

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

## CITY OF PORTLAND

Please Read  
Application And  
Notes, If Any,  
Attached

PERMIT ISSUED

Permit Number: 070651

JUL 11 2007

This is to certify that CITY OF PORTLAND / Lur Constructionhas permission to Plaza RestorationAT 389 CONGRESS ST

Call 027 C012001

provided that the person or persons who accept this permit shall comply with all of the provisions of the Statutes of the State and of the Ordinances of the City of Portland regulating the construction, maintenance and use of buildings and structures, and of the application on file in this department.

Apply to Public Works for street line and grade if nature of work requires such information.

Notification of inspection must be given and when permission is procured before this building or part thereof is occupied or service is closed-in. 4 HOUR NOTICE REQUIRED.

A certificate of occupancy must be procured by owner before this building or part thereof is occupied.

## OTHER REQUIRED APPROVALS

Fire Dept. Greg Cruz

Health Dept. \_\_\_\_\_

Appeal Board \_\_\_\_\_

Other \_\_\_\_\_

Department Name

Director - Building &amp; Inspection Services

PENALTY FOR REMOVING THIS CARD

**City of Portland, Maine - Building or Use Permit Application**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 07-0651	Issue Date:	CBL: 027 C012001
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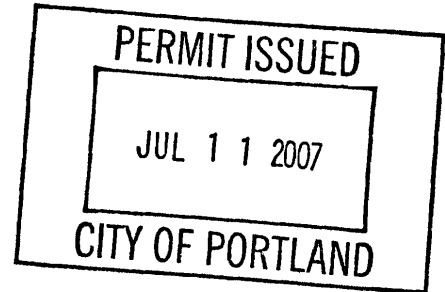
Location of Construction: 389 CONGRESS ST	Owner Name: CITY OF PORTLAND	Owner Address: 389 CONGRESS ST	Phone:
Business Name:	Contractor Name: Lumus Construction	Contractor Address: 175 Lancaster St Suite 208F Portland	Phone: 2075228620
Lessee/Buyer's Name	Phone:	Permit Type: Alterations - Commercial	Zone: B-3

Past Use: City Hall Plaza	Proposed Use: City Hall Plaza - Plaza Restoration	Permit Fee: \$4,410.00	Cost of Work: \$438,500.00	CEO District: 1
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Proposed Project Description: Plaza Restoration	FIRE DEPT: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied	INSPECTION: Use Group: A-3 Type: N/A Stair Reconstruction
	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i> 7/11/07

Permit Taken By: Idobson	Date Applied For: 06/04/2007	<b>Zoning Approval</b>
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- This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
- Building permits do not include plumbing, septic or electrical work.
- Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..



<b>Special Zone or Reviews</b> <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetland <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan Maj <input type="checkbox"/> Minor <input type="checkbox"/> MM <input type="checkbox"/> Date: <i>6/4/07</i>	<b>Zoning Appeal</b> <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied Date:	<b>Historic Preservation</b> <input type="checkbox"/> Not in District or Landmark <input type="checkbox"/> Does Not Require Review <input checked="" type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input checked="" type="checkbox"/> Approved w/Conditions <i>(partial approval)</i> <input type="checkbox"/> Denied Date: <i>6/20/07</i> <i>D. Andrews</i>
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**CERTIFICATION**

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE

**City of Portland, Maine - Building or Use Permit**

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

<b>Permit No:</b> 07-0651	<b>Date Applied For:</b> 06/04/2007	<b>CBL:</b> 027 C012001
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<b>Location of Construction:</b> 389 CONGRESS ST	<b>Owner Name:</b> CITY OF PORTLAND	<b>Owner Address:</b> 389 CONGRESS ST	<b>Phone:</b>
<b>Business Name:</b>	<b>Contractor Name:</b> Lumus Construction	<b>Contractor Address:</b> 175 Lancaster St Suite 208F Portland	<b>Phone:</b> (207) 522-8620
<b>Lessee/Buyer's Name</b>	<b>Phone:</b>	<b>Permit Type:</b> Alterations - Commercial	

<b>Proposed Use:</b> City Hall Plaza - Plaza Restoration	<b>Proposed Project Description:</b> Plaza Restoration
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**Dept:** Historic      **Status:** Approved with Conditions      **Reviewer:** Deborah Andrews      **Approval Date:** 06/20/2007

**Note:** **Ok to Issue:**

- 1) \* Note: This approval shall not extend to the proposed alteration to the granite paving stone within the semi-circular plaza, which is intended to accommodate installation of the annual Christmas tree. This alteration will require separate review and approval by the Historic Preservation Board.

**Dept:** Zoning      **Status:** Approved      **Reviewer:** Marge Schmuckal      **Approval Date:** 06/04/2007

**Note:** **Ok to Issue:**

**Dept:** Building      **Status:** Approved with Conditions      **Reviewer:** Jeanine Bourke      **Approval Date:** 07/11/2007

**Note:** **Ok to Issue:**

- 1) Sec. 3407 of the IBC 2003 allows historic exceptions to the code

**Dept:** Fire      **Status:** Approved with Conditions      **Reviewer:** Capt Greg Cass      **Approval Date:** 06/27/2007

**Note:** **Ok to Issue:**

- 1) Handrails do not meet current codes. {Historic}

**Comments:**

7/10/2007-jmb: Spoke with John Turk about the soils investigation and specs on the MDOT fill. He will get from SW Cole and send electronically.

7/10/2007-jmb: Received documents, ok to issue

7/10/2007-jmb: Left voicemail with Deb A. To see about more handrails



# General Building Permit Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: <i>Portland City Hall Plaza 389 Congress Street</i>		
Total Square Footage of Proposed Structure		Square Footage of Lot
Tax Assessor's Chart, Block & Lot Chart#      Block#      Lot# <i>27            C            12</i>	Owner: <i>City of Portland</i>	Telephone:
Lessee/Buyer's Name (If Applicable)	Applicant name, address & telephone: <i>Lumus Construction, Inc 175 Lancaster Street Suite 208F Portland, ME 04101</i>	Cost Of Work: \$ <i>438,500-</i> Fee: \$ _____ C of O Fee: \$ _____
Current legal use (i.e. single family) <i>City Hall</i> If vacant, what was the previous use? _____ Proposed Specific use: _____ Is property part of a subdivision? _____ If yes, please name _____ Project description: <i>- Plaza Restoration -</i>		
Contractor's name, address & telephone: Who should we contact when the permit is ready: <i>Mathew Sauvageau</i> Mailing address: _____ Phone: <i>522-8620</i> <i>175 Lancaster Street, Suite 208F Portland, ME 04101</i>		

Please submit all of the information outlined in the Commercial Application Checklist.  
Failure to do so will result in the automatic denial of your permit.

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information or to download copies of this form and other applications visit the Inspections Division on-line at [www.portlandmaine.gov](http://www.portlandmaine.gov), or stop by the Inspections Division office, room 315 City Hall or call 874-8703.

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: <i>[Signature]</i>	Date:
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**This is not a permit; you may not commence ANY work until the permit is issued.**



# Certificate of Design Application

From Designer: t+l-architects, LLC  
Date: 1 June 2007  
Job Name: City Hall Plaza Restoration  
Address of Construction: 389 Congress Street, Portland

## 2003 International Building Code

Construction project was designed to the building code criteria listed below:

Building Code & Year IBC 03 Use Group Classification (s) n/a  
Type of Construction n/a  
Will the Structure have a Fire suppression system in Accordance with Section 903.3.1 of the 2003 IRC n/a  
Is the Structure mixed use? n/a If yes, separated or non separated or non separated (section 302.3) \_\_\_\_\_  
Supervisory alarm System? n/a Geotechnical/Soils report required? (See Section 1802.2) yes, performed

### Structural Design Calculations

\_\_\_\_\_ Submitted for all structural members (106.1 - 106.11)

### Design Loads on Construction Documents (1603)

Uniformly distributed floor live loads (7603.11, 1807)

Floor Area Use	Loads Shown
_____	_____
_____	_____
_____	_____
_____	_____

### Wind loads (1603.1.4, 1609)

\_\_\_\_\_ Design option utilized (1609.1.1, 1609.6)  
\_\_\_\_\_ Basic wind speed (1809.3)  
\_\_\_\_\_ Building category and wind importance Factor,  $I_w$   
table 1604.5, 1609.5)  
\_\_\_\_\_ Wind exposure category (1609.4)  
\_\_\_\_\_ Internal pressure coefficient (ASCE 7)  
\_\_\_\_\_ Component and cladding pressures (1609.1.1, 1609.6.2.2)  
\_\_\_\_\_ Main force wind pressures (7603.1.1, 1609.6.2.1)

### Earth design data (1603.1.5, 1614-1623)

\_\_\_\_\_ Design option utilized (1614.1)  
Non-building seismic use group ("Category")  
\_\_\_\_\_ Spectral response coefficients,  $S_D$  &  $S_{D1}$  (1615.1)  
\_\_\_\_\_ Site class (1615.1.5)

\_\_\_\_\_ Live load reduction  
\_\_\_\_\_ Roof live loads (1603.1.2, 1607.11)  
\_\_\_\_\_ Roof snow loads (1603.7.3, 1608)  
\_\_\_\_\_ Ground snow load,  $P_g$  (1608.2)  
\_\_\_\_\_ If  $P_g > 10$  psf, flat-roof snow load  $P_f$   
\_\_\_\_\_ If  $P_g > 10$  psf, snow exposure factor,  $C_e$   
\_\_\_\_\_ If  $P_g > 10$  psf, snow load importance factor,  $I_s$   
\_\_\_\_\_ Roof thermal factor,  $C_t$  (1608.4)  
\_\_\_\_\_ Sloped roof snowload,  $P_s$  (1608.4)  
\_\_\_\_\_ Seismic design category (1616.3)  
\_\_\_\_\_ Basic seismic force resisting system (1617.6.2)  
\_\_\_\_\_ Response modification coefficient,  $R$ , and  
deflection amplification factor,  $C_d$  (1617.6.2)  
\_\_\_\_\_ Analysis procedure (1616.6, 1617.5)  
\_\_\_\_\_ Design base shear (1617.4, 1617.5.1)

### Flood loads (1803.1.6, 1612)

\_\_\_\_\_ Flood Hazard area (1612.3)  
\_\_\_\_\_ Elevation of structure

### Other loads

\_\_\_\_\_ Concentrated loads (1607.4)  
\_\_\_\_\_ Partition loads (1607.5)  
\_\_\_\_\_ Misc. loads (Table 1607.8, 1607.6.1, 1607.7,  
1607.12, 1607.13, 1610, 1611, 2404)



## Certificate of Design

Date: 1 June 2007

From: John Turk, AIA

These plans and / or specifications covering construction work on:

Portland City Hall Plaza Restoration Phase 1.

Have been designed and drawn up by the undersigned, a Maine registered Architect / Engineer according to the *2003 International Building Code* and local amendments.

Signature: John Turk

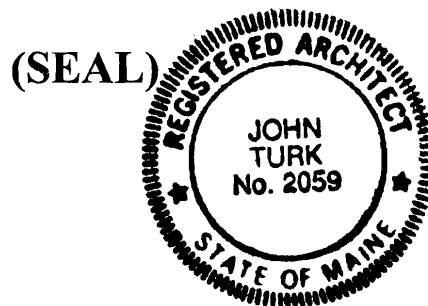
Title: Principal

Firm: ttl - architects, LLC

Address: 28 Danforth St. #213

Portland, ME 04101

Phone: 761-9662



For more information or to download this form and other permit applications visit the Inspections Division on our website at [www.portlandmaine.gov](http://www.portlandmaine.gov)



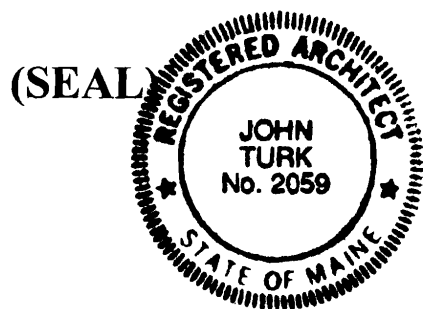
## Accessibility Building Code Certificate

Designer: t+1-architects, LLC

Address of Project: 389 Congress Street, Portland

Nature of Project: Portland City Hall Plaza Restoration,  
Restoration of Central and Upper  
Plaza granite and Foundation.

The technical submissions covering the proposed construction work as described above have been designed in compliance with applicable referenced standards found in the Maine Human Rights Law and Federal Americans with Disability Act. Residential Buildings with 4 units or more must conform to the Federal Fair Housing Accessibility Standards. Please provide proof of compliance if applicable.



Signature: John Turk

Title: Principal

Firm: t+1-architects, LLC

Address: 28 Danforth St. #213  
Portland, ME 04101

Phone: 761-9662

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## Jeanie Bourke - City Hall Plaza permit

**From:** "John Turk" <johnturk@ttl-architects.com>  
**To:** <jmb@portlandmaine.gov>  
**Date:** 7/10/2007 11:35 AM  
**Subject:** City Hall Plaza permit  
**CC:** "Brad Beisswanger" <brad@lumusinc.com>, "Leeman Bob" <bob@portlandmaine.gov>

Jeanne,

Attached are the SW Cole's Boring Tests and recommendations along with our Compaction and Structural Fill specification sections. Please let me know if there is anything else you may need to issue the permit. Thanks.

John

John Turk, AIA  
ttl-architects, llc  
28 Danforth Street, Suite 213  
Portland, ME 04101  
t: 207.761.9662  
f: 207.761.9696  
[johnturk@ttl-architects.com](mailto:johnturk@ttl-architects.com)



## SECTION 02220 - EXCAVATION, BACKFILL, AND COMPACTION

## PART 1 - GENERAL

## 1.01 GENERAL PROVISIONS:

- A. Documents affecting Work of this Section include, but are not necessarily limited to, THE CONDITIONS OF THE CONTRACT General Conditions, Supplementary Conditions, Addenda and all Sections of Division 1, which are hereby made a part of this Section.
- B. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.
- C. The Standard Specifications referred to herein is the book entitled "*Standard Specifications, Highways and Bridges*" published by the State of Maine Department of Transportation dated April, 1995 as supplemented, excluding the following portions thereof: DIVISION 100, SECTIONS 102 THROUGH 109; NUMERICAL INDEX OF PAYMENT ITEMS INCLUDED IN EACH SECTION. Those Sections of the aforementioned Standard Specifications which are cited herein are applicable to the Work of this Contract as they may be modified, amplified, or added to by this Section.
- D. Reference is made to OSHA Safety and Health Standards for the Construction Industry, 29 CFR 1926/1910, Latest Revision.

## 1.02 DESCRIPTION OF WORK:

- A. Provide all labor, material, equipment and services required to complete the following:
  - 1. Excavation, trenching, filling, backfilling and compaction as required, for the site drainage and the removal and replacement of unsuitable subsurface materials.
  - 2. Provide and install compacted granular fill as necessary for site, roadway, and street subgrades, and crushed stone or sand bedding materials for underdrain system, etc.; all as required to complete the construction as indicated on the Contract Drawings and as specified herein.
  - 3. Provide all necessary sheeting, shoring and bracing to protect the Work and assure safety of Workers, adjacent property and the public.
  - 4. Maintenance of all excavations free from water.
  - 5. Removal and proper disposal of all loose or disturbed ash fill, marine deposits, glacial till, or other unsuitable material within the specified areas, retaining wall areas, or other subgrade areas, as directed by the Project Architect, and replacement with suitable compacted fill as directed.

6. Pre-compact undisturbed original soil or existing fill as appropriate and as specified, prior to construction and placement of new fill and backfill.
7. Coordinate field density tests as required herein and as directed by the Project Architect.

B. Related Work specified elsewhere:

Site Special Conditions - Section 02000  
Site Preparation - Section 02100  
Grading - Section 02210  
Gravel Base Courses - Section 02230  
Slope Protection & Erosion Control - Section 02270  
Paving, Walks & Curbing - Section 02500  
Storm Drainage Systems - Section 02720

1.03 PROTECTION:

- A. Paved surfaces: Do not operate equipment on paved surfaces. Paved surfaces outside the specified limits of Work which become damaged shall be repaved by the Contractor at no additional cost to Owner.
- B. Maintain excavations with approved barricades, lights, and sign to protect life and property until excavation is filled and graded to a condition acceptable to the City of Portland.
- C. Protect structures, utilities, sidewalks, pavements, monitoring wells, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. The Contractor shall be responsible for actual cost of repair or replacement of any items damaged as a result of construction activities. This cost shall include any professional services required for inspection of repairs or replacements.

1.04 QUALITY ASSURANCE; SUBMITTALS:

- A. General: Comply with requirements of SECTION 01400 - SUBMITTALS, QUALITY REQUIREMENTS and 01416 - SOIL TESTING.
- B. Field Measurements:
  1. Verify that survey horizontal and vertical control reference points are present and correct as indicated. Protect from disturbance during the course of the Work, or correctly re-establish as necessary. Refer to Section 02011 - Layout of Work.
  2. During construction, provide all necessary line and grade staking to properly control the Work, as specified in Section 02011 Layout of Work.
- C. Codes and Standards:

1. American Society for Testing Materials (ASTM), Latest Edition:
  - D422 Method for Particle Size Analysis of Soils
  - D698 Test for Moisture-Density Relations of Soils Using 5.5 lb. (2.5 kg) Rammer and 12 inch (304.8mm) Drop (Standard Proctor)
  - D1556 Test for Density of Soil in Place by the Sand Cone Method
  - D1557 Test for Moisture-Density Relations of Soils using 10-lb (4.5 kg) Rammer and 18-inch (457 mm) Drop (Modified Proctor)
  - D2216 Laboratory Determination of Moisture Content of Soil
  - D2487 Classification of Soils for Engineering Purposes
  - D2922 Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
  - D3017 Test for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
2. American Association of State Highway and Transportation Officials (AASHTO), Latest Edition: T 88 Mechanical Analysis of Soils.

D. Testing and Inspection:

1. The Owner may engage a testing and inspection service for excavation classification and quality control testing during earthwork operations.
2. The Contractor shall assist Testing Agency as required and shall deliver samples of all materials required to the Testing Agency at Contractor's expense. Coordinate testing with Owner and Project Representative.
3. The Project Representative may inspect critical phases of earth excavation, subgrade excavation, fill placement, and footing excavation as directed by the Project Architect, prior to placement of fill materials, pavement bases, or footings. Coordinate with Owner and Project Representative for inspection of Work.
4. Tests for Proposed Soil Materials:
  - a) Test soil materials proposed for use in the Work and promptly submit test reports to Project Architect.
  - b) For granular fill materials, perform a mechanical analysis (ASTM D422) and moisture-density curve (ASTM D-1557 modified). Submit samples and test results to Project Architect prior to placement of fill.
5. Tolerances:
  - a) Maintain the moisture content of fill material as it is being placed within plus or minus two percent of the optimum moisture content of the material as determined by the laboratory tests herein specified.
  - b) Grading – See Section 02210.

E. Submittals:

1. Soils material test results for compacted granular fill, granular borrow, stone bedding material, and sand bedding material.
2. Field density test results.

#### 1.04 SITE CONDITIONS:

- A. See Geotech report prepared by S.W. Cole, dated 15 August 2006. This report is attached for contractor information only.

### PART 2 – PRODUCTS

#### 2.01 MATERIALS:

- A. Fill Material from On-Site Excavations:
  1. Suitable excavated material may be used for general filling and rough grading of the site detention pond embankments, provided the soil can be compacted to required density. On-site material shall not be used as fill beneath or adjacent to structures, parking areas, or roadways, unless it is tested and meets the appropriate requirements for granular borrow or structural fill, as outlined below.
  2. Unsuitable soils are materials that cannot be compacted to required density or contain organic material, peat, muck, coal, ash or debris, pavement stones or boulders greater than 12 inches in any dimension, frozen material, and material, in the opinion of the Project Architect, will not provide a suitable foundation or subgrade.
- B. Compacted Structural Fill: Structural granular fill shall be used below and adjacent to the exterior foundation walls and where indicated in Contract Documents. Compacted structural fill shall consist of sand and gravel of hard durable particles, free of organic material, loam, lumps or balls of clay, trash, snow, ice, frozen soil, stones over 4-inch diameter, or other objectionable material. The gradation of that portion of the material passing a 3-inch sieve shall meet the following limits:

Sieve Designation Percentage by Weight Passing Square Mesh Sieve

3 Inch 100  
¼ Inch 25-70  
No. 40 0-30  
No. 200 0-5
- C. Granular Borrow: Granular borrow shall be used as fill to raise site grades to sub-grade below pavement areas. Granular borrow shall be suitable sand or gravel, uniformly graded granular material, free of organic materials, loam, lumps or balls of clay, trash, snow, ice, frozen soil, stumps over 6-inch diameter, or other objectionable material. The gradation of that portion of the material passing a 3-inch sieve shall meet the following limits:

Sieve Designation Percentage by Weight  
Passing Square Mesh Sieve

6" 100  
 ¼" 25-70  
 No. 40 0-30  
 No. 200 0-7

Material encountered during on-site excavation which falls within the above specification and proven by testing in accordance with these specifications, may be stored in segregated stockpiles for reuse as Granular Borrow.

- D. Stone Bedding Material: Crushed drainage stone for all underdrains, and pipe or structure bedding material shall conform to MDOT Specification 703.22, Type C, for underdrain backfill material, as presented below:

Sieve Designation  
 Percentage by Weight  
 Passing Square Mesh Sieve  
 1 in. 100  
 ¾ in. 95-100  
 ½ in. 35-70  
 3/8 in. 0-20  
 No. 200 0-5

- E. Sand Bedding Material: Sand bedding material for the water lines, electrical and telephone lines and conduits shall be clean granular material, free from lumps, balls of clay, and organic material, and shall conform to the following table:

Sieve Size Max. % Passing by Weight

1" 100  
 ½ in. 75-100  
 No. 4 50-100  
 No. 20 15-80  
 No. 50 0-15  
 No. 200 0-5

- F. Select Borrow: Sieve analysis by weight:

Sieve Size Max. % Passing by Weight  
 3" 100  
 1" 95-100  
 No. 4 75-100  
 No. 40 50-85  
 No. 200 30-60

- G. Common Borrow: Earth suitable for general fill construction, free from frozen material, plastic clay, vegetation, perishable rubble, peat and other unsuitable materials. The moisture content shall be sufficient to provide required compaction and stable embankment. In no case shall the moisture content exceed 4% above optimum as determined by ASTM D698.

- H. Refill Material: 3/4" crushed stone, for refilling excavation below normal grade, rock excavation or refilling excavated unsuitable material, unless otherwise directed by the Project Representative.

- I. Select Backfill: Use structural fill or 3/4" crushed stone as directed by the Project Architect.

### PART 3 – EXECUTION

#### 3.01 PREPARATION:

- A. Be sure that all necessary erosion and sedimentation controls are in place and properly maintained, prior to and during any earthwork.
- B. Locate and mark any and all existing underground and aboveground utilities before beginning any earthwork. Notify "Dig-Safe" (1-888-344-7233) at least 3 days prior to beginning any excavation Work.
- C. Remove and properly dispose of any pavement, structures, fences, etc. scheduled for removal (See Section 02100 - Site Preparation). Save and properly store any materials scheduled for re-use.
- D. In conjunction with the Owner and Project Representative, designate acceptable temporary spoil and waste areas as necessary, for on-site storage of waste, demolition material, loam, earth, etc. Properly store until disposal of materials is completed throughout the course of the Work, and maintain all such areas as necessary.
- E. Contractor shall secure any necessary sources of borrow materials promptly, so that earthwork may proceed expeditiously once started. Complete all earthwork activities in a given area as soon as possible once the area is stripped.

#### 3.02 EARTH EXCAVATION:

- A. Excavation consists of the removal, re-use as site fill, and/or satisfactory disposal of all materials encountered, to establish sub-grades shown on the Plans. Maintain surface drainage to prevent ponding or erosion. Do not excavate extremely wet or frozen material. In wet areas, provide pumping equipment or grade the area so that water drains from the soil to allow proper excavation or drilling operations. Provide any special equipment necessary to perform earthwork operations. When excavating near trees to be saved, prune exposed roots to minimize injury to same.
  1. Mass excavation - removal of soil materials in open areas where equipment with blade or bucket, such as bulldozer, front end loader, or earth scraper is used.
  2. Trench excavation - removal of soil materials in confined areas, such as trenches or pits, where equipment such as backhoe, shovel, clamshell or trencher is used.
- B. Contractor shall remove all existing material, including but not necessarily limited to soil, rubble, debris, trash, existing stone or masonry walls, minor structures, unsuitable material and soils of all types. If the Contractor uncovers material of a suspicious or hazardous nature, regulated material, unhealthful or contaminated soils or other unanticipated conditions,

immediately inform the Project Representative, and do not proceed in affected areas until instructed to do so in writing by the Project Representative. Unanticipated conditions will be handled on a unit price basis per Division 1.

- C. Contractor shall remove existing site materials as follows:
  - 1. Concrete Mudslabs - As defined on Drawings and in these documents.
  - 2. Unsuitable Fill Materials - As defined on Drawings and in these documents.
  - 3. Utility Trenches - Excavate to required depths below pipe invert or utility structure base, allowing for pipe bedding material or gravel base material, as defined on Drawings and in these documents.
  - 4. Restored Pavers and Concrete Sidewalks - Excavate to required depths below finish grades, allowing for new material and base material, as defined on Drawings and in these documents.
- E. Excavations carried below the depths indicated or as required for construction, without written authorization from the Project Representative, shall be filled with concrete or compacted structural fill, as specified by the Project Representative, at the Contractor's expense.
- F. When excavating and filling around tree areas protect root systems of trees to be saved. Prune roots as directed. (See Section 02100, SS 3.02 - Protection of Trees)

### 3.03 STRUCTURAL EXCAVATION:

- A. Conform to elevations and dimensions shown within a tolerance of 0.05 ft., and extending a sufficient distance from footings and foundations to permit proper foundation and subdrain construction.
- B. Excavate all unsuitable materials to the material limits, extending beyond all footings in fill a distance equal to the depth of fill required below the footing plus two feet on all sides. Final excavation to subgrade in marine deposits shall be made with equipment suitable for the purpose (such as with a smooth bladed backhoe or by hand) so as to minimize disturbance to bearing surfaces.
- C. In all cases, excavate all ash.
- D. For adequate frost protection, excavation for all exterior foundations, utility underdrains, etc., must extend to a minimum depth of 4.5 feet below the lowest surrounding exterior grade. Protect bottoms of excavations from freezing when atmospheric temperature is below 35 degrees Fahrenheit or as directed by Project Representative.
- E. All backfilling and compaction Work shall be reviewed and tested as specified prior to the pouring of footings. The Contractor shall notify the Project Representative when areas are ready for testing, and shall have the Project

Representative review comments in writing prior to beginning the construction of footings. See requirements for SS 3.13 - Compaction, below.

3.04 TRENCH EXCAVATION AND BACKFILL (Utilities):

- A. Trench excavation includes excavation for underground lines and structures as shown on the Plans. Make trench walls as near vertical as practical, consistent with OSHA requirements (See OSHA Regulations - 29 CFR 926.65-"Excavations" -Appendix B) and safe Working practices. Shore and brace as necessary. Keep excavations free from water in order to carry on Work properly.
- B. Do not excavate to full depth in freezing temperature unless structure or line can be installed immediately. Protect excavation bottom from freezing.
- C. Excavation shall be made to such a point as to allow a minimum of six inches (6") of bedding to be placed beneath the bottom of all barrels, bells or couplings of all pipes installed. The maximum clear width of trench at the top of the pipe shall be not more than the outside diameter of the pipe plus two feet. The bottom of the trench shall be accurately graded to provide a uniform layer of bedding material for each Section of pipe. Safety shall be the controlling factor in determining minimum trench widths.
- D. Before installation of any sewer or drain pipe, the Contractor shall first place and consolidate a minimum six inch (6") layer of 3/4" crushed stone or approved bedding on the trench bottom. After the pipe has been laid, additional crushed stone or bedding shall be placed and consolidated to the crown of the pipe. The trench shall then be carefully backfilled with stone (or sand, if required) to 12" above the crown of the pipe, backfill shall be deposited in six inch (6") layers, thoroughly consolidated by hand or mechanical tampers, until the pipe has at least twelve inches (12") of cover over the top of the pipe. (Refer to "Typical Pipe Installation Detail" on Plans.)
- E. The remainder of the trench shall be backfilled as follows:
  - 1. In Roads, Walks, Drives, Etc.:
    - a) The area between a line 12 inches over the top of the pipe and a line at sub-grade elevation below finished pavement (see pavement details on Plans), shall be carefully backfilled in not over twelve (12) inch layers using suitable material taken from the excavation or approved granular borrow hauled in for the purpose, as meets the specifications. No mud, frozen earth, or stone larger than four (4) inches in diameter is to be used for trench backfilling.
    - b) The trench shall be consolidated by tamping, rolling, or other mechanical means, as proposed by the Contractor. If the pipe is displaced from alignment by settlement or compaction, it shall be re-laid at the Contractor's expense.
    - c) The remaining distance to the top of the trench shall be filled with road subbase and base gravel as specified and detailed,



hauled in for the purpose and furnished by the Contractor. This gravel shall be placed, graded and compacted as specified in layers to the finished surface. (See Section 02230 - Gravel Base Courses).

- F. After the completion of all backfilling operations, the Contractor shall grade the site to the lines, grades and elevations shown on the Contract Drawings, taking into account any subsequent topsoil and paving requirements. Finished grading shall not be done until the installation of all underground utilities has been completed in the affected area.
- G. When installation of utilities is in fill areas, place compacted fill to proposed height of top of pipe and then trench to required elevation to set pipe. Extend fill at least 10 ft. on both sides of pipe. Backfill around pipe as specified above and compact to required density.

### 3.05 DEWATERING:

- A. Control surface and sub-surface runoff so as not to allow water to enter or accumulate in excavations or areas to be filled. Remove water from excavations to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades, foundations and undisturbed bearing surfaces. Control water level to at least 12 inches below subgrade elevation to reduce disturbance of the subgrade soils and provide a more stable Working surface during construction. Provide and maintain sumps, pumps, suction and discharge lines and other dewatering systems and components necessary to convey water away from the work area. Discharge water in safe, legal manner into temporary sedimentation ponds or existing waterways or drainage systems, as required. Do not allow water carrying soil particles to be discharged directly to existing waterways or drainage systems. Refer to Erosion Control Plan for measures to be taken to remove soil particles from water. Under no conditions shall surface water or groundwater be discharged into sanitary sewer systems.
- B. Install sedimentation basins or other sedimentation controls as required, to prevent sediment damage downstream. Correct any erosion or sedimentation problems as directed at no additional cost to the Owner. Conform to all applicable regulations of the Cumberland County Natural Resources Conservation Service, Maine Department of Environmental Protection, and U.S. Environmental Protection Agency NPDES Permit Requirements.

### 3.06 UNSUITABLE SOILS:

- A. Test pits and borings have been taken on the site. Refer to the Geotechnical Report Prepared by S.W. Cole, dated 15 August 2006, and the project Drawings. These borings are for information only and are not and in no way shall they be construed as a guarantee as to actual subsurface conditions. Refer to Section 02220-1.05.
- B. Field locate the limits of and properly remove and dispose of all encountered unsuitable subsurface materials when so directed by the Project Representative. All such materials shall become the property of the Contractor and shall be properly disposed of off-site.

- C. Secure all required state and local permits necessary for removal and disposal of any sewerage, toxins, or any other such classified materials that may be encountered on-site.
- D. Unsuitable material such as peat, muck, soils with high organic content, or junk fill which underlies the subgrade or the bottom of excavations, outside the normal limits of excavation as shown on the Drawings, shall be removed and replaced with suitable material when necessary to meet the specifications. The "Contract Price" will be adjusted in accordance with the General Conditions and Supplementary General Conditions to compensate for the cost of additional excavation and suitable replacement materials.
- E. Unsuitable material which lies within the limits of required excavation will be removed as part of the Work, without change in the "Contract Price".
- F. Soil rendered unsuitable for bearing by the Contractor's operations shall be removed at the Contractor's expense, and replaced with compacted gravel, crushed stone or concrete, at no expense to the Owner.
- G. Unsuitable soils shall be legally disposed of off-site at the Contractor's expense.

### 3.07 ROCK EXCAVATION:

- A. Rock excavation is not anticipated as a part of the project. Rock excavation shall be defined as: All rock, ledge, or boulders in undisturbed soil that cannot be removed by a mechanical scarifier and power shovel of 1.0 cubic yards capacity, and/or D-8 bulldozer with ripper, without use of line drilling or explosives. Boulders 2 cubic yards or smaller shall be considered to be unclassified material regardless of location. During excavations if stone in excess of 2 cubic yards is encountered and cannot be moved it will be considered as "rock" as herein defined.

### 3.08 FROST:

- A. No fill materials shall be placed when the subgrade, the fill material, or the previous lift on which fill is to be placed is frozen. In the event that the subgrade or any fill which already has been placed becomes frozen, it shall be thawed, scarified and then recompact, or else removed, to meet the compaction requirements of the specifications before the next lift is placed. Any soft spots resulting from frost shall be removed or recompact to meet the requirements of compaction specified herein before new fill material is placed.

### 3.09 FILL AND BACKFILL:

- A. Filling is the placement of satisfactory soil materials, whether originating from on-site or off-site, in areas where existing grade is to be raised in elevation. Where the existing ground has a density less than that specified herein (see SS 3.13 - "Compaction"), compact the soil to the required density. Where unsatisfactory soils occur in areas to be filled, remove same before filling and dispose of these soils in areas designated by the Specifications (see SS 3.06).

- B. Backfilling is the placement of satisfactory porous materials in trenches, pits, against structures or other areas previously excavated, or as shown on the Plans.
- C. Place fill and backfill in not over 12" layers (loose measure) and compact each layer to required density (see "compaction"). Areas to be filled and backfilled must be free of standing water. Do not place fill or backfill on surfaces that are muddy, frozen, or contain frost or ice.
- D. Backfilling at the foundation walls shall only be started after review by the Project Representative or his/her representative.
- E. On existing slopes of 4:1 or steeper, excavate horizontal benches 6' wide every 2' vertically to eliminate shear planes before placing any fill.
- F. Filling and backfilling of walls, foundations, trenches or retaining walls shall not commence until construction below finish grade has been inspected, forms removed and the excavation cleared of trash and debris. Stones larger than 2" maximum dimension will not be permitted in the upper layer of fill.
- G. Filling and backfilling of utility trenches shall not commence until all piping, conduit, etc., has been installed, tested and approved and the locations of all pipe, fittings, and underground structures have been measured and recorded. Fill and/or backfill shall be carefully placed by hand around the pipe or conduit to a depth of one foot above the top of the pipe and shall be carefully tamped, in not less than two lifts; compaction shall be done with hand rammers or mechanical tampers so as not to damage the completed pipe.
- H. The Contractor shall assume responsibility for site surface and subsurface drainage and shall maintain such drainage during the life of the Contract, and shall at all times protect adjacent property, structures and utilities.

### 3.10 PLACEMENT OF COMPACTED GRANULAR BORROW:

- A. In roadway and parking areas, compacted granular fill shall be used for all filling and backfilling to subgrade.
- B. Compacted Granular Borrow should be placed in maximum 8" thick lifts and compacted to the densities as specified herein, as determined by ASTM D1557 (Modified Proctor). Before placing the first lift of compacted granular fill, all disturbed soil, loose rock, organic matter, asphalt, concrete, trash, rubble or other deleterious or compressible material shall be removed from the subgrade. The granular fill shall be spread evenly by mechanical equipment or by manual means above the designed (compacted) subgrade, and shall be built up in horizontal layers as nearly even as practicable to prevent the thickness of lift from exceeding that specified.
- C. If the Granular Borrow material becomes too wet for the required compaction, the fill shall be dried to within the required moisture/density relationship prior to commencing or continuing compaction operations. Likewise, if the fill material becomes too dry for the required compaction, the fill shall be

moistened to the required moisture/density relationship prior to commencing or continuing compaction operations.

- D. Puddling methods of compaction will not be permitted.

### 3.11 PLACEMENT OF COMPACTED STRUCTURAL FILL:

- A. In all footing and wall areas, Compacted Structural Fill shall be used for all filling and backfilling to subgrade, as indicated on the Drawings.
- B. Compacted Structural Fill shall be placed in maximum 8" thick lifts and compacted to the densities as specified herein as determined by ASTM D1557 (Modified Proctor). Before placing the first lift of compacted structural fill, all disturbed soil, loose rock, organic matter, asphalt, concrete, trash, rubble or other deleterious or compressible material shall be removed from the subgrade. The structural fill shall be spread evenly by mechanical equipment or by manual means above the accepted (compacted) subgrade, and shall be built up in horizontal layers as nearly even as practicable, to prevent the thickness of lift from exceeding that specified.
- C. If the Structural Fill material becomes too wet for the required compaction, the fill shall be dried to within the required moisture/density relationship prior to commencing or continuing compaction operations. Likewise, if in the opinion of the Project Representative, the fill material becomes too dry for the required compaction, the fill shall be moistened to the required moisture/density relationship prior to commencing or continuing compaction operations.
- D. Puddling methods of compaction will not be permitted.

### 3.12 COMPACTION:

- A. All fill and backfill shall be placed in maximum 8-inch lifts and compacted in accordance with the following: Density
- 1) Exterior Foundation Areas 95%
  - 2) Walkway Area 92%
  - 3) Road base and subbase 95%
  - 4) Pipe bedding and backfill 95%
- Refer to Section 02230 – Gravel Base Courses for appropriate compaction requirements of subbase and base materials.
- B. The in-place density and the degree of compaction shall be determined in accordance with ASTM D 2922 (nuclear in-place density) as Work progresses. Each layer of fill shall be placed and tested and no succeeding layers shall be placed until review of the previous layer has occurred. Any corrective Work required as a result of the testing and the expense of re-testing shall be borne by the Contractor, at no additional cost to the Owner.
- C. Backfill of excavations and walls: Any excavation (e.g. utilities, walls, footings, etc.) made in areas where compacted granular or structural fill is required, shall be backfilled with compacted granular or structural fill as designated. Where compacted fill is placed adjacent to walls, the difference in

elevation of the top of the fill on either side of the wall can be no more than one foot at any time, or else the wall must be adequately braced.

- D. Final Review: Immediately before placing of footings, foundations, or floor slab on compacted structural or stone fill or virgin soil, the Project Representative will observe the foundation and floor slab subgrade. The Contractor shall remove any soft fill if directed, and replace it with properly compacted material. The pouring of foundations or floor slab shall commence within 24 hours of final approval. Rain, frost and other factors (which, in the opinion of the Project Representative, are potentially damaging to the fill) occurring after the final review, but before or during pouring, shall require an additional observation of the compacted fill for acceptance by the Project Representative.

### 3.13 FIELD QUALITY CONTROL:

- A. All of the material testing shall be performed by a testing laboratory experienced in performing the required tests, and shall be reviewed by the Project Representative. The Owner shall employ the testing laboratory and pay for all of the tests, except for retesting as specified below. The Contractor shall be responsible for coordination with the Project Representative and testing laboratory, providing a minimum of 48 hours notice prior to the need for testing.
- B. Materials test reports and in-place field density test reports shall be submitted by the testing laboratory directly to the Project Representative with a copy to the Contractor.
- C. Refer to Part 1, Section 1.03, Quality Assurance for the Standards for Testing.
- D. The actual locations of all tests shall be determined in the field by the Project Representative, or his representative.
- E. The in-place field density tests shall be taken generally as follows:
  - 1. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2000 sq. ft. of paved area and 1000 sq. ft. of building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2000 sq. ft. of paved area and 1000 sq. ft. of overlaying building slab, but in no case less than 3 tests.
  - 2. Foundation Wall Backfill Outside of Structure: Make at least ten field density tests at locations and elevations as directed by Project Representative.
  - 3. Fill and backfill other than at the walls and foundations: One (1) test will be required for each 500 cubic yards of fill and backfill.
  - 4. Backfill in utility trenches: One (1) test will be required for each 75 lineal feet of trench line, for each 2' vertical depth of backfill and at the finished subgrade.

- F. If any of the in-place field density tests as specified above indicate that the compaction is less than specified herein, the extent of the unacceptable compaction shall be clearly established by additional testing. All of the material which has failed to meet the compaction requirements shall be removed, refilled or re-backfilled, compacted and tested until the specified compaction requirements are met. All of the corrective Work shall be in accordance with the Contract Documents, and all costs related to the corrective Work and testing shall be paid by the Contractor.

3.15 DISPOSAL OF EXCESS AND WASTE MATERIALS:

- A. Transport waste material, including unsuitable subsurface materials, trash, stumps and debris, to off-site disposal area in accordance with these Specifications, and local regulations, at Contractor's expense.

3.16 MAINTENANCE AND RESTORATION:

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion, and keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances, until final project acceptance. Remove accumulated silt and soil from detention basin as directed during the project by the Project Representative.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and recompact to required density before proceeding with other affected Work.
- D. Restore planting beds, pavement, walks and curbs, or other exterior surfaces displaced or marked by the Work of this Contract, to their original conditions, to the satisfaction of the Project Representative or his representative.
- E. Restore areas affected by settlement, due to the Work of the Contractor, to original lines, grades or levels. Correct conditions contributing in any way to such settlement in a manner acceptable to the Project Representative. Remove and replace any improperly placed or compacted fill material at no additional cost to the Owner.

END OF SECTION

## SECTION 02230 - GRAVEL BASE COURSES

## PART 1 – GENERAL

## 1.01 GENERAL PROVISIONS:

- A. Documents affecting Work of this Section include, but are not necessarily limited to, THE CONDITIONS OF THE CONTRACT General Conditions, Supplementary Conditions, Addenda and all Sections of Division 1, which are hereby made a part of this Section.
- B. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.
- C. The "Standard Specifications" referred to herein is the book entitled "*Standard Specifications, Highways and Bridges*" published by the State of Maine Department of Transportation dated April, 1995, as supplemented, excluding the following portions thereof: DIVISION 100, SECTIONS 102 THROUGH 109; NUMERICAL INDEX OF PAYMENT ITEMS INCLUDED IN EACH SECTION. Those Sections of the aforementioned Standard Specifications which are cited herein are applicable to the Work of this Contract as they may be modified, amplified or added to by this Section.

## 1.02 DESCRIPTION OF WORK:

- A. Provide labor, materials, equipment and services necessary for proper and complete installation of the gravel subbase and base courses for pavement, sidewalk, and concrete foundation areas, as indicated on the Drawings and herein specified:
  - 1. Preparation of subgrade
  - 2. Gravel subbase course.
  - 3. Gravel base course.
  - 4. Gravel shimming.
  - 5. Materials and compaction testing as required.
- B. Related Work specified elsewhere:
  - Site Preparation - Section 02100
  - Grading - Section 02210
  - Excavation, Backfill and Compaction - Section 02220
  - Erosion Control & Slope Protection - Section 02270
  - Paving, Walks and Curbs - Section 02500
  - Water Distribution Systems - Section 02660
  - Drainage Systems - Section 02720

## 1.03 QUALITY ASSURANCE:

- A. General: Comply with requirements of Section 01400 - SUBMITTALS; QUALITY REQUIREMENTS.

- B. Codes and Standards: The Work under this Section shall conform to the following, except as may be modified herein:
1. American Society for Testing and Materials (ASTM), Standard Specifications and Methods of Testing.
    - D422 Method for Particle Size Analysis of Soils
    - D698 Test for Moisture-Density Relations of Soils Using 5.5 lb. (2.5 kg) Rammer and 12 inch (304.8mm) Drop (Standard Proctor)
    - D1557 Test for Moisture-Density Relations of Soils using 10-lb (4.5 kg) Rammer and 18-inch (457 mm) Drop (Modified Proctor)
    - D2922 Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
    - D3017 Test for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
  2. American Association of State Highway and Transportation Officials (AASHTO), Latest Edition: T 88 Mechanical Analysis of Soils
  3. State of Maine, Department of Transportation, Standard Specifications, Highways and Bridges, Latest Edition.

#### 1.04 SUBMITTALS:

- A. Furnish samples, test reports, and materials certifications prepared by soils testing laboratory as required for gravel base and sub-base. Certifying, by the Contractor, that the materials comply with, or exceed the requirements herein.
- B. Test Results:
1. Mechanical analysis (ASTM D422) and moisture-density curve (ASTM D1557M) test results for gravel subbase and base courses.
  2. Field Density test results (ASTM D2922).

#### 1.05 PRODUCT HANDLING:

- A. Store materials properly to prevent damage, deterioration and inclusion of foreign matter. Aggregates shall be stockpiled in a well-drained location.

### PART 2 – PRODUCTS

#### 2.01 MATERIALS:

- A. Gravel Subbase: Clean gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the part that passes a 3- inch sieve shall meet the grading requirements of MDOT Specifications Section 703.06(b), Type D, as presented below:

Sieve Designation Percentage by Weight



Passing Square Mesh Sieve  
6" 100  
1/4 in. 25-70  
No. 40 0-30  
No. 200 0-7.0

Aggregate for subbase shall not contain particles of rock which will not pass the 6-inch square mesh sieve.

- C. Aggregate Base: Screened or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. The shall meet the grading requirement of Maine DOT Specification, Section 703.06(a), Type A, as presented below:

Sieve Designation  
Percentage by Weight  
Passing Square Mesh Sieve  
2" 100  
1/2 in. 45-70  
1/4 in. 30-55  
No. 40 0-20  
No. 200 0-5.0

Type A aggregate for base shall not contain particles of rock which will not pass the 2-inch square mesh sieve.

### PART 3 – EXECUTION

#### 3.01 SUBGRADE PREPARATION FOR GRAVEL BASE COURSES:

- A. Form, shape and roll subgrade to conform to subgrade elevations and cross-section of finished pavement. Roller: ten-ton minimum weight in all open areas; suitable equipment in confined spaces.
- B. Remove stones greater than 4" from subgrade to 12" depth. Fill depressions with suitable material. When surface areas become impervious due to concentrations of fines, lightly scarify and re-compact. In severe cases, remove such material and replace with suitable soil as directed.
- C. Compact subgrade to 92% of maximum laboratory density (ASTM-D 2922; Nuclear Method Density). Shape to smooth surface free of irregularities. Protect from damage by proper construction of drainage swales as shown and directed, prior to placement of gravel subbase.

#### 3.02 INSPECTION AND TESTING:

- A. Prior to placement of any subbase gravel, the Project Representative shall review subgrade conditions.
- B. See Item 1.04 of this Section for required tests and test reports.

- C. Refer to Section 01416, for general standards and locations for testing. The Project Representative or his representative will designate specific locations for testing.

### 3.03 GRAVEL SUBBASE:

- A. Obtain acceptance by the Project Representative of gravel material prior to delivery to the site.
- B. On prepared approved subgrade construct gravel subbase to conform to details on Drawings and these Specifications. Gravel shall consist of sound gravel particles free of thin shale, clay or organic material, with no stone over 6" in size, as specified in SS 2.01 B.
- C. Construct subbase in one course when compacted depth required is 8" or less and two or more courses when depth required is over 8". Compact each course to 95% of maximum laboratory density (ASTM-D2922: Nuclear Method Density). Course thicknesses required are after compaction.
- D. Conform construction methods to MDOT Standard Specifications, Section 304.03 and 304.04, and these Specifications.

### 3.04 AGGREGATE BASE:

- A. Obtain acceptance by the Project Representative of aggregate material prior to delivery to the site.
- B. On compacted subbase, construct aggregate base to lines and grades to conform with details on Drawings and these Specifications. Coordinate base course construction with granite or bituminous curb installation, and with cobble gutter when present.
- C. Construct base in one course when compacted depth required is 6" or less and two or more courses when compacted depth required is over 6". Compact each course to 95% of maximum laboratory density (ASTM D2922: Nuclear Method Density). Thickness required is after final compaction.
- D. Construction methods shall conform to MDOT Standard Specifications, Section 304.03, 304.04 and 304.05, and these Specifications.

### 3.05 AGGREGATE SHIMMING

- A. On existing base material to receive pavement, shape aggregate base to lines and grades to conform with details on Drawings and these Specifications. Add additional aggregate base material as required to bring to proper grades. Compact to 95% of maximum laboratory density (ASTM D2922: Nuclear Method Density)

### 3.06 GRADING:

- A. Comply with Section 02210-Grading.

END OF SECTION

**GEOTECHNICAL ENGINEERING SERVICES  
CITY HALL – PLAZA RENOVATIONS  
389 CONGRESS STREET  
PORTLAND, MAINE**

**06-0700.1**

**August 15, 2006**

**Prepared for:**

City of Portland  
Attn: Matt Fitzgerald  
City of Portland Purchasing Department  
389 Congress Street  
Portland, Maine 04101

**Prepared by:**



286 Portland Road  
Gray, Maine 04039

## TABLE OF CONTENTS

1.0 INTRODUCTION .....	1
1.1 Scope of Work .....	1
1.2 Proposed Construction .....	1
2.0 EXPLORATION AND TESTING .....	2
2.1 Exploration .....	2
2.2 Testing .....	2
3.0 SITE AND SUBSURFACE CONDITIONS .....	2
3.1 Site Conditions .....	2
3.2 Subsurface Conditions .....	2
3.3 Groundwater Conditions .....	3
3.4 Frost Conditions .....	3
4.0 EVALUATIONS AND RECOMMENDATIONS .....	3
4.1 General .....	3
4.2 Subgrade Preparation .....	3
4.3 Frost Considerations .....	3
4.4 Pavement Sections .....	4
4.4.1 Soil Section .....	4
4.4.2 Insulated Section .....	5
4.5 Subgrade Modulus .....	5
4.6 Drainage and Grading .....	5
4.7 Design Review and Construction Testing .....	6
5.0 CLOSURE .....	6

Attachment A	Limitations
Sheet 1	Exploration Location Plan
Sheets 2 through 5	Test Boring Logs
Sheet 6	Key to the Notes and Symbols
Sheets 7 through 12	Laboratory Test Results



**S.W. COLE**  
ENGINEERING, INC.

• Geotechnical Engineering • Field & Lab Testing • Scientific & Environmental Consulting

06-0700.1

August 15, 2006

City of Portland  
Attention: Matt Fitzgerald  
City of Portland Purchasing Department  
389 Congress Street  
Portland, Maine 04101

Subject: Geotechnical Engineering Services  
City Hall – Plaza Renovations  
389 Congress Street  
Portland, Maine

Dear Mr. Fitzgerald:

In accordance with our Agreement dated June 28, 2006, we have made a subsurface investigation for the City Hall Plaza Renovations at 389 Congress Street in Portland, Maine. This report summarizes our findings and geotechnical recommendations relative to the plaza renovation. The contents of this report are subject to the limitations set forth in Attachment A.

## **1.0 INTRODUCTION**

### **1.1 Scope of Work**

The purpose of our work was to obtain subsurface information in order to provide geotechnical consultation for the proposed project. Our scope of work included four test boring explorations, geotechnical laboratory testing, a geotechnical evaluation of the subsurface findings relative to the proposed construction and preparation of this report.

### **1.2 Proposed Construction**

We understand that as part of the overall renovation project, the existing stone and concrete plaza is to be removed and reconstructed. We understand the stone will be re-used, but the concrete portion will be replaced.

GRAY, ME OFFICE

286 Portland Road, Gray, ME 04039-9586 ■ Tel (207) 657-2866 ■ Fax (207) 657-2840 ■ E-Mail [infogray@swcole.com](mailto:infogray@swcole.com) ■ [www.swcole.com](http://www.swcole.com)

*Other offices in Augusta, Bangor, and Caribou, Maine & Somersworth, New Hampshire*

## **2.0 EXPLORATION AND TESTING**

### **2.1 Exploration**

Four test borings (B-1 to B-4) were made in the plaza area on July 14, 2006 by Northern Test Boring of Gorham, Maine working under subcontract to S. W. COLE ENGINEERING, INC. The exploration locations were selected by Resurgence Engineering. The test borings were drilled to depths of 10.3 to 13 feet. Approximate boring locations are shown on the "Exploration Location Plan" attached as Sheet 1. Logs of the test borings are attached as Sheets 2 through 5. A key to the notes and symbols used on the logs is attached as Sheet 6.

### **2.2 Testing**

Standard penetration tests (SPT) were performed during drilling using a split-spoon sampler. SPT blow counts are shown on the boring logs. Laboratory testing was performed on selected samples recovered from the test borings. The results of moisture content (ASTM D2216) testing are shown on the logs. The results of gradation tests (ASTM C117) are attached as Sheets 7 through 12.

## **3.0 SITE AND SUBSURFACE CONDITIONS**

### **3.1 Site Conditions**

The existing plaza is situated on the easterly side of the existing Portland City Hall and consists of stone pavers and concrete slabs. The plaza is at about sidewalk elevation.

### **3.2 Subsurface Conditions**

The concrete slab was observed to be about 4 inches thick at borings B-1 and B-4. The existing stone pavers were on the order of 4 to 6 inches thick overlying a thin grout pad at borings B-2 and B-3. Below the concrete and granite sidewalks the borings generally encountered a black sandy ash layer 1 to 5 feet thick. Below the black ash fill a layer of fill consisting of silty sand and sand with some gravel and ash was encountered to depths of about 5 to 7 feet at borings B-1, B-2, and B-4. What appears to be native brown silty sand was encountered below the fill. Borings B-1, B-2, and B-3 were terminated in the native soils at depth of about 10.5 feet. A refusal surface, interpreted to be bedrock, was encountered in boring B-4 at 13 feet below the ground surface.

### **3.3 Groundwater Conditions**

No free water was observed in the completed boreholes. Boring B-2 encountered saturated soils from 4 to 6.5 feet below the surface. In general, groundwater will fluctuate seasonally and in response to precipitation and snow melt.

### **3.4 Frost Conditions**

The design freezing index for the Portland, Maine area is approximately 1,250 Fahrenheit degree-days, which corresponds to a frost penetration depth of 4.5 feet.

## **4.0 EVALUATIONS AND RECOMMENDATIONS**

### **4.1 General**

Based on our understanding of the proposed construction, the subsurface exploration findings, and the laboratory testing, we offer the following comments:

- The ash and fill soils are not suitable for support of the proposed pavements and are frost susceptible.
- Appropriate base materials and/or insulation should be used to reduce the potential for freeze-thaw damage.
- Adequate drainage should be provided to reduce the likelihood of seasonally saturated subsoils and potential freeze-thaw damage to concrete slabs and stone pavers.

### **4.2 Subgrade Preparation**

All existing surface materials and curbing should be removed from the area of the plaza reconstruction. The subgrade should be proof rolled with at least 4 passes of a 5 ton steel drum roller in static mode prior to placement of the reconstructed pavement section. Any soft or wet areas should be overexcavated and replaced with compacted MDOT 703.06 Type D material. S. W. COLE ENGINEERING, INC. should be on-site to observe excavation and subgrade preparation.

### **4.3 Frost Considerations**

Frost penetration can be on the order of 4.5 feet or more in this area of the state. In the absence of full depth excavation of frost susceptible soils or use of insulation, frost will penetrate into the subgrade and some frost heaving and distress of concrete and stone

pavement must be anticipated. It is recommended that a full depth reconstruction consisting of non-frost susceptible soils or an insulated pavement section be utilized to reduce frost potential.

#### **4.4 Pavement Sections**

The following sections are recommended for use in the plaza reconstruction. All subbase and base courses should be compacted to at least 95 percent of their maximum dry density as determined by ASTM D1557. Materials are based on Maine Department of Transportation specifications. It is understood that a granular bedding layer will be used under the stone pavers for fine grading. It is recommended that a clean, crushed sand or similar free-draining material be used for the bedding layer. We also understand that a thin grout layer will likely be utilized directly below the stone pavers.

##### **4.4.1 Soil Section**

<b>Recommended Pavement Section</b>		
Layer	Layer Thickness	
	Stone Pavers	Concrete Slab
Bedding	By others	N/A
MDOT 703.06 Type A Base Course	12 inches	12 inches
MDOT 703.06 Type D Subbase (modified to 3 inch minus)	40 inches	40 inches
Total	52 inches	52 inches

Note: No asphalt reclaim in the base or subbase materials.



#### **4.4.2 Insulated Section**

<b>Recommended Pavement Section</b>		
Layer	Layer Thickness	
	Stone Pavers	Concrete Slab
Bedding	By others	N/A
MDOT 703.06 Type A Base Course	12 inches	12 inches
High Density Rigid Insulation (suitable for below grade use)	2 inches	2 inches
MDOT 703.06 Type A Base Course	8 inches	8 inches
Total	22 inches	22 inches

Note: No asphalt reclaim in the base or subbase materials.

#### **4.5 Subgrade Modulus**

Concrete sidewalks may be designed using a subgrade reaction modulus of 150 pci (pounds per cubic inch) provided the slab is underlain by at least 12 inches of compacted MDOT 703.06 Type A base course placed over properly prepared subgrades.

#### **4.6 Drainage and Grading**

No free water was encountered during the explorations; however, it is likely that the subsoils may become saturated seasonally. The durability of the pavement structure may be affected by periods of saturated soils, particularly during freeze-thaw cycles. Consideration should be given to the development of both surface and subgrade drainage. Subgrades should be sloped to promote groundwater movement towards the periphery and/or perimeter underdrains. The plaza surface area should be graded to promote surface drainage toward the periphery and toward catch basins. Underdrains should be installed around the perimeter of the reconstructed plaza to enhance drainage. Underdrains should be installed at least 4.5 feet below finished grade for frost protection and should have positive gravity outlets. Four inch perforated drain pipes wrapped in a filter sock should be utilized for perimeter drains.

#### **4.7 Design Review and Construction Testing**

S. W. COLE ENGINEERING, INC. should be engaged to review the construction documents prior to construction to confirm that our recommendations have been appropriately interpreted and implemented.


S. W. COLE ENGINEERING, INC. should be retained to provide testing and observation services during the plaza reconstruction. This is to observe compliance with the design recommendations, drawings and specifications and to allow design changes in the event that subsurface conditions are found to differ from those anticipated prior to the start of construction. S. W. COLE ENGINEERING, INC. is available to test soil, concrete, and other construction materials.

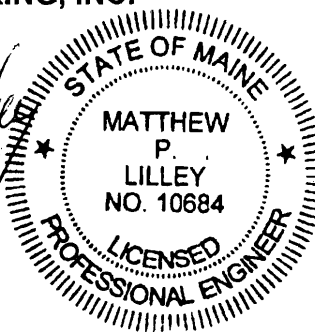
#### **5.0 CLOSURE**

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

Very truly yours,

**S. W. COLE ENGINEERING, INC.**

  
Matthew P. Lilley, P. E.  
Geotechnical Engineer



MPL:mpl/pfb

c: Jeffrey T. Read, P. E. – Pinkham & Greer Consulting Engineers, Inc.  
c: Alfred Hodson – Resurgence Engineering  
c: Chad Merritt – Consigli

## **Attachment A Limitations**

This report has been prepared for the exclusive use of the City of Portland for specific application to the proposed Plaza Renovations at 389 Congress Street in Portland, Maine. S. W. COLE ENGINEERING, INC. has endeavored to conduct the work in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

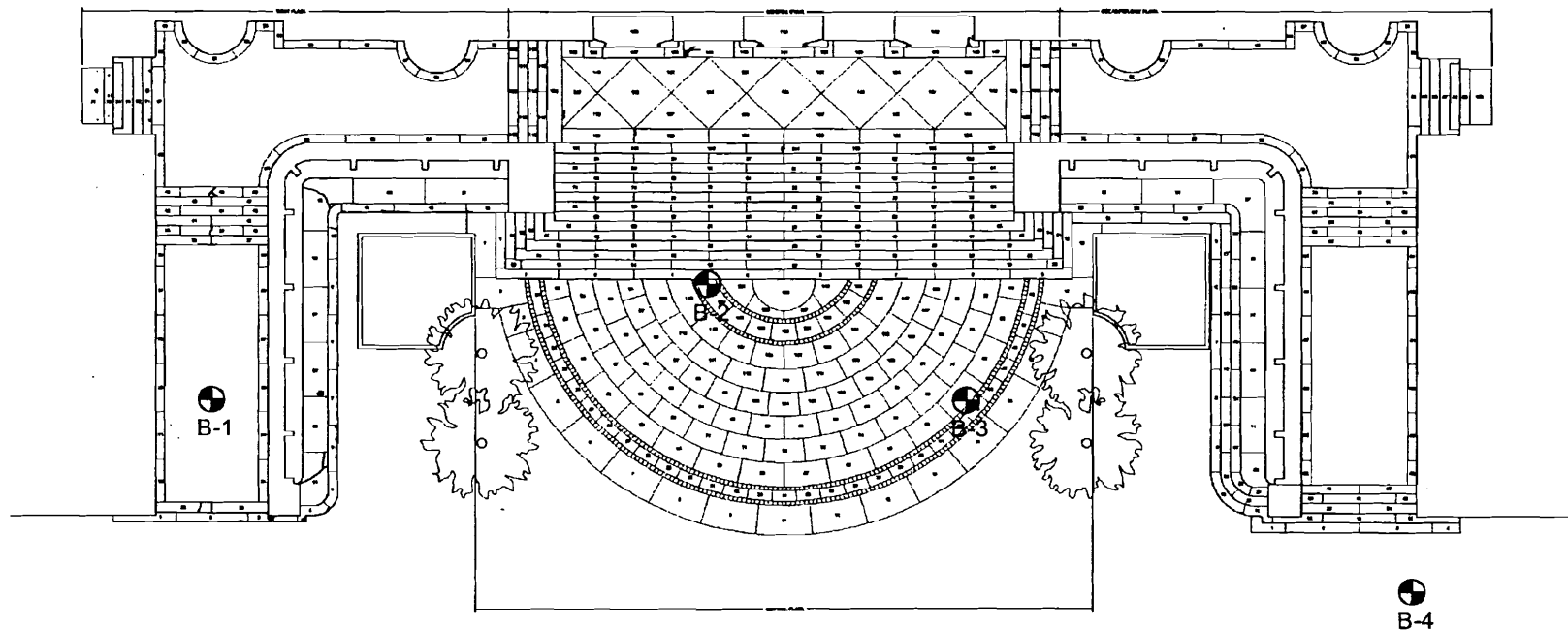
The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

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

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

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

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



**LEGEND**

⊕ Approximate Test Boring Location

**NOTE :**

Base plan provided by TTI Architects.



**S.W. COLE**  
ENGINEERING, INC.

CITY OF PORTLAND

**EXPLORATION LOCATION PLAN**

City Hall - Plaza Renovations  
389 Congress Street  
Portland, Maine

Job No. 06-0700.1 S  
Date : 08/03/06

Scale Not to Scale  
Sheet 1





# BORING LOG

BORING NO.: **B-2**  
 SHEET: **1 OF 1**  
 PROJECT NO.: **06-0700.1 S**  
 DATE START: **7/14/2006**  
 DATE FINISH: **7/14/2006**  
 ELEVATION: **NOT AVAILABLE**  
 SWC REP.: **PFK**

PROJECT: **PROPOSED CITY HALL PLAZA RENOVATIONS**  
 CLIENT: **CITY OF PORTLAND**  
 LOCATION: **PORTLAND, MAINE**  
 DRILLING FIRM: **NORTHEAST TEST BORINGS, INC.** DRILLER: **BUBBA**  
 CASING: TYPE **SSA** SIZE I.D. **2 1/2"** HAMMER WT. **30"**  
 SAMPLER: TYPE **SS** SIZE I.D. **1 3/8"** HAMMER WT. **140 LB** SAMPLER DEPTH **30"**  
 CORE BARREL: \_\_\_\_\_

**WATER LEVEL INFORMATION**  
 SATURATED SOILS FROM ABOUT 4' TO 6.5'  
 MOIST TO WET BELOW 6.5'+/-

CASING BLOWS PER FOOT	SAMPLE				SAMPLER BLOWS PER FOOT				DEPTH FEET	STRATA & TEST DATA
	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		
									4"+/-	GRANITE PAVER AND GROUT LAYER
									1"+/-	BLACK SANDY ASH (FILL) - LOOSE -
	1D	2.0'	0.8'	2.5'	14	2	1	2		BROWN SILTY GRAVELLY SAND WITH SOME BRICK PIECES (FILL) W = 30.0%
	2D	2.0'	0.8'	4.5'	2	1	2	6		- LOOSE - W = 15.2%
	3D	2.0'	0.7'	6.5'	1	2	6	14	7'+/-	BROWN SILTY SAND AND GRAVEL WITH SOME BRICK PIECES (FILL) W = 11.4%
	4D	2.0'	1.2'	8.5'	14	19	16	19		- DENSE -
	5D	2.0'	2.0'	10.5'	16	18	22	24	10.5'	BROWN SAND AND SILT, TRACE GRAVEL W = 12.3%
										BOTTOM OF EXPLORATION AT 10.5'
SAMPLES:					SOIL CLASSIFIED BY:				REMARKS:	
D = SPLIT SPOON					X DRILLER - VISUALLY				STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.	
C = 3" SHELBY TUBE					X SOIL TECH. - VISUALLY					
U = 3.5" SHELBY TUBE					X LABORATORY TEST					
BORING NO.: <b>B-2</b>										



# BORING LOG

BORING NO.: **B-3**  
 SHEET: **1 OF 1**  
 PROJECT NO.: **06-0700.1 S**  
 DATE START: **7/14/2006**  
 DATE FINISH: **7/14/2006**  
 ELEVATION: **NOT AVAILABLE**  
 SWC REP.: **PFK**

PROJECT: **PROPOSED CITY HALL PLAZA RENOVATIONS**  
 CLIENT: **CITY OF PORTLAND**  
 LOCATION: **PORTLAND, MAINE**  
 DRILLING FIRM: **NORTHEAST TEST BORINGS, INC.** DRILLER: **BUBBA**

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

**WATER LEVEL INFORMATION**  
 NO FREE WATER OBSERVED  
 SOILS MOIST

CASING BLOWS PER FOOT	SAMPLE				SAMPLER BLOWS PER FOOT				DEPTH	STRATA & TEST DATA
	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		
									6" +/-	GRANITE PAVER AND GROUT LAYER
	1D	2.0'	0.3'	2.5'	12	3	3	2		-LOOSE . . . . BLACK SANDY ASH, WITH SOME BRICK PIECES (FILL) . . . . MEDIUM DENSE ~
	2D	2.0'	0.5'	4.5'	2	4	8	9	5" +/-	
	3D	2.0'	1.3'	6.5'	9	6	5	9		- MEDIUM DENSE BECOMING . . . . BROWN SILTY SAND, SOME GRAVEL W = 14.6% W = 11.1% . . . . DENSE ~
	4D	2.0'	2.0'	8.5'	12	15	16	18	10.5'	
	5D	2.0'	2.0'	10.5'	15	19	22	27		BOTTOM OF EXPLORATION AT 10.5'

SAMPLES: D = SPLIT SPOON C = 3" SHELBY TUBE U = 3.5" SHELBY TUBE	SOIL CLASSIFIED BY: <input checked="checked" type="checkbox"/> DRILLER - VISUALLY <input checked="checked" type="checkbox"/> SOIL TECH. - VISUALLY <input checked="checked" type="checkbox"/> LABORATORY TEST	REMARKS:  STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.	<div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">4</div>
	BORING NO.: <b>B-3</b>		



# BORING LOG

BORING NO.: **B-4**  
 SHEET: 1 OF 1  
 PROJECT NO.: 06-0700.1 S  
 DATE START: 7/14/2006  
 DATE FINISH: 7/14/2006  
 ELEVATION: NOT AVAILABLE  
 SWC REP.: PFK

PROJECT: **PROPOSED CITY HALL PLAZA RENOVATIONS**  
 CLIENT: **CITY OF PORTLAND**  
 LOCATION: **PORTLAND, MAINE**  
 DRILLING FIRM: **NORTHEAST TEST BORINGS, INC.** DRILLER: **BUBBA**  
 TYPE: \_\_\_\_\_ SIZE I.D.: \_\_\_\_\_ HAMMER WT.: \_\_\_\_\_ HAMMER FALL: \_\_\_\_\_  
 CASING: **SSA** 2 1/2"  
 SAMPLER: **SS** 1 3/8" 140 LB 30"  
 CORE BARREL: \_\_\_\_\_

**WATER LEVEL INFORMATION**  
 NO FREE WATER OBSERVED  
 SOILS MOIST

CASING BLOWS PER FOOT	SAMPLE				SAMPLER BLOWS PER				DEPTH	STRATA & TEST DATA
	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24		
									4"+/-	CONCRETE SIDEWALK
										-LOOSE-
	1D	2.0'	0.8'	2.3'	3	5	6	3	3'+/-	BLACK SANDY ASH (FILL)
										BROWNISH GRAY SAND, SOME SILT AND BROWN SILTY FINE SAND, SOME GRAVEL (FILL) - LOOSE -
	2D	2.0'	1.0'	4.3'	2	3	5	11	5'+/-	- MEDIUM DENSE BECOMING . . .
										BROWN SILTY SAND, SOME GRAVEL
	3D	2.0'	1.6'	6.3'	7	7	9	15		
	4D	2.0'	1.7'	8.3'	7	11	17	24	10.3'	. . . DENSE -
	5D	2.0'	2.0'	10.3'	15	18	17	19		
										PROBE AUGER 10.3' TO 13.0' - NO SAMPLING
									13.0'	AUGER REFUSAL AT 13.0' PROBABLE BEDROCK

SAMPLES: \_\_\_\_\_ SOIL CLASSIFIED BY: \_\_\_\_\_  
 D = SPLIT SPOON  DRILLER - VISUALLY  
 C = 3" SHELBY TUBE  SOIL TECH. - VISUALLY  
 U = 3.5" SHELBY TUBE  LABORATORY TEST

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

(5)

BORING NO.: **B-4**



## **KEY TO THE NOTES & SYMBOLS**

### **Test Boring and Test Pit Explorations**

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

#### **Key to Symbols Used:**

w	-	water content, percent (dry weight basis)
q <sub>u</sub>	-	unconfined compressive strength, kips/sq. ft. - based on laboratory unconfined compressive test
S <sub>v</sub>	-	field vane shear strength, kips/sq. ft.
L <sub>v</sub>	-	lab vane shear strength, kips/sq. ft.
q <sub>p</sub>	-	unconfined compressive strength, kips/sq. ft. based on pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W <sub>L</sub>	-	liquid limit - Atterberg test
W <sub>P</sub>	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass. RQD is computed from recovered core samples.
γ <sub>T</sub>	-	total soil weight
γ <sub>B</sub>	-	buoyant soil weight

#### **Description of Proportions:**

0 to 5% TRACE  
5 to 12% SOME  
12 to 35% "Y"  
35+% AND

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

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

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

Project Name PORTLAND - 389 CONGRESS STREET - CITY HALL - PLAZA  
 RENOVATIONS - GEOTECHNICAL ENGINEERING SERVICES  
 Client CITY OF PORTLAND

Project Number 06-0700.1

Lab ID 5413G

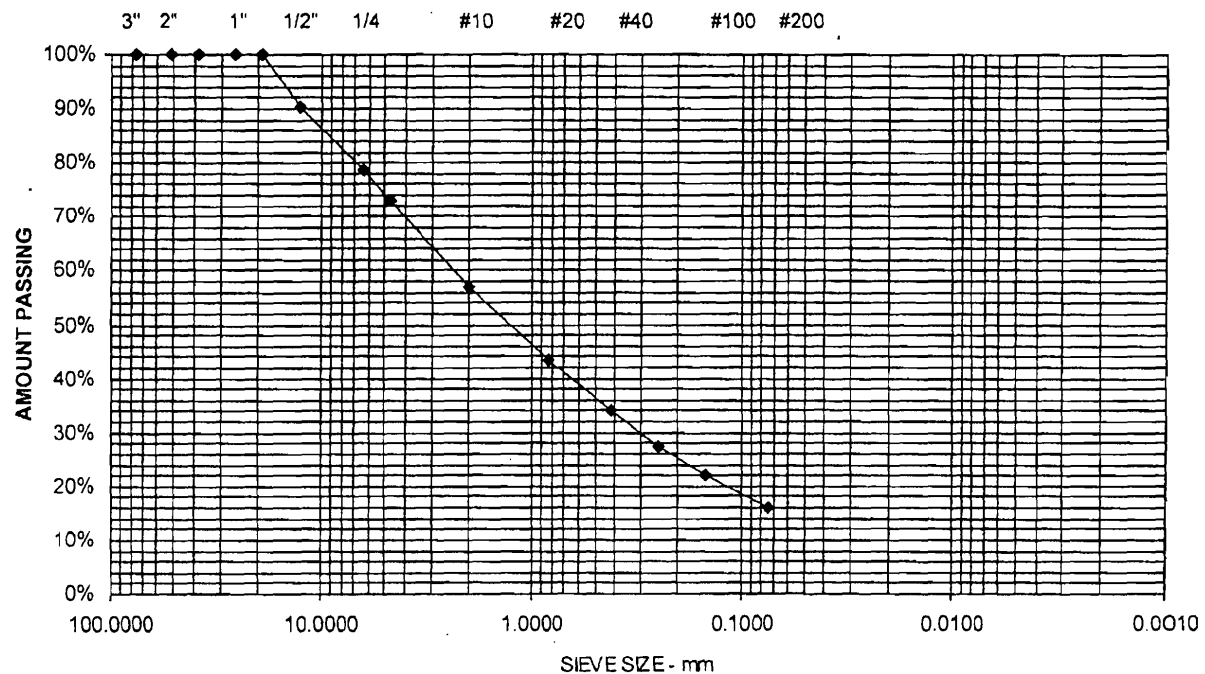
Date Received 7/14/2006

Date Complete 7/17/2006

Tested By JUSTIN BISSON

Material Source B2 S1 0.5-2.5

<u>STANDARD DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	90	
6.3 mm	1/4"	79	
4.75 mm	No. 4	73	27.2% Gravel
2.00 mm	No. 10	57	
850 μm	No. 20	44	
425 μm	No. 40	34	56.8% Sand
250 μm	No. 60	28	
150 μm	No. 100	22	
75 μm	No. 200	16.0	16% Fines



Project Name PORTLAND - 389 CONGRESS STREET - CITY HALL - PLAZA  
RENOVATIONS - GEOTECHNICAL ENGINEERING SERVICES

Project Number 06-0700.1

Client CITY OF PORTLAND

Lab ID 5414G

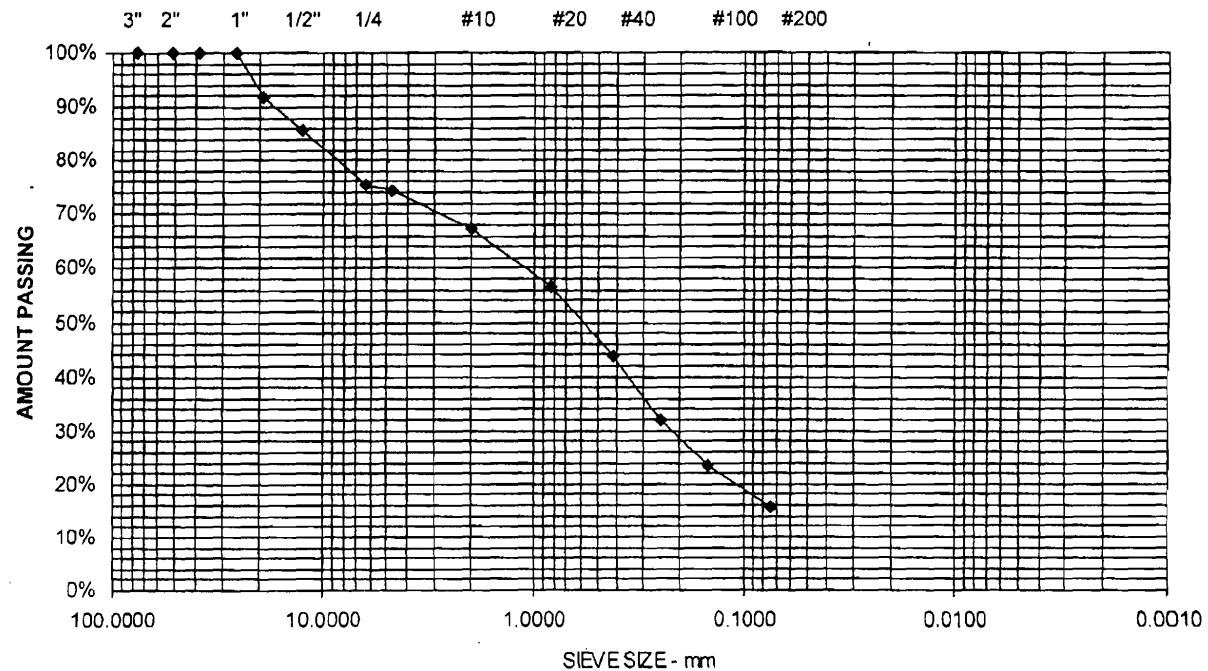
Date Received 7/14/2006

Date Complete 7/17/2006

Material Source B2 S2 2.5-4.5

Tested By JUSTIN BISSON

<u>STANDARD DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	92	
12.5 mm	1/2"	86	
6.3 mm	1/4"	76	
4.75 mm	No. 4	74	25.6% Gravel
2.00 mm	No. 10	67	
850 μm	No. 20	57	
425 μm	No. 40	44	58.6% Sand
250 μm	No. 60	32	
150 μm	No. 100	24	
75 μm	No. 200	15.8	15.8% Fines

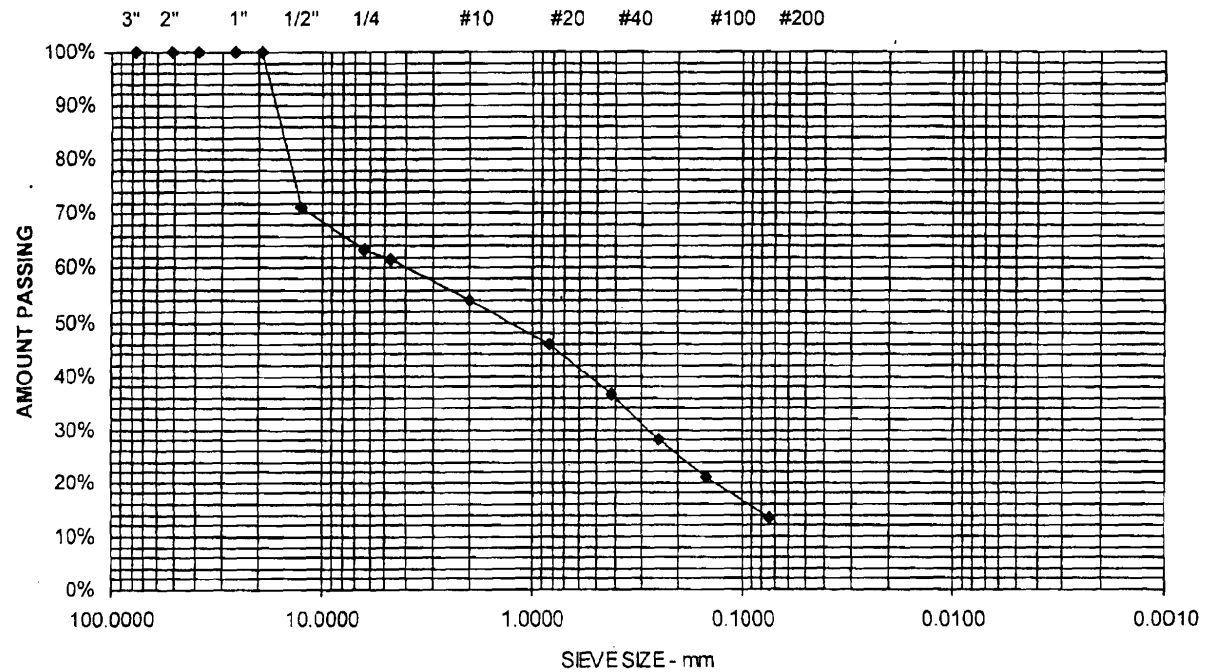


Project Name PORTLAND - 389 CONGRESS STREET - CITY HALL - PLAZA  
RENOVATIONS - GEOTECHNICAL ENGINEERING SERVICES  
Client CITY OF PORTLAND

Project Number 06-0700.1  
Lab ID 5415G  
Date Received 7/14/2006  
Date Complete 7/17/2006  
Tested By JUSTIN BISSON

Material Source B2 S3 4.5-6.5

STANDARD DESIGNATION (mm/μm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	71	
6.3 mm	1/4"	63	
4.75 mm	No. 4	62	38.3% Gravel
2.00 mm	No. 10	54	
850 μm	No. 20	46	
425 μm	No. 40	37	48.1% Sand
250 μm	No. 60	28	
150 μm	No. 100	21	
75 μm	No. 200	13.6	13.6% Fines



Project Name PORTLAND - 389 CONGRESS STREET - CITY HALL - PLAZA  
 RENOVATIONS - GEOTECHNICAL ENGINEERING SERVICES  
 Client CITY OF PORTLAND

Project Number 06-0700.1

Lab ID 5416G

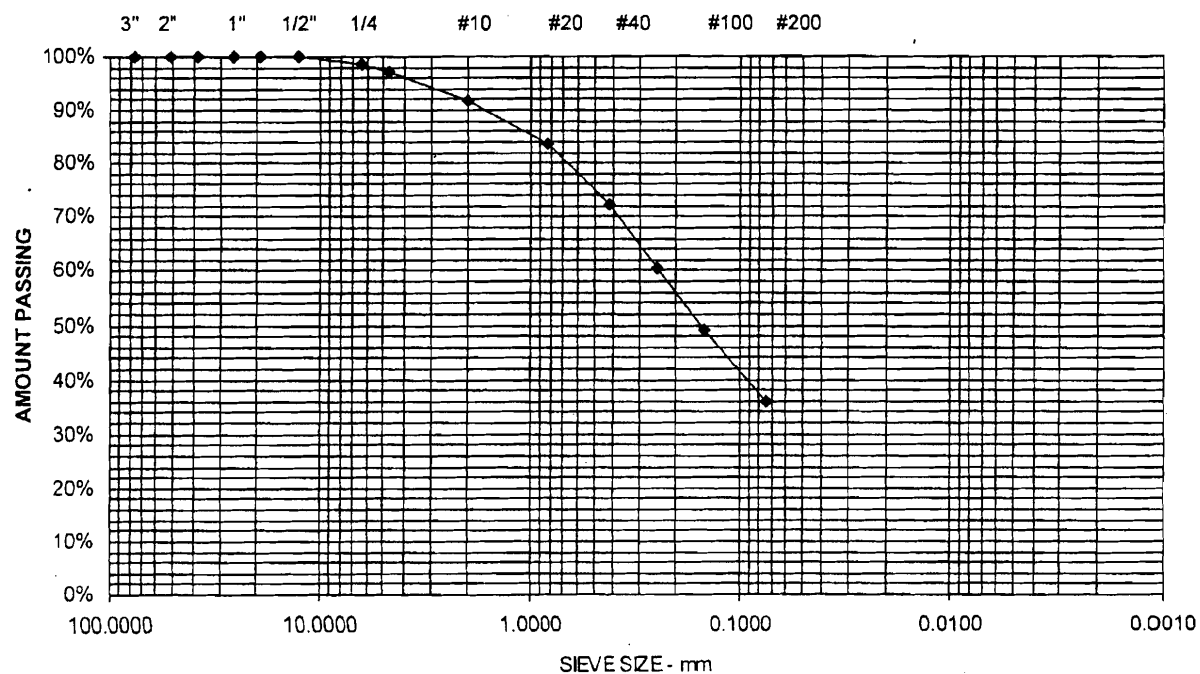
Date Received 7/14/2006

Date Complete 7/17/2006

Material Source B2 S5 8.5-10.5

Tested By JUSTIN BISSON

<u>STANDARD</u> <u>DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	98	
4.75 mm	No. 4	97	2.8% Gravel
2.00 mm	No. 10	92	
850 μm	No. 20	84	
425 μm	No. 40	72	61.3% Sand
250 μm	No. 60	61	
150 μm	No. 100	49	
75 μm	No. 200	35.9	35.9% Fines





# Report of Gradation

ASTM C-117 & C-136

Project Name PORTLAND - 389 CONGRESS STREET - CITY HALL - PLAZA  
RENOVATIONS - GEOTECHNICAL ENGINEERING SERVICES

Project Number 06-0700.1

Client CITY OF PORTLAND

Lab ID 5410G

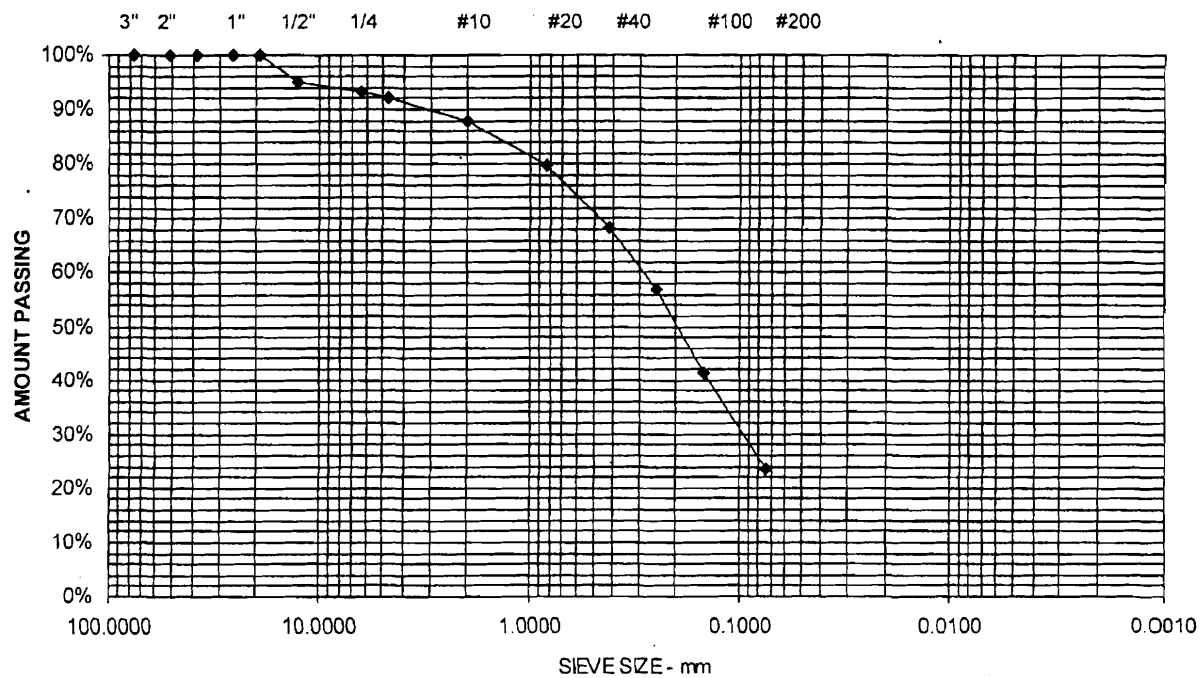
Date Received 7/14/2006

Date Complete 7/17/2006

Material Source B3 S3 4.5-6.5

Tested By JUSTIN BISSON

<u>STANDARD DESIGNATION (mm/um)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	95	
6.3 mm	1/4"	93	
4.75 mm	No. 4	92	8% Gravel
2.00 mm	No. 10	88	
850 um	No. 20	80	
425 um	No. 40	68	68.4% Sand
250 um	No. 60	57	
150 um	No. 100	41	
75 um	No. 200	23.6	23.6% Fines



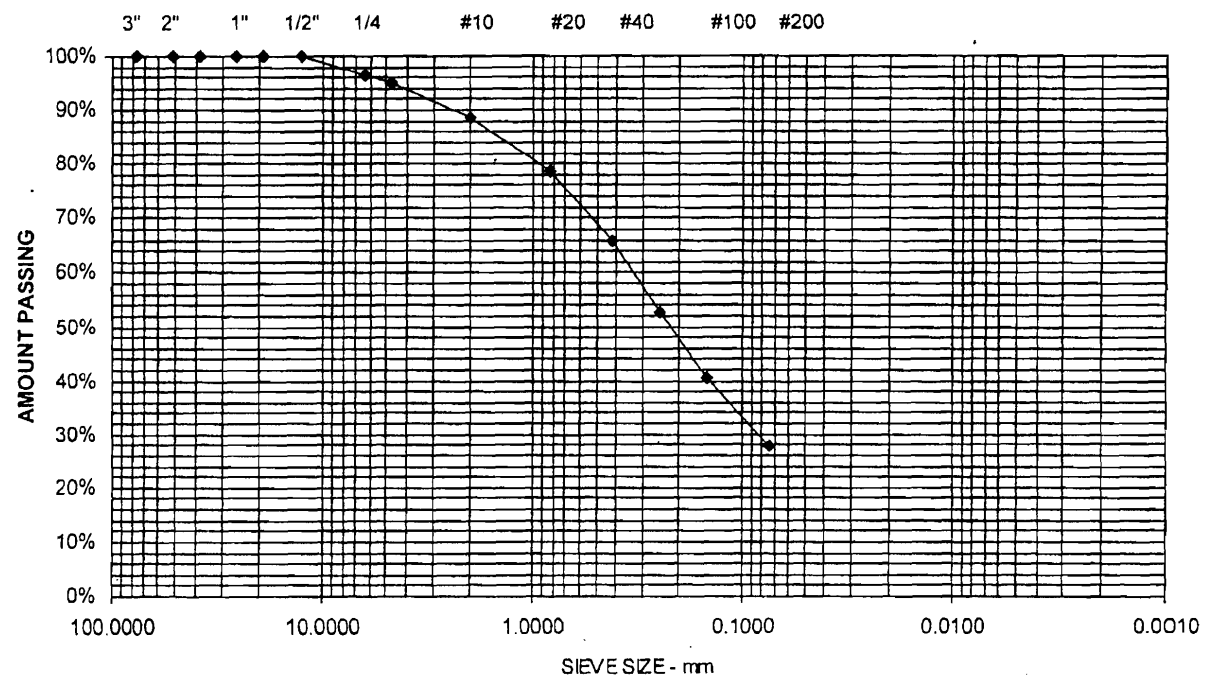
Comments: w = 14.6%

Project Name PORTLAND - 389 CONGRESS STREET - CITY HALL - PLAZA  
 RENOVATIONS - GEOTECHNICAL ENGINEERING SERVICES  
 Client CITY OF PORTLAND

Project Number 06-0700.1  
 Lab ID 5411G  
 Date Received 7/14/2006  
 Date Complete 7/17/2006  
 Tested By JUSTIN BISSON

Material Source B3 S4 6.5-8.5

STANDARD DESIGNATION (mm/ $\mu$ m)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	96	
4.75 mm	No. 4	95	4.9% Gravel
2.00 mm	No. 10	89	
850 $\mu$ m	No. 20	79	
425 $\mu$ m	No. 40	66	67.5% Sand
250 $\mu$ m	No. 60	53	
150 $\mu$ m	No. 100	41	
75 $\mu$ m	No. 200	27.6	27.6% Fines



# Portland City Plaza Restora

389 Congress Str  
Portland, Maine

15 December 2006

Bid # 2207



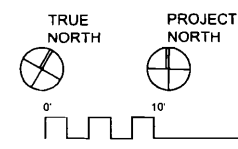
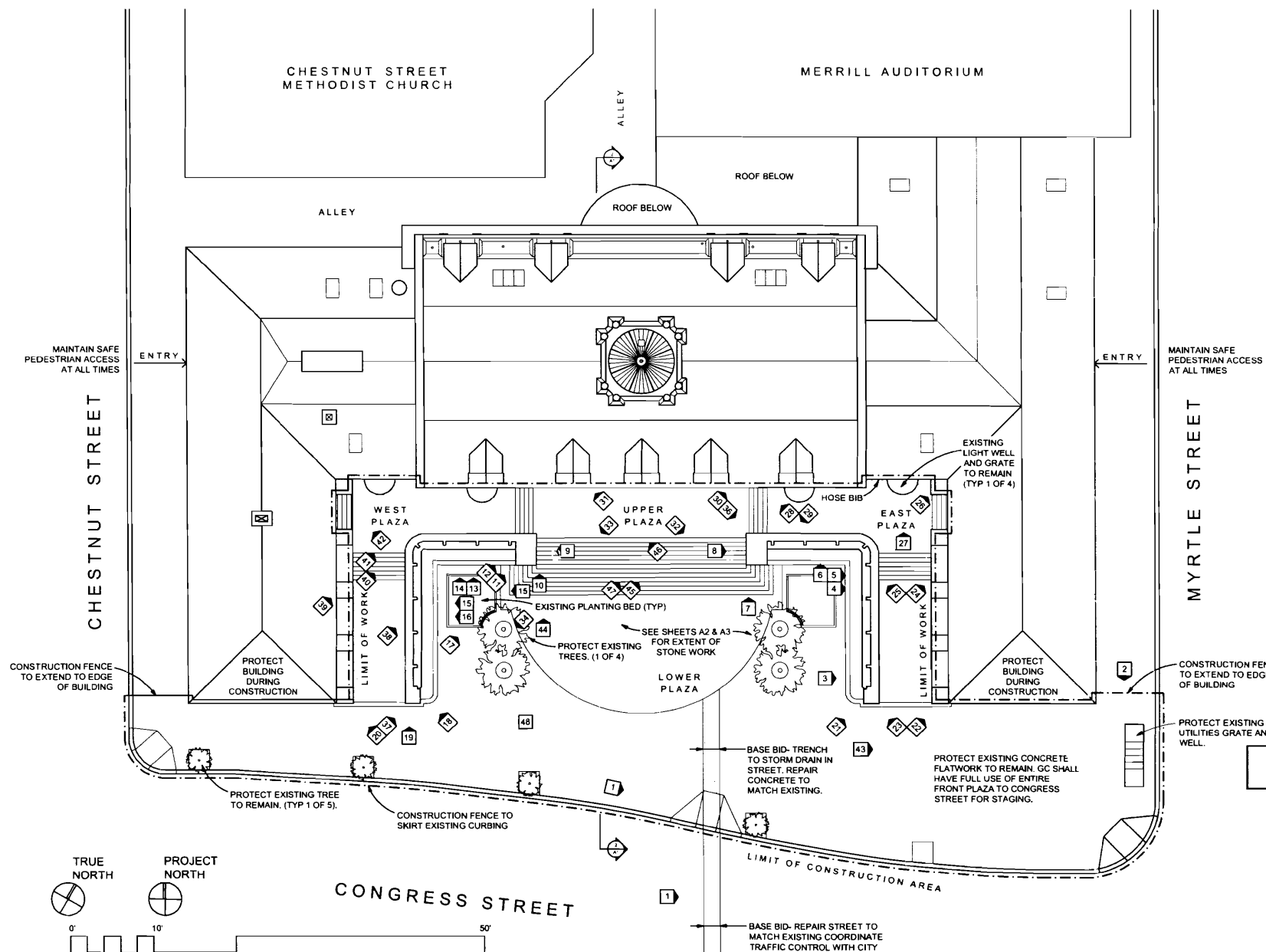
**tll-architects, llc**

28 DANFORTH STREET  
PORTLAND, MAINE 04101  
TEL. 207.761.9662  
FAX. 207.761.9696

**PINKHAM & GREER**  
CONSULTING ENGINEERS, INC.

380 US ROUTE ONE  
FALMOUTH, MAINE  
TEL. 207.781.5242





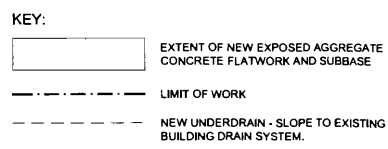
**1 ROOF / SITE PLAN / PHOTO KEY** SEE CIVIL DRAWINGS FOR SUB-GRADE AND UNDERDRAIN DESIGN.  
 A-1 1/16" = 1'-0"

**GENERAL NOTES:**

- SITE PLAN AND SITE SECTION ARE DIAGRAMMATIC IN NATURE AND ARE PROVIDED SOLELY FOR INFORMATIONAL PURPOSES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD MEASURE AND VERIFY EXISTING SITE CONDITIONS AND ACCESS OPPORTUNITIES PRIOR TO SUBMITTING A BID. UPON DISCOVERY, CONTRACTOR SHALL IMMEDIATELY NOTIFY ARCHITECT OF ANY DISCREPANCY OR CONFLICT.
- CONTRACTOR SHALL MAINTAIN SAFE, UNIMPEDED PEDESTRIAN ACCESS AT BOTH THE MYRTLE AND CHESTNUT STREET ENTRIES AT ALL TIMES DURING THE COURSE OF CONSTRUCTION. IF REQUIRED, THE MAIN ENTRY OFF OF CONGRESS STREET MAY BE BLOCKED OFF IF APPROPRIATE DIRECTIONAL SIGNAGE IS INSTALLED INDICATING ACCESS AT BOTH SIDE ENTRIES.
- THE CONTRACTOR MAY USE THE ENTIRE CONGRESS STREET PLAZA AT THE FRONT OF THE BUILDING AS A STAGING AREA DURING THE COURSE OF CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ADEQUATELY PROTECT CONSTRUCTION MATERIALS AND EQUIPMENT. PROTECTIVE CONSTRUCTION FENCING WILL BE ALLOWED AT THE LIMIT LINE SHOWN TO CONTAIN CONSTRUCTION ACTIVITIES.
- EXISTING STRUCTURE AND FINISHES OUTSIDE OF THE LIMITS OF THE WORK, INCLUDING GRANITE, PLANTINGS AND WALKWAYS SHALL BE PROTECTED AT ALL TIMES DURING THE COURSE OF CONSTRUCTION. ANY DAMAGED MATERIAL ON THIS OR ADJACENT PROPERTIES SHALL BE RESTORED OR REPLACED IN KIND IN THE EVENT OF CONSTRUCTION RELATED DAMAGE. DIGITAL PHOTO DOCUMENTATION WILL BE TAKEN OF THE VICINITY PRIOR TO AWARD OF CONTRACT TO RECORD EXISTING CONDITIONS.
- CONTRACTOR SHALL REMOVE EXISTING ASH/RUBBLE SUB-BASE MATERIAL UNDER CONCRETE WALKS SCHEDULED TO BE REMOVED. REMOVAL SHALL BE TO 4'-6" BELOW FINISH SURFACE. SEE CIVIL DRAWINGS FOR NEW SUBSURFACE DRAINAGE AND SUB-BASE DESIGN.
- CONTRACTOR SHALL REMOVE EXISTING 6" REINFORCED CONC. MUDSLAB, ASH/RUBBLE SUB-BASE MATERIAL UNDER STONE PAVERS SCHEDULED TO BE REMOVED, RESTORED AND REINSTALLED IN ORIGINAL POSITION. REMOVAL SHALL BE TO 4'-6" BELOW FINISH SURFACE. SEE CIVIL DRAWINGS FOR NEW SUBSURFACE DRAINAGE AND SUB-BASE DESIGN.
- THE MONUMENTAL STAIRS, BALUSTRADES AND STONE PAVERS HAVE GENERALLY CREPT AWAY FROM THE BUILDING OVER THE YEARS-TOWARDS CONGRESS STREET. IT WILL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO REMOVE, NUMBER, CLEAN AND REINSTALL ORIGINAL MASONRY COMPONENTS TO A PLUMB POSITION THAT BEST APPROXIMATES ORIGINAL POSITIONING (CIRCA 1911). CONTRACTOR SHALL WORK WITH THE ARCHITECT TO DETERMINE PRECISE RELATIONSHIPS BETWEEN STONES AS REASSEMBLY PROGRESSES. PARTICULAR CARE WILL BE REQUIRED AT THE BALUSTRADE DISASSEMBLY / RE-ASSEMBLY SECTIONS.
- ALL JOINTS AT STONE STAIRS ARE TO BE PLACED IN A 1" THICK NATURAL CEMENT MORTAR BED AND JOINTS SHALL BE POINTED WITH NATURAL CEMENT. TOP 1/2" OF JOINTS SHALL RECEIVE TWO BEDS OF 1/4" LEAD FILL.
- ALL STONE PAVERS ARE TO BE DRYLAD WITH SPECIFIED SUBBASE AND BROOM SWEEP CRUSHED SAND.
- THE AGGREGATE AND 4'X4' SCORING PATTERN OF THE NEW EXPOSED AGGREGATE FLATWORK IS TO MATCH THE ORIGINAL. PHOTO-DOCUMENTATION WILL SERVE AS GUIDE FOR RECREATING THE SCORING PATTERN. PHYSICAL SAMPLE OF EXISTING CONCRETE SURFACE (AS SELECTED BY ARCHITECT) WILL SERVE AS GUIDE FOR MATCHING AGGREGATE SIZE, SHAPE AND COLOR.
- CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE AND LOCAL REGULATORY REQUIREMENTS.

**BASE BID & ALTERNATES NOTES:**

- BASE BID COMPRISES ALL THE WORK PRESCRIBED FOR THE UPPER AND LOWER PLAZAS.
- ALTERNATE 1. COMPRISES ALL THE WORK PRESCRIBED FOR THE WEST PLAZA AND BALUSTRADE.
- ALTERNATE 2. COMPRISES ALL THE WORK PRESCRIBED FOR THE EAST PLAZA AND BALUSTRADE.
- GC SHALL REPLACE IN-KIND ANY EXPOSED AGGREGATE CONCRETE WALKING SURFACE (SCHEDULED TO REMAIN) THAT IS DEEMED NECESSARY TO REMOVE IN ORDER TO INSTALL NEW FOUNDATION SYSTEM.

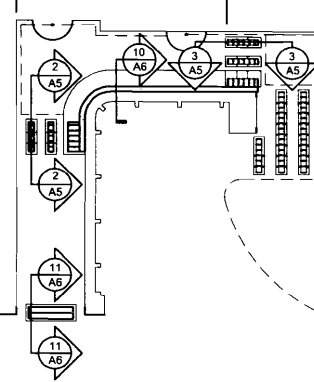


**8** PHOTO KEY OF EXISTING CONDITIONS. SEE DIVISION 2 OF THE SPECIFICATIONS.

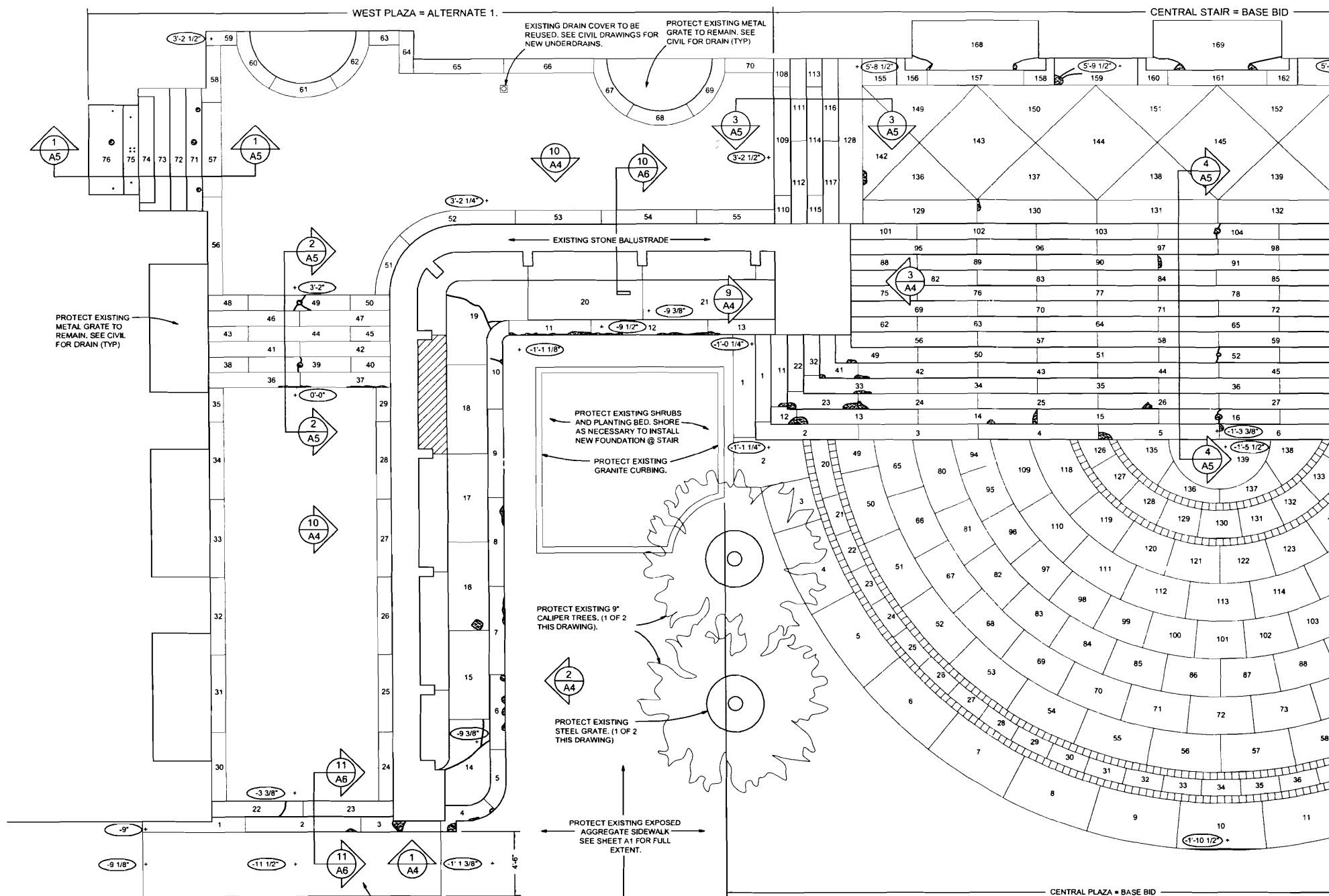
**2 BUILDING / S**  
 A-1 1/16" = 1'-0"



**ALTERNATE 1.**

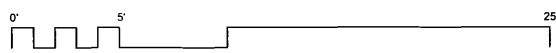


**3 FOUNDATION & UNDE**  
 A-1 1/16" = 1'-0"  
 SEE DRAWING S-1 FOR TYPICAL FOUNDATION I



1 PARTIAL PLAZA PLAN (WEST & CENTRAL SECTIONS)  
A-2 1/4" = 1'-0"

ALTERNATE 1 AND BASE BID



STONES REQUIRING LIFTING, NUMBERING, CLEANING AND RESETTING.

WEST PLAZA STONES: 1-3, 22-29, 30-35, 36-50, 51-55, 56-70.  
LOWER CENTRAL PLAZA STONES: 1-139  
CENTRAL STAIR AND UPPER PLAZA STONES: 1-107, 108-154, 155, 159, 163, 167.

STONES TO REMAIN IN PLACE, CUT AND REPOINT JOINTS AS PRESCRIBED.

WEST PLAZA STONES: 4-13, 71-76.  
UPPER CENTRAL PLAZA STONES: 156-158, 160-162, 164-166, 168-170.

STONES REQUIRING GRANITE SECTION REPAIR.

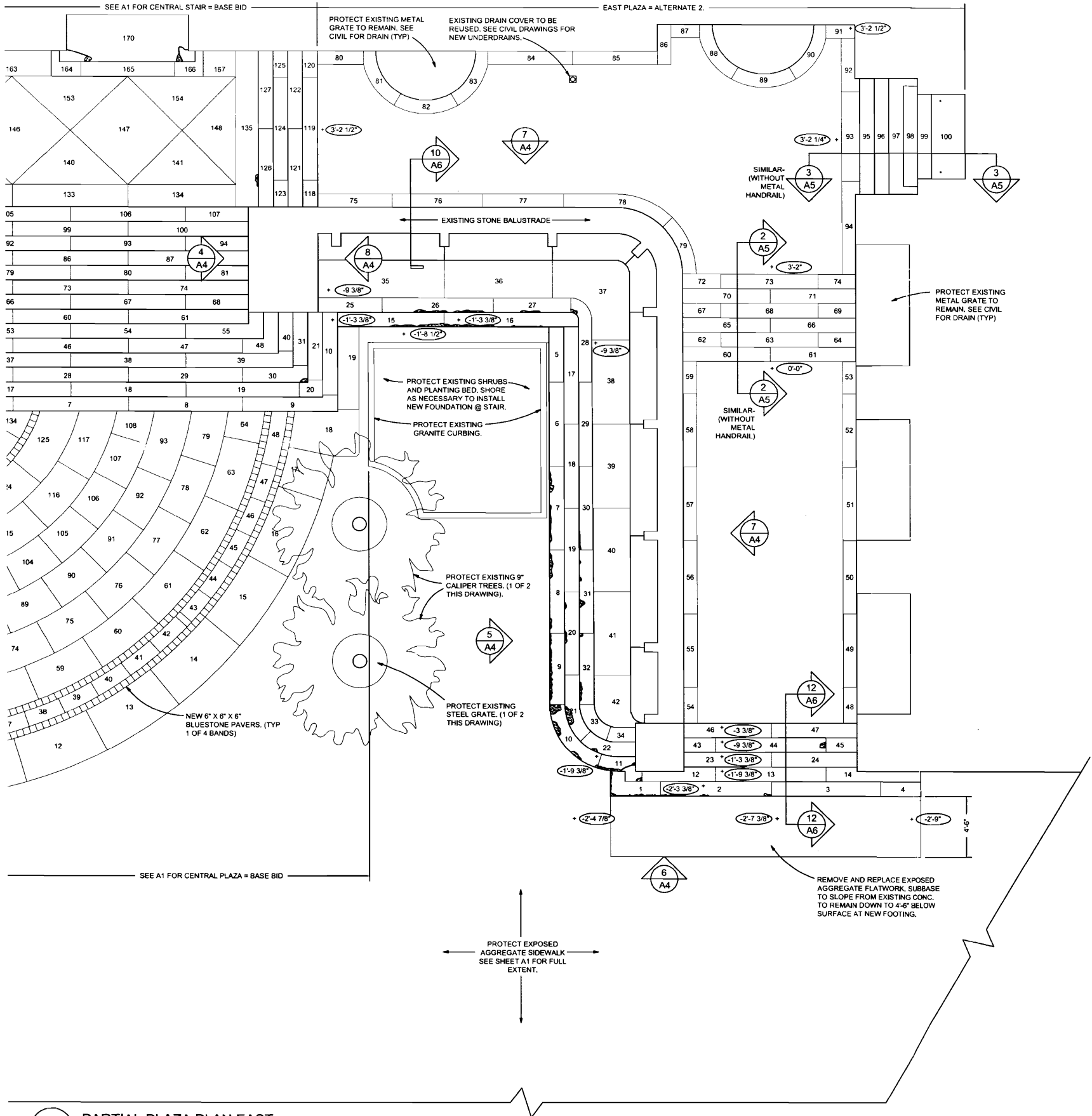
WEST PLAZA STONES: 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 18, 19, 36, 37, 39, 49, 71, 75, 76.  
UPPER CENTRAL PLAZA STONES: 5, 6, 7, 8, 11, 12, 13, 14, 16, 23, 24, 26, 30, 33, 38, 41, 42, 49, 52, 91, 104, 130, 135, 142, 159, 168, 169, 170.

STONES REQUIRING GRANITE CRACK REPAIR.

WEST PLAZA STONES: 10, 14, 19, 22, 49.  
UPPER CENTRAL PLAZA STONES: 159, 168, 169, 170.

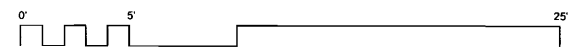
KEY:

EXTENT OF NEW EXPOSED AGGREGATE FLATWORK AND SUBBASE  
SINGLE STONE BENCH PIECE TO BE REPOSITIONED TO ORIGINAL INTENT POSITION.

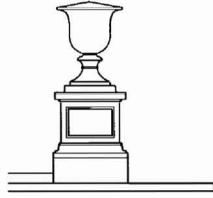


1 PARTIAL PLAZA PLAN EAST  
A-3 1/4" = 1'-0"

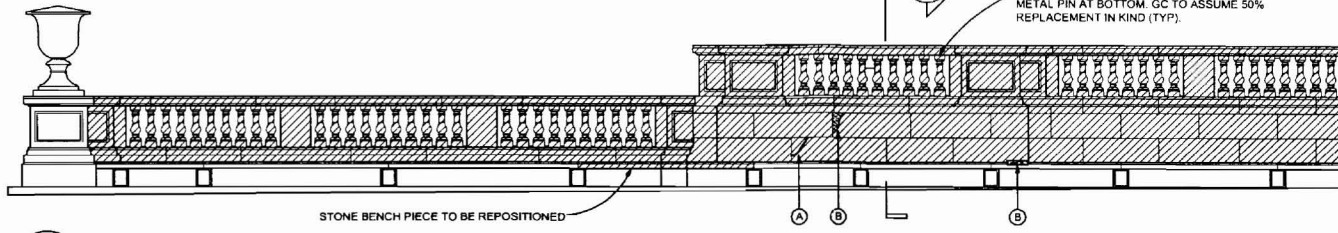
ALTERNATE 2.



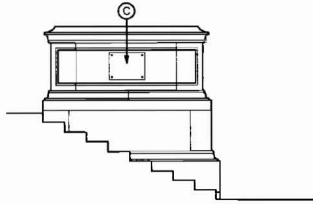
- STONES REQUIRING LIFTING, CLEANING AND RESETTING.  
EAST PLAZA STONES: 1-4, 12-14, 43-45, 46-47, 48-53, 54-59, 60-7
- STONES TO REMAIN IN PLACE REPOINT JOINTS AS PRESCRIBED.  
EAST PLAZA STONES: 5-11, 15-35-42, 95-100.
- STONES REQUIRING SECTION.  
EAST PLAZA STONES: 1, 2, 7, 8, 9
- STONES REQUIRING CRACK REPAIR.  
EAST PLAZA STONE: 11.



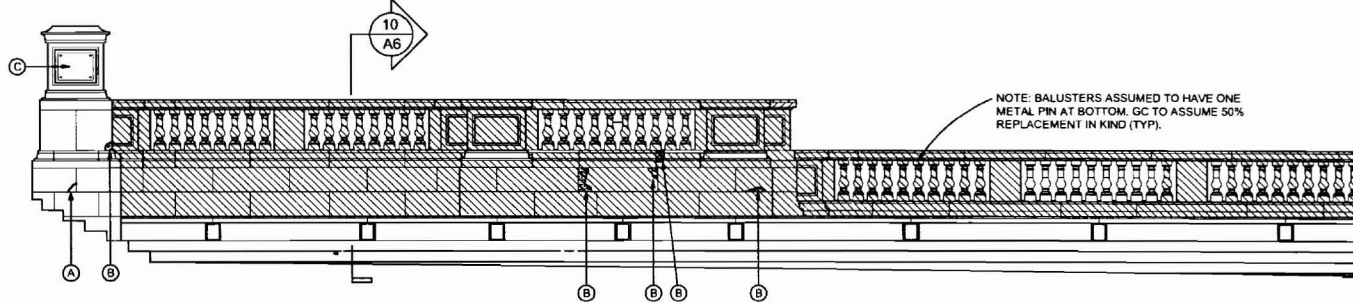
1 SMALL WEST PIER LOOKING NORTH  
A-4 1/4" = 1'-0" ALTERNATE 1.



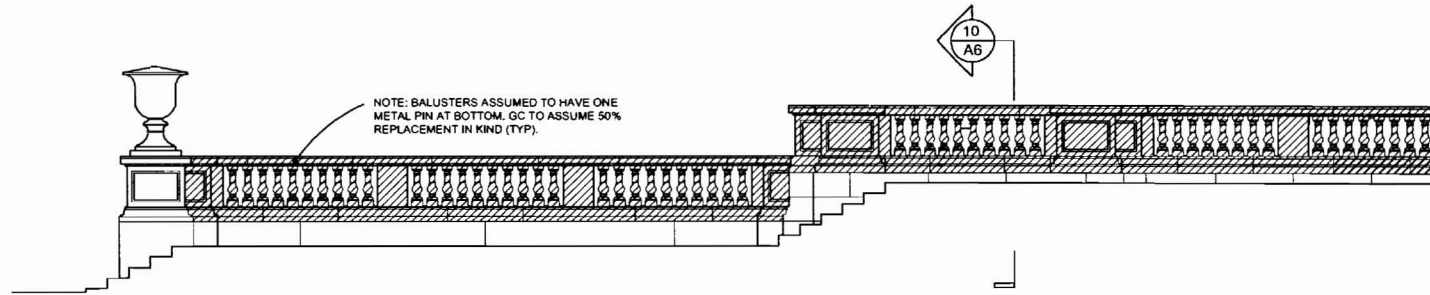
2 WEST BALUSTRADE LOOKING WEST (UNFOLDED)  
A-4 1/4" = 1'-0" ALTERNATE 1.



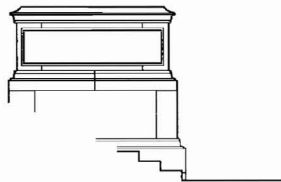
4 BIG EAST PIER LOOKING EAST  
A-4 1/4" = 1'-0" ALTERNATE 2.



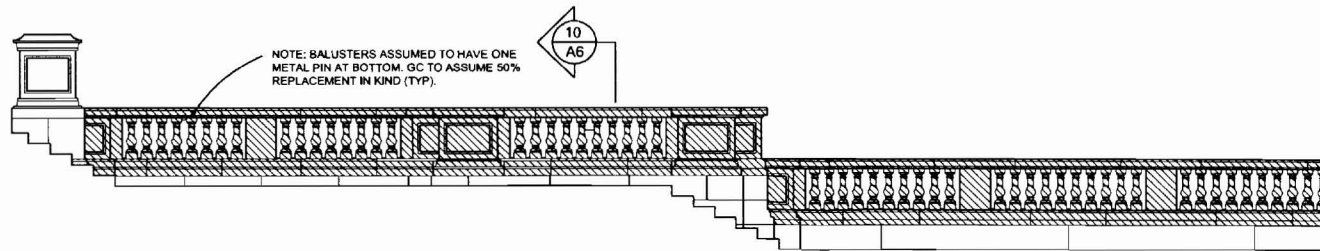
5 EAST BALUSTRADE LOOKING EAST (UNFOLDED)  
A-4 1/4" = 1'-0" ALTERNATE 2.



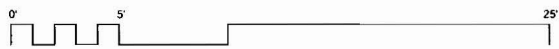
7 EAST BALUSTRADE LOOKING WEST (UNFOLDED)  
A-4 1/4" = 1'-0" ALTERNATE 2.



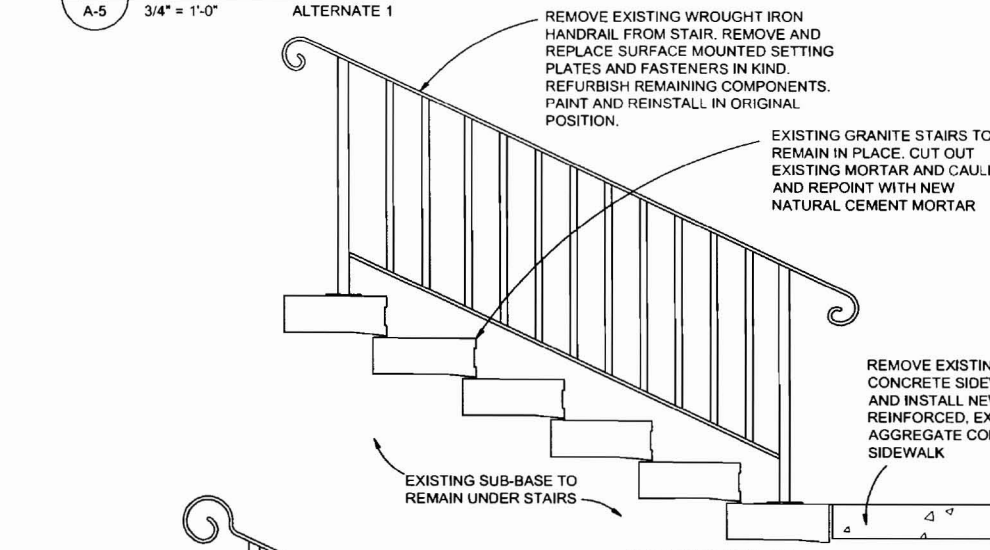
9 BIG WEST PIER LOOKING EAST  
A-4 1/4" = 1'-0" ALTERNATE 1.



10 WEST BALUSTRADE LOOKING EAST (UNFOLDED)  
A-4 1/4" = 1'-0" ALTERNATE 1.

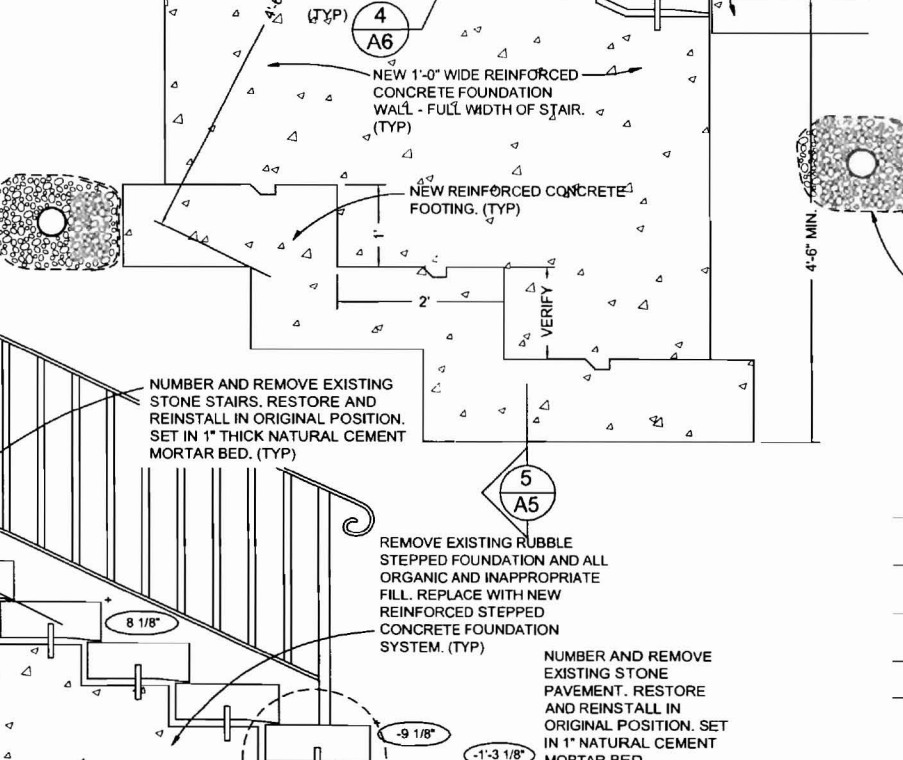
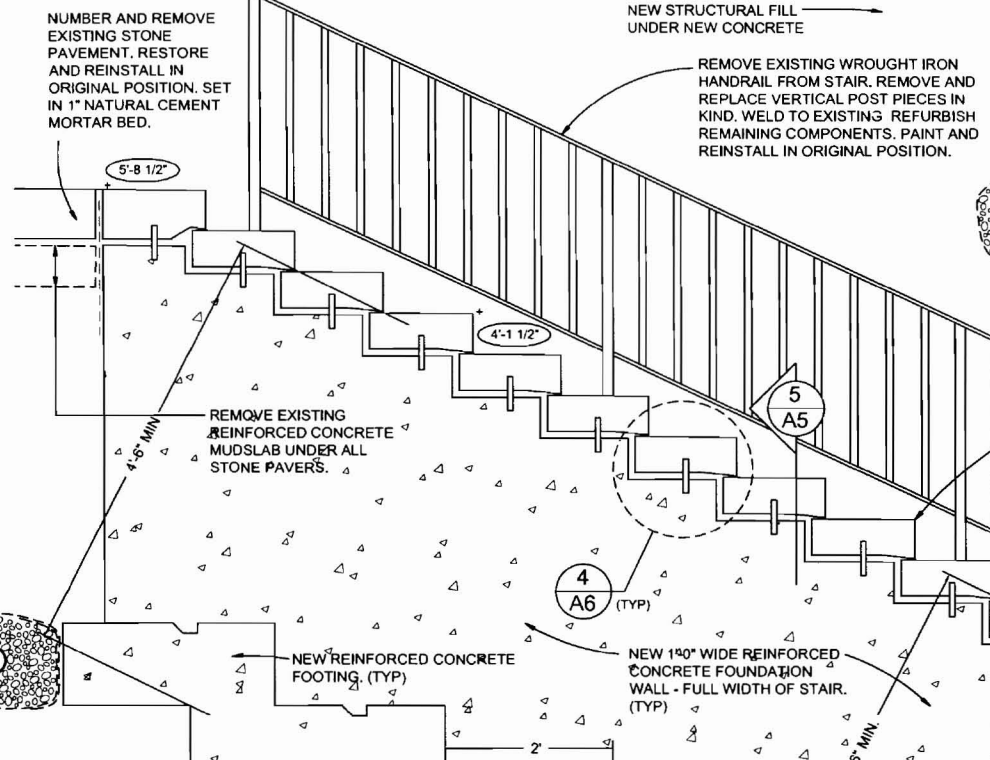
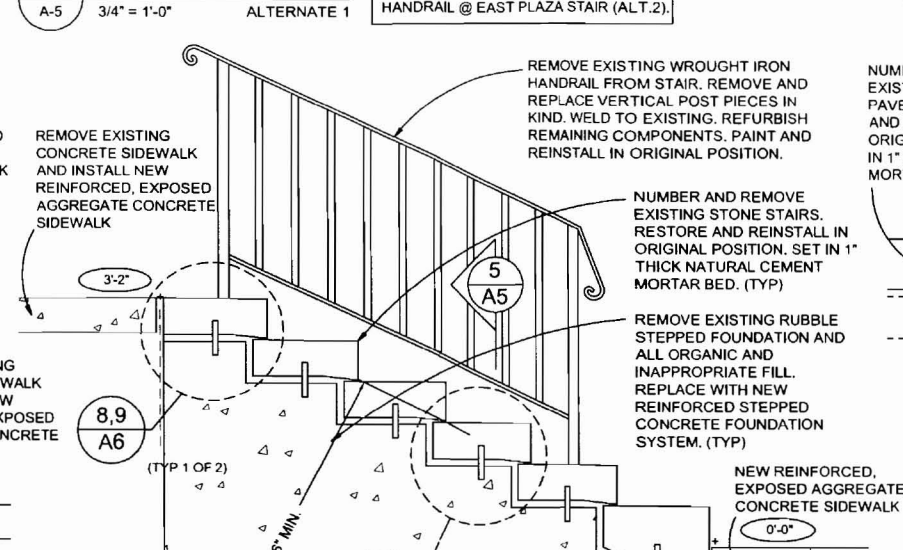


1  
A-5 3/4" = 1'-0" ALTERNATE 1

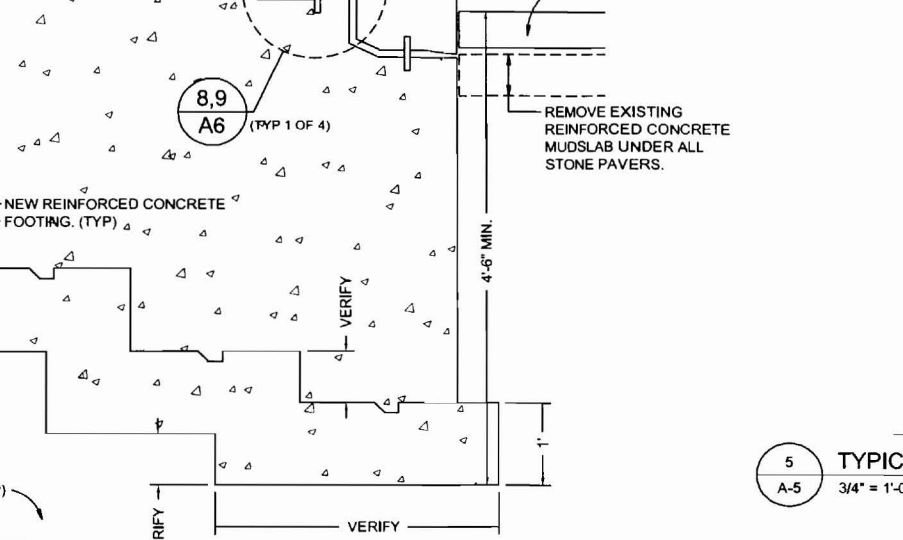
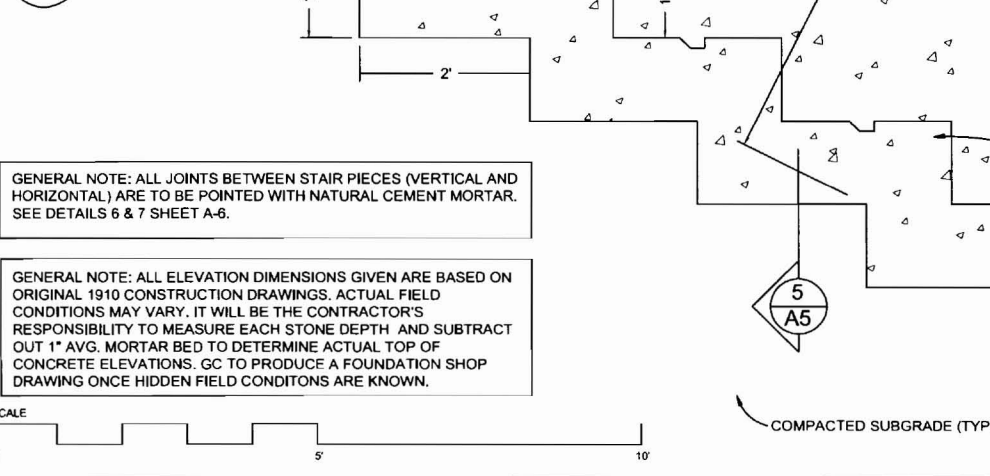


2  
A-5 3/4" = 1'-0" ALTERNATE 1

NOTE: NO EXISTING (OR NEW) METAL HANDRAIL @ EAST PLAZA STAIR (ALT. 2).

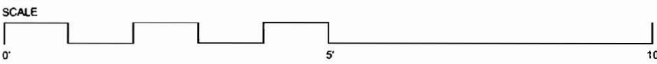


4  
A-5 3/4" = 1'-0" BASE BID



GENERAL NOTE: ALL JOINTS BETWEEN STAIR PIECES (VERTICAL AND HORIZONTAL) ARE TO BE POINTED WITH NATURAL CEMENT MORTAR. SEE DETAILS 6 & 7 SHEET A-6.

GENERAL NOTE: ALL ELEVATION DIMENSIONS GIVEN ARE BASED ON ORIGINAL 1910 CONSTRUCTION DRAWINGS. ACTUAL FIELD CONDITIONS MAY VARY. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO MEASURE EACH STONE DEPTH AND SUBTRACT OUT 1" AVG. MORTAR BED TO DETERMINE ACTUAL TOP OF CONCRETE ELEVATIONS. GC TO PRODUCE A FOUNDATION SHOP DRAWING ONCE HIDDEN FIELD CONDITONS ARE KNOWN.



5  
A-5 3/4" = 1'-0" TYPICAL



NUMBER, EXISTING PAVEMENT AND REIN AND REIN ORIGINAL IN 1" NATURAL CEMENT MORTAR

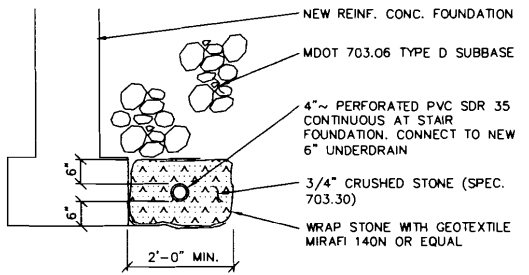
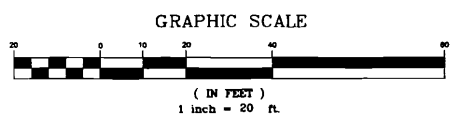
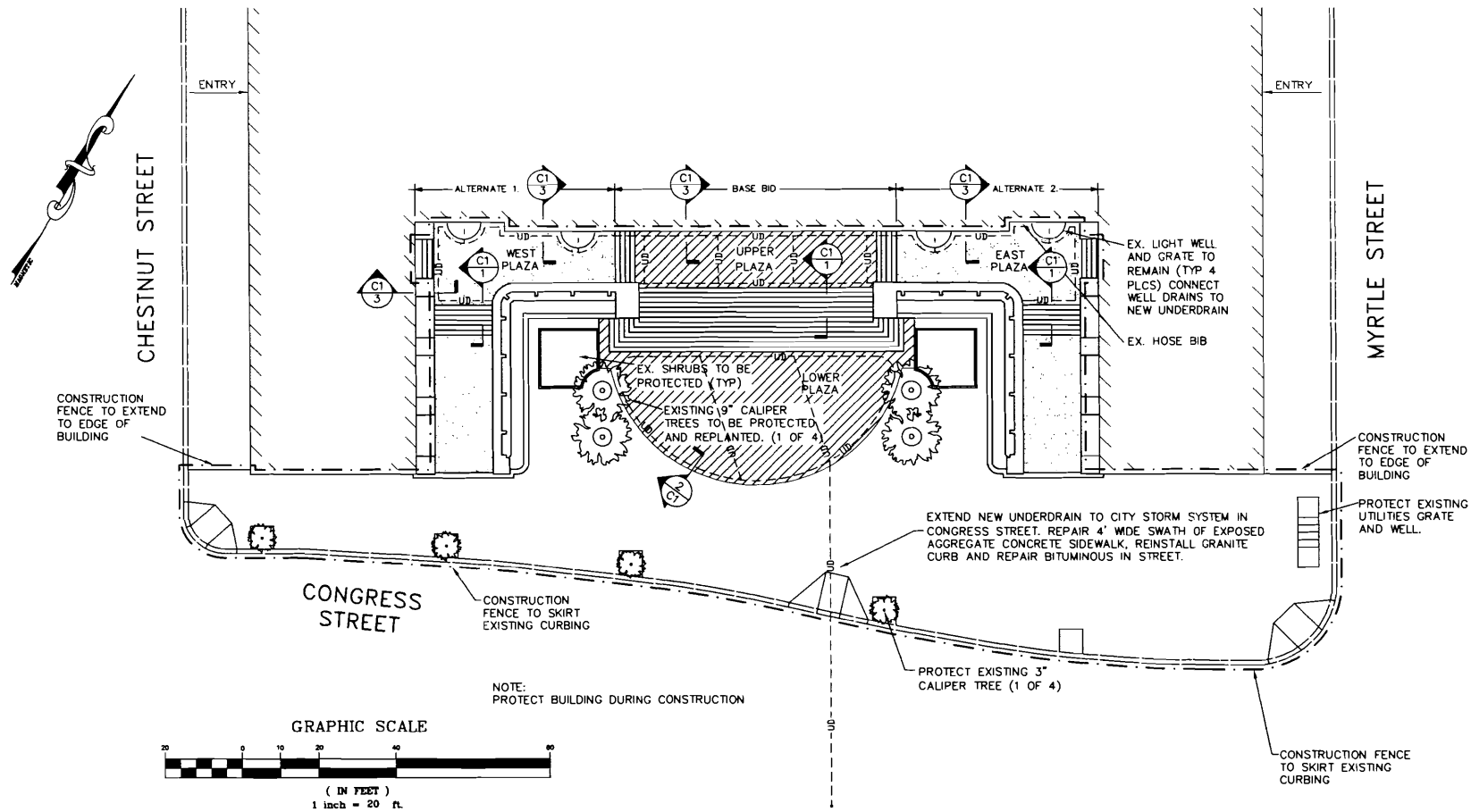
VERIFY

VERIFY

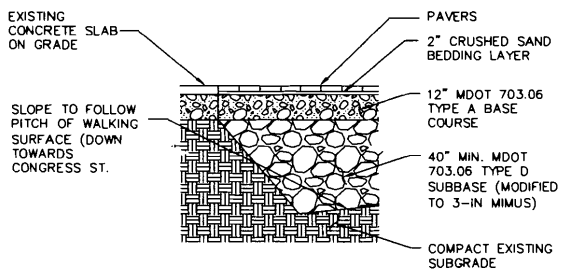
VERIFY

VERIFY

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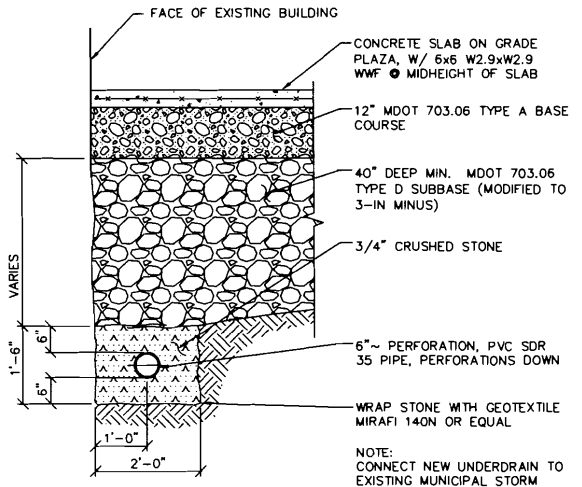


1 UNDERDRAIN @ NEW STAIR  
NOT TO SCALE

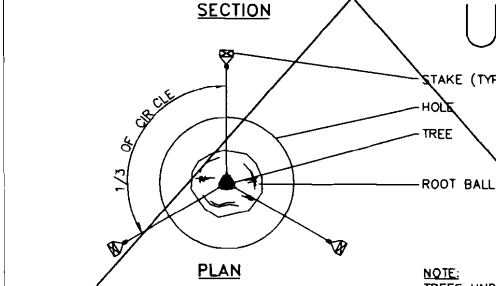
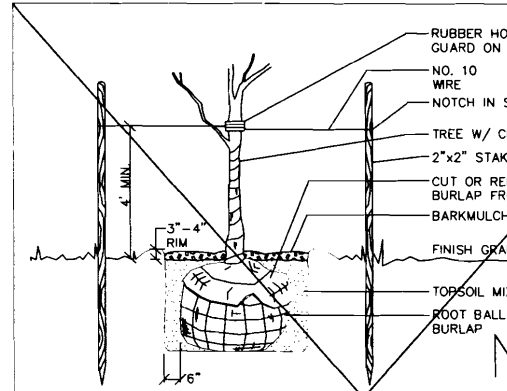


2 PLAZA SUBGRADE RECONSTRUCTION  
NOT TO SCALE

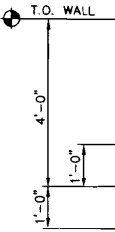
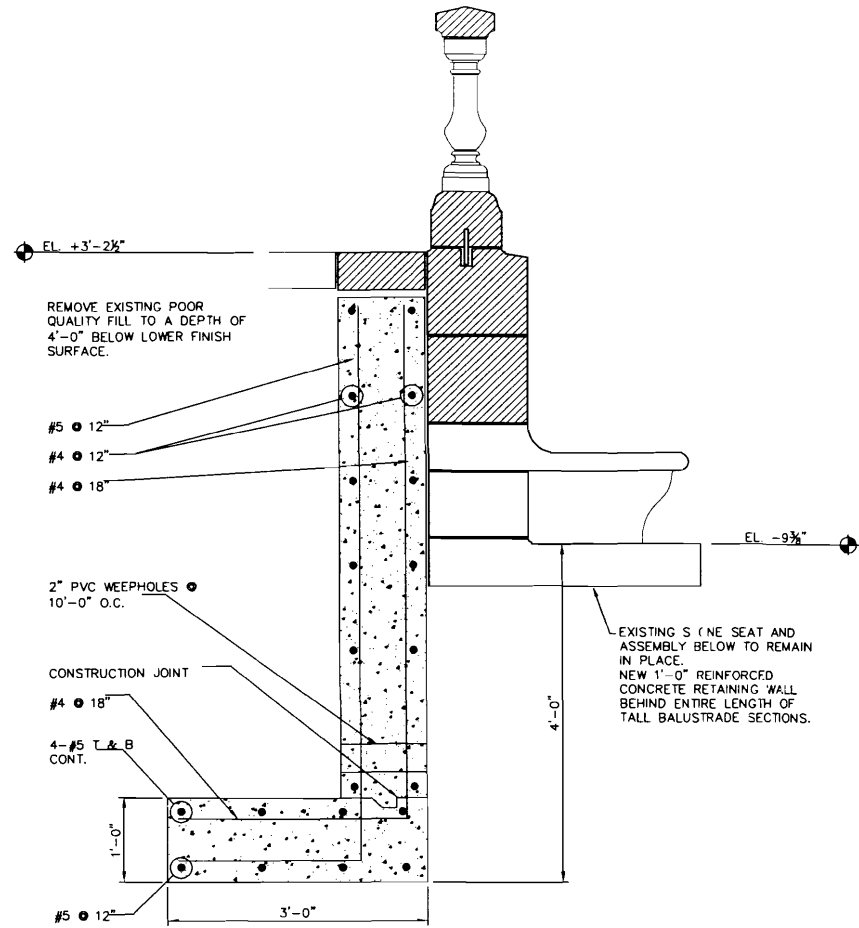
TYPICAL CONCRETE CONSTRUCTION	USE
	CONCRETE PLAZA & SIDEWALKS



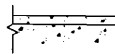
3 SECTION AGAINST BUILDING  
NOT TO SCALE



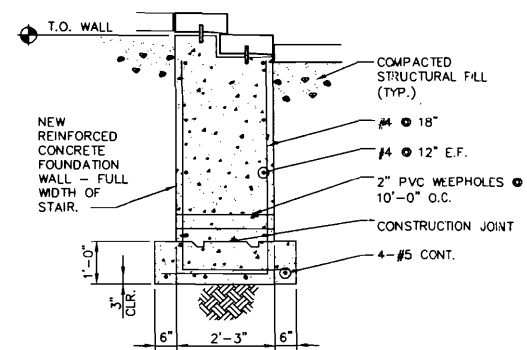
4 TREE PLANTING DETAIL  
NOTE: TREES UNDER REQUIRE ST



TYP.  
N.T.S.



NOTE: COOR  
& N  
ARCH. D  
TYP. N.



SECTION 6/A4