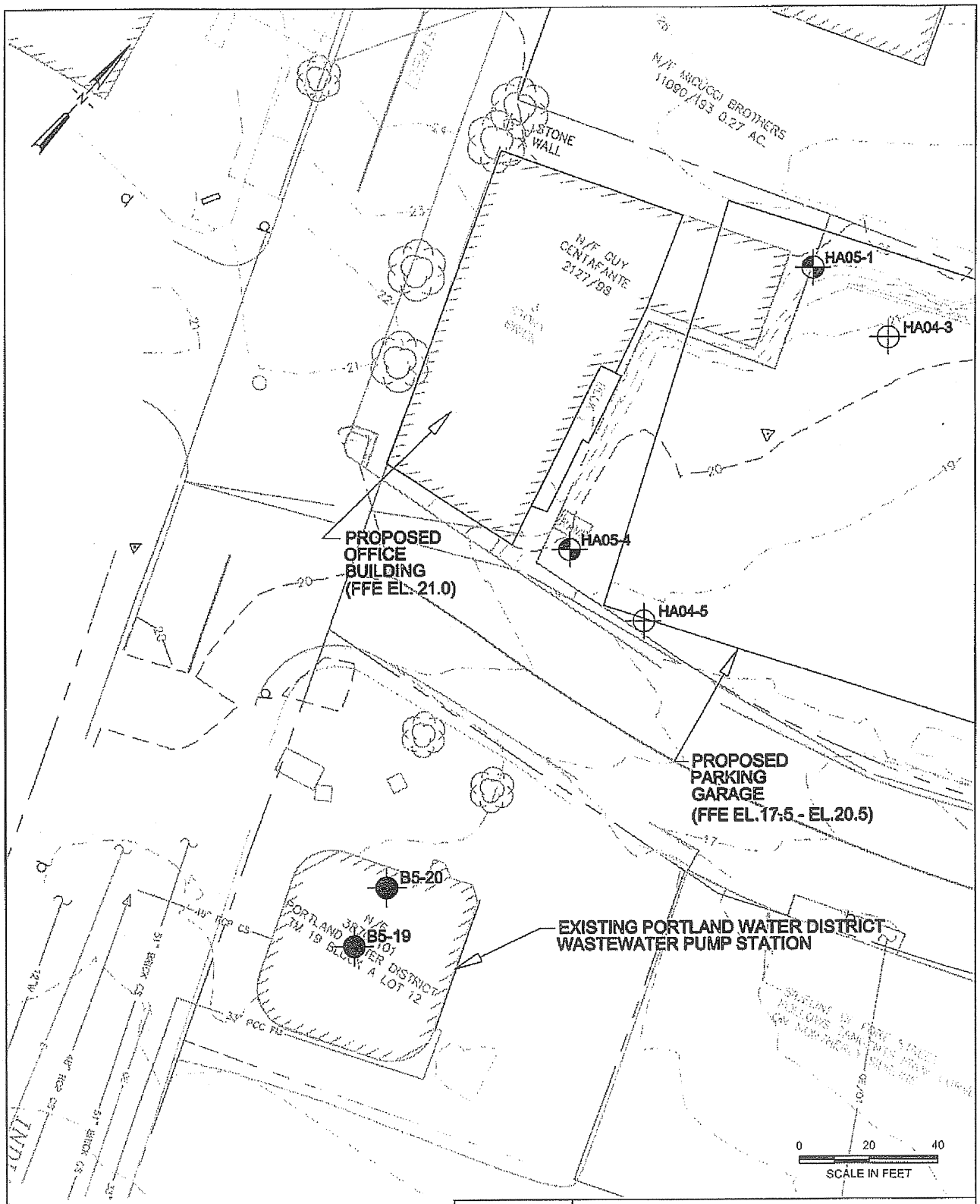


TABLE I
Subsurface Explorations
Proposed Office Building
Eastern Waterfront Development
Portland, Maine

Test Boring No.	Estimated Ground Surface Elevation[1,2]	Thickness of Strata (ft)				Elevation of Top of Bedrock[1]	Elevation of Bottom of Exploration[1]
		Bituminous Concrete/ Concrete	Fill	Marine Deposit	Glacial Till		
HA05-1	23.0	NE	4.0	18.5	33.2	-32.7	-37.3
HA05-4	20.0	0.3	2.3	35.4	>29.0	NE	-47.0
HA04-3	21.0	NE	7.0	16.7	29.3	-32.0[4]	-32.0
HA04-5	18.5	0.2	5.3	27.0	19.5	-33.5[4]	-33.5
B5-19	18.0	NE	4.0	14.0	8.3	-8.3	-18.3
B5-20	18.3	NE	5.5	25.0	8.0	-20.2	-29.6

Notes:
1. Ground surface elevations are in feet and reference Portland City Datum.
2. Ground surface elevations are approximate and were determined by interpolating between existing elevation contours.
3. "NE" indicates that the stratum was not encountered in the test boring.
4. Top of bedrock based on rod probe advancement data. Rock was not cored.



LEGEND

- APPROXIMATE LOCATION OF TEST BORING DRILLED BETWEEN 26 SEPTEMBER AND 6 OCTOBER 2005
- APPROXIMATE LOCATION OF TEST BORING DRILLED ON 6 FEBRUARY 2004
- APPROXIMATE LOCATION OF TEST BORING DRILLED IN MAY 1975
- 21 ELEVATION CONTOUR OF EXISTING GROUND SURFACE (PORTLAND CITY DATUM)

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

PROPOSED OFFICE BUILDING
EASTERN WATERFRONT DEVELOPMENT
PORTLAND, MAINE

SITE & SUBSURFACE EXPLORATION LOCATION PLAN

SCALE: AS SHOWN

MARCH 2006

FIGURE 1

APPENDIX A

Logs of Recent Test Borings

TEST BORING REPORT

Boring No. HA05-1

Project Eastern Waterfront Development Portland, ME
Client Riverwalk, LLC
Contractor Maine Test Borings, Inc.

File No. 30322-000
Sheet No. 1 of 3
Start September 28, 2005
Finish September 29, 2005
Driller B. Enos
H&A Rep. B. Steinert
Elevation 23.0+/- Datum Portland City
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	SS	NQ	Rig Make & Model: B-53 Mobile Drill Trailer
Inside Diameter (in.)	3.0	1 3/8	1.9	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	30	30	-	Casing: Driven
				Hoist/Hammer: Winch/Safety Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	4 8 7 6	S1 8	0.0 2.0	NO WELL INSTALLED		SW	Medium dense, dark-brown to black, well graded SAND (SW), mps=25 mm., no odor, moist, roots and brick fragments present.		10	15	25	40	10				
							-FILL-										
	7 2 1 4	S2 7	2.0 4.0			SW	Very loose, dark-brown to black, well graded SAND (SW), mps=25 mm., no odor, wet, roots and brick fragments present.		10	15	30	15	30				
							-FILL-										
	1 1 1 2	S3 4	4.0 6.0		4.0	SM	Very loose, gray, silty SAND (SM), mps=0.25 mm., no odor, wet.				10	70	20				
5							-MARINE DEPOSIT-										
	1 2 3 5	S4 21	6.0 8.0		6.0	SC	Loose, gray, clayey SAND (SC), mps=0.42 mm.					60	40				
					6.5	CL	Medium stiff, gray lean CLAY (CL), mps=0.075mm., no odor, wet, mottled.						100				
							-MARINE DEPOSIT-										
10	WOH 1 1 WOH	S5 24	10.0 12.0			CL	Very soft, gray, lean CLAY (CL), mps=0.075 mm., no odor, wet.						100				
							-MARINE DEPOSIT-										
15							shear strength. VI = 15.0-15.6 ft. Su = 370 psf/ 110 psf (remolded)										
					17.5												
20	WOH 1 WOH 1	S6 8	20.0 22.0			CL	Very soft, gray, lean CLAY (CL), mps=25 mm., no odor, wet, 25 mm. piece of gravel in top of spoon.						100				
							-MARINE DEPOSIT-										
					22.5		NOTE: Advance casing and wash out to 25 ft. Coarse sand and gravel observed in wash water.										
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
9-29-05	07:28	-	55	60.3	14.2

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe
V In-Situ Vane Shear

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 55.7
Rock Cored (lin. ft.) 4.6
Samples 13S, 2C

Boring No. HA05-1

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

HALEY & ALDRICH

Boring No. HA05-1
File No. 30322-000
Sheet No. 2 of 3

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25	4 2 WOH 4	S7 15	25.0 27.0			SM	Very loose, gray silty SAND (SM), mps=19 mm., no odor, very wet. -GLACIAL TILL- NOTE: Advanced casing and wash out to 30 ft. Coarse sand and gravel observed in wash water.		5	10	30	35	20				
30	21 4 5 8	S8 12	30.0 32.0			SM	Loose, gray silty SAND (SM), mps=19 mm., no odor, very wet. -GLACIAL TILL-			10	30	40	20				
35	8 15 31 9	S9 14	35.0 37.0			SM	Dense, gray silty SAND (SM), mps=38 mm. in tip of spoon, no odor, very wet. -GLACIAL TILL-			10	30	40	20				
40	15 6 5 5	S10 14	40.0 42.0			SM	Medium dense, gray silty SAND (SM), mps=38 mm., slightly bonded, no odor, very wet. -GLACIAL TILL-			10	30	40	20				
45	10 16 21 31	S11 16	45.0 47.0			SM	Dense, gray silty SAND (SM), mps=38 mm., slightly bonded, no odor, very wet. -GLACIAL TILL-			10	30	40	20				
50	21 58 100(3 in.)	S12	50.0 52.0			SM	Very dense, gray silty SAND (SM), mps=38 mm., slightly bonded, no odor, very wet. -GLACIAL TILL-			10	30	40	20				
					51.5		NOTE: Advance casing to 51.3 ft., wash out to 51.1 ft.										
					52.9		Cored through granite boulder at 51.5-52.9 ft. (C1). -WEATHERED ROCK-										
55	22 102(3 in.)	S13 9	55.0 55.7				Split spoon refusal at 55.7 ft.										
					55.7		Begin NQ rock core (55.7 ft). See Core Boring Report HA05-1 for details.										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH

CORE BORING REPORT

Boring No. HA05-1
File No. 30322-000
Sheet No. 3 of 3

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
									SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
50									
55									Top of bedrock at 55.7 ft. Begin NQ rock core.
	8	C2	55.7 60.3	42/0	76/0		NO WELL INSTALLED	55.7	Moderately hard, fresh, gray to green, fine grained SCHIST. Primary joints dipping at horizontal to low angles, extremely close to very close, undulating, very tight to moderately wide, some soil infilling in joints.
	6								
	6								
	3								
60	4							60.3	-BOTTOM OF EXPLORATION-
									NOTE: Hole open to 57.4 ft. after pulling core barrel. Water measured at 14.2 ft.

TEST BORING REPORT

Boring No. HA05-4

Project Eastern Waterfront Development Portland, ME
Client Riverwalk, LLC
Contractor Maine Test Borings, Inc.

File No. 30322-000
Sheet No. 1 of 3
Start September 29, 2005
Finish September 29, 2005
Driller B. Enos
H&A Rep. B. Steinert
Elevation 20.0+/-
Datum Portland City
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	SS	-	Rig Make & Model: B-53 Mobile Drill Truck
Inside Diameter (in.)	3.0	1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	30	30	-	Casing: Driven
				Hoist/Hammer: Winch/Safety Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							-BITUMINOUS CONCRETE-										
	6 6 4 3	S1 10	0.4 2.4		0.3	SP	Loose to medium dense, dark-brown to black, poorly graded SAND (SP), mps=6.4 mm., no odor, damp, brick fragments present, heavy black staining at tip of spoon.			20	50	20	10				
							-FILL-										
	8 4 4 6	S2 15	2.4 4.4		2.6	CL	Medium stiff, olive-gray, mottled, lean CLAY (CL), mps=0.075 mm., no odor, damp.						100				
							-MARINE DEPOSIT-										
5	8 10 11 11	S3 18	4.4 6.4														
	9 10 9 9	S4 3	6.4 8.4			CL	Very stiff, olive-gray, mottled, lean CLAY (CL), mps=0.075 mm., no odor, damp.						100				
							-MARINE DEPOSIT-										
	2 2 2 2	S5 24	8.4 10.4			CL	Very stiff, olive-gray, mottled, lean CLAY (CL), mps=0.075 mm., trace sand, no odor, damp.						100				
10				NO WELL INSTALLED			-MARINE DEPOSIT-										
						CL	NOTE: Brick fragments and glass observed in cuttings. Soft to medium stiff, olive-gray, mottled, lean CLAY (CL), mps=0.075 mm., no odor, damp.						100				
							-MARINE DEPOSIT-										
					13.0												
15							V1 = 15.0-15.6 ft. Su = 1300 psf/ 90 psf (remolded)										
20	WOR WOR WOH WOH	S6 24	20.0 22.0			CL	Very soft, gray, lean CLAY (CL), mps=0.042 mm., no odor, wet, trace fine sand at tip of spoon.						10 90				
							-MARINE DEPOSIT-										
25																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe
V In-Situ Vane Shear

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 67.0
Rock Cored (lin. ft.) -
Samples 14S

Boring No. HA05-4

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Boring No. HA05-4
File No. 30322-000
Sheet No. 2 of 3

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
25							V2 = 25-25.6 ft. Su = 630 psf / 40 psf (remolded)										
30	WOR WOH WOH 4	S7 24	30.0 32.0			CL	Very soft, gray, lean CLAY (CL), mps=0.042 mm., no odor; wet, sand and silt present from 31-32 ft. -MARINE DEPOSIT-					10 30	90 70				
35	4 4 5 5	S8 12	35.0 37.0														
					36.5	SP	Loose, gray, poorly graded SAND with gravel (SP), mps=19 mm., no odor, wet. -MARINE DEPOSIT-		15	5		75	10				
					38.0												
40	35 44 56 50	S9 0	40.0 42.0				No recovery, possibly pushing stone at tip of spoon.										
45	9 13 10 12	S10 16	45.0 47.0			SM	Medium dense, gray, silty SAND with gravel (SM), mps=19 mm., no odor, wet. -GLACIAL TILL-		15	5	20	30	30				
50	7 9 11 15	S11 16	50.0 52.0			SM	Medium dense, gray, silty SAND with gravel (SM), mps=25 mm., no odor, wet. -GLACIAL TILL-		15	5	20	30	30				
55	14 13 15 15	S12 0	55.0 57.0				No recovery.										
60	20 22 26 35	S13 24	60.0 62.0			SM	Dense, gray, silty SAND with gravel (SM), mps=19 mm., no odor, wet. -GLACIAL TILL-		15	5	20	30	30				

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Boring No. HA05-4
File No. 30322-000
Sheet No. 3 of 3

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
65	30 37 60 80	S14	65.0 67.0			SM	Very dense, gray, silty SAND with gravel (SM), mps=19 mm., no odor, wet. -GLACIAL TILL-		15	5	20	30	30				
					67.0		-BOTTOM OF EXPLORATION- NOTE: Hole caved in to 32 ft. after pulling casing. Backfilled hole with cuttings, sand and cold patch at surface.										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Boring No. HA04-3

Project Eastern Waterfront Development, Portland, ME
Client Riverwalk, LLC
Contractor Maine Test Borings, Inc.

File No. 30322-000
Sheet No. 1 of 3
Start February 6, 2004
Finish February 6, 2004
Driller G. Rudnicki
H&A Rep. T. Erickson
Elevation 21.0 +/-
Datum Portland City
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS	-	Rig Make & Model: Mobile Drill B47 ATV Rig
Inside Diameter (in.)	3.0	1.375	-	Bit Type: Cutting Head
Hammer Weight (lb.)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: -
				Hoist/Hammer: Winch/Safety Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				NO WELL INSTALLED			NOTE: Auger spoils indicates sandy GRAVEL from 0.0-4.0 ft. (frozen from 0.0-2.5 ft.) -FILL-										
					4.0		NOTE: Ash, wood, brick and cinders present from 4-7 ft. -FILL-										
5					7.0		NOTE: Gray-brown, lean CLAY from 7-9 ft. -MARINE DEPOSIT-										
					9.0		NOTE: Gray, lean clay starting at 7 ft. -MARINE DEPOSIT- NOTE: HSA used from 0.0-10.0 ft. Rod probes starting at 10.0 ft. due to time constraints; no samples taken (see page 3 of log).										
10																	
15																	
20																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
02-06-04	14:25	0.1	0	9	DRY

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe
V In-Situ Vane Shear

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 53.0
Rock Cored (lin. ft.) -
Samples -

Boring No. HA04-3

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA04-3
File No. 30322-000
Sheet No. 2 of 3

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20																	
					23.7		NOTE: Probe action indicates probable strata change at 23.7 ft.										
25							-GLACIAL TILL-										
30																	
35																	
40																	
45																	

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY & ALDRICH

TEST BORING REPORT

Boring No. HA04-3
File No. 30322-000
Sheet No. 3 of 3

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
50							-GLACIAL TILL-										
					53.0		NOTE: Probe refusal at 53 ft.										
							-BOTTOM OF EXPLORATION-										

Probe Information: AW Rod Probe (300 lb. hammer/18 in. fall)

Depth	Probe Advancement
10-22'	Push
23-24'	5 blows/ft.
24-25'	6 blows/ft.
25-26'	7 blows/ft.
26-27'	6 blows/ft.
27-28'	8 blows/ft.
28-29'	5 blows/ft.
29-30'	9 blows/ft.
30-31'	16 blows/ft.
31-32'	12 blows/ft.
32-33'	18 blows/ft.
33-34'	32 blows/ft.
34-35'	14 blows/ft.
35-36'	33 blows/ft.
36-37'	19 blows/ft.
37-38'	18 blows/ft.
38-39'	17 blows/ft.
39-40'	13 blows/ft.
40-41'	22 blows/ft.
41-42'	22 blows/ft.
42-43'	19 blows/ft.
43-44'	23 blows/ft.
44-45'	30 blows/ft.
45-46'	30 blows/ft.
46-47'	36 blows/ft.
47-48'	33 blows/ft.
48-49'	26 blows/ft.
49-50'	41 blows/ft.
50-51'	28 blows/ft.
51-52'	58 blows/ft.
52-53'	85 blows/ft.

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size.
NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich.

TEST BORING REPORT

Boring No. HA04-5

Project Eastern Waterfront Development, Portland, ME
Client Riverwalk, LLC
Contractor Maine Test Borings, Inc.

File No. 30322-000
Sheet No. 1 of 3
Start February 6, 2004
Finish February 6, 2004
Driller G. Rudnicki
H&A Rep. T. Erickson
Elevation 18.5 +/-
Datum Portland City
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	SS	-	Rig Make & Model: Mobile Drill B47 ATV Rig
Inside Diameter (in.)	3.0	1.375	-	Bit Type: Cutting Head
Hammer Weight (lb.)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: -
				Hoist/Hammer: Winch/Safety Hammer

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				NO WELL INSTALLED	0.2		-BITUMINOUS CONCRETE- NOTE: Auger spoils pile indicates brown and red-brown, gravelly SAND with 20-50% brick fragments. -FILL-										
5					5.5		NOTE: Probable change to brown and gray-brown, lean CLAY at 5.5 ft. -MARINE DEPOSIT-										
10					9.5		NOTE: Probable change to gray, lean CLAY at 9.5 ft. -MARINE DEPOSIT- NOTE: Probe auger strating at 10 ft. due to time constraints: no samples taken.										
15																	
20																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
02-06-04	15:30	0.2	0	8.5	DRY

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe
V In-Situ Vane Shear

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 52
Rock Cored (lin. ft.) -
Samples -

Boring No. HA04-5

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Boring No. HA04-5
File No. 30322-000
Sheet No. 2 of 3

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20							-MARINE DEPOSIT-										
25																	
30																	
							NOTE: Probable strata change to glacial till at 32.5										
					32.5												
35							-GLACIAL TILL-										
40																	
45																	

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

TEST BORING REPORT

Boring No. HA04-5
File No. 30322-000
Sheet No. 3 of 3

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
50							-GLACIAL TILL-										
					52.0		NOTE: Probe auger refusal at 52 ft. -BOTTOM OF EXPLORATION-										

Probe Information: AW Rod Probe (300 lb. hammer/18 in. fall)

Depth	Probe Advancement
10-32'	Push
32-33'	9 blows/ft.
33-34'	13 blows/ft.
34-35'	11 blows/ft.
35-36'	17 blows/ft.
36-37'	13 blows/ft.
37-38'	19 blows/ft.
38-39'	20 blows/ft.
39-40'	26 blows/ft.
40-41'	16 blows/ft.
41-42'	18 blows/ft.
42-43'	25 blows/ft.
43-44'	31 blows/ft.
44-45'	30 blows/ft.
45-46'	46 blows/ft.
46-47'	65 blows/ft.
47-48'	65 blows/ft.
48-49'	60 blows/ft.
49-50'	71 blows/ft.
50-51'	72 blows/ft.
51-52'	75 blows/ft.

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

APPENDIX B

Logs of Previous Test Borings

NORTHERN NEW ENGLAND TEST BORING COMPANY

142 HIGH STREET – ROOM 430 – PORTLAND, MAINE 04101

SHEET 1 OF 1
DATE
HOLE NO. B5-19
LINE & STA.
OFFSET
SURF. ELEV. 18.01 +/-

TO Haley & Aldrich, Inc. | ADDRESS Cambridge, Mass.
PROJECT NAME Reloc. India St. Pump Sta. | LOCATION Portland, Maine
REPORT SENT TO above
SAMPLES SENT TO " | PROJ. NO. 2882 | OUR JOB NO. 55714

GROUND WATER OBSERVATIONS
At 9'6" after 1/2 Hours
At ____ after ____ Hours

Rods "AW"	CASING	SAMPLER	CORE BAR.
Type	BW	S/S	BX-D3
Size I.D.	2½"	1-3/8"	1-5/8
Hammer Wt.	300#	140#	1½
Hammer Fall	24"	30"	BIT dia

	Date	Time
START	5/6/75	a.m.
COMPLETE	5/7/75	p.m.
TOTAL HRS.		a.m. p.m.
BORING FOREMAN	Dalrymple	
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec
	10	0'-1'6"	D	14	26	13	dry dense		Sand, Cinders, Brick, Gravel, FILL	1	18"	7"
	6											
	10											
	17							4'				
	19											
	21	5'-6'6"	D	6	8	10	moist very stiff		Brown CLAY	2	18"	17"
	31											
	28											
	28											
	29											
	43	10'-11'6"	D	1	2	3	moist medium stiff			3	18"	18"
	44											
	39							13'				
	41								Gray CLAY & fine sand layers			
	36											
	25	15'-16'6"	D	1	0	1	moist soft			4	18"	18"
	24											
	22							18'				
	28											
	25								Gray fine-medium SAND & Silty clay, trace fine gravel			
	33	20'-21'6"	D	2	2	7	wet loose			5	18"	0
	24											
	21	21'6"-23'	D	7	1	1	"			6	18"	10"
	24											
	25						moist	24'				
		25'-26'4"	D	17	56	55/4"	very dense	26'4"	Gray fine-medium SAND, some silt, some F-M gravel-TILL	7	16"	12"
		26'4"-27'2"		C	Min/Foot		10			C1	10"	10"
							10					
		27'2"-27'8"		C			9			C2	6"	6"
		27'8"-32'4"		C			9		Gray SCHIST - hard & seamy	C3	56"	56"
							12					
							11					
		32'4"-36'4"		C			11			C4	48"	48"
							12					
							13					
		Bot. of Core					12	36'4"				
									Bottom of Boring - 36'4"			

GROUND SURFACE TO 26'4" USED BW "CASING: THEN cored to 36'4"

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%

140 lb Wt. x 30" fall on 2" O.D. Sampler
Cohesionless Density: 0-10 Loose; 10-30 Med. Dense; 30-50 Dense
Cohesive Consistency: 0-4 Soft; 4-8 M/Stiff; 8-15 Stiff; 30+ Hard

SUMMARY:
Earth Boring 26'4"
Rock Coring 10'
Samples 7

NORTHERN NEW ENGLAND TEST BORING COMPANY

142 HIGH STREET – ROOM 430 – PORTLAND, MAINE 04101

SHEET 1 OF 2

TO Haley & Aldrich, Inc. | ADDRESS Cambridge, Mass.

PROJECT NAME Reloc. India St. Pump Sta. | LOCATION Portland, Maine

REPORT SENT TO above | PROJ. NO. 2882

SAMPLES SENT TO " | OUR JOB NO. 55714

DATE

HOLE NO. B-5-20

LINE & STA.

OFFSET

SURF. ELEV. 18.31 +/

GROUND WATER OBSERVATIONS

At 10'6" after 60 Hours

At ____ after ____ Hours

Rods "AW"	CASING	SAMPLER	CORE BAR.
Type	BW	S/S	BX-D3
Size I.D.	2½"	1-3/8"	
Hammer Wt.	300#	140#	BIT
Hammer Fall	24"	30"	dia

	Date	Time
START	5/9/75	a.m.
COMPLETE	5/12/75	p.m.
TOTAL HRS.		a.m. p.m.

BORING FOREMAN Dalrymple

INSPECTOR

SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec
	13	0'-1'6"	D	24	29	16	dry dense		Brown Sand, Gravel & Red Brick - FILL	1	18"	10"
	30											
	28											
	26											
	18							5'6"				
	5	5'-6'6"	D	12	6	5	moist stiff		Brown CLAY & fine sand	2	18"	11"
	6											
	6											
	7											
	9							10'6"				
	21	10'-11'6"	D	4	4	5	"			3	18"	10"
	18								Brown CLAY, trace fine sand			
	23											
	26											
	21							15'				
	20	15'-16'6"	D	1	0	1	moist soft		Gray marine CLAY	4	18"	16"
	20											
	17											
	16											
	14											
	15	20'-21'6"	D	1	0	1	"			5	18"	16"
	10											
	11											
	10											
	10							25'6"				
	12	25'-26'6"	D	2	1	1	wet soft		Gray CLAY, trace fine sand	6	18"	16"
	11											
	17											
	16											
	12											
	21	30'-31'6"	D	---	---	---		30'6"	(no recovery)	7	18"	0"
	18	31'6"-33'	D	7	7	8	wet medium dense		Gray fine-medium SAND & silty clay, little fine gravel	8	18"	13"
	20											
	21											
	20											
	31	35'-36'6"	D	---	---	---				9	18"	0"
	26	36'6"-38'	D	12	12	14	moist medium dense	37'6"		10	18"	8"
	30		Mat. of Cobbles						Gray fine-medium SAND, some silt, trace clay & F-M gravel			
	50											

GROUND SURFACE TO 38'6" USED BW "CASING: THEN cored

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency		
0-10	Loose	0-4	Soft	30 + Hard
10-30	Med. Dense	4-8	M/Stiff	
30-50	Dense	8-15	Stiff	

SUMMARY:
Earth Boring 38'6
Rock Coring 9'5
Samples 10

NORTHERN NEW ENGLAND TEST BORING COMPANY

142 HIGH STREET – ROOM 430 – PORTLAND, MAINE 04101

SHEET 2 OF 2

TO _____ ADDRESS _____

PROJECT NAME _____ LOCATION _____

REPORT SENT TO _____ PROJ. NO. _____

SAMPLES SENT TO _____ OUR JOB NO. _____

DATE _____

HOLE NO. B5-20

LINE & STA. _____

OFFSET _____

SURF. ELEV. _____

GROUND WATER OBSERVATIONS

At _____ after _____ Hours

At _____ after _____ Hours

	CASING	SAMPLER	CORE BAR.
Type			
Size I.D.			
Hammer Wt.			BIT
Hammer Fall			

	Date	Time
START		a.m. p.m.
COMPLETE		a.m. p.m.
TOTAL HRS.		

BORING FOREMAN _____

INSPECTOR _____

SOILS ENGR. _____

LOCATION OF BORING: _____

DEPTH	Casing Blows per foot	Sample Depths From – To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec
									REFUSAL @ 38'6"			
									50 blows 300#hammer on cas.			
							Min/ft	38'6"	Top of Rock - 38'6"			
40		38'6"-43'6"	C				5			C1	60'	50'
							6					
							6		Gray GNEISS - hard & seamy			
							6					
		43'6"-47'11"	C				6			C2	53'	60'
45'							6					
							7					
							7					
							8					
							8	47'11"				
50'									Bottom of Boring - 47'11"			
									Picked up core left in hole			
									7"			

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
D=Dry C=Cored W=Washed
UP=Undisturbed Piston
TP=Test Pit A=Auger V=Vane Test
UT=Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

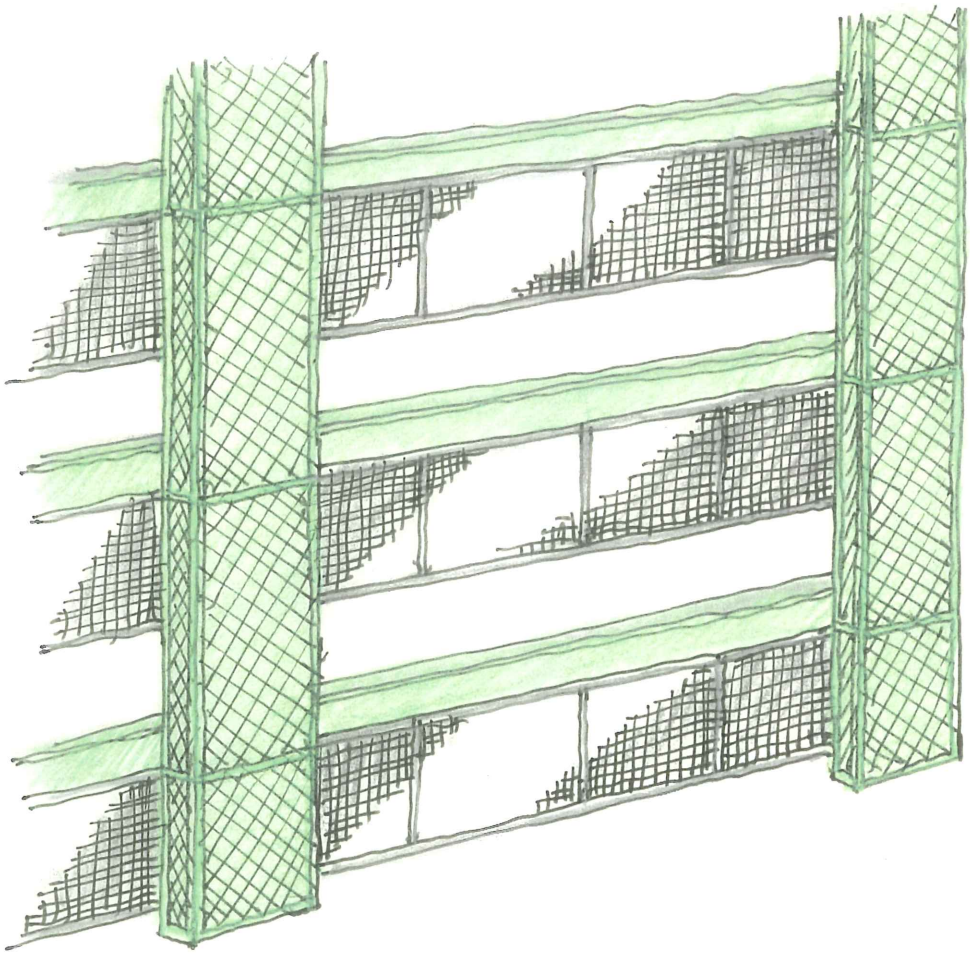
140lb Wt. x 30" fall on 2" O.D. Sampler

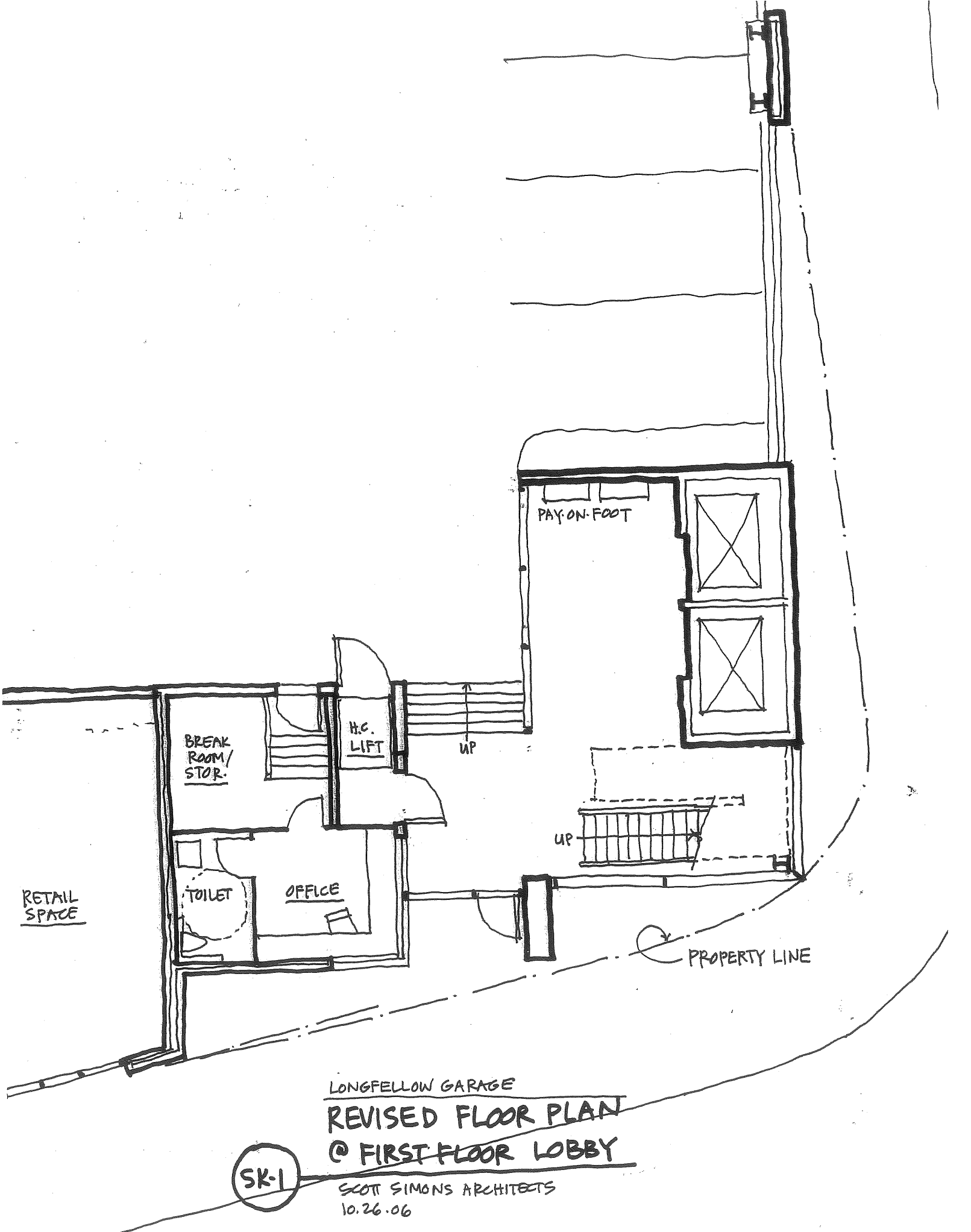
Cohesionless Density
0-10 Loose
10-30 Med. Dense.
30-50 Dense
50 + Very Dense

Cohesive Consistency
0-4 Soft
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff
30 + Hard

SUMMARY:
Earth Boring _____
Rock Coring _____
Samples _____

HOLE NO.





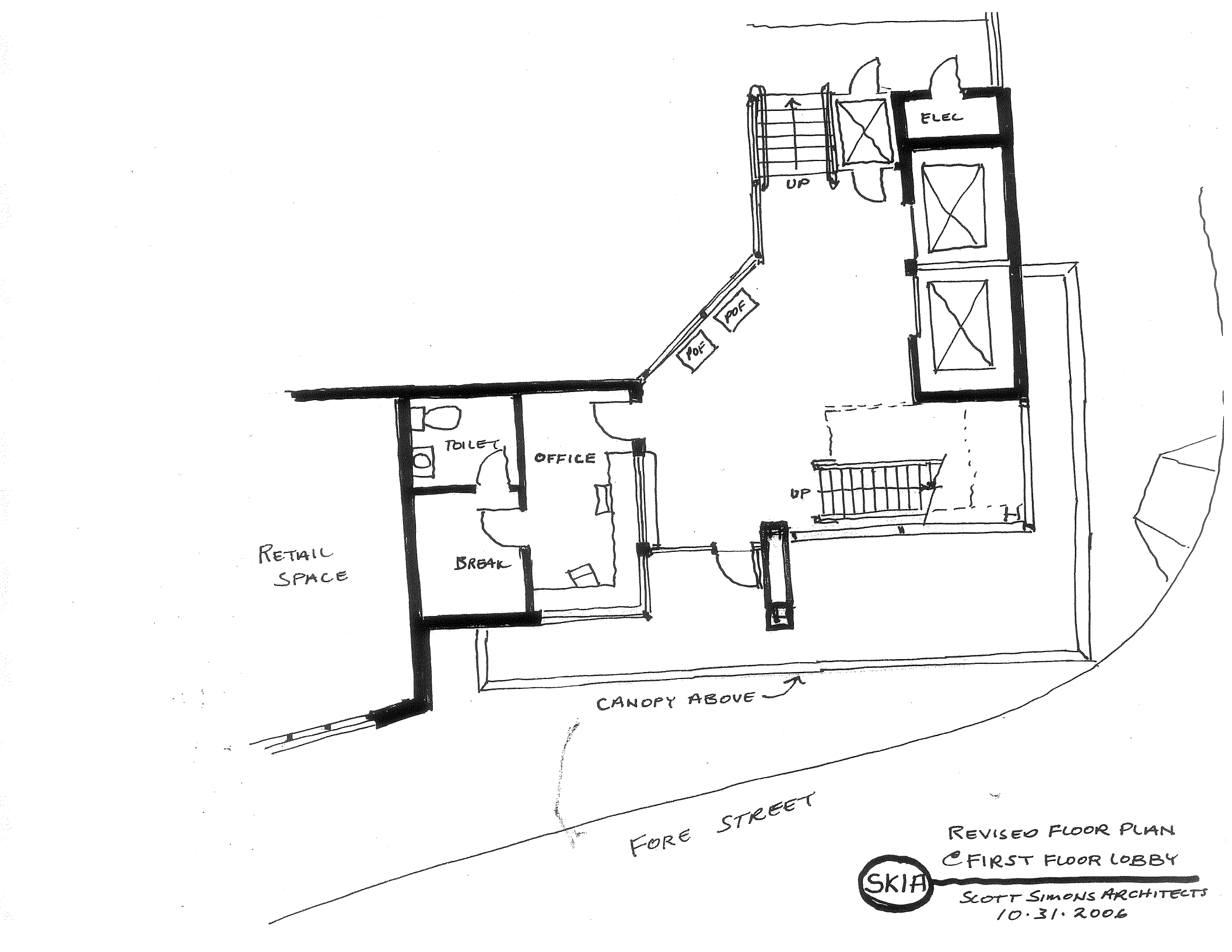
LONGFELLOW GARAGE

REVISED FLOOR PLAN @ FIRST FLOOR LOBBY

SK-1

SCOTT SIMONS ARCHITECTS

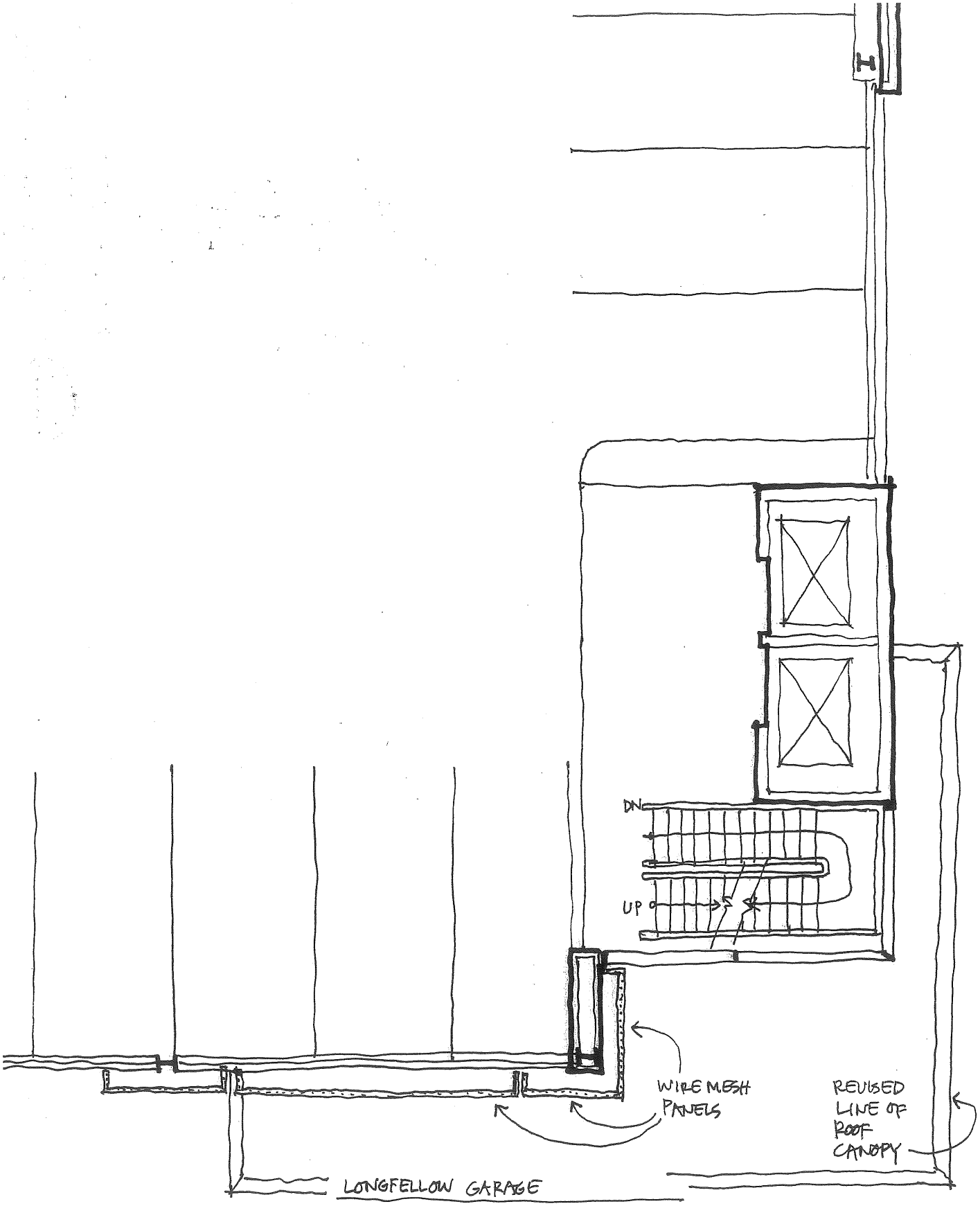
10.26.06



REVISED FLOOR PLAN
© FIRST FLOOR LOBBY

SKIA

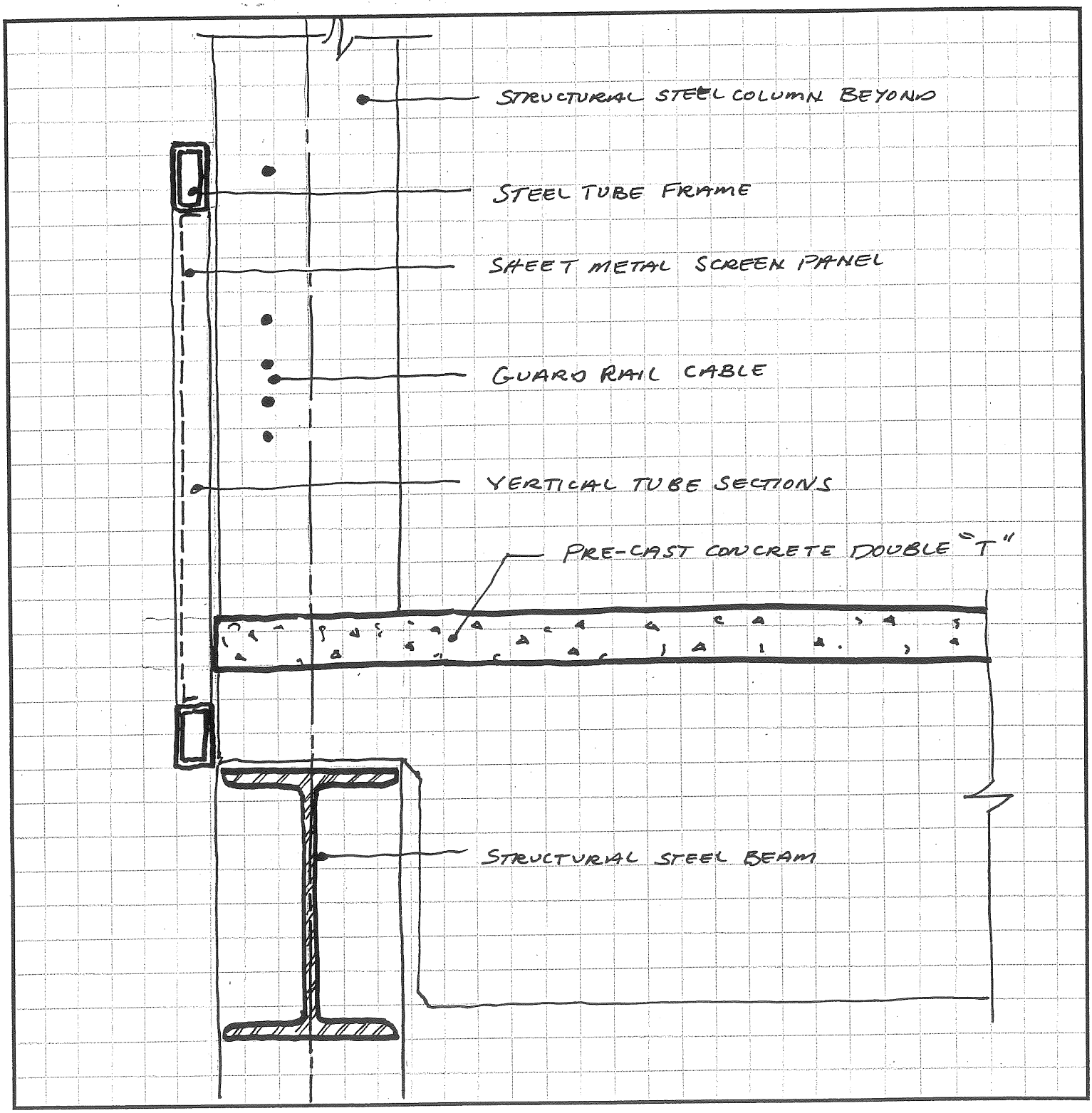
SCOTT SIMONS ARCHITECTS
10.31.2006



REVISED FLOOR PLAN @ SECOND FLOOR LOBBY

SK-2

SCOTT SIMONS ARCHITECTS
10.26.06



SK4D DECK EDGE DETAIL

SCOTT SIMONS ARCHITECTS

10.31.2006

WOODARD & CURRAN
Engineering • Science • Operations

CORPORATE OFFICES: Maine, Massachusetts,
New Hampshire, Connecticut, Florida
Operational offices throughout the U.S

December 16, 2005

Bill Needelman
City of Portland
389 Congress Street
Portland, ME 04101

Re: The Longfellow at Ocean Gateway, Major Site Plan Application

Dear Bill:

On behalf of Riverwalk, LLC, we are submitting nine (9) copies of the Major Site Plan and Subdivision Application for The Longfellow at Ocean Gateway, with all supporting documentation, to be used in Planning Board review. These documents were prepared in accordance with Chapter 14, Land Use, of the Code of Ordinances of the City of Portland, Maine, and meet the applicable sections of the City of Portland, Maine, Technical and Design Standards and Guidelines adopted September 1987, last amended March 2000.

The proposed project involves the construction of a six story mixed use condominium building with retail space, a spa, restaurant, approximately 105 condominium units and 11 townhouses, a six story plus grade parking garage with capacity for approximately 719 +/- vehicles and a five story office building with first floor retail space. Construction of the project is anticipated to begin in the spring of 2006 and be completed by early spring of 2008.

We understand that Ocean Gateway's Major Site Plan Permit will need to be amended to remove the 1.06 acre gravel lot that the City is in the process of selling to Riverwalk, LLC. It is our understanding that this amendment will be processed by the City concurrent to the review and approval of this project.

We look forward to working with your office and the Planning Board on this project. Please do not hesitate to contact Woodard & Curran if you have any questions or comments.

Sincerely,
WOODARD & CURRAN INC.

David Senus, PE
Project Engineer

DAS
203555.05

Enclosure

PORTLAND MAINE
Strengthening a Remarkable City, Building a Community for Life • *www.portlandmaine.gov*

Corporation Counsel
Gary C. Wood

October 5, 2005

Associate Counsel
James R. Adolf
Elizabeth L. Boynton
Donna M. Katsiaficas
Penny Littell

Drew Swenson
Swenson & Co.
2 Market Street
Portland, Maine 04101

Re: Historic Preservation Review – Riverwalk

Dear Drew:

You have asked for clarification as to the role the Historic Preservation Board will play in the review of the Riverwalk project. I met with Deb Andrews and Bill Needleman today to go over the general parameters of the project and questions of jurisdiction.

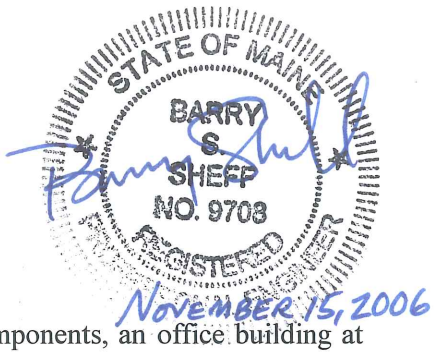
The former Grand Trunk Railroad office building (Turner Barker) is the easternmost structure within the boundaries of the Portland Waterfront Historic District—see enclosed map. The historic district encompasses the Grand Trunk property as a whole, not just the building itself. As such, all exterior and site alterations proposed for the property are subject to review and approval by the Historic Preservation Board. Accordingly, we are in agreement that the review will proceed as follows:

The Historic Preservation Board will review alterations proposed for the Turner Barker building itself and the lot upon which the Turner Barker building sits; the review will address the building connections to the balance of the Project, as well as the proposed circulation improvements that fall within the boundaries of the lot. You will be applying for a Certificate of Appropriateness for the proposed work. The Historic Preservation Board makes the final determination on your request for a Certificate of Appropriateness.

As part of the site plan review process, the Planning Board will review a proposed structure or object that is within 100 feet of the Historic District or Building to determine that it is "not incongruous to the architectural style or character" of the district when viewed from the street or public open space-- see Section 14-526 (18) of the City Code.

The Planning Board review and the Historic Preservation Board review can occur on parallel tracks and at the same time. It is anticipated that any potentially conflicting

6. STORMWATER MANAGEMENT



6.1 OVERVIEW

The Eastern Waterfront Development project comprises three distinct components, an office building at the corner of Fore and India Streets, a parking garage on the northwest side of Fore Street between India Street and the proposed Hancock Street extension, and a mixed-use complex that will include residential condominiums, retail shops, a restaurant and subsurface parking, inland from Commercial Street between India and Hancock Streets. Each aspect of the project is further explained and indicated on site plans in Section 1 of this application.

The site consists of four lots, three of which are privately owned and one City owned (under a Purchase & Sale Agreement with Riverwalk LLC), occupying a total area of approximately 2.92 acres. The current use of the proposed development site is primarily surface parking with a few small commercial (storage/restaurant/lounge/office) and residential buildings. Use of the properties adjacent to the development site include manufacturing, restaurant/lounge, governmental and multi- and single-family residential. A copy of Sheet C-101: Existing Site Plan is attached in Section 1 of this application.

6.2 SITE CHANGES

Buildings and structures to be constructed include three buildings with a combined footprint of approximately 85,100 square feet. The proposed mixed-use complex will incorporate the existing Grand Trunk Building. The other two proposed buildings are a parking garage and professional office building. An open-air plaza is proposed in the center of the condominium portion of the mixed-use complex. Landscaping totaling about 0.34 acres is proposed in and around proposed structures.

Table 6.1 indicates the changes in impervious surfaces on the site as a result of the proposed project:

Table 6.1: Impervious Area Summary

	Total Area (acres)	Impervious Area (acres)	Percent Impervious (%)
Pre-Development	2.92	2.92	100.0
Post-Development	2.92	2.58	88.4
CHANGE	**0.00**	**-0.34**	**-11.6**

6.3 STORMWATER MANAGEMENT DESIGN

Currently, the entire area of the site located to the north of Fore Street is collected in catch basins and discharged to the City of Portland combined sewer. The runoff joins the municipal wastewater flow and is piped to the India Street Pump Station and then pumped to the East End Wastewater Treatment Plant. During large rain events, when capacity of the municipal combined (sanitary and storm) sewer is

exceeded, the combined sewer overflow (#23) is activated at the foot of India Street and discharges to Casco Bay occur.

A small portion of the project area between Fore Street and Commercial Street also drains to the City of Portland combined sewer. This area is located nearest India Street. The majority of the area between Fore Street and Commercial Street drains to the east onto the adjacent Ocean Gateway site before discharging into the Fore River. Presently, approximately 51% of the proposed site discharges stormwater runoff to the combined sewer.

As a result of the proposed project, all of the area between Fore Street and Commercial Street will discharge into the stormwater collection system along Hancock Street (currently under construction as part of the Ocean Gateway Project). Runoff from the Parking Garage and the adjacent landscaped areas will be discharged to the stormwater collection system along the connection between the two segments of Hancock Street (to be constructed by the City adjacent to the proposed project). Only the proposed office building at 25 India Street will continue to discharge runoff into the combined sewer. As a result of the proposed project, area discharging to the combined sewer is reduced to only about 14%.

During design of the Ocean Gateway project, the proposed storm drain system and outfall were designed to hydraulically accommodate flows that could be anticipated from future build-out of the area. During initial design of the Longfellow project, the increased area discharged to the Ocean Gateway stormwater system resulted in an increase in the peak runoff rates in the Ocean Gateway system. In order to prevent this increase in the peak runoff rate, subsurface stormwater detention structures will be provided at the Longfellow Residences and Retail complex and at the Parking Garage. The structures to be used will be the StormChamber system by Hydrologic Solutions, the StormTech system by StormTech, or another similar product. A Product Installation Brochure, consisting of specifications and details, for the StormChamber system has been attached to this section. Product Specifications and Typical Details for the StormTech product have also been attached. Inspection and Maintenance procedures have been included in Section 6.4.3.

The subsurface detention structures will be designed with each detention system embedded within a layer of stone extending 1 foot below the system to 6 inches above the system. Due to differing heights between the two systems, the depth of this stone layer will be 4.5 feet for the StormChamber system and 4 feet for the StormTech system. The StormChamber system is slightly taller and results in a slightly smaller footprint for equivalent storage. The final design of the subsurface stormwater detention structure will be performed by the selected vendor.

At the Parking Garage detention structure, a 6" outlet is at the base of the stone layer (elevation 19.0'), another 6" outlet is at the base of the manufactured structure (elevation 20.0'), and a third 12" outlet is provided one foot below the top of the manufactured structure (22.0' for the StormChamber system and 21.50' for the StormTech system). At the Residences and Retail complex detention structure, an 8" outlet is at the base of the stone layer (elevation 9.5'), another 8" outlet is at the base of the manufactured structure (elevation 10.5'), and a third 12" outlet is provided one foot below the top of the manufactured structure (12.5' for the StormChamber system and 12.0' for the StormTech system).

The detention structure at the Residences and Retail complex is site limited in size; the detention results in a drop in peak runoff rate of approximately 15% through the system during the 25-year storm. The detention structure at the Parking Garage results in a reduction of the peak runoff rate of approximately 45%.

An evaluation was performed to determine whether the capacity designed into the Ocean Gateway project could accommodate stormwater discharge from the project site. Although the area that drains to the City stormwater collection system will be expanded to include the Longfellow Parking Garage and adjacent open area, the peak runoff rate at the Ocean Gateway Stormwater Treatment Unit #2 is slightly decreased. No additional infrastructure is required at the Ocean Gateway site to accommodate runoff from the Longfellow project. For further information, see the Woodard & Curran Design Memorandum dated October 13, 2006, revised November 3, 2006, regarding The Longfellow - Impacts on Ocean Gateway Stormwater Conveyance and Treatment Measures, which has been attached to this section.

6.3.1 Applicable Standards

The latest version of the MeDEP Chapter 500: Stormwater Management (MeDEP Chapter 500) was consulted to determine the standards to which the proposed project must be designed. More than one acre of area will be disturbed during construction of the project; therefore, some level of stormwater permitting is required.

Paragraph 13 of Chapter 500 states that "[n]ew construction on an impervious area created prior to July 1, 1997 is not counted when determining the amount of impervious area on a parcel." Because the entire site is impervious (gravel parking, concrete, pavement and buildings), and has been since before July 1, 1997, the proposed project will not create any impervious surface. Further, there will be less than 5 acres of developed area. Therefore, the proposed project qualifies for a Stormwater Permit by Rule.

The standards from Chapter 500 that could be considered applicable to the project are: 4A, "Basic Standard" because more than one acre will be disturbed; and 5E "Discharge to Public Storm Sewer System" because a portion of the development will discharge runoff to the City of Portland combined sewer system. An Erosion and Sedimentation Control Plan has been prepared to address the Basic Standards and was attached previously. The City and PWD were contacted to get approval to continue discharging runoff to the combined sewer at the same time that the two entities were contacted to obtain sewer capacity letters. These letters and all responses were attached previously to Section 5 of this Application.

The City of Portland Technical and Design Standards and Guidelines (City Standards), Section V – Stormwater Management Standards states that all developments must comply with the standards set forth in MeDEP Chapter 500 as discussed above. Additionally, the standards state that pre-development peak runoff rates from the site must be maintained, though it is unclear whether this requirement will remain once the City has amended its standards to more closely reflect the updated MeDEP Chapter 500. As a result, the project has been designed to comply with Section V of the City Standards to the extent that MeDEP Chapter 500 can still be met. Should occasion arise where the two sets of standards conflict, MeDEP Chapter 500 will govern.

6.3.2 Stormwater Quantity Calculations

The intent of this section is to address the effects of site runoff from a proposed development project on the local watershed. The stormwater modeling presented herein compares the existing site conditions with the proposed site conditions (pre-development and post-development).

Stormwater modeling was done using the HydroCAD Stormwater Modeling System by Applied Microcomputer Systems. HydroCAD uses TR20 runoff calculation methodology. The computation sheets resulting from the models are attached at the end of this section.

The runoff curve numbers (RCN) for the subcatchments have been computed using the TR55 methodology. The subcatchments were divided based on land use and acreage measurements were used to compute a weighted (composite) RCN.

The time of concentration (Tc) paths for the subcatchments were selected to represent the most hydrologically remote point of the watershed. The Tc paths are shown respectively on the Pre-Development and Post-Development Stormwater Plans. Note that the Tc computations contain time calculations using TR55 sheet flow, shallow concentrated flow equations, and circular channel (pipe).

Soils information used in the computations was obtained from the Soil Survey of Cumberland County, Maine, USDA Soil Conservation Service (SCS Survey). Although the majority of the site lies on land made up of fill material, the soil surrounding the project site is Hinckley gravelly sandy loam, Hydrologic Soils Group (HSG) "A". As such, HSG "A" was used to model the project site. Geotechnical Reports for each building associated with the proposed project were later referenced to confirm the use of HSG "A". Copies of each Geotechnical Report have been included with this submission.

For this project, the 2-, 10-, and 25-year return frequency storms of 24-hour duration were analyzed. A Type III rainfall distribution was applied to these storms. The 2-, 10-, and 25-year 24-hour precipitation measurements (3.0 inch, 4.7 inch, and 5.5 inch, respectively) were taken from Appendix D of the BMPs.

6.3.2.1 Pre-Development Condition

To model the project, the existing site was separated into multiple drainage area subcatchments. Subcatchments 1X through 5X represent the Pre-Development conditions. These subcatchments are depicted in Figure 6.1 attached to this section. Subcatchments 1X and 2X represent the area of the project to the north of Fore Street. Subcatchments 3X through 5X represent the portions of the project south of Fore Street.

The stormwater collection system, currently under construction as part of the Ocean Gateway project, has been included in the Pre-Development condition using zero area Ponds at the catch basins. Zero area Ponds were used so that the storm drain piping could be modeled as outlets. With the piping modeled as outlets, the HydroCAD software is able to account for entrance losses and pressure flow, rather than simply Manning's flow. Ponds D2 and D3 represent the stormwater collection system along the extension of Commercial Street. Ponds D7 and D8 represent the stormwater collection system along the extension of Hancock Street.

Two study points have been identified at the site for the purpose of quantity modeling, represented by Reaches FR and CS. Reach FR is used to quantify the amount of runoff that flows from the site to an adjacent parcel without any true collection, and ultimately into the Fore River. Reach CS is used to quantify the runoff that flows into the City of Portland combined sewer.

The Pre-Development Stormwater Plan drawing, attached to this section, depicts the subcatchments, reaches, and time of concentration paths utilized in the model.

6.3.2.2 Post-Development Condition

For the proposed conditions, two models have been developed, one for each potential subsurface detention unit. For each, Subcatchments 1AP, 1BP, 2P, 3P, 4P, 5AP, 5BP and 5CP define the Post-Development subcatchments. These subcatchments are depicted in Figure 6.2 attached to this section.

The subcatchments have been numbered to roughly correspond to similarly named Pre-Development subcatchments. Ponds UH1 and UH2 have been added, representing the additional stormwater collection system along the connection between the two segments of Hancock Street (to be constructed by the City adjacent to the proposed project).

Ponds 1B and 5C have also been added to the post development models, representing the subsurface detention structures. These two ponds are the only elements that differ between the two post-development models. The HydroCAD software includes both the StormChamber system and the StormTech system as available default storage types. The ponds were modeled as they will be designed, with each detention system embedded within a layer of stone (40% void space) extending 1 foot below the system to 6 inches above the system.

The same two Study Points identified in the Pre-Development condition have also been included in the Post-Development condition in order to compare runoff. The Post-Development Stormwater Plan (Figure 6.2) is attached at the end of this section, depicting the subcatchments, reaches, ponds, and time of concentration paths utilized in the model.

6.3.2.3 Summary

Peak runoff values calculated for the Pre-Development and Post-Development conditions are listed in Table 6.2. The peak discharge to the Combined Sewer does not occur exactly at the same point in time as the peak discharge to the Fore River. The "TOTAL" peak discharge is the peak discharge associated with a particular point in time, and therefore is not simply the sum of the Combined Sewer and Fore River peak discharges. Flow rates are present for both detention systems; results for the StormChamber system are designated with an "A" and results for the StormTech system are designated with a "B".

Table 6.2: Runoff Summary

STUDY POINT	PEAK RUNOFF 2 Year (CFS)	PEAK RUNOFF 10 Year (CFS)	PEAK RUNOFF 25 Year (CFS)
Fore River – FR (Pre-Development)	4.66	6.59	7.74
Fore River – FR (Post-Development)	4.77 [A] / 4.55 [B]	7.36 [A] / 7.14 [B]	8.87 [A] / 8.89 [B]
CHANGE IN RUNOFF	**0.11 [A] / -0.11 [B]**	**0.77 [A] / 0.55 [B]**	**1.13 [A] / 1.15 [B]**
Combined Sewer - CS (Pre-Development)	5.17	8.20	9.62
Combined Sewer - CS (Post-Development)	0.99	1.73	2.07
CHANGE IN RUNOFF	**-5.18**	**-6.47**	**-7.55**
TOTAL (Pre-Development)	9.15	14.53	17.05
TOTAL (Post-Development)	5.56 [A] / 5.33 [B]	8.76 [A] / 8.46 [B]	10.31 [A]/10.38 [B]
CHANGE IN RUNOFF	**-3.59 [A] / -3.82 [B]**	**-5.77 [A] / -6.07 [B]**	**-6.74 [A] / -6.67 [B]**

[A] - Detention using StormChamber system by Hydrologic Solutions.

[B] - Detention using StormTech system.

As shown in Table 6.2 and the appended calculations, overall runoff from the site decreases during the 2-, 10- and 25-year storms as a result of the proposed project. This decrease is possible by design and with the use of subsurface stormwater detention. There is a significant decrease in the amount of runoff to the City's combined sewer system, with a corresponding, though much less significant, increase in the amount of runoff to the Fore River during the 10- and 25-year storms. During the 2-year storm, peak runoff to the Fore River is slightly increased using the StormChamber system, and slightly decreased using the StormTech system; however, the 0.11 cfs difference in flow in each case is negligible (+/- 2%).

The Fore River is tidal in the area where runoff from the site is discharged and therefore represents an ocean discharge. Further, during the Ocean Gateway design, the stormwater collection system was sized to accommodate the area between Commercial Street and Fore Street. Since the total runoff from the site will be decreased from the pre-development condition, the proposed development is in compliance with Section V of the City Standards.

The watershed routing diagram and model output from HydroCAD is attached at the end of this section for both the Pre-and Post-Development conditions.

6.3.3 Stormwater Quality

As stated previously, the site is currently 100% impervious surface. Under the Pre-Development conditions, 51% of stormwater runoff at the project site discharges to the City's combined sewer system. In the Pre-Development condition, the remaining 49% of the site drains untreated off site, and ultimately into Portland Harbor at the mouth of the Fore River by overland flow.

In the Post-Development condition, approximately 14% of the site will continue to be discharged to the City's combined sewer system. Under most conditions, the runoff from this area will combine with the City's municipal wastewater and be treated at the East End Wastewater Treatment Plant. However, during large rain events, when capacity of the municipal combined sewer is exceeded, runoff from this area may be discharged to Casco Bay untreated.

For the remaining 86% of the Post-Development site, runoff will be collected and discharged to the stormwater collection system constructed as part of the Ocean Gateway project. The runoff that passes from the site into the stormwater collection system will be treated through the use of water quality inlets in the catch basins (Casco Traps) and the Ocean Gateway Stormwater Treatment Unit 2.

In addition, non-structural measures to control non-point source pollution will be used. These non-structural measures include those specified as basic standards in the new MeDEP Chapter 500. Some maintenance aspects of the non-structural methods have been included in Section 6.4 below, but a more comprehensive list and description is included in the Erosion and Sedimentation Control Plan previously submitted.

6.4 MAINTENANCE OF STORMWATER SYSTEMS

Upon completion of the project, Riverwalk LLC will assume responsibility for overseeing the property, including the inspection and maintenance of the site's stormwater drainage system, treatment measures, roadways, parking areas, permanent erosion control measures, buffers, and landscaped areas located outside of City right-of-ways. Inspection and Maintenance Forms have been attached to this section. A Maintenance Supervisor will be hired prior to occupancy. Riverwalk, LLC can be contacted at: 2 Market Street, Suite 500, Portland, ME, 04101; (207) 775-2464 (phone) and (207) 775-2465 (fax).

6.4.1 Catch Basins

The Maintenance Supervisor will inspect all catch basins in the project site. Catch basins will be inspected semi-annually in spring and fall. These visual inspections ensure the catch basin grate is free of debris and that sediment in the sump has not accumulated above the pipe inverts. If cleaning is required, the Maintenance Supervisor will contract the services of Catch Basin Cleaners [P.O. Box 1579; Meredith, N.H., 03253; (603) 279-3118] or a similar firm.

6.4.2 Parking and Paved Areas

Parking and paved areas will be inspected annually each spring. Visual inspections will enable site roads and parking areas to be kept clean and clear through contracting periodic sweeping and winter plowing as required. The inspections will also ensure pavement markings are repainted as needed to maintain property traffic circulation and parking space delineation. Damaged islands will be repaired promptly. Paved areas will be plowed and sanded as often as necessary to maintain public safety.

The Maintenance Supervisor will have the pavement swept and cleaned within the project site on an annual, as-needed basis. This work will be contracted with Zebra Striping, Inc. [101 Pleasant Hill Rd.; Scarborough, ME, 04074; (207) 883-7081] or a similar firm.

6.4.3 Subsurface Detention Structures

The subsurface detention structure will be inspected semi-annually, in spring and fall, and following major storms, through the maintenance port. These inspections will ensure that runoff continues to drain from the structure and sediment does not build up.

Should the structure fail to drain completely, an attempt will first be made to remove blockage from the outlet by either snaking or high pressure water. If sediment is observed to have built up in the structure, sediment will be resuspended using high pressure water through the maintenance port and captured at the outlet of the structures for removal from the system. If these efforts are unsuccessful, a portion of the structure will need to be excavated to remove the blockage within the structure itself. The Maintenance Supervisor would hire a local contractor to perform this work.

6.5 CONCLUSION

The project has been designed to comply with the new MeDEP Chapter 500: Stormwater Management and with Section V of the City Standards to the extent possible. The site has been designed to reduce the area discharging stormwater runoff to the combined sewer from 51% of the site to 14% of the site.

The proposed project will have only minimal effect on runoff relationships at, and downstream of, the site. The amount of runoff discharged to the City of Portland combined sewer will be greatly decreased. Depending upon pricing and selection of the subsurface detention structures, the rate of runoff discharged from the site to the Fore River will increase or decrease slightly during the 2-year storm, though either would be negligible. The rate of runoff will decrease during the 10- and 25-year storms. Since the total runoff from the site will be decreased from the pre-development condition, the proposed development is in compliance with Section V of the City Standards. The project will have no adverse effect on any runoff relationship and will maintain available capacity within the Ocean Gateway Stormwater Treatment Unit #2.

An Erosion and Sedimentation Control Plan has been previously submitted which describes non-structural measures to be used at the site both during and after construction to protect water quality to the extent practicable. Upon completion of the project, maintenance responsibility for the site stormwater conveyance and treatment measures will be the responsibility of Riverwalk, LLC.

6.6 ATTACHMENTS

Stormwater System Inspection and Maintenance Forms

StormChamber Installation Brochure

StormTech Product Specifications

StormTech SC-740 Chamber Detail Sheet

Woodard & Curran Design Memorandum dated October 13, 2006, revised November 3, 2006, regarding The Longfellow - Impacts on Ocean Gateway Stormwater Conveyance and Treatment Measures

Figure 6.1 – Pre-Development Stormwater Management Plan.

Figure 6.2 – Post-Development Stormwater Management Plan.

HydroCAD Calculations (Pre-Development).

HydroCAD Calculations (Post-Development with StormChamber system).

HydroCAD Calculations (Post-Development with StormTech system).

THE LONGFELLOW
CATCH BASIN
SEMI-ANNUAL VISUAL MONITORING RECORD

CB#: _____ Date:_____ Time:_____

Last Date and Approximate rainfall amount:_____
Estimated depth of water in sump_____

Characteristics of Catch Basin:

Grate Condition_____

Outlet Condition_____

Sediment Present_____

Floatables or Oil Sheen _____

Other Observances _____

_____

_____

Observations of surrounding drainage area during visual monitoring: _____

_____

_____

Signature of person conducting visual monitoring:

_____ _____

Name Date

_____

Title

THE LONGFELLOW
PARKING LOT
ANNUAL VISUAL INSPECTION RECORDS

Parking Lot # _____
Date/Time _____
Weather Conditions _____
Inspector (s) _____

1. Problems observed:

_____
_____
_____
_____
_____

2. Follow-up actions required following inspection:

_____
_____
_____
_____
_____

3. Name and title of person(s) notified of inspection results:

_____ _____
Name Title date

_____ _____
Name Title date

4. Signature of inspector: _____
Name Title

_____
date

THE LONGFELLOW
SUBSURFACE DETENTION STRUCTURE
SEMI-ANNUAL VISUAL MONITORING RECORD

Date:_____ Time:_____

Last Date and Approximate rainfall amount:_____
Estimated depth of Water in structure (if any)_____

Characteristics of Structure:

Maintenance Port Condition_____
Stored Water Present_____
Sedimentation Present_____
Outlet Pipe Condition_____
Emergency Outlet Pipe Condition_____
Floatables or Oil Sheen _____
Other observances _____
_____
_____

Observations of structure drainage area during visual monitoring: _____
_____
_____

Follow-up actions required as result of observations:

_____
_____

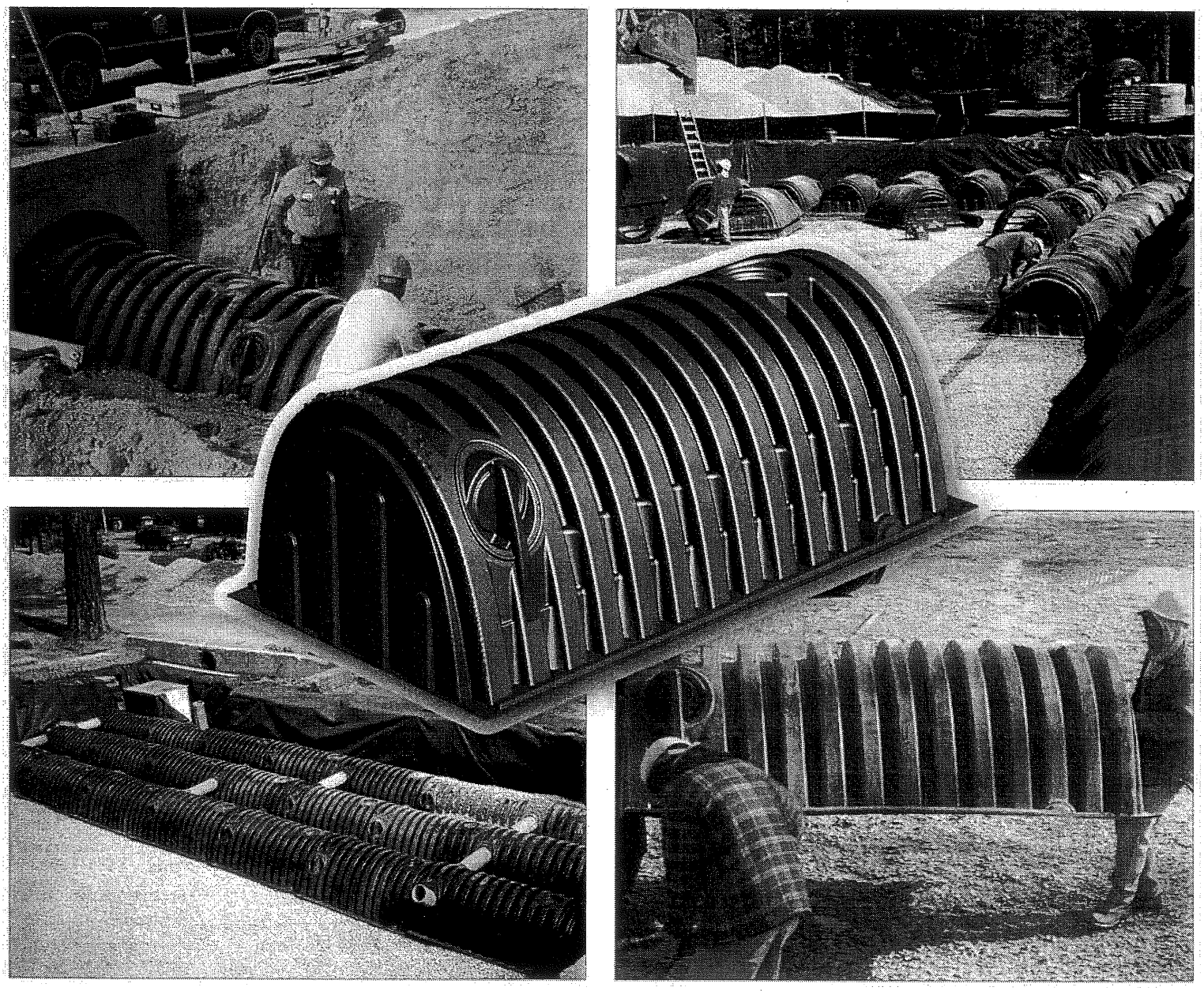
Signature of person conducting visual monitoring:

_____ _____
Name date

_____
Title

StormChamber™

Installation Brochure



StormWater Management brought to you by Hydrologic Solutions

BEFORE YOUR STORMCHAMBERS™ ARRIVE

1. StormChambers™ will arrive either on a flat bed trailer or in an enclosed van. If in an enclosed van, we will try our best to have the driver load the pallets at the tail of the van. However, be prepared with a long chain, metal cable, or strong rope or straps to drag a pallet from the nose of the van. A forklift is the easiest way to unload pallets of StormChambers™.
2. A full pallet of StormChambers™ will weigh approximately 1,700 pounds, will be about 5' wide, 8.5' long, and approximately 8.5' high.

MATERIALS NEEDED

1. Wire cutters to remove the metal bands that secure the StormChambers™ to their pallets.
2. Two 6'-10' lengths of 2x4 studs to use as levers to separate the palletized StormChambers™.
3. 3" drywall screws to close in the bases of the StormChambers™ until the stone is placed around them.
4. Light weight stabilization netting to go under the StormChambers™ to prevent movement of stone – shipped with the StormChambers™.
5. Heavy weight stabilization netting, to be centered below each inspection/clean out riser to prevent removal of stone and soil when vacuum – cleaned with a vacuum truck. Also to be placed under each StormChamber™ to receive storm water from storm drain inlet pipes, to function as a "splash pan" to prevent erosion of underlying stone and soil – shipped with the StormChambers™.
6. 1"-2" crushed, washed, hard stone for the trench base and to backfill around the StormChambers™.
7. 4 ounce non – woven filter fabric to be used at the interface between the stone and soil backfill and to cover trench side walls. Use Mirafi 140N, Mirafi 140NC, Synthetic Industries 401, or AMOCO 4545 or 4535 filter fabric.
8. 4' sections of 8" (unless otherwise specified), smooth walled Schedule 40 or SDR 35 or equivalent pipe for the interconnections between rows of StormChambers™ (check plans for number and location of interconnections).
9. Unless otherwise specified, 10" smooth walled Schedule 40 or SDR 35 or equivalent pipe for inspection/clean out risers (check plans for number and location of risers).
10. Three small angle irons and 0.5" screws for each inspection/clean out riser to support riser onto top portals of StormChambers™.
11. Cleanout caps or tops for inspection/clean out risers.
12. Unless otherwise specified, one casting for each inspection/clean out riser in pavement (East Jordan V – 8450 or equivalent).
13. Unless otherwise specified, concrete and related materials to form 6' x 9' reinforced pads to hold castings for inspection/clean out risers.

EQUIPMENT NEEDED

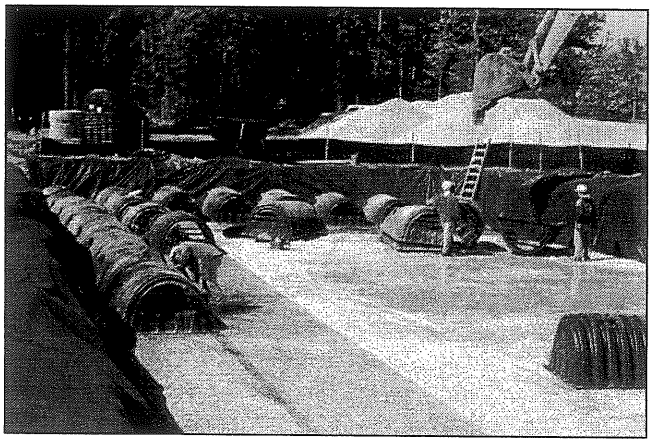
1. Forklift or other type of equipment to unload StormChambers™ (see above).
2. Excavator to dig the trench from the sides and to place stone and soil backfill.
3. Two battery or power operated screw guns to connect bases of overlapping StormChambers™.
4. Saws – All, router bit on a drill, or key hole saw to cut open side and top portals in StormChambers™.
5. Light weight, tracked dozer, not exceeding 1,100 lbs/sf to grade backfill.
6. Hand – operated compactor, small roller, or tracked vehicle for fill compaction. Tracked vehicle must not exceed 1,100 lbs/sf; hand operated compactor or vibratory roller must not exceed a dynamic force of 20,000 lbs.
7. Transit or laser.
8. Stone bucket.

WHEN YOUR STORMCHAMBERS™ ARRIVE

1. Unloading – see "Before Your StormChambers™ Arrrive", above. As a last resort, the pallets can be dragged off of the trailer and dropped on the ground. This will not injure the StormChambers™.
2. Confirm the total number of StormChambers™ and contact HydroLogic Solutions immediately if the count is incorrect.
3. Confirm the number of Start, Middle and End StormChambers™. Each pallet should be marked with the number of each.

TRENCH PREPARATION

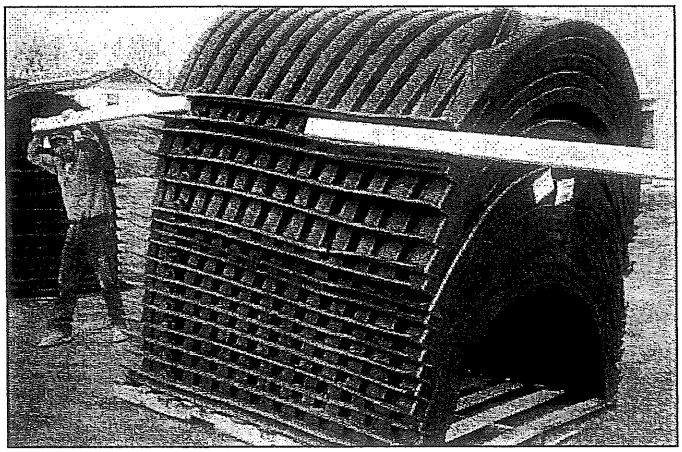
1. Do not excavate trench until dry weather is forecast long enough to allow at least coverage of the StormChamber™ system with filter fabric prior to raining to avoid soil filling void spaces in the stone.
2. Excavate to a width and length sufficient to accommodate the number of StormChambers™ plus a minimum one foot border around the entire bed. The bottom of the bed must be level, unless otherwise specified.
3. If the StormChamber™ system was designed for infiltration and heavy clays are encountered, it is recommended that pea gravel and sharp concrete sand be tilled into the top one foot of trench bed prior to placing the stone base.
4. Do not use heavy equipment on the excavated trench bed in order to avoid soil compaction.
5. If use of heavy equipment on the excavated trench bed can not be avoided, scarify the trench bottom and break up soil clumps before adding the stone base.



Line trench walls, not trench bottom, with 4oz. non – woven filter fabric.

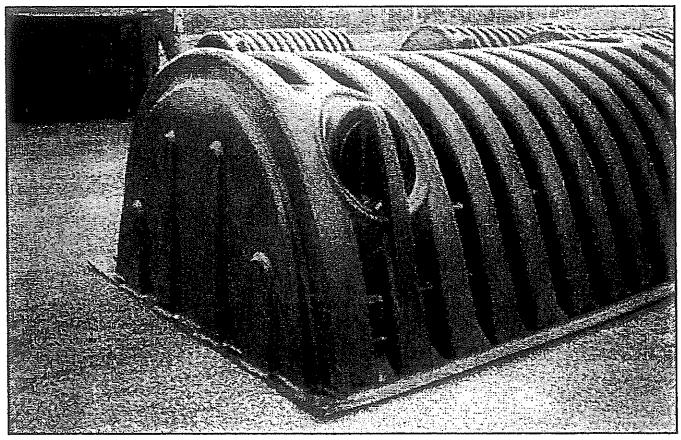
6. Line trench walls with a 4 – ounce non – woven filter fabric such as Mirafi 140N or 140NC, Synthetic Industries 401, or AMOCCO 4545 or 4535. Overlap adjacent filter fabric by at least 2'. Do not place filter fabric under the StormChambers™. The filter fabric will clog, restricting the infiltration capability of the StormChamber™ system.
7. Unless otherwise specified, place 6" of crushed, washed, 1" to 2" hard stone on the bottom of the level and zero grade trench.
8. If it becomes impractical to level the stone base by hand, use a low pressure, tracked dozer, not exceeding 1,100 lbs/sf, maintaining at least 6" of stone under the tracks at all times.
9. Do not use excavated trench as a sedimentation trap or basin during construction. The fine soil particles will accumulate at the soil boundary and restrict the infiltration capability of the system.

STORMCHAMBER™ INSTALLATION



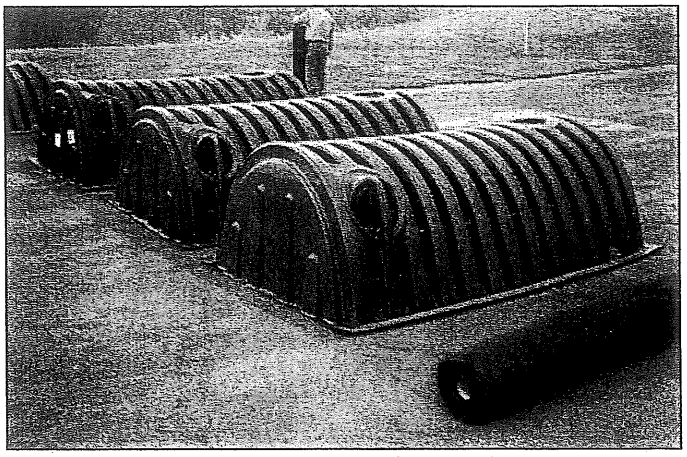
You may need to use 2x4's to separate chambers.

1. You may need assistance in separating the StormChambers™. Based on weather and transit conditions, sometimes the StormChambers™ become tightly compacted. Separate StormChambers™ using two 2x4 studs along one of its sides for leverage. Do not use any damaged units – contact HydroLogic Solutions immediately.



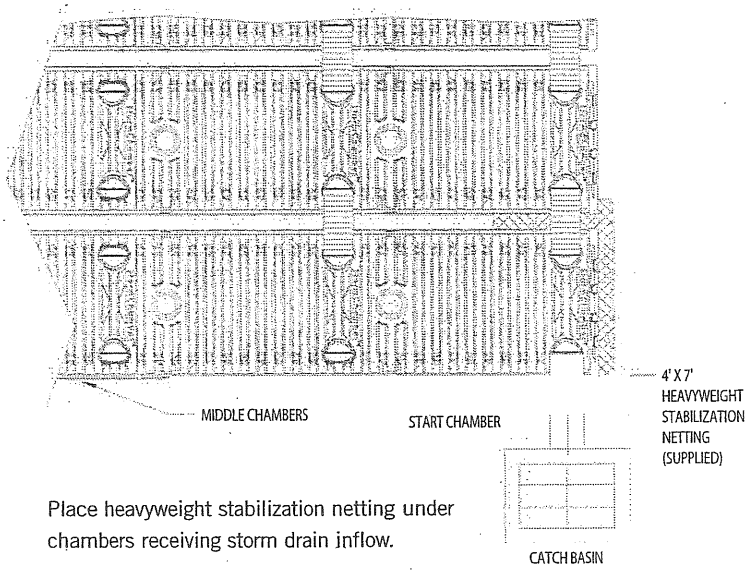
Row placement begins at inflow end of chamber system with Start Model StormChambers™.

2. Start building the StormChamber™ system with the Start Model StormChamber™ at the inflow end of the StormChamber™ system. The Start Models are completely closed at the end with the two side portals.



Place lightweight stabilization netting under StormChambers™.

3. Roll out two rows of the light weight stabilization netting (provided with the StormChambers™) perpendicular to the rows of where the Start StormChambers™ will be placed. Overlap the rows by approximately 1'. Keep the netting flat; if moved, re – straighten and flatten out.

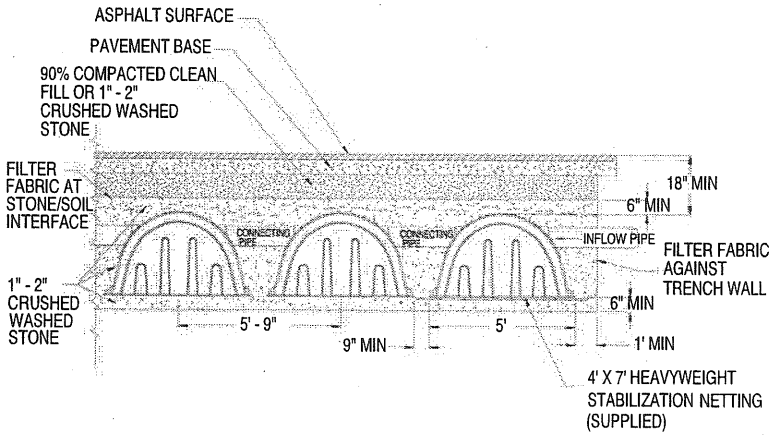


Place heavyweight stabilization netting under chambers receiving storm drain inflow.

4. Place one piece of the heavy weight stabilization netting (provided with the StormChambers™) perpendicular to and under each StormChamber™ that will be receiving inlet storm drain pipes. Place on top of the light weight netting and place one edge of the netting under, and slightly extending beyond, the closed end wall of the StormChamber™. Have the netting extend equally beyond both sides of the StormChamber™. The purpose of the heavy weight stabilization netting is to function as a "splash pan," preventing excavation of the underlying stone and soil, while allowing infiltration to occur.

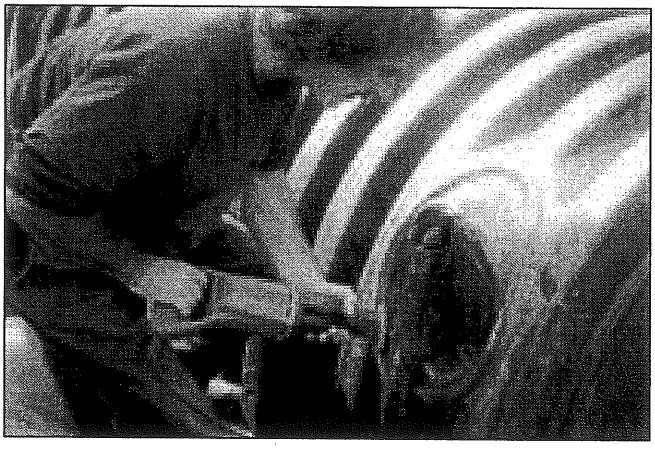
STORMCHAMBER™ INSTALLATION

(CONTINUED)



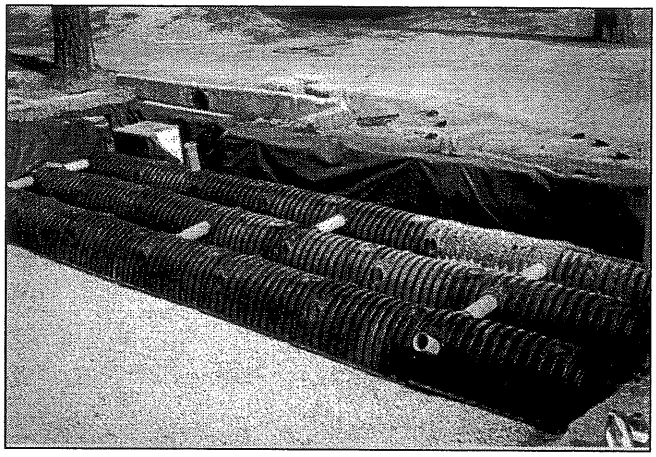
Space StormChambers™ at least 9" apart at the base at the end wall.

5. Place the Start Model StormChambers™ (completely closed at the end with the two side portals), spaced a minimum of 5' 9" apart at the center line of the end walls (9" apart at the base at the end walls). Position the closed ends at least 1' from the trench wall.



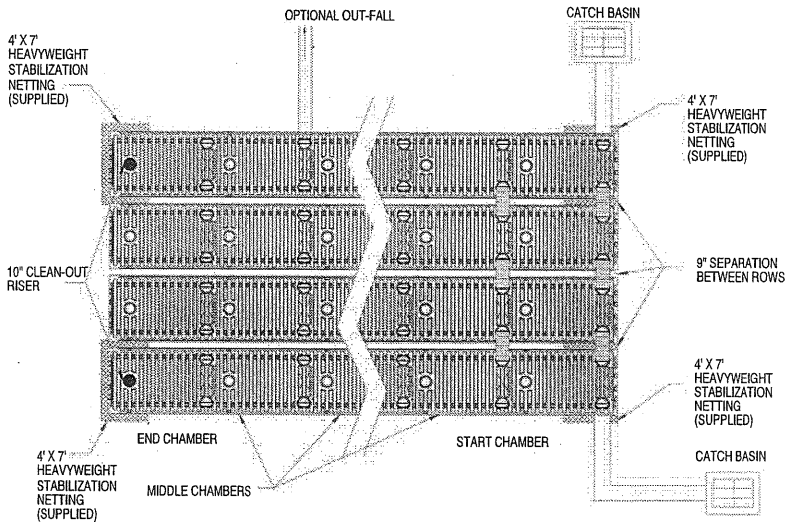
Cut out side portals for smooth wall PVC inflow drainpipe and row connecting pipes. Cut out indentation guides are provided for 8", 10" and 12" pipes.

6. Cut open the side portals for the inflow storm drain pipes (size and location specified on the plans) and lateral connecting pipes between StormChamber™ rows (8" ID Schedule 40 or SDR 35 smooth walled PVC, unless otherwise specified) with a reciprocating saw, router bit on a drill, or keyhole saw along the defined indented circle. If the cut extends more than 0.5" beyond the indented circle, place a piece of the filter fabric over the hole, cut an X just short of the width of the opening, and insert the pipe. The connection does not need to be water tight. 12" ID smooth walled pipe is the largest diameter pipe that can be inserted into the side portals. In order to facilitate placement, install the lateral connecting pipes in the specified StormChambers™ before attaching the next StormChamber™ in the row.



Insert smooth wall PVC row connecting pipes.

7. Mark the midpoints of 8" ID (unless otherwise specified) smooth wall pipe and insert into the adjacent StormChambers™ where specified so that the marked midpoint is centered between the two adjacent StormChambers™. Pipe length should be sufficient to extend 6" – 12" into both adjacent StormChambers™.



Example of typical StormChamber™ layout.

8. If the locations of row – connecting pipes are not specified, add 8" pipes across all rows directly opposite where the inflow storm drain pipe(s) is inserted. This will typically connect at least all the Start Model StormChambers™ of each row. Additional connections across all rows of StormChambers™ should be made so that the total diameter of pipe connections between any pair of rows is approximately equal to the total diameter of all inflow storm drain pipes. For example, a StormChamber™ system with one 12" inflow drain pipe would require 2, 8" pipes between each row of StormChambers™.

STORMCHAMBER™ INSTALLATION

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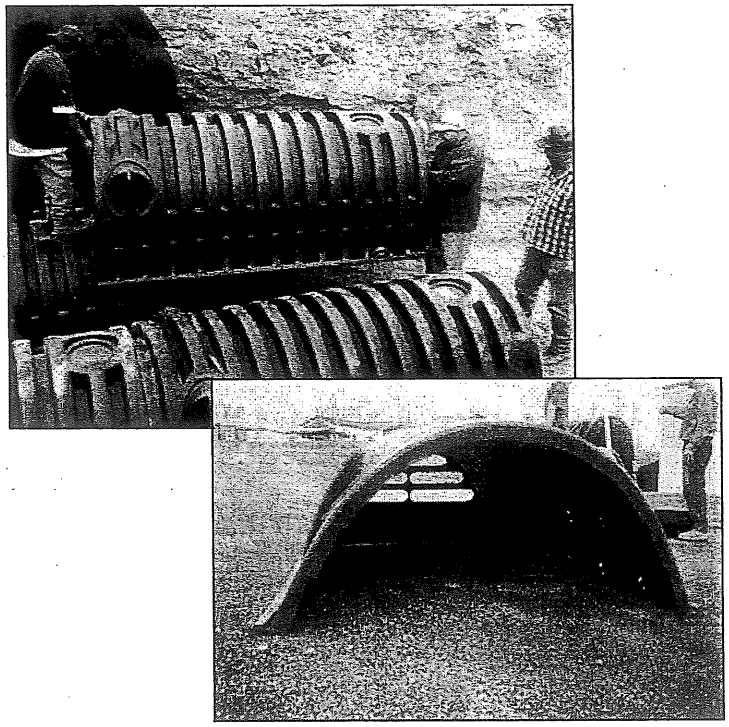
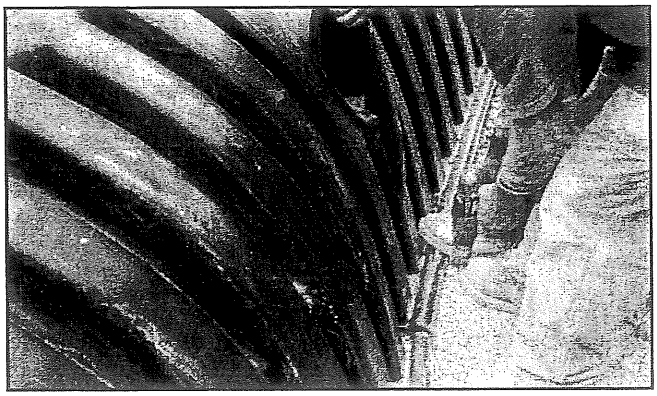


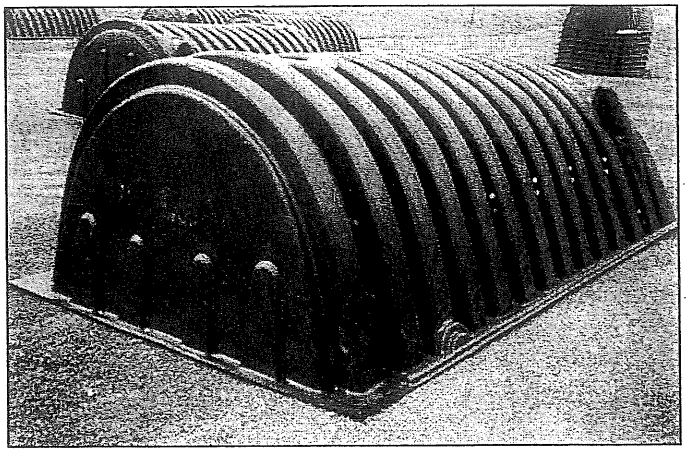
Place first rib of next chamber over last rib of previous chamber.

9. Roll out additional light weight stabilization netting, overlaying the previous sheet by 1' and place the first rib of a Middle Model (completely open at side portal end, partially open at top portal end) over the last rib of each of the Start Model StormChambers™.



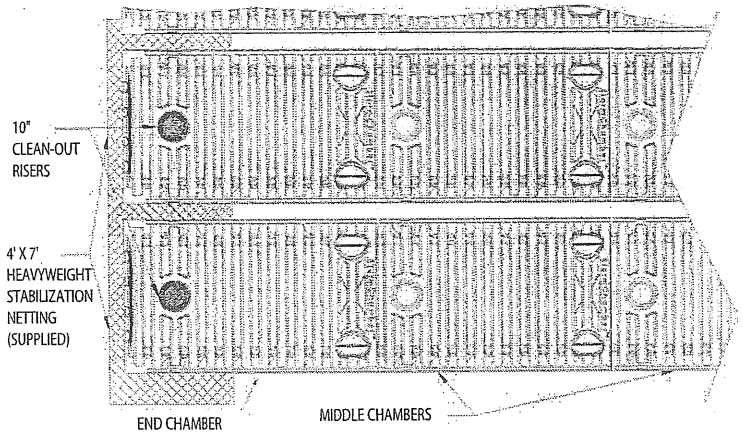
Screw StormChamber™ together to prevent stone inflow.

10. Screw the Middle Model StormChambers™ to the Start Models near their base on both sides with regular 3" dry wall screws. One screw on each side should be sufficient to temporarily hold the StormChambers™ together until the stone is placed. The gap between the two StormChambers™ near their base must be closed enough to prevent stone from migrating into them to prevent the potential for finished surface subsidence.



End each row with and end model StormChamber™ which is closed at the top portal end and open at the side portal end.

11. Continue placing and screwing the rest of the StormChambers™, one at a time, as necessary, inserting any additional lateral – connecting pipes as specified, leaving at least 1' between the end of the End Model (completely open at the side portal end, completely closed at the top portal end) and the trench wall.



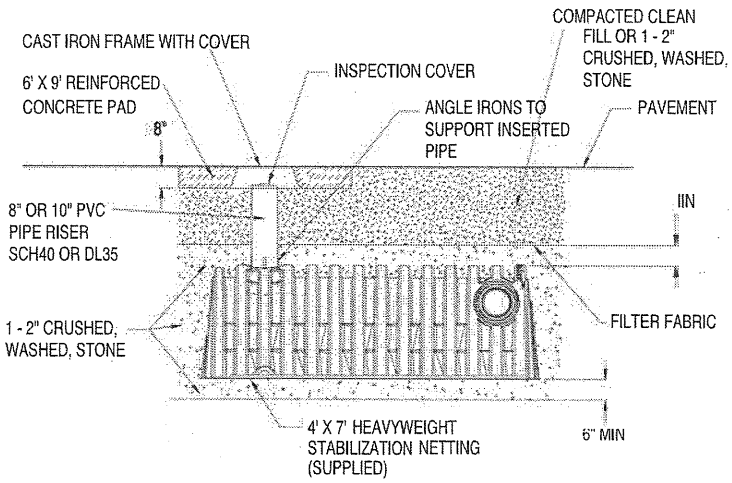
Place heavyweight stabilization netting under chambers with cleanout risers.

12. Place one piece of the heavy duty stabilization netting under the top portal end of each StormChamber™ that will be installed with a 10" PVC riser for access by a vacuum truck for clean out. Extend the netting equally beyond both sides of the StormChamber™ and extend about 1' beyond the end wall of the StormChambers™. The purpose of the netting is to prevent the stone and soil from being sucked up by the vacuum truck.

13. For large StormChamber™ systems it may be necessary to install and backfill a few Stormchambers™ of all rows at a time.

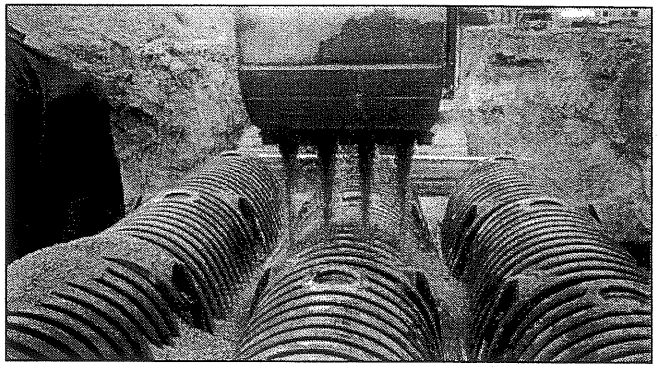
STORMCHAMBER™ INSTALLATION

(CONTINUED)



Install cleanout/inspection risers pipes.

14. Cut a hole in the top portal for a 10" ID smooth walled SDR 35 or PVC Schedule 40 riser – along the larger of the two indented circles, unless an 8" pipe is specified. If the cut extends more than 0.5" beyond the cut out, place a piece of the filter fabric over the hole, cut an X slightly shorter than the width of the opening, and insert the pipe. Attach three small angle irons equally spaced approximately 1' up from the end of the pipe. Use 0.5" screws on riser pipe to prevent restricting insert of vacuum truck clean out tube. It is not necessary to screw the angle irons to the StormChamber™. The purpose of the angle irons is simply to support the pipe until the backfill is placed. Insert the bottom 1' of pipe into the top portal and backfill. Attach top of riser pipe to a "Fernco Type" rubber cap, or to a cleanout cover assembly, as specified on the plans. Place an access casting in a concrete pad above, once all fill is placed, for risers in pavement.



Deposit 1" – 2" crushed, washed, hard stone directly along the centerline of the StormChambers™.

15. Deposit 1" – 2" crushed, washed, hard stone directly along the centerline of the StormChambers™ to evenly flow down each side to keep the StormChambers™ in proper alignment. Do not place the stone directly against the closed end walls at the start and end of the rows. Let the stone fall in place at the StormChamber™ end from the top of the StormChamber™. Add stone to at least 6" above the StormChambers™.

16. Level the stone cover with a vibratory compactor, not to exceed a dynamic force of 10,000 lbs, or with a low pressure, tracked vehicle not exceeding 1,100 lbs/sf.

IMPORTANT: If low pressure, tracked dozer is used, do not run dozer on anything less than 6" of stone above the StormChambers™. Spread stone in small piles to prevent movement of the StormChambers™. Caution must be exercised when placing stone on top of the StormChambers™ so that excessive pressure is not applied directly on the StormChambers™ by equipment "buckets".

17. Cover the stone with 4 ounce non – woven filter fabric. Overlap adjacent sheets by at least 2'.

BACKFILLING

1. Backfill soil must be free from large stones and large organic material (e.g. tree limbs and root stumps), and must be capable of being compacted to at least 90% of the Standard Proctor Test (AASHTO Method T – 99). If not, crusher run or other suitable backfill material must be used. The same type of stone surrounding the StormChambers™ can also be extended up to the pavement sub grade, if desired.
2. Backfill and compaction of the soil backfill must be achieved in lifts 6" – 8" high. Grading of lifts should start in one corner of the system with a low pressure, tracked dozer, with a pressure not exceeding 1,100 lbs/sf, keeping at least 1' of fill in front of the blade at all times. Compact lifts to 90% Standard Proctor with tracked vehicles not exceeding 1,100 lbs/sf, or with a hand operated compactor or vibratory roller not exceeding a dynamic force of 20,000 lbs.
3. Restrict wheeled vehicles to a maximum axle load of 8,000 pounds with 6" of fill over the StormChambers™ and 16,000 pounds with 12" of fill.
4. Keep the StormChamber™ system closed or protected from receiving sediment until the site is completely stabilized.

IMPORTANT: After compaction of backfill and setting of final grade, avoid parking on or traversing over the StormChamber™ installation with heavily loaded trucks and heavy equipment until paved.

IMPORTANT: These instructions assume accepted construction procedures and loaded trucks that do not exceed specified DOT load limits. Uncustomary loads or improper load distributions in vehicles may require additional cover. Contact HydroLogic Solutions for installation under abnormal conditions. Installations not in compliance with these instructions will void the warranty.

Contact HydroLogic Solutions for technical assistance at 1.877.426.9128 or email us at info@hydrologicsolutions.com.

CONTACT INFORMATION

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www.hydrologicsolutions.com

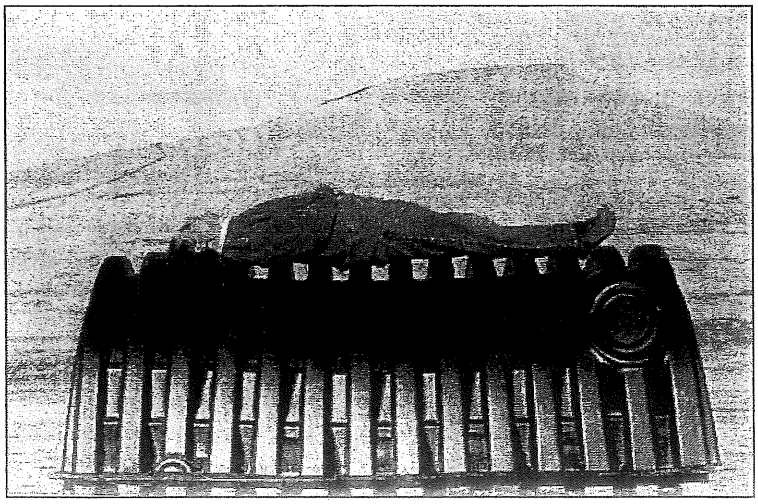
HYDROLOGIC SOLUTIONS LIMITED WARRANTY

HydroLogic Solutions will warranty the structural integrity of each HydroLogic Solutions StormChamber™ in accordance with the installation instructions and is warranted to the original purchaser against defective materials and workmanship for 10 years from the date of purchase. It is the responsibility of the purchaser to inspect the StormChamber™ units prior to installation and to inform HydroLogic Solutions of any defect prior to installation. HydroLogic Solutions will only be responsible for supplying replacement StormChamber™ unit(s). HydroLogic Solutions' liability specifically excludes the cost of removal and/or installation of the units.

There are no other warranties with respect to the units, including no warranties of merchantability or fitness for a particular purpose. This warranty does not extend to incidental, consequential, special, or indirect damages. The company shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other loss or expense incurred by buyer. Specifically excluded from warranty coverage is damage to the units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the units, improper construction protocols, installation of the units not consistent with HydroLogic Solutions' installation instructions, placement by buyer of improper materials into buyer's system, or any other event not caused by the company. HydroLogic Solutions shall not be responsible for any loss or damage to the buyer, the units, or any third party resulting from its installation or shipment. Buyer shall be solely responsible for ensuring that installation of the system is completed in accordance HydroLogic Solutions' installation instructions and with all applicable laws, codes, rules and regulations.

Inspect all shipment within 5 days of receipt of StormChambers™. Failure to advise HydroLogic Solutions of defects on shipments within this period will constitute acceptance of the shipment.

This warranty shall not apply to any party other than the original buyer. Furthermore, no company representative has the authority to modify or change this warranty in any manner.



The StormChamber™ is protected by the folowing U.S. Patents: 6,361,248; 6,612,777; 469,187; 465,545. Canadian Patents: 2,356,592. Other U.S. and Canadian Patents Pending.

STORMTECH PRODUCT SPECIFICATIONS

1.0 GENERAL

1.1 STORMTECH CHAMBERS ARE DESIGNED TO CONTROL STORMWATER RUNOFF. AS A SUBSURFACE RETENTION SYSTEM, STORMTECH CHAMBERS RETAIN AND ALLOW EFFECTIVE INFILTRATION OF WATER INTO THE SOIL. AS A SUBSURFACE DETENTION SYSTEM, STORMTECH CHAMBERS DETAIN AND ALLOW FOR THE METERED FLOW OF WATER TO AN OUTFALL.

2.0 CHAMBER PARAMETERS

2.1 THE CHAMBER SHALL BE INJECTION MOLDED OF POLYPROPYLENE RESIN TO BE INHERENTLY RESISTANT TO ENVIRONMENTAL STRESS CRACKING (ESCR), AND TO MAINTAIN ADEQUATE STIFFNESS THROUGH HIGHER TEMPERATURES EXPERIENCED DURING INSTALLATION AND SERVICE.

2.2 THE NOMINAL CHAMBER DIMENSIONS OF THE STORMTECH SC-740 SHALL BE 30.0 INCHES TALL, 51.0 INCHES WIDE AND 90.7 INCHES LONG. THE NOMINAL CHAMBER DIMENSIONS OF THE STORMTECH SC-310 SHALL BE 16.0 INCHES TALL, 34.0 INCHES WIDE AND 90.7 INCHES LONG. THE INSTALLED LENGTH OF A JOINED CHAMBER SHALL BE 85.4 INCHES.

2.3 THE CHAMBER SHALL HAVE A CONTINUOUSLY CURVED SECTION PROFILE.

2.4 THE CHAMBER SHALL BE OPEN-BOTTOMED.

2.5 THE CHAMBER SHALL INCORPORATE AN OVERLAPPING CORRUGATION JOINT SYSTEM TO ALLOW CHAMBER ROWS OF ALMOST ANY LENGTH TO BE CREATED. THE OVERLAPPING CORRUGATION JOINT SYSTEM SHALL BE EFFECTIVE WHILE ALLOWING A CHAMBER TO BE TRIMMED TO SHORTEN ITS OVERALL LENGTH.

2.6 THE NOMINAL STORAGE VOLUME OF A JOINED STORMTECH SC-740 CHAMBER SHALL BE 74.9 CUBIC FEET PER CHAMBER WHEN INSTALLED PER STORMTECH'S TYPICAL DETAILS (INCLUDES THE VOLUME OF CRUSHED ANGULAR STONE WITH AN ASSUMED 40% POROSITY). THIS EQUATES TO 2.2 CUBIC FEET OF STORAGE/SQUARE FOOT OF BED. THE NOMINAL STORAGE VOLUME OF AN INSTALLED STORMTECH SC-310 CHAMBER SHALL BE 31.0 CUBIC FEET PER CHAMBER WHEN INSTALLED PER STORMTECH'S TYPICAL DETAILS (INCLUDES THE VOLUME OF CRUSHED ANGULAR STONE WITH AN ASSUMED 40% POROSITY). THIS EQUATES TO 1.3 CUBIC FEET OF STORAGE/SQUARE FOOT OF BED.

2.7 THE CHAMBER SHALL HAVE FORTY-EIGHT ORIFICES PENETRATING THE SIDEWALLS TO ALLOW FOR LATERAL CONVEYANCE OF WATER.

2.8 THE CHAMBER SHALL HAVE TWO ORIFICES NEAR ITS TOP TO ALLOW FOR EQUALIZATION OF AIR PRESSURE BETWEEN ITS INTERIOR AND EXTERIOR.

2.9 THE CHAMBER SHALL HAVE BOTH OF ITS ENDS OPEN TO ALLOW FOR UNIMPEDED HYDRAULIC FLOWS AND VISUAL INSPECTIONS DOWN A ROW'S ENTIRE LENGTH.

2.10 THE CHAMBER SHALL HAVE 14 CORRUGATIONS.

2.11 THE CHAMBER SHALL HAVE A CIRCULAR, INDENTED, FLAT SURFACE ON THE TOP OF THE CHAMBER FOR AN OPTIONAL 4-INCH INSPECTION PORT OR CLEAN-OUT.

2.12 THE CHAMBER SHALL BE ANALYZED AND DESIGNED USING AASHTO METHODS FOR THERMOPLASTIC CULVERTS CONTAINED IN THE LRFD BRIDGE DESIGN SPECIFICATIONS, 2ND EDITION, INCLUDING INTERIM SPECIFICATIONS THROUGH 2001. DESIGN LIVE LOAD SHALL BE THE AASHTO HS20 TRUCK. DESIGN SHALL CONSIDER EARTH AND LIVE LOADS AS APPROPRIATE FOR THE MINIMUM TO MAXIMUM SPECIFIED DEPTH OF FILL.

2.13 THE CHAMBER SHALL BE MANUFACTURED IN AN ISO 9001:2000 CERTIFIED FACILITY.

3.0 END CAP PARAMETERS

3.1 THE END CAP SHALL BE INJECTION MOLDED OF POLYPROPYLENE RESIN TO BE INHERENTLY RESISTANT TO ENVIRONMENTAL STRESS CRACKING, AND TO MAINTAIN ADEQUATE STIFFNESS THROUGH HIGHER TEMPERATURES EXPERIENCED DURING INSTALLATION AND SERVICE.

3.2 THE END CAP SHALL BE DESIGNED TO FIT INTO ANY CORRUGATION OF A CHAMBER, WHICH ALLOWS: CAPPING A CHAMBER THAT HAS ITS LENGTH TRIMMED; SEGMENTING ROWS INTO STORAGE BASINS OF VARIOUS LENGTHS.

3.3 THE END CAP SHALL HAVE SAW GUIDES TO ALLOW EASY CUTTING FOR VARIOUS DIAMETERS OF PIPE THAT MAY BE USED TO INLET THE SYSTEM.

3.4 THE END CAP SHALL HAVE EXCESS STRUCTURAL ADEQUACIES TO ALLOW CUTTING AN ORIFICE OF ANY SIZE AT ANY INVERT ELEVATION.

3.5 THE PRIMARY FACE OF AN END CAP SHALL BE CURVED OUTWARD TO RESIST HORIZONTAL LOADS GENERATED NEAR THE EDGES OF BEDS.

3.6 THE END CAP SHALL BE MANUFACTURED IN AN ISO 9001:2000 CERTIFIED FACILITY.

WOODARD & CURRAN
Engineering · Science · Operations

CORPORATE OFFICES: Maine, Massachusetts, New Hampshire, Connecticut, Florida
Operational offices throughout the U.S.

MEMORANDUM

TO: Barry Sheff, P.E.

FROM: Kenneth Volock, P.E.

DATE: October 13, 2006, revised November 3, 2006

RE: The Longfellow –Impacts on Ocean Gateway Stormwater Conveyance and Treatment Measures

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The purpose of this memorandum is to investigate the impacts that The Longfellow project will have on the stormwater conveyance and treatment measures that have been constructed for the Ocean Gateway Project. As newly proposed, runoff from several aspects of the Longfellow project would be collected in the City stormwater collection system, recently constructed as part of the Ocean Gateway Project. These areas would include: the Residences and Retail complex and plaza; the Grand Trunk Building and adjacent courtyard; the Parking Garage; and the open area to the North of the Parking Garage (at Hancock and Middle Streets). Runoff from the Residences and Retail complex and plaza and the Parking Garage would be collected in subsurface detention structures before being discharged to the City stormwater collection system. Either the StormChamber product by Hydrologic Solutions, the StormTech system, or some other equivalent product will be used in constructing the subsurface detention structures. Runoff from all areas would then pass through a stormwater treatment unit, identified on the Ocean Gateway Drawings as Stormwater Treatment Unit 2.

The Ocean Gateway treatment measures were permitted and sized to provide a TSS removal rate of 40.3% across the entire site; the site encompassed the Residences and Retail complex and plaza. In achieving the 40.3% TSS removal for the entire site, Stormwater Treatment Unit 2 must maintain a 60% TSS Removal rate. Should the removal rate drop below 60% for the treatment unit, TSS removal for the entire site would drop below 40%, the minimum TSS removal rate required by the Maine Department of Environmental Protection (MeDEP) as part of the Ocean Gateway permit # L-7866-26-E-N & L-7866-4E-F-N.

On March 8, 2006, the Ocean Gateway contractor, Reed & Reed, submitted a 10-foot diameter Downstream Defender for the project. The submittal was reviewed and, after additional information was provided on March 29, 2006, the unit was accepted on April 6, 2006. The unit has been installed by Reed & Reed as part of the construction project.

A stormwater runoff model was developed by combining the areas of the Ocean Gateway Project for which runoff is collected and passed through the treatment unit in question. The model was then modified to reflect the proposed Longfellow project. The model was run twice for each of the potential detention structure products: once with the Residences and Retail complex, central plaza, the Grand Trunk Building and adjacent courtyard collected and passed through the treatment unit; and once with the Parking Garage and open area to the North also collected and treated.

Peak runoff capacities for the 10-foot diameter Downstream Defender and results of the model runs for each product are summarized in Table 1 below. Capacities are provided for 60% TSS Removal based on the 1-year storm and the peak flow rate through the unit based on the 25-year storm. Flow rates are present for both detention systems; results for the StormChamber system are designated with a "C" and results for the StormTech system are designated with a "D". Supporting HydroCad data has been attached to this Memorandum for reference.

Table 1: Runoff Summary

COLLECTION AREA	PEAK RUNOFF 1 Year (CFS)	PEAK RUNOFF 25 Year (CFS)
Ocean Gateway Stormwater Treatment Unit #2 Capacity	12.85 [A]	25.00 [B]
Ocean Gateway Project (Currently under construction)	9.80	23.52
Ocean Gateway Project with addition of Residences and Retail complex and the Grand Trunk Building	8.88 [C]/ 8.68 [D]	21.42 [C]/ 20.98 [D]
Ocean Gateway Project and addition of Residences and Retail complex, the Grand Trunk Building and Parking Garage	9.74 [C]/ 9.52 [D]	23.11 [C]/ 23.10 [D]

[A] - Peak runoff rate for the 1-year storm to achieve 60% TSS removal as approved by the Maine Department of Environmental Protection.

[B] - Peak runoff rates for the 25-year storm as specified by the manufacturer.

[C] - Detention using StormChamber system by Hydrologic Solutions.

[D] - Detention using StormTech system.

As shown in Table 2, the peak runoff rate through the stormwater treatment unit will be reduced as a result of the Longfellow project. The reduction in peak runoff will be accomplished through the use of subsurface stormwater detention at the Longfellow Residences and Retail complex and the Parking Garage.

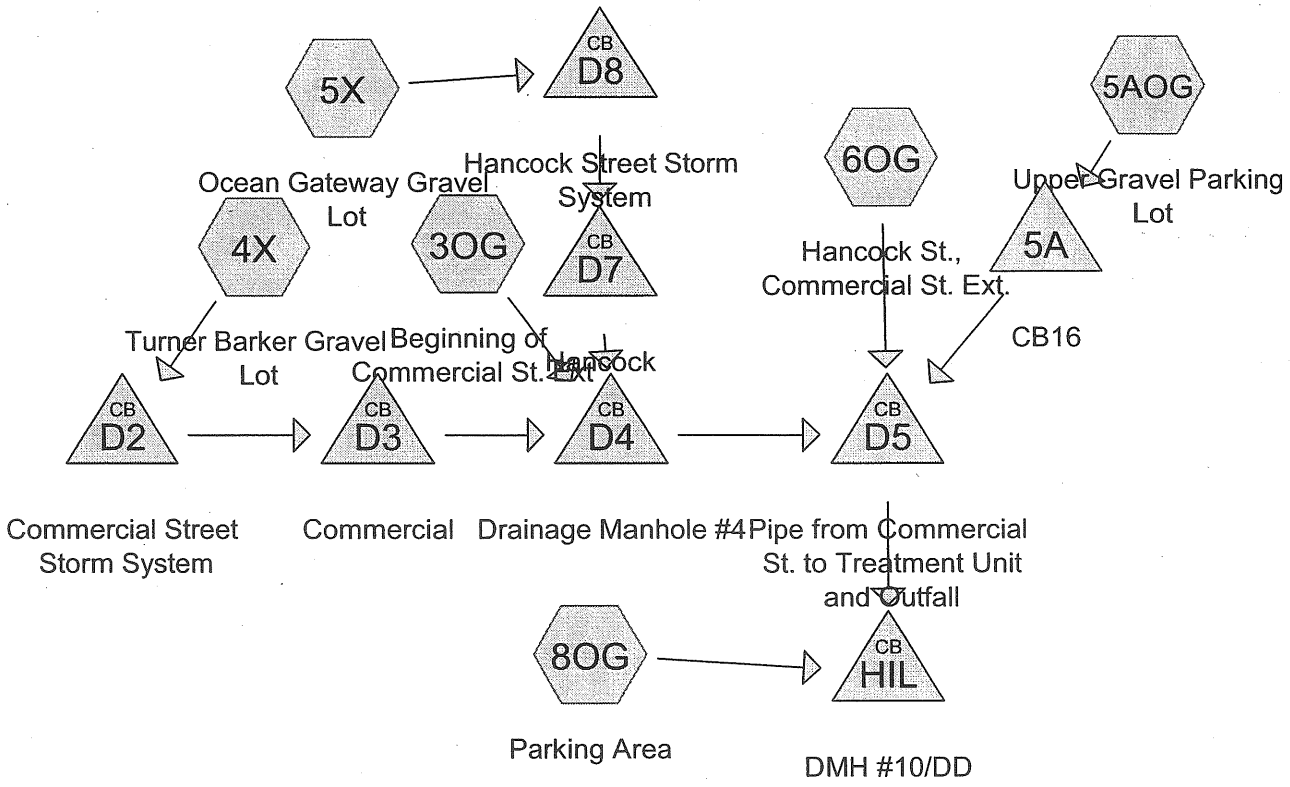
Conclusion

Subsurface stormwater detention will be used at the Longfellow Residences and Retail complex and at the Parking Garage to control runoff. Through the use of subsurface detention, the area that drains to the City stormwater collection system will be expanded to include the Longfellow Parking Garage and adjacent open area without increasing the peak runoff rate at the Ocean Gateway Stormwater Treatment Unit #2. In fact, the peak runoff rate is slightly decreased. No additional infrastructure is required at the Ocean Gateway site to accommodate runoff from the Longfellow project.

KRV/
203555.05

Attachments

cc: File



Subcat Reach Pond Link

Drainage Diagram for Ocean Gateway and The Longfellow-Existing
Prepared by Woodard & Curran 10/30/2006

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3OG: Beginning of Commercial St. Ext Runoff Area=0.600 ac Runoff Depth>1.68"
Flow Length=456' Tc=4.8 min CN=93 Runoff=1.25 cfs 0.084 af

Subcatchment 4X: Turner Barker Gravel Lot Runoff Area=18,745 sf Runoff Depth>1.95"
Flow Length=210' Tc=4.2 min CN=96 Runoff=1.02 cfs 0.070 af

Subcatchment 5AOG: Upper Gravel Parking Lot Runoff Area=1.950 ac Runoff Depth>2.13"
Flow Length=445' Tc=13.2 min CN=98 Runoff=3.73 cfs 0.346 af

Subcatchment 5X: Ocean Gateway Gravel Lot Runoff Area=44,245 sf Runoff Depth>2.13"
Flow Length=250' Tc=5.5 min CN=98 Runoff=2.41 cfs 0.180 af

Subcatchment 6OG: Hancock St., Commercial St. Ext. Runoff Area=1.350 ac Runoff Depth>1.86"
Flow Length=550' Tc=2.8 min CN=95 Runoff=3.25 cfs 0.209 af

Subcatchment 8OG: Parking Area Runoff Area=0.800 ac Runoff Depth>0.62"
Flow Length=125' Tc=27.5 min CN=76 Runoff=0.35 cfs 0.042 af

Pond 5A: CB16 Peak Elev=13.19' Storage=1,170 cf Inflow=3.73 cfs 0.346 af
Outflow=3.40 cfs 0.344 af

Pond D2: Commercial Street Storm System Peak Elev=9.39' Inflow=1.02 cfs 0.070 af
15.0" x 192.0' Culvert Outflow=1.02 cfs 0.070 af

Pond D3: Commercial Peak Elev=9.14' Inflow=1.02 cfs 0.070 af
15.0" x 192.0' Culvert Outflow=1.02 cfs 0.070 af

Pond D4: Drainage Manhole #4 Peak Elev=9.02' Inflow=4.67 cfs 0.334 af
36.0" x 250.0' Culvert Outflow=4.67 cfs 0.334 af

Pond D5: Pipe from Commercial St. to Treatment Unit and Outf Peak Elev=8.50' Inflow=9.72 cfs 0.887 af
36.0" x 137.0' Culvert Outflow=9.72 cfs 0.887 af

Pond D7: Hancock Peak Elev=9.10' Inflow=2.41 cfs 0.180 af
30.0" x 36.0' Culvert Outflow=2.41 cfs 0.180 af

Pond D8: Hancock Street Storm System Peak Elev=10.43' Inflow=2.41 cfs 0.180 af
24.0" x 196.0' Culvert Outflow=2.41 cfs 0.180 af

Pond HIL: DMH #10/DD Peak Elev=8.09' Inflow=9.80 cfs 0.928 af
36.0" x 102.0' Culvert Outflow=9.80 cfs 0.928 af

Total Runoff Area = 6.146 ac Runoff Volume = 0.930 af Average Runoff Depth = 1.82"
9.69% Pervious Area = 0.596 ac 90.31% Impervious Area = 5.550 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3OG: Beginning of Commercial St. Ext Runoff Area=0.600 ac Runoff Depth>4.43"
Flow Length=456' Tc=4.8 min CN=93 Runoff=3.13 cfs 0.221 af

Subcatchment 4X: Turner Barker Gravel Lot Runoff Area=18,745 sf Runoff Depth>4.71"
Flow Length=210' Tc=4.2 min CN=96 Runoff=2.38 cfs 0.169 af

Subcatchment 5AOG: Upper Gravel Parking Lot Runoff Area=1.950 ac Runoff Depth>4.87"
Flow Length=445' Tc=13.2 min CN=98 Runoff=8.35 cfs 0.792 af

Subcatchment 5X: Ocean Gateway Gravel Lot Runoff Area=44,245 sf Runoff Depth>4.87"
Flow Length=250' Tc=5.5 min CN=98 Runoff=5.40 cfs 0.413 af

Subcatchment 6OG: Hancock St., Commercial St. Ext. Runoff Area=1.350 ac Runoff Depth>4.62"
Flow Length=550' Tc=2.8 min CN=95 Runoff=7.70 cfs 0.520 af

Subcatchment 8OG: Parking Area Runoff Area=0.800 ac Runoff Depth>2.73"
Flow Length=125' Tc=27.5 min CN=76 Runoff=1.62 cfs 0.182 af

Pond 5A: CB16 Peak Elev=13.39' Storage=2,048 cf Inflow=8.35 cfs 0.792 af
Outflow=7.87 cfs 0.789 af

Pond D2: Commercial Street Storm System Peak Elev=10.03' Inflow=2.38 cfs 0.169 af
15.0" x 192.0' Culvert Outflow=2.38 cfs 0.169 af

Pond D3: Commercial Peak Elev=9.97' Inflow=2.38 cfs 0.169 af
15.0" x 192.0' Culvert Outflow=2.38 cfs 0.169 af

Pond D4: Drainage Manhole #4 Peak Elev=9.90' Inflow=10.86 cfs 0.803 af
36.0" x 250.0' Culvert Outflow=10.86 cfs 0.803 af

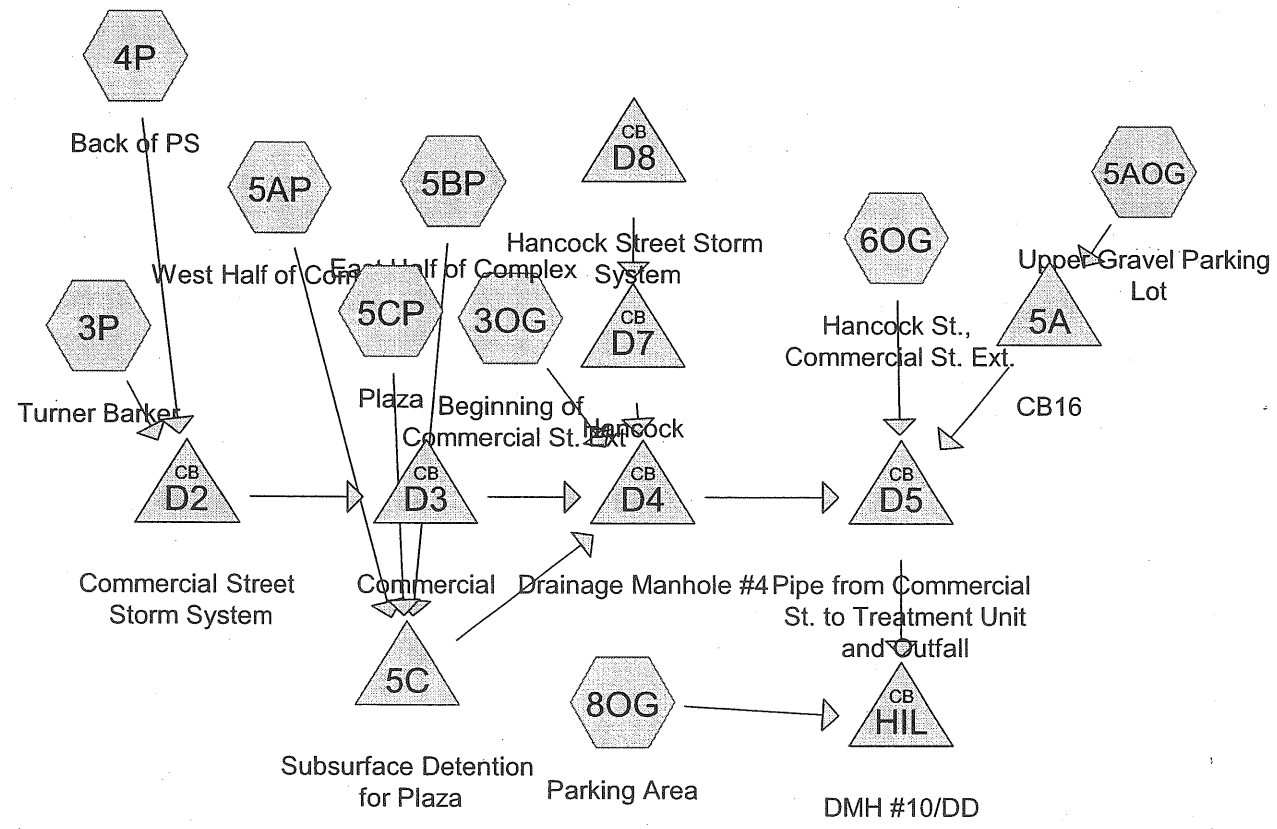
Pond D5: Pipe from Commercial St. to Treatment Unit and Out Peak Elev=9.61' Inflow=22.89 cfs 2.112 af
36.0" x 137.0' Culvert Outflow=22.89 cfs 2.112 af

Pond D7: Hancock Peak Elev=9.95' Inflow=5.40 cfs 0.413 af
30.0" x 36.0' Culvert Outflow=5.40 cfs 0.413 af

Pond D8: Hancock Street Storm System Peak Elev=10.81' Inflow=5.40 cfs 0.413 af
24.0" x 196.0' Culvert Outflow=5.40 cfs 0.413 af

Pond HIL: DMH #10/DD Peak Elev=9.05' Inflow=23.52 cfs 2.294 af
36.0" x 102.0' Culvert Outflow=23.52 cfs 2.294 af

Total Runoff Area = 6.146 ac Runoff Volume = 2.297 af Average Runoff Depth = 4.48"
9.69% Pervious Area = 0.596 ac 90.31% Impervious Area = 5.550 ac



Subcat Reach Pond Link

Drainage Diagram for Ocean Gateway and The Longfellow-Residences-SC
Prepared by Woodard & Curran 10/30/2006

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3OG: Beginning of Commercial St. Ext Runoff Area=0.600 ac Runoff Depth>1.68"
Flow Length=456' Tc=4.8 min CN=93 Runoff=1.25 cfs 0.084 af

Subcatchment 3P: Turner Barker Runoff Area=9,230 sf Runoff Depth>1.68"
Flow Length=100' Slope=0.0100 '/' Tc=1.7 min CN=93 Runoff=0.47 cfs 0.030 af

Subcatchment 4P: Back of PS Runoff Area=3,655 sf Runoff Depth=0.00"
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 5AOG: Upper Gravel Parking Lot Runoff Area=1.950 ac Runoff Depth>2.13"
Flow Length=445' Tc=13.2 min CN=98 Runoff=3.73 cfs 0.346 af

Subcatchment 5AP: West Half of Complex Runoff Area=14,410 sf Runoff Depth>2.13"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.059 af

Subcatchment 5BP: East Half of Complex Runoff Area=38,510 sf Runoff Depth>2.13"
Tc=6.0 min CN=98 Runoff=2.08 cfs 0.157 af

Subcatchment 5CP: Plaza Runoff Area=4,995 sf Runoff Depth>2.13"
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.31 cfs 0.020 af

Subcatchment 6OG: Hancock St., Commercial St. Ext. Runoff Area=1.350 ac Runoff Depth>1.86"
Flow Length=550' Tc=2.8 min CN=95 Runoff=3.25 cfs 0.209 af

Subcatchment 8OG: Parking Area Runoff Area=0.800 ac Runoff Depth>0.62"
Flow Length=125' Tc=27.5 min CN=76 Runoff=0.35 cfs 0.042 af

Pond 5A: CB16 Peak Elev=13.19' Storage=1,170 cf Inflow=3.73 cfs 0.346 af
Outflow=3.40 cfs 0.344 af

Pond 5C: Subsurface Detention for Plaza Peak Elev=11.05' Storage=682 cf Inflow=3.06 cfs 0.236 af
Outflow=2.64 cfs 0.235 af

Pond D2: Commercial Street Storm System Peak Elev=9.17' Inflow=0.47 cfs 0.030 af
15.0" x 192.0' Culvert Outflow=0.47 cfs 0.030 af

Pond D3: Commercial Peak Elev=8.99' Inflow=0.47 cfs 0.030 af
15.0" x 192.0' Culvert Outflow=0.47 cfs 0.030 af

Pond D4: Drainage Manhole #4 Peak Elev=8.97' Inflow=4.02 cfs 0.349 af
36.0" x 250.0' Culvert Outflow=4.02 cfs 0.349 af

Pond D5: Pipe from Commercial St. to Treatment Unit and Outf Peak Elev=8.44' Inflow=8.78 cfs 0.902 af
36.0" x 137.0' Culvert Outflow=8.78 cfs 0.902 af

Pond D7: Hancock Peak Elev=8.85' Inflow=0.00 cfs 0.000 af
30.0" x 36.0' Culvert Outflow=0.00 cfs 0.000 af

Pond D8: Hancock Street Storm System Peak Elev=0.00'
24.0" x 196.0' Culvert Primary=0.00 cfs 0.000 af

Pond HIL: DMH #10/DD Peak Elev=8.01' Inflow=8.88 cfs 0.943 af
36.0" x 102.0' Culvert Outflow=8.88 cfs 0.943 af

Total Runoff Area = 6.325 ac Runoff Volume = 0.946 af Average Runoff Depth = 1.79"
10.33% Pervious Area = 0.653 ac 89.67% Impervious Area = 5.672 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3OG: Beginning of Commercial St. Ext Runoff Area=0.600 ac Runoff Depth>4.43"
Flow Length=456' Tc=4.8 min CN=93 Runoff=3.13 cfs 0.221 af

Subcatchment 3P: Turner Barker Runoff Area=9,230 sf Runoff Depth>4.43"
Flow Length=100' Slope=0.0100 '/' Tc=1.7 min CN=93 Runoff=1.18 cfs 0.078 af

Subcatchment 4P: Back of PS Runoff Area=3,655 sf Runoff Depth>0.25"
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.01 cfs 0.002 af

Subcatchment 5AOG: Upper Gravel Parking Lot Runoff Area=1.950 ac Runoff Depth>4.87"
Flow Length=445' Tc=13.2 min CN=98 Runoff=8.35 cfs 0.792 af

Subcatchment 5AP: West Half of Complex Runoff Area=14,410 sf Runoff Depth>4.87"
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af

Subcatchment 5BP: East Half of Complex Runoff Area=38,510 sf Runoff Depth>4.87"
Tc=6.0 min CN=98 Runoff=4.65 cfs 0.359 af

Subcatchment 5CP: Plaza Runoff Area=4,995 sf Runoff Depth>4.87"
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.68 cfs 0.047 af

Subcatchment 6OG: Hancock St., Commercial St. Ext. Runoff Area=1.350 ac Runoff Depth>4.62"
Flow Length=550' Tc=2.8 min CN=95 Runoff=7.70 cfs 0.520 af

Subcatchment 8OG: Parking Area Runoff Area=0.800 ac Runoff Depth>2.73"
Flow Length=125' Tc=27.5 min CN=76 Runoff=1.62 cfs 0.182 af

Pond 5A: CB16 Peak Elev=13.39' Storage=2,048 cf Inflow=8.35 cfs 0.792 af
Outflow=7.87 cfs 0.789 af

Pond 5C: Subsurface Detention for Plaza Peak Elev=12.83' Storage=1,698 cf Inflow=6.84 cfs 0.540 af
Outflow=5.71 cfs 0.539 af

Pond D2: Commercial Street Storm System Peak Elev=9.83' Inflow=1.18 cfs 0.080 af
15.0" x 192.0' Culvert Outflow=1.18 cfs 0.080 af

Pond D3: Commercial Peak Elev=9.81' Inflow=1.18 cfs 0.080 af
15.0" x 192.0' Culvert Outflow=1.18 cfs 0.080 af

Pond D4: Drainage Manhole #4 Peak Elev=9.80' Inflow=8.80 cfs 0.840 af
36.0" x 250.0' Culvert Outflow=8.80 cfs 0.840 af

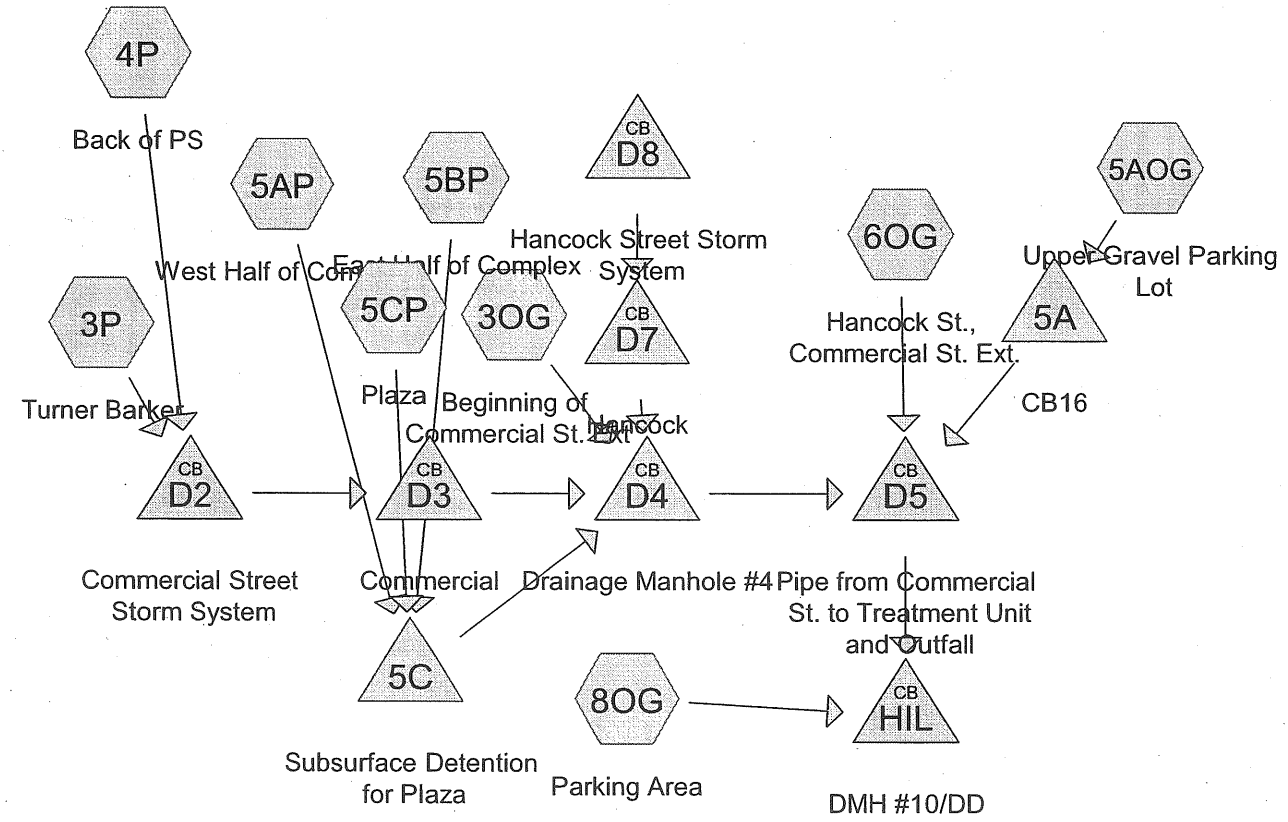
Pond D5: Pipe from Commercial St. to Treatment Unit and Out Peak Elev=9.47' Inflow=20.77 cfs 2.149 af
36.0" x 137.0' Culvert Outflow=20.77 cfs 2.149 af

Pond D7: Hancock Peak Elev=9.37' Inflow=0.00 cfs 0.000 af
30.0" x 36.0' Culvert Outflow=0.00 cfs 0.000 af

Pond D8: Hancock Street Storm System Peak Elev=0.00'
24.0" x 196.0' Culvert Primary=0.00 cfs 0.000 af

Pond HIL: DMH #10/DD Peak Elev=8.92' Inflow=21.42 cfs 2.331 af
36.0" x 102.0' Culvert Outflow=21.42 cfs 2.331 af

Total Runoff Area = 6.325 ac Runoff Volume = 2.335 af Average Runoff Depth = 4.43"
10.33% Pervious Area = 0.653 ac 89.67% Impervious Area = 5.672 ac



Subcat Reach Pond Link

Drainage Diagram for Ocean Gateway and The Longfellow-Residences-ST
Prepared by Woodard & Curran 10/30/2006

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3OG: Beginning of Commercial St. Ext Runoff Area=0.600 ac Runoff Depth>1.68"
Flow Length=456' Tc=4.8 min CN=93 Runoff=1.25 cfs 0.084 af

Subcatchment 3P: Turner Barker Runoff Area=9,230 sf Runoff Depth>1.68"
Flow Length=100' Slope=0.0100 '/' Tc=1.7 min CN=93 Runoff=0.47 cfs 0.030 af

Subcatchment 4P: Back of PS Runoff Area=3,655 sf Runoff Depth=0.00"
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 5AOG: Upper Gravel Parking Lot Runoff Area=1.950 ac Runoff Depth>2.13"
Flow Length=445' Tc=13.2 min CN=98 Runoff=3.73 cfs 0.346 af

Subcatchment 5AP: West Half of Complex Runoff Area=14,410 sf Runoff Depth>2.13"
Tc=6.0 min CN=98 Runoff=0.78 cfs 0.059 af

Subcatchment 5BP: East Half of Complex Runoff Area=38,510 sf Runoff Depth>2.13"
Tc=6.0 min CN=98 Runoff=2.08 cfs 0.157 af

Subcatchment 5CP: Plaza Runoff Area=4,995 sf Runoff Depth>2.13"
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.31 cfs 0.020 af

Subcatchment 6OG: Hancock St., Commercial St. Ext. Runoff Area=1.350 ac Runoff Depth>1.86"
Flow Length=550' Tc=2.8 min CN=95 Runoff=3.25 cfs 0.209 af

Subcatchment 8OG: Parking Area Runoff Area=0.800 ac Runoff Depth>0.62"
Flow Length=125' Tc=27.5 min CN=76 Runoff=0.35 cfs 0.042 af

Pond 5A: CB16 Peak Elev=13.19' Storage=1,170 cf Inflow=3.73 cfs 0.346 af
Outflow=3.40 cfs 0.344 af

Pond 5C: Subsurface Detention for Plaza Peak Elev=11.00' Storage=806 cf Inflow=3.06 cfs 0.236 af
Outflow=2.50 cfs 0.235 af

Pond D2: Commercial Street Storm System Peak Elev=9.17' Inflow=0.47 cfs 0.030 af
15.0" x 192.0' Culvert Outflow=0.47 cfs 0.030 af

Pond D3: Commercial Peak Elev=8.97' Inflow=0.47 cfs 0.030 af
15.0" x 192.0' Culvert Outflow=0.47 cfs 0.030 af

Pond D4: Drainage Manhole #4 Peak Elev=8.95' Inflow=3.82 cfs 0.349 af
36.0" x 250.0' Culvert Outflow=3.82 cfs 0.349 af

Pond D5: Pipe from Commercial St. to Treatment Unit and Outf Peak Elev=8.42' Inflow=8.59 cfs 0.901 af
36.0" x 137.0' Culvert Outflow=8.59 cfs 0.901 af

Pond D7: Hancock Peak Elev=8.85' Inflow=0.00 cfs 0.000 af
30.0" x 36.0' Culvert Outflow=0.00 cfs 0.000 af

Pond D8: Hancock Street Storm System Peak Elev=0.00'
24.0" x 196.0' Culvert Primary=0.00 cfs 0.000 af

Pond HIL: DMH #10/DD Peak Elev=7.99' Inflow=8.68 cfs 0.943 af
36.0" x 102.0' Culvert Outflow=8.68 cfs 0.943 af

Total Runoff Area = 6.325 ac Runoff Volume = 0.946 af Average Runoff Depth = 1.79"
10.33% Pervious Area = 0.653 ac 89.67% Impervious Area = 5.672 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3OG: Beginning of Commercial St. Ext Runoff Area=0.600 ac Runoff Depth>4.43"
Flow Length=456' Tc=4.8 min CN=93 Runoff=3.13 cfs 0.221 af

Subcatchment 3P: Turner Barker Runoff Area=9,230 sf Runoff Depth>4.43"
Flow Length=100' Slope=0.0100 '/' Tc=1.7 min CN=93 Runoff=1.18 cfs 0.078 af

Subcatchment 4P: Back of PS Runoff Area=3,655 sf Runoff Depth>0.25"
Flow Length=110' Slope=0.0300 '/' Tc=8.7 min CN=39 Runoff=0.01 cfs 0.002 af

Subcatchment 5AOG: Upper Gravel Parking Lot Runoff Area=1.950 ac Runoff Depth>4.87"
Flow Length=445' Tc=13.2 min CN=98 Runoff=8.35 cfs 0.792 af

Subcatchment 5AP: West Half of Complex Runoff Area=14,410 sf Runoff Depth>4.87"
Tc=6.0 min CN=98 Runoff=1.74 cfs 0.134 af

Subcatchment 5BP: East Half of Complex Runoff Area=38,510 sf Runoff Depth>4.87"
Tc=6.0 min CN=98 Runoff=4.65 cfs 0.359 af

Subcatchment 5CP: Plaza Runoff Area=4,995 sf Runoff Depth>4.87"
Flow Length=75' Slope=0.0125 '/' Tc=1.2 min CN=98 Runoff=0.68 cfs 0.047 af

Subcatchment 6OG: Hancock St., Commercial St. Ext. Runoff Area=1.350 ac Runoff Depth>4.62"
Flow Length=550' Tc=2.8 min CN=95 Runoff=7.70 cfs 0.520 af

Subcatchment 8OG: Parking Area Runoff Area=0.800 ac Runoff Depth>2.73"
Flow Length=125' Tc=27.5 min CN=76 Runoff=1.62 cfs 0.182 af

Pond 5A: CB16 Peak Elev=13.39' Storage=2,048 cf Inflow=8.35 cfs 0.792 af
Outflow=7.87 cfs 0.789 af

Pond 5C: Subsurface Detention for Plaza Peak Elev=12.49' Storage=1,879 cf Inflow=6.84 cfs 0.540 af
Outflow=5.82 cfs 0.539 af

Pond D2: Commercial Street Storm System Peak Elev=9.83' Inflow=1.18 cfs 0.080 af
15.0" x 192.0' Culvert Outflow=1.18 cfs 0.080 af

Pond D3: Commercial Peak Elev=9.81' Inflow=1.18 cfs 0.080 af
15.0" x 192.0' Culvert Outflow=1.18 cfs 0.080 af

Pond D4: Drainage Manhole #4 Peak Elev=9.80' Inflow=8.93 cfs 0.840 af
36.0" x 250.0' Culvert Outflow=8.93 cfs 0.840 af

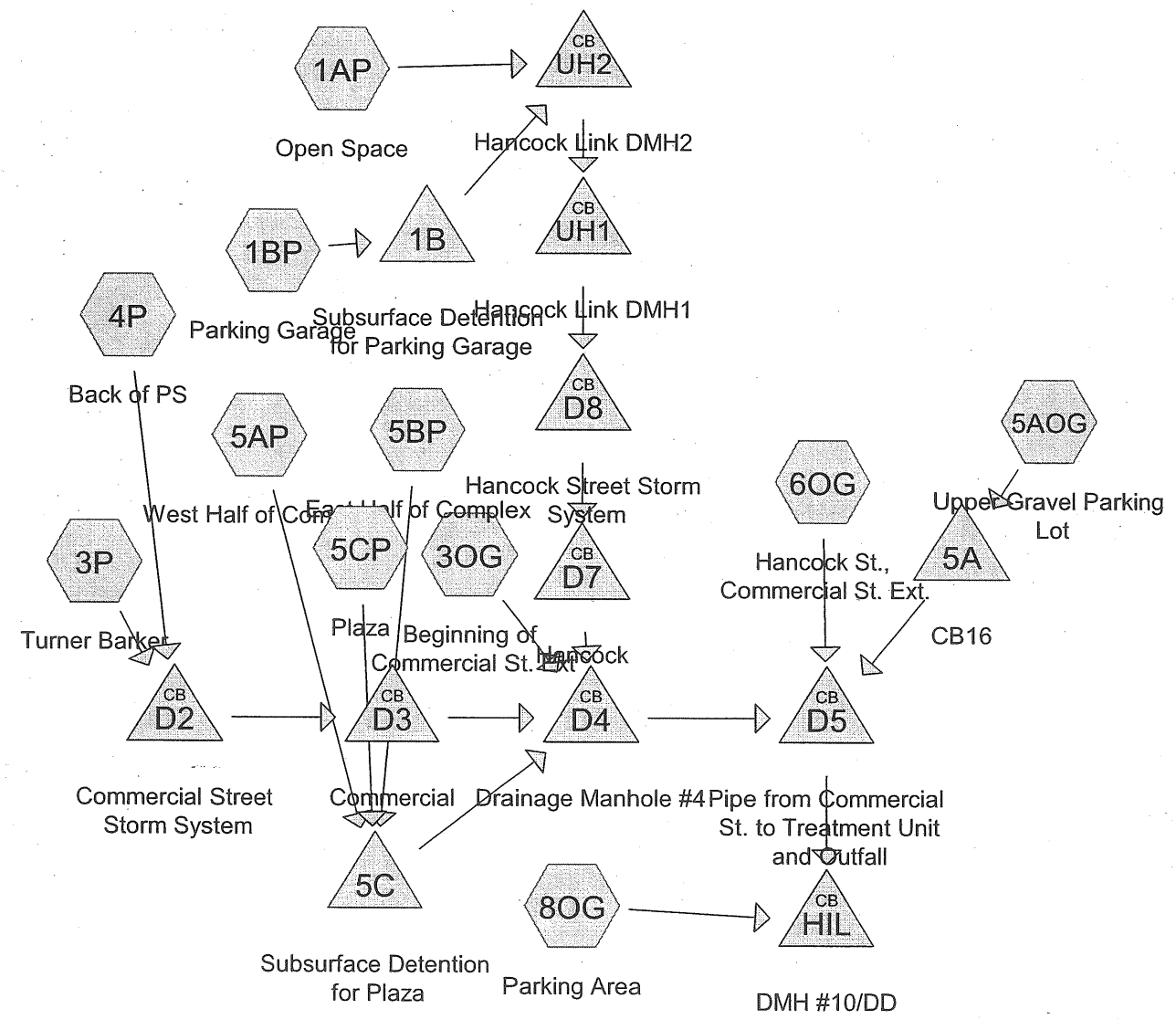
Pond D5: Pipe from Commercial St. to Treatment Unit and Out Peak Elev=9.47' Inflow=20.66 cfs 2.149 af
36.0" x 137.0' Culvert Outflow=20.66 cfs 2.149 af

Pond D7: Hancock Peak Elev=9.37' Inflow=0.00 cfs 0.000 af
30.0" x 36.0' Culvert Outflow=0.00 cfs 0.000 af

Pond D8: Hancock Street Storm System Peak Elev=0.00'
24.0" x 196.0' Culvert Primary=0.00 cfs 0.000 af

Pond HIL: DMH #10/DD Peak Elev=8.89' Inflow=20.98 cfs 2.331 af
36.0" x 102.0' Culvert Outflow=20.98 cfs 2.331 af

Total Runoff Area = 6.325 ac Runoff Volume = 2.335 af Average Runoff Depth = 4.43"
10.33% Pervious Area = 0.653 ac 89.67% Impervious Area = 5.672 ac



Subcat Reach Pond Link

Drainage Diagram for Ocean Gateway and The Longfellow-Residences and Garage-SC

Prepared by Woodard & Curran 11/3/2006