Nitsch Engineering

October 19, 2022

NOTICE OF INTENT

Under the *Wetlands Protection Act* (M.G.L. c. 131, §40),
the *Rivers Protection Act* (M.G.L. c. 256, Acts of 1996)
and their Regulations (310 CMR 10.00),

For:
SEAPORT CIRCLE
777 Congress Street
Boston, MA 02210

Prepared for:

LO Parcel H, LLC
53 State Street, 8th Floor
Boston, MA 02109

Prepared by:

NITSCH ENGINEERING, INC.
2 Center Plaza Suite 430
Boston, MA 02108

Nitsch Project #13511

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SECTION 1

NOTICE OF INTENT FORMS

WPA Form 3 - Notice of Intent
NOI Wetland Fee Transmittal Form

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

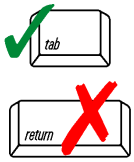
Provided by MassDEP:

MassDEP File Number

Document Transaction Number

City/Town

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

777 Congress Street — a. Street Address
Boston — b. City/Town
02210 — c. Zip Code

Latitude and Longitude:
42.347369 — d. Latitude
71.038819 — e. Longitude

f. Assessors Map/Plat Number: 0602678000, 0602678500, 0602678700, & 0602681000

2. Applicant:

Mark — a. First Name
Callahan — b. Last Name
LO Parcel H, LLC — c. Organization
53 State Street, 8th Floor — d. Street Address
Boston — e. City/Town
MA — f. State
02109 — g. Zip Code
(617)951-4112 — h. Phone Number
i. Fax Number
mcallahan@LPC.com — j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

Bradford — a. First Name
Washburn — b. Last Name
Massachusetts Port Authority — c. Organization
One Harborside Drive, Suite 200S — d. Street Address
East Boston — e. City/Town
MA — f. State
02128 — g. Zip Code
h. Phone Number
i. Fax Number
bwashburn@massport.com — j. Email address

4. Representative (if any):

Coleman — a. First Name
Horsley — b. Last Name
Nitsch Engineering, Inc — c. Company
2 Center Plaza, Suite 430 — d. Street Address
Boston — e. City/Town
MA — f. State
02108 — g. Zip Code
(617)338-0063 — h. Phone Number
i. Fax Number
chorsley@nitscheng.com — j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

$3,087.50 — a. Total Fee Paid
$1,037.50 — b. State Fee Paid
$2,050 — c. City/Town Fee Paid

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A. General Information (continued)

6. General Project Description:

The construction of a laboratory/research & development and office building and job training/non-profit center named Seaport Circle. Other site improvements include installation of new utilities to support the proposed site and construction of new stormwater management systems.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☒ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

a. County

b. Certificate # (if registered land)

c. Book

d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☐ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	1. square feet	2. square feet
	3. cubic feet of flood storage lost	4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet	
	2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☐ Riverfront Area	1. Name of Waterway (if available) - **specify coastal or inland**	

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☐ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: _____ square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet _____ b. square feet within 100 ft. _____ c. square feet between 100 ft. and 200 ft. _____

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☐ Yes ☐ No

3. ☒ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f**. above.

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Provided by MassDEP:

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☒ Land Subject to Coastal Storm Flowage	110,542 1. square feet	

4. ☐ Restoration/Enhancement

If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings

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C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

   a. ☐ Yes ☒ No

   If yes, include proof of mailing or hand delivery of NOI to:

   Natural Heritage and Endangered Species Program
   Division of Fisheries and Wildlife
   1 Rabbit Hill Road
   Westborough, MA 01581

   b. Date of map

   If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

   c. Submit Supplemental Information for Endangered Species Review*

      1. ☐ Percentage/acreage of property to be altered:

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

      2. ☐ Assessor's Map or right-of-way plan of site

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

   (a) ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

   (b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see https://www.mass.gov/ma-endangered-species-act-mesa-regulatory-review).
Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

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C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review).
Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☐ Not applicable – project is in inland resource area only b. ☐ Yes ☒ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: dmf.envreview-south@mass.gov

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: dmf.envreview-north@mass.gov

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

c. ☐ Is this an aquaculture project? d. ☐ Yes ☒ No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).

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C. Other Applicable Standards and Requirements (cont'd)

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

b. ACEC

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

2. ☐ A portion of the site constitutes redevelopment

3. ☒ Proprietary BMPs are included in the Stormwater Management System.

b. ☐ No. Check why the project is exempt:

1. ☐ Single-family house

2. ☐ Emergency road repair

3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☐ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☐ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

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D. Additional Information (cont'd)

3. ☐ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

a. Plan Title

b. Prepared By

c. Signed and Stamped by

d. Final Revision Date

e. Scale

See NOI Text

f. Additional Plan or Document Title

g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☐ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

057411	10/18/2022
2. Municipal Check Number	3. Check date
057413	10/18/2022
4. State Check Number	5. Check date
Nitsch Engineering, Inc.	
6. Payor name on check: First Name	7. Payor name on check: Last Name

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Provided by MassDEP:

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F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant — 2. Date: 10/17/22

3. Signature of Property Owner (if different) — 4. Date: 10/17/22

5. Signature of Representative (if any) — 6. Date: 10/18/22

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

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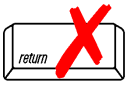

A. Applicant Information

1. Location of Project:

777 Congress Street	Boston
a. Street Address	b. City/Town
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Mark		Callahan	
a. First Name		b. Last Name	
LO Parcel H, LLC			
c. Organization			
53 State Street, 8th Floor			
d. Mailing Address			
Boston		MA	02109
e. City/Town		f. State	g. Zip Code
(617)951-4112		mcallahan@LPC.com	
h. Phone Number	i. Fax Number	j. Email Address	

3. Property Owner (if different):

Bradford		Washburn	
a. First Name		b. Last Name	
Massachusetts Port Authority			
c. Organization			
One Harborside Drive, Suite 200S			
d. Mailing Address			
East Boston		MA	02128
e. City/Town		f. State	g. Zip Code
		bwashburn@massport.com	
h. Phone Number	i. Fax Number	j. Email Address	

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

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B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Category 3 (b)	2	$1,050	$2,100

Step 5/Total Project Fee: $1,100

Step 6/Fee Payments:

Total Project Fee:	$3,087.50 a. Total Fee from Step 5
State share of filing Fee:	$1,037.50 b. 1/2 Total Fee **less $**12.50
City/Town share of filling Fee:	$2,050 c. 1/2 Total Fee **plus** $12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

SECTION 2

PROJECT NARRATIVE

PROJECT NARRATIVE CONTENTS

1.0 EXECUTIVE SUMMARY

On behalf of the Applicant, Nitsch Engineering is filing the enclosed Notice of Intent (NOI) with the City of Boston Conservation Commission for construction of a laboratory/research & development and office building and job training/non-profit center named Seaport Circle (the Project). Other site improvements include installation of new utilities to support the proposed site and construction of new stormwater management systems. The purpose of this NOI Application is to receive an Order of Conditions from the City of Boston Conservation Commission approving the proposed project under the *Wetlands Protection Act* (M.G.L. c. 131, §40), the *Rivers Protection Act* (M.G.L. c. 256, Acts of 1996) and their Regulations (310 CMR 10.00).

The Project site contains approximately 181,750 square feet, or 4.2 acres, and is located at 777 Congress Street in the South Boston Waterfront neighborhood of Boston, Massachusetts (the Project Site). The Project Site includes a parcel improved with a surface parking lot known as Massport Parcel H, which is owned by the Massachusetts Port Authority (Massport), an adjacent parcel of undeveloped land (Parcel H-1), and a parcel consisting of the Massachusetts Bay Transportation Authority (MBTA) Silver Line Way and land that includes the existing Boston Water and Sewer Commission (BWSC) Pump Station. The project site is bounded by Interstate 90 to the south, Congress Street to the north, Port Lane to the west, and Starboard Way to the east.

The Project is proposed as a 13-story laboratory research & development and office building located on Parcel H totaling 587,000 GFA, a two-story job training/non-profit center on the adjacent parcel totally approximately 16,000 GFA, and an elevated walkway that connects these two buildings with the Ora Seaport Apartment and the Hyatt Place Hotel to the north. Additionally, the Project will dramatically improve the MBTA Silver Line Way station as well as make other public realm improvements. The proposed buildings will take up a total of ± 81,080 square feet at the ground floor and the total site impervious area will occupy ± 72,240 square feet.

The site is within the FEMA Zone AE with a Base Flood Elevation (BFE) of 10’ NAVD88 (16.46 BCB [Boston City Base]) and Zone X: Area of Minimal Flood Hazard. The proposed site improvements are within 110,542 square feet of jurisdictional Land Subject to Coastal Storm Flowage. Refer to Figures 1 and 3 for a Locus Map showing the site.

The Project includes several mitigation measures to offset the impacts to Land Subject to Coastal Storm Flowage. The stormwater management system has been designed in accordance with the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards. The proposed mitigation measures are further discussed in the Stormwater Report, included as Section 3.

2.0 EXISTING CONDITIONS

2.1 Existing Site Description

The existing site is improved with a parking lot on Parcel H with an adjacent 0.3 acres of landscape (grass, trees, and shrubs) over the Ted Williams tunnel entrance portal.

2.2 Existing Utility Infrastructure

Sanitary Sewer

The wastewater system in the vicinity of the Project Site is owned and operated by the BWSC. There is an existing 30-inch sanitary sewer main located in Congress Street adjacent to the Project Site that flows southeast to a 30-inch sanitary sewer main in Starboard Way. There is an existing 30-inch sewer line within Silver Line Way that runs adjacent to the southern section of the Project Site and a 12-inch sewer main that starts in Silver Line Way and continues to Starboard Way. The BWSC owns two 16-inch force mains that leave the Trilling Way Pump Station on the southern edge of the project. There are not any existing sanitary mains in Massport Haul Road in the vicinity of the project.

Water (Domestic and Fire Protection)

The existing water mains in the vicinity of the Project Site are owned and maintained by Massport. There are two 12-inch ductile iron cement lined (DICL) water mains in Congress Street; a 12-inch southern low main, and a 12-inch southern high main. Within Starboard Way, there are two 12-inch DICL water mains; a 12-inch southern low main, and a 12-inch southern high main. Within Silver Line Way, there are two 12-inch DICL water mains; a 12-inch southern low main, and a 12-inch southern high main. There is a 12-inch DICL southern low main in Massport Haul Road.

Stormwater Management

The existing stormwater system in the vicinity of the project is owned and managed by Massport. The records indicate that there is a storm drain in Congress Street, Silver Line Way, and Starboard Way. In Congress Street, there is an 18-inch drain line adjacent to the Project Site which increases to 30 inches as it runs North on to Northern Avenue to Boston Harbor. Within Silver Line Way, there is also a 12-inch drain line that increases to 15 inches as it connects to a 15-inch drain line in Starboard Way adjacent to the site. Finally, there is a 12-inch Massport owned drain main in Massport Haul Road. All stormwater mains discharge to outfall SDO241 in Boston Harbor along Northern Avenue.

There is an existing closed drainage system on Parcel H consisting of catch basin that connect to the 18-inch Massport storm drain that flows east along Congress Street. Parcel H1 is unimproved with no stormwater management infrastructure.

Natural Gas

National Grid owns and maintains the existing gas mains adjacent to the Site.

Electrical/Telephone/Cable

There are no existing teldata and electrical conduits on the site.

2.3 Soils

NRCS Soil Designations

The Soil Classification Summary (Table 1) outlines the Natural Resources Conservation Services (NRCS) designation of the soil series at the Site. The soils within the Project Site are classified within two categories (Figure 5).

Table 1. Soil Classification Summary

Soil Unit	Soil Series	Hydrologic Soil Group
603	Urban land, wet substratum, 0 to 3 percent slopes	---
655	Udorthents, wet substratum	---

On-Site Soil Investigations

A Geotechnical Design Report was prepared by Haley & Aldrich, Inc. (H&A) using available subsurface explorations to provide design recommendations. Previous investigations include test borings from December 2000 – May 2001 at Massport Parcel F-1 (610 Congress Street), test borings from 2017 at Massport Parcel K (now Ora Seaport and Hyatt Place), and test borings from December 1989 – March 1990 from the CA/T Tunnel. The report generally described the subsurface conditions at the Site as an approximately 25-40ft layer of sill and organic soils overlying inorganic and naturally deposited Marine Clay soils. Additional subsurface explorations at the Project Site are proposed by H&A and will be conducted when the site is accessible.

The Geotechnical Design Report can be found in Appendix E of the Stormwater Report in Section 3.

2.4 Environmental Considerations

FEMA Flood Zone

Based on the Flood Insurance Rate Map (FIRM), Community Panel Number 25025C0081J, dated 03/16/2016, the majority of the Site is located within Zone AE with a based flood elevation of 10' NAVD88 (16.46' BCB) and a portion of the site is located within Zone X (areas of minimal flood hazard). Refer to Figure 4 – FEMA Floodplain Map.

Water Supply Protection Area

The site is not located within a Water Supply Protection Area.

Wetland Resource Areas

The site is within the FEMA Zone AE with a Base Flood Elevation (BFE) of 10' NAVD88 (16.46' BCB) and Zone X: Area of Minimal Flood Hazard. There are proposed site improvements within jurisdictional Land Subject to Coastal Storm Flowage amounting to 110,542 square feet.

Natural Heritage and Endangered Species Program

A review of the 15th Edition of the Massachusetts Natural Heritage Atlas prepared by the Natural Heritage and Endangered Species Program (NHESP), dated August 1, 2021, indicates that the site is not located within a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife (Figure 3).

3.0 PROPOSED CONDITIONS

3.1 Overview of Proposed Work

The project involves the construction of a laboratory/research & development and office building and job training/non-profit center named Seaport Circle. Other site improvements include installation of new utilities to support the proposed site and construction of new stormwater management systems.

The Project is classified as a new development and is anticipated to increase the overall impervious area for the Project by approximately 12,490 square feet. Table 2 below indicates the pre- and post-development uses and surface coverage characteristics of the Site.

Table 2. Proposed land use change for Seaport Circle (in square feet)

Land Use	Existing	Proposed	Change
Building Area	1,505	81,080	+79,575
Site Impervious Area	139,325	72,240	-67,085
Landscaping	24,615	12,125	-12,490
Total	165,445	165.445	0

3.2 Utilities

All proposed utility connections to the building will connect to infrastructure currently existing in the public rights-of-way surrounding the Site.

Sanitary Sewer

The Project proposes two 6-inch SDR35 PVC lab waste services and two 8-inch SDR35 PVC sewer services connecting the building into the proposed 12-inch sewer main in Congress Street to replace the 30-inch abandoned record sewer main in Congress Street with a newly proposed sewer manhole to start the main. The Project also proposed a 4-inch SDR35 PVC sewer service from the building into the proposed 8-inch sewer main in Silver Lane Way which will connect into the 12-inch sewer main in Starboard Way.

Water (Domestic and Fire Protection)

The Project proposes a new 6-inch Class 56 CLDI zinc coated domestic water services and one new 8-inch Class 56 CLDI zinc coated fire protection service which will connect the proposed building and proposed fire hydrant to the 12-inch ductile iron water main in Silver Line Way. The 6-inch domestic service will connect to the southern low main and the 8-inch fire protection service will connect to the southern high main. The Project also proposed a 4-inch Class 56 DICL zinc coated domestic water service and a 6-inch Class 56 DICL zinc coated fire protection service connecting the proposed building to 12-inch southern low water main in Massport Haul Road.

Stormwater Management

The Project will collect, store, and recharge 1.25 inches of stormwater runoff from the building's roofs. Stormwater runoff will be directed to a proposed 86,000-gallon stormwater reuse tank connecting to two recharge wells with a 15" and 12" PVC overflows to the proposed 24" RCP drain main to be constructed in Port Lane by this project. Site drainage will be directed to pervious pavers and/or drainage in the adjacent streets. In addition to the 24-inch drain main in Port Lane the project is also proposing to upsize the existing 18-inch drain main in Congress Street to a 24-inch main.

Natural Gas

There is a gas connection proposed to connect to the National Grid existing main in Congress Street adjacent to the site.

Electrical/Telephone/Cable

There are no existing teldata and electrical conduits on the site. Proposed electrical services will connect to the infrastructure located in Congress Street, Starboard Lane, and Massport Haul Road.

3.3 Resilient Building Design & Infrastructure

The Project Site is located in FEMA Zone AE: Area of Minimal Flood Hazard. While the proposed project will increase impervious cover, the site will capture 1.25-inches of rainfall from the impervious area, increasing the site's current stormwater retention onsite. The post-development stormwater drainage has sufficient capacity to support increased rain events as described in the Stormwater Report in Section 3.

The Project team integrated resilient concepts into the design of the proposed Project which include incorporating best practices related to climate preparedness and offers solutions that respond to the impacts of climate related events. The site landscape incorporates trees and greenspace where possible.

The project is compliant with the Massachusetts Port Authority Floodproofing Design Guide, revised April 2015, and the Massachusetts Port Authority's Sustainability and Resiliency Design Standards and Guidelines, dated December 2018. The lobby entrance is at 20.5 feet BCB and all critical infrastructure is located at the 2nd floor or higher per Massport Floodproofing guidelines.

3.4 Snow Removal

On the existing site, snow is moved to the edges of the parking areas. Snow is not removed from the property and is not dumped in the Boston Harbor.

The proposed snow management plan will continue the existing practices with the following specific requirements:

- During typical snow plowing operations, snow shall be pushed to designated snow removal areas.
- Snow shall not be stockpiles in wetland resource areas or drainage system components.
- In severe conditions where snow cannot be stockpiled on site, the snow shall be removed from the site and properly disposed of in accordance with DEP Guideline BRP601-01.
- Deicing chemicals shall be stored in a locked room inside the building and shall be used at exterior stairs and walkways.
- Before winter begins, the property owner and the contractor shall review snow plowing, deicing, and stockpiling procedures. Areas designated for stockpiling should be cleaned of any debris.

3.5 Tree Removal and Planting

As part of the development of the site, 29 trees will be removed during the construction of this project and additional trees/shrubs will be planted after construction as shown in Table 3 below. Please see Section 5 for more information on the Landscape Demolition Plan and Planting Plans for the project.

Table 3. Planting Schedule

Trees	QTY	Botanical Name	Common Name
UP	9	Ulmus parvifolia	Lacebark Elm
Shrubs	**QTY**	**Botanical Name**	**Common Name**
AP	27	Aesculus parviflora	Bottlebrush Buckeye
CP2	197	Comptonia peregrina	Sweet Fern
FB	203	Fothergilla gardini ‘Blue Mist’	Blue Mist Dwarf Fotherfilla
SH2	355	Sarcococca hookeriana humilis	Trailing Sweetbox
TN	103	Taxus baccata ‘Nana’	Dwarf English Yew

4.0 WETLAND RESOURCE AREA IMPACTS

The impact of the proposed project on wetland resources was limited to the maximum extent practicable. The site is within the FEMA Zone AE with a Base Flood Elevation (BFE) of 10' NAVD88 (16,46 BCB) and Zone X: Area of Minimal Flood Hazard, see the Survey Showing Land Subject to Coastal Flooding in Section 5. The proposed site improvements within 110,542 square feet of jurisdictional Land Subject to Coastal Storm Flooding (LSCSF) as shown in Table 4 below. Based on projected 2070 storm events, the Project is not expected to significantly impact the coastal flooding at the Site.

Table 4. Wetland Resource Area Impacts

Resource Area	Proposed Impact Areas
Land Subject to Coastal Storm Flowage	110,542 SF

The proposed site improvements within Land Subject to Coastal Storm Flowage include:

- Buildings, sidewalk, roadway improvements, landscaping, and utility work

Erosion and sediment control barriers will be placed along the perimeter of the site to protect the Land Subject to Coastal Storm Flowage as indicated on the site plans.

The project is designed to meet the groundwater recharge standards as indicated in the DEP Stormwater Management System regulations. The Site was designed using environmentally-sensitive site design and stormwater BMP treatment trains to minimize the loss of annual recharge to groundwater. The annual recharge from the post-development site will approximate the annual recharge from pre-development conditions based on soil type using the guidelines provided in the MassDEP Stormwater Management Handbook.

Impervious Area in HSG D = 91,112 square feet
Rv (Recharge Volume) = 91,110 x 0.1 in. / (12 inches/ft) = 759 cubic feet
Total Required Recharge Volume = 759 cubic feet

1.87 acres of 2.09 impervious acres, or 90%, are directed to the infiltrations BMPs. An adjustment calculation was performed to ensure the entire recharge requirement can be met by this area.

Adjusted Required Recharge Volume = [1/ (% to recharge system)] x Required Recharge Volume
= [1/0.90] x 759 cubic feet
= 1.11 x 759 cubic feet
= 844 cubic feet

The infiltration BMPs are sized to exceed the recharge volume required under the MassDEP Stormwater Management Standards.

Table 5. Proposed Recharge Volumes for Stormwater BMPs

Infiltration BMP	Recharge Volume (cf)
Subsurface Infiltration System	11,500
Total	**11,500**

5.0 PROPOSED MITIGATION MEASURES

5.1 Construction Period Erosion and Sedimentation Controls

Erosion and sedimentation controls are proposed to reduce the construction-related impact of the proposed project on adjacent wetland resource areas. Control measures will include, but are not limited to, minimizing land disturbance, providing temporary stabilization and covers, installing perimeter controls (silt fence and straw wattles/bales), constructing temporary sediment basins, and providing stormwater inlet protection (silt sack, straw wattles/bales). The contractor will be required to do inspections of all controls regularly to ensure that the controls are working properly. The contractor shall clean and reinstall any control that needs to be cleaned or replaced. Additionally, the contractor will clean/flush the entire stormwater management system prior to final acceptance by the owner.

The proposed project will disturb more than one acre of land, which requires the filing of a National Pollutant Discharge Elimination System (NPDES) Stormwater Construction General Permit. To apply for coverage under this General Permit, a Notice of Intent will be submitted to the U.S. Environmental Protection Agency prior to the commencement of construction by the Contractor. The NPDES Notice of Intent requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) for construction activities, which will be submitted to the Conservation Commission and the DEP prior to construction by the Contractor. The SWPPP is a detailed erosion and sediment control plan that indicates the structural and non-structural erosion and sediment controls that will be employed, as appropriate, to control erosion on the construction site. A draft of the SWPPP will be provided prior to construction.

Prior to the commencement of construction, the Applicant will prepare a comprehensive Construction Management Plan (CMP) that will encompass a range of matters, including the soil erosion and sedimentation controls noted above. In addition to the perimeter controls mentioned above, the CMP will address fugitive dust control, spill prevention, rodent control measures, the staging of construction vehicles to maximize pedestrian safety, the regular removal of debris from the construction site, and the removal of any contaminants in accordance with applicable laws and regulations. The CMP will be submitted to the City of Boston Transportation Department and Massport for approval, as well as to staff of the Boston Conservation Commission.

Climate Change Considerations

A summary of the climate change considerations as related to the proposed scope of work is below:

Sea Level Rise/Coastal Flooding
The Boston Planning & Development Agency has determined a Sea Level Rise Base Flood Elevation (SLR-BFE) of 19.50 ft (BCB) for the area of improvements and Public Way. The proposed work will not deter or negatively impact any future sea level rise. The proposed work will not occur during anticipated large storm events, when existing areas within the 100-year flood plain may inundated with water and flooded.

Precipitation/Stormwater Flooding:
Future storm events may be more frequent and intense. The proposed work will not deter future improvements to adapt to increased precipitation or prevent future stormwater flooding improvements to meet future resilience measures. The proposed construction work will not occur during anticipated large storm events which may cause localized flooding.

Extreme Heat:
Even though the Project is proposing to increase impervious area, the new pedestrian experience will improve dramatically and mitigate any adverse effects by any potential changes to the heat island at the site. The MBTA Silver Line bus stop will be shaded by the proposed building and the pedestrian walkway between buildings will limit exposure to any heat island effects.

Climate Ready Boston:
The forecasted maps and proposed strategies of the Climate Ready Boston program including Climate Ready Boston documents, have been reviewed for how they can be applied to the proposed work. Climate change will not have an immediate impact on this project because the building improvements meet Massport's Floodproofing Guidelines.

BWSC Inundation Model:
The forecasted maps of the BWSC Inundation Model data and future larger storm events impacts on the site and how they can be applied to the work have been reviewed. The inundation model data will not have an immediate impact on the limited project in the proposal because the building improvements meet Massport's Floodproofing Guidelines.

5.2 Post-Construction Stormwater Management

There will be a closed drainage system to collect the runoff from the roof and proposed roadway from the proposed project. The runoff from the roof and site will be collected in an infiltration system, and all runoff eventually discharges to a closed drainage system that will drain to the BWSC drain main in Port Lane. The overall site is designed to improve water quality. For more information on the stormwater management system, refer to the Stormwater Report included in Section 3.

5.3 Long-Term Pollution Prevention

A Long-Term Pollution Prevention Plan has been prepared in compliance with the Standards 4 and 9 of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, which require provisions for the following:

- Good Housekeeping
- Storing materials and waste products inside or under cover
- Vehicle washing
- Routine inspections of stormwater best management practices
- Spill prevention and response
- Maintenance of lawns, gardens, and other landscaped areas
- Storage and used of fertilizers, herbicides, and pesticides
- Pet waste management
- Operation and management of septic systems
- Proper management of deicing chemicals and snow

The project Owner has reviewed and agreed to implement the management practices outlined in the Plan and proactively conduct operations at Seaport Circle in an environmentally responsible manner.

5.4 Alternatives Analysis

The Alternative Program described in this section evaluated alternative scenarios from the proposed Project. The Alternative Program could include variations, such as:

- Scenario A: Building on Parcel H (no Pavilion on Parcel H-1, limited Pedestrian Link to facilitate Silver Line Way station access but no connection to the Ora/Hyatt or Parcel H-1)
- Scenario B: Building on Parcel H and Pavilion on Parcel H-1 (limited Pedestrian Link to facilitate Silver Line Way station access but no connection to the Ora/Hyatt or Parcel H-1)
- Scenario C: Building on Parcel H with Pedestrian link to Silver Line Way station and Ora/Hyatt (no Pavilion on, or Pedestrian Link to, Parcel H-1)

In scenarios A and C where there is no Pavilion on Parcel H-1, its uses would be relocated to the Building, still maintaining the same number of levels as the proposed Project and an entry to the remaining portion of the Pedestrian Link, as well as having access from the lobby on the ground floor. Parcel H-1 would remain vacant and would remain under Massport ownership.

The Alternative Program would have a negligible impact on stormwater management approaches and the Project's overall stormwater impacts. If the Pavilion were not to be constructed, there could be a slight reduction in runoff rates coming off of the Pavilion site due to the elimination of the impervious roof in favor of a vegetated field.

The existing Project Site consists mostly of paved parking areas and paved roadways with associated sidewalks and planted landscaping. The Alternative Program, to the maximum extent practicable, would install permeable pavers and planted areas where possible. The Alternative Program's green roof, stormwater tank, and increased storm main size will help provide stormwater peak storm mitigation to counteract this reduction in pervious area.

5.5 Climate Change Resilience

The proposed project improvements consider climate change in multiple ways including sea level rise, heat island effect and plantings, and stormwater runoff impacts.

Massport facilities, including 777 Congress Street, are increasingly susceptible to flooding hazards caused by extreme storms and rising sea levels as a result of climate change. Massport has incorporated its Floodproofing Design Guide into its capital planning and real estate development processes to make its infrastructure and operations more resilient to these anticipated flooding threats.

Incorporation of the Floodproofing Design Guide is intended to help Massport achieve the following flood resiliency objectives:

- Protect the safety of passengers, occupants, workers, and first responders;
- Minimize flood damage to critical Massport facilities, whose destruction or loss of service will have a debilitating effect on the security, economy, safety, health, and welfare of the public;
- Enhance business resiliency, and expeditiously recover and restart critical services with minimum delay and damage to public safety, health, economy, and security;
- Provide for operational continuity to the greatest extent possible;
- Minimize losses of electrical power, communications, security, and other critical services facility wide and to individual critical assets;
- Prevent structural and property damage to the maximum extent possible;

- Maintain capacity to support regional emergency response and disaster recovery at Logan Airport and Conley Terminal during, and immediately after, an extreme storm event;

In accordance with Massport initiatives to address climate change, the Project team has incorporated resilient design features into the design of the Project. The design follows and will comply with best practices related to climate preparedness and the impacts of climate related events in accordance with the Massport Floodproofing Design Guide. The building features that address this resiliency design area as follows:

- The Project Site is currently located in the FEMA AE (El. 10 feet NAVD88 or 16.46 feet BCB) zone which means it is already prone to flooding. With rising seas, it is anticipated to be subject to three to four feet of additional water levels (base flooding) in 2070 (based on current sea level rise projections);
- The lobby entrance is at 20.5 feet BCB and all critical infrastructure is located at the 2nd floor or higher.

Additionally, a flood/storm event management plan will be developed to implement resiliency measures including raising elevators, selectively turning off power and implementing flood/storm event management plan.

Lastly, the Project will incorporate new, permanent landscaping across the proposed site layout. This landscaping will serve to bring green, open space area, and plantings to a site that currently has none. Additionally, this proposed landscaping will also serve another purpose. Its addition to the site will reduce site runoff, as well as increase the quality of the runoff from the proposed site.
Please see '*Section 5: Site Renderings and Proposed Landscaping'* for details and proposed site landscaping layout.

6.0 INTERESTS OF THE WETLANDS PROTECTION ACT

The Wetlands Protection Act regulates wetland resource areas in order to contribute to the following interests:

- Protection of Public and Private Water Supply
- Protection of Groundwater Supply
- Flood Control
- Storm Damage Prevention
- Prevention of Pollution
- Protection of Land Containing Shellfish
- Protection of Fisheries
- Protection of Wildlife Habitat

By installing stormwater best management practices on the project site, the proposed project will protect the interests of the Wetlands Protection Act, including protection of private/public water supply, protection of groundwater supply, providing flood control, prevention of storm damage, and prevention of pollution.

7.0 CONCLUSION

On behalf of the Applicant, Nitsch Engineering is filing the enclosed Notice of Intent (NOI) Application with the City of Boston Conservation Commission for the construction of Seaport Circle located at 777 Congress Street in the South Boston Waterfront neighborhood of Boston, Massachusetts. The proposed project provides numerous mitigation measures including: minimizing the disturbance within resource area boundaries, minimization of earthwork, and improving the stormwater management system to meet the DEP Stormwater Management Standards. This NOI report and associated appendices provide a thorough description of the design details and regulatory compliance in accordance with the pertinent Wetland Statutes and Regulations. The Applicant seeks an Order of Conditions approving the project as proposed.

SECTION 3

Stormwater Report (under separate cover)

Including the Long-Term Pollution Prevention Plan and Stormwater Operation and Maintenance Plan

SECTION 4

DOCUMENTATION OF ABUTTER NOTIFICATION

Abutter Notification
Affidavit of Service
Certified Abutters List

Notification to Abutters

By Hand Delivery, Certified Mail (return receipt requested), or Certificates of Mailing

This is a notification required by law. You are receiving this notification because you have been identified as the owner of land abutting another parcel of land for which certain activities are proposed. Those activities require a permit under the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40).

In accordance with the second paragraph of the Massachusetts Wetlands Protection Act, and 310 CMR 10.05(4)(a) of the Wetlands Regulations, you are hereby notified that:

A. A Notice of Intent was filed with the Boston Conservation Commission on 10/19/2022 seeking permission to remove, fill, dredge, or alter an area subject to protection under M.G.L. c. 131 §40. The following is a description of the proposed activity/activities:

The Project involves the construction of a laboratory and office building connected via elevated walkway to a training/non-profit center.

B. The name of the applicant is: LO Parcel H, LLC.

C. The address of the land where the activity is proposed is: 777 Congress Street, South Boston Waterfront, Boston, MA

D. Copies of the Notice of Intent may be examined or obtained at the office of the Boston Conservation Commission, located at Boston City Hall, Environmental Department, Room 709, 1 City Hall Square, Boston, MA 02201. The regular business hours of the Commission are 9 AM to 5 PM, Monday through Friday, and the Commission may be reached at (617)635-3850.

E. Copies of the Notice of Intent may be obtained from the applicant or their representative by calling Mark Callahan, LO Parcel H, LLC, at (617)951-4112. An administrative fee may be applied for providing copies of the NOI and plans.

F. Information regarding the date, time, and location of the public hearing regarding the Notice of Intent may be obtained from the Boston Conservation Commission. Notice of the public hearing will be published at least five business days in advance, in the Boston Herald.

Notification provided pursuant to the above requirement does not automatically confer standing to the recipient to request Departmental Action for the underlying matter. See 310 CMR 10.05(7)(a)4.

致相邻地产业主的通知书

由专人递送、挂号信寄送（要求回执），或出具邮寄证明

根据法律要求，特此发出本通知书。您收到本通知书是因为，您已被确定为与另一地块相邻土地的所有者，该地块拟进行某些活动。这些活动需要依据《马萨诸塞州湿地保护法》（M.G.L. c. 131, § 40条款）获取许可。

根据《马萨诸塞州湿地保护法》第二段，以及《湿地条例》310 CMR 10.05(4)(a)条款，特此通知贵方：

A. 2022年10月19日已向波士顿保护委员会（Boston Conservation Commission）提交了一份**《意向通知书》**，请求允许移除、填充、疏浚或改造受M.G. L.c.131§40条款项下保护的区域。 以下是对该拟议单项/多项活动的描述：

该项目涉及一座实验室和办公楼的建设施工，将经由高架人行道与一家培训/非营利中心相连通。

B. 申请人名称：LO Parcel H，LLC。

C. 拟开展活动的地块地址为：马萨诸塞州波士顿市南波士顿海滨地区国会街777号（777 Congress Street, South Boston Waterfront, Boston, MA）

D. 该《意向通知书》副本可在波士顿保护委员会办公室查阅或获取，地址：马萨诸塞州波士顿市政厅广场1号波士顿市政厅环境部709室，邮编：02201（Boston City Hall, Environmental Department, Room 709, 1 City Hall Square, Boston, MA 02201）。委员会的正常工作时间为周一至周五上午9点至下午5点，可致电与委员会联系，电话：（617）635-3850。

E. 该《意向通知书》副本可从申请人或其代表处获得，可致电Mark Callahan，LO Parcel H，LLC，电话：（617）951-4112。提供NOI（《意向通知书》）和地块规划的副本可能需要支付行政费用。

F. **关于《意向通知书》**公众听证会的日期、时间和地点的有关信息可从波士顿保护委员会获取。公众听证会的通知将至少提前五个工作日在《波士顿先驱报》发布。

根据上述要求提供的通知书不会自动授予接收人就相关事宜请求主管部委行动的资格。参阅310 CMR 10.05(7)(a)4。

FULL_ADDRESS	CITY	ZIPCODE	OWNER	ADDRESSEE	MAIL_ADDRESS	MAIL_CS	STATE	MAIL_ZIPCODE
SWS NORTHERN AV	SOUTH BOSTON	2127	MASS PORT AUTHORITY		1 HARBORSIDE DR #200S	EAST BOSTON	MA	2128
TRILLING WY	BOSTON	2210	MASS PORT AUTHORITY		1 HARBORSIDE DR #200S	EAST BOSTON	MA	2128
NORTHERN AV	BOSTON	2210	MASS PORT AUTHORITY		1 HARBORSIDE DR #200S	EAST BOSTON	MA	2128
SWS NORTHERN AV	SOUTH BOSTON	2127	MASS PORT AUTHORITY		1 HARBORSIDE DR #200S	EAST BOSTON	MA	2128
TRILLING WY	BOSTON	2210	COMMONWEALTH OF MASS		TRILLING WY	BOSTON	MA	2210
7 CHANNEL ST	BOSTON	2210	ECONOMIC DEVELOPMENT AND	C/O CHRISTOPHER GIULIANI	1 CITY HALL SQ 9TH FL	BOSTON	MA	2201
1 PARK LA	SOUTH BOSTON	2127	PARK LANE SEAPORT AUTHORITY	C/O RIVERSIDE	ONE PARK LANE	BOSTON	MA	2210
606 CONGRESS ST	BOSTON	2210	RBW OWNER LP	500 BOYLSTON ST SUITE 1880	C/O ROCKPOINT FUND ACQUISITION LLC	BOSTON	MA	2116
295 315 NORTHERN AV	BOSTON	2210	PARCEL K RESIDENTIAL	C/O PHOENIX PROPERTY COMPANY	5950 SHERRY LANE SUITE #320	DALLAS	TX	75225
225 NORTHERN AV	SOUTH BOSTON	2127	PARK LANE SEAPORT LEASEHOLD	C/O RIVERSIDE	ONE PARK LANE	BOSTON	MA	2210
30 TRILLING WY	BOSTON	2210	COMMONWEALTH OF MASS		30 TRILLING WAY	BOSTON	MA	2210
2 HARBOR ST	BOSTON	2210	ECONOMIC DEVELOPMENT AND	C/O CHRISTOPHER GIULIANI	1 CITY HALL SQ 9TH FL	BOSTON	MA	2201
225 NORTHERN AV	SOUTH BOSTON	2127	SEAPORT REALTY CO LLC	C/O PARK LANE SEAPORT J MALEGA	6406 IVY LANE STE 700	GREENBELT	MD	20770
325 NORTHERN AV	BOSTON	2210	COMM OF MASS PORT AUTH		325 NORTHERN AVE	BOSTON	MA	2210
1 TRILLING WY	BOSTON	2210	COMMONWEALTH OF MASS LESSEE		1 TRILLING WAY	BOSTON	MA	2210
12 CHANNEL ST	BOSTON	2210	ECONOMIC DEVELOPMENT AND	C/O CHRISTOPHER GIULIANI	1 CITY HALL SQ 9TH FL	BOSTON	MA	2201
660 SUMMER ST	BOSTON	2127	UNITED STATES OF AMERICA	ARMY CORP OF ENG- N.E. DIV	424 TRAPELO RD	WALTHAM	MA	2452
601 CONGRESS ST	BOSTON	2210	601 CONGRESS MA LLC LESSEE	601 CONGRESS ST	C/O JEFF SPRUIL	BOSTON	MA	2210
295 315 NORTHERN AV	BOSTON	2210	HP BOSTON PARTNERS LLC	MCWHINNEY REAL ESTATE SERVICES	1800 WAZEE STREET SUIE #200	DENVER	CO	80202
NORTHERN AV	BOSTON	2210	COMMONWEALTH OF MASS		NORTHERN AV	BOSTON	MA	2210
329 NORTHERN AV	BOSTON	2210	ECONOMIC DEVELOPMENT AND	C/O CHRISTOPHER GIULIANI	1 CITY HALL SQ 9TH FL	BOSTON	MA	2201
295 315 NORTHERN AV	BOSTON	2210	PARCEL K GARAGE	C/O PHEONIX PROPERTY COMPANY	5950 SHERRY LANE SUITE #320	DALLAS	TX	75225
225 NORTHERN AV	SOUTH BOSTON	2127	SEAPORT REALTY COMPANY LLC	C/O PARK LANE SEAPORT J MALEGA	6406 IVY LANE STE 700	GREENBELT	MD	20770

City of Boston
Environment

CITY of BOSTON
Conservation Commission

AFFIDAVIT OF SERVICE
FOR ABUTTER NOTIFICATION

Under the Massachusetts Wetlands Protection Act
~~and Boston Wetlands Ordinance~~

I, Coleman Horsley, PE, hereby certify under pains and penalties of perjury that that at least one week prior to the public hearing, I gave notice to abutters in compliance with the second paragraph of Massachusetts General Laws Chapter 131, section 40, and the DEP Guide to Abutter Notification dated April 8, 1994, in connection with the following matter:

A Notice of Intent was filed under the Massachusetts Wetlands Protection Act ~~and/or the Boston Wetlands Ordinance~~ by LO Parcel H, LLC for the construction of a laboratory and office building connected via elevated walkway to a training/non-profit center located at 777 Congress Street, South Boston Waterfront, Boston, MA.

The Abutter Notification For, the list of abutters to whom it was given, and their addresses are attached to this Affidavit of Service.

Coleman Horsley

Name

10/19/2022

Date

SECTION 5

SUPPLEMENTAL DOCUMENTS

Landscaping Site Preparation and Demolition Plan
Landscaping Planting Plans

Survey Showing Land Subject to Coastal Flooding

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SITE PREPARATION AND DEMOLITION LEGEND

- PROPERTY LINE
- BWSC EASEMENT
- EXISTING 8'-0" WROUGHT IRON FENCE TO REMAIN IN PLACE
- EXISTING 8'-0" WROUGHT IRON FENCE TO BE REMOVED
- EXISTING 4'-0" CHAIN LINK FENCE TO BE REMOVED
- EXISTING PLANT BED
- EXISTING BRICK PAVEMENT
- EXISTING CONCRETE PAVEMENT
- EXISTING ASPHALT PAVEMENT
- EXISTING BUS SHELTER
- EXISTING OBSERVATION WELL TO REMAIN IN PLACE.
- EXISTING STANDPIPE TO REMAIN IN PLACE.
- EXISTING GATEPOST TO REMAIN IN PLACE
- EXISTING TRANSFORMER TO REMAIN IN PLACE
- EXISTING LIGHT POLE TO BE REMOVED.
- EXISTING SIGN TO BE REMOVED.
- EXISTING PARKING METER TO BE REMOVED.
- EXISTING HYDRANT TO BE REMOVED.
- EXISTING CONIFEROUS TREE TO BE REMOVED.
- EXISTING BOLLARD TO BE REMOVED.
- EXISTING UTILITY POLE TO BE REMOVED.
- EXISTING TRASH RECEPTACLE TO BE REMOVED.
- EXISTING HANDHOLD TO BE REMOVED.
- EXISTING UTILITY POLE WITH LIGHT TO BE REMOVED.
- EXISTING BUS SHELTER TO BE REMOVED AND DISPOSED OF. COORDINATE REMOVAL WITH MBTA
- EXISTING CATCH BASIN TO BE REMOVED
- EXISTING BIKE RACK TO BE REMOVED

NOTE:
SITE PREPARATION AND DEMOLITION FOR BOTH LAB AND PAVILION SITES TO BE COORDINATED BY OWNER, MASSPORT, THE ARCHITECT OF RECORD FOR THE LAB BUILDING, SITE CIVIL ENGINEER, SITE LANDSCAPE ARCHITECT, AND THE MASSACHUSETTS BAY TRANSIT AUTHORITY.

REMOVE EXISTING SECURITY BOOTH

REMOVE EXISTING GATE ARM AND POST

REMOVE EXISTING PAYMENT KIOSK

REMOVE EXISTING TICKET KIOSK

REMOVE EXISTING SECURITY BOOTH

CATENARY WIRES ABOVE. COORDINATE REMOVAL WITH MBTA

EXISTING BWSC STRUCTURE TO REMAIN. PROTECT EXTENTS WITHIN EXISTING WROUGHT IRON FENCE, INCLUDING GATE POSTS

REMOVE EXISTING SECURITY BOOTH. COORDINATE REMOVAL AND DISPOSAL WITH THE MBTA

REMOVE EXISTING WOOD BOX

REMOVE EXISTING PLASTIC BOX

NOTE: REMOVE, SALVAGE, AND STOCKPILE EXISTING BIKE RACKS (2) FOR RE-USE

NOTE: REMOVE, SALVAGE, AND STOCKPILE EXISTING BRICK PAVING FOR RE-USE

SITE PREPARATION AND DEMOLITION KEY

1.00 HARDSCAPE, CURB, AND FENCES

1.1 EXISTING ASPHALT PAVEMENT TO BE REMOVED

1.2 EXISTING CONCRETE PAVEMENT TO BE REMOVED

1.3 EXISTING BRICK PAVEMENT TO BE REMOVED

1.4 EXISTING CONCRETE RETAINING WALL TO REMAIN IN PLACE AND BE PROTECTED DURING CONSTRUCTION

1.5 EXISTING GRANITE CURB TO BE REMOVED, SALVAGED,AND RESET. SEE CIVIL DWGS.

1.6 EXISTING 4'-0" CHAIN LINK FENCE TO BE REMOVED

1.7 EXISTING 8'-0" WROUGHT IRON FENCE TO REMAIN IN PLACE AND BE PROTECTED DURING CONSTRUCTION

1.8 EXISTING 8'-0" WROUGHT IRON FENCE TO BE REMOVED

2.00 VEGETATION AND SOILS

2.1 CLEAR AND GRUB EXISTING VEGETATION. EXISTING SOILS TO BE REMOVED AND DISPOSED OF

2.2 EXISTING CONIFEROUS TREE TO BE REMOVED. GRIND OR REMOVE STUMP TO 3'-0" BELOW FINISHED GRADE

3.00 UTILITIES

3.1 LIGHT POLE AND FOUNDATION REMOVAL, SEE ELECTRICAL DWGS.

3.2 EXISTING WALK SIGNAL TO BE REMOVED, SEE ELECTRICAL DWGS.

3.3 EXISTING UTILITY POLE AND FOUNDATION TO BE REMOVED, VIF LOCATION AND SEE ELECTRICAL DWGS.

3.4 EXISTING UTILITY POLE AND FOUNDATION WITH LIGHT TO BE REMOVED, SEE ELECTRICAL DWGS.

3.5 EXISTING HYDRANT TO BE REMOVED. SEE CIVIL DWGS

3.6 EXISTING HANDHOLD TO BE REMOVED, SEE CIVIL DWGS.

3.7 EXISTING TRANSFORMER TO REMAIN IN PLACE AND BE PROTECTED DURING CONSTRUCTION.

3.8 EXISTING CATCH BASIN TO BE REMOVED AND DISPOSED OF.. COORDINATE REMOVAL WITH CIVIL DWGS.

3.9 EXISTING DRAIN MANHOLE TO BE REMOVED AND DISPOSED OF.. COORDINATE REMOVAL WITH CIVIL DWGS.

3.10 EXISTING SEWER MANHOLE TO BE REMOVED AND DISPOSED OF.. COORDINATE REMOVAL WITH CIVIL DWGS.

4.00 MISCELLANEOUS SITE FEATURES

4.1 EXISTING OBSERVATION WELL TO REMAIN IN PLACE AND BE PROTECTED DURING CONSTRUCTION

4.2 EXISTING STANDPIPE TO REMAIN IN PLACE AND BE PROTECTED DURING CONSTRUCTION

4.3 EXISTING PARKING METER AND FOUNDATION TO BE REMOVED

4.4 EXISTING TRASH RECEPTACLE TO BE REMOVED

4.5 EXISTING BUS SHELTER TO BE REMOVED COORDINATE REMOVAL AND DISPOSAL WITH MBTA

4.6 EXISTING BOLLARD AND FOUNDATION TO BE REMOVED

4.7 EXISTING SIGN AND FOUNDATION TO BE REMOVED

4.8 REMOVE AND SALVAGE EXISTING BIKE RACK FOR REUSE

NOTES:
1. PRIOR TO COMMENCING WORK, CONTRACTOR TO REVIEW AND CONFIRM ALL SITE PREPARATION AND DEMOLITION WITHIN THE BOSTON WATER AND SEWER COMMISSION EASEMENT WITH OWNER, LANDSCAPE ARCHITECT, CIVIL ENGINEER, AND THE BOSTON WATER AND SEWER COMMISSION.
2. PRIOR TO COMMENCING ANY DEMOLITION OF SITE UTILITY POLES, LIGHTS, OVERHEAD CATENARY WIRES, AND ALL ALLIED MBTA SITE FEATURES INCLUDING BUS SHELTERS, SIGNAGE, AND ETC, CONTRACTOR TO REVIEW AND CONFIRM SCOPE OF WORK WITH THE OWNER, LANDSCAPE ARCHITECT, CIVIL ENGINEER, AND THE MASSACHUSETTS BAY TRANSIT AUTHORITY.

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET ARCHITECTURE & DESIGN
MOODY•NOLAN

CONSULTANTS:

LANDSCAPE ARCHITECT:
kmdg KLOPFER MARTIN DESIGN GROUP
69 CANAL STREET | 2ND FLOOR
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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

KEY PLAN

DRAWING TITLE:

SITE PREPARATION AND DEMOLITION PLAN

Project No.	**21008**
Dwn/Chk By	**EB DD/ES**
Date	**10/03/2022**
Scale	**1" = 20'-0"**

DRAWING NUMBER:

L1.01

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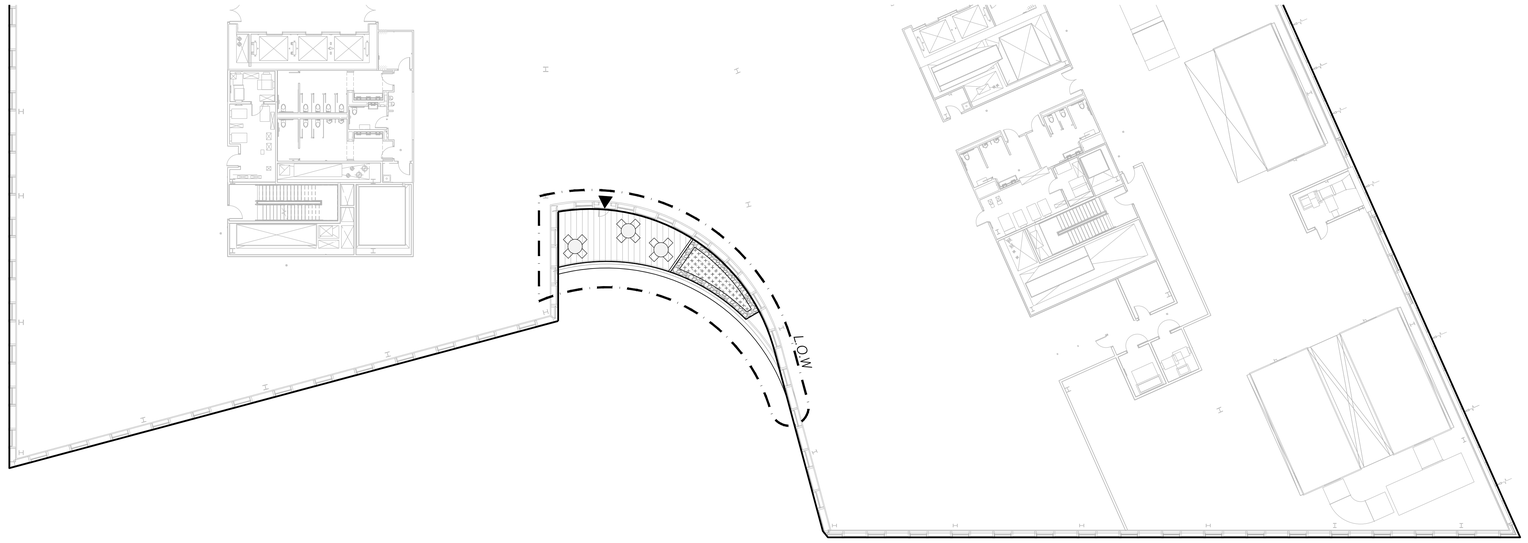


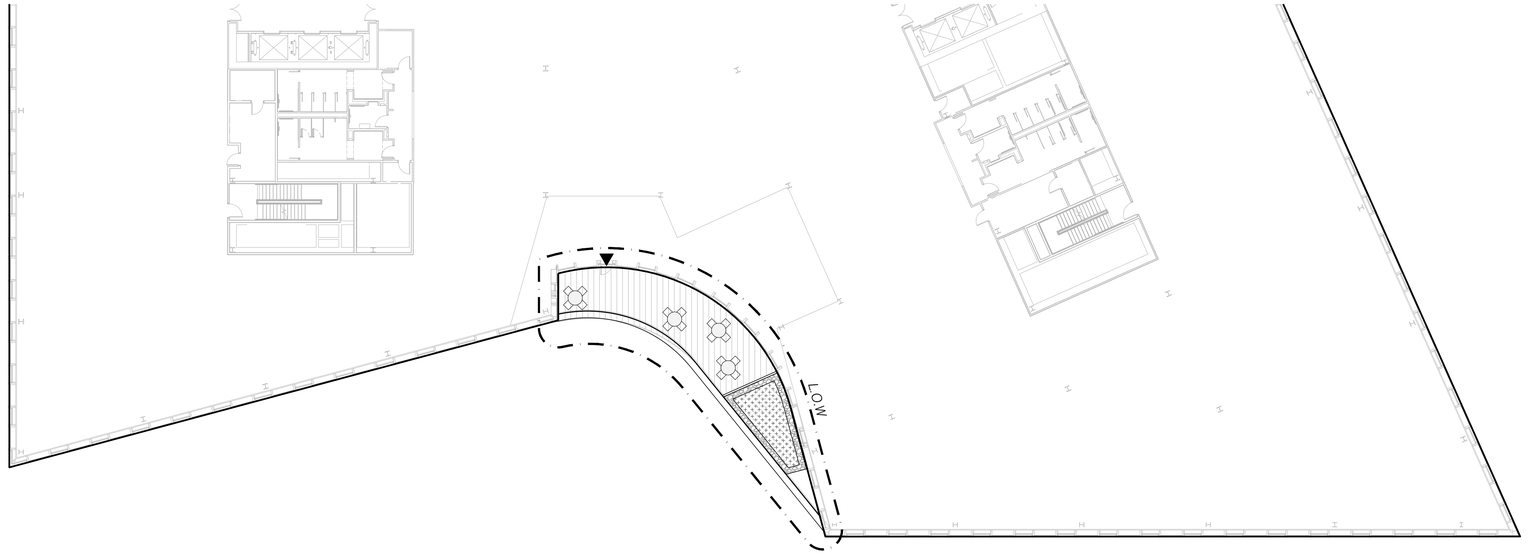
2 PLANTING PLAN - LEVEL 9

SCALE: 1/16" = 1'-0"

PLANTING LEGEND LVL 6 & 9

PLANTING LEGEND

7 L8.01 — 8 L8.01 PERENNIAL PLANTING



1 PLANTING PLAN - LEVEL 6

SCALE: 1/16" = 1'-0"

PLANT_SCHEDULE

	LVL 6&9 PERENNIAL MIX	262 sf		
	Andropogon gerardii / Big Bluestem	55	1 gal	20% @ 12" oc
	Andropogon glomeratus / Bushy Bluestem	55	1 gal	20% @ 12" oc
	Epimedium x perralchicum / Epimedium	55	1 gal	20% @ 12" oc
	Eragrostis spectabilis / Purple Lovegrass	55	1 gal	20% @ 12" oc
	Hakonechloa macra / Hanoke Grass	55	1 gal	20% @ 12" oc

CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

ARROWSTREET ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

KEY PLAN

DRAWING TITLE:

PLANTING PLAN - LEVEL 6 & 9

Project No.	**21008**
Dwn/Chk By	**EB DD MF/ES**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

L6.03

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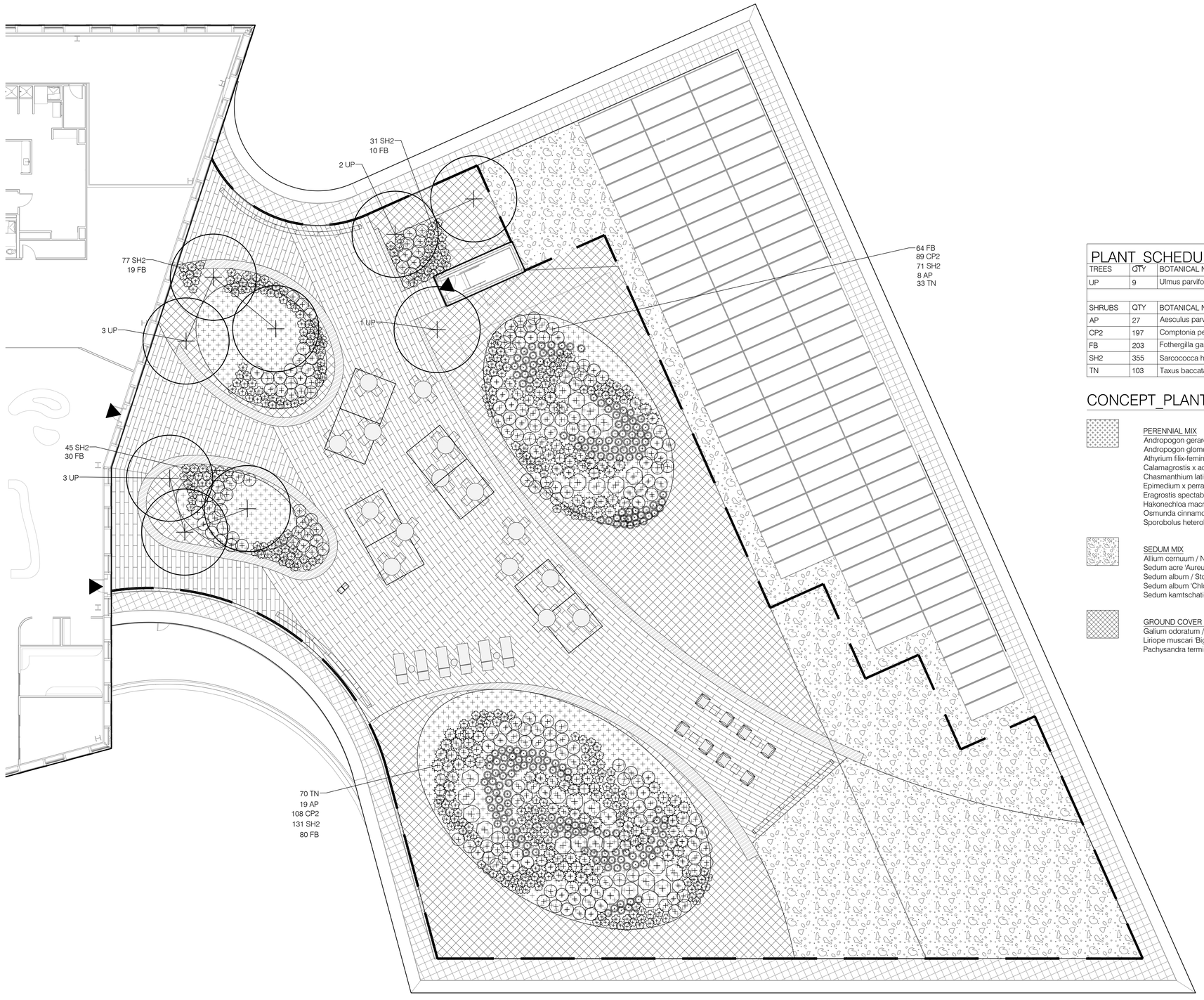

PLANTING LEGEND LVL 10

- SEDUM PLANTING
- PERENNIAL PLANTING (7 L8.01 / 8 L8.01)
- GROUND COVER PLANTING
- TREE PLANTING IN PLANTING BED (9 L8.01)
- EVERGREEN SHRUB
- DECIDUOUS SHRUB
- DECIDUOUS TREE

PLANT_SCHEDULE

TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
UP	9	Ulmus parvifolia	Lacebark Elm	2.5-3" cal. B&B
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AP	27	Aesculus parviflora	Bottlebrush Buckeye	3 gal
CP2	197	Comptonia peregrina	Sweet Fern	3 gal
FB	203	Fothergilla gardenii `Blue Mist`	Blue Mist Dwarf Fothergilla	3 gal
SH2	355	Sarcococca hookeriana humilis	Trailing Sweetbox	#3 pot
TN	103	Taxus baccata 'Nana'	Dwarf English Yew	3 gal

CONCEPT_PLANT_SCHEDULE

PERENNIAL MIX	5,237 sf		
Andropogon gerardii / Big Bluestem	545	1 gal	10% @ 12" oc
Andropogon glomeratus / Bushy Bluestem	545	1 gal	10% @ 12" oc
Athyrium filix-femina / Common Lady Fern	545	1 gal	10% @ 12" oc
Calamagrostis x acutiflora 'Karl Foerster' / Karl Foerster Feather Reed Grass	545	1 gal	10% @ 12" oc
Chasmanthium latifolium / Inland Sea Oats	545	1 gal	10% @ 12" oc
Epimedium x perralchicum / Epimedium	545	1 gal	10% @ 12" oc
Eragrostis spectabilis / Purple Lovegrass	545	1 gal	10% @ 12" oc
Hakonechloa macra / Hanoke Grass	545	1 gal	10% @ 12" oc
Osmunda cinnamomea / Cinnamon Fern	545	1 gal	10% @ 12" oc
Sporobolus heterolepis / Prairie Dropseed	545	1 gal	10% @ 12" oc
SEDUM MIX	5,946 sf		
Allium cernuum / Nodding Onion	1,236	flat	20% @ 12" oc
Sedum acre 'Aureum' / Golden Stonecrop	1,189 sf	flat	20%
Sedum album / Stonecrop	1,189 sf	flat	20%
Sedum album 'Chloroticum' / Stonecrop	1,189 sf	flat	20%
Sedum kamtschaticum / Orange Stonecrop	1,189 sf	flat	20%
GROUND COVER MIX	5,610 sf		
Galium odoratum / Sweet Woodruff	5,830	4"pot	25% @ 6" oc
Liriope muscari 'Big Blue' / Big Blue Lilyturf	1,458	4"pot	25% @ 12" oc
Pachysandra terminalis 'Green Sheen' / Green Sheen Japanese Pachysandra	11,660	4"pot	50% @ 6" oc

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN
MOODY•NOLAN

CONSULTANTS:

LANDSCAPE ARCHITECT:
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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

KEY PLAN

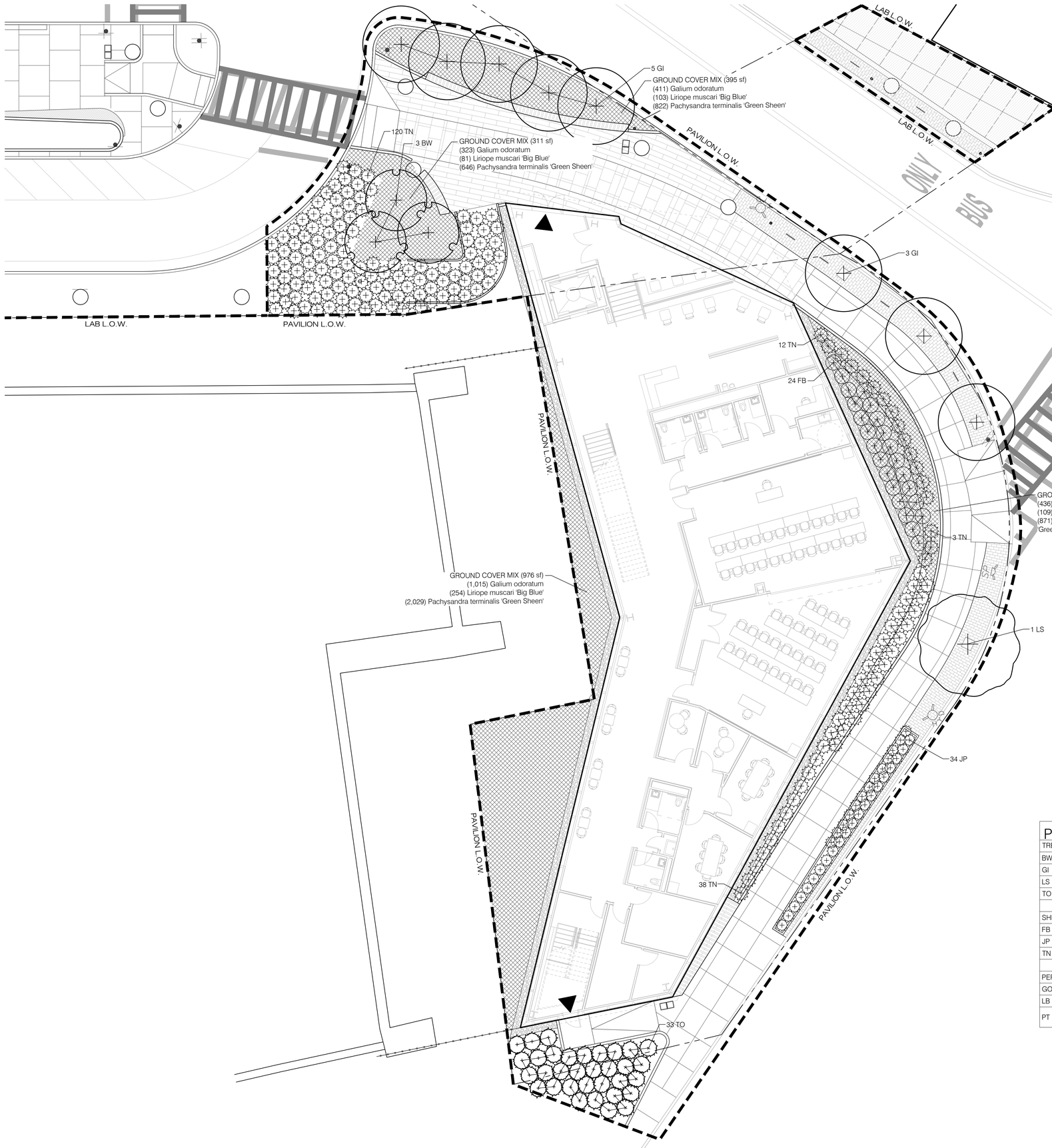
DRAWING TITLE:

PLANTING PLAN - LEVEL 10

Project No.	**21008**
Dwn/Chk By	**EB DD MF/ES**
Date	**10/03/2022**
Scale	**1" = 20'-0"**

DRAWING NUMBER:

L6.04



PLANTING LEGEND

- PAVILION L.O.W.
- PROPERTY LINE
- BUILDING OVERHANG
- CONC. UNIT PAVERS
- SITE FEATURE
- BIKE RACK
- BUILDING ENTRY
- TRASH AND RECYCLE RECEPTACLES
- SECURITY FENCE
- 7 / L8.01, 6 / L8.01 — GROUND COVER PLANTING
- 9 / L8.01 — TREE PLANTING IN SAND BASED STRUCTURAL SOIL
- 8 / L8.01 — TREE PLANTING IN PLANTING BED
- EVERGREEN SHRUB
- DECIDUOUS SHRUB
- EVERGREEN TREE
- DECIDUOUS TREE

PLANTING NOTES

1. ALL PLANT MATERIAL SHALL CONFORM TO THE MINIMUM GUIDELINES ESTABLISHED BY THE AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC. IN ADDITION, ALL PLANT MATERIAL FOR THE PROJECT SHALL BE OF SPECIMEN QUALITY.
2. ALL PLANTS TO BE BALLED AND BURLAPPED OR CONTAINER-GROWN, UNLESS OTHERWISE NOTED ON PLANT LIST.
3. ANY PROPOSED SUBSTITUTIONS OF PLANT SPECIES SHALL BE MADE WITH PLANTS OF EQUIVALENT OVERALL FORM, HEIGHT, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT AND CULTURE ONLY AS APPROVED BY THE LANDSCAPE ARCHITECT.
4. ALL PLANTS SHALL BE TAGGED AND APPROVED BY THE LANDSCAPE ARCHITECT AT THE NURSERY PRIOR TO DIGGING OR DELIVERY TO SITE. CONTRACTOR TO NOTIFY THE LANDSCAPE ARCHITECT TWO WEEKS IN ADVANCE OF TREE TAGGING TO SCHEDULE.
5. CONTRACTOR SHALL LOCATE AND VERIFY ALL EXISTING UTILITY LINES PRIOR TO PLANTING AND SHALL REPORT ANY CONFLICTS TO THE LANDSCAPE ARCHITECT.
6. STAKE LOCATION OF ALL PROPOSED PLANTING FOR APPROVAL BY THE LANDSCAPE ARCHITECT PRIOR TO THE COMMENCEMENT OF PLANTING. ALL PLANT LOCATIONS SHALL BE APPROVED IN WRITING BY L.A.
7. PLANT MATERIAL SHALL BEAR SAME RELATIONSHIP TO GRADE AS IT BORE TO PREVIOUS GRADE. PLANT MATERIAL SHALL ALSO BE IN THE SAME SOLAR ORIENTATION AS AT NURSERY. MATERIAL SHALL BE TAGGED ON THE NORTH SIDE OF THE PLANT TO FACILITATE PROPER ORIENTATION.
8. ALL PLANTING BEDS TO RECEIVE TWO INCHES (2") OR THREE INCHES (3") OF BARK MULCH PER SPECIFICATIONS.
9. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIAL IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING SHOWN ON ALL DRAWINGS.
10. LAYOUT OF ALL PLANT MATERIAL TO BE APPROVED BY LANDSCAPE ARCHITECT PRIOR TO PLANTING.

PLANT SCHEDULE

TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
BW	3	Betula populifolia 'Whitespire Sr.'	Whitespire Senior Gray Birch	3.5-4" cal. B&B	
GI	8	Gleditsia triacanthos inermis 'Suncole'	Sunburst Honey Locust	3.5-5" cal. B&B	
LS	1	Liquidambar styraciflua	Sweet Gum	2.5-3" cal. B&B	
TO	33	Thuja occidentalis	American Arborvitae	5-6` ht. B&B	
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
FB	24	Fothergilla gardenii `Blue Mist`	Blue Mist Dwarf Fothergilla	3 gal	
JP	37	Juniperus procumbens	Japanese Garden Juniper	3 gal	
TN	175	Taxus baccata 'Nana'	Dwarf English Yew	3 gal	
PERENNIALS	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
GO	2184	Galium odoratum	Pennsylvania Sedge	4" pot	6" o.c.
LB	546	Liriope muscari 'Big Blue'	Big Blue Lilyturf	4" pot	12" o.c.
PT	4367	Pachysandra terminalis 'Green Sheen'	Green Sheen Japanese Pachysandra	4" pot	6" o.c.

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects
460 Hillside Avenue, Suite J
Needham, Massachusetts 02494
781.858.3011

CONSULTANTS:

LANDSCAPE ARCHITECT:

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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH
N

KEY PLAN

DRAWING TITLE:

PLANTING PLAN

Project No.	2102
Dwn/Chk By	xx/xx
Date	10/03/22
Scale	1/8" = 1'-0"

DRAWING NUMBER:

L6.01

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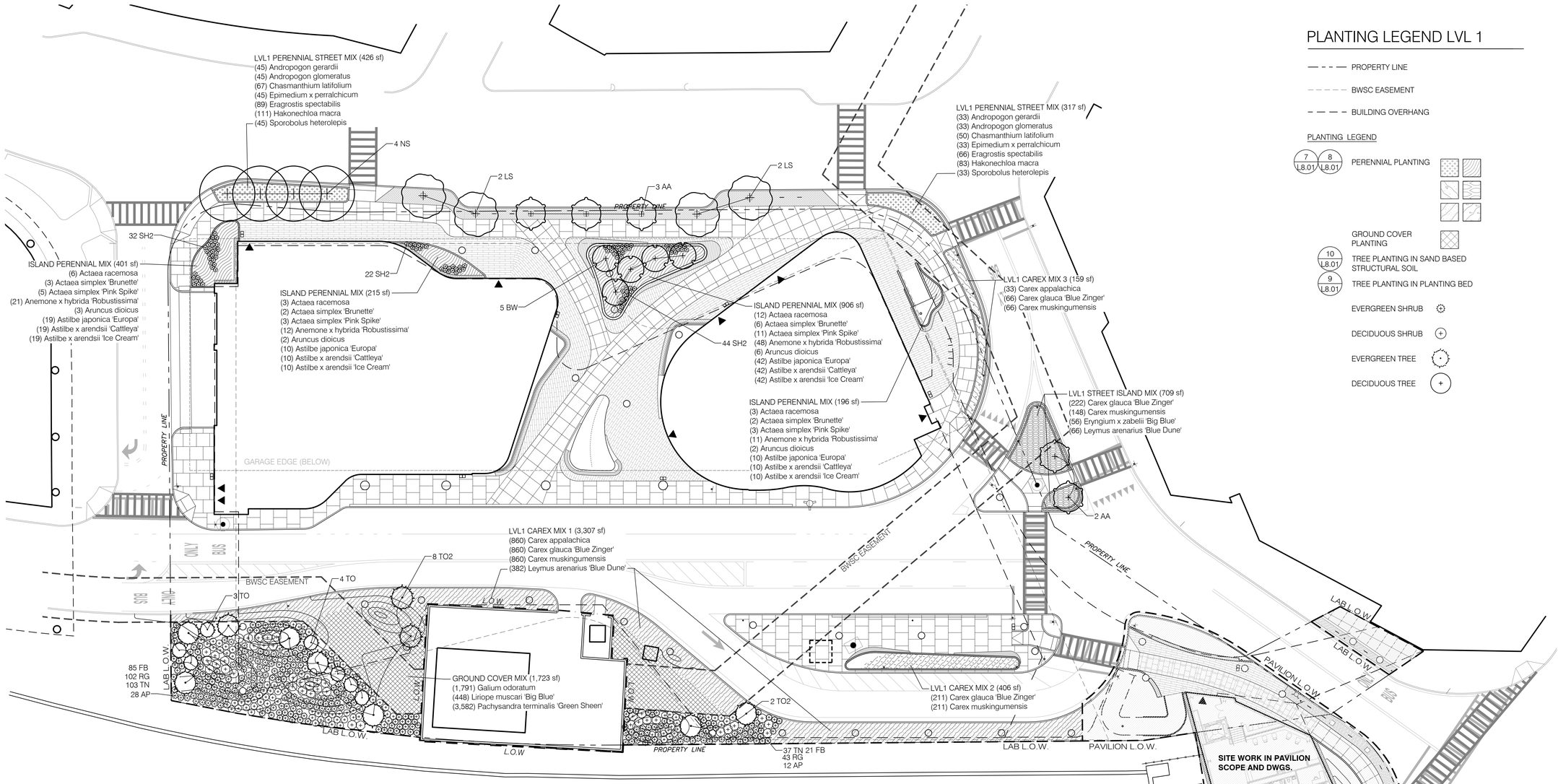

PLANTING LEGEND LVL 1

PROPERTY LINE

BWSC EASEMENT

BUILDING OVERHANG

PLANTING LEGEND

7 / L8.01 — 8 / L8.01 PERENNIAL PLANTING

GROUND COVER PLANTING

10 / L8.01 TREE PLANTING IN SAND BASED STRUCTURAL SOIL

9 / L8.01 TREE PLANTING IN PLANTING BED

EVERGREEN SHRUB

DECIDUOUS SHRUB

EVERGREEN TREE

DECIDUOUS TREE

PLANT_SCHEDULE

TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AA	5	Acer rubrum 'Autumn Flame'	Autumn Flame Red Maple	3-3.5" cal. B&B
BW	5	Betula populifolia 'Whitespire Sr.'	Whitespire Senior Gray Birch	3.5-4" cal. B&B
LS	4	Liquidambar styraciflua	Sweet Gum	2.5-3" cal. B&B
NS	4	Nyssa sylvatica	Tupelo	2.5-3" cal. B&B
TO	7	Thuja occidentalis	American Arborvitae	5-6` ht. B&B
TO2	10	Thuja occidentalis	American Arborvitae	12` ht. B&B

SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AP	40	Aesculus parviflora	Bottlebrush Buckeye	3 gal
FB	106	Fothergilla gardenii `Blue Mist`	Blue Mist Dwarf Fothergilla	3 gal
RG	145	Rhus aromatica 'Gro-Low'	Gro-Low Fragrant Sumac	3 gal
SH2	98	Sarcococca hookeriana humilis	Trailing Sweetbox	#3 pot
TN	140	Taxus baccata 'Nana'	Dwarf English Yew	3 gal

CONCEPT_PLANT_SCHEDULE

GROUND COVER MIX	2,691 sf			
Galium odoratum / Sweet Woodruff	2,797	4"pot	25% @ 6" oc	
Liriope muscari 'Big Blue' / Big Blue Lilyturf	700	4"pot	25% @ 12" oc	
Pachysandra terminalis 'Green Sheen' / Green Sheen Japanese Pachysandra	5,594	4"pot	50% @ 6" oc	
ISLAND PERENNIAL MIX	1,718 sf			
Actaea racemosa / Black Snakeroot	23	2 gal	20% @ 48" oc	
Actaea simplex 'Brunette' / Brunette Snakeroot	12	5 gal	10% @ 48" oc	
Actaea simplex 'Pink Spike' / Pink Spike Snakeroot	20	2 gal	10% @ 36" oc	
Anemone x hybrida 'Robustissima' / Robust Japanese Anemone	90	1 gal	20% @ 24" oc	
Aruncus dioicus / Goatsbeard	12	5 gal	10% @ 48" oc	
Astilbe japonica 'Europa' / Europa Japanese Astilbe	80	#1 pot	10% @ 18" oc	
Astilbe x arendsii 'Cattleya' / Cattleya Astilbe	80	#1 pot	10% @ 18" oc	
Astilbe x arendsii 'Ice Cream' / Ice Cream Astilbe	80	#1 pot	10% @ 18" oc	
LVL1 PERENNIAL STREET MIX	743 sf			
Andropogon gerardii / Big Bluestem	78	1 gal	10% @ 12" oc	
Andropogon glomeratus / Bushy Bluestem	78	1 gal	10% @ 12" oc	
Chasmanthium latifolium / Inland Sea Oats	116	1 gal	15% @ 12" oc	
Epimedium x perralchicum / Epimedium	78	1 gal	10% @ 12" oc	
Eragrostis spectabilis / Purple Lovegrass	155	1 gal	20% @ 12" oc	
Hakonechloa macra / Hancke Grass	194	1 gal	25% @ 12" oc	
Sporobolus heterolepis / Prairie Dropseed	78	1 gal	10% @ 12" oc	

LVL1 CAREX MIX 1
Carex appalachica / Appalachian Sedge
Carex glauca 'Blue Zinger' / Blue Zinger Sedge
Carex muskingumensis / Palm Sedge
Leymus arenarius 'Blue Dune' / Blue Dune Lyme Grass

LVL1 CAREX MIX 2
Carex glauca 'Blue Zinger' / Blue Zinger Sedge
Carex muskingumensis / Palm Sedge

LVL1 STREET ISLAND MIX
Carex glauca 'Blue Zinger' / Blue Zinger Sedge
Carex muskingumensis / Palm Sedge
Eryngium x zabelii 'Big Blue' / Big Blue Sea Holly
Leymus arenarius 'Blue Dune' / Blue Dune Lyme Grass

LVL1 CAREX MIX 3
Carex appalachica / Appalachian Sedge
Carex glauca 'Blue Zinger' / Blue Zinger Sedge
Carex muskingumensis / Palm Sedge

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET ARCHITECTURE & DESIGN
MOODY•NOLAN

CONSULTANTS:

LANDSCAPE ARCHITECT:
kmdg KLOPFER MARTIN DESIGN GROUP
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www.klopfermartin.com

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

KEY PLAN

DRAWING TITLE:

PLANTING PLAN - LEVEL 1

Project No.	**21008**
Dwn/Chk By	**EB DD MF/ES**
Date	**10/03/2022**
Scale	**1" = 20'-0"**

DRAWING NUMBER:

L6.01

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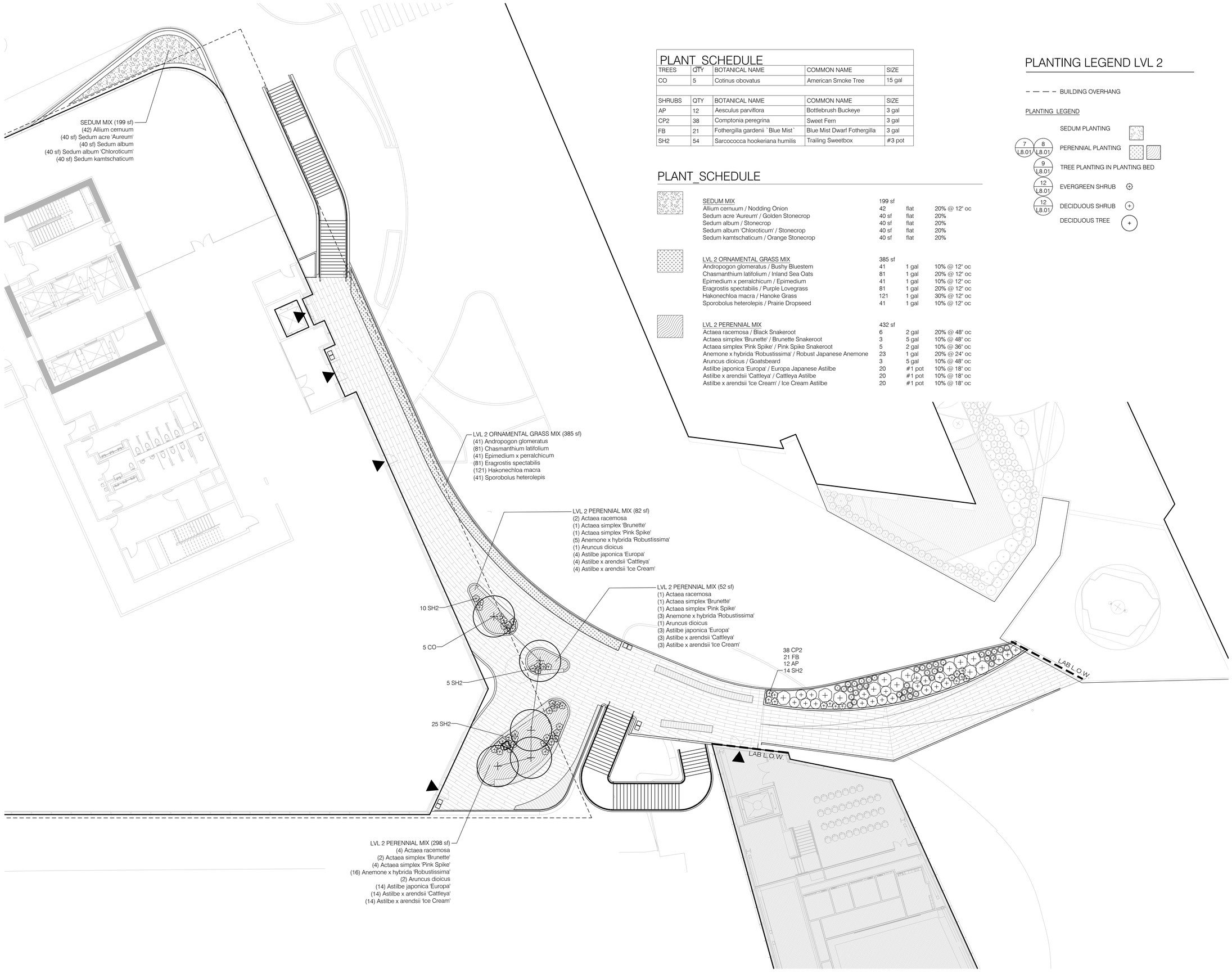

PLANT_SCHEDULE

TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
CO	5	Cotinus obovatus	American Smoke Tree	15 gal
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AP	12	Aesculus parviflora	Bottlebrush Buckeye	3 gal
CP2	38	Comptonia peregrina	Sweet Fern	3 gal
FB	21	Fothergilla gardenii ``Blue Mist``	Blue Mist Dwarf Fothergilla	3 gal
SH2	54	Sarcococca hookeriana humilis	Trailing Sweetbox	#3 pot

PLANT_SCHEDULE

SEDUM MIX	199 sf			
Allium cernuum / Nodding Onion	42	flat	20% @ 12" oc	
Sedum acre 'Aureum' / Golden Stonecrop	40 sf	flat	20%	
Sedum album / Stonecrop	40 sf	flat	20%	
Sedum album 'Chloroticum' / Stonecrop	40 sf	flat	20%	
Sedum kamtschaticum / Orange Stonecrop	40 sf	flat	20%	
LVL 2 ORNAMENTAL GRASS MIX	385 sf			
Andropogon glomeratus / Bushy Bluestem	41	1 gal	10% @ 12" oc	
Chasmanthium latifolium / Inland Sea Oats	81	1 gal	20% @ 12" oc	
Epimedium x perralchicum / Epimedium	41	1 gal	10% @ 12" oc	
Eragrostis spectabilis / Purple Lovegrass	81	1 gal	20% @ 12" oc	
Hakonechloa macra / Hanoke Grass	121	1 gal	30% @ 12" oc	
Sporobolus heterolepis / Prairie Dropseed	41	1 gal	10% @ 12" oc	
LVL 2 PERENNIAL MIX	432 sf			
Actaea racemosa / Black Snakeroot	6	2 gal	20% @ 48" oc	
Actaea simplex 'Brunette' / Brunette Snakeroot	3	5 gal	10% @ 48" oc	
Actaea simplex 'Pink Spike' / Pink Spike Snakeroot	5	2 gal	10% @ 36" oc	
Anemone x hybrida 'Robustissima' / Robust Japanese Anemone	23	1 gal	20% @ 24" oc	
Aruncus dioicus / Goatsbeard	3	5 gal	10% @ 48" oc	
Astilbe japonica 'Europa' / Europa Japanese Astilbe	20	#1 pot	10% @ 18" oc	
Astilbe x arendsii 'Cattleya' / Cattleya Astilbe	20	#1 pot	10% @ 18" oc	
Astilbe x arendsii 'Ice Cream' / Ice Cream Astilbe	20	#1 pot	10% @ 18" oc	

PLANTING LEGEND LVL 2

BUILDING OVERHANG

PLANTING LEGEND

SEDUM PLANTING

PERENNIAL PLANTING

TREE PLANTING IN PLANTING BED

EVERGREEN SHRUB

DECIDUOUS SHRUB

DECIDUOUS TREE

CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

LANDSCAPE ARCHITECT:

kmdg
KLOPFER MARTIN DESIGN GROUP
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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

KEY PLAN

DRAWING TITLE:

PLANTING PLAN - LEVEL 2

Project No.	**21008**
Dwn/Chk By	**EB DD MF/ES**
Date	**10/03/2022**
Scale	**1" = 20'-0"**

DRAWING NUMBER:

L6.02

ZONING CLASSIFICATION

ZONING DISTRICT: GENERAL INDUSTRIAL "I-2"
OVERLAY DISTRICT: RESTRICTED PARKING OVERLAY DISTRICT

DIMENSIONAL TABLE PER – GENERAL INDUSTRIAL "I-2"

MINIMUM LOT SIZE	NONE*
MINIMUM LOT AREA	NONE*
MINIMUM LOT WIDTH	NONE*
MAXIMUM FLOOR AREA RATIO	2.0
MAXIMUM BUILDING HEIGHT	NONE
MINIMUM USABLE OPEN SPACE	NONE*
MINIMUM FRONT YARD	NONE*
MINIMUM SIDE YARD	**
MINIMUM REAR YARD	12 FEET*
MINIMUM SETBACK OF PARAPET	(H+L)/6

* SEE SECTION 13-4 OF CITY OF BOSTON ZONING CODE
** SEE SECTION 19-5 OF CITY OF BOSTON ZONING CODE

BOUNDARY DESCRIPTIONS PER COMMITMENT NO. BLC-28182 ISSUED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 15, 2021.

PARCELS H AND H1 SHOWN ON AN UNRECORDED PLAN ENTITLED 'ALTA/NSPS LAND TITLE SURVEY, PARCEL H–#30TRILLING WAY, BOSTON, MASS.', DATED MARCH 17, 2021.

NOTE: PARCELS H AND H1 ARE MADE UP OF A PORTION OF VARIOUS CITY OF BOSTON ASSESSOR PARCELS. THUS, ATTACHED IS A COLOR-CODED PLAN OF ASSESSOR PARCELS AS SHOWN ON THE ASSESSOR'S MAP.

A. THE GREEN PARCEL SHOWN ON THE PLAN, ASSESSOR'S PARCEL ID: 0602678900.

B. THE BLUE PARCEL SHOWN ON THE PLAN, ASSESSOR'S PARCEL ID: 0602678000.

C. THE ORANGE PARCEL SHOWN ON THE PLAN, ASSESSOR'S PARCEL ID: 0602678500.

D. THE GOLD PARCEL SHOWN ON THE PLAN, ASSESSOR'S PARCEL ID: 0602681000.

E. THE PINK PARCEL SHOWN ON THE PLAN–NO ASSESSOR'S PARCEL ID. PART OF THIS PARCEL IS A PORTION OF PARCEL 66-E-3 FROM LAYOUT NO. 6968 WHICH IS A PORTION OF PARCEL E-8 THAT WAS TRANSFERRED BY THE MASSACHUSETTS DEPARTMENT OF HIGHWAYS TO THE MASSACHUSETTS TURNPIKE AUTHORITY (NOW THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION).

F. TWO GRAY PARCELS SHOWN ON THE PLAN, THE FIRST OF THESE BEING A PORTION OF PARCEL H ON THE ALTA PLAN IS A PORTION OF TRILLING WAY WHICH HAS BEEN DISCONTINUED. THERE IS NO ASSESSOR'S PARCEL ID FOR THIS PARCEL. THE SECOND GRAY PARCEL WHICH IS A PORTION OF PARCEL H–1 ON THE ALTA PLAN WAS A PORTION OF MASSPORT HAUL ROAD AND A PORTION OF ASSESSOR'S PARCEL ID:0602683000.

G. THE EASEMENT PARCELS 66-E-2, 66-E-3, AND 66-E-10 WERE TAKEN AS PART OF LAYOUT NO. 6968 AND ARE PERMANENT SUBSURFACE EASEMENTS. THESE WERE TRANSFERRED BY THE DEPARTMENT OF HIGHWAYS TO THE MASSACHUSETTS TURNPIKE AUTHORITY AND NOW MAKE UP A PORTION OF PARCEL E-8.

H. THE EASEMENT TO THE MASSACHUSETTS TURNPIKE AUTHORITY REGARDING THE SILVER LINE NOTED ABOVE, RUNS THROUGH PROPOSED PARCEL H SHOWN ON THE ALTA PLAN PROVIDED TO US BY YOUR OFFICE.

PARKING SUMMARY

117	STANDARD SPACES
5	HANDICAP SPACES
122	TOTAL SPACES

NOTES:

1. BENCH MARK INFORMATION:

   BENCH MARK USED:

   TBM–B: LEFT HYDRANT BOLT OVER MAIN OUTLET, LOCATED ON THE WESTERLY SIDE OF CONGRESS STREET APPROXIMATELY 130 FEET FROM THE SOUTHERLY SIDELINE OF NORTHERN AVENUE, AS SHOWN HEREON.
   ELEVATION = 17.86

   TBM–D: X–CUT SET ON A BOLT AT THE CORNER OF A STEEL FENCE ON THE SOUTHERLY SIDELINE OF SILVER LINE WAY APPROXIMATELY 115 FEET FROM THE WESTERLY SIDELINE OF MASSPORT HAUL ROAD.
   ELEVATION= 16.88

2. ELEVATIONS REFER TO BOSTON CITY BASE (BCB).

3. CONTOUR INTERVAL EQUALS ONE (1) FOOT.

4. THE PROPERTY SHOWN HEREON IS THE SAME PROPERTY DESCRIBED IN TITLE COMMITMENT NUMBER BLC–28182 ISSUED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 15, 2021.

5. THE SUBJECT PROPERTY HAS DIRECT ACCESS TO CONGRESS STREET, STARBOARD LANE, SILVER LINE WAY, AND PORT LANE, ALL MASSPORT SERVICE ROADS WITHOUT DEDICATED LAYOUTS.

6. BY GRAPHIC PLOTTING ONLY, THE PARCEL SHOWN HEREON LIES WITHIN ZONE "AE", AN AREA INSIDE OF THE 1% ANNUAL CHANCE FLOOD, BASE FLOOD ELEVATIONS DETERMINED; ZONE X" (SHADED)), AN AREA OF 0.2% ANNUAL CHANCE FLOOD; AND ZONE "X" (UNSHADED), AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (F.E.M.A.) FLOOD INSURANCE RATE MAP (F.I.R.M.) FOR SUFFOLK COUNTY, MASSACHUSETTS, MAP NUMBER 25025C0091J, CITY OF BOSTON COMMUNITY NUMBER 250286, PANEL NUMBER 0081, HAVING AN EFFECTIVE DATE OF MARCH 16, 2016.

7. ZONING INFORMATION AS SHOWN HEREON WAS NOT PROVIDED BY THE TITLE INSURER AS REQUIRED BY ITEM 6 (A OR B) OF TABLE "A" IN THE 2016 ALTA SURVEY REQUIREMENTS.

8. UNDER SECTION 5.E.IV OF THE STANDARDS, LOCATION OF SURFACE EVIDENCE OF UTILITIES IS INCLUDED IN EVERY ALTA/NSPS LAND TITLE SURVEY, INDEPENDENT OF ITEM 11 IN TABLE A.

9. THERE WAS NO OBSERVED EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS AT THE TIME OF SURVEY.

10. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO PROPOSED CHANGES IN STREET RIGHT OF WAY LINES.

11. PROPERTY LINE AND EASEMENT INFORMATION SHOWN PROVIDED BY MASSACHUSETTS PORT AUTHORITY IN A DRAWING NAMED "2442–05.DWG" RECEIVED ON 04/12/2021.

12. UTILITY INFORMATION SHOWN IS BASED ON BOTH A FIELD SURVEY AND PLANS OF RECORD. THE LOCATIONS OF UNDERGROUND PIPES AND CONDUITS HAVE BEEN DETERMINED FROM THE AFOREMENTIONED RECORD PLANS AND ARE APPROXIMATE ONLY. WE CANNOT ASSUME RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES THAT ARE OMITTED OR INACCURATELY SHOWN ON SAID RECORD PLANS, SINCE SUBSURFACE UTILITIES CANNOT BE VISIBLY VERIFIED. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED AND THE ACTUAL LOCATION OF SUBSURFACE STRUCTURES SHOULD BE DETERMINED IN THE FIELD. CALL, TOLL FREE, THE DIG SAFE CALL CENTER AT 1–888–344–7233 SEVENTY–TWO HOURS PRIOR TO EXCAVATION.

13. THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF FELDMAN GEOSPATIAL ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO FELDMAN GEOSPATIAL'S SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY FELDMAN GEOSPATIAL.

LEGEND

SEWER MANHOLE		BC	BOTTOM OF CURB
DRAIN MANHOLE		BCB	BIT. CONC. BERM
ELECTRIC MANHOLE		[X.X"]	BUILDING DIMENSION
TELEPHONE MANHOLE		BFA	BUILDING FOOTPRINT AREA
MBTA MANHOLE		BH	BUILDING HEIGHT
MANHOLE		BIT	BITUMINOUS
HYDRANT		BK	BACK
WATER SHUT OFF/WATER GATE		BOT=	BOTTOM ELEVATION
GAS SHUT OFF/GAS GATE		BT	BOTTOM TRAP
BOSTON WATER VALVE		BW	BOTTOM OF WALL
CATCH BASIN		BWSC	BOSTON WATER AND SEWER COMMISSION
GUY WIRE		(C)	CALCULATED
TRAFFIC CONTROL BOX		CC	CONCRETE CURB
UTILITY POLE		CHB	CHORD BEARING
LIGHT POLE		CHD	CHORD DISTANCE
WALK LIGHT		COL	COLUMN
ELECTRIC HANDHOLE		CONC	CONCRETE
BOLLARD		CRW	CONCRETE RETAINING WALL
POST		Δ=	DELTA ANGLE
SIGN		DH	DRILL HOLE
AREA DRAIN		ENT	ENTRANCE
PARKING METER		FD	FOUND
CLEAN OUT		FFE	FINISH FLOOR ELEVATION
BIKE RACK		FCC	FLUSH CONCRETE CURB
STONE BOUND FOUND WITH DRILL HOLE		FGC	FLUSH GRANITE CURB
OBSERVATION WELL		GD	GARAGE DOOR
STAND PIPE/SIAMESE CONNECTION		GRAN	GRANITE
UTILITY POLE W/ LIGHT		I=	INVERT ELEVATION
TRANSFORMER		HANDC.	HANDICAPPED
TRASH RECEPTACLE		L=	ARC LENGTH
DISABLED PARKING SPACE		LCC	LAND COURT CASE
DECIDUOUS TREE		LSA	LANDSCAPED AREA
CONIFEROUS TREE		MTL	METAL
EXCEPTION NUMBER LISTED IN TITLE COMMITMENT		NVP	NO VISIBLE PIPES
HANDICAP RAMP		OHD	OVERHEAD DOOR
GATE POST		OV	OVER
IRRIGATION CONTROL VALVE		PIL	PIN IN LEAD
CURB RETURN		POB	POINT OF BEGINNING
INDICATES COMMON OWNERSHIP		R=	RADIUS OR RIM ELEVATION
NUMBER OF PARKING SPACES		(R)	RECORD
PROPOSED SEWER EASEMENT		(REC)	RECORD
PROPOSED 20' WIDE FORCE MAIN SEWER EASEMENT		SB	STONE BOUND
PROPOSED SEWER EASEMENT		SQ. FT.	SQUARE FEET
BWSC EASEMENT 66-SS-14-BWSC		T=	TOP
BWSC EASEMENT 66-SS-15-BWSC		TBM	TEMPORARY BENCH MARK
BWSC EASEMENT 66-SS-16-BWSC		TC=	TOP OF CURB
24' WIDE BWSC SEWER EASEMENT		TH	THRESHOLD
20' WIDE SEWER EASEMENT		TOD	TOP OF DEBRIS
SILVER LINE WAY EASEMENT		TOW	TOP OF WATER
10' WIDE SEWER EASEMENT		TR=	CENTERLINE OF TROUGH
CENTRAL ARTERY TAKING EASEMENTS		TT=	TOP OF TRAP
		TW	TOP OF WALL
		VGC	VERTICAL GRANITE CURB
		WIF	WROUGHT IRON FENCE
		—C—	CABLE TELEVISION
		—CS—	COMBINED SEWER
		—D—	DRAIN
		—E—	ELECTRIC
		—G—	GAS
		—GW—	OVERHEAD GUY WIRE
		—FMC—	FORCE MAIN SEWER
		—M—	MBTA
		—OHW—	OVERHEAD WIRES
		—S—	SEWER
		—T—	TELEPHONE
		—W—	WATER
		S(ABD)	ABANDONED
		12"D(CI)	PIPE SIZE AND MATERIAL
		—CI—	CAST IRON
		—CPP—	CORRUGATED PLASTIC PIPE
		—FO—	FIBER OPTIC
		—PVC—	POLYVINYL CHLORIDE
		—RCP—	REINFORCED CONCRETE PIPE
			WROUGHT IRON FENCE

EXCEPTIONS FROM COVERAGE (SURVEY RELATED ONLY) SCHEDULE B, PART II, LISTED IN TITLE COMMITMENT NO. BLC–28182 ISSUED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 15, 2021.

(6) INTENTIONALLY OMITTED

(7) ORDER BY THE CITY OF BOSTON PUBLIC IMPROVEMENT COMMISSION FOR THE LAYOUT AND CONSTRUCTION OF TRILLING WAY AS A PUBLIC HIGHWAY AND BETTERMENT ASSESSMENTS SET FORTH THEREIN, DATED NOVEMBER 26, 1963, RECORDED WITH SAID DEEDS, BOOK 7808, PAGE 30. (TRILLING WAY HAS BEEN DISCONTINUED)

(8) ORDER BY THE CITY OF BOSTON PUBLIC IMPROVEMENT COMMISSION FOR THE LAYOUT AND CONSTRUCTION OF TRILLING WAY AS A PUBLIC HIGHWAY AND BETTERMENT ASSESSMENTS SET FORTH THEREIN, DATED OCTOBER 13, 1964, RECORDED WITH SAID DEEDS, BOOK 7897, PAGE 77. SEE PLAN NO. L–9391. (TRILLING WAY HAS BEEN DISCONTINUED)

(9) ORDER BY THE CITY OF BOSTON PUBLIC IMPROVEMENT COMMISSION FOR THE DISCONTINUANCE OF TRILLING WAY AS A PUBLIC WAY, DATED JANUARY 15, 2004, RECORDED WITH SAID DEEDS, BOOK 34225, PAGE 340 AND SHOWN ON PLAN RECORDED THEREWITH AND AS APPROXIMATELY SHOWN ON THE SURVEY. (AS SHOWN HEREON)

NOTE: TRILLING WAY IS NOT TAKEN IN FEE BY THE CITY OF BOSTON. THE FEE REMAINS IN MASSACHUSETTS PORT AUTHORITY. THE CITY OF BOSTON HAS DISCONTINUED THEIR PUBLIC WAY AS NOTED ABOVE.

(10) INTENTIONALLY OMITTED.

(11) INTENTIONALLY OMITTED.

(12) GRANT OF EASEMENT AND EASEMENT AGREEMENT BETWEEN MASSACHUSETTS PORT AUTHORITY AND BOSTON WATER AND SEWER COMMISSION, DATED SEPTEMBER 4, 1984, RECORDED WITH SAID DEEDS, BOOK 11142, PAGE 256 AND SHOWN ON PLAN RECORDED THEREWITH; AS AFFECTED BY LAYOUT NO. 6968 AND ORDER OF TAKING BY DEPARTMENT OF HIGHWAYS ACTING ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS, DATED JUNE 10, 1992, RECORDED WITH SAID DEEDS, BOOK 17568, PAGE 68 AND SHOWN ON PLAN RECORDED THEREWITH; (FOR BETTER VIEWING SEE LO 6968 ENCLOSED HEREWITH), AS FURTHER AFFECTED BY AMENDMENT #1 TO EASEMENT AGREEMENT, DATED DECEMBER 23, 2003, RECORDED WITH SAID DEEDS, BOOK 33545, PAGE 153, AS FURTHER AFFECTED BY AN AGREEMENT REGARDING CONSTRUCTION WITHIN EASEMENT DATED NOVEMBER 30, 2017, RECORDED WITH SAID DEEDS, BOOK 58898, PAGE 1 AND AS APPROXIMATELY SHOWN ON THE SURVEY. (AS SHOWN HEREON)

(13) INTENTIONALLY MOVED TO NOTE.

(14) INTENTIONALLY MOVED TO REQUIREMENTS.

(15) INTENTIONALLY OMITTED.

(16) SALE/MITIGATION AGREEMENT BETWEEN COMMONWEALTH OF MASSACHUSETTS, ACTING BY AND THROUGH ITS PUBLIC WORKS DEPARTMENT AND MASSACHUSETTS PORT AUTHORITY DATED OCTOBER 3, 1991, RECORDED WITH SAID DEEDS, BOOK 17133, PAGE 122, AS AFFECTED BY AN AFFIDAVIT UNDER MGL C. 183 §5B (IN AS MUCH AS IT AFFECTS PARCEL 66–E–3 OF SAID TAKING), DATED NOVEMBER 30, 2017, RECORDED WITH SAID DEEDS, BOOK 58898, PAGE 8. (NOT PLOTTABLE)

(17) WAIVER AND AGREEMENT BY AND BETWEEN MASSACHUSETTS PORT AUTHORITY AND MASSACHUSETTS DEPARTMENT OF HIGHWAYS FOR EMINENT DOMAIN TAKING OF COMMONWEALTH FLATS, SOUTH BOSTON, DATED MAY 20, 1992, RECORDED WITH SAID DEEDS, BOOK 17567, PAGE 268, AS AFFECTED BY A FIRST AMENDMENT TO WAIVER AND AGREEMENT, DATED JUNE 16, 1992, RECORDED WITH SAID DEEDS, BOOK 17567, PAGE 339 AS FURTHER AFFECTED BY AN AFFIDAVIT UNDER MGL C. 183, §5B (IN AS MUCH AS IT AFFECTS PARCEL 66–E–3 OF SAID TAKING), DATED NOVEMBER 30, 2017, RECORDED WITH SAID DEEDS, BOOK 58898, PAGE 8. (AS SHOWN HEREON)

EXCEPTIONS FROM COVERAGE CONTINUED.

(18) LAYOUT NO. 6968 AND ORDER OF TAKING BY DEPARTMENT OF HIGHWAYS ACTING ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS, DATED JUNE 10, 1992, RECORDED WITH SAID DEEDS, BOOK 17568, PAGE 68 AND SHOWN ON PLAN RECORDED THEREWITH, (FOR BETTER VIEWING SEE LO 6968 IN THE FILE), (PARCELS 66–1E 20; 66–1E–4; 66–E–2; 66–E–3; 66–E–10; EXISTING 24' WIDE SANITARY EASEMENT), AS AFFECTED BY AN ORDER OF TAKING BY DEPARTMENT OF HIGHWAYS ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS FOR EXTENSION OF TEMPORARY EASEMENTS, DATED SEPTEMBER 20, 1995, RECORDED WITH SAID DEEDS, BOOK 20045, PAGE 91, (PARCEL 66–TE–4 EXTENDED UNTIL DEC. 31, 1996), AS FURTHER AFFECTED BY AN AFFIDAVIT UNDER MGL C.183, §5B (IN AS MUCH AS IT AFFECTS PARCEL 66–E–3 OF SAID TAKING), DATED NOVEMBER 30, 2017, RECORDED WITH SAID DEEDS, BOOK 58898, PAGE 8 AND AS APPROXIMATELY SHOWN ON THE SURVEY.
(TEMPORARY CONSTRUCTION EASEMENTS HAVE EXPIRED) (AS SHOWN HEREON)

(19) ORDER OF TAKING BY DEPARTMENT OF HIGHWAYS ACTING ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS, DATED APRIL 26, 1995, RECORDED WITH SAID DEEDS, BOOK 19762, PAGE 46 AND SHOWN ON PLAN RECORDED THEREWITH AND AS APPROXIMATELY SHOWN ON THE SURVEY. (PARCELS 66–SS–14–BWSC; 66–SS–15–BWSC; 66–SS–16–BWSC) (AS SHOWN HEREON)

(20) EASEMENT GRANT AND TRANSFER BY DEPARTMENT OF HIGHWAYS ACTING ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS TO MASSACHUSETTS TURNPIKE AUTHORITY DATED DECEMBER 13, 1995, RECORDED WITH SAID DEEDS, BOOK 20226, PAGE 172 AND SHOWN ON PLAN RECORDED THEREWITH, (PARCEL E–8 ON SAID PLAN), AS AFFECTED BY SUPPLEMENT NO. 1 TO 1995 EASEMENT GRANT AND TRANSFER, DATED JULY 1, 1997, RECORDED WITH SAID DEEDS, BOOK 21971, PAGE 320, (AFFECTS PORTIONS OF PARCEL E–8 WHICH ARE NON–LOCUS), AS FURTHER AFFECTED BY SUPPLEMENT NO. 2 TO 1995 EASEMENT GRANT AND TRANSFER, DATED JULY 1, 1999, RECORDED WITH SAID DEEDS, BOOK 24091, PAGE 39 AND AS APPROXIMATELY SHOWN ON THE SURVEY. (AS SHOWN HEREON)

(21) ORDER OF TRANSFER THAT ALL PROPERTY HELD BY MASSACHUSETTS DEPARTMENT OF HIGHWAYS BE TRANSFERRED TO MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, DATED OCTOBER 28, 2009, RECORDED WITH SAID DEEDS, BOOK 45797, PAGE 65. (NOT PLOTTABLE)

(22) EASEMENT AGREEMENT BETWEEN MASSACHUSETTS PORT AUTHORITY AND MASSACHUSETTS BAY TRANSPORTATION AUTHORITY FOR SILVER LINE WAY, DATED MAY 21, 2015, RECORDED WITH SAID DEEDS, BOOK 54633, PAGE 330 AND SHOWN ON PLAN 255 OF 2015 AND AS APPROXIMATELY SHOWN ON THE SURVEY. EASEMENT AREA 3 AFFECTS LOCUS. (AS SHOWN HEREON)

(23) INTENTIONALLY MOVED TO NOTE.

(24) UTILITY CORRIDOR NO. 2 AS SHOWN ON SHEET 2 OF PLAN FOR LAYOUT NO. 6968. (AS SHOWN HEREON)

(25) EXISTING 10' WIDE SANITARY SEWER EASEMENT AS SHOWN ON SHEET 2 OF PLAN FOR LAYOUT NO. 6968. (AS SHOWN HEREON)

(26) RIGHTS OF OTHERS TO USE STARBOARD LANE, SILVER LINE WAY AND MASSPORT HAUL ROAD AS PORTIONS OF THESE WAYS ARE PART OF PARCELS H AND H–1 AS SHOWN ON THE ALTA PLAN PROVIDED. (AS SHOWN HEREON)

NOTE: THERE ARE NO DEDICATED LAYOUTS RECORDED FOR CONGRESS STREET, STARBOARD LANE, MASSPORT HAUL ROAD OR SILVER LINE WAY SHOWN ON THE ALTA PLAN. THESE STREETS ARE ALL LOCATED ON MASSACHUSETTS PORT AUTHORITY LAND.

NOTE: ALTHOUGH SPECIFICALLY EXCLUDED FROM THE COVERAGE OF THIS POLICY, THE FOLLOWING ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY:

A. ORDER OF CONDITIONS DEP FILE #6–272 BY THE BOSTON CONSERVATION COMMISSION DATED DECEMBER 7, 1984, RECORDED WITH SAID DEEDS, BOOK 11825, PAGE 101. (NOT LOCUS)

B. ORDER OF CONDITIONS BY THE BOSTON CONSERVATION COMMISSION, DEP FILE #006–1426, DATED APRIL 6, 2015, RECORDED WITH SAID DEEDS, BOOK 55023, PAGE 19, AS AFFECTED BY A CERTIFICATE OF COMPLIANCE DATED AUGUST 24, 2016, RECORDED WITH SAID DEEDS, BOOK 58333, PAGE 87. (NOT LOCUS)

PARCEL H BOUNDARY DESCRIPTION (PER SURVEY)

A CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF BOSTON, COUNTY OF SUFFOLK, AND THE COMMONWEALTH OF MASSACHUSETTS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT OF TANGENCY ON THE SOUTHERLY SIDE OF CONGRESS STREET, FORMING AN INTERSECTION WITH THE WESTERLY SIDE OF PORT LANE;

RUNNING S 84°52'01" E, A DISTANCE OF 31.45 FEET TO A POINT OF CURVATURE;

THENCE RUNNING BY A CURVE TO THE LEFT HAVING AN ARC LENGTH OF 25.00 FEET, A RADIUS OF 282.29 FEET, AND A DELTA ANGLE OF 05°04'27" TO A POINT OF TANGENCY;

THENCE RUNNING S 89°56'28" E, A DISTANCE OF 215.17 FEET TO A POINT OF CURVATURE;

THENCE RUNNING BY A CURVE TO THE RIGHT HAVING AN ARC LENGTH OF 56.66 FEET, A RADIUS OF 55.39 FEET, A DELTA ANGLE OF 58°36'47", A CHORD BEARING OF S 60°38'05" E, AND A CHORD DISTANCE OF 54.22 FEET TO A POINT OF NON–TANGENCY. THE PREVIOUS FOUR COURSES BY THE SOUTHERLY SIDE OF SAID CONGRESS STREET;

THENCE TURNING AND RUNNING S 22°11'09" E, A DISTANCE OF 127.05 FEET TO A POINT;

THENCE TURNING AND RUNNING S 55°26'48" E, A DISTANCE OF 150.82 FEET TO A POINT. THE PREVIOUS TWO COURSES BY THE WESTERLY SIDE SAID STARBOARD LANE AND SILVER LINE WAY;

THENCE TURNING AND RUNNING S 82°43'03" W, A DISTANCE OF 61.71 FEET TO A POINT OF NON–TANGENCY;

THENCE RUNNING BY A CURVE TO THE RIGHT HAVING AN ARC LENGTH OF 23.00 FEET, A RADIUS OF 1402.50 FEET, A DELTA ANGLE OF 00°56'23", A CHORD BEARING OF S 81°28'37" W, AND A CHORD DISTANCE OF 23.00 FEET TO A POINT OF NON–TANGENCY;

THENCE TURNING AND RUNNING S 89°54'39" W, A DISTANCE OF 237.44 FEET TO A POINT OF CURVATURE;

THENCE RUNNING BY A CURVE TO THE RIGHT HAVING AN ARC LENGTH OF 203.75 FEET, A RADIUS OF 945.00 FEET, A DELTA ANGLE OF 12°21'23", A CHORD BEARING OF N 83°54'44" W, AND A CHORD DISTANCE OF 203.36 FEET TO A POINT OF NON–TANGENCY. THE PREVIOUS THREE COURSES BEING BY THE NORTHERLY SIDELINE OF INTERSTATE 90;

THENCE TURNING AND RUNNING N 00°01'35" W, A DISTANCE OF 193.97 FEET TO A POINT OF CURVATURE;

THENCE RUNNING BY A CURVE TO THE RIGHT HAVING AN ARC LENGTH OF 50.00 FEET, A RADIUS OF 30.11 FEET, AND A DELTA ANGLE OF 95°09'34" TO THE POINT OF BEGINNING. THE PREVIOUS TWO COURSES BY THE EASTERLY SIDE OF PORT LANE

SAID PARCEL CONTAINING 96,776 SQUARE FEET OR 2.222 ACRES.

PARCEL H1 BOUNDARY DESCRIPTION (PER SURVEY)

A CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF BOSTON, COUNTY OF SUFFOLK, AND THE COMMONWEALTH OF MASSACHUSETTS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT OF NON–TANGENCY OF A CURVE FORMING THE INTERSECTION OF THE SOUTHWESTERLY SIDELINE OF SILVER LINE WAY AND THE NORTHWESTERLY SIDELINE OF MASSPORT HAUL ROAD. THENCE;

RUNNING S 35°36'55" W BY SAID MASSPORT HAUL ROAD, A DISTANCE OF 79.43 FEET TO A POINT;

THENCE TURNING AND RUNNING S 76°58'38" W, A DISTANCE OF 41.91 FEET TO A POINT;

THENCE TURNING AND RUNNING N 06°25'39" W, A DISTANCE OF 71.00 FEET TO A POINT;

THENCE TURNING AND RUNNING N 78°59'32" E, A DISTANCE OF 24.81 FEET TO A POINT;

THENCE TURNING AND RUNNING N 08°59'36" W, A DISTANCE OF 80.00 FEET TO A POINT;

THENCE TURNING AND RUNNING N 82°43'03" E, A DISTANCE OF 61.71 FEET TO A POINT ON SAID SILVER LINE WAY;

THENCE RUNNING BY SAID SILVER LINE WAY BY A CURVE TO THE RIGHT, HAVING AN ARC LENGTH OF 102.82 FEET, A RADIUS OF 60.30 FEET, A DELTA ANGLE OF 97°41'32", A CHORD BEARING OF S 13°59'58" E, AND A CHORD DISTANCE OF 90.81 FEET TO THE POINT OF BEGINNING.

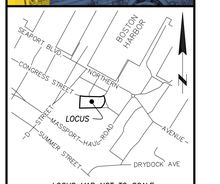
SAID PARCEL CONTAINING 11,515 SQUARE FEET.

FELDMAN GEOSPATIAL

BOSTON HEADQUARTERS
152 HAMPDEN STREET
BOSTON, MA 02119

WORCESTER OFFICE
27 MECHANIC STREET
WORCESTER, MA 01608

(617)357–9740
www.feldmangeo.com



LOCUS MAP NOT TO SCALE

TO: LQ PARCEL H LLC & MASSACHUSETTS PORT AUTHORITY & COMMONWEALTH LAND TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 5, 7(A), 7(B)(1), 8, 9, 11(A), 13, 14, 16, 17, 18, AND 19 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED ON MARCH 17, 2021.

FELDMAN GEOSPATIAL

DRAFT 08/11/2022

TIMOTHY R. AGURKIS, PLS — DATE
(MA# 52782)
TAGURKIS@FELDMANGEO.COM

ADDRESS:

PARCELS H & H1
#30 TRILLING WAY
BOSTON, MASS.

RESEARCH:	FIELD CHIEF:
PROJ MGR: TRA	APPROVED:
CALC: CEM	CADD: CEM
FIELD CHK:	CRD FILE: 17948

REVISIONS:

DRAWING NAME:

ALTA/NSPS
LAND TITLE SURVEY

DATE: MARCH 17, 2021

20 0 10 20 40
SCALE: 1"=20'

SHEET NO. 1 OF 1

FILENAME: \\NEWSTAFF\Feldman\PROJECTS\17900s\17948\DWG\17948-ALTA.dwg

FIGURES

Path: P:\10000-14999\13511.1 Massport H\Civil\CAD\GIS\Figure 1 - USGS Locus Map\Figure 1 - USGS Locus Map\Figure 1 - USGS Locus Map.aprx

Figure 1: USGS Locus Map

10/19/2022

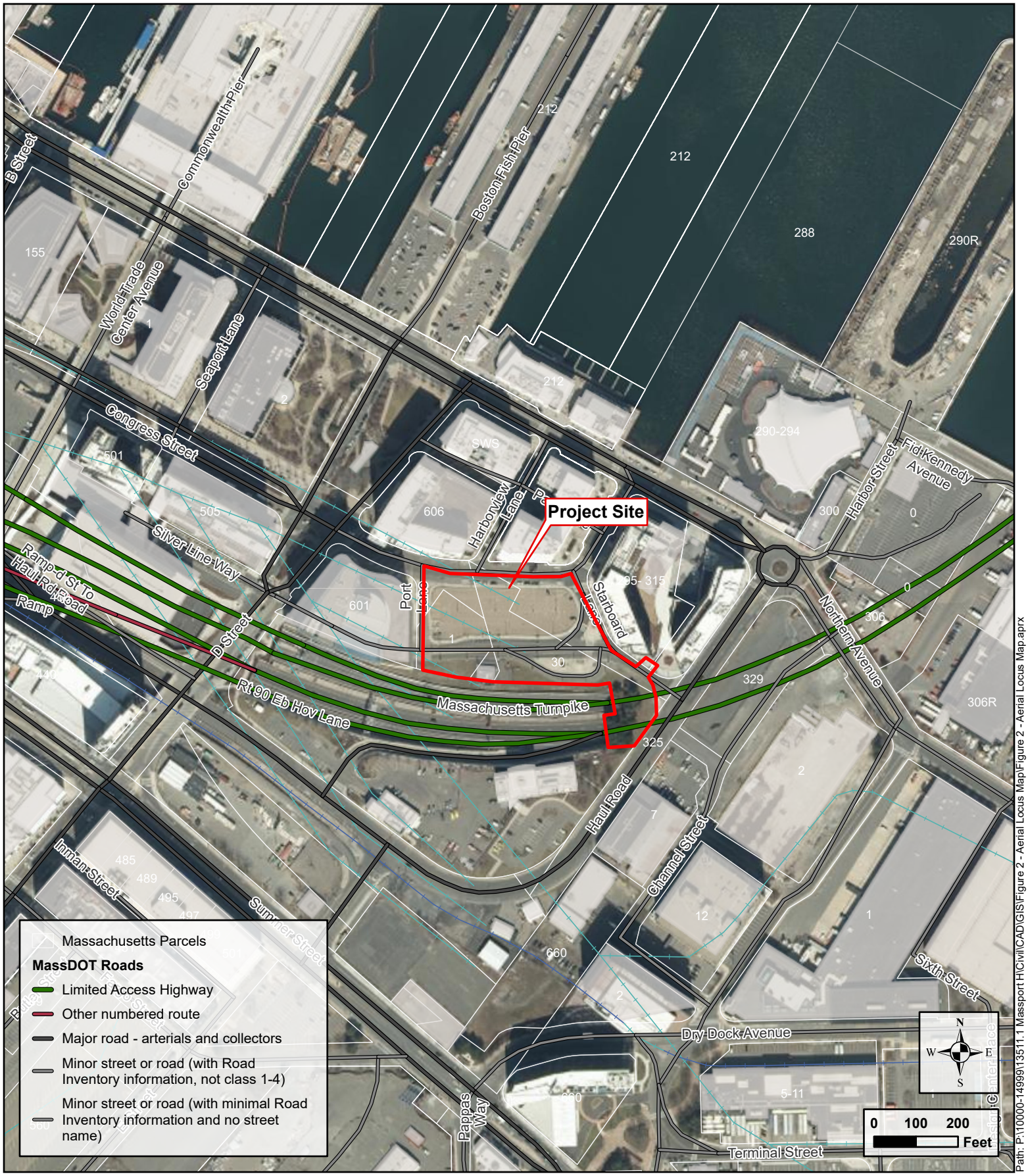
Seaport Circle

777 Congress Street, Boston MA 02210

Data Source: MassGIS, USGS

Nitsch Project #13511.1

Nitsch Engineering



Path: P:\10000-14999\13511.1 Massport H\Civil\CAD\GIS\Figure 2 - Aerial Locus Map\Figure 2 - Aerial Locus Map.aprx

Figure 2: Aerial Locus Map

10/19/2022

Seaport Circle

777 Congress Street, Boston MA 02210

Data Source: MassGIS

Nitsch Project #13511.1

Nitsch Engineering

Path: P:\10000-14999\13511.1 Massport H\Civil\CAD\GIS\Figure 3 - Natural Heritage and Endangered Species Program Map\Figure 3 - Natural Heritage and Endangered Species Program Map.aprx

Figure 3: Natural Heritage and Endangered Species Program Map

10/19/2022

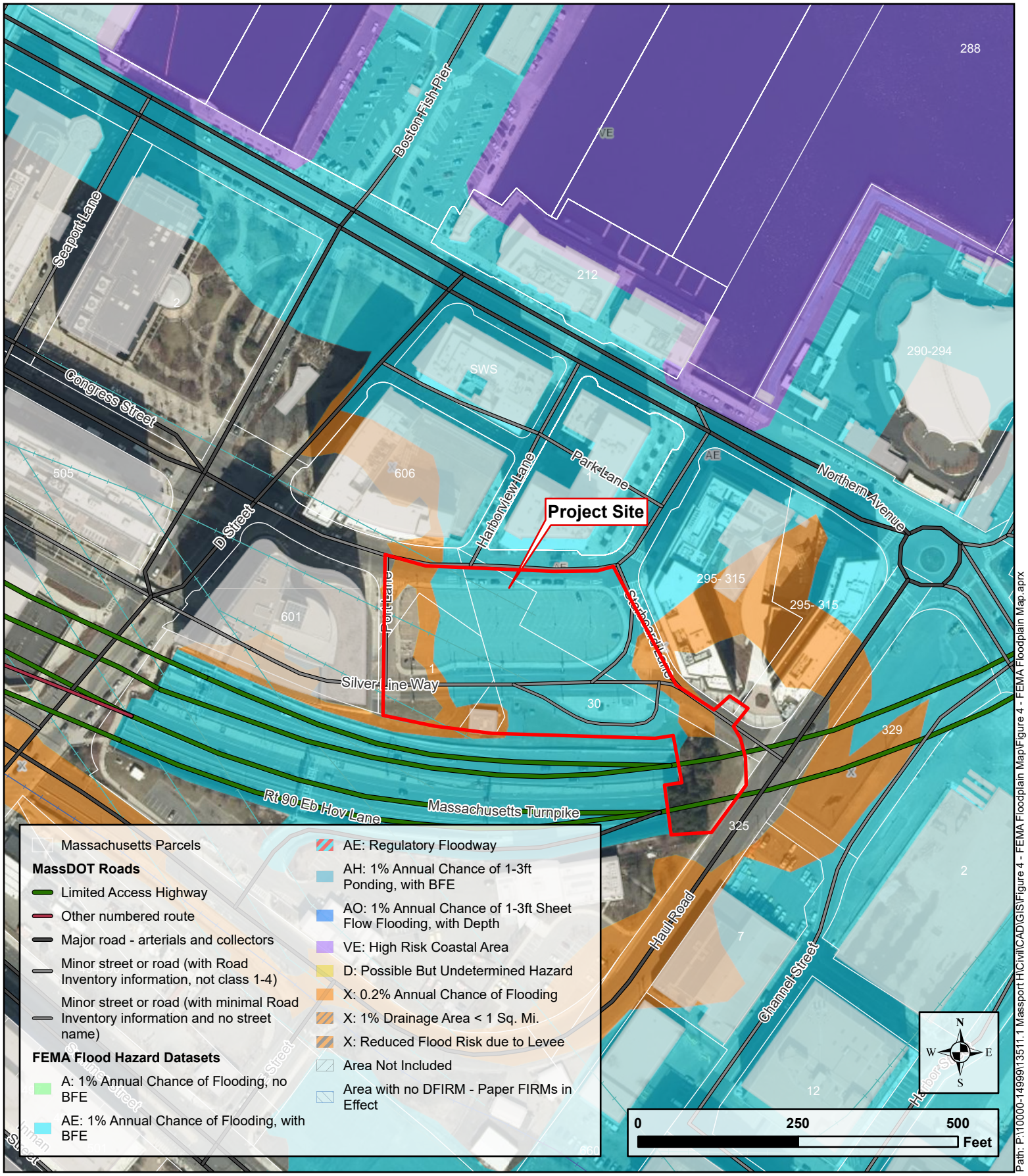
Seaport Circle

777 Congress Street, Boston MA 02210

Data Source: MassGIS

Nitsch Project #13511.1

Nitsch Engineering



Path: P:\10000-14999\13511.1 Massport H\Civil\CAD\GIS\Figure 4 - FEMA Floodplain Map\Figure 4 - FEMA Floodplain Map.aprx

Figure 4: FEMA Floodplain Map

10/19/2022

Seaport Circle

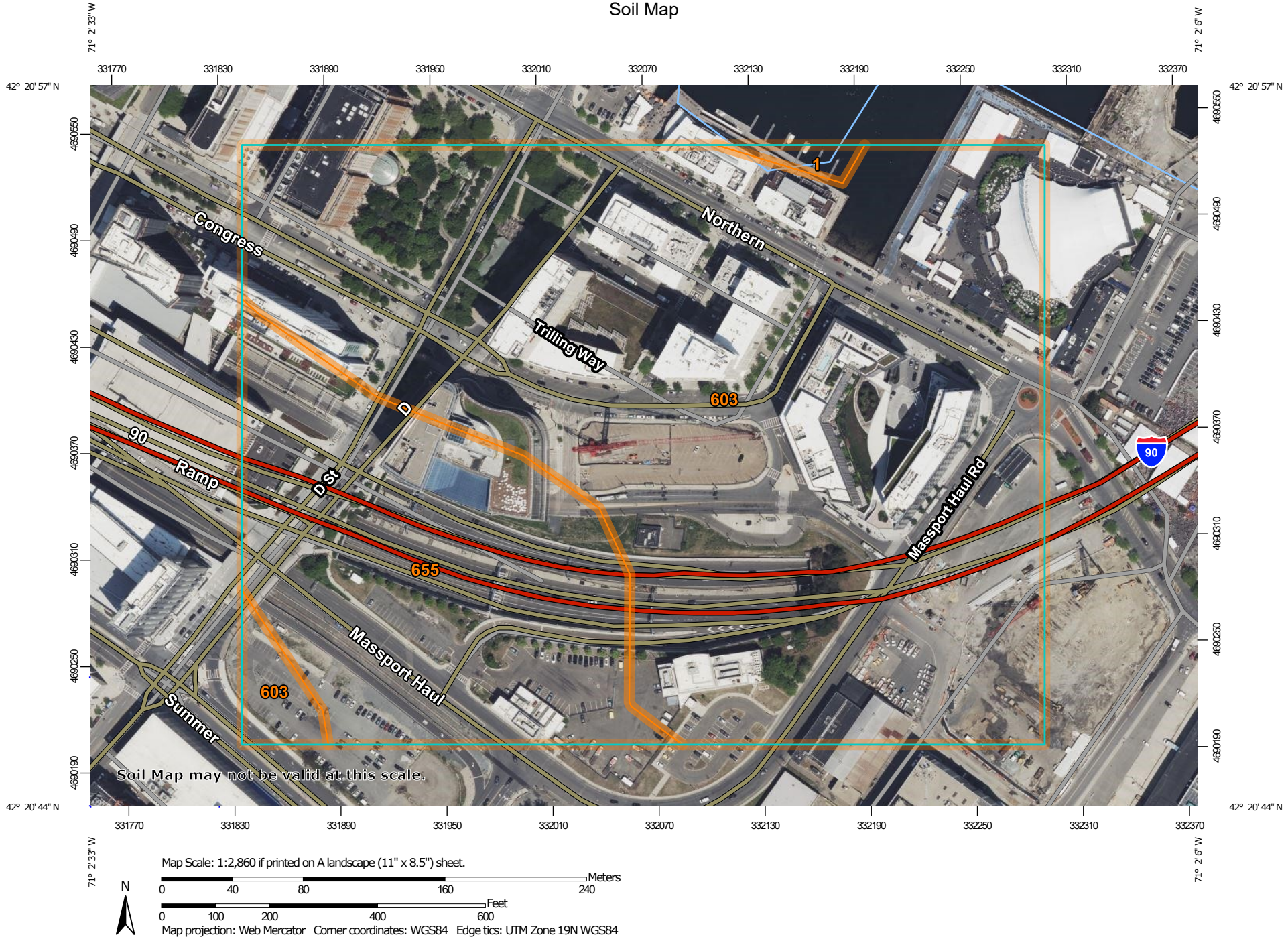
777 Congress Street, Boston MA 02210

Data Source: MassGIS

Nitsch Project #13511.1

Nitsch Engineering

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,860 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 17, Sep 3, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	0.2	0.6%
603	Urban land, wet substratum, 0 to 3 percent slopes	28.4	74.6%
655	Udorthents, wet substratum	9.4	24.8%
Totals for Area of Interest		**38.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

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DEMOLITION NOTES:

1. SITE PREPARATION AND DEMOLITION SHALL INCLUDE THOSE AREAS WITHIN THE LIMIT OF WORK LINE AS SHOWN ON THE CONTRACT DOCUMENTS.
2. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
3. CONSULT ALL OF THE DRAWINGS AND SPECIFICATIONS FOR COORDINATION REQUIREMENTS BEFORE COMMENCING DEMOLITION.
4. THE CONTRACTOR SHALL COORDINATE SITE DEMOLITION EFFORTS WITH ALL TRADES THAT MAY BE AFFECTED BY THE WORK.
5. ALL ITEMS REQUIRING REMOVAL SHALL BE REMOVED TO FULL DEPTH TO INCLUDE BASE MATERIAL AND FOOTINGS OR FOUNDATIONS AS REQUIRED TO FACILITATE CONSTRUCTION, AND LEGALLY DISPOSED OF OFFSITE BY CONTRACTOR.
6. UTILITY PIPES DESIGNATED TO BE ABANDONED IN PLACE SHALL BE PLUGGED AT THEIR ENDS WITH WATERTIGHT BRICK MASONRY OR CEMENT MORTAR WITH A MINIMUM THICKNESS OF 8 INCHES.
7. UTILITY PIPES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE COMPLETE REMOVAL AND DISPOSAL OF THE ENTIRE LENGTH OF PIPE AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN THE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
8. UTILITY STRUCTURES DESIGNATED TO BE ABANDONED IN PLACE SHALL HAVE THEIR CAST IRON CASTINGS REMOVED AND DISPOSED, INLET AND OUTLET PIPES PLUGGED, THE BOTTOM OF THE STRUCTURES SHALL BE BROKEN, THE VOID OF THE STRUCTURES SHALL BE BACKFILLED AND COMPACTED TO 95% WITH ORDINARY BORROW OR FLOWABLE FILL, AND THE TOP OF THE STRUCTURE SHALL BE REMOVED SO THAT IT IS AT LEAST 36 INCHES BELOW FINISH GRADE.
9. UTILITY STRUCTURES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE REMOVAL AND DISPOSAL OF CAST IRON CASTINGS, PLUGGING OF INLET AND OUTLET PIPES, REMOVAL OF THE STRUCTURE, AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN HE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
10. ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFFSITE.
11. AT ALL LOCATIONS WHERE EXISTING CURBING, CONCRETE PAVEMENT OR BITUMINOUS CONCRETE ROADWAY ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE.
12. EXTEND DESIGNATED LIMIT OF WORK AS NECESSARY TO ACCOMPLISH ROUGH GRADING, EROSION CONTROL, TREE PROTECTION, AND SITE WORK AS REQUIRED BY THESE DRAWINGS AND SPECIFICATIONS.
13. THE CONTRACTOR SHALL REMOVE FROM THE SITE ALL RUBBISH AND DEBRIS FOUND THEREON. STORAGE OF SUCH MATERIALS ON THE PROJECT SITE WILL NOT BE PERMITTED. THE CONTRACTOR SHALL LEAVE THE SITE IN SAFE, CLEAN, AND LEVEL CONDITION UPON COMPLETION OF THE SITE DEMOLITION WORK.
14. REMOVE AND STOCKPILE ALL EXISTING SITE LIGHTS, BENCHES, TRASH RECEPTACLES, TRAFFIC SIGNS, GRANITE CURB, AND OTHER SITE IMPROVEMENTS WITHIN LIMIT OF WORK LINE UNLESS OTHERWISE NOTED.
15. THE CONTRACTOR SHALL REMOVE FROM THE AREA OF CONSTRUCTION PAVEMENT, CONCRETE, CURBING, POLES AND FOUNDATIONS, ISLANDS, TREE BERMS AND OTHER FEATURES WITHIN THE LIMITS OF CONSTRUCTION AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION WHETHER SPECIFIED ON THE DRAWINGS OR NOT.

BWSC & CONTRACTOR NOTES:

1. THE ESTIMATED SANITARY SEWAGE DISCHARGE IS 49,977 GALLONS PER DAY (GPD). THIS ESTIMATE IS BASED ON 310 C.M.R. 15.000 THE STATE ENVIRONMENTAL CODE, TITLE 5: STANDARD REQUIREMENTS FOR THE SITING, CONSTRUCTION, INSPECTION, UPGRADE AND EXPANSION OF ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS AND FOR THE TRANSPORT AND DISPOSAL OF SEPTAGE.
2. THE ESTIMATED DAILY WATER USE IS 54,975 GPD BASED ON THE ESTIMATED SANITARY SEWAGE DISCHARGE WITH A 10% PEAKING FACTOR. THE PEAK DOMESTIC FLOW BASED ON FIXTURE COUNTS IS APPROXIMATELY XX GPM [FROM MEP].
3. TWO XXXX" COMPOUND WATER METERS WILL BE EITHER NEPTUNE OR ELSTER AMCO COMPOUND TYPE METERS. THE METERS MUST BE PURCHASED BY THE CONTRACTOR. A METER TRANSMITTER UNIT (MTU) SHALL BE SUPPLIED BY THE COMMISSION AT THE OWNER'S EXPENSE. A FEE OF $325/MTU WILL BE PAID TO THE COMMISSION AT THE TIME OF FILING THE GENERAL SERVICE APPLICATION.
4. BACKWATER VALVES SHALL BE PROVIDED BY THE PLUMBER AT ALL GRAVITY SANITARY SEWER AND STORM DRAIN CONNECTIONS FOR ANY FIXTURE LOCATED AT AN ELEVATION BELOW THE TOP OF THE SEWER OR DRAIN MANHOLE.
5. THE CONTRACTOR SHALL NOTIFY THE BWSC CROSS-CONNECTION DEPARTMENT AT 617-989-7283 ONCE BACKWATER VALVES ARE INSTALLED FOR BWSC INSPECTION.
6. DYE TESTING SHALL BE PERFORMED ON NEW STORM DRAIN AND SANITARY SEWER CONNECTIONS AFTER INSTALLATION IS COMPLETE. DYE TESTS SHALL BE WITNESSED BY THE BWSC.
7. A PREREQUISITE FOR FILING A GENERAL SERVICE APPLICATION WITH THE BWSC FOR NEW CONSTRUCTION IS THE ROUGH CONSTRUCTION SIGN-OFF DOCUMENT FROM THE CITY OF BOSTON'S INSPECTIONAL SERVICES DEPARTMENT.
8. AN AS-BUILT PLAN (AUTOCAD 2016 OR EARLIER RELEASE) SHALL BE PROVIDED BY THE CONTRACTOR AND ENDORSED BY A CIVIL ENGINEER OR PROFESSIONAL LAND SURVEYOR SHOWING THE LOCATION, DEPTH, AND INVERT OF EVERY BEND, FITTING, VALVE, CLEANOUT AND ANCHOR. THE AS-BUILT DRAWING SHALL BE SUBMITTED TO THE BOSTON AND WATER SEWER COMMISSION FOR REVIEW AND APPROVAL.
9. WATER SHUT DOWN SHALL BE COORDINATED WITH BWSC WATER OPERATIONS, (617) 989-7276, 24 HOURS NOTICE REQUIRED.
10. PROVIDE "DON'T DUMP" PLAQUES AT ALL CATCH BASIN AND DRAIN INLET LOCATIONS. "DON'T DUMP" PLAQUES TO BE PURCHASED FROM BWSC.
11. THE CONTRACTOR SHALL PURCHASE THE NEW HYDRANT(S) FROM THE BWSC. THE CONTRACTOR SHALL PURCHASE THE HYDRANT(S) FROM THE COMMISSION WHEN FILING THE GENERAL SERVICE APPLICATION.
12. EXISTING WATER METER(S) TO BE REMOVED OR REPLACED SHALL BE RETURNED TO BWSC.
13. THE CONTRACTOR SHALL VIDEO INSPECT THE EXISTING 24"/36"/48" BWSC DRAIN MAIN IN MASSPORT HAUL ROAD PRIOR TO CONSTRUCTION AND AFTER CONSTRUCTION IS COMPLETE AND SUBMIT TO BWSC AND NITSCH ENGINEERING FOR REVIEW. THE INSPECTION SOFTWARE SHALL BE CAPABLE OF EXPORTING DIGITAL INSPECTION LOG DATA INTO AN MSACCESS DATABASE IN THE PIPELINE ASSESSMENT AND CERTIFICATION PROGRAM (PACP) STANDARD EXCHANGE FORMAT. THE INSPECTION SOFTWARE CODING SYSTEM SHALL BE PACP CERTIFIED (LATEST EDITION) AS PER THE NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES (NASSCO). THE SOFTWARE SHALL BE EQUIPPED WITH ALL MODULES NECESSARY FOR PACP INSPECTIONS AND SCORING. THE CONTRACTOR SHALL COORDINATE DIRECTLY WITH BWSC TO DETERMINE AN APPROVED VIDEO INSPECTION COMPANY AND DELIVERABLE.

EROSION AND SEDIMENT CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS" PREPARED BY DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF RESOURCE PROTECTION, AND THE CURRENT NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES.
2. MEANS OF EROSION AND SEDIMENT PROTECTION AS NOTED ON THE DRAWINGS INDICATE MINIMUM RECOMMENDED PROVISIONS. THE CONTRACTOR IS RESPONSIBLE FOR FINAL SELECTION AND PLACEMENT OF EROSION AND SEDIMENTATION CONTROLS BASED ON ACTUAL SITE CONDITIONS AND CONSTRUCTION CONDITIONS. ADDITIONAL MEANS OF PROTECTION SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED FOR CONTINUED OR UNFORESEEN EROSION PROBLEMS, OR AS DIRECTED BY CONTROLLING MUNICIPAL AUTHORITIES, AT NO ADDITIONAL EXPENSE TO THE OWNER.
3. AN EROSION CONTROL BARRIER SHALL BE INSTALLED ALONG THE EDGE OF PROPOSED DEVELOPMENT AS INDICATED IN THE PLAN PRIOR TO COMMENCEMENT OF DEMOLITION OR CONSTRUCTION OPERATIONS.
4. SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF AND DURING ALL PHASES OF CONSTRUCTION AND BE CONSTRUCTED PRIOR TO AND IMMEDIATELY AFTER ANY GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL ON THE SITE.
5. AFTER ANY SIGNIFICANT RAINFALL (GREATER THAN 0.25 INCHES OF RAINFALL WITHIN 24 HOURS), SEDIMENT CONTROL STRUCTURES SHALL BE INSPECTED FOR INTEGRITY. ANY DAMAGE SHALL BE CORRECTED IMMEDIATELY.
6. PERIODIC INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL STRUCTURES SHALL BE PROVIDED TO ENSURE THAT THE INTENDED PURPOSE IS ACCOMPLISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SEDIMENT LEAVING THE LIMIT OF WORK. SEDIMENT CONTROL MEASURES SHALL BE IN WORKING CONDITION AT THE END OF EACH WORKING DAY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING SEDIMENT FROM ENTERING ANY STORM DRAINAGE SYSTEM AND FROM BEING CONVEYED TO ANY WETLAND RESOURCE AREA, PUBLIC WAYS, ABUTTING PROPERTY, OR OUTSIDE OF THE PROJECT LIMITS.
8. THE CONTRACTOR SHALL PROTECT ALL DRAINAGE SWALES AND GROUND SURFACES WITHIN THE LIMIT OF WORK FROM EROSIVE CONDITIONS. STRAW BALE, CRUSHED STONE OR EQUIVALENT CHECK DAMS ARE TO BE PROVIDED AT A MAXIMUM OF TWO HUNDRED (200) FOOT SPACING, OR LESS AS SITE-SPECIFIC CONDITIONS WARRANT, WITHIN ALL DRAINAGE SWALES AND DITCHES AND AT UPSTREAM SIDES OF ALL DRAINAGE INLETS.
9. ALL STOCK PILES SHALL BE PROTECTED AND LOCATED A MINIMUM OF 100' FROM EXISTING WETLAND RESOURCE AREAS & WITHIN THE LIMIT OF WORK.
10. ANY SEDIMENT TRACKED ONTO PAVED AREAS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.
11. ALL SEDIMENT RETAINED BY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE LEGALLY DISPOSED OF OFFSITE.
12. TEMPORARY DIVERSION DITCHES, PERMANENT DITCHES, CHANNELS, EMBANKMENTS, AND ANY DENUDED SURFACE THAT WILL BE EXPOSED FOR A PERIOD OF 14 CALENDAR DAYS OR MORE SHALL BE CONSIDERED CRITICAL VEGETATION AREAS. THESE AREAS SHALL BE STABILIZED/PROTECTED WITH APPROPRIATE EROSION CONTROL MATTING OR OTHER EROSION CONTROL METHODS.
13. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS DIRECTED BY THE PERMITTING AUTHORITY OR OWNER.
14. THE CONTRACTOR SHALL USE TEMPORARY SEEDING, MULCHING, OR OTHER APPROVED STABILIZATION MEASURES TO PROTECT EXPOSED AREAS DURING PROLONGED CONSTRUCTION OR OTHER LAND DISTURBANCE. STOCKPILES THAT WILL BE EXPOSED FOR LONGER THAN 14 DAYS SHALL BE STABILIZED.
15. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL EROSION AND SEDIMENT CONTROLS AT THE COMPLETION OF SITE CONSTRUCTION, BUT ONLY WHEN DIRECTED BY THE CITY OF BOSTON CONSERVATION AGENT. STABILIZE OR SEED BARE AREAS LEFT AFTER EROSION CONTROL REMOVAL.

EARTH MOVING AND GRADING NOTES:

1. ALL TOPSOIL ENCOUNTERED WITHIN THE WORK AREA SHALL BE STRIPPED TO ITS FULL DEPTH AND STOCKPILED FOR REUSE. EXCESS TOPSOIL SHALL BE REMOVED FROM THE SITE UNLESS OTHERWISE DIRECTED BY THE OWNER. TOPSOIL PILES SHALL REMAIN SEGREGATED FROM EXCAVATED SUBSURFACE SOIL MATERIALS.
2. GRADES WITHIN HANDICAP PARKING SPACES AND ACCESS AISLES SHALL NOT EXCEED 1.5% IN ANY DIRECTION.
3. CROSS SLOPES OF ALL PEDESTRIAN WALKS SHALL NOT EXCEED 1.5%.
4. RUNNING SLOPE OF ALL PEDESTRIAN WALKS SHALL NOT EXCEED 4.5%, UNLESS OTHERWISE NOTED.
5. THE CONTRACTOR SHALL EXERCISE CAUTION IN ALL EXCAVATION ACTIVITY DUE TO POSSIBLE EXISTENCE OF UNRECORDED UTILITY LINES.
6. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MINIMUM OF 1% UNLESS OTHERWISE NOTED.
7. PROVIDE POSITIVE DRAINAGE AWAY FROM FACE OF BUILDINGS AT ALL LOCATIONS.
8. PITCH EVENLY BETWEEN CONTOUR LINES AND BETWEEN SPOT GRADES. SPOT GRADE ELEVATIONS TAKE PRECEDENCE OVER CONTOUR LINES.
9. ALL PROPOSED TOP OF CURB ELEVATIONS ARE SIX INCHES (6") ABOVE BOTTOM OF CURB ELEVATIONS UNLESS OTHERWISE NOTED. ALL PROPOSED TOP OF CAPE COD BERM ELEVATIONS ARE FOUR INCHES (4") ABOVE BOTTOM OF CURB ELEVATION UNLESS OTHERWISE NOTED.
10. THE CONTRACTOR SHALL BLEND NEW GRADING SMOOTHLY INTO EXISTING GRADING AT LIMITS OF GRADING.
11. WHERE NEW PAVING MEETS EXISTING PAVING, MEET LINE AND GRADE OF EXISTING PAVING WITH SMOOTH TRANSITION BETWEEN EXISTING AND NEW SURFACES.
12. THE CONTRACTOR SHALL VERIFY EXISTING GRADES IN THE FIELD AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
13. PITCH TOPS OF ALL WALLS AT ONE-EIGHTH INCH (1/8") PER FOOT FROM BACK OF WALL TO FACE OF WALL.
14. SURPLUS MATERIALS SHALL BE REMOVED FROM THE SITE UNLESS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE. REFER TO EARTHWORK SPECIFICATIONS.
15. ANY AREAS OUTSIDE OF THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED BY THE CONTRACTOR TO THE PRE-CONSTRUCTION CONDITION/GRADE AT NO COST TO THE OWNER.
16. EXCAVATION REQUIRED WITHIN PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO OWNER.

GENERAL NOTES:

1. TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING SITE FEATURES WERE OBTAINED FROM A PLAN ENTITLED "ALTA/NSPS LAND TITLE SURVEY PARCEL H-#30 TRILLING WAY BOSTON, MASS.", PREPARED BY FELDMAN LAND SURVEYORS, DRAFT DATED 04-22-2021.
2. FLOODPLAIN INFORMATION WAS OBTAINED FROM THE FLOOD INSURANCE RATE MAP (FIRM) NO. 25025C0081J. THE SITE IS IN ZONES AE AND X.
3. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82, SECTION 40, AS AMENDED, WHICH STATES THAT NO ONE MAY EXCAVATE IN THE COMMONWEALTH OF MASSACHUSETTS EXCEPT IN AN EMERGENCY WITHOUT 72 HOURS NOTICE, EXCLUSIVE OF SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS, TO NATURAL GAS PIPELINE COMPANIES, AND MUNICIPAL UTILITY DEPARTMENTS THAT SUPPLY GAS, ELECTRICITY, TELEPHONE, OR CABLE TELEVISION SERVICE IN OR TO THE CITY OR TOWN WHERE THE EXCAVATION IS TO BE MADE. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1-888-DIG-SAFE.
4. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82A, ALSO REFERRED TO AS JACKIE'S LAW, AS DETAILED IN SECTION 520 CMR 14.00 OF THE CODE OF MASSACHUSETTS REGULATIONS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS AND SAFETY CODES IN THE CONSTRUCTION OF ALL IMPROVEMENTS.
6. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND CONTACTING THE CONTROLLING AUTHORITIES AND/OR UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THEIR LINES. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND NITSCH ENGINEERING. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENGINEER OR OWNER'S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.
8. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
9. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENTS TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER'S REPRESENTATION IMMEDIATELY.
11. THE CONTRACTOR SHALL CONDUCT ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ESTABLISHMENT AND USE OF ALL VERTICAL AND HORIZONTAL CONSTRUCTION CONTROLS.
13. ELEVATIONS REFER TO BOSTON CITY BASE(BCB).
14. THE CONTRACTOR SHALL COMPLY WITH THE ORDER OF CONDITIONS DATED XXXX XX, XXXX AND ISSUED BY THE XXXX CONSERVATION COMMISSION (DEP #XXX-XXX).
15. FOR SOIL INFORMATION REFER TO GEOTECHNICAL REPORT.

UTILITY NOTES:

1. ALL UTILITY CONNECTIONS ARE SUBJECT TO THE APPROVAL OF, AND GRANTING OF PERMITS BY, THE LOCAL MUNICIPALITY. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL PERMITS AND APPROVALS RELATED TO UTILITY WORK PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR OBTAINING ALL PERMISSIONS FOR, AND FOR CONDUCTING ALL PREPARATIONS RELATED TO, WORK AFFECTING ANY UTILITIES WITHIN THE JURISDICTION OF ANY NON-MUNICIPAL UTILITY COMPANY, INCLUDING BUT NOT LIMITED TO ELECTRIC, TELEPHONE, AND/OR GAS. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES, DEPARTMENTS, AND UTILITY COMPANIES, IN WRITING, AT LEAST 7 DAYS (OR PER UTILITY COMPANY REQUIREMENT) AND NOT MORE THAN 30 DAYS PRIOR TO ANY CONSTRUCTION.
3. THE CONTRACTOR SHALL MAINTAIN UTILITIES SERVICING BUILDINGS AND FACILITIES WITHIN OR OUTSIDE THE PROJECT LIMIT UNLESS THE INTERRUPTION OF SERVICE IS COORDINATED WITH THE OWNER.
4. ALL WATER, SEWER, AND DRAIN WORK SHALL BE PERFORMED ACCORDING TO THE REQUIREMENTS AND STANDARD SPECIFICATIONS OF THE LOCAL MUNICIPALITY.
5. GAS, TELECOMMUNICATIONS AND ELECTRIC SERVICES ARE TO BE DESIGNED BY EACH UTILITY COMPANY IN COORDINATION WITH THE MECHANICAL, ELECTRIC, AND PLUMBING CONSULTANTS.
6. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES OF NEW UTILITIES WITH GAS, TELECOMMUNICATION AND ELECTRICAL SERVICES.
7. INSTALL WATER LINES WITH A MINIMUM OF FIVE FEET OF COVER AND A MAXIMUM OF SEVEN FEET COVER FROM THE FINAL DESIGN GRADES.
8. MAINTAIN 10 FEET HORIZONTAL SEPARATION AND 18 INCHES VERTICAL SEPARATION (WATER OVER SEWER) BETWEEN SEWER AND WATER LINES. WHEREVER THERE IS LESS THAN 10 FEET OF HORIZONTAL SEPARATION AND 18 INCHES OF VERTICAL SEPARATION BETWEEN A PROPOSED OR EXISTING SEWER LINE TO REMAIN AND A PROPOSED OR EXISTING WATER LINE TO REMAIN BOTH WATER MAIN AND SEWER MAIN SHALL BE CONSTRUCTED OF MECHANICAL JOINT CEMENT LINED DUCTILE IRON PIPE FOR A DISTANCE OF 10-FEET ON EITHER SIDE OF THE CROSSING. ONE (1) FULL LENGTH OF WATER PIPE SHALL BE CENTERED OVER THE SEWER AT THE CROSSING.
9. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES EXCEPT THOSE NOTED TO BE ABANDONED AND/OR REMOVED & DISPOSED.
10. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR TRENCHING, BACKFILLING, AND SURFACE RESTORATION FOR GAS UTILITY SYSTEMS.
11. ALL ONSITE UTILITIES SHALL BE INSTALLED UNDERGROUND UNLESS OTHERWISE NOTED.
12. ALL EXISTING AND PROPOSED MANHOLE FRAMES, COVERS, VALVES, CLEANOUTS, CASTINGS, ETC. SHALL BE RAISED TO FINISHED GRADE PRIOR TO FINAL GRADING AND PAVING CONSTRUCTION.
13. ALL GRATES IN WALKWAYS SHALL BE ADA COMPLIANT.

PROPOSED LEGEND

- LIMIT OF WORK
- EXISTING UTILITY TO BE ABANDONED, REMOVED AND DISPOSED IF IN CONFLICT WITH NEW SITE IMPROVEMENTS, OR AS INDICATED ON DRAWINGS
- EROSION CONTROL BARRIER
- CONSTRUCTION FENCE
- W — DOMESTIC WATER PIPE
- FP — FIRE PROTECTION PIPE
- S — SANITARY SEWER PIPE
- D — STORM DRAIN PIPE
- G — GAS PIPE
- E — ELECTRIC DUCTBANK
- T/C — TELECOM DUCTBANK
- INLET PROTECTION
- ELEVATION CONTOURS
- MATCH LINE
- CENTERLINE
- CO — CLEANOUT
- AREA DRAIN
- ACCESS BASIN
- DRAIN MANHOLE
- WATER QUALITY STRUCTURE
- CATCH BASIN
- WATER QUALITY INLET
- SEWER MANHOLE
- TMH — TELECOM MANHOLE
- EMH — ELECTRIC MANHOLE
- WV — WATER VALVE
- HYD — FIRE HYDRANT

ABBREVIATIONS

AB	ACCESS BASIN
AD	AREA DRAIN
BC	BOTTOM OF CURB ELEVATION
BW	BOTTOM OF WALL ELEVATION
CB	CATCH BASIN
CCB	CAPE COD BERM
CI	CAST IRON
CJ	CONTROL JOINT
CL	CENTER LINE
CO	CLEANOUT
COP	CENTER OF PIPE
CP	CARRIER PIPE
CPP	CORRUGATED POLYETHYLENE PIPE
DCB	DOUBLE CATCH BASIN
DI	DUCTILE IRON PIPE CEMENT LINED
DMH	DRAIN MANHOLE
EHH	ELECTRIC HANDHOLE
EJ	EXPANSION JOINT
EMH	ELECTRIC MANHOLE
FD	FOUNDATION DRAIN
FFE	FINISHED FLOOR ELEVATION
HP	HIGH POINT
HYD	FIRE HYDRANT
INV	INVERT ELEVATION
LF	LINEAR FEET
LOW	LIMIT OF WORK
LP	LOW POINT
LW	LAB WASTE
M&P	MAINTAIN AND PROTECT
NIC	NOT IN CONTRACT
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
PD	PERIMETER DRAIN
PERF	PERFORATED
PVC	POLYVINYL CHLORIDE PIPE
R&D	REMOVE AND DISPOSE
R&S	REMOVE AND STOCKPILE
RD	ROOF DRAIN
RIM	RIM ELEVATION
SMH	SEWER MANHOLE
SS	SEWER SERVICE
TC	TOP OF CURB ELEVATION
TW	TOP OF WALL ELEVATION
THH	TELECOM HANDHOLE
TMH	TELECOM MANHOLE
TOP	TOP OF PIPE
TOD	TOP OF DUCT BANK
TYP	TYPICAL
UD	UNDERDRAIN
USD	UNDERSLAB DRAIN
VGC	VERTICAL GRANITE CURB
WQI	WATER QUALITY INLET
WQS	WATER QUALITY STRUCTURE
WV	WATER VALVE

MASSPORT STREET LIGHTING NOTES:

1. ALL MASSPORT STREET LIGHT POLE INSTALLATIONS SHALL MEET THE MASSPORT STANDARD SPECIFICATIONS AND DETAILS.
2. PROPOSED STREET LIGHT LOCATIONS REQUIRE A MASSPORT STANDARD LIGHT POLE BASE, LIGHT POLE, LAMP, CONDUIT, CABLING & COMPOSITE PULLBOX, UNLESS OTHERWISE NOTED.
3. STREET LIGHTING CONDUIT RUNNING FROM THE LIGHT POLE TO PULLBOX SHALL BE 2" PVC.
4. STREET LIGHTING CONDUIT RUNNING FROM PULLBOX TO PULLBOX SHALL BE 3" PVC.
5. STREET LIGHTING CONDUIT RUNNING UNDER ROADWAYS, DRIVEWAYS, OR OTHER VEHICULAR TRAVELED SURFACES SHALL BE CONCRETE ENCASED.
8. REMOVE AND RETURN EXISTING MASSPORT LIGHTS WITHIN THE LIMIT OF WORK TO MASSPORT, UNLESS OTHERWISE NOTED.
9. EXISTING MASSPORT LIGHT POLES AND LUMINARIES TO BE REPLACED SHALL BE PROTECTED, REMOVED & RETURNED TO MASSPORT STREET LIGHTING SECTION.
10. ALL EXISTING PULLBOXES TO BE REUSED SHALL BE CLEANED OUT AND THE FRAME AND COVER SHALL BE REPLACED WITH A STANDARD CITY OF BOSTON COMPOSITE PULLBOX.
11. STREET LIGHT LOCATIONS NEED TO BE APPROVED BY MASSPORT PRIOR TO INSTALLATION FOR COORDINATION ONLY. STREET LIGHT LOCATIONS SHOWN FOR COORDINATION ONLY.
12. THE CONTRACTOR SHALL COORDINATE A FINAL INSPECTION WITH THE MASSPORT STREET LIGHTING SECTION AND APPROVAL/SIGN OFF FROM THE SECTION FOR THE INSTALLED STREET LIGHTS.
13. THE CONTRACTOR SHALL CONFIRM STREET LIGHTS ARE CONNECTED TO THE MASSPORT LIGHTING POWER SOURCE AND OPERATE ACCORDING TO MASSPORT STREET LIGHTING STANDARD SPECIFICATIONS AT NIGHT.
14. FOR PRIVATE LIGHTING ON SITE AND PRIVATE WAYS, SEE LANDSCAPE ARCHITECT AND ELECTRICAL ENGINEER PLANS.

11/17/2021 9:58:35 AM

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:
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- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL NOTES LEGEND AND ABBREVIATIONS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

C1.00

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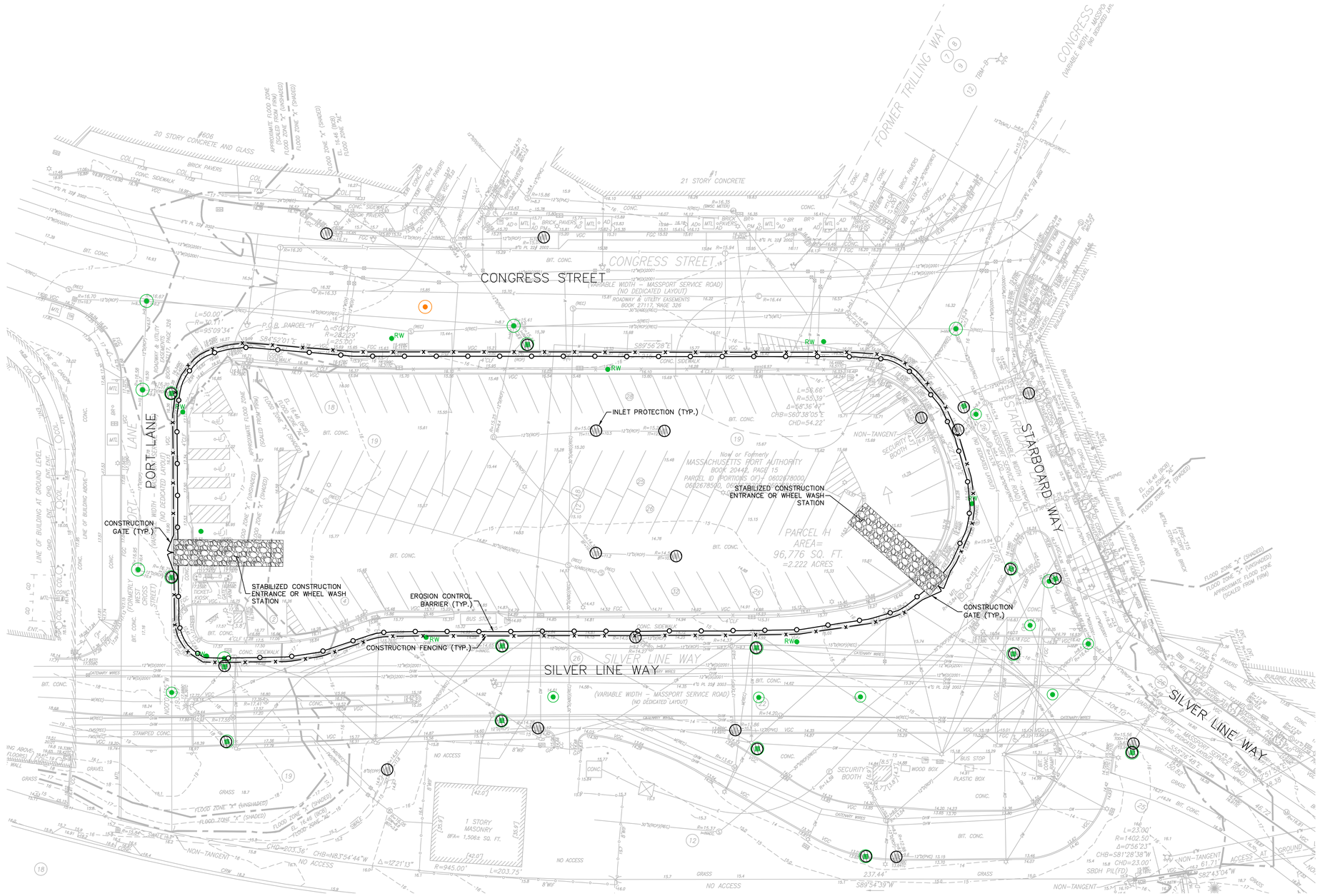

SCALE:
1" = 20'
20 10 0 20 40

11/17/2021 9:58:35 AM

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
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ARCHITECTURE & DESIGN

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- Geotechnical Engineering
- Planning
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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

EROSION AND SEDIMENTATION CONTROL PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

C2.00

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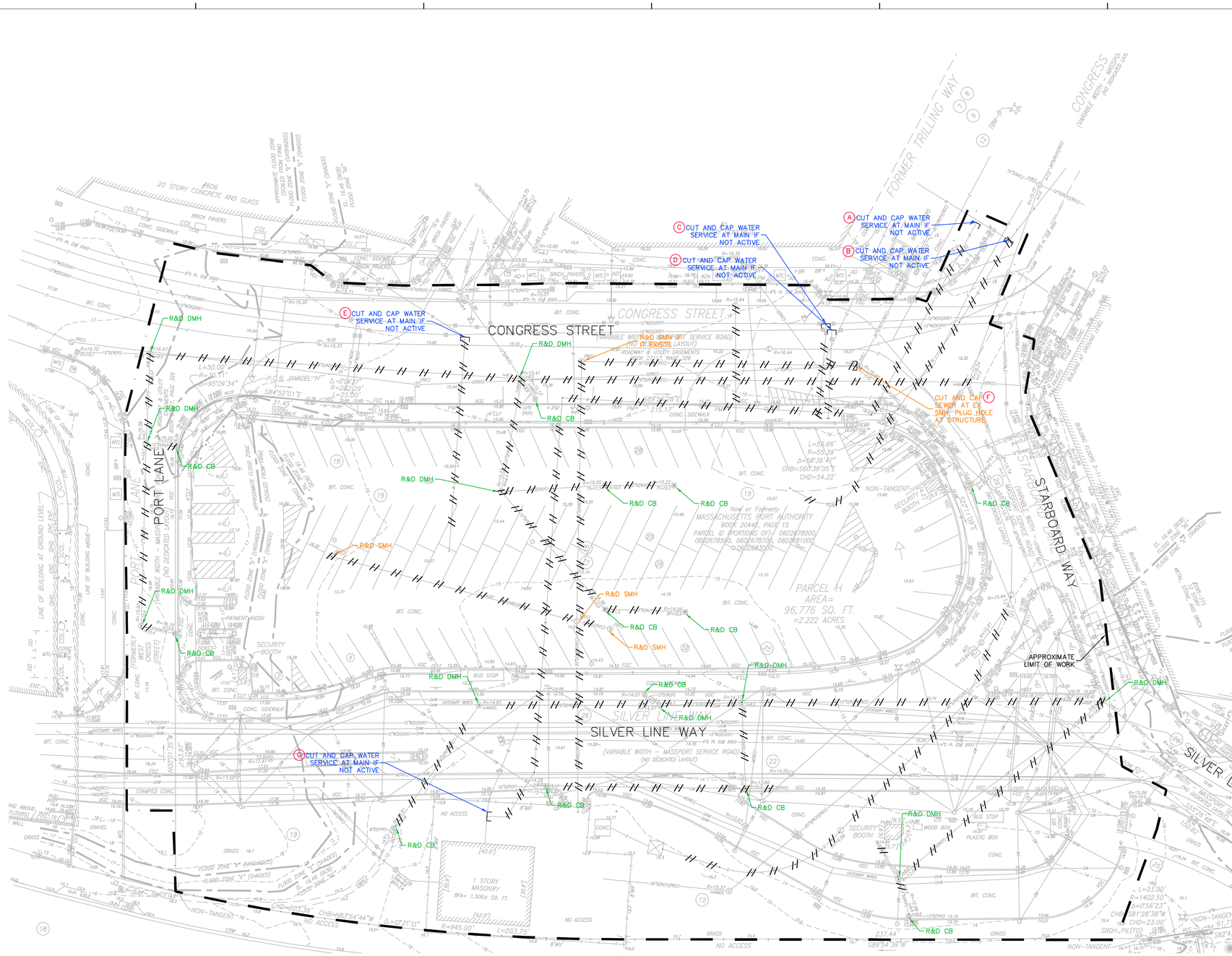


NOTE:
1. REFER TO PAVILION BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT.

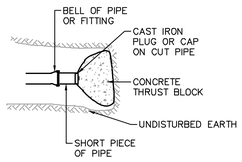
2. ALL UTILITIES NOT CALLED OUT TO BE DEMOLISHED SHALL BE PROTECTED AND MAINTAINED.

3. CONTRACTOR TO CONFIRM ACTIVE STATUS OF ALL LINES PRIOR TO DEMOLITION.

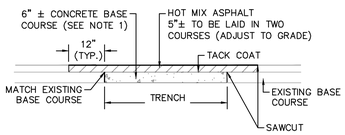
4. ALL UTILITIES WITHIN THE FOOTPRINT OF THE GARAGE SHALL BE DEMOLISHED OR REROUTED DEPENDING ON ACTIVITY STATUS.

5. REFER TO MEP/UTILITY PROVIDER PLANS FOR DETAILS OF THE DEMOLITION OF ELECTRICAL, TELECOM, MBTA INFRASTRUCTURE AND GAS LINES.

6. REMOVE AND DISPOSE OF ALL STREET LIGHTING POLES, HANDHOLES, AND CONDUIT WITHIN THE LIMIT OF WORK.



PLUG OR CAP DETAIL
NOT TO SCALE



NOTES:
1. PROPOSED CONCRETE BASE COURSE SHALL BE LEVEL WITH THE TOP OF THE EXISTING BASE COURSE

PAVEMENT RESTORATION OVER TRENCH DETAIL
NOT TO SCALE

BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(A) – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
(B) – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
(C) – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
(D) – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
(E) – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
(F) – CUT AND CAP SEWER SERVICE AT EXISTING SMH				
(G) – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				

BUILDING ADDRESS:
701 CONGRESS STREET
BOSTON, MA 02210

WARD / PARCEL #:
WARD 06 PARCELS 02681000, 02678000
02678700

LAND USE CODE:
EXEMPT

METER NUMBERS:
TO BE ASSIGNED

ACCOUNT NUMBERS:
TO BE ASSIGNED

OWNER CONTACT:
MARK F. CALLAHAN
DIRECTOR OF DEVELOPMENT
LINCOLN PROPERTY COMPANY
52 STATE STREET, 8TH FLOOR
BOSTON, MA 02109
OFFICE: 617-951-4112

BUILDING USE: COMMERCIAL

BWSC SITE PLAN #_____
BWSC USE ONLY

11/17/2021 9:58:35 AM

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

Nitsch Engineering
www.nitscheng.com
2 Center Plaza, Suite 430
Boston, MA 02108
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F: (617) 338-6472
- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Geotechnical Engineering
- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55696
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

UTILITY DEMOLITION PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	CMH/JMS
Date	10/03/2022
Scale	AS NOTED

DRAWING NUMBER:

C3.00

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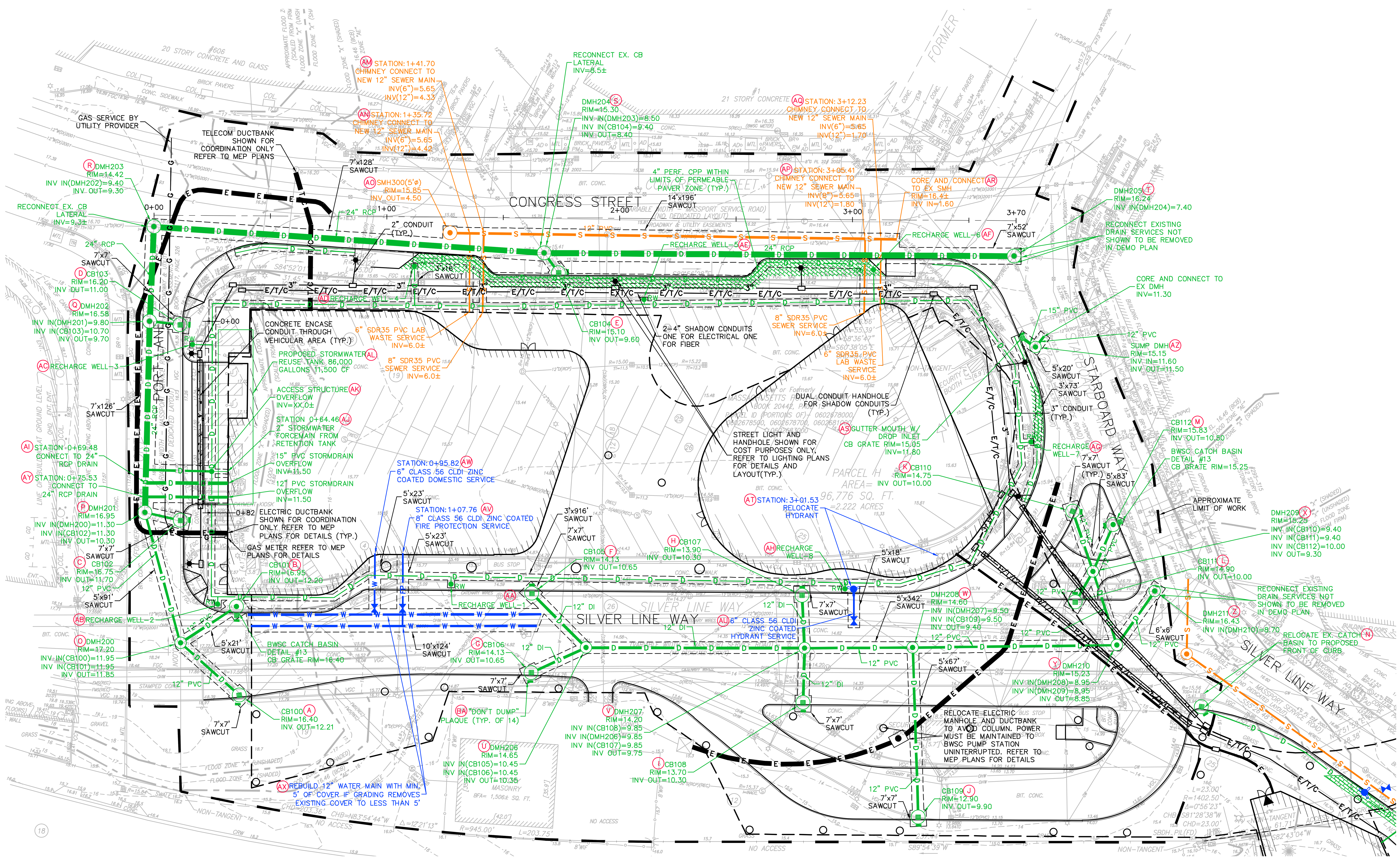

NOTES:
1. REFER TO PAVILION BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT
2. REFER TO MEP PLANS FOR DETAILS ON MBTA CATANARY WIRES AND MBTA INFRASTRUCTURE

BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(A) – NEW CATCH BASIN 100				
(B) – NEW CATCH BASIN 101				
(C) – NEW CATCH BASIN 102				
(D) – NEW CATCH BASIN 103				
(E) – NEW CATCH BASIN 104				
(F) – NEW CATCH BASIN 105				
(G) – NEW CATCH BASIN 106				
(H) – NEW CATCH BASIN 107				
(I) – NEW CATCH BASIN 108				
(J) – NEW CATCH BASIN 109				
(K) – NEW CATCH BASIN 110				
(L) – NEW CATCH BASIN 111				
(M) – NEW CATCH BASIN 112				
(N) – NEW CATCH BASIN 113				
(O) – NEW DRAIN MANHOLE 200				
(P) – NEW DRAIN MANHOLE 201				
(Q) – NEW DRAIN MANHOLE 202				
(R) – NEW DRAIN MANHOLE 203				
(S) – NEW DRAIN MANHOLE 204				
(T) – NEW DRAIN MANHOLE 205				
(U) – NEW DRAIN MANHOLE 206				
(V) – NEW DRAIN MANHOLE 207				
(W) – NEW DRAIN MANHOLE 208				
(X) – NEW DRAIN MANHOLE 209				
(Y) – NEW DRAIN MANHOLE 210				
(Z) – NEW DRAIN MANHOLE 211				
(AA) – NEW RECHARGE WELL 1				

BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(AB) – NEW RECHARGE WELL 2				
(AC) – NEW RECHARGE WELL 3				
(AD) – NEW RECHARGE WELL 4				
(AE) – NEW RECHARGE WELL 5				
(AF) – NEW RECHARGE WELL 6				
(AG) – NEW RECHARGE WELL 7				
(AH) – NEW RECHARGE WELL 8				
(AI) – NEW DRAIN CONNECTION				
(AJ) – NEW 2" FORCE MAIN FROM RETENTION TANK				
(AK) – NEW ACCESS STRUCTURE				
(AL) – NEW STORMWATER TANK				
(AM) – NEW SEWER CONNECTION				
(AN) – NEW SEWER CONNECTION				
(AO) – NEW SEWER MANHOLE 300				
(AP) – NEW SEWER CONNECTION				
(AQ) – NEW SEWER CONNECTION				
(AR) – NEW SEWER CONNECTION				
(AS) – NEW GUTTERMOUTH W/ DROP INLET				
(AT) – RELOCATE HYDRANT				N/A
(AU) – NEW 6" HYDRANT SERVICE				N/A
(AV) – NEW 8" FIRE PROTECTION SERVICE				N/A
(AW) – NEW 6" DOMESTIC SERVICE				N/A
(AX) – NEW 12" WATER MAIN				N/A
(AY) – NEW DRAIN CONNECTION				
(AZ) – SUMP DRAIN MANHOLE				
(BA) – DON'T DUMP PLAQUE (14)				N/A
4:1 I/I FEE				N/A
AS-BUILT				N/A

PROPOSED RECHARGE VOLUME CALCULATIONS:

Total Impervious Area (SF) = 102,615 SF
Required Reuse = 1.25" storm over Impervious Area

Required Storage Volume = Roof Area + Impervious Site Area
= 81,417 SF(Roof) x [1.25'/12"] +21,198 SF(Site) x [1.25'/12"] = 10,690 CF ◄

A 86,000 Gallon stormwater collection tank will be located in the building and the water will be pumped to recharge wells located in Port Lane, Congress Street, Silver Line way and Starboard Way, this system is designed to drawdown within 72 hours.

BWSC SITE PLAN #______

BWSC USE ONLY

BUILDING ADDRESS:
777 CONGRESS STREET
BOSTON, MA 02210

WARD / PARCEL #:
WARD 06 PARCELS 02681000, 02678000
02678700

LAND USE CODE:
EXEMPT

METER NUMBERS:
TO BE ASSIGNED

ACCOUNT NUMBERS:
TO BE ASSIGNED

OWNER CONTACT:
MARK F. CALLAHAN
DIRECTOR OF DEVELOPMENT
LINCOLN PROPERTY COMPANY
52 STATE STREET, 8TH FLOOR
BOSTON, MA 02109
OFFICE: 617-951-4112

BUILDING USE: COMMERCIAL

SCALE:
1" = 20'
20 10 0 20 40

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET ARCHITECTURE & DESIGN
MOODY•NOLAN

CONSULTANTS:
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F: (617) 338-6472
► Civil Engineering
► Land Surveying
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► Structural Engineering
► Green Infrastructure
► Planning
► GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1
COMMONWEALTH OF MASSACHUSETTS COLEMAN McLEAN HORSLEY CIVIL NO. 55996 REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL UTILITY PLAN

Project No.	21008(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/2022
Scale	AS NOTED

DRAWING NUMBER:
C4.00

11/17/2021 9:58:35 AM

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LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	45.15	S55°01'12"E
L2	97.62	S89°35'11"E
L3	48.82	S49°35'11"E
L4	4.81	N1°27'53"E
L5	2.59	S0°58'22"E
L6	12.46	S86°43'26"E
L7	42.22	S89°35'11"E
L8	22.49	N79°23'43"E
L9	4.21	N87°37'04"E
L10	144.64	S89°35'11"E
L11	1.81	S0°24'49"W
L12	76.81	N89°35'11"W
L13	4.35	N49°35'11"W
L14	10.62	N75°52'09"W

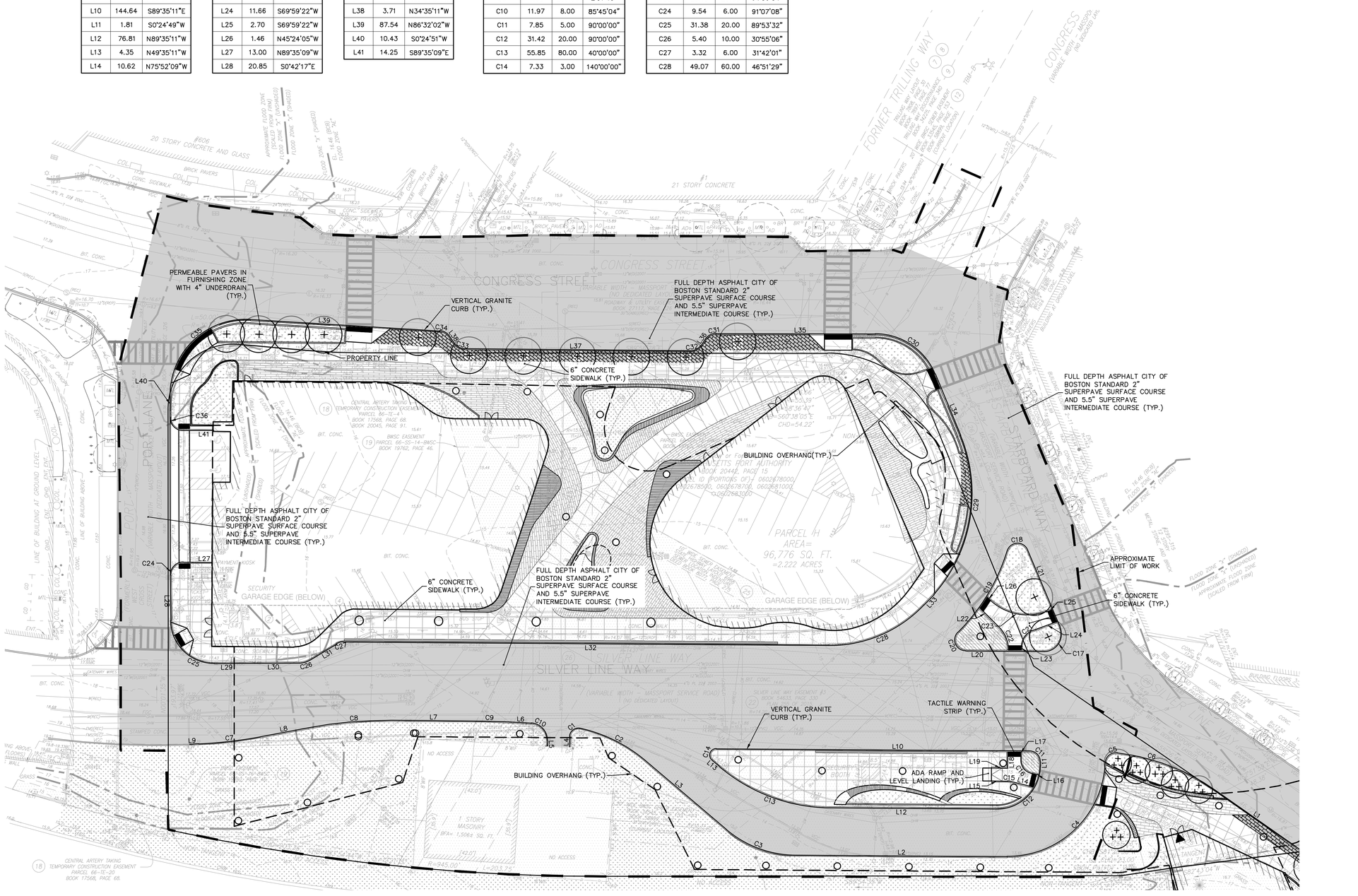
LINE TABLE		
LINE #	LENGTH	DIRECTION
L15	7.68	N89°29'37"W
L16	3.64	S75°52'09"E
L17	3.83	S0°24'51"W
L18	7.46	S0°24'51"W
L19	7.50	N89°35'09"W
L20	36.24	S89°35'11"E
L21	38.81	N22°49'34"W
L22	12.24	N45°24'05"W
L23	1.64	S0°24'49"W
L24	11.66	S69°59'22"W
L25	2.70	S69°59'22"W
L26	1.46	N45°24'05"W
L27	13.00	N89°35'09"W
L28	20.85	S0°42'17"E

LINE TABLE		
LINE #	LENGTH	DIRECTION
L29	10.91	N89°37'54"E
L30	28.20	N89°37'54"E
L31	14.12	N58°42'48"E
L32	224.08	S89°35'11"E
L33	6.79	N43°33'20"E
L34	30.76	N22°35'57"W
L35	73.43	N89°56'09"W
L36	3.39	S35°24'49"W
L37	104.11	N89°31'24"W
L38	3.71	N34°35'11"W
L39	87.54	N86°32'02"W
L40	10.43	S0°24'51"W
L41	14.25	S89°35'09"E

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C1	7.08	4.00	101°27'22"
C2	33.95	70.00	27°47'13"
C3	34.91	50.00	40°00'00"
C4	69.09	45.00	87°58'24"
C5	8.23	5.00	94°18'44"
C6	49.27	100.00	28°13'39"
C7	28.70	200.00	8°13'19"
C8	38.46	200.00	11°01'05"
C9	9.99	200.00	2°51'45"
C10	11.97	8.00	85°45'04"
C11	7.85	5.00	90°00'00"
C12	31.42	20.00	90°00'00"
C13	55.85	80.00	40°00'00"
C14	7.33	3.00	140°00'00"

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C15	1.43	6.00	13°37'27"
C16	7.99	6.00	76°17'00"
C17	15.81	8.00	113°14'23"
C18	12.23	5.00	140°09'04"
C19	44.36	90.00	28°14'30"
C20	11.77	5.00	134°51'03"
C21	9.71	8.00	69°34'33"
C22	11.90	15.00	45°28'20"
C23	28.19	25.00	64°36'34"
C24	9.54	6.00	91°07'08"
C25	31.38	20.00	89°53'32"
C26	5.40	10.00	30°55'06"
C27	3.32	6.00	31°42'01"
C28	49.07	60.00	46°51'29"

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C29	78.41	70.00	64°10'52"
C30	35.26	30.00	67°20'12"
C31	5.76	6.00	55°00'00"
C32	5.77	6.00	55°03'45"
C33	5.75	6.00	54°56'14"
C34	5.44	6.00	51°56'52"
C35	56.84	35.00	93°03'07"
C36	9.42	6.00	90°00'00"



LEGEND
LIMIT OF FULL DEPTH ASPHALT REPAVING

NOTE:
REFER TO PAVILION BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT

SCALE:
1" = 20'
20 10 0 20 40

11/17/2021 9:58:35 AM

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

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- Structural Engineering
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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

LAYOUT AND MATERIALS PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

C5.00

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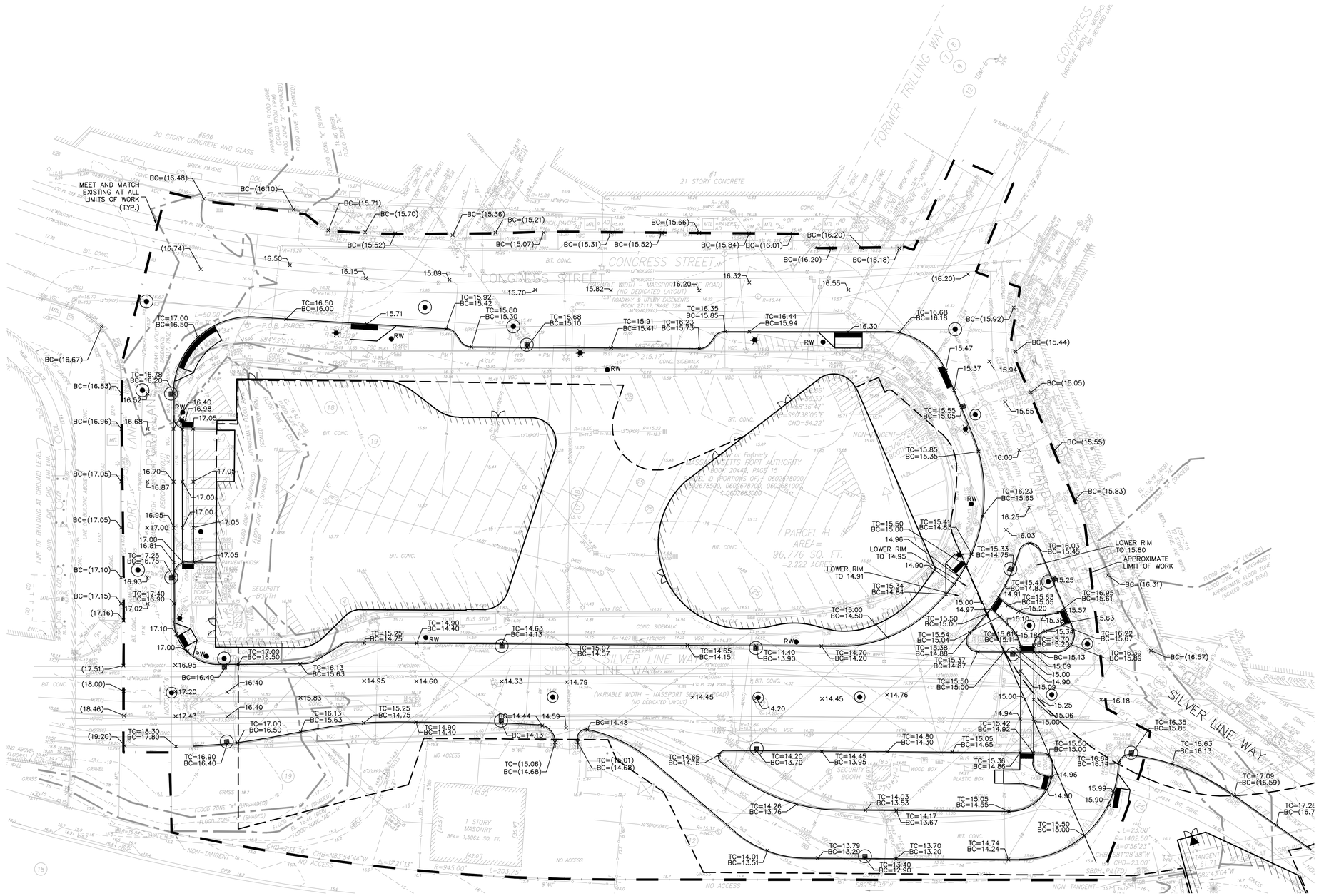

NOTES:
1. REFER TO PAVILION BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT
2. ADJUST ALL UTILITY COVERS, GATES, ETC. TO FINISH GRADE WITHIN LIMITS OF WORK.
3. SEE LANDSCAPE PLANS FOR SIDEWALK AND SITE GRADING.

SCALE:
1" = 20'
20 10 0 20 40

11/17/2021 9:58:35 AM

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55998
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL GRADING PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

C6.00

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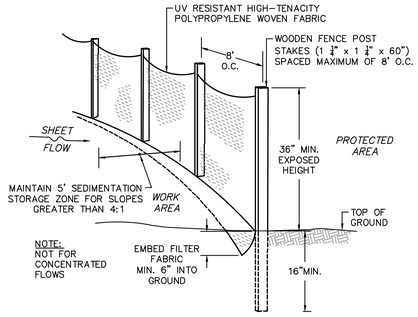
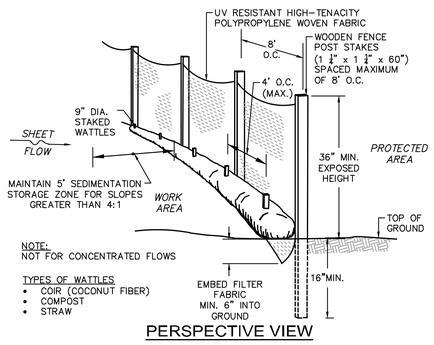
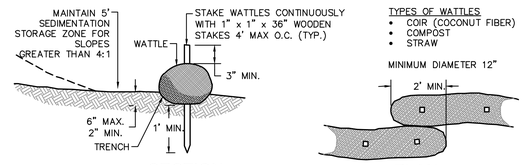


PERSPECTIVE VIEW



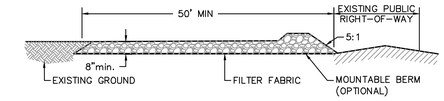
PERSPECTIVE VIEW



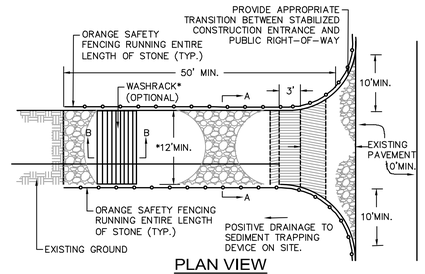
SECTION PLAN

WATTLES - SLOPE PROTECTION FOR SLOPES LESS THAN 10:1

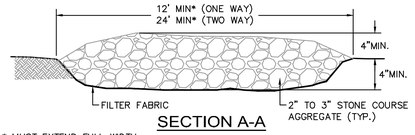
NOT TO SCALE



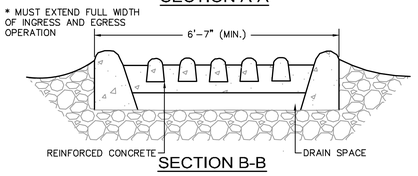
SIDE ELEVATION



PLAN VIEW



SECTION A-A



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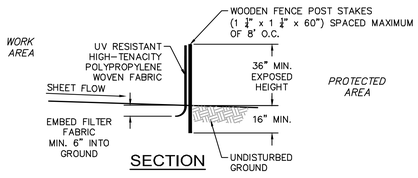
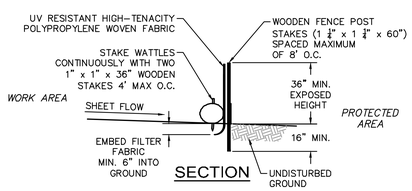


SECTION

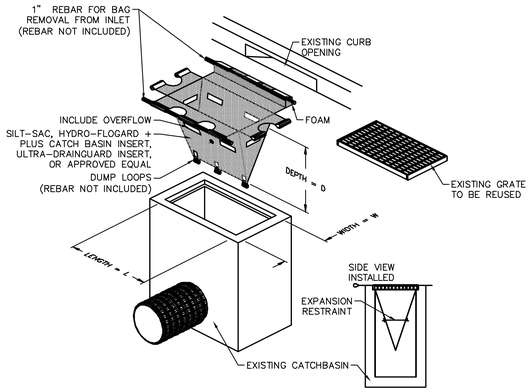
PERIMETER PROTECTION BARRIER



SECTION

PERIMETER PROTECTION BARRIER
SILT FENCE DETAIL WITH WATTLES

NOT TO SCALE



THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS SHEET, OVERLAND OR CONCENTRATED FLOWS (NOT GREATER THAN 1 CFS). THE METHOD CAN DRAIN FLAT AREA TO STEEP SLOPES. INLET CAPACITY WILL BE DECREASED WITH THIS METHOD AND THE CONTRACTOR SHALL EXPECT PONDING DURING HIGH FLOW EVENTS.

INLET PROTECTION
CATCH BASIN W/ SILTATION SACK

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

LENGTH – GREATER THAN OR EQUAL TO 50 FEET

WIDTH – TWELVE FOOT MINIMUM (ONE WAY), TWENTY FOUR FOOT MINIMUM (TWO WAY), BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.

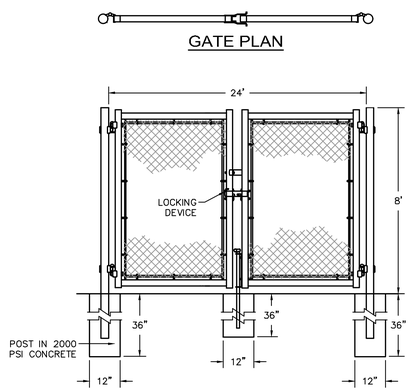
SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM SHALL BE PERMITTED.

THICKNESS – 8"

MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED.

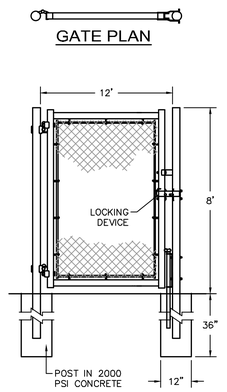
STABILIZED CONSTRUCTION ENTRANCE



DOUBLE GATE ELEVATION

24' WIDE DOUBLE GATE

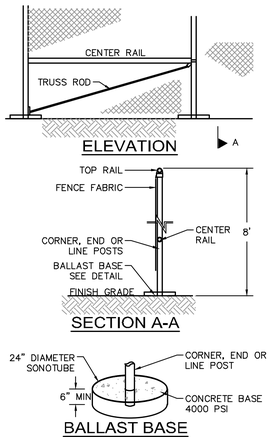
NOT TO SCALE



SINGLE GATE ELEVATION

12' WIDE EMERGENCY GATE

NOT TO SCALE



NOTES
1. END, GATE AND CORNER POSTS SHALL BE BRACED TO ADJACENT LINE POSTS. (MORE THAN 30° CHANGE IN DIRECTION CONSTITUTES A CORNER)
2. FABRIC SHALL BE 0.148" GAUGE MIN. WIRE, WOVEN INTO APPROXIMATELY 2" DIAMOND MESH.
3. ZINC-COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH PRIME WESTERN SPELTER OR EQUAL.
4. ALUMINUM COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH ALUMINUM ALLOY.
5. LINE POSTS SHALL BE 2½" O.D. END OR CORNER POSTS SHALL BE 3" O.D.
6. THE CONTRACTOR IS RESPONSIBLE FOR SURFACE RESTORATION ONCE THE FENCE IS REMOVED.
7. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE TEMPORARY CONSTRUCTION FENCE AT THE CONCLUSION OF THE PROJECT.

TEMPORARY CONSTRUCTION
CHAIN LINK FENCE WITH BALLAST BASE

NOT TO SCALE

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

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- Land Surveying
- Transportation Engineering
- Structural Engineering
- Geotechnical Engineering
- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS — COLEMAN McLEAN HORSLEY — CIVIL — NO. 55986 — REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL DETAILS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

C7.00

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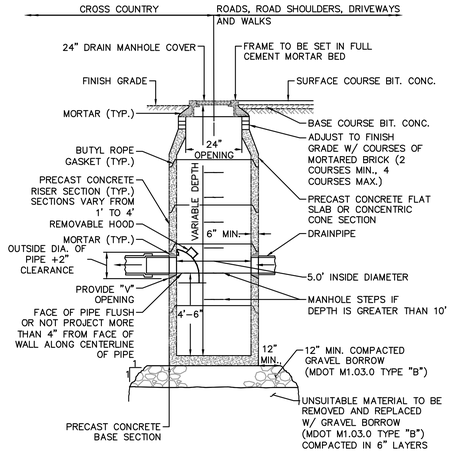
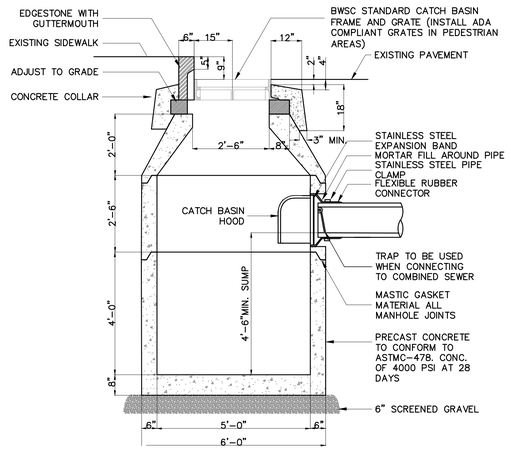


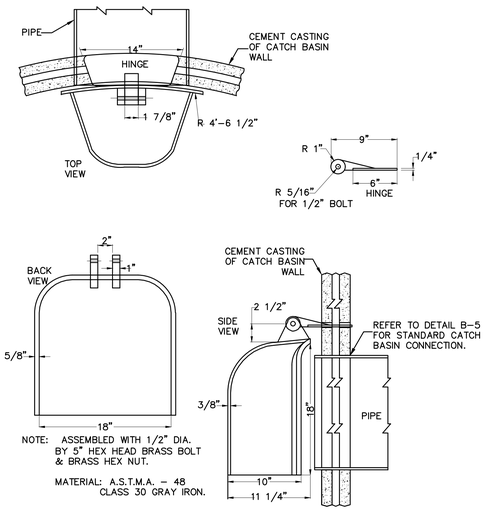
DRAIN MANHOLE WITH SUMP DETAIL

NOT TO SCALE



BWSC STANDARD CATCH BASIN

NOT TO SCALE



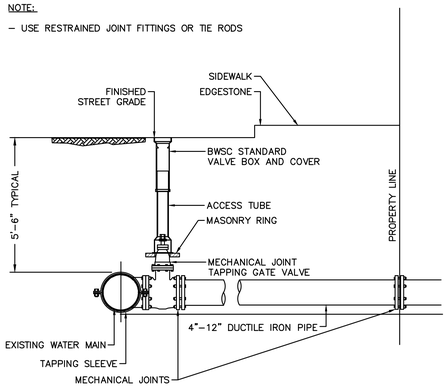
CATCH BASIN HOOD

NOT TO SCALE

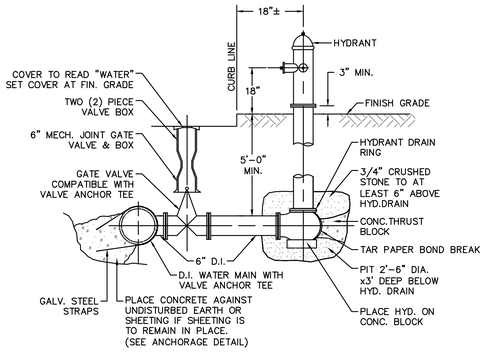
MEGALUG JOINT RESTRAINT

N.T.S.

NOTE:
MEGALUG JOINT RESTRAINT SHALL BE USED AT EACH BEND IN THE PIPE.



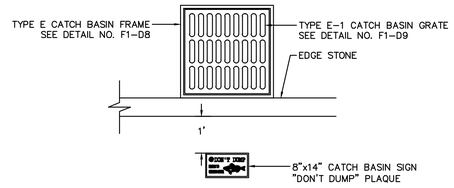
TYPICAL WATER PIPE CONNECTION WITH TAPPING SLEEVE AND GATE VALVE



NOTE: ALL JOINTS ON HYDRANT BRANCH TO BE RESTRAINED JOINTS

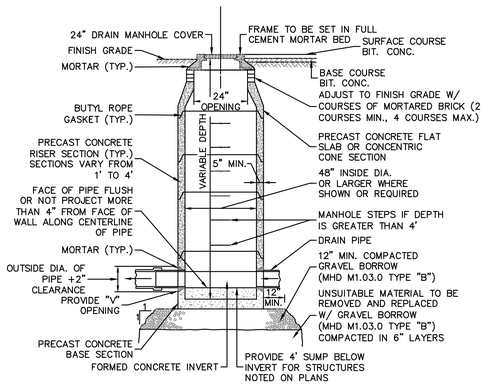
FIRE HYDRANT DETAIL

NOT TO SCALE



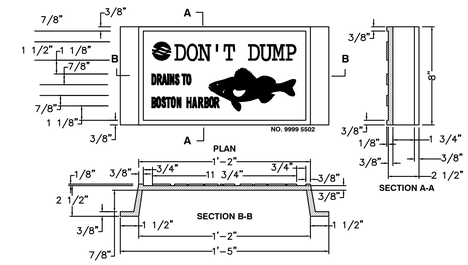
CATCH BASIN SIGN INSTALLATION

NOT TO SCALE



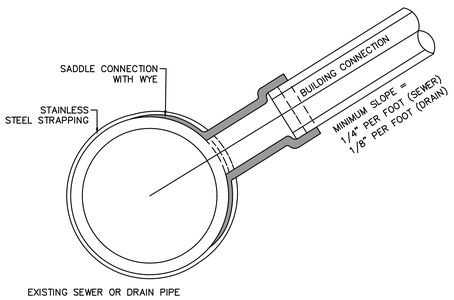
TYPICAL DRAIN MANHOLE DETAIL

NOT TO SCALE



BWSC "DON'T DUMP" PLAQUE DETAIL

NOT TO SCALE

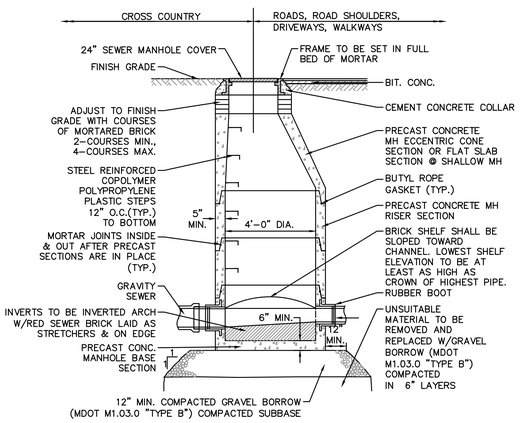


NOTES:

1. FULL PVC OR IRON SADDLE MAY BE USED TO CONNECT TO EXISTING PVC, CLAY, CONCRETE OR IRON PIPE.
2. SADDLES MUST HAVE RUBBER GASKETS AND SHALL BE TIGHTENED WITH STRAPS. SADDLES WILL NOT BE CEMENTED ONTO THE PIPE.
3. FULL WYE CONNECTION FITTINGS MAY BE USED.
4. PIPE SHALL BE CUT TO CONFORM TO THE OPENING IN THE SADDLE.
5. CONNECTIONS DIRECTLY INTO THE EXISTING PIPE WITHOUT A SADDLE OR A FULL WYE FITTING ARE NOT ALLOWED.

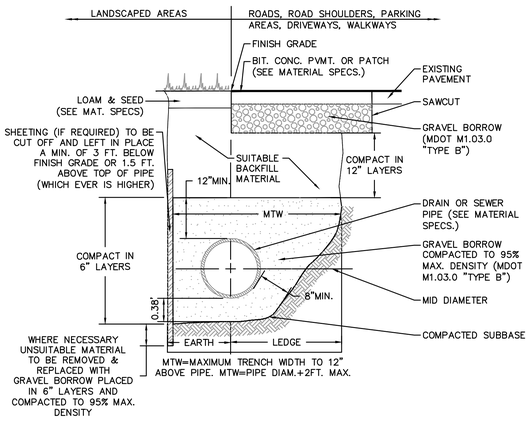
TYPICAL SADDLE CONNECTION DETAIL TO EXISTING DRAIN OR SEWER (6" TO 15")

NOT TO SCALE



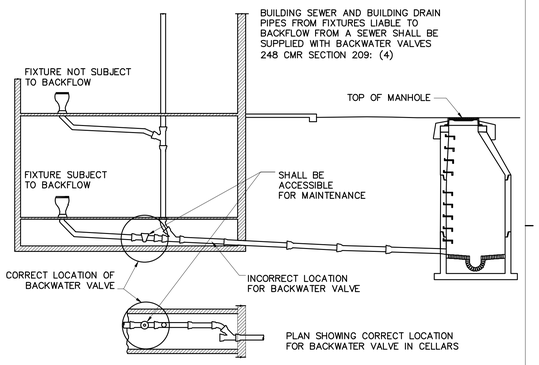
TYPICAL SEWER MANHOLE DETAIL

NOT TO SCALE



STANDARD TRENCH DETAIL FOR UTILITY PIPE

NOT TO SCALE



NOTE: ALL PLUMBING FIXTURES BELOW THE LEVEL OF THE TOP OF THE MANHOLE OF THE SEWER SERVICING THE FIXTURE(S) SHALL BE CONSIDERED AS BEING SUBJECT TO BACKFLOW AND SHALL BE SUPPLIED WITH BACKWATER VALVES.

BACK WATER VALVES TO BE LOCATED IN BUILDING AND DESIGNED, DETAILED, AND SPECIFIED BY THE PLUMBING ENGINEER. SHOWN FOR PERMITTING ONLY.

STANDARD BACKWATER VALVE

NOT TO SCALE

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

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- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL DETAILS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

C7.01

11/17/2021 9:58:35 AM

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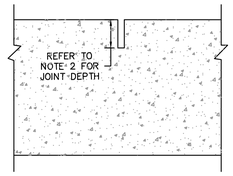
NOTES:

1. CONTROL JOINTS 5' O.C. UNLESS SHOWN OTHERWISE (6' MAX).
2. EDGES OF PAVEMENT AND JOINTS IN CONCRETE SHALL BE SAWCUT TO A DEPTH EQUAL TO AT LEAST ¼ OF THE CONCRETE THICKNESS OR 1 INCH WHICHEVER IS GREATER.
3. SAWCUTTING SHALL OCCUR 4–12 HOURS AFTER FINISHING WITH A WET–CUT SAW OR 1–4 HOURS WITH A EARLY ENTRY DRY–CUT SAW (ONCE JOINT RAVELING NO LONGER OCCURS)

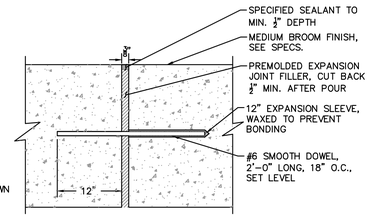


SAWCUT CONTROL JOINT DETAIL

NOT TO SCALE

NOTES:

1. DOWEL IS TYPICAL AT ALL EXPANSION JOINTS EXCEPT AGAINST VERTICAL WALLS AND CURBS.
2. EXPANSION JOINTS 20'–0" O.C. UNLESS OTHERWISE SHOWN
3. SAWCUT EDGES AND JOINTS ALL PANELS.

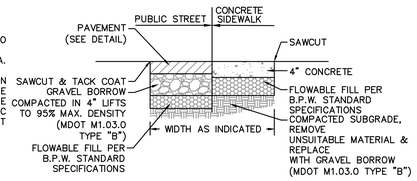


SAWCUT EXPANSION JOINT DETAIL

NOT TO SCALE

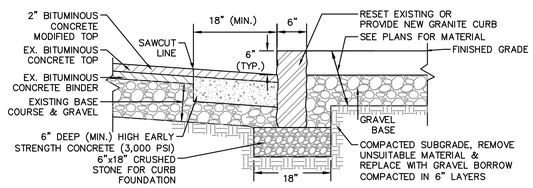
NOTES:

1. SURFACE FINISH TO MATCH SURROUNDING AREA.
2. PERMANENT RESTORATION WITHIN ROADWAY SHALL BE COMPLETED BY THE BOSTON PUBLIC WORKS DEPARTMENT



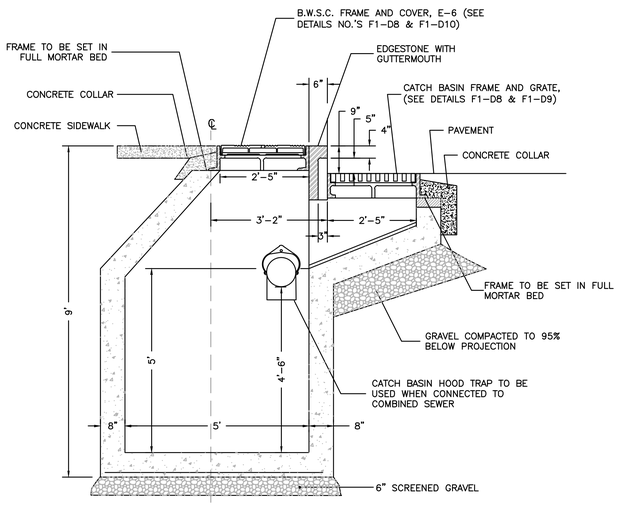
SURFACE RESTORATION WITHIN PUBLIC WAYS DETAIL

NOT TO SCALE



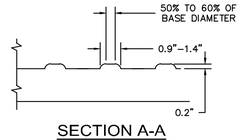
TYPICAL GRANITE CURB IN PUBLIC WAY SECTION DETAIL

NOT TO SCALE



STANDARD CATCH BASIN #13

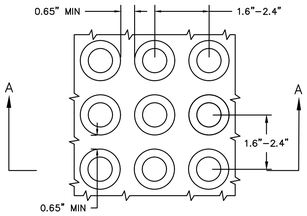
NOT TO SCALE



SECTION A-A

NOTES:

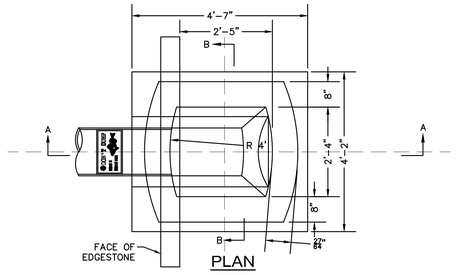
1. DETECTABLE WARNING PANELS SHALL BE PERMANENTLY APPLIED TO THE RAMP.
2. DETECTABLE WARNING PANELS SHALL CONTRAST VISUALLY WITH THE ADJACENT WALKWAY SURFACES PER THE FOLLOWING COLOR SCHEDULE:
   - PALE YELLOW ON CEMENT CONCRETE PEDESTRIAN RAMPS
3. DETECTABLE WARNING PANELS SHALL BE AS MANUFACTURED BY ADA SOLUTIONS, INC. OF NORTH BILLERICA, MA OR AN APPROVED EQUAL.
4. DETECTABLE WARNING PANELS SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS.



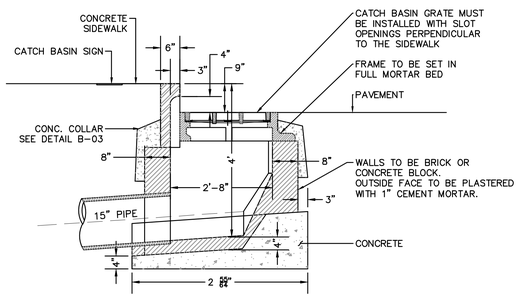
DETECTABLE WARNING PANEL

DETECTABLE WARNING PANEL FOR PEDESTRIAN RAMPS DETAIL

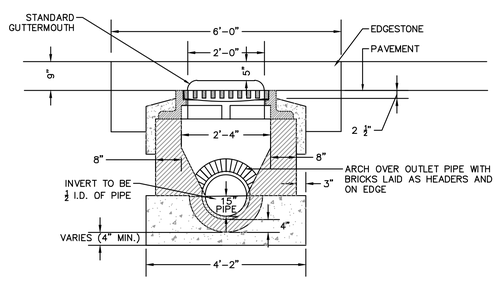
NOT TO SCALE



PLAN



SECTION A-A



SECTION B-B

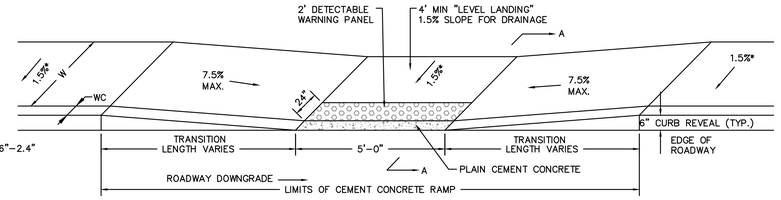
CITY OF BOSTON DROP INLET WITH GUTTERMOUTH PLAN AND SECTIONS

NOT TO SCALE

BOSTON CB

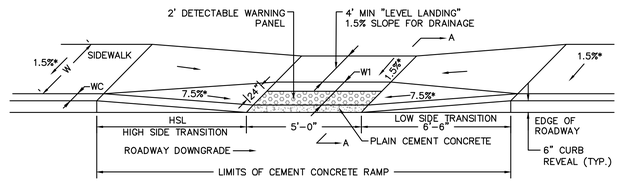
ROADWAY PROFILE GRADE	HIGH SIDE TRANSITION LENGTH
ROADWAY PROFILE GRADE %	HIGH SIDE TRANSITION LENGTH (FEET)
0	6'–6"
0–1	7'–8"
1–2	9'–0"
2–3	11'–0"
3–4	14'–0"
>4	15' (MAX.)

NOTE–BASED ON A DESIGN SLOPE OF 7.5% & A REVEAL OF 6"



PEDESTRIAN RAMP DETAIL (4' TO 6' WIDE)

NOT TO SCALE

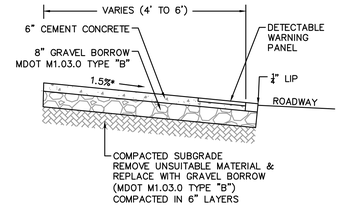


ROADWAY PROFILE GRADE	HIGH SIDE TRANSITION LENGTH
ROADWAY PROFILE GRADE %	HIGH SIDE TRANSITION LENGTH (FEET)
0	6'–6"
0–1	7'–8"
1–2	9'–0"
2–3	11'–0"
3–4	14'–0"
>4	15' (MAX.)

NOTE–BASED ON A DESIGN SLOPE OF 7.5% & A REVEAL OF 6"

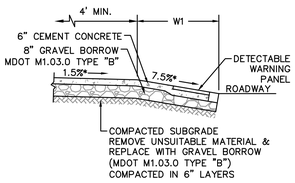
LEGEND:

HSL = HIGH SIDE TRANSITION LENGTH (VARIES–SEE CHART)
W = SIDEWALK WIDTH (USABLE WIDTH)
W1 = PERPENDICULAR RAMP LENGTH (W–4')
Wc = CURB WIDTH (VARIES 0"–6")
* = TOLERANCE FOR CONSTRUCTION (±0.5%)



SECTION A-A

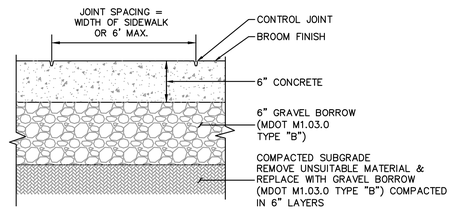
LEGEND
W = SIDEWALK WIDTH (VARIES 4' TO 6')
Wc = CURB WIDTH (VARIES 0" TO 6")
* = TOLERANCE FOR CONSTRUCTION (± 0.5%)



SECTION A-A

PEDESTRIAN RAMP DETAIL (6'-0" TO 12'-6" WIDE)

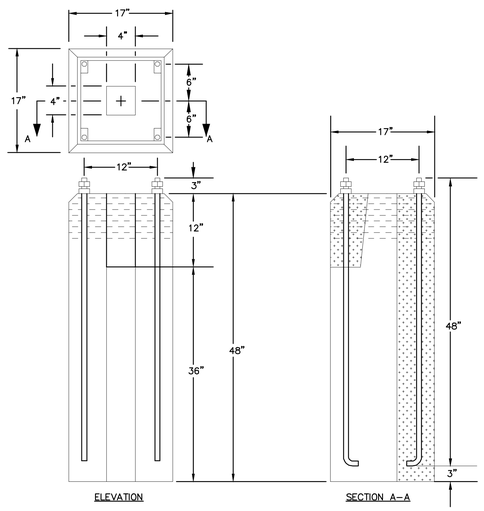
NOT TO SCALE



NOTES:
1. SURFACE FINISH TO MATCH SURROUNDING AREA.
2. REFER TO CITY OF BOSTON PUBLIC WORKS DEPARTMENT RULES AND SPECIFICATIONS FOR EXCAVATION ACTIVITY WITHIN THE CITY OF BOSTON FOR MATERIALS AND INSTALLATION REQUIREMENTS.
3. CONCRETE SIDEWALK WITH MEDIUM BROOM FINISH. DIRECTION OF FINISH TO BE PERPENDICULAR TO THE LONGITUDINAL DIRECTION OF PAVEMENT. CONTROL JOINTS SHALL BE PLACED AT 6' O.C., EXPANSION JOINTS 30' O.C.
4. CONTROL JOINTS SHOULD BE SAW CUT.

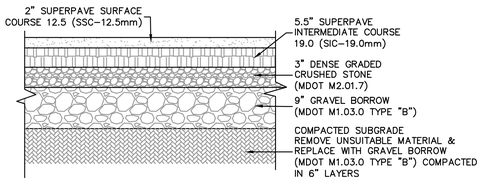
CONCRETE SIDEWALK DETAIL

NOT TO SCALE



CITY OF BOSTON PRECAST POLE BASE

NOT TO SCALE



HOT MIX ASPHALT PAVING (TWO COURSES) DETAIL

NOT TO SCALE

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:
Nitsch Engineering
www.nitscheng.com
2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472
- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION:
SEAPORT CIRCLE
MASSPORT PARCEL H

ISSUANCE:
60% MBTA DESIGN SUBMISSION

STAMP:
NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:
CIVIL DETAILS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	CMH/JMS
Date	10/03/2022
Scale	AS NOTED

DRAWING NUMBER:
C7.02

11/17/2021 9:58:35 AM

DEMOLITION NOTES:

1. SITE PREPARATION AND DEMOLITION SHALL INCLUDE THOSE AREAS WITHIN THE LIMIT OF WORK LINE AS SHOWN ON THE CONTRACT DOCUMENTS.
2. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
3. CONSULT ALL OF THE DRAWINGS AND SPECIFICATIONS FOR COORDINATION REQUIREMENTS BEFORE COMMENCING DEMOLITION.
4. THE CONTRACTOR SHALL COORDINATE SITE DEMOLITION EFFORTS WITH ALL TRADES THAT MAY BE AFFECTED BY THE WORK.
5. ALL ITEMS REQUIRING REMOVAL SHALL BE REMOVED TO FULL DEPTH TO INCLUDE BASE MATERIAL AND FOOTINGS OR FOUNDATIONS AS REQUIRED TO FACILITATE CONSTRUCTION, AND LEGALLY DISPOSED OF OFFSITE BY CONTRACTOR.
6. UTILITY PIPES DESIGNATED TO BE ABANDONED IN PLACE SHALL BE PLUGGED AT THEIR ENDS WITH WATERTIGHT BRICK MASONRY OR CEMENT MORTAR WITH A MINIMUM THICKNESS OF 8 INCHES.
7. UTILITY PIPES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE COMPLETE REMOVAL AND DISPOSAL OF THE ENTIRE LENGTH OF PIPE AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN THE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
8. UTILITY STRUCTURES DESIGNATED TO BE ABANDONED IN PLACE SHALL HAVE THEIR CAST IRON CASTINGS REMOVED AND DISPOSED, INLET AND OUTLET PIPES PLUGGED, THE BOTTOM OF THE STRUCTURES SHALL BE BROKEN, THE VOID OF THE STRUCTURES SHALL BE BACKFILLED AND COMPACTED TO 95% WITH ORDINARY BORROW OR FLOWABLE FILL, AND THE TOP OF THE STRUCTURE SHALL BE REMOVED SO THAT IT IS AT LEAST 36 INCHES BELOW FINISH GRADE.
9. UTILITY STRUCTURES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE REMOVAL AND DISPOSAL OF CAST IRON CASTINGS, PLUGGING OF INLET AND OUTLET PIPES, REMOVAL OF THE STRUCTURE, AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN HE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
10. ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFFSITE.
11. AT ALL LOCATIONS WHERE EXISTING CURBING, CONCRETE PAVEMENT OR BITUMINOUS CONCRETE ROADWAY ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE.
12. EXTEND DESIGNATED LIMIT OF WORK AS NECESSARY TO ACCOMPLISH ROUGH GRADING, EROSION CONTROL, TREE PROTECTION, AND SITE WORK AS REQUIRED BY THESE DRAWINGS AND SPECIFICATIONS.
13. THE CONTRACTOR SHALL REMOVE FROM THE SITE ALL RUBBISH AND DEBRIS FOUND THEREON. STORAGE OF SUCH MATERIALS ON THE PROJECT SITE WILL NOT BE PERMITTED. THE CONTRACTOR SHALL LEAVE THE SITE IN SAFE, CLEAN, AND LEVEL CONDITION UPON COMPLETION OF THE SITE DEMOLITION WORK.
14. REMOVE AND STOCKPILE ALL EXISTING SITE LIGHTS, BENCHES, TRASH RECEPTACLES, TRAFFIC SIGNS, GRANITE CURB, AND OTHER SITE IMPROVEMENTS WITHIN LIMIT OF WORK LINE UNLESS OTHERWISE NOTED.
15. THE CONTRACTOR SHALL REMOVE FROM THE AREA OF CONSTRUCTION PAVEMENT, CONCRETE, CURBING, POLES AND FOUNDATIONS, ISLANDS, TREE BERMS AND OTHER FEATURES WITHIN THE LIMITS OF CONSTRUCTION AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION WHETHER SPECIFIED ON THE DRAWINGS OR NOT.

BWSC & CONTRACTOR NOTES:

1. THE ESTIMATED SANITARY SEWAGE DISCHARGE IS 780 GALLONS PER DAY (GPD). THIS ESTIMATE IS BASED ON 310 C.M.R. 15.000 THE STATE ENVIRONMENTAL CODE, TITLE 5: STANDARD REQUIREMENTS FOR THE SITING, CONSTRUCTION, INSPECTION, UPGRADE AND EXPANSION OF ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS AND FOR THE TRANSPORT AND DISPOSAL OF SEPTAGE.
2. THE ESTIMATED DAILY WATER USE IS 858 GPD BASED ON THE ESTIMATED SANITARY SEWAGE DISCHARGE WITH A 10% PEAKING FACTOR. THE PEAK DOMESTIC FLOW BASED ON FIXTURE COUNTS IS APPROXIMATELY XX GPM [FROM MEP].
3. TWO XXXX" COMPOUND WATER METERS WILL BE EITHER NEPTUNE OR ELSTER AMCO COMPOUND TYPE METERS. THE METERS MUST BE PURCHASED BY THE CONTRACTOR. A METER TRANSMITTER UNIT (MTU) SHALL BE SUPPLIED BY THE COMMISSION AT THE OWNER'S EXPENSE. A FEE OF $325/MTU WILL BE PAID TO THE COMMISSION AT THE TIME OF FILING THE GENERAL SERVICE APPLICATION.
4. BACKWATER VALVES SHALL BE PROVIDED BY THE PLUMBER AT ALL GRAVITY SANITARY SEWER AND STORM DRAIN CONNECTIONS FOR ANY FIXTURE LOCATED AT AN ELEVATION BELOW THE TOP OF THE SEWER OR DRAIN MANHOLE.
5. THE CONTRACTOR SHALL NOTIFY THE BWSC CROSS-CONNECTION DEPARTMENT AT 617-989-7283 ONCE BACKWATER VALVES ARE INSTALLED FOR BWSC INSPECTION.
6. DYE TESTING SHALL BE PERFORMED ON NEW STORM DRAIN AND SANITARY SEWER CONNECTIONS AFTER INSTALLATION IS COMPLETE. DYE TESTS SHALL BE WITNESSED BY THE BWSC.
7. A PREREQUISITE FOR FILING A GENERAL SERVICE APPLICATION WITH THE BWSC FOR NEW CONSTRUCTION IS THE ROUGH CONSTRUCTION SIGN-OFF DOCUMENT FROM THE CITY OF BOSTON'S INSPECTIONAL SERVICES DEPARTMENT.
8. AN AS-BUILT PLAN (AUTOCAD 2016 OR EARLIER RELEASE) SHALL BE PROVIDED BY THE CONTRACTOR AND ENDORSED BY A CIVIL ENGINEER OR PROFESSIONAL LAND SURVEYOR SHOWING THE LOCATION, DEPTH, AND INVERT OF EVERY BEND, FITTING, VALVE, CLEANOUT AND ANCHOR. THE AS-BUILT DRAWING SHALL BE SUBMITTED TO THE BOSTON AND WATER SEWER COMMISSION FOR REVIEW AND APPROVAL.
9. WATER SHUT DOWN SHALL BE COORDINATED WITH BWSC WATER OPERATIONS, (617) 989-7276, 24 HOURS NOTICE REQUIRED.
10. PROVIDE "DON'T DUMP" PLAQUES AT ALL CATCH BASIN AND DRAIN INLET LOCATIONS. "DON'T DUMP" PLAQUES TO BE PURCHASED FROM BWSC.
11. THE CONTRACTOR SHALL PURCHASE THE NEW HYDRANT(S) FROM THE BWSC. THE CONTRACTOR SHALL PURCHASE THE HYDRANT(S) FROM THE COMMISSION WHEN FILING THE GENERAL SERVICE APPLICATION.
12. EXISTING WATER METER(S) TO BE REMOVED OR REPLACED SHALL BE RETURNED TO BWSC.
13. THE CONTRACTOR SHALL VIDEO INSPECT THE EXISTING 24"/36"/48" BWSC DRAIN MAIN IN MASSPORT HAUL ROAD PRIOR TO CONSTRUCTION AND AFTER CONSTRUCTION IS COMPLETE AND SUBMIT TO BWSC AND NITSCH ENGINEERING FOR REVIEW. THE INSPECTION SOFTWARE SHALL BE CAPABLE OF EXPORTING DIGITAL INSPECTION LOG DATA INTO AN MSACCESS DATABASE IN THE PIPELINE ASSESSMENT AND CERTIFICATION PROGRAM (PACP) STANDARD EXCHANGE FORMAT. THE INSPECTION SOFTWARE CODING SYSTEM SHALL BE PACP CERTIFIED (LATEST EDITION) AS PER THE NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES (NASSCO). THE SOFTWARE SHALL BE EQUIPPED WITH ALL MODULES NECESSARY FOR PACP INSPECTIONS AND SCORING. THE CONTRACTOR SHALL COORDINATE DIRECTLY WITH BWSC TO DETERMINE AN APPROVED VIDEO INSPECTION COMPANY AND DELIVERABLE.

EROSION AND SEDIMENT CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS" PREPARED BY DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF RESOURCE PROTECTION, AND THE CURRENT NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES.
2. MEANS OF EROSION AND SEDIMENT PROTECTION AS NOTED ON THE DRAWINGS INDICATE MINIMUM RECOMMENDED PROVISIONS. THE CONTRACTOR IS RESPONSIBLE FOR FINAL SELECTION AND PLACEMENT OF EROSION AND SEDIMENTATION CONTROLS BASED ON ACTUAL SITE CONDITIONS AND CONSTRUCTION CONDITIONS. ADDITIONAL MEANS OF PROTECTION SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED FOR CONTINUED OR UNFORESEEN EROSION PROBLEMS, OR AS DIRECTED BY CONTROLLING MUNICIPAL AUTHORITIES, AT NO ADDITIONAL EXPENSE TO THE OWNER.
3. AN EROSION CONTROL BARRIER SHALL BE INSTALLED ALONG THE EDGE OF PROPOSED DEVELOPMENT AS INDICATED IN THE PLAN PRIOR TO COMMENCEMENT OF DEMOLITION OR CONSTRUCTION OPERATIONS.
4. SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF AND DURING ALL PHASES OF CONSTRUCTION AND BE CONSTRUCTED PRIOR TO AND IMMEDIATELY AFTER ANY GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL ON THE SITE.
5. AFTER ANY SIGNIFICANT RAINFALL (GREATER THAN 0.25 INCHES OF RAINFALL WITHIN 24 HOURS), SEDIMENT CONTROL STRUCTURES SHALL BE INSPECTED FOR INTEGRITY. ANY DAMAGE SHALL BE CORRECTED IMMEDIATELY.
6. PERIODIC INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL STRUCTURES SHALL BE PROVIDED TO ENSURE THAT THE INTENDED PURPOSE IS ACCOMPLISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SEDIMENT LEAVING THE LIMIT OF WORK. SEDIMENT CONTROL MEASURES SHALL BE IN WORKING CONDITION AT THE END OF EACH WORKING DAY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING SEDIMENT FROM ENTERING ANY STORM DRAINAGE SYSTEM AND FROM BEING CONVEYED TO ANY WETLAND RESOURCE AREA, PUBLIC WAYS, ABUTTING PROPERTY, OR OUTSIDE OF THE PROJECT LIMITS.
8. THE CONTRACTOR SHALL PROTECT ALL DRAINAGE SWALES AND GROUND SURFACES WITHIN THE LIMIT OF WORK FROM EROSIVE CONDITIONS. STRAW BALE, CRUSHED STONE OR EQUIVALENT CHECK DAMS ARE TO BE PROVIDED AT A MAXIMUM OF TWO HUNDRED (200) FOOT SPACING, OR LESS AS SITE-SPECIFIC CONDITIONS WARRANT, WITHIN ALL DRAINAGE SWALES AND DITCHES AND AT UPSTREAM SIDES OF ALL DRAINAGE INLETS.
9. ALL STOCK PILES SHALL BE PROTECTED AND LOCATED A MINIMUM OF 100' FROM EXISTING WETLAND RESOURCE AREAS & WITHIN THE LIMIT OF WORK.
10. ANY SEDIMENT TRACKED ONTO PAVED AREAS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.
11. ALL SEDIMENT RETAINED BY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE LEGALLY DISPOSED OF OFFSITE.
12. TEMPORARY DIVERSION DITCHES, PERMANENT DITCHES, CHANNELS, EMBANKMENTS, AND ANY DENUDED SURFACE THAT WILL BE EXPOSED FOR A PERIOD OF 14 CALENDAR DAYS OR MORE SHALL BE CONSIDERED CRITICAL VEGETATION AREAS. THESE AREAS SHALL BE STABILIZED/PROTECTED WITH APPROPRIATE EROSION CONTROL MATTING OR OTHER EROSION CONTROL METHODS.
13. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS DIRECTED BY THE PERMITTING AUTHORITY OR OWNER.
14. THE CONTRACTOR SHALL USE TEMPORARY SEEDING, MULCHING, OR OTHER APPROVED STABILIZATION MEASURES TO PROTECT EXPOSED AREAS DURING PROLONGED CONSTRUCTION OR OTHER LAND DISTURBANCE. STOCKPILES THAT WILL BE EXPOSED FOR LONGER THAN 14 DAYS SHALL BE STABILIZED.
15. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL EROSION AND SEDIMENT CONTROLS AT THE COMPLETION OF SITE CONSTRUCTION, BUT ONLY WHEN DIRECTED BY THE CITY OF BOSTON CONSERVATION AGENT. STABILIZE OR SEED BARE AREAS LEFT AFTER EROSION CONTROL REMOVAL.

EARTH MOVING AND GRADING NOTES:

1. ALL TOPSOIL ENCOUNTERED WITHIN THE WORK AREA SHALL BE STRIPPED TO ITS FULL DEPTH AND STOCKPILED FOR REUSE. EXCESS TOPSOIL SHALL BE REMOVED FROM THE SITE UNLESS OTHERWISE DIRECTED BY THE OWNER. TOPSOIL PILES SHALL REMAIN SEGREGATED FROM EXCAVATED SUBSURFACE SOIL MATERIALS.
2. GRADES WITHIN HANDICAP PARKING SPACES AND ACCESS AISLES SHALL NOT EXCEED 1.5% IN ANY DIRECTION.
3. CROSS SLOPES OF ALL PEDESTRIAN WALKS SHALL NOT EXCEED 1.5%.
4. RUNNING SLOPE OF ALL PEDESTRIAN WALKS SHALL NOT EXCEED 4.5%, UNLESS OTHERWISE NOTED.
5. THE CONTRACTOR SHALL EXERCISE CAUTION IN ALL EXCAVATION ACTIVITY DUE TO POSSIBLE EXISTENCE OF UNRECORDED UTILITY LINES.
6. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MINIMUM OF 1% UNLESS OTHERWISE NOTED.
7. PROVIDE POSITIVE DRAINAGE AWAY FROM FACE OF BUILDINGS AT ALL LOCATIONS.
8. PITCH EVENLY BETWEEN CONTOUR LINES AND BETWEEN SPOT GRADES. SPOT GRADE ELEVATIONS TAKE PRECEDENCE OVER CONTOUR LINES.
9. ALL PROPOSED TOP OF CURB ELEVATIONS ARE SIX INCHES (6") ABOVE BOTTOM OF CURB ELEVATIONS UNLESS OTHERWISE NOTED. ALL PROPOSED TOP OF CAPE COD BERM ELEVATIONS ARE FOUR INCHES (4") ABOVE BOTTOM OF CURB ELEVATION UNLESS OTHERWISE NOTED.
10. THE CONTRACTOR SHALL BLEND NEW GRADING SMOOTHLY INTO EXISTING GRADING AT LIMITS OF GRADING.
11. WHERE NEW PAVING MEETS EXISTING PAVING, MEET LINE AND GRADE OF EXISTING PAVING WITH SMOOTH TRANSITION BETWEEN EXISTING AND NEW SURFACES.
12. THE CONTRACTOR SHALL VERIFY EXISTING GRADES IN THE FIELD AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
13. PITCH TOPS OF ALL WALLS AT ONE-EIGHTH INCH (1/8") PER FOOT FROM BACK OF WALL TO FACE OF WALL.
14. SURPLUS MATERIALS SHALL BE REMOVED FROM THE SITE UNLESS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE. REFER TO EARTHWORK SPECIFICATIONS.
15. ANY AREAS OUTSIDE OF THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED BY THE CONTRACTOR TO THE PRE-CONSTRUCTION CONDITION/GRADE AT NO COST TO THE OWNER.
16. EXCAVATION REQUIRED WITHIN PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO OWNER.

GENERAL NOTES:

1. TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING SITE FEATURES WERE OBTAINED FROM A PLAN ENTITLED "ALTA/NSPS LAND TITLE SURVEY PARCEL H-#30 TRILLING WAY BOSTON, MASS.", PREPARED BY FELDMAN LAND SURVEYORS, DRAFT DATED 04-22-2021.
2. FLOODPLAIN INFORMATION WAS OBTAINED FROM THE FLOOD INSURANCE RATE MAP (FIRM) NO. 25025C0081J. THE SITE IS IN ZONES AE AND X.
3. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82, SECTION 40, AS AMENDED, WHICH STATES THAT NO ONE MAY EXCAVATE IN THE COMMONWEALTH OF MASSACHUSETTS EXCEPT IN AN EMERGENCY WITHOUT 72 HOURS NOTICE, EXCLUSIVE OF SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS, TO NATURAL GAS PIPELINE COMPANIES, AND MUNICIPAL UTILITY DEPARTMENTS THAT SUPPLY GAS, ELECTRICITY, TELEPHONE, OR CABLE TELEVISION SERVICE IN OR TO THE CITY OR TOWN WHERE THE EXCAVATION IS TO BE MADE. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1-888-DIG-SAFE.
4. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82A, ALSO REFERRED TO AS JACKIE'S LAW, AS DETAILED IN SECTION 520 CMR 14.00 OF THE CODE OF MASSACHUSETTS REGULATIONS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS AND SAFETY CODES IN THE CONSTRUCTION OF ALL IMPROVEMENTS.
6. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND CONTACTING THE CONTROLLING AUTHORITIES AND/OR UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THEIR LINES. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND NITSCH ENGINEERING. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENGINEER OR OWNER'S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.
8. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
9. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENTS TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER'S REPRESENTATION IMMEDIATELY.
11. THE CONTRACTOR SHALL CONDUCT ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ESTABLISHMENT AND USE OF ALL VERTICAL AND HORIZONTAL CONSTRUCTION CONTROLS.
13. ELEVATIONS REFER TO BOSTON CITY BASE(BCB).
14. THE CONTRACTOR SHALL COMPLY WITH THE ORDER OF CONDITIONS DATED XXXX XX, XXXX AND ISSUED BY THE XXXX CONSERVATION COMMISSION (DEP #XXX-XXX).
15. FOR SOIL INFORMATION REFER TO GEOTECHNICAL REPORT.

UTILITY NOTES:

1. ALL UTILITY CONNECTIONS ARE SUBJECT TO THE APPROVAL OF, AND GRANTING OF PERMITS BY, THE LOCAL MUNICIPALITY. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL PERMITS AND APPROVALS RELATED TO UTILITY WORK PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR OBTAINING ALL PERMISSIONS FOR, AND FOR CONDUCTING ALL PREPARATIONS RELATED TO, WORK AFFECTING ANY UTILITIES WITHIN THE JURISDICTION OF ANY NON-MUNICIPAL UTILITY COMPANY, INCLUDING BUT NOT LIMITED TO ELECTRIC, TELEPHONE, AND/OR GAS. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES, DEPARTMENTS, AND UTILITY COMPANIES, IN WRITING, AT LEAST 7 DAYS (OR PER UTILITY COMPANY REQUIREMENT) AND NOT MORE THAN 30 DAYS PRIOR TO ANY CONSTRUCTION.
3. THE CONTRACTOR SHALL MAINTAIN UTILITIES SERVICING BUILDINGS AND FACILITIES WITHIN OR OUTSIDE THE PROJECT LIMIT UNLESS THE INTERRUPTION OF SERVICE IS COORDINATED WITH THE OWNER.
4. ALL WATER, SEWER, AND DRAIN WORK SHALL BE PERFORMED ACCORDING TO THE REQUIREMENTS AND STANDARD SPECIFICATIONS OF THE LOCAL MUNICIPALITY.
5. GAS, TELECOMMUNICATIONS AND ELECTRIC SERVICES ARE TO BE DESIGNED BY EACH UTILITY COMPANY IN COORDINATION WITH THE MECHANICAL, ELECTRIC, AND PLUMBING CONSULTANTS.
6. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES OF NEW UTILITIES WITH GAS, TELECOMMUNICATION AND ELECTRICAL SERVICES.
7. INSTALL WATER LINES WITH A MINIMUM OF FIVE FEET OF COVER AND A MAXIMUM OF SEVEN FEET COVER FROM THE FINAL DESIGN GRADES.
8. MAINTAIN 10 FEET HORIZONTAL SEPARATION AND 18 INCHES VERTICAL SEPARATION (WATER OVER SEWER) BETWEEN SEWER AND WATER LINES. WHEREVER THERE IS LESS THAN 10 FEET OF HORIZONTAL SEPARATION AND 18 INCHES OF VERTICAL SEPARATION BETWEEN A PROPOSED OR EXISTING SEWER LINE TO REMAIN AND A PROPOSED OR EXISTING WATER LINE TO REMAIN BOTH WATER MAIN AND SEWER MAIN SHALL BE CONSTRUCTED OF MECHANICAL JOINT CEMENT LINED DUCTILE IRON PIPE FOR A DISTANCE OF 10-FEET ON EITHER SIDE OF THE CROSSING. ONE (1) FULL LENGTH OF WATER PIPE SHALL BE CENTERED OVER THE SEWER AT THE CROSSING.
9. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES EXCEPT THOSE NOTED TO BE ABANDONED AND/OR REMOVED & DISPOSED.
10. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR TRENCHING, BACKFILLING, AND SURFACE RESTORATION FOR GAS UTILITY SYSTEMS.
11. ALL ONSITE UTILITIES SHALL BE INSTALLED UNDERGROUND UNLESS OTHERWISE NOTED.
12. ALL EXISTING AND PROPOSED MANHOLE FRAMES, COVERS, VALVES, CLEANOUTS, CASTINGS, ETC. SHALL BE RAISED TO FINISHED GRADE PRIOR TO FINAL GRADING AND PAVING CONSTRUCTION.
13. ALL GRATES IN WALKWAYS SHALL BE ADA COMPLIANT.

PROPOSED LEGEND

- LIMIT OF WORK
- EXISTING UTILITY TO BE ABANDONED, REMOVED AND DISPOSED IF IN CONFLICT WITH NEW SITE IMPROVEMENTS, OR AS INDICATED ON DRAWINGS
- EROSION CONTROL BARRIER
- CONSTRUCTION FENCE
- W — DOMESTIC WATER PIPE
- FP — FIRE PROTECTION PIPE
- S — SANITARY SEWER PIPE
- D — STORM DRAIN PIPE
- G — GAS PIPE
- E — ELECTRIC DUCTBANK
- T/C — TELECOM DUCTBANK
- INLET PROTECTION
- ELEVATION CONTOURS
- MATCH LINE
- CENTERLINE
- CO — CLEANOUT
- AREA DRAIN
- ACCESS BASIN
- DRAIN MANHOLE
- WATER QUALITY STRUCTURE
- CATCH BASIN
- WATER QUALITY INLET
- SEWER MANHOLE
- TMH — TELECOM MANHOLE
- EMH — ELECTRIC MANHOLE
- WV — WATER VALVE
- HYD — FIRE HYDRANT

ABBREVIATIONS

AB	ACCESS BASIN
AD	AREA DRAIN
BC	BOTTOM OF CURB ELEVATION
BW	BOTTOM OF WALL ELEVATION
CB	CATCH BASIN
CCB	CAPE COD BERM
CI	CAST IRON
CJ	CONTROL JOINT
CL	CENTER LINE
CO	CLEANOUT
COP	CENTER OF PIPE
CP	CARRIER PIPE
CPP	CORRUGATED POLYETHYLENE PIPE
DCB	DOUBLE CATCH BASIN
DI	DUCTILE IRON PIPE CEMENT LINED
DMH	DRAIN MANHOLE
EHH	ELECTRIC HANDHOLE
EJ	EXPANSION JOINT
EMH	ELECTRIC MANHOLE
FD	FOUNDATION DRAIN
FFE	FINISHED FLOOR ELEVATION
HP	HIGH POINT
HYD	FIRE HYDRANT
INV	INVERT ELEVATION
LF	LINEAR FEET
LOW	LIMIT OF WORK
LP	LOW POINT
LW	LAB WASTE
M&P	MAINTAIN AND PROTECT
NIC	NOT IN CONTRACT
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
PD	PERIMETER DRAIN
PERF	PERFORATED
PVC	POLYVINYL CHLORIDE PIPE
R&D	REMOVE AND DISPOSE
R&S	REMOVE AND STOCKPILE
RD	ROOF DRAIN
RIM	RIM ELEVATION
SMH	SEWER MANHOLE
SS	SEWER SERVICE
TC	TOP OF CURB ELEVATION
TW	TOP OF WALL ELEVATION
THH	TELECOM HANDHOLE
TMH	TELECOM MANHOLE
TOP	TOP OF PIPE
TOD	TOP OF DUCT BANK
TYP	TYPICAL
UD	UNDERDRAIN
USD	UNDERSLAB DRAIN
VGC	VERTICAL GRANITE CURB
WQI	WATER QUALITY INLET
WQS	WATER QUALITY STRUCTURE
WV	WATER VALVE

CLIENT:
LINCOLN PROPERTY COMPANY

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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL NOTES LEGEND AND ABBREVIATIONS

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

C1.00

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NOTE:
1. REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT.

SCALE:
1" = 20'
20 10 0 20 40

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects
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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN MILEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

EROSION AND SEDIMENTATION CONTROL PLAN

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

C2.00

BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(A) – CUT AND CAP WATER SERVICE				

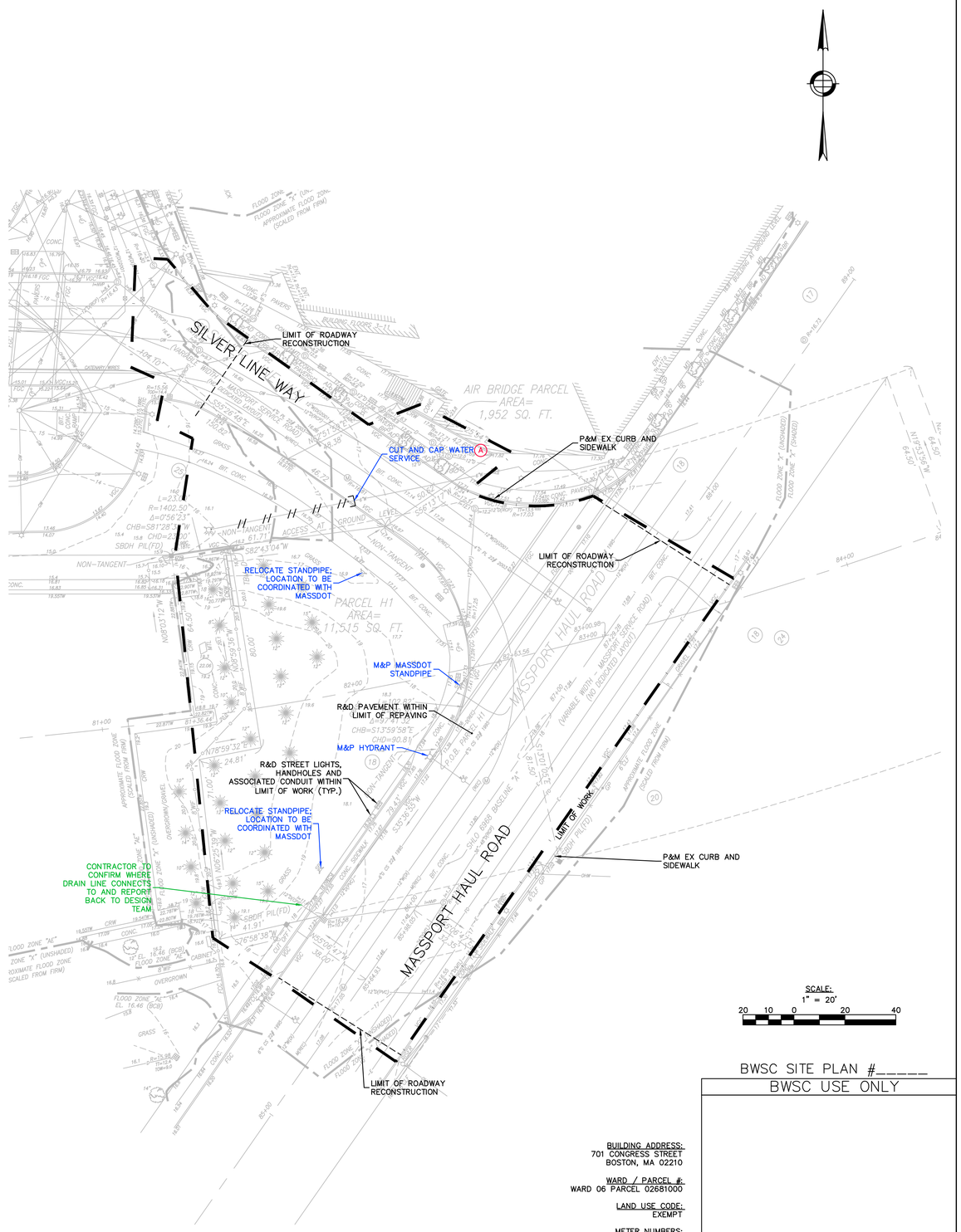
PLUG OR CAP DETAIL

NOT TO SCALE

NOTES:
1. PROPOSED CONCRETE BASE COURSE SHALL BE LEVEL WITH THE TOP OF THE EXISTING BASE COURSE

PAVEMENT RESTORATION OVER TRENCH DETAIL

NOT TO SCALE



SCALE:
1" = 20'
20 10 0 20 40

BWSC SITE PLAN #_____

BWSC USE ONLY

NOTE:
1. REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT.

2. ALL UTILITIES NOT CALLED OUT TO BE DEMOLISHED SHALL BE PROTECTED AND MAINTAINED.

3. CONTRACTOR TO CONFIRM ACTIVE STATUS OF ALL LINES PRIOR TO DEMOLITION.

4. ALL UTILITIES WITHIN THE FOOTPRINT OF THE PROPOSED BUILDING SHALL BE DEMOLISHED OR REROUTED DEPENDING ON ACTIVITY STATUS.

BUILDING ADDRESS:
701 CONGRESS STREET
BOSTON, MA 02210

WARD / PARCEL #:
WARD 06 PARCEL 02681000

LAND USE CODE:
EXEMPT

METER NUMBERS:
TO BE ASSIGNED

ACCOUNT NUMBERS:
TO BE ASSIGNED

OWNER CONTACT:
MARK F. CALLAHAN
DIRECTOR OF DEVELOPMENT
LINCOLN PROPERTY COMPANY
52 STATE STREET, 8TH FLOOR
BOSTON, MA 02109
OFFICE: 617-951-4112

BUILDING USE: COMMERCIAL

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects
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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

SITE CUT AND CAP PLAN

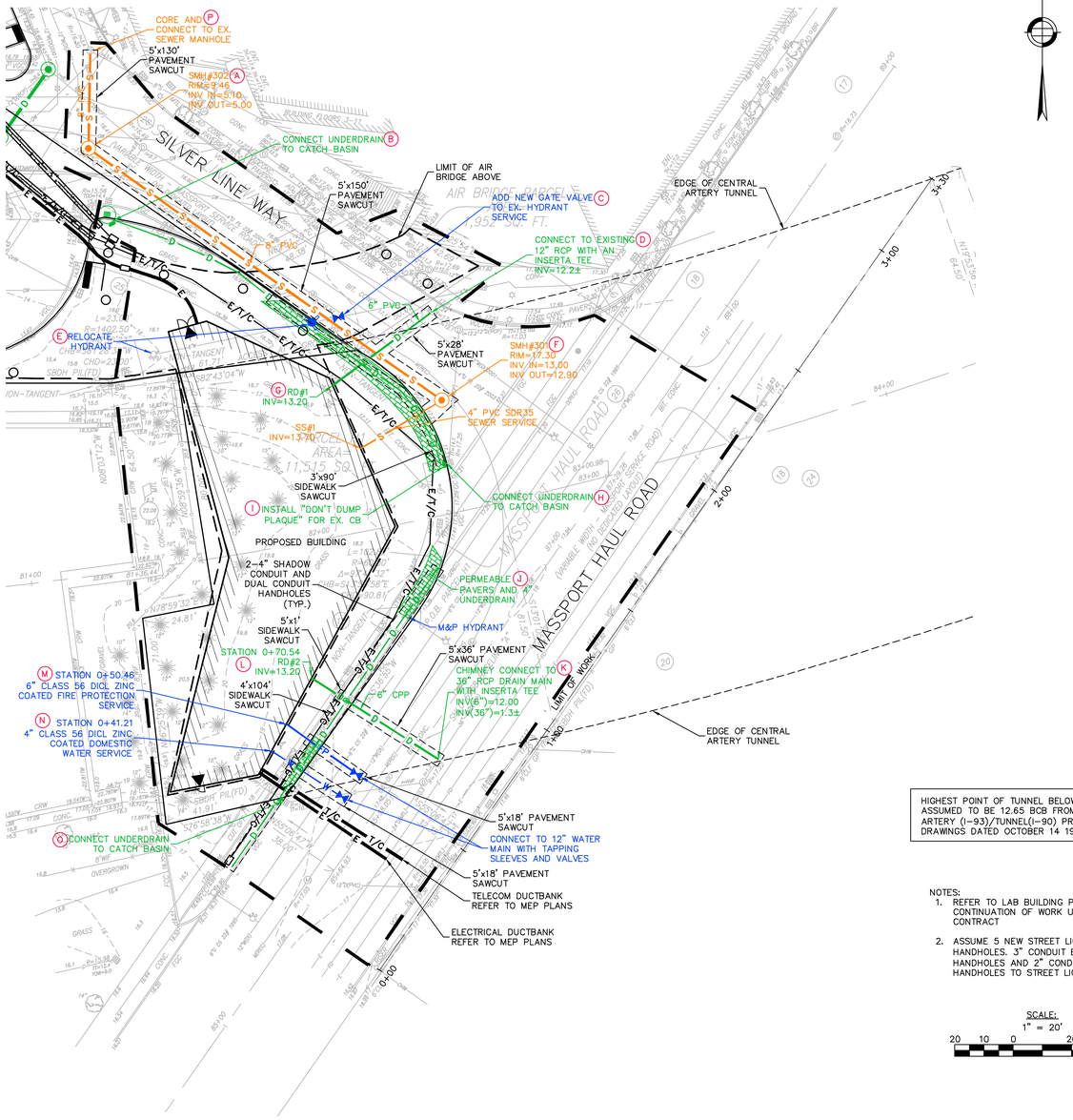
Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

C3.00

BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(A) – NEW SEWER MANHOLE 302				
(B) – NEW DRAIN CONNECTION				
(C) – NEW GATE VALVE				N/A
(D) – NEW DRAIN CONNECTION				
(E) – RELOCATE HYDRANT				N/A
(F) – NEW SEWER MANHOLE 301				
(G) – NEW ROOF DRAIN 1				
(H) – NEW DRAIN CONNECTION				
(I) – DON'T DUMP PLAQUE (2)				N/A
(J) – NEW 4" UNDERDRAIN				
(K) – NEW DRAIN CONNECTION				
(L) – NEW ROOF DRAIN 2				
(M) – NEW 6" FIRE PROTECTION SERVICE				N/A
(N) – NEW 4" DOMESTIC SERVICE				N/A
(O) – NEW DRAIN CONNECTION				
(P) – NEW SEWER CONNECTION				N/A
(Q) 4:1 I/I FEE				N/A
(R) AS-BUILT				



HIGHEST POINT OF TUNNEL BELOW PROJECT ASSUMED TO BE 12.65 BCB FROM CENTRAL ARTERY (I-93)/TUNNEL(I-90) PROJECT RECORD DRAWINGS DATED OCTOBER 14 1991

NOTES:
1. REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT
2. ASSUME 5 NEW STREET LIGHTS WITH 6 HANDHOLES, 3" CONDUIT BETWEEN HANDHOLES AND 2" CONDUIT FROM HANDHOLES TO STREET LIGHT

SCALE:
1" = 20'
20 10 0 20 40

BWSC SITE PLAN #_____

BWSC USE ONLY

OWNER:
MASSACHUSETTS PORT AUTHORITY
1 HARBORSIDE DRIVE, SUITE 200S
BOSTON, MA 02128

BUILDING ADDRESS:
701 CONGRESS STREET
BOSTON, MA 02210

WARD / PARCEL #:
WARD 06 PARCELS 02681000

LAND USE CODE:
EXEMPT

METER NUMBERS:
TO BE ASSIGNED

ACCOUNT NUMBERS:
TO BE ASSIGNED

CONTACT:

TEL.:

BUILDING USE: COMMERCIAL

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
STUDIO ENÉE architects
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PROJECT INFORMATION
SEAPORT CIRCLE PAVILION
MASSPORT PARCEL H

ISSUANCE:
60% MBTA DESIGN SUBMISSION

STAMP:
NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:
CIVIL UTILITY PLAN

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:
C4.00

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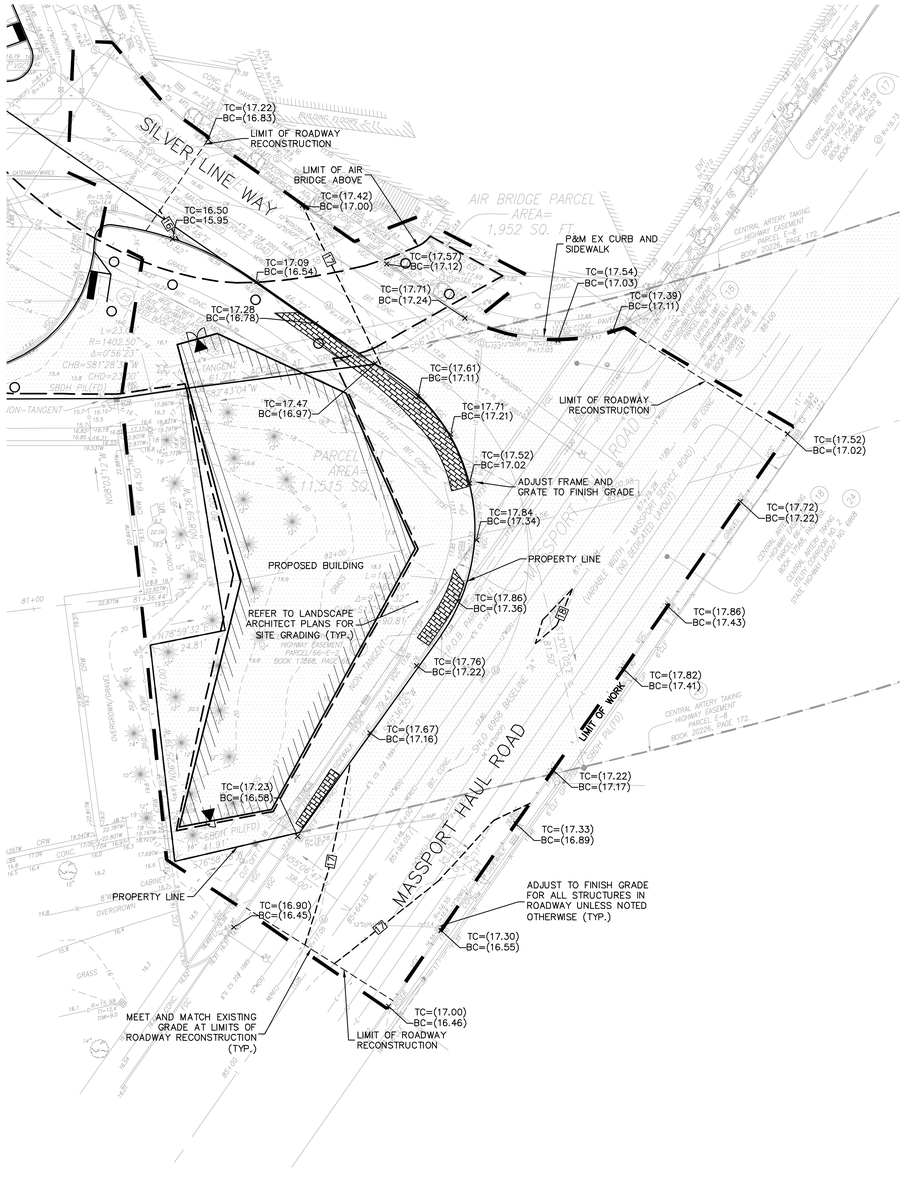

NOTES:
1. REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT
2. FFE AND SITE GRADING TO BE COORDINATED WITH LA AND ARCHITECT AT NEXT SUBMISSION

SCALE:
1" = 20'

20 10 0 20 40

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects

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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

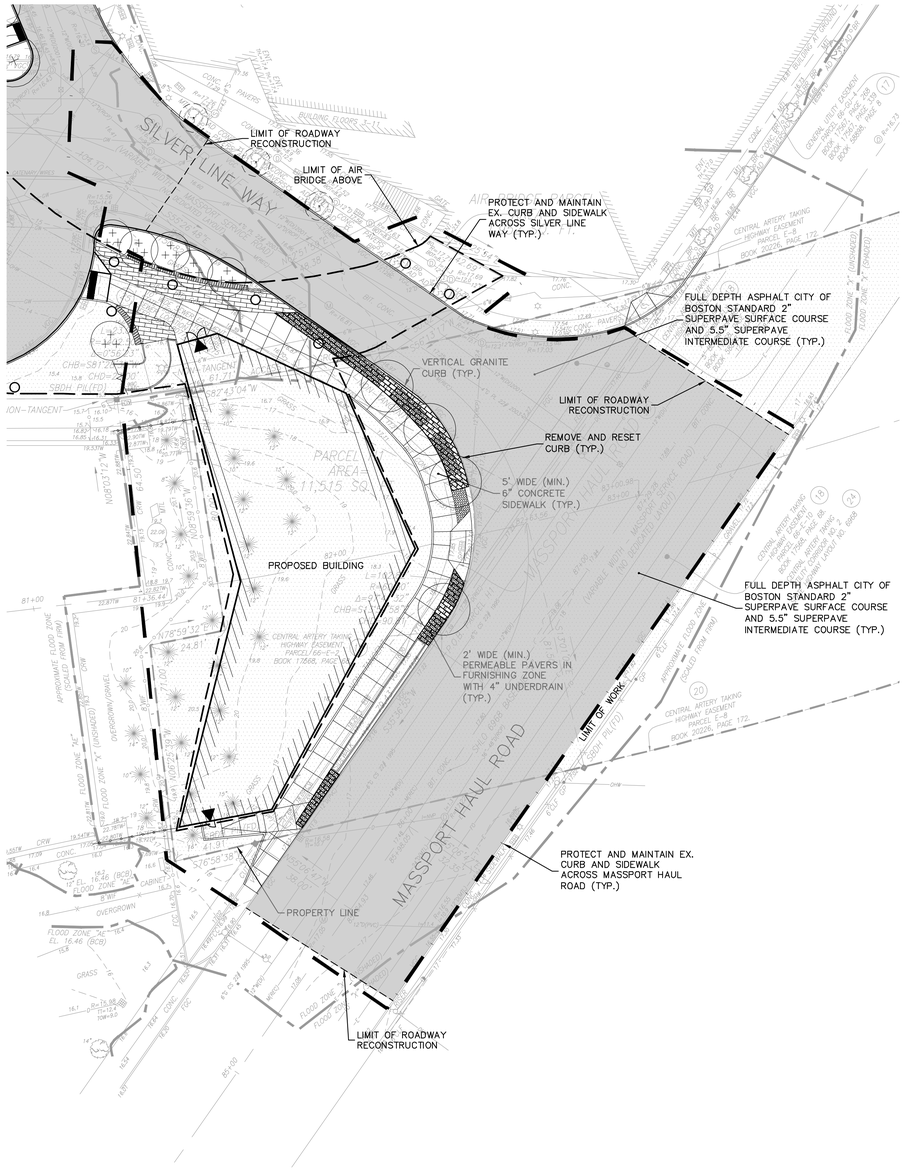
DRAWING TITLE:

CIVIL ROADWAY GRADING PLAN

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

C5.00



NOTE:
REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT

SCALE:
1" = 20'
20 10 0 20 40

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CLIENT:

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ARCHITECT:

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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

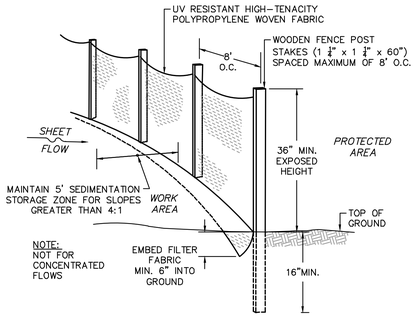
DRAWING TITLE:

LAYOUT AND MATERIALS PLAN

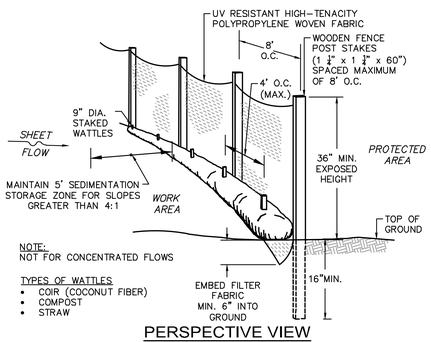
Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

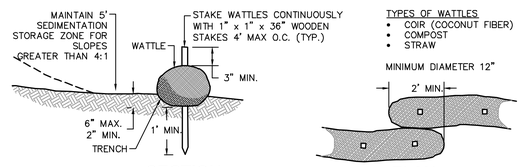
C6.00



PERSPECTIVE VIEW

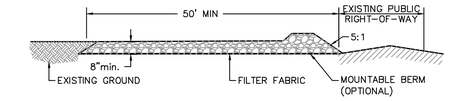


PERSPECTIVE VIEW

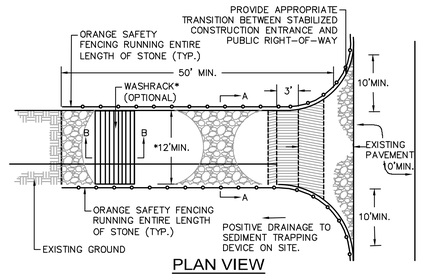


WATTLES - SLOPE PROTECTION FOR SLOPES LESS THAN 10:1

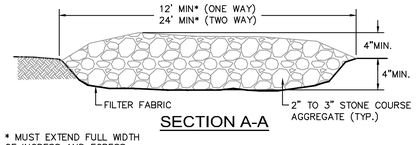
NOT TO SCALE



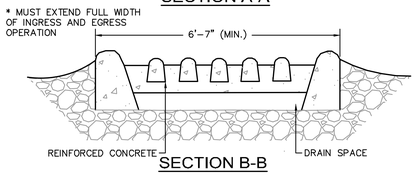
SIDE ELEVATION



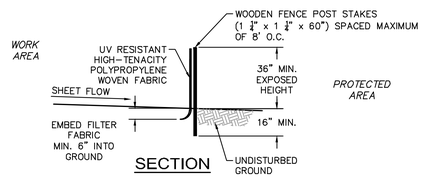
PLAN VIEW

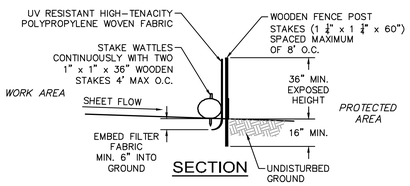


SECTION A-A



SECTION B-B

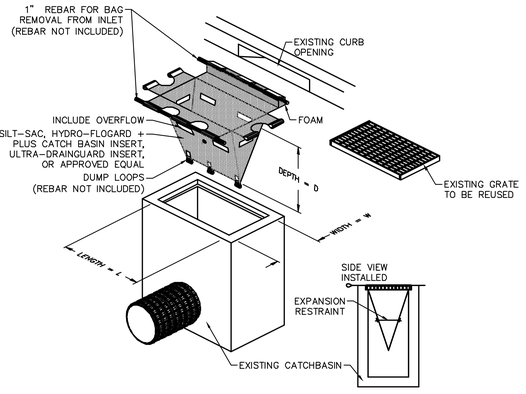




PERIMETER PROTECTION BARRIER
SILT FENCE DETAIL WITH WATTLES

NOT TO SCALE

PERIMETER PROTECTION BARRIER



THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS SHEET, OVERLAND OR CONCENTRATED FLOWS (NOT GREATER THAN 1 CFS). THE METHOD CAN DRAIN FLAT AREA TO STEEP SLOPES. INLET CAPACITY WILL BE DECREASED WITH THIS METHOD AND THE CONTRACTOR SHALL EXPECT PONDING DURING HIGH FLOW EVENTS.

INLET PROTECTION
CATCH BASIN W/ SILTATION SACK

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

LENGTH – GREATER THAN OR EQUAL TO 50 FEET

WIDTH – TWELVE FOOT MINIMUM (ONE WAY), TWENTY FOUR FOOT MINIMUM (TWO WAY), BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.

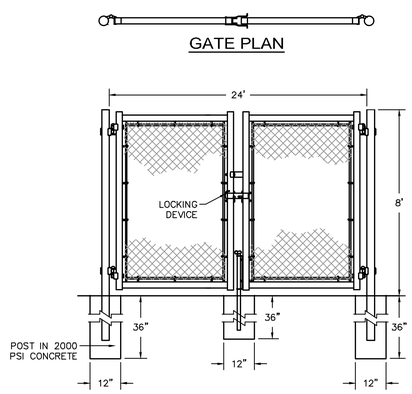
SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM SHALL BE PERMITTED.

THICKNESS – 8"

MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED.

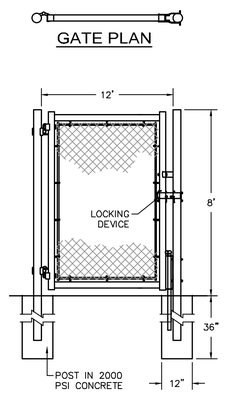
STABILIZED CONSTRUCTION ENTRANCE



DOUBLE GATE ELEVATION

24' WIDE DOUBLE GATE

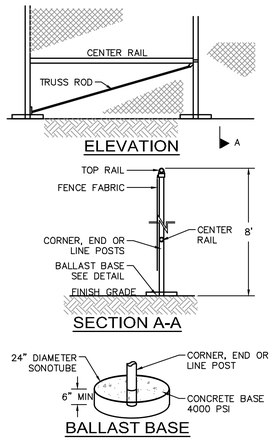
NOT TO SCALE



SINGLE GATE ELEVATION

12' WIDE EMERGENCY GATE

NOT TO SCALE



NOTES

1. END, GATE AND CORNER POSTS SHALL BE BRACED TO ADJACENT LINE POSTS. (MORE THAN 30° CHANGE IN DIRECTION CONSTITUTES A CORNER)
2. FABRIC SHALL BE 0.148" GAUGE MIN. WIRE, WOVEN INTO APPROXIMATELY 2" DIAMOND MESH.
3. ZINC-COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH PRIME WESTERN SPELTER OR EQUAL.
4. ALUMINUM COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH ALUMINUM ALLOY.
5. LINE POSTS SHALL BE 2½" O.D. END OR CORNER POSTS SHALL BE 3" O.D.
6. THE CONTRACTOR IS RESPONSIBLE FOR SURFACE RESTORATION ONCE THE FENCE IS REMOVED.
7. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE TEMPORARY CONSTRUCTION FENCE AT THE CONCLUSION OF THE PROJECT.

TEMPORARY CONSTRUCTION
CHAIN LINK FENCE WITH BALLAST BASE

NOT TO SCALE

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects
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► Transportation Engineering
► Structural Engineering
► Green Infrastructure
► Planning
► GIS

PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55998
REGISTERED
PROFESSIONAL ENGINEER

KEY PLAN

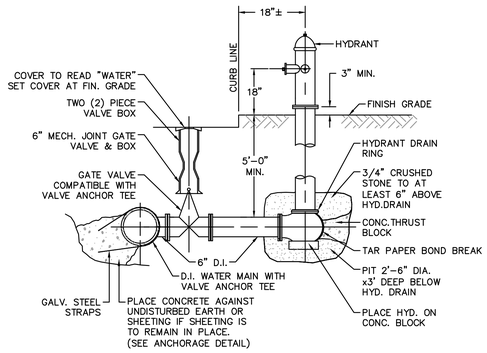
DRAWING TITLE:

CIVIL DETAILS

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

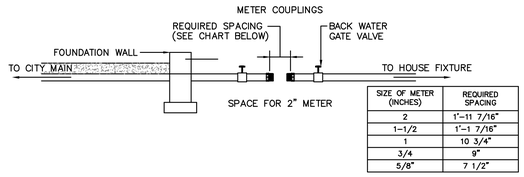
C7.00



NOTE: ALL JOINTS ON HYDRANT BRANCH TO BE RESTRAINED JOINTS

FIRE HYDRANT DETAIL

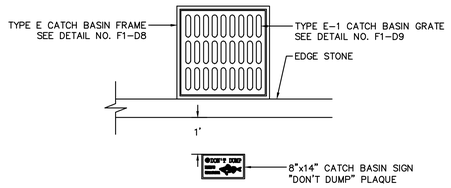
NOT TO SCALE



SIZE OF METER (INCHES)	REQUIRED SPACING
2	1'-11 7/16"
1-1/2	1'-1 7/16"
1	10 3/4"
3/4	9"
5/8"	7 1/2"

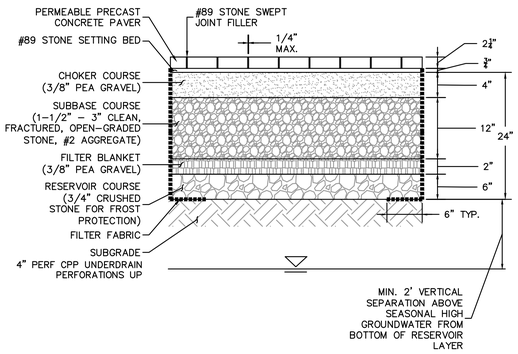
BWSC METER SPACING DETAIL

NOT TO SCALE



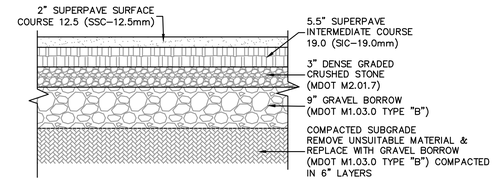
CATCH BASIN SIGN INSTALLATION

NOT TO SCALE



PERMEABLE PAVEMENT SYSTEM (TYP.)

NOT TO SCALE

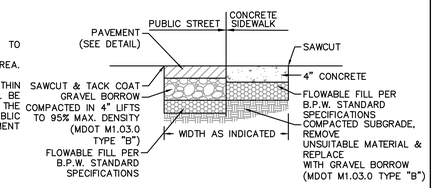


HOT MIX ASPHALT PAVING (TWO COURSES) DETAIL

NOT TO SCALE

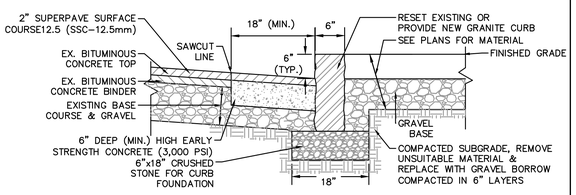
NOTES:

1. SURFACE FINISH TO MATCH SURROUNDING AREA.
2. PERMANENT RESTORATION WITHIN ROADWAY SHALL BE COMPLETED BY THE BOSTON PUBLIC WORKS DEPARTMENT



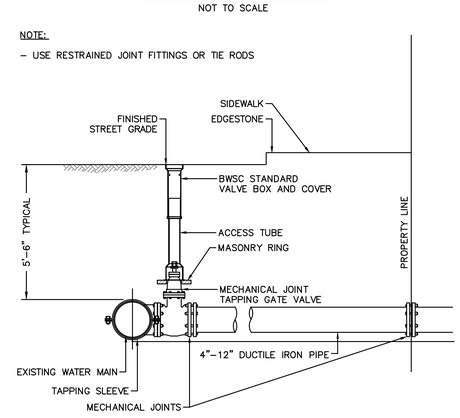
SURFACE RESTORATION WITHIN PUBLIC WAYS DETAIL

NOT TO SCALE



TYPICAL GRANITE CURB IN PUBLIC WAY SECTION DETAIL

NOT TO SCALE

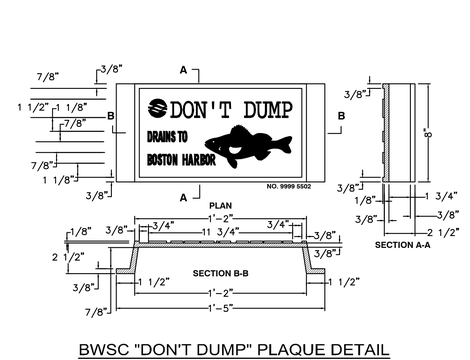


NOTE:

- USE RESTRAINED JOINT FITTINGS OR TIE RODS

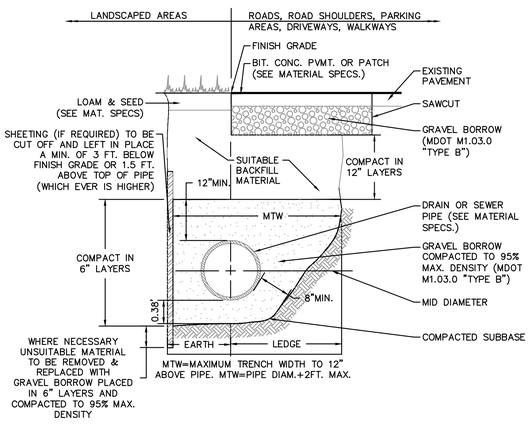
TYPICAL WATER PIPE CONNECTION WITH TAPPING SLEEVE AND GATE VALVE

NOT TO SCALE



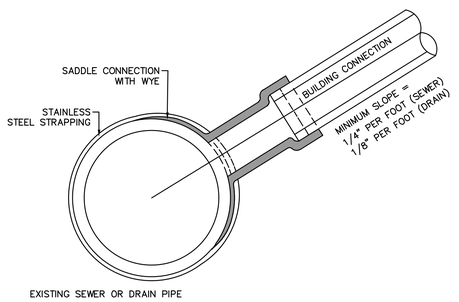
BWSC "DON'T DUMP" PLAQUE DETAIL

NOT TO SCALE



STANDARD TRENCH DETAIL FOR UTILITY PIPE

NOT TO SCALE

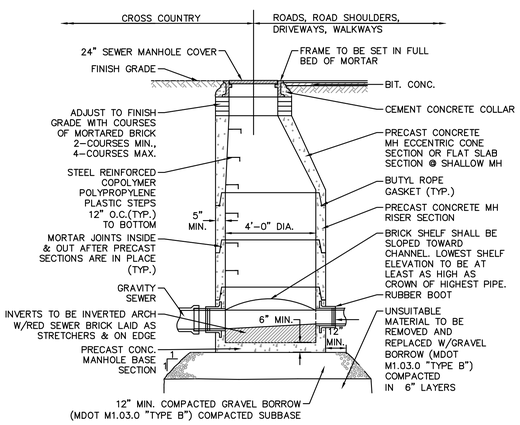


NOTES:

1. FULL PVC OR IRON SADDLE MAY BE USED TO CONNECT TO EXISTING PVC, CLAY, CONCRETE OR IRON PIPE.
2. SADDLES MUST HAVE RUBBER GASKETS AND SHALL BE TIGHTENED WITH STRAPS. SADDLES WILL NOT BE CEMENTED ONTO THE PIPE.
3. FULL WYE CONNECTION FITTINGS MAY BE USED.
4. PIPE SHALL BE CUT TO CONFORM TO THE OPENING IN THE SADDLE.
5. CONNECTIONS DIRECTLY INTO THE EXISTING PIPE WITHOUT A SADDLE OR A FULL WYE FITTING ARE NOT ALLOWED.

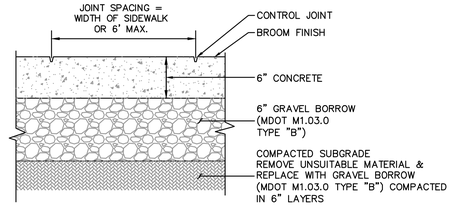
TYPICAL SADDLE CONNECTION DETAIL TO EXISTING DRAIN OR SEWER (6" TO 15")

NOT TO SCALE



TYPICAL SEWER MANHOLE DETAIL

NOT TO SCALE



NOTES:

1. SURFACE FINISH TO MATCH SURROUNDING AREA.
2. REFER TO CITY OF BOSTON PUBLIC WORKS DEPARTMENT RULES AND SPECIFICATIONS FOR EXCAVATION ACTIVITY WITHIN THE CITY OF BOSTON FOR MATERIALS AND INSTALLATION REQUIREMENTS.
3. CONCRETE SIDEWALK WITH MEDIUM BROOM FINISH. DIRECTION OF FINISH TO BE PERPENDICULAR TO THE LONGITUDINAL DIRECTION OF PAVEMENT. CONTROL JOINTS SHALL BE PLACED AT 6' O.C., EXPANSION JOINTS 30' O.C.
4. CONTROL JOINTS SHOULD BE SAW CUT.

CONCRETE SIDEWALK DETAIL

NOT TO SCALE

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

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- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED
PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL DETAILS

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

C7.01

October 19, 2022

STORMWATER REPORT

For
SEAPORT CIRCLE
777 Congress Street
Boston, MA 02210

Prepared for:

LO Parcel H, LLC
53 State Street, 8th Floor
Boston, MA 02109

Prepared by:

NITSCH ENGINEERING, INC.
2 Center Plaza, Suite 430
Boston, MA 02143

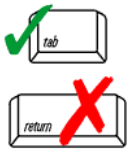
Nitsch Project #13511

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

---

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

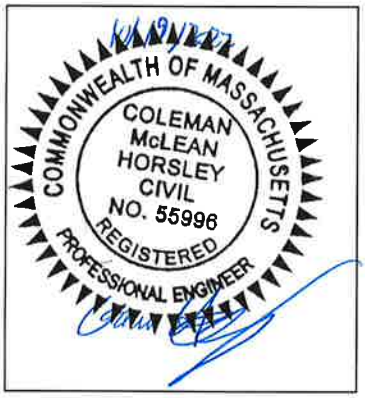
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



10/19/2022
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☒ Other (describe): Porous Pavement and Recharge Wells

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☒ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

---

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☒ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☒ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

TABLE OF CONTENTS

1.0 INTRODUCTION

Nitsch Engineering has prepared this Stormwater Report to support the Boston Conservation Commission (BCC) Notice of Intent (NOI) application. The project site is located at 777 Congress Street in the South Boston Waterfront of Boston, Massachusetts (subsequently referred to as the "Site"). The Project Site includes a 0.96-acre surface parking lot on Parcel H, which is owned by the Massachusetts Port Authority (Massport), an adjacent 0.3 acres of undeveloped land, and a 1.26-acre parcel consisting of the Massachusetts Bay Transportation Authority (MBTA) Silver Line Way and land that includes the existing Boston Water and Sewer Commission (BWSC) Pump Station. In addition, the project is providing improvements to 1.28-acres of public-access roadways adjacent to the site. This area was included in drainage analyses in this report but not included in mitigation calculations. The project site is bounded by Interstate 90 to the south, Congress Street to the north, Port Lane to the west, and Starboard Way to the east. The Project includes construction of a laboratory/research & development and office building and job training/non-profit center named Seaport Circle (the Project). Other site improvements include installation of new utilities to support the proposed site and construction of new stormwater management systems.

The proposed stormwater management system has been designed to comply with the requirements of the Boston Water and Sewer Commission (BWSC) and the Massachusetts Department of Environmental Protection (DEP) Stormwater Management Standards.

2.0 EXISTING CONDITIONS

The Site is located at 777 Congress Street in the South Boston Waterfront of Boston, Massachusetts. The existing site is developed as a parking lot on Parcel H with an adjacent 0.3 acres of undeveloped land. The site is within the FEMA Zone AE with a Base Flood Elevation (BFE) of 10' NAVD88 (16,46 BCB) and Zone X: Area of Minimal Flood Hazard. The proposed site improvements within 110,542 square feet of jurisdictional Land Subject to Coastal Storm Flowage.

2.1 Existing Drainage Infrastructure

The existing Parcel H is developed as a parking lot sloping slightly to the south and drains via four on-site catch basins in the center of the Site. These catch basins then connect to the 12-inch BWSC drain in Congress Street. The adjacent undeveloped land with a high point along the western part of the Site adjacent to the Massachusetts Turnpike Overpass and sloping to the east towards Silver Line Way and Haul Road.

According to BWSC record documents, the existing stormwater system in the vicinity of the Project is owned and managed by Massport. The records indicate that there is a storm drain in Congress Street, Silver Line Way, and Starboard Way. In Congress Street, there is an 18-inch drain line adjacent to the Project Site and increases to 30 inches as it runs North on to Northern Avenue to Boston Harbor. Within Silver Line Way, there is also a 12-inch drain line that increases to 15 inches as it connects to a 15-inch drain line in Starboard Way adjacent to the site. All stormwater mains discharge to outfall SDO241 in Boston Harbor along Northern Avenue.

2.2 NRSC Soil Designations

The Soil Classification Summary (Table 1) outlines the Natural Resources Conservation Services (NRCS) designation of the soil series at the Site. The soils within the Project Site are classified within two categories (Figure 5).

Table 1. Soil Classification Summary

Soil Unit	Soil Series	Hydrologic Soil Group
603	Urban land, wet substratum, 0 to 3 percent slopes	---
655	Udorthents, wet substratum	---

2.3 On-Site Soil Investigations

A Geotechnical Design Report was prepared by Haley & Aldrich, Inc. (H&A) using available subsurface explorations to provide design recommendations. Previous investigations include test borings from December 2000 – May 2001 at Massport Parcel F-1, test borings from 2017 at Massport Parcel K, and test borings from December 1989 – March 1990 from the CA/T Tunnel. The report generally described the subsurface conditions at the Site as an approximately 25-40ft layer of sill and organic soils overlying inorganic and naturally deposited Marine Clay soils. Additional subsurface explorations at the Project Site are proposed by H&A and will be conducted when the site is accessible. The Geotechnical Design Report can be found in Appendix E.

2.4 Wetland Resource Areas

There is one wetland resource area per the *Massachusetts Wetlands Protection Act* located within the vicinity of the project. The site is within the FEMA Zone AE with a Base Flood Elevation (BFE) of 10' NAVD88 (16,46 BCB) and Zone X: Area of Minimal Flood Hazard. The proposed site improvements are within 110,542 square feet of jurisdictional Land Subject to Coastal Storm Flowage.

2.5 Total Maximum Daily Load (TMDL)

The Site ultimately discharges into the lower Charles River and therefore is located within the Charles River watershed and is subject to TMDL for phosphorous the Lower Charles River Basin by MassDEP. The project is also subject to the TMDL for pathogens for the Charles River. The Project has been designed to minimize stormwater discharge and associated phosphorus pollutants through infiltration and porous pavement to meet the 65% load reduction. The Project will also meet the intent of the pathogen TMDL through infiltration and best management practices during the installation of the restrooms and sanitary sewer connection. No illicit discharges or sanitary sewer overflows (SSOs) are anticipated at the Site. Design calculations for the Site excluding public ways can be found in Appendix A.

3.0 PROPOSED CONDITIONS

3.1 Project Description

The project involves the construction of a laboratory/research & development and office building and job training/non-profit center named Seaport Circle. Other site improvements include installation of new utilities to support the proposed site and construction of new stormwater management systems. There are two buildings connected via internal walkways with landscaping and an above ground sky bridge.

The Project is classified as a new development and is anticipated to increase the overall impervious area for the Project by approximately 12,490 square feet. Table 2 below indicates the pre- and post-development uses and surface coverage characteristics of the Site.

Table 2. Proposed land use change for Seaport Circle (in square feet)

Land Use	Existing	Proposed	Change
Building Area	1,505	81,080	+79,575
Site Impervious Area	139,325	72,240	-67,085
Landscaping	24,615	12,125	-12,490
Total	165,445	165.445	0

3.2 Stormwater Management System

The Site will include the installation of a stormwater management system that is designed to meet the MassDEP Stormwater Management Standards. As a new development, the Project is required to provide peak flow and volume mitigation under MassDEP Regulations and provide water quality treatment and groundwater recharge.

The proposed stormwater management system for the Project will include infiltration via porous pavement and recharge wells. The stormwater from the main building and associated canopy will collect in an underground stormwater management system that infiltrates via two recharge wells. This infiltration system includes a 86,000 gallon (11,500 cf) tank which was sized to accommodate 1.25” of runoff across the impervious area from the entire site. Site pavement and landscaping will run off into catch basins in the street and/or porous pavement. The runoff from the pavilion will be directed to the street drainage system, the volume of runoff from the pavilion is accounted for in the volume of the infiltration system for the main building. Street drainage will continue to utilize the existing infrastructure via catch basins.

Refer to Appendix A for design sheets detailing the treatment via porous pavement. The proposed stormwater management system will work to improve stormwater quality leaving the Site, by treating stormwater to remove TSS and phosphorus and reduce peak rates of runoff from the Site. Overflow from the proposed BMPs will be discharged to the to BWSC drain main in Port Lane.

3.3 Stormwater Management During Construction

The Site Contractor will be responsible for stormwater management of the active construction site and is required to adhere to the conditions of the 2022 Construction General Permit under the Environmental Protection Agency through the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP). A draft SWPPP will be prepared in accordance with the MassDEP Stormwater Management Standards and the 2022 Construction General Permit and will be provided at a later date.

4.0 STORMWATER MANAGEMENT ANALYSIS

4.1 Methodology

Nitsch Engineering completed a hydrologic analysis of the existing project site utilizing Soil Conservation Service (SCS) Runoff Curve Number (CN) methodology. The SCS method calculates the rate at which the runoff reaches the design point considering several factors: the slope and flow lengths of the subcatchment area, the soil type of the subcatchment area, and the type of surface cover in the subcatchment area. HydroCAD Version 10.00 computer modeling software was used in conjunction with the SCS method to determine the peak runoff rates and runoff volumes for the 2-, 10-, 25-, and 100-year, 24-hour storm events. The proposed project site is being analyzed with the same methodology.

The Site was divided into multiple drainage areas, or subcatchments, which drain to the design points along the property boundary and within the site. For each subcatchment area, SCS Runoff Curve Numbers (CNs) were selected by using the cover type and hydrologic soil group of each area. The peak runoff rates and runoff volumes for the 2-, 10-, 25- and 100-year 24-hour storm events were then determined by inputting the drainage areas, CNs, and time of concentration (T_c) paths into the HydroCAD model.

The National Oceanic and Atmospheric Administration Atlas 14 precipitation frequency estimates were used to calculate the 2-, 10-, 25-, and 100- year 24-hour storm events in HydroCAD. Refer to the HydroCAD calculations in Appendix B and C for rainfall information.

4.2 HydroCAD Version 10.00

The HydroCAD computer program uses SCS and TR-20 methods to model drainage systems. TR-20 (Technical Release 20) was developed by the Soil Conservation Service to estimate runoff and peak discharges in small watersheds. TR-20 is generally accepted by engineers and reviewing authorities as the standard method for estimating runoff and peak discharges.

HydroCAD Version 10.00 uses up to four types of components to analyze the hydrology of a given site: subcatchments, reaches, basins, and links. Subcatchments are areas of land that produce surface runoff. The area, weighted CN, and T_c characterize each individual subcatchment area. Reaches are generally uniform streams, channels, or pipes that convey water from one point to another. A basin is any impoundment that fills with water from one or more sources and empties via an outlet structure. Links are used to introduce hydrographs into a project from another source or to provide a junction for more than one hydrograph within a project. The time span for the model was set for 0-48 hours in order to prevent truncation of the hydrograph.

4.3 Existing Hydrologic Conditions

Nitsch Engineering delineated the project site into two on-site sub catchment (watershed) areas discharging to two design point utilizing an existing conditions survey and on-site observations (See Figure FIG 1). Table 4 summarizes the design point, location and area of the watershed. The design point (DP) is defined as the wetland system. The HydroCAD model for existing conditions is provided in Appendix B and results from the HydroCAD calculations are summarized below in Table 3.

Table 3. Existing Drainage Area Summary

Subcatchment	Area (acres)	Description
EX DA #1	3.23	Parking, roadway, roof, and sidewalk
EX DA #2	0.57	Parking, roadway, and sidewalk
Total Area	**3.80**	

4.4 Proposed Hydrologic Conditions

The stormwater management system has been designed to mitigate peak runoff conditions in accordance with state and municipal requirements. Table 4 summarizes the DP, location, and area of each subcatchment for proposed conditions for the Project. The existing watershed areas were modified to reflect the proposed topography, storm drainage structures and BMPs, and roof areas. (See Figure FIG 2). The HydroCAD model for proposed conditions is provided in Appendix C.

Table 4. Proposed Drainage Area Summary*

Subcatchment	Area (acres)	Description
PR DA #1	0.03	Pavement, pervious pavers, and landscaping
PR DA #2	0.26	Pavement, pervious pavers, and landscaping
PR DA #3	1.22	Roadway and landscaping
PR DA #4	1.66	Roof – main building and canopy footprint
PR DA #5	0.08	Pavilion roof
PR-DA #6	0.14	Pavement and grass cover
PR DA #7	0.08	Pavilion roof
PR-DA #8	0.33	Roadway
Total Area	**3.80**	

4.5 Peak Flow Rates

The proposed stormwater management system is expected to reduce the proposed peak runoff rates to at or below the existing rates for the 2-, 10-, 25-, and 100-year storm events. Table 5 below summarizes the existing and proposed hydrologic analyses for the site.

Table 5 – Peak Rates of Runoff in Cubic Feet per Second (cfs)

Storm Event	2-year	10-year	25-year	100-year
Existing	10.68	17.40	21.58	27.96
Proposed	9.51	15.11	18.41	23.36

The HydroCAD model does not include the recharge via injection wells which provide 72-hour drawdown for the entire recharge tank volume which is equivalent to 0.264 acre-feet of the peak volumes of stormwater runoff. In order to account for this, Table 6 below includes both the HydroCAD output for proposed runoff along with the proposed runoff to includes the injection wells.

Table 6 –Volumes of Runoff for Total Site (in acre-feet)

Storm Event	2-year	10-year	25-year	100-year
Existing	0.847	1.410	1.763	2.301
Proposed	0.877	1.436	1.788	2.324
Proposed with Volume Reduction	0.613	1.172	1.524	2.060

5.0 MassDEP Stormwater Management Standards

The Project is considered a ***new development*** under the DEP Stormwater Management System. The Site will be designed to meet and exceed the MassDEP Stormwater Management Standards as summarized below:

Standard 1: No New Untreated Discharges

The Project will not discharge any untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. Stormwater from the Site will be collected and treated in accordance with the MassDEP Stormwater Management Standards and stormwater outfalls will be stabilized to prevent erosion.

Standard 2: Peak Rate Attenuation

The proposed stormwater management system will be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates. To prevent storm damage and downstream flooding, the proposed stormwater management practices will mitigate peak runoff rates for the 2-, 10-, 25- and 100-year, 24-hour storm events. Refer to Table 5 for an existing and proposed runoff rate comparison.

Standard 3: Groundwater Recharge

Most of the Site is expected to be able to support groundwater recharge via groundwater recharge wells. Infiltration is provided through this recharge system under the building.

Impervious Area in HSG D = 91,112 square feet
Rv (Recharge Volume) = 91,110 x 0.1 in. / (12 inches/ft)
= 759 cubic feet

Total Required Recharge Volume = 759 cubic feet

1.87 acres of 2.09 impervious acres, or 90%, are directed to the infiltrations BMPs. An adjustment calculation was performed to ensure the entire recharge requirement can be met by this area.

Adjusted Required Recharge Volume = [1/ (% to recharge system)] x Required Recharge Volume
= [1/0.90] x 759 cubic feet
= 1.11 x 759 cubic feet
= 844 cubic feet

The infiltration BMPs are sized to exceed the recharge volume required under the MassDEP Stormwater Management Standards.

Table 7. Proposed Recharge Volumes for Stormwater BMPs

Infiltration BMP	Recharge Volume (cf)
Subsurface Infiltration System	11,500
Total	**11,500**

Standard 4: Water Quality Treatment

The proposed stormwater management system will be designed to remove greater than 80% of the average annual post-construction load of Total Suspended Solids (TSS). The TMDL in the Lower Charles River requires a minimum of 65% phosphorus reduction and Fecal Coliform bacterial shall not exceed a geometric mean of 200 organisms per 100 mL in any representative set of samples, nor shall more than 10 percent of the samples exceed 400 organisms per 100mL. Structural stormwater BMPs include infiltration and porous pavement to remove any pathogens, a minimum of 80% Total Suspended Solids, and 65% Phosphorus from the 1.25” rainfall depth over the site. Infiltration calculation spreadsheets are provided in Appendix A.

Source control and pollution prevention measures, such as vacuum cleaning, street sweeping, proper snow management, and stabilization of eroded surfaces, are included in the Long-Term Pollution Prevention Plan and Operation and Maintenance Plan (Appendix D).

Standard 5: Land Uses with Higher Potential Pollutant Loads Refer to Standard 5 for LUHPPL Thresholds

The project is not considered a LUHPPL and therefore, this standard is not applicable.

Standard 6: Critical Areas

The Project is not located within any critical areas. Therefore, this standard is not applicable.

Standard 7: Redevelopments

The Project is not considered a redevelopment under the MassDEP Stormwater Management Standards. Therefore, this standard is not applicable.

Standard 8: Construction Period Pollution Prevention and Sedimentation Control

A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) will be developed and implemented during the Notice of Intent permitting process.

Because the Project will disturb more than one (1) acre of land, a Notice of Intent will be submitted to the Environmental Protection Agency (EPA) for coverage under the National Pollution Discharge Elimination System (NPDES) Construction General Permit. As part of this application the Applicant is required to prepare a Stormwater Pollution Prevention Plan (SWPPP) and implement the measures in the SWPPP. The SWPPP, which is to be kept on site, includes erosion and sediment controls (stabilization practices and structural practices), temporary and permanent stormwater management measures, Contractor inspection schedules and reporting of all SWPPP features, materials management, waste disposal, off-site vehicle tracking, spill prevention and response, sanitation, and non-stormwater discharges. A draft SWPPP will be provided at a later date.

Standard 9: Operation and Maintenance Plan

A post-construction operation and maintenance plan has been prepared and will be implemented to ensure that stormwater management systems function as designed. Source control and stormwater BMP operation requirements for the site are summarized in the Long-Term Pollution Prevention Plan and Operation and Maintenance Plan provided in Appendix D.

Standard 10: Prohibition of Illicit Discharges

There will be no illicit discharges to the stormwater management system associated with the Project. An Illicit Discharge Compliance Statement is provided in Appendix A.

6.0 CONCLUSION

In conclusion, the Project's stormwater management system will reduce or maintain peak runoff rates and volumes through infiltration and porous pavement to improve the water quality of stormwater being discharged from the Site. Environmentally sensitive site design and low impact development techniques will be implemented throughout the Site. The Project is being designed to meet and exceed the MassDEP Stormwater Management Standards and the BWSC requirements.

FIGURES

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EX DP#1

EX DA#1

EX DP#2

EX DA#2

CONGRESS STREET

PORT LANE

STARBOARD LANE

SILVER LINE WAY

MASSPORT HAULROAD

INTERSTATE 90
MASSACHUSETTS TURNPIKE
(MASSACHUSETTS DEPARTMENT OF TRANSPORTATION)
(PUBLIC – VARIABLE WIDTH)
(STATE HIGHWAY LAYOUT #6968)

SHLO 6968 MAIN BASELINE

PARCEL H
AREA=
96,776 SQ. FT.
=2.222 ACRES

PARCEL H1
AREA=
11,515 SQ. FT.

AIR BRIDGE PARCEL
AREA=
1,952 SQ. FT.

LEGEND

SUBCATCHMENT AREA

SUBCATCHMENT AREA LABEL

DESIGN POINT

SCALE:
1" = 20'
20 10 0 20 40

11/17/2021 9:58:35 AM

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

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- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

KEY PLAN

DRAWING TITLE:

EXISTING DRAINAGE AREAS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

FIG. 1

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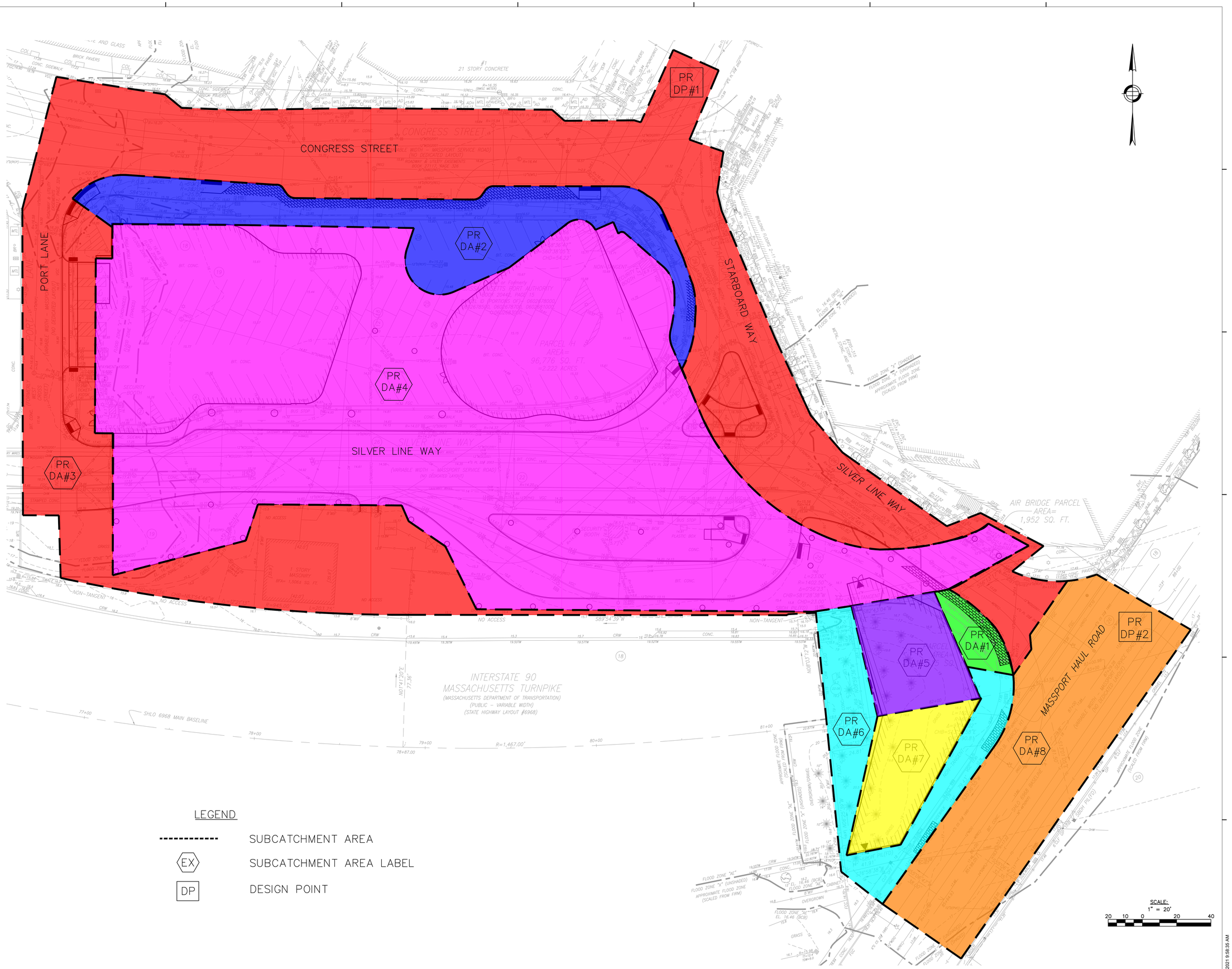

CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

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- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

KEY PLAN

DRAWING TITLE:

PROPOSED DRAINAGE AREAS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

FIG. 2

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APPENDIX A

Stormwater Management Standards Documentation

Standard 4: TSS Removal Spreadsheet
Phosphorus Removal Spreadsheet

Standard 10: Illicit Discharge Compliance Statement

Seaport Circle
WATER QUALITY TREATMENT SUMMARY

Nitsch Engineering has prepared this Water Quality Treatment Summary for the proposed Seaport Circle project for the City of Boston Conservation Commission Notice of intent application. In compliance with City of Boston requirements and MassDEP Stormwater Management Standard #4, the proposed stormwater management system is designed to remove at least 80% of the average annual post-construction load of Total Suspended Solids (TSS).

A summary of treatment trains proposed to provide water quantity control and water quality improvement at the proposed project site is provided below.

Treatment Train A
Subsurface Infiltration→ Closed Drainage system

Treatment Train B
Porous Pavement→ Subsurface Infiltration -> Closed Drainage System

Treatment Train A
Subsurface Infiltration → DP

Treatment Spreadsheet

B	C	D	E	F
BMP	TSS Removal Rate[1]	Starting TSS Load	Amount Removed (C*D)	Remaining Load (D-E)
Subsurface Infiltration	**0.80**	**1.00**	**0.80**	**0.20**

Total TSS Removal = **80%** **Meets 80% TSS removal requirement**

Treatment Train B
Porous Pavement → Subsurface Infiltration → DP

Treatment Spreadsheet

B BMP	C TSS Removal Rate	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Permeable Pavers/Porous Pavement	**0.80**	**1.00**	**0.80**	**0.20**
Subsurface Infiltration	**0.80**	**0.20**	**0.16**	**0.04**

Total TSS Removal = **96%** **Meets 80% TSS removal requirement**

PHOSPHORUS REMOVAL CALCULATIONS
MassPort Parcel H

Existing Phosphorus Loading

	Existing		
	Area ac	Export Rate lbs/acre/yr	Phosphorus Load lbs P/yr
Impervious - Pavement	1.92	1.78	3.41
Impervious - Roof	0.03	1.78	0.06
Pervious	0.58	0.29	0.17
Total	2.53		3.64
Phosphorus reduction required (65% of Phosphorus Load)			**2.37**

Structural Stormwater Strategies

	Surface Type	Treated Area (ac)	P Load Rate (lbs/ac/yr)	Starting P Load (lbs/yr)	P Removal (%)	P Removed (lbs/yr)
Infiltration	Roof	1.66	1.78	2.955		2.748
	Pavement	0.12	1.78	0.214	93%	0.20
	Landscape	0.30	0.29	0.086		0.080
				3.25		**3.03**

Total Phosphorus Removed	**3.03**
	3.03>2.37

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STANDARD 10: Illicit Discharge Compliance Statement

Project Name: Seaport Circle	Nitsch Project #: 13511
Location: 777 Congress Street, Boston, MA	Checked by:
Prepared by: Nitsch Engineering	Sheet No. 1 of 1
Date: 10/19/2022	

Standard 10 states: All illicit discharges to the stormwater management system are prohibited.

This is to verify:

1. Based on the information available there are no known or suspected illicit discharges to the stormwater management system at 777 Congress Street site as defined in the MassDEP Stormwater Handbook.

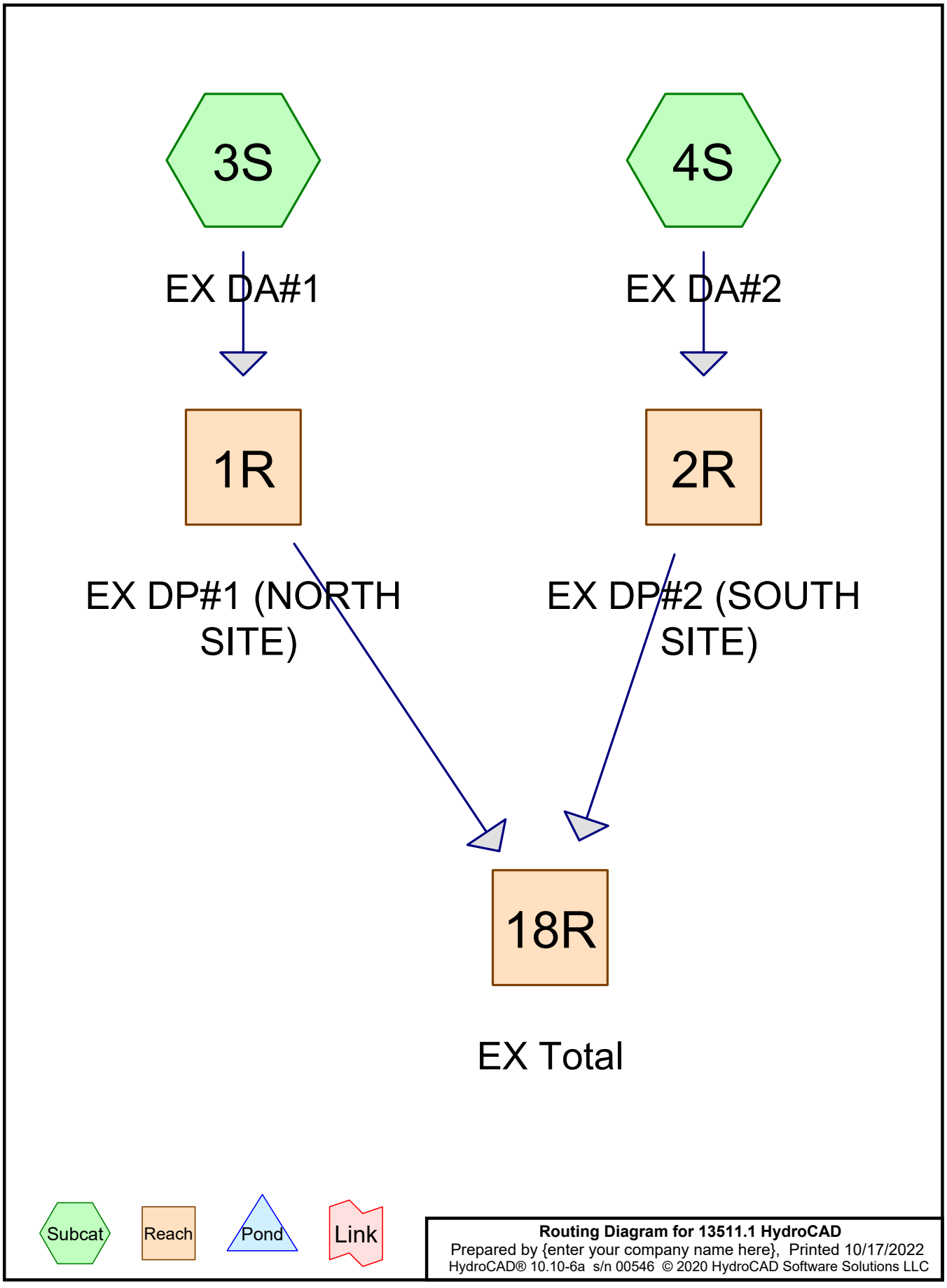
2. The design of the stormwater system includes no proposed illicit discharges.

Coleman Horsley, PE

10/19/2022
Date

APPENDIX B

Pre-Development Conditions – HydroCAD Calculations



Routing Diagram for 13511.1 HydroCAD
Prepared by {enter your company name here}, Printed 10/17/2022
HydroCAD® 10.10-6a s/n 00546 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	NOAA 24-hr	D	Default	24.00	1	3.20	2
2	10-year	NOAA 24-hr	D	Default	24.00	1	5.06	2
3	25-year	NOAA 24-hr	D	Default	24.00	1	6.23	2
4	100-year	NOAA 24-hr	D	Default	24.00	1	8.02	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.565	80	>75% Grass cover, Good, HSG D (3S, 4S)
3.233	98	Paved parking, HSG D (3S, 4S)
3.798	**95**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.798	HSG D	3S, 4S
0.000	Other	
3.798		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.565	0.000	0.565	>75% Grass cover, Good	3S, 4S
0.000	0.000	0.000	3.233	0.000	3.233	Paved parking	3S, 4S
0.000	**0.000**	**0.000**	**3.798**	**0.000**	**3.798**	**TOTAL AREA**	

Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: EX DA#1 Runoff Area=140,681 sf 87.54% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=96 Runoff=9.18 cfs 0.732 af

Subcatchment4S: EX DA#2 Runoff Area=24,764 sf 71.40% Impervious Runoff Depth>2.44"
Tc=6.0 min CN=93 Runoff=1.50 cfs 0.116 af

Reach 1R: EX DP#1 (NORTH SITE) Inflow=9.18 cfs 0.732 af
Outflow=9.18 cfs 0.732 af

Reach 2R: EX DP#2 (SOUTH SITE) Inflow=1.50 cfs 0.116 af
Outflow=1.50 cfs 0.116 af

Reach 18R: EX Total Inflow=10.68 cfs 0.847 af
Outflow=10.68 cfs 0.847 af

Total Runoff Area = 3.798 ac Runoff Volume = 0.847 af Average Runoff Depth = 2.68"
14.88% Pervious = 0.565 ac 85.12% Impervious = 3.233 ac

Summary for Subcatchment 3S: EX DA#1

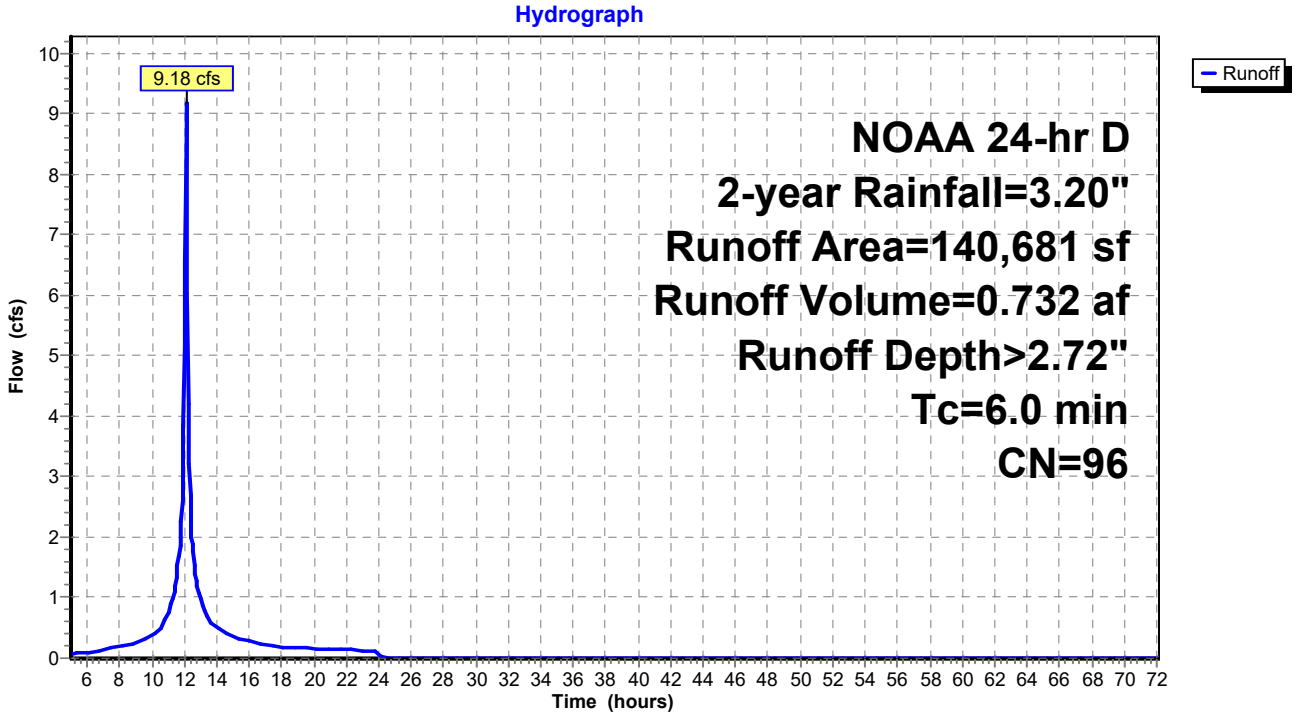
Runoff = 9.18 cfs @ 12.13 hrs, Volume= 0.732 af, Depth> 2.72"
Routed to Reach 1R : EX DP#1 (NORTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
17,533	80	>75% Grass cover, Good, HSG D
123,148	98	Paved parking, HSG D
140,681	96	Weighted Average
17,533		12.46% Pervious Area
123,148		87.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX DA#1



Summary for Subcatchment 4S: EX DA#2

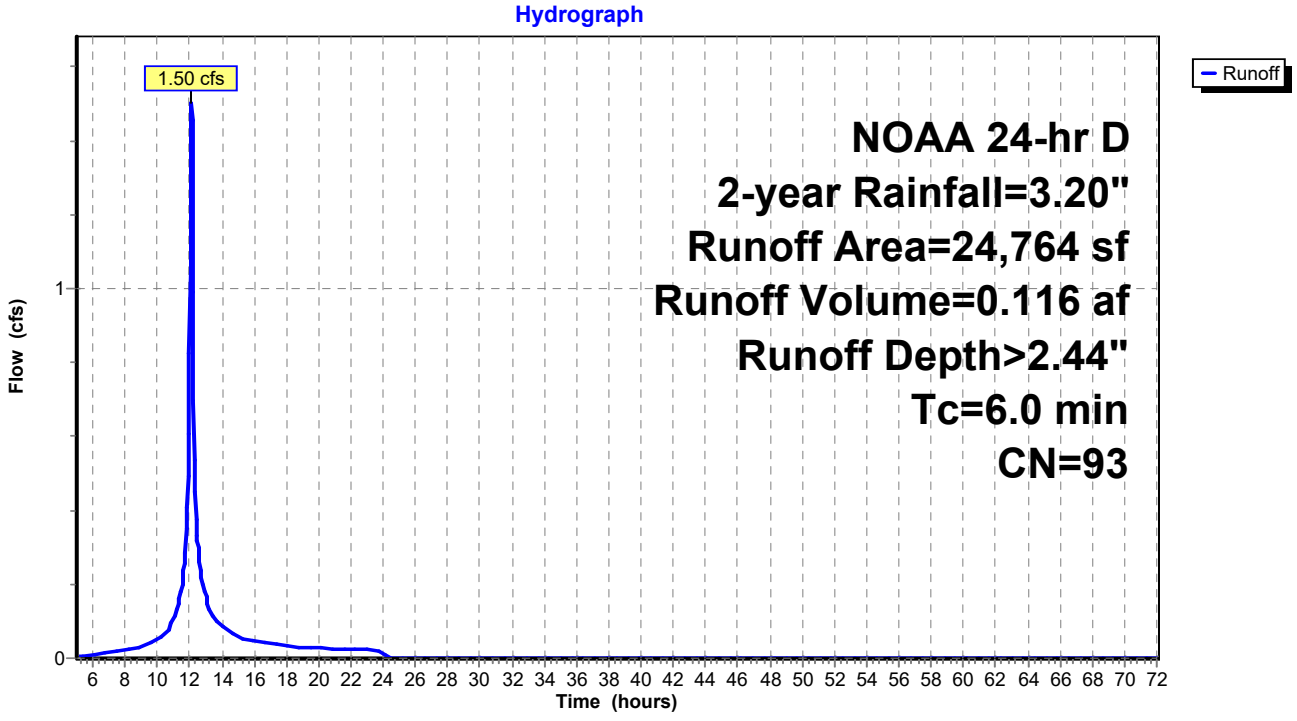
Runoff = 1.50 cfs @ 12.13 hrs, Volume= 0.116 af, Depth> 2.44"
Routed to Reach 2R : EX DP#2 (SOUTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
7,082	80	>75% Grass cover, Good, HSG D
17,682	98	Paved parking, HSG D
24,764	93	Weighted Average
7,082		28.60% Pervious Area
17,682		71.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX DA#2

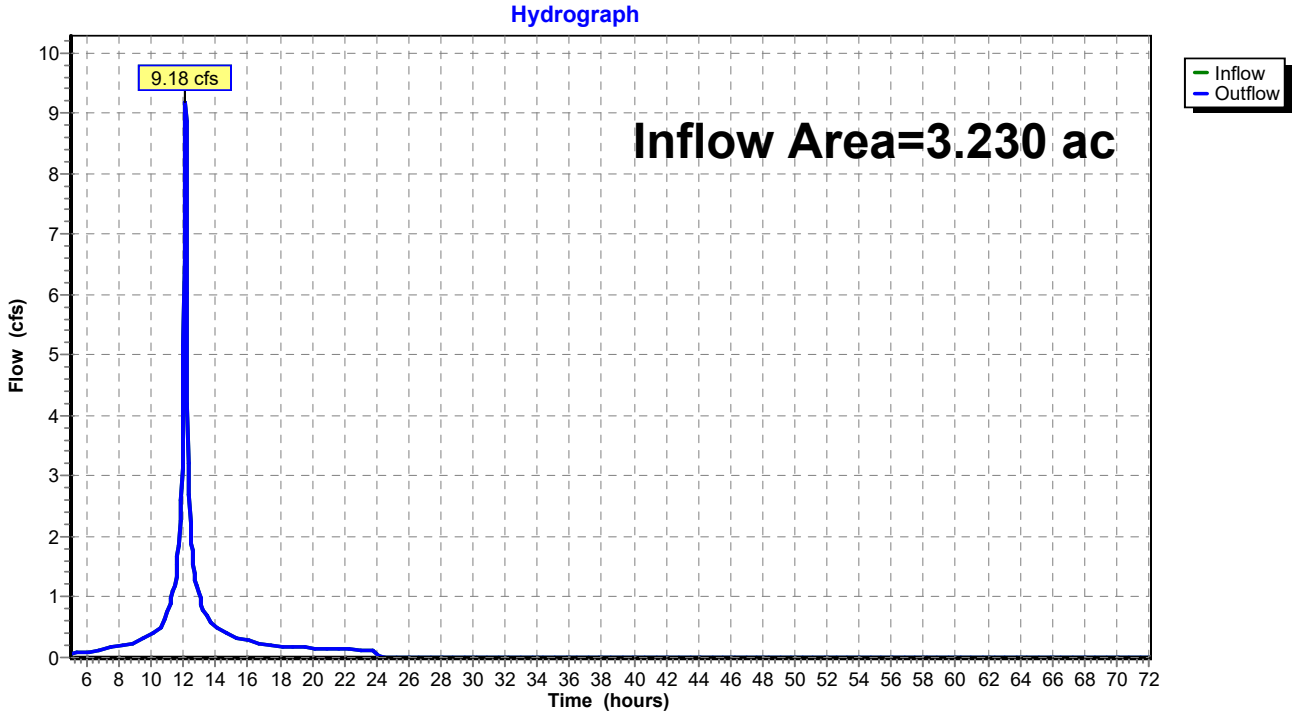


Summary for Reach 1R: EX DP#1 (NORTH SITE)

Inflow Area = 3.230 ac, 87.54% Impervious, Inflow Depth > 2.72" for 2-year event
Inflow = 9.18 cfs @ 12.13 hrs, Volume= 0.732 af
Outflow = 9.18 cfs @ 12.13 hrs, Volume= 0.732 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 18R : EX Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: EX DP#1 (NORTH SITE)

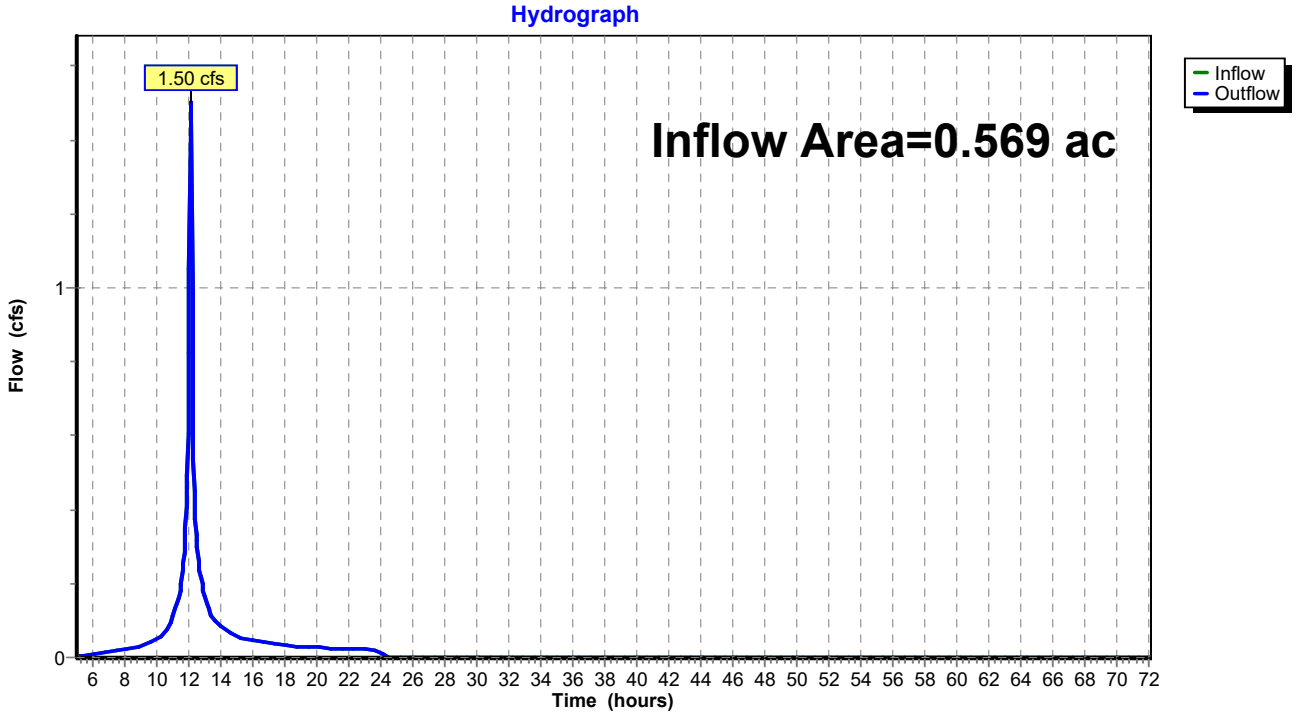


Summary for Reach 2R: EX DP#2 (SOUTH SITE)

Inflow Area = 0.569 ac, 71.40% Impervious, Inflow Depth > 2.44" for 2-year event
Inflow = 1.50 cfs @ 12.13 hrs, Volume= 0.116 af
Outflow = 1.50 cfs @ 12.13 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 18R : EX Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: EX DP#2 (SOUTH SITE)

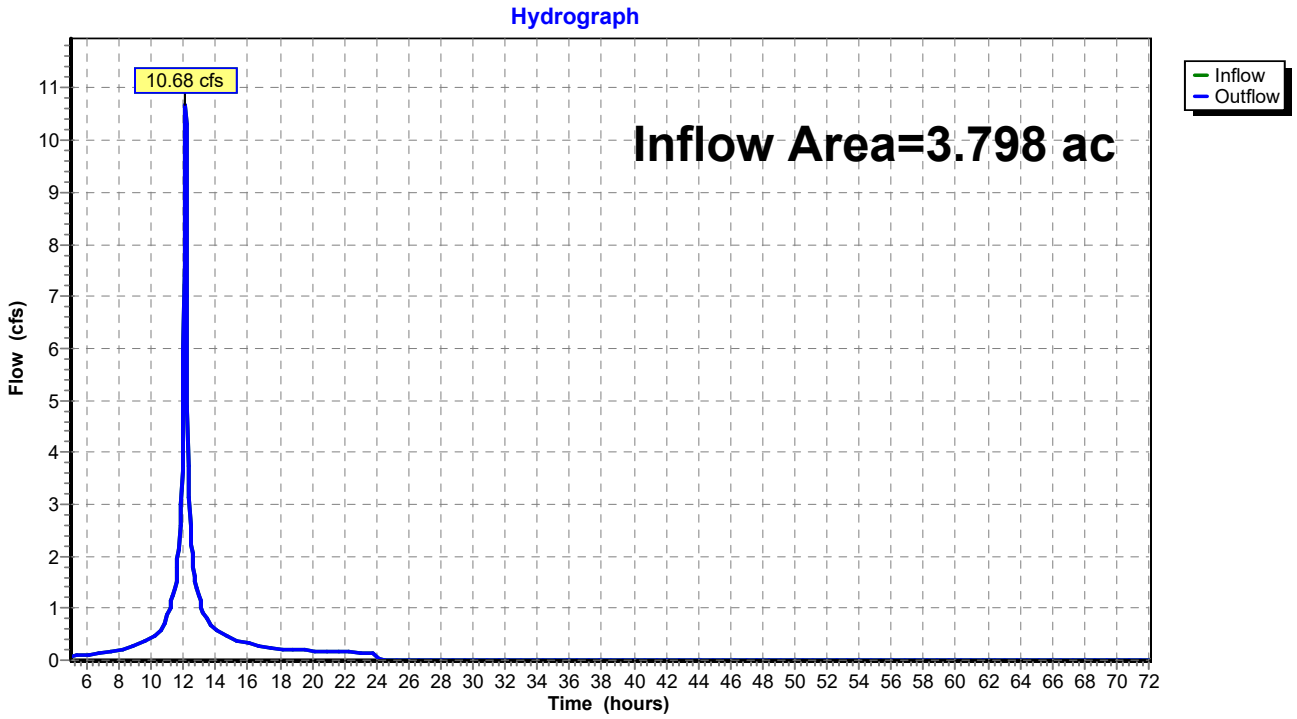


Summary for Reach 18R: EX Total

Inflow Area = 3.798 ac, 85.12% Impervious, Inflow Depth > 2.68" for 2-year event
Inflow = 10.68 cfs @ 12.13 hrs, Volume= 0.847 af
Outflow = 10.68 cfs @ 12.13 hrs, Volume= 0.847 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 18R: EX Total



Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: EX DA#1 Runoff Area=140,681 sf 87.54% Impervious Runoff Depth>4.50"
Tc=6.0 min CN=96 Runoff=14.87 cfs 1.210 af

Subcatchment4S: EX DA#2 Runoff Area=24,764 sf 71.40% Impervious Runoff Depth>4.22"
Tc=6.0 min CN=93 Runoff=2.53 cfs 0.200 af

Reach 1R: EX DP#1 (NORTH SITE) Inflow=14.87 cfs 1.210 af
Outflow=14.87 cfs 1.210 af

Reach 2R: EX DP#2 (SOUTH SITE) Inflow=2.53 cfs 0.200 af
Outflow=2.53 cfs 0.200 af

Reach 18R: EX Total Inflow=17.40 cfs 1.410 af
Outflow=17.40 cfs 1.410 af

Total Runoff Area = 3.798 ac Runoff Volume = 1.410 af Average Runoff Depth = 4.46"
14.88% Pervious = 0.565 ac 85.12% Impervious = 3.233 ac

Summary for Subcatchment 3S: EX DA#1

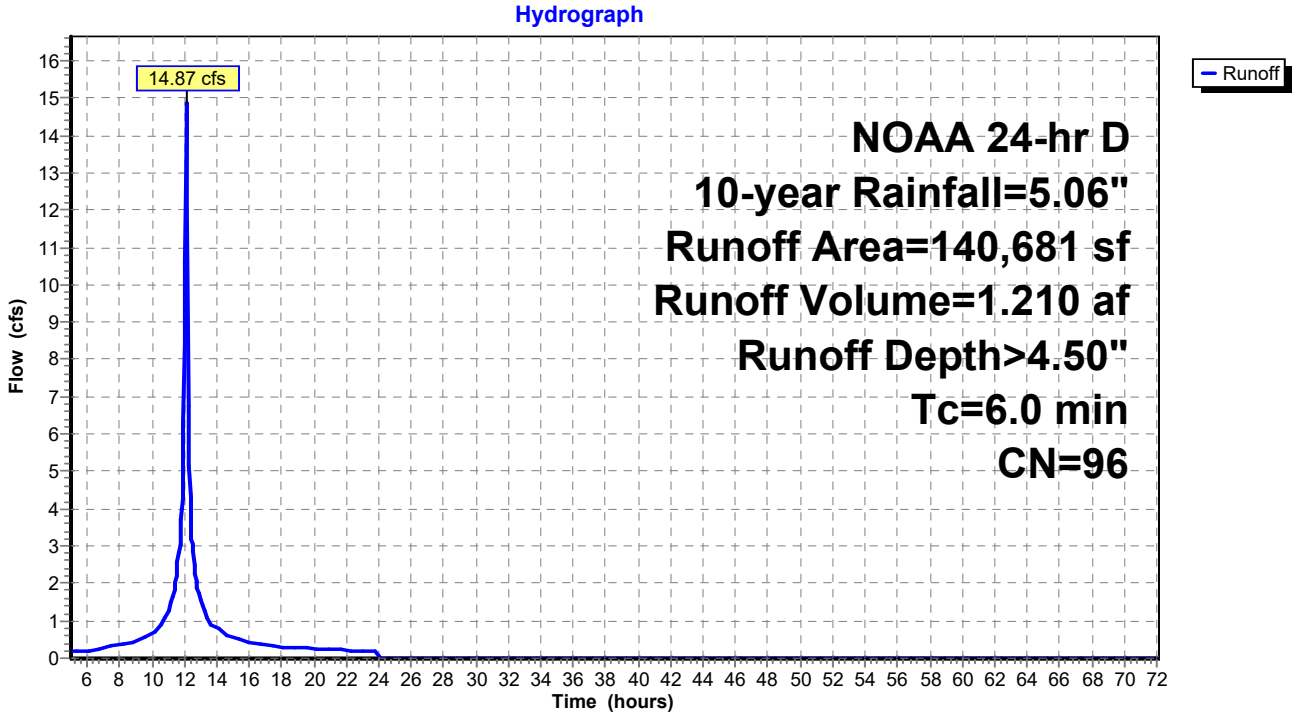
Runoff = 14.87 cfs @ 12.13 hrs, Volume= 1.210 af, Depth> 4.50"
Routed to Reach 1R : EX DP#1 (NORTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
17,533	80	>75% Grass cover, Good, HSG D
123,148	98	Paved parking, HSG D
140,681	96	Weighted Average
17,533		12.46% Pervious Area
123,148		87.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX DA#1



Summary for Subcatchment 4S: EX DA#2

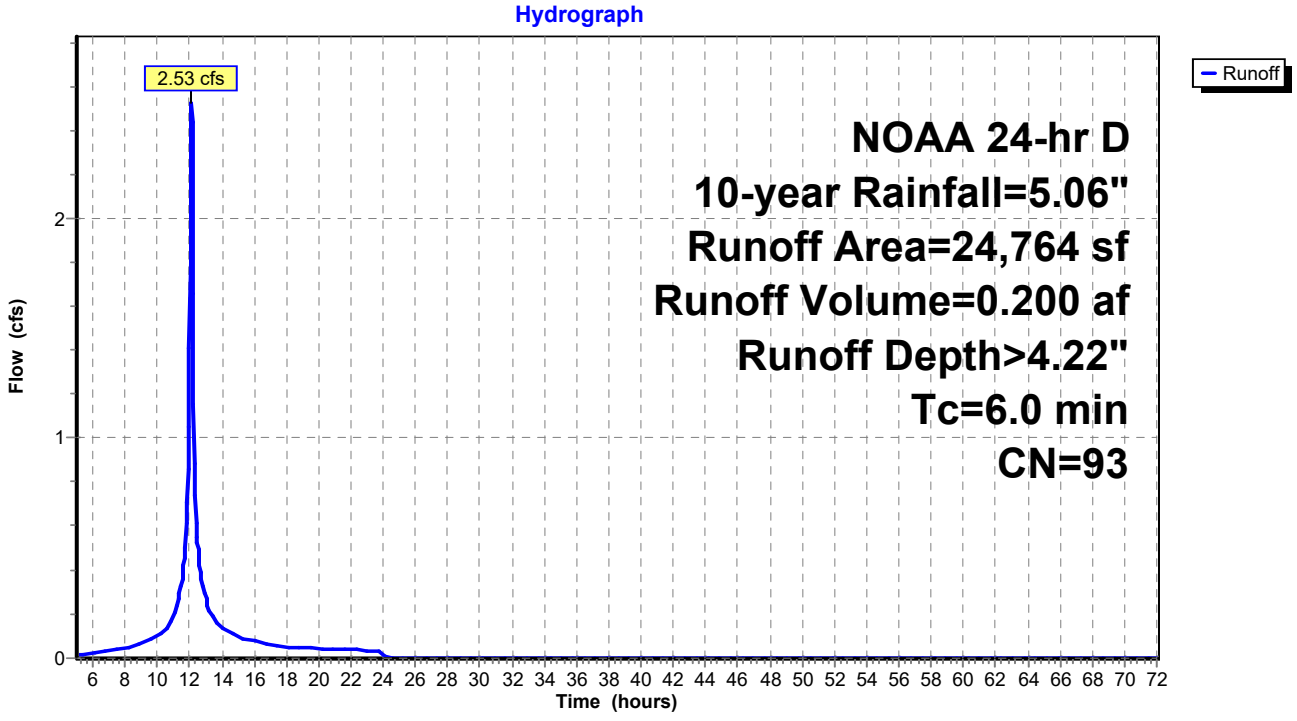
Runoff = 2.53 cfs @ 12.13 hrs, Volume= 0.200 af, Depth> 4.22"
Routed to Reach 2R : EX DP#2 (SOUTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
7,082	80	>75% Grass cover, Good, HSG D
17,682	98	Paved parking, HSG D
24,764	93	Weighted Average
7,082		28.60% Pervious Area
17,682		71.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX DA#2

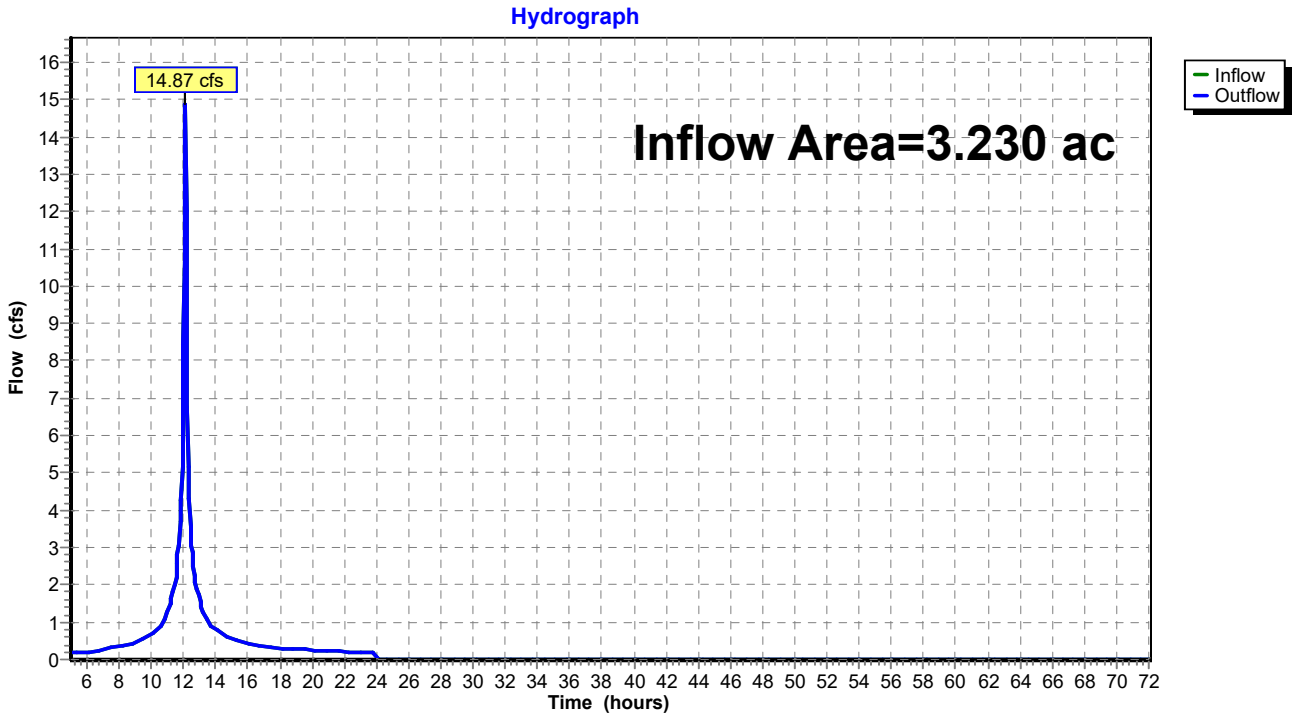


Summary for Reach 1R: EX DP#1 (NORTH SITE)

Inflow Area = 3.230 ac, 87.54% Impervious, Inflow Depth > 4.50" for 10-year event
Inflow = 14.87 cfs @ 12.13 hrs, Volume= 1.210 af
Outflow = 14.87 cfs @ 12.13 hrs, Volume= 1.210 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 18R : EX Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: EX DP#1 (NORTH SITE)

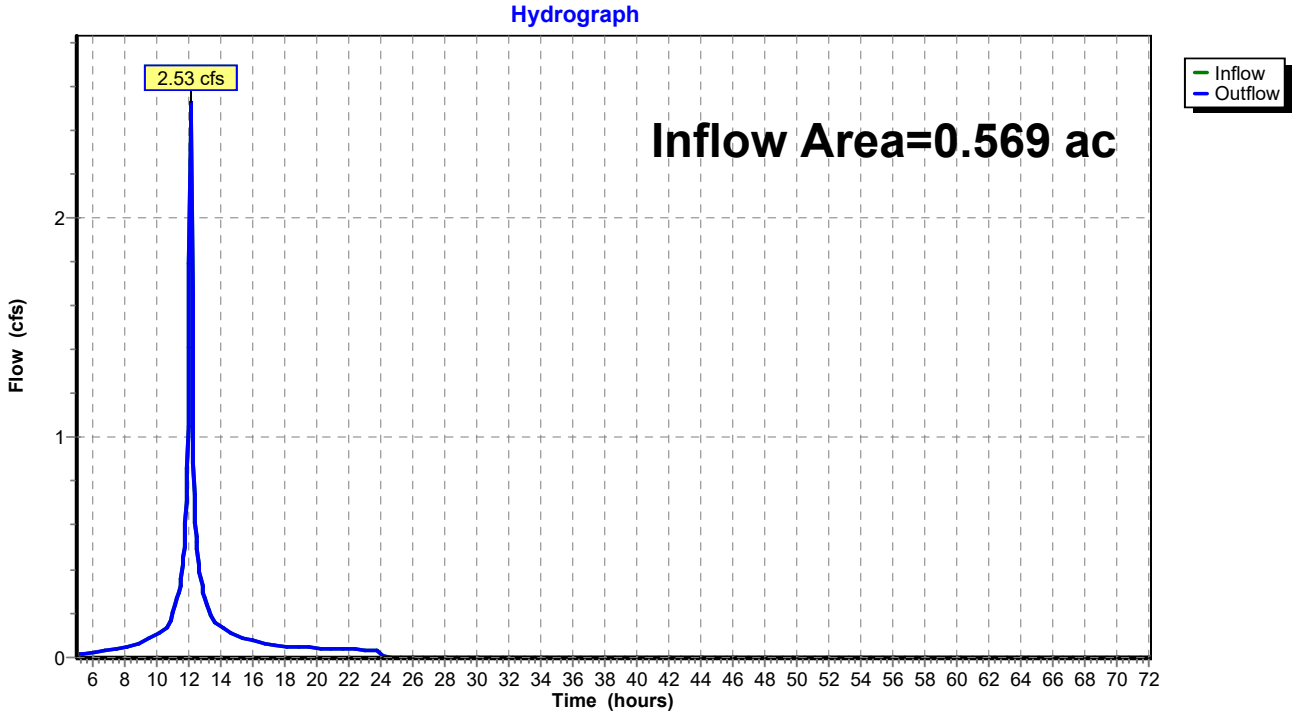


Summary for Reach 2R: EX DP#2 (SOUTH SITE)

Inflow Area = 0.569 ac, 71.40% Impervious, Inflow Depth > 4.22" for 10-year event
Inflow = 2.53 cfs @ 12.13 hrs, Volume= 0.200 af
Outflow = 2.53 cfs @ 12.13 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 18R : EX Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: EX DP#2 (SOUTH SITE)

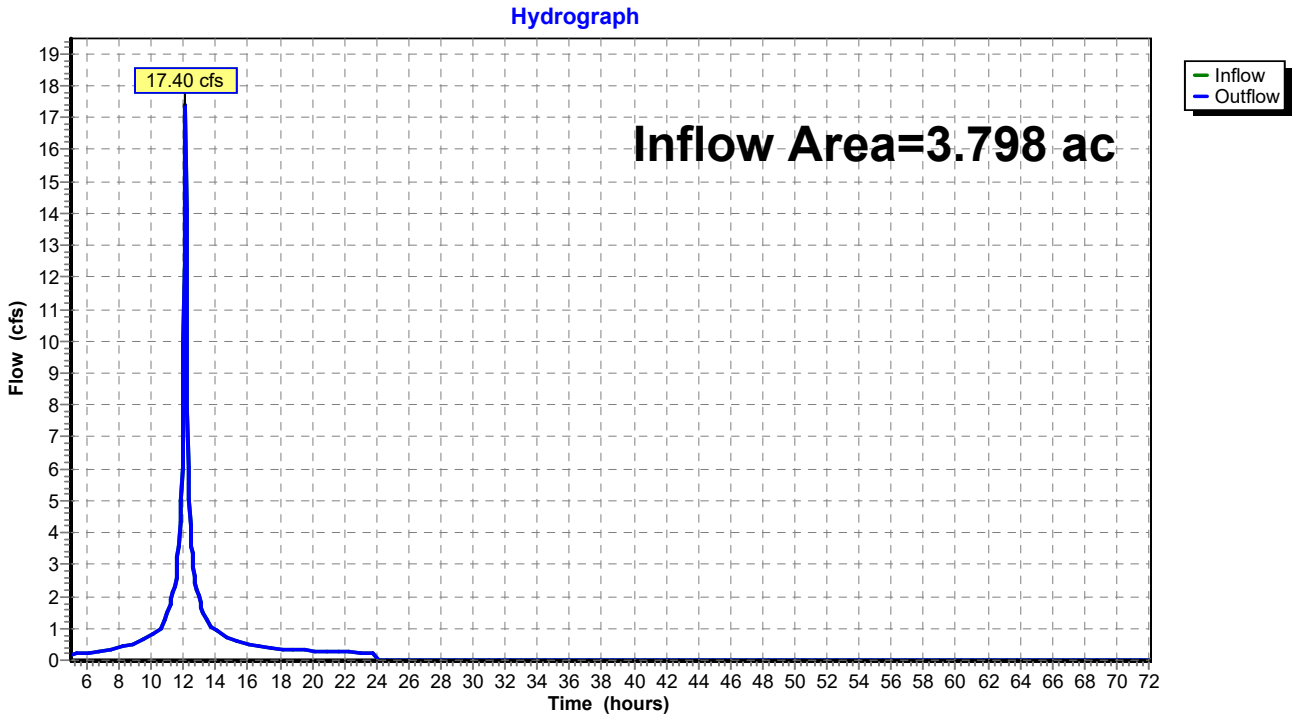


Summary for Reach 18R: EX Total

Inflow Area = 3.798 ac, 85.12% Impervious, Inflow Depth > 4.46" for 10-year event
Inflow = 17.40 cfs @ 12.13 hrs, Volume= 1.410 af
Outflow = 17.40 cfs @ 12.13 hrs, Volume= 1.410 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 18R: EX Total



Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: EX DA#1 Runoff Area=140,681 sf 87.54% Impervious Runoff Depth>5.61"
Tc=6.0 min CN=96 Runoff=18.42 cfs 1.510 af

Subcatchment4S: EX DA#2 Runoff Area=24,764 sf 71.40% Impervious Runoff Depth>5.34"
Tc=6.0 min CN=93 Runoff=3.16 cfs 0.253 af

Reach 1R: EX DP#1 (NORTH SITE) Inflow=18.42 cfs 1.510 af
Outflow=18.42 cfs 1.510 af

Reach 2R: EX DP#2 (SOUTH SITE) Inflow=3.16 cfs 0.253 af
Outflow=3.16 cfs 0.253 af

Reach 18R: EX Total Inflow=21.58 cfs 1.763 af
Outflow=21.58 cfs 1.763 af

Total Runoff Area = 3.798 ac Runoff Volume = 1.763 af Average Runoff Depth = 5.57"
14.88% Pervious = 0.565 ac 85.12% Impervious = 3.233 ac

Summary for Subcatchment 3S: EX DA#1

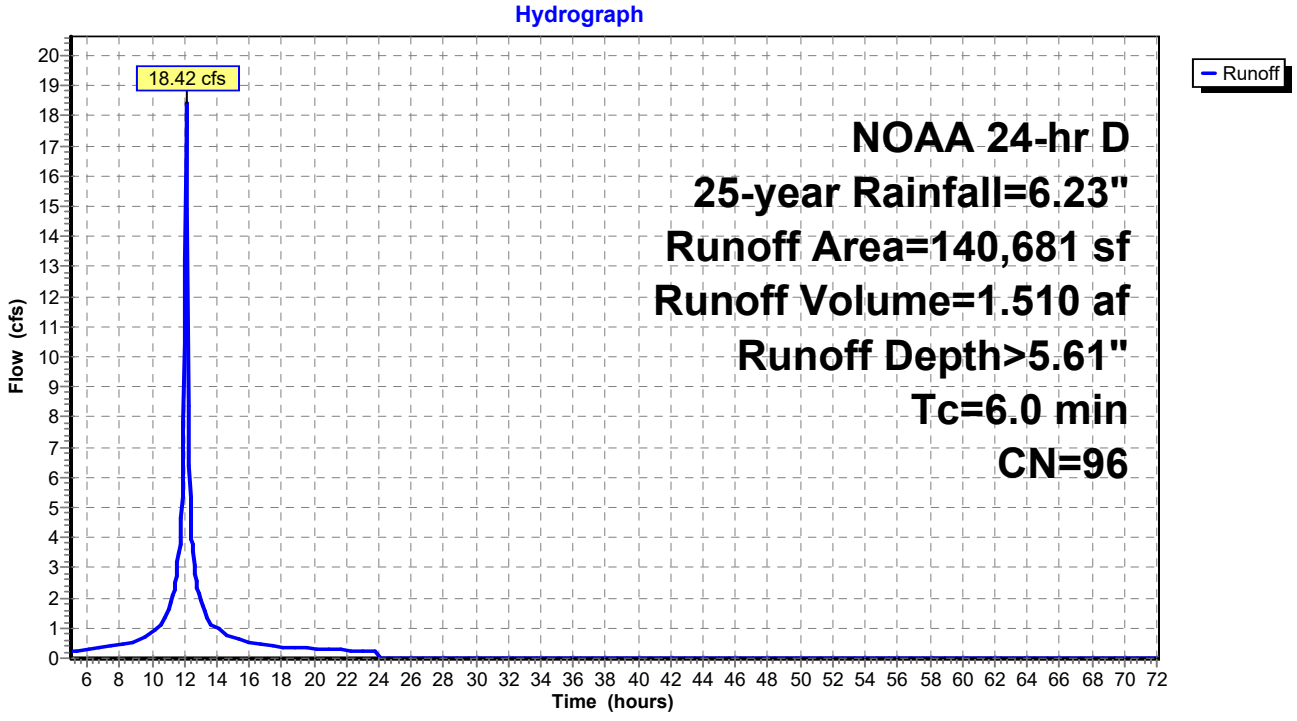
Runoff = 18.42 cfs @ 12.13 hrs, Volume= 1.510 af, Depth> 5.61"
Routed to Reach 1R : EX DP#1 (NORTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
17,533	80	>75% Grass cover, Good, HSG D
123,148	98	Paved parking, HSG D
140,681	96	Weighted Average
17,533		12.46% Pervious Area
123,148		87.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX DA#1



Summary for Subcatchment 4S: EX DA#2

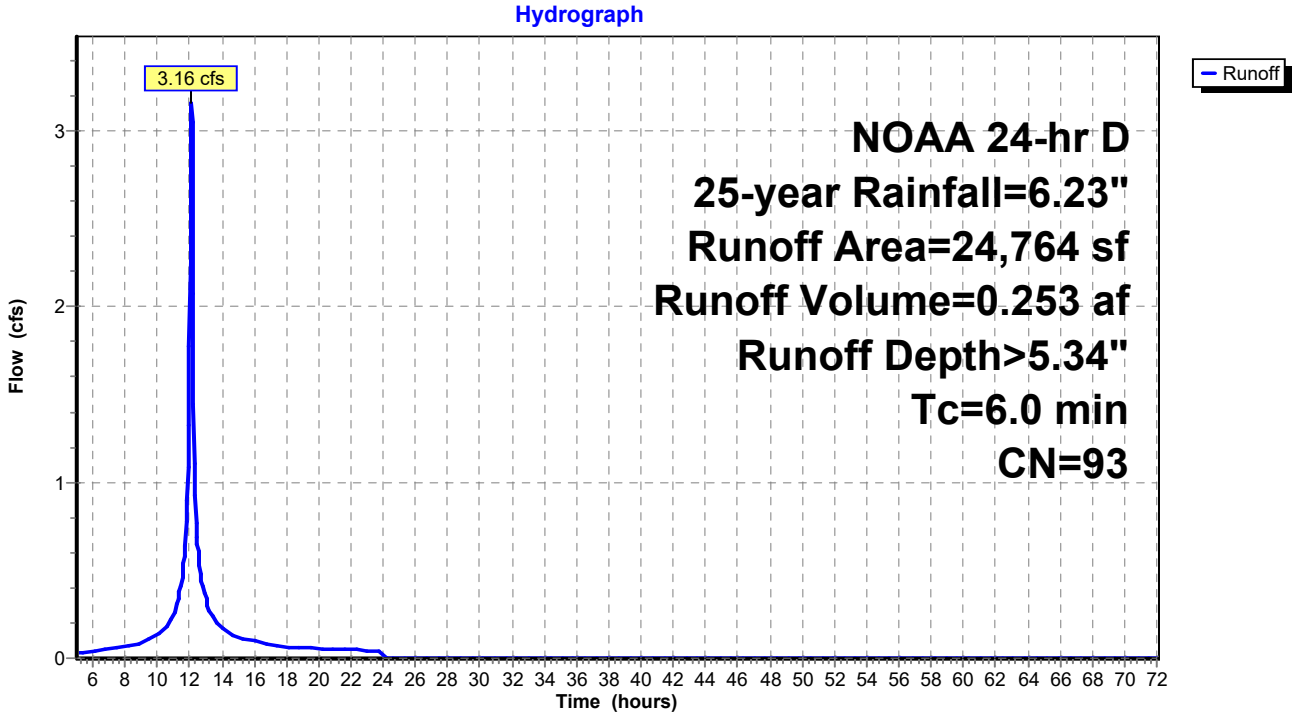
Runoff = 3.16 cfs @ 12.13 hrs, Volume= 0.253 af, Depth> 5.34"
Routed to Reach 2R : EX DP#2 (SOUTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
7,082	80	>75% Grass cover, Good, HSG D
17,682	98	Paved parking, HSG D
24,764	93	Weighted Average
7,082		28.60% Pervious Area
17,682		71.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX DA#2

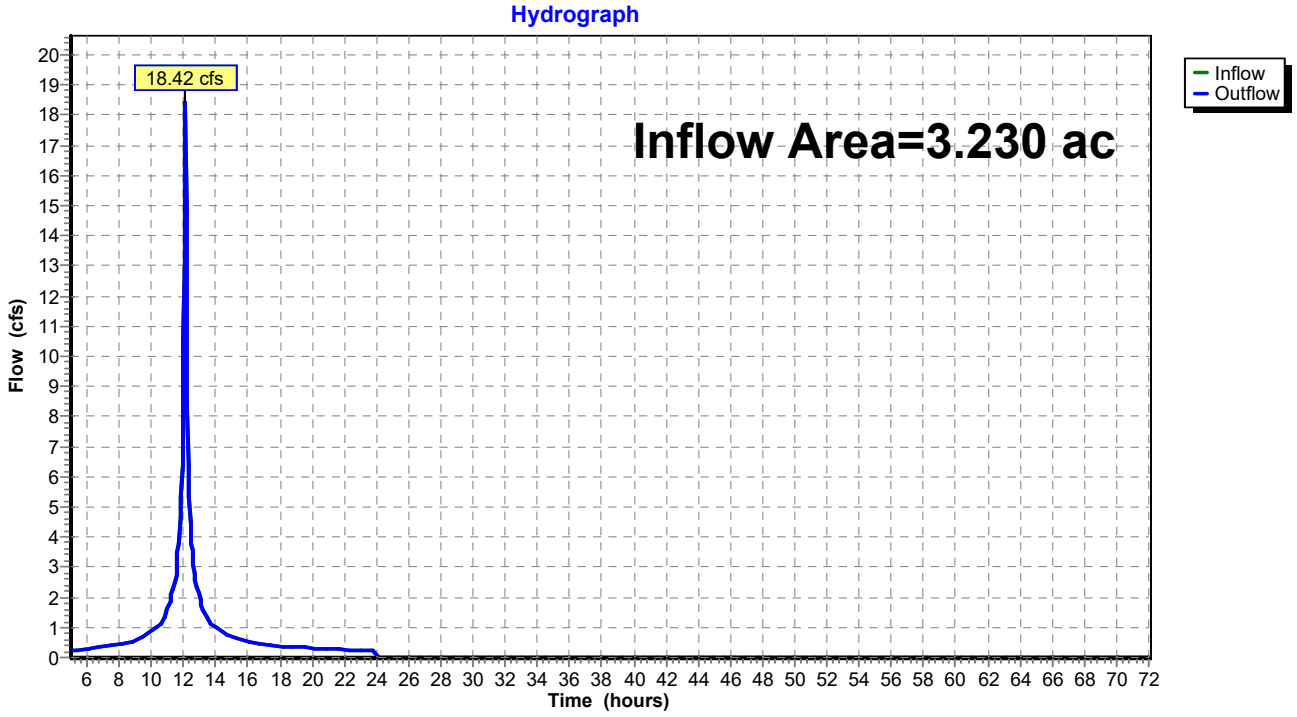


Summary for Reach 1R: EX DP#1 (NORTH SITE)

Inflow Area = 3.230 ac, 87.54% Impervious, Inflow Depth > 5.61" for 25-year event
Inflow = 18.42 cfs @ 12.13 hrs, Volume= 1.510 af
Outflow = 18.42 cfs @ 12.13 hrs, Volume= 1.510 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 18R : EX Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: EX DP#1 (NORTH SITE)

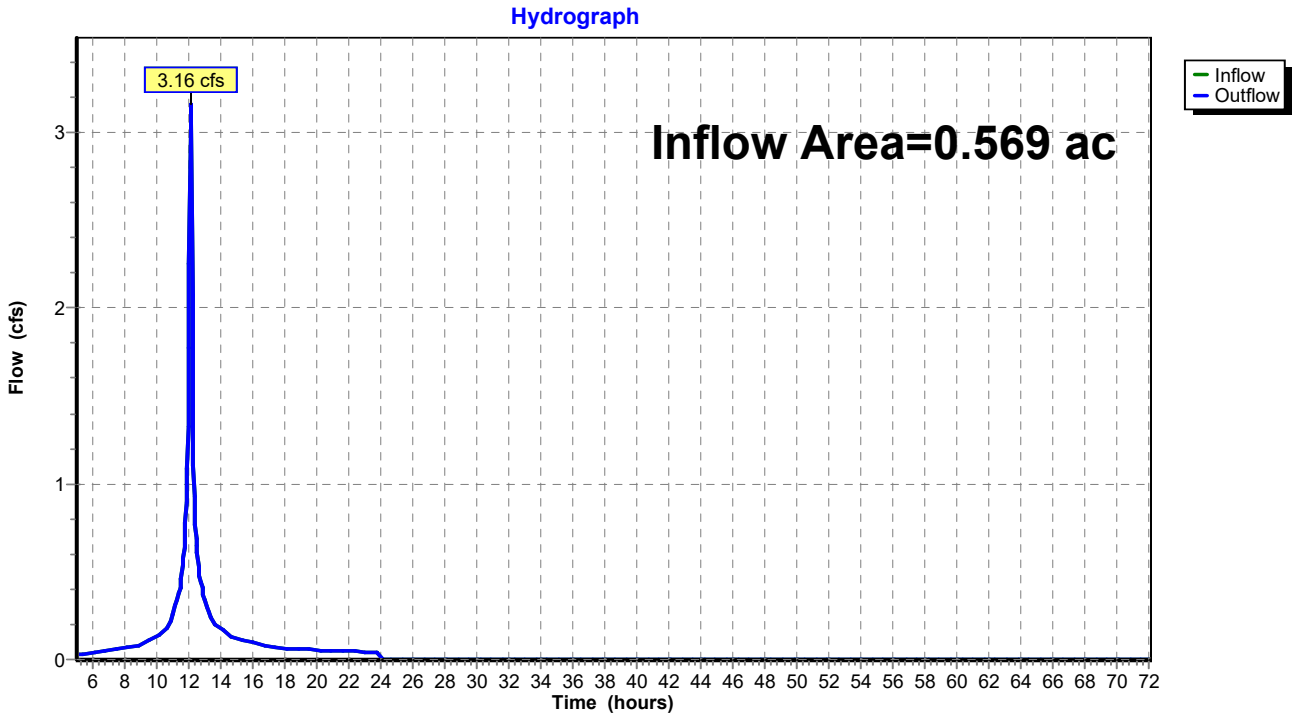


Summary for Reach 2R: EX DP#2 (SOUTH SITE)

Inflow Area = 0.569 ac, 71.40% Impervious, Inflow Depth > 5.34" for 25-year event
Inflow = 3.16 cfs @ 12.13 hrs, Volume= 0.253 af
Outflow = 3.16 cfs @ 12.13 hrs, Volume= 0.253 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 18R : EX Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: EX DP#2 (SOUTH SITE)

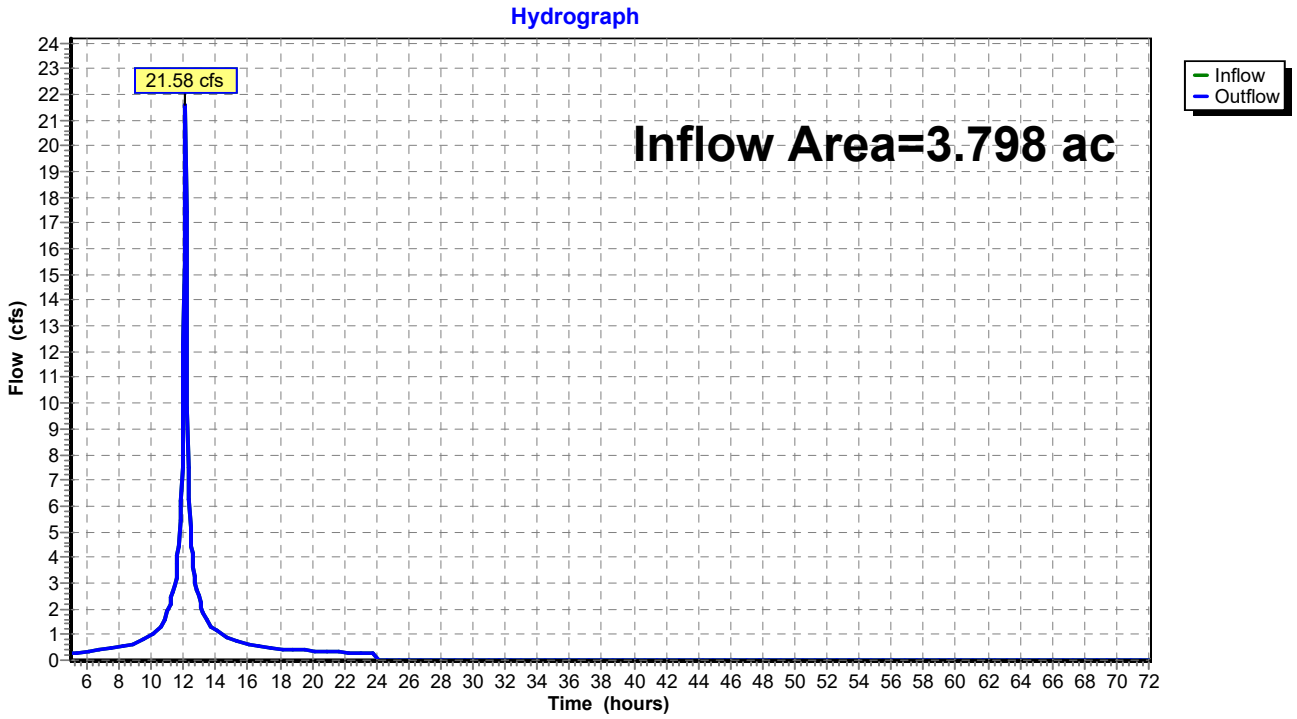


Summary for Reach 18R: EX Total

Inflow Area = 3.798 ac, 85.12% Impervious, Inflow Depth > 5.57" for 25-year event
Inflow = 21.58 cfs @ 12.13 hrs, Volume= 1.763 af
Outflow = 21.58 cfs @ 12.13 hrs, Volume= 1.763 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 18R: EX Total



Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: EX DA#1 Runoff Area=140,681 sf 87.54% Impervious Runoff Depth>7.31"
Tc=6.0 min CN=96 Runoff=23.84 cfs 1.967 af

Subcatchment4S: EX DA#2 Runoff Area=24,764 sf 71.40% Impervious Runoff Depth>7.05"
Tc=6.0 min CN=93 Runoff=4.13 cfs 0.334 af

Reach 1R: EX DP#1 (NORTH SITE) Inflow=23.84 cfs 1.967 af
Outflow=23.84 cfs 1.967 af

Reach 2R: EX DP#2 (SOUTH SITE) Inflow=4.13 cfs 0.334 af
Outflow=4.13 cfs 0.334 af

Reach 18R: EX Total Inflow=27.96 cfs 2.301 af
Outflow=27.96 cfs 2.301 af

Total Runoff Area = 3.798 ac Runoff Volume = 2.301 af Average Runoff Depth = 7.27"
14.88% Pervious = 0.565 ac 85.12% Impervious = 3.233 ac

Summary for Subcatchment 3S: EX DA#1

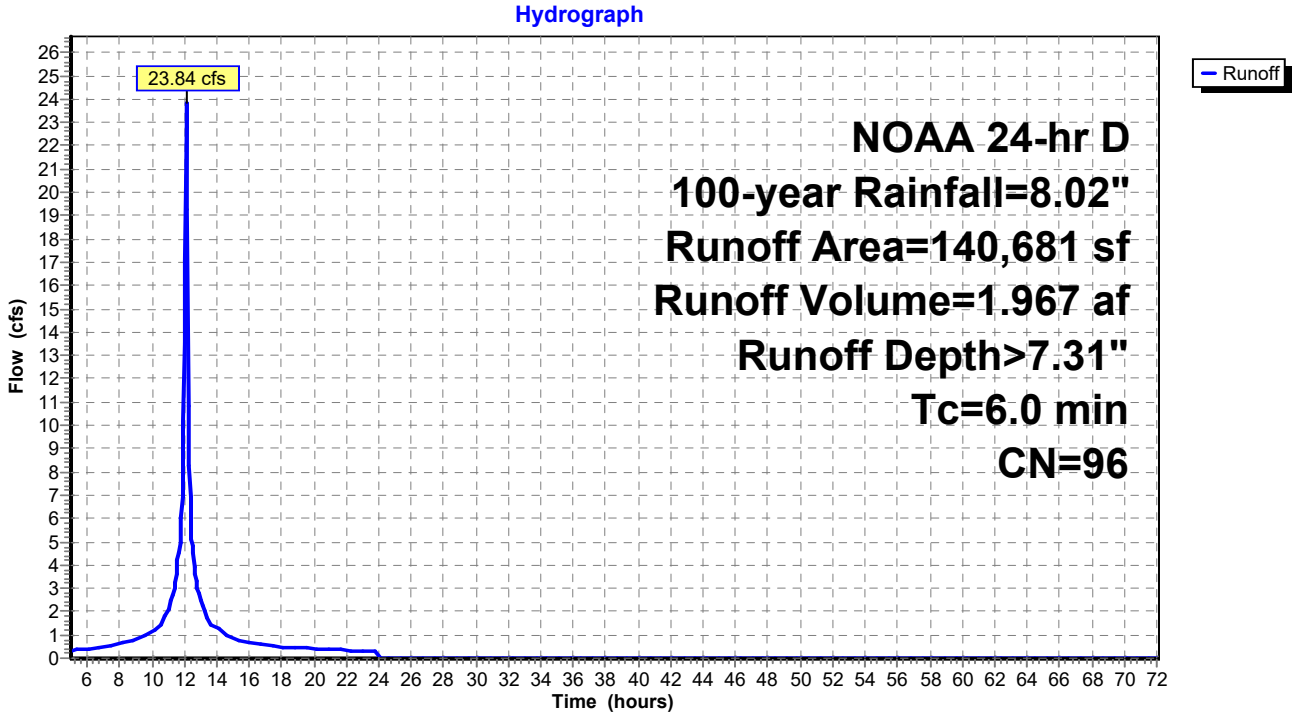
Runoff = 23.84 cfs @ 12.13 hrs, Volume= 1.967 af, Depth> 7.31"
Routed to Reach 1R : EX DP#1 (NORTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
17,533	80	>75% Grass cover, Good, HSG D
123,148	98	Paved parking, HSG D
140,681	96	Weighted Average
17,533		12.46% Pervious Area
123,148		87.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: EX DA#1



Summary for Subcatchment 4S: EX DA#2

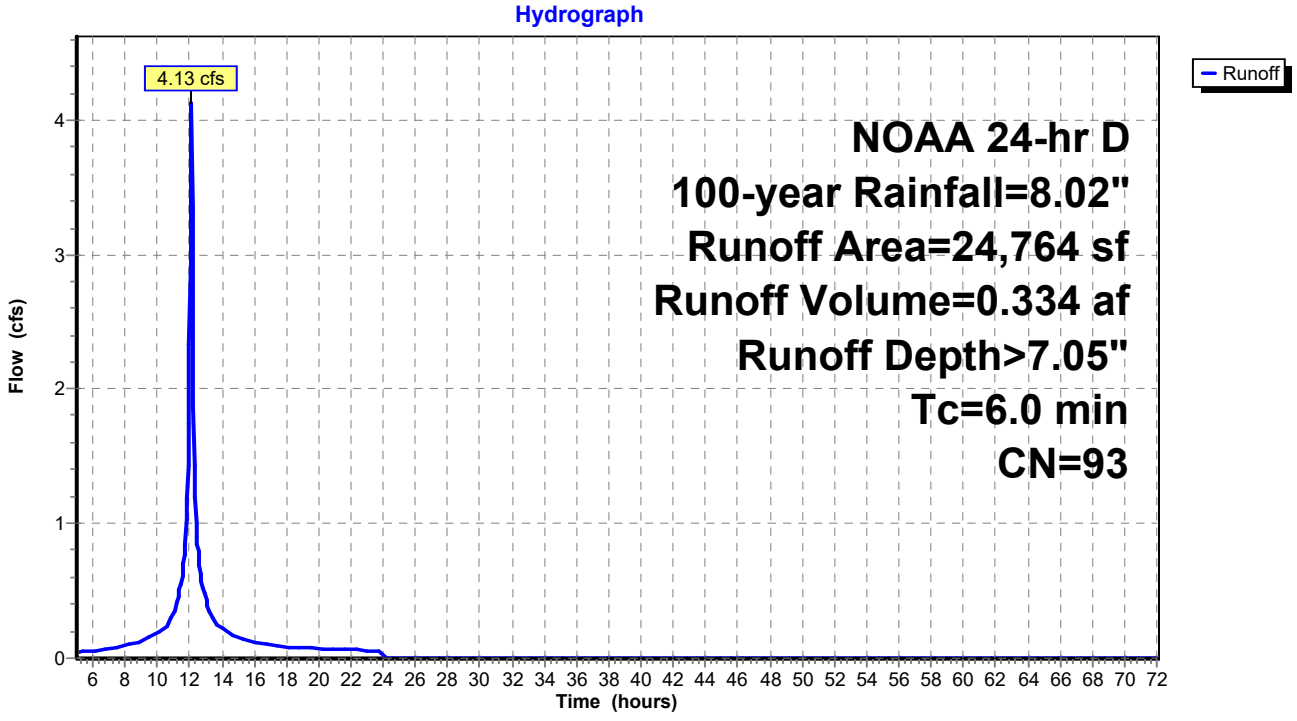
Runoff = 4.13 cfs @ 12.13 hrs, Volume= 0.334 af, Depth> 7.05"
Routed to Reach 2R : EX DP#2 (SOUTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
7,082	80	>75% Grass cover, Good, HSG D
17,682	98	Paved parking, HSG D
24,764	93	Weighted Average
7,082		28.60% Pervious Area
17,682		71.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: EX DA#2

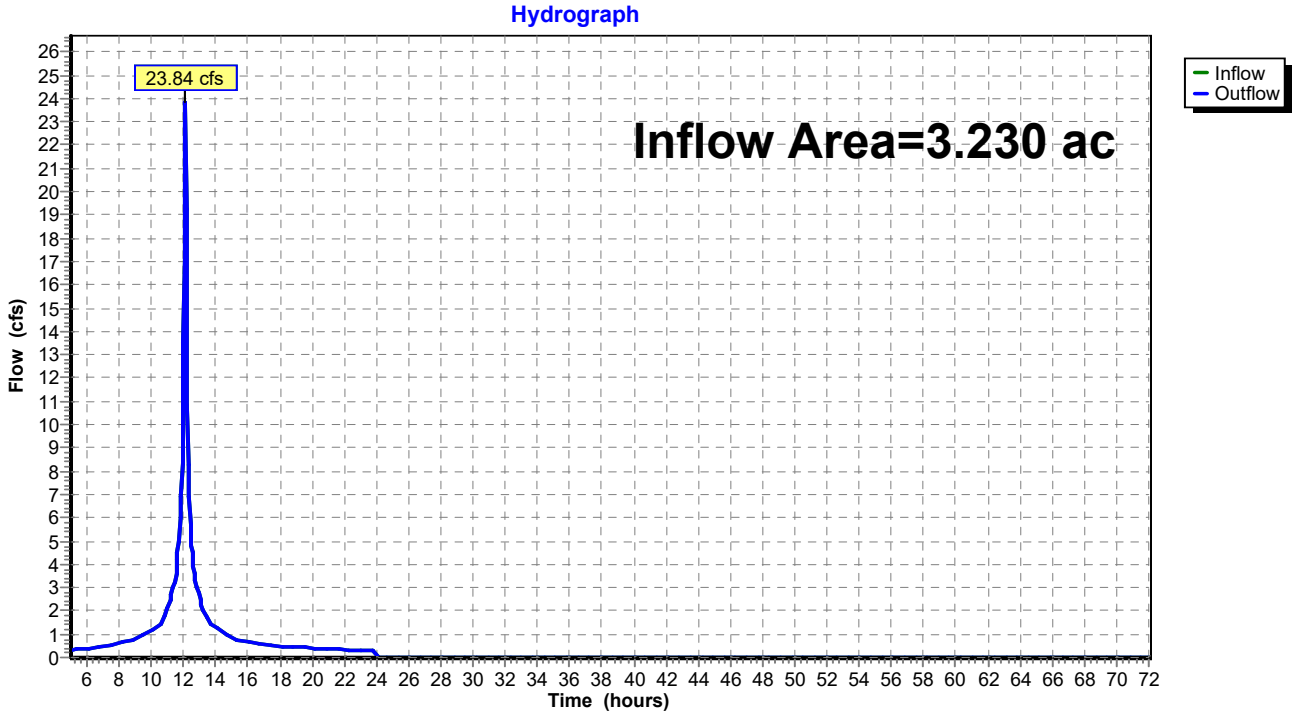


Summary for Reach 1R: EX DP#1 (NORTH SITE)

Inflow Area = 3.230 ac, 87.54% Impervious, Inflow Depth > 7.31" for 100-year event
Inflow = 23.84 cfs @ 12.13 hrs, Volume= 1.967 af
Outflow = 23.84 cfs @ 12.13 hrs, Volume= 1.967 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 18R : EX Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 1R: EX DP#1 (NORTH SITE)

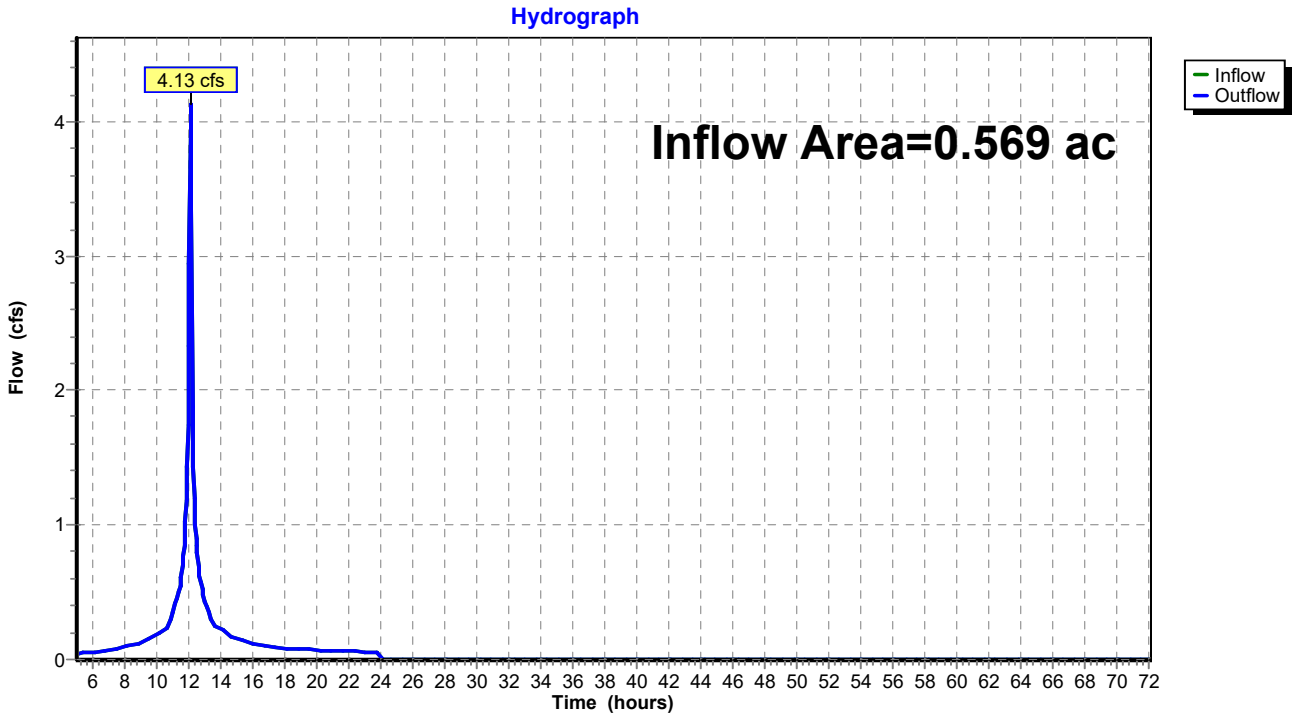


Summary for Reach 2R: EX DP#2 (SOUTH SITE)

Inflow Area = 0.569 ac, 71.40% Impervious, Inflow Depth > 7.05" for 100-year event
Inflow = 4.13 cfs @ 12.13 hrs, Volume= 0.334 af
Outflow = 4.13 cfs @ 12.13 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 18R : EX Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 2R: EX DP#2 (SOUTH SITE)

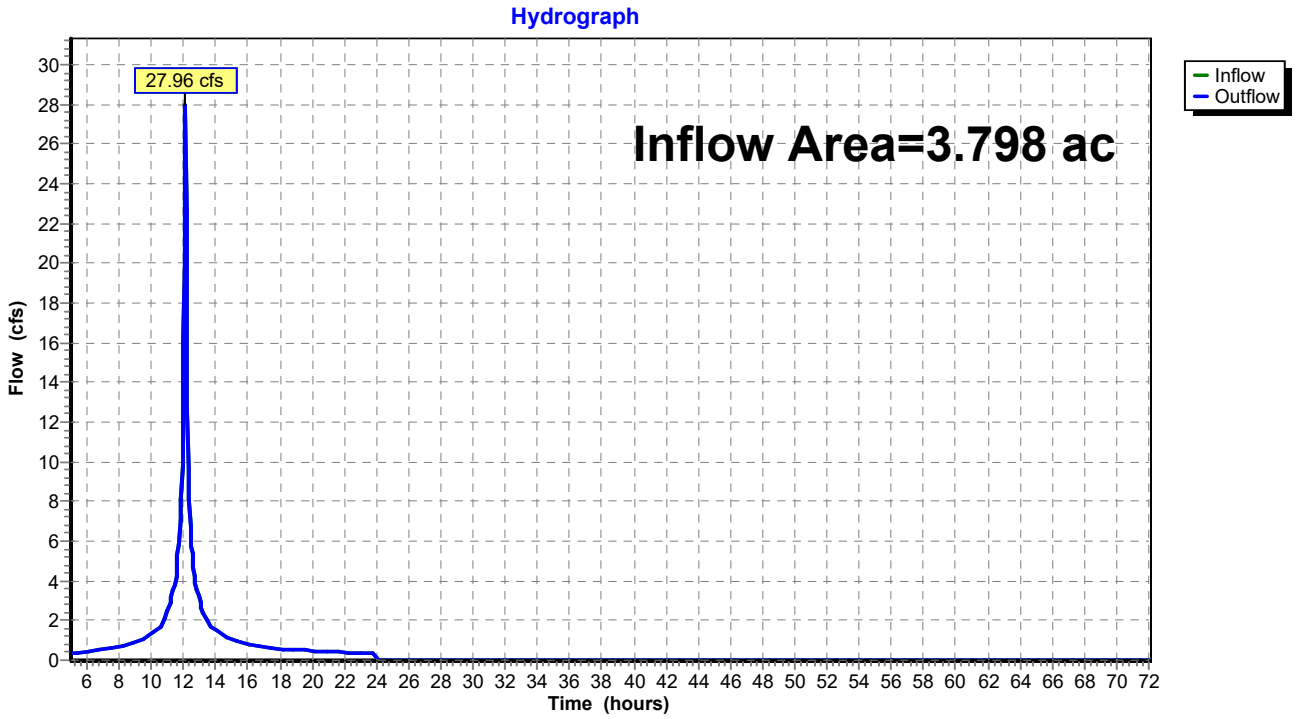


Summary for Reach 18R: EX Total

Inflow Area = 3.798 ac, 85.12% Impervious, Inflow Depth > 7.27" for 100-year event
Inflow = 27.96 cfs @ 12.13 hrs, Volume= 2.301 af
Outflow = 27.96 cfs @ 12.13 hrs, Volume= 2.301 af, Atten= 0%, Lag= 0.0 min

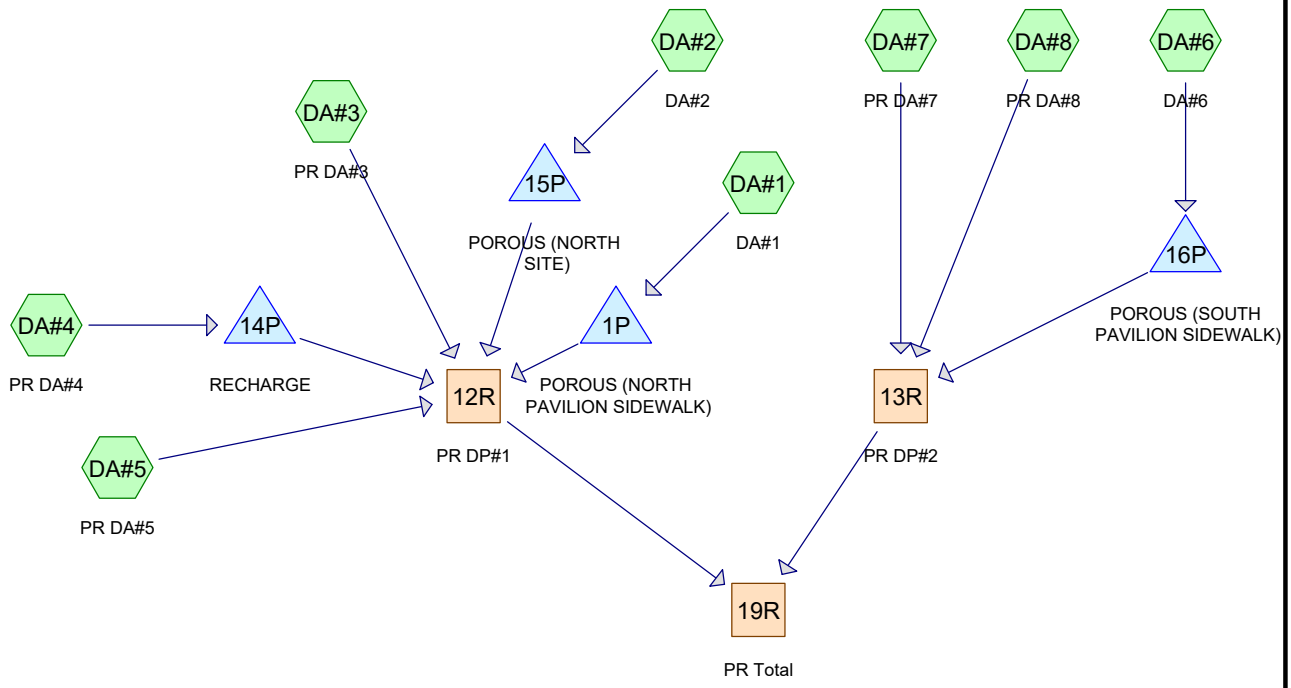
Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 18R: EX Total



APPENDIX C

Post-Development Conditions – HydroCAD Calculations



Subcat Reach Pond Link

Routing Diagram for 13511.1 HydroCAD
Prepared by {enter your company name here}, Printed 10/17/2022
HydroCAD® 10.10-6a s/n 00546 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	NOAA 24-hr	D	Default	24.00	1	3.20	2
2	10-year	NOAA 24-hr	D	Default	24.00	1	5.06	2
3	25-year	NOAA 24-hr	D	Default	24.00	1	6.23	2
4	100-year	NOAA 24-hr	D	Default	24.00	1	8.02	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.278	80	>75% Grass cover, Good, HSG D (DA#2, DA#3, DA#6)
1.658	98	Paved parking, HSG D (DA#1, DA#2, DA#3, DA#6, DA#8)
1.861	98	Roofs, HSG D (DA#3, DA#4, DA#5, DA#7)
3.798	**97**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.798	HSG D	DA#1, DA#2, DA#3, DA#4, DA#5, DA#6, DA#7, DA#8
0.000	Other	
3.798		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.278	0.000	0.278	>75% Grass cover, Good	DA#2, DA#3, DA#6
0.000	0.000	0.000	1.658	0.000	1.658	Paved parking	DA#1, DA#2, DA#3, DA#6, DA#8
0.000	0.000	0.000	1.861	0.000	1.861	Roofs	DA#3, DA#4, DA#5, DA#7
0.000	**0.000**	**0.000**	**3.798**	**0.000**	**3.798**	**TOTAL AREA**	

Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA#1: DA#1 Runoff Area=1,120 sf 100.00% Impervious Runoff Depth>2.97"
Tc=491.0 min CN=98 Runoff=0.01 cfs 0.006 af

SubcatchmentDA#2: DA#2 Runoff Area=11,285 sf 72.01% Impervious Runoff Depth=2.45"
Tc=491.0 min CN=93 Runoff=0.06 cfs 0.053 af

SubcatchmentDA#3: PR DA#3 Runoff Area=53,150 sf 89.88% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=96 Runoff=3.47 cfs 0.276 af

SubcatchmentDA#4: PR DA#4 Runoff Area=72,378 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=4.87 cfs 0.400 af

SubcatchmentDA#5: PR DA#5 Runoff Area=3,578 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=0.24 cfs 0.020 af

SubcatchmentDA#6: DA#6 Runoff Area=5,877 sf 39.00% Impervious Runoff Depth=1.91"
Tc=491.0 min CN=87 Runoff=0.03 cfs 0.022 af

SubcatchmentDA#7: PR DA#7 Runoff Area=3,618 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=0.24 cfs 0.020 af

SubcatchmentDA#8: PR DA#8 Runoff Area=14,439 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=0.97 cfs 0.080 af

Reach 12R: PR DP#1 Inflow=8.30 cfs 0.731 af
Outflow=8.30 cfs 0.731 af

Reach 13R: PR DP#2 Inflow=1.22 cfs 0.121 af
Outflow=1.22 cfs 0.121 af

Reach 19R: PR Total Inflow=9.51 cfs 0.853 af
Outflow=9.51 cfs 0.853 af

Pond 1P: POROUS (NORTH PAVILION Peak Elev=15.46' Storage=8 cf Inflow=0.01 cfs 0.006 af
Outflow=0.01 cfs 0.006 af

Pond 14P: RECHARGE Peak Elev=12.31' Storage=1,717 cf Inflow=4.87 cfs 0.400 af
Outflow=4.65 cfs 0.376 af

Pond 15P: POROUS (NORTH SITE) Peak Elev=14.55' Storage=77 cf Inflow=0.06 cfs 0.053 af
Outflow=0.06 cfs 0.053 af

Pond 16P: POROUS (SOUTH PAVILION Peak Elev=15.87' Storage=8 cf Inflow=0.03 cfs 0.022 af
Outflow=0.03 cfs 0.022 af

Total Runoff Area = 3.798 ac Runoff Volume = 0.877 af Average Runoff Depth = 2.77"
7.33% Pervious = 0.278 ac 92.67% Impervious = 3.520 ac

Summary for Subcatchment DA#1: DA#1

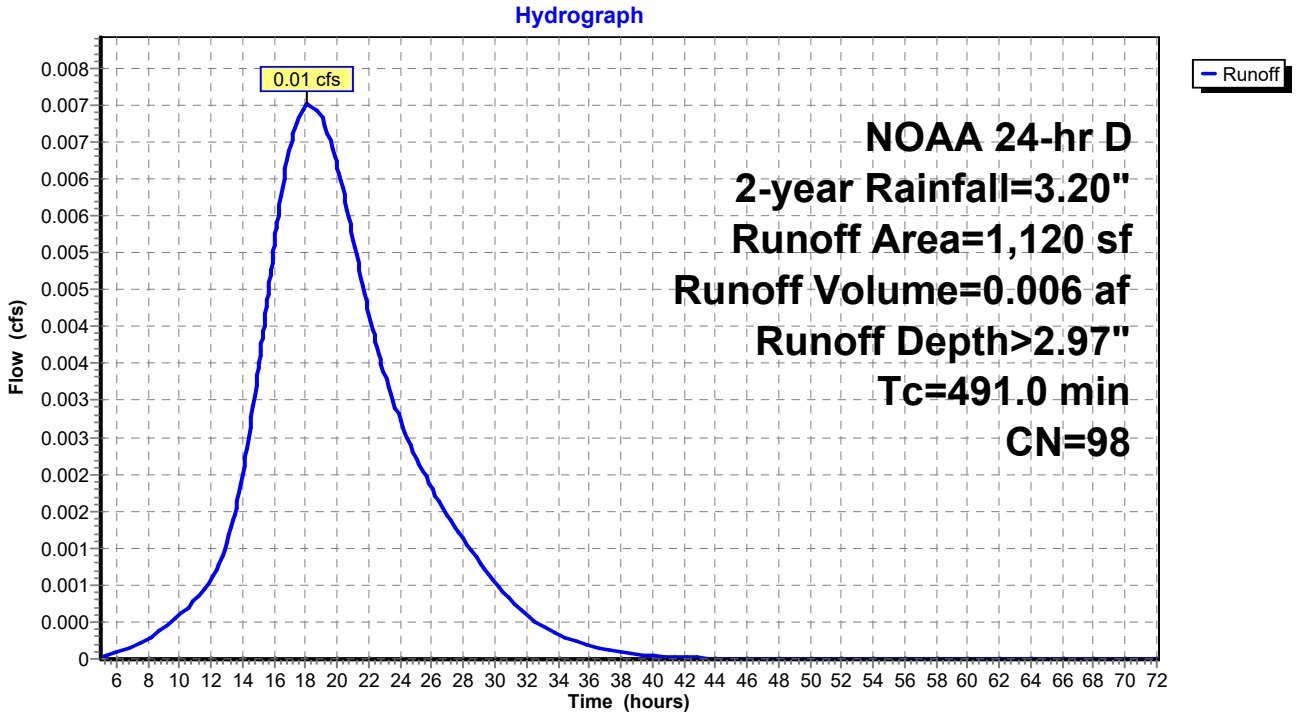
Runoff = 0.01 cfs @ 18.02 hrs, Volume= 0.006 af, Depth> 2.97"
Routed to Pond 1P : POROUS (NORTH PAVILION SIDEWALK)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
1,120	98	Paved parking, HSG D
1,120		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#1: DA#1



Summary for Subcatchment DA#2: DA#2

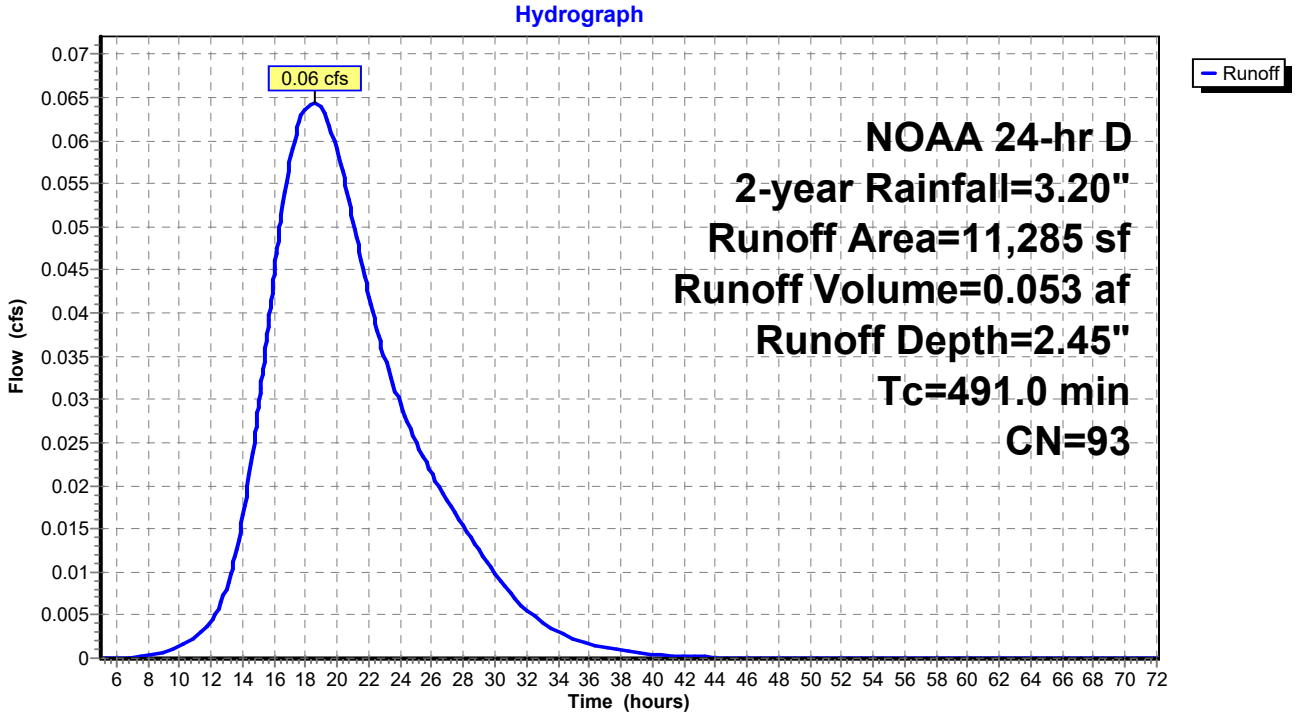
Runoff = 0.06 cfs @ 18.53 hrs, Volume= 0.053 af, Depth= 2.45"
Routed to Pond 15P : POROUS (NORTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
8,126	98	Paved parking, HSG D
3,159	80	>75% Grass cover, Good, HSG D
11,285	93	Weighted Average
3,159		27.99% Pervious Area
8,126		72.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#2: DA#2



Summary for Subcatchment DA#3: PR DA#3

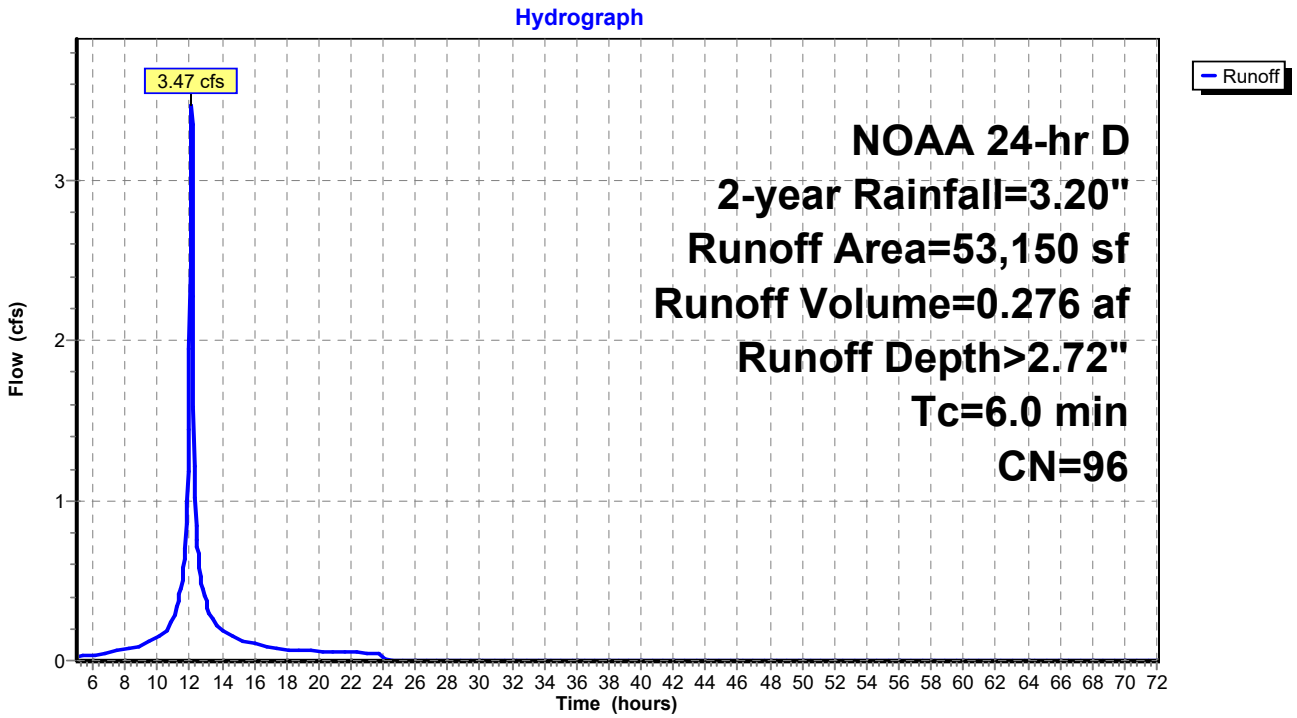
Runoff = 3.47 cfs @ 12.13 hrs, Volume= 0.276 af, Depth> 2.72"
Routed to Reach 12R : PR DP#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
5,381	80	>75% Grass cover, Good, HSG D
46,263	98	Paved parking, HSG D
1,506	98	Roofs, HSG D
53,150	96	Weighted Average
5,381		10.12% Pervious Area
47,769		89.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#3: PR DA#3



Summary for Subcatchment DA#4: PR DA#4

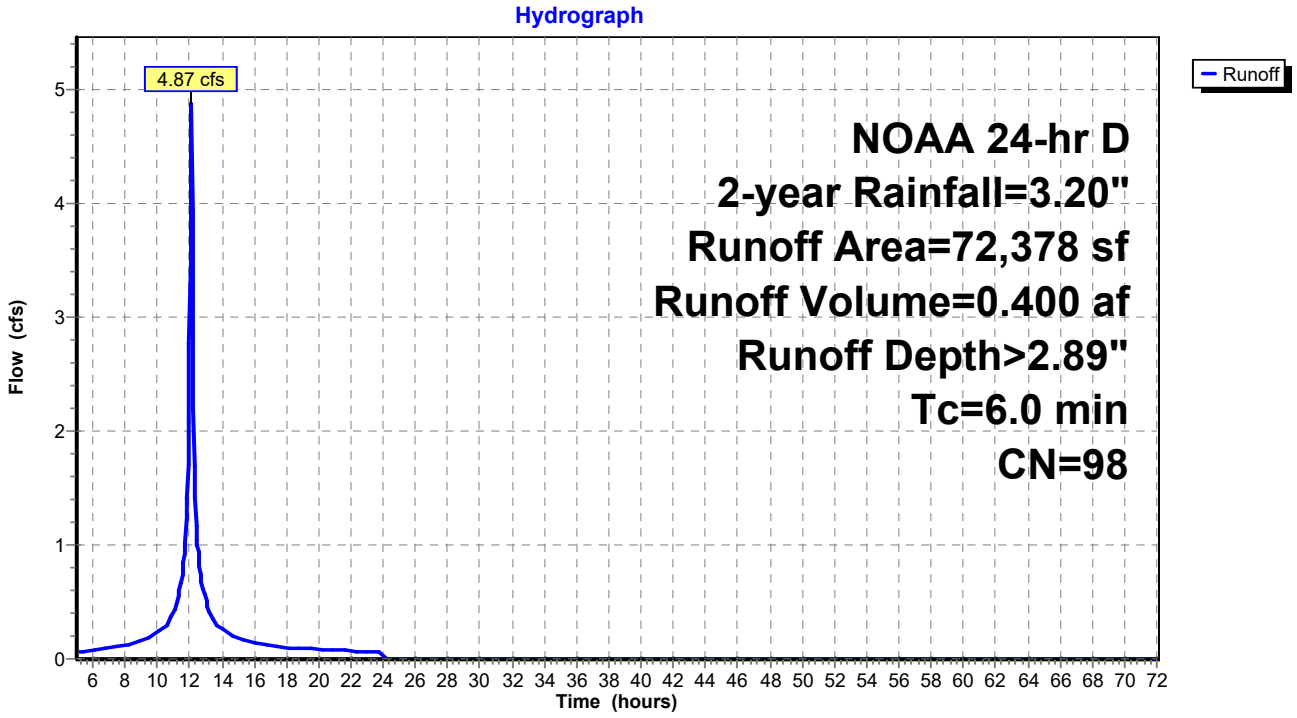
Runoff = 4.87 cfs @ 12.13 hrs, Volume= 0.400 af, Depth> 2.89"
Routed to Pond 14P : RECHARGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
72,378	98	Roofs, HSG D
72,378		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#4: PR DA#4



Summary for Subcatchment DA#5: PR DA#5

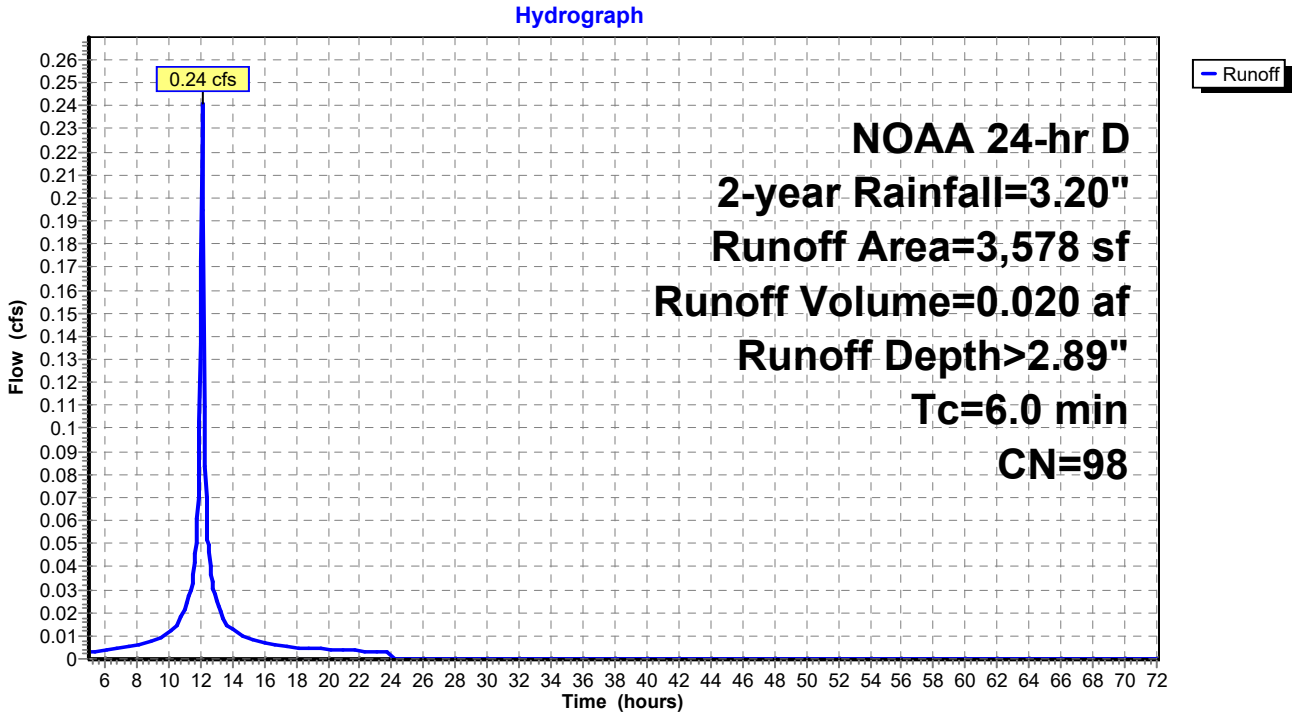
Runoff = 0.24 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 2.89"
Routed to Reach 12R : PR DP#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
3,578	98	Roofs, HSG D
3,578		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#5: PR DA#5



Summary for Subcatchment DA#6: DA#6

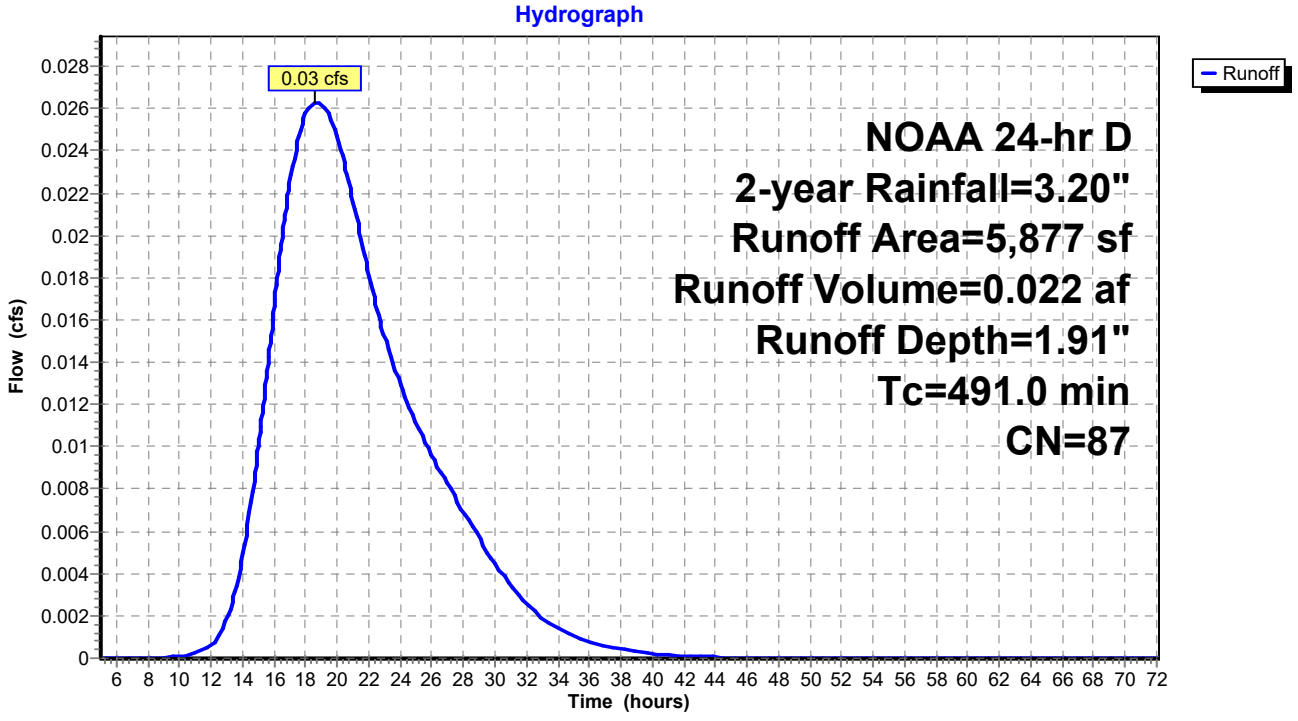
Runoff = 0.03 cfs @ 18.61 hrs, Volume= 0.022 af, Depth= 1.91"
Routed to Pond 16P : POROUS (SOUTH PAVILION SIDEWALK)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
2,292	98	Paved parking, HSG D
3,585	80	>75% Grass cover, Good, HSG D
5,877	87	Weighted Average
3,585		61.00% Pervious Area
2,292		39.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#6: DA#6



Summary for Subcatchment DA#7: PR DA#7

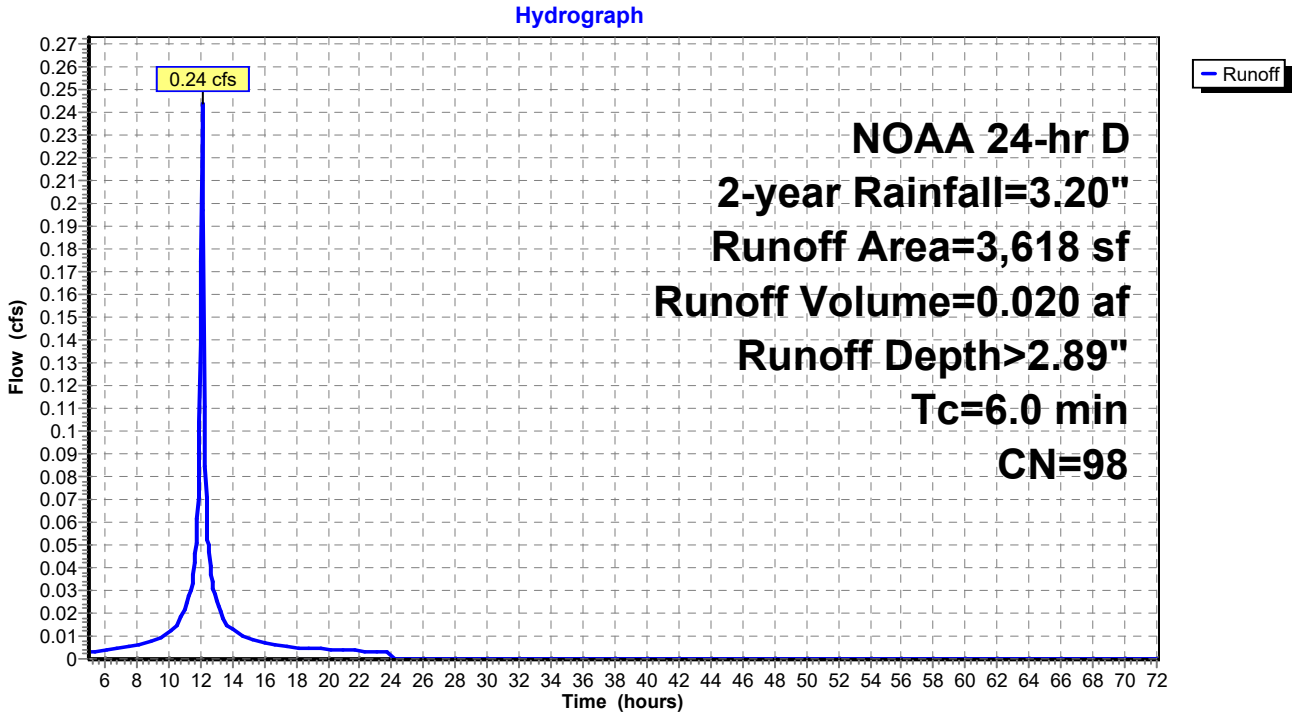
Runoff = 0.24 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 2.89"
Routed to Reach 13R : PR DP#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
3,618	98	Roofs, HSG D
3,618		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#7: PR DA#7



Summary for Subcatchment DA#8: PR DA#8

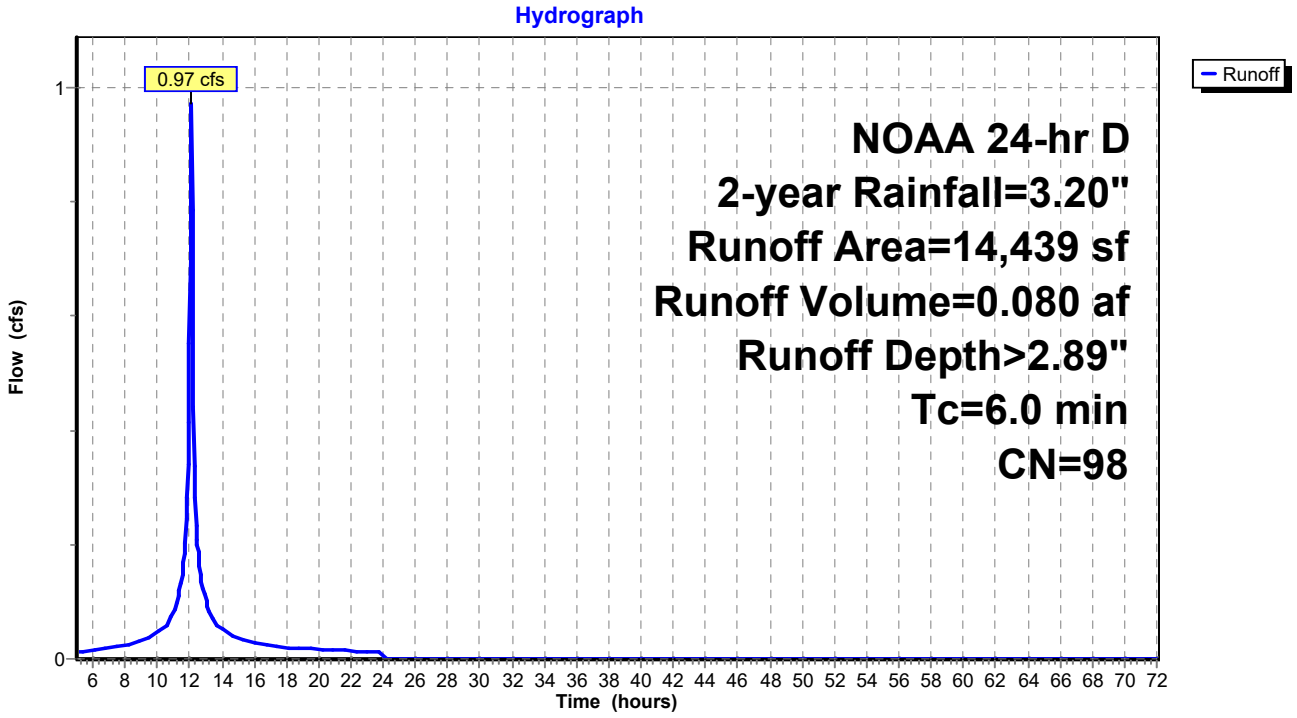
Runoff = 0.97 cfs @ 12.13 hrs, Volume= 0.080 af, Depth> 2.89"
Routed to Reach 13R : PR DP#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2-year Rainfall=3.20"

Area (sf)	CN	Description
14,439	98	Paved parking, HSG D
14,439		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#8: PR DA#8

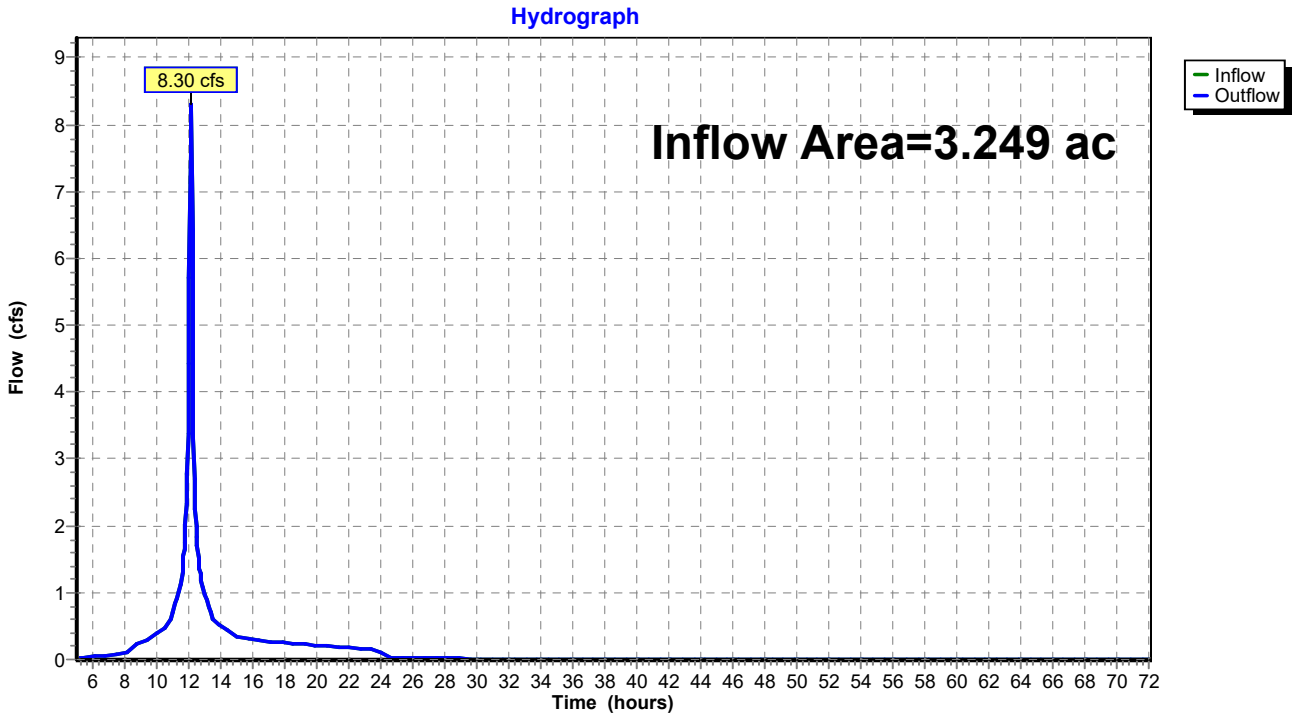


Summary for Reach 12R: PR DP#1

Inflow Area = 3.249 ac, 93.97% Impervious, Inflow Depth > 2.70" for 2-year event
Inflow = 8.30 cfs @ 12.14 hrs, Volume= 0.731 af
Outflow = 8.30 cfs @ 12.14 hrs, Volume= 0.731 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 19R : PR Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: PR DP#1

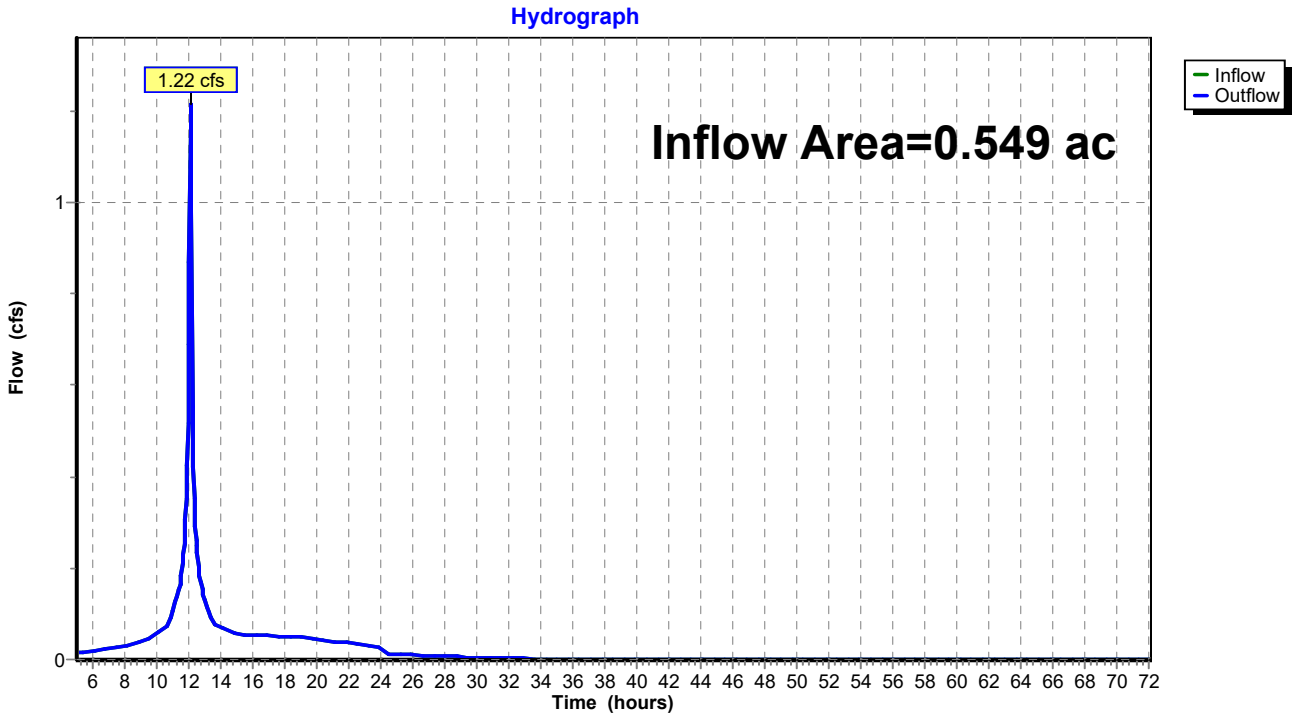


Summary for Reach 13R: PR DP#2

Inflow Area = 0.549 ac, 85.02% Impervious, Inflow Depth > 2.65" for 2-year event
Inflow = 1.22 cfs @ 12.13 hrs, Volume= 0.121 af
Outflow = 1.22 cfs @ 12.13 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 19R : PR Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 13R: PR DP#2

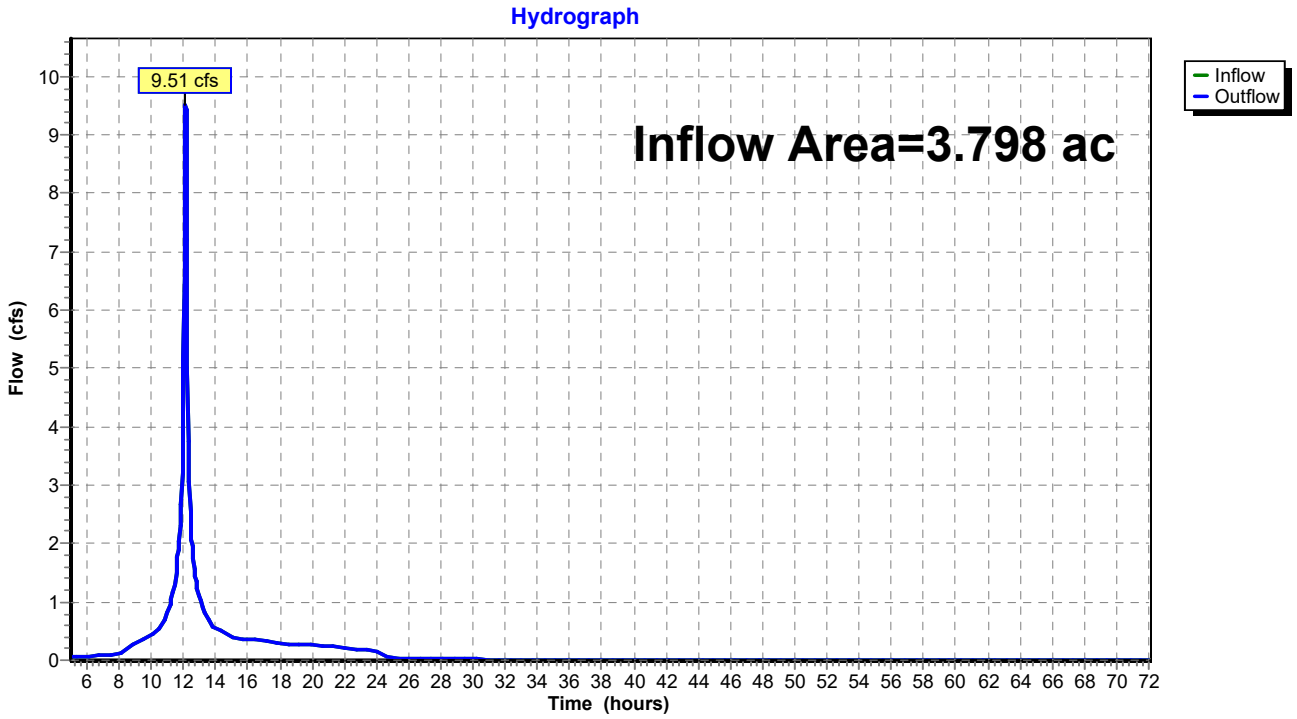


Summary for Reach 19R: PR Total

Inflow Area = 3.798 ac, 92.67% Impervious, Inflow Depth > 2.69" for 2-year event
Inflow = 9.51 cfs @ 12.14 hrs, Volume= 0.853 af
Outflow = 9.51 cfs @ 12.14 hrs, Volume= 0.853 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 19R: PR Total



Summary for Pond 1P: POROUS (NORTH PAVILION SIDEWALK)

Inflow Area = 0.026 ac,100.00% Impervious, Inflow Depth > 2.97" for 2-year event
Inflow = 0.01 cfs @ 18.02 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 18.28 hrs, Volume= 0.006 af, Atten= 0%, Lag= 15.3 min
Primary = 0.01 cfs @ 18.28 hrs, Volume= 0.006 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.46' @ 18.28 hrs Surf.Area= 434 sf Storage= 8 cf

Plug-Flow detention time= 23.8 min calculated for 0.006 af (100% of inflow)
Center-of-Mass det. time= 23.4 min (1,233.0 - 1,209.6)

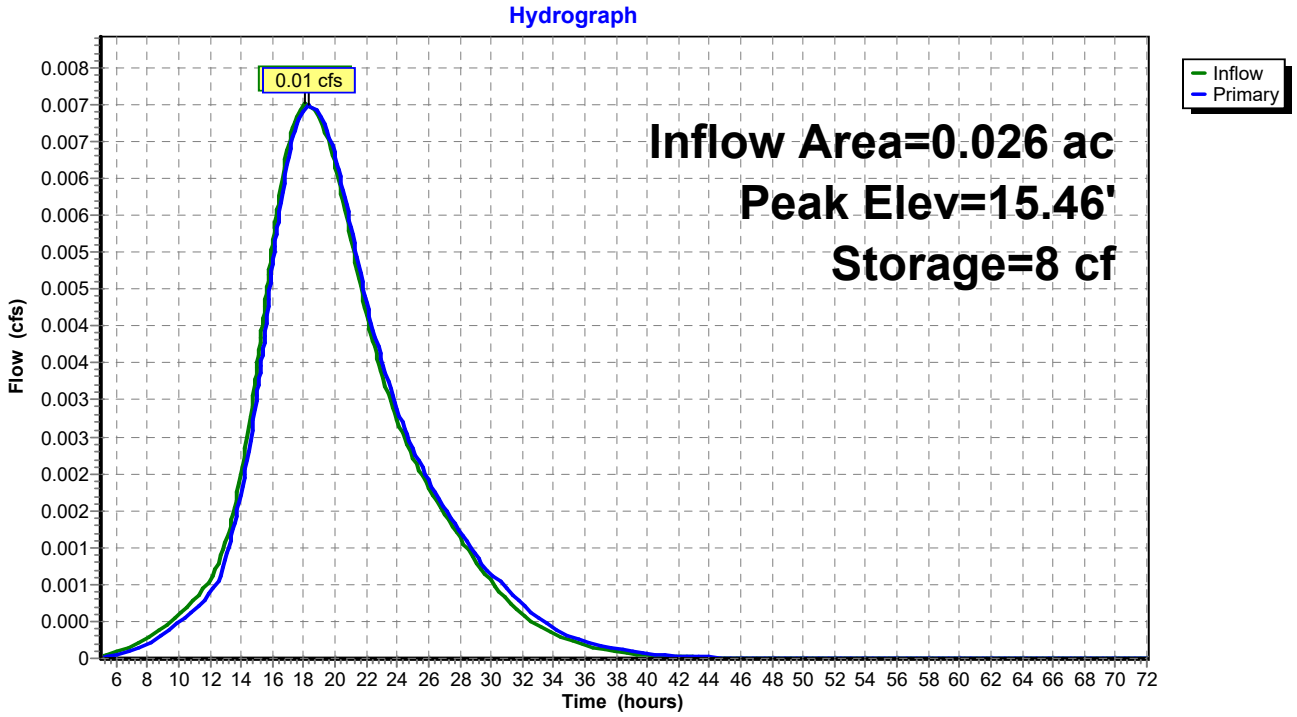
Volume	Invert	Avail.Storage	Storage Description
#1	15.41'	274 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 920 cf Overall - 7 cf Embedded = 913 cf x 30.0% Voids
#2	15.41'	7 cf	**4.0" Round Pipe Storage** Inside #1 L= 80.0'
		281 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.41	434	0	0
15.74	434	143	143
15.90	434	69	213
17.03	434	490	703
17.53	434	217	920

Device	Routing	Invert	Outlet Devices
#1	Primary	15.41'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 18.28 hrs HW=15.46' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.79 fps)

Pond 1P: POROUS (NORTH PAVILION SIDEWALK)



Summary for Pond 14P: RECHARGE

Inflow Area = 1.662 ac,100.00% Impervious, Inflow Depth > 2.89" for 2-year event
Inflow = 4.87 cfs @ 12.13 hrs, Volume= 0.400 af
Outflow = 4.65 cfs @ 12.15 hrs, Volume= 0.376 af, Atten= 5%, Lag= 1.4 min
Primary = 4.65 cfs @ 12.15 hrs, Volume= 0.376 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 12.31' @ 12.15 hrs Surf.Area= 878 sf Storage= 1,717 cf

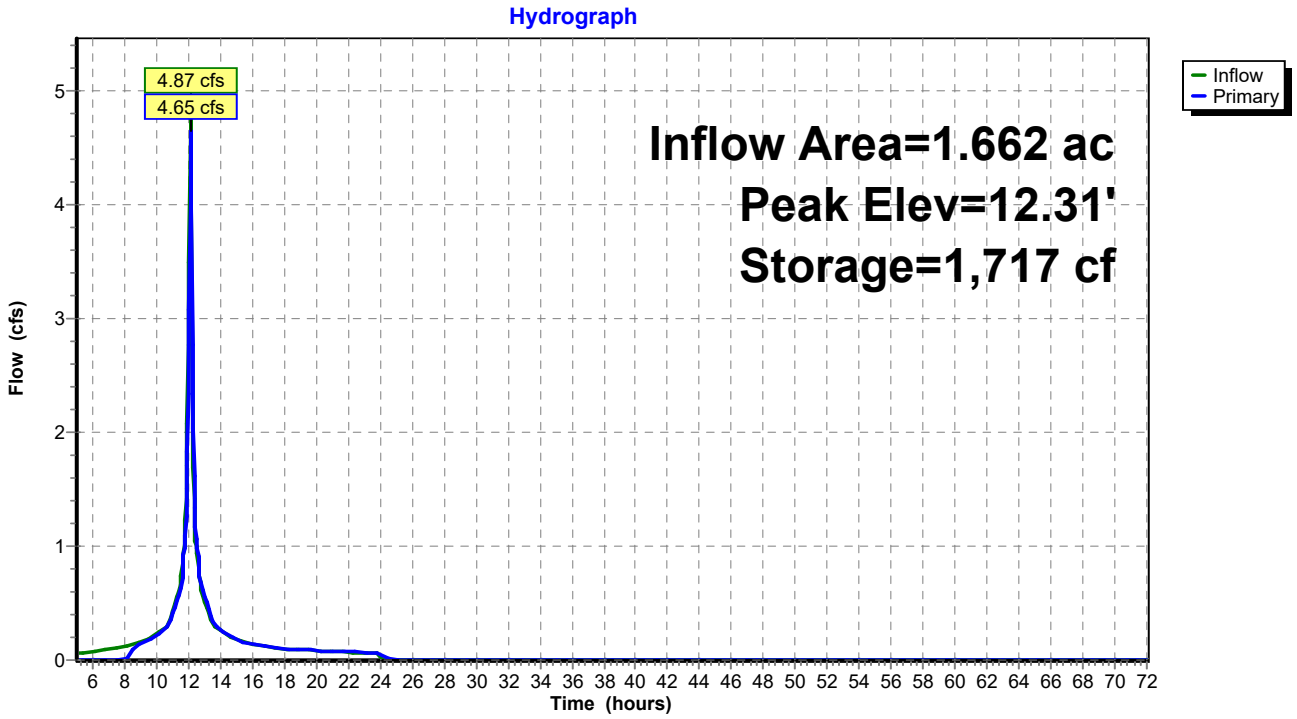
Plug-Flow detention time= 64.7 min calculated for 0.375 af (94% of inflow)
Center-of-Mass det. time= 29.9 min (802.9 - 773.0)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	13,254 cf	**180.0" Round Pipe Storage** L= 75.0'

Device	Routing	Invert	Outlet Devices		
#1	Primary	11.50'	**12.0" Vert. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	11.50'	**15.0" Vert. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=4.64 cfs @ 12.15 hrs HW=12.31' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 2.08 cfs @ 3.06 fps)
└─**2=Orifice/Grate** (Orifice Controls 2.56 cfs @ 3.06 fps)

Pond 14P: RECHARGE



Summary for Pond 15P: POROUS (NORTH SITE)

Inflow Area = 0.259 ac, 72.01% Impervious, Inflow Depth = 2.45" for 2-year event
Inflow = 0.06 cfs @ 18.53 hrs, Volume= 0.053 af
Outflow = 0.06 cfs @ 18.63 hrs, Volume= 0.053 af, Atten= 0%, Lag= 6.1 min
Primary = 0.06 cfs @ 18.63 hrs, Volume= 0.053 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 14.55' @ 18.63 hrs Surf.Area= 1,302 sf Storage= 77 cf

Plug-Flow detention time= 28.9 min calculated for 0.053 af (100% of inflow)
Center-of-Mass det. time= 28.5 min (1,278.2 - 1,249.6)

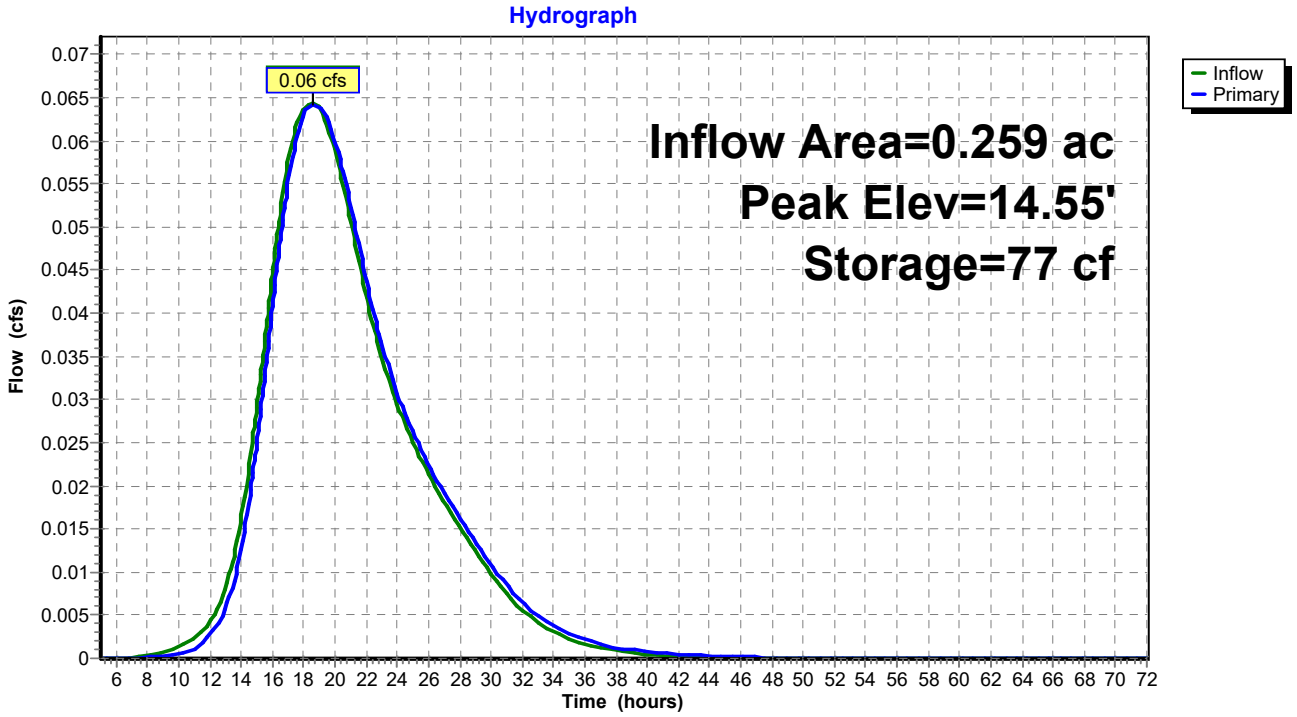
Volume	Invert	Avail.Storage	Storage Description
#1	14.38'	820 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,760 cf Overall - 26 cf Embedded = 2,734 cf x 30.0% Voids
#2	14.38'	26 cf	**4.0" Round Pipe Storage** Inside #1 L= 300.0'
		846 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.38	1,302	0	0
14.71	1,302	430	430
14.88	1,302	221	651
16.00	1,302	1,458	2,109
16.50	1,302	651	2,760

Device	Routing	Invert	Outlet Devices
#1	Primary	14.38'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.06 cfs @ 18.63 hrs HW=14.55' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.41 fps)

Pond 15P: POROUS (NORTH SITE)



Summary for Pond 16P: POROUS (SOUTH PAVILION SIDEWALK)

Inflow Area = 0.135 ac, 39.00% Impervious, Inflow Depth = 1.91" for 2-year event
Inflow = 0.03 cfs @ 18.61 hrs, Volume= 0.022 af
Outflow = 0.03 cfs @ 18.72 hrs, Volume= 0.022 af, Atten= 0%, Lag= 6.6 min
Primary = 0.03 cfs @ 18.72 hrs, Volume= 0.022 af
Routed to Reach 13R : PR DP#2

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.87' @ 18.72 hrs Surf.Area= 175 sf Storage= 8 cf

Plug-Flow detention time= 6.6 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 6.5 min (1,285.6 - 1,279.1)

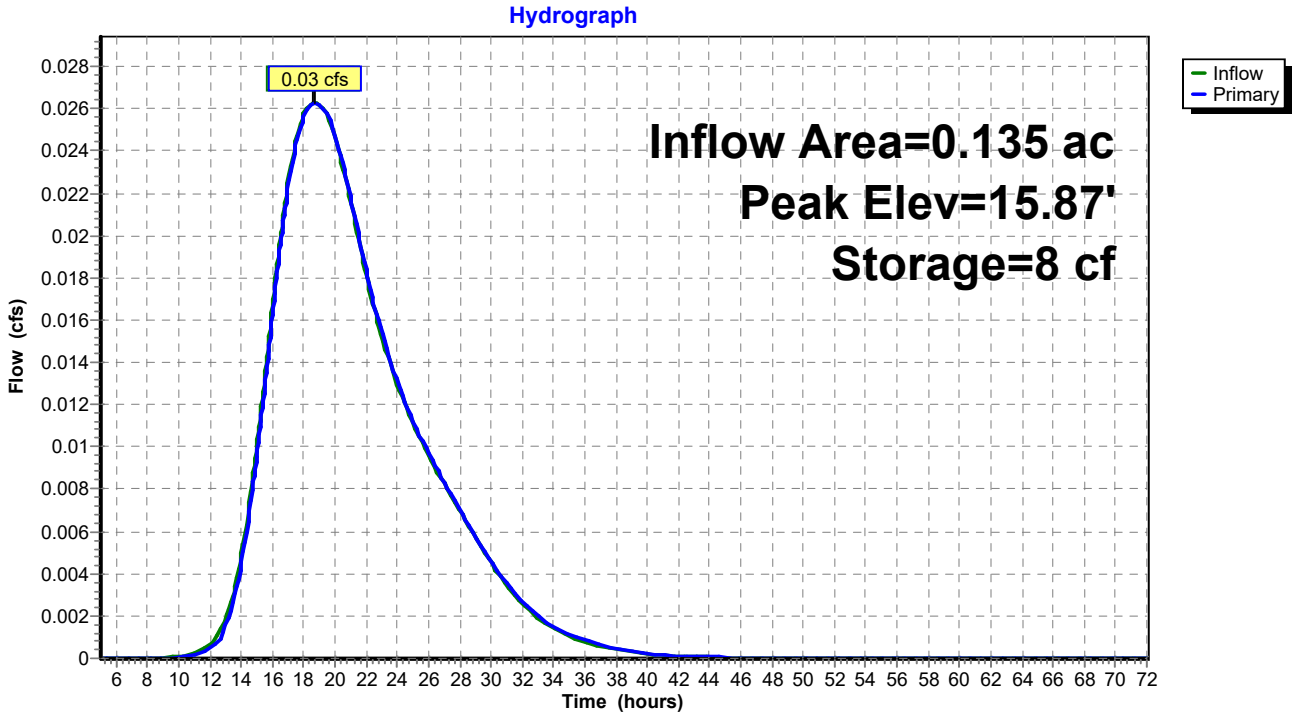
Volume	Invert	Avail.Storage	Storage Description
#1	15.76'	108 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 371 cf Overall - 11 cf Embedded = 360 cf x 30.0% Voids
#2	15.76'	11 cf	**4.0" Round Pipe Storage** Inside #1 L= 124.0'
		119 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.76	175	0	0
16.09	175	58	58
16.26	175	30	88
17.38	175	196	283
17.88	175	88	371

Device	Routing	Invert	Outlet Devices
#1	Primary	15.76'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 18.72 hrs HW=15.87' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.11 fps)

Pond 16P: POROUS (SOUTH PAVILION SIDEWALK)



Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA#1: DA#1 Runoff Area=1,120 sf 100.00% Impervious Runoff Depth>4.82"
Tc=491.0 min CN=98 Runoff=0.01 cfs 0.010 af

SubcatchmentDA#2: DA#2 Runoff Area=11,285 sf 72.01% Impervious Runoff Depth>4.26"
Tc=491.0 min CN=93 Runoff=0.11 cfs 0.092 af

SubcatchmentDA#3: PR DA#3 Runoff Area=53,150 sf 89.88% Impervious Runoff Depth>4.50"
Tc=6.0 min CN=96 Runoff=5.62 cfs 0.457 af

SubcatchmentDA#4: PR DA#4 Runoff Area=72,378 sf 100.00% Impervious Runoff Depth>4.65"
Tc=6.0 min CN=98 Runoff=7.76 cfs 0.644 af

SubcatchmentDA#5: PR DA#5 Runoff Area=3,578 sf 100.00% Impervious Runoff Depth>4.65"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.032 af

SubcatchmentDA#6: DA#6 Runoff Area=5,877 sf 39.00% Impervious Runoff Depth=3.62"
Tc=491.0 min CN=87 Runoff=0.05 cfs 0.041 af

SubcatchmentDA#7: PR DA#7 Runoff Area=3,618 sf 100.00% Impervious Runoff Depth>4.65"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.032 af

SubcatchmentDA#8: PR DA#8 Runoff Area=14,439 sf 100.00% Impervious Runoff Depth>4.65"
Tc=6.0 min CN=98 Runoff=1.55 cfs 0.128 af

Reach 12R: PR DP#1 Inflow=13.18 cfs 1.211 af
Outflow=13.18 cfs 1.211 af

Reach 13R: PR DP#2 Inflow=1.94 cfs 0.201 af
Outflow=1.94 cfs 0.201 af

Reach 19R: PR Total Inflow=15.11 cfs 1.412 af
Outflow=15.11 cfs 1.412 af

Pond 1P: POROUS (NORTH PAVILION Peak Elev=15.48' Storage=10 cf Inflow=0.01 cfs 0.010 af
Outflow=0.01 cfs 0.010 af

Pond 14P: RECHARGE Peak Elev=12.64' Storage=2,013 cf Inflow=7.76 cfs 0.644 af
Outflow=7.28 cfs 0.620 af

Pond 15P: POROUS (NORTH SITE) Peak Elev=14.62' Storage=107 cf Inflow=0.11 cfs 0.092 af
Outflow=0.11 cfs 0.092 af

Pond 16P: POROUS (SOUTH PAVILION Peak Elev=15.91' Storage=11 cf Inflow=0.05 cfs 0.041 af
Outflow=0.05 cfs 0.041 af

Total Runoff Area = 3.798 ac Runoff Volume = 1.436 af Average Runoff Depth = 4.54"
7.33% Pervious = 0.278 ac 92.67% Impervious = 3.520 ac

Summary for Subcatchment DA#1: DA#1

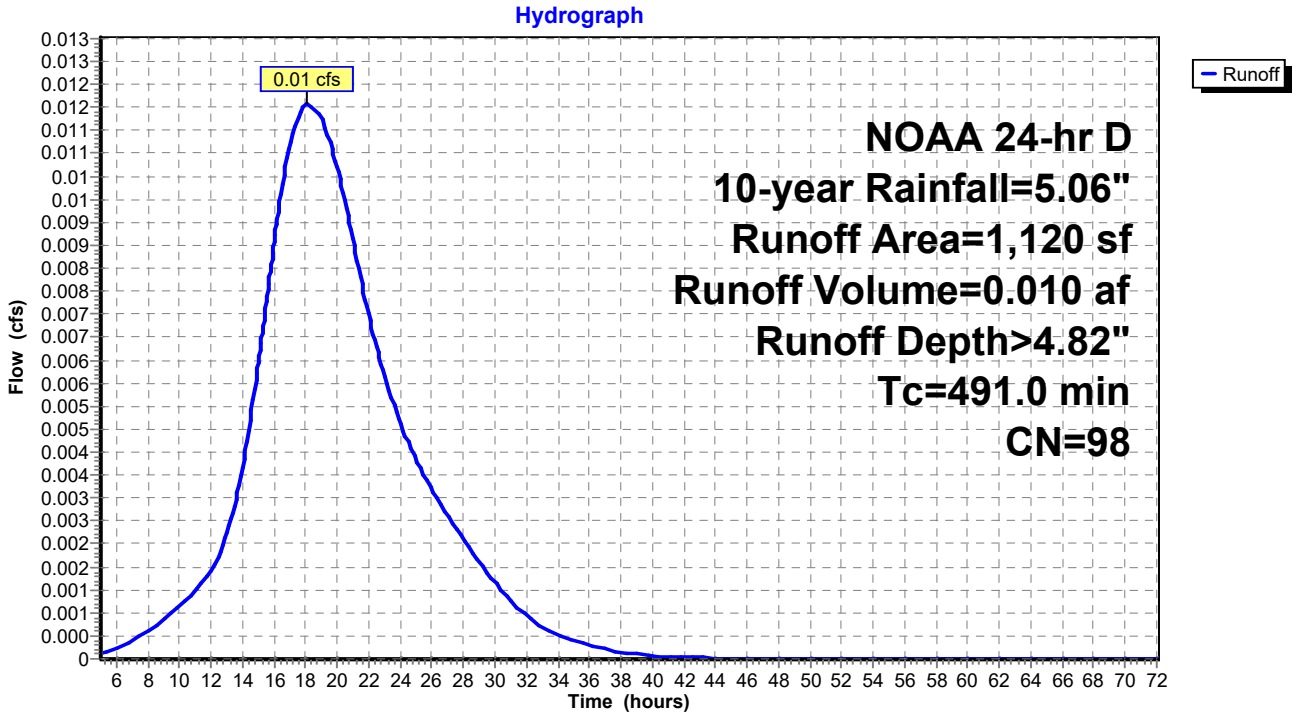
Runoff = 0.01 cfs @ 18.02 hrs, Volume= 0.010 af, Depth> 4.82"
Routed to Pond 1P : POROUS (NORTH PAVILION SIDEWALK)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
1,120	98	Paved parking, HSG D
1,120		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#1: DA#1



Summary for Subcatchment DA#2: DA#2

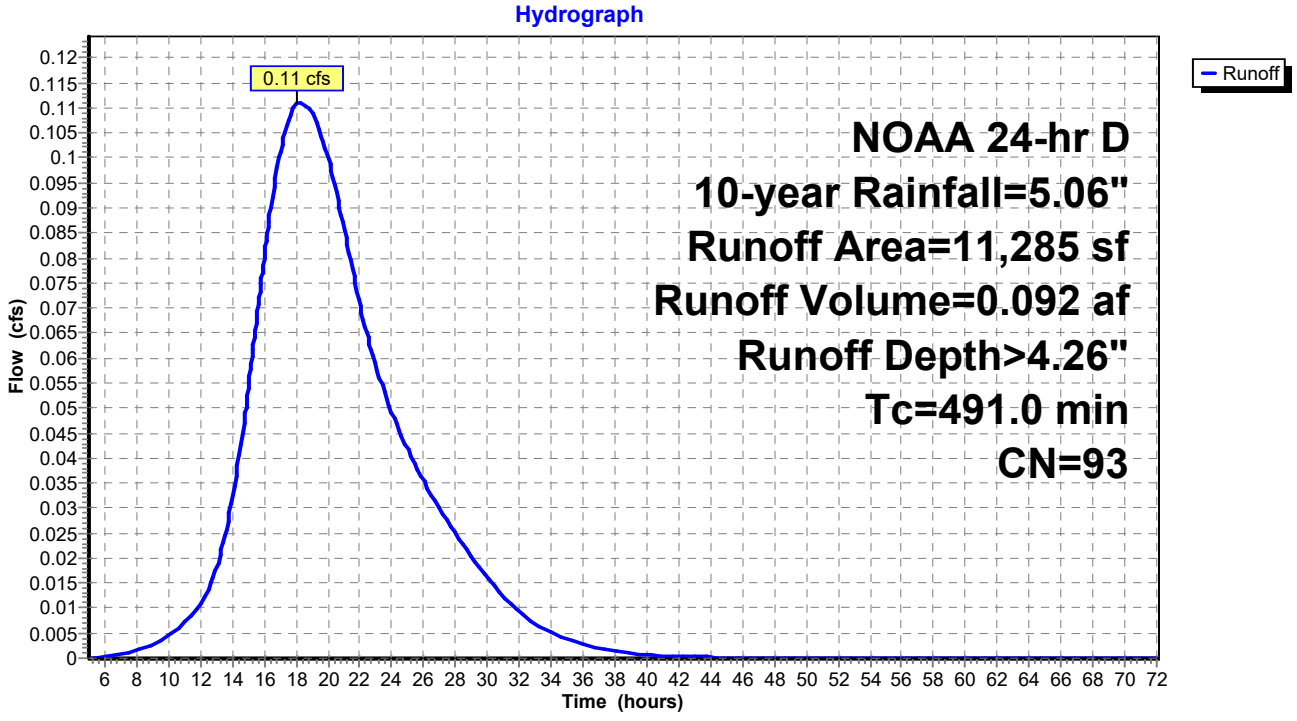
Runoff = 0.11 cfs @ 18.06 hrs, Volume= 0.092 af, Depth> 4.26"
Routed to Pond 15P : POROUS (NORTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
8,126	98	Paved parking, HSG D
3,159	80	>75% Grass cover, Good, HSG D
11,285	93	Weighted Average
3,159		27.99% Pervious Area
8,126		72.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#2: DA#2



Summary for Subcatchment DA#3: PR DA#3

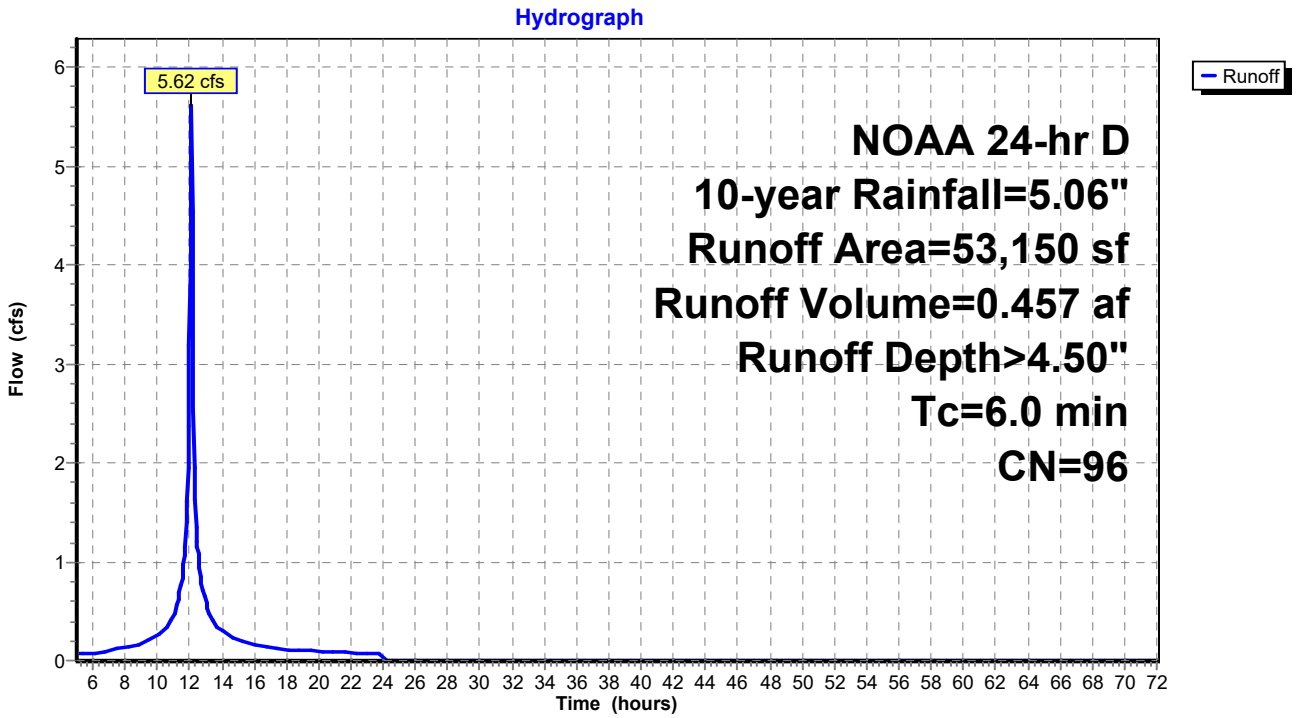
Runoff = 5.62 cfs @ 12.13 hrs, Volume= 0.457 af, Depth> 4.50"
Routed to Reach 12R : PR DP#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
5,381	80	>75% Grass cover, Good, HSG D
46,263	98	Paved parking, HSG D
1,506	98	Roofs, HSG D
53,150	96	Weighted Average
5,381		10.12% Pervious Area
47,769		89.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#3: PR DA#3



Summary for Subcatchment DA#4: PR DA#4

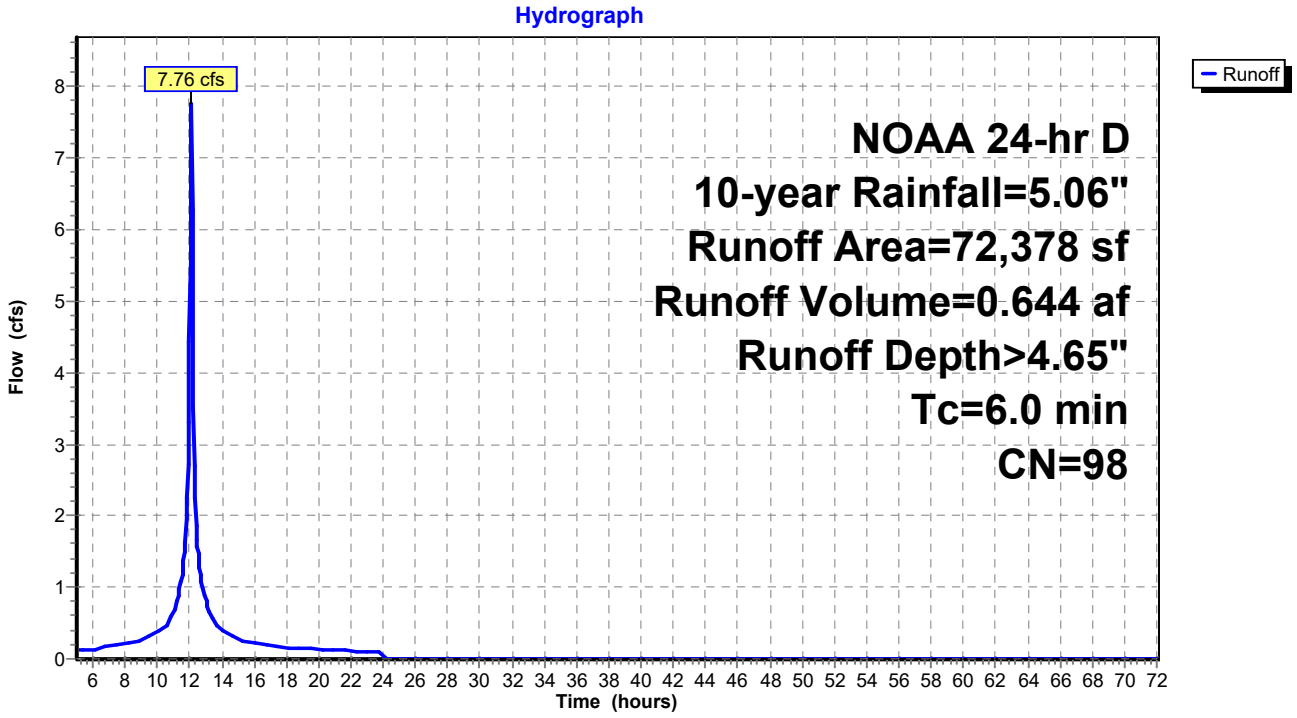
Runoff = 7.76 cfs @ 12.13 hrs, Volume= 0.644 af, Depth> 4.65"
Routed to Pond 14P : RECHARGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
72,378	98	Roofs, HSG D
72,378		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#4: PR DA#4



Summary for Subcatchment DA#5: PR DA#5

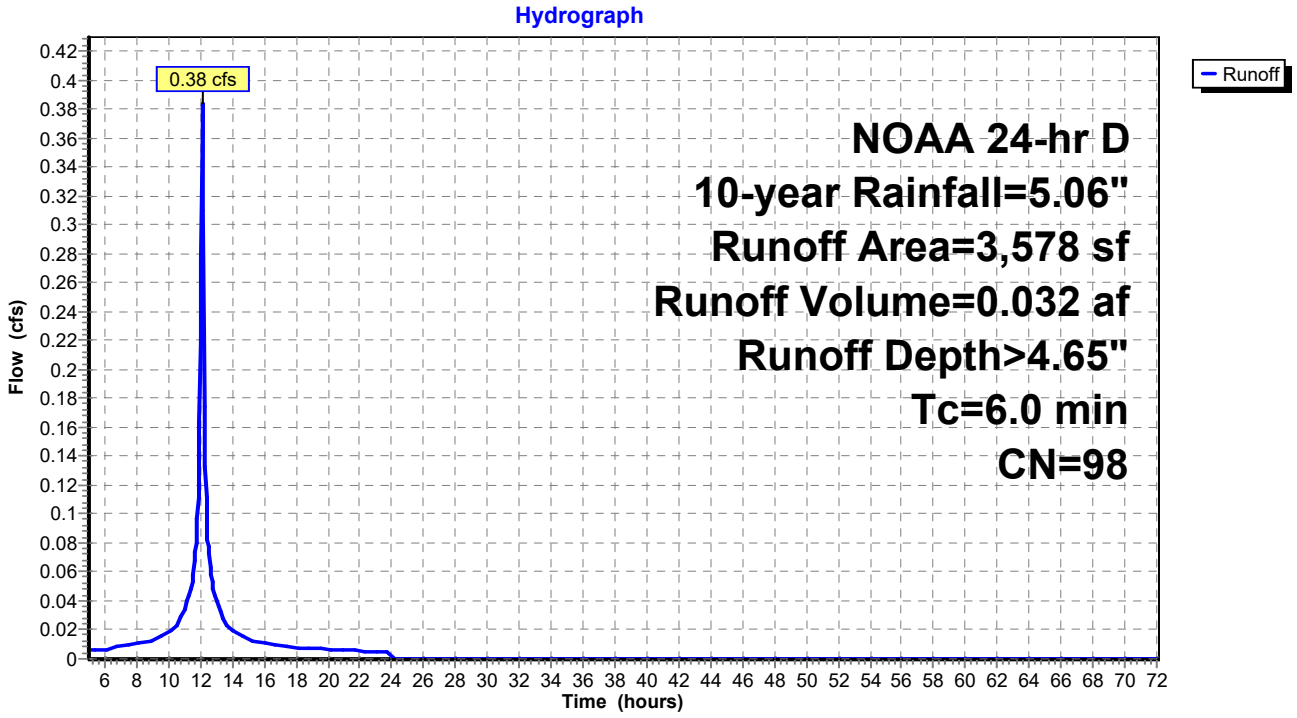
Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.032 af, Depth> 4.65"
Routed to Reach 12R : PR DP#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
3,578	98	Roofs, HSG D
3,578		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#5: PR DA#5



Summary for Subcatchment DA#6: DA#6

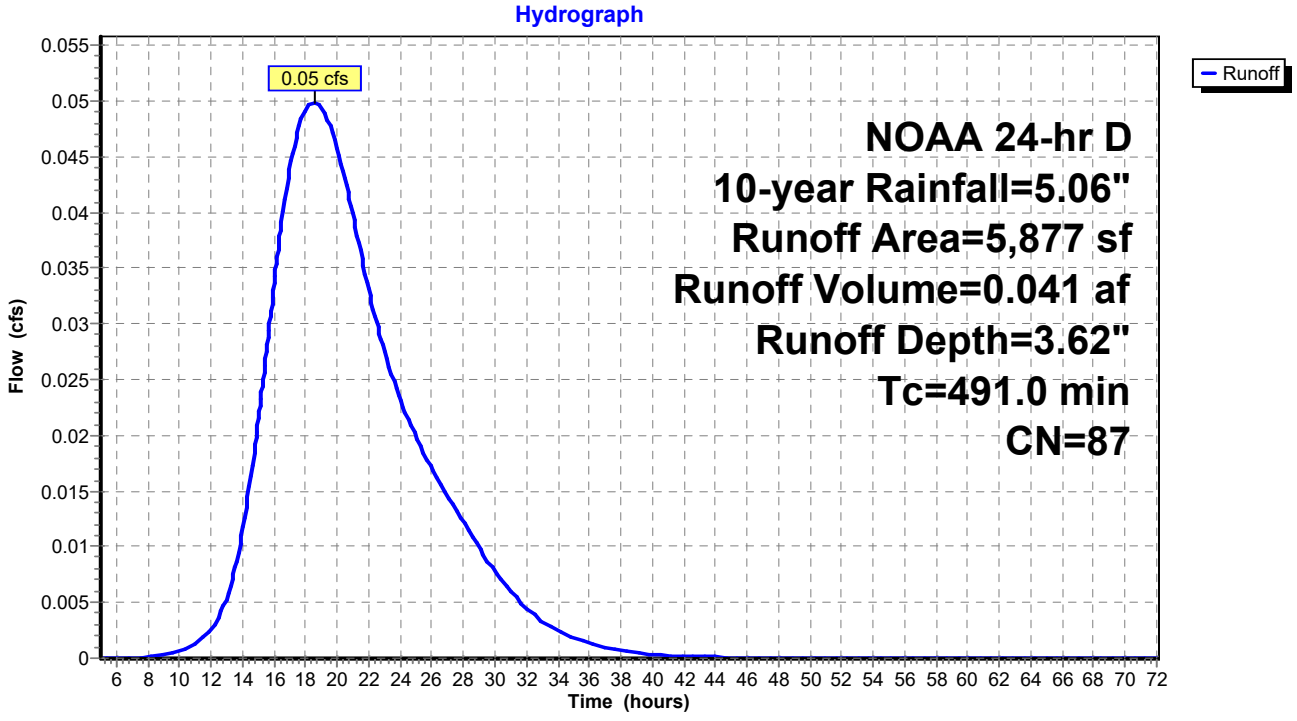
Runoff = 0.05 cfs @ 18.55 hrs, Volume= 0.041 af, Depth= 3.62"
Routed to Pond 16P : POROUS (SOUTH PAVILION SIDEWALK)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
2,292	98	Paved parking, HSG D
3,585	80	>75% Grass cover, Good, HSG D
5,877	87	Weighted Average
3,585		61.00% Pervious Area
2,292		39.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#6: DA#6



Summary for Subcatchment DA#7: PR DA#7

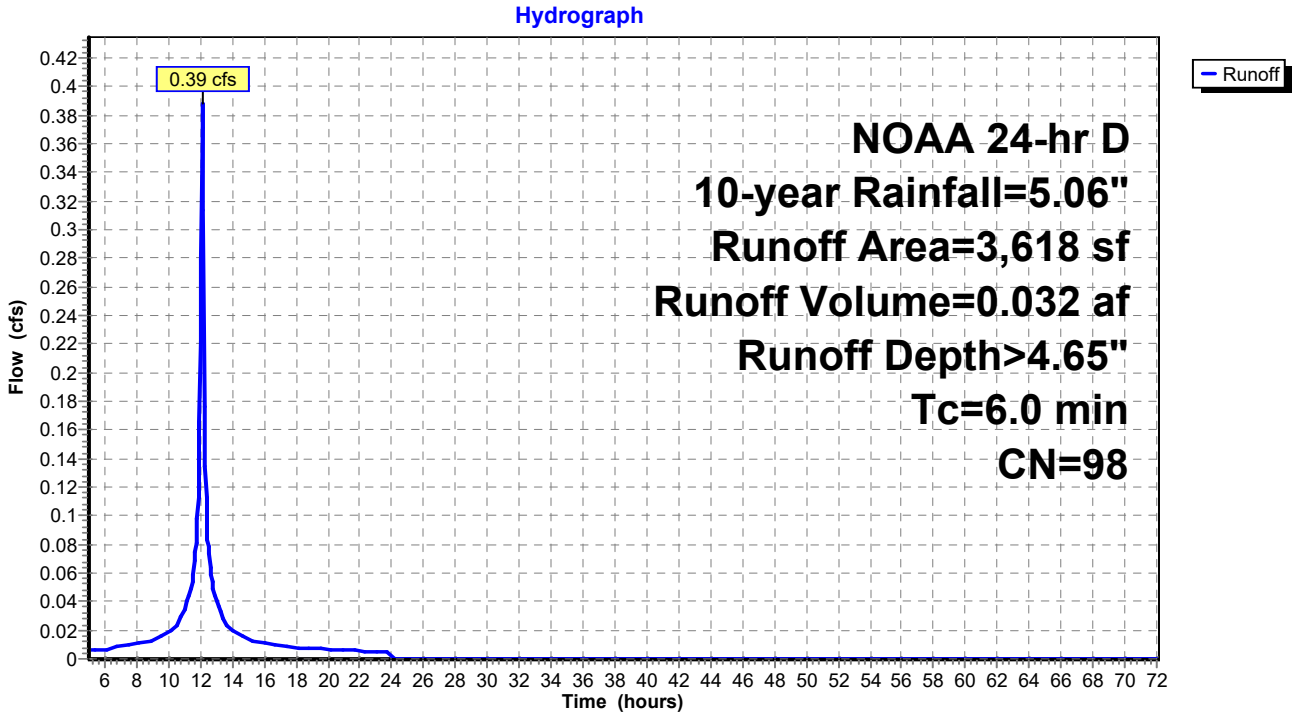
Runoff = 0.39 cfs @ 12.13 hrs, Volume= 0.032 af, Depth> 4.65"
Routed to Reach 13R : PR DP#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
3,618	98	Roofs, HSG D
3,618		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#7: PR DA#7



Summary for Subcatchment DA#8: PR DA#8

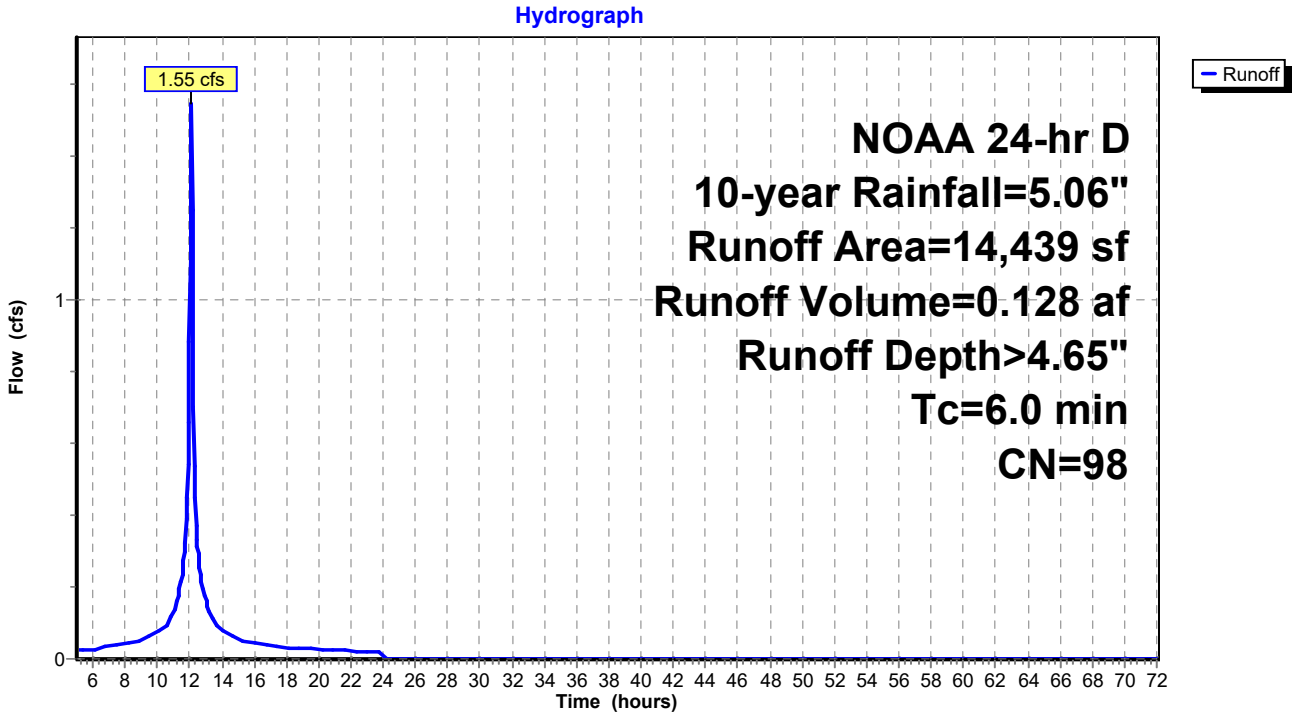
Runoff = 1.55 cfs @ 12.13 hrs, Volume= 0.128 af, Depth> 4.65"
Routed to Reach 13R : PR DP#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10-year Rainfall=5.06"

Area (sf)	CN	Description
14,439	98	Paved parking, HSG D
14,439		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#8: PR DA#8

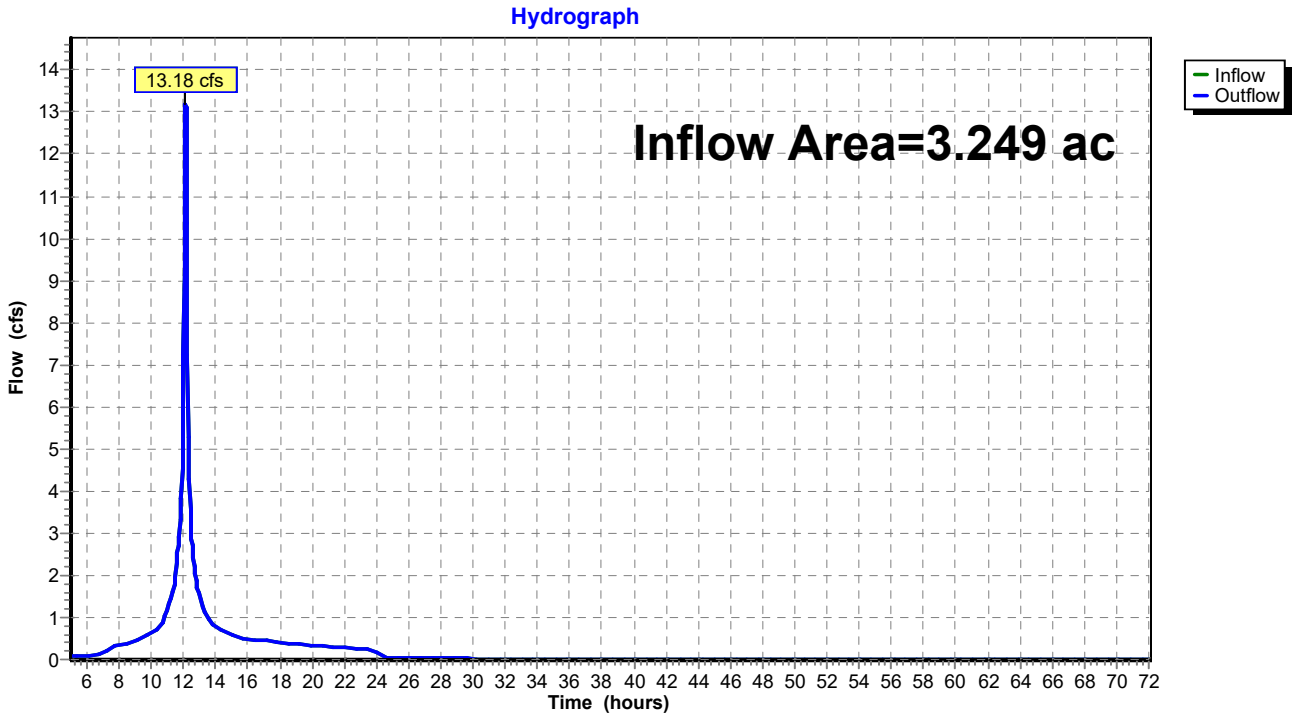


Summary for Reach 12R: PR DP#1

Inflow Area = 3.249 ac, 93.97% Impervious, Inflow Depth > 4.47" for 10-year event
Inflow = 13.18 cfs @ 12.14 hrs, Volume= 1.211 af
Outflow = 13.18 cfs @ 12.14 hrs, Volume= 1.211 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 19R : PR Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: PR DP#1

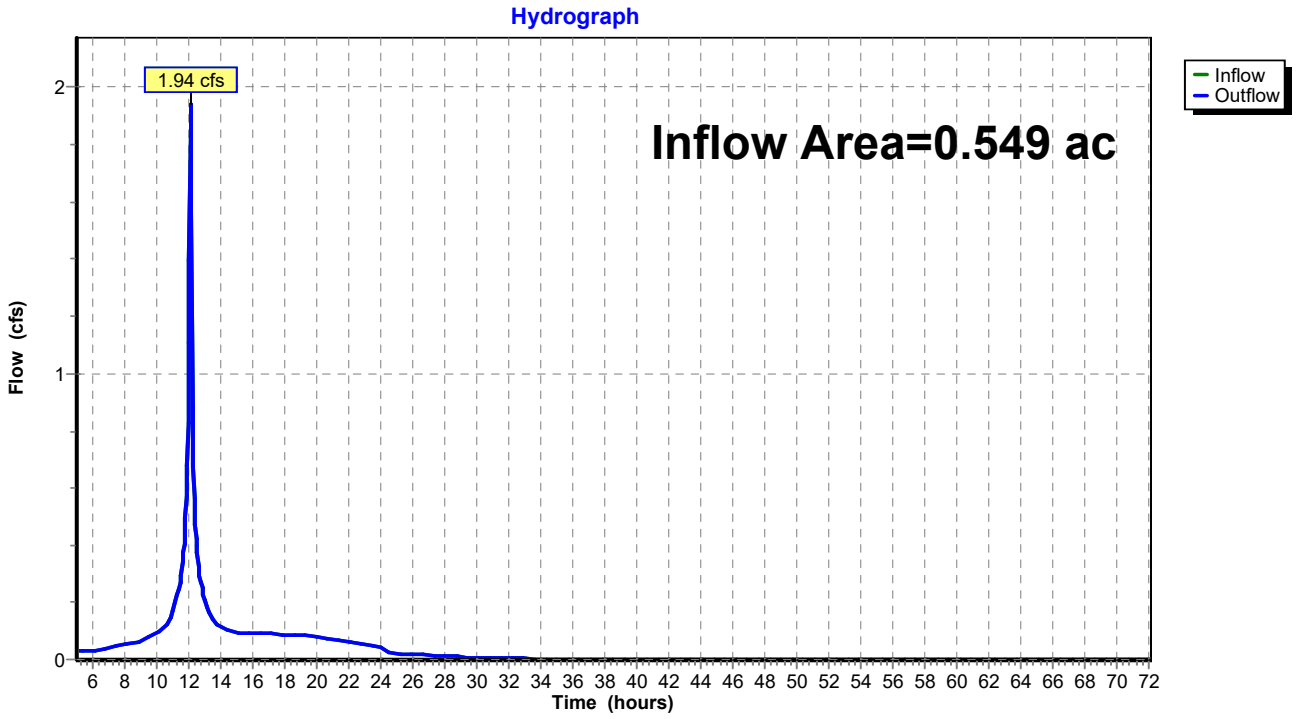


Summary for Reach 13R: PR DP#2

Inflow Area = 0.549 ac, 85.02% Impervious, Inflow Depth > 4.40" for 10-year event
Inflow = 1.94 cfs @ 12.13 hrs, Volume= 0.201 af
Outflow = 1.94 cfs @ 12.13 hrs, Volume= 0.201 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 19R : PR Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 13R: PR DP#2

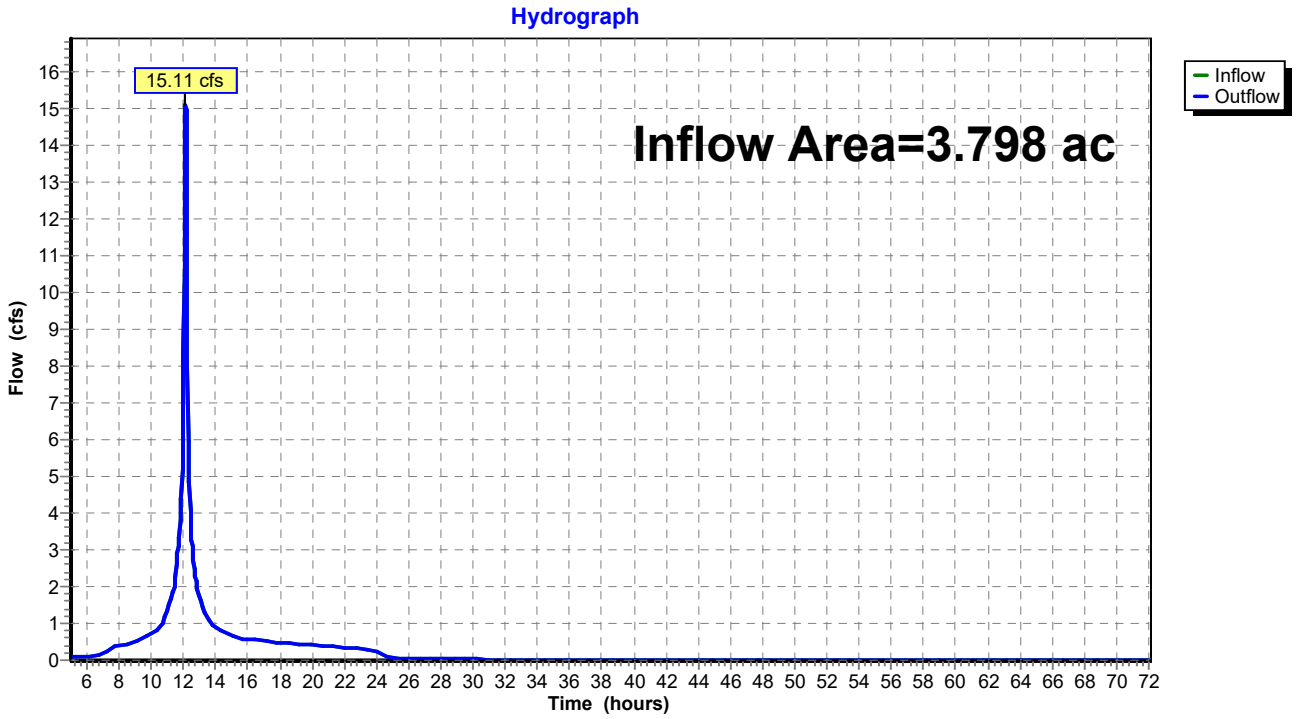


Summary for Reach 19R: PR Total

Inflow Area = 3.798 ac, 92.67% Impervious, Inflow Depth > 4.46" for 10-year event
Inflow = 15.11 cfs @ 12.14 hrs, Volume= 1.412 af
Outflow = 15.11 cfs @ 12.14 hrs, Volume= 1.412 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 19R: PR Total



Summary for Pond 1P: POROUS (NORTH PAVILION SIDEWALK)

Inflow Area = 0.026 ac,100.00% Impervious, Inflow Depth > 4.82" for 10-year event
Inflow = 0.01 cfs @ 18.02 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 18.19 hrs, Volume= 0.010 af, Atten= 0%, Lag= 10.1 min
Primary = 0.01 cfs @ 18.19 hrs, Volume= 0.010 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.48' @ 18.19 hrs Surf.Area= 434 sf Storage= 10 cf

Plug-Flow detention time= 19.9 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 19.5 min (1,220.1 - 1,200.6)

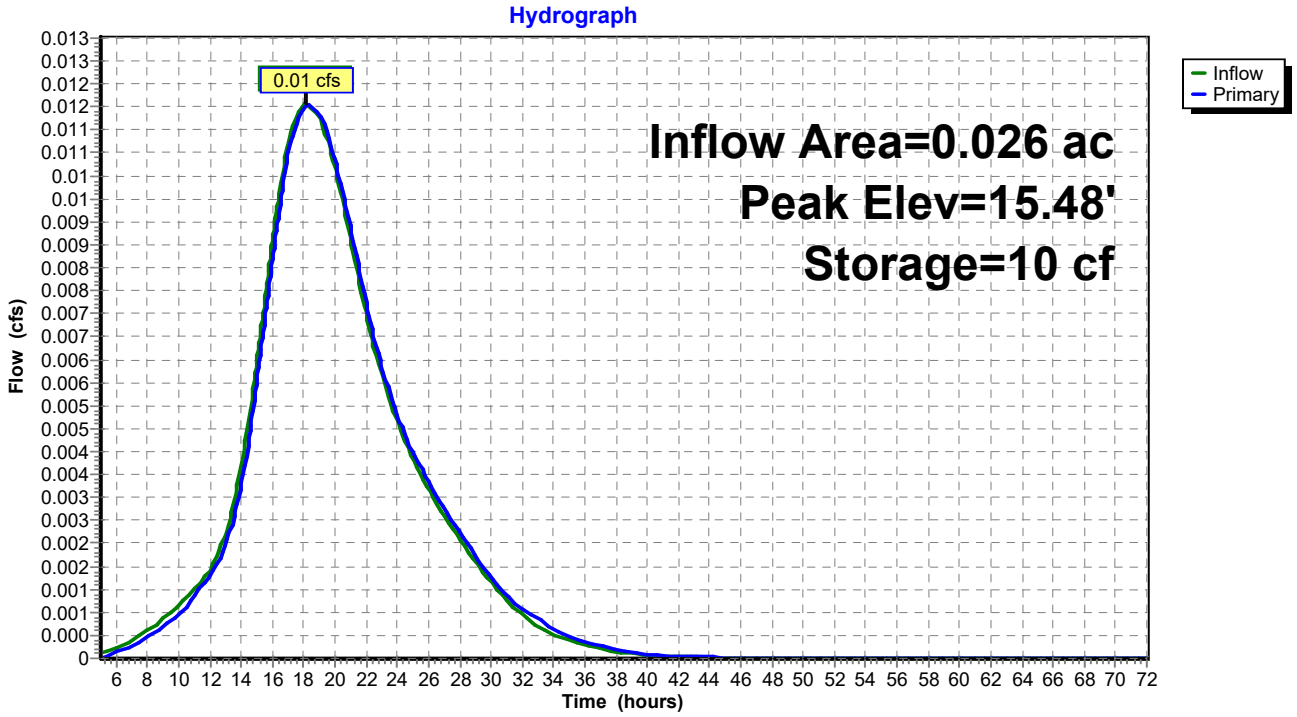
Volume	Invert	Avail.Storage	Storage Description
#1	15.41'	274 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 920 cf Overall - 7 cf Embedded = 913 cf x 30.0% Voids
#2	15.41'	7 cf	**4.0" Round Pipe Storage** Inside #1 L= 80.0'
		281 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.41	434	0	0
15.74	434	143	143
15.90	434	69	213
17.03	434	490	703
17.53	434	217	920

Device	Routing	Invert	Outlet Devices
#1	Primary	15.41'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 18.19 hrs HW=15.48' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.90 fps)

Pond 1P: POROUS (NORTH PAVILION SIDEWALK)



Summary for Pond 14P: RECHARGE

Inflow Area = 1.662 ac,100.00% Impervious, Inflow Depth > 4.65" for 10-year event
Inflow = 7.76 cfs @ 12.13 hrs, Volume= 0.644 af
Outflow = 7.28 cfs @ 12.15 hrs, Volume= 0.620 af, Atten= 6%, Lag= 1.5 min
Primary = 7.28 cfs @ 12.15 hrs, Volume= 0.620 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 12.64' @ 12.15 hrs Surf.Area= 915 sf Storage= 2,013 cf

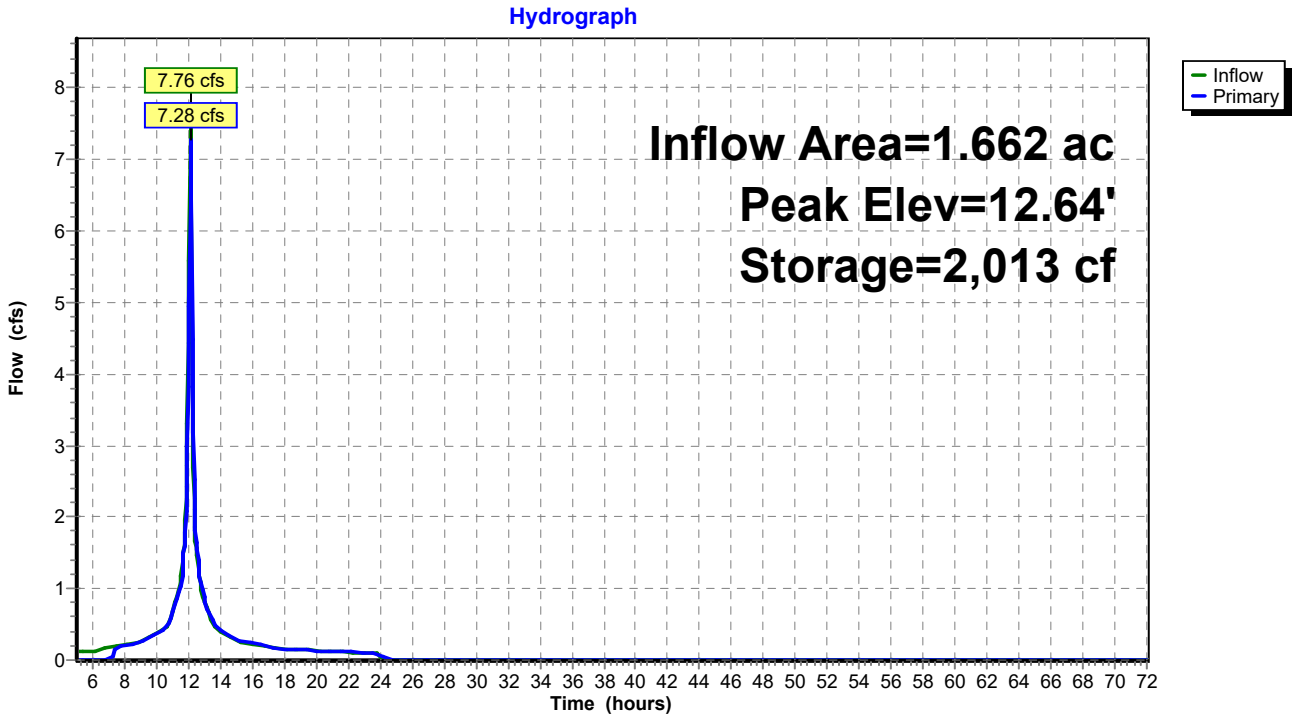
Plug-Flow detention time= 44.5 min calculated for 0.619 af (96% of inflow)
Center-of-Mass det. time= 21.1 min (790.6 - 769.5)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	13,254 cf	**180.0" Round Pipe Storage** L= 75.0'

Device	Routing	Invert	Outlet Devices		
#1	Primary	11.50'	**12.0" Vert. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	11.50'	**15.0" Vert. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=7.27 cfs @ 12.15 hrs HW=12.64' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 3.02 cfs @ 3.84 fps)
└**2=Orifice/Grate** (Orifice Controls 4.25 cfs @ 3.63 fps)

Pond 14P: RECHARGE



Summary for Pond 15P: POROUS (NORTH SITE)

Inflow Area = 0.259 ac, 72.01% Impervious, Inflow Depth > 4.26" for 10-year event
Inflow = 0.11 cfs @ 18.06 hrs, Volume= 0.092 af
Outflow = 0.11 cfs @ 18.53 hrs, Volume= 0.092 af, Atten= 0%, Lag= 28.1 min
Primary = 0.11 cfs @ 18.53 hrs, Volume= 0.092 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 14.62' @ 18.53 hrs Surf.Area= 1,302 sf Storage= 107 cf

Plug-Flow detention time= 23.3 min calculated for 0.092 af (100% of inflow)
Center-of-Mass det. time= 22.9 min (1,256.1 - 1,233.1)

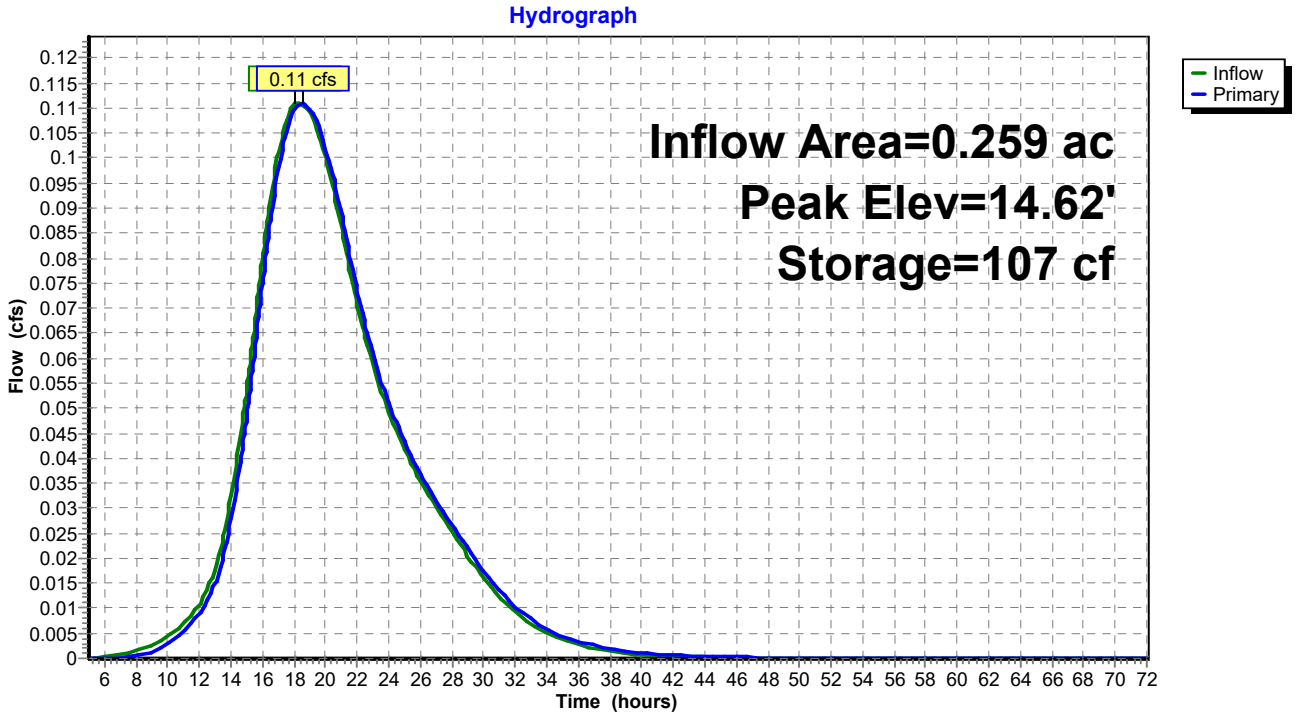
Volume	Invert	Avail.Storage	Storage Description
#1	14.38'	820 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,760 cf Overall - 26 cf Embedded = 2,734 cf x 30.0% Voids
#2	14.38'	26 cf	**4.0" Round Pipe Storage** Inside #1 L= 300.0'
		846 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.38	1,302	0	0
14.71	1,302	430	430
14.88	1,302	221	651
16.00	1,302	1,458	2,109
16.50	1,302	651	2,760

Device	Routing	Invert	Outlet Devices
#1	Primary	14.38'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.11 cfs @ 18.53 hrs HW=14.62' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 1.66 fps)

Pond 15P: POROUS (NORTH SITE)



Summary for Pond 16P: POROUS (SOUTH PAVILION SIDEWALK)

Inflow Area = 0.135 ac, 39.00% Impervious, Inflow Depth = 3.62" for 10-year event
Inflow = 0.05 cfs @ 18.55 hrs, Volume= 0.041 af
Outflow = 0.05 cfs @ 18.58 hrs, Volume= 0.041 af, Atten= 0%, Lag= 1.9 min
Primary = 0.05 cfs @ 18.58 hrs, Volume= 0.041 af
Routed to Reach 13R : PR DP#2

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.91' @ 18.58 hrs Surf.Area= 175 sf Storage= 11 cf

Plug-Flow detention time= 5.1 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (1,263.9 - 1,258.8)

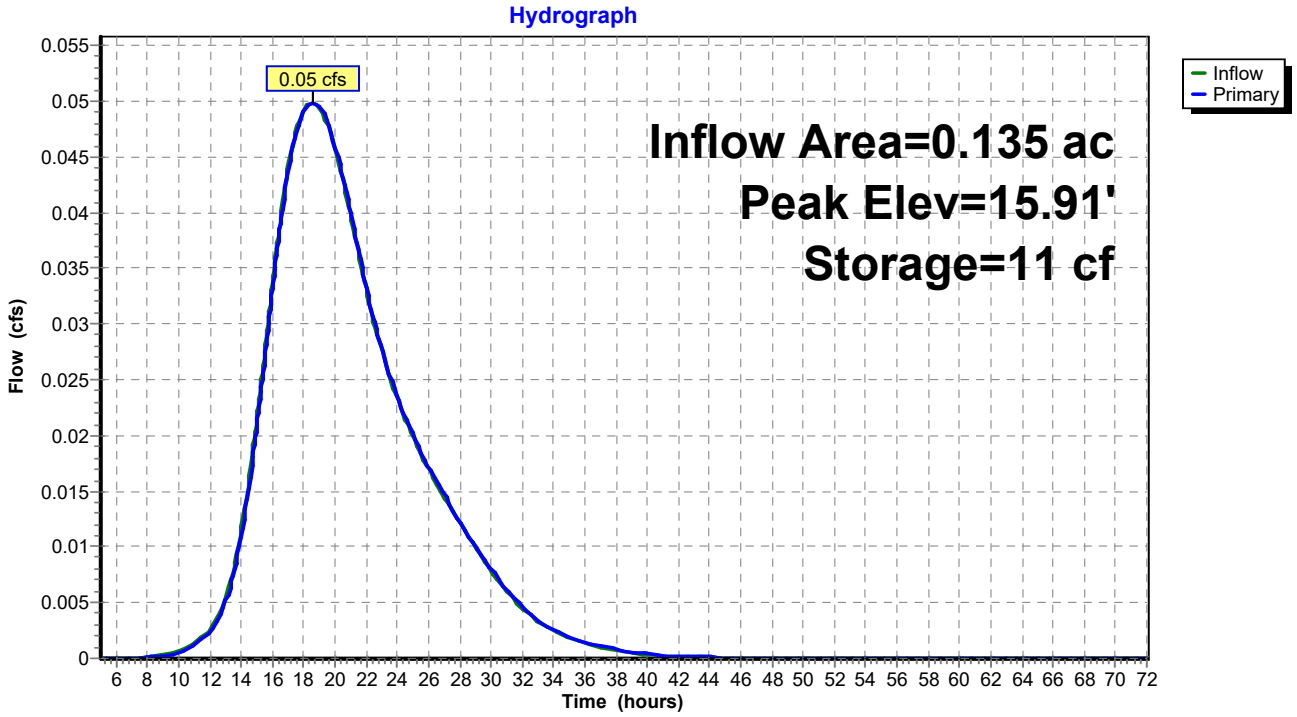
Volume	Invert	Avail.Storage	Storage Description
#1	15.76'	108 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 371 cf Overall - 11 cf Embedded = 360 cf x 30.0% Voids
#2	15.76'	11 cf	**4.0" Round Pipe Storage** Inside #1 L= 124.0'
		119 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.76	175	0	0
16.09	175	58	58
16.26	175	30	88
17.38	175	196	283
17.88	175	88	371

Device	Routing	Invert	Outlet Devices
#1	Primary	15.76'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 18.58 hrs HW=15.91' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.32 fps)

Pond 16P: POROUS (SOUTH PAVILION SIDEWALK)



Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA#1: DA#1 Runoff Area=1,120 sf 100.00% Impervious Runoff Depth>5.99"
Tc=491.0 min CN=98 Runoff=0.01 cfs 0.013 af

SubcatchmentDA#2: DA#2 Runoff Area=11,285 sf 72.01% Impervious Runoff Depth>5.41"
Tc=491.0 min CN=93 Runoff=0.14 cfs 0.117 af

SubcatchmentDA#3: PR DA#3 Runoff Area=53,150 sf 89.88% Impervious Runoff Depth>5.61"
Tc=6.0 min CN=96 Runoff=6.96 cfs 0.570 af

SubcatchmentDA#4: PR DA#4 Runoff Area=72,378 sf 100.00% Impervious Runoff Depth>5.75"
Tc=6.0 min CN=98 Runoff=9.57 cfs 0.796 af

SubcatchmentDA#5: PR DA#5 Runoff Area=3,578 sf 100.00% Impervious Runoff Depth>5.75"
Tc=6.0 min CN=98 Runoff=0.47 cfs 0.039 af

SubcatchmentDA#6: DA#6 Runoff Area=5,877 sf 39.00% Impervious Runoff Depth=4.74"
Tc=491.0 min CN=87 Runoff=0.06 cfs 0.053 af

SubcatchmentDA#7: PR DA#7 Runoff Area=3,618 sf 100.00% Impervious Runoff Depth>5.75"
Tc=6.0 min CN=98 Runoff=0.48 cfs 0.040 af

SubcatchmentDA#8: PR DA#8 Runoff Area=14,439 sf 100.00% Impervious Runoff Depth>5.75"
Tc=6.0 min CN=98 Runoff=1.91 cfs 0.159 af

Reach 12R: PR DP#1 Inflow=16.04 cfs 1.512 af
Outflow=16.04 cfs 1.512 af

Reach 13R: PR DP#2 Inflow=2.39 cfs 0.252 af
Outflow=2.39 cfs 0.252 af

Reach 19R: PR Total Inflow=18.41 cfs 1.763 af
Outflow=18.41 cfs 1.763 af

Pond 1P: POROUS (NORTH PAVILION Peak Elev=15.49' Storage=11 cf Inflow=0.01 cfs 0.013 af
Outflow=0.01 cfs 0.013 af

Pond 14P: RECHARGE Peak Elev=12.90' Storage=2,251 cf Inflow=9.57 cfs 0.796 af
Outflow=8.76 cfs 0.772 af

Pond 15P: POROUS (NORTH SITE) Peak Elev=14.66' Storage=125 cf Inflow=0.14 cfs 0.117 af
Outflow=0.14 cfs 0.117 af

Pond 16P: POROUS (SOUTH PAVILION Peak Elev=15.93' Storage=13 cf Inflow=0.06 cfs 0.053 af
Outflow=0.06 cfs 0.053 af

Total Runoff Area = 3.798 ac Runoff Volume = 1.788 af Average Runoff Depth = 5.65"
7.33% Pervious = 0.278 ac 92.67% Impervious = 3.520 ac

Summary for Subcatchment DA#1: DA#1

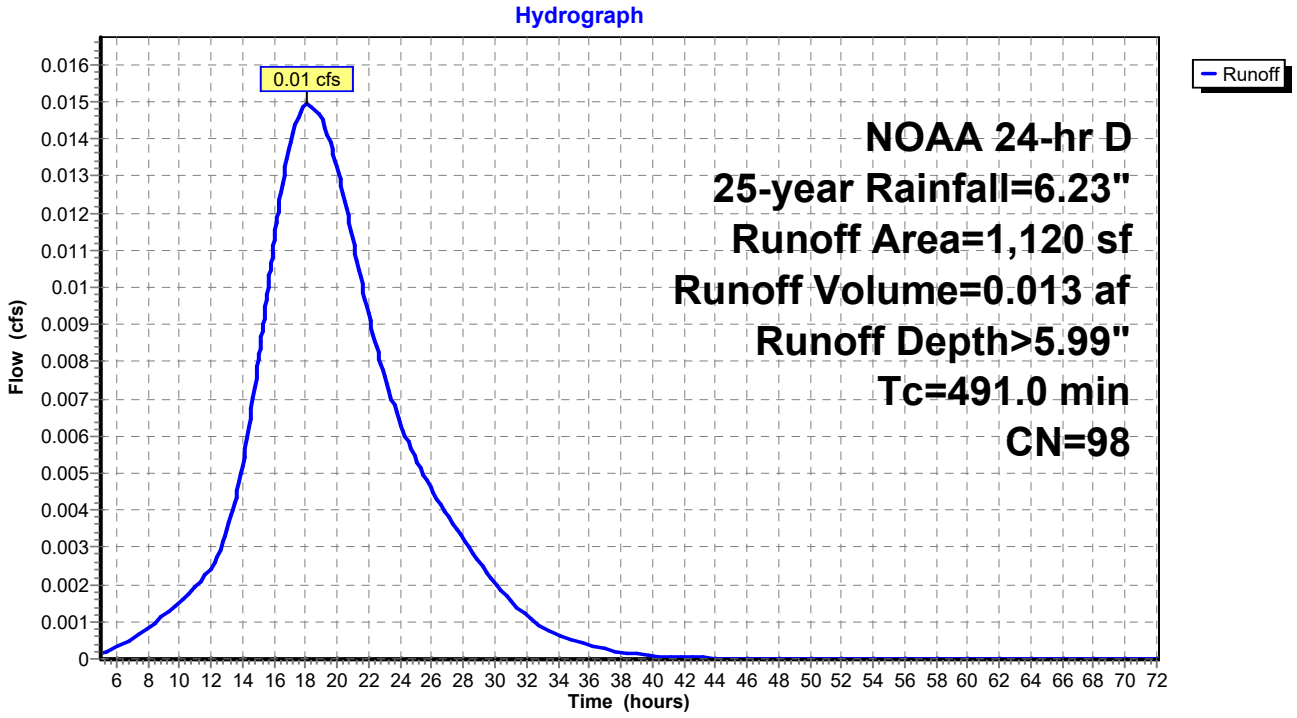
Runoff = 0.01 cfs @ 18.02 hrs, Volume= 0.013 af, Depth> 5.99"
Routed to Pond 1P : POROUS (NORTH PAVILION SIDEWALK)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
1,120	98	Paved parking, HSG D
1,120		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#1: DA#1



Summary for Subcatchment DA#2: DA#2

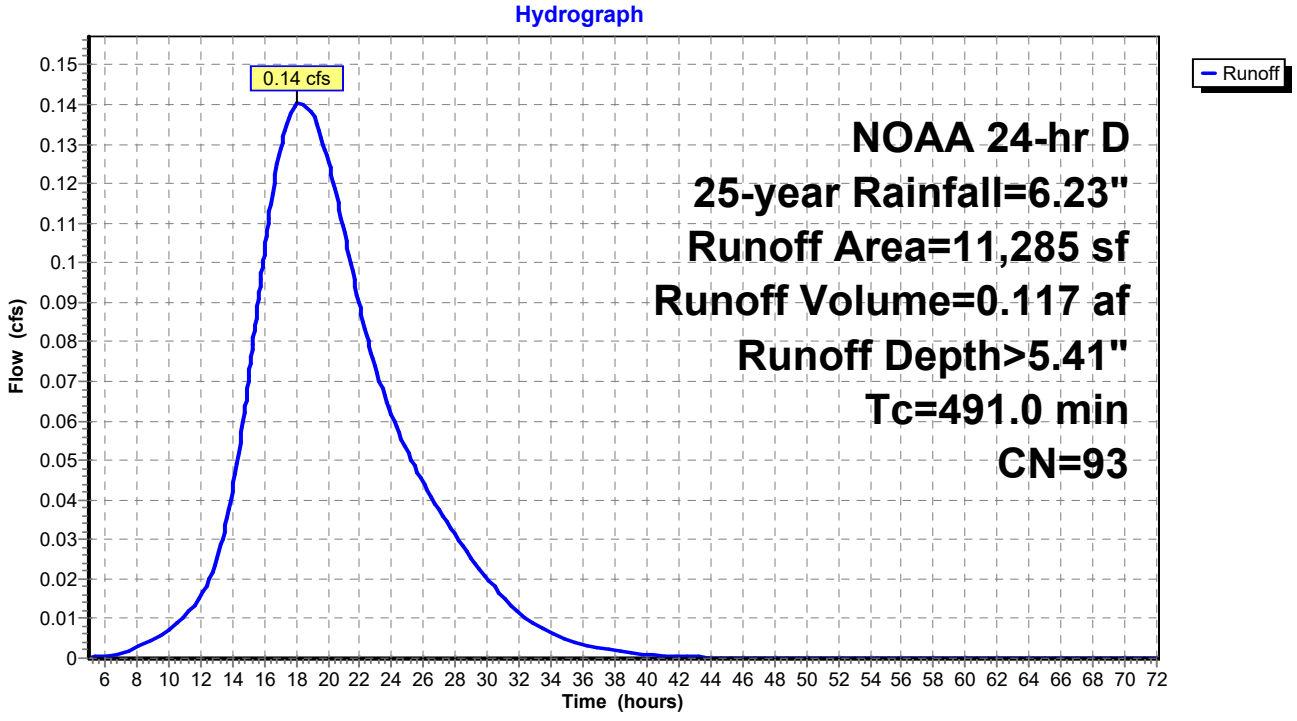
Runoff = 0.14 cfs @ 18.05 hrs, Volume= 0.117 af, Depth> 5.41"
Routed to Pond 15P : POROUS (NORTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
8,126	98	Paved parking, HSG D
3,159	80	>75% Grass cover, Good, HSG D
11,285	93	Weighted Average
3,159		27.99% Pervious Area
8,126		72.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#2: DA#2



Summary for Subcatchment DA#3: PR DA#3

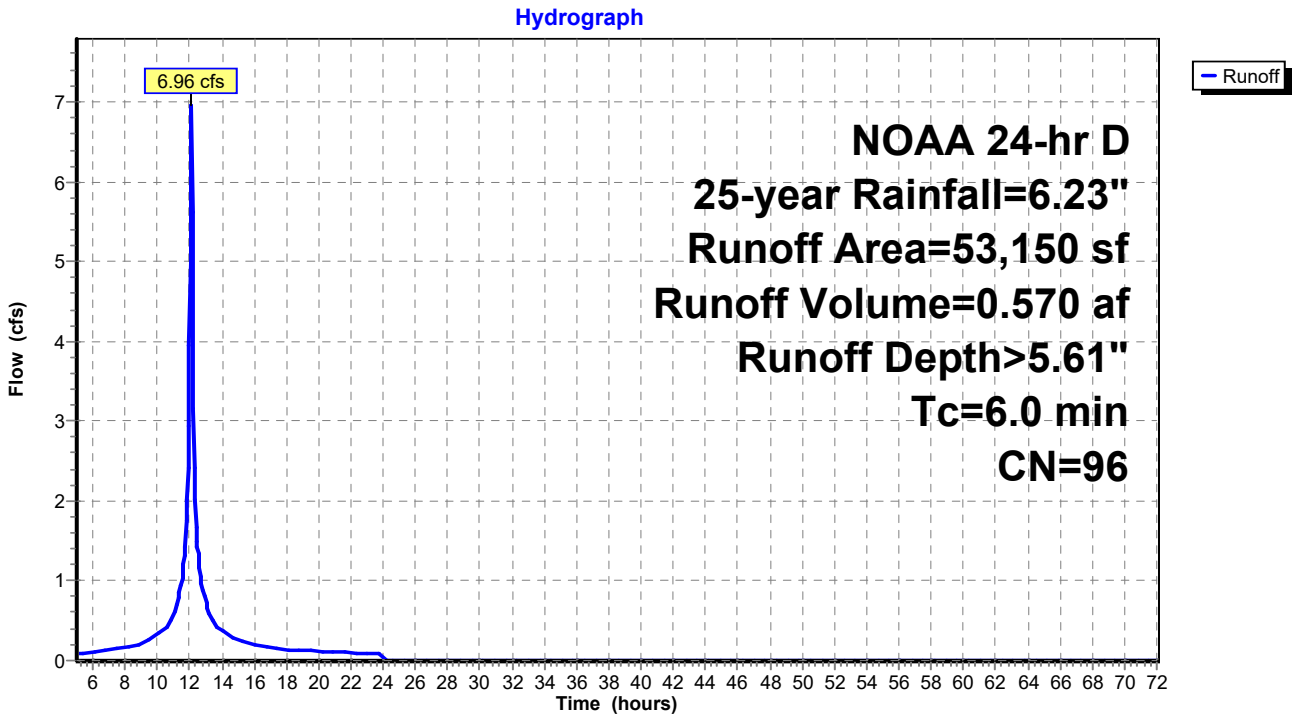
Runoff = 6.96 cfs @ 12.13 hrs, Volume= 0.570 af, Depth> 5.61"
Routed to Reach 12R : PR DP#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
5,381	80	>75% Grass cover, Good, HSG D
46,263	98	Paved parking, HSG D
1,506	98	Roofs, HSG D
53,150	96	Weighted Average
5,381		10.12% Pervious Area
47,769		89.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#3: PR DA#3



Summary for Subcatchment DA#4: PR DA#4

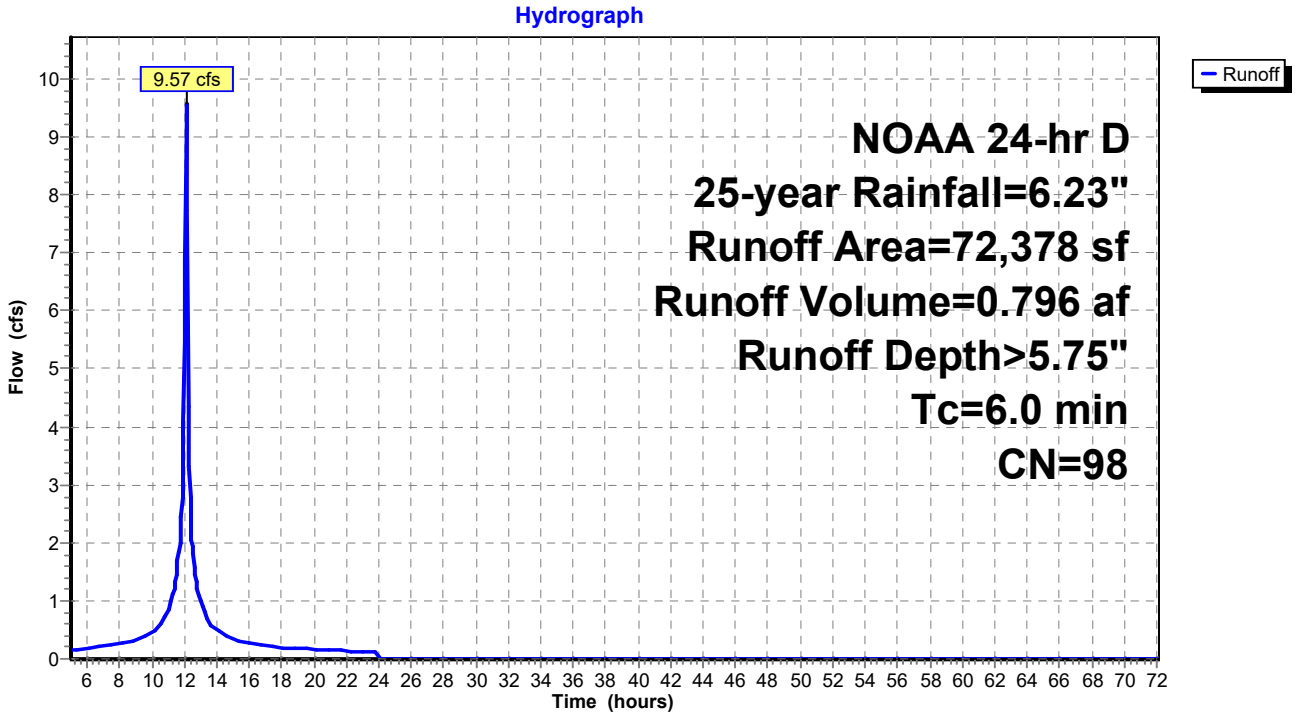
Runoff = 9.57 cfs @ 12.13 hrs, Volume= 0.796 af, Depth> 5.75"
Routed to Pond 14P : RECHARGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
72,378	98	Roofs, HSG D
72,378		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#4: PR DA#4



Summary for Subcatchment DA#5: PR DA#5

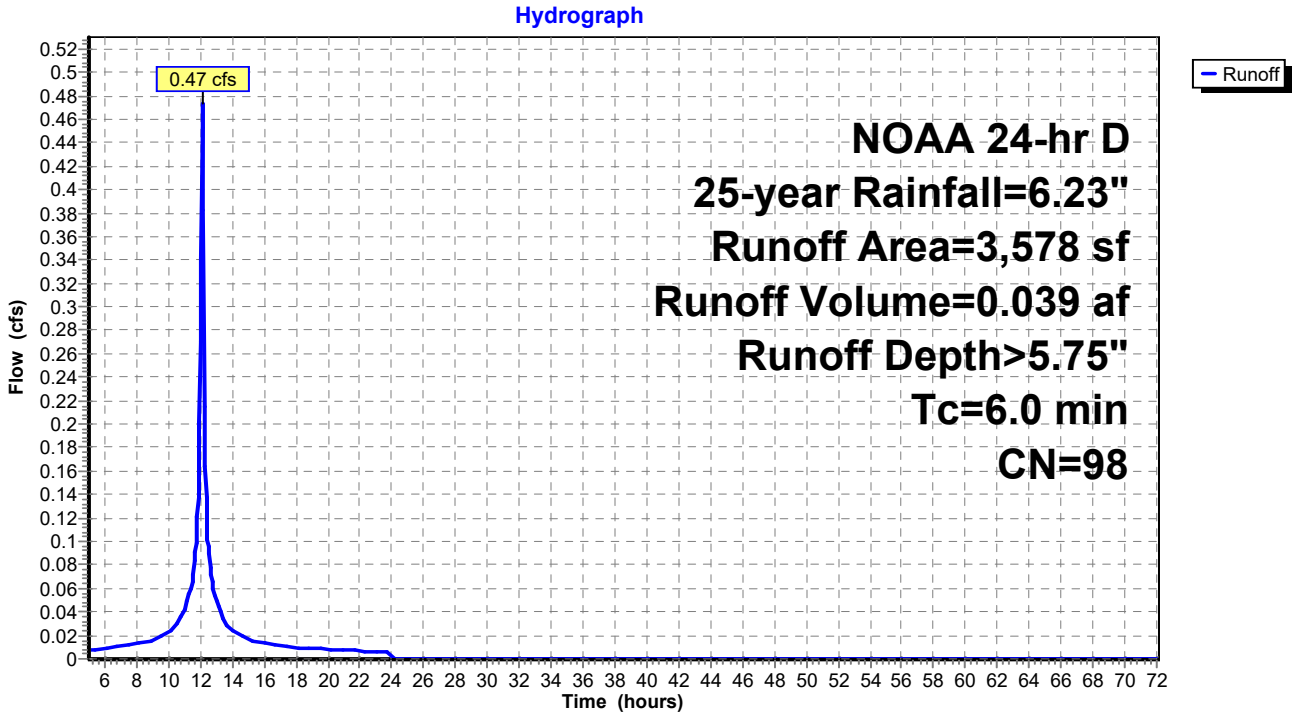
Runoff = 0.47 cfs @ 12.13 hrs, Volume= 0.039 af, Depth> 5.75"
Routed to Reach 12R : PR DP#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
3,578	98	Roofs, HSG D
3,578		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#5: PR DA#5



Summary for Subcatchment DA#6: DA#6

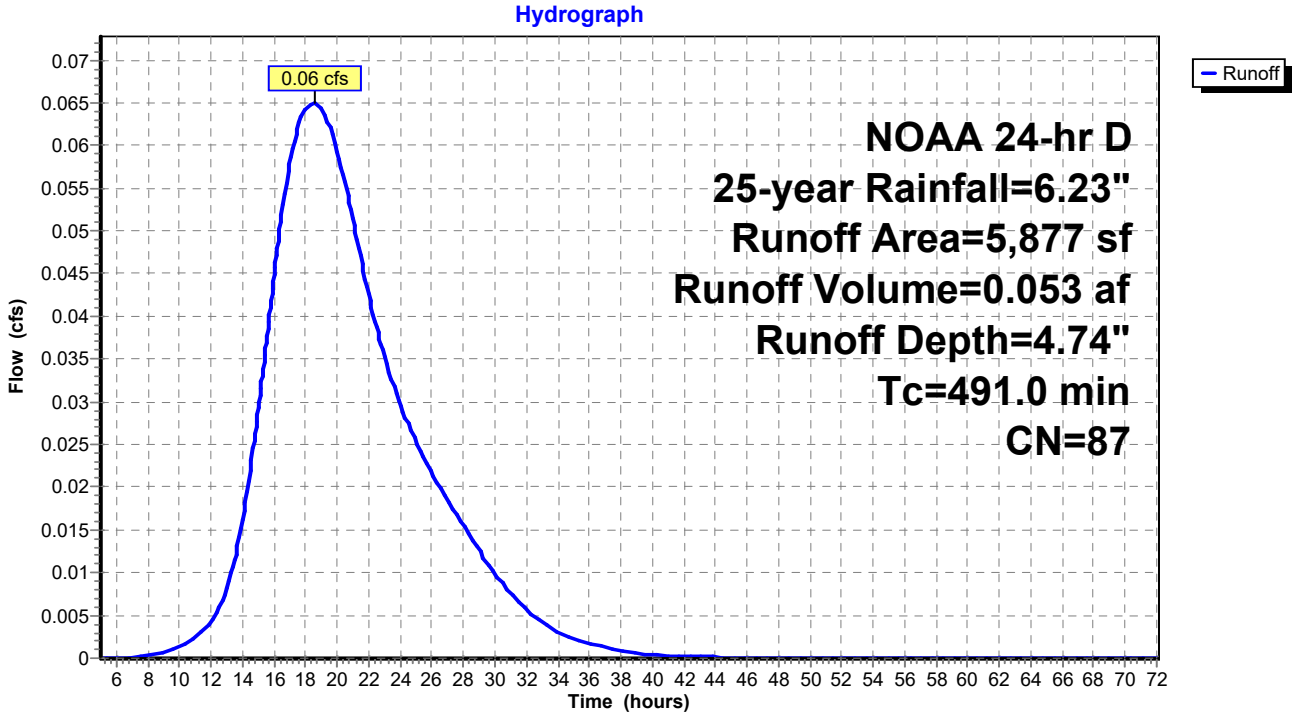
Runoff = 0.06 cfs @ 18.53 hrs, Volume= 0.053 af, Depth= 4.74"
Routed to Pond 16P : POROUS (SOUTH PAVILION SIDEWALK)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
2,292	98	Paved parking, HSG D
3,585	80	>75% Grass cover, Good, HSG D
5,877	87	Weighted Average
3,585		61.00% Pervious Area
2,292		39.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#6: DA#6



Summary for Subcatchment DA#7: PR DA#7

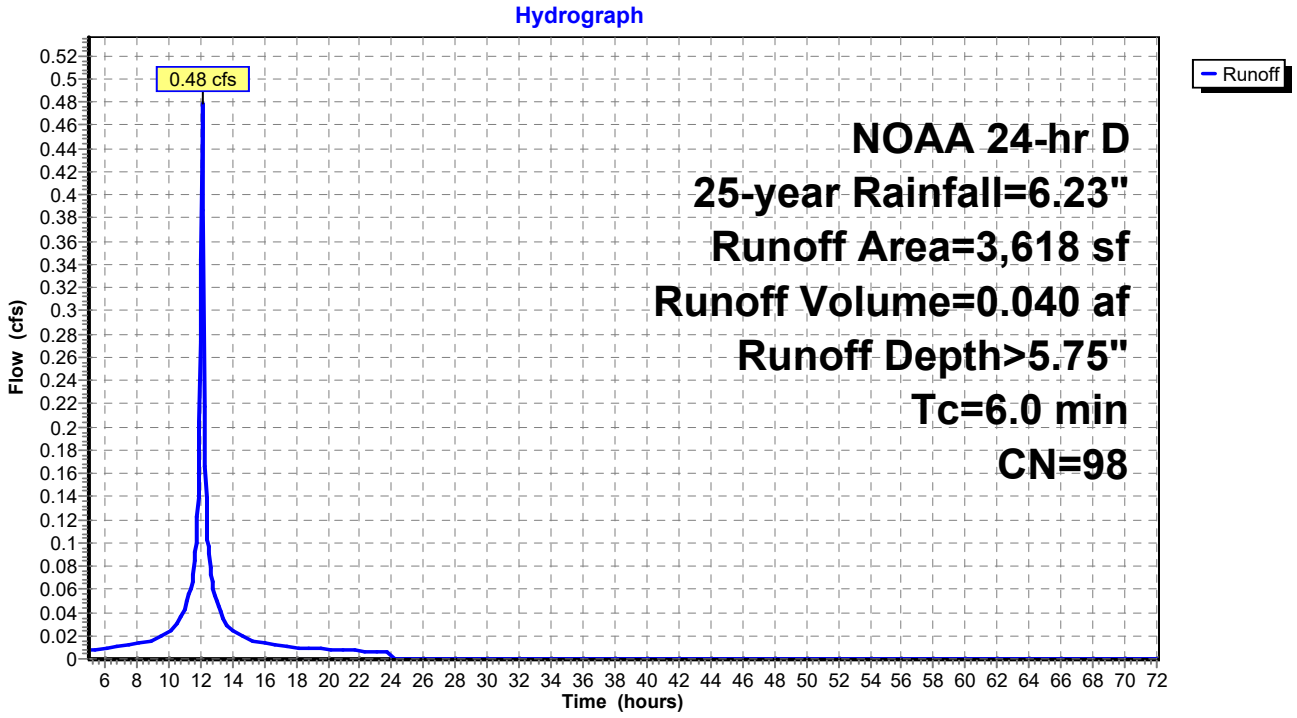
Runoff = 0.48 cfs @ 12.13 hrs, Volume= 0.040 af, Depth> 5.75"
Routed to Reach 13R : PR DP#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
3,618	98	Roofs, HSG D
3,618		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#7: PR DA#7



Summary for Subcatchment DA#8: PR DA#8

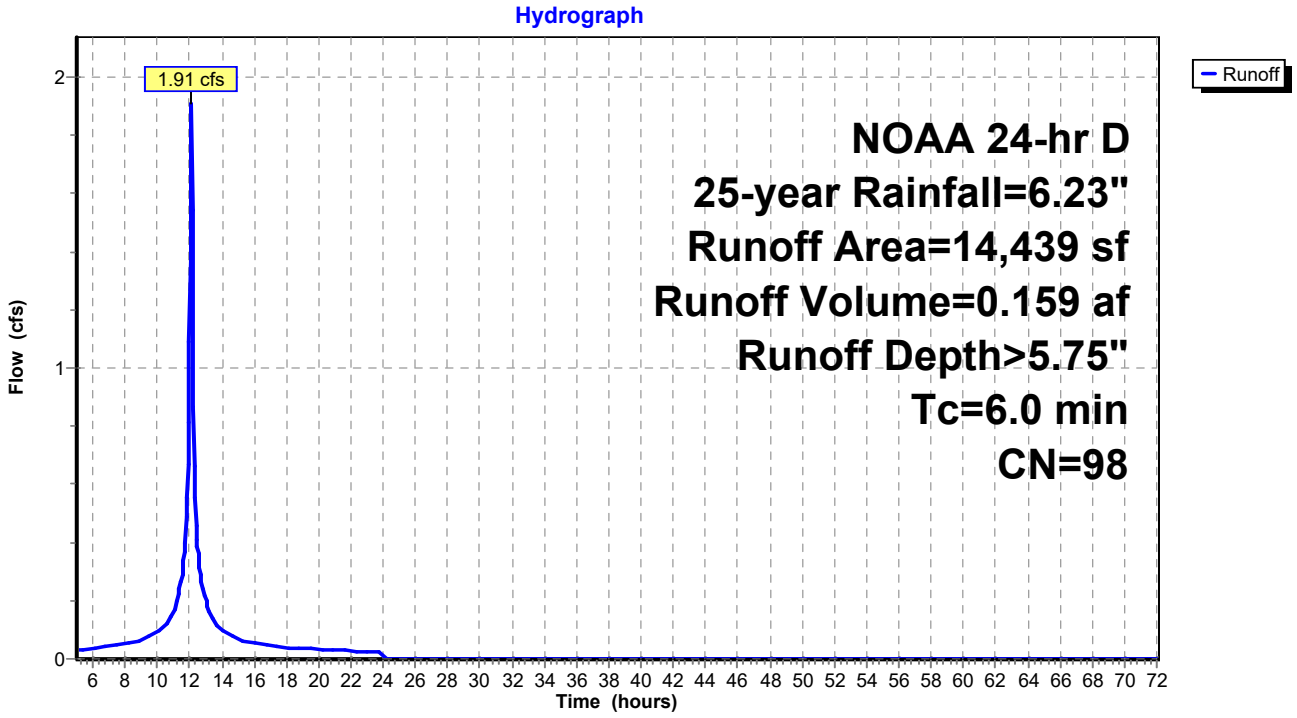
Runoff = 1.91 cfs @ 12.13 hrs, Volume= 0.159 af, Depth> 5.75"
Routed to Reach 13R : PR DP#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 25-year Rainfall=6.23"

Area (sf)	CN	Description
14,439	98	Paved parking, HSG D
14,439		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#8: PR DA#8

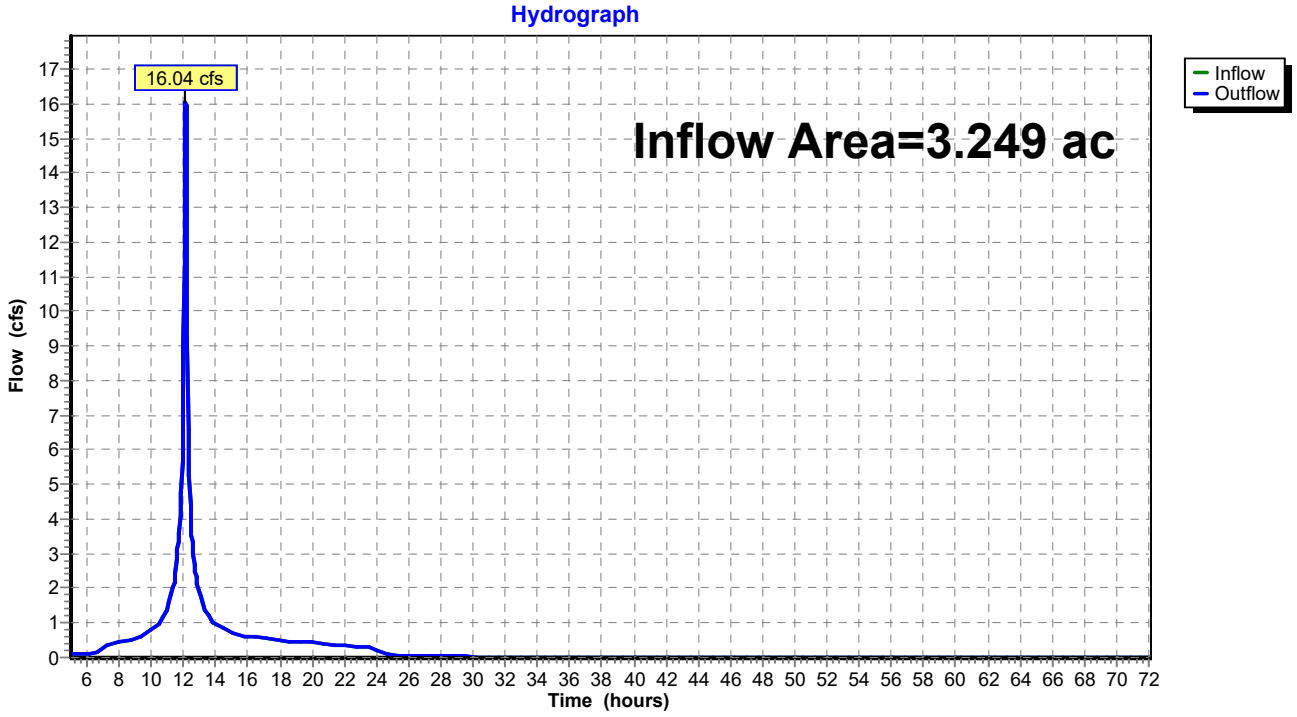


Summary for Reach 12R: PR DP#1

Inflow Area = 3.249 ac, 93.97% Impervious, Inflow Depth > 5.58" for 25-year event
Inflow = 16.04 cfs @ 12.14 hrs, Volume= 1.512 af
Outflow = 16.04 cfs @ 12.14 hrs, Volume= 1.512 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 19R : PR Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: PR DP#1

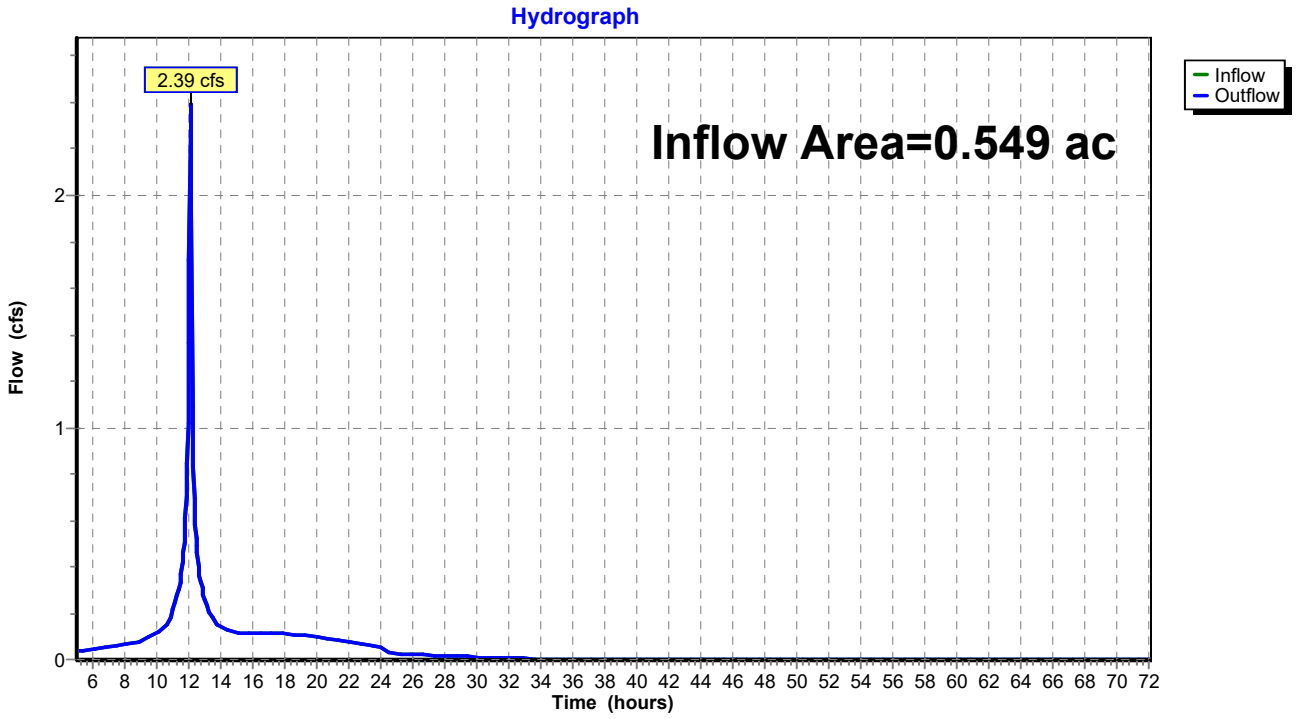


Summary for Reach 13R: PR DP#2

Inflow Area = 0.549 ac, 85.02% Impervious, Inflow Depth > 5.50" for 25-year event
Inflow = 2.39 cfs @ 12.13 hrs, Volume= 0.252 af
Outflow = 2.39 cfs @ 12.13 hrs, Volume= 0.252 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 19R : PR Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 13R: PR DP#2

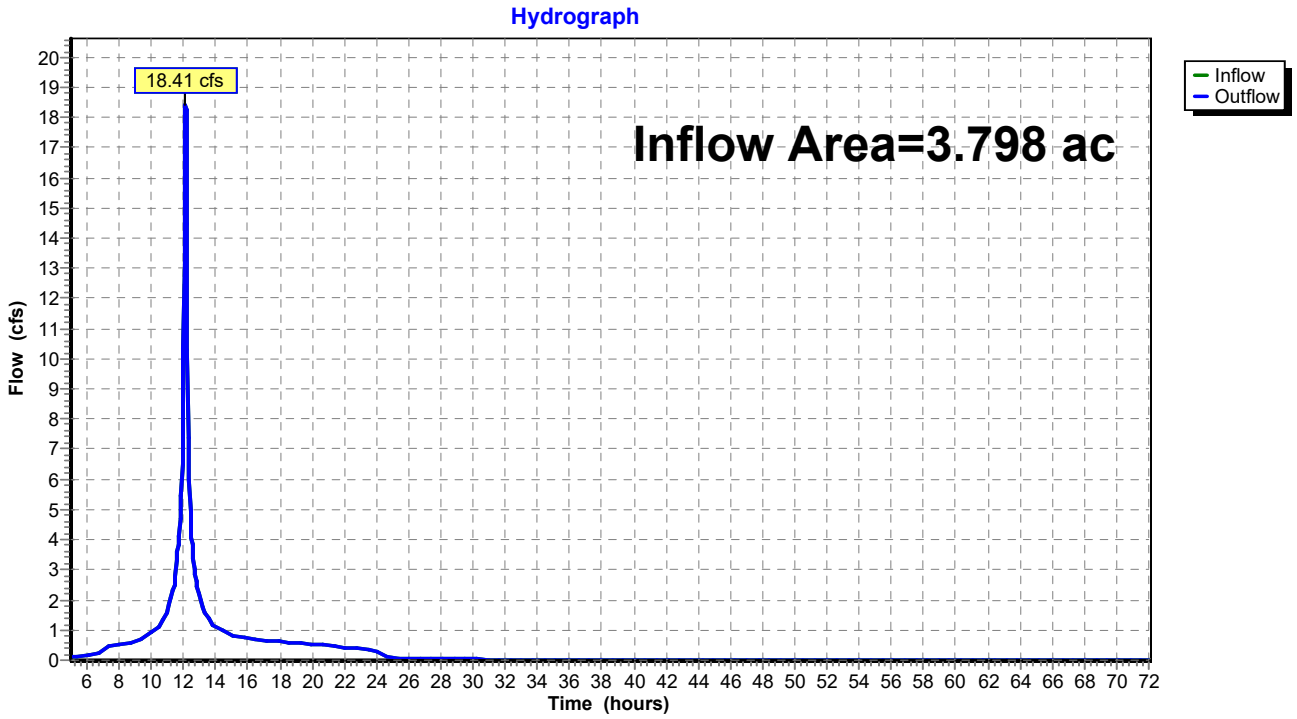


Summary for Reach 19R: PR Total

Inflow Area = 3.798 ac, 92.67% Impervious, Inflow Depth > 5.57" for 25-year event
Inflow = 18.41 cfs @ 12.14 hrs, Volume= 1.763 af
Outflow = 18.41 cfs @ 12.14 hrs, Volume= 1.763 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 19R: PR Total



Summary for Pond 1P: POROUS (NORTH PAVILION SIDEWALK)

Inflow Area = 0.026 ac,100.00% Impervious, Inflow Depth > 5.99" for 25-year event
Inflow = 0.01 cfs @ 18.02 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 18.18 hrs, Volume= 0.013 af, Atten= 0%, Lag= 9.7 min
Primary = 0.01 cfs @ 18.18 hrs, Volume= 0.013 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.49' @ 18.18 hrs Surf.Area= 434 sf Storage= 11 cf

Plug-Flow detention time= 17.9 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 17.8 min (1,215.2 - 1,197.3)

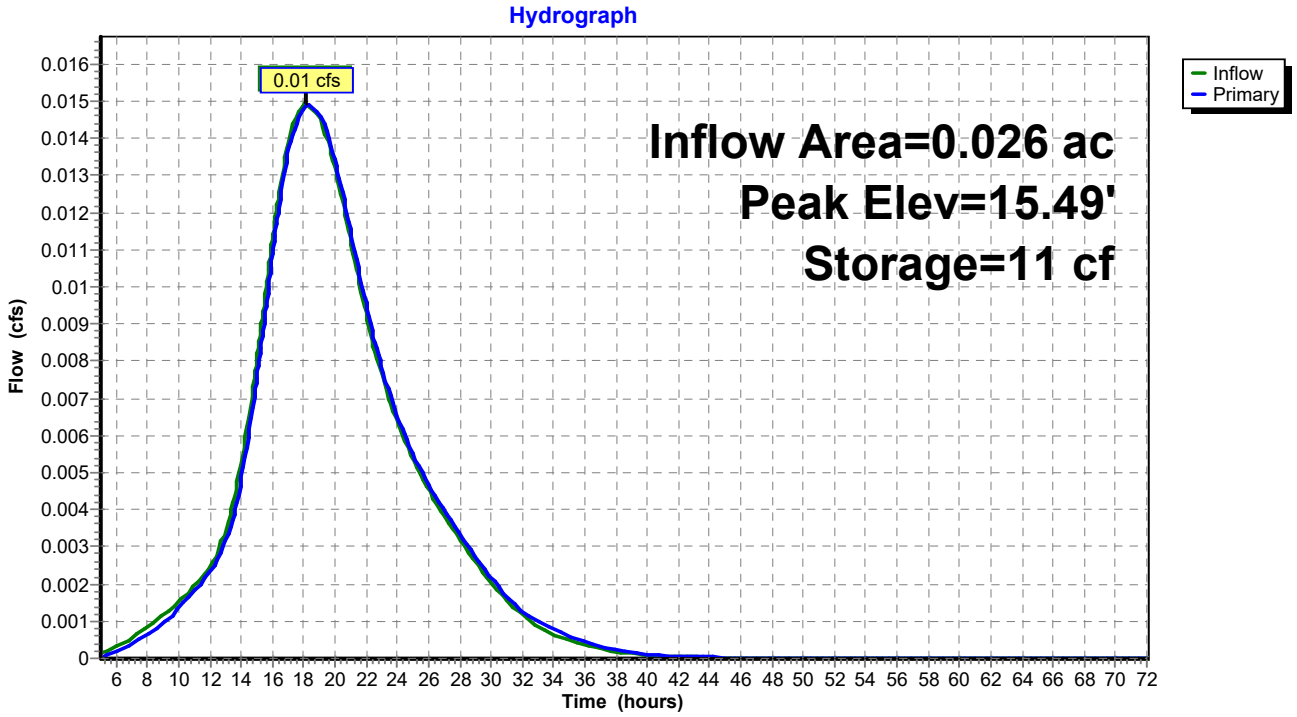
Volume	Invert	Avail.Storage	Storage Description
#1	15.41'	274 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 920 cf Overall - 7 cf Embedded = 913 cf x 30.0% Voids
#2	15.41'	7 cf	**4.0" Round Pipe Storage** Inside #1 L= 80.0'
		281 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.41	434	0	0
15.74	434	143	143
15.90	434	69	213
17.03	434	490	703
17.53	434	217	920

Device	Routing	Invert	Outlet Devices
#1	Primary	15.41'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 18.18 hrs HW=15.49' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.95 fps)

Pond 1P: POROUS (NORTH PAVILION SIDEWALK)



Summary for Pond 14P: RECHARGE

Inflow Area = 1.662 ac,100.00% Impervious, Inflow Depth > 5.75" for 25-year event
Inflow = 9.57 cfs @ 12.13 hrs, Volume= 0.796 af
Outflow = 8.76 cfs @ 12.16 hrs, Volume= 0.772 af, Atten= 9%, Lag= 1.7 min
Primary = 8.76 cfs @ 12.16 hrs, Volume= 0.772 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 12.90' @ 12.15 hrs Surf.Area= 942 sf Storage= 2,251 cf

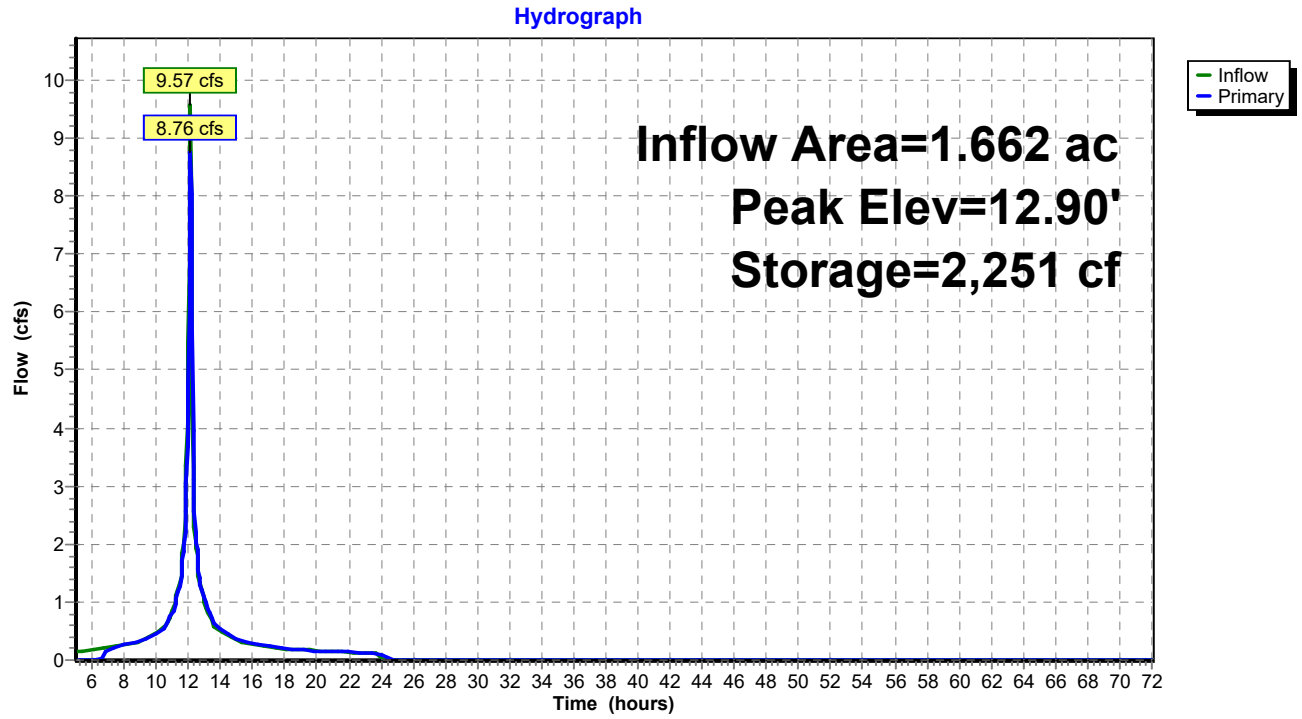
Plug-Flow detention time= 37.2 min calculated for 0.771 af (97% of inflow)
Center-of-Mass det. time= 18.0 min (786.4 - 768.5)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	13,254 cf	**180.0" Round Pipe Storage** L= 75.0'

Device	Routing	Invert	Outlet Devices		
#1	Primary	11.50'	**12.0" Vert. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	11.50'	**15.0" Vert. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=8.68 cfs @ 12.16 hrs HW=12.88' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 3.55 cfs @ 4.52 fps)
└**2=Orifice/Grate** (Orifice Controls 5.14 cfs @ 4.18 fps)

Pond 14P: RECHARGE



Summary for Pond 15P: POROUS (NORTH SITE)

Inflow Area = 0.259 ac, 72.01% Impervious, Inflow Depth > 5.41" for 25-year event
Inflow = 0.14 cfs @ 18.05 hrs, Volume= 0.117 af
Outflow = 0.14 cfs @ 18.46 hrs, Volume= 0.117 af, Atten= 0%, Lag= 24.8 min
Primary = 0.14 cfs @ 18.46 hrs, Volume= 0.117 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 14.66' @ 18.46 hrs Surf.Area= 1,302 sf Storage= 125 cf

Plug-Flow detention time= 20.8 min calculated for 0.117 af (100% of inflow)
Center-of-Mass det. time= 21.0 min (1,247.5 - 1,226.5)

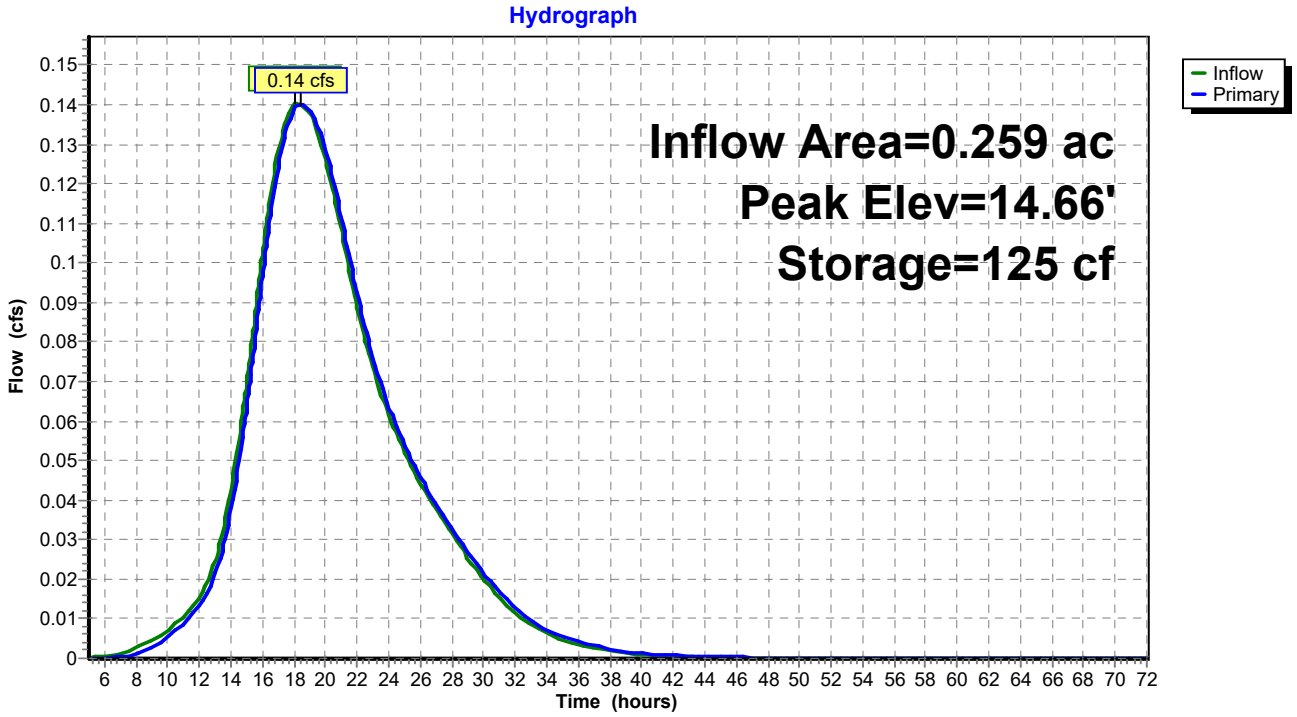
Volume	Invert	Avail.Storage	Storage Description
#1	14.38'	820 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,760 cf Overall - 26 cf Embedded = 2,734 cf x 30.0% Voids
#2	14.38'	26 cf	**4.0" Round Pipe Storage** Inside #1 L= 300.0'
		846 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.38	1,302	0	0
14.71	1,302	430	430
14.88	1,302	221	651
16.00	1,302	1,458	2,109
16.50	1,302	651	2,760

Device	Routing	Invert	Outlet Devices
#1	Primary	14.38'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 18.46 hrs HW=14.66' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.14 cfs @ 1.80 fps)

Pond 15P: POROUS (NORTH SITE)



Summary for Pond 16P: POROUS (SOUTH PAVILION SIDEWALK)

Inflow Area = 0.135 ac, 39.00% Impervious, Inflow Depth = 4.74" for 25-year event
Inflow = 0.06 cfs @ 18.53 hrs, Volume= 0.053 af
Outflow = 0.06 cfs @ 18.55 hrs, Volume= 0.053 af, Atten= 0%, Lag= 1.1 min
Primary = 0.06 cfs @ 18.55 hrs, Volume= 0.053 af
Routed to Reach 13R : PR DP#2

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.93' @ 18.55 hrs Surf.Area= 175 sf Storage= 13 cf

Plug-Flow detention time= 4.6 min calculated for 0.053 af (100% of inflow)
Center-of-Mass det. time= 4.6 min (1,255.0 - 1,250.4)

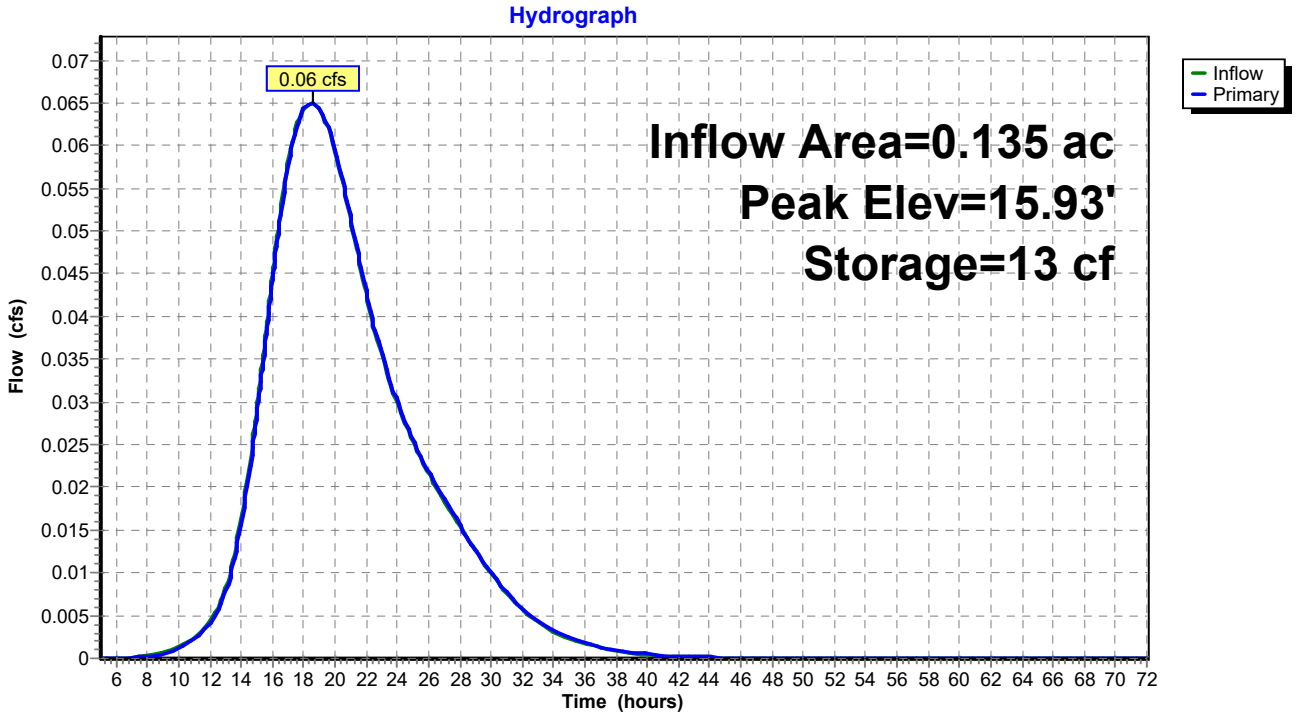
Volume	Invert	Avail.Storage	Storage Description
#1	15.76'	108 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 371 cf Overall - 11 cf Embedded = 360 cf x 30.0% Voids
#2	15.76'	11 cf	**4.0" Round Pipe Storage** Inside #1 L= 124.0'
		119 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.76	175	0	0
16.09	175	58	58
16.26	175	30	88
17.38	175	196	283
17.88	175	88	371

Device	Routing	Invert	Outlet Devices
#1	Primary	15.76'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.06 cfs @ 18.55 hrs HW=15.93' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.42 fps)

Pond 16P: POROUS (SOUTH PAVILION SIDEWALK)



Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA#1: DA#1 Runoff Area=1,120 sf 100.00% Impervious Runoff Depth>7.77"
Tc=491.0 min CN=98 Runoff=0.02 cfs 0.017 af

SubcatchmentDA#2: DA#2 Runoff Area=11,285 sf 72.01% Impervious Runoff Depth>7.18"
Tc=491.0 min CN=93 Runoff=0.19 cfs 0.155 af

SubcatchmentDA#3: PR DA#3 Runoff Area=53,150 sf 89.88% Impervious Runoff Depth>7.31"
Tc=6.0 min CN=96 Runoff=9.01 cfs 0.743 af

SubcatchmentDA#4: PR DA#4 Runoff Area=72,378 sf 100.00% Impervious Runoff Depth>7.43"
Tc=6.0 min CN=98 Runoff=12.34 cfs 1.029 af

SubcatchmentDA#5: PR DA#5 Runoff Area=3,578 sf 100.00% Impervious Runoff Depth>7.43"
Tc=6.0 min CN=98 Runoff=0.61 cfs 0.051 af

SubcatchmentDA#6: DA#6 Runoff Area=5,877 sf 39.00% Impervious Runoff Depth>6.47"
Tc=491.0 min CN=87 Runoff=0.09 cfs 0.073 af

SubcatchmentDA#7: PR DA#7 Runoff Area=3,618 sf 100.00% Impervious Runoff Depth>7.43"
Tc=6.0 min CN=98 Runoff=0.62 cfs 0.051 af

SubcatchmentDA#8: PR DA#8 Runoff Area=14,439 sf 100.00% Impervious Runoff Depth>7.43"
Tc=6.0 min CN=98 Runoff=2.46 cfs 0.205 af

Reach 12R: PR DP#1 Inflow=20.30 cfs 1.971 af
Outflow=20.30 cfs 1.971 af

Reach 13R: PR DP#2 Inflow=3.09 cfs 0.329 af
Outflow=3.09 cfs 0.329 af

Reach 19R: PR Total Inflow=23.36 cfs 2.300 af
Outflow=23.36 cfs 2.300 af

Pond 1P: POROUS (NORTH PAVILION Peak Elev=15.50' Storage=13 cf Inflow=0.02 cfs 0.017 af
Outflow=0.02 cfs 0.017 af

Pond 14P: RECHARGE Peak Elev=13.35' Storage=2,693 cf Inflow=12.34 cfs 1.029 af
Outflow=10.96 cfs 1.005 af

Pond 15P: POROUS (NORTH SITE) Peak Elev=14.74' Storage=159 cf Inflow=0.19 cfs 0.155 af
Outflow=0.18 cfs 0.155 af

Pond 16P: POROUS (SOUTH PAVILION Peak Elev=15.97' Storage=16 cf Inflow=0.09 cfs 0.073 af
Outflow=0.09 cfs 0.073 af

Total Runoff Area = 3.798 ac Runoff Volume = 2.324 af Average Runoff Depth = 7.34"
7.33% Pervious = 0.278 ac 92.67% Impervious = 3.520 ac

Summary for Subcatchment DA#1: DA#1

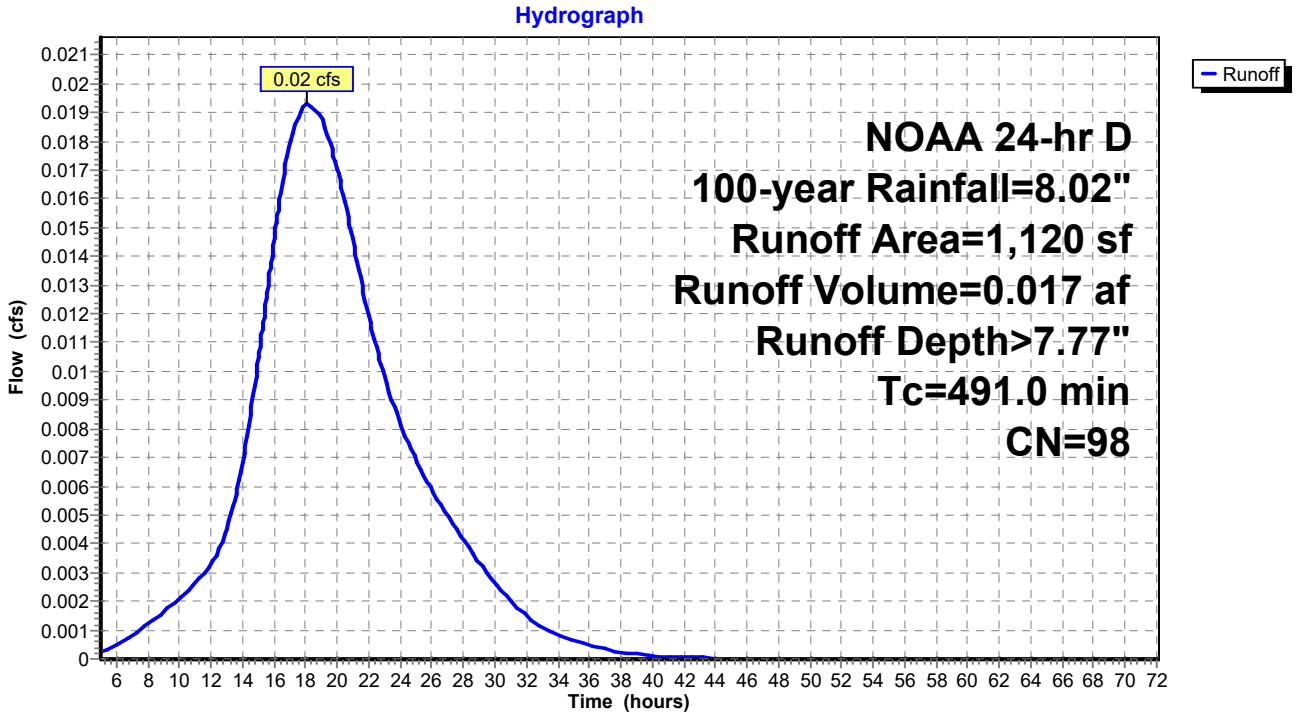
Runoff = 0.02 cfs @ 18.02 hrs, Volume= 0.017 af, Depth> 7.77"
Routed to Pond 1P : POROUS (NORTH PAVILION SIDEWALK)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
1,120	98	Paved parking, HSG D
1,120		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#1: DA#1



Summary for Subcatchment DA#2: DA#2

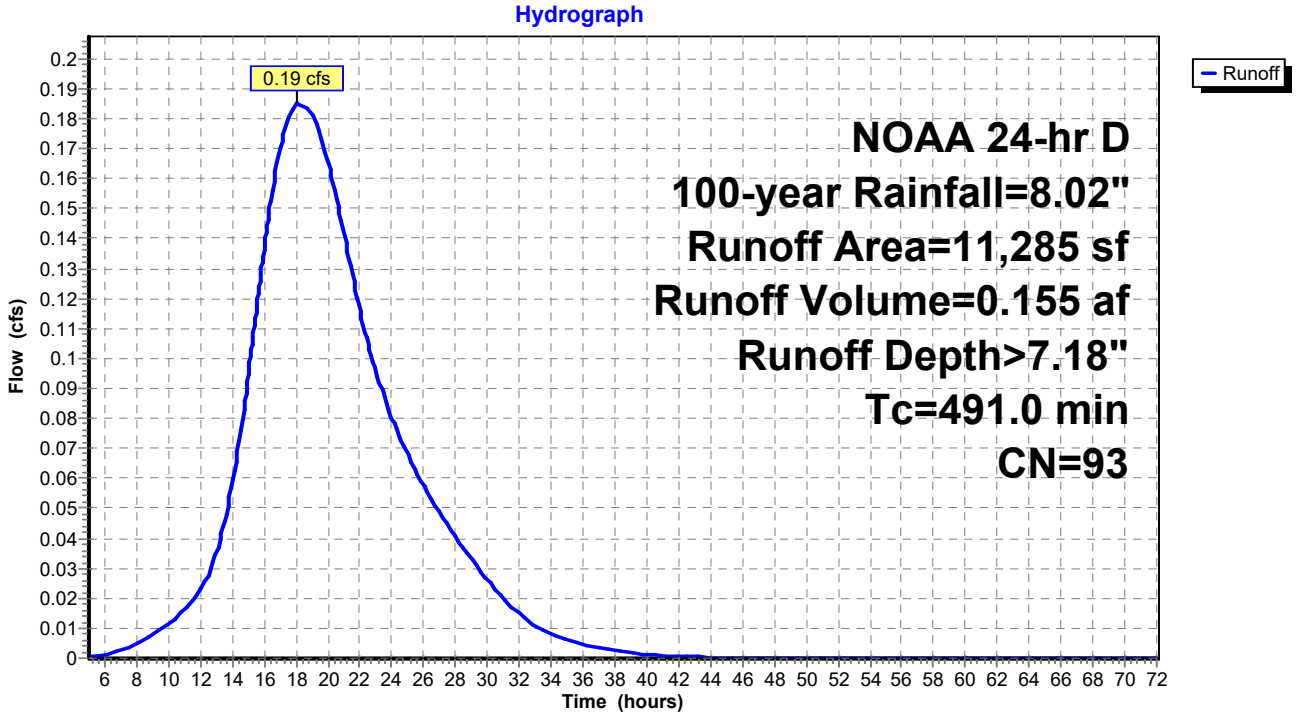
Runoff = 0.19 cfs @ 18.04 hrs, Volume= 0.155 af, Depth> 7.18"
Routed to Pond 15P : POROUS (NORTH SITE)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
8,126	98	Paved parking, HSG D
3,159	80	>75% Grass cover, Good, HSG D
11,285	93	Weighted Average
3,159		27.99% Pervious Area
8,126		72.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#2: DA#2



Summary for Subcatchment DA#3: PR DA#3

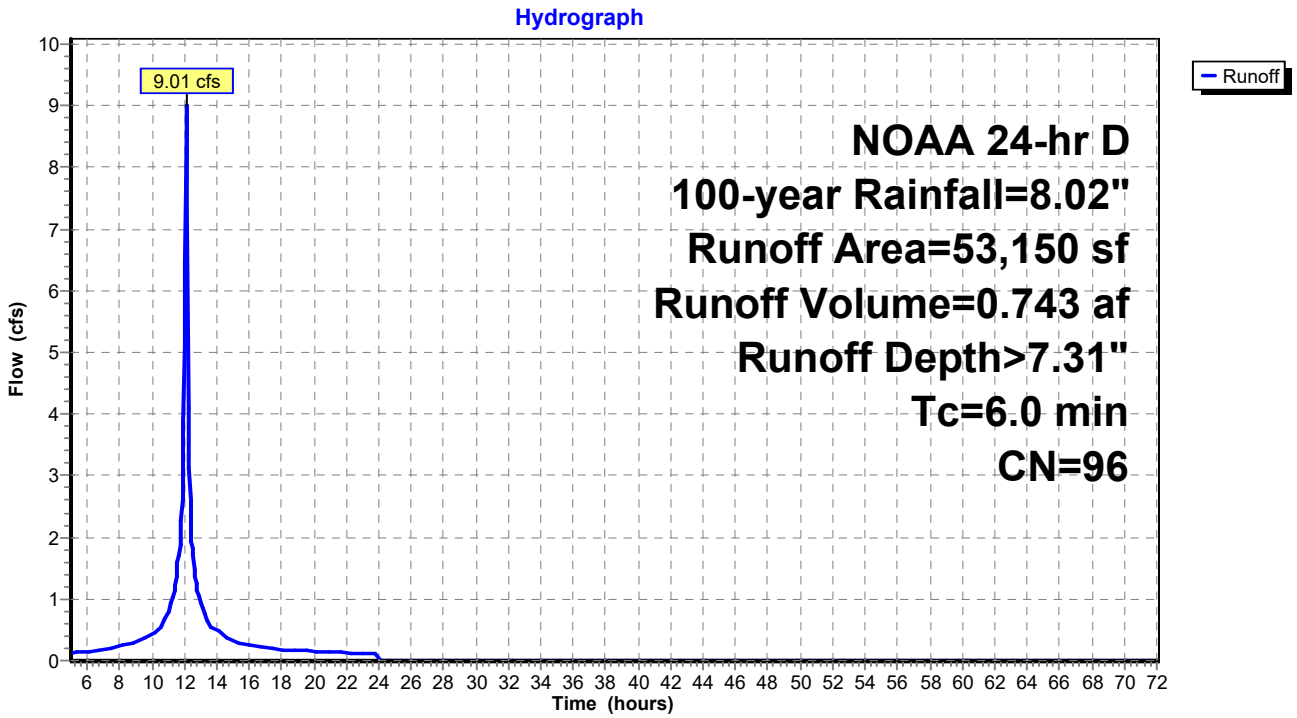
Runoff = 9.01 cfs @ 12.13 hrs, Volume= 0.743 af, Depth> 7.31"
Routed to Reach 12R : PR DP#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
5,381	80	>75% Grass cover, Good, HSG D
46,263	98	Paved parking, HSG D
1,506	98	Roofs, HSG D
53,150	96	Weighted Average
5,381		10.12% Pervious Area
47,769		89.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#3: PR DA#3



Summary for Subcatchment DA#4: PR DA#4

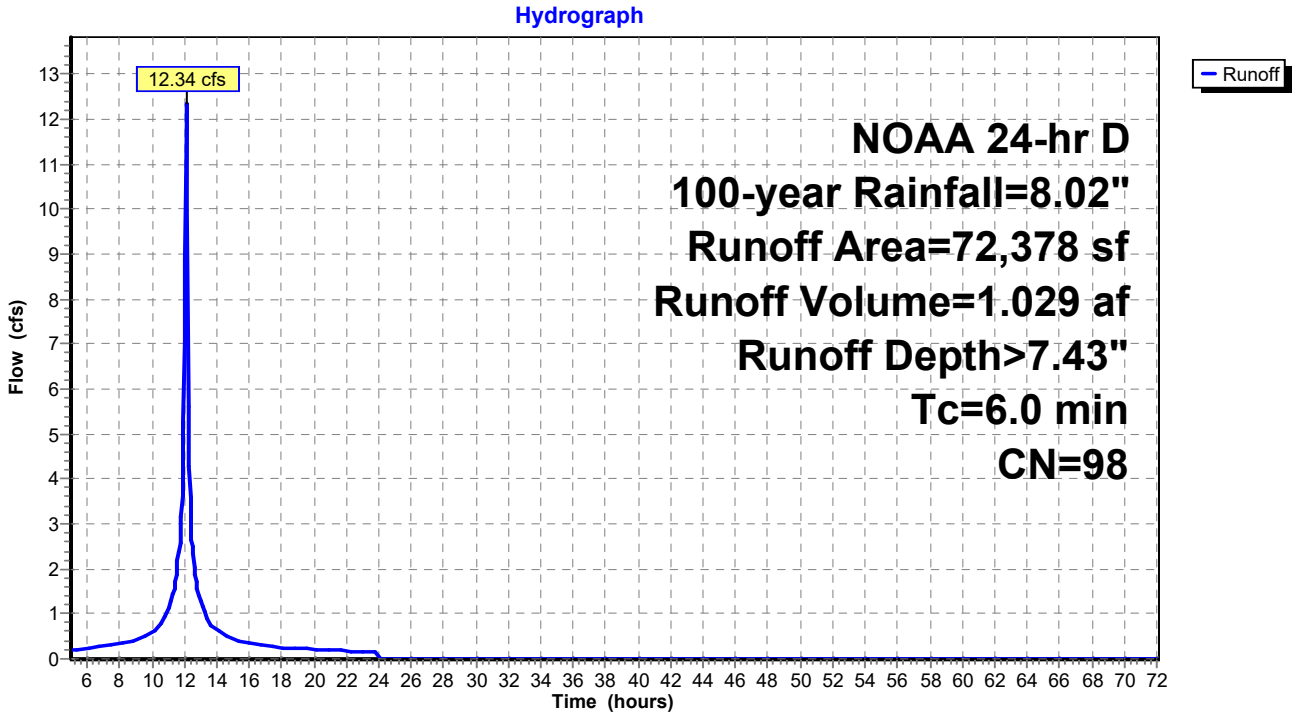
Runoff = 12.34 cfs @ 12.13 hrs, Volume= 1.029 af, Depth> 7.43"
Routed to Pond 14P : RECHARGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
72,378	98	Roofs, HSG D
72,378		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#4: PR DA#4



Summary for Subcatchment DA#5: PR DA#5

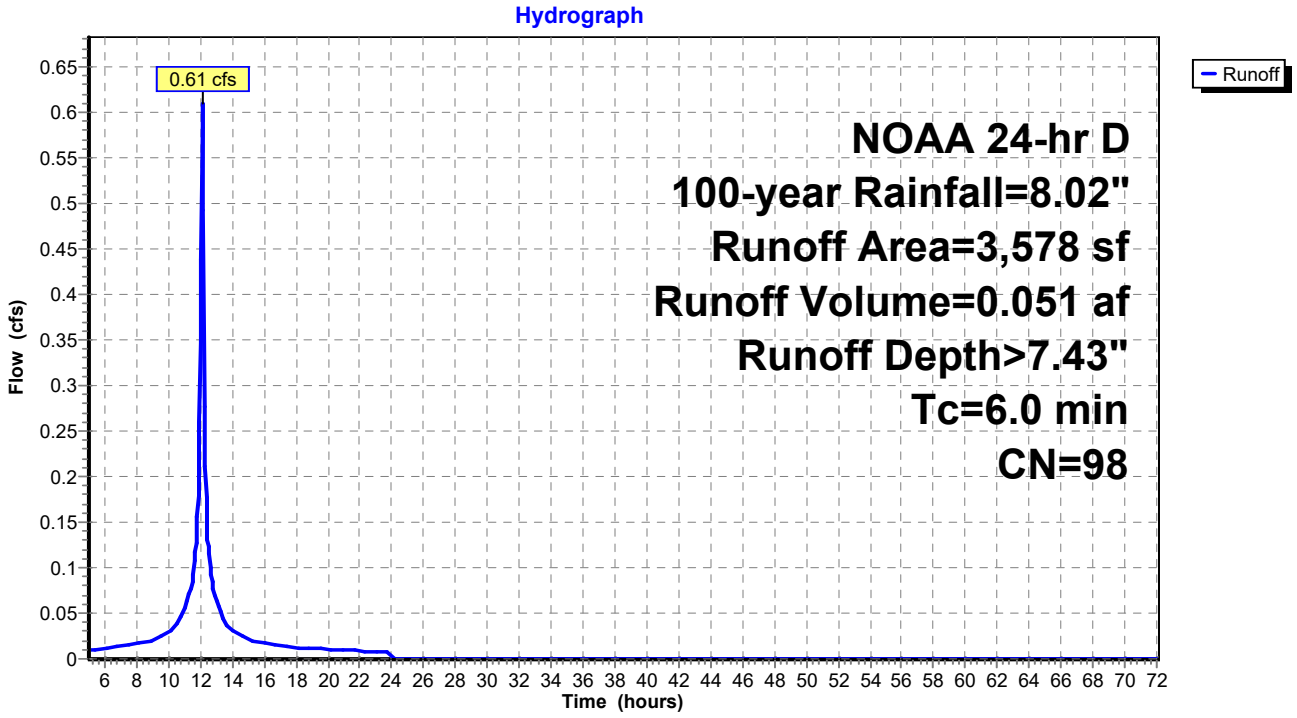
Runoff = 0.61 cfs @ 12.13 hrs, Volume= 0.051 af, Depth> 7.43"
Routed to Reach 12R : PR DP#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
3,578	98	Roofs, HSG D
3,578		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#5: PR DA#5



Summary for Subcatchment DA#6: DA#6

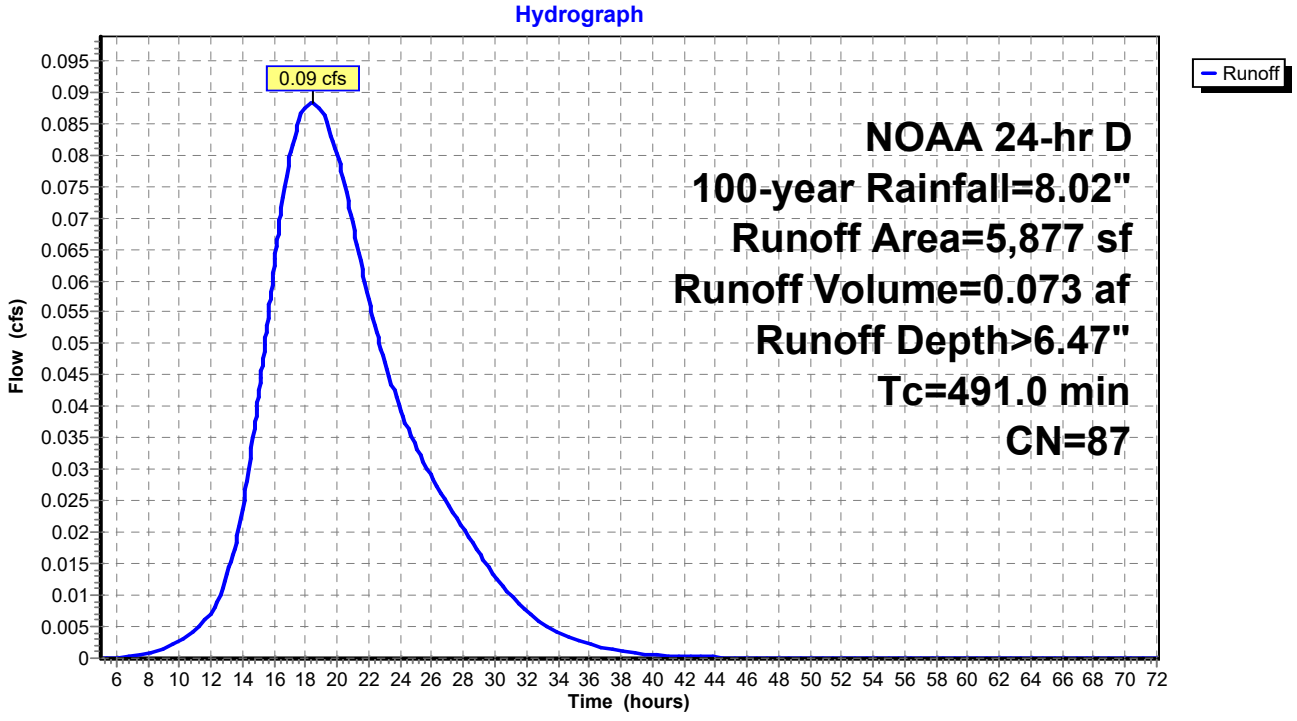
Runoff = 0.09 cfs @ 18.50 hrs, Volume= 0.073 af, Depth> 6.47"
Routed to Pond 16P : POROUS (SOUTH PAVILION SIDEWALK)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
2,292	98	Paved parking, HSG D
3,585	80	>75% Grass cover, Good, HSG D
5,877	87	Weighted Average
3,585		61.00% Pervious Area
2,292		39.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
491.0					**Direct Entry,**

Subcatchment DA#6: DA#6



Summary for Subcatchment DA#7: PR DA#7

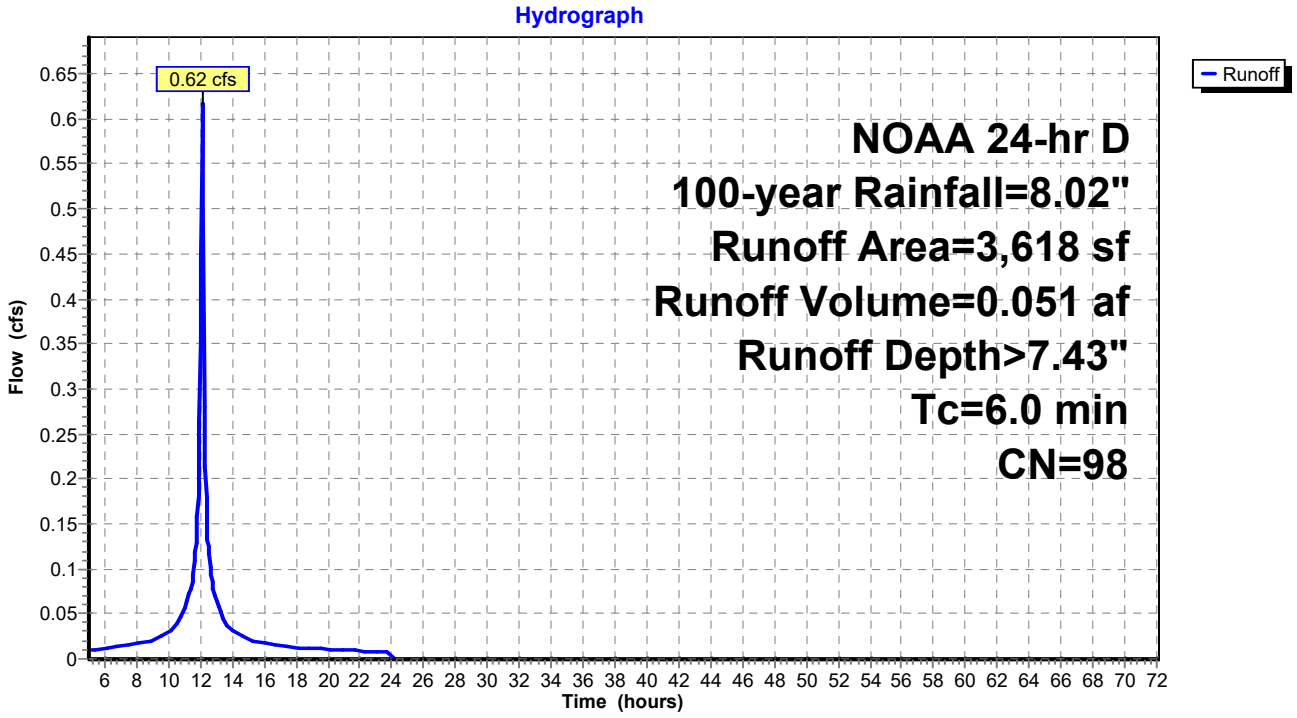
Runoff = 0.62 cfs @ 12.13 hrs, Volume= 0.051 af, Depth> 7.43"
Routed to Reach 13R : PR DP#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
3,618	98	Roofs, HSG D
3,618		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#7: PR DA#7



Summary for Subcatchment DA#8: PR DA#8

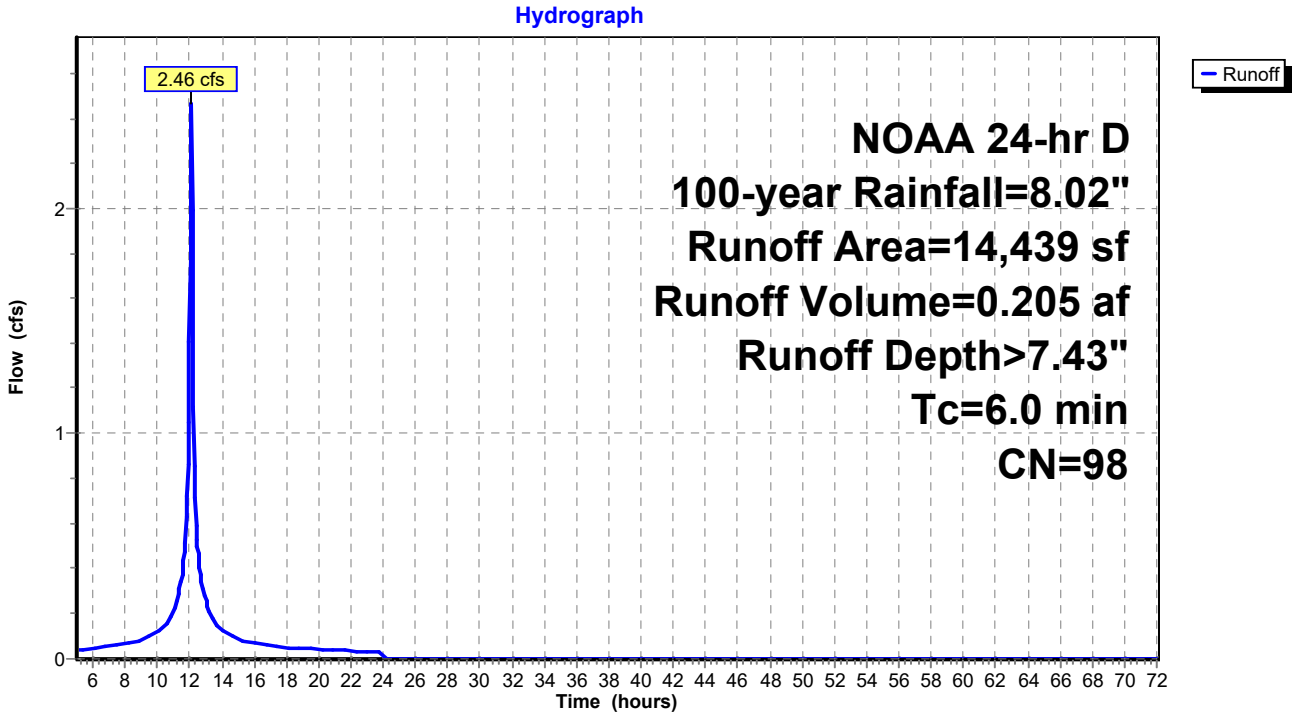
Runoff = 2.46 cfs @ 12.13 hrs, Volume= 0.205 af, Depth> 7.43"
Routed to Reach 13R : PR DP#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100-year Rainfall=8.02"

Area (sf)	CN	Description
14,439	98	Paved parking, HSG D
14,439		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA#8: PR DA#8

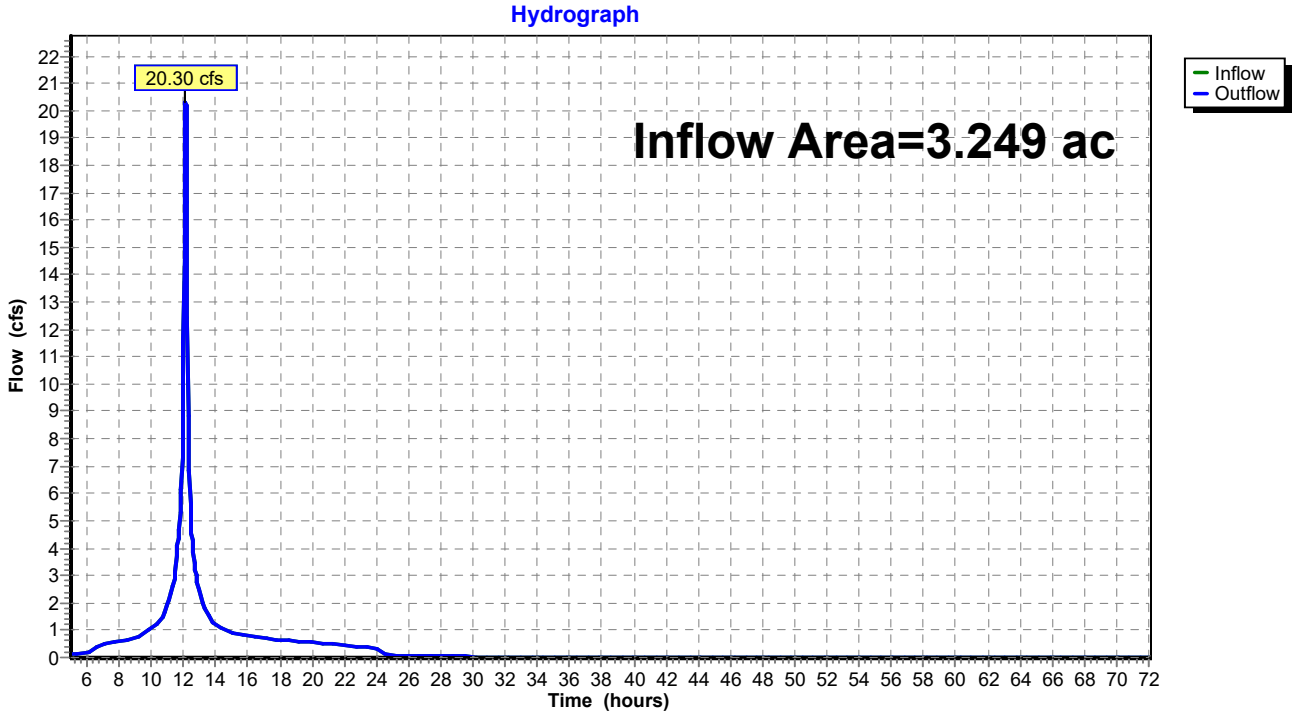


Summary for Reach 12R: PR DP#1

Inflow Area = 3.249 ac, 93.97% Impervious, Inflow Depth > 7.28" for 100-year event
Inflow = 20.30 cfs @ 12.14 hrs, Volume= 1.971 af
Outflow = 20.30 cfs @ 12.14 hrs, Volume= 1.971 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 19R : PR Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 12R: PR DP#1

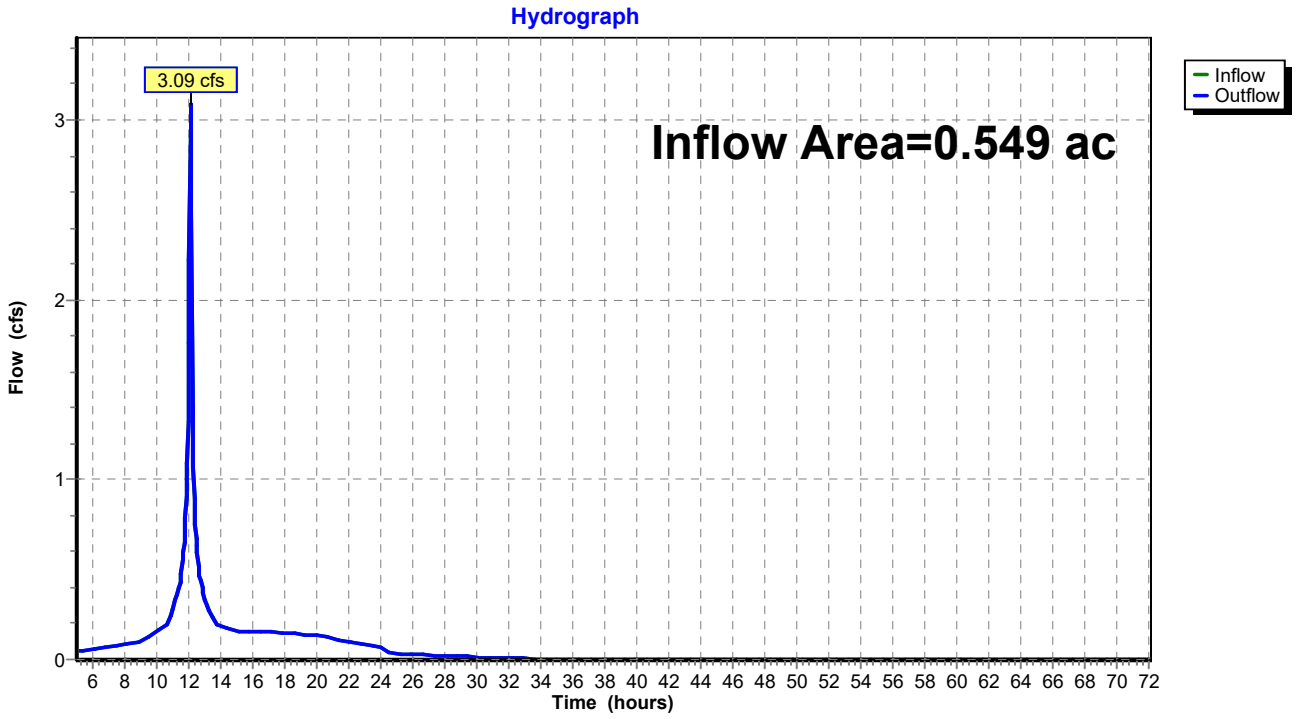


Summary for Reach 13R: PR DP#2

Inflow Area = 0.549 ac, 85.02% Impervious, Inflow Depth > 7.20" for 100-year event
Inflow = 3.09 cfs @ 12.13 hrs, Volume= 0.329 af
Outflow = 3.09 cfs @ 12.13 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 19R : PR Total

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 13R: PR DP#2

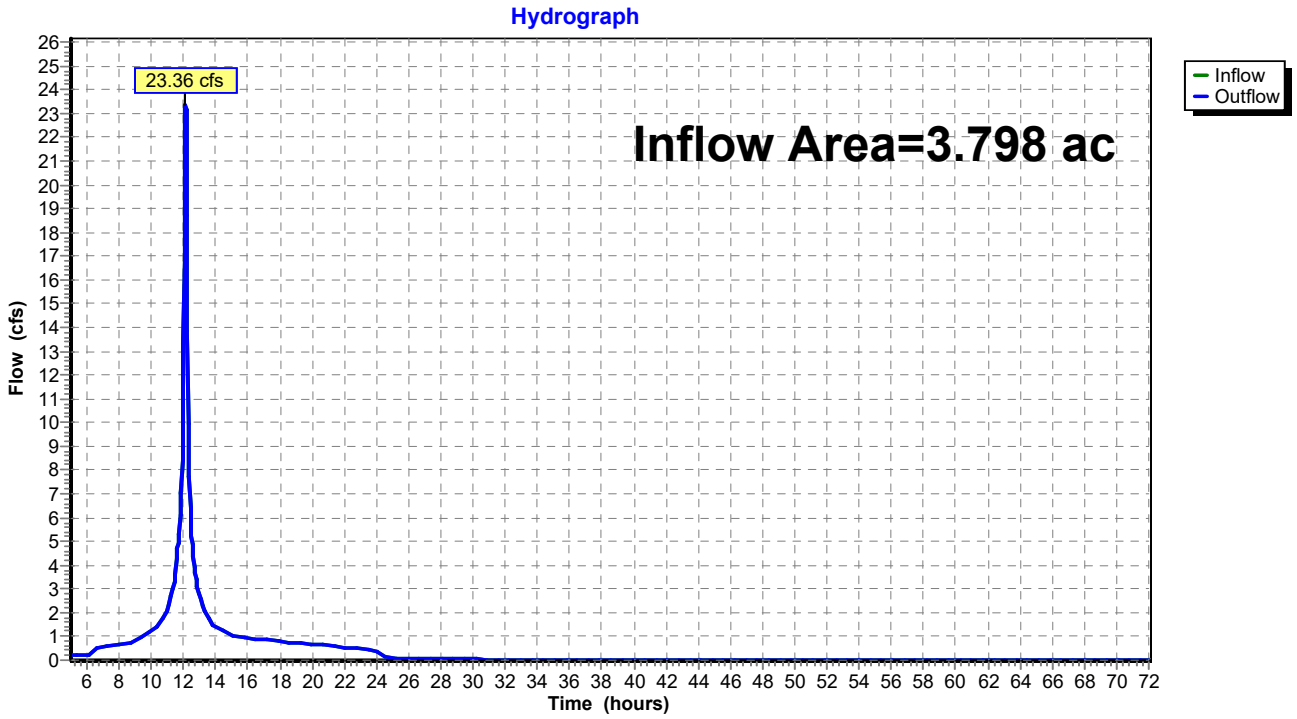


Summary for Reach 19R: PR Total

Inflow Area = 3.798 ac, 92.67% Impervious, Inflow Depth > 7.27" for 100-year event
Inflow = 23.36 cfs @ 12.14 hrs, Volume= 2.300 af
Outflow = 23.36 cfs @ 12.14 hrs, Volume= 2.300 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs

Reach 19R: PR Total



Summary for Pond 1P: POROUS (NORTH PAVILION SIDEWALK)

Inflow Area = 0.026 ac,100.00% Impervious, Inflow Depth > 7.77" for 100-year event
Inflow = 0.02 cfs @ 18.02 hrs, Volume= 0.017 af
Outflow = 0.02 cfs @ 18.15 hrs, Volume= 0.017 af, Atten= 0%, Lag= 7.7 min
Primary = 0.02 cfs @ 18.15 hrs, Volume= 0.017 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.50' @ 18.15 hrs Surf.Area= 434 sf Storage= 13 cf

Plug-Flow detention time= 16.5 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 16.0 min (1,210.0 - 1,193.9)

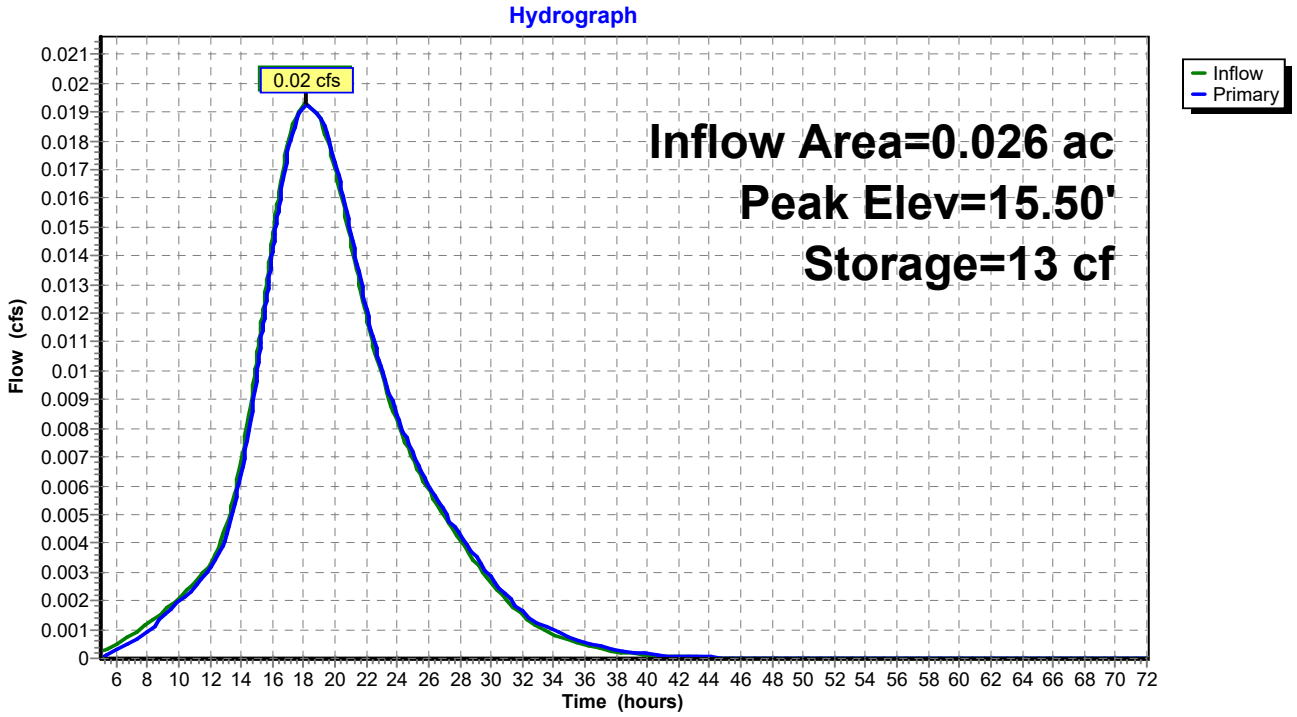
Volume	Invert	Avail.Storage	Storage Description
#1	15.41'	274 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 920 cf Overall - 7 cf Embedded = 913 cf x 30.0% Voids
#2	15.41'	7 cf	**4.0" Round Pipe Storage** Inside #1 L= 80.0'
		281 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.41	434	0	0
15.74	434	143	143
15.90	434	69	213
17.03	434	490	703
17.53	434	217	920

Device	Routing	Invert	Outlet Devices
#1	Primary	15.41'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 18.15 hrs HW=15.50' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 1.02 fps)

Pond 1P: POROUS (NORTH PAVILION SIDEWALK)



Summary for Pond 14P: RECHARGE

Inflow Area = 1.662 ac,100.00% Impervious, Inflow Depth > 7.43" for 100-year event
Inflow = 12.34 cfs @ 12.13 hrs, Volume= 1.029 af
Outflow = 10.96 cfs @ 12.16 hrs, Volume= 1.005 af, Atten= 11%, Lag= 2.1 min
Primary = 10.96 cfs @ 12.16 hrs, Volume= 1.005 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 13.35' @ 12.16 hrs Surf.Area= 983 sf Storage= 2,693 cf

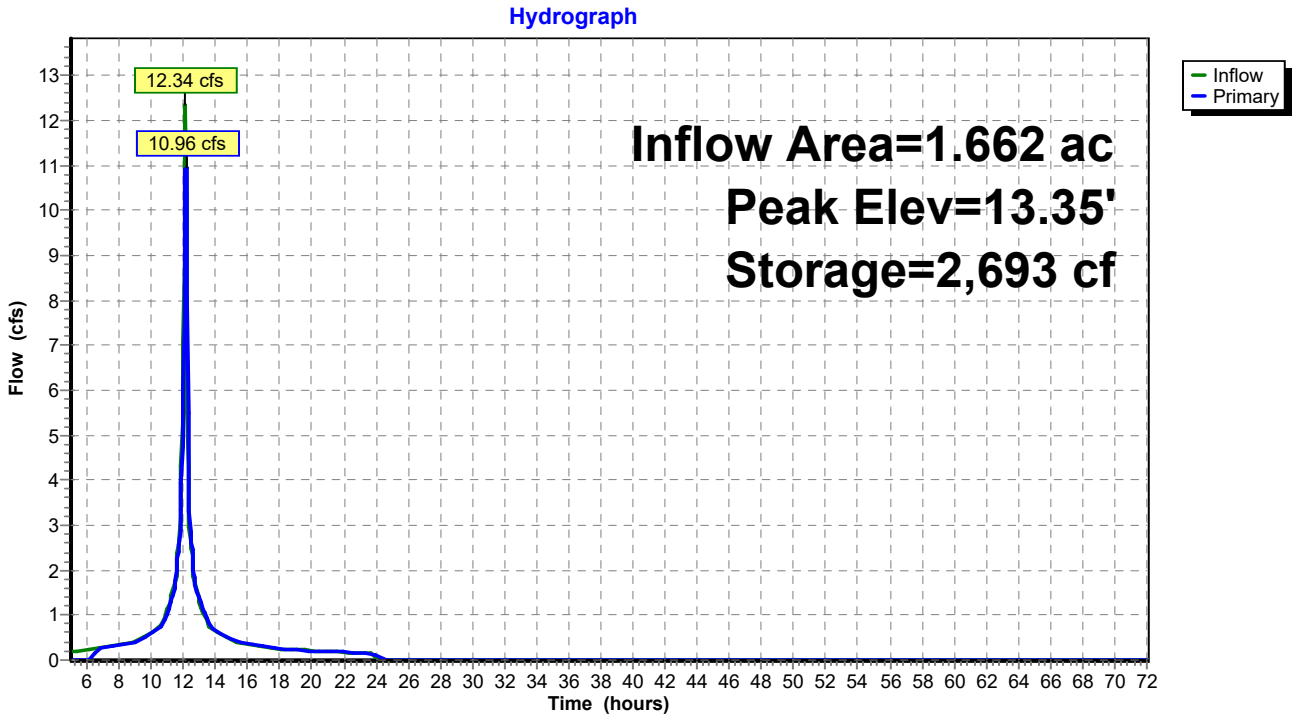
Plug-Flow detention time= 30.1 min calculated for 1.004 af (98% of inflow)
Center-of-Mass det. time= 14.8 min (782.4 - 767.6)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	13,254 cf	**180.0" Round Pipe Storage** L= 75.0'

Device	Routing	Invert	Outlet Devices		
#1	Primary	11.50'	**12.0" Vert. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	11.50'	**15.0" Vert. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=10.79 cfs @ 12.16 hrs HW=13.32' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 4.34 cfs @ 5.53 fps)
└**2=Orifice/Grate** (Orifice Controls 6.45 cfs @ 5.26 fps)

Pond 14P: RECHARGE



Summary for Pond 15P: POROUS (NORTH SITE)

Inflow Area = 0.259 ac, 72.01% Impervious, Inflow Depth > 7.18" for 100-year event
Inflow = 0.19 cfs @ 18.04 hrs, Volume= 0.155 af
Outflow = 0.18 cfs @ 18.48 hrs, Volume= 0.155 af, Atten= 0%, Lag= 26.5 min
Primary = 0.18 cfs @ 18.48 hrs, Volume= 0.155 af
Routed to Reach 12R : PR DP#1

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 14.74' @ 18.48 hrs Surf.Area= 1,302 sf Storage= 159 cf

Plug-Flow detention time= 19.0 min calculated for 0.155 af (100% of inflow)
Center-of-Mass det. time= 19.1 min (1,238.3 - 1,219.2)

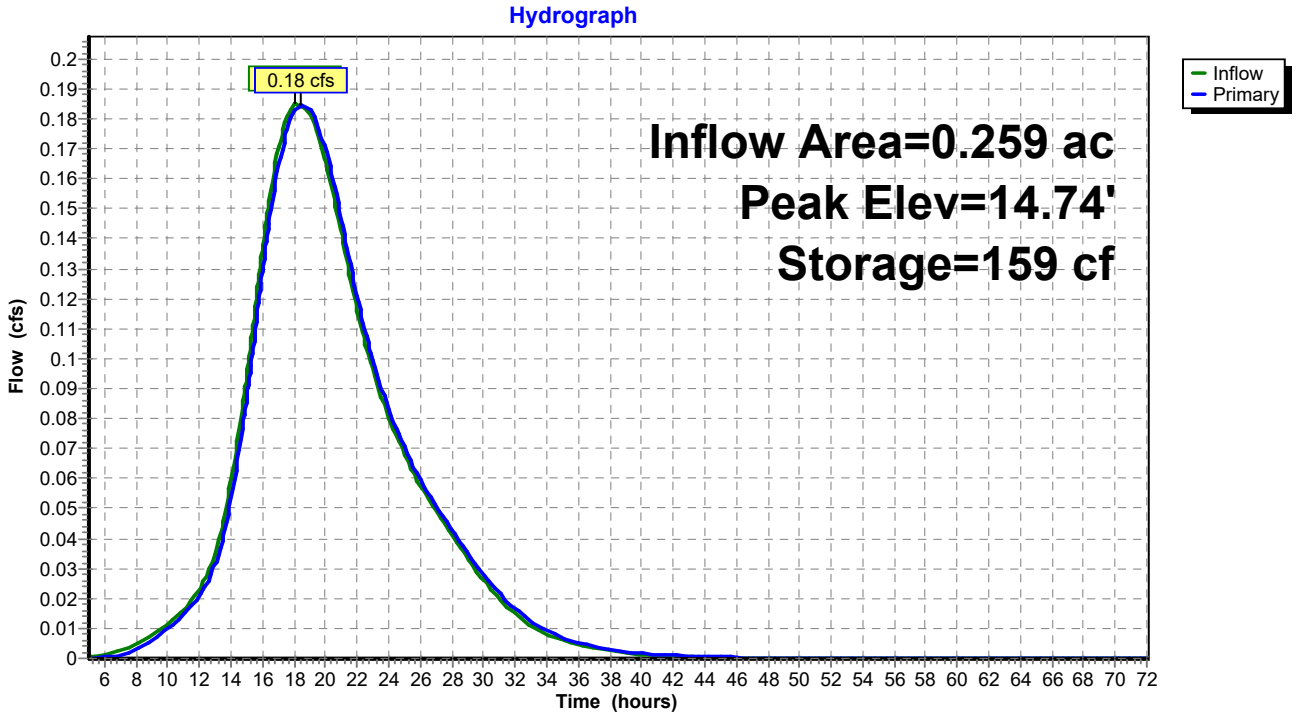
Volume	Invert	Avail.Storage	Storage Description
#1	14.38'	820 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,760 cf Overall - 26 cf Embedded = 2,734 cf x 30.0% Voids
#2	14.38'	26 cf	**4.0" Round Pipe Storage** Inside #1 L= 300.0'
		846 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
14.38	1,302	0	0
14.71	1,302	430	430
14.88	1,302	221	651
16.00	1,302	1,458	2,109
16.50	1,302	651	2,760

Device	Routing	Invert	Outlet Devices
#1	Primary	14.38'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 18.48 hrs HW=14.74' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.18 cfs @ 2.11 fps)

Pond 15P: POROUS (NORTH SITE)



Summary for Pond 16P: POROUS (SOUTH PAVILION SIDEWALK)

Inflow Area = 0.135 ac, 39.00% Impervious, Inflow Depth > 6.47" for 100-year event
Inflow = 0.09 cfs @ 18.50 hrs, Volume= 0.073 af
Outflow = 0.09 cfs @ 18.53 hrs, Volume= 0.073 af, Atten= 0%, Lag= 1.6 min
Primary = 0.09 cfs @ 18.53 hrs, Volume= 0.073 af
Routed to Reach 13R : PR DP#2

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.97' @ 18.53 hrs Surf.Area= 175 sf Storage= 16 cf

Plug-Flow detention time= 4.1 min calculated for 0.073 af (100% of inflow)
Center-of-Mass det. time= 4.1 min (1,245.0 - 1,240.9)

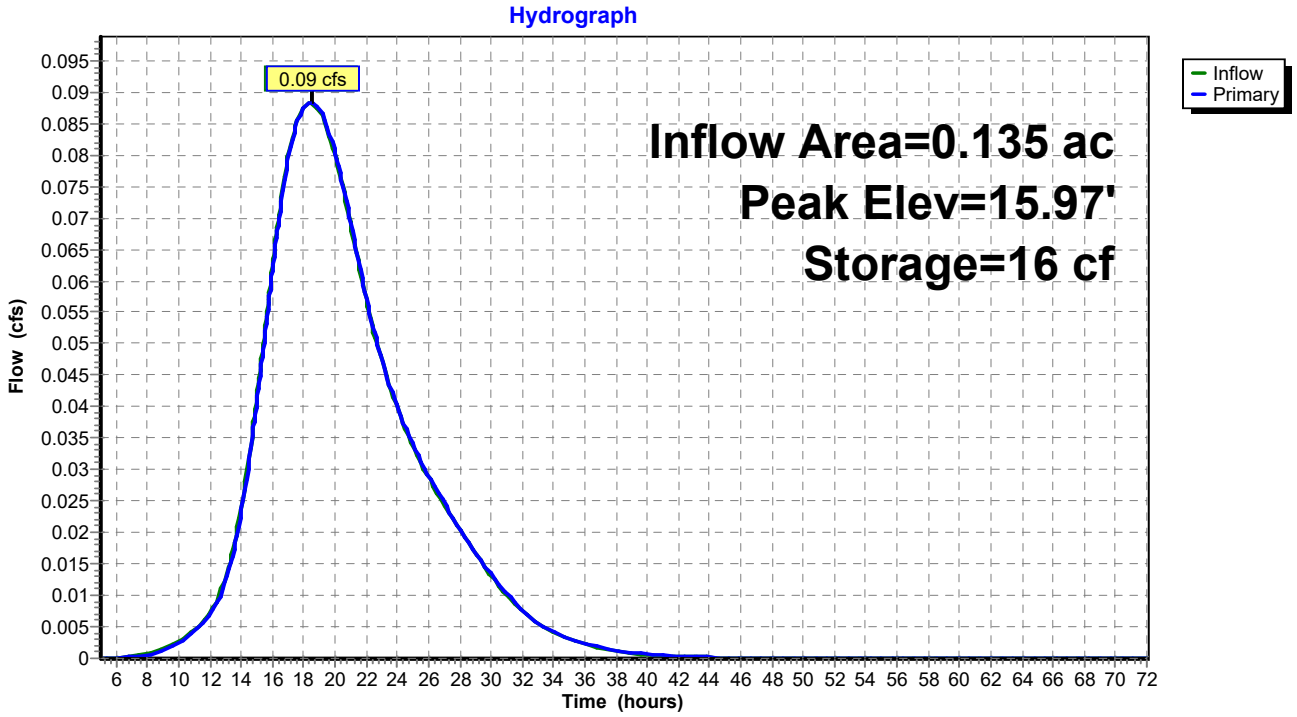
Volume	Invert	Avail.Storage	Storage Description
#1	15.76'	108 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 371 cf Overall - 11 cf Embedded = 360 cf x 30.0% Voids
#2	15.76'	11 cf	**4.0" Round Pipe Storage** Inside #1 L= 124.0'
		119 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
15.76	175	0	0
16.09	175	58	58
16.26	175	30	88
17.38	175	196	283
17.88	175	88	371

Device	Routing	Invert	Outlet Devices
#1	Primary	15.76'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.09 cfs @ 18.53 hrs HW=15.97' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.55 fps)

Pond 16P: POROUS (SOUTH PAVILION SIDEWALK)



APPENDIX D

Long-Term Pollution Prevention and Stormwater Operation and Maintenance Plan

Nitsch Engineering

October 19, 2022

LONG-TERM POLLUTION PREVENTION PLAN AND STORMWATER OPERATION AND MAINTENANCE PLAN

For:

SEAPORT CIRCLE
777 Congress Street
Boston, MA 02210

Prepared for:

LO Parcel H, LLC
53 State Street, 8th Floor
Boston, MA 02109

Prepared by:

NITSCH ENGINEERING, INC.
2 Center Plaza, Suite 430
Boston, MA 02108

Nitsch Project #13511

TABLE OF CONTENTS

SECTION 1 Introduction

The purpose of this document is to specify the pollution prevention measures and stormwater management system operation and maintenance for the Seaport Circle site located at 777 Congress Street, Boston, MA 02210. The Responsible Party indicated below shall implement the management practices outlined in this document and proactively conduct operations at the project site in an environmentally responsible manner. Compliance with this Manual does not in any way dismiss the responsible party, owner, property manager, or occupants from compliance with other applicable federal, state or local laws.

Responsible Party: LO Parcel H, LLC
Mark Callahan
53 State Street, 8th Floor, Boston, MA 02109
(617)951-4112

This Document has been prepared in compliance with Standards 4 and 9 of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, which state:

Standard 4

The Long-Term Pollution Prevention Plan shall include the proper procedures for the following:

1. Good housekeeping;
2. Storing materials and waste products inside or under cover;
3. Vehicle washing;
4. Routine inspections of stormwater best management practices;
5. Spill prevention and response;
6. Maintenance of lawns, gardens, and other landscaped areas;
7. Storage and use of fertilizers, herbicides, and pesticides;
8. Pet waste management;
9. Operation and management of septic systems; and
10. Proper management of deicing chemicals and snow.

Standard 9

The Long-Term Operation and Maintenance Plan shall at a minimum include:

1. Stormwater management system(s) owner(s);
2. The party or parties responsible for operation and maintenance, including how future property owners shall be notified of the presence of the stormwater management system and the requirement for operation and maintenance;
3. The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks;
4. A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point;
5. A description and delineation of public safety features; and
6. An estimated operations and maintenance budget.

SECTION 2 Long-Term Pollution Prevention Plan

The Responsible Party shall implement the following good housekeeping procedures at the project site to reduce the possibility of accidental releases and to reduce safety hazards.

Storage of Hazardous Materials

To prevent leaks and spills, keep hazardous materials and waste products under cover or inside. Use drip pans or spill containment systems to prevent chemicals from entering the drainage system. Inspect storage areas for materials and waste products at least once per year to determine amount and type of the material on site, and if the material requires disposal.

Securely store liquid petroleum products and other liquid chemicals in federally- and state-approved containers. Restrict access to maintenance personnel and administrators.

Storage of Waste Products

Collect and store all waste materials in securely lidded dumpster(s) or other secure containers as applicable to the material. Keep dumpster lids closed and the areas around them clean. Do not fill the dumpsters with liquid waste or hose them out. Sweep areas around the dumpster regularly and put the debris in the garbage, instead of sweeping or hosing it into the parking lot. Legally dispose of collected waste on a regular basis.

Segregate liquid wastes from solid waste and recycle through hazardous waste disposal companies, whenever possible. Contact a hazardous waste hauler for proper disposal to a hazardous waste collection center.

Spill Prevention and Response

Implement spill response procedures for releases of significant materials such as fuels, oils, or chemical materials onto the ground or other area that could reasonably be expected to discharge to surface or groundwater.

1. For minor spills, keep fifty (50) gallon spill control kits and Speedy Dry at all shop and work areas.
2. Immediately contact applicable Federal, State, and local agencies for reportable quantities as required by law.
3. Immediately perform applicable containment and cleanup procedures following a spill release.
4. Promptly remove and dispose of all material collected during the response in accordance with Federal, State, and local requirements. A licensed emergency response contractor may be required to assist in cleanup of releases depending on the amount of the release, and the ability of the Contractor to perform the required response.
5. Reportable quantities of chemicals, fuels, or oils are established under the Clean Water Act and enforced through MassDEP.

Minimize Soil Erosion

Soil erosion facilitates mechanical transport of nutrients, pathogens, and organic matter to surface water bodies. Repair all areas where erosion is occurring throughout the project site. Stabilize bare soil with riprap, seed, mulch, or vegetation.

Vehicle Washing

Vehicle washing will occur within the covered service area. The car wash will be a state-of-the art system that will reclaim and reuse water for the car wash operation. Eventual discharge of the wash water will be directed to the sanitary sewer.

Maintenance of Lawns, Gardens, and other Landscaped Areas

Pesticides and fertilizers shall not be used in the landscaped areas associated with the project site and shall not be stored on-site. Dumping of lawn wastes, brush or leaves or other materials or debris is not permitted in any Resource Area. Grass clippings, pruned branches and any other landscaped waste should be disposed of or composted in an appropriate location. No irrigation shall be used in the landscaped areas for this project.

Management of Deicing Chemicals and Snow

The qualified contractor selected for snow plowing and deicing shall be made fully aware of the requirements of this section.

No road salt (sodium chloride) shall be stored on-site. The use of magnesium chloride de-icing product with a 0.5 to 1.0 percent sodium chloride mix for snow and ice treatment is permitted. The product shall be stored in a locked room inside the building and shall be used at exterior stairs and walkways. The snow plow contractor shall adhere to these magnesium chloride use and storage requirements.

Snow shall not be stockpiled in wetland resource areas. In severe conditions where snow cannot be stockpiled on site, the snow shall be removed from the site and properly disposed of in accordance with DEP Guideline BRP601-01.

Use of sand is permitted only for impervious roadways and parking areas. If sand is applied, the snow plowed from impervious areas shall not be stored on porous asphalt.

Porous asphalt areas are proposed throughout the site. These areas will be delineated on-site using pavement markings. Porous asphalt performs well in cold climates and can reduce meltwater runoff during the snowmelt period; however there are specific winter management techniques that must be followed for porous asphalt systems.

The porous asphalt areas shall be maintained during snow events as provided below:

1. Apply anti-icing treatments only when absolutely necessary (in extreme events). It is not anticipated that deicing chemicals will be required for typical winter events.
2. Plow as needed after storm events. Avoid scarifying the porous asphalt surface. Special plow blades should be used whenever possible. Raised blade is not recommended.
3. Apply the minimum amount of deicing agents during and after storms required to control compact snow and ice that are not removed by plowing.
4. Do not apply sand in porous asphalt areas “No Sanding” signs shall be posted before the first snowfall and maintenance and snow removal contractors shall be made aware of this requirement.

Before winter begins, the property owner and the contractor shall review snow plowing, deicing, and stockpiling procedures. Areas designated for stockpiling should be cleaned of any debris. Street and parking lot sweeping should be followed in accordance with the Operation and Maintenance Plan.

Coordination with other Permits and Requirements

Certain conditions of other approvals affecting the long-term management of the property shall be considered part of this Long-Term Pollution Prevention Plan. The Owner shall become familiar with those documents and comply with the guidelines set forth in those documents.

SECTION 3 Stormwater Management System Operation and Maintenance Plan

Introduction

This Operation and Maintenance Plan (O&M Plan) for Seaport Circle site is required under Standard 9 of the 2008 MassDEP Stormwater Handbook to provide best management practices for implementing maintenance activities for the stormwater management system in a manner that minimizes impacts to wetland resource areas.

The Owner shall implement this O&M Plan and proactively conduct operations at the site in an environmentally responsible manner. Compliance with this O&M Plan does not in any way dismiss the Owner from compliance with other applicable Federal, State or local laws.

Routine maintenance during construction and post-development phases of the project, as defined in the Operation and Maintenance Plan, shall be permitted without amendment to the Order of Conditions. A continuing condition in the Certificate of Compliance shall ensure that maintenance can be performed without triggering further filings under the Wetlands Protection Act.

All stormwater best management practices (BMPs) shall be operated and maintained in accordance with the design plans and the Operation and Maintenance Plan approved by the issuing authority. The Owner shall:

1. Maintain an operation and maintenance log for the last three years, including inspections, repairs, replacement, and disposal (for disposal the log shall indicate the type of material and the disposal location). This is a rolling log in which the responsible party records all operation and maintenance activities for the past three years.
2. Make this log available to MassDEP and the Conservation Commission upon request; and
3. Allow members and agents of the MassDEP and the Conservation Commission to enter and inspect the premises to evaluate and ensure that the Owner complies with the Operation and Maintenance requirements for each BMP.

Stormwater Operation and Maintenance Requirements

Inspect and maintain the stormwater management system as directed below. Refer to the design drawings for the location of each component of the system. Repairs to any component of the system shall be made as soon as possible to prevent any potential pollutants (including silt) from entering the resource areas.

Porous Pavement

Porous pavement areas are proposed throughout the site. These areas will be delineated on-site using pavement markings.

Frequent cleaning and maintenance of the porous pavement surface is critical to prevent clogging. Frequent vacuum sweeping along with jet washing of porous pavement is required. No winter sanding shall be conducted on the porous surface. For proper maintenance:

1. Post signs identifying porous pavement areas.
2. Minimize salt use during winter months.
3. No winter sanding is allowed.
4. Keep landscaped areas well maintained to prevent soil from being transported onto the pavement.
5. Regularly monitor the porous pavement surface to make sure that it drains properly after storm events. Inspect surface annually for deterioration or spalling.
6. At a minimum, the porous pavement shall be cleaned after the winter season and every three months thereafter. This requirement may be adjusted as needed, based on regular visual inspections of the porous

pavement surface.

7. For porous asphalts and concretes, clean the surface using power washer to dislodge trapped particles and then vacuum sweep the area.
8. For paving stones, add joint material to replace material that has been transported. Reseed grass pavers to fill in bare spots.
9. Never reseal or repave with impermeable materials.
10. Once per year, the infiltrative capacity of the porous pavement should be tested by running a hose over each porous pavement area for 30 minutes.
11. Sections of damaged porous asphalt (rutting, etc.) can be repaired by heating and rerolling the asphalt.
12. When infiltrative capacity of porous pavement is reduced to less than the design rate, the porous pavement shall be replaced by milling to the choker course.
13. Attach rollers to the bottoms of snowplows to prevent them from catching on the edges of grass pavers and some paving stones.

Street Sweeping

Perform street sweeping at least twice per year, whenever there is significant debris present on roads and parking lots. Street sweeping shall occur in the spring and fall. Sweepings must be handled and disposed of properly according to the Boston Conservation Commission.

Repair of the Stormwater Management System

The stormwater management system shall be maintained. The repair of any component of the system shall be made as soon as possible to prevent any potential pollutants including silt from entering the resource areas or the existing closed drainage system.

Reporting

The Owner shall maintain a record of drainage system inspections and maintenance (per this Plan) and submit a yearly report to the Boston Conservation Commission.

STORMWATER MANAGEMENT SYSTEM INSPECTION FORM

Seaport Circle **Boston, MA**		**Inspected by:_____** **Date:_____**
Component	**Status/Inspection**	**Action Taken**
Porous Asphalt		
General site conditions – evidence of erosion, etc.		

SUBMIT COPIES OF STORMWATER MANAGEMENT SYSTEM INSPECTION FORM TO THE BOSTON CONSERVATION COMMISSION WITH THE YEARLY REPORT.

APPENDIX E

Soil Investigations

NRCS Soil Maps and Descriptions
Geotechnical Report

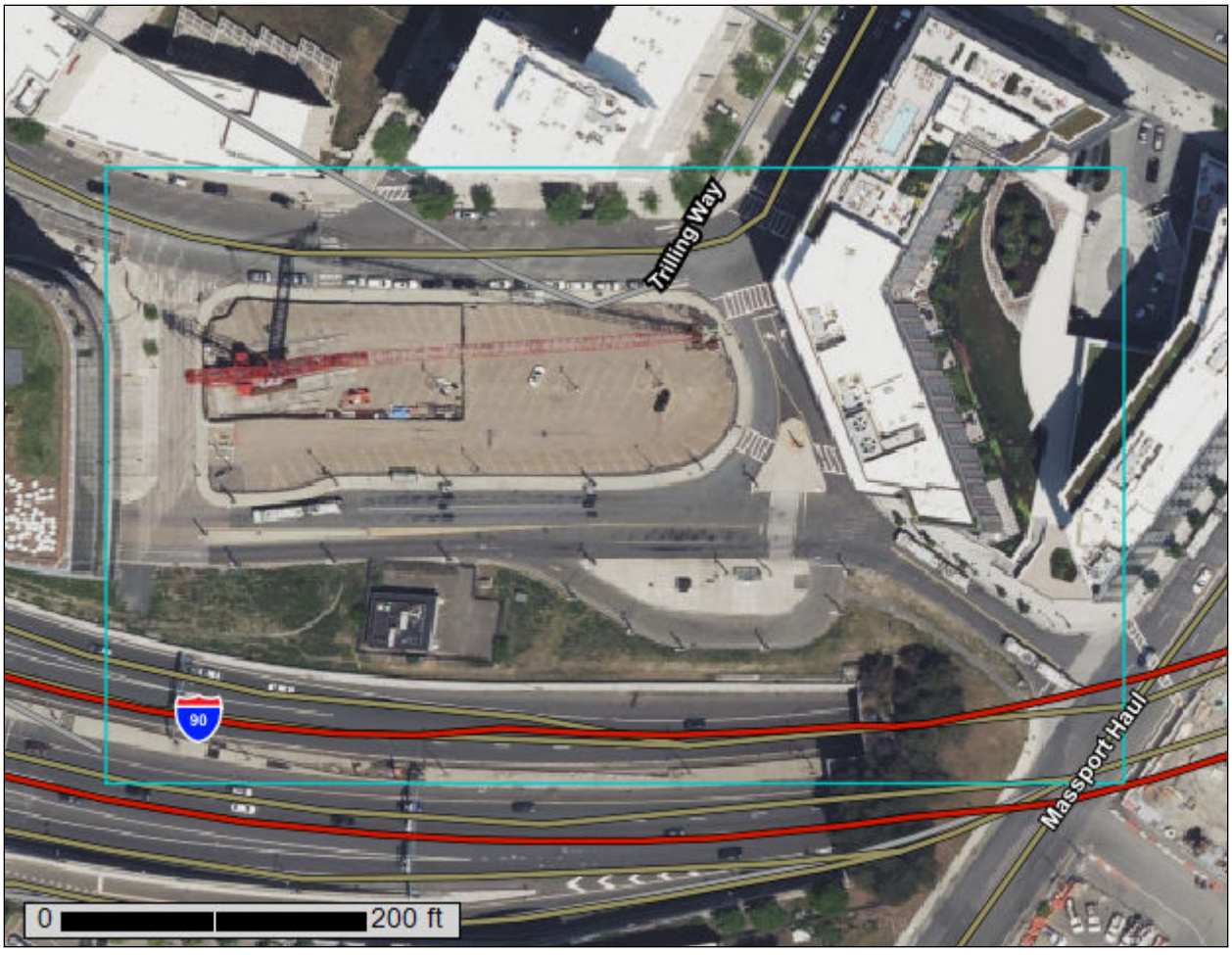
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Norfolk and Suffolk Counties, Massachusetts



September 29, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

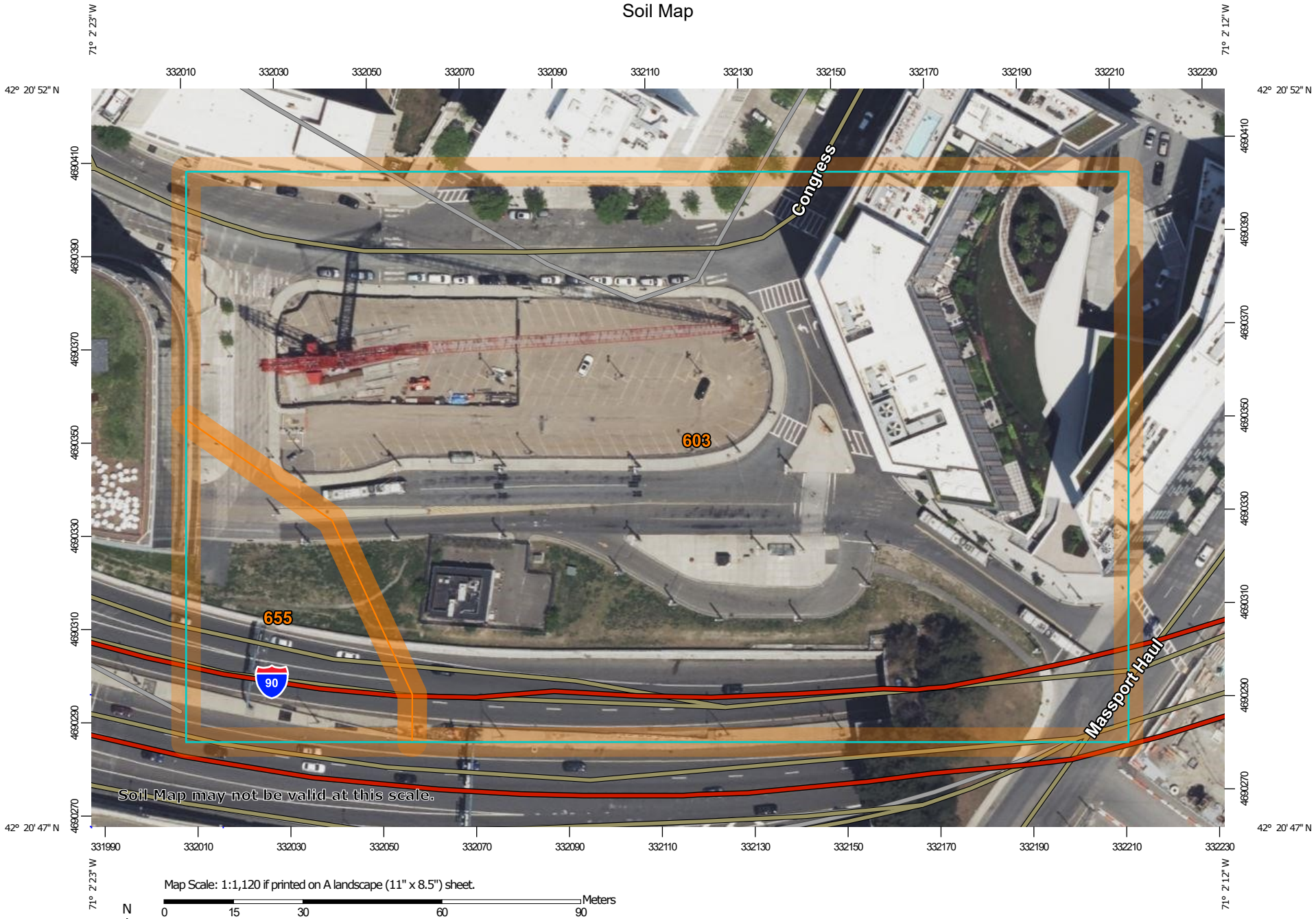
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 17, Sep 3, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
603	Urban land, wet substratum, 0 to 3 percent slopes	5.6	90.6%
655	Udorthents, wet substratum	0.6	9.4%
Totals for Area of Interest		**6.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Norfolk and Suffolk Counties, Massachusetts

603—Urban land, wet substratum, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: vkyl
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Excavated and filled land over herbaceous organic material and/or alluvium and/or marine deposits

Minor Components

Udorthents

Percent of map unit: 13 percent
Hydric soil rating: Unranked

Beaches

Percent of map unit: 2 percent
Hydric soil rating: Unranked

655—Udorthents, wet substratum

Map Unit Setting

National map unit symbol: vkyd
Elevation: -30 to 310 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Riser, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Excavated and filled sandy and gravelly human transported material over highly-decomposed herbaceous organic material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Minor Components

Urban land

Percent of map unit: 3 percent
Hydric soil rating: Unranked

Ipswich

Percent of map unit: 2 percent
Landform: Marshes
Hydric soil rating: Yes

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HALEY ALDRICH

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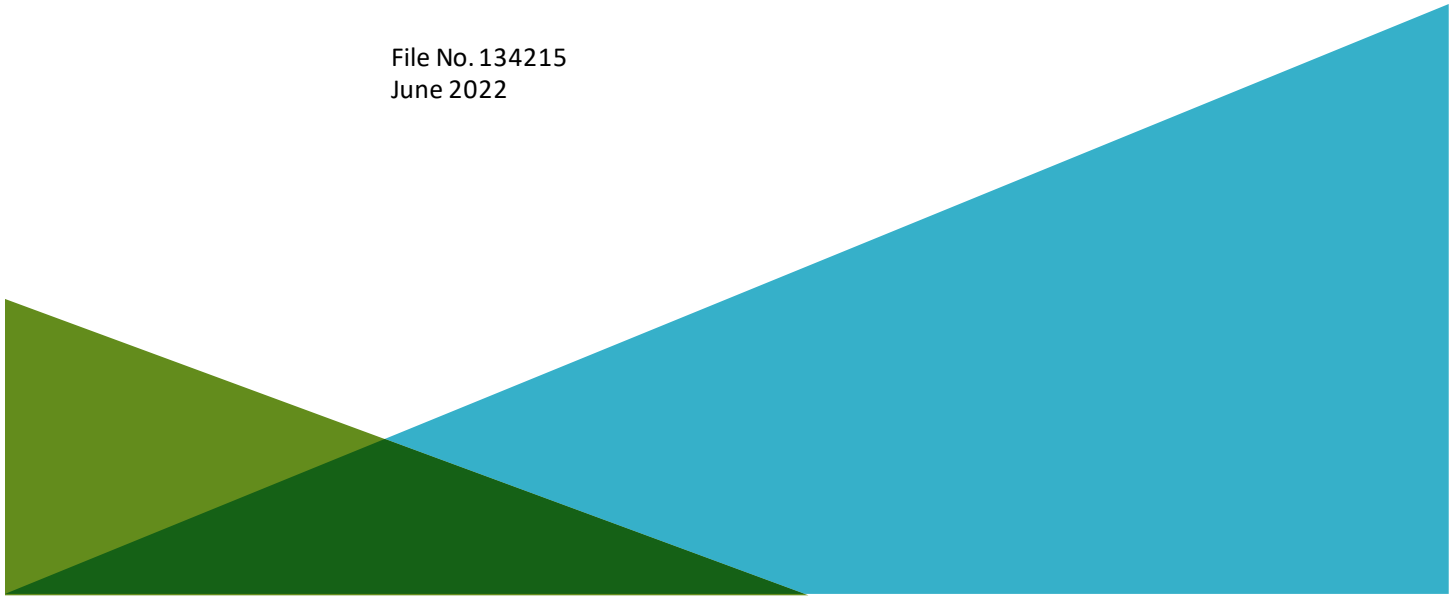
GEOTECHNICAL DESIGN REPORT
SEAPORT CIRCLE - MASSPORT PARCEL H
701 CONGRESS STREET
BOSTON, MASSACHUSETTS

by
Haley & Aldrich, Inc.
Boston, Massachusetts

for
LO Parcel H, LLC c/o Lincoln Property Company
Boston, Massachusetts

File No. 134215
June 2022



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3 June 2022
File No. 134215-002

LO Parcel H, LLC c/o Lincoln Property Company
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Attention: Mark Callahan
Director of Development

Subject: Geotechnical Design Report
Seaport Circle – Massport Parcel H
701 Congress Street
South Boston, Massachusetts

Ladies and Gentlemen:

This report presents the available subsurface explorations and provides foundation design recommendations for the proposed construction of Seaport Circle located at 701 Congress Street in South Boston, Massachusetts.

Subsurface explorations have generally identified a 25 to 40 foot (ft) layer of fill and organic soils overlying inorganic and naturally deposited Marine Clay soils at the site. We recommend the Lab building and Pedestrian Link be supported by a combination of deep foundations, driven end-bearing piles and drilled shafts socketed in bedrock. We recommend the Pavilion be partially founded on driven end-bearing piles and partially founded on footings bearing above the roof I-90 Turnpike Tunnel following soil removal such that there is zero net load applied to the tunnel roof. Details of the available subsurface data and our geotechnical recommendations are provided in the subsequent report sections.

There are numerous existing structures within and adjacent to the subject site including utilities, existing above-grade structures, remnant building foundations, and below-grade elements used as temporary support during CA/T construction. Active streets and easements have been considered in the design and will continued to be evaluated for construction of the new development.

We appreciate the opportunity to provide consulting services for this project and look forward to our continued association during the completion of design and subsequent construction.

Please contact us if you would like to receive a copy of this report.

Sincerely yours,
HALEY & ALDRICH, INC.

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1. Introduction

1.1 GENERAL

This report summarizes available information on subsurface soil and groundwater conditions and provides recommendations for foundation design for the proposed structures planned to be constructed as part of the Seaport Circle development. The project site is located on a parcel of land owned by Massachusetts Port Authority (Massport) and designated Parcels H and H1. The general site location is shown on Figure 1, Project Locus. The report is intended to aid planning and design activities by the project team, as well as serve as a reference document for the project construction Contract Documents.

1.2 ELEVATION DATUM

Elevations in this report are in feet and Boston City Base Datum (BCB) which is 5.65 feet (ft) below National Geodetic Vertical Datum of 1929 (NGVD), wherein elevation (El.) 0.0 BCB is equal to El. 5.65 NGVD. For reference, the Massachusetts Turnpike Authority (MTA) Datum is 100 ft above NGVD, thus EL. 0 (MTA) equals El. -94.35 (BCB). The Mass DOT Central Artery Tunnel (CA/T) datum is also 100 ft above NGVD, and EL. 0 (MTA) equals El. -94.35 (BCB).

1.3 PROPOSED DEVELOPMENT

The development is planned to include a new 9 to 12-story laboratory/research structure with an overall footprint of about 65,000 square feet (sq ft), which covers most of the parcel. A portion of the above-grade structure will span over Silver Line Way and will be supported on columns and new foundations along the south side of the site. An approximately 35,000 sq ft one-level below grade parking garage is planned north of Silver Line Way and below the east and west towers of the new building. The top of the below grade garage floor slab is planned at El. 1 BCB, and the building ground floor is generally planned at El. 20.5.

A separate two-story Pavilion is planned at the southeast side of the project and will be public space. The Pavilion structure will be constructed over the existing Interstate 90 (I-90) Massachusetts Turnpike tunnel. The Pavilion structure will be connected to the Lab structure via a Pedestrian Link which will span over a portion of Silver Line Way.

A simplified illustration of the limits of the proposed new building footprint is indicated on Figure 3 – Proposed Development and Proposed Subsurface Explorations.

2. Site Conditions

The general location of the project site is indicated on Figure 1- Project Locus and Figure 2 – Existing Conditions and Existing Subsurface Exploration Location Plan. Additional information on existing site conditions is provided in Sections 2.1 and 2.2 below.

2.1 SITE HISTORY

The subject site and vicinity were originally tidal flats that were filled in the late 19th century. The site was originally developed with railroad tracks as part of a freight terminal. In the 1960s the northern and eastern portions of the subject site were redeveloped with fish processing and cold storage buildings along the historical road, Trilling Way. The railroad tracks were removed by the 1980s and an additional fisheries building was constructed on the west side of the subject site. In the mid-1990s, the central artery highway project (CA/T) began construction immediately to the south. The fisheries buildings were removed from the subject site and Trilling Way was replaced by the new Congress Street extension by the early 2000s. Additional information about former structures on the site was obtained from CA/T reports for Design Section D004A. Relevant information related to previous structures on the site is summarized below. Copies of Sanborn Fire Insurance Maps indicating previous structure locations are provided Appendix A.

2.1.1 Previous Structures

In addition to railroad freight yards on a portion of the site, three former commercial/warehouse buildings used for fish processing were located on the property as indicated on Figure 2. Former buildings were demolished prior to CA/T construction in the mid-1990s. Reportedly, foundations and substructures of the former buildings were removed to at least 2 ft below existing ground surface. Remnant foundations are believed to be abandoned in place. Select figures and logs of Test Pits conducted for CA/T Design Section D004A indicating limited exposed foundation conditions of the former structures are included in Appendix B.

Foundation plans for the former structures are not available, therefore locations and conditions are not defined. Available foundation information for the previous structures collected during review of the Boston Inspectional Services Department (ISD) online permits, information in the CA/T Design Section D004A Geotechnical Engineering Report, and the Test Pit Program Report for various CA/T Design Sections is as follows:

- Former Building No. 16 - Turner Fisheries building - Inspectional Services Department (ISD) records for the former building on the west side of the project site, listed as 1 Trilling Way, indicate that the building was supported on wood pile foundations. The reference CA/T report indicates that a test pit completed in 1990 exposed a corrugated metal pipe below the pile cap indicating that concrete filled shell piles or a composite pile may have been used for some of the piles.
- Former Building No. 17 - Boston Bonnie Fisheries or Caribou Fisheries building - A portion of the former building, listed as 30 Trilling Way, was located on the east side of the project site. ISD records indicate that the structure was supported on concrete caisson foundations. Based on records and discussions with Suffolk Construction and reported conditions encountered during construction at Massport Parcel K, it is believed that caissons have an enlarged base (bells). Test

pits completed for the CA/T project revealed the tops of concrete caissons and grade beams. The reference CA/T Data Report indicates that a portion of the structure was supported on wood piles.

- Former Building No. 23 - Commercial Union Building – A section of the former building was located on the south side of the project site. The referenced CA/T report indicates the building was constructed on perimeter strip footings and interior spread footings. No test pits were conducted at this location.

2.2 EXISTING SITE CONDITIONS

The project site consists of Massport Parcels H and H1 totaling 108,293 sq ft (2.49 acres). The north half of the parcel is currently occupied by an existing surface parking lot. On the south side of the site, a Massachusetts Bay Transportation Authority (MBTA) easement for bus access runs east to west along Silver Line Way. South of Silver Line Way is a landscaped area, beyond which is the CA/T I-90 boat section and tunnel. A City of Boston Water and Sewer Commission (BWSC) pump station is located within the landscaped area. Several BWSC easements connect to the pump station from the west, north, and east. The southeast portion of the site, designated Parcel H1, is located over the existing I-90 Turnpike tunnel. Other utilities and easements exist at the site. Information related to existing infrastructure and structures on and adjacent to the site are summarized below.

2.3 SURROUNDING STRUCTURES

A summary of available information for existing infrastructure, structures and buildings on and around the site is summarized below. The information was collected from documents provided by the design team, Haley & Aldrich, Inc. (Haley & Aldrich) project files, and/or publicly available records.

Existing Structure (Location)	Description
MBTA Silver Line Way Surface Road, Curb and Jug Handle (South and Southeast)	• MBTA Operations within the Silver Line Way Easement #3 include bus traffic supported by overhead catenary lines, a bus stop at the east side of the site, and the "jug handle" road for bus turning. The easement continues southeast of the site property line and connects into the Massport Haul Road. • Silver Line Way crosses through the easement and slopes gently from west edge of the site at El. 19 down to El. 16 at the east to meet Starboard Lane. The "jug handle" portion of the roadway is south of the main Silver Line Roadway and slopes down to approximately El. 13. • Utilities located beneath the easement include drainage, sewer, water, and electrical ductbanks.
601 Congress Street (West)	• 601 Congress Street is a 14-story office structure with two and half levels of below grade parking located west of the project site. The garage is supported on a mat foundation, and the above grade building spans over Silver Line Way and is supported by columns and drilled shaft foundations south of Silver Line Way. • Formerly called Massport Parcel F-1. • Port Lane, owned by Massport, separates the 601 Congress Street building and the subject site.

Existing Structure (Location)	Description
Renaissance Hotel 606 Congress Street (Northwest)	• 606 Congress Street is a twenty-one-story hotel with below-grade parking, constructed around 2005.
1 Park Lane (North)	• 1 Park Lane is a 21-story residential building with three levels below grade, constructed in 2006.
Ora Seaport 295-315 Northern Avenue (East)	• Two, 11-story towers (residential and hotel) constructed over a shared one-level below-grade garage. • Formerly called Massport Parcel K.
Interstate I-90 Massachusetts Turnpike Boat Section from Station 76+00 to 81+35 (South)	• The Interstate 90 Turnpike boat section is located between approximately CA/T station 76+00 to 81+35. • The permanent boat section is documented in construction drawings from the Central Artery to be concrete retaining wall supported on an 8 to 10.5 ft thick concrete mat. The concrete mat is generally bearing in the Marine Deposits and has vertical rock anchors spaced 15 to 20 ft on center to resist the upward hydrostatic pressure on the mat. The rock anchors are discontinued at approximately station 81+10, as the boat section transitions to the tunnel portal. • Based on available MassDOT contract drawings and limited available information in Haley & Aldrich's files, we understand a temporary steel sheet pile support of excavation system was installed along the northern side of the boat section to facilitate construction of the permanent concrete structure (see Illustration 2.3.1 below). The sheet pile wall was likely offset from the boat section wall by about 4 to 5 ft to allow for forming and backfilling of the boat section wall. Documents from 1993 of the CA/T construction and denoted "tieback redesign" included in Appendix C indicate four levels of tiebacks may have been used as temporary bracing of the sheet pile wall. It is not known if these documents represent what was ultimately installed; length and angle of tiebacks is not indicated. The deeper levels of tiebacks, if present, may extend into glacial till or bedrock. Shop drawings or as-built construction drawings for the temporary support of excavation and tiebacks were not located in CA/T archives. Refer to section C-C on Figure 5 for a depiction of possible extent of tiebacks. It is expected that the tiebacks were detensioned as the permanent boat section was constructed; the detensioned tieback strands and abandoned sheet piles likely remain in place. Tiebacks were not connected to the permanent boat section structure.
Interstate 90 Massachusetts Turnpike Tunnel from STA. 81+35 to 82+63.56 (South)	• The I-90 west bound tunnel starts at approximately Station 81+35. At the westbound tunnel portal, the top of the roof is indicated to be at El. 12.65 BCB based on as-built drawings. • The tunnel foundation consists of a 10.5 ft thick reinforced concrete mat bearing on Marine Clay deposits. At Sta 81+35 the west bound tunnel mat is bearing at El. -29.5. • The exterior walls are 7.5 ft thick, with a median wall between the westbound and east bound traffic.

Existing Structure (Location)	Description
Interstate 90 Massachusetts Turnpike Tunnel from STA. 81+35 to 82+63.56 (South) (Continued)	• The documented existing conditions of the I-90 have been incorporated into the Revit Model for the project by the Architect, and portions of the tunnel are illustrated on the enclosed Figures 4 and 5 Subsurface profile B-B and C-C, respectively. • The temporary support of excavation system used for construction of the tunnel included a concrete diaphragm (slurry wall), and based on available documents, five levels of tiebacks were presumed to be used as external bracing for the north slurry wall. Similar to the boat section, the slurry wall was constructed offset from the permanent tunnel wall. Tiebacks locations and configuration are not known but it is expected that they were detensioned and the strands remain in place. Tiebacks were not connected to the permanent tunnel wall.
Boston Water and Sewer Commission (BWSC) Pump Station and Easement	• The BWSC Pump house is a one story masonry structure located between Silver Line Way and the I-90 boat section on the southern site of the site. The Pump house has below-grade space, with the pump room floor at El. -8.35 (approximately 25 ft below the grade level floor). • Available drawings indicate the pump house is supported on 14-in. diameter, poured concrete piles installed with tips at about to El. -93.4 and noted as having 50 ton capacity each. • A 36-in. reinforced concrete pipe enters at El. -2.5 from the east into the pump house and exits (at approximately El. 4) on the west of the building within a BWSC Easement.

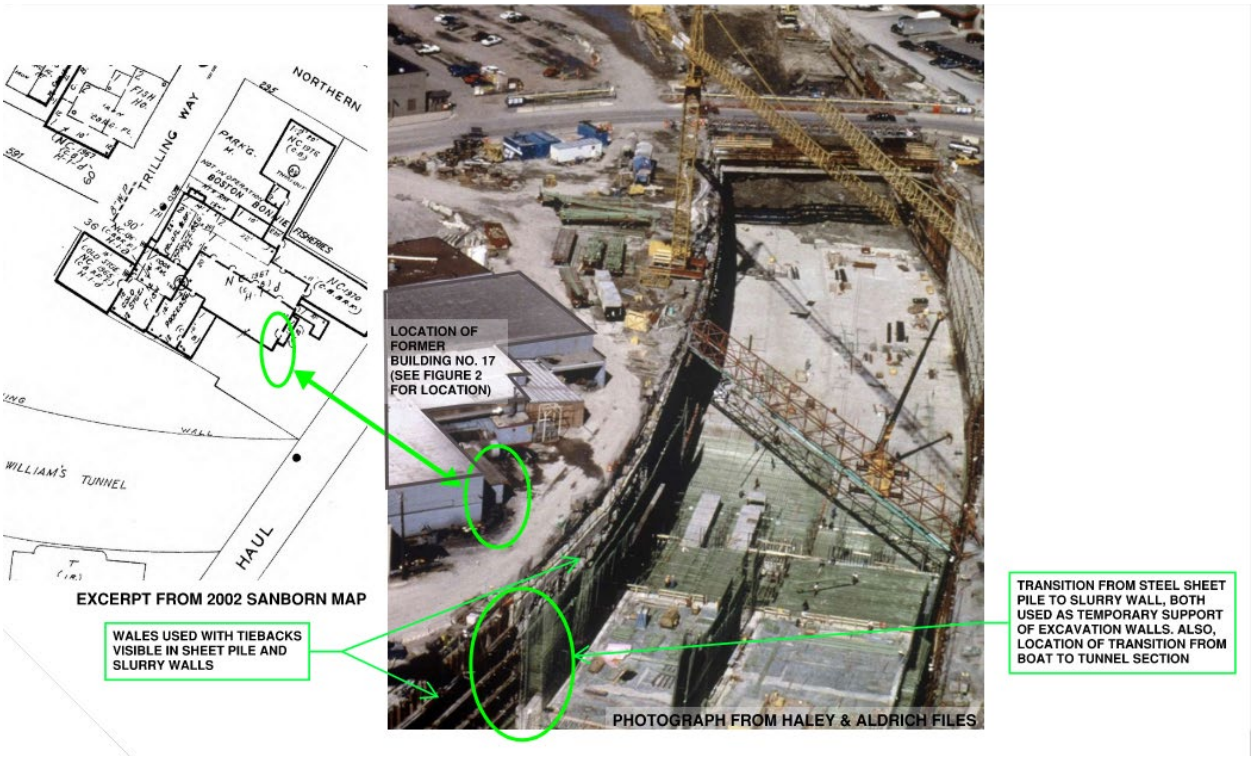

Illustration 2.3.1 – Excerpt of 2002 Sanborn Map with Ariel Photo of I-90 construction adjacent to the site

3. Subsurface Exploration Program

3.1 HISTORIC EXPLORATIONS

Haley & Aldrich has researched and compiled subsurface data from readily available sources from previous projects completed around the project site. Source reports are listed in as references to this report. Relevant data is indicated below:

- Massport Parcel F-1 (601 Congress Street): Test borings B-1, B-3, P1, P2, and P3, were drilled between December 2000 and May 2001 on Massport Parcel F-1 located west of the site. The test boring logs were obtained from the Geotechnical Report completed by Haley & Aldrich for the former Manulife building project.
- Massport Parcel K (295-315 Northern Avenue): Test borings K-101, K104 and G-106 were drilled on Massport Parcel K located east of the site. Test boring logs were obtained from the Geotechnical Report provided to us, dated 2017 and prepared by McPhail Associates, for the recently constructed Ora Apartments and Hyatt Place Hotel project.
- CA/T Tunnel (I-90 Massachusetts Turnpike): Logs of test borings designated SB2-36 to SB2-73 drilled between December 1989 to March 1990 were obtained from the Central Artery (I-93)/ Tunnel, (I-90) Project Design Section D004A and D024A reports. The borings were undertaken for design and construction of the CA/T boat section structure located south of the site.

Locations of test borings are indicated on Figure 2. Test boring logs are included in Appendix D. Referenced documents are listed at the end of this report.

3.2 RECENT EXPLORATION PROGRAM

3.2.1 Refraction Microtremor Seismic Survey

On 25 April 2022, Hager-Richter Geoscience, Inc. conducted shear wave velocity testing at the site along four surface test lines in the proposed garage and Lab Building areas. Descriptions of test methods, test line locations, and measured passive shear wave velocities (pVs) are included in the report titled "Shear Wave Velocity Testing, Boston Seaport, Boston, Massachusetts," prepared by Hager-Ritcher Geoscience, Inc. provided in Appendix E.

3.3 PROPOSED EXPLORATION PROGRAM

Future, additional subsurface explorations for the Seaport Circle project are planned when the site is accessible. The program will include geotechnical test borings to define specific conditions, relative to depth and quality of bedrock within the proposed building footprint, for deep foundation installation. Locations of the proposed Geotechnical test borings are shown on Figure 3.

Concurrent with the geotechnical test borings, soil sampling and analytical testing for environmental pre-characterization of material to be excavated from the site will be undertaken.

Following the completion of the proposed exploration program we will update the subsurface soil, groundwater, and bedrock data in this report, review and confirm the recommendations, and issue an updated report.

3.4 SUBSURFACE SOIL AND GROUNDWATER CONDITIONS

3.4.1 Soil and Bedrock Conditions

A summary of soil stratigraphy encountered at test boring locations is provided on Table 1. The subsurface data was used to develop Subsurface Profiles provided in Figures 4 and 5. Subsurface conditions are anticipated to consist of the following in order of increasing depth below the ground surface:

Generalized Strata Description	Range in Thickness (ft)	Approximate Elevation Top of Stratum (ft)
Miscellaneous Fill	8.5 to 31	12.8 to 18.6
Organic Soils*	3 to 19.5	-1.0 to -16.3
Marine Clay	39 to 89.5	-9.5 to -25.3
Glacial Deposits	1.5 to 22	-60 to -99
Bedrock	-	-85 to -127

Notes:
** Test boring P-3 indicates the presence of an Estuarine Deposit between two layers of Organic Deposits for a total thickness of 27.5 ft.*

- Fill – The fill is expected to consists of SAND, CLAY and/or GRAVEL with varying amounts of miscellaneous manmade materials.
- Cohesive Fill – A stratum of SILT and lean CLAY intermixed with ORGANIC SOIL and miscellaneous materials was encountered in available borings. This stratum layer is likely the result of historical hydraulic filling of the site.
- Organic Deposit – A deposit of ORGANIC SOIL with peat fibers was encountered below the Cohesive Fill or intermixed with Cohesive Fill. The deposit was likely disturbed by the occurrence of the hydraulic filling.
- Marine Deposits (Clay) – The marine deposits typically consisted of very soft to stiff lean CLAY interbedded with occasional seams of silt or sand. Medium stiff to stiff clay deposits, referred to as the "clay crust", were encountered at the top 5 to 15 ft of the strata.
- Glacial Deposits – A variety of glacial deposits generally consisting of dense SILT, CLAY, SAND or GRAVEL were encountered below the Marine Clay and above the bedrock. Depending on the composition of the deposit it was designated as Glaciolacustrine, Glaciomarine, Glaciofluvial, or Glacial Till. The deposits vary in thickness and are not present at each deep test boring location.
- Bedrock –Weathered or decomposed rock was noted in available borings to be 0 to 7 ft thick and generally decreases in thickness from west to east. The weathered rock consists of clayey SAND, SILT OR GRAVEL with varying amounts of gravel and having a distinct rock fabric from the ARGILLITE or tuffaceous ARGILLITE. The sound bedrock was collected using coring methods and was described as ARGILLITE and aphanitic ARGILLITE.

  Figure 6 – Contour Plan of Top of Bedrock Elevation**,** depicts the estimated top of geologic bedrock across the project site using available information. The elevation of the top of bedrock slopes down from the northeast to south, from approximately El. -80 at Starboard Lane to El. -100 at the CA/T boat section wall.

3.4.2 Groundwater Conditions

Based on historic groundwater level data in referenced reports, groundwater levels measured near the project site typically ranged from El. 4.5 to 12.1 BCB, but reportedly as high as El. 16.

Location	Range of Measured Groundwater Elevation (ft, BCB)
601 Congress Street (west)	El. 12.1 to 8.5
295-315 Northern Avenue (east)	El. 9.1 to 4.5
Central Artery Design Report (south)	El. 13.7 to 6.7

Groundwater levels vary with season, precipitation, construction activity in the area, below-grade structures, leakage from utilities, and other factors. As a result, groundwater levels observed during and following construction may vary from those reported herein.

4. Foundation Design Recommendations

4.1 GENERAL

Foundations for the proposed buildings should be designed and constructed in accordance with the Massachusetts State Building Code (Building Code). Recommendations provided herein are based on requirements of the 9th Edition of the Building Code.

Recommendations in this report are based on the proposed building layout and site development plan as understood at the time of this report. Column loads were provided by McNamara/Salvia in April 2022 and Ryan Biggs in May 2022, structural engineers for the Lab building and the Pavilion respectively. The range of loads expected on the foundations are summarized in the table below. Pedestrian link loads were not available at the time of this report.

Proposed Structure	Compression Loads (kips)	Uplift/Tension Loads (kips)	Lateral Loads (kips)
Lab Building	220 to 3742	0 to -160	0 to 122
Pavilion	29 to 342	0 to -56	0 to 95

The near surface fill and organic soils have a combined thickness of 30 to 40 ft and are not considered suitable for building column support.

4.1.1 Lab Building and Garage Foundation Support

For the lab building, a shallow foundation system (mat or footings) bearing in the Marine Clay is not considered feasible for support of the various structures due to the depth to suitable bearing soils (Marine Clay), the magnitude of the column loads, and anticipated settlement. Based on the building loading and site constraints, it is recommended that foundations for the laboratory/research building derive their support in the underlying bedrock at depth. A variety of deep foundation types are considered technically feasible and have been evaluated including driven end bearing piles, drilled micropiles (DMPs), and drilled shafts (either rectangular Load Bearing Elements [LBEs] or circular caissons). A combination of drilled shafts and steel H-piles were selected based on schedule, cost, consideration of impacts to adjacent structures, and site constraints.

4.1.2 Pavilion Foundation Support

At the Pavilion, end-bearing steel H-piles are planned to support northern columns outside of the tunnel. The southern foundations are planned to bear directly on the tunnel following soil removal to avoid any additional loading on the tunnel.

As discussed further in Section 5 of this report, pre-excavation will be required will be required prior to foundation element installation. However, removal of the remnant tiebacks obstructions believed to be present north of the CA/T boat section and tunnel may be limited to the reach of the excavator and could be encountered during foundation installation.

4.2 FOUNDATION DESIGN RECOMMENDATIONS

4.2.1 Lab Building

Based on coordination with the Structural Engineer, drilled shafts are currently recommended for support of new building columns outside of the garage footprint and driven end bearing piles within the garage. The advantage of drilled shafts is that column loads can be supported on one high capacity foundation element and the geotechnical capacity can vary to support the column load depending on the socket length in the bedrock bearing stratum. Steel H-piles will be used in the area of the building where large pile caps can be accommodated at the laboratory garage.

4.2.1.1 Drilled Shafts

Drilled shafts should be designed to extend through overlying soils to transfer loads to sound (not weathered) Bedrock.

- Drilled shafts supporting building loads are estimated to bear on competent, sound Bedrock encountered at depths of 105 to 120 ft below existing ground surface. Historic borings indicate the presence of up to 7 ft of Weathered Bedrock above competent sound Bedrock across the site.
- Structural design drawings will include estimated bottom of shaft elevations. Actual drilled shaft lengths will be adjusted in the field based on actual rock conditions encountered at each of the drilled shaft location (depth and weathered zone)
- The drilled shaft concrete should be designed with a minimum compressive 28-day strength (f'c=5,000 psi) that avoids overstressing the concrete in the drilled shafts and to limit elastic settlement.
- Drilled shafts should be designed in accordance with Table 1810.3.2.6 of the IBC 2015 and the relevant exceptions in the MBC.
- For drilled shafts not subject to lateral or uplift, minimum required center-to-center spacing s two times the diameter of shaft.
- For drilled shafts subject to uplift, minimum required center-to-center spacing is three times the diameter of shaft.
- The recommended allowable side resistance (skin friction) and end-bearing pressure for design of the drilled shafts are listed below:

Foundation Type/ Stratum	Compression Skin Friction (ksf)	Tension Skin Friction (ksf)	End Bearing (ksf)	Maximum Allowable Load End Bearing (%)[2]
Drilled Shafts In Sound Bedrock[1]	8	5	80	50

Notes:

1. *Sound Bedrock is defined as hard to medium hard, moderately to slightly weathered, extremely to slightly fractured, fine-grained Argillite. Weathered bedrock will not be considered as part of the drilled-in pile or shaft rock socket design.*
2. *When the total design load exceeds the end bearing capacity of the foundation element, the end bearing capacity should be limited to 50% of the total design load to determine the minimum embedment length required.*

Foundation Type/ Stratum	Compression Skin Friction (ksf)	Tension Skin Friction (ksf)	End Bearing (ksf)	Maximum Allowable Load End Bearing (%)[2]

3. *The compression load carrying capacity of each drilled shaft is the sum of the end bearing and compression skin friction components developed within the sound Bedrock.*
4. *The tension, or uplift, load carrying capacity of each drilled shaft is only the side resistance components developed within the sound Bedrock.*
5. *Each Drilled Shaft should have a minimum embedment depth of 5 ft below the top of sound Bedrock.*
6. *Where feasible, the rock socket should be limited to less than 25 ft by increasing the diameter of the drilled shafts.*

- Drilled shafts/caissons should be laid out to be a minimum distance of 5 ft from any existing or proposed structure such as basement walls, or abandoned support of excavation.
- A minimum distance of 10 ft from the closest face of the north MassDOT tunnel and boat section wall should be maintained to be clear of the abandoned support of excavation system with the exception of the tiebacks which are expected to extend a further distance into the site.
- Refer to Appendix F for Geotechnical lateral capacity evaluation of 6 ft diameter drilled shafts.
- Drilled shafts should be constructed using temporary steel casing or slurry drilling fluid to stabilize hole during excavation. At a minimum, drilled shafts should be temporarily cased 5 ft into the Marine Clay Deposits, through the Fill and Organic Deposits. Where close to sensitive structures the casing should extend deeper as necessary to protect against potential loss of ground.

4.2.1.2 End Bearing Driven Piles

Vertical loads can be supported on 430-kip (215 ton) vertical capacity steel H-piles, HP14x117, driven to end bearing in underlying bedrock.

Steel H-piles are installed by driving with hydraulically-powered pile driving hammers. Driven piles should be initially vibrated to the top of the glacial till or bedrock bearing stratum. Driven piles are driven to bear in end-bearing in the dense glacial till and/or sound bedrock below the Site.

Design criteria for driven steel H-piles are as:

- Steel H-piles should consist of HP 14x117 piles, driven to end-bearing in bedrock, having a minimum yield strength (f_y) of 50 ksi and constructed of steel conforming to ASTM standards.
- A design capacity of 430-kip per pile in axial compression is recommended. The recommended capacity considers pile capacity efficiency as well as material stress and drivability limitations. The pile capacity assumes that one-sixteenth of an inch has been deducted from all surfaces to account for corrosion.
- Some steel H-piles will experience tensile or uplift forces. The allowable uplift capacity of the piles is a maximum of 45 kips.
- The minimum center-to-center pile spacing should be 36 in. for compression.
- Where possible, piles with tensile loads should be spaced 43 in. or more apart. Piles spaced less than 43 in. apart, should consider a reduced allowable tensile capacity linearly interpreted between 15 kips at 36 in spacing and 45 kips at 43 in. spacing.

- Based on available subsurface information, we anticipate pile lengths could range from approximately 110 ft to 125 ft, below existing ground surface (assumed at around El. 15), and assuming a 10 ft embedment into bedrock.
- A maximum of one pile splice is allowed developing the full pile section capacity in compression, tension, and bending.
- Piles should be fitted with a steel driving shoe (driving tip) to facilitate advancement of H-piles past potential obstructions and into the underlying glacial till and bedrock.
- The pile Contractor should conduct and submit for approval of the proposed pile hammer and driving criteria based on the results of a dynamic (WEAP) analyses.
- The bottoms of pile caps and grade beams should be constructed at least 4 ft below adjacent ground surfaces that will be exposed to freezing temperatures unless insulation or other comparable protection is provided.
- The top 45 ft of the pile should be epoxy-coated. The length of epoxy coated pile assumes the piles are driven from a working surface at El. 15 or 16, if the piles are driving from a lower elevation the epoxy coating length can be reduced.
- Remnants of historic structures are expected within the proposed below grade garage and may include granite blocks, building slabs, potentially wood piles, belled caisson, detensioned tiebacks and other potential obstructions. Pre-excavation at pile locations will be required to remove obstructions.
- We recommend that a pile load test waiver request be prepared and submitted to the applicable governing agency indicating static pile load test results from a nearby project that utilized 430-kip end bearing H-piles are applicable to this project and that a pile load test is not required. Additionally, an indicator pile program consisting of a minimum of 10 piles will be required, including dynamic testing of indicator piles, to confirm capacity, drivability conditions, hammer energy, and pile lengths.
- Refer to Appendix G for geotechnical lateral capacity evaluation of a driven HP 14x117 pile.

4.2.2 Pavilion

Most of the proposed Pavilion structure is located over the existing I-90 Turnpike Tunnel, and the structure will be supported on spread footings bearing above the tunnel walls. The design and construction of the spread footings will include removal of existing soil above the tunnel such that no additional load is applied to the tunnel.

The northern end of the Pavilion is located north of and beyond the limits of the tunnel structure. Several different foundation types are feasible to support Pavilion column loads in this area including end bearing piles to bedrock, or friction piles bearing in the marine clay.

Driven end bearing steel H-piles were selected to reduce the number of foundation elements required and allow for easier pile relocation to avoid existing tiebacks.

4.2.2.1 Reinforced Concrete Footing Foundations

For portions of the Pavilion supported on spread footings on the existing I-90 Turnpike Tunnel over the tunnel walls:

- Column loads should be designed to be supported on conventional reinforced concrete spread footings bearing on Granular Fill located above the tunnel median and south walls. While the footings are recommended to be designed for a maximum allowable bearing pressure of 4 kips per square foot (ksf), we understand the design will achieve no net additional load on the tunnel. Existing fill will be removed as necessary to compensate for the Pavilion structure load. Lightweight fill is planned to be used around the footings and under the Pavilion slab.
- Design footings such that the minimum lateral dimension (width) is 18 in.
- Design footings to bear a minimum of 4 ft below lowest adjacent ground or slab surface exposed to freezing.
- Existing granular fill over the tunnel at the bearing elevation should be proof-compacted with hand-guided compaction equipment prior to placement of the concrete footing.
- For estimating resistance to base shear below footings a frictional resistance of 0.3 between soil and concrete may be assumed.
- Passive pressure against the side of footings should be neglected where soil is not present adjacent to footings.

4.2.2.2 End Bearing Driven Piles

Refer to section 4.2.1.2 - End Bearing Driven Piles for design recommendations. Piles installed for the Pavilion will be located approximately 15 to 25 feet from the existing tunnel.

4.2.3 Pedestrian Link

At the time of this report, our understanding is that the Pedestrian Link will be supported on deep foundation elements. Please refer to 4.2.1.1 – Drilled Shafts and 4.2.1.2 - End Bearing Driven above for design criteria.

4.2.4 Foundation Settlement

For the Lab building, total and differential settlement of the drilled shafts and steel H-piles are anticipated to be less than 0.5 in. at the top of the element. Elastic shortening of the drilled shafts and H-piles should be expected and considered in the design at the lowest level floor slab or the top of the foundation element. Shortening is expected to occur during the application of the dead load (structure and floor slabs) and live loads.

As a result of net zero additional loading over the tunnel, settlement of the footings over the tunnel and the tunnel is estimated to also be negligible. Given the relatively low ratio of applied load to capacity of the end-bearing H-piles, differential settlement between the pile-supported columns and columns over the tunnel is anticipated to be negligible.

4.3 DESIGN GROUNDWATER AND WATERPROOFING

4.3.1 Design Groundwater Elevation and Waterproofing

Based on a review of groundwater levels at and in vicinity of the site, we recommend a design groundwater level at El. 13 for use in determining buoyancy/hydrostatic uplift pressure beneath permanent structures outside the limits of the garage. Design groundwater level does not consider site flooding or changes due to stormwater infiltration systems that may impact conditions at specific locations.

For structures (vaults and chambers, not foundations and mats) and pits below the lowest level floor slab, we recommend those structures be fully waterproofed and be designed to resist the hydrostatic uplift pressure equal to the height of water between the invert of the underslab drainpipe (typically a minimum of 8 in. below the lowest level slab) and design bottom of pit structure.

The site is located within a flood zone as defined by the City of Boston Planning & Development Agency (BPDA). We understand that the project's Design Flood Level (DFL) has been designated as El. 20.5. Accordingly, for waterproofing and lateral loading on below-grade, exterior vertical walls, we recommend using the DFL.

We also recommend waterstops in all below-grade wall/slab and wall/foundation joints.

4.3.2 Design of Sub-Slab Drainage System in Garage

An underslab drainage system is recommended below the lowest level garage floor slab to relieve hydrostatic uplift pressure:

- The underslab drainage system should consist of 4-in. diameter perforated PVC (or HDPE) drainpipes embedded in a 12-in. thick layer of crushed stone (3/4-in. size crushed stone meeting the requirements of MHD M2.01.4) below the floor slab. Pipes can be laid flat; loping of the drainpipes is not required. Geotextile filter fabric should be installed over the subgrade soils and wrapped around the exterior edge of the stone layer. In areas where pile caps are proposed, the geotextile filter fabric should extend over the top of the pile cap a minimum lateral distance of 3 ft. Pipes should be laid flat, looped and interconnected to create alternate flow paths, and planned to avoid conflicts with other utilities below the floor.
- The underslab drainage system will need to transmit water to an ejector pit which will then be pumped out of the below-grade garage.
- A perimeter groundwater cut-off should be provided by leaving the interlocking steel sheet pile wall in place, after use as temporary lateral earth support.
- In order to isolate the underslab drainage system, flowable fill and/or low permeability fill should be placed between the sheeting and cast-in-place foundation wall from the bottom of excavation for perimeter pile caps up to about El. 13. Where blind-sided forms are used for foundation walls, the "belly" of the steel sheet pile excavation support wall should be filled with flowable fill.

4.4 STORMWATER RECHARGE

The footprint of the building occupies much of the property limits which results in limited area to infiltrate stormwater. An analysis for stormwater infiltration along Port Lane, Congress Street, and Starboard Lane was undertaken to evaluate infiltration within the Fill and Cohesive Fill at the site. The capacity of the fill to infiltrate water is limited due to shallow groundwater, highly variability of the existing fill, and the cohesive nature of some of the fill.

Based on the preliminary analysis conducted, the groundwater level within the fill soils is estimated to increase/mound at each recharge well approximately 2 ft above the measured, static groundwater level (approximately El. 10). At this time, we recommend a minimum of eight wells spaced 40 to 50 ft on center be planned to infiltrate the 78,000 gallons of water estimated by the project Civil Engineer. In situ permeability testing will be conducted as part of the proposed exploration program to confirm the infiltration assumptions.

4.5 BELOW GRADE WALLS

4.5.1 Pressures on Below Grade Walls

The one level garage for the proposed Lab building will extend to a depth of 15 to 16.5 ft below finished site grades. Below-grade basement walls should be designed to resist permanent lateral pressures due to a combination of soil, seismic effects, surface surcharge effects, and hydrostatic forces. For design of below-grade walls, assume the groundwater elevation to be equal to the Design Flood Level, DFL (El. 20.5). Minimum recommended lateral pressures for design of below-grade walls are provided below:

- Hydrostatic: Hydrostatic pressures should be applied for the height of the wall below the DFL.
- Static: For foundation walls restrained at top (at-rest condition and undrained), use an equivalent fluid unit weight of soil equal to 40 pounds per cubic foot (pcf) below the DFL.
- Surcharge: Lateral pressures due to construction equipment, roadway traffic loading, material storage, or other loads adjacent to walls should be applied as a uniform pressure over the height of the wall. Assuming a 250 psf surcharge pressure, the magnitude of lateral pressure should be calculated as 0.5 times the value of the surcharge pressure to the bottom of excavation.
- Seismic: Seismically induced lateral earth pressures for below-grade foundations walls should be calculated in accordance with the Building Code Article 1610.2 using a total soil unit weight (γt) of 120 pcf. This results in an inverted triangular pressure applied over the height of the wall (H, ft) with a magnitude of 8.5H (psf) at the top of the wall. The magnitude of the load at the lowest level slab is zero.

4.5.2 Spatial Considerations

The layout of new columns outside of the below grade garage walls will need to consider the wall thickness and the thickness and tolerances of the temporary support of excavation system. For preliminary planning we recommend the following:

- Waterproofing and protection = 2 to 3 inches (to be determined by others)
- Thickness assuming interlocking steel sheet piling = 16 to 18 inches
- Installation tolerance + lateral deflection = 6 to 8 inches
- Total: 24 to 30 inches +/-

The distance will need to be increased by approximately 5 ft if two sided forms are used for wall construction. The distance does not consider the size of walers or other components of an internal bracing system at the top of the support of excavation wall. Any sheet piles installed out of project specified tolerance may also impact wall layout/dimensions.

4.6 LATERAL LOAD RESISTANCE

4.6.1 Lab Building

For pile caps and grade beams in the proposed Lab Building, the net allowable lateral resistance (passive minus active) provided by the backfill against the pile caps or grade beams can be calculated by using an equivalent fluid unit weight of 160 pcf. This value assumes that granular backfill is placed within 3 ft laterally around pile caps and grade beams, and systematically compacted in lifts to minimum 95 percent of maximum dry density. The top of the assumed passive zone should be 6 in. below the top of the adjacent soil or backfill surface.

The contribution of lateral resistance by deep foundations are provided in Appendix F for 6 ft diameter drilled shafts and Appendix G for driven HP14x117.

4.6.2 Pavilion

A coefficient of friction between cast-in-place concrete footing bases and the bearing strata or lean concrete equal to 0.30 may be used to calculate ultimate sliding resistance. A factor of safety of at least 1.5 should be applied to calculate the allowable sliding resistance.

For pile caps supporting the proposed Pavilion, the net allowable lateral resistance (passive minus active) provided by the backfill against the walls/footings can be calculated by using an equivalent fluid unit weight of 160 pcf provided the pile caps are backfilled with soil and not lightweight fill or blocks. This value assumes that granular backfill is placed within 3 ft laterally around footings and walls, and systematically compacted in lifts to minimum 95 percent of maximum dry density. The top of the assumed passive zone should be 6 in. below the top of the adjacent soil or backfill surface. Where soil is not present adjacent to walls/footings, resistance due to passive pressure should be neglected.

4.7 LOWEST LEVEL FLOOR SLAB

The lowest level floor slab at El. 1 BCB in the Garage will be within the Fill and/or Organic soils underlying the site. A soil supported slab in these soil conditions would result in differential settlement and cracking of the lowest level slab. Over-excavation and replacement of the underlying Fill and Organic soils is not considered practical. Accordingly, we recommend that the below-grade parking slab be constructed as a structurally supported slab designed to span between pile-supported columns. Intermediate slab-support piles may need to be considered to reduce the span and thickness of the slab.

4.8 SEISMIC DESIGN

Based on our analysis, we recommend the following parameters in accordance with the Building Code:

- Seismic Site Class D
- S_s = 0.217 (Note 1)
- S_1 = 0.069 (Note 1)
- F_a = 1.6 (Note 2)
- F_v = 2.4 (Note 2)

Notes:
1. Values determined from Table 1604.11 of the Massachusetts State Building Code, 9th Edition.
2. Values determined from Table 1613.3.3(1) and Table 1613.3.3(2) of the International Building Code, 2015.

During an earthquake occurrence, additional transient pressures may develop against the exterior garage foundation walls of the structure due to the inertia effect of the surrounding soil strata. Since the basement walls are braced with the floor slabs, they are relatively rigid and non-yielding. This condition should be taken into account in determining the seismically induced component of the lateral earth pressure. Recommended seismically-induced lateral earth pressures for below-grade foundation walls are provided above in Section 4.5.

The foundation bearing soils at the site are not considered susceptible to liquefaction during the design earthquake in accordance with criteria in the Building Code.

4.9 UTILITIES AND SITE IMPROVEMENTS

Site utilities within the below-grade garage limits will be underlain by cohesive fill and organic deposits that will experience on-going, differential settlement estimated to be 1 to 2 in. over 10 years. Subslab utilities that are sensitive to settlement (rely on sloping, etc.) or with rigid connections to the slab, should be hung from the structural slab with pipe hangers. Where possible, flexible connections should be used accommodate the settlement.

Site utilities beyond the garage limits are anticipated to be soil-supported. Where these utilities penetrate through the foundation wall, oversized holes should be utilized to reduce the potential for utility breakage (due to post-construction settlement of the soil-supported utility). We also recommend flexible connections at utility transitions from soil-supported (outside the building) to pile supported structures (inside the building). All penetrations should be sealed and waterproofed on the exterior side of the building wall.

The fill and organic soils at the site are susceptible settlement where the site grades are raised above existing grades. Settlement resulting from raises-in-grade in soft scape, landscape areas can be managed with regular landscape maintenance. Raises in grade below hardscape or site improvement will need to be reviewed on a case-by-case basis relative to the schedule and sequence of the construction to evaluate the potential impact of the settlement.

New utilities and site structures should be evaluated relative to resistance to hydrostatic uplift forces. This will particularly be true in areas where lightweight fill material is used for grade raise materials, where there will be less load imparted by the backfill material to counteract buoyancy forces.

4.10 EVALUATION OF IMPACTS TO ADJACENT STRUCTURES

Evaluations of potential impacts to adjacent structures has been considered in project design and design criteria and construction methodology selected to minimize off site impacts.

- **Pavilion:** New footings bearing on the CA/T tunnel walls under the Pavilion are designed to not add any additional load to the tunnel.
- **Below Grade Garage Construction**: A steel sheet pile wall will be used for temporary excavation support during construction of the one level below grade garage. The construction methodology has been commonly used in the area. The steel sheet pile wall provides a watertight excavation support system. Nearby buildings and the CA/T boat section and tunnel are located at a distance to not be impacted by potential ground movement during excavation. Performance criteria has been developed for wall deflection to minimize potential impacts to adjacent streets and below-grade utilities and other structures.
- **CA/T Boat Section and Tunnel:** Vertical or lateral loading from the new development will not be applied to the CA/T boat section or tunnel. The abandoned steel sheet pile and slurry wall outside the cast in place concrete boat section and tunnel walls will act as protection to the tunnel and ramps during construction of the new building. The CA/T tunnel walls were constructed as cast in place walls and do not rely on the sheet pile or slurry walls since they were only used for temporary earth support. Furthermore, the sheet pile and slurry walls and temporary tiebacks are not in contact with the permanent boat section and tunnel walls and there is soil/backfill outside the tunnel wall. The sheet pile and slurry wall will remain in place and not used for the below grade garage construction.

  Temporary tiebacks (soil and possibly rock anchors) extending from the temporary sheet pile or slurry walls into the site have been abandoned. These tiebacks can be cut as necessary as they were only used for temporary earth support systems and are not connected to the boat section or tunnel walls. Removing tiebacks will not impact the boat section or tunnel walls.

  Vibrations generated during foundation and below grade construction walls are expected to be within tolerable limits.
- **Pedestrian Link over Silver Line Way:** The pedestrian link will be supported on deep foundation elements. Differential settlement between the Pedestrian Link and the other new structure is anticipated to be negligible.
- **BWSC Pump house:** The BWSC Pump house is supported on deep foundation. Impacts due to adjacent foundation installation are not expected.
- **Recommended Monitoring Program:** Performance criteria for design and construction has been developed in consideration of potential off site impacts, protection of adjacent structures during construction of the below-grade parking garage and building foundations. The performance criteria have been incorporated into the contract documents. The monitoring program is recommended to be implemented prior to the start of construction and consist of the following as applicable to the nature and proximity of the proposed work and the adjacent structures. See The location and extent of the monitoring program is indicated on the Contract Drawings. See Section 6 for additional details.

5. Construction Considerations

5.1 GENERAL EXCAVATION

The primary purpose of this section is to comment on the items related to excavation, dewatering, lateral earth support, foundation construction, earthwork, and related geotechnical engineering aspects of the proposed construction. Topics within this section will be incorporated into the project Contract Documents (Specification sections). Prospective contractors should evaluate potential construction issues based on their knowledge and experience with similar soils conditions in the project area, taking into account their own proposed construction methods.

In addition to the construction guidelines and recommendations provided herein, construction activities should conform to the requirements of the Occupational Safety and Health Administration (OSHA) and all other applicable Federal, Municipal and State regulatory requirements.

5.2 PRE-TRENCHING/ PRE-EXCAVATION

Pre-trenching/pre-excavation through the surficial fill to the top of the organic deposits (a depth no less than about 15 ft) in advance of installing the sheet pile support of excavation system and at planned foundation locations is recommended to remove obstructions. Pre-trenching should be conducted in a controlled manner – particularly where there are remnant foundations. Foundations and the remnants of previous structures that once occupied the site should be anticipated buried throughout the site including previous historical building foundations (including wood piles, concrete caissons (likely belled), and composite piles), temporary works, former streets, abandoned utilities, and other structures not recorded. Voids created from remnant foundation removal below 10 feet will require tremie filling with pea stone, low strength flow fill, or other approved material to stabilize the hole.

Removal of remanent concrete caissons in conflict with the proposed sheetpile wall and/or new foundations will likely need to be removed in their entirety. The caissons are believed to have bells below a straight shaft, likely 30 to 40 ft below existing grade. Extractions methods may include driving oversized casing around the caisson to the bottom of the element followed by extraction and/or demolition of the shaft and bell. Once the caisson has been removed, backfill with flowable fill with tremie methods during temporary casing removal.

Remnant tieback anchors associated with the adjacent existing I-90 Turnpike support of excavation system may be encountered during below-grade construction. Tiebacks may be encountered during foundation installation for the lab and pavilion buildings, particularly south of the garage closest to the boat section and tunnel walls. Tiebacks may also be encountered within the proposed garage limits during sheetpile installation or foundation installation – primarily along the southern side of the sheetpile SOE system. The possible zone of tiebacks is shown on Figure 3 and Sections B-B and C-C.

Pre-augering or spudding at discrete locations along the sheetpile alignment and at foundation locations could be considered in addition to pre-excavation. The purpose of the pre-augering is to locate tiebacks or other obstruction before the start of pile installation and reduce vibrations associated with the pile installation.

5.3 TEMPORARY SUPPORT OF EXCAVATION

Temporary lateral earth support will be required for the construction of the below-grade garage and potentially other site improvements where an open cut is not feasible.

For the garage, temporary lateral earth support will need to serve as a groundwater cut-off in addition to earth retention and limiting ground movement. It is recommended that excavation support be provided by a continuous interlocking steel sheet pile wall. Other excavation support systems are considered technically feasible (e.g., soil mix wall, slurry walls, secant pile walls); however, steel sheet piles are typically more cost effective for this depth of excavation. Sheet piles should be installed with a variable moment vibratory hammer to control vibrations. The sequence for excavation, temporary bracing, and construction of the below-grade foundations, walls and slabs will be determined by the contractor. The contractor will also be responsible for design of the temporary lateral earth support system for temporary loading conditions. Design of the sheeting should consider protection of the adjacent utilities and structures and should include a minimum of one level of bracing.

The top of the earth support wall will be approximately at ground surface and the toe of the wall will need to extend a minimum of 15 ft below the bottom of excavation and a minimum of 10 ft into the Marine Clay to create a groundwater seepage cut off during excavation and to reduce seepage flows into the underslab drainage system.

The steel sheet pile wall should be left in place following construction to serve as a permanent groundwater cut-off wall around the basement and should be cut-off a minimum of 5 ft below adjacent finished grade.

The Contractor should consider the sequencing of the sheetpiling installation relative to the steel H-pile foundation installations for the building and the sequencing of excavation activities in the evaluation of bracing requirements. Furthermore, the alignment and performance tolerance of the excavation support system including bracing and walers should consider the proposed methods for forming, placing, waterproofing and backfilling of the foundation wall (e.g., one-sided formwork with any necessary surface preparation to sheetpile wall to facilitate placement and protection of blind-side waterproofing). For planning purposes, assume an installation tolerance and deflection 6 to 8 in. of the sheet pile wall.

Use of external bracing such as tiebacks/soil anchors is not considered feasible because of proximity of below grade structures, utilities, easements, and locations of new deep foundations supporting building columns outside of the garage.

5.4 FOUNDATION INSTALLATION

5.4.1 Steel H-Piles

Steel H-piles may be initially advanced with a variable moment vibratory hammer (VMVH); an impact hammer must be used for final driving to end bearing. The selected hammer should be capable of delivering the minimum rated energy that is compatible with the design pile configuration and capacity. The Contractor should propose a final driving criterion for the selected hammer rated energy, based on the results of computer Wave equation analyses (i.e., GRLWEAP) conducted by the Contractor's

Engineer. Criteria for piles and their installation will be detailed in the Construction Contract Documents.

An indicator pile driving program will be developed and implemented to provide information on pile type drivability, production lengths and splicing conditions (if any), and for dynamic testing. The program will consist of a minimum of 10 indicator piles. The contractor may be required to undertake and successfully complete a static load testing program to verify design compression capacity depending on the results of the dynamic loading.

Production piles should be installed from (or near) existing site grades to avoid equipment stability issues if operating within/near the softer, Cohesive Fill and Organic Deposits. Design cut-off elevation for piles is anticipated to be several feet below the pile installation grade. Following completion of pile installations and during excavation for the below grade parking structure, pile stickups will need to be carefully cut down and protected as the excavation proceeds.

5.4.2 Drilled Shafts

Based on the nature of the fill and organic deposits, temporary steel casing installed into the Marine Clay deposits will be required to stabilize fill and organic soils. Excavation below the Marine Clay deposits should be advanced with slurry or with temporary casing. The tiebacks will likely be present within drilled shaft excavations below the limits of the pre-excavation. Where encountered it is expected that the strands would twist around the augers and prevent them from advancing. The contractor shall use alternate equipment if augers are not able to advance past the tieback locations.

5.5 EXCAVATION

The Fill soils likely contains over-size materials including debris, cobbles and boulders, and remnant foundations (concrete pile caps, concrete piles) from the former on-site building to be demolished. Excavations will be required for construction of the below-grade parking structure, pile caps, grade beams, elevator pits, utilities and other features.

In addition, the excavation bottom is anticipated to be underlain by up to approximately 10 to 24 ft of Fill and/or Organic soils that may be loose/soft and unstable, especially if disturbed by construction equipment. Upon reaching design bottom of excavation the Contractor may need to establish a working surface with geotextile and crushed stone and/or a mudmat to facilitate drainage layer, slab, and pile cap construction. The contractor's support of excavation design should consider the sequence of excavation and predicted movements considering the construction of a working surface.

5.6 CONSTRUCTION DEWATERING

The basement excavation as well as other site improvements will extend below site groundwater levels. Temporary construction dewatering will be required to lower groundwater levels inside the excavations and conduct work in the dry. The groundwater level must be kept at least two ft below the bottom of the excavation during construction.

The dewatering system should be designed to avoid groundwater drawdown outside the limits of the excavation. On-site recharge of dewatering effluent will be challenging and limited by the cohesive fill and organic deposits. Onsite recharge may be possible for small, limited excavations. Off-site discharge

of dewatering effluent will be the primary method for water management. A dewatering treatment system will be required as described in the project specifications and temporary dewatering permit will need to be obtained from the appropriate agencies.

5.7 PREPARATION OF FOOTING BEARING SURFACES

Subgrade conditions at the Pavilion should be observed in the field by a geotechnical engineer to confirm the assumed bearing conditions.

5.8 CONSTRUCTION MONITORING

It is recommended that an experienced geotechnical engineer or technician qualified by training and experience be present during pertinent foundation construction activities for which the Code Section 1704.6 through 1704.8 mandates be reviewed and approved by a registered design professional. The general purpose of the on-site monitoring program is to provide accurate documentation of construction activities such as pre-trenching activities, support of excavation installation, foundation installation and load testing (dynamic and static), site excavation and dewatering, and final subgrade for footing foundations, observe that work is conducted in accordance with plans and specifications, and correlate these activities with instrumentation data. Another purpose of Owner site representation is to clearly document potential changed conditions claims by accurately documenting construction conditions and the work performed by the Contractor.

It is recommended that Haley & Aldrich be retained to provide the recommended services during construction. This will enable us to observe compliance with the design concepts, specifications and the Building Code, help to resolve construction problems and to facilitate design changes in the event that subsurface conditions differ from those anticipated.

6. Impacts to Adjacent Structures

The project will be constructed within close proximity of existing structures and infrastructure. The recommended foundation systems and construction methodology have been selected to minimize impacts to adjacent structures and a geotechnical instrumentation and monitoring program will be implemented to document the construction impacts. The purpose of the instrumentation and monitoring program is to document pre-construction conditions, confirm predictions of soil and structure behavior, provide, monitor and document the Contractor's conformance with specified performance criteria, provide early warning of problems, and aid assessments of the need for measures to mitigation as performance criteria are approached.

Recommended geotechnical instrumentation will include the following:

- Preconstruction conditions survey of adjacent structures, and street surface within 50 ft of the site;
- Installation and monitoring of survey reference points to measure vertical movements of adjacent buildings, structures, and streets. An automated system will be included for the CA/T boat ramp and tunnel walls;
- Utility monitoring points to measure vertical movements of selected adjacent utilities;
- Reference points to monitor horizontal deflection of the support of excavation system;
- Observation wells to monitor area groundwater levels;
- Vibration monitoring during pile driving activities.

Performance criteria for adjacent structure movement and vibrations will be incorporated into the Monitoring program for the project and are indicated on GT drawings included in Contract Documents.

7. Limitations

This report has been prepared for specific application to the Seaport Circle (Massport Parcel H) development located at 701 Congress Street in Boston, Massachusetts, as understood at this time, in accordance with generally accepted geotechnical engineering practice common to the local area. In the event that changes in the nature, design or location of the building or other features are planned, the conclusions and recommendations contained in this report should not be considered valid, unless the changes are reviewed by Haley & Aldrich and the conclusions of this report modified or verified in writing.

The analyses and recommendations are based, in part, upon the data obtained from the referenced subsurface explorations and structural loading conditions. When additional subsurface information becomes available or significant loading changes occur, Haley & Aldrich will review. The nature and extent of variations between explorations may not become evident until construction. If variations then appear, it may be necessary to reevaluate the recommendations of this report.

Recommendations for foundation drainage, moisture protection and/or waterproofing have been included herein, when appropriate. These recommendations address the conventional geotechnical engineering related aspects of design and construction and are not intended to provide an environment that would prohibit infestation of mold or other biological pollutants. Our work scope did not include the development of criteria or procedures to minimize the risk of mold or other biological pollutant infestations in or near any structure.

References

1. Report titled “Final Geotechnical Engineering Report, Central Artery (I-93)/Tunnel (I-90) Project, Design Sections D004A and D024A, Boston, Massachusetts,” prepared by Haley and Aldrich, Inc. dated 10 October 1991.

2. Report titled “Final Report on Test Pit Program South Boston Area, Central Artery (I-93)/Tunnel (I-90) Project, Boston, Massachusetts,” prepared by Haley and Aldrich, Inc. dated 25 February 1991.

3. Report titles “Schematic Design – Geotechnical Summary, Proposed Manulife Financial Development, Parcel F-1, South Boston, Massachusetts,” prepared by Haley & Aldric, Inc., dated 15 February 2001.

4. Report titled “Revised Foundation Engineering Report, Parcel K, South Boston, Massachusetts,” prepared by McPhail Associates, LLC dated 13 January 2017.

TABLE

TABLE I
SUMMARY OF AVAILABLE SUBSURFACE DATA
SEAPORT CIRLCE - MASSPORT PARCEL H
BOSTON, MASSACHUSETTS

HALEY ALDRICH
H&A File No. 134215
3 June 2022

TEST BORING DESIGNATION	GROUND ELEVATION (FT,NAVD 88)	DEPTH OF EXPLORATION (FT)	FILL	ORGANICS			MARINE DEPOSITS			GLACIAL DEPOSITS			BEDROCK	
			THICKNESS (FT)	DEPTH TO TOP (FT)	EL. OF TOP (FT)	THICKNESS (FT)	DEPTH TO TOP (FT)	EL. OF TOP (FT)	THICKNESS (FT)	DEPTH TO TOP (FT)	EL. OF TOP (FT)	THICKNESS (FT)	DEPTH TO TOP (FT)	EL. OF TOP (FT)
CENTRAL ARTERY / TUNNEL														
SB2-46	15.4	125.1	18.5	18.5	-3.1	7.5	26.0	-10.7	80.5	109.0	-93.7	14.0	123.0	-107.7
SB2-49	14.9	133.6	24.5	24.5	-9.6	11.0	35.5	-20.7	64.2	99.7	-84.9	8.7	108.4	-93.6
SB2-51	18.6	128.6	24.0	24.0	-5.4	13.5	37.5	-19.0	72.5	112.0	-93.5	11.0	123.0	-104.5
SB2-52	15.3	110.0	25.0	25.0	-9.8	11.3	36.3	-21.1	55.4	91.7	-76.5	-	-	-
SB2-55	15.7	143.0	23.5	23.5	-7.8	12.6	36.1	-20.5	68.9	105.0	-89.4	10.5	115.5	-99.9
SB2-56	15.6	47.0	18.5	18.5	-2.9	19.5	38.0	-22.5	-	-	-	-	-	-
SB2-59	13.8	152.5	24.0	24.0	-10.3	13.5	37.5	-23.8	64.5	102.0	-88.3	22.0	124.0	-110.3
SB2-60	15.1	135.0	21.5	21.5	-6.4	18.5	40.0	-25.0	62.0	102.0	-87.0	11.0	113.0	-98.0
SB2-61	16.6	152.7	24.0	24.0	-7.4	16.5	40.5	-24.0	69.5	110.0	-93.5	17.5	127.5	-111.0
SB2-62	12.8	113.9	24.0	24.0	-11.3	14.0	38.0	-25.3	66.8	104.8	-92.1	8.1	112.9	-100.2
SB2-67	15.2	109.8	24.5	24.5	-9.3	9.0	33.5	-18.4	70.0	103.5	-88.4	6.3	109.8	-94.7
SB2-68	15.9	129.6	23.5	23.5	-7.6	10.5	34.0	-18.2	62.5	96.5	-80.7	14.4	110.9	-95.1
SB2-69	15.3	133.5	28.5	28.5	-13.3	5.0	33.5	-18.3	71.0	104.5	-89.3	9.2	113.7	-98.5
MASSPORT PARCEL F-1, 601 CONGRESS STREET (FORMER MANULIFE BUILDING)														
B-1	15.5	153.5	16.5	16.5	-1.0	8.5	25.0	-9.5	89.5	114.5	-99.0	5.5	120.0	-104.5
B-3	14.7	126.5	31.0	31.0	-16.3	3.0	34.0	-19.3	69.0	103.0	-88.3	4.0	107.0	-92.3
P-1	15.0	160.0	28.0	28.0	-13.0	5.0	33.0	-18.0	73.5	NE	NE	NE	106.5	-91.5
P-2	15.0	149.0	19.0	19.0	-4.0	11.5	30.5	-15.5	77.0	107.5	-92.5	6.5	114.0	-99.0
P-3	15.0	125.0	8.5	8.5	6.5	27.5	36.0	-21.0	57.0	93.0	-78.0	15.5	108.5	-93.5
MASSPORT PARCEL K (ORA APARTMENTS/HYATT PLACE HOTEL) (BY OTHERS)														
K-101	16.0	102.0	19.0	19.0	-3.0	18.0	37.0	-21.0	39.0	76.0	-60.0	15.5	91.5	-75.5
K-104	16.7	98.0	22.5	22.5	-5.8	15.0	37.5	-20.8	46.7	84.2	-67.5	1.5	85.7	-69.0
G-106	18.0	103.5	26.0	26.0	-8.0	15.0	41.0	-23.0	43.5	84.5	-66.5	12.8	97.3	-79.3

NOTES:
1. ELEVATIONS ARE IN FEET AND REFERENCE THE BOSTON CITY BASE DATUM (BCB).
2. DEPTH TO GLACIAL TILL AND BEDROCK WERE IRREGULAR. DEPTHS ARE TAKEN AS CLOSEST DISTANCE FROM GROUND SURFACE TO SOIL STRATUM.
3. TOP OF BEDROCK INCLUDES TOP OF GEOLOGIC BEDROCK AND DOES NOT DIFFERENTIATE BETWEEN WEATHERED, DECOMPOSED, OR SOUND BEDROCK.

ABBREVIATIONS:
EL: ELEVATION
NE: INDICATES NOT ENCOUNTERED
"-" : INDICATES NOT DETERMINED; BORING TERMINATED BEFORE PRESENCE OF DEPOSIT VERIFIED OR STRATUM NOT SAMPLED

FIGURES

SITE COORDINATES: 42°20'50"N, 71°02'19"W

MAP SOURCE: USGS

HALEY ALDRICH

SEAPORT CIRCLE
MASSPORT PARCEL H - 701 CONGRESS STREET
BOSTON, MASSACHUSETTS

PROJECT LOCUS

APPROXIMATE SCALE: 1 INCH = 2,000 FEET
JUNE 2022

FIGURE 1

0134215_001_LOCUS HALEYALDRICH\PSTODDARD

606 CONGRESS STREET

1 PARK LANE

CONGRESS STREET

FORMER TRILLING WAY

APPROXIMATE LOCATION OF FORMER BUILDING LOCATION NO.17

APPROXIMATE LOCATION OF FORMER BUILDING LOCATION NO.16

601 CONGRESS STREET

PORT LANE

SB2-TP1
10-IN PILE, OBSERVED TO BE CORRUGATED METAL CASING FILLED WITH CONCRETE

SB2-TP10
CONCRETE CAISSON FOUNDATION OBSERVED

PARCEL H
AREA=
96,776 SQ. FT.
=2.222 ACRES

SB2-TP2
CONCRETE FOOTING OBSERVED

SILVER LINE WAY

STARBOARD LANE

295-315 NORTHERN AVENUE

BWSC PUMP STATION

POSSIBLE LOCATION OF TEMPORARY SUPPORT OF EXCAVATION

POSSIBLE ZONE OF TIEBACKS (SEE SECTION B-B AND C-C) (NOTE: LOCATION NOT CONFIRMED)

INTERSTATE 90 MASSACHUSETTS BOAT SECTION
STATION 76+00 TO 81+36.44

INTERSTATE 90
MASSACHUSETTS TURNPIKE
(MASSACHUSETTS DEPARTMENT OF TRANSPORTATION)
(PUBLIC – VARIABLE WIDTH)
(STATE HIGHWAY LAYOUT #6968)

SB2-TP3
CONCRETE CAISSON OBSERVED

INTERSTATE 90
MASSACHUSETTS
TUNNEL
(BELOW GRADE)

PARCEL H1
AREA=
11,515 SQ. FT.

STA. 81+45 TRANSITION FROM STEEL SHEET PILE WALL (WEST) TO 36-IN. SLURRY WALL (EAST), BOTH USED AS TEMPORARY SUPPORT OF EXCAVATION WALLS (NOTE: LOCATION NOT CONFIRMED)

APPROXIMATE LOCATION OF FORMER BUILDING LOCATION NO.23

AIR BRIDGE PARCEL
AREA=
1,952 SQ. FT.

SHLD 6968 MAIN BASELINE

MASSPORT HARBOR

SB2-41, SB2-56, SB2-52, SB2-62, SB2-60, SB2-55, SB2-61, SB2-59, SB2-68, SB2-69, SB2-67, G-106, K-101, K-104, B-3, P-3, A, B, C

LEGEND

- SB2-41 — DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY GZA DRILLING CO., INC., FROM DECEMBER 1989 TO MARCH 1990 FOR THE CENTRAL ARTERY/TUNNEL PROJECT AND MONITORED BY HALEY & ALDRICH, INC. PERSONNEL.
- B-1 — DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY GUILD DRILLING CO., INC., FROM 26 DECEMBER 2000 TO 25 MAY 2001, AND MONITORED BY HALEY & ALDRICH, INC. PERSONNEL.
- K-104 — DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY NORTHERN DRILL SERVICE INC., FROM 6 DECEMBER 2016 TO 19 DECEMBER 2016, AND MONITORED BY MCPHAIL ASSOCIATES.
- G-106 — DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY CARR-DEE CORP., NO DRILLING DATE PROVIDED.
- DESIGNATION AND APPROXIMATE LOCATION OF TEST PIT EXCAVATED BY LAL CONSTRUCTION CO., INC. BETWEEN 16 AUGUST 1990 AND 9 NOVEMBER 1990
- PROPERTY LIMIT
- A — DESIGNATION AND APPROXIMATE LOCATION OF SUBSURFACE PROFILE

NOTES

1. BASE PLAN REFERENCES DRAWING TITLED "17948-ALTA_HALEY_ALDRICH.DWG", DATED 08 OCTOBER 2021, BY FELDMAN LAND SURVEYORS, RECEIVED ON 07 JANUARY 2022.
2. LOCATION OF EXPLORATIONS SHOULD BE CONSIDERED APPROXIMATE.
3. FORMER BUILDING LOCATIONS NO. 16 AND 17 AND DEMOLITION NOTES TAKEN FROM DRAWING C-3, "PARCELS H&K PARKING LOTS, SOUTH BOSTON, MASSACHUSETTS", PREPARED FOR MASSACHUSETTS PORT AUTHORITY, MPA PROJECT NO. D281-C1, DATED DECEMBER 2003.
4. FORMER BUILDING LOCATIONS NO. 23 AND FOUNDATION DATA TAKEN FROM FINAL REPORT ON TEST PIT PROGRAM, SOUTH BOSTON AREA, CENTRAL ARTERY (I-93)/ TUNNEL (I-90) PROJECT, BOSTON, MASSACHUSETTS, BY HALEY & ALDRICH, INC. FOR MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS, DATED 25 FEBRUARY 1911.

N

0 30 60 90 120
SCALE IN FEET

HALEY ALDRICH

SEAPORT CIRCLE
MASSPORT PARCEL H - 701 CONGRESS STREET
BOSTON, MASSACHUSETTS

EXISTING CONDITIONS AND AVAILABLE SUBSURFACE EXPLORATIONS

SCALE: AS SHOWN
JUNE 2022

FIGURE 2

DTE
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\134215\CAD\134215_000X_EXPLORATION-PLAN.DWG
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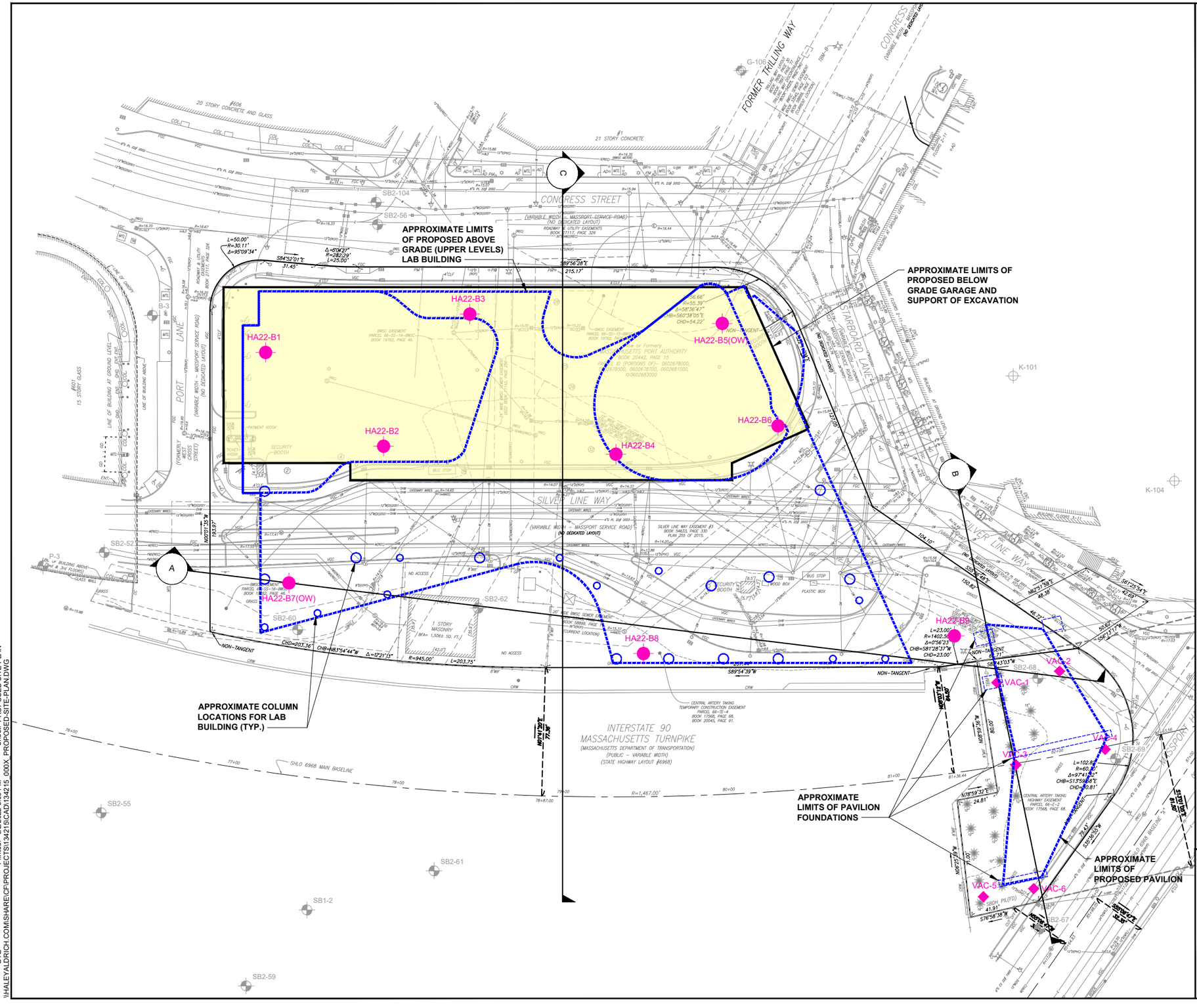
Sheet: SITE-SUBSURFACE-ELP



LEGEND

HA22-B8	DESIGNATION AND APPROXIMATE LOCATION OF PROPOSED TEST BORING
VAC-1	DESIGNATION AND APPROXIMATE LOCATION OF PROPOSED VACUUM EXCAVATION EXPLORATORY PROBE TO LOCATED CA/T STRUCTURE
(OW)	INDICATES PROPOSED OBSERVATION WELL
SB2-41	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY GZA DRILLING CO., INC., FROM DECEMBER 1989 TO MARCH 1990 FOR THE CENTRAL ARTERY/TUNNEL PROJECT AND MONITORED BY HALEY & ALDRICH, INC. PERSONNEL.
B-1	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY GUILD DRILLING CO., INC., FROM 26 DECEMBER 2000 TO 25 MAY 2001, AND MONITORED BY HALEY & ALDRICH, INC. PERSONNEL.
K-104	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY NORTHERN DRILL SERVICE INC., FROM 6 DECEMBER 2016 TO 19 DECEMBER 2016, AND MONITORED BY MCPHAIL ASSOCIATES.
G-106	DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY CARR-DEE CORP., NO DRILLING DATE PROVIDED.
	PROPERTY LIMIT
A	DESIGNATION AND APPROXIMATE LOCATION OF SUBSURFACE PROFILE

NOTES

1. ELEVATIONS ARE IN FEET AND REFERENCE THE BOSTON CITY BASE (BCB) VERTICAL DATUM.
2. BASE PLAN REFERENCES DRAWING TITLED "17948-ALTA_HALEY_ALDRICH.DWG", DATED 08 OCTOBER 2021, BY FELDMAN LAND SURVEYORS, RECEIVED ON 07 JANUARY 2022.
3. PROPOSED LIMITS OF LEVEL P1 LAB REFERENCES STRUCTURAL REVIT FILE TITLED "21008_PARCEL_H_STRUCT_LAB_2020.RVT", VERSION 7, DATED 22 APRIL 2022.
4. PROPOSED LIMITS OF LEVEL 1 LAB REFERENCES ARCHITECTURAL REVIT FILE TITLED "21008_PARCEL_H_V2020.RVT", VERSION 57, DATED 22 APRIL 2022.
5. PROPOSED LIMITS OF OVERALL LAB STRUCTURE REFERENCES ARCHITECTURAL REVIT FILE TITLED "21008_PARCEL_H_V2020.RVT", VERSION 57, DATED 22 APRIL 2022.
6. PROPOSED LIMITS OF LEVEL 1 PAVILION REFERENCES STRUCTURAL REVIT FILE TITLED "21008_PARCEL_H_STRUCT_PAVILION_2022.RVT", VERSION 9, DATED 08 APRIL 2022.

N

0 30 60 90 120

SCALE IN FEET

HALEY ALDRICH

SEAPORT CIRCLE
MASSPORT PARCEL H - 701 CONGRESS STREET
BOSTON, MASSACHUSETTS

PROPOSED DEVELOPMENT AND PROPOSED SUBSURFACE CONDITIONS

SCALE: AS SHOWN
JUNE 2022

FIGURE 3

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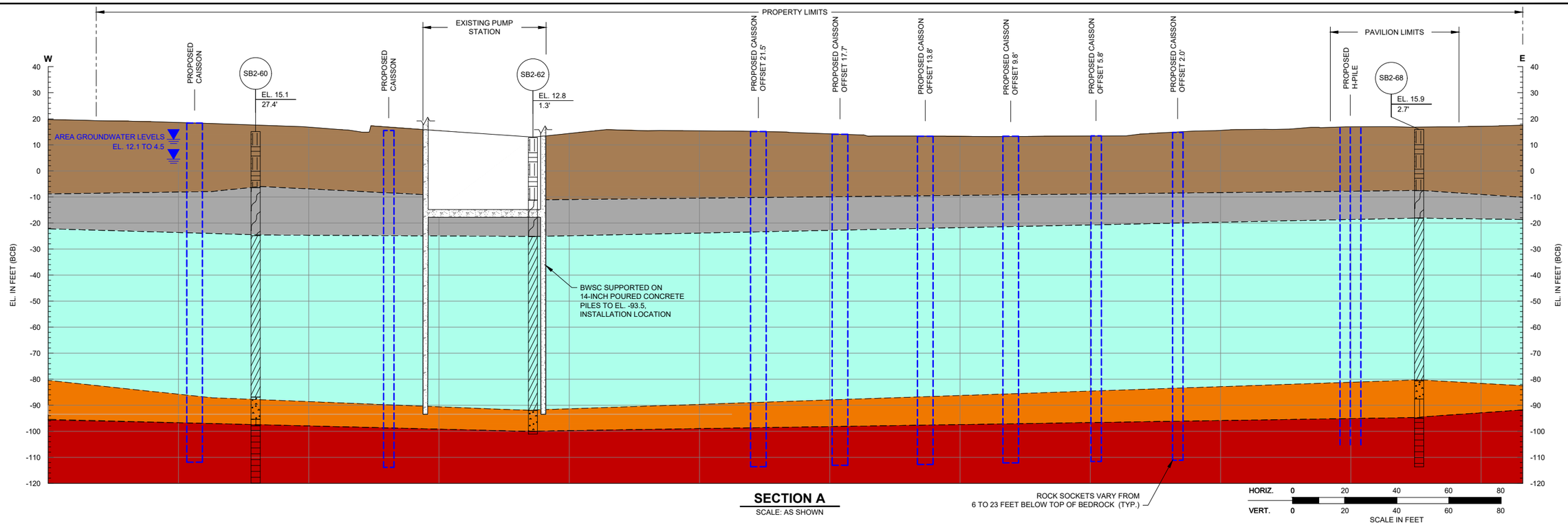
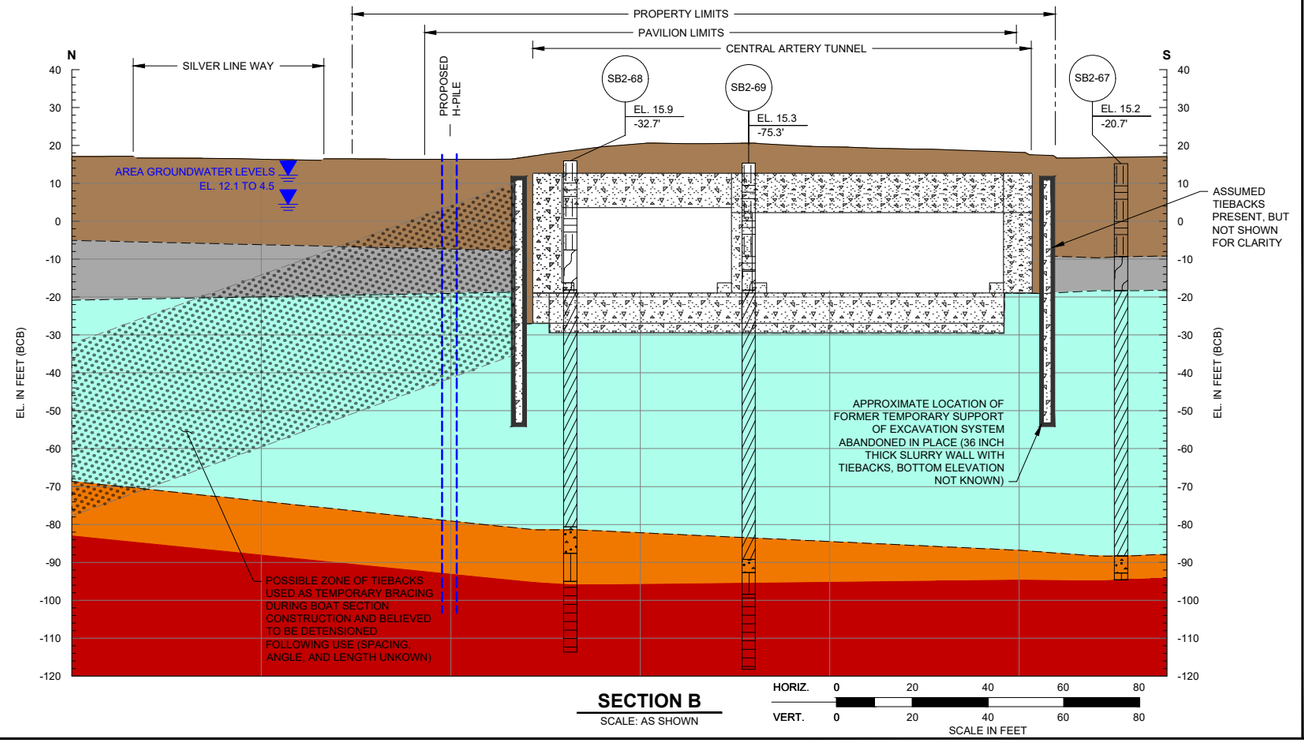
Sheet: PROPOSED SITE PLAN
DTE
\\HALEYALDRICH.COM\SHARE\CP\PROJECTS\134215\CAD\134215_000X_PROPOSED-SITE-PLAN.DWG

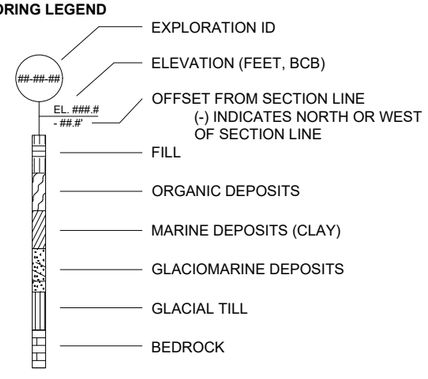


SECTION A
SCALE: AS SHOWN



SECTION B
SCALE: AS SHOWN

BORING LEGEND



GEOLOGIC LEGEND

- FILL
- ORGANICS
- MARINE DEPOSITS (CLAY)
- GLACIAL DEPOSITS (INCLUDING GLACIOMARINE AND GLACIAL TILL DEPOSITS)
- BEDROCK

LEGEND

- EXISTING GROUND SURFACE
- INTERPRETED GEOLOGIC STRATA BREAK
- DEPICTION OF PROPOSED FOUNDATION OR BELOW GRADE ELEMENT

NOTES

1. REFER TO FIGURE 2 FOR PLAN LOCATION OF BORINGS, SUBSURFACE PROFILE LOCATIONS, AND GENERAL EXISTING CONDITIONS.
2. OFFSET DISTANCES INDICATED ARE MEASURED FROM THE PLAN LOCATION OF THE PROFILE LINE, PERPENDICULAR TO THE LINE.
3. SUBSURFACE PROFILES DEPICT THE GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ON THE PROFILE ARE BASED UPON INTERPOLATION BETWEEN ADJACENT BORINGS.
4. ELEVATIONS ARE IN FEET AND REFERENCE THE BOSTON CITY BASE (BCB) VERTICAL DATUM.
5. EXISTING I-90 TURNPIKE STRUCTURES, PROPOSED FOUNDATIONS, AND PROPOSED BELOW-GRADE LIMITS REFERENCE STRUCTURAL REVIT FILE TITLED "21008_PARCEL_H_STRUCT_LAB_2020.RVT", DATED 22 APRIL 2022 AND MODIFIED BASED ON OUR UNDERSTANDING AT THE TIME OF THIS REPORT.
6. EXISTING SITE AND ADJACENT FEATURES ARE PROVIDED FOR GENERAL UNDERSTANDING OF SITE CONDITIONS AND ACTUAL CONDITIONS COULD VARY SIGNIFICANTLY FROM SECTION ILLUSTRATION. PROPOSED FOUNDATIONS AND BELOW-GRADE LIMITS ARE TO BE USED FOR PLANNING ONLY AND ARE NOT INTENDED TO BE CONTRACT DOCUMENTS.

HALEY ALDRICH

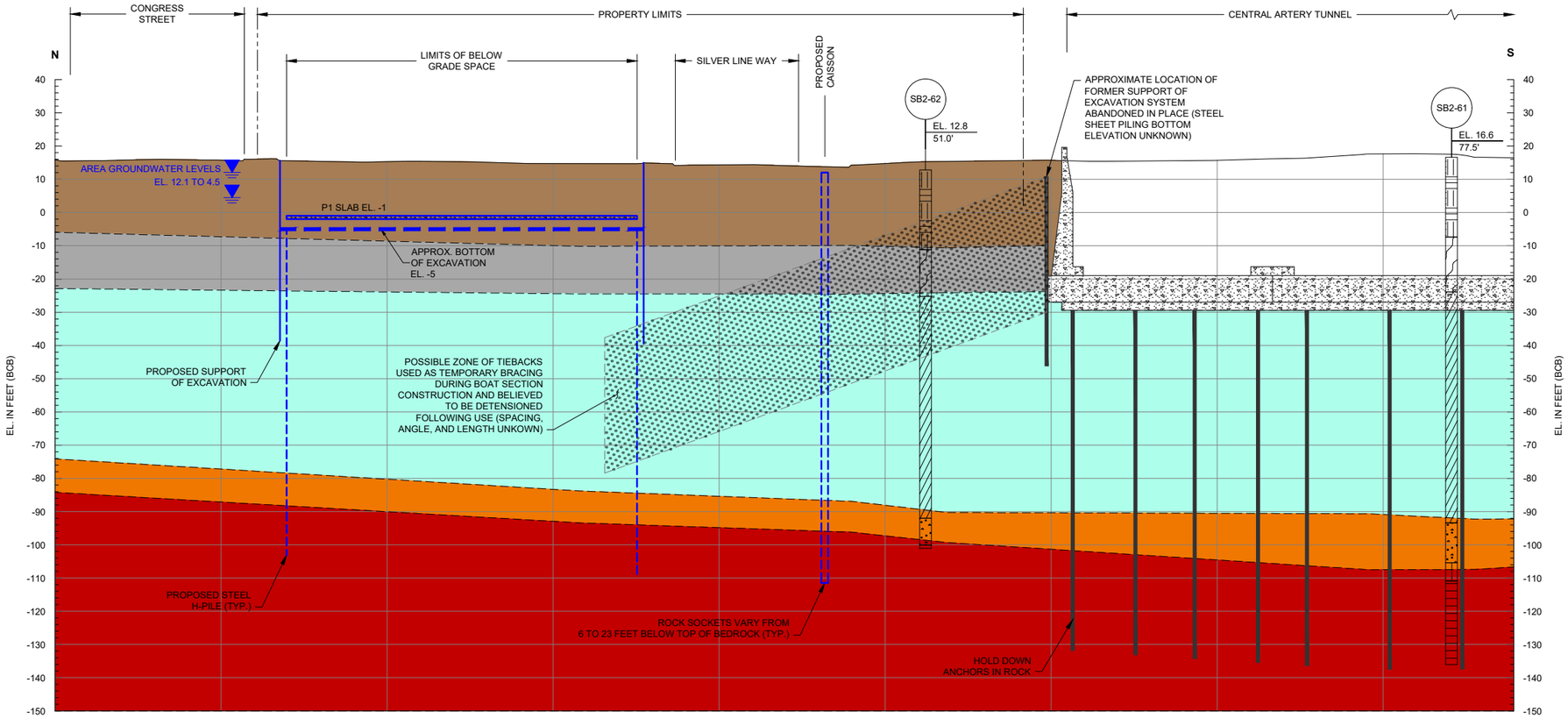
SEAPORT CIRCLE
MASSPORT PARCEL H - 701 CONGRESS STREET
BOSTON, MASSACHUSETTS

SECTIONS A-A AND B-B

SCALE: AS SHOWN
JUNE 2022

FIGURE 4

Saved by: GANDERSON Printed: 6/3/2022 10:38 AM Sheet: A_B
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\134215\CAD\134215_000X_CROSS-SECTIONS.DWG



SECTION C
SCALE: AS SHOWN

NOTES

1. REFER TO FIGURE 4 FOR NOTES AND LEGEND.

HORIZ. 0 20 40 60 80
VERT. 0 20 40 60 80
SCALE IN FEET

HALEY ALDRICH

SEAPORT CIRCLE
MASSPORT PARCEL H - 701 CONGRESS STREET
BOSTON, MASSACHUSETTS

SECTION C-C

SCALE: AS SHOWN
JUNE 2022

FIGURE 5

Printed: 6/3/2022 10:38 AM
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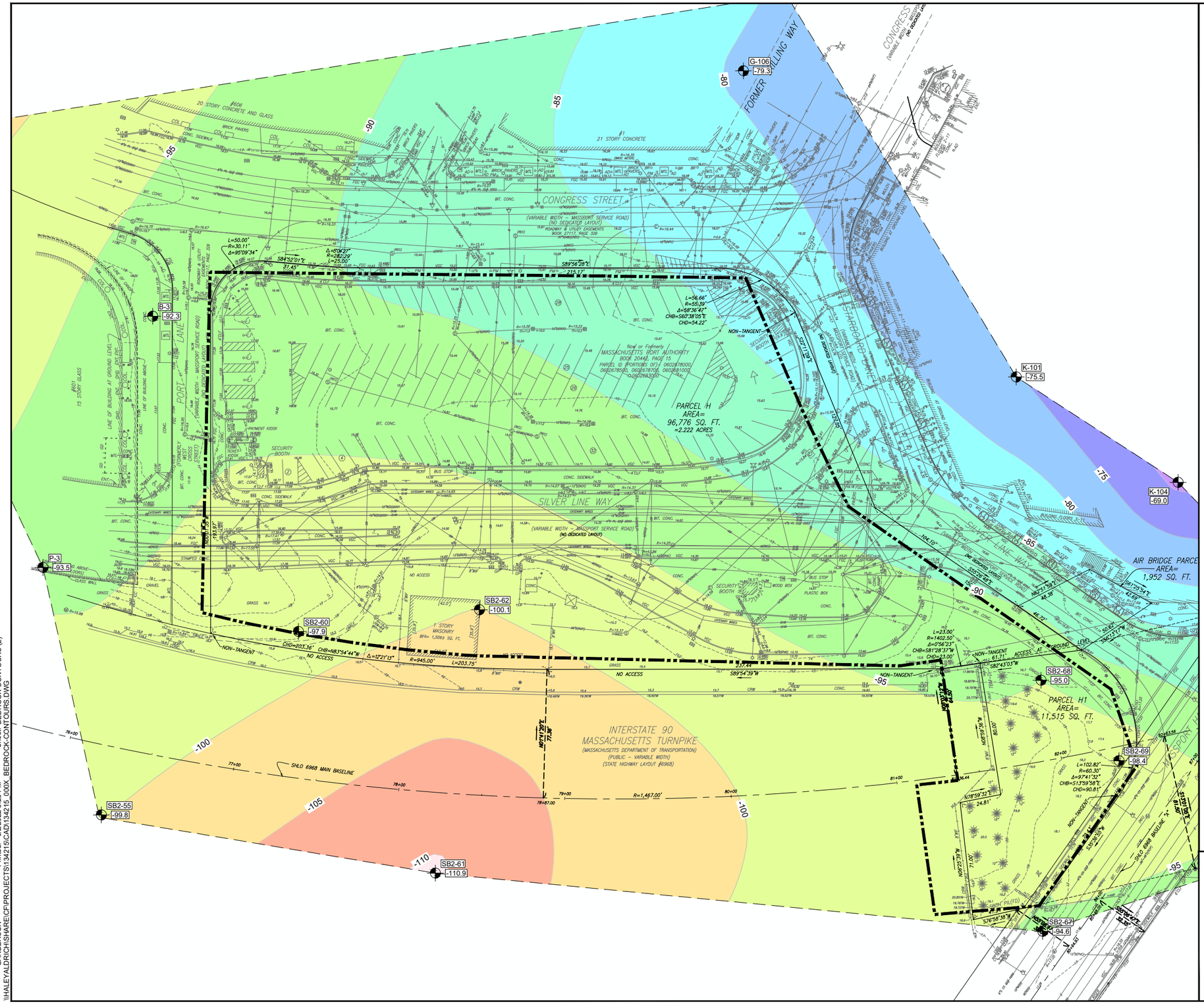
GANDERSON
\\HALEYALDRICH.COM\SHARE\CP\PROJECTS\134215\CAD\134215_000X_CROSS-SECTIONS.DWG



LEGEND

▬ · ▬	PROPERTY LIMIT
-105	CONTOUR (5 FOOT-INTERVALS)
– – –	LIMIT OF INTERPRETED BEDROCK SURFACE
-77.1	APPROXIMATE ELEVATION OF TOP OF BEDROCK

ELEVATIONS TABLE (FT, BCB)		
MIN. ELEV. (FT)	MAX. ELEV. (FT)	COLOR
-115	-110	
-110	-105	
-105	-100	
-100	-95	
-95	-90	
-90	-85	
-85	-80	
-80	-75	
-75	-70	
-70	-65	

NOTES

1. REFER TO FIGURE 2 FOR EXISTING CONDITIONS REFERENCES.
2. TOP OF BEDROCK INCLUDES TOP OF GEOLOGIC BEDROCK AND DOES NOT DIFFERENTIATE BETWEEN WEATHERED, DECOMPOSED, OR SOUND BEDROCK.
3. ELEVATIONS ARE IN FEET AND REFERENCE THE BOSTON CITY BASE (BCB) VERTICAL DATUM.
4. CONTOURS SHOWN WERE GENERATED BY INTERPOLATING BETWEEN EXPLORATION LOCATIONS, ACTUAL ELEVATIONS MAY VARY.
5. LOCATIONS OF EXPLORATIONS SHOULD BE CONSIDERED APPROXIMATE.

N

0 30 60 90 120

SCALE IN FEET

HALEY ALDRICH

SEAPORT CIRCLE
MASSPORT PARCEL H - 701 CONGRESS STREET
BOSTON, MASSACHUSETTS

CONTOUR PLAN OF TOP OF BEDROCK ELEVATION

SCALE: AS SHOWN
JUNE 2022

FIGURE 6

GANDERSON
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Sheet: BEDROCK-CONTOURS (2)
\\HALEYALDRICH\SHARE\CF\PROJECTS\134215\CAD\134215_000X_BEDROCK-CONTOURS.DWG

APPENDIX A
Sanborn Maps

Seaport Circle - Massport Parcel H

Congress Street

Boston, MA 02210

Inquiry Number: 6434924.3

April 05, 2021

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

04/05/21

Site Name:

Seaport Circle - Massport Parc
Congress Street
Boston, MA 02210
EDR Inquiry # 6434924.3

Client Name:

Haley & Aldrich, Inc.
465 Medford Street
Boston, MA 02129
Contact: Pippa Stoddard

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Haley & Aldrich, Inc. were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

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Certified Sanborn Results:

Certification # DBD4-44B5-A033

PO # NA

Project 134215

Maps Provided:

2002	1964
1998	1950
1995	1923
1994	
1993	
1992	
1990	
1988	

Sanborn® Library search results

Certification #: DBD4-44B5-A033

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

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Sanborn Sheet Key

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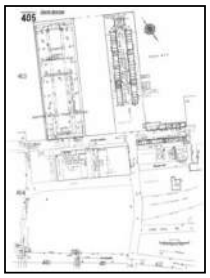
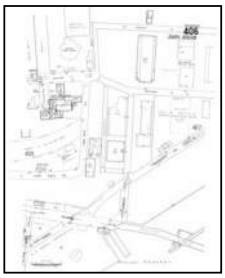
2002 Source Sheets

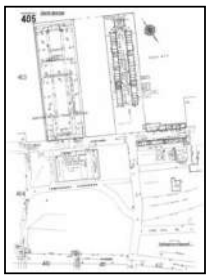


Volume 4, Sheet 405
2002

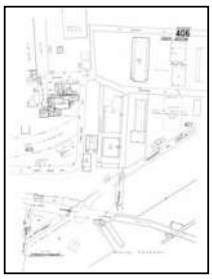


Volume 4, Sheet 406
2002

1998 Source Sheets

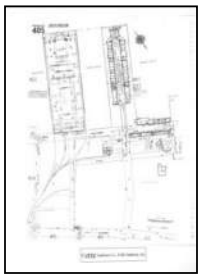


Volume 4, Sheet 405
1998



Volume 4, Sheet 406
1998

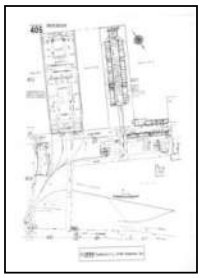
1995 Source Sheets



Volume 4, Sheet 405
1995

Volume 4, Sheet 406
1995

1994 Source Sheets



Volume 4, Sheet 405
1994

Volume 4, Sheet 406
1994

Sanborn Sheet Key

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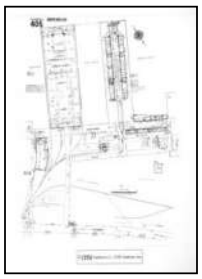
1993 Source Sheets

Volume 4, Sheet 405
1993

Volume 4, Sheet 406
1993

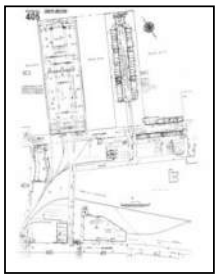
1992 Source Sheets



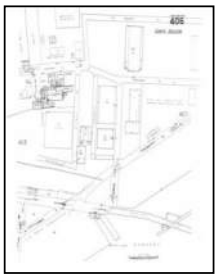
Volume 4, Sheet 405
1992

Volume 4, Sheet 406
1992

1990 Source Sheets

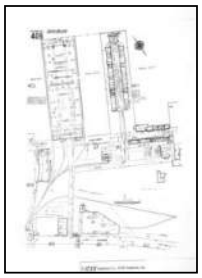


Volume 4, Sheet 405
1990



Volume 4, Sheet 406
1990

1988 Source Sheets



Volume 4, Sheet 405
1988

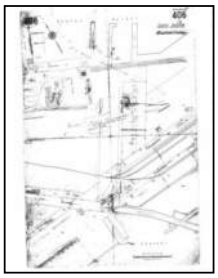
Volume 4, Sheet 406
1988

Sanborn Sheet Key

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

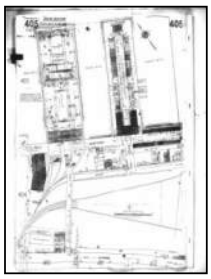
1964 Source Sheets

Volume 4, Sheet 405
1964

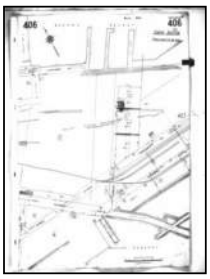


Volume 4, Sheet 406
1964

1950 Source Sheets

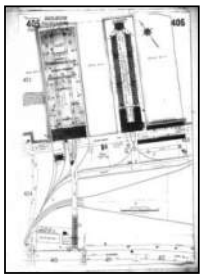


Volume 4, Sheet 405
1950

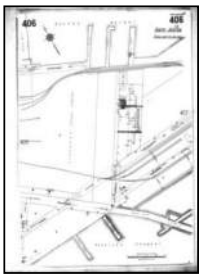


Volume 4, Sheet 406
1950

1923 Source Sheets



Volume 4, Sheet 405
1923



Volume 4, Sheet 406
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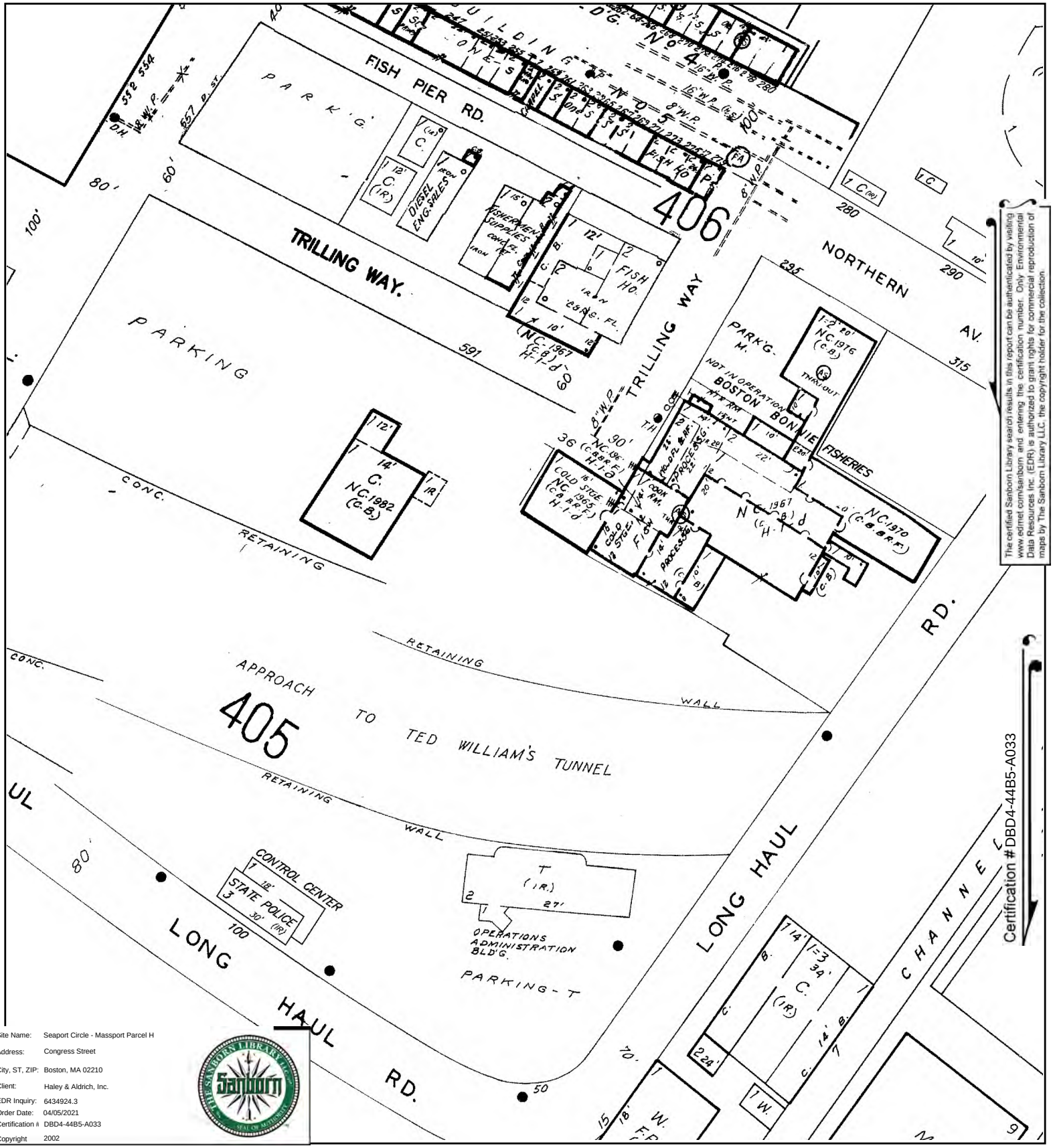

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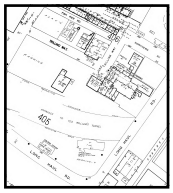

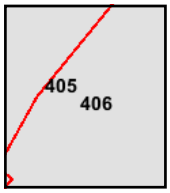

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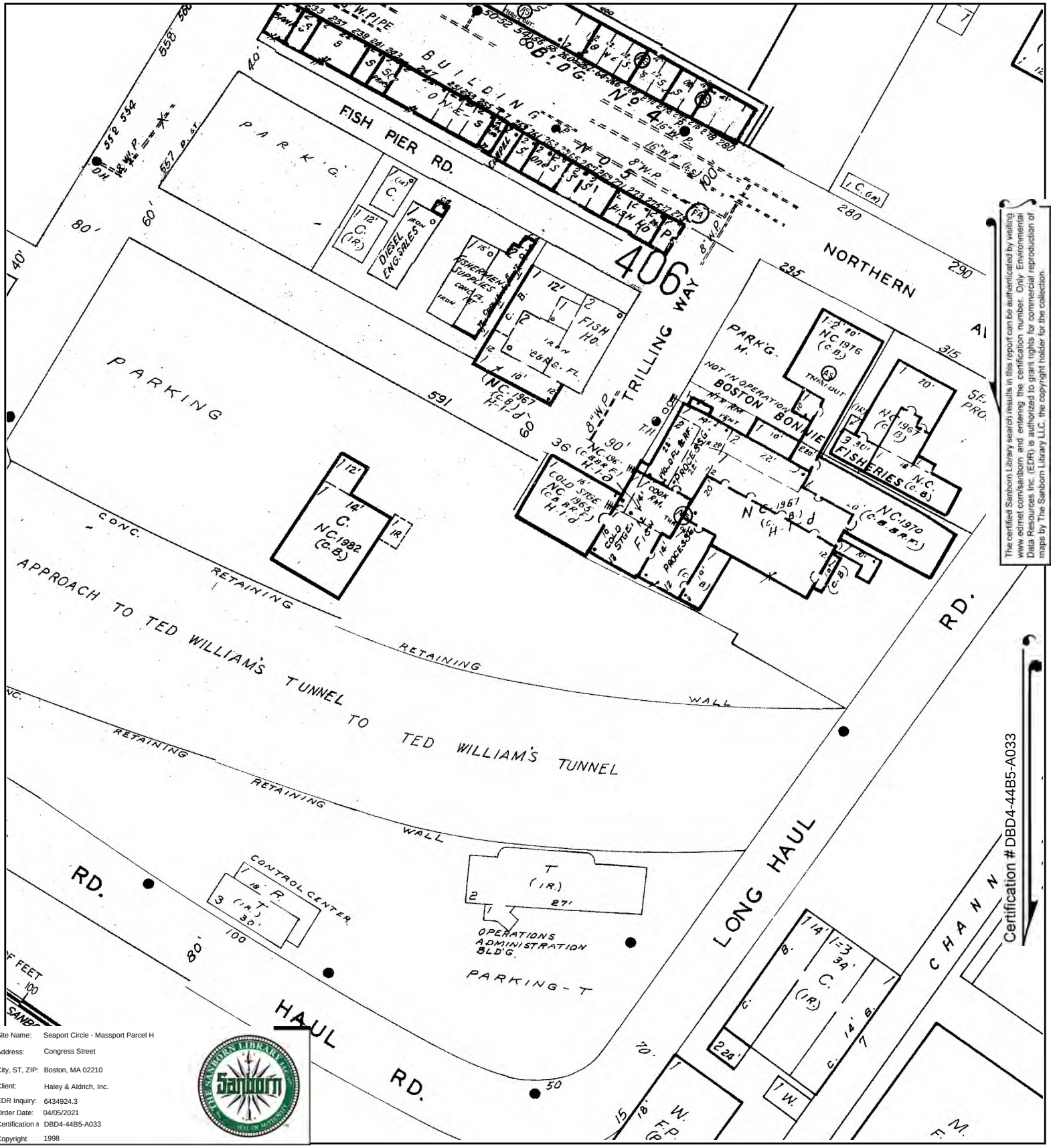

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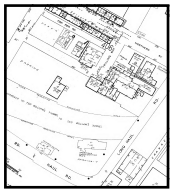

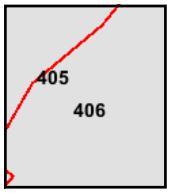

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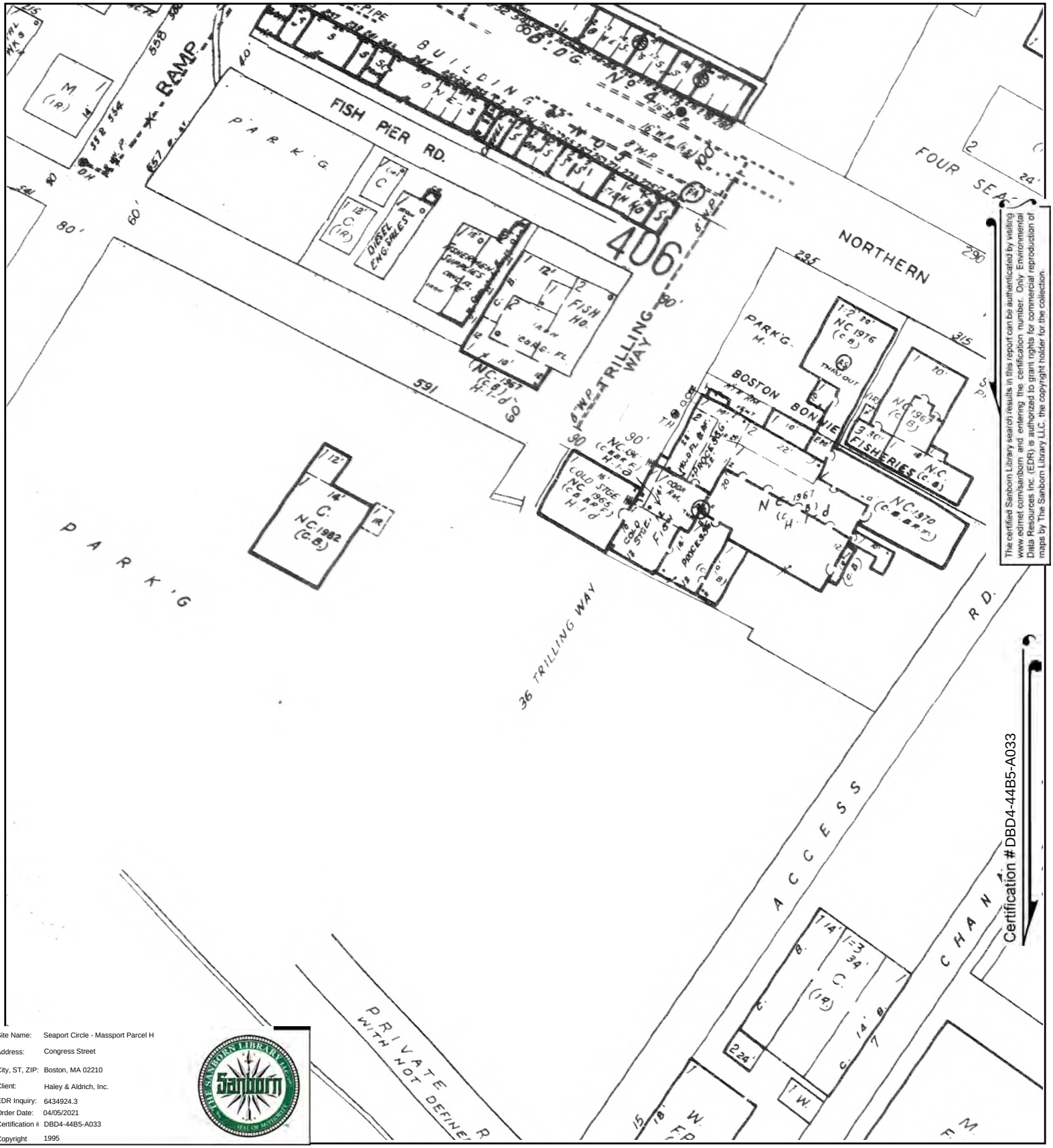

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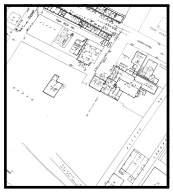

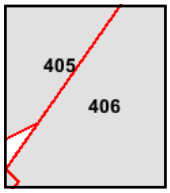

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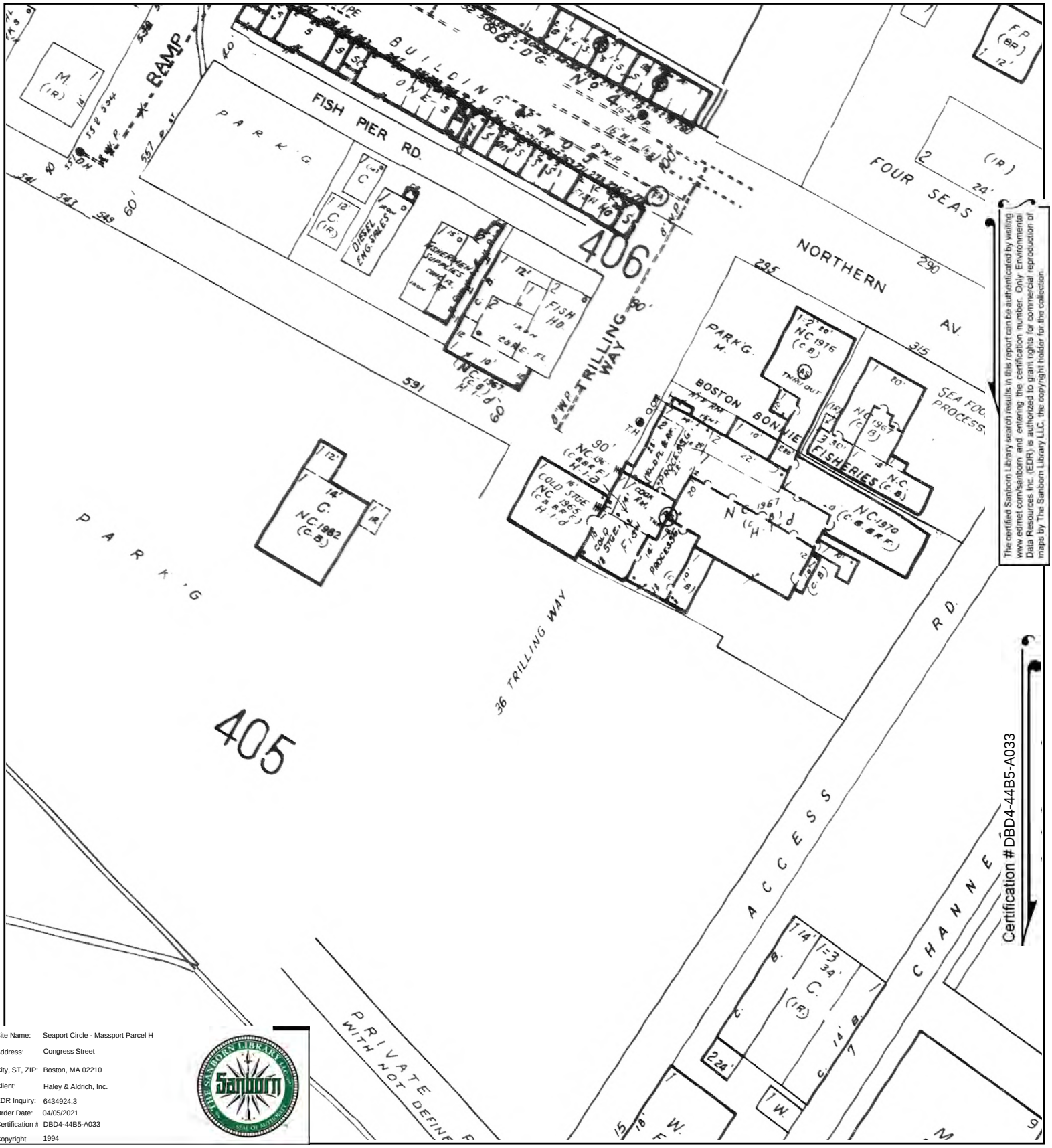

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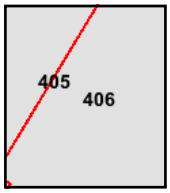

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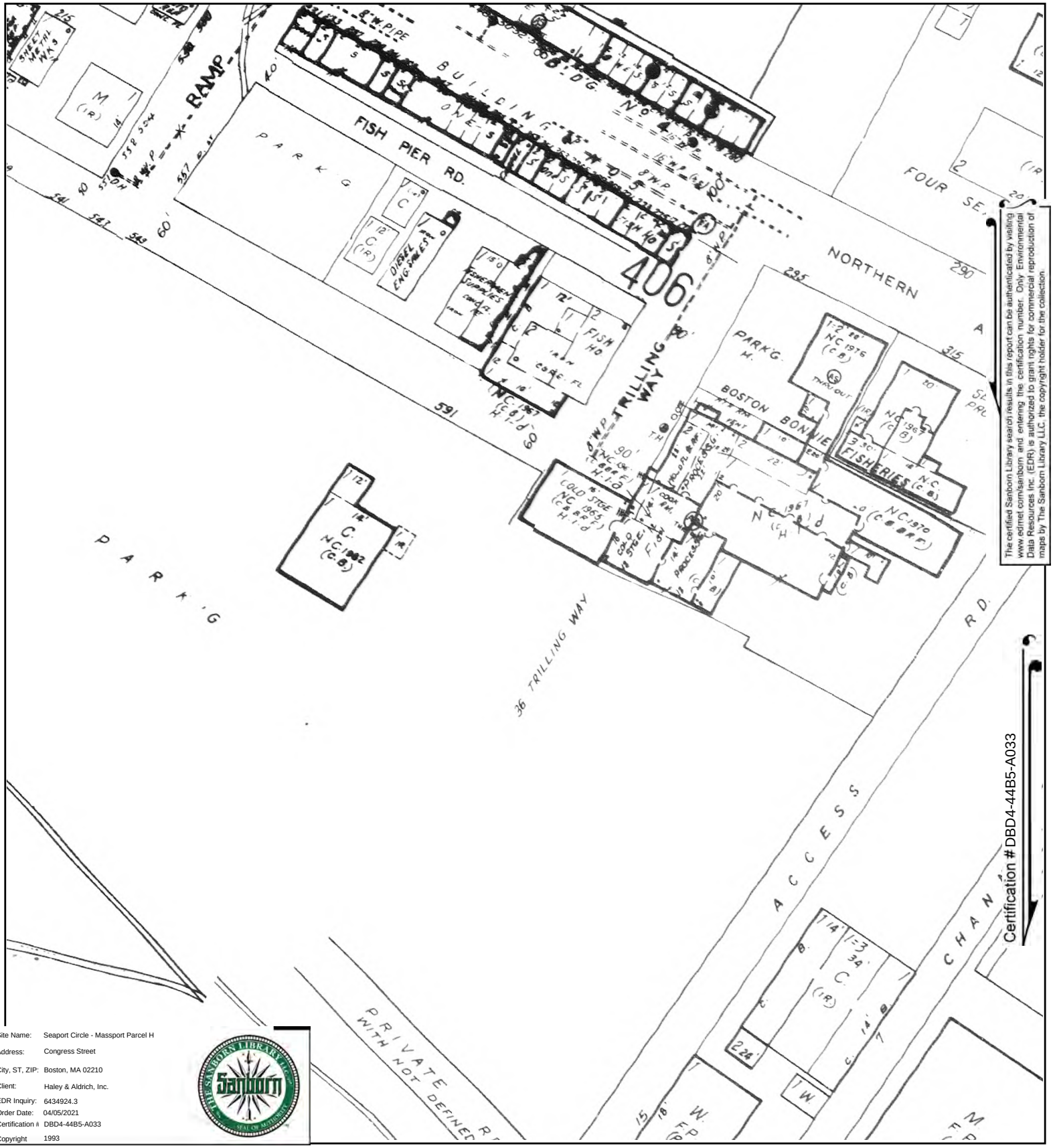

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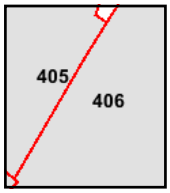

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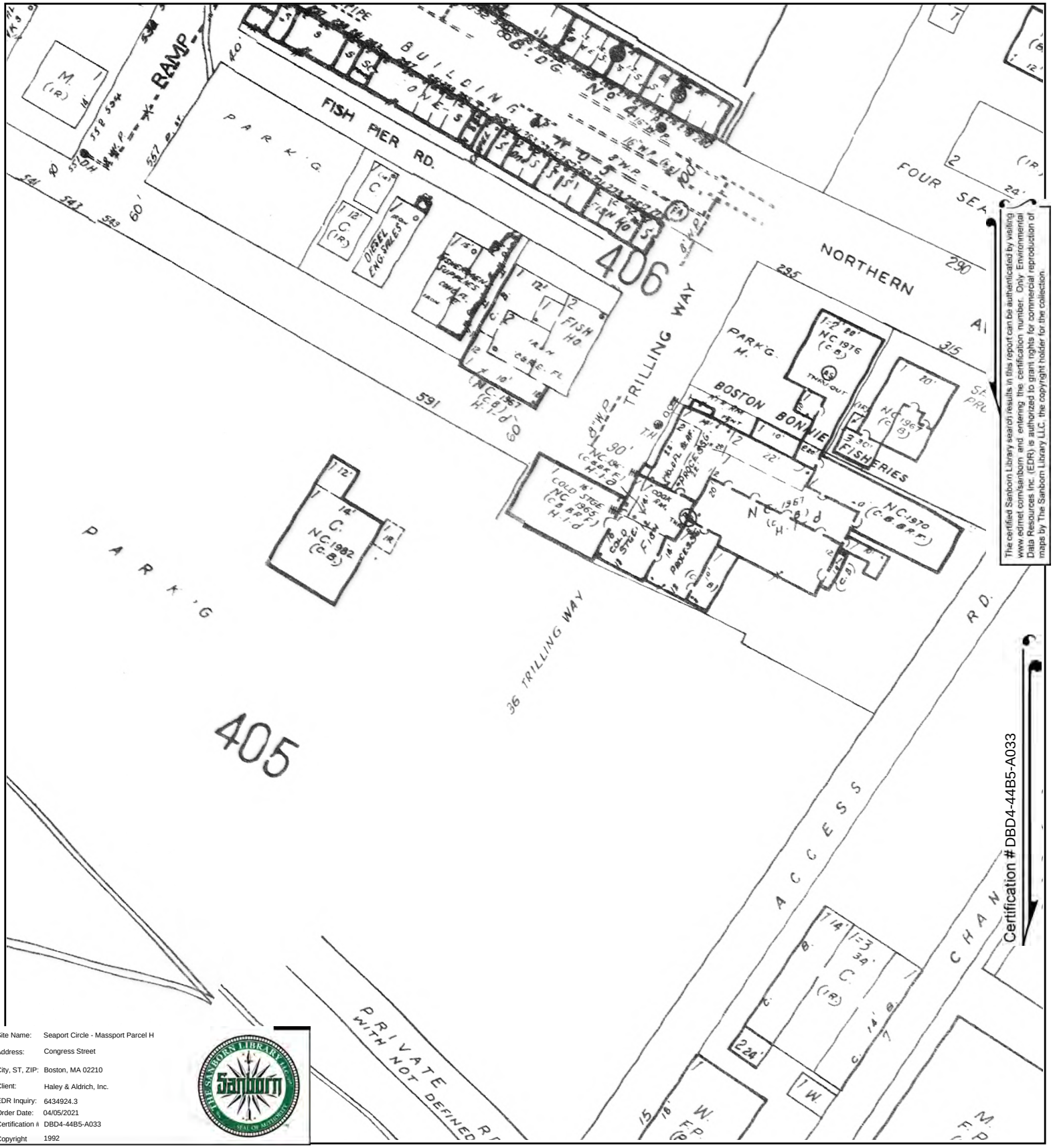

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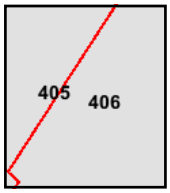

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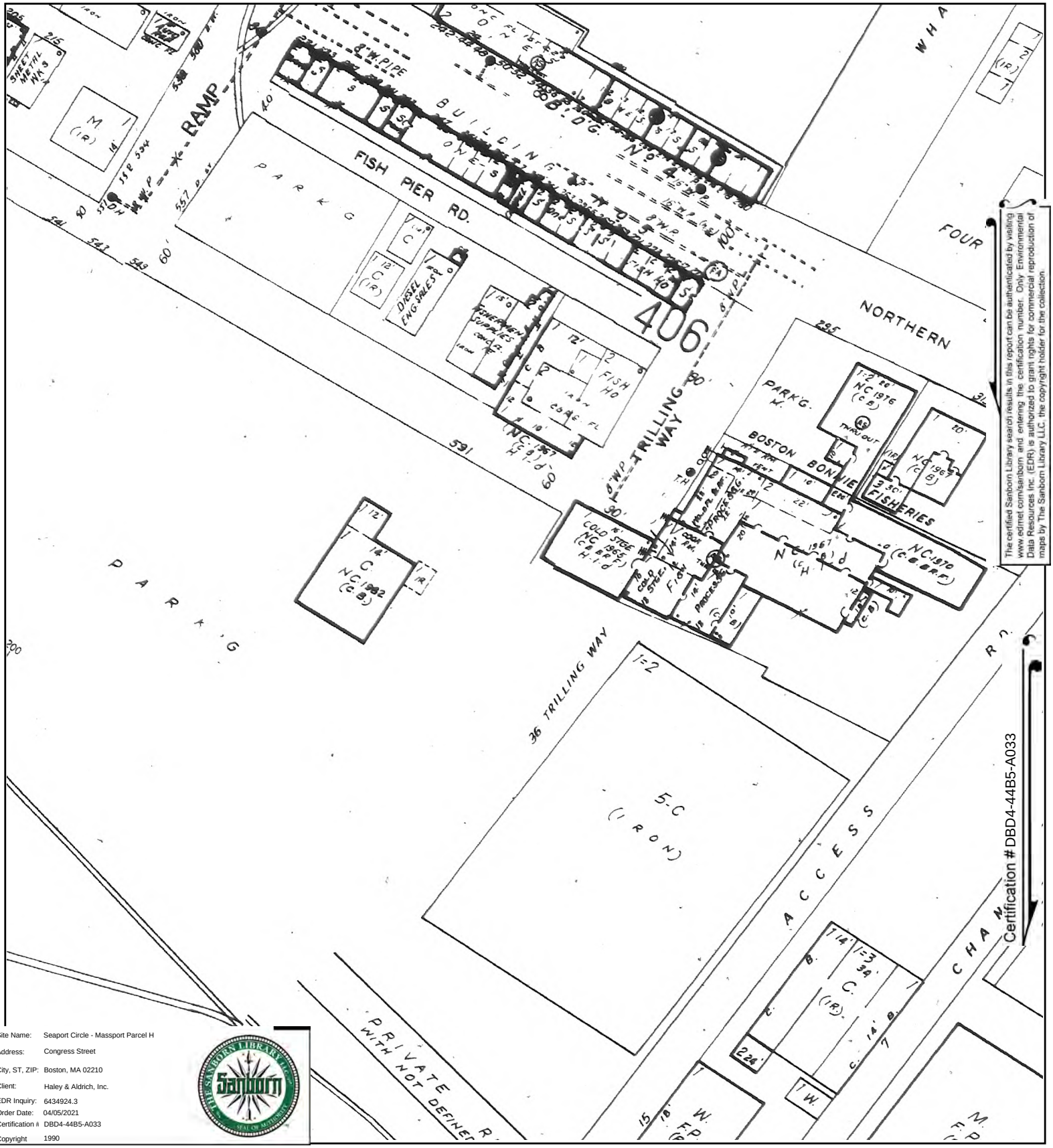

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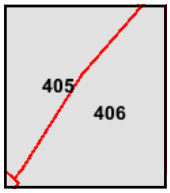

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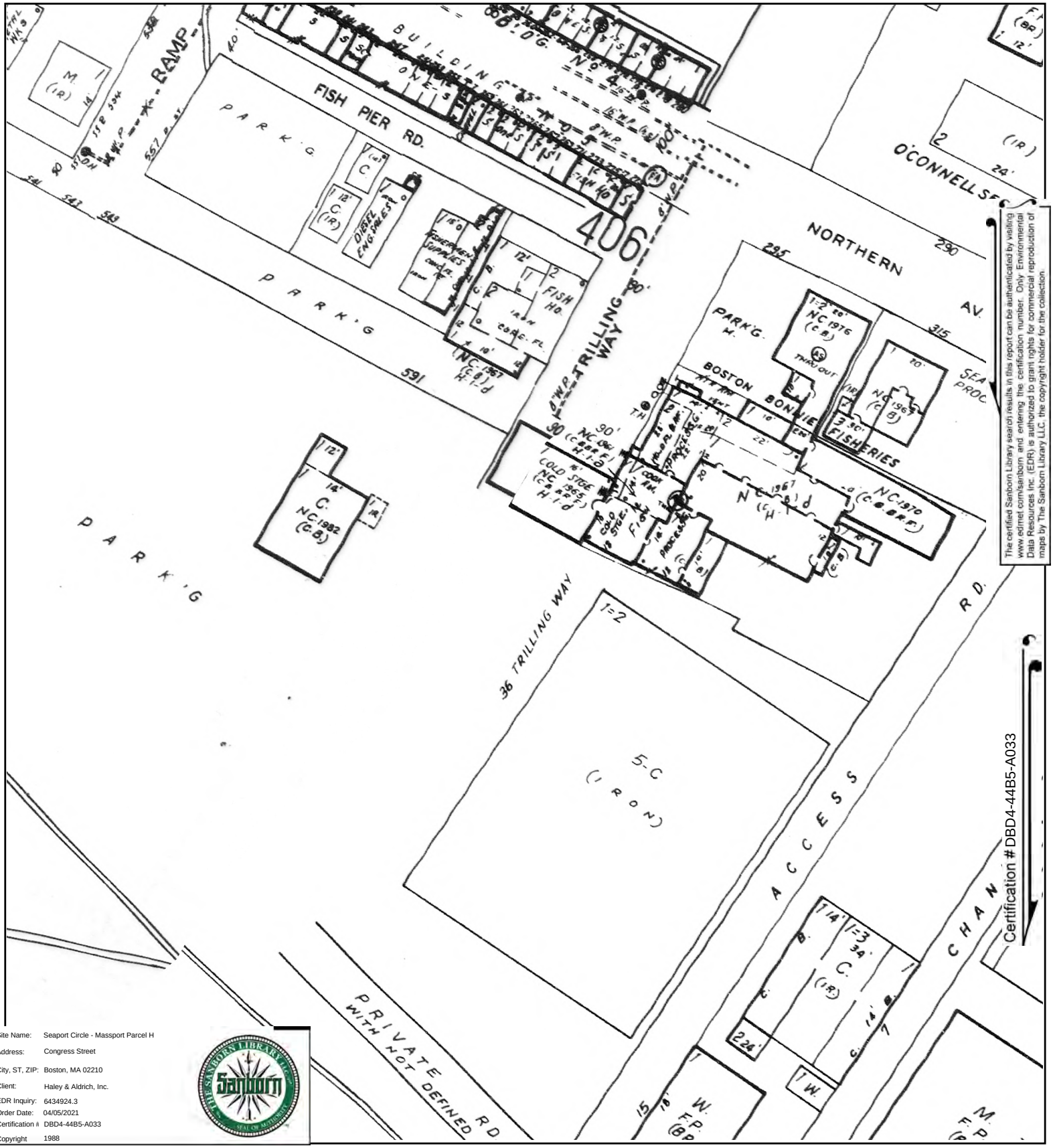

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Copyright	1988

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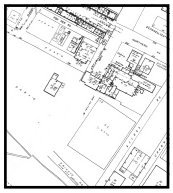

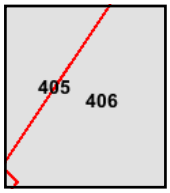

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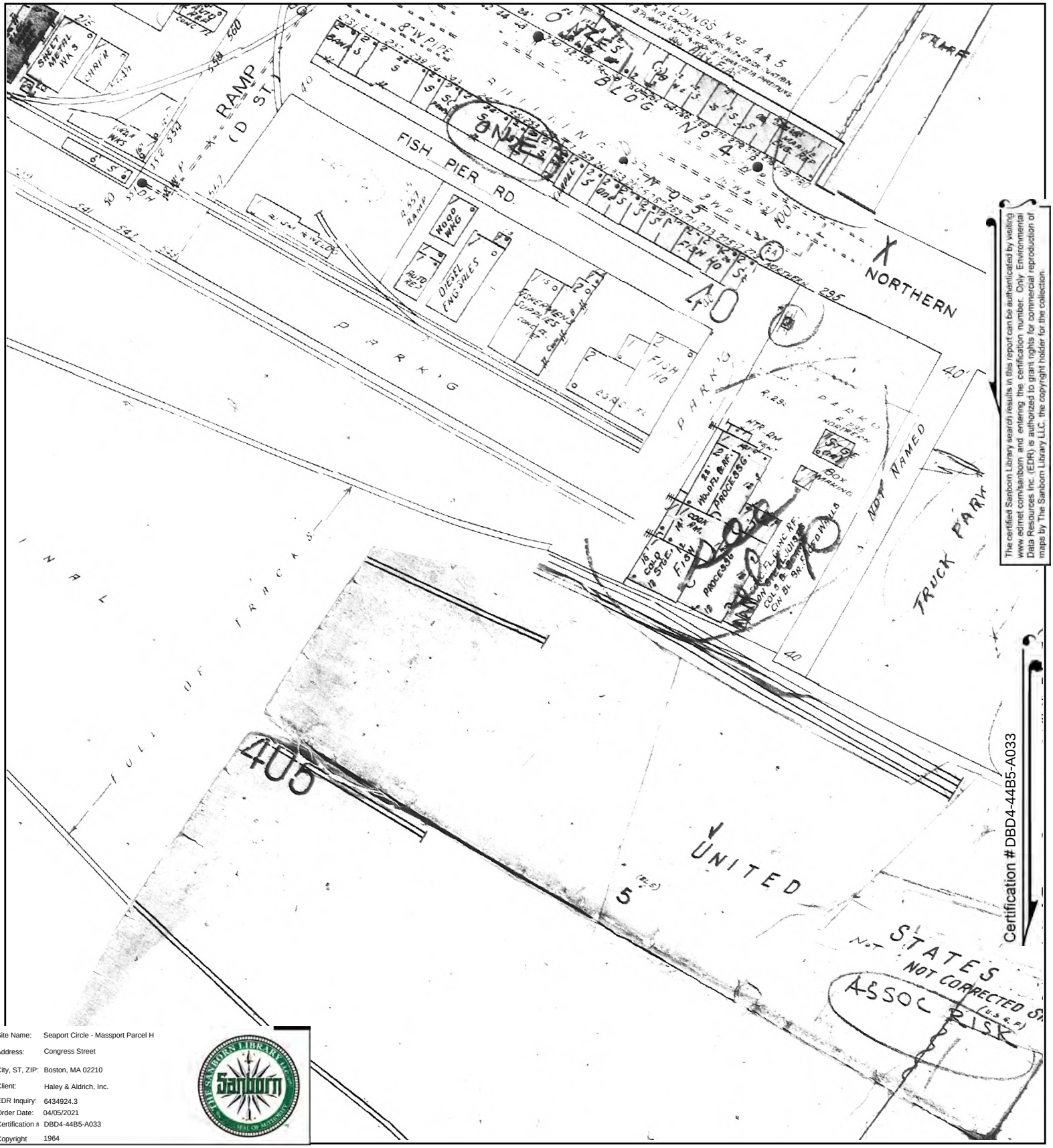

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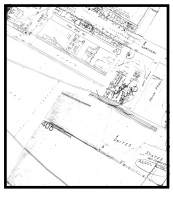

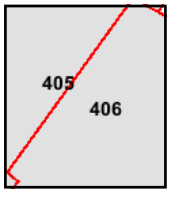

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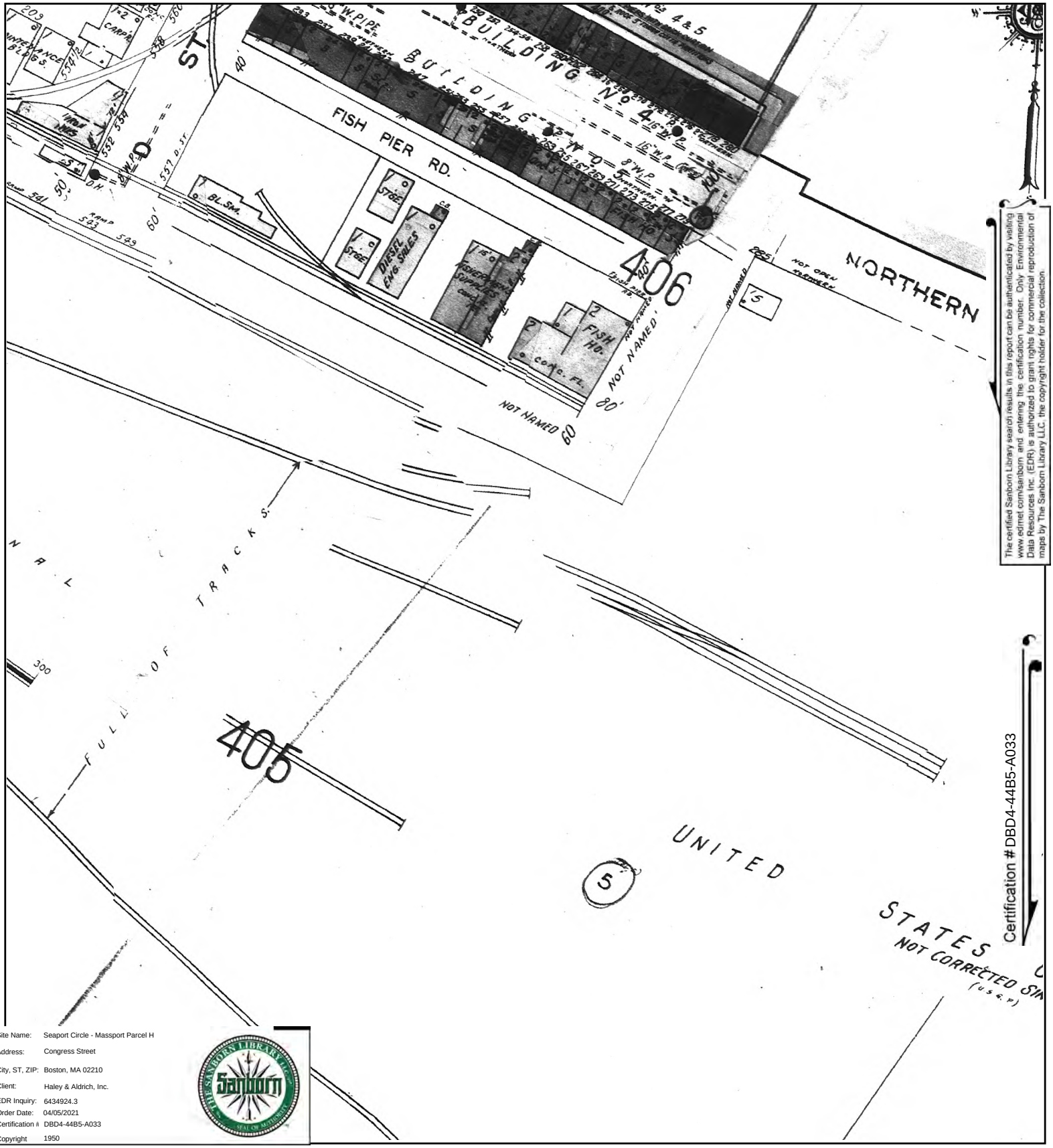

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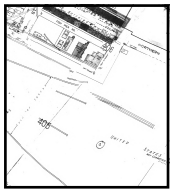

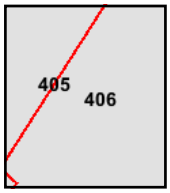

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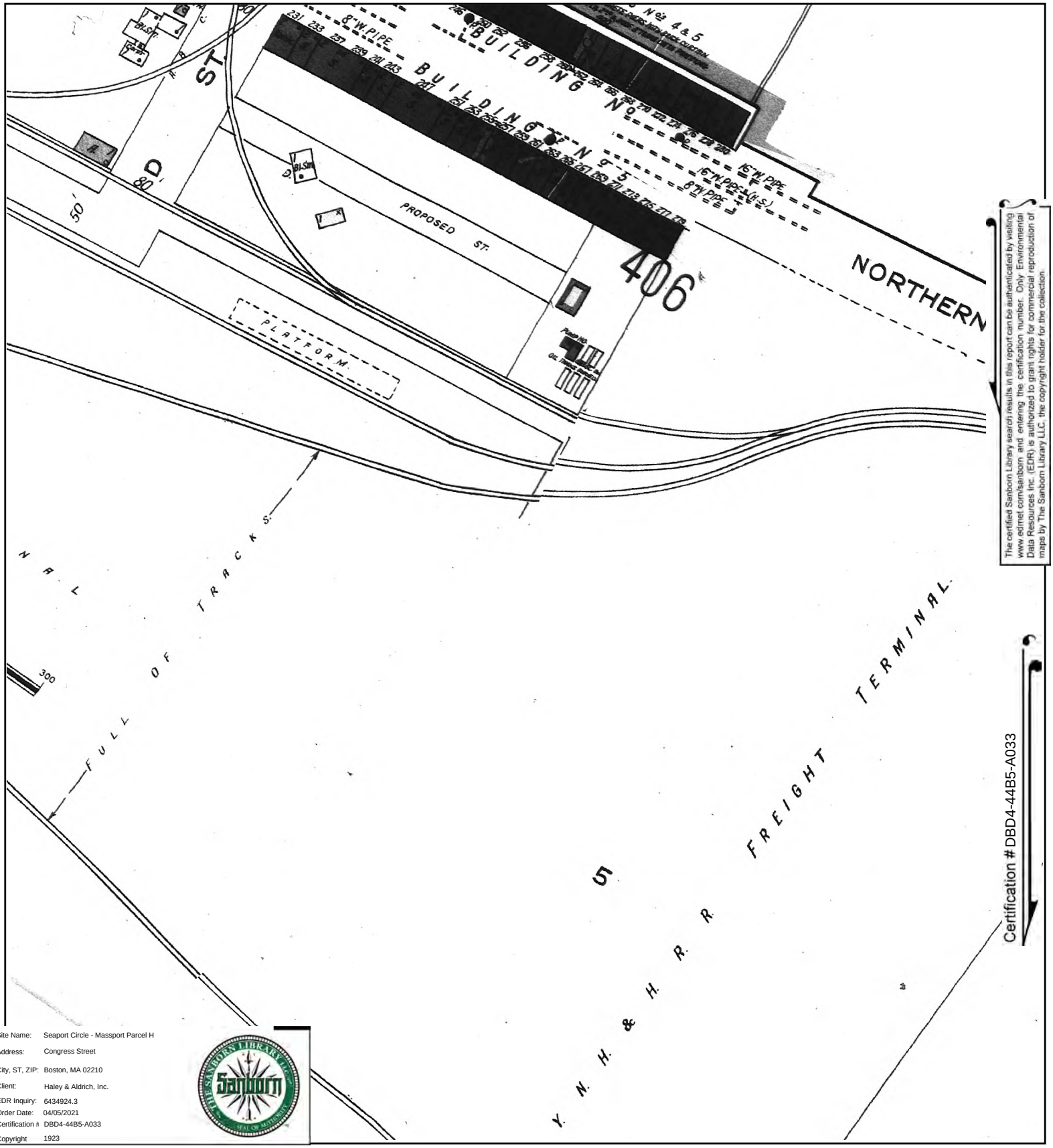

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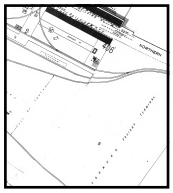

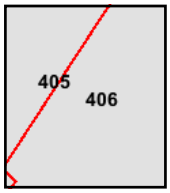

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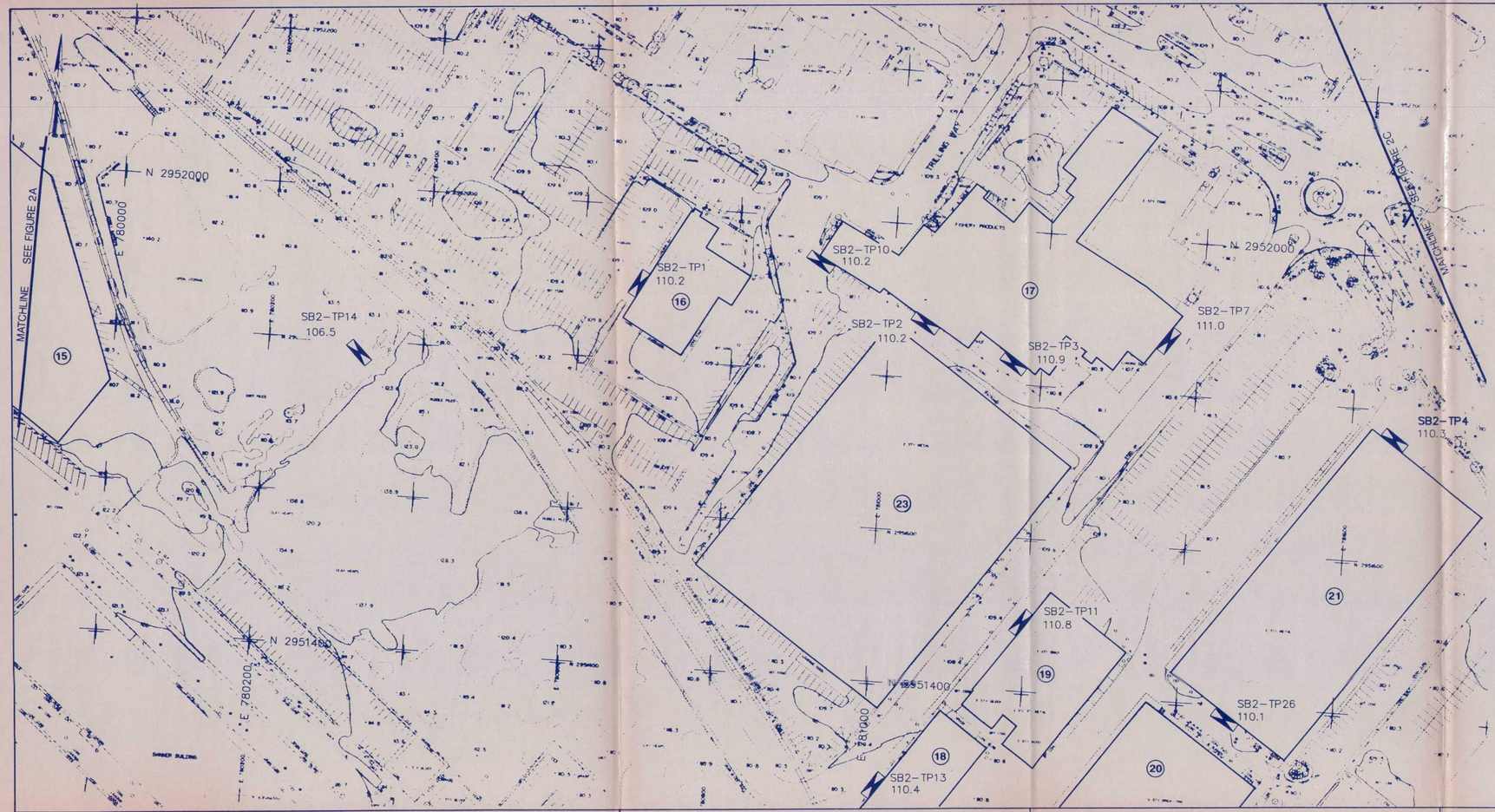
APPENDIX B
Previous Test Pits

SUMMARY OF TEST PIT DATA

CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT
BOSTON, MASSACHUSETTS
SOUTH BOSTON AREA

TEST PIT NUMBER	(B) BUILDING (S) STRUCTURE (O) OPEN	BUILDING NO.	BUILDING NAME	LOCATION CENTER OF TEST PIT N	LOCATION CENTER OF TEST PIT E	GROUND SURFACE ELEV. (FT)	OBSERVED FOUNDATION TYPE	TEST PIT DRAWING	TEST PIT LOG	REMARKS
SB2-TP1	B	16	Turner Fisheries	2951895	780674	110.2	Corrugated Metal Pile	C-1	-	Foundation plans indicate timber pile foundation, Possible composite piles
SB2-TP2	B	17	Caribou Fisheries	2951874	781046	110.2	Concrete Footing	C-2	-	
SB2-TP3	B	17	Caribou Fisheries	2951831	781164	110.9	Concrete Caisson	C-3	-	
SB2-TP4	B	21	Towle Manufacturing	2951763	781656	110.3	Corrugated Metal Pile	C-4	-	
SB2-TP5	O	N/A	N/A	2952018	781881	110.2	N/A	-	D-1	No obstructions encountered
SB2-TP6	O	N/A	N/A	2952171	781999	110.1	N/A	-	D-2	No obstructions encountered
SB2-TP7	B	17	Caribou Fisheries	2951880	781362	111.0	Concrete Caisson	C-3	-	
SB2-TP8	O	N/A	N/A	2952335	782292	110.2	N/A	C-5	D-3	Boulders encountered in fill
SB2-TP9	B	22	Nagle Seafood	2951898	782011	110.6	Timber Piles	C-6	-	
SB2-TP10	B	17	Caribou Fisheries	2151945	780908	110.2	Concrete Caissons	C-6	-	
SB2-TP11	B	19	Stavis Seafood	2951492	781197	110.8	Structural Concrete Slab	C-7	-	
SB2-TP12	B	22	Nagle Seafood	2952014	782282	110.7	Timber Piles	C-7	-	
SB2-TP13	B	18	US Navy Garage	2951266	781017	110.4	Corrugated Metal Pile	C-8	-	
SB2-TP14	O	N/A	N/A	2951784	780318	106.5	N/A	-	D-4	No obstructions encountered
SB2-TP15	O	N/A	N/A	2952264	782131	109.4	N/A	C-9	D-5	Sheet pile bulkhead exposed
SB2-TP16	O	N/A	N/A	2952248	782138	109.7	N/A	C-10	D-6	Utilities and concrete structure encountered
SB2-TP17	O	N/A	N/A	2952225	782201	109.4	N/A	C-11	D-7	Sheet pile bulkhead exposed
SB2-TP18	O	N/A	N/A	2952190	782190	109.6	N/A	C-12	D-8	Concrete structure exposed
SB2-TP19	O	N/A	N/A	2952721	782882	111.2	N/A	C-13	D-9	Boulders and concrete obstructions encountered
SB2-TP20	O	N/A	N/A	2952568	782755	111.0	N/A	C-14	D-10	Boulders encountered in fill
SB2-TP21	O	N/A	N/A	2952364	782610	110.5	N/A	C-14	D-11	Concrete slab sections encountered in fill
SB2-TP22	O	N/A	N/A	2952175	782481	109.8	N/A	C-15	D-12	Numerous cobbles, boulders, and large granite blocks encountered
SB2-TP23	O	N/A	N/A	2952215	782257	110.0	N/A	C-16	D-13	Boulders and concrete sections encountered
SB2-TP24	O	N/A	N/A	2951844	779627	131.1	N/A	C-17	D-14	Steel conduit exposed in exploration
SB2-TP25	O	N/A	N/A	2951827	779615	128.5	N/A	C-17	D-15	Concrete duct exposed
SB2-TP26	B	21	Towle Manufacturing	2951387	781468	110.1	Corrugated Metal Pile	C-4	-	
SB2-TP27	O	N/A	N/A	2952189	782183	110.5	N/A	C-18	D-16	Utilities, concrete structures, and tie rods exposed
SB3-TP1	B	4	Brewster Wall Covering	2952281	777726	109.6	Timber Piles	C-19	-	
SB3-TP2	B	7	Bloom South & Gurney	2952389	778297	110.8	Concrete Caissons	C-20	-	
SB3-TP3	B	9	Northcoast Seafood	2952004	778967	110.4	Timber Piles	C-21	-	Previous test pit encountered concrete footing; See Appendix B
SB3-TP4	B	9	Northcoast Seafood	2952017	779138	114.2	Concrete Footing	C-19	-	
SB3-TP5	B	8	US Post Office Annex	2951916	778395	109.9	Concrete Footing	C-21	-	
SB3-TP6	S	N/A	N/A	2952291	778822	110.6	N/A	C-22	-	
SB3-TP7	S	N/A	N/A	2952165	778988	110.2	N/A	C-23	-	
SB3-TP8	S	N/A	N/A	2951966	779445	111.3	N/A	C-24	-	
SB3-TP9	S	N/A	N/A	2952318	779681	111.2	N/A	C-25	-	
SB3-TP10	B	2	19 Wormwood Street	2951909	777717	109.1	Timber Pies	C-26	-	
SB3-TP11	O	N/A	N/A	2952097	778132	110.4	N/A	-	D-17	Black oily fluid encountered within exploration
SB3-TP12	O	N/A	N/A	2952257	778528	109.9	N/A	-	D-18	No Obstructions Encountered
SB3-TP13	B	10	Araban Coffee	2951892	779208	113.5	Concrete Caisson	C-27	-	
SB3-TP14	B	13	210 "C" Street	2951761	779451	109.9	Concrete Caisson	C-28	-	
SB3-TP15	B	12	Fisheries Co-op	2952617	779155	110.3		C-29	-	



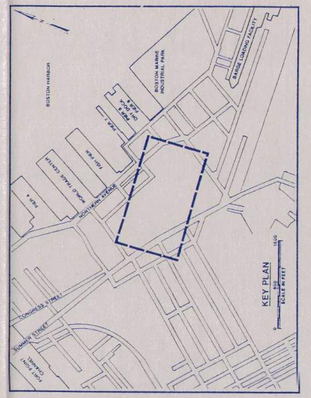
LEGEND:

SB3-TP4 114.2 — LOCATION, DESIGNATION, AND GROUND SURFACE ELEVATION OF TEST PIT. REFER TO TABLE 1 FOR LOCATION OF TEST PIT LOG OR DRAWING IN THIS REPORT.

(16) — BUILDING REFERENCE NUMBER AS INDEXED IN TABLE 1, AND APPENDIX A.

NOTES:

1. BASE PLAN PREPARED FROM TOPOGRAPHIC PLAN OF SOUTH BOSTON, PROVIDED BY BECHTEL/PARSONS BRINCKERHOFF, ORIGINAL SCALE: 1 INCH = 100 FEET.
2. LOCATIONS AND GROUND SURFACE ELEVATIONS OF TEST PITS WERE DETERMINED BY BRYANT ASSOCIATES, INC., OF BOSTON, MA.
3. NORTH AND EAST COORDINATE GRID LINES ARE RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83).
4. ELEVATIONS ARE IN FEET AND REFER TO THE PROJECT DATUM, ESTABLISHED AT 100.00 FT. BELOW NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD). EL. 100.00 PROJECT DATUM EQUALS EL 0.0 NGVD.



0 100 200
SCALE IN FEET

THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT
SOUTH BOSTON AREA

HALEY & ALDRICH, INC.
Geotechnical Engineers & Environmental Consultants

TEST PIT LOCATION PLAN

FIGURE 2B

STRUCTURE DATA SHEET

CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT

Haley & Aldrich, Inc.

STRUCTURE INFORMATION

BUILDING NO. 16
(SEE FIGURE 2B)

Name:	Turner Fisheries
Address:	One Trilling Way
Architect:	Unknown
Builder:	Unknown
Date Constructed:	Unknown
No. Stories:	One
Size:	Approximately 100 ft. by 150 ft. in plan.

FOUNDATION INFORMATION

REPORTED FOUNDATION TYPE:
Timber Piles indicated on plans, possibly composite piles based on test pit findings

REPORTED CONDITION:
Creosoted pine, oak or fir piles, tip approximately 8-in. diameter, minimum 10-in. diameter at cut off; driven to refusal. Single or two pile groups, 116 piles at 20-ton capacity. Piles spaced at 10 ft. center-center along north-south, and 15 ft. center-center along east-west direction. Hand-written note indicates length of wood piles is 40 ft. Information is not from "as-built" drawings.

INFORMATION SOURCE

Plans prepared by: Unknown
(Reference 17)

Note: Data on foundation type and description was obtained from referenced Information Source and has not been verified by Haley & Aldrich, Inc.

TEST PIT INFORMATION

Test Pit No.	Figure No.
SB2-TP1	C-1

FOUNDATION EXPOSED:
Concrete-filled, corrugated metal shell piles, approx. 12 in. diameter. Pile top exposed at approx. El. 105.7, beneath 2.5-ft. high pile cap.

Note: Foundation conditions reported above represent conditions exposed at the location indicated on the date of the test pit exploration only.

File No. 10360-22
SB16SD.WK1;21-DEC-90

STRUCTURE DATA SHEET

CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT

Haley & Aldrich, Inc.

STRUCTURE INFORMATION

BUILDING NO. 17
(SEE FIGURE 2B)

Name:	Caribou Fisheries (Formerly Boston Bonnie Fisheries)
Address:	295 Northern Avenue
Architect:	Arthur Winebaum (1964 addition plans)
Builder:	Unknown
Date Constructed:	Original Structure–Unknown; Additions–1960s and 1970s
No. Stories:	Varies - several buildings on site.
Size:	Approximately 79,200 sq. ft.

FOUNDATION INFORMATION

REPORTED FOUNDATION TYPE:

Several types at different buildings: Timber pile foundations, spread footings, slab-on-grade.

REPORTED CONDITION:

Plans for proposed new single-story holding room No. 3 (1964) indicate a 55 by 90-ft. addition to the northwest side of existing structures, to be founded on mixed hardwood timber piles in 2 to 3 pile caps. Caps are spaced 21.5 ft. apart along perimeter of proposed addition; piles to be driven to 15-ton capacity "below water table". Grade beam (approx. 1 by 4.5 ft.) connects pile caps. Piles to have 12-in. minimum diameter at butt, 8-in. at tip. Approximately 2.5-ft. wide wall footing foundation shown for proposed connection to existing building indicate 10- by 18-ft. addition to northeast side of building along Northern Ave., supported by 2-ft. wide wall footings. Information not from "as-built" drawings.

Plans prepared by: James L. Barry for Arthur Winebaum (References 18 and 19)

Note: Data on foundation type and description was obtained from referenced Information Source and has not been verified by Haley & Aldrich, Inc.

TEST PIT INFORMATION

Test Pit No.	Figure No.
SB2-TP2	C-2
SB2-TP3	C-3
SB2-TP7	C-3
SB2-TP10	C-6

FOUNDATION EXPOSED:

SB2-TP2: top of approx. 1-ft thick concrete wall footing exposed at El. 105.5.

SB2-TP3: 3.3-ft. dia. concrete caisson exposed at El. 106.9, below 3.8-ft. high concrete foundation wall.

SB2-TP7: 3.5-ft. dia. concrete caisson exposed at El. 107, below 3.8-ft. high concrete foundation wall.

SB2-TP10: 3.3-ft. dia. concrete caisson exposed at El. 106.1, below 4.1-ft. high concrete foundation wall.

Note: Foundation conditions reported above represent conditions exposed at the location indicated on the date of the test pit exploration only.

File No. 10360-22
SB17SD.WK1;21-DEC-90

STRUCTURE DATA SHEET

CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT

Haley & Aldrich, Inc.

STRUCTURE INFORMATION

BUILDING NO. 23
(SEE FIGURE 2B)

Name:	Commercial Union Building
Address:	
Architect:	Joseph Cafiero (renovations only)
Builder:	Unknown
Date Constructed:	1969
No. Stories:	One
Size:	Aproximately 120,000 sq.ft. (298 ft. by 402 ft. in plan)

FOUNDATION INFORMATION

REPORTED FOUNDATION TYPE:
Concrete Footings

REPORTED CONDITION:
Footings designed for 1000 psf bearing pressure. Exterior foundation wall 1 ft. wide, on strip footing 1-ft. thick by 2-ft. wide. Interior footings 8 by 8 ft. by 1.5-ft. thick. Proposed new 6-in. concrete slab with 6 by 6 welded wire mesh for renovated areas. Around perimeter, inside of foundation wall and through sections of building interior, slab tied to some footings with grade beams. Information is not from "as-built' drawings.

INFORMATION SOURCE

Plans prepared by: Joseph Cafiero and Stran-Steel Corporation (References 32 and 33)

Note: Data on foundation type and description was obtained from referenced Information Source and has not been verified by Haley & Aldrich, Inc.

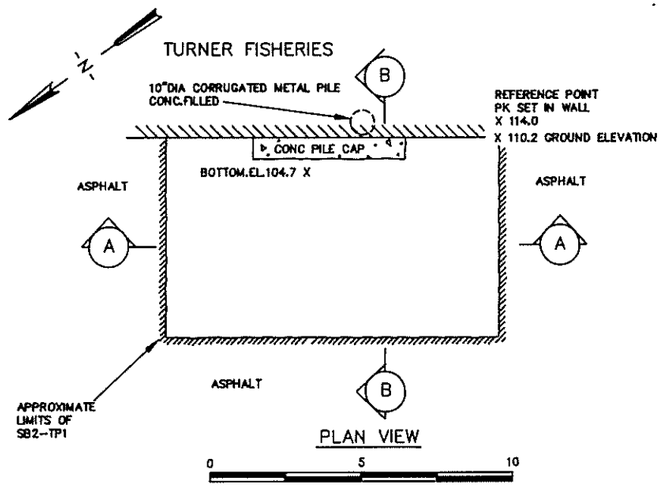
TEST PIT INFORMATION

Test Pit No.	Figure No.
N/A	N/A

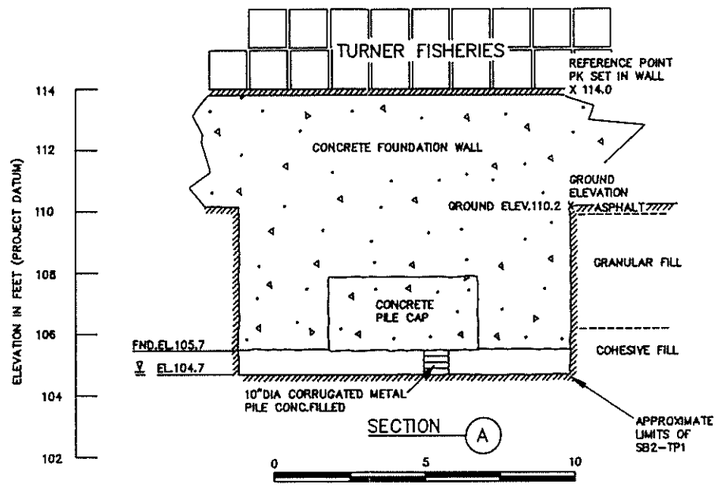
FOUNDATION EXPOSED:

Note: Foundation conditions reported above represent conditions exposed at the location indicated on the date of the test pit exploration only.

File No. 10360-22
SB23SD.WK1;21-DEC-199



SB2-TP1



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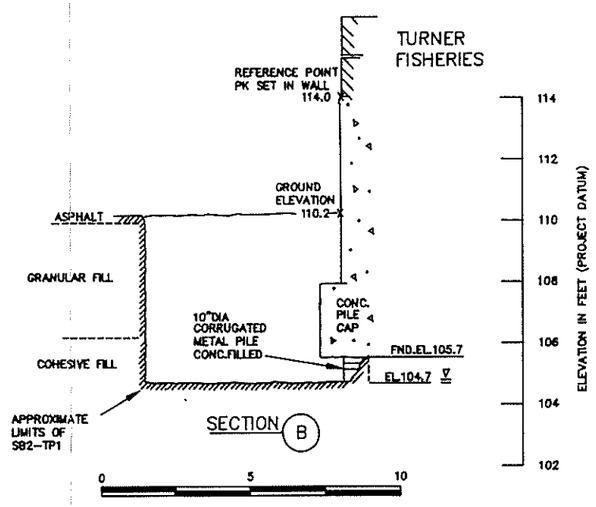


SB2-TP1

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

BRYANT ASSOCIATES, INC.
BOSTON, MASSACHUSETTS

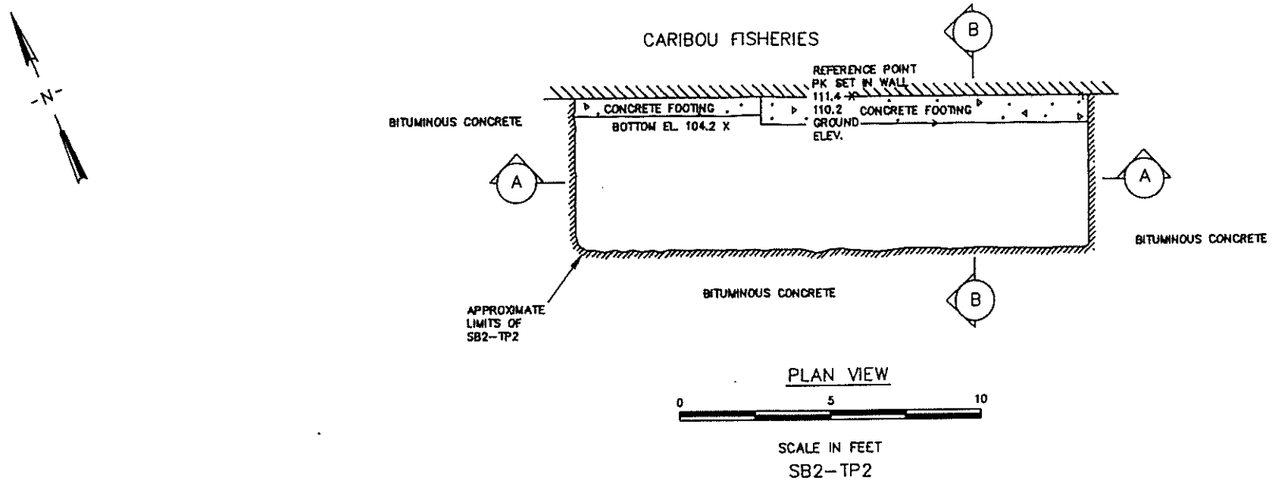
CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT
BOSTON, MASSACHUSETTS

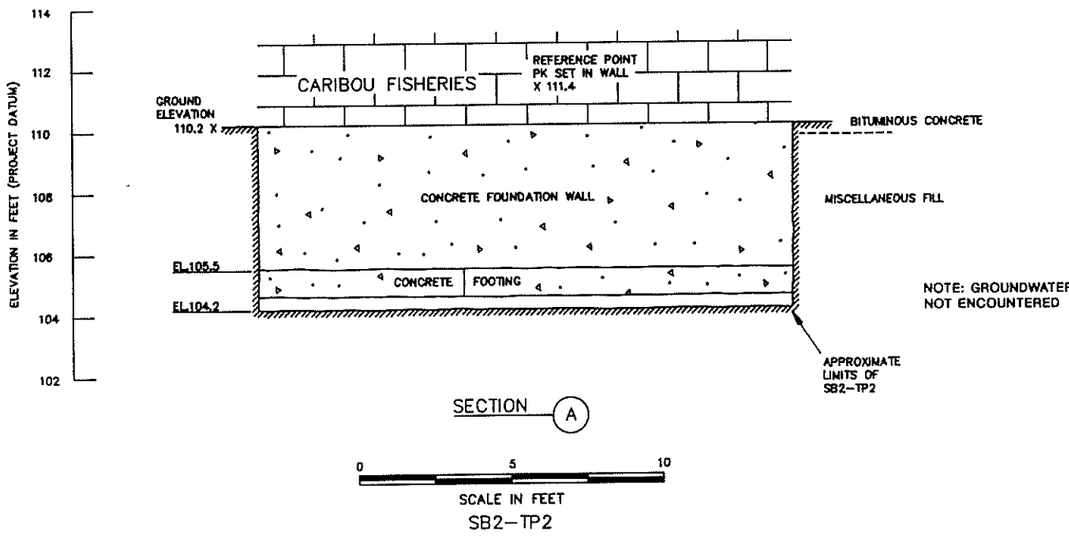
DESIGN SECTION – D004A

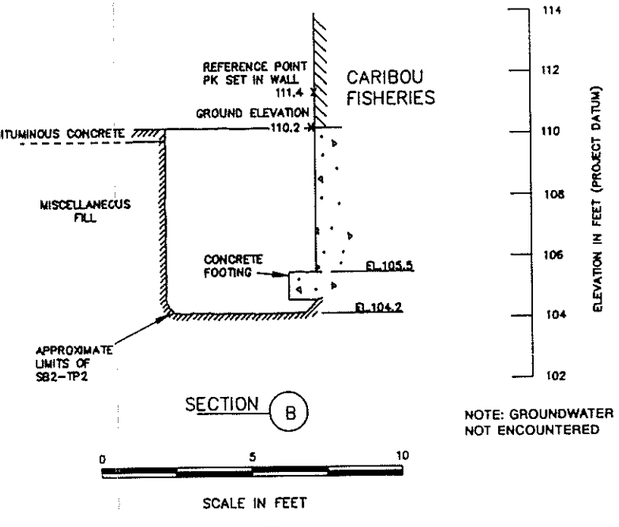
PLAN AND SECTIONS
NO. SB2-TP1

FILE NO. 10360-22 FEBRUARY 1991

FIGURE C-1







HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

BRYANT ASSOCIATES, INC.
BOSTON, MASSACHUSETTS

CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT
BOSTON, MASSACHUSETTS

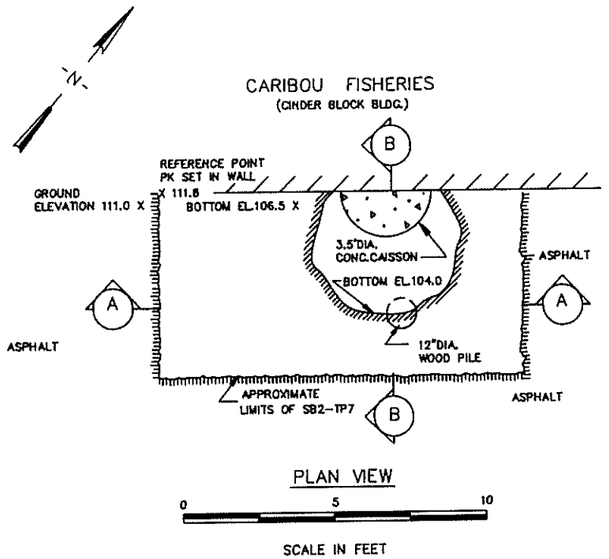
DESIGN SECTION – D004A

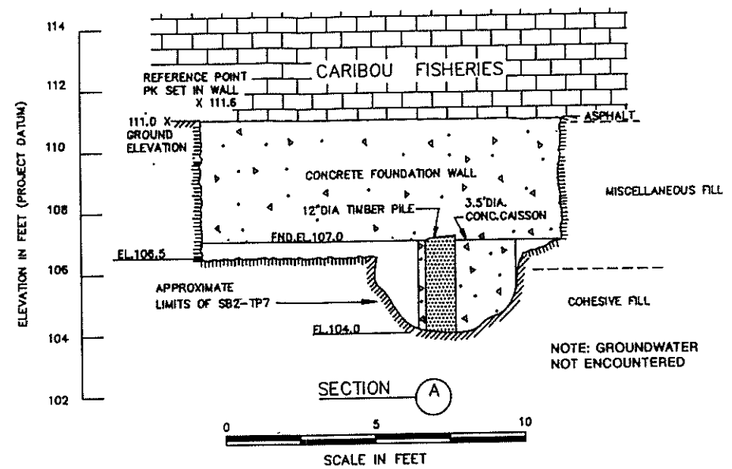
PLAN AND SECTIONS
NO. SB2-TP2

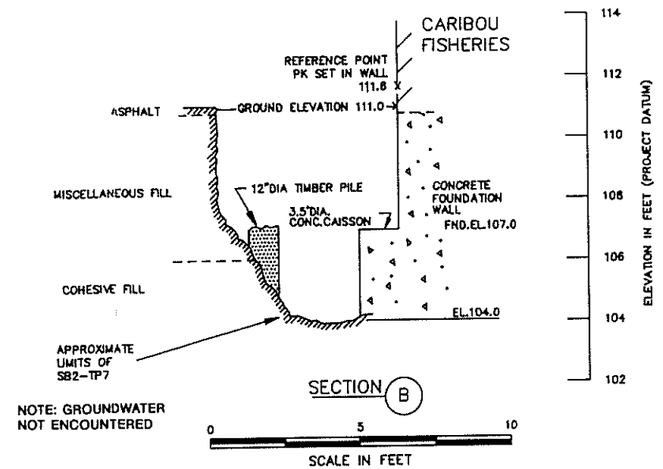
FILE NO. 10360-22

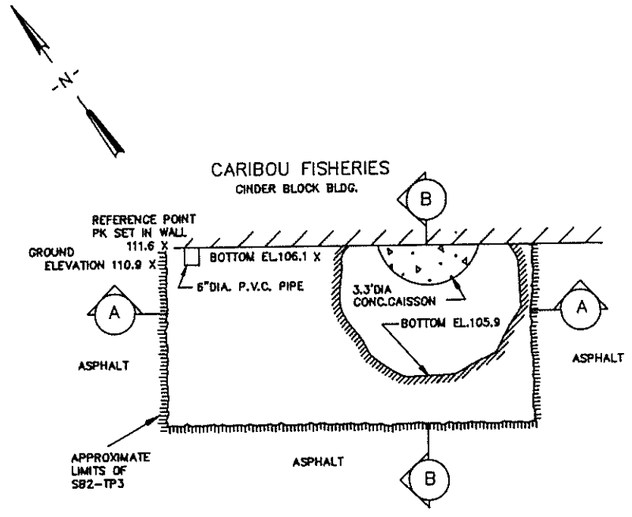
FEBRUARY 1991

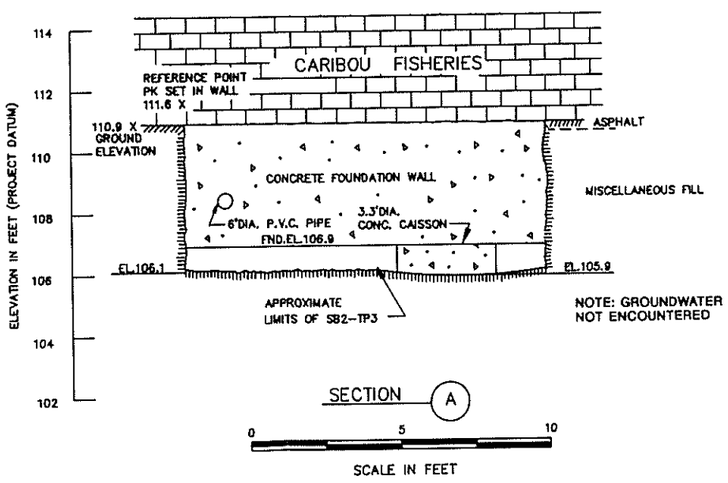
FIGURE C-2

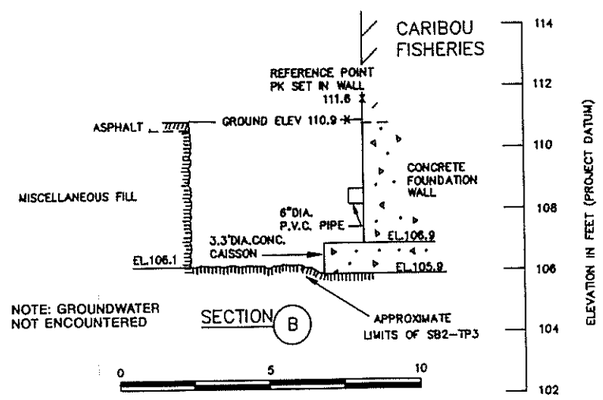












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BOSTON, MASSACHUSETTS

CENTRAL ARTERY (I-93)/TUNNEL (I-90) PROJECT
BOSTON, MASSACHUSETTS

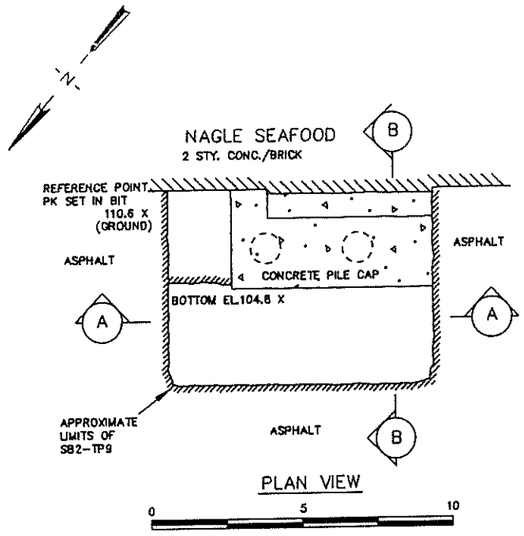
DESIGN SECTION D004A

PLAN AND SECTIONS NOS. SB2-TP7, SB2-TP3

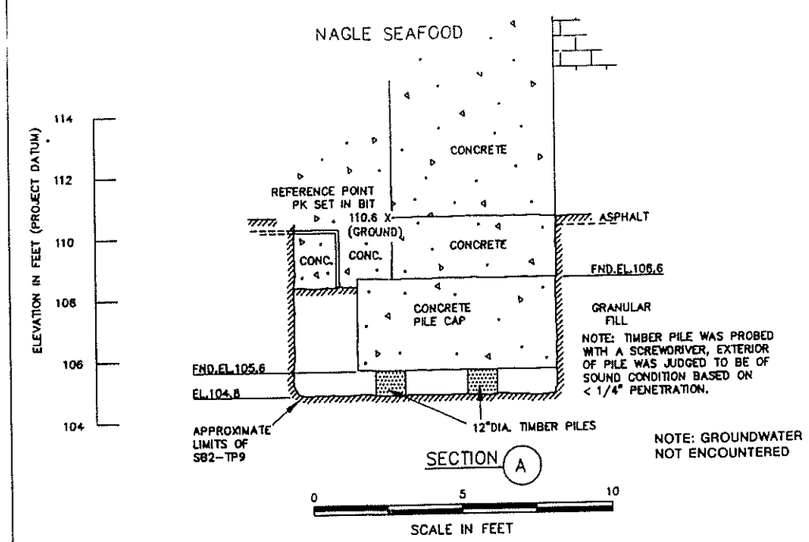
FILE NO. 10360-22

FEBRUARY 1991

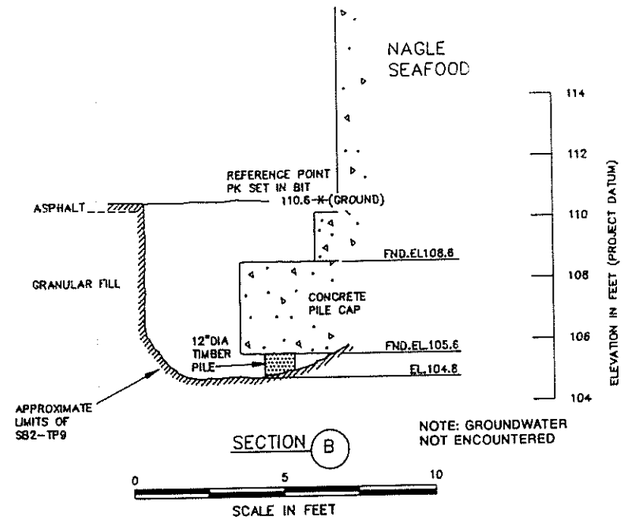
FIGURE C-3



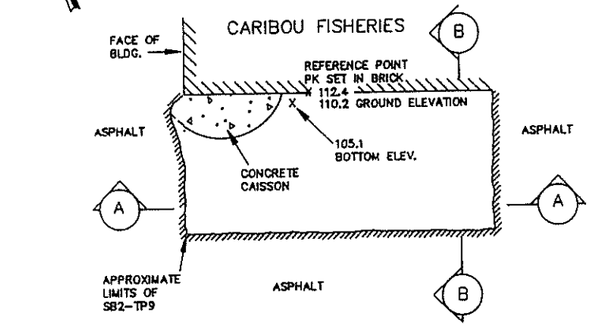
SB2–TP9



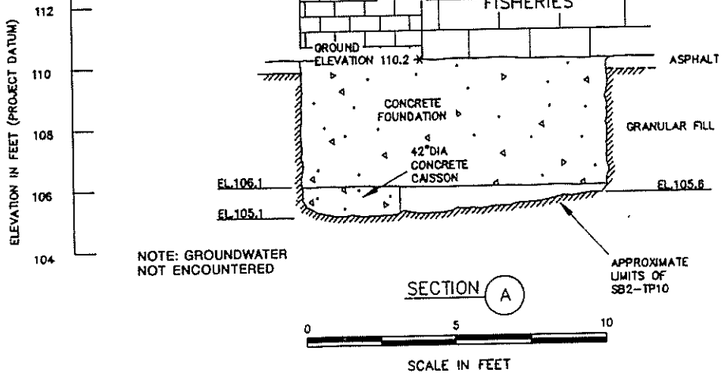
SB2–TP9



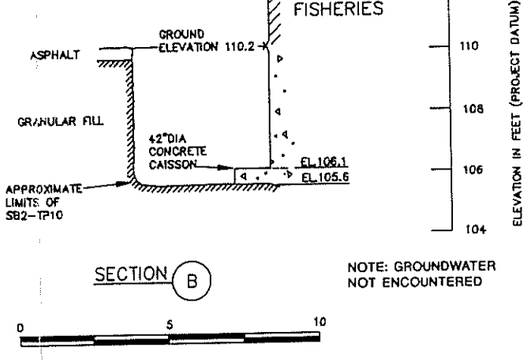
SB2–TP9



SB2–TP10



SB2–TP10



SB2–TP10

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BOSTON, MASSACHUSETTS

CENTRAL ARTERY (I–93)/TUNNEL (I–90) PROJECT
BOSTON, MASSACHUSETTS

DESIGN SECTION – D004A

PLAN AND SECTIONS
NOS. SB2-TP9, SB2-TP10

FILE NO. 10360–22

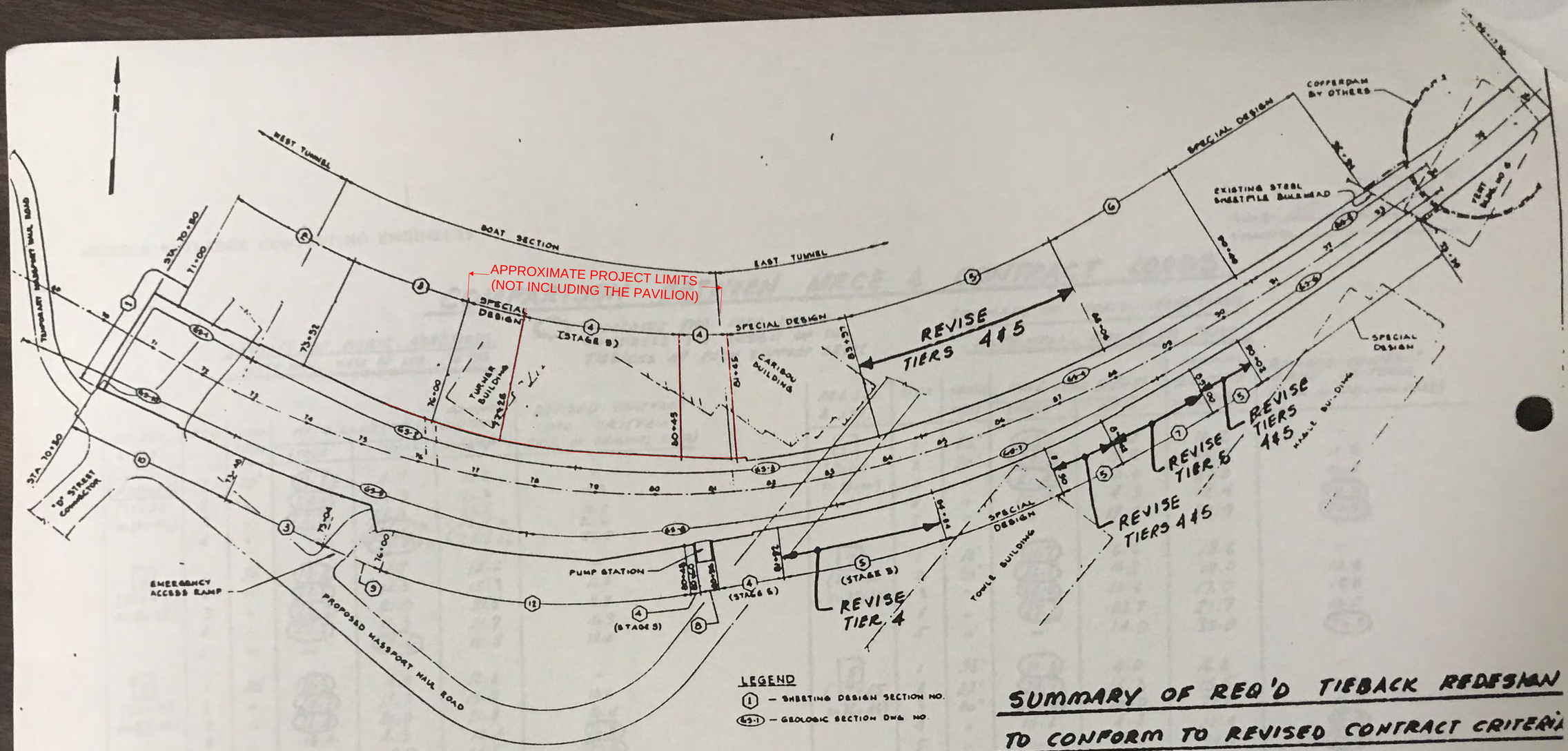
FEBRUARY 1991

FIGURE C-6

APPENDIX C
Historical Documents on Temporary Tiebacks Used During CA/T Construction

Invert Slab Design

HALEY ALDRICH



P L A N

SUMMARY OF REQ'D TIEBACK REDESIGN TO CONFORM TO REVISED CONTRACT CRITERIA

6/23/93

REV NO.	DATE	BY	DESCRIPTION
2	9-24-92	LV	GENERAL REVISION
1	6-24-92	AH	GENERAL REVISION

MASSACHUSETTS HIGHWAY DEPARTMENT
CENTRAL ARTERY / TUNNEL PROJECT
BOSTON HARBOR INDUSTRIAL PARK
VENT BUILDING NO. 6

KIEWIT - P A C J.V.

MUESER RUTLEDGE CONSULTING ENGINEERS

KEY PLAN

1"=80	5-6-92	PLAN	SHT
92833-CD442	SHEET NO. #	7774	KP-1

MUESER RUTLEDGE CONSULTING ENGINEERS

Sheet No 2 Of
File 7774
Made By BJ Date 11.3.92
Checked By ____ Da t ____

COMPARISON BETWEEN MRCE & CONTRACT LOADS

O INDICATES THE LOAD WHICH CONTROLS THE DESIGN OF THE TIEBACKS AT EACH SUPPORT LEVEL

SUMMARY OF HORIZ. REACTIONS
NORTH WALL, EAST OF STA. 76+00

DES. SEC. & STA.	TIER	TIEBACK ANGLE	MRCE LOAD (K/FT) STAGE	MRCE LOAD (K/FT) FINAL	ORIGINAL CONTRACT LOAD(K/FT)	REVISED CONTRACT LOAD CRITERIA (75% OF ORIGINAL LOAD)
4 STAGE 5 (77+26 TO 80+45)	1	20°	(13.2)	4.7	12.2	–
	2	"	(24.8)	14.3	15.3	11.5
	3	"	(28.5)	21.0	21.5	16.2
	4	"	–	(26.1) * (30.0) **	26.7 * < 29.3 **	20.0 22.0
4 (80+45 TO 81+39)	1	20°	(13.2)	4.7	12.2	–
	2	"	(24.8)	14.3	15.3	11.5
	3	"	(28.5)	21.0	21.5	16.2
	4	"	(27.8)	11.3	21.7	16.3
	5	"	–	(22.6)	16.5	12.4
5 (83+97 TO 87+10)	1	20°	(11.3)	4.0	16.2	–
	2	"	(24.7)	15.2	15.5	11.6
	3	"	(21.4)	20.0	21.8	16.4
	4	"	10.4	4.3	22.4	(16.8)
	5	"	–	19.5	34.5	(25.9)
5 (87+40 TO 88+06)	1	30°	(11.3)	4.0	16.2	–
	2	18°	(24.7)	15.2	15.5	11.6
	3	20°	(21.4)	20.0	21.8	16.4
	4	"	10.4	4.3	22.4	(16.8)
	5	"	–	19.5	34.5	(25.9)
6 (88+06 TO 89+54)	1	30°	(12.3)	5.6	17.6	–
	2	18°	(27.0)	18.6	18.7	14.0
	3	20°	(27.4)	22.7	21.1	15.8
	4	20°	(20.8)	8.8	23.7	17.8
	5	20°	–	(24.6)	35.3	(26.5)
6 (89+54 TO 90+46)	1	38°	(12.3)	5.6	17.6	–
	2	18°	(27.0)	18.6	18.7	14.0
	3	18°	(27.4)	22.7	21.1	15.8
	4	22°	(20.8)	8.8	23.7	17.8
	5	20°	–	(24.6)	35.3	(26.5)

APPROX. EQUIVALENT TO EXIST DESIGN LOAD - SAY OKAY

NOTE : CONTRACT LOADS FOR DES. SEC. 5 ARE TAKEN FROM SUBMISSION 3.
* STA. 77+26 TO 78+50
** STA. 78+50 TO 80+45

SUMMARY OF HORIZ. REACTIONS
SOUTH WALL, EAST OF STA. 76+00

DES. SEC. & STN.	TIER	TIEBACK ANGLE	MRCE LOAD (K/FT) STAGE	MRCE LOAD (K/FT) FINAL	ORIGINAL CONTRACT LOAD(K/FT)	REVISED CONTRACT LOAD CRITERIA (75% OF ORIGINAL LOAD)
5 (80+01 TO 83+00)	1	22°	(11.3)	4.0	16.2	–
	2	20°	(24.7)	15.2	15.5	11.6
	3	"	(21.4)	20.0	21.8	16.4
	4	"	10.4	4.3	22.4	(16.8)
	5	"	–	19.5	34.5	(25.9)
7 (83+00 TO 87+45)	1	18°	(11.7)	6.6	18.6	–
	2	20°	(26.1)	16.2	17.0	12.8
	3	"	(18.0)	15.2	17.0	12.8
	4	"	(27.2)	23.7	21.7	16.3
	5	"	–	14.0	35.0	(26.3)
5 (87+45 TO 86+16)	1	25°	(11.3)	4.0	16.2	–
	2	22°	(24.7)	15.2	15.5	11.6
	3	20°	(21.4)	20.0	21.8	16.4
	4	"	10.4	4.3	22.4	(16.8)
	5	"	–	19.5	34.5	(25.9)
5 STAGES (84+54 TO 81+92)	1	25°	(12.3)	4.3	16.9	–
	2	"	(25.0)	18.2	17.7	13.3
	3	"	(20.5)	19.6	25.4	19.1
	4	"	–	7.7	34.1	(25.6)
4 STAGES (81+92 TO 80+48)	1	20°	(13.2)	4.7	12.2	–
	2	"	(24.8)	14.3	15.3	11.5
	3	"	(28.5)	21.0	21.5	16.1
	4	"	–	(21.1)	24.2	18.2
12 (80+48 TO 76+04)	1	22°	(13.5)	5.7	14.3	–
	2	"	(34.1)	21.2	18.9	14.2
	3	20°	–	(16.9)	33.6	25.2
ANP STA. (80+98 TO 80+58)	1	22°	(14.2)	8.8	18.7	–
	2	"	(22.8)	19.0	27.3	(20.5)
	3	20°	(20.7)	13.2	30.1	(22.6)
	4	"	–	(25.1)	35.1	(26.3)

APPROX. EQUIVALENT TO EXIST DESIGN LOAD - SAY OK

NOTE : CONTRACT LOADS FOR DES. SECS. 5, 5 STAGE 5, & 7 ARE TAKEN FROM SUBMISSION 3.

APPENDIX D
Available Boring Logs

TEST BORING REPORT

Boring No. B-1

Project PARCEL F-1 SOUTH BOSTON, MASSACHUSETTS
Client MASS. PIKE
Contractor GUILD DRILLING, INC.

File No. 27079-000
Sheet No. 1 of 7
Start January 10, 2001
Finish January 17, 2001
Driller A. Whitaker
H&A Rep. Pope/Dodson
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	NX	Rig Make & Model: Truck
Inside Diameter (in.)	4.0	1 3/8	2.0	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: Bentonite
Hammer Fall (in.)	24	30	-	Casing: Driven
				Hoist/Hammer: Cat-Head, Safety Hammer

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							Black bituminous ASPHALT										
	13 10	S1 2"	1.0 2.0		0.5	SP	Medium dense black poorly graded SAND (SP), mps 0.5 in., no structure, no odor, dry		5	50	30	10	5	N	L	L	
	6 7 8 11	S2 4"	2.0 4.0		2.0	ML	-FILL- Medium dense dark gray sandy SILT (ML), mps 0.5 in., no structure, no odor, moist, trace brick pieces -FILL-		5	5	15	20	55				
	1 1 1 1	S3 16"	4.0 6.0		4.0	ML	Very soft olive gray SILT (ML), mps 0.5 mm., no structure, no odor, moist, trace shell pieces -COHESIVE FILL-				5	10	85	L	L	L	
5	2 1 2 2	S4 14"	6.0 8.0				Similar to sample S3, except soft										
	WOR 2 1 1	S5 12"	8.0 10.0	NO WELL INSTALLED			Similar to sample S3, except mottled dense gray and blue gray										
10	1 1 1 1	S6 16"	10.0 12.0		10.0	CL	Very soft olive gray and blue gray lean CLAY (CL), mps 0.25 in., no structure, no odor, wet		5				95	S	L	L-M	
	1 1 1 2	S7 24"	12.0 14.0				Similar to sample S6 except trace black staining -COHESIVE FILL-					5	95	S	L	L-M	
15	1 1 1 1	S8	14.0 16.0				Similar to sample S7 except dark gray staining										
	1	S9	16.0				Similar to sample S7 except dark gray staining										
	2 3 4	6" S9A 14"	16.5 16.5 18.0		16.5	SM/ OL-OH	Loose dark gray silty SAND (SM), mps 0.2 mm., thinly bedded, moderate organic odor, wet, trace organic fibers, shell specks, fines moderately organic					55	45	R			
	4 4 3 2	S10 14"	18.0 20.0				Similar to S9A -ORGANICS/ESTUARINE DEPOSITS-					55	45	R			
20																	

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
					N/A

Sample Identification		Well Diagram	
O	Open End Rod		Riser Pipe
T	Thin Wall Tube		Screen
U	Undisturbed Sample		Filter Sand
S	Split Spoon		Cuttings
G	Geoprobe		Grout
			Concrete
			Bentonite Seal

Summary

Overburden (lin. ft.) 124.0
Rock Cored (lin. ft.) 29.5
Samples S27,U6,C6

Boring No. B-1

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

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B-1
File No. 27079-000
Sheet No. 2 of 7

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	1 1 2 2	S11 10"	20.0 22.0			ML/ OL- OH SM/ OL- OH	Loose dark gray sandy SILT (ML), mps 0.1 mm., very thinly bedded, slight organic odor, wet, trace organic fibers, fines slightly organic, slightly plastic, occasional layers of sandy lean CLAY <2.0 in. thick -ORGANICS/ESTUARINE DEPOSITS-					30	70	S-R	N	N-L	
	1 2 3 4	S12 22"	22.0 24.0		22.0	CL/ OL- OH	Medium stiff dark gray sandy lean CLAY (CL), mps 0.5 in., laminated, slight to moderate organic odor, wet, trace shell specs and organic fibers, fines slightly organic -ORGANICS/ESTUARINE DEPOSITS-					30	70	S	L	M	
	WOR/12"	S13	24.0 25.0		24.0	OL/ OH	Dark brown sandy ORGANIC SOIL (OL/OH), mps 0.5 in., very thinly bedded, no odor, wet, trace organic fibers, shell specks, fines moderately plastic -ORGANICS/ESTUARINE DEPOSITS-		5			25	70	S	L	M	
25	5 7	S13A	25.0 26.0		25.0	CL	Stiff blue gray olive gray lean CLAY with sand (CL), mps 0.1 in., laminated, trace organic odor, wet, trace organic fibers -MARINE DEPOSITS-					5	95	N	M	M	
	22 24 36 41	S14 15"	26.0 28.0				Hard olive gray lean CLAY (CL), mps 0.1 mm., laminated, no odor, wet, trace fine sand										
	9 12 13 17	S15 20"	28.0 30.0			CL	Very stiff brown lean CLAY (CL), mps 0.1 mm., laminated, no odor, wet						100	N	M	M	
30	3 5 8 8	S16 18"	30.0 32.0		30.0	CH	Stiff brown fat CLAY (CH), mps 0.1 mm., laminated, no odor, wet						100	N	H	H	
	9 11 11 11	S17 16"	32.0 34.0				Similar to S16 except very stiff -MARINE DEPOSITS-						100	N	H	H	
	4 4 5 6	S18 8"	34.0 36.0			CH	Stiff brown fat CLAY (CH), mps 0.1 mm., laminated, no odor, wet						100	N	H	H	
35																	
	PUSH/24"	U1 20"	39.0 41.0														
40	2 2 3 4	S19 24"	41.0 43.0			CH	Medium stiff olive gray fat CLAY (CH), mps 0.1 mm., laminated, no odor, moist										
	PUSH/24"	U2 18"	44.0 46.0														
45	2 5 5 5	S20 24"	46.0 48.0				Similar to S19 except stiff										
	PUSH/24"	U3	49.0														

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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TEST BORING REPORT

Boring No. B-1
File No. 27079-000
Sheet No. 3 of 7

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
50		24"	51.0														
	2 4 5 6	S21 24"	51.0 53.0				Similar to S19 except stiff -MARINE DEPOSITS-										
	PUSH/24"	U4 23"	54.0 56.0														
55	2 3 3 4	S23 24"	56.0 58.0				Similar to S19 Note: Limited sampling from 58.0 ft. to 114.5 ft.										
60																	
	PUSH/24"	U5 20"	64.0 66.0														
65	1 1 1 1	S23 24"	66.0 68.0				Similar to sample S19										
70																	
	PUSH/24"	U6 23"	74.0 76.0														
75	1 2 2 3	S24 24"	76.0 78.0			CH	Soft olive gray fat CLAY (CH), mps <0.1 mm., laminated, no odor, moist -MARINE DEPOSITS-						100	N	L	H	H

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B-1
File No. 27079-000
Sheet No. 4 of 7

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
80							-MARINE DEPOSITS-										
85																	
	1/12"	S25	89.0				Similar to sample S24 except very soft										
90	1/12"	24"	91.0														
95																	
100																	
105																	

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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TEST BORING REPORT

Boring No. B-1
File No. 27079-000
Sheet No. 5 of 7

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
110							-MARINE DEPOSITS-										
115	16 14 12 10	S26 12"	114.5 116.5		114.5	ML	Medium dense gray gravelly SILT with sand (ML), mps 19 mm., no structure, no odor, moist. coarse fraction angular -GLACIAL TILL-		30	5	5	5	55	S	M	L	
	46 45	S27 6"	119.0 120.0			ML	Similar to S26 except very dense TOP OF DECOMPOSED BEDROCK AT 120.0 FT.										
120	84 64	S27A 6"	120.0 121.0		120.0		Hard blue gray SILT with gravel (ML), mps 0.75 in., sample consists of highly decomposed argillite, slight bedding visible, no odor, moist Note: Advanced roller bit to 124.0 ft. before beginning core run. See "Core Boring Report" for rock description. -DECOMPOSED BEDROCK-		30			5	65	S	L	L	
125																	
130																	
135																	

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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CORE BORING REPORT

Boring No. B-1
File No. 27079-000
Sheet No. 6 of 7

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
115									SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
120									TOP OF DECOMPOSED BEDROCK AT 120.0 FT.
								120.0	-DECOMPOSED BEDROCK-
125	7	C1	124.0 129.0	10 0	16 0	High	NO WELL INSTALLED		C1: Medium hard, highly weathered, gray, aphanitic, ARGILLITE. Insufficient material to determine joints. Note: Used 400 gallons of water (two tanks).
	6								
	5								
	5								
	5								
	4	C2	129.0 134.5	19 0	29 0	High			C2: Medium hard, highly weathered, gray, aphanitic, ARGILLITE. Bedding extremely thin at low angles. Primary joints low angle parallel to bedding, extremely close to close, planar, smooth, discolored, tight. Note: No water return.
130	6								
	5								
	6								
	5								
									TOP OF WEATHERED BEDROCK 134.5 FT.
135	5	C3	134.5 139.5	46 0	77 0	Moder- ate		134.5	C3: Medium hard, moderately weathered, gray, aphanitic ARGILLITE. Bedding extremely thin at low angles. Primary joint set low angle parallel to bedding, extremely close to close, planar, smooth, fresh, open. Secondary joint set at high angle, moderate spacing, planar, smooth, fresh, open. Tertiary joint set moderate dipping perpendicular to secondary joint set, close to moderate, planar, smooth, fresh, open.
	6								
	12								-WEATHERED BEDROCK-
	5								
	14								
140		C4	139.5	41	68	Moder-			C4: Similar to core C-3

HALEY & ALDRICH

CORE BORING REPORT

Boring No. B-1
File No. 27079-000
Sheet No. 7 of 7

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
140	6		144.5	0	0	ate	NO WELL INSTALLED		
	7								
	6								-WEATHERED BEDROCK-
	7								
	6								
		C5	144.5	41	68	Moder-			C5: Similar to core C-3, except primary joints discolored, occasional calcite cementation.
145	5		149.5	0	0	ate			
	6								
	5								
	6								
	6								
		C6	149.5	42	88	Moder-			C6: Similar to core C-3, except occasional discoloration of primary joints.
150	5		153.5	10	21	ate			
	6								
	6								
	6								
								153.5	BOTTOM OF EXPLORATION 153.5 FT.

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TEST BORING REPORT

Boring No. B-3

Project PARCEL F-1 SOUTH BOSTON, MASSACHUSETTS
Client MASS. PIKE
Contractor GUILD DRILLING, INC.

File No. 27079-000
Sheet No. 1 of 6
Start January 3, 2001
Finish January 24, 2001
Driller A. Whitaker
H&A Rep. P. Pope
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	NW	S	-	Rig Make & Model: Truck
Inside Diameter (in.)	3.0	1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: Driven
				Hoist/Hammer: Cat-Head, Safety Hammer

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							Black bituminous ASPHALT										
					0.5	SW-SM	Medium dense brown well graded SAND with silt (SW-SM), mps 0.75 in., no structure, no odor, moist -FILL-		15	30	25	20	10				
	14 12	S1 6"	1.0 2.0														
	12 10	S2 10"	2.0 3.0		2.0	SP	Medium dense brown poorly graded SAND (SP), mps 0.5 in., no structure, no odor, moist, sample primarily cinder and ash -FILL-		5	55	20	15	5	R	L	N	N
	6 5		3.0 4.0														
	6 3	S3 3"	4.0 5.0														
5	14 14		5.0 6.0		5.0	ML	Stiff olive gray sandy SILT (ML), mps 0.75 in., no structure, no odor, moist, trace cinder brick pieces -FILL-		5	5	10	25	55	N	L	L	L
	4 3 2 3	S4 0"	6.0 8.0				No recovery										
	2 1 1 1	S5 6"	8.0 10.0	NO WELL INSTALLED	8.0	ML	Very soft olive brown SILT with sand (ML), mps 1 mm., no structure, slight petroleum odor, wet, trace brick pieces				5	10	85				
10	1 1 1 1	S6 14"	10.0 12.0				Similar to S5, except no medium sand -COHESIVE FILL-										
	2 2 3 2	S7 24"	12.0 14.0				Similar to S5, except medium stiff										
	1 1 3 6	S8 16"	14.0 16.0		14.0	ML	Similar to S5 except soft trace wood pieces, one 0.2 mm. fine sand seam -FILL-										
15	7 8 3 2	S9 12"	16.0 18.0		16.0	SP-SM	Medium dense gray poorly graded SAND with silt (SP-SM), mps 0.5 mm., no structure, slight petroleum odor, moist -FILL-				5	85	10	S	L	L	N
	4 2 2 2	S10 12"	18.0 20.0				Similar to S9, except very loose trace brick pieces, shell pieces										
20																	

Water Level Data

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

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 114.0
Rock Cored (lin. ft.) 12.5
Samples S28,U7,C3

Boring No. B-3

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

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B-3
File No. 27079-000
Sheet No. 2 of 6

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	2 2 1 2	S11 24"	20.0 22.0			SP- SM	Similar to S9, except very loose trace brick, shell pieces -FILL-										
	1 1 1 1	S12 6"	22.0 24.0		22.0	ML	Very soft olive gray SILT (ML), mps 0.5 mm., no structure, slight sulfur odor, moist, trace shell pieces -ESTUARINE DEPOSITS-					10	90	N	L	L	
25	1 2 2 2	S13 12"	24.0 26.0				Similar to S12, except soft										
	3 3 4 3	S14 12"	26.0 28.0				Similar to S12, except medium stiff										
	WOH/18" 1	S15 24"	28.0 30.0				Similar to S12, except very soft, occasional peat pieces										
30	3 3	S16 12"	30.0 31.0			MH	Medium stiff olive gray elastic SILT (MH), mps 0.2 mm., no structure, organic odor, moist					5	95	N	M	M	
	4 7	S16A 12"	31.0 32.0		31.0	OL/ OH	-ESTUARINE DEPOSITS- Stiff brown ORGANIC SOIL (OL/OH), peat, mps 0.2 mm., no structure, organic odor, moist										
	2 3 5 7	S17 24"	32.0 34.0				-ORGANIC DEPOSITS- Similar to S16A, except grades to silt at the bottom of sample										
	8 10 19 20	S18 24"	34.0 36.0		34.0	CH	Very stiff blue gray fat CLAY (CH), mps <0.1 mm., no structure, no odor, moist Note: Upper 6.0 in. approximately 20% fine sand. -MARINE DEPOSITS- Note: Clay determined too hard and sandy for tube, advanced boring to 39.0 ft. for tube sampling.						100	N	H	H	H
40	PUSH/24"	U1 23"	39.0 41.0														
	5 4 4 6	S19 24"	41.0 43.0			CH	Medium stiff olive gray fat CLAY (CH), mps <0.1 mm., laminated, occasional fine sand seams, no odor, moist					5	95	N	M	H	
45	PUSH/24"	U2 23"	44.0 46.0														
	1 2 2 4	S20 24"	46.0 48.0				Similar to S19, except soft										
	PUSH/24"	U3	49.0														

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B-3
File No. 27079-000
Sheet No. 3 of 6

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
50		23"	51.0			CH											
	1 2 3 5	S21 24"	51.0 53.0				Similar to S19, except medium stiff -MARINE DEPOSITS-										
	PUSH/24"	U4 23"	54.0 56.0														
55																	
	WOR 1 2 3	S22 24"	56.0 58.0				Similar to S19, except soft										
60																	
	PUSH/24"	U5 23"	64.0 66.0														
65																	
	1 1 3 4	S23 24"	66.0 68.0				Similar to S19, except soft										
70																	
	PUSH/24"	U6 23"	74.0 76.0														
75																	
	1 2 3 3	S24 24"	76.0 78.0			CH	Medium stiff olive fat CLAY (CH), mps < 0.1 mm., laminated, no odor, moist -MARINE DEPOSITS-						100	N	M	H	H

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

Boring No. B-3

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B-3
File No. 27079-000
Sheet No. 4 of 6

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
80						CH	-MARINE DEPOSITS-										
85																	
	PUSH/24"	U7 23"	89.0 91.0														
90	WOH/12" 3 4	S25 24"	91.0 93.0				Similar to S24, except soft										
95																	
100																	
					103.0		Note: Drill action suggests stratum change at 103.0 ft.										
105	29 24 31 26	S26 3"	104.0 106.0			ML	Hard gray gravelly SILT with sand (ML), mps 10 mm., no structure, no odor, moist, gravel fraction angular -GLACIAL TILL-		20	10	10	15	45	N	L	L	L
							TOP OF DECOMPOSED BEDROCK AT 107.0 FT.										
					107.0		Note: Drill action smoothed out suggests stratum change at 107.0 ft. -DECOMPOSED BEDROCK-										

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. B-3
File No. 27079-000
Sheet No. 5 of 6

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
110	34 40 42 48	S27 8"	109.0 111.0				Hard blue gray sandy SILT (ML), mps 0.5 mm., laminated, no odor, moist. Sample consists of decomposed argillite. -DECOMPOSED BEDROCK-				10	25	65	N	H	L	L
							TOP OF SOUND BEDROCK AT 114.0 FT.										
115	100/0"	S28 0"	114.0 114.0		114.0		No recovery -BEDROCK- See "Core Boring Report" for rock description.										
120																	
125																	

*SPT = Sampler blows per 6 in. **Maximum particle size is determined by direct observation within the limitations of sampler size.

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

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HALEY & ALDRICH

CORE BORING REPORT

Boring No. B-3
File No. 27079-000
Sheet No. 6 of 6

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
									SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
105									
									TOP OF DECOMPOSED BEDROCK AT 107.0 FT.
								107.0	
									-DECOMPOSED BEDROCK-
110									
									TOP OF SOUND BEDROCK AT 114.0 FT.
	7	C1	114.0 119.0	44 21	73 35	Fresh	NO WELL INSTALLED	114.0	C1: Moderately hard, fresh, gray, aphanitic ARGILLITE. Bedding extremely thin at low angles. Primary joint set low angle parallel to bedding, moderate, planar, smooth, discolored, open. Secondary joint set high angle, moderate, planar, smooth, discolored, open. -BEDROCK- Note: Losing water over 200 gallons/ft. of rock core. Note: Spun NW casing to 119.0 ft. before starting C-2 run.
115	8								
	10								
	10								
	10								
	8	C2	119.0 121.5	22 0	71 0	Fresh			C2: Similar to C-1 Note: Core run stopped at 2.5 ft. because of rock jamming inside core barrel.
120	15								
	3	C3	121.5 126.5	44 23	73 38	Fresh			C3: Similar to C-1, except tertiary joint set moderately dipping perpendicular to bedding, moderate, planar, smooth, discolored, open
	3								
	7								
125	7								
	7							126.5	BOTTOM OF EXPLORATION 126.5 FT.

TEST BORING REPORT

Boring No. P-1

Project MANULIFE PARCEL F1 SOUTH BOSTON, MASSACHUSETTS
Client MANULIFE FINANCIAL
Contractor GUILD DRILLING CO. INC.

File No. 27079-010
Sheet No. 1 of 8
Start May 22, 2001
Finish May 25, 2001
Driller C. O'Donnell
H&A Rep. M. Dodson
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	NV	Rig Make & Model: Truck
Inside Diameter (in.)	4.0	1 3/8	2.0	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: Driven
				Hoist/Hammer: Cat-Head Safety Hammer

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	17 28 17 32	S1 17"	0.0 2.0	NO WELL INSTALLED		SP-SM	Dense gray brown poorly graded SAND with silt (SP-SM), mps 0.75 in., no structure, no odor, dry, trace ashes and cinders, 10% brick fragments -FILL-		10	5	15	45	10				
	24 22 26 35	S2 14"	2.0 4.0		2.0	SP	Dense light brown tan poorly graded SAND (SP), mps 0.5 in., no structure, no odor, dry		5	5	10	80					
5	16 21 22 20	S3 10"	4.0 6.0			SP	Similar to above, except mps 20 mm. -FILL-			5	20	75					
	27 31 31 26	S4 18"	6.0 8.0			SP	Similar to above, except very dense, mps 0.25 in.			15	25	60					
	15 20 25 25	S5 6"	8.0 10.0			SP	Similar to above, except dense, mps 0.5 in.		5	10	20	65					
10	16 16 13 11	S6 5"	10.0 12.0			SP	Similar to above, except medium dense		5	15	25	55					
	16 16 15 21	S7 19"	12.0 14.0			SP	Similar to above, except dense		5	5	10	80					
	7 4 5 6	NR	14.0 16.0				No recovery										
15	5 6 6 6	S8 4"	16.0 18.0			SP	Medium dense brown poorly graded SAND (SP), mps 4 mm., no structure, no odor, wet				15	85					
	6 7 12 14	S9 9"	18.0 20.0			SP	Similar to above, except mps 15 mm.			5	15	80					
20																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
5/25/01	0630	16.0	120.0	140.0	15.5

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 120.0
Rock Cored (lin. ft.) 40.0
Samples S19,C8

Boring No. P-1

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

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-1
File No. 27079-010
Sheet No. 2 of 8

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	15 18 12 16	NR	20.0 22.0			SP	No recovery -FILL-										
	13 7 13 18	S10 17"	22.0 24.0		22.0	SP-SM	Medium dense gray brown poorly graded SAND with silt (SP-SM), mps 8 mm., no structure, no odor, wet			5	5	80	10				
25	22 10 7 5	NR	24.0 26.0				No recovery -FILL-										
	4 4 4 4	S11 15"	26.0 28.0		26.0	SP	Loose brown poorly graded SAND (SP), mps 20 mm., no structure, no odor, wet -FILL-				10	85	5				
	5 5 5 5	S12 15"	28.0 30.0		28.0		Loose dark gray silty SAND (SM), mps 0.25 in., no structure, no odor, wet -ESTUARINE DEPOSITS-		5			80	15				
30	6 5 4 5	S13 8"	30.0 32.0			SM	Loose dark gray silty SAND (SM), mps 1 mm. (shell), very thinly bedded, no odor, wet, trace shell fragments -ESTUARINE DEPOSITS-					80	20				
	16 12	S14 4"	32.0 33.0			SM	Similar to above except medium dense										
	21 29	S14A 8"	33.0 34.0		33.0	CH	Hard olive brown gray fat CLAY (CH), mps <1 mm., no structure, no odor, wet -MARINE DEPOSITS-					5	95				
40	2 3 4 5	S15 24"	39.0 41.0			CH	Medium stiff olive gray brown fat CLAY (CH), mps <1 mm., laminated, occasional fine sand partings, no odor, wet						100				
45																	

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-1
File No. 27079-010
Sheet No. 3 of 8

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
50						CH											
55							-MARINE DEPOSITS-										
60																	
65																	
70	WOR WOH 1 1	S16 18"	69.0 71.0			CH	Very soft gray fat CLAY (CH), mps <1 mm., laminated, no odor, wet						100				
75							Note: No sampling required to Bedrock.										

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-1
File No. 27079-010
Sheet No. 4 of 8

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
80						CH											
85							-MARINE DEPOSITS-										
90							Note: No sampling required until bedrock.										
95																	
100																	
105																	
					106.5		PROBABLE TOP OF WEATHERED BEDROCK AT 106.5 FT. Note: Drill action indicates stratum change. -WEATHERED BEDROCK-										

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-1
File No. 27079-010
Sheet No. 5 of 8

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
110	21 23 22 29	S17 12"	109.0 111.0			GM	Dense blue gray silty GRAVEL with sand (weathered ARGILLITE) (GM), mps 1.25 in., bedding very thin, highly fractured, highly weathered, some fractures and fractured zones kaolinized or weathered to soil like conditions, fines moderately elastic -WEATHERED BEDROCK-	25	30	15	10	5	15				
115	36 46 36 33	S18 8"	114.0 116.0			GM	Similar to above, except very dense -WEATHERED BEDROCK-	20	40	15	5	5	15				
120	120/5"	S19 5"	119.0 119.4				Similar to above See "Core Boring Report" for bedrock description.	5	40	20	10	10	15				
125																	
130																	
135																	

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

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

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HALEY & ALDRICH

CORE BORING REPORT

Boring No. P-1
File No. 27079-010
Sheet No. 6 of 8

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
100							NO WELL INSTALLED		SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
105									PROBABLE TOP OF WEATHERED BEDROCK AT 106.5 FT.
								106.5	-WEATHERED BEDROCK-
110									
115									
120		C1	120.0 125.0	54 36	90 67	Moderate			TOP OF SOUND BEDROCK AT 121.0 FT.
	3 8 8 9 9					Slight to Fresh		121.0	C1: Medium hard, slightly weathered to fresh, gray, aphanitic ARGILLITE, very thin to thinly bedded, moderately dipping, primary joint surfaces, high angle, closely to moderately spaced, rough, planar, fresh, tight. Secondary joint surfaces parallel with bedding, moderately to widely spaced, rough, planar, calcite filled. One low angle smooth, planar, discolored, wide joint at 120.8 ft., weak high angle planes from 120.8 ft. to ~122.5 ft., fresh. -BEDROCK-
125									

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HALEY & ALDRICH

CORE BORING REPORT

Boring No. P-1
File No. 27079-010
Sheet No. 7 of 8

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
125		C2	125.0 130.0	57 47	95 78	Fresh	NO WELL INSTALLED		C2: Similar to run C1 except fresh, no secondary joint surfaced with calcite infillings. -BEDROCK-
	9								
	10								
	9								
	10								
	10								
130		C3	130.0 135.0	60 43	100 72	Fresh			C3: Similar to run C2, except one calcite filled joint at 130.8 ft. parallel with bedding, rough, planar, discolored, tight. Primary joint set very close to moderate.
135		C4	135.0 140.0	60 52	100 87	Fresh			C4: Medium hard fresh gray aphanitic ARGILLITE, very thin to thin bedding, moderately dipping. Primary joint set parallel with bedding, close to widely spaced, rough, planar, discolored to fresh, tight to open. Vertical to high angle < 1 mm., thick, calcite plane from 134.4 ft. to 135.7 ft., caused drill break (weak plane).
140		C5	140.0 145.0	60 60	100 100	Fresh			C5: Similar to run C4, except one calcite filled drill break at 144.0 ft., parallel with bedding occasional planar calcite veins at high angle mentioned in run C4, bedding disturbed, some minor displacement. -BEDROCK-
145		C6	145.0 150.0	60 56	100 93	Fresh			C6: Similar to run C5, except one calcite filled joint at 147.3 ft., parallel with bedding, rough, planar, discolored, tight.
150									

H:\A_CORE+WELL3 LibFile USCSTBC2.GDT G:\27079\010GEO-1\LOGS.GPJ Jul 6, 01

HALEY & ALDRICH

CORE BORING REPORT

Boring No. P-1
File No. 27079-010
Sheet No. 8 of 8

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
		C7	150.0 155.0	60 53	100 88	Fresh	NO WELL INSTALLED		C7: Similar to C6, except slightly weathered below 154.0 ft., fractured zone with intersecting smooth, planar, tight joints from 154.4 to 154.6 ft., joints are high to low angle. -BEDROCK-
155		C8	155.0 160.0	54 24	90 40	Slight to Moderate			C8: Medium hard, slightly weathered, gray, aphanitic ARGILLITE. Very thin to thinly bedded moderately dipping, primary joint set parallel with bedding, close to moderately spaced, rough, planar, discolored, moderate angle, but not parallel with bedding, smooth, planar, fresh to discolored. One high angle joint from 161.6 ft. to 161.9 ft., possibly previous calcite healed, smooth, planar, fresh to discolored, tight. Moderately weathered below 158.0 ft.
160								160.0	BOTTOM OF EXPLORATION 160.0 FT.

H+A_CORE+WELL3 LibFile USCSTBC2.GDT G:\27079\010GEO~1\LOGS.GPJ Jul 6, 01

TEST BORING REPORT

Boring No. P-2

Project MANULIFE PARCEL F1 SOUTH BOSTON, MASSACHUSETTS
Client MANULIFE FINANCIAL
Contractor GUILD DRILLING CO. INC.

File No. 27079-010
Sheet No. 1 of 7
Start May 14, 2001
Finish May 16, 2001
Driller C. O'Donnell
H&A Rep. D. Palleiko
Elevation Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	NX	Rig Make & Model: Truck
Inside Diameter (in.)		1 3/8	2.0	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: Driven
				Hoist/Hammer: Cat-Head Safety Hammer

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	30 27 17 20	S1 12"	0.0 2.0			SW-SC	Dense brown red mottled well graded SAND with clay and gravel (SW-SC), trace to little brick fragments, glass fragments, furnace core, mps 1.0 in., no structure, no odor, dry -FILL-		10	15	25	25	10				
							Note: 3.2 to 3.8 ft. wood in wash water.										
5	11 14 16 81/5"	S2 9"	4.0 6.0		4.0	SW	Medium dense light brown, well graded SAND (SW), mps 1.0 in., no odor, moist - FILL-		10	20	35	30	5				
10	17 16 19 16	S3 10"	9.0 11.0	NO WELL INSTALLED		SW	Dense light brown well graded SAND (SW), mps 0.75 in., no structure, no odor, moist		10	20	35	30	5				
					13.0		Note: Drilling action indicates stratum change at 13.0 ft.										
15	37 22 13 7	S4 4"	14.0 16.0			SM	Dense gray silty SAND (SM), little medium sand, trace coarse sand, fine gravel, furnace slag, brick fragments -FILL-		5	5	20	40	20				
20	3 WOR/18"	NA 0"	19.0 21.0		19.0		Note: Possible stratum change at 19.0 ft. -ORGANIC DEPOSITS-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
5/16/01	1300	1	119.0	149.0	13.4

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 119.0
Rock Cored (lin. ft.) 30.0
Samples S7,C6

Boring No. P-2

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

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-2
File No. 27079-010
Sheet No. 2 of 7

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20							-ORGANIC DEPOSITS-										
25	3 2 2 2	S5 24"	24.0 26.0			OL/OH/MH	Soft gray sandy elastic SILT (MH) and ORGANIC SOILS (OL/OH), frequent layers of organic material, mps 2 mm., sulfur odor, wet PP = 0.25/0.5 t.s.f. -ORGANIC DEPOSITS-				10	30	50	S	L	L	L
					28.0												
30	1 2 4 6	S6 18"	29.0 31.0			PT	Medium stiff brown fibrous PEAT (PT), sulfur odor, wet -ORGANIC DEPOSITS-										
					30.5	CL	Medium stiff blue gray lean CLAY (CL), mps 0.5 mm., fine laminations with frequent fine sand partings, dry, no odor PP = 1.0/1.25 t.s.f. -MARINE DEPOSITS-										
35	7 16 16 20	S7 20"	34.0 36.0			CL	Hard blue gray lean CLAY (CL), frequent fine sand partings and 0.5 to 2 mm. laminae, no odor, moist PP = 3.5 t.s.f.										
40							Note: No sampling required to bedrock.										
45																	

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-2
File No. 27079-010
Sheet No. 3 of 7

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
50						CL	-MARINE DEPOSITS-										
55																	
60							Note: No sampling required to bedrock.										
65																	
70																	
75																	

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-2
File No. 27079-010
Sheet No. 4 of 7

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
80						CL	-MARINE DEPOSITS-										
85							Note: No sampling required to bedrock.										
90																	
95																	
100																	
105					107.5		Note: Drilling action indicates stratum change at 107.5 ft. -OUTWASH DEPOSITS-										

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-2
File No. 27079-010
Sheet No. 5 of 7

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
110							-OUTWASH DEPOSITS-										
							TOP OF WEATHERED BEDROCK AT 114.0 FT.										
					114.0												
115							-WEATHERED BEDROCK-										
							TOP OF SOUND BEDROCK AT 116.0 FT.										
					116.0		Note: See "Core Boring Report" for bedrock description.										
							-BEDROCK-										
120																	
125																	
130																	
135																	

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

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

Boring No. P-2

USCS_TB3 LibFile USCSTBC3.GDT G:\27079\010GEO~1\LOGS.GPJ Jul 6, 01

HALEY & ALDRICH

CORE BORING REPORT

Boring No. P-2
File No. 27079-010
Sheet No. 6 of 7

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (mm)	Visual Description and Remarks
110									SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
									TOP OF WEATHERED BEDROCK AT 114.0 FT.
								114.0	-WEATHERED BEDROCK-
115									TOP OF SOUND BEDROCK AT 116.0 FT.
								116.0	-BEDROCK-
		C1	119.0 124.0	49 39	83 65	Fresh	NO WELL INSTALLED		C1: Medium hard, fresh, gray, aphanitic ARGILLITE, very thin to thin bedded, moderately dipping. Primary joint set high angle, very close to closely spaced, rough, planar, fresh, tight to open. Secondary joint set bedding parallel, moderately dipping, all joints are calcite filled. Single zone of brecciation at 122.6 ft. to 122.9 ft. Also some primary joint surfaces show micro-faulting with offsets of ~0.25 in. with no visible slickenlines.
120	14 10 10 10 9								
		C2	124.0 129.0	58 48	97 80	Fresh			C2: Medium hard, fresh, gray ARGILLITE. Very thin to thinly bedded, moderately dipping. Primary joint set high angle, very close to closely spaced, rough, planar, fresh, tight to open. Secondary joint bedding close to parallel, calcite healed, small scale micro-faulting with up to 0.25 in. offset. Water loss at 124.5 ft.
125	12 10 7 10 10								
		C3	129.0 134.0	52 50	94 83	Fresh			C3: Medium hard, fresh, gray ARGILLITE. Very thin to thin bedded, moderately dipping. Primary joint set high angle closely spaced, rough, planar, fresh, tight to open. Secondary joint set moderate angle, closely spaced, joint surfaces are calcite healed and less prominent.
130	12 9 8 8 6								
		C4	134.0 139.0	60 57	100 95	Fresh			C4: Medium hard, fresh, gray, ARGILLITE. Very thin to thin bedded, moderately dipping. Primary joint set at high angle, closely spaced, rough,
135	10								

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HALEY & ALDRICH

CORE BORING REPORT

Boring No. P-2
File No. 27079-010
Sheet No. 7 of 7

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
135	10								planar. Secondary joint set moderate angle, closely spaced, joint surfaces are calcite healed and less prominent.
	10								-BEDROCK-
	10								
	10								
	10	C5	139.0 144.0	55 55	92 92	Fresh			C5: Medium hard, fresh, gray ARGILLITE. Very thin to thin bedded, moderately dipping. Primary joint set high angle, closely spaced, rough, stepped to planar. Secondary joint set moderate angle, bedding parallel, calcite healed.
140	11								
	19								
	9								
	9								
	6	C6	144.0 149.0	60 56	100 93	Fresh	NO WELL INSTALLED		C6: Medium hard, fresh, gray, ARGILLITE. Very thin to thin bedded, moderately dipping. Primary joint set high angle, closely spaced, rough, stepped to planar, calcite infillings, closed.
145	6								
	6								
	6								
	6								
	6							149.0	BOTTOM OF EXPLORATION 149.0 FT.

H:\A_CORE+WELL3 LibFile USCSTBC2.GDT G:\27079\010GEO-1\LOGS.GPJ Jul 11, 01

HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-3

Project MANULIFE PARCEL F1 SOUTH BOSTON, MASSACHUSETTS
Client MANULIFE FINANCIAL
Contractor GUILD DRILLING CO. INC.

File No. 27079-010
Sheet No. 1 of 6
Start May 16, 2001
Finish May 18, 2001
Driller C. O'Donnell
H&A Rep. D. Palleiko
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	NX	Rig Make & Model: Truck
Inside Diameter (in.)	4.0	1 3/8	2.0	Bit Type: Roller Bit
Hammer Weight (lb.)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: Driven
				Hoist/Hammer: Cat-Head Safety Hammer

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	4 7 14 20	S1 13"	0.0 2.0	NO WELL INSTALLED		SW-SC	Medium dense red gray brown mottled well graded SAND with clay and gravel (SW-SC), trace to little brick fragments, glass shards, mps 0.75 in., no structure, no odor, moist HS = 2.5 ppm -FILL-		15	20	25	30	10				
5	35 22 9 5	S2 14"	4.0 6.0			SW-SC	Dense red gray brown mottled clayey SAND with gravel (SW-SC), little fragments, pieces of brick, asphalt, concrete, glass, etc. HS = 2.0 ppm		15	20	25	25	15				
					8.5		Note: Stratum change indicated by drilling action.										
10	4 2 1/12"	S3 11"	9.0 11.0			MH	Soft gray sandy elastic SILT (MH), frequent 1/16 to 3/4 layers of organic material (leaf litter), trace shell fragments, no odor, wet H.S. = 1.5 t.s.f. -ESTUARINE DEPOSITS-				10	30	50	S	L	L	L
					13.8												
15	7 3 4 2	S4 14"	14.0 16.0			CL/MH	Medium stiff olive gray sandy lean CLAY (CL), occasional 3.5 in. layer of gray sandy elastic SILT (MH), frequent laminae of organic material (1/16 in.), little seashells, trace fine gravel, mps 0.75 in. -ESTUARINE DEPOSITS-		5		5	25	60	N	M	M	M
					18.5												
20	1 1	S5 20"	19.0 21.0			SP-SM	Very loose gray poorly graded SAND with silt (SP-SM), trace fine gravel, peat fragments, seashells, plant fibers		5		5	60	10	S	L	L	L

Water Level Data

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

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 111.0
Rock Cored (lin. ft.) 14.0
Samples S11,C3

Boring No. P-3

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

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

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

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-3
File No. 27079-010
Sheet No. 2 of 6

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20	2 1						-ESTUARINE DEPOSITS-										
					20.5	OL/OH	Single lens of dark brown ORGANIC SOIL (OL/OH), trace seashells at tip, sulfur odor at tip, no odor (rest of sample), wet, mps 0.75 in. -ORGANIC DEPOSITS-										
					23.0												
	2 2 3 2	S6 20"	24.0 26.0			CL	Medium stiff olive gray lean CLAY with sand (CL), trace seashells, mps 0.75 in., slight sulfur odor, moist, trace organics PP = 1.75/1.0 t.s.f. -ESTUARINE DEPOSITS-		5		5	10	80	S/N	M	M	
25																	
30	WOH/12" 1 1	S7 23"	29.0 31.0			CL	Very soft olive gray lean CLAY (CL), trace seashells, organics, strong sulfur odor, moist, mps 0.75 in.					5	95	S/N	L	L	
					33.5	PT	Medium stiff light brown to black PEAT (PT), mps 0.75 in., plant fibers, leaf litter, laminated, strong sulfur odor, wet -ORGANIC DEPOSITS-										
35	1 3 4 5	S8 14"	34.0 36.0														
					36.0												
40	4 5 7 5	S9 21"	39.0 41.0			CL	Stiff olive to olive gray lean CLAY (CL), mps 1.5 mm., laminated, frequent fine sand partings, dry, no odor PP = 1.5/1.0 t.s.f. -MARINE DEPOSITS-					10	90	N	M	M	M
45	15 11 12 11	S10 17"	44.0 46.0				Very stiff olive to olive gray lean CLAY (CL), mps 2.5 cm. (gravel - argillite fragment), laminated frequent fine sand partings, dry, no odor -MARINE DEPOSITS-										
							Note: No sampling required to 93.0 ft.										

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

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

USCS_TB3 LibFile USCSTBC3.GDT G:\27079\010GEO~1\LOGS.GPJ Jul 11, 01

HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-3
File No. 27079-010
Sheet No. 4 of 6

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
80																	
85							Note: No sampling required to 93.0 ft. -MARINE DEPOSITS-										
					93.0		Note: Drilling action indicates possible stratum change at 93.0 ft.										
90	12 32 27 29	S11 11"	94.0 96.0			SW-SC	Very dense well graded SAND with clay and gravel (SW-SC), mps 1.0 cm., no obvious structure, no odor, wet, no bonding -OUTWASH DEPOSITS-		15	20	25	30	10				
95					97.5		Note: Drilling action indicates stratum change at 97.5 ft. -GLACIAL TILL- Note: No sampling required until bedrock.										
100																	
105							TOP OF BEDROCK AT 108.5 FT.										

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

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

Boring No. P-3

HALEY & ALDRICH

TEST BORING REPORT

Boring No. P-3
File No. 27079-010
Sheet No. 5 of 6

Depth (ft.)	SPT*	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size**, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
					108.5		Note: See "Core Boring Report" for bedrock description.										
110							-BEDROCK-										
115																	
120																	
125																	

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

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

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HALEY & ALDRICH

CORE BORING REPORT

Boring No. P-3
File No. 27079-010
Sheet No. 6 of 6

Depth (ft)	Drilling Rate Min./ft	Run No.	Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Well Diagram	Elev./ Depth (ft)	Visual Description and Remarks
105									SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
									TOP OF BEDROCK AT 108.5 FT.
								108.0	
110		C1	111.0 115.0	39 14	61 48	Fresh			C1: Medium hard, fresh, gray, aphanitic ARGILLITE, very thin to thinly bedded, moderately dipping. Primary joints set high angle and closely spaced, rough, planar, open to closed, calcite filling, no visible slickenlines. -BEDROCK-
115		C2	115.0 120.0	54 28	90 47	Fresh	NO WELL INSTALLED		C2: Medium hard, fresh, gray, ARGILLITE. Very thin to thinly bedded, moderately dipping. Primary joint set high angle, closely spaced, rough, planar, open to closed, calcite filled. Secondary joint set moderately dipping, rough, planar, widely spaced, calcite filled.
120		C3	120.0 125.0	51 28	85 27	Fresh			C3: Medium hard, fresh, gray, ARGILLITE. Very thin to thinly bedded, moderately dipping. Primary joint set high angle, closely spaced, rough, planar, open to closed. Secondary joints set moderately dipping, rough, planar, widely spaced calcite filled.
125								125.0	BOTTOM OF EXPLORATION 125.0 FT.

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Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-19-16
City/State:	Boston, MA	**Date Finished:**	12-21-16

Boring No.

K-101

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.0

Casing Type: 4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-19-16	8	8.0	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
			0.3 / 15.7	ASPHALT						
1	15			FILL	115/11"	S1	11/10	0.5-1.4	15 100/5"	Very dense, gray to brown, SILTY SAND, some gravel, w/ ash & cinders. (Fill)
2	14									
3	13									
4	12									
5	11				19	S2	24/1	4.0-6.0	14 10 9 3	Compact, gray, GRAVEL. (Fill) Spoon mostly empty, probably pushing s stone.
6	10									
7	9		7.5 / 8.5							
8	8			DREDGE FILL						
9	7									
10	6				1	S3	24/19	9.0-11.0	1/12" 1 1	Very soft, gray, SILTY CLAY. (Dredge Fill)
11	5									
12	4									
13	3									
14	2									
15	1				1	S4	24/24	14.0-16.0	1/12" 1 1	Very soft, gray, SILTY CLAY, trace gravel, w/ shells. (Dredge Fill)
16	0									
17	-1									
18	-2									
19	-3		19.0 / -3.0	ORGANICS	5	S5	24/14	19.0-21.0	2 3 2 2	Firm, gray, ORGANIC SILT, w/ shells. (Organics)
20	-4									
21	-5									
22	-6									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
4" casing to 39 feet, 3" casing to 91.5 feet below ground surface.

Weather:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-19-16
City/State:	Boston, MA	**Date Finished:**	12-21-16

Boring No.

K-101

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.0

Casing Type: 4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-19-16	8	8.0	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen. /Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
24	-8									
25	-9				1	S6	24/18	24.0-26.0	1 1/12" 2	Very soft, gray, ORGANIC SILT. (Organics)
26	-10									
27	-11									
28	-12									
29	-13									
30	-14			ORGANICS	1	S7	24/24	29.0-31.0	1/12" 1 1	Very soft, gray, ORGANIC SILT, w/ shells. (Organics)
31	-15									
32	-16									
33	-17									
34	-18									
35	-19				2	S8	24/24	34.0-36.0	WOH/6" 1 1 5	Very soft to soft, gray, ORGANIC SILT, some sand, trace peat, w/ shells. (Organics)
36	-20									
37	-21		37.0 / -21.0							
38	-22									
39	-23									
40	-24				16	S9	24/24	39.0-41.0	5 7 9 11	Stiff, gray, SILTY CLAY. (Marine Clay)
41	-25			MARINE CLAY						
42	-26									
43	-27									
44	-28									
45	-29									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
4" casing to 39 feet, 3" casing to 91.5 feet below ground surface.

Weather:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-19-16
City/State:	Boston, MA	**Date Finished:**	12-21-16

Boring No.

K-101

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.0

Casing Type: 4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-19-16	8	8.0	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
47	-31									
48	-32									
49	-33								3	Firm, gray, SILTY CLAY. (Marine Clay)
50	-34				7	S10	24/24	49.0-51.0	3	
51	-35								4	
52	-36								5	
53	-37									
54	-38									
55	-39									
56	-40									
57	-41									
58	-42			MARINE CLAY						
59	-43									
60	-44				3	S11	24/24	59.0-61.0	1	Soft, gray, SILTY CLAY. (Marine Clay)
61	-45								1	
62	-46								2	
63	-47								3	
64	-48									
65	-49									
66	-50									
67	-51									
68	-52									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
4" casing to 39 feet, 3" casing to 91.5 feet below ground surface.

Weather:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-19-16
City/State:	Boston, MA	**Date Finished:**	12-21-16

Boring No.

K-101

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.0

Casing Type: 4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-19-16	8	8.0	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
70	-54			MARINE CLAY	1	S12	24/24	69.0-71.0	WOR/12" 1 2	Very soft, gray, SILTY CLAY. (Marine Clay)
71	-55									
72	-56									
73	-57									
74	-58									
75	-59									
76	-60		76.0 / -60.0							
77	-61			GLACIOMARINE	17	S13	24/9	76.5-78.5	51 10 7 10	Compact, gray, well graded mixture of SILT, SAND and GRAVEL, some clay. (Glaciomarine)
78	-62									
79	-63									
80	-64									
81	-65									
82	-66									
83	-67									
84	-68									
85	-69				19	S12	24/6	84.0-86.0	14 14 5 6	Compact, gray, well graded mixture of SILT, SAND and GRAVEL, trace clay. (Glaciomarine)
86	-70									
87	-71		87.5 / -71.5							
88	-72			GLACIAL TILL	18	S13	24/7	89.0-91.0	36 9 9 12	Compact, gray, SILTY SAND and GRAVEL, w/ fractured rock. (Glacial Till)
89	-73									
90	-74									
91	-75		91.5 / -75.5							
				BEDROCK						

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
4" casing to 39 feet, 3" casing to 91.5 feet below ground surface.

Weather:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-19-16
City/State:	Boston, MA	**Date Finished:**	12-21-16

Boring No.

K-101

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.0

Casing Type: 4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-19-16	8	8.0	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
93	-77			BEDROCK	64%	RC1	60/51	92.0-97.0	4 5 5 4 5	Moderately hard to hard, very slight weathering, slightly fractured, gray, amorphous, CAMBRIDGE ARGILLITE, moderately close, moderately dipping, smooth joints; very thin moderately dipping bedding, w/ calcite veins and fillings at joints. (Bedrock)
94	-78									
95	-79									
96	-80									
97	-81									
98	-82				77%	RC2	60/60	97.0-102.0	4 4 4 4 6	Moderately hard to hard, very slight weathering, slightly fractured, gray, amorphous, CAMBRIDGE ARGILLITE, moderately close, moderately dipping, smooth joints; very thin moderately dipping bedding, w/ calcite veins and fillings at joints. (Bedrock)
99	-83									
100	-84									
101	-85									
102	-86		102.0 / -86.0	Bottom of borehole at 102 feet below ground surface.						
103	-87									
104	-88									
105	-89									
106	-90									
107	-91									
108	-92									
109	-93									
110	-94									
111	-95									
112	-96									
113	-97									
114	-98									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
4" casing to 39 feet, 3" casing to 91.5 feet below ground surface.

Weather:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-13-16
City/State:	Boston, MA	**Date Finished:**	12-15-16

Boring No.

K-104

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.7

Casing Type: 5"/4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-9-16	8	8.7	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen. /Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
			0.3 / 16.4	ASPHALT						
1	16				77	S1	24/18	0.5-2.5	14 40 37 22	Very dense, brown, SILTY SAND, some gravel, trace clay, w/ brick and ash & cinders. (Fill)
2	15									
3	14									
4	13			FILL	120/1"	S2	7/7	4.0-4.6	20 100/1"	Very dense, brown to gray, SILTY SAND, some clay and gravel, w/ ash & cinders. (Fill)
5	12									
6	11									
7	10									
8	9		8.0 / 8.7							
9	8									
10	7				2	S3	24/10	9.0-11.0	WOH/6" 1 1 1	Very soft to soft, gray, SILTY CLAY, trace gravel. (Dredge Fill)
11	6									
12	5									
13	4									
14	3									
15	2			DREDGE FILL	2	S4	24/19	14.0-16.0	WOH/6" 1 1 5	Very soft to soft, gray, SILTY CLAY, trace gravel. (Dredge Fill)
16	1									
17	0									
18	-1									
19	-2									
20	-3				6	S5	24/8	19.0-21.0	4 3 3 2	Loose, gray, fine grain, SILTY SAND, trace gravel. (Dredge Fill)
21	-4									
22	-5									
	-6		22.5 / -5.8	ORGANICS						

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
5" casing to 14 feet, 4" casing to 39 feet and 3" casing to 88.5 feet below ground surface. Hole grouted upon completion.

Weather:

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CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-13-16
City/State:	Boston, MA	**Date Finished:**	12-15-16

Boring No.

K-104

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.7

Casing Type: 5"/4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-9-16	8	8.7	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen. /Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
24	-7									
25	-8				3	S6	24/17	24.0-26.0	1 2 1 1	Soft, gray/black, SILTY ORGANICS, w/ shells. (Organics)
26	-9									
27	-10									
28	-11									
29	-12									
30	-13				2	S7	24/24	29.0-31.0	WOH/6" 1 1 1	Very soft to soft, gray/black, SILTY ORGANICS, w/ shells. (Organics)
31	-14			ORGANICS						
32	-15									
33	-16									
34	-17									
35	-18				2	S8	24/24	34.0-36.0	WOH/6" 1 1 1	Very soft to soft, gray/black, SILTY ORGANICS, trace peat, w/ shells. (Organics)
36	-19									
37	-20									
38	-21		37.5 / -20.8							
39	-22									
40	-23				9	S9	24/24	39.0-41.0	2 4 5 6	Stiff, gray/blue, SILTY CLAY. (Marine Clay)
41	-24									
42	-25			MARINE CLAY						
43	-26									
44	-27									
45	-28									
	-29									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
5" casing to 14 feet, 4" casing to 39 feet and 3" casing to 88.5 feet below ground surface. Hole grouted upon completion.

Weather:

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2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-13-16
City/State:	Boston, MA	**Date Finished:**	12-15-16

Boring No.

K-104

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.7

Casing Type: 5"/4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-9-16	8	8.7	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
47	-30									
48	-31									
49	-32									
50	-33				8	S10	24/24	49.0-51.0	2 4 4 6	Firm to stiff, gray, SILTY CLAY. (Marine Clay)
51	-34									
52	-35									
53	-36									
54	-37									
55	-38									
56	-39									
57	-40			MARINE CLAY						
58	-41									
59	-42									
60	-43				4	S11	24/24	59.0-61.0	1 2 2 3	Soft to firm, gray, SILTY CLAY. (Marine Clay)
61	-44									
62	-45									
63	-46									
64	-47									
65	-48									
66	-49									
67	-50									
68	-51									
	-52									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
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Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-13-16
City/State:	Boston, MA	**Date Finished:**	12-15-16

Boring No.

K-104

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.7

Casing Type: 5"/4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-9-16	8	8.7	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
70	-53				4	S12	24/24	69.0-71.0	WOH/6" 2 2 4	Soft to firm, gray, SILTY CLAY. (Marine Clay)
71	-54									
72	-55									
73	-56									
74	-57									
75	-58									
76	-59									
77	-60			MARINE CLAY						
78	-61									
79	-62									
80	-63				2	S13	24/24	79.0-81.0	WOR/6" WOH/6" 2 3	Very soft to soft, gray, SILTY CLAY. (Marine Clay)
81	-64									
82	-65									
83	-66									
84	-67		84.2 / -67.5							
85	-68		85.7 / -69.0	GLACIOMARINE	20	S14	18/8	84.2-85.7	8 9 11	Compact, gray, well graded mixture of, SILT, SAND and GRAVEL, trace clay. (Glaciomarine)
86	-69				~~100/4"~~	~~S14A~~	~~4/100/4"~~	~~85.7-86.0~~		Very dense, gray, weathered, CAMBRIDGE ARGILLITE. (Bedrock)
87	-70									
88	-71									
89	-72			BEDROCK						
90	-73									Moderately hard to hard, slight to moderate weathering, severly fractured, gray, amorphous, CAMBRIDGE ARGILLITE, moderately close, moderately dipping, smooth joints; very thin moderately dipping bedding, w/ calcite veins and fillings at joints. (Bedrock)
91	-74				0%	RC1	60/12	89.0-94.0		Severe fracturing most likely due to increased amount of calcite veins and filling within the rock.
	-75									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

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Notes:
5" casing to 14 feet, 4" casing to 39 feet and 3" casing to 88.5 feet below ground surface. Hole grouted upon completion.

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2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
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Project:	Parcel K	**Job #:**	5876
Location:	301 Northern Ave.	**Date Started:**	12-13-16
City/State:	Boston, MA	**Date Finished:**	12-15-16

Boring No.

K-104

Contractor: Northern Drill Service, Inc.
Driller/Helper: Carl/Jon
Logged By/Reviewed By: M. Sachs
Surface Elevation (ft): 16.7

Casing Type: 5"/4"/3"
Casing Hammer (lbs)/Drop (in): 140/30"
Sampler Size/Type: 24" Split Spoon
Sampler Hammer (lbs)/Drop (in): 140/30"

Groundwater Observations

Date	Depth	Elev.	Notes
12-9-16	8	8.7	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
93	-76								4 6 5 8	
94	-77									
95	-78			BEDROCK					5 3	Moderately hard to hard, slight to moderate weathering, severly fractured, gray, amorphous, CAMBRIDGE ARGILLITE, moderately close, moderately dipping, smooth joints; very thin moderately dipping bedding, w/ calcite veins and fillings at joints. (Bedrock)
96	-79				0%	RC2	48/29	94.0-98.0	3 4	Severe fracturing most likely due to increased amount of calcite veins and filling within the rock. In recovery most likely recovered some rock from RC1 that was left in the hole.
97	-80								3	
98	-81		98.0 / -81.3							
99	-82			Bottom of borehole at 98 feet below ground surface.						
100	-83									
101	-84									
102	-85									
103	-86									
104	-87									
105	-88									
106	-89									
107	-90									
108	-91									
109	-92									
110	-93									
111	-94									
112	-95									
113	-96									
114	-97									
	-98									

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
5" casing to 14 feet, 4" casing to 39 feet and 3" casing to 88.5 feet below ground surface. Hole grouted upon completion.

Weather:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

CARR-DEE CORP.

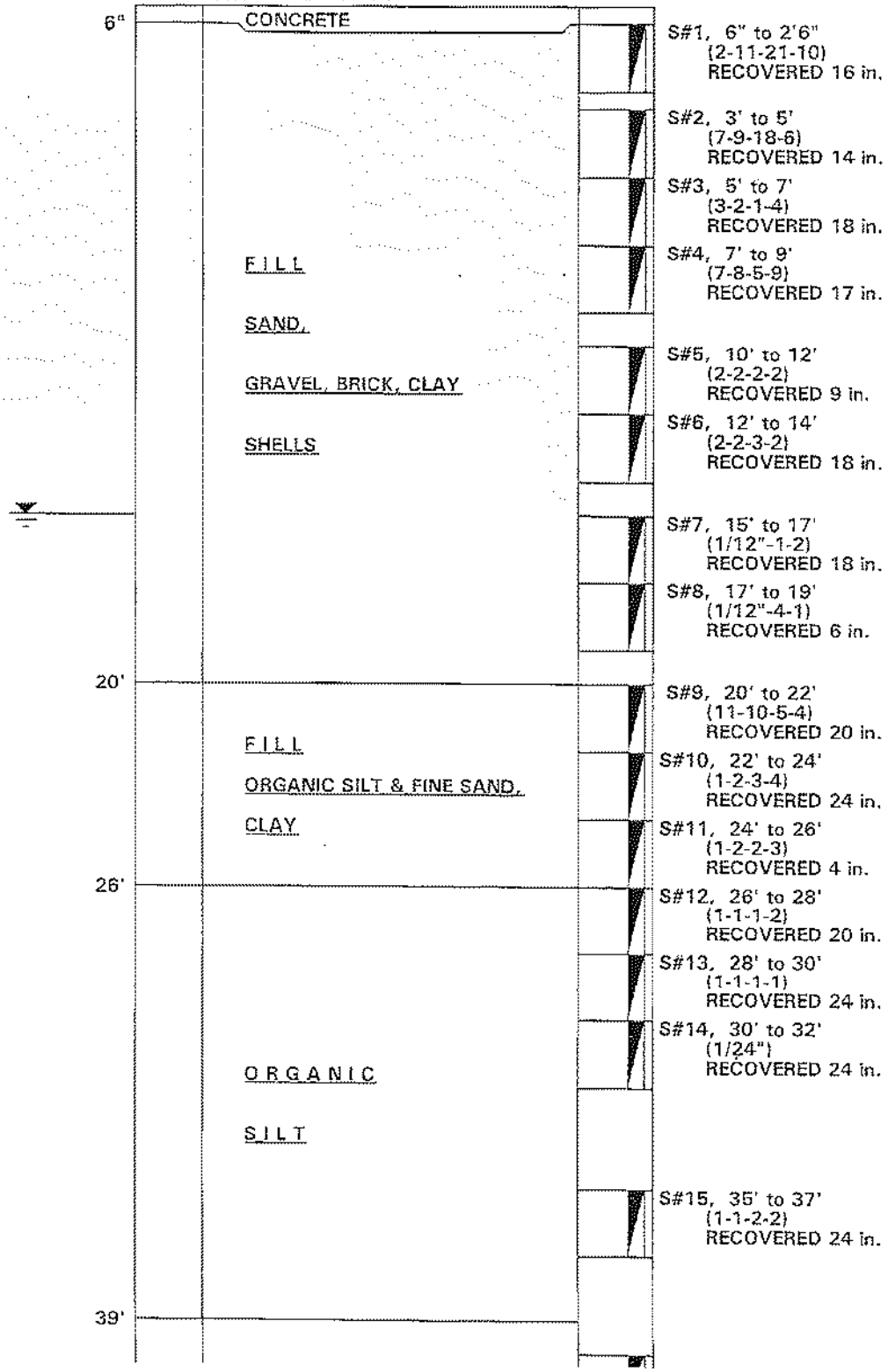
37 LINDEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500

To: McPHAIL ASSOCIATES, INC., 30 NORFOLK ST.,CAMBRIDGE,MA Date: Job No.: 2003-61

Location: SEAPORT HOTEL & RESIDENCES,NORTHERN AVE., & D ST.,BOSTON,MA Scale: 1 in. = 5 ft.

BORING G-106

GROUND SURFACE EL+112.8



All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

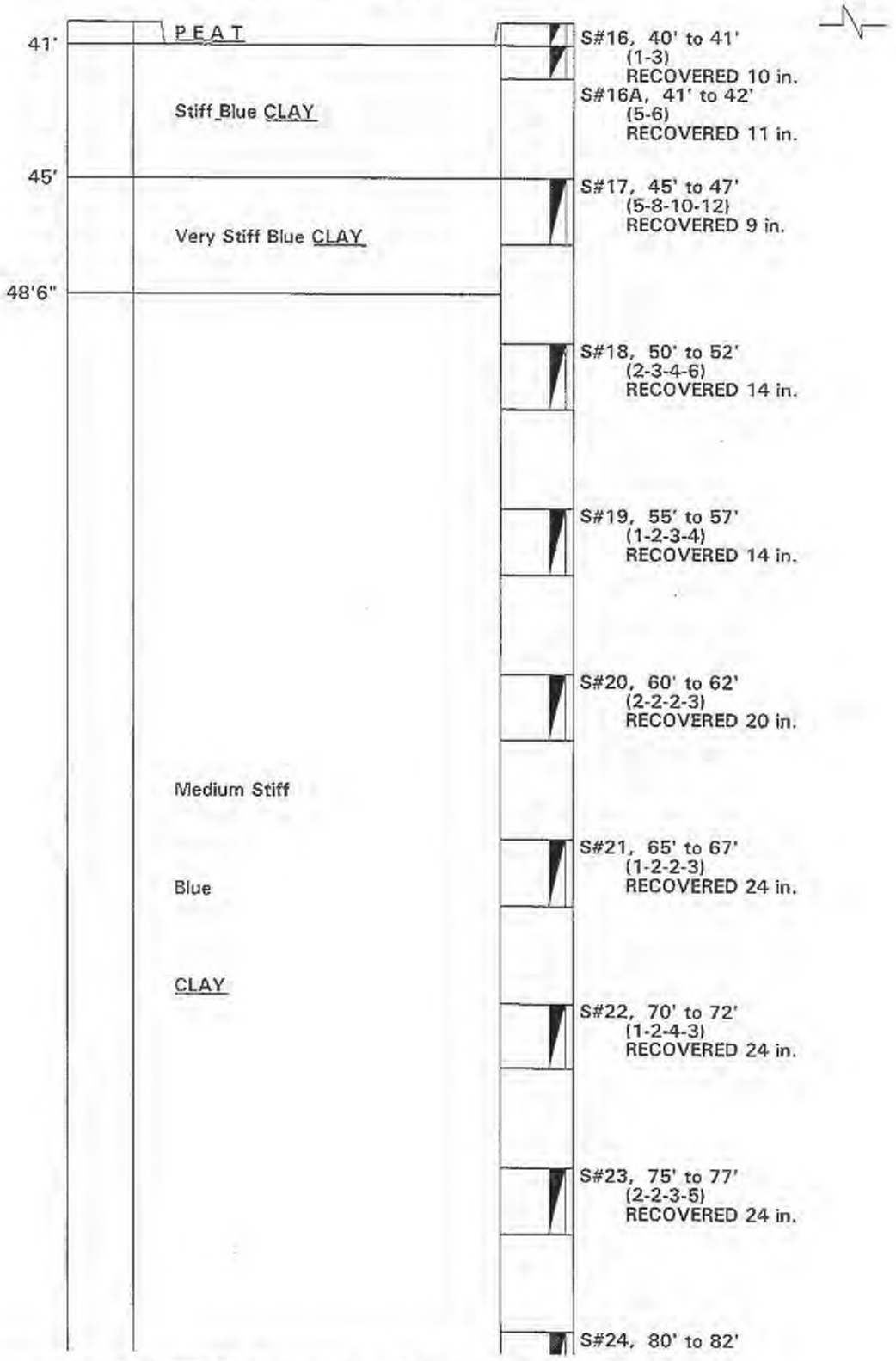
CARR-DEE CORP.

37 LINDEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500

To: McPHAIL ASSOCIATES, INC., 30 NORFOLK ST.,CAMBRIDGE,MA Date: _____ Job No.: 2003-61

Location: SEAPORT HOTEL & RESIDENCES,NORTHERN AVE., & D ST.,BOSTON,MA Scale: 1 in. = 5 ft.

BORING G-106



All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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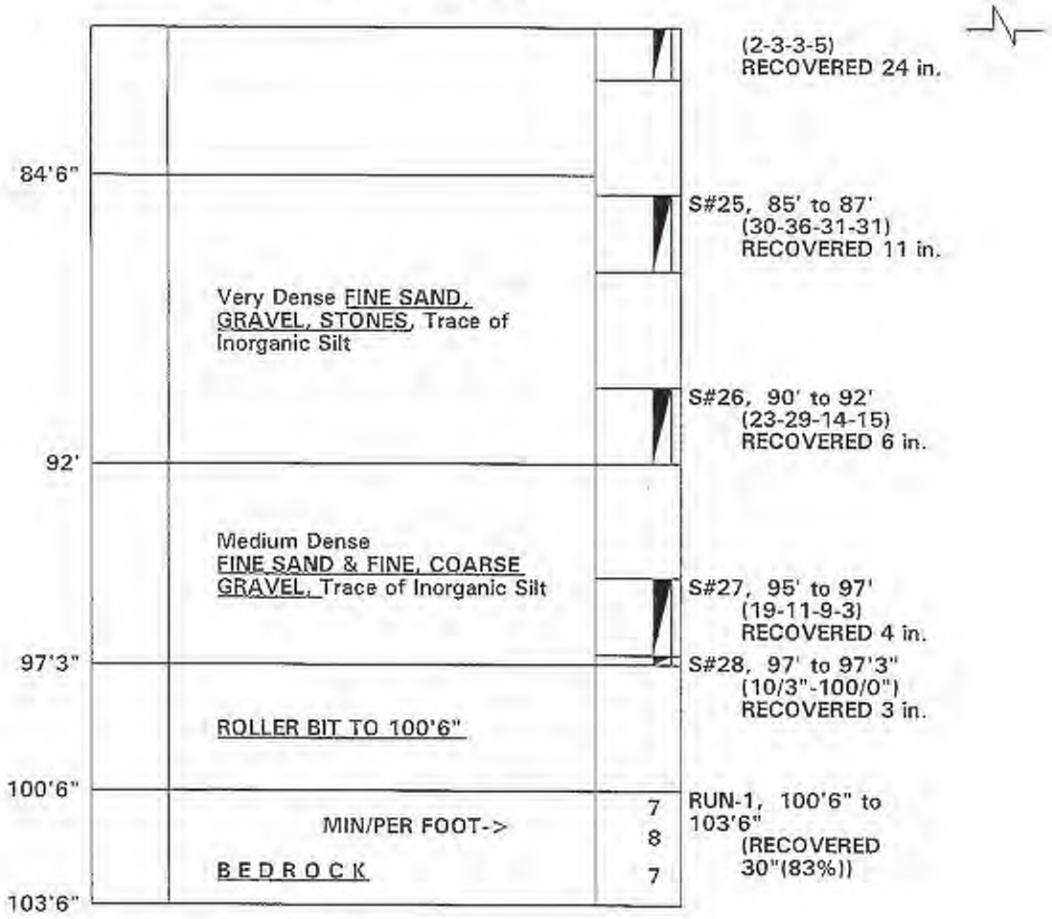
37 LINDEN STREET P.O. BOX 67 MEDFORD, MA 02155-0001 Telephone (617) 391-4500

To: McPHAIL ASSOCIATES, INC., 30 NORFOLK ST.,CAMBRIDGE,MA Date: _____ Job No.: 2003-61

Location: SEAPORT HOTEL & RESIDENCES,NORTHERN AVE., & D ST.,BOSTON,MA Scale: 1 in. =. 5 ft.

BORING G-106



WATER LEVEL 15'
SIZE OF AUGERS 3-3/4" I.D., LENGTH 15'0"
SIZE OF CASING NW, LENGTH 97/3"
SIZE OF ROCK CORE BX, LENGTH DRILLED: 3'0"
DRILLER JOSEPH DE SIMONE, INSPECTOR: TOM CORMICAN
DATE STARTED & COMPLETED: 4-24-2003, 4-25-2003

All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches(±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

Haley & Aldrich, Inc. — **TEST BORING LOG** — **BORING SB2-46**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

CONTRACT : 89374
SHEET NO. : 1 of 5
LOCATION N: 2951942
E : 780432
ELEVATION : 109.7
DATE START: 31-1-90
END : 2-2-90
DRILLER : A. Redford
INSPECTOR : D. Warren

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	NW	S	----
02-01-90	0715	8.5	35.0	62.0	Size I.D.:	3"	1 3/8"	----
					Hammer Wt.:	----	140#	----
					Hammer Fall:	----	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			18 28 19 19	S1		0.5 2.5	12"	109.4 0.3	-BITUMINOUS ASPHALT- Dry, dense, brown COARSE TO FINE SAND and fine gravel, some silt, trace brick, cinders.
									-GRANULAR FILL-
								105.7 4.0	
5			3 3 3 3	S2		4.5 6.5	19"		Moist, medium stiff, gray CLAY and silt, trace fine sand in frequent partings.
									-COHESIVE FILL-
10			WOH " 3 3	S3		10.0 12.0	24"		Wet, loose, gray FINE SAND and silt, trace clay, shell fragments, organics. (SM)
15			5 3 1 3	S4		15.0 17.0	20"		Wet, medium stiff, gray ORGANIC SILT, some fine sand, little clay, trace shell fragments, peat fibers. Strong organic odor.
								91.2 18.5	
20			3 1 2 3	S5		20.0 22.0	24"		Wet, soft, gray ORGANIC SILT, some fine sand, trace coarse gravel, shells, peat fibers, with occasional irregular pockets of coarse to fine sand.
									-ORGANIC DEPOSITS-
								85.7 24.0	
									Wet, medium stiff, brown fibrous PEAT.

24 MAY 91

STP

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 123.0'
Rock: 2.1'
Samples: S25

BORING SB2-46

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-46
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			2 3 3 7	S6	25.0 27.0	24"	83.7 26.0	Wet, medium stiff, brown fibrous PEAT. -ORGANIC DEPOSITS- Wet, stiff, gray CLAY and silt, trace peat fibers, fine sand in irregular pockets and partings. PP = 1.0 TSF. -MARINE DEPOSITS-
30			14 14 18 20	S7	30.0 32.0	24"		Moist, hard, yellow brown CLAY an d silt, trace fine sand in occasional partings. PP > 4.5 TSF.
35			3 3 5 5	S8	35.0 37.0	24"		Moist, medium stiff, gray CLAY and silt, trace fine sand in occasional partings. PP = 1.0 TSF. -MARINE DEPOSITS-
40			WOR 2 3 4	S9	40.0 42.0	24"		Moist, medium stiff, gray SILT and clay, trace fine sand. (CL) PP = 0.50 TSF.
45			WOR WOH 3 4	S10	45.0 47.0	24"		DO. except soft. PP = 0.25 TSF.
50			WOR " WOH 4	S11	50.0 52.0	24"		DO. except very soft.

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	123.0'
Rock:	2.1'
Samples:	S25

BORING SB2-46

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-46**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR " 3 4	S12	55.0 57.0	24"		Moist, soft, gray CLAY an d silt. -MARINE DEPOSITS-
60			WOR " " 3	S13	60.0 62.0	24"		DO. except very soft.
65			WOR " " WOH	S14	65.0 67.0	24"		DO. PP = 0.25 TSF.
70			WOR " " "	S15	70.0 72.0	24"		DO. PP < 0.25 TSF.
75			WOR " " 3	S16	75.0 77.0	24"		DO. PP < 0.25 TSF.
80			WOR " 1 2	S17	80.0 82.0	24"		DO. PP < 0.25 TSF.

24 MAY 91

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	- S - Split Spoon	Overburden: 123.0'
4-10	Loose	2-4	Soft	- T - Thin Wall Tube	Rock: 2.1'
10-30	Medium Dense	4-8	Medium Stiff	- U - Undisturbed Piston	Samples: S25
30-50	Dense	8-15	Stiff	- C - Diamond Core	
50+	Very Dense	15-30	Very Stiff	- W - Wash Sample	BORING **SB2-46**
		30+	Hard	- See Remarks	

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-46**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR " " WOH	S18	85.0 87.0	24"		Moist, very soft, gray CLAY and silt. PP < 0.25 TSF. -MARINE DEPOSITS-
90			WOR " " 3	S19	90.0 92.0	24"		DO. PP < 0.25 TSF.
95			WOR " " 3	S20	95.0 97.0	24"		DO. PP < 0.25 TSF.
100			WOR " " 2	S21	100.0 102.0	24"		DO. PP < 0.25 TSF.
105			WOR " " 4	S22	105.0 107.0	24"		DO. PP < 0.25 TSF.
							3.2 106.5	Moist, stiff, gray, interbedded SILT and clay, little fine sand. -GLACIOLACUSTRINE DEPOSITS-
							0.7 109.0	
110			46 41 55 83	S23	110.0 112.0	12"		Moist, very dense, gray brown COARSE TO FINE SAND, some fine gravel, little silt, clay. -GLACIOMARINE DEPOSITS-
							-5.3	

24 MAY 91

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY
0-4	Very Loose	0-2	Very Soft
4-10	Loose	2-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	Very Stiff
		30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 123.0'
Rock: 2.1'
Samples: S25

BORING **SB2-46**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-46**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			46 56 74 26	S24	115.0 117.0	13"	115.0	Moist, very dense, gray COARSE TO FINE SAND and silt, some fine gravel, trace clay. -GLACIAL TILL DEPOSITS-
120			43 100 39 28	S25	120.0 122.0	13"		DO.
							-13.3 123.0	POSSIBLE TOP OF BEDROCK 123.0'
								-CAMBRIDGE FORMATION-
125			200/1"	NR	125.0 125.1		-15.4 125.1	BOTTOM OF EXPLORATION 125.1' BOREHOLE GROUTED UPON COMPLETION WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER BPF = BLOWS PER FOOT PP = AVERAGE POCKET PENETROMETER READING

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	123.0'
Rock:	2.1'
Samples:	S25

BORING **SB2-46**

Haley & Aldrich, Inc. — **TEST BORING LOG** — **BORING SB2-49**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW/NW	S	NV-2
1-25-90	0830	4.9	0.0	12.0	Size I.D.:	4"/3"	1 3/8"	2"
					Hammer Wt.:	300#	140#	----
					Hammer Fall:	24"	30"	----

CONTRACT : 89374
SHEET NO. : 1 of 5
LOCATION N: 2951854
E : 780529
ELEVATION : 109.2
DATE START: 25-1-90
END : 31-1-90
DRILLER : P. Wordell
INSPECTOR : B. Byrne

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			25 20 18 12	S1	0.2 2.2	13"	108.3 0.9 107.9 1.3	-BITUMINOUS ASPHALT- Dry, dense, light brown COARSE TO FINE SAND, little fine gravel, trace silt. -GRANULAR FILL-
5			2 2 6 5	S2	5.0 7.0	17"		Moist, loose, gray COARSE TO FINE SAND, little fine gravel, silt, trace clay, brick fragments. -MISCELLANEOUS FILL-
10			WOR 1 WOH "	S3	10.0 12.0	20"	99.2 10.0	Moist, very soft, gray CLAY and silt, little fine sand in frequent layers from 11.5' to 12.0'. -COHESIVE FILL-
15			PUSH " "	NR	15.0 17.0	0"		Pushed 3" diameter undisturbed tube sample in cohesive fill from 15.0' to 17.0'. No recovery.
			PUSH " "	U1	18.0 20.0	24"		Pushed 3" diameter undisturbed tube sample in cohesive fill from 18.0' to 20.0'. Recovered 24". (SM-CL)
20							84.7 24.5	

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 108.4'
Rock: 25.2'
Samples: S14U8C5

BORING SB2-49

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-49
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			1 WOH 1 1	S4	25.0 27.0	9"		Moist, very soft, gray ORGANIC CLAY and silt, trace fine sand, shell fragments. -ORGANIC DEPOSITS-
			PUSH " "	U2	28.0 30.0	22"		Pushed 3" diameter undisturbed tube sample in organic silt from 28.0' to 30.0'. Recovered 22". (OH)
30							75.2 34.0	Moist, soft, dark brown, fibrous PEAT. -ORGANIC DEPOSITS-
35			4 9 12 17	S5	35.0 37.0	15"	73.7 35.5	Moist, very stiff, gray CLAY and silt. PP = 3.5 TSF. -MARINE DEPOSITS-
40			PUSH " "	U3	40.0 42.0	19"		Pushed 3" diameter undisturbed tube sample in marine clay from 40.0' to 42.0'. Recovered 19". (CH)
45			1 2 2 2	S6	45.0 47.0	24"		DO. except soft. PP = 0.25 TSF.
50			PUSH " "	U4	50.0 52.0	23"		Pushed 3" diameter undisturbed tube sample in marine clay from 50.0' to 52.0'. Recovered 22". (CH/CL)

24 MAY 91

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY
0-4	Very Loose	0-2	Very Soft
4-10	Loose	2-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	Very Stiff
		30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	108.4'
Rock:	25.2'
Samples:	S14U8C5

BORING SB2-49

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-49**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR 1 3 2	S7	55.0 57.0	24"		Moist, soft, gray CLAY and silt. PP = 0.25 TSF.
								-MARINE DEPOSITS-
60			PUSH " "	U5	60.0 62.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 60.0' to 62.0'. Recovered 24". (CH)
65			WOR 1 3 3	S8	65.0 67.0	24"		DO. PP = 0.25 TSF.
70			PUSH " "	U6	70.0 72.0	23"		Pushed 3" diameter undisturbed tube sample in marine clay from 70.0' to 72.0'. Recovered 23". (CL/CH)
75			WOR 1 3 3	S9	75.0 77.0	24"		DO. PP = 0.25 TSF.
80			PUSH " "	U7	80.0 82.0	23"		Pushed 3" diameter undisturbed tube sample in marine clay from 80.0' to 82.0'. Recovered 23". (CH)

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	108.4'
Rock:	25.2'
Samples:	S14U8C5

BORING **SB2-49**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-49**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR 2 3 4	S10	85.0 87.0	24"		Moist, medium stiff, gray CLAY and silt. PP = 0.25 TSF. -MARINE DEPOSITS-
90			PUSH " " "	U8	90.0 92.0	23"		Pushed 3" diameter undisturbed tube sample in marine clay from 90.0' to 92.0'. Recovered 23". (CL)
95			WOR 2 3 4	S11	95.0 97.0	24"		DO. PP < 0.25 TSF.
							9.5 99.7	
100			8 12 12 24	S12	100.0 102.0	8"		Moist, medium dense, gray COARSE TO FINE SAND, some fine gravel, little silt, clay. -GLACIOMARINE DEPOSITS-
105			32 41 42 37	S13	105.0 107.0	10"	4.2 105.0	Moist, very dense, gray COARSE TO FINE SAND and fine gravel, some silt, trace clay in disrupted pockets. -GLACIAL TILL DEPOSITS-
			75 100/0 40%	S14 C1	108.4 109.1 109.1 113.6	4" 42"	0.8 108.4 0.1 109.1	TOP OF BEDROCK 108.4' Moist, very dense, gray FINE GRAVEL and coarse to fine sand in angular argillite fragments. -FRACTURED BEDROCK- Moderately hard, very slightly weathered, moderately fractured, gray, aphanitic ARGILLITE. Bedding very thin, dipping at 40 degrees. Joints very close, open, smooth planar and dipping parallel to bedding planes. Open, smooth, planar, high angle joint at 109.9'.
110		3 4 5 5 5 5	50%	C2	113.6 118.6	60"		-CAMBRIDGE FORMATION- C2: DO. except extremely fractured. Joints very close and dipping parallel to bedding planes. Sound from 113.6' to 114.7'.

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	108.4'
Rock:	25.2'
Samples:	S14U8C5

BORING **SB2-49**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-49**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		5						
		5						
		5						
		5	50%	C3	118.6 123.6	60"		C3: DO. except moderately fractured to sound. Joints close, tight, smooth, planar and dipping parallel to bedding planes. Tight, smooth, planar, calcite coated, high angle joints at 119.9' and 122.1' Slickensided at 122.1'.
-120-		6						
		5						
		5						
		5						
		5						-CAMBRIDGE FORMATION-
		5	73%	C4	123.6 128.6	56"		C4: DO. except joints dipping at low to moderate angles. Clay infilled joint at 125.3'.
-125-		4						NOTE: Lost core assigned to bottom of run.
		4						
		5						
		3						
		5						NOTE: Total water loss at 128.2'.
		4	77%	C5	128.6 133.6	60"		C5: DO. except with open, rough, undulating high angle joints at 130.6' and 130.8'. Calcite infilled joint at 128.6', clay seam at 131.1'.
-130-		5						
		4						
		5					-24.4 133.6	BOTTOM OF EXPLORATION 133.6' BOREHOLE GROUTED UPON COMPLETION WOH = WEIGHT OF HAMMER WOR = WEIGHT OF RODS RQD = ROCK QUALITY DESIGNATION BPF = BLOWS PER FOOT PP = AVERAGE POCKET PENETROMETER READING

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	108.4'
Rock:	25.2'
Samples:	S14U8C5

BORING **SB2-49**

Haley & Aldrich, Inc. **TEST BORING LOG** BORING **SB2-50**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

CONTRACT : 89374
SHEET NO. : 1 of 7
LOCATION N: 2951593
E : 780442
ELEVATION : 115.2
DATE START: 5-2-90
END : 15-2-90
DRILLER : R. Jones
INSPECTOR : D. Burke

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW/NW	S	NV-2
02-06-90	0645	10.0	15.0	15.0	Size I.D.:	4"/3"	1 3/8"	2"
02-12-90	0700	15.7	134.5	144.5	Hammer Wt.:	300#	140#	----
02-13-90	0645	14.7	134.5	163.6	Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			5 12 25 27	S1	0.0 2.0	18"		Moist, dense, black gray COARSE TO FINE SAND, some silt, little fine gravel, trace clay, wood, brick, coal fragments, cinder particles.
								-MISCELLANEOUS FILL-
5			26 34 110/3"	S2	5.0 6.3	12"		Dry, very dense, brown COARSE TO FINE SAND, some silt, fine gravel, trace brick, cinder, coal particles. NOTE: Possibly pushing cobble.
							106.7 8.5	
10			5 38 8 10	S3	10.0 12.0	14"		Wet, hard, brown gray SILT and clay, some coarse to fine sand, trace wood, cinder, coal particles. NOTE: Possibly pushing cobble.
								-COHESIVE FILL-
15			4 9 21 14	S4	15.0 17.0	5"		Wet, very stiff, mottled black gray CLAY and silt, little coarse to fine sand, trace coarse gravel. Strong hydrocarbon odor.
20			PUSH " "	U1	21.0 23.0	7"		Pushed 3" diameter undisturbed tube sample in cohesive fill from 21.0' to 23.0'. Recovered 7". (GP)
							90.2	

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 134.5'
Rock: 50.4'
Samples: S16U6C16

BORING **SB2-50**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-50
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 7

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			4 5 7 8	S5	25.5 27.5	20"	25.0	Wet, stiff, yellow gray ORGANIC CLAY and silt, trace coarse to fine sand in frequent partings, seams. -ORGANIC DEPOSITS-
30			PUSH " "	U2	31.0 33.0	16"		Pushed 3" diameter undisturbed tube sample in organic deposits from 31.0' to 33.0'. Recovered 16". (OH)
35			11 21 23 27	S6	36.0 38.0	20"	79.7 35.5	Wet, hard, yellow gray CLAY and silt, trace fine sand in frequent partings. PP = 4.5 TSF. -MARINE DEPOSITS-
40			PUSH " "	NR	41.0 43.0	0"		Attempted 3" diameter undisturbed tube sample in marine clay deposit form 41.0' to 42.0'. No recovery.
45			4 4 6 7	S7	46.0 48.0	20"		Wet, stiff, yellow gray CLAY and silt, trace fine sand in frequent partings. PP = 1.0 TSF.
50			PUSH " "	NR	51.0 53.0	0"		Attempted 3" diameter undisturbed tube sample in marine clay from 51.0' to 53.0'. No recovery.

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	134.5'
Rock:	50.4'
Samples:	S16U6C16

BORING SB2-50

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-50**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 7

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			4 4 7 9	S8	56.0 58.0	23"		Wet, stiff, gray CLAY and silt, trace fine sand in occasional partings. PP = 0.75 TSF. -MARINE DEPOSITS-
60			PUSH " "	U3	61.0 63.0	12"		Pushed 3" diameter undisturbed tube sample in marine clay from 61.0' to 63.0'. Recovered 12". (CH/CL)
65			3 4 5 4	S9	66.0 68.0	10"		Wet, stiff, gray CLAY and silt. PP = 0.5 TSF.
70			PUSH " "	U4	71.0 73.0	12"		Pushed 3" diameter undisturbed tube sample in marine clay from 71.0' to 73.0'. Recovered 12". (CL/CH)
75			4 5 6 6	NR	76.0 78.0	0"		No recovery.
80			PUSH " "	NA	81.0 83.0	2"		Attempted 3" diameter undisturbed tube sample in marine clay from 81.0' to 82.0'. Recovered 2": Tube rejected.

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	134.5'
Rock:	50.4'
Samples:	S16U6C16

BORING **SB2-50**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-50**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 7

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR " 3	S10	86.0 88.0	24"		Wet, very soft, gray CLAY and silt, trace fine sand in occasional parting. PP = < 0.25 TSF.
90								-MARINE DEPOSITS-
			PUSH " "	NR	91.0 93.0	5"		Attempted 3" diameter undisturbed tube sample in marine clay from 91.0' to 93.0'. Recovered 5": Tube rejected.
			WOR " 1	S11	93.0 95.0	24"		Wet, very soft, gray CLAY and silt. PP < 0.25 TSF.
95								
			PUSH " "	U5	96.0 98.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 96.0' to 98.0'. Recovered 24". (CH/CL)
100								
			WOR " "	S12	101.0 103.0	24"		Wet, very soft, blue gray CLAY and silt. PP = 0.25 TSF.
105								
			PUSH " "	NA	106.0 108.0	8"		Attempted 3" diameter undisturbed tube sample in marine clay from 106.0' to 108.0'. Recovered 8": Tube rejected.
110								
			WOR " 3 4	S13	111.0 113.0	24"		Wet, soft, gray CLAY and silt. PP = 0.5 TSF.

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	134.5'
Rock:	50.4'
Samples:	S16U6C16

BORING **SB2-50**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-50**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 7

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			PUSH " "	U6	116.0 118.0	9"		Pushed 3" diameter undisturbed tube sample in marine clay from 116.0' to 118.0'. Recovered 9". (CL)
								-MARINE DEPOSITS-
120			1 4 7 20	S14	121.0 123.0	23"	-6.8 122.0	Wet, stiff, gray, interbedded SILT and clay, some fine sand in frequent seams.
								-GLACIOLACUSTRINE DEPOSITS-
125			3 8 10 26	S15	126.0 128.0	7"		DO. except very stiff.
							-12.8 128.0	-POSSIBLE GLACIOMARINE DEPOSITS-
130			47 32 31 28	S16	130.5 132.5	4"	-15.3 130.5	Wet, very dense, gray COARSE TO FINE SAND and fine gravel, little silt.
								-GLACIAL TILL DEPOSITS-
							-19.3 134.5	TOP OF BEDROCK 134.5'
135		3	0%	C1	135.5 139.5	48"		NOTE: Advanced casing to 134.5' and began coring. C1: Very hard, moderately weathered, extremely fractured, green gray, medium to fine grained DIORITE. Joints very close, open, rough, planar, dipping at high to vertical angles. Joint surfaces generally discolored and oxidized. Some joint surfaces carbonized and contain very thin clay, silt or epidote coatings. Core surface consistently pitted.
		4						-FRACTURED BEDROCK-
		5						
		5						
		7	0%	C2	139.5 144.5	60"		C2: DO. except slickensided joint surfaces at 140.2', 141.3' and 143.8'.
140		6						
		6						
		7						
		6						-CAMBRIDGE FORMATION-
		6	17%#	C3	144.5	48"		C3: DO. except with frequent slickensided joint surfaces

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	134.5'
Rock:	50.4'
Samples:	S16U6C16

BORING **SB2-50**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-50**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 6 of 7

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		6			148.5			from 145.9' to 148.5'. Core surface pitted from 144.5' to 147.2' and smooth from 147.2' to 148.5'.
		6						
		7						-FRACTURED BEDROCK-
		6	27%#	C4	148.5 149.8	15"		C4: Very hard, moderately weathered, extremely fractured green gray medium to fine grained DIORITE. Joints very close to close, open, smooth, planar to undulating, dipping from 25 to 60 degrees. Joint surfaces generally fresh with occasional clay and silt infilling. Slickensided joint surfaces from 149.0' to 149.2'. Core surface pitted.
		6						
150		5	7%#	C5	149.8 154.4	54"		C5: DO. Slickensides at 152.8'.
		5						
		5						
		6						
		7	23%	C6	154.4 158.8	52"	-39.3 154.5	C6: Do. except slightly weathered and moderately fractured. Joints dipping from 15 to 80 degrees. Joints frequently occur along steeply dipping calcite veins, occasional clay and silt infilling. Slickensides at 155.4'.
155		6						
		5						
		5						
		5						
		6	15%	C7	158.8 161.0	26"		C7: DO.
160		5						
		6	0%	C8	161.0 163.6	30"		C8: DO. Numerous healed joints along steeply dipping calcite veins. Slickensides at 161.8'.
		7						
		5						
		5	0%	C9	163.6 166.0	24"	-49.2 164.4	C9: DO. except moderately weathered and frequent clay and silt infilling.
165		7						
		6	0%	C10	166.0 167.3	13"		Hard, fine grained to moderately weathered, extremely fractured, gray, aphanitic, tuffaceous ARGILLITE.
		7	0%	C11	167.3 168.1	11"		C10: DO. Bedding very thin dipping at 65 degrees. Occasional thin to very thin seams of gray white tuff dipping parallel to bedding. Joints very close, tight, smooth, stepped to planar dipping at 70 degrees in various directions. Joint surfaces generally fresh, occasionally oxidized.
		6	0%	C12	168.1 170.2	23"		-CAMBRIDGE FORMATION-
		6						C11: DO. except slightly weathered and aphanitic. Joint surfaces occasionally calcite coated.
170		6	0%	C13	170.2 175.5	62"		C12: DO. except moderately to extremely fractured. Joint surfaces generally fresh, occasionally very slightly oxidized. Numerous healed joints and slickensides at 169.8'.
		6						C13: Hard, slightly weathered, extremely fractured, gray, aphanitic ARIGILLITE. Distinct very thin bedding dipping at 60 degrees. Joints very close, open, smooth, planar, occasionally stepped, dipping from 25 to 90 degrees. Extremely fractured zone from 172.2' to 175.5'
		7						
		6						
		5						

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 134.5'
Rock: 50.4'
Samples: S16U6C16

BORING **SB2-50**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-50
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 7 of 7

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		5	0%	C14	175.5 177.9	29"		associated with intersecting vertical and steeply dipping joints. Joint surfaces generally fresh, occasionally very slightly oxidized. Slickensides at 170.3' 170.5' and 171.3'.
		5						C14: DO. except extremely fractured zone from 177.9' to 181.7' associated with intersecting vertical and steeply dipping joints.
		5						-CAMBRIDGE FORMATION-
		5	0%	C15	177.9 181.7	44"		C15: DO. except joints occasionally parallel to bedding. Occasional clay and silt infilling.
-180-								
			22%	C16	181.7 184.9	32"		C16: DO. except moderately fractured. Joints close, tight smooth, planar dipping at 40 and 60 degrees. Vertical joint at 182.6'. Joint surfaces generally fresh, slight epidote coatings.
								NOTE: 100% water loss from 135.5' to 182.0'. Core runs C3 to C16 terminated due to jammed core barrel at bottom of run.
							-69.7 184.9	BOTTOM OF EXPLORATION 184.9'
								BOREHOLE GROUTED UPON COMPLETION
								WOR = WEIGHT OF RODS
								BPF = BLOWS PER FOOT
								RQD = ROCK QUALITY DESIGNATION
								PP = AVERAGE POCKET PENETROMETER READING
								# = ROD MODIFIER : ROCK MODERATELY WEATHERED

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	134.5'
Rock:	50.4'
Samples:	S16U6C16

BORING SB2-50

Haley & Aldrich, Inc. **TEST BORING LOG** BORING **SB2-51**

PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**
CONTRACTOR: **GZA DRILLING, INC.**

CONTRACT : **89374**
SHEET NO. : **1 of 5**
LOCATION N: **2951714**
E : **780478**
ELEVATION : **112.9**
DATE START: **28-12-89**
END : **4-1-90**
DRILLER : **R. Jones**
INSPECTOR : **J. Nixa**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW/NW	S	----
12-28-89	1000	11.0	10.0	12.0	Size I.D.:	4"/3"	1 3/8"	----
12-29-89	0738	3.3	10.0	41.0	Hammer Wt.:	300#	140#	----
01-02-90	0745	8.0	41.0	74.0	Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			72/4"	S1	2.0 2.4	3"		Dry, very dense, black brown FINE SAND and silt, little fine gravel, coarse sand. -GRANULAR FILL-
5			27 19 15 13	S2	5.0 7.0	14"		Moist, dense, brown black COARSE TO FINE SAND, trace brick fragments, cinders.
							104.4 8.5	
10			2 3 5 10	S3	10.0 12.0	14"		Wet, medium stiff, gray CLAY and silt, little coarse to fine sand, trace shell fragments. -COHESIVE FILL-
							99.4 13.5	
15			4 9 8 11	S4	15.0 17.0	24"		Wet, very stiff, gray brown CLAY and coarse to fine sand, little silt. -COHESIVE FILL-
20			3 2 5 3	S5	20.0 22.0	19"		Wet, medium stiff, gray black SILT and clay, little fine sand.
			11 7	S6	24.0 26.0	18"	88.9 24.0	Wet, stiff, gray black ORGANIC SILT and fine sand, some

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 123.0'
Rock: 5.6'
Samples: S27

BORING **SB2-51**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-51
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			5 4					clay, trace shell fragments.
								-ORGANIC DEPOSITS-
30			1 2 1 2	S7	29.0 31.0	24"		Wet, soft, gray ORGANIC SILT and clay, trace shells. Slight organic odor.
							78.9 34.0	Wet, stiff, brown, fibrous PEAT, little organic silt.
35			2 3 6 7	S8	34.0 36.0	24"		-ORGANIC DEPOSITS-
							75.4 37.5	
40			10 13 16 19	S9	39.0 41.0	22"		Wet, very stiff, gray brown CLAY and silt. PP = 4.0 TSF.
								-MARINE DEPOSITS-
45			2 4 6 5	S10	44.0 46.0	24"		Wet, stiff, gray brown CLAY and silt. PP = 1.0 TSF.
50			3 2 4 6	S11	49.0 51.0	22"		Wet, medium stiff, gray brown CLAY and silt. PP = 0.75 TSF.
			3 3	S12	54.0 56.0	24"		DO. except trace fine sand frequent partings.

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	123.0'
Rock:	5.6'
Samples:	S27

BORING SB2-51

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-51
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			4 4					
60			3 3 5 7	S13	59.0 61.0	24"		Moist, medium stiff, gray CLAY and silt, trace shells. PP = 0.5 TSF.
								-MARINE DEPOSITS-
65			WOR 3 4 4	S14	64.0 66.0	23"		DO. except no shells. PP = 0.5 TSF.
70			WOR " 2 4	S15	69.0 71.0	23"		DO. except soft. PP = 0.5 TSF.
75			1 2 3 3	S16	74.0 76.0	24"		DO. except medium stiff. PP = 0.25 TSF.
80			WOR " " 3	S17	79.0 81.0	23"		DO. except very soft. PP < 0.25 TSF.
			WOR "	S18	84.0 86.0	23"		DO.

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- - See Remarks

SUMMARY

Overburden:	123.0'
Rock:	5.6'
Samples:	S27

BORING SB2-51

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-51
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR 3					
90			WOR " "	S19	89.0 91.0	24"		Wet, very soft, gray CLAY and silt. PP < 0.25 TSF.
								-MARINE DEPOSITS-
95			WOR " 1	S20	94.0 96.0	23"		DO. PP < 0.25 TSF.
100			WOR " 2	S21	99.0 101.0	23"		DO. PP < 0.25 TSF.
105			WOR " 3	S22	104.0 106.0	24"		DO. except trace coarse sand. PP < 0.25 TSF.
110			WOR " 3 5	S23	109.0 111.0	22"	2.9 110.0	Wet, soft, gray, interbedded SILT and clay, some fine sand. NOTE: Pushing cobble, angular piece of argillite. -GLACIOLACUSTRINE DEPOSITS-
							0.9 112.0	-GLACIOMARINE DEPOSITS-
			20 24	S24	114.0 116.0	7"		Wet, dense, gray COARSE TO FINE SAND and fine gravel, little clay, silt, trace coarse gravel.

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	123.0'
Rock:	5.6'
Samples:	S27

BORING SB2-51

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-51
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			22 17					-GLACIOMARINE DEPOSITS-
							-4.1 117.0	
120			18 22 30 28	S25	118.5 120.5	7"		Wet, very dense, gray FINE GRAVEL, some coarse to fine sand, little silt, trace clay. (GM) -GLACIAL TILL DEPOSITS-
							-10.1 123.0	TOP OF BEDROCK 123.0'
125			27 24 39 45	S26	123.5 125.5	8"		Wet, very dense, gray SILT, some fine gravel, little coarse to fine sand, clay. Material consists of very severely to completely weathered argillite. -DECOMPOSED BEDROCK- NOTE: Conducted VHPT-1 and VHPT-2 from 120.5' to 125.5'.
								Wet, very dense, gray COARSE TO FINE SAND and fine gravel, little silt. Coarse fragment consists of angular argillite.
			100/1 55*/0	S27	128.5 128.6		-15.7 128.6	BOTTOM OF EXPLORATION 128.6' BOREHOLE GROUTED UPON COMPLETION WOR = WEIGHT OF RODS BPF = BLOWS PER FOOT PP = AVERAGE POCKET PENETROMETER READING * = USED 300# HAMMER TO DRIVE SAMPLER VHPT = VARIABLE HEAD PERMEABLILITY TEST

24 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- - See Remarks

SUMMARY

Overburden:	123.0'
Rock:	5.6'
Samples:	S27

BORING SB2-51

Haley & Aldrich, Inc. **TEST BORING LOG** **BORING SB2-52**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

CONTRACT : 89374
SHEET NO. : 1 of 4
LOCATION N: 2951848
E : 780638
ELEVATION : 109.6
DATE START: 19-1-90
END : 24-1-90
DRILLER : P. Wordell
INSPECTOR : B. Byrne

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	S	----
01-19-90	1230	3.4	5.0	7.0	Size I.D.:	4"	1 3/8"	----
01-23-90	0700	3.4	20.0	20.0	Hammer Wt.:	300#	140#	----
					Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			8 8 16 8	S1		0.3 2.3	12"	109.3 0.3	-BITUMINOUS ASPHALT- Dry, medium dense, brown, COARSE TO FINE SAND, trace fine gravel, silt, with cobbles.
									-GRANULAR FILL-
5			8 14 3 2	S2		5.0 7.0	1"		DO.
			4 12 5 4	S3		7.0 9.0	18"	102.6 7.0	Moist, very stiff, gray black SILT, little clay, organics, trace fine sand, shell fragments.
10			1 2 1 1	S4		10.0 12.0	24"		DO. except soft.
									-COHESIVE FILL-
15			WOR " 1 2	S5		15.0 17.0	24"		DO. except very soft.
								92.6 17.0	
20		8 9 7 9 10	4 1 3 2	S6		20.0 22.0	12"		Moist, loose, gray SILT, some coarse to fine sand, little organics, trace shell fragments, clay in frequent laminae, fine gravel. (ML) -GRANULAR FILL-
								84.6	

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 110.0'
Rock: 0.0'
Samples: S23

BORING SB2-52

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-52**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 4

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			1 WOH " 1	S7	25.0 27.0	24"	25.0	Moist, very soft, gray ORGANIC SILT, little clay, shell fragments. PP < 0.25 TSF. -ORGANIC DEPOSITS-
30			1 WOH 1 2	S8	30.0 32.0	24"		DO. PP < 0.25 TSF.
35			1 1 2 5	S9	35.0 37.0	24"	73.6 36.0 73.3 36.3	DO. Moist, soft, dark brown PEAT, some organic silt. -ORGANIC DEPOSITS- Moist, medium stiff, gray CLAY and silt, trace peat. PP = 2.5 TSF.
40			4 8 9 11	S10	40.0 42.0	24"		Moist, very stiff, gray, laminated CLAY and silt. -MARINE DEPOSITS-
45			1 3 3 3	S11	45.0 47.0	24"		Moist, medium stiff, gray CLAY and silt. PP = 0.5 TSF.
50			1 2 3 4	S12	50.0 52.0	24"		DO. PP = 0.5 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 110.0'
Rock: 0.0'
Samples: S23

BORING **SB2-52**

Haley & Aldrich, Inc. | TEST BORING LOG | BORING SB2-52

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

CONTRACT : 89374
SHEET NO. : 3 of 4

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			1 3 3 4	S13	55.0 57.0	24"		Moist, medium stiff, gray, laminated CLAY and silt. PP = 0.5 TSF. -MARINE DEPOSITS-
60			1 WOH 3 4	S14	60.0 62.0	24"		DO. except soft. PP = 0.5 TSF.
65			1 3 4 5	S15	65.0 67.0	24"		DO. except medium stiff. PP = 0.25 TSF.
70			WOR 2 4 4	S16	70.0 72.0	24"		DO. PP < 0.25 TSF.
75			1 1 4 5	S17	75.0 77.0	24"		DO. PP = 0.25 TSF.
80			WOR 2 4 4	S18	80.0 82.0	24"		DO. PP = 0.25 TSF.

25 MAY 91

STP

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 110.0'
Rock: 0.0'
Samples: S23

BORING SB2-52

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-52
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 4

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			2 4 6 8	S19	85.0 87.0	24"		Moist, stiff, gray CLAY and silt. PP = 1.0 TSF. -MARINE DEPOSITS-
90			1 3 9 9	S20	90.0 92.0	24"	17.9 91.7	DO. PP = 0.25 TSF.
								Moist, medium dense, gray COARSE TO FINE SAND, little fine gravel, silt, clay. -GLACIOMARINE DEPOSITS-
95			25 44 43 50	S21	95.0 97.0	10"		Wet, very dense, gray COARSE TO FINE SAND and fine gravel, some silt, trace clay.
100			35 33 70	S22	100.0 101.5	7"	9.6 100.0	Moist, very dense, gray COARSE TO FINE SAND and silt, some fine gravel, trace clay. -GLACIAL TILL DEPOSITS-
105			80 55 65 86	S23	105.0 107.0	9"		DO. NOTE: Borehole caved in at 110.0'. No sample taken.
110							-0.4 110.0	BOTTOM OF EXPLORATION 110.0' BOREHOLE GROUTED UPON COMPLETION WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER BPF = BLOWS PER FOOT PP = AVERAGE POCKET PENETROMETER READING

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	110.0'
Rock:	0.0'
Samples:	S23

BORING SB2-52

Haley & Aldrich, Inc. — **TEST BORING LOG** — **BORING SB2-53**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

CONTRACT : 89374
SHEET NO. : 1 of 2
LOCATION N: 2951442
E : 780503
ELEVATION : 115.4
DATE START: 28-12-89
END : 29-12-89
DRILLER : F. Perry
INSPECTOR : D. Burke

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HSA	S	----
12-29-89	0800	11.0	10.0	12.0	Size I.D.:	3 3/4"	1 3/8"	----
					Hammer Wt.:	----	140#	----
					Hammer Fall:	----	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			100/3"	S1	2.0 2.3	3"		Dry, very dense, brown gray CINDERS, some coarse sand, little fine gravel, trace brick fragments. Strong hydrocarbon odor.
								-MISCELLANEOUS FILL-
5			80 50/1"	S2	5.0 5.7	6"		Dry, very dense, brown gray FINE SAND, some silt, coarse sand, little coarse to fine gravel, trace brick, shell fragments, cinders, glass.
10			50 10 8 10	S3	10.0 12.0	2"	104.9 10.5	Moist, medium dense, brown FINE SAND and silt, little coarse sand, trace brick, glass, cinders, shells.
								-COHESIVE FILL-
15			5 13 18 7	S4	15.0 17.0	20"		Wet, hard, gray CLAY and silt, little fine sand, trace brick, shell fragments, wood.
							96.9 18.5	
20			3 2 2 4	S5	20.0 22.0	6"		Wet, loose, gray FINE SAND, little coarse sand, trace silt, brick, shell, wood fragments.
								-GRANULAR FILL-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 42.0'
Rock: 0.0'
Samples: S9

BORING SB2-53

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-53
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			11 4 6 31	S6	25.0 27.0	17"	89.4 26.0	Wet, medium dense, gray FINE SAND, little silt, coarse sand, trace brick, shells, wood fragments. -MISCELLANEOUS FILL- Wet, medium stiff, gray ORGANIC SILT and clay, some fine sand, brick, shell fragments. PP = 1.0 TSF. NOTE: Gray, fine sand blew up into augers to cause high blow count for last 6" of sample.
30			1 2 3 3	S7	30.0 32.0	23"		Wet, medium stiff, gray ORGANIC SILT and clay, trace fine sand, brick, shell fragments. PP = 0.75 TSF. -ORGANIC DEPOSITS-
35			6 13 24 28	S8	35.0 37.0	18"	80.9 34.5 80.3 35.1	Wet, medium stiff, brown, fibrous PEAT, little organic silt. -ORGANIC DEPOSITS- Wet, hard, yellow gray CLAY and silt, trace fine, gray sand in frequent partings. PP > 4.5 TSF. -MARINE DEPOSITS-
40			8 7 10 13	S9	40.0 42.0	22"	73.4 42.0	DO. except very stiff. PP = 2.5 TSF. BOTTOM OF EXPLORATION 42.0' BOREHOLE GROUTED UPON COMPLETION BPF = BLOWS PER FOOT PP = AVERAGE POCKET PENETROMETER READING

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 42.0'
Rock: 0.0'
Samples: S9

BORING SB2-53

Haley & Aldrich, Inc. — TEST BORING LOG — BORING **SB2-54**

PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**
CONTRACTOR: **GZA DRILLING, INC.**

CONTRACT	:	89374
SHEET NO.	:	1 of 5
LOCATION N:		2951534
E	:	780580
ELEVATION	:	113.6
DATE START:		19-12-89
END	:	28-12-89
DRILLER	:	F. Perry
INSPECTOR	:	D. Burke

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW/NW	S	----
12-19-89	1200	8.0	10.0	10.0	Size I.D.:	4"/3"	1 3/8"	----
12-26-89	0700	10.0	40.0	80.0	Hammer Wt.:	300#	140#	----
12-28-89	0650	12.4	40.0	120.0	Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			16 70	S1	2.0 3.0	12"		Dry, very dense, black gray FINE SAND, some silt, coarse sand, little fine gravel, trace glass, brick, cinders, wood. NOTE: Possibly pushing cobble.
5			25 21 12 6	S2	5.0 7.0	14"		Dry, dense, black brown COARSE TO FINE SAND, some silt, fine gravel, little black silt in frequent layers, trace slag, cinders. -MISCELLANEOUS FILL-
							104.1 9.5	
10			2 3 6 6	S3	10.0 12.0	12"		Wet, stiff, gray CLAY, some silt, fine sand, little coarse sand. PP = 1.5 TSF. -COHESIVE FILL-
15			6 6 4 5	S4	15.0 17.0	12"		Wet, stiff, gray SILT, some clay, fine sand, little coarse sand, trace fine gravel, peat. PP = 0.25 TSF.
20			5 3 4 5	S5	20.0 22.0	21"		Wet, medium stiff, gray SILT and clay, some coarse sand, trace peat, cinders, shell fragments. PP = 0.25 TSF.
							88.6	

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 124.5'
Rock: 0.0'
Samples: S26

BORING **SB2-54**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-54
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			3 3 3 5	S6	25.0 27.0	23"	25.0	Wet, medium stiff, gray ORGANIC SILT, little fine sand, clay, trace peat. PP = 0.5 TSF.
								-ORGANIC DEPOSITS-
30		84						
		108 56	1 3 2 3	S7	31.0 33.0	24"		Wet, medium stiff, gray ORGANIC SILT, trace shell fragments, peat. PP = 1.0 TSF.
		75 102						
35								
			3 6 10 19	S8	36.0 38.0	18"	77.1 36.5 76.6 37.0	Wet, medium stiff, black PEAT and organic silt. -ORGANIC DEPOSITS- Wet, very stiff, blue gray CLAY and silt, trace fine sand. PP = 2.5 TSF.
40			11 12 13 16	S9	40.0 42.0	22"		Wet, very stiff, yellow gray, mottled CLAY and silt, trace fine sand. PP = 2.5 TSF
								-MARINE DEPOSITS-
45			4 5 6 7	S10	45.0 47.0	20"		DO. except stiff. PP = 1.25 TSF.
50			4 5 6 7	S11	50.0 52.0	18"		DO. except gray. PP = 0.75 TSF.
								-MARINE DEPOSITS-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	124.5'
Rock:	0.0'
Samples:	S26

BORING SB2-54

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-54
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			3 4 4 5	S12	55.0 57.0	21"		Wet, medium stiff, gray CLAY and silt, trace fine sand in occasional partings. PP = 0.75 TSF.
								-MARINE DEPOSITS-
60			2 3 4 4	S13	60.0 62.0	18"		DO. PP = 0.75 TSF.
65			1 3 4 5	S14	65.0 67.0	18"		DO. except no fine sand partings. PP = 0.75 TSF.
70			WOR 5 4 4	S15	70.0 72.0	20"		DO. except stiff. PP = 0.5 TSF.
75			WOR " " 6	S16	75.0 77.0	18"		DO. except very soft. PP = 0.25 TSF.
80			WOR " 3 4	S17	80.0 82.0	21"		DO. except soft. PP = 0.25 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	124.5'
Rock:	0.0'
Samples:	S26

BORING SB2-54

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-54**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR " " 5	S18	85.0 87.0	23"		Wet, very soft, gray CLAY and silt. PP < 0.25 TSF. -MARINE DEPOSITS-
90			WOR " " 3	S19	90.0 92.0	24"		DO. PP < 0.25 TSF.
95			WOR " " 3	S20	95.0 97.0	23"		DO. PP < 0.25 TSF.
100			WOR " " 3	S21	100.0 102.0	23"		DO. PP < 0.25 TSF.
105			WOR " " "	S22	105.0 107.0	24"		DO. PP < 0.25 TSF.
110			WOR " " "	S23	110.0 112.0	24"		DO. except trace fine sand in frequent partings. PP < 0.25 TSF.
							1.1 112.5	-GLACIOMARINE DEPOSITS-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	124.5'
Rock:	0.0'
Samples:	S26

BORING **SB2-54**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-54
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			37 27 25 27	S24	115.0 117.0	10"		Wet, very dense, gray COARSE TO FINE GRAVEL, trace coarse to fine sand, silt. (GP) NOTE: Pushing cobble. -GLACIOMARINE DEPOSITS- NOTE: 75% water loss from 117.0' to 117.5'. Advanced borehole with rollerbit through boulder from 117.5' to 118.5'.
							-5.9	
120			45 41 51 59	S25	119.5 121.5	18"	119.5	Wet, very dense, gray COARSE TO FINE SAND and fine gravel, little silt. Possible fine sand layer from 121.0' to 121.5'. NOTE: Advanced 3" NW casing to 122.5' due to repeated caving of borehole.
			36 32 24 30	S26	122.5 124.5	6"		Wet, very dense, gray COARSE TO FINE SAND, some fine gravel, little silt. -GLACIAL TILL DEPOSITS-
							-10.9 124.5	BOTTOM OF EXPLORATION 124.5 BOREHOLE GROUTED UPON COMPLETION WOR = WEIGHT OF RODS BPF = BLOWS PER FOOT PP = AVERAGE POCKET PENETROMETER READING

26 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	124.5'
Rock:	0.0'
Samples:	S26

BORING SB2-54

Haley & Aldrich, Inc. — **TEST BORING LOG** — **BORING SB2-55 PZ**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

CONTRACT :	89374
SHEET NO. :	1 of 6
LOCATION N:	2951691
E :	780636
ELEVATION :	110.0
DATE START:	28-3-90
END :	5-4-90
DRILLER :	R. Jones
INSPECTOR :	J. Breslin

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	NW	S	NV-2
03-29-90	0615	9.2	15.0	15.0	Size I.D.:	3"	1 3/8"	2"
03-30-90	0630	8.6	40.0	100.5	Hammer Wt.:	300#	140#	----
04-04-90	0600	10.2	115.5	116.0	Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
							109.6	-BITUMINOUS ASPHALT
			10 11 10 8	S1	0.5 2.5	11"	0.4	Moist, medium dense, brown COARSE TO FINE SAND, some fine gravel, brick fragments, cinders.
								-MISCELLANEOUS FILL-
5			2 4 6 5	S2	5.0 7.0	15"	105.0 5.0	Moist, stiff, gray black, mottled CLAY and silt, little fine sand.
10			4 4 5 4	S3	10.0 12.0	5"		Wet, loose, gray SILT and coarse to fine sand, little fine gravel, clay, shell fragments.
15			2 3 2 2	S4	15.0 17.0	9"		Moist, medium stiff, gray CLAY and silt, trace shell fragments, peat fibers, fine sand. (CH) PP < 0.25 TSF.
								-COHESIVE FILL-
20			3 2 1 2	S5	20.0 22.0	15"		Moist, soft, gray black SILT and fine sand, little clay, trace coarse sand, fine gravel, shell fragments, peat fibers. (OL)
							86.5 23.5	-ORGANIC DEPOSITS-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 115.5'
Rock: 27.5'
Samples: S24 C6

BORING SB2-55 PZ

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-55 PZ
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR 2 2 2	S6	25.0 27.0	19"		Moist, soft, gray ORGANIC SILT, little fine sand, trace shell fragments, clay. (OL) PP = 0.25 TSF. -ORGANIC DEPOSITS-
30			WOR 1 2 2	S7	30.0 32.0	23"		DO. PP < 0.25 TSF.
							76.5 33.5	
35			4 5 6 10	S8	35.0 37.0	18"		-ORGANIC DEPOSITS- Moist, stiff, brown PEAT, little organic silt, trace clay, fine sand. (OH)
							73.9 36.1	Moist, very stiff, gray CLAY and silt, trace organics. PP = 1.25 TSF.
40			5 7 10 12	S9	40.0 42.0	24"		Moist, very stiff, gray CLAY and silt, trace fine sand in frequent partings. PP < 4.5 TSF. -MARINE DEPOSITS-
45			2 3 4 6	S10	45.5 47.5	24"		DO. except medium stiff. PP = 0.5 TSF.
50			3 3 3 5	S11	50.5 52.5	24"		Moist, medium stiff, gray, laminated CLAY and silt. PP = 0.5 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	115.5'
Rock:	27.5'
Samples:	S24 C6

BORING SB2-55 PZ

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-55 PZ
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			2 3 5 5	S12	55.5 57.5	24"		Moist, medium stiff, gray, laminated CLAY and silt. PP = 0.75 TSF.
								-MARINE DEPOSITS-
60			2 3 4 6	S13	60.5 62.5	24"		DO. PP = 0.5 TSF.
65			WOR 3 5 6	S14	65.5 67.5	24"		Moist, medium stiff, gray CLAY and silt. PP = 0.5 TSF.
70			3 4 5 6	S15	70.5 72.5	24"		DO. except stiff. PP = 1.0 TSF.
75			2 2 5 6	S16	75.5 77.5	24"		Moist, medium stiff, gray CLAY and silt, trace fine sand in frequent partings. PP = 0.75 TSF.
80			WOR " 6 5	S17	80.5 82.5	24"		DO. PP < 0.25 TSF.

26 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	115.5'
Rock:	27.5'
Samples:	S24 C6

BORING SB2-55 PZ

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-55 PZ
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR " 3 6	S18	85.5 87.5	24"		Moist, soft, gray CLAY and silt, trace fine sand in frequent partings. PP < 0.25 TSF. -MARINE DEPOSITS-
90			WOR " 1 5	S19	90.5 92.5	24"		DO. except very soft. PP < 0.25 TSF.
95			WOR " 3 5	S20	95.5 97.5	24"		DO. except soft, frequent laminae. PP < 0.25 TSF.
100			WOR " 4 5	S21	100.5 102.5	24"		Moist, soft, gray CLAY and silt, trace fine sand in frequent partings. PP < 0.25 TSF.
105			22 36 27 24	S22	105.5 107.5	11"	5.0 105.0	Moist, very dense, gray FINE GRAVEL and coarse to fine sand, some silt, trace clay. -GLACIOMARINE DEPOSITS-
110			47 37 16 23	S23	110.5 112.5	8"	0.0 110.0	Moist, very dense, gray FINE SAND and silt, some gravel, trace clay, with cobbles, boulders. -GLACIAL TILL DEPOSITS-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	115.5'
Rock:	27.5'
Samples:	S24 C6

BORING SB2-55 PZ

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-55 PZ**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
							-5.5	TOP OF BEDROCK 115.5'
			120	S24	115.5	4"	115.5	Moist, very dense, gray FINE GRAVEL, little silt, coarse to fine sand, composed of angular argillite fragments.
			120/1"		116.1		-6.5	
			22%	C1	116.5 121.5	50"	116.5	-FRACTURED BEDROCK- Moderately hard, slightly weathered, moderately to extremely fractured, gray, aphanitic ARGILLITE. Bedding very thin, dipping at 40 degrees. Joints very close, open, smooth, planar, dipping parallel to bedding. Joint surfaces generally fresh, occasionally calcite coated, occasionally oxidized, slickensides at 116.9' and 118.7'.
		3						
		2						
		2						
120		2						
		3	0%	C2	121.5 123.5	11"		C2: Moderately hard, very severely weathered, extremely fractured, gray, aphanitic ARGILLITE. Joints and bedding indiscernible.
		2						
		2	50%	C3	123.5 128.5	60"		C3: Moderately hard, slightly weathered, moderately fractured, gray, aphanitic ARGILLITE. Bedding very thin, dipping at 40 degrees. Joints close, open, smooth, planar, dipping parallel to bedding. Joint surfaces slightly weathered, occasionally calcite coated, occasionally oxidized. Open, smooth, planar, calcite coated, vertical joint from 125.7' to 126.2'.
		3						
125		3						
		3						
		4						
		4	68%	C4	128.5 133.5	56"		C4: DO. except hard with tight, smooth, planar, high angle joint from 130.6' to 131.0'.
		4						
130		4						-CAMBRIDGE FORMATION-
		4						
		4						
		4						
		4	61%	C5	133.5 138.0	54"		C5: DO. except with open, smooth, stepped joint dipping at 60 degrees in direction 140 degrees from bedding plane dip direction at 134.5'. Open, smooth, stepped joint dipping at 45 degrees in direction 195 degrees from bedding plane dip direction at 137.2'.
135		4						
		4						
		3						
		2	65%	C6	138.0 143.0	60"		C6: Hard, slightly weathered, moderately fractured, gray, aphanitic ARGILLITE. Bedding very thin, dipping at 40 degrees. Joints close, open, smooth, planar, dipping parallel to bedding. Joint surfaces slightly weathered, occasionally calcite coated, occasionally oxidized. Extremely fractured zones from 139.5' to 139.9' and from 141.0' to 141.5' associated with clay infilled joints at 139.8' and 141.2'.
		3						
140		4						
		4						
		4					-33.0	
25 MAY 91							143.0	BOTTOM OF EXPLORATION 143.0' PNEUMATIC/VIBRATING WIRE PIEZOMETER INSTALLED AT 108.5' BOREHOLE GROUTED UPON COMPLETION

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	115.5'
Rock:	27.5'
Samples:	S24 C6

BORING **SB2-55 PZ**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-55 PZ
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 6 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								WOR = WEIGHT OF RODS RQD = ROCK QUALITY DESIGNATION PP = AVERAGE POCKET PENETROMETER READING BPF = BLOWS PER FOOT

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 115.5'
Rock: 27.5'
Samples: S24 C6

BORING SB2-55 PZ

Haley & Aldrich, Inc. **TEST BORING LOG** **BORING SB2-56 OW**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC

CONTRACT : 89374
SHEET NO. : 1 of 2
LOCATION N: 2952046
E : 780803
ELEVATION : 109.9
DATE START: 23-2-90
END : 23-2-90
DRILLER : A. Redford
INSPECTOR : N. Nichols

GROUNDWATER		DEPTH (ft) OF:		
Date	Time	Water	Casing	Hole
02-23-90	1130	15.6	30.0	47.0

EQUIPMENT	CASING	SAMPLER	CORE
Type	HSA/NW	S	----
Size I.D.:	4 1/4 3"	1 3/8"	----
Hammer Wt.:	----	140#	----
Hammer Fall:	----	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
							109.6	-BITUMINOUS ASPHALT-
							0.3	NOTE: Cobbles encountered from 0.3' to 1.0'.
			4 8 10 12	S1	1.0 3.0	16"		Moist, medium dense, gray black COARSE TO FINE SAND, some cinder fragments, little silt, fine gravel, trace brick fragments.
								-MISCELLANEOUS FILL-
5			1 3 9 1	S2	5.0 7.0	9"		Moist, medium dense, gray black COARSE TO FINE SAND and silt, little fine gravel, cinder fragments, trace clay, brick particles.
							101.9	
							8.0	NOTE: Strata change indicated by auger progression.
10			WOH " "	NR	10.0 12.0	0"		No recovery.
								-COHESIVE FILL-
15			WOR 1 2 3	S3	15.0 17.0	4"		Wet, soft, black SILT and coarse to fine sand, little clay, trace brick fragments, organics. Wet, medium stiff, yellow gray CLAY and silt. PP = 1.25 TSF.
							91.4	
							18.5	
20			WOR 1 2 1	S4	20.0 22.0	24"		Wet, soft, gray black FINE SAND and organic silt, trace clay, shell fragments. PP = 0.5 TSF.
								-ORGANIC DEPOSITS-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 47.0'
Rock: 0.0'
Samples: S9

BORING SB2-56 OW

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-56 OW**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR WOH " "	S5	25.0 27.0	24"		Wet, very soft, gray ORGANIC SILT and clay, little fine sand, organics, trace peat fibers. PP = 0.5 TSF. -ORGANIC DEPOSITS-
30			WOR WOH 1 2	S6	30.0 32.0	24"		DO. PP = 0.5 TSF.
35			WOH 1 2 2	S7	35.0 37.0	24"		Wet, soft, gray ORGANIC SILT, little clay, peat fibers, trace shell fragments. PP = 0.5 TSF.
							71.9 38.0	
40			5 8 10 12	S8	40.0 42.0	16"		Wet, very stiff, yellow gray CLAY and silt. PP = 2.25 TSF. -MARINE DEPOSITS-
45			3 4 5 6	S9	45.0 47.0	24"		Wet, medium stiff, yellow gray CLAY and silt. PP = 1.0 TSF.
							62.9 47.0	BOTTOM OF EXPLORATION 47.0' BOREHOLE GROUTED UPON COMPLETION 2.0" ID PVC OBSERVATION WELL INSTALLED IN AN ADJACENT SUPPLEMENTAL BOREHOLE AT 22.2' BPF = BLOWS PER FOOT WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER

26 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	47.0'
Rock:	0.0'
Samples:	S9

BORING **SB2-56 OW**

Haley & Aldrich, Inc. — **TEST BORING LOG** — BORING **SB2-59**

PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**
CONTRACTOR: **GZA DRILLING, INC.**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW/NW	S	NV-2
02-08-90	0630	7.0	30.0	109.0	Size I.D.:	4"/3"	1 3/8"	2"
02-12-90	0630	7.0	124.0	152.5	Hammer Wt.:	300#	140#	----
					Hammer Fall:	24"	30"	----

CONTRACT : **89374**
SHEET NO. : **1 of 6**
LOCATION N: **2951587**
E : **780724**
ELEVATION : **108.1**
DATE START: **5-2-90**
END : **12-2-90**
DRILLER : **F. Perry**
INSPECTOR : **C. Nowak**

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								107.8 0.3	-BITUMINOUS ASPHALT-
			6 7 6 6	S1		1.5 3.5	4"		Dry, medium dense, brown COARSE TO FINE SAND, trace silt. -GRANULAR FILL-
								104.1 4.0	
5			153*	S2		5.0 5.5	2"		Wet, very dense, gray FINE GRAVEL, little concrete pieces, trace silt. -MISCELLANEOUS FILL-
								100.6 7.5	
10			6 3 3 2	S3		10.0 12.0	7"		Wet, medium stiff, gray CLAY and silt, some coarse to fine sand, trace shell fragments. -COHESIVE FILL-
15			5 3 3 3	S4		15.0 17.0	21"		Wet, medium stiff, gray FINE SAND, some silt, clay, little peat, trace shell fragments.
20			5 4 5 5	S5		19.0 21.0	12"		Attempted 3" diameter undisturbed tube sample in cohesive fill at 19.0'. No recovery. Wet, stiff, gray CLAY, some silt, coarse to fine sand, little shell fragments, trace peat.
								84.1 24.0	
			2 1	S6		24.0 26.0	1"		Wet, soft, gray ORGANIC SILT and clay, trace coarse to fine sand, shell fragments.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 124.0'
Rock: 28.5'
Samples: S17U8C6

BORING **SB2-59**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-59**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			2 3					
								-ORGANIC DEPOSITS-
30			PUSH " "	U1	29.0 31.0	24"		Pushed 3" diameter undisturbed tube sample in organic deposits from 29.0' to 31.0'. Recovered 24". (OH)
			2 3 4 5	S7	34.0 36.0	9"		Wet, medium stiff, gray CLAY and silt, some peat, trace shell fragments.
35							72.6 35.5	-ORGANIC DEPOSITS-
							70.6 37.5	Wet, stiff, brown, fibrous PEAT with wood.
			PUSH " "	U2	39.0 41.0	21"		Pushed 3" diameter undisturbed tube sample in marine clay from 39.0' to 41.0'. Recovered 21". (CH)
40								-MARINE DEPOSITS-
			3 4 5 5	S8	44.0 46.0	20"		Wet, stiff, gray CLAY and silt, trace fine sand in occasional partings. PP = 0.5 TSF.
45								
			PUSH " "	U3	49.0 51.0	20"		Pushed 3" diameter undisturbed tube sample in marine clay from 49.0' to 51.0'. Recovered 20". (CH/CL)
50								
			2 4	S9	54.0 56.0	21"		Wet, medium stiff, gray CLAY and silt, trace fine sand in occasional partings.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 124.0'
Rock: 28.5'
Samples: S17U8C6

BORING **SB2-59**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-59
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			4 5					PP = 0.5 TSF.
60			PUSH " "	U4	59.0 61.0	20"		Pushed 3" diameter undisturbed tube sample in marine clay from 59.0' to 61.0'. Recovered 20".
								-MARINE DEPOSITS-
65			WOR 3 4 4	S10	64.0 66.0	9"		Wet, medium stiff, gray CLAY and silt. PP = 0.5 TSF.
70			PUSH " "	U5	69.0 71.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 69.0' to 71.0'. Recovered 24".
75			WOR 3 4 4	S11	74.0 76.0	24"		Wet, medium stiff, gray CLAY and silt. PP = 0.5 TSF.
80			PUSH " "	U6	79.0 81.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 79.0' to 81.0'. Recovered 24".
			WOR "	S12	84.0 86.0	24"		DO. PP = 0.25 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	124.0'
Rock:	28.5'
Samples:	S17U8C6

BORING SB2-59

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-59**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			5 5					
90			PUSH " "	U7	89.0 91.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 89.0' to 91.0'. Recovered 24". (CL/CH)
								-MARINE DEPOSITS-
95			WOR 2 5 5	S13	94.0 96.0	24"		Wet, medium stiff, gray CLAY and silt. PP = 0.5 TSF.
100			PUSH " "	U8	99.0 101.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 99.0' to 101.0'. Recovered 24". (CL)
							6.1 102.0	
105			22 16 17 19	S14	103.0 105.0	9"		Wet, hard, gray SILT, some coarse to fine sand, fine gravel, little clay.
								-GLACIOMARINE DEPOSITS-
110			26 35 36 40	S15	109.0 111.0	4"	-1.9 110.0	Wet, very dense, gray COARSE TO FINE SAND, some fine gravel, little silt.
								-GLACIAL TILL DEPOSITS-
			32 31	S16	114.0 116.0	2"		Wet, very dense, gray FINE GRAVEL, some coarse to fine sand, trace silt.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	124.0'
Rock:	28.5'
Samples:	S17U8C6

BORING **SB2-59**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-59**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			31 43					-GLACIAL TILL DEPOSITS-
120			58* 86* 120*	S17	119.0 120.5	8"		Wet, very dense, gray COARSE TO FINE SAND, some fine gravel, little silt (well bonded in situ).
			100*/0"	NR	121.0 124.0	0"		No recovery.
							-15.9 124.0	TOP OF BEDROCK 124.0'
125		6 6 4 5	8%	C1	124.0 128.0	45"		C1: Hard, slightly weathered, moderately fractured, gray, aphanatic ARGILLITE. Bedding very thin and moderately dipping. Joints very close, open, smooth, planar, dipping parallel to bedding planes. Occasional tight, smooth, planar, high angle joints dipping in direction 180 degrees to bedding plane dip direction. Occasional very thin calcite veins. Joint surfaces generally oxidized or contain clay coatings.
130		5 4 5 6	28%	C2	128.0 132.0	48"		NOTE: Approximately 90% water loss from 124.0' to 152.5'. C2: DO. except fractured from 128.8' to 130.5'. Very severely weathered zone from 130.0' to 130.5'.
135		3 5 4 4 4	53%	C3	132.5 137.5	60"		C3: DO. except very slightly weathered, moderately to slightly fractured.
								-CAMBRIDGE FORMATION-
140		5 5 5 5 4	67%	C4	137.5 142.5	60"		C4: DO. except sound, fine grained to aphanitic, arenaceous ARGILLITE.
		4 4 4	84%	C5	142.5 147.5	57"		C5: DO.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	124.0'
Rock:	28.5'
Samples:	S17U8C6

BORING **SB2-59**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-59
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 6 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		3						
		3						
		4	100%	C6	147.5 152.5	60"		C6: Moderately hard, very slightly weathered, sound, gray, fine grained to aphanitic, arenaceous ARGILLITE. Bedding very thin and moderately dipping. Joints close, tight, smooth, planar, dipping parallel to bedding planes. Occasional very thin calcite veins. Joint surfaces contain calcite or clay coatings.
		5						
-150-		4						
		3						
		3						-CAMBRIDGE FORMATION-
		4					-44.4 152.5	BOTTOM OF EXPLORATION 152.5' BOREHOLE GROUTED UPON COMPLETION WOR = WEIGHT OF RODS BPF = BLOWS PER FOOT RQD = ROCK QUALITY DESIGNATION * = USED 300# HAMMER TO DRIVE SAMPLER PP = AVERAGE POCKET PENETROMETER READING

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	124.0'
Rock:	28.5'
Samples:	S17U8C6

BORING SB2-59

Haley & Aldrich, Inc. **TEST BORING LOG** BORING **SB2-60**

PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**
CONTRACTOR: **GZA DRILLING, INC**

CONTRACT : **89374**
SHEET NO. : **1 of 5**
LOCATION N: **2951801**
E : **780755**
ELEVATION : **109.4**
DATE START: **1-3-90**
END : **9-3-90**
DRILLER : **F. Perry**
INSPECTOR : **D. Warren**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW/NW	S	NV-2
03-01-90	0730	4.0	5.0	7.0	Size I.D.:	4"/3"	1 3/8"	2"
					Hammer Wt.:	300#	140#	----
					Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								109.1 0.3	-BITUMINOUS ASPHALT-
			13 8 6 6	S1		1.5 3.5	24"		Moist, medium dense, brown black COARSE TO FINE SAND, some cinder fragments, fine gravel, little silt, clay, concrete, trace brick fragments.
									-MISCELLANEOUS FILL-
5			10 10 28 20	S2		5.0 7.0	7"		Wet, hard, brown black SILT and coarse to fine sand, trace gravel, brick fragments, cinders.
								100.9 8.5	
10			1 1 1 1	S3		10.0 12.0	21"		Wet, very soft, gray CLAY and silt, some peat fibers, trace fine sand.
									-COHESIVE FILL-
			PUSH " " "	U1		13.5 15.5	23"		Pushed 3" diameter undisturbed tube sample in cohesive fill from 13.5' to 15.5'. Recovered 23". (CH)
15									
			5 3 4 5	S4		18.5 20.5	12"		Wet, medium stiff, gray FINE SAND and clay, some silt, trace gravel, peat fibers, shell fragments.
20									
								87.9 21.5	-ORGANIC DEPOSITS-
			1 2 2	S5		23.5 25.5	24"		Moist, soft, gray ORGANIC SILT, little fine sand, clay, trace shell fragments, peat fibers, coarse sand, fine gravel.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 113.0'
Rock: 22.0'
Samples: S14U8C5

BORING **SB2-60**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-60**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			3					PP = 0.5 TSF. (ML) -ORGANIC DEPOSITS-
			PUSH " " "	U2	28.5 30.5	19"		Pushed 3" diameter undisturbed tube sample in organic deposits from 28.5' to 30.5'. Recovered 19". (OH)
30								
			3 4 5 5	S6	33.5 35.5	24"		Moist, medium stiff, gray ORGANIC SILT, some clay, trace shell particles, peat fibers, coarse to fine sand, fine gravel. (OL) PP = 0.5 TSF.
35								
			PUSH "	U3	39.0 40.0	9"	70.4 39.0 69.4 40.0	Pushed 3" diameter undisturbed tube sample in organic deposits from 39.0' to 40.0'. Tube refused on top of clay at 40.0'. Recovered 9". (OH) Possible Peat Stratum. -ORGANIC DEPOSITS-
40								NOTE: Conducted PMT-1 41.6'.
								NOTE: Conducted PMT-2 at 43.6'.
45			4 5 7 7	S7	45.0 47.0	24"		Moist, stiff, gray CLAY and silt, trace fine sand in occasional partings. PP = 1.5 TSF. -MARINE DEPOSITS-
50			PUSH " " "	U4	50.0 52.0	20"		Pushed 3" diameter undisturbed tube sample in marine clay from 50.0' to 52.0'. Recovered 20". (CL/CH)
								NOTE: Conducted PMT-3 at 53.6'.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	113.0'
Rock:	22.0'
Samples:	S14U8C5

BORING **SB2-60**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-60**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR 3 4 5	S8	55.0 57.0	24"		Moist, medium stiff, gray CLAY and silt. PP = 0.5 TSF.
								-MARINE DEPOSITS-
60			PUSH " "	U5	60.0 62.0	23"		Pushed 3" diameter undisturbed tube sample in marine clay from 60.0' to 62.0'. Recovered 23". (CH/CL)
65			WOR 3 4 5	S9	65.0 67.0	24"		Moist, medium stiff, gray CLAY and silt. PP = 0.5 TSF.
70			PUSH " "	U6	70.0 72.0	19"		Pushed 3" diameter undisturbed tube sample in marine clay from 70.0' to 72.0'. Recovered 19".
75			WOR " 4 4	S10	75.0 77.0	24"		Moist, soft, gray CLAY and silt. PP = 0.5 TSF.
80			PUSH " "	U7	80.0 82.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 80.0' to 82.0'. Recovered 24".

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 113.0'
Rock: 22.0'
Samples: S14U8C5

BORING **SB2-60**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-60**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR " 3 6	S11	85.0 87.0	24"		Moist, soft, gray CLAY and silt. PP = 0.25 TSF. -MARINE DEPOSITS-
90			PUSH " " "	U8	90.0 92.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 90.0' to 92.0'. Recovered 24".
95			WOR " " 4	S12	95.0 97.0	24"		Moist, very soft, gray CLAY and silt. PP = 0.25 TSF.
100			PUSH " " "	NR	100.0 102.0	0"		Attempted 3" diameter undisturbed tube sample in marine clay from 100.0' to 102.0'. No recovery.
							7.4 102.0	
			21 27 37 31	S13	102.5 104.5	6"		Wet, very dense, gray COARSE TO FINE SAND, some silt, fine gravel, little clay, trace coarse gravel. -GLACIOMARINE DEPOSITS-
105								NOTE: Conducted PMT-4 at 106.7'.
			28 27 19 20	S14	109.0 111.0	4"		
110							-1.1 110.5	Moist, hard, gray SILT and fine gravel, some coarse to fine sand, trace coarse gravel, clay (well bonded in situ). -GLACIAL TILL DEPOSITS-
							-3.6 113.0	TOP OF BEDROCK 113.0'
25 MAY 91		4	47%	C1	114.0 119.0	52"		-DECOMPOSED BEDROCK- C1: Moderately hard, fresh, slightly fractured, gray, aphanitic ARGILLITE. Bedding very thin, dipping at

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 113.0'
Rock: 22.0'
Samples: S14U8C5

BORING **SB2-60**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-60**
PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**		CONTRACT : **89374**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**		SHEET NO. : **5 of 5**

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		4						50 degrees. Joints close, tight, smooth, planar, generally dipping parallel to bedding, occasionally dipping at 25 degrees opposite to bedding. Joint surfaces slightly weathered with occasional silt coatings. Core breaks easily along bedding planes.
		4						-CAMBRIDGE FORMATION-
		4						NOTE: Conducted PMT-5 at 117.1'.
		5						
		5	83%	C2	119.0 120.0	12"		C2: Moderately hard, fresh, moderately fractured, gray, aphanitic ARGILLITE. Very thin bedding dipping at 50 degrees. Joints close, tight, smooth, planar, and dipping parallel to bedding planes. Occasional open, rough, stepped, vertical joint.
120		5	90%	C3	120.0 125.0	59"		C3: DO. except bedding dipping at 50 degrees to 60 degrees.
		6						
		4						
		4						
		4						
125		4	88%	C4	125.0 130.0	58"		C4: DO. except bedding dipping at 45 degrees to 50 degrees and no calcite coated joints or calcite veins discernible. Moderately dipping joint opposite bedding at 126.4'.
		4						
		4						
		4						
		4						
130			100%	C5	130.0 135.0	60"		C5: DO. with occasional irregular, very thin, calcite veins and pyrite bearing sandstone beds. Tight, smooth, planar joint dipping at 35 degrees in direction 165 degrees from bedding plane dip direction at 134.1'.
135							-25.6 135.0	BOTTOM OF EXPLORATION 135.0'
								BOREHOLE GROUTED UPON COMPLETION
								WOR = WEIGHT OF RODS
								BPF = BLOWS PER FOOT
								RQD = ROCK QUALITY DESIGNATION
								PP = AVERAGE POCKET PENETROMETER READING
								PMT = PRESSUREMETER TEST

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	113.0'
Rock:	22.0'
Samples:	S14U8C5

BORING **SB2-60**

Haley & Aldrich, Inc. **TEST BORING LOG** BORING **SB2-61**

PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**
CONTRACTOR: **GZA DRILLING, INC.**

CONTRACT : **89374**
SHEET NO. : **1 of 6**
LOCATION N: **2951656**
E : **780837**
ELEVATION : **110.9**
DATE START: **7-5-90**
END : **15-5-90**
DRILLER : **R. Jones**
INSPECTOR : **C. Odiaga**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW/NW	S	NV-2
5-7-90	0920	5.4	0.0	7.0	Size I.D.:	4"/3"	1 3/8"	2"
5-9-90	0600	13.9	25.5	77.0	Hammer Wt.:	300#	140#	----
5-10-90	0600	13.6	25.5	100.0	Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								110.5 0.4	-BITUMINOUS ASPHALT-
			9 10 10 10	S1		1.0 3.0	18"		Moist, medium dense, brown COARSE TO FINE SAND, little fine gravel, cinders, ash.
			6 9 11 11	S2		3.0 5.0	12"		Moist, medium dense, black CINDERS and coarse to fine sand, little ash.
5			14 5 6 9	S3		5.0 7.0	10"		DO. except trace brick particles. -MISCELLANEOUS FILL-
			4 6 5 5	S4		7.0 9.0	16"	102.9 8.0	Moist, medium dense, brown gray COARSE TO FINE SAND and silt, some brick, trace shell particles.
10			3 3 6 5	S5		10.0 12.0	1"		Moist, stiff, gray SILT and fine sand, little clay, brick, trace shell particles.
15			PUSH " " "	U1		16.6 18.6	21"		Pushed 3" diameter undisturbed tube sample in cohesive fill from 16.6' to 18.6'. Recovered 21". (OH) -COHESIVE FILL-
20			4 3 3 10	S6		20.6 22.6	12"		Wet, medium stiff, black SILT and coarse to fine sand, some clay, trace shell particles.
								86.9 24.0	-ORGANIC DEPOSITS-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 127.5'
Rock: 25.2'
Samples: S20U7C6

BORING **SB2-61**

Haley & Aldrich, Inc. | TEST BORING LOG | BORING **SB2-61**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

CONTRACT : 89374
SHEET NO. : 2 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			4 3 3 3	NR	25.5 27.5	0"		Attempted 3" diameter undisturbed tube sample in organic deposits at 25.5'. No recovery.
30			1 1 2 3	S7	30.0 32.0	24"		Moist, soft, gray ORGANIC SILT, little clay, trace fine sand, shell fragments, peat fibers. PP = 0.5 TSF. -ORGANIC DEPOSITS-
35			PUSH " "	U2	35.0 37.0	23"		Pushed 3" diameter undisturbed tube sample in organic deposits from 35.0' to 37.0'. Recovered 23". (OH)
							72.9 38.0	Probable brown PEAT with fibers.
40			2 3 5 6	S8	40.0 42.0	24"	70.4 40.5	Moist, medium stiff, blue gray ORGANIC CLAY and silt. Moist, stiff, yellow gray, mottled CLAY and silt, trace organics. PP = 1.0 TSF. -MARINE DEPOSITS-
45			PUSH " "	U3	45.0 47.0	21"		Pushed 3" diameter undisturbed tube sample in marine clay from 45.0' to 47.0'. Recovered 21". (CL/CH)
50			WOR 2 4 5	S9	50.0 52.0	23"		Moist, medium stiff, gray CLAY and silt, occasional silt laminae. PP = 0.75 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 127.5'
Rock: 25.2'
Samples: S20U7C6

BORING **SB2-61**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-61
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			PUSH " "	U4	55.0 57.0	16"		Pushed 3" diameter undisturbed tube sample in marine clay from 55.0' to 57.0'. Recovered 16". (CH/CL)
								-MARINE DEPOSITS-
60			WOR 2 3 5	S10	60.0 62.0	23"		Moist, medium stiff, gray CLAY and silt, occasional silt laminae. PP = 0.5 TSF.
65			PUSH " "	U5	65.0 67.0	8"		Pushed 3" diameter undisturbed tube sample in marine clay from 65.0' to 67.0'. Recovered 8".
70			WOR " 1 4	S11	70.0 72.0	23"		DO. except very soft. PP = 0.5 TSF.
75			PUSH " "	NR	75.0 77.0	0"		Pushed 3" diameter undisturbed tube sample in marine clay from 75.0' to 77.0'. No recovery.
80			WOR " 5 5	S12	80.0 82.0	20"		DO. except medium stiff. PP = 0.5 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	127.5'
Rock:	25.2'
Samples:	S20U7C6

BORING SB2-61

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-61**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			PUSH " "	U6	85.0 87.0	9"		Pushed 3" diameter undisturbed tube sample in marine clay from 85.0' to 87.0'. Recovered 9". (CH)
								-MARINE DEPOSITS-
90			WOR " 2 6	SI3	90.0 92.0			Moist, soft, gray CLAY and silt, occasional silt laminae. PP = 0.5 TSF.
95			PUSH " "	NR	95.0 97.0	0"		Attempted 3" diameter undisturbed tube sample in marine clay from 95.0' to 97.0'. No recovery.
			WOR " 2 5	SI4	97.0 99.0	24"		DO. PP = 0.25 TSF.
100			PUSH " "	U7	101.0 103.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 101.0' to 103.0'. Recovered 24". (CL)
105			WOR " 1 5	SI5	105.0 107.0	24"		DO. except very soft, trace shell fragments. PP = 0.25 TSF.
							0.9	
110			56 26 16 25	SI6	110.0 112.0	11"	110.0	Moist, dense, gray FINE GRAVEL, some silt, little coarse to fine sand, clay. -GLACIOMARINE DEPOSITS-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 127.5'
Rock: 25.2'
Samples: S20U7C6

BORING **SB2-61**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-61
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		67	39	S17	115.5	12"		Moist, very dense, gray FINE GRAVEL, some coarse to fine sand, little silt, clay (well bonded in situ). (GM)
		74	26		117.5			-GLACIOMARINE DEPOSITS-
			29					NOTE: Conducted VHPT-1 and VHPT-2 from 114.5' to 117.5'.
			21					NOTE: Conducted PMT-1 at 118.5'.
120								
			35	S18	120.5	16"		Moist, very dense, gray FINE GRAVEL, some coarse to fine sand, silt (well bonded in situ). (GM)
			38		122.5			
			33				-11.1	
			39				122.0	Moist, very dense, gray FINE GRAVEL, little coarse to fine sand, silt, clay. (GP-GM)
								-GLACIAL TILL DEPOSITS-
		1	NA	C1	124.5	8"		Moist, very dense, gray COARSE TO FINE GRAVEL.
125		2			127.0			
		8						
		99	71	S19	127.0	10"	-16.6	Moist, very dense, gray COARSE TO FINE SAND and silt, some gravel, trace clay.
			120		127.8		127.5	TOP OF BEDROCK 127.5
		22						-DECOMPOSED BEDROCK-
		26						
130		29						
		66						
		6	120/1"	S20	132.0	1"		Moist, hard, gray SILT and fine gravel composed of completely weathered argillite.
		3	0%	C2	132.1	56"		C2: Soft to very soft, moderately severe to severely weathered, moderately to extremely fractured, gray aphanitic ARGILLITE.
		3			132.1			Bedding very thin, dipping at moderate angles, occasionally indistinct. Joints close to very close, tight, smooth, planar and frequently dipping parallel to bedding. Extreme fracturing due in part to intersection of low to high angle joints.
135		3			136.8			
		4						NOTE: Conducted PMT-2 at 135.0'.
		3	0%	C3	136.8	48"		C3: Soft, moderately severely to severely weathered, slightly fractured, gray aphanitic ARGILLITE. Bedding very thin, dipping at high angles. Joints close to very close, generally tight, smooth, planar and dipping parallel to bedding.
		3			140.8			
		5						
140		4						
		3	0%	C4	140.8	41"		C4: DO. except slightly to extremely fractured, bedding frequently indistinct. Joints low angle or at high angle dipping opposite to bedding. Very soft, completely weathered zone from 141.7' to 142.6'.
		4			144.5			
		3						-CAMBRIDGE FORMATION-
		4						
		4	0%	C5	144.5	45"		C5: Soft, moderately severely weathered, slightly to

25 MAY 91

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY
0-4	Very Loose	0-2	Very Soft
4-10	Loose	2-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
50+	Very Dense	15-30	Very Stiff
		30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	127.5'
Rock:	25.2'
Samples:	S20U7C6

BORING SB2-61

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-61**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 6 of 6

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		3			148.2			extremely fractured, gray aphanitic ARGILLITE. Bedding very thin, dipping at moderate angles. Joints close to very close, tight, smooth, planar, and generally dipping parallel to bedding. Very severely weathered zones from 146.0' to 146.2' and from 148.0' to 148.2'.
		3						
								-CAMBRIDGE FORMATION-
		4	0%	C6	148.2 152.7	53"		C6: Soft, moderately severely weathered, moderately fractured, gray aphanitic ARGILLITE. Bedding very thin, dipping at moderate angles. Joints close to very close, tight, smooth, planar and generally dipping parallel to bedding. Extremely fractured zones accompanied by very severe weathering from 149.0' to 149.3', from 150.3' to 150.6' and from 152.0' to 152.5'.
-150-		3						
		4						
		4					-41.8 152.7	
								BOTTOM OF EXPLORATION AT 152.7' BOREHOLE GROUTED UPON COMPLETION BPF = BLOWS PER FOOT RQD = ROCK QUALITY DESIGNATION PP = AVERAGE POCKET PENETROMETER READING WOR = WEIGHT OF RODS VHPT = VARIABLE HEAD PERMEABILITY TEST PMT = PRESSUREMETER TEST

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 127.5'
Rock: 25.2'
Samples: S20U7C6

BORING **SB2-61**

Haley & Aldrich, Inc. | **TEST BORING LOG** | BORING **SB2-62**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

CONTRACT : 89374
SHEET NO. : 1 of 5
LOCATION N: 2951814
E : 780864
ELEVATION : 107.1
DATE START: 1-2-90
END : 2-2-90
DRILLER : P. Wordell
INSPECTOR : B. Byrne

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	S	----
2-1-90	1030	5.1	0.0	17.0	Size I.D.:	4"	1 3/8"	----
					Hammer Wt.:	300#	140#	----
					Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			7 9 11 11	S1		0.2 2.2	16"	106.9 0.2	-BITUMINOUS ASPHALT- Dry, medium dense, yellow brown COARSE TO FINE SAND, little fine gravel. -GRANULAR FILL-
5			4 13 8 11	S2		5.0 7.0	12"		Moist, medium dense, gray COARSE TO FINE SAND, little fine gravel, silt.
								97.6 9.5	
10			4 1 1 2	S3		10.0 12.0	10"		Moist, soft, gray CLAY and silt, little fine sand, trace shell fragments. PP < 0.25 TSF. -COHESIVE FILL-
15			WOR 1 " 1	S4		15.0 17.0	16"		Moist, very soft, gray CLAY and silt, trace organics. PP < 0.25 TSF.
20			4 2 2 3	S5		20.0 22.0	13"		Moist, loose, gray COARSE TO FINE SAND, some silt, little clay, trace fine gravel, shell fragments. (SC-SM) PP < 0.25 TSF.
								83.1 24.0	-ORGANIC DEPOSITS-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 112.9'
Rock: 1.0'
Samples: S23

BORING **SB2-62**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-62
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			1 WOH " "	S6	25.0 27.0	24"		Moist, very soft, gray ORGANIC SILT, and clay, trace shell fragments. PP < 0.25 TSF. -ORGANIC DEPOSITS-
30			1 WOH " 2	S7	30.0 32.0	24"		Moist, soft, gray black ORGANIC SILT, trace fine sand, peat. PP < 0.25 TSF.
35			1 2 3 3	S8	35.0 37.0	24"	70.3 36.8 69.1 38.0	DO. except medium stiff. Moist, very soft, brown PEAT and organic silt. -ORGANIC DEPOSITS-
40			5 7 10 13	S9	40.0 42.0	20"		Moist, very stiff, yellow gray, mottled CLAY and silt. PP = 3.5 TSF. -MARINE DEPOSITS-
45			3 5 6 9	S10	45.0 47.0	22"		Moist, stiff, gray CLAY and silt. PP = 1.75 TSF.
50			3 4 5 5	S11	50.0 52.0	20"		DO. PP = 1.0 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	112.9'
Rock:	1.0'
Samples:	S23

BORING SB2-62

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-62**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			1 3 3 4	S12	55.0 57.0	24"		Moist, medium stiff, gray CLAY and silt. PP = 0.75 TSF.
								-MARINE DEPOSITS-
60			1 2 3 4	S13	60.0 62.0	24"		DO. PP < 0.25 TSF.
65			1 1 3 3	S14	65.0 67.0	24"		DO. PP = 0.25 TSF.
70			1 2 3 3	S15	70.0 72.0	24"		DO. PP < 0.25 TSF.
75			WOR 1 3 3	S16	75.0 77.0	24"		DO. PP = 0.25 TSF.
80			WOR " " 3	S17	80.0 82.0	24"		DO. except very soft. PP < 0.25 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	112.9'
Rock:	1.0'
Samples:	S23

BORING **SB2-62**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-62**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR 2 3 4	S18	85.0 87.0	24"		Moist, medium stiff, gray CLAY and silt. PP < 0.25 TSF.
								-MARINE DEPOSITS-
90			WOR " " 3	S19	90.0 92.0	24"		DO. except very soft. PP < 0.25 TSF.
95			WOR " " 3	S20	95.0 97.0	24"		DO. PP < 0.25 TSF.
100			4 5 5 4	S21	100.0 102.0	13"		Moist, stiff, yellow brown CLAY and silt. PP < 0.25 TSF.
							2.3 104.8	
105			21 27 37 50	S22	105.0 107.0	12"		Moist, very dense, gray FINE SAND, little silt, clay, coarse to fine sand, fine gravel.
								-GLACIOMARINE DEPOSITS-
110			12 11 11 17	S23	110.0 112.0	6"		DO. except very stiff.
							-5.8 112.9	TOP OF BEDROCK 112.9'
			50*/0	NR	113.9 113.9	0"	-6.8 113.9	-FRACTURED BEDROCK- BOTTOM OF EXPLORATION 113.9'

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	112.9'
Rock:	1.0'
Samples:	S23

BORING **SB2-62**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-62
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								BOREHOLE GROUTED UPON COMPLETION WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER BPF = BLOWS PER FOOT PP = AVERAGE POCKET PENETROMETER READING * = USED 300# HAMMER TO DRIVE SAMPLER

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	112.9'
Rock:	1.0'
Samples:	S23

BORING SB2-62

Haley & Aldrich, Inc. — TEST BORING LOG — BORING **SB2-64**

PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**
CONTRACTOR: **GZA DRILLING, INC.**

CONTRACT :	89374
SHEET NO. :	1 of 5
LOCATION N:	2951459
E :	780860
ELEVATION :	110.2
DATE START:	13-1-90
END :	18-1-90
DRILLER :	R. Jones
INSPECTOR :	D. Burke

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	S	----
01-13-90	0950	6.8	5.0	7.0	Size I.D.:	4"	1 3/8"	----
01-16-90	0625	4.9	40.5	48.5	Hammer Wt.:	300#	140#	----
01-17-90	0640	9.0	40.5	107.0	Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			14 16 14 8	S1	1.5 3.5	17"		Dry, medium dense, black brown COARSE TO FINE SAND, little fine gravel, trace silt. -GRANULAR FILL-
5			8 2 2 4	S2	5.0 7.0	12"		Moist, loose, brown COARSE TO FINE SAND, trace silt.
							101.7 8.5	
10			1 1 WOH 1	S3	10.0 12.0	11"		Wet, very soft, gray black CLAY and silt, little organics, trace fine sand. -COHESIVE FILL-
15			2 2 3 4	S4	15.0 17.0	24"		Wet, medium stiff, gray CLAY and silt, trace coarse to fine sand.
20			4 2 2 4	S5	18.5 20.5	20"		Wet, soft, gray ORGANIC SILT, little fine sand, trace coal, wood, brick, shell fragments.
							86.7 23.5	
			1 1 1	S6	23.5 25.5	23"		Wet, very soft, gray ORGANIC SILT, trace fine sand in occasional partings, shell fragments, peat fibers. PP = 1.0 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	112.5'
Rock:	8.1,'
Samples:	S24

BORING **SB2-64**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-64**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			2					
			1 1 2 3	S7	28.5 30.5	24"		Wet, soft, gray ORGANIC SILT, trace shell fragments. PP = 0.5 TSF. -ORGANIC DEPOSITS-
30							76.7	
			WOR 2 2 4	S8	33.5 35.5	23"	33.5	Wet, soft, gray brown PEAT, trace shell fragments. PP = 0.5 TSF.
		48						
35		47						-ORGANIC DEPOSITS-
		48						
		51					72.2	
		60	4 5 8 10	S9	38.5 40.5	24"	38.0	Wet, stiff, gray CLAY and silt, trace fine sand in frequent partings. PP = 1.5 TSF. -MARINE DEPOSITS-
40								
			2 3 4 4	S10	43.5 45.5	24"		Wet, medium stiff, gray CLAY and silt. PP = 0.75 TSF.
45								
			2 3 3 4	NR	48.5 50.5	0"		No recovery.
50								
			1 3 3	S11	53.5 55.5	19"		Wet, medium stiff, gray CLAY and silt. PP = 0.5 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	112.5'
Rock:	8.1,'
Samples:	S24

BORING **SB2-64**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-64**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			3					
			2 4 3 5	SI2	58.5 60.5	12"		Wet, medium stiff, gray CLAY and silt. PP = 0.25 TSF.
60								-MARINE DEPOSITS-
			WOH 3 3 5	SI3	63.5 65.5	24"		DO. PP = 0.25 TSF.
65								
			WOR 2 4 4	SI4	68.5 70.5	24"		DO. PP = 0.5 TSF.
70								
			1 2 3 4	SI5	73.5 75.5	24"		DO.
75								
			WOR 1 4 5	SI6	78.5 80.5	24"		DO. PP = 0.75 TSF.
80								
			WOR 2 4	SI7	83.5 85.5	24"		DO. PP = 0.25 TSF.

26 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	112.5'
Rock:	8.1,'
Samples:	S24

BORING **SB2-64**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-64
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			5					
90			WOR " 4 5	S18	88.5 90.5	24"		Wet, soft, gray CLAY and silt. PP = 0.25 TSF. -MARINE DEPOSITS-
95			WOR " 4 5	S19	93.5 95.5	24"		DO. PP = 0.25 TSF.
100			WOR " 2 5	S20	98.5 100.5	24"		DO. except very soft. PP = 0.25 TSF.
105			WOR " " 2	S21	103.5 105.5	23"		DO. except trace fine sand in occasional partings. PP = 0.25 TSF.
							3.2 107.0	
110			33 29 23 22	S22	107.5 109.5	6"		Wet, very dense, gray COARSE TO FINE SAND, some silt, little fine gravel, clay. NOTE: Pushing cobble, lodged in tip. -GLACIOMARINE DEPOSITS-
							-2.3 112.5	TOP OF BEDROCK 112.5'
			24 33 32 26	S23	112.5 114.5	9"		Wet, very dense, gray COARSE TO FINE SAND, some clay, fine gravel composed of argillite fragments. -DECOMPOSED BEDROCK-

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 112.5'
Rock: 8.1,'
Samples: S24

BORING SB2-64

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-64**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								-DECOMPOSED BEDROCK-
			36 34 39	S24	117.5 119.0	6"		Wet, very dense, gray SILT and fine gravel composed of argillite fragments, little fine sand, trace clay.
-120-								
			100*/1"	NR	120.5 120.6	0"	-10.4 120.6	REFUSAL 120.6' BOREHOLE GROUTED UPON COMPLETION WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER BPF = BLOWS PER FOOT PP = AVERAGE POCKET PENETROMETER READING * = USED 300# HAMMER TO DRIVE SAMPLER

25 MAY 91

SIT

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 112.5'
Rock: 8.1,'
Samples: S24

BORING **SB2-64**

Haley & Aldrich, Inc. — **TEST BORING LOG** — BORING **SB2-66**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

GROUNDWATER		DEPTH (ft) OF:		
Date	Time	Water	Casing	Hole
02-22-90	0700	4.7	20.0	32.0

EQUIPMENT	CASING	SAMPLER	CORE
Type	HSA/NW	S	----
Size I.D.:	4 1/4 3"	1 3/8"	----
Hammer Wt.:	----	140#	----
Hammer Fall:	----	30"	----

CONTRACT : 89374
SHEET NO. : 1 of 2
LOCATION N: 2951451
E : 781080
ELEVATION : 109.0
DATE START: 21-2-90
END : 22-2-90
DRILLER : A. Redford
INSPECTOR : N. Nichols

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
				S1		0.2 2.0		108.8 0.2	-BITUMINOUS ASPHALT- NOTE: Sample S1 taken from auger cuttings. Moist, brown COARSE TO FINE SAND, little coarse to fine gravel with cobbles.
			3 4 5 4	S2		2.0 4.0	4"		Moist, loose, brown COARSE TO FINE SAND, little silt, trace fine gravel, clay.
								105.0 4.0	-GRANULAR FILL-
5			3 2 1 1	S3		5.0 7.0	20"		Moist, soft, gray CLAY and silt. PP = 0.5 TSF. -COHESIVE FILL-
10			WOH " "	S4		10.0 12.0	7"		Wet, very soft, gray CLAY and silt. PP < 0.25 TSF.
15			WOR WOH 2 3	S5		15.0 17.0	12"		DO. except trace coarse to fine sand, shell fragments. PP = 0.5 TSF.
20			1 1 1 1	S6		20.0 22.0	16"		Wet, very soft, black ORGANIC SILT, little clay, trace fine sand, clay. PP = 0.5 TSF.
								85.5 23.5	-ORGANIC DEPOSITS-

25 MAY 91

5 IN

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 42.0'
Rock: 0.0'
Samples: S10

BORING **SB2-66**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-66
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 2

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR WOH " "	S7	25.0 27.0	24"		Wet, very soft, gray ORGANIC SILT and clay, trace shell fragments. PP = 0.5 TSF.
30			WOR WOH " "	S8	30.0 32.0	24"		DO. PP = 0.5 TSF. -ORGANIC DEPOSITS-
35			WOR 3 6 12	S9	35.0 37.0	22"	73.5 35.5	DO. PP = 1.0 TSF. Wet, very stiff, gray CLAY and silt, trace peat fibers. PP = 1.75 TSF. -MARINE DEPOSITS-
40			7 10 13 13	S10	40.0 42.0	22"		Moist, very stiff, yellow gray CLAY and silt. PP = 2.0 TSF.
							67.0 42.0	BOTTOM OF EXPLORATION 42.0' BOREHOLE GROUTED UPON COMPLETION BPF = BLOWS PER FOOT WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER PP = AVERAGE POCKET PENETROMETER READING

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	42.0'
Rock:	0.0'
Samples:	S10

BORING SB2-66

Haley & Aldrich, Inc. **TEST BORING LOG** BORING **SB2-67**

PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**
CONTRACTOR: **GZA DRILLING, INC.**

CONTRACT : **89374**
SHEET NO. : **1 of 4**
LOCATION N: **2951621**
E : **781202**
ELEVATION : **109.5**
DATE START: **9-4-90**
END : **13-4-90**
DRILLER : **A. Redford**
INSPECTOR : **B. Byrne**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	S	----
04-09-90	0820	5.5	0.0	12.0	Size I.D.:	4"	1 3/8"	----
					Hammer Wt.:	300#	140#	----
					Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								109.2	
			38	S1		0.5	20"	0.3	-BITUMINOUS ASPHALT-
			33			2.5			Dry, very dense, gray COARSE TO FINE SAND, some fine gravel, trace silt.
			25						-GRANULAR FILL-
			27						
5			6	S2		5.0	21"		Moist, medium dense, gray black COARSE TO FINE SAND, little fine gravel, silt, trace cinders.
			8			7.0			
			4						
			4						
								100.0	
								9.5	
10			1	S3		10.0	20"		Moist, soft, gray SILT and fine sand, some organic clay.
			1			12.0			
			1						
			1						
15			1	S4		15.0	24"		Moist, very soft, gray ORGANIC SILT and clay, little coarse sand in occasional pockets.
			WOR			17.0			
			1						
			WOR						-COHESIVE FILL-
20		28	3	S5		20.0	1"		DO. except medium stiff.
		18	4			22.0			
		15	2						
		8	3						
		12						85.0	
								24.5	-ORGANIC DEPOSITS-

25 MAY 91

SR

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 109.8'
Rock: 0.0'
Samples: S23

BORING **SB2-67**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-67**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 4

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		15	WOH	S6	25.0	24"		Moist, very soft, gray ORGANIC SILT and clay, trace shell, wood fragments.
		22	"		27.0			PP < 0.25 TSF.
			1					
		12	WOH					
		14						-ORGANIC DEPOSITS-
		17						
30			WOH	S7	30.0	24"		Moist, soft, gray ORGANIC SILT and clay, trace shell fragments.
			"		32.0			PP < 0.25 TSF.
			3					
			2					
							77.0	
							32.5	Probable brown PEAT, trace wood.
							76.0	-ORGANIC DEPOSITS-
							33.5	
35		7	7	S8	35.0	24"		Moist, very stiff, yellow gray CLAY and silt, occasional silt laminae.
			12		37.0			PP = 3.25 TSF.
			17					
			18					-MARINE DEPOSITS-
40			4	S9	40.0	24"		DO.
			7		42.0			PP = 1.75 TSF.
			8					
			8					
45			4	S10	45.0	24"		DO. except stiff.
			6		47.0			PP = 1.25 TSF.
			6					
			7					
50			1	S11	50.0	24"		Wet, stiff, gray CLAY and silt.
			4		52.0			PP = 1.5 TSF.
			5					
			6					

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 109.8'
Rock: 0.0'
Samples: S23

BORING **SB2-67**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-67**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 4

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR 2 4 5	S12	55.0 57.0	24"		Wet, medium stiff, gray CLAY and silt. PP = 0.5 TSF.
								-MARINE DEPOSITS-
60			WOR " 4 6	S13	60.0 62.0	24"		DO. except soft. PP = 0.25 TSF.
65			2 4 6 4	S14	65.0 67.0	7"		DO. except stiff. PP = 0.25 TSF.
70			1 4 4 5	S15	70.0 72.0	12"		DO. except medium stiff. PP < 0.25 TSF.
75			3 4 4 6	S16	75.0 77.0	18"		DO.
80			WOR 3 6 8	S17	80.0 82.0	24"		DO. except stiff. PP = 0.75 TSF.

25 MAY 91

SRP

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 109.8'
Rock: 0.0'
Samples: S23

BORING **SB2-67**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-67**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 4

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR " 3 6	S18	85.0 87.0	24"		Wet, soft, gray CLAY and silt. PP = 0.25 TSF. -MARINE DEPOSITS-
90			WOR 4 5 6	S19	90.0 92.0	18"		DO. except stiff. PP = 0.25 TSF.
95			WOR 4 5 6	S20	95.0 97.0	9"		DO. PP = 0.25 TSF.
100			WOR " "	S21	100.0 102.0	22"		DO. except very soft. PP < 0.25 TSF.
							6.0 103.5	
105			27 40 44 36	S22	105.0 107.0	13"		Wet, very dense, gray FINE GRAVEL and coarse to fine sand, little silt, trace clay. (SM) -GLACIOMARINE DEPOSITS-
							1.5 108.0	
			100/2" 100*/0"	S23	109.6 109.8	2"	-0.3 109.8	Wet, very dense, gray FINE GRAVEL and coarse to fine sand, little silt. -GLACIAL TILL DEPOSITS-

REFUSAL 109.8'
BOREHOLE GROUTED UPON COMPLETION
WOR = WEIGHT OF RODS
WOH = WEIGHT OF HAMMER
* = USED 300# HAMMER TO DRIVE SAMPLER
BPF = BLOWS PER FOOT
PP = AVERAGE POCKET PENETROMETER READING

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 109.8'
Rock: 0.0'
Samples: S23

BORING **SB2-67**

Haley & Aldrich, Inc. — **TEST BORING LOG** — BORING **SB2-68 OW**

PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA
CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
CONTRACTOR: GZA DRILLING, INC.

CONTRACT : 89374
SHEET NO. : 1 of 5
LOCATION N: 2951772
E : 781201
ELEVATION : 110.2
DATE START: 1-5-90
END : 8-5-90
DRILLER : P. Wordell
INSPECTOR : D. Warren

GROUNDWATER		DEPTH (ft) OF:		
Date	Time	Water	Casing	Hole
5-1-90	1330	8.0	8.2	10.2
5-2-90	0830	5.2	10.0	14.2

EQUIPMENT	CASING	SAMPLER	CORE
Type	HW/NW	S	NV-2
Size I.D.:	4"/3"	1 3/8"	2"
Hammer Wt.:	300#	140#	----
Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			11 11 9 8	S1	0.2 2.2	18"	109.9 0.3	-BITUMINOUS ASPHALT- Moist, medium dense, brown black COARSE TO FINE SAND, some silt, little fine gravel, cinder particles, trace slag, coal, brick particles. -GRANULAR FILL-
			7 8 6 4	S2	2.2 4.2	12"	106.2 4.0	DO. with some fine sand, silt, trace fine gravel in occasional pockets.
5			1 2 3 4	S3	4.2 6.2	6"	104.0 6.2	Moist, medium stiff, brown SILT and clay, some fine gravel, little coarse to fine sand. -COHESIVE FILL-
			5 7 7 11	S4	6.2 8.2	18"		Wet, medium dense, gray FINE SAND, trace fine gravel, shell fragments. -GRANULAR FILL-
			1 WOH 1 1	S5	8.2 10.2	16"		Wet, very loose, gray FINE SAND, little silt, trace coarse sand, fine gravel. (SM)
10			1 1 WOH "	S6	10.2 12.2	20"	100.0 10.2	Moist, very soft, gray black SILT, trace fine sand, clay. Strong petroleum odor.
			3 2 1 2	S7	12.2 14.2	24"		Moist, soft, gray black SILT, little fine sand, trace clay, slag, cinders. Strong petroleum odor. -COHESIVE FILL-
15			3 2 3 4	S8	15.0 17.0			Moist, medium stiff, gray CLAY and silt, some coarse to fine sand, trace coarse to fine gravel, shell fragments, cinders, slag. Slight petroleum odor. Attempted 3" diameter undisturbed tube sample at 15.0'. No penetration.
20			PUSH " " "	U1	20.0 22.0	24"		Pushed 3" diameter undisturbed tube sample in cohesive fill from 20.0' to 22.0'. Recovered 24". (CL/CH)
							86.7 23.5	-ORGANIC DEPOSITS-

25 MAY 91

SRF

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	110.9'
Rock:	18.7'
Samples:	S19U8C4

BORING **SB2-68 OW**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-68 OW**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			1 WOH " 2	S9	25.0 27.0	24"		Moist, very soft, gray ORGANIC SILT, trace shell fragments. -ORGANIC DEPOSITS-
30			PUSH " " "	U2	30.0 32.0	24"		Pushed 3" diameter undisturbed tube sample in organic deposits from 30.0' to 32.0'. Recovered 24". (OH)
							78.2 32.0	
								Probable Peat Deposit. -ORGANIC DEPOSITS-
							76.2 34.0	
35			9 14 24 31	S10	35.0 37.0	24"		Moist, hard, yellow gray, mottled CLAY and silt, trace fine sand in occasional partings. PP > 4.5 TSF. -MARINE DEPOSITS-
40			PUSH "	U3	40.0 41.2	14"		Pushed 3" diameter undisturbed tube sample in marine clay from 40.0' to 41.2'. Recovered 14". (CH/CL)
45			4 5 6 8	S11	45.0 47.0	24"		Moist, stiff, yellow gray, mottled CLAY and silt, trace fine sand in occasional partings. PP = 1.50 TSF.
50			PUSH "	U4	50.0 51.2	14"		Pushed 3" diameter undisturbed tube sample in marine clay from 50.0' to 52.0'. Recovered 14".

25 MAY 91

- 11 -

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 110.9'
Rock: 18.7'
Samples: S19U8C4

BORING **SB2-68 OW**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-68 OW
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			2 3 4 4	S12	55.0 57.0	24"		Moist, medium stiff, gray CLAY and silt. PP = 0.75 TSF. -MARINE DEPOSITS-
60			PUSH " "	U5	60.0 62.0	22"		Pushed 3" diameter undisturbed tube sample in marine clay from 60.0' to 62.0'. Recovered 22". (CL)
65			3 3 3 4	S13	65.0 67.0	24"		Moist, medium stiff, gray CLAY and silt, trace fine sand in occasional partings. PP = 0.50 TSF.
70			PUSH " "	U6	70.0 72.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 70.0' to 72.0'. Recovered 24".
75			WOR 1 3 4	S14	75.0 77.0	24"		Moist, soft, gray CLAY and silt. PP = 0.25 TSF.
80			PUSH " "	U7	80.0 82.0	22"		Pushed 3" diameter undisturbed tube sample in marine clay from 80.0' to 82.0'. Recovered 22".

25 MAY 91

STP

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	110.9'
Rock:	18.7'
Samples:	S19U8C4

BORING SB2-68 OW

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-68 OW**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR 3 4 5	S15	85.0 87.0	24"		Moist, medium stiff, gray CLAY and silt. PP = 0.25 TSF. -MARINE DEPOSITS-
90			PUSH " " "	U8	90.0 92.0	24"		Pushed 3" diameter undisturbed tube sample in marine clay from 90.0' to 92.0'. Recovered 24".
95			WOR " 9 12	S16	95.0 97.0	24"	13.7 96.5	Moist, stiff, gray CLAY and silt. PP = 0.25 TSF.
								Moist, very stiff, gray SILT, some coarse to fine sand, little fine gravel, clay. -GLACIOMARINE DEPOSITS-
100			22 29 25 18	S17	100.0 102.0	10"		Moist, very dense, gray COARSE TO FINE SAND, some silt, little fine gravel, clay, with cobbles.
							6.7 103.5	
105			59 64 46 47	S18	105.0 107.0	12"		Moist, very dense, gray SILT and fine gravel, some coarse to fine sand, trace clay, with cobbles (well bonded in situ). -GLACIAL TILL DEPOSITS-
110			73 80/5"	S19	110.0 110.9		-0.7 110.9	DO. TOP OF BEDROCK 110.9'
			35/0" 77%	C1	111.0 116.0	57"		Hard, very slightly weathered, moderately fractured to sound, gray, fine grained to aphanitic arenaceous ARGILLITE. Bedding very thin, moderately dipping. Joints close, tight, smooth to rough, planar, frequently dipping parallel to bedding planes, as well as frequently dipping at steep angles opposite to bedding planes. Joint surfaces generally slightly weathered,
		3						
		3						
		4						

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	110.9'
Rock:	18.7'
Samples:	S19U8C4

BORING **SB2-68 OW**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-68 OW
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
		3						slightly oxidized, calcite coated or containing silt coatings.
		3	81%	C2	116.0 119.6	38"		Calcite coated joint surfaces with slickensides, roughly diagonal to dip direction of joint surface at 112.9', 113.2', and 114.2'.
		4						C2: Hard, very slightly weathered, sound, gray, fine grained to aphanitic, arenaceous ARGILLITE. Bedding very thin, moderately dipping. Joints close to moderately close.
		3						-CAMBRIDGE FORMATION-
-120-		3	98%	C3	119.6 124.6	60"		C3: DO. except joints occasionally dipping parallel to bedding planes, frequently dipping opposite to bedding planes at shallow to steep angles. Occasional thin, irregular, steeply dipping calcite veins.
		3						
		3						
		3						
		4						
-125-			100%	C4	124.6 129.6	60"		C4: DO. except very slightly weathered joints generally dipping parallel to bedding. Open, smooth, planar, steeply dipping joint, opposite to bedding from 127.7' to 129.0'.
		3						
		3						
		3						
		3					-19.4 129.6	

BOTTOM OF EXPLORATION 129.6'
BOREHOLE GROUTED UPON COMPLETION
WOR = WEIGHT OF RODS
BPF = BLOWS PER FOOT
RQD = ROCK QUALITY DESIGNATION
2.0" ID PVC OBSERVATION WELL INSTALLED IN AN ADJACENT SUPPLEMENTAL BOREHOLE AT 22.2'
PUSH = PRESSED WITH DRILL RIG HYDRAULICS

26 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY
Overburden: 110.9'
Rock: 18.7'
Samples: S19U8C4

BORING SB2-68 OW

Haley & Aldrich, Inc. — TEST BORING LOG — BORING **SB2-69**

PROJECT: **CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA**
CLIENT : **MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS**
CONTRACTOR: **GZA DRILLING, INC.**

CONTRACT : **89374**
SHEET NO. : **1 of 5**
LOCATION N: **2951724**
E : **781248**
ELEVATION : **109.6**
DATE START: **1-5-90**
END : **4-5-90**
DRILLER : **A. Redford**
INSPECTOR : **C. Toscano**

GROUNDWATER		DEPTH (ft) OF:			EQUIPMENT	CASING	SAMPLER	CORE
Date	Time	Water	Casing	Hole	Type	HW	S	NV-2
5-2-90	0615	4.4	36.4	47.0	Size I.D.:	4"	1 3/8"	2"
5-3-90	0610	1.2	36.4	100.0	Hammer Wt.:	300#	140#	----
					Hammer Fall:	24"	30"	----

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type		Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								109.4	-BITUMINOUS ASPHALT-
			11 13 11 5	S1		1.0 3.0	18"	0.2	Moist, medium dense, black CINDERS and coarse sand, little fine gravel.
									-MISCELLANEOUS FILL-
5			6 5 7 8	S2		5.0 7.0	13"		Moist, medium dense, gray COARSE TO FINE SAND and silt, trace shell fragments, brick particles.
								101.1 8.5	
10			2 1 2 2	S3		10.0 12.0	16"		Wet, soft, gray CLAY and organic silt, some fine sand, trace fine gravel. PP < 0.25 TSF.
15			WOR " 1 2	S4		15.0 17.0	24"		Moist, very soft, gray CLAY and organic silt, little fine sand, trace coal particles. PP = 1.0 TSF.
									-COHESIVE FILL-
								91.1 18.5	
20			WOR 1 2 2	S5		20.0 22.0	13"		Moist, very loose, gray FINE SAND, some silt, trace clay, shell fragments, coarse sand, fine gravel. (SM) PP < 0.25 TSF.
								87.6 22.0	-GRANULAR FILL-
									-COHESIVE FILL-

26 MAY 91

-12-

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	113.7'
Rock:	21.8'
Samples:	S23 C5

BORING **SB2-69**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-69
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 2 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			2 1 2 3	S6	25.0 27.0	2"		Moist, soft, gray SILT and clay, little fine sand, trace shell fragments, cinders, slag. -COHESIVE FILL-
							81.1 28.5	
30			WOR WOH " 4	S7	30.0 32.0	20"		Moist, very soft, gray ORGANIC SILT, trace clay, shell fragments. -ORGANIC DEPOSITS-
							78.1 31.5	Moist, medium stiff, brown, fibrous PEAT. -ORGANIC DEPOSITS-
							76.1 33.5	
35			9 17 21 25	S8	35.0 37.0	18"		Moist, hard, gray yellow CLAY and silt. PP = 2.25 TSF. -MARINE DEPOSITS-
40			5 13 10 13	S9	40.0 42.0	24"		DO. except very stiff. PP = 2.25 TSF.
45			4 9 10 13	S10	45.0 47.0	24"		DO. PP = 2.25 TSF.
50			WOH 6 7 8	S11	50.0 52.0	24"		DO. except gray and stiff. PP = 1.75 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	113.7'
Rock:	21.8'
Samples:	S23 C5

BORING SB2-69

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-69**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 3 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOH " 6 7	S12	55.0 57.0	24"		Moist, medium stiff, gray, laminated CLAY and silt. PP = 1.5 TSF.
								-MARINE DEPOSITS-
60			WOR 1 4 5	S13	60.0 62.0	24"		DO. PP = 1.0 TSF.
65			WOR 3 3 7	S14	65.0 67.0	24"		DO.
70			WOR " 4 5	S15	70.0 72.0	24"		DO. PP = 1.0 TSF.
75			WOR WOH 3 6	S16	75.0 77.0	24"		DO. except soft.
80			WOR WOH 5 6	S17	80.0 82.0	24"		DO. except medium stiff. PP = 1.25 TSF.

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden: 113.7'
Rock: 21.8'
Samples: S23 C5

BORING **SB2-69**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING **SB2-69**
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 4 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
			WOR " 4 5	S18	85.0 87.0	24"		Moist, medium stiff, gray CLAY and silt. PP = 1.25 TSF. -MARINE DEPOSITS-
90			WOR " " 6	S19	90.0 92.0	24"		DO. except very soft. PP = 0.75 TSF.
95			WOR " " 8	S20	95.0 97.0	24"		DO. PP = 1.0 TSF.
100			WOR " " 4	S21	100.0 102.0	24"		DO. PP = 0.75 TSF.
							5.1 104.5	
105			20 21 17 22	S22	105.0 107.0	13"		Moist, very dense, gray COARSE TO FINE SAND, little fine gravel, clay. -GLACIOMARINE DEPOSITS-
							1.6 108.0	
110			72 120/5"	S23	110.0 110.9	8"		Moist, hard, gray SILT, some fine gravel, coarse to fine sand, trace clay, with cobbles (well bonded in situ). -GLACIAL TILL DEPOSITS- TOP OF BEDROCK 113.7'
							-4.1 113.7	
		3	95%	C1	114.0 119.0	57"		C1: Hard, fresh, slightly to moderately fractured, gray, aphanitic ARGILLITE. Bedding very thin, dipping at

25 MAY 91

STP

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	113.7'
Rock:	21.8'
Samples:	S23 C5

BORING **SB2-69**

Haley & Aldrich, Inc.	TEST BORING LOG	BORING SB2-69
PROJECT: CENTRAL ARTERY/TUNNEL PROJECT, BOSTON MA CLIENT : MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS		CONTRACT : 89374 SHEET NO. : 5 of 5

Depth in Feet	Strata Change	Case BPF (Drill) (min/ft)	Sampler Blows Per 6" (RQD%)	Sample Number/ Type	Sample Depth Range (ft)	Sample Recovery (in)	Elevation/ Depth (ft)	FIELD CLASSIFICATION AND REMARKS
								moderate angles and intermittently indistinct. Joints moderately close to close, tight, smooth, planar and occasionally rough, undulating to stepped and moderately dipping parallel to bedding. Tight, smooth, planar and high angle joint from 114.5' to 114.8'. Extremely fractured zone from 118.0' to end of run associated with intersecting moderate and high angle joints.
		2						
		2						
		3						
		3						
		3	67%	C2	119.0 122.0	36"		C2: DO. except joints moderately close to very close, tight, smooth, planar, and moderately dipping parallel to bedding.
120		2						
		4						
		3	78%	C3	122.0 127.0	58"		C3: DO. except slightly to extremely fractured.
		3						
		3						
125		3						-CAMBRIDGE FORMATION-
		3						
		3						
		3	52%	C4	127.0 130.5	42"		C4: Hard, fresh, slightly to moderately fractured, gray, aphanitic ARGILLITE. Bedding very thin, dipping at moderate angles. Joints moderately close to very close, tight, smooth, planar, and dipping parallel to bedding. High angle, calcite coated joints from 129.0' to 129.4' and from 129.8' to 130.3'. Extremely fractured zone from 129.8' to 130.3' associated with intersecting joints.
		2						
		3						
130			31%	C5	130.5 135.5	52"		C5: Hard, fresh, moderately to extremely fractured, gray, fine grained to aphantic ARGILLITE. Bedding very thin, dipping at moderate angles. Joints moderately close to very close, tight to open, generally smooth, planar and dipping parallel to bedding. Extremely fractured zones from 131.7' to 132.1', from 132.5' to 133.0', and from 134.2' to 134.8' with open, smooth, planar to stepped joints dipping at low to high angles. Slightly fractured from 130.5' to 131.7'.
		3						
		2						
		3						
		3						
135		3					-25.9 135.5	BOTTOM OF EXPLORATION 135.5'

BOREHOLE GROUTED UPON COMPLETION
WOR = WEIGHT OF RODS
WOH = WEIGHT OF HAMMER
PP = AVERAGE POCKET PENETROMETER READING
BPF = BLOWS PER FOOT
RQD = ROCK QUALITY DESIGNATION

25 MAY 91

BLOWS/FT.	DENSITY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
50+	Very Dense

BLOWS/FT.	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium Stiff
8-15	Stiff
15-30	Very Stiff
30+	Hard

SAMPLE IDENTIFICATION
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- W - Wash Sample
- See Remarks

SUMMARY

Overburden:	113.7'
Rock:	21.8'
Samples:	S23 C5

BORING SB2-69

APPENDIX E
Shear Wave Velocity Testing Report from Hager-Richter Geoscience, Inc.

HAGER-RICHTER
GEOSCIENCE, INC.

SHEAR WAVE VELOCITY TESTING
BOSTON SEAPORT
BOSTON, MASSACHUSETTS

Prepared for:

Haley & Aldrich, Inc.
465 Medford Street | Suite 2200
Boston, MA 02129

Prepared by:

Hager-Richter Geoscience, Inc.
8 Industrial Way - D10
Salem, New Hampshire 03079

File 22VD15
May 2022

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HAGER-RICHTER
GEOSCIENCE, INC.

GEOPHYSICS FOR THE ENGINEERING COMMUNITY
SALEM, NEW HAMPSHIRE
Tel: 603.893.9944
FORDS, NEW JERSEY
Tel: 732.661.0555

May 17, 2022
File 22VD15

Mary C. Votto, EIT
Senior Geotechnical Engineer
Haley & Aldrich, Inc.
465 Medford Street | Suite 2200
Boston, MA 02129

Tel: (617) 886-7323
Cell: (617) 386-6394
Email: MVotto@haleyaldrich.com

RE: Shear Wave Velocity Testing
Boston Seaport
Boston, Massachusetts

Dear Ms. Votto:

In this report, we summarize the results of shear wave velocity testing conducted by Hager-Richter Geoscience, Inc. (HRGS) in April 2022 at the above referenced site for Haley & Aldrich, Inc. (H&A). The scope of the survey and the area of interest were specified by H&A.

INTRODUCTION

The site is a commercial property and former airfield located on Runway Road in East Hartford, Connecticut. The general location of the Site is shown in Figure 1. According to information provided by H&A, redevelopment is planned for the site. As part of a geotechnical investigation of the Site, H&A required site-specific shear wave velocity information as a function of depth for the soil and bedrock to a depth of 100 feet for the determination of seismic site class. Figure 2 shows the locations of the shear wave velocity test lines and center points.

H&A provided boring logs for the Site that indicate varying thicknesses of fill, organics, marine and till deposits. Some locations encountered bedrock at about 113 feet below ground surface.

OBJECTIVE

The objective of the geophysical survey was to provide shear wave velocity information as a function of depth to a depth of 100 feet.

THE SURVEY

Vanja Dezelic, Ph.D., and Sean Reid of HRGS conducted the field operations on April 25, 2022. The project was coordinated with Mary C. Votto, EIT, who was on site and assisted with logistics and access at the site. Data analysis and interpretation were completed at the HRGS offices. Original data and field notes will be retained in the HRGS files for a minimum of three years.

Shear wave velocity testing was conducted using the passive shear wave seismic (pVs) method, also called the Refraction Microtremor (ReMi) method along four (4) test lines. Figure 2 shows the locations of the transects.

Photo 1. General site conditions showing Line 2 looking southwest

METHODS AND EQUIPMENT

As indicated above, the passive shear wave seismic (pVs) method, also called the Refraction Microtremor method, or ReMi was used to determine the shear wave velocity as a function of depth.

The passive shear wave seismic (pVs) method is a geophysical method to determine a vertical shear-wave velocity profile at a single location by analyzing a particular type of seismic wave recorded on a multichannel record. The name pVs is derived from p for passive and Vs for velocity of shear waves. The pVs method, also called the Refraction Microtremor method, or

ReMi™, uses Rayleigh waves, a particular kind of wave first described by Lord Rayleigh in 1885. Such waves are dispersive (meaning that the velocity is a function of the wavelength), and the amplitude of such waves decreases with depth. The velocity depends primarily on the shear wave velocities and layering of the subsurface material.

Rayleigh waves are a significant part of the ambient subsurface noise at most, if not all, sites. There are many sources of such noise, including, but not limited to, wind, pedestrian and vehicular traffic, surface and subway trains, and construction activities. Although such noise can be troublesome for most seismic methods, it is the source of signals for the pVs method, and the higher the noise level, the better the results for this method.

Low frequency (4.5 Hz) geophones are installed 5 to 10 ft apart along a straight line and connected to a seismograph. The ambient noise is recorded for 30 seconds two or three times and examined to be sure that noise of sufficiently low frequency is present. If the noise is sufficient, then 15 to 20 such records are acquired. If the noise spectra do not reach sufficiently low frequencies, then one walks or runs along the test line during data acquisition to add low frequency noise to the ambient noise. The surface waves used in the pVs method, considered noise in seismic refraction and reflection surveys, are enhanced during data acquisition and processing for the pVs method. The seismic data are analyzed using SeisOpt® ReMi™, a commercially licensed software package developed by Optim, Inc. located at the University of Nevada at Reno. Results are normally presented as 1-D plots or in tabular form showing shear wave velocity as a function of depth at the center of the seismic line.

It should be noted that the method produces a single velocity profile (Vs as a function of depth Z) at one location (namely, the center of the line) for each line. The software also calculates the average shear wave velocity using the following equation (taken from the International Building Code):

$$V_{avg} = \left(\sum_{i=1}^{N} d_i \right) / \sum_{i=1}^{N} d_i / V_i \qquad \text{Eq. 1}$$

where V_{avg} is average shear wave velocity
d_i is thickness of the i^{th} layer
V_i is the shear wave velocity of the i^{th} layer
N is the number of layers

The Seismic Site Class, based solely on average shear wave velocity, is defined by the IBC as follows:

Site Class	Soil Profile Name	Soil Shear Wave Velocity (ft/s)
A	Hard rock	$V_s > 5000$
B	Rock	$2500 < V_s \leq 5000$
C	Very dense soil and soft rock	$1200 < V_s \leq 2500$
D	Stiff soil profile	$600 \leq V_s \leq 1200$
E	Soft soil profile	$V_s < 600$

Although the IBC provides other methods to determine the Site Class, such as standard penetration resistance (N-values) and soil undrained shear strength, this report provides site specific data for shear wave velocity only. Furthermore, there is no consideration of other factors that may affect a site such as liquefaction. **The final determination of seismic site class should be made by the project engineer.**

Site Specific. We used two 24-channel digital seismographs (Geometrics Geodes) coupled to 48 geophones to acquire the pVs data. We used 4.5-Hz frequency vertical geophones for the subject shear wave velocity testing.

The locations of the four (4) test lines are shown in Figure 2. The pVs data were acquired using 48 geophones and a geophone spacing of 5 feet for Lines 1 and 3, and 24 geophones and a geophone spacing of 6 feet for Lines 2 and 4. The pVs method yields a single vertical velocity profile at the mid points of the test lines, shown in Figure 2. The seismic source for the pVs test was ambient noise and random hammer striking and walking up and down the line while acquiring the data to enhance the low frequency content of the seismic signal.

LIMITATIONS OF THE METHOD

pVs. As with all physical measurements, there is experimental error in the velocities that are determined using the passive shear wave velocity seismic method. For the pVs method, the accuracy of V_{avg} is stated by Optim, Inc. to be 5-15%.

The depth of investigation is a function of the noise spectrum, and long wavelengths (low frequencies) are required to determine velocity at large depths. Noise levels can be improved by a person running along the seismic spread during data acquisition.

RESULTS

The geophysical survey consisted of passive shear wave seismic (pVs) testing conducted along four (4) test lines, designated as pVs Lines 1, 2, 3 and 4. The pVs test line locations and center points for the velocity profiles are shown in Figure 2.

H&A provided boring logs for the Site that indicate varying of fill, organics, marine and till deposits. Some locations encountered bedrock at about 113 feet below ground surface and deeper.

The results of the pVs testing are reported in Table 1. For modeling purposes, the subsurface stratigraphy was broken into four discrete units. The velocity units do not necessarily correlate with specific lithologic units identified in the borings. We note that boring logs do not provide a complete stratigraphic constraint, therefore, the number of layers and the thickness that provides the best statistical fit to the respective dispersion curve was used for each line independently. The root mean square error for the fit of the dispersion curve versus the measured data using the model velocities was 1.4% for pVs Test Lines 1, 2, 3, and 1.8% for pVs Test Line 4.

No attempt was made to “force” a specific model to the data. The velocities for the units to the maximum depth investigated, and the average values of the velocity of shear waves, Vs100, determined by Equation 1 for the depth interval of 0 – 100+ ft are also reported in Table 1 for pVs Lines 1, 2, 3 and 4.

LIMITATIONS ON USE OF THIS REPORT

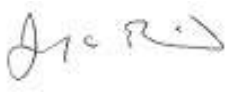
This letter report was prepared for the exclusive use H&A Consultants (Client). No other party shall be entitled to rely on this Report, or any information, documents, records, data, interpretations, advice, or opinions given to Client by Hager-Richter Geoscience, Inc. (HRGS) in the performance of its work. The Report relates solely to the specific project for which HRGS has been retained and shall not be used or relied upon by Client or any third party for any variation or extension of this project, any other project, or any other purpose without the express written permission of HRGS. Any unpermitted use by Client or any third party shall be at Client's or such third party's own risk and without any liability to HRGS.

HRGS has used reasonable care, skill, competence, and judgment in the performance of its services for this project consistent with professional standards for those providing similar services at the same time, in the same locale, and under like circumstances. Unless otherwise stated, the work performed by HRGS should be understood to be exploratory and interpretational in character and any results, findings or recommendations contained in this Report or resulting from the work proposed may include decisions which are judgmental in nature and not necessarily based solely on pure science or engineering. It should be noted that our conclusions might be modified if subsurface conditions were better delineated with additional subsurface exploration including, but not limited to, test pits, soil borings with collection of soil and water samples, and laboratory testing.

Except as expressly provided in this limitations section, HRGS makes no other representation or warranty of any kind whatsoever, oral or written, expressed or implied; and all implied warranties of merchantability and fitness for a particular purpose, are hereby disclaimed.

If you have any questions or comments on this letter report, please contact us at your convenience. It has been a pleasure to work with H&A on this project. We look forward to working with you again in the future.

Sincerely,
HAGER-RICHTER GEOSCIENCE, INC.



Vanja Dezelic Ph.D.
Geophysicist

Jeffrey Reid, P.G.
Owner / Principal Geophysicist

Attachments: Table 1, Figures 1 & 2

TABLE - pVs TESTING RESULTS

Geologic Unit*	pVs Test Line 1	
	Depth Interval (ft)	**Vs** (ft/s)**
Fill/Organics	0 – 20	472
Marine Deposits	20 – 52	488
Marine/Till Deposits	52 – 113	1,011
Bedrock	113+	1,654
$V_{S\ 100}$ (ft/s)	643	
RMS Error (%)	1.4	

Geologic Unit*	pVs Test Line 2	
	Depth Interval (ft)	**Vs** (ft/s)**
Fill/Organics	0 – 19	448
Marine Deposits	19 – 48	475
Marine/Till Deposits	48 - 113	986
Bedrock	113+	1,502
$V_{S\ 100}$ (ft/s)	640	
RMS Error (%)	1.4	

Geologic Unit*	pVs Test Line 3	
	Depth Interval (ft)	**Vs** (ft/s)**
Fill/Organics	0 – 20	447
Marine Deposits	20 - 52	463
Marine/Till Deposits	52 - 116	999
Bedrock	116+	1,489
$V_{S\ 100}$ (ft/s)	618	
RMS Error (%)	1.4	

Geologic Unit*	pVs Test Line 4	
	Depth Interval (ft)	**Vs** (ft/s)**
Fill/Organics	0 – 22.5	433
Marine Deposits	22.5 – 55	468
Marine/Till Deposits	55 - 118	1,030
Bedrock	118+	1,524
$V_{S\ 100}$ (ft/s)	604	
RMS Error (%)	1.8	

* Stratigraphy is roughly based on Boring Logs provided by H&A

** Shear wave velocity profile is determined for the mid-point of the test line

N

APPROXIMATE SCALE (feet)

0 500 1000

MASS

LOCATION

NOTE:

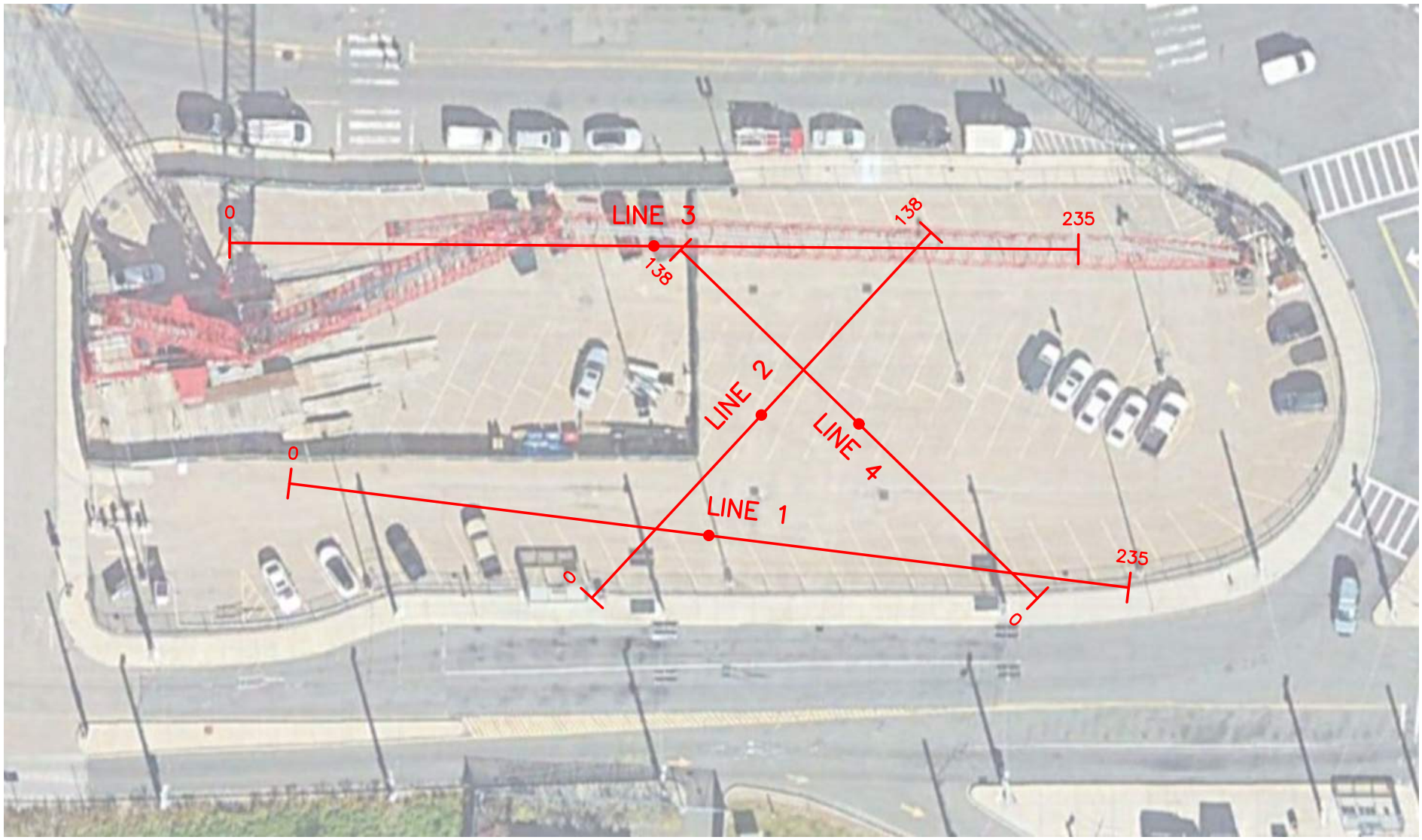
Modified from Google Earth Pro aerial photograph.

Figure 1
General Site Location
Boston Seaport
Boston, Massachusetts

File 22VD15 | May, 2022

HAGER–RICHTER

Salem, NH | Fords, NJ



SCALE (feet)

0 40 80

LEGEND

pVs TEST LINE WITH MIDPOINT

N

NOTE:

Modified from Google Earth Pro aerial photograph.

Figure 2
pVs Test Line Locations
Boston Seaport
Boston, Massachusetts

File 22VD15 | May, 2022

HAGER–RICHTER
Salem, NH | Fords, NJ

APPENDIX F
Geotechnical Lateral Capacity Evaluation of 6 ft Diameter Drilled Shafts

HALEY ALDRICH	CALCULATIONS	File No.:	134215
		Sheet:	1 of 2
Client:	Lincoln Property Company	Date:	26MAY2022
Project:	Seaport Circle - Parcel H	Computed by:	MCV
Subject:	Lateral Resistance of 6 ft Diameter Drilled Shaft	Checked by:	KMT

OBJECTIVE

Calculate the lateral resistance of a single 6-ft diameter rock-socketed drilled shaft along column line Z.

ASSUMPTIONS

1. Single drilled shaft analysis (using LPile software program). Elevations are in feet Boston City Base (ft, BCB).
2. Drilled shaft is modeled as linear elastic with infinite strength.
3. Drilled shaft modeled with "cracked" moment of inertia (i.e., Icracked=2/3*Igross).
4. Compressive strength of concrete is f'c = 5000 psi, Young's modulus Ec = 4031 ksi.
5. Pinned and fixed head conditions were analyzed. Drilled shaft is vertical (NO BATTER).
6. Shafts are spaced far enough apart (>5 times the diameter) such that lateral group effects are negligible. However, a p-y reduction factor of 0.7 (P-multiplier) was used to account for seismic effects on soil lateral resistance.
7. Vertical load not applied for this analysis. Capacity of drilled shaft section to resist combined vertical and lateral (induced moment) loads to be checked by others.
8. The top of drilled shaft/bottom of cap is modeled at El. +12.
9. Groundwater at El. 13.
10. Rock lateral k value was based on GSI=50 and Ei=1390 ksi (intact Young's Modulus for Shale from AASHTO LRFD)
11. Properties in the lateral analysis model are as follows:

Layer	Material	Type	Top El. (ft)	Total Unit Wt., γ_t (pcf)	S_u or ϕ (psf, deg)	k or ε_{50} (pci,%)
1	Cohesive Fill	Cohesive	12	115	750	2
2	Organics	Cohesive	-9	110	400	2
3	Clay Crust	Cohesive	-25	120	1300	1
4	Marine Clay	Cohesive	-35	120	1000	1
5	Glacial Deposits	Cohesionless	-85	130	38	120
6	Bedrock	Rock	-95	165	-	2000

Notes:

1. S_u = undrained shear strength, ϕ = soil internal friction angle, k = lateral subgrade modulus, ε_{50} = percent strain at 50% of shear strength
2. ϕ and k apply to Cohesionless type materials, S_u and ε_{50} apply to Cohesive type materials.

12. Section properties of the drilled shaft are as follows:

Diameter	Area	Igross	Icracked	Econcrete
(in.)	(in^2)	(in^4)	(in^4)	(ksi)
72	4072	1319167	879445	4031

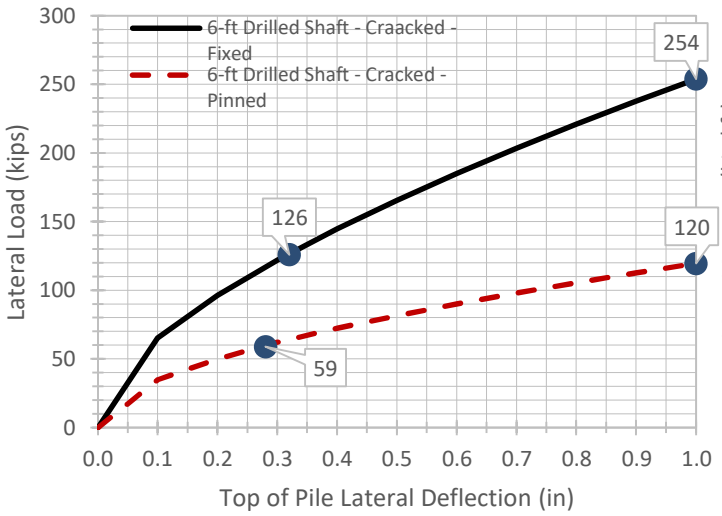
Note: Cracked moment of inertia (Icracked) is 2/3 gross moment of inertia (Igross)

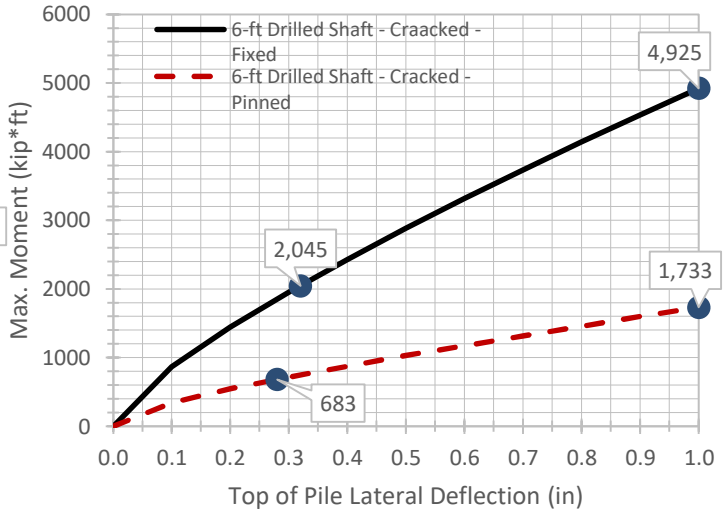
CALCULATIONS

1. Plots of load versus deflection and Max. bending moment versus deflection are presented in the following page.
2. Fixed head and pinned head results are shown.
3. The structural engineer should check that the drilled shaft can resist the combined axial and max. bending moment at the selected lateral capacity/deflection.

HALEY ALDRICH	CALCULATIONS	File No.:	134215
		Sheet:	2 of 2
Client:	Lincoln Property Company	Date:	26MAY2022
Project:	Seaport Circle - Parcel H	Computed by:	MCV
Subject:	Lateral Resistance of 6 ft Diameter Drilled Shaft	Checked by:	KMT

6-ft Diameter Drilled Shaft (Cracked Moment of Inertia) at Column Line Z





RECOMMENDATIONS:

Drilled Shafts will be used to resolve a portion of lateral loads for the lab building. The allowable lateral drilled shaft capacities presented below are based on one half of the load that produces 1 inch of deflection. The Structural engineer should evaluate the drilled shaft for combined forces. The following table summarizes lateral capacity for varying conditions:

	Recommendations per IBC 1810.3.3.2		
Shaft Head Condition	Lateral Capacity (kips)	Corresponding Maximum Moment (kip-ft)	Corresponding Deflection (in.)
Pinned Head	59	683	0.28
Fixed Head	126	2045	0.32

ALTERNATE APPROACH:

The Structural engineer may select another capacity from the curves above provided the lateral deflection meets the requirements highlighted below from IBC 2015.

1810.3.3.2 Allowable lateral load. Where required by the design, the lateral load capacity of a single deep foundation element or a group thereof shall be determined by an *approved* method of analysis or by lateral load tests to at least twice the proposed design working load. The resulting allowable load shall not be more than one-half of the load that produces a gross lateral movement of 1 inch (25 mm) at the lower of the top of foundation element and the ground surface, unless it can be shown that the predicted lateral movement shall cause neither harmful distortion of, nor instability in, the structure, nor cause any element to be loaded beyond its capacity.

APPENDIX G
Geotechnical Lateral Capacity Evaluation of Driven Steel HP14x127

HALEY ALDRICH	CALCULATIONS	File No.:	134215
		Sheet:	1 of 2
Client:	Lincoln Property Company	Date:	9MAY2022
Project:	Seaport Circle - Parcel H	Computed by:	MCV
Subject:	Lateral Resistance of Garage HP 14x117 Piles	Checked by:	KMT

OBJECTIVE

Calculate the lateral resistance of HP 14x117 H-Piles

ASSUMPTIONS

1. Single pile analysis (using LPile software program). Elevations are in feet Boston City Base (ft, BCB).
2. Corrosion allowance equal to 1/16 inch analyzed. (reduction on outside face of steel section).
3. Pinned and fixed head conditions were analyzed. Pile is vertical (NO BATTER).
4. P-multiplier (p-y curve reduction) equal to 0.5 to account for HPIle-soil-HPile interaction (group effects).
5. Vertical load not applied for this analysis. Capacity of Pile section to resist combined vertical and lateral (induced moment) loads to be checked by others.
6. The top of pile/bottom of pile cap is modeled at El. -5.
7. Groundwater at El. 13.
8. Load applied such that bending is occurring about the Weak Axis
9. Soil properties in the lateral analysis model are as follows:

Layer	Material	Type	Top El. (ft)	Total Unit Wt., γ_t (pcf)	S_u or ϕ (psf, deg)	k or ε_{50} (pci,%)
1	Cohesive Fill/Organics	Cohesive	-5	110	400	2
2	Clay Crust	Cohesive	-20	120	1300	1
3	Marine Clay	Cohesive	-30	120	1000	1

Notes:

1. S_u = undrained shear strength, ϕ = soil internal friction angle, k = lateral subgrade modulus, ε_{50} = percent strain at 50% of shear strength
2. ϕ and k apply to Cohesionless type materials, S_u and ε_{50} apply to Cohesive type materials.

8. Section properties for the H-piles are as follows:

Section	Esteel (ksi)	Corr. (in.)	Iwk. (in.^4)	A (in.^2)
HP14x117	29000	1/16	365	28.7

Note: Corr. is the corrosion loss assumed for the steel section.

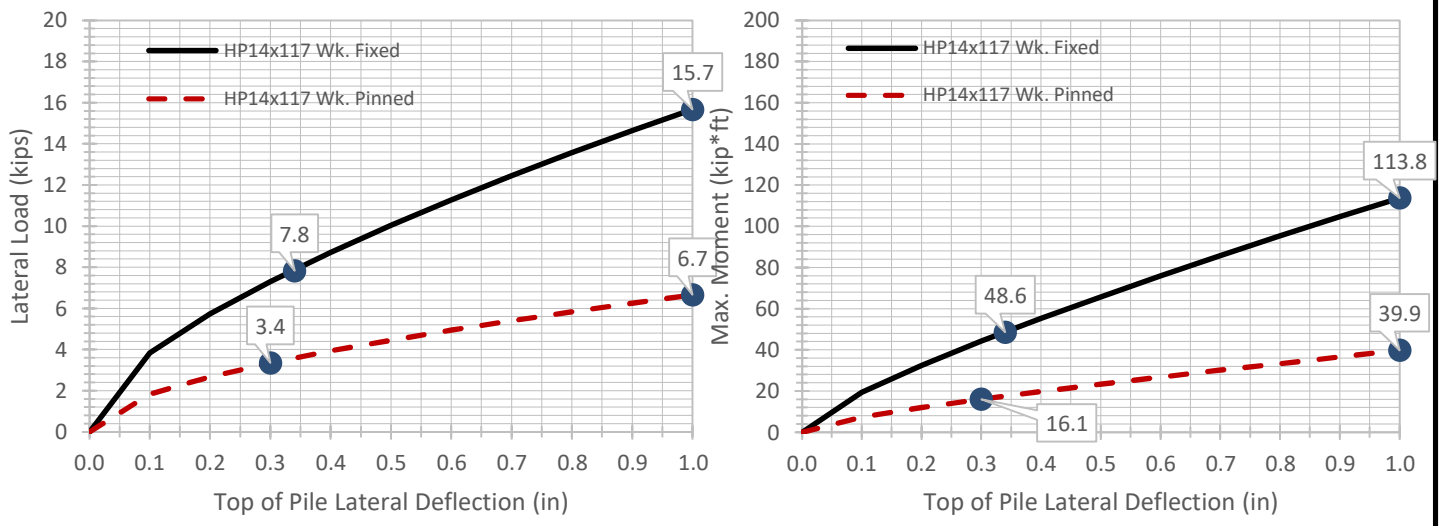
CALCULATIONS

1. Plots of load versus deflection and Max. pile bending moment versus deflection are presented in the following page.
2. Fixed head and pinned head results are shown.
3. The structural engineer should check that the pile can resist the combined axial and max. bending moment at the selected lateral capacity/deflection.

HALEY ALDRICH	CALCULATIONS	File No.:	134215
		Sheet:	2 of 2
Client:	Lincoln Property Company	Date:	10MAY2022
Project:	Seaport Circle - Parcel H	Computed by:	MCV
Subject:	Lateral Resistance of Garage HP 14x117 Piles	Checked by:	KMT

Notes:
Wk. - lateral loads are applied that causes bending about the weak axis of the H-Pile.

HP14X117 (1/16-in CORROSION)



RECOMMENDATIONS:

Steel H-piles will be used to resolve a portion of lateral loads for the lab building. The allowable lateral pile capacities presented below are based on one half of the load that produces 1 inch of deflection. The Structural engineer should evaluate the piles for combined forces. The following table summarizes lateral

	Recommendations per IBC 1810.3.3.2		
Pile Head Condition	Lateral Capacity (kips)	Corresponding Maximum Moment (kip-ft)	Corresponding Deflection (in.)
Pinned Head	3.4	16.1	0.3
Fixed Head	7.8	48.6	0.34

ALTERNATE APPROACH:

The Structural engineer may select another capacity from the curves above provided the lateral deflection meets the requirements highlighted below from IBC 2015.

1810.3.3.2 Allowable lateral load. Where required by the design, the lateral load capacity of a single deep foundation element or a group thereof shall be determined by an *approved* method of analysis or by lateral load tests to at least twice the proposed design working load. The resulting allowable load shall not be more than one-half of the load that produces a gross lateral movement of 1 inch (25 mm) at the lower of the top of foundation element and the ground surface, unless it can be shown that the predicted lateral movement shall cause neither harmful distortion of, nor instability in, the structure, nor cause any element to be loaded beyond its capacity.

Nitsch Engineering

2 Center Plaza, Suite 430
Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

November 2, 2022

Mr. Nicholas Moreno
Executive Director, Boston Conservation Commission
City of Boston Environmental Department
Boston City Hall
Boston, MA

RE: Nitsch Project #13511.1
777 Congress Street
Boston, MA
DEP File #006-1904

Dear Mr. Moreno:

Attached please find these supplemental materials per your October 21, 2022, email request:

1. Landscaping Narrative
2. Stamped Existing Condition survey
3. Design drawings w/ clearer resource area and clear proposed and existing grading
4. Building profiles w/ resource areas
5. Construction Management plan and narrative
6. Updated Abutter notification

Additionally, we are confirming that Massport is the sole owner in fee-simple of the land within the limit of work.

Please contact me with any questions or to arrange a meeting to further discuss the project.

Very truly yours,

Nitsch Engineering, Inc.

Coleman Horsley, PE,
Project Engineer

P:\10000-14999\13511.1 Massport H\Civil\Project Data\NOI\13511.1- LT Massport Parcel H Con Com 2022-11-01.docx

Cc: Kate Oetheimer, Boston Conservation Commission

PRELIMINARY CONSTRUCTION MANAGEMENT PLAN

PARCEL H
701 Congress Street
Boston, Massachusetts

Prepared for
Massachusetts Port Authority
Massachusetts Bay Transportation Authority
Massachusetts Department of Transportation
Boston Transportation Department
Boston Water & Sewer Commission

Developers
LO Parcel H, LLC

Construction Manager
Suffolk Construction Co., Inc.

Prepared by
Suffolk Construction Co., Inc.

Date
October 4, 2022

General Information

Parcel H LLC (the "Owner"), and Suffolk Construction Co., Inc. (the "Construction Manager") have developed the attached Construction Management Plan (CMP) for review and approval by the Massachusetts Port Authority (MassPORT), Massachusetts Bay Transportation Authority (MBTA), Massachusetts Department of Transportation (MassDOT), Boston Transportation Department (BTD) and Boston Water & Sewer Commission (BWSC) all collectively referred to as "Agencies". The CMP includes the following:

- Written agreement describing construction activities;
- Construction Management Plan
- Construction Schedule

Project Description

The project site, Massport Parcel H, is situated along the South side of Congress Street and bounded by Port Lane to the west, Silver Line Way to the south, and Starboard Way to the east. The site was formerly utilized as a commercial parking lot.

The proposed project includes the construction of a new, LEED (Gold) Certified 700,000 sf laboratory/research structure covering most of the parcel and ranging in height from 9 to 12 stories above grade. A portion of the structure will span over Silver Line Way on the south side of the site. An approximately 35,000 sf one level below grade parking garage is planned north of silver line way, below the east and west towers of the new building.

A separate two-story pavilion for public use is planned at the east end of the project. The Pavilion structure will be constructed over the CA/T tunnel.

The work includes, but is not limited to, demolition of the surface parking lot, structural excavation and backfill required for building construction, building foundation, building structure, exterior wall and roof, building systems, vertical circulation, interior circulation, interior construction and finishes and equipment, millwork and specialties. One level of parking below grade for a maximum of 85 cars.

Developers:
LO Parcel H, LLC

Construction Manager:
Suffolk Construction Co., Inc.
Frank Craemer, Vice President, Operations
65 Allerton Street
Boston, MA 02129
(617) 517-5236
fcraemer@suffolk.com

Construction Activity Schedule

In order to best understand the total impacts to the neighborhood, this CMP has been prepared as a comprehensive document that details the logistics related to the construction of Parcel H. To minimize impacts on the surrounding roadway network and to provide a safe pedestrian environment, it is expected that major construction activities will occur in seven (7) phases as summarized in Table 1 below:

Table 1. Proposed Construction Schedule

Construction Activity	Anticipated Duration
1. Mobilize Site / Cut & Cap	March 2023 – May 2023
2. SOE/Piles / Mass Ex / Pile Caps	April 2023 – August 2023
3. Foundations & Core Walls	July 2023 – Nov 2023
4. Underslab Plbg / Structural Slab	Oct 2023 – Nov 2023
5. Steel / Slab on Deck / Fireproof	Nov 2023 – July 2024
6. Façade / Roofs / Elevator / Int.	May 2024 – Oct 2025
7. Interior Finishes	Oct 2024 – Dec 2025
8. Finishes / Landsape / C of O	March 2025 - April 2026

Construction mobilization is scheduled to commence in March 2023 with occupancy planned by April 2026 (approximately 36 months). Typical construction hours will be from 7:00 am to 6:00 pm, Monday through Friday. It is anticipated that night shifts and/or weekend shifts will be required at various times throughout the project. If night and/or weekend work is required, then advance notice will be provided to Massport.

Potential Off-hour Activities include, but is not necessarily limited to;

1. Concrete Work
2. Tower Crane Erection
3. Structural Steel Erection
4. Hoist Erection and Jumps
5. 2nd Shift Façade Installation
6. 2nd Shift Deliveries
7. Utility installation

Phase 1: Relocate Bus Stops / Mobilize Site / Steel Sheeting (Ref. SLP.01)
Duration: 2 months (March 2023 – May 2023)

Activity Overview: During this phase we will install the elements of the construction management plan, install erosion control measures, strip the site as required for pre-trench / pre-excavation activities, and relocate/cut and cap utilities. During (or prior to) this time frame we

anticipate the catenary infrastructure will be removed by others. The following Massport material and/or equipment will be removed and either delivered to a Massport facility on the Mass Haul Road or temporarily stored offsite for later reinstallation. The items include:

- Parking control equipment
- Parking attendant booths
- MBTA bus stop shelters
- MBTA inspector booth

To complete the work, excavators, rubber tired backhoes, and other support equipment will be used. Trucks and equipment will enter the site via a gate at the west end of the Congress Street frontage (Gate A) and will exit the site via an additional gate at the east end of the frontage (Gate B). Police details will be provided at gates to control vehicular and pedestrian traffic when trucks are entering or existing the site.

To provide a safe working environment the site will be enclosed with a 6' high chain link fence as well as 3' high chain link fence on jersey barriers. The barriers and fence will be located at the end of the travel way to provide a sufficient work zone therefore eliminating the sidewalk and related crosswalks at Starboard Way (west side), Silver Line Way (north side), Congress Street (south side) and Port Lane (east side).

Appropriate signage will be installed on Congress Street, Starboard Way, Silverline Way and Mass Haul Road to direct pedestrians around the work zone and to identify no-parking zones.

It is anticipated that the MBTA Silver Line Way Bus Stop (inbound and outbound) will be relocated temporarily during Phase 1-7. This activity will require additional coordination and feedback from MBTA as the project review continues.

First Responder Access: Throughout construction, a clear path for emergency vehicle access will be maintained around the site (reference SLP drawings). For off-hour access, a Knox Box will be installed at Gate D and Gate F.

Phase 2: SOE / Piles / Mass Excavation / Pile Caps (Ref. SLP.02)
Duration: 5 months (April 2023 – August 2023)

Activity Overview: During this sequence of work we will commence pre-trench / pre-excavation activities, drive steel sheeting, install deep foundations, perform mass excavation and bracing installation and place pile caps. To minimize stockpiling, excavated soils will be "live loaded" to trucks and transported for legal disposal offsite. In the event soils are stockpiled, the stockpile will be covered to mitigate dust migration. Throughout construction, street sweepers will be deployed as required to keep streets adjacent to the site clear of dust and/or dirt generated by construction operations. In addition, laborers will monitor truck traffic exiting the site and sweep construction exits and streets as required to maintain cleanliness and to mitigate any soil residue from truck wheels.

To protect adjacent streets and structures during excavation of the 1-level below grade parking, the excavation will be supported by steel sheet piling (SOE), including 1-level of bracing, driven from grade to approximately -50' to -55' below grade to achieve water cutoff. A survey of the surrounding areas (structures, walls, etc.) will be conducted prior to any driving of sheeting (and later, deep foundations) to provide historic data as to any pre-existing conditions

The geotechnical engineer will have on site representation during the SOE, deep foundation and mass excavation activities. During this phase of work, assist cranes, pile driving equipment, caisson rigs, mini pile rigs, concrete pumps and other support equipment will be utilized. When be rigged and driven, piles will be on a leash.

During this phase, trucks and equipment will continue to enter the site via a gate at the west end of the Congress Street frontage (Gate A) and will exit the site via an additional gate at the east end of the frontage (Gate B). Additional construction access will also be via access points on Silver Line way. Police details will be provided at gates to control vehicular and pedestrian traffic when trucks are entering or existing the site.

First Responder Access: Throughout construction, a clear path for emergency vehicle access will be maintained around the site (reference SLP drawings). For off-hour access, a Knox Box will be installed at Gate D and Gate F.

Phase 3: Foundations & Core Walls (ref. SLP.03)
Duration: 5 months (July 2023 – November 2023)

Activity Overview: This timeline includes installation of waterproofing and foundation walls and the construction of the two (2) concrete cores. We anticipate installing the two (2) luffing jib tower cranes during this phase to ease site logistics and to support concrete core construction. The use of luffing job tower cranes prevents the need to swing any loads over I-90. At no time will the jib swing over I-90 both when in service and when out of service.

During these operations assist cranes, concrete pumps and other support equipment will be utilized.

All staging, including fence, gates, barriers and signage will remain from Phase 2.

During this phase, trucks and equipment will continue to enter the site via a gate at the west end of the Congress Street frontage (Gate A) and will exit the site via an additional gate at the east end of the frontage (Gate B). Additional construction access will also be via access points on Silver Line way. Police details will be provided at gates to control vehicular and pedestrian traffic when trucks are entering or existing the site.

First Responder Access: Throughout construction, a clear path for emergency vehicle access will be maintained around the site (reference SLP drawings). For off-hour access, a Knox Box will be installed at Gate D and Gate F.

Phase IV: Under-slab Plumbing / Structural Slap (ref. SLP.04)
Duration: 2 months (October 2023 – November 2023)

Activity Overview: This phase runs concurrent with phase 2. The focus will be completing under-slab utilities, installation of pump chambers and placing the structural slab. This work is supported by min-excavators with select use of mobile cranes to set large structures. The tower crane will support reinforcing steel logistics for structural slab construction. Structural slab placements will be supported by concrete pumps and concrete trucks.

All staging, including fence, gates, barriers and signage will remain from Phase 2.

First Responder Access: Throughout construction, a clear path for emergency vehicle access will be maintained around the site (reference SLP drawings). For off-hour access, a Knox Box will be installed at Gate D and Gate F.

Phase V: Steel / Slab on Deck / Fireproofing (ref. SLP.05)
Duration: 9 months (November 2023 – July 2024)

Activity Overview: During this phase we will erect structural steel and stairs, placement of concrete decks. The interior egress stairs will follow close behind structural steel erection. Fireproofing will commence as concrete decks are placed. MEP rough and riser work will follow the decks. The exterior hoists will be installed during this phase.

All staging, including fence, gates, barriers and signage will remain from Phase 2.

First Responder Access: Throughout construction, a clear path for emergency vehicle access will be maintained around the site (reference SLP drawings). For off-hour access, a Knox Box will be installed at Gate D and Gate F.

Phase VI: Façade / Roofs / Elevators (ref. SLP.06)
Duration: 18 months (May 2024 – October 2024)

Activity Overview: During this phase façade installation will occur which includes unitized curtainwall. As decks are placed and fireproofing is installed during Phase V, the unitized curtainwall system will follow. Temporary roofs will be installed to facilitate the start of the elevators. MEP rough work and riser work will continue during this phase. All major MEP equipment will be rigged into place during this phase.

All staging, including fence, gates, barriers and signage will remain from Phase 2.

First Responder Access: Throughout construction, a clear path for emergency vehicle access will be maintained around the site (reference SLP drawings). For off-hour access, a Knox Box will be installed at Gate D and Gate F.

Phase VII: Façade / MEP Rough / Interior Finishes (ref. SLP.07)
Duration: 15 months (October 2024 – December 2025)

Activity Overview: Interior finishes will begin during this phase and will follow curtainwall, MEP rough and riser work and temporary roof construction.

All staging, including fence, gates, barriers and signage will remain from Phase 2.

First Responder Access: Throughout construction, a clear path for emergency vehicle access will be maintained around the site (reference SLP drawings). For off-hour access, a Knox Box will be installed at Gate D and Gate F.

Phase VIII: Finishes / Landscaping / C of O (ref. SLP.08)
Duration: 13 months (March 2025 – April 2026)

Activity Overview: Phase VIII involves installation of exterior landscape and hardscape at the street level, raised walkway/pedestrian link and roof decks. During this phase, finishes will be completed and punch listed, mechanical and electrical systems will be started up and commissioned and the building will be made ready for occupancy. Local and State inspections will occur during this phase. All life safety systems will be tested and inspected with Massport, the State of Massachusetts Department of Public Safety (DPS) and the Massport Fire Department.

All staging, including fence, gates, barriers and signage will remain from Phase 2. However, during this phase we will begin to demobilize elements of the construction management plan as required to facilitate the installation of the landscaping and hardscape around the site.

First Responder Access: Throughout construction, a clear path for emergency vehicle access will be maintained around the site (reference SLP drawings). For off-hour access, a Knox Box will be installed at Gate D and Gate F.

Street Occupancies

Street occupancy is required for that includes, but is not limited to:

- Support of Excavation
- Deep Foundations
- Structural Steel Erection
- Façade Installation
- Site Improvements

To ensure the safety of pedestrians and non-construction vehicular traffic, it is anticipated that the roadway closure on Silverline Way, Starboard Way and the metered parking along Congress Street will be taken out of service in whole or in part during construction.

The sidewalk that fronts the project on Silver Line Way, Starboard Way, Congress Street, and Port Lane will be closed in whole or in part for the entirety of the project. Safe pedestrian sidewalk access will be maintained on the north side of Congress Street and on the west side of Port Lane. Safe pedestrian passage will also be maintained at the sidewalk that runs along the

east side of Starboard Way and Silverline Way with only the need for select and limited diversion during deep foundation, structural steel and site improvement work that impacts the sidewalk.

In addition, the parking lane that fronts the project along Congress Street will be taken. These areas will become drive lanes and staging areas for construction operations.

Construction street occupancy will be affected by the following equipment and work:

- Construction Equipment
  - Delivery Trucks
  - Trucks and Equipment

- Street Surface Work
  - Utility Connections

Pre-Construction

Prior to any work beginning on site, Suffolk Construction will meet with the Agencies to review construction procedures and to finalize all details of this CMP. Two (2) weeks prior to mobilization of any subcontractor the subcontractors Project Manager and onsite Foreman are require to attend a preconstruction meeting with Suffolk. At this meeting the subcontractor's personnel review, along with other topics, these key project specific items to ensure a successful project for all trades. These key specifics are as follows.

1. Subcontractor orientation of the project (work hours, truck routes, parking, etc.)
2. Specific scope of work is reviewed for content and execution.
3. The project schedule is reviewed for complete acceptance and understanding of expectations and project phasing logic.
4. Safety and housekeeping requirements.

Perimeter Protection/Public Safety

Police details will direct traffic entering and exiting the construction site at all times during construction. Appropriate signage will be installed to assist pedestrians and cyclists.

Construction deliveries will be planned and managed to facilitate the efficient flow of pedestrian and vehicular traffic around the site.

Fencing will be installed to isolate the construction area from pedestrian and vehicular traffic. Construction procedures will be designed to satisfy all Occupational Safety and Health Administration (OSHA) safety standards for specific site construction activities

Each subcontractor will implement and manage its own Safety and Health Program for the project. All employees of subcontractors and suppliers, regardless of tier, will be trained relative to the complete safety and health requirements for the project.

Adequate site lighting will be provided at all times. Existing street lighting will be maintained at locations where it does not interfere with construction operations. If existing street lighting is removed for construction, then temporary street lighting attached to the temporary fencing will be provided.

Safety on Site

All subcontractor working on site shall provide and maintain all safety measures, procedures, and documentation as required by governing agencies. The job site will be enclosed by temporary fencing. Suffolk Construction will meet with the Agencies to review the proposed traffic management plan to ensure acceptance and compliance with location jurisdiction. Prior to the start of work by any subcontract a Hazardous Risk Assessment Plan is reviewed. During this review all potential hazardous work requirements and the safety plans required to mitigate these risks are confirmed. Construction procedures will be designed to meet all OSHA safety standards for specific site activities. With the support of Suffolk Construction, all subcontractors will implement and manage their own Health and Safety program for the project. All site personnel will be subject to follow the safety orientation and identification guidelines and processes established by Suffolk Construction.

Access to the site for emergency vehicles will be maintained at all times with a dedicated and marked point of access. All other site points of access will be maintained for a secondary access as needed. The proposed project site logistic and traffic plans are designed to isolate the construction while providing safe access for pedestrians and vehicles during normal day to day activities and emergencies.

Signage and Distribution of Information

Signage will direct pedestrian around the site as well as direct truck traffic and deliveries. Construction and regulatory signage will be provided.

The construction site will have a sign installed that will list the name and contact information, including the phone number, for Suffolk Construction's designated contact. This sign will be clearly visible to enable the public to call with any question or concerns.

Abutter and Agency Coordination

Suffolk Construction recognizes the challenges of building construction in an urban setting and the importance of responding to the needs of adjacent business and residents. The abutting properties will be informed of the scheduled start of construction and will be updated on the development during its construction as needed.

As appropriate, Suffolk Construction will coordinate construction activities with the Agencies and other on-going construction projects in the area to help minimize the impacts to the community.

Emergency Vehicle Access

The project logistics and staging plan will ensure that emergency vehicle access to and from the construction site will be maintained at all times.

Material Handling/Construction Waste

Suffolk will take an active role relative to the processing and recycling of construction waste. Arrangements will be made for the segregation, reprocessing, reuse and recycling of materials. For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per DEP's Regulations for Solid Waste Facilities, 310 CMR 16.00.

During site development activities, it is anticipated that on-site refueling of machinery will be required. The site contractor will obtain the necessary onsite refueling permit from Massport Fire Department prior to commencing site development activities. Fuel will likely be needed for temporary heat on the interior of the buildings and/or the exterior façade and the appropriate permits/inspections will be obtained from the plumbing inspector and fire department.

Dumpster Location and Loading

Dumpsters will be located within the construction staging area. Dumpster will have proper Fire Department Permits. Dumpster pick-ups will take place during normal construction hours and will avoid peak traffic periods

Construction Traffic Impacts

• *Construction Trip Generation*

No personal vehicles will be allowed to park at the project construction site or in the adjacent neighborhood. Additionally, jobsite personnel will be encouraged to utilize public transportation. Due to the proximity and connections to T line branches and several MBTA bus routes, substantial level of public transportation use is anticipated by workers. Lock-up facilities for work tools will be provided to make public transportation more convenient and desirable for workers. Terms and conditions related to workforce parking and public transportation use will be written into each subcontract.

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• *Truck Routes and Volumes*

Trucking is needed to remove soils and debris from the site, and to deliver new construction materials and equipment as the project proceeds.

Construction is expected to generate an average of 10-25 trucks per day for the entire construction period, with higher volumes during earthwork, foundations, structural steel and façade construction. The impact of construction traffic in the evening peak hour is expected to be insignificant because most deliveries are completed prior to the end of the typical construction work day (6:00 p.m.). Truck activity is expected to be uniformly distributed throughout the work day.

Trucks coming to and from the site are required to use major roadways or highways, not local streets. The selection of proposed truck routes is based on the following criteria:

- Minimizing truck activity in the residential neighborhoods. To mitigate congestion on site that may impact vehicular traffic during heavy trucking operations (soil

excavation, concrete placements, steel deliveries) trucking to site will be controlled via 2-way communication between the site and the driver.
- Designating specific roads where trucks are permitted
- Providing access to and from the major arteries (e.g. Interstate 90, Interstate 93, etc.)

The proposed truck routes will minimize the impact of construction trucks on the adjacent neighborhoods. It is anticipated that most trucks will access/egress the work zone via the main construction gates located on Congress Street. In general, it is expected that all truck traffic to the site will follow the following routes:

From Interstate 90 East Bound

- Take Exit 25 towards Congress Street.
- Turn right onto Congress Street.
- Enter site at gate at intersection of Congress Street and Starboard Way.

From Interstate 90 West Bound

- Take Exit 24-25 towards South Boston.
- Turn right and follow signs for Convention Center / D Street.
- Merge onto Congress Street
- Enter site at gate at intersection of Congress Street and Starboard Way.

To Interstate 90

- Exit site and take right onto Northern Avenue.
- Turn first right onto Mass Haul Road.
- Merge onto ramp to Interstate 90 EB or WB.

Construction Air Quality

To reduce emission of fugitive dust and minimize impacts on the location environment, the Suffolk will adhere to a number of strictly enforced mitigation measures. These include:

- Wetting agents will be used regularly to control and suppress dust that may come from the construction materials.

- All trucks for transportation of construction debris will be fully covered.

- Actual construction practices will be monitored to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized and to ensure that any emissions of dust are negligible.

- Street and sidewalks will be cleaned periodically to minimize dust accumulations.

Construction Noise

The project will require the use of equipment that can be heard from off site locations. This project is committed to mitigate noise impacts caused by the project. Increased community sound levels, however, are an inherent consequence of construction activities. The area currently has ambient noise due to urban activities including air and traffic noise.

The proposed construction process for the project has been designed around the constraints at the site. The exact pieces of equipment will be finalized after subcontractor selection is completed. Construction will occur during the day time (7:00 am to 6:00 pm). Weekend work will be the exception. All off hour work will be per MassPort requirements and permitted as required. ISD, MassPort, and the Office of Neighborhood Services (ONS) will be notified of all off-hour work.

Every reasonable effort will be made to minimize the noise impact of construction activities. Mitigation measures will include:

- Using appropriate mufflers on all equipment and providing ongoing maintenance of intake and exhaust mufflers.
- Maintaining muffler enclosures on continuously operating equipment, such as air compressors and welding generators.
- Replacing specific construction operations by less noisy ones where feasible and practical.
- Selecting equipment operations to keep average noise levels low, to synchronize noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels.
- Use of tower cranes for steel erection will reduce street noise associated with truck mounted equipment, where practical.
- Turn off idle equipment.

Rodent Control

Consistent with the Massachusetts State Sanitary Code, Chapter 11, 105 CMR 410.550 and the State Building Code, Section 108.6 - Policy Number 87-4 (City of Boston), the Parcel H Project will develop a rodent control program prior to the start of construction. The program will include the performance of extermination and control procedures on a bi-weekly basis and the placement of tamper resistant bait boxes around the perimeter of the site.

Utilities

Utility cut & cap, infrastructure and connection work will be conducted on all streets that surround the site. Although a significant amount of utility work will take place within the limits of the construction zone, utility tie-ins will require connections outside the work zone. For

utility cut and cap and utility tie-ins, it is anticipated that off-hour work (second shift) will be required. The project utilities requiring work in adjacent streets is listed below:

LAB BUILDING

- Fire Service - Silver Line Way
- Domestic service – Silver Line Way
- Storm Drain Service – Port Lane, Silver Line Way
- Sewer Service – Congress Street
- Power Service – Congress Street, Port Lane (off site work by Eversource)
- Tele/Data Service – Congress Street (off site work by provider)
- Gas Service – Congress Street (work by NGRID)

PAVILION BUILDING

- Fire Service - Massport Haul Road
- Domestic service – Massport Haul Road
- Storm Drain Service – Massport Haul Road
- Sewer Service – Silver Line Way
- Power Service – Massport Haul Road (off site work by Eversource)
- Tele/Data Service – Massport Haul Road (off site work by provider)
- Gas Service – Massport Haul (work by NGRID)

Suffolk will provide 24/7 access to the site for any Utility Company that requires access to service an existing utility that remains within the construction zone.

Agency Coordination and Work Plans

Throughout construction work will take place on Agency land and/or right-of-way. Protection of the general public and Agency employees, infrastructure and property is the number one priority. Throughout the duration of the project, Suffolk will prepare Work Plans for Agency review and approval before commencing work.

Work Plans are task specific means and methods plans that will include, but are not limited to:

- Logistics plans that identify limits of work, temporary protection and proposed equipment;
- Proposed equipment capacities;
- Critical picks (if any);
- Temporary protection and maintenance measures;
- Task duration and related work hours;
- Temporary diversions;
- Temporary shut-downs;
- Etc.

Geotechnical Impacts and Monitoring

Excavation is required for foundations and to accommodate the 1-level below grade parking structure. Due to the depth of excavation and ground water levels, a temporary excavation support system is required around the site perimeter to retain adjacent soils, protect adjacent streets and utilities, maintain groundwater levels outside the site, and for proper groundwater control within the excavation. Temporary excavation support and groundwater control will be achieved through the installation of continuously interlocking steel sheet pile wall that is advanced into the underlying marine clay deposit to achieve an effective groundwater cut-off. The sheet piles will be advanced to a minimum depth of 15 feet into the marine clay deposit to achieve a groundwater cutoff and restrained by one (1) level of bracing.

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Given an effective temporary groundwater cut-off being achieved by the sheet pile cofferdam, sumping from within the excavation should suffice for dewatering such that construction can proceed in-the-dry. It is anticipated that dewatering by means of strategically located sumps and trenches should suffice during foundation construction operations. A groundwater discharge permit from the Environmental Protection Agency (EPA) will be required in order to legally dispose of groundwater collected during construction into nearby storm drains. Prior to discharge, chemical analysis of groundwater samples will be taken by the Developers geotechnical engineer.

The Laboratory Building structure will be supported by a combination of HP 14x117 steel H-piles and caissons. The Pavilion Building structure will be supported by mini piles and grade beams supported by the MassDOT tunnel walls. Based on the sheet pile and Deep Foundation installation, the Developer intends to engage the geotechnical engineer to provide a comprehensive geotechnical monitoring program (please see Geotechnical Report and plans by Haley and Aldrich for more information. An instrumentation plan has been included in the drawing set).

Special Conditions

- Community Outreach: Suffolk Construction and ownership will provide notices and updates on progress and upcoming expectations for the construction activities. At all times during construction activity there will be management staff on -site and available for assistance. Proper 24-hour emergency contacts and information will be provided.
- Suffolk Construction will replace, in kind, any pavement markings or signage damaged during construction.
- All local, state and federal laws governing the work will be strictly adhered to at all times.

Emergency Contacts

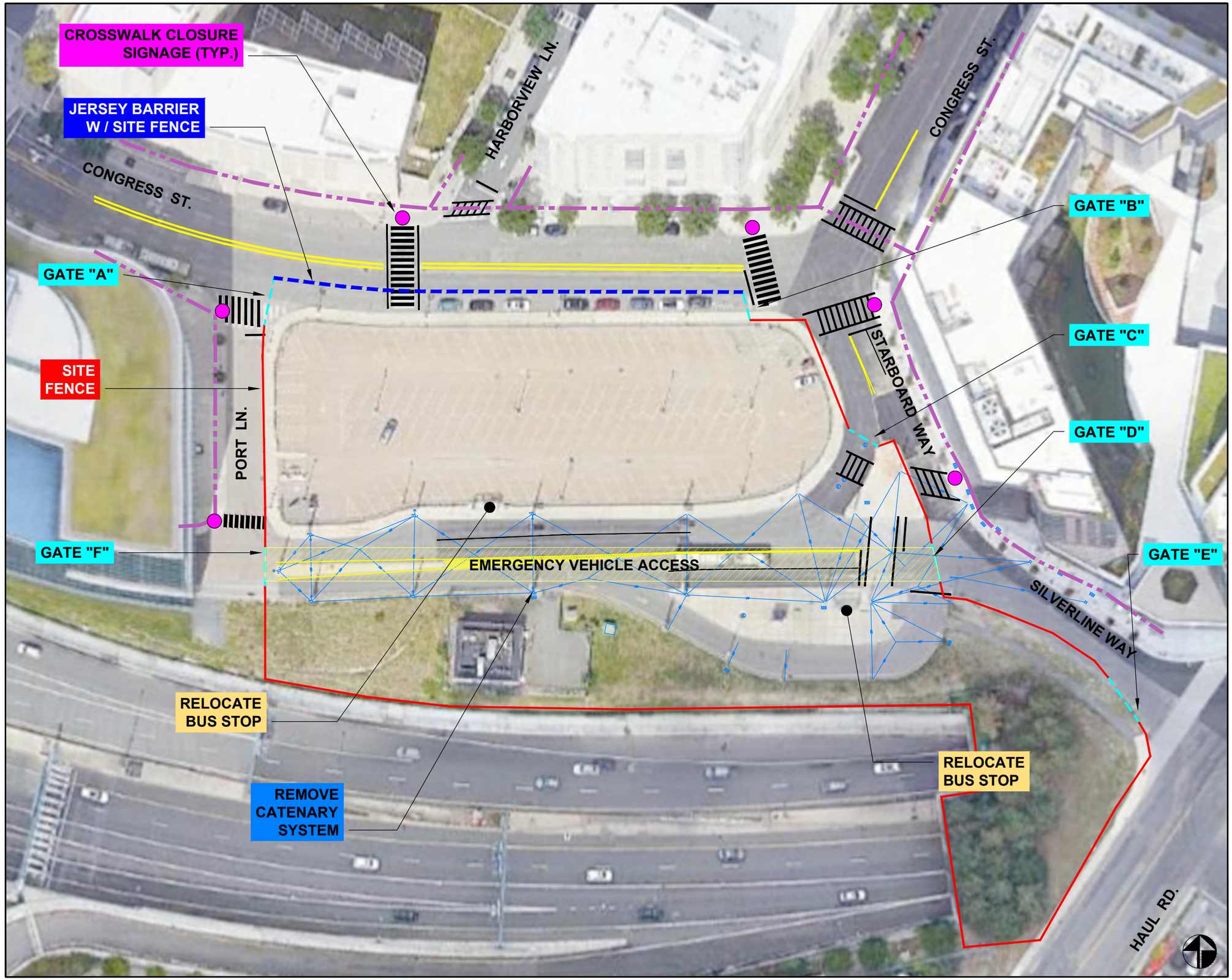
A 24-hour emergency contact list will be distributed to all parties involved in the project.

Suffolk Construction

Frank Craemer (617) 605-2014
Suffolk Construction Co., Inc. 24-hour (617) 445-3500

LO Parcel H, LLC

Mark Callahan (315) 263-5707



SCHEDULED ACTIVITIES
FEB. 2023 - MAY 2023
● EROSION CONTROL
● SITE FENCE / BARRIERS
● SELECTIVE CLEARING
● CUT / CAP UTILITIES
● RELOCATE UTILITIES
● PRE-EXCAVATION
● REMOVE CATENARY SYSTEM

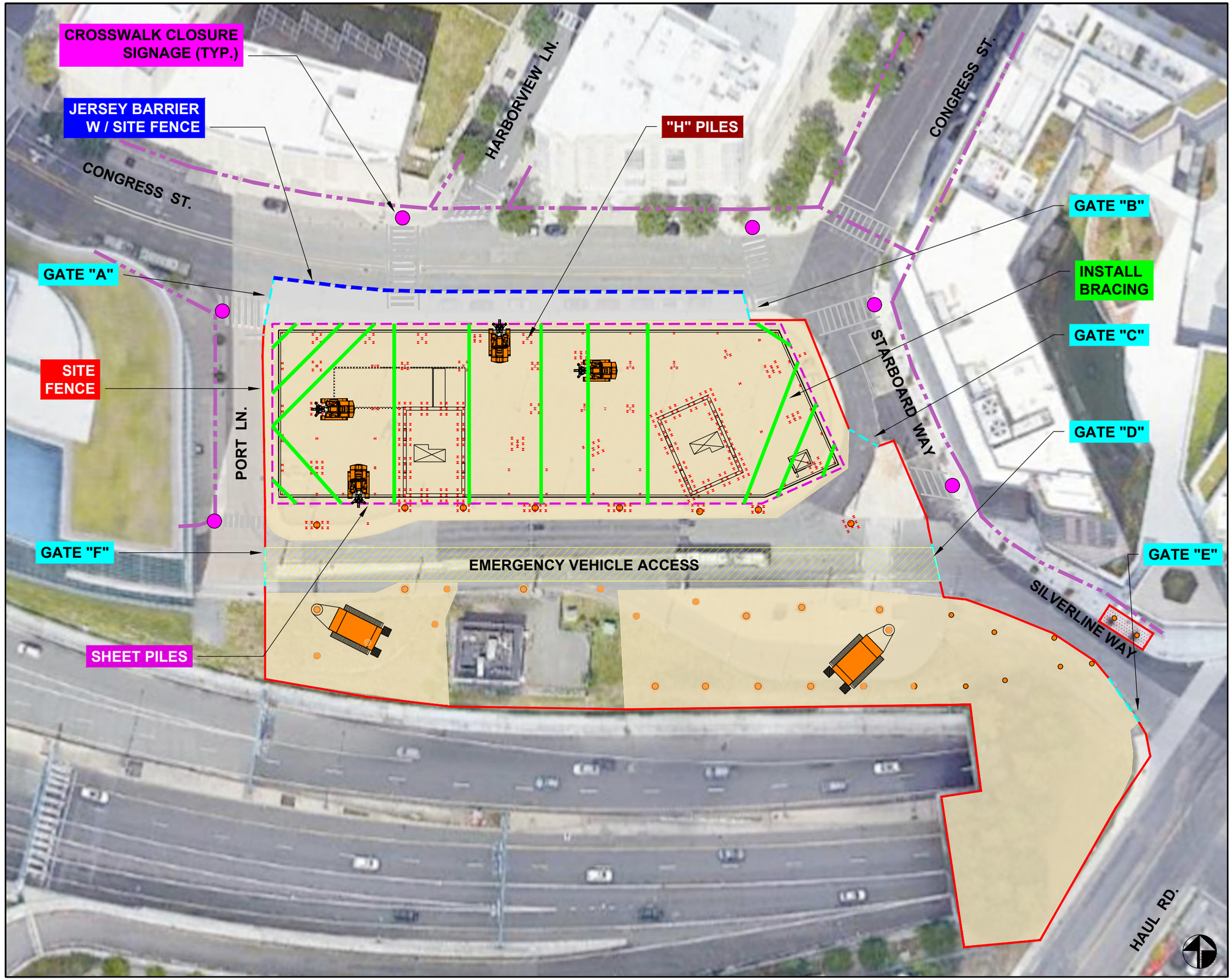
SUFFOLK
65 ALLERTON ST.
BOSTON MA, 02119
TEL: (617) 445-3500

DRAWN BY: J.W.G. CHECKED BY: F.C.
SCALE : NTS DATE : 10-04-2022

PROJECT:
PARCEL H

TITLE:
PROPOSED SITE LOGISTICS PLAN

DRAWING NO:
SLP.01



SCHEDULED ACTIVITIES

APR. 2023 - AUG. 2023

- DRIVE SHEETS
- INSTALL BRACING
- CAISSONS
- H-PILES
- EXCAVATION

SUFFOLK

65 ALLERTON ST.
BOSTON MA, 02119
TEL: (617) 445-3500

DRAWN BY: J.W.G. CHECKED BY: F.C.

SCALE : NTS DATE : 10-04-2022

PROJECT:

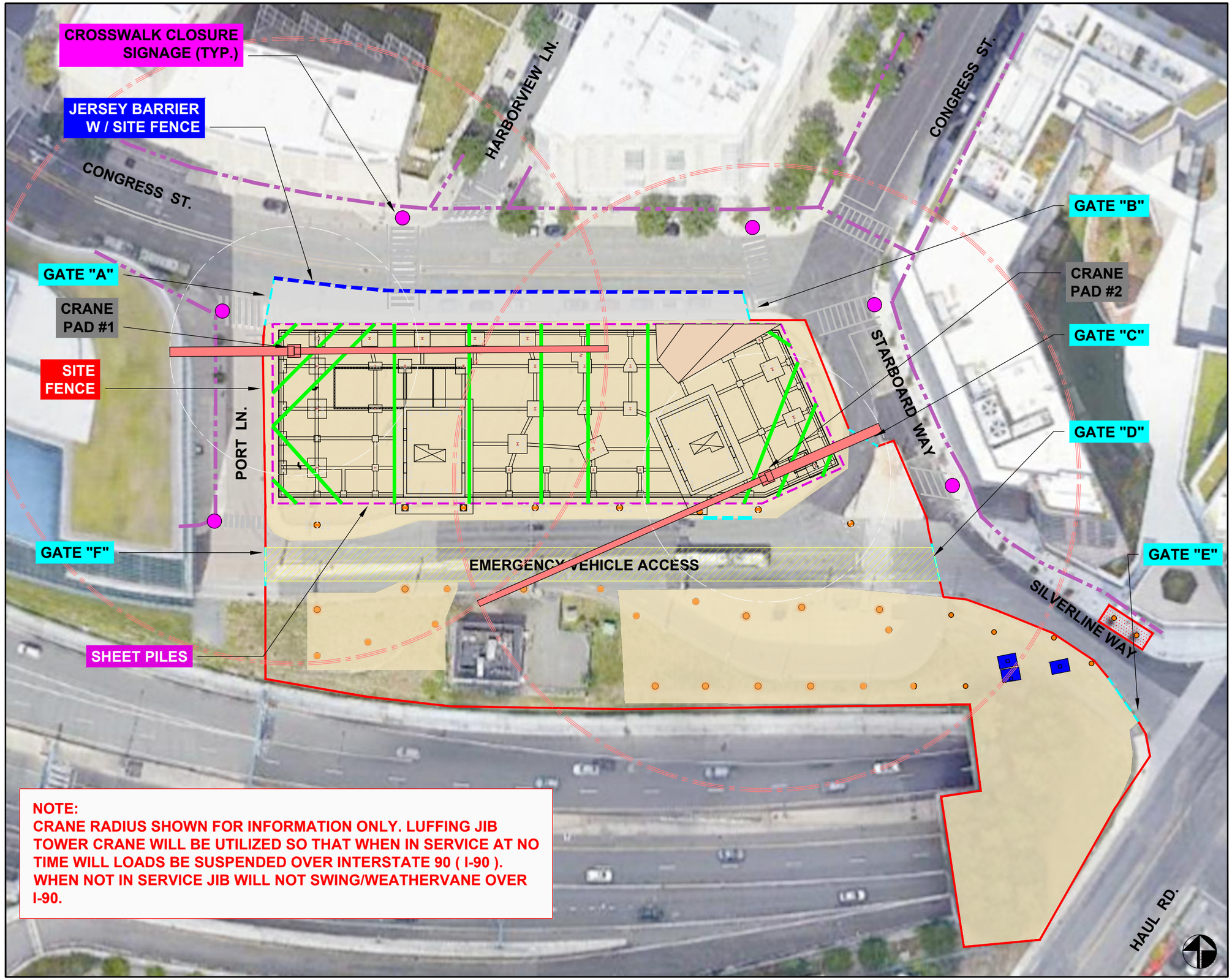
PARCEL H

TITLE:

PROPOSED SITE LOGISTICS PLAN

DRAWING NO:

SLP.02



NOTE:
CRANE RADIUS SHOWN FOR INFORMATION ONLY. LUFFING JIB TOWER CRANE WILL BE UTILIZED SO THAT WHEN IN SERVICE AT NO TIME WILL LOADS BE SUSPENDED OVER INTERSTATE 90 (I-90). WHEN NOT IN SERVICE JIB WILL NOT SWING/WEATHERVANE OVER I-90.

SCHEDULED ACTIVITIES

JULY 2023 - NOV. 2023

- CRANE PADS
- WATERPROOFING
- PILE CAPS
- GRADE BEAMS
- ERECT TOWER CRANES
- CORE PILE CAPS
- CORE WALLS
- SITE UTILITIES

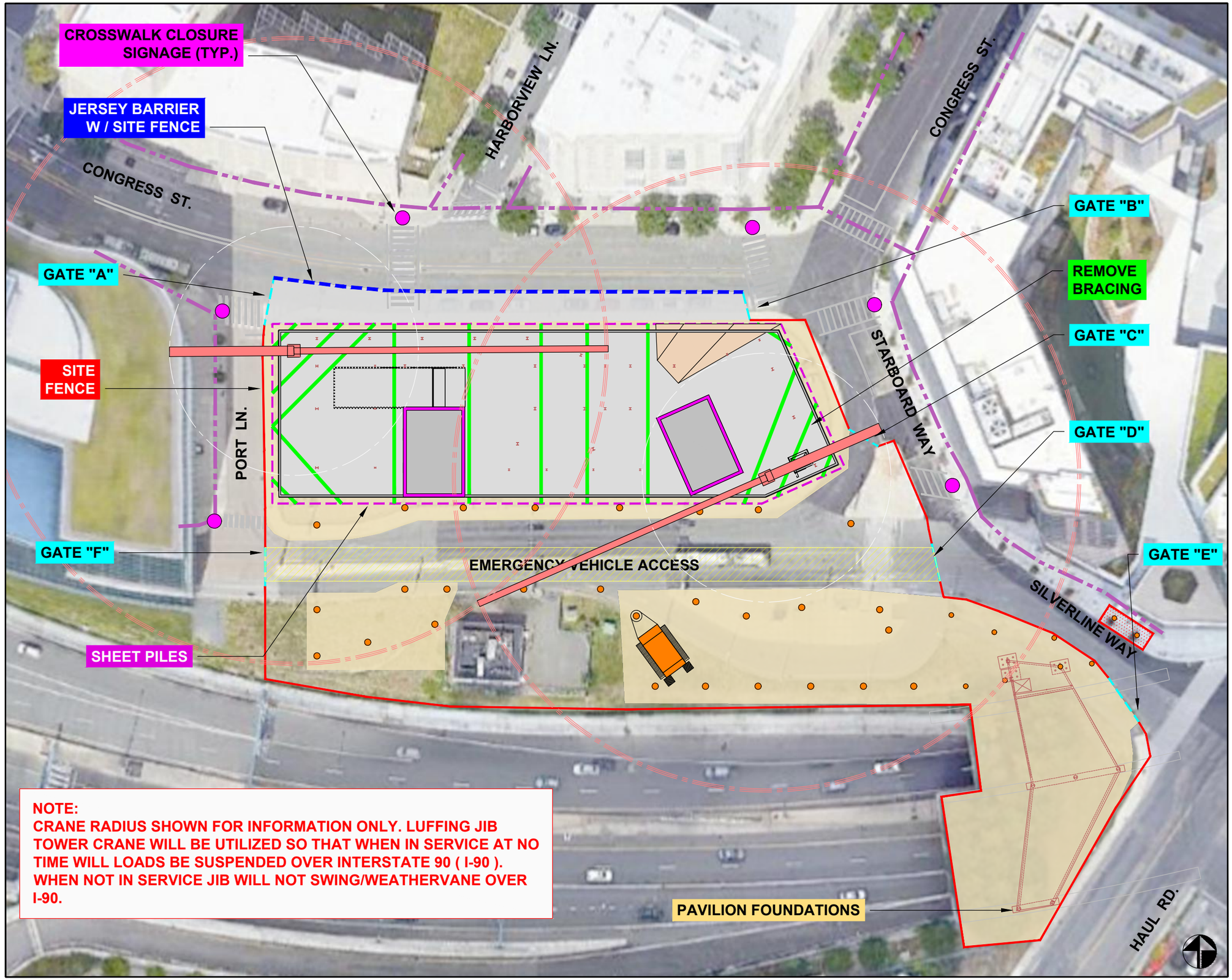
SUFFOLK
65 ALLERTON ST.
BOSTON MA, 02119
TEL: (617) 445-3500

DRAWN BY: J.W.G. CHECKED BY: F.C.
SCALE : NTS DATE : 10-04-2022

PROJECT:
PARCEL H

TITLE:
PROPOSED SITE LOGISTICS PLAN

DRAWING NO:
SLP.03



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SCHEDULED ACTIVITIES

OCT. 2023 - NOV. 2023

- **UNDERSLAB UTILITIES**
- **P1 COLUMNS**
- **STRUCTURAL SLAB**
- **SITE UTILITIES**

SUFFOLK

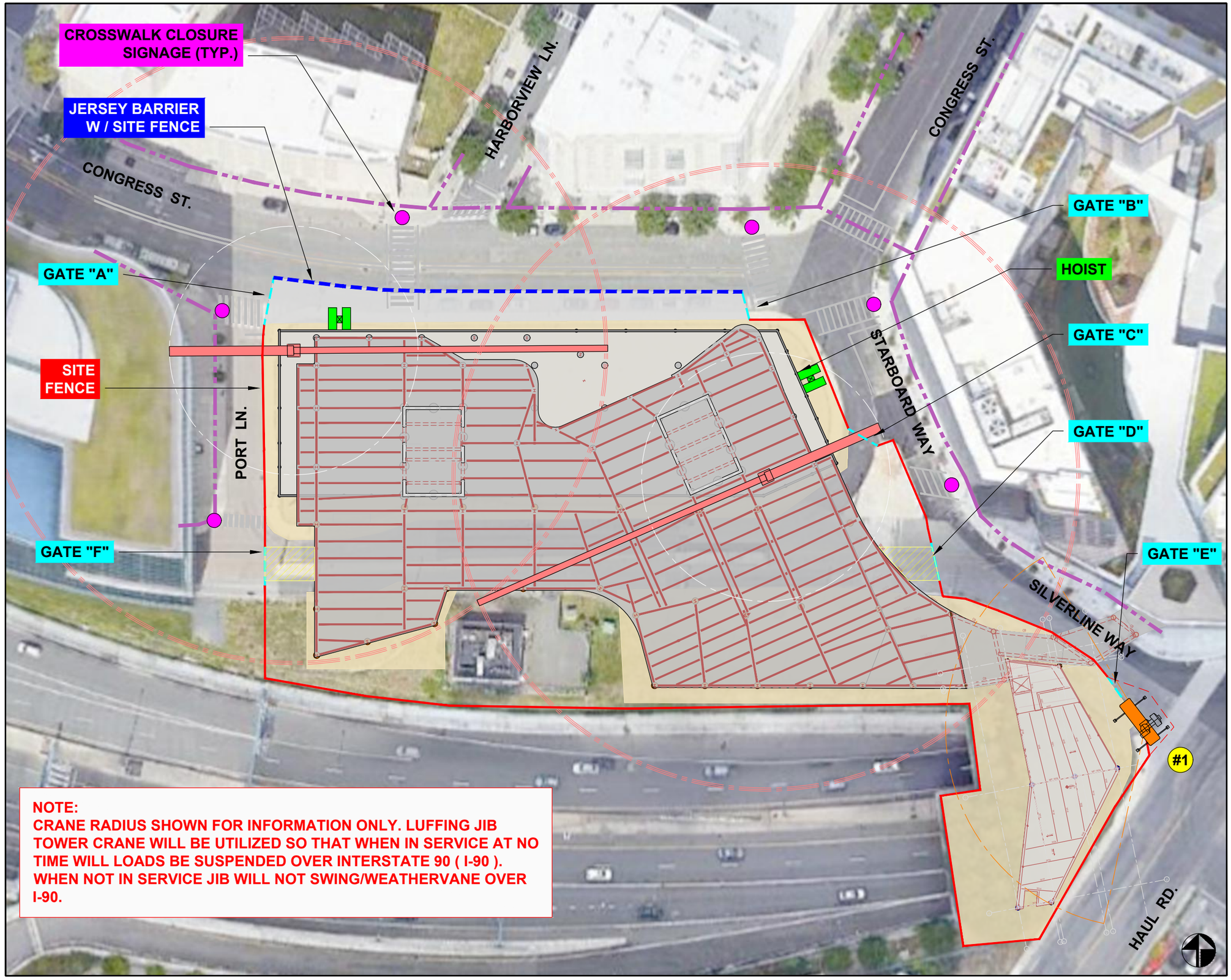
65 ALLERTON ST.
BOSTON MA, 02119
TEL: (617) 445-3500

DRAWN BY: J.W.G. CHECKED BY: F.C.
SCALE : NTS DATE : 10-04-2022

PROJECT:
PARCEL H

TITLE:
PROPOSED SITE LOGISTICS PLAN

DRAWING NO:
SLP.04



NOTE:
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SCHEDULED ACTIVITIES
NOV. 2023 - JULY 2024
● ERECT STRUCTURAL STEEL
● SLAB-ON-DECKS
● INSTALL HOISTS
● SPRAY FIREPROOFING
● INTERIOR STAIRS
● MEP ROUGH / RISERS

NOTE #1
ADJUST SITE FENCE AT PAVILION DURING STEEL OPERATIONS

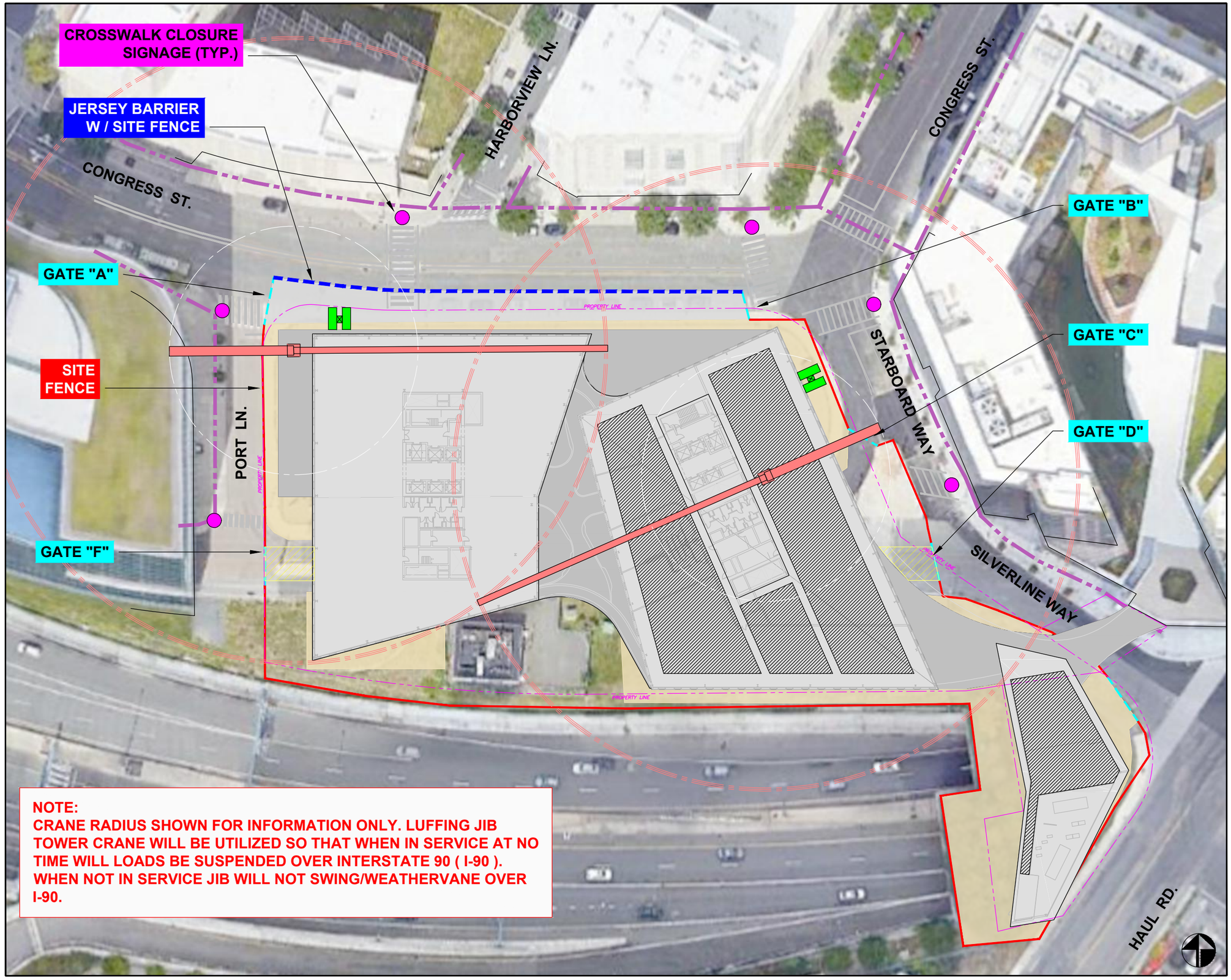
SUFFOLK
65 ALLERTON ST.
BOSTON MA, 02119
TEL: (617) 445-3500

DRAWN BY: J.W.G.	CHECKED BY: F.C.
SCALE : NTS	DATE : 10-04-2022

PROJECT: **PARCEL H**

TITLE: **PROPOSED SITE LOGISTICS PLAN**

DRAWING NO: **SLP.05**



NOTE:
CRANE RADIUS SHOWN FOR INFORMATION ONLY. LUFFING JIB TOWER CRANE WILL BE UTILIZED SO THAT WHEN IN SERVICE AT NO TIME WILL LOADS BE SUSPENDED OVER INTERSTATE 90 (I-90). WHEN NOT IN SERVICE JIB WILL NOT SWING/WEATHERVANE OVER I-90.

SCHEDULED ACTIVITIES
MAY 2024 - OCT. 2024
● SITE UTILITIES
● CURTAIN WALL
● ROOFING
● RIG / SET MEP EQUIPMENT
● ELEVATORS
● MEP ROUGH / RISERS

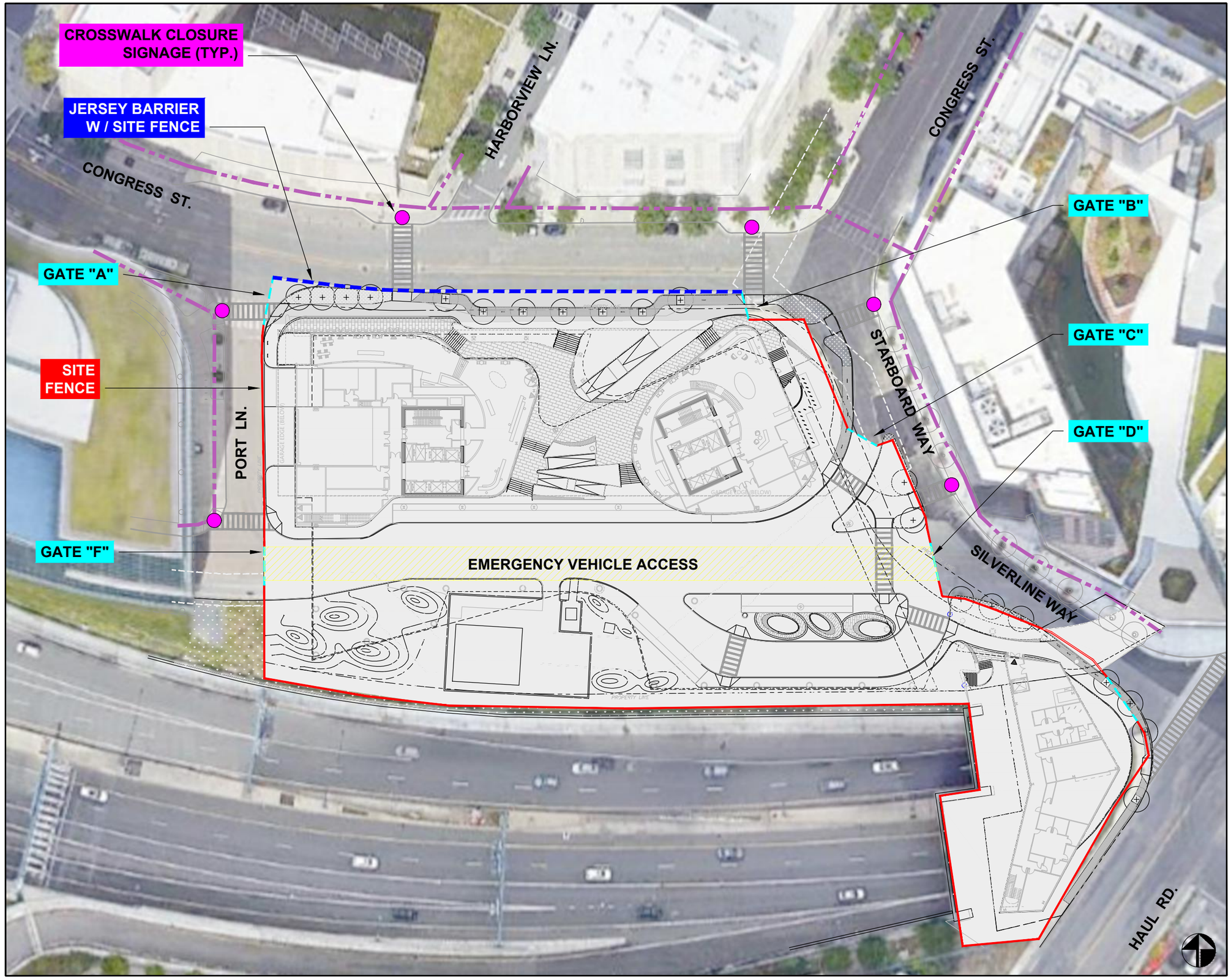
SUFFOLK
65 ALLERTON ST.
BOSTON MA, 02119
TEL: (617) 445-3500

DRAWN BY: J.W.G. CHECKED BY: F.C.
SCALE : NTS DATE : 10-04-2022

PROJECT:
PARCEL H

TITLE:
PROPOSED SITE LOGISTICS PLAN

DRAWING NO:
SLP.06



SCHEDULED ACTIVITIES

OCT. 2024 - DEC. 2025

- SITE UTILITIES
- CURTAIN WALL
- ROOF TIGHT
- INTERIOR FINISH
- ELEVATORS
- MEP FINISHES

SUFFOLK

65 ALLERTON ST.
BOSTON MA, 02119
TEL: (617) 445-3500

DRAWN BY: J.W.G. CHECKED BY: F.C.

SCALE : NTS DATE : 10-04-2022

PROJECT:

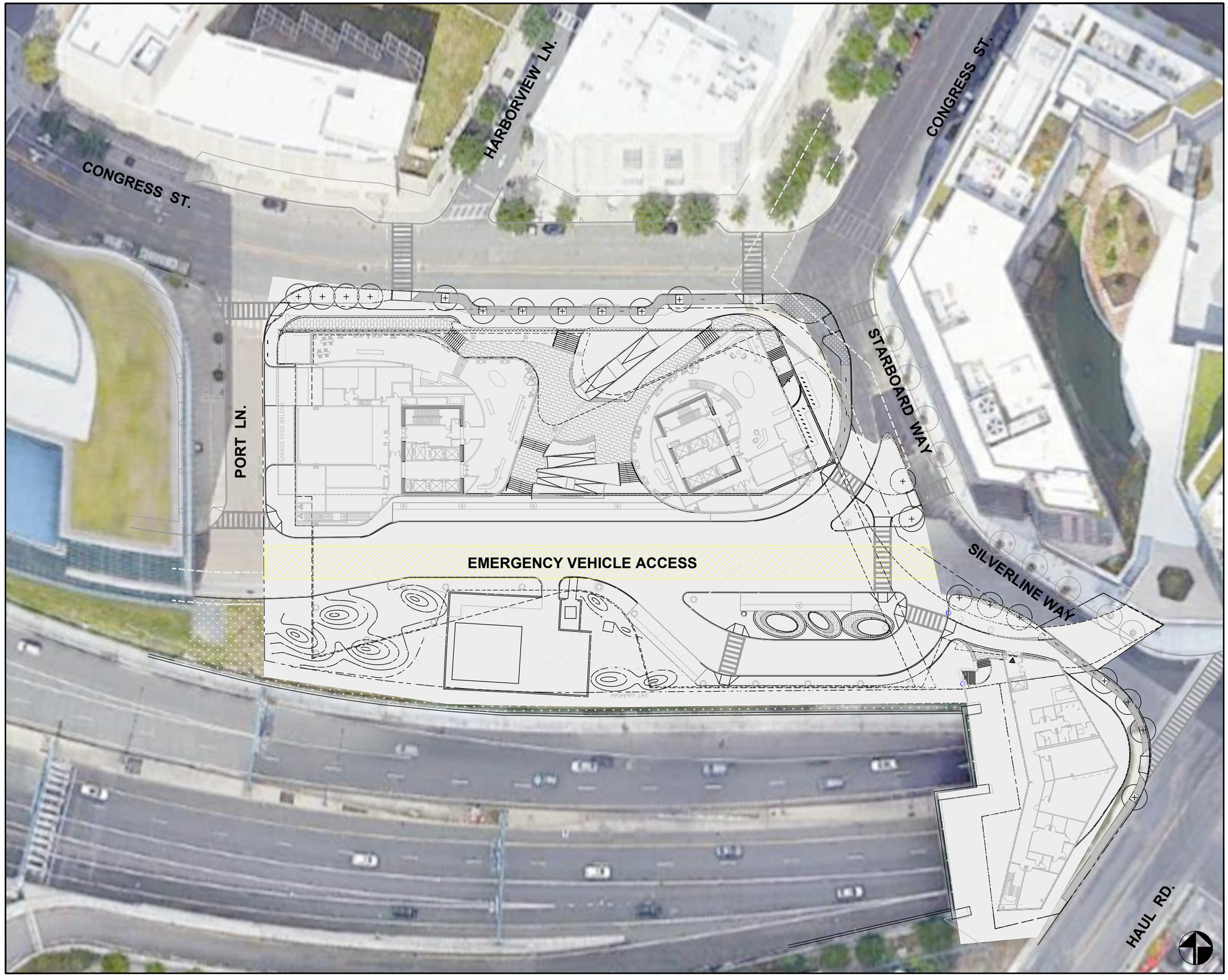
PARCEL H

TITLE:

PROPOSED SITE LOGISTICS PLAN

DRAWING NO:

SLP.07



SCHEDULED ACTIVITIES

MAR. 2025 - 2026

- SITE UTILITIES
- HARDSCAPE & LANDSCAPE
- INTERIOR FINISH
- ELEVATORS
- MEP FINISHES
- PUNCHLIST & COMMISSIONING

SUFFOLK

65 ALLERTON ST.
BOSTON MA, 02119
TEL: (617) 445-3500

DRAWN BY: J.W.G. CHECKED BY: F.C.
SCALE : NTS DATE : 10-04-2022

PROJECT:
PARCEL H

TITLE:
PROPOSED SITE LOGISTICS PLAN

DRAWING NO:
SLP.08

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DEMOLITION NOTES:

1. SITE PREPARATION AND DEMOLITION SHALL INCLUDE THOSE AREAS WITHIN THE LIMIT OF WORK LINE AS SHOWN ON THE CONTRACT DOCUMENTS.
2. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
3. CONSULT ALL OF THE DRAWINGS AND SPECIFICATIONS FOR COORDINATION REQUIREMENTS BEFORE COMMENCING DEMOLITION.
4. THE CONTRACTOR SHALL COORDINATE SITE DEMOLITION EFFORTS WITH ALL TRADES THAT MAY BE AFFECTED BY THE WORK.
5. ALL ITEMS REQUIRING REMOVAL SHALL BE REMOVED TO FULL DEPTH TO INCLUDE BASE MATERIAL AND FOOTINGS OR FOUNDATIONS AS REQUIRED TO FACILITATE CONSTRUCTION, AND LEGALLY DISPOSED OF OFFSITE BY CONTRACTOR.
6. UTILITY PIPES DESIGNATED TO BE ABANDONED IN PLACE SHALL BE PLUGGED AT THEIR ENDS WITH WATERTIGHT BRICK MASONRY OR CEMENT MORTAR WITH A MINIMUM THICKNESS OF 8 INCHES.
7. UTILITY PIPES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE COMPLETE REMOVAL AND DISPOSAL OF THE ENTIRE LENGTH OF PIPE AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN THE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
8. UTILITY STRUCTURES DESIGNATED TO BE ABANDONED IN PLACE SHALL HAVE THEIR CAST IRON CASTINGS REMOVED AND DISPOSED, INLET AND OUTLET PIPES PLUGGED, THE BOTTOM OF THE STRUCTURES SHALL BE BROKEN, THE VOID OF THE STRUCTURES SHALL BE BACKFILLED AND COMPACTED TO 95% WITH ORDINARY BORROW OR FLOWABLE FILL, AND THE TOP OF THE STRUCTURE SHALL BE REMOVED SO THAT IT IS AT LEAST 36 INCHES BELOW FINISH GRADE.
9. UTILITY STRUCTURES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE REMOVAL AND DISPOSAL OF CAST IRON CASTINGS, PLUGGING OF INLET AND OUTLET PIPES, REMOVAL OF THE STRUCTURE, AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN HE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
10. ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFFSITE.
11. AT ALL LOCATIONS WHERE EXISTING CURBING, CONCRETE PAVEMENT OR BITUMINOUS CONCRETE ROADWAY ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE.
12. EXTEND DESIGNATED LIMIT OF WORK AS NECESSARY TO ACCOMPLISH ROUGH GRADING, EROSION CONTROL, TREE PROTECTION, AND SITE WORK AS REQUIRED BY THESE DRAWINGS AND SPECIFICATIONS.
13. THE CONTRACTOR SHALL REMOVE FROM THE SITE ALL RUBBISH AND DEBRIS FOUND THEREON. STORAGE OF SUCH MATERIALS ON THE PROJECT SITE WILL NOT BE PERMITTED. THE CONTRACTOR SHALL LEAVE THE SITE IN SAFE, CLEAN, AND LEVEL CONDITION UPON COMPLETION OF THE SITE DEMOLITION WORK.
14. REMOVE AND STOCKPILE ALL EXISTING SITE LIGHTS, BENCHES, TRASH RECEPTACLES, TRAFFIC SIGNS, GRANITE CURB, AND OTHER SITE IMPROVEMENTS WITHIN LIMIT OF WORK LINE UNLESS OTHERWISE NOTED.
15. THE CONTRACTOR SHALL REMOVE FROM THE AREA OF CONSTRUCTION PAVEMENT, CONCRETE, CURBING, POLES AND FOUNDATIONS, ISLANDS, TREE BERMS AND OTHER FEATURES WITHIN THE LIMITS OF CONSTRUCTION AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION WHETHER SPECIFIED ON THE DRAWINGS OR NOT.

BWSC & CONTRACTOR NOTES:

1. THE ESTIMATED SANITARY SEWAGE DISCHARGE IS 49,977 GALLONS PER DAY (GPD). THIS ESTIMATE IS BASED ON 310 C.M.R. 15.000 THE STATE ENVIRONMENTAL CODE, TITLE 5: STANDARD REQUIREMENTS FOR THE SITING, CONSTRUCTION, INSPECTION, UPGRADE AND EXPANSION OF ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS AND FOR THE TRANSPORT AND DISPOSAL OF SEPTAGE.
2. THE ESTIMATED DAILY WATER USE IS 54,975 GPD BASED ON THE ESTIMATED SANITARY SEWAGE DISCHARGE WITH A 10% PEAKING FACTOR. THE PEAK DOMESTIC FLOW BASED ON FIXTURE COUNTS IS APPROXIMATELY XX GPM [FROM MEP].
3. TWO XXXX" COMPOUND WATER METERS WILL BE EITHER NEPTUNE OR ELSTER AMCO COMPOUND TYPE METERS. THE METERS MUST BE PURCHASED BY THE CONTRACTOR. A METER TRANSMITTER UNIT (MTU) SHALL BE SUPPLIED BY THE COMMISSION AT THE OWNER'S EXPENSE. A FEE OF $325/MTU WILL BE PAID TO THE COMMISSION AT THE TIME OF FILING THE GENERAL SERVICE APPLICATION.
4. BACKWATER VALVES SHALL BE PROVIDED BY THE PLUMBER AT ALL GRAVITY SANITARY SEWER AND STORM DRAIN CONNECTIONS FOR ANY FIXTURE LOCATED AT AN ELEVATION BELOW THE TOP OF THE SEWER OR DRAIN MANHOLE.
5. THE CONTRACTOR SHALL NOTIFY THE BWSC CROSS-CONNECTION DEPARTMENT AT 617-989-7283 ONCE BACKWATER VALVES ARE INSTALLED FOR BWSC INSPECTION.
6. DYE TESTING SHALL BE PERFORMED ON NEW STORM DRAIN AND SANITARY SEWER CONNECTIONS AFTER INSTALLATION IS COMPLETE. DYE TESTS SHALL BE WITNESSED BY THE BWSC.
7. A PREREQUISITE FOR FILING A GENERAL SERVICE APPLICATION WITH THE BWSC FOR NEW CONSTRUCTION IS THE ROUGH CONSTRUCTION SIGN-OFF DOCUMENT FROM THE CITY OF BOSTON'S INSPECTIONAL SERVICES DEPARTMENT.
8. AN AS-BUILT PLAN (AUTOCAD 2016 OR EARLIER RELEASE) SHALL BE PROVIDED BY THE CONTRACTOR AND ENDORSED BY A CIVIL ENGINEER OR PROFESSIONAL LAND SURVEYOR SHOWING THE LOCATION, DEPTH, AND INVERT OF EVERY BEND, FITTING, VALVE, CLEANOUT AND ANCHOR. THE AS-BUILT DRAWING SHALL BE SUBMITTED TO THE BOSTON AND WATER SEWER COMMISSION FOR REVIEW AND APPROVAL.
9. WATER SHUT DOWN SHALL BE COORDINATED WITH BWSC WATER OPERATIONS, (617) 989-7276, 24 HOURS NOTICE REQUIRED.
10. PROVIDE "DON'T DUMP" PLAQUES AT ALL CATCH BASIN AND DRAIN INLET LOCATIONS. "DON'T DUMP" PLAQUES TO BE PURCHASED FROM BWSC.
11. THE CONTRACTOR SHALL PURCHASE THE NEW HYDRANT(S) FROM THE BWSC. THE CONTRACTOR SHALL PURCHASE THE HYDRANT(S) FROM THE COMMISSION WHEN FILING THE GENERAL SERVICE APPLICATION.
12. EXISTING WATER METER(S) TO BE REMOVED OR REPLACED SHALL BE RETURNED TO BWSC.
13. THE CONTRACTOR SHALL VIDEO INSPECT THE EXISTING 24"/36"/48" BWSC DRAIN MAIN IN MASSPORT HAUL ROAD PRIOR TO CONSTRUCTION AND AFTER CONSTRUCTION IS COMPLETE AND SUBMIT TO BWSC AND NITSCH ENGINEERING FOR REVIEW. THE INSPECTION SOFTWARE SHALL BE CAPABLE OF EXPORTING DIGITAL INSPECTION LOG DATA INTO AN MSACCESS DATABASE IN THE PIPELINE ASSESSMENT AND CERTIFICATION PROGRAM (PACP) STANDARD EXCHANGE FORMAT. THE INSPECTION SOFTWARE CODING SYSTEM SHALL BE PACP CERTIFIED (LATEST EDITION) AS PER THE NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES (NASSCO). THE SOFTWARE SHALL BE EQUIPPED WITH ALL MODULES NECESSARY FOR PACP INSPECTIONS AND SCORING. THE CONTRACTOR SHALL COORDINATE DIRECTLY WITH BWSC TO DETERMINE AN APPROVED VIDEO INSPECTION COMPANY AND DELIVERABLE.

EROSION AND SEDIMENT CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS" PREPARED BY DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF RESOURCE PROTECTION, AND THE CURRENT NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES.
2. MEANS OF EROSION AND SEDIMENT PROTECTION AS NOTED ON THE DRAWINGS INDICATE MINIMUM RECOMMENDED PROVISIONS. THE CONTRACTOR IS RESPONSIBLE FOR FINAL SELECTION AND PLACEMENT OF EROSION AND SEDIMENTATION CONTROLS BASED ON ACTUAL SITE CONDITIONS AND CONSTRUCTION CONDITIONS. ADDITIONAL MEANS OF PROTECTION SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED FOR CONTINUED OR UNFORESEEN EROSION PROBLEMS, OR AS DIRECTED BY CONTROLLING MUNICIPAL AUTHORITIES, AT NO ADDITIONAL EXPENSE TO THE OWNER.
3. AN EROSION CONTROL BARRIER SHALL BE INSTALLED ALONG THE EDGE OF PROPOSED DEVELOPMENT AS INDICATED IN THE PLAN PRIOR TO COMMENCEMENT OF DEMOLITION OR CONSTRUCTION OPERATIONS.
4. SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF AND DURING ALL PHASES OF CONSTRUCTION AND BE CONSTRUCTED PRIOR TO AND IMMEDIATELY AFTER ANY GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL ON THE SITE.
5. AFTER ANY SIGNIFICANT RAINFALL (GREATER THAN 0.25 INCHES OF RAINFALL WITHIN 24 HOURS), SEDIMENT CONTROL STRUCTURES SHALL BE INSPECTED FOR INTEGRITY. ANY DAMAGE SHALL BE CORRECTED IMMEDIATELY.
6. PERIODIC INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL STRUCTURES SHALL BE PROVIDED TO ENSURE THAT THE INTENDED PURPOSE IS ACCOMPLISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SEDIMENT LEAVING THE LIMIT OF WORK. SEDIMENT CONTROL MEASURES SHALL BE IN WORKING CONDITION AT THE END OF EACH WORKING DAY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING SEDIMENT FROM ENTERING ANY STORM DRAINAGE SYSTEM AND FROM BEING CONVEYED TO ANY WETLAND RESOURCE AREA, PUBLIC WAYS, ABUTTING PROPERTY, OR OUTSIDE OF THE PROJECT LIMITS.
8. THE CONTRACTOR SHALL PROTECT ALL DRAINAGE SWALES AND GROUND SURFACES WITHIN THE LIMIT OF WORK FROM EROSIVE CONDITIONS. STRAW BALE, CRUSHED STONE OR EQUIVALENT CHECK DAMS ARE TO BE PROVIDED AT A MAXIMUM OF TWO HUNDRED (200) FOOT SPACING, OR LESS AS SITE-SPECIFIC CONDITIONS WARRANT, WITHIN ALL DRAINAGE SWALES AND DITCHES AND AT UPSTREAM SIDES OF ALL DRAINAGE INLETS.
9. ALL STOCK PILES SHALL BE PROTECTED AND LOCATED A MINIMUM OF 100' FROM EXISTING WETLAND RESOURCE AREAS & WITHIN THE LIMIT OF WORK.
10. ANY SEDIMENT TRACKED ONTO PAVED AREAS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.
11. ALL SEDIMENT RETAINED BY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE LEGALLY DISPOSED OF OFFSITE.
12. TEMPORARY DIVERSION DITCHES, PERMANENT DITCHES, CHANNELS, EMBANKMENTS, AND ANY DENUDED SURFACE THAT WILL BE EXPOSED FOR A PERIOD OF 14 CALENDAR DAYS OR MORE SHALL BE CONSIDERED CRITICAL VEGETATION AREAS. THESE AREAS SHALL BE STABILIZED/PROTECTED WITH APPROPRIATE EROSION CONTROL MATTING OR OTHER EROSION CONTROL METHODS.
13. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS DIRECTED BY THE PERMITTING AUTHORITY OR OWNER.
14. THE CONTRACTOR SHALL USE TEMPORARY SEEDING, MULCHING, OR OTHER APPROVED STABILIZATION MEASURES TO PROTECT EXPOSED AREAS DURING PROLONGED CONSTRUCTION OR OTHER LAND DISTURBANCE. STOCKPILES THAT WILL BE EXPOSED FOR LONGER THAN 14 DAYS SHALL BE STABILIZED.
15. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL EROSION AND SEDIMENT CONTROLS AT THE COMPLETION OF SITE CONSTRUCTION, BUT ONLY WHEN DIRECTED BY THE CITY OF BOSTON CONSERVATION AGENT. STABILIZE OR SEED BARE AREAS LEFT AFTER EROSION CONTROL REMOVAL.

EARTH MOVING AND GRADING NOTES:

1. ALL TOPSOIL ENCOUNTERED WITHIN THE WORK AREA SHALL BE STRIPPED TO ITS FULL DEPTH AND STOCKPILED FOR REUSE. EXCESS TOPSOIL SHALL BE REMOVED FROM THE SITE UNLESS OTHERWISE DIRECTED BY THE OWNER. TOPSOIL PILES SHALL REMAIN SEGREGATED FROM EXCAVATED SUBSURFACE SOIL MATERIALS.
2. GRADES WITHIN HANDICAP PARKING SPACES AND ACCESS AISLES SHALL NOT EXCEED 1.5% IN ANY DIRECTION.
3. CROSS SLOPES OF ALL PEDESTRIAN WALKS SHALL NOT EXCEED 1.5%.
4. RUNNING SLOPE OF ALL PEDESTRIAN WALKS SHALL NOT EXCEED 4.5%, UNLESS OTHERWISE NOTED.
5. THE CONTRACTOR SHALL EXERCISE CAUTION IN ALL EXCAVATION ACTIVITY DUE TO POSSIBLE EXISTENCE OF UNRECORDED UTILITY LINES.
6. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MINIMUM OF 1% UNLESS OTHERWISE NOTED.
7. PROVIDE POSITIVE DRAINAGE AWAY FROM FACE OF BUILDINGS AT ALL LOCATIONS.
8. PITCH EVENLY BETWEEN CONTOUR LINES AND BETWEEN SPOT GRADES. SPOT GRADE ELEVATIONS TAKE PRECEDENCE OVER CONTOUR LINES.
9. ALL PROPOSED TOP OF CURB ELEVATIONS ARE SIX INCHES (6") ABOVE BOTTOM OF CURB ELEVATIONS UNLESS OTHERWISE NOTED. ALL PROPOSED TOP OF CAPE COD BERM ELEVATIONS ARE FOUR INCHES (4") ABOVE BOTTOM OF CURB ELEVATION UNLESS OTHERWISE NOTED.
10. THE CONTRACTOR SHALL BLEND NEW GRADING SMOOTHLY INTO EXISTING GRADING AT LIMITS OF GRADING.
11. WHERE NEW PAVING MEETS EXISTING PAVING, MEET LINE AND GRADE OF EXISTING PAVING WITH SMOOTH TRANSITION BETWEEN EXISTING AND NEW SURFACES.
12. THE CONTRACTOR SHALL VERIFY EXISTING GRADES IN THE FIELD AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
13. PITCH TOPS OF ALL WALLS AT ONE-EIGHTH INCH (1/8") PER FOOT FROM BACK OF WALL TO FACE OF WALL.
14. SURPLUS MATERIALS SHALL BE REMOVED FROM THE SITE UNLESS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE. REFER TO EARTHWORK SPECIFICATIONS.
15. ANY AREAS OUTSIDE OF THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED BY THE CONTRACTOR TO THE PRE-CONSTRUCTION CONDITION/GRADE AT NO COST TO THE OWNER.
16. EXCAVATION REQUIRED WITHIN PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO OWNER.

GENERAL NOTES:

1. TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING SITE FEATURES WERE OBTAINED FROM A PLAN ENTITLED "ALTA/NSPS LAND TITLE SURVEY PARCEL H-#30 TRILLING WAY BOSTON, MASS.", PREPARED BY FELDMAN LAND SURVEYORS, DRAFT DATED 04-22-2021.
2. FLOODPLAIN INFORMATION WAS OBTAINED FROM THE FLOOD INSURANCE RATE MAP (FIRM) NO. 25025C0081J. THE SITE IS IN ZONES AE AND X.
3. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82, SECTION 40, AS AMENDED, WHICH STATES THAT NO ONE MAY EXCAVATE IN THE COMMONWEALTH OF MASSACHUSETTS EXCEPT IN AN EMERGENCY WITHOUT 72 HOURS NOTICE, EXCLUSIVE OF SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS, TO NATURAL GAS PIPELINE COMPANIES, AND MUNICIPAL UTILITY DEPARTMENTS THAT SUPPLY GAS, ELECTRICITY, TELEPHONE, OR CABLE TELEVISION SERVICE IN OR TO THE CITY OR TOWN WHERE THE EXCAVATION IS TO BE MADE. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1-888-DIG-SAFE.
4. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82A, ALSO REFERRED TO AS JACKIE'S LAW, AS DETAILED IN SECTION 520 CMR 14.00 OF THE CODE OF MASSACHUSETTS REGULATIONS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS AND SAFETY CODES IN THE CONSTRUCTION OF ALL IMPROVEMENTS.
6. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND CONTACTING THE CONTROLLING AUTHORITIES AND/OR UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THEIR LINES. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND NITSCH ENGINEERING. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENGINEER OR OWNER'S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.
8. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
9. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENTS TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER'S REPRESENTATION IMMEDIATELY.
11. THE CONTRACTOR SHALL CONDUCT ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ESTABLISHMENT AND USE OF ALL VERTICAL AND HORIZONTAL CONSTRUCTION CONTROLS.
13. ELEVATIONS REFER TO BOSTON CITY BASE(BCB).
14. THE CONTRACTOR SHALL COMPLY WITH THE ORDER OF CONDITIONS DATED XXXX XX, XXXX AND ISSUED BY THE XXXX CONSERVATION COMMISSION (DEP #XXX-XXX).
15. FOR SOIL INFORMATION REFER TO GEOTECHNICAL REPORT.

UTILITY NOTES:

1. ALL UTILITY CONNECTIONS ARE SUBJECT TO THE APPROVAL OF, AND GRANTING OF PERMITS BY, THE LOCAL MUNICIPALITY. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL PERMITS AND APPROVALS RELATED TO UTILITY WORK PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR OBTAINING ALL PERMISSIONS FOR, AND FOR CONDUCTING ALL PREPARATIONS RELATED TO, WORK AFFECTING ANY UTILITIES WITHIN THE JURISDICTION OF ANY NON-MUNICIPAL UTILITY COMPANY, INCLUDING BUT NOT LIMITED TO ELECTRIC, TELEPHONE, AND/OR GAS. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES, DEPARTMENTS, AND UTILITY COMPANIES, IN WRITING, AT LEAST 7 DAYS (OR PER UTILITY COMPANY REQUIREMENT) AND NOT MORE THAN 30 DAYS PRIOR TO ANY CONSTRUCTION.
3. THE CONTRACTOR SHALL MAINTAIN UTILITIES SERVICING BUILDINGS AND FACILITIES WITHIN OR OUTSIDE THE PROJECT LIMIT UNLESS THE INTERRUPTION OF SERVICE IS COORDINATED WITH THE OWNER.
4. ALL WATER, SEWER, AND DRAIN WORK SHALL BE PERFORMED ACCORDING TO THE REQUIREMENTS AND STANDARD SPECIFICATIONS OF THE LOCAL MUNICIPALITY.
5. GAS, TELECOMMUNICATIONS AND ELECTRIC SERVICES ARE TO BE DESIGNED BY EACH UTILITY COMPANY IN COORDINATION WITH THE MECHANICAL, ELECTRIC, AND PLUMBING CONSULTANTS.
6. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES OF NEW UTILITIES WITH GAS, TELECOMMUNICATION AND ELECTRICAL SERVICES.
7. INSTALL WATER LINES WITH A MINIMUM OF FIVE FEET OF COVER AND A MAXIMUM OF SEVEN FEET COVER FROM THE FINAL DESIGN GRADES.
8. MAINTAIN 10 FEET HORIZONTAL SEPARATION AND 18 INCHES VERTICAL SEPARATION (WATER OVER SEWER) BETWEEN SEWER AND WATER LINES. WHEREVER THERE IS LESS THAN 10 FEET OF HORIZONTAL SEPARATION AND 18 INCHES OF VERTICAL SEPARATION BETWEEN A PROPOSED OR EXISTING SEWER LINE TO REMAIN AND A PROPOSED OR EXISTING WATER LINE TO REMAIN BOTH WATER MAIN AND SEWER MAIN SHALL BE CONSTRUCTED OF MECHANICAL JOINT CEMENT LINED DUCTILE IRON PIPE FOR A DISTANCE OF 10-FEET ON EITHER SIDE OF THE CROSSING. ONE (1) FULL LENGTH OF WATER PIPE SHALL BE CENTERED OVER THE SEWER AT THE CROSSING.
9. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES EXCEPT THOSE NOTED TO BE ABANDONED AND/OR REMOVED & DISPOSED.
10. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR TRENCHING, BACKFILLING, AND SURFACE RESTORATION FOR GAS UTILITY SYSTEMS.
11. ALL ONSITE UTILITIES SHALL BE INSTALLED UNDERGROUND UNLESS OTHERWISE NOTED.
12. ALL EXISTING AND PROPOSED MANHOLE FRAMES, COVERS, VALVES, CLEANOUTS, CASTINGS, ETC. SHALL BE RAISED TO FINISHED GRADE PRIOR TO FINAL GRADING AND PAVING CONSTRUCTION.
13. ALL GRATES IN WALKWAYS SHALL BE ADA COMPLIANT.

PROPOSED LEGEND

- LIMIT OF WORK
- EXISTING UTILITY TO BE ABANDONED, REMOVED AND DISPOSED IF IN CONFLICT WITH NEW SITE IMPROVEMENTS, OR AS INDICATED ON DRAWINGS
- EROSION CONTROL BARRIER
- CONSTRUCTION FENCE
- W — DOMESTIC WATER PIPE
- FP — FIRE PROTECTION PIPE
- S — SANITARY SEWER PIPE
- D — STORM DRAIN PIPE
- G — GAS PIPE
- E — ELECTRIC DUCTBANK
- T/C — TELECOM DUCTBANK
- INLET PROTECTION
- ELEVATION CONTOURS
- MATCH LINE
- CENTERLINE
- CO — CLEANOUT
- AREA DRAIN
- ACCESS BASIN
- DRAIN MANHOLE
- WATER QUALITY STRUCTURE
- CATCH BASIN
- WATER QUALITY INLET
- SEWER MANHOLE
- TMH — TELECOM MANHOLE
- EMH — ELECTRIC MANHOLE
- WV — WATER VALVE
- HYD — FIRE HYDRANT

ABBREVIATIONS

AB	ACCESS BASIN
AD	AREA DRAIN
BC	BOTTOM OF CURB ELEVATION
BW	BOTTOM OF WALL ELEVATION
CB	CATCH BASIN
CCB	CAPE COD BERM
CI	CAST IRON
CJ	CONTROL JOINT
CL	CENTER LINE
CO	CLEANOUT
COP	CENTER OF PIPE
CP	CARRIER PIPE
CPP	CORRUGATED POLYETHYLENE PIPE
DCB	DOUBLE CATCH BASIN
DI	DUCTILE IRON PIPE CEMENT LINED
DMH	DRAIN MANHOLE
EHH	ELECTRIC HANDHOLE
EJ	EXPANSION JOINT
EMH	ELECTRIC MANHOLE
FD	FOUNDATION DRAIN
FFE	FINISHED FLOOR ELEVATION
HP	HIGH POINT
HYD	FIRE HYDRANT
INV	INVERT ELEVATION
LF	LINEAR FEET
LOW	LIMIT OF WORK
LP	LOW POINT
LW	LAB WASTE
M&P	MAINTAIN AND PROTECT
NIC	NOT IN CONTRACT
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
PD	PERIMETER DRAIN
PERF	PERFORATED
PVC	POLYVINYL CHLORIDE PIPE
R&D	REMOVE AND DISPOSE
R&S	REMOVE AND STOCKPILE
RD	ROOF DRAIN
RIM	RIM ELEVATION
SMH	SEWER MANHOLE
SS	SEWER SERVICE
TC	TOP OF CURB ELEVATION
TW	TOP OF WALL ELEVATION
THH	TELECOM HANDHOLE
TMH	TELECOM MANHOLE
TOP	TOP OF PIPE
TOD	TOP OF DUCT BANK
TYP	TYPICAL
UD	UNDERDRAIN
USD	UNDERSLAB DRAIN
VGC	VERTICAL GRANITE CURB
WQI	WATER QUALITY INLET
WQS	WATER QUALITY STRUCTURE
WV	WATER VALVE

MASSPORT STREET LIGHTING NOTES:

1. ALL MASSPORT STREET LIGHT POLE INSTALLATIONS SHALL MEET THE MASSPORT STANDARD SPECIFICATIONS AND DETAILS.
2. PROPOSED STREET LIGHT LOCATIONS REQUIRE A MASSPORT STANDARD LIGHT POLE BASE, LIGHT POLE, LAMP, CONDUIT, CABLING & COMPOSITE PULLBOX, UNLESS OTHERWISE NOTED.
3. STREET LIGHTING CONDUIT RUNNING FROM THE LIGHT POLE TO PULLBOX SHALL BE 2" PVC.
4. STREET LIGHTING CONDUIT RUNNING FROM PULLBOX TO PULLBOX SHALL BE 3" PVC.
5. STREET LIGHTING CONDUIT RUNNING UNDER ROADWAYS, DRIVEWAYS, OR OTHER VEHICULAR TRAVELED SURFACES SHALL BE CONCRETE ENCASED.
8. REMOVE AND RETURN EXISTING MASSPORT LIGHTS WITHIN THE LIMIT OF WORK TO MASSPORT, UNLESS OTHERWISE NOTED.
9. EXISTING MASSPORT LIGHT POLES AND LUMINARIES TO BE REPLACED SHALL BE PROTECTED, REMOVED & RETURNED TO MASSPORT STREET LIGHTING SECTION.
10. ALL EXISTING PULLBOXES TO BE REUSED SHALL BE CLEANED OUT AND THE FRAME AND COVER SHALL BE REPLACED WITH A STANDARD CITY OF BOSTON COMPOSITE PULLBOX.
11. STREET LIGHT LOCATIONS NEED TO BE APPROVED BY MASSPORT PRIOR TO INSTALLATION FOR COORDINATION ONLY. STREET LIGHT LOCATIONS SHOWN FOR COORDINATION ONLY.
12. THE CONTRACTOR SHALL COORDINATE A FINAL INSPECTION WITH THE MASSPORT STREET LIGHTING SECTION AND APPROVAL/SIGN OFF FROM THE SECTION FOR THE INSTALLED STREET LIGHTS.
13. THE CONTRACTOR SHALL CONFIRM STREET LIGHTS ARE CONNECTED TO THE MASSPORT LIGHTING POWER SOURCE AND OPERATE ACCORDING TO MASSPORT STREET LIGHTING STANDARD SPECIFICATIONS AT NIGHT.
14. FOR PRIVATE LIGHTING ON SITE AND PRIVATE WAYS, SEE LANDSCAPE ARCHITECT AND ELECTRICAL ENGINEER PLANS.

11/17/2021 9:58:35 AM

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:
Nitsch Engineering
www.nitscheng.com
2 Center Plaza, Suite 430
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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL NOTES LEGEND AND ABBREVIATIONS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

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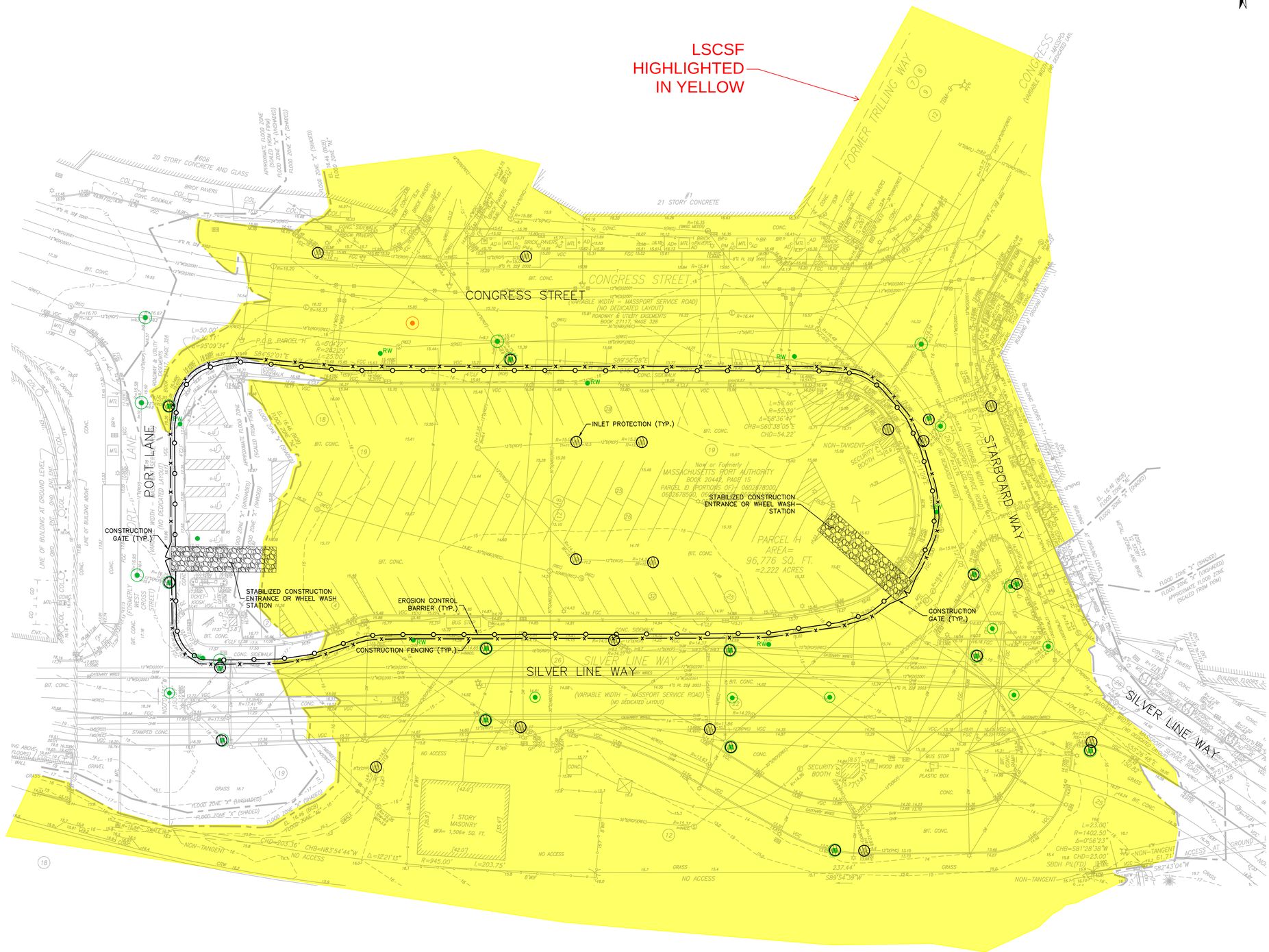

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

ARROWSTREET
ARCHITECTURE & DESIGN

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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

EROSION AND SEDIMENTATION CONTROL PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

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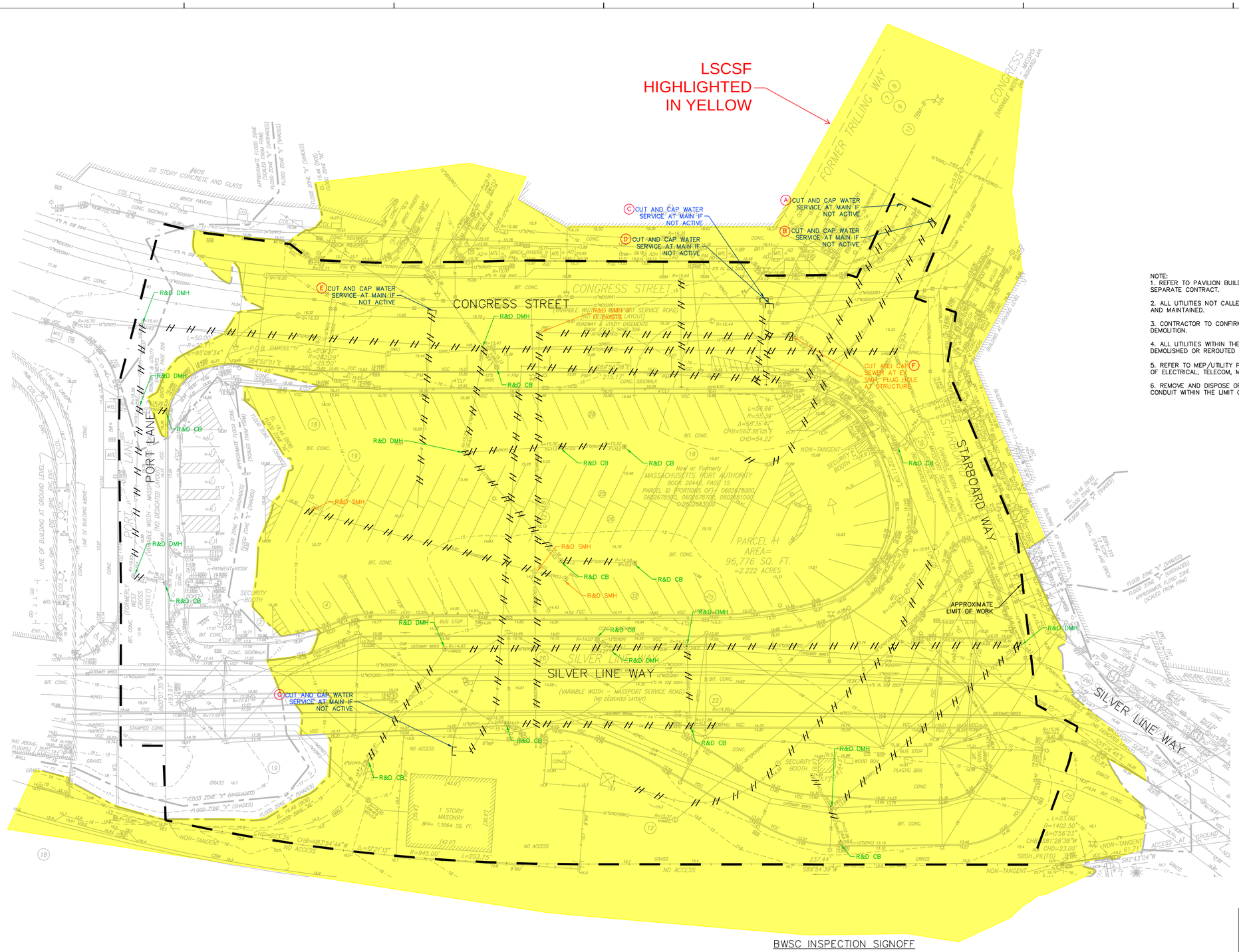


NOTE:
1. REFER TO PAVILION BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT.

2. ALL UTILITIES NOT CALLED OUT TO BE DEMOLISHED SHALL BE PROTECTED AND MAINTAINED.

3. CONTRACTOR TO CONFIRM ACTIVE STATUS OF ALL LINES PRIOR TO DEMOLITION.

4. ALL UTILITIES WITHIN THE FOOTPRINT OF THE GARAGE SHALL BE DEMOLISHED OR REROUTED DEPENDING ON ACTIVITY STATUS.

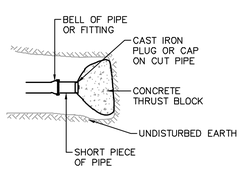
5. REFER TO MEP/UTILITY PROVIDER PLANS FOR DETAILS OF THE DEMOLITION OF ELECTRICAL, TELECOM, MBTA INFRASTRUCTURE AND GAS LINES.

6. REMOVE AND DISPOSE OF ALL STREET LIGHTING POLES, HANDHOLES, AND CONDUIT WITHIN THE LIMIT OF WORK.

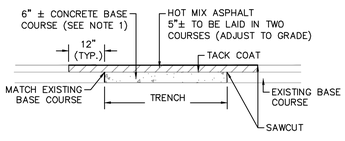
SCALE:
1" = 20'
20 10 0 20 40

BWSC SITE PLAN #_____

BWSC USE ONLY



PLUG OR CAP DETAIL
NOT TO SCALE



NOTES:
1. PROPOSED CONCRETE BASE COURSE SHALL BE LEVEL WITH THE TOP OF THE EXISTING BASE COURSE

PAVEMENT RESTORATION OVER TRENCH DETAIL
NOT TO SCALE

BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
A – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
B – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
C – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
D – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
E – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				
F – CUT AND CAP SEWER SERVICE AT EXISTING SMH				
G – CUT AND CAP WATER SERVICE AT MAIN IF NOT ACTIVE				

BUILDING ADDRESS:
701 CONGRESS STREET
BOSTON, MA 02210

WARD / PARCEL #:
WARD 06 PARCELS 02681000, 02678000
02678700

LAND USE CODE:
EXEMPT

METER NUMBERS:
TO BE ASSIGNED

ACCOUNT NUMBERS:
TO BE ASSIGNED

OWNER CONTACT:
MARK F. CALLAHAN
DIRECTOR OF DEVELOPMENT
LINCOLN PROPERTY COMPANY
52 STATE STREET, 8TH FLOOR
BOSTON, MA 02109
OFFICE: 617-951-4112

BUILDING USE: COMMERCIAL

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

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- Transportation Engineering
- Structural Engineering
- Geotechnical Engineering
- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55986
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

UTILITY DEMOLITION PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	CMH/JMS
Date	10/03/2022
Scale	AS NOTED

DRAWING NUMBER:

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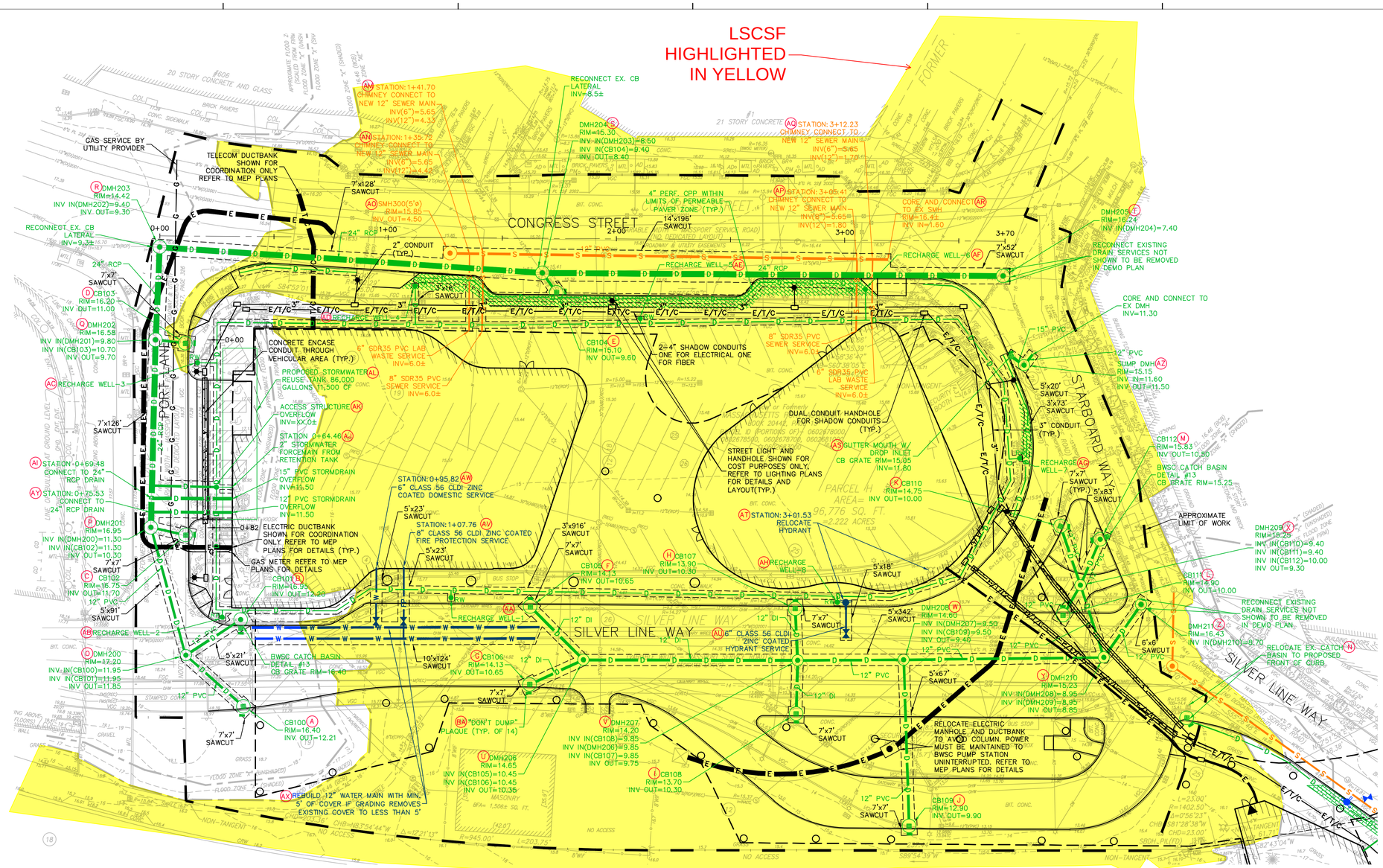

NOTES:
1. REFER TO PAVILION BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT
2. REFER TO MEP PLANS FOR DETAILS ON MBTA CATANARY WIRES AND MBTA INFRASTRUCTURE

BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(A) – NEW CATCH BASIN 100				
(B) – NEW CATCH BASIN 101				
(C) – NEW CATCH BASIN 102				
(D) – NEW CATCH BASIN 103				
(E) – NEW CATCH BASIN 104				
(F) – NEW CATCH BASIN 105				
(G) – NEW CATCH BASIN 106				
(H) – NEW CATCH BASIN 107				
(I) – NEW CATCH BASIN 108				
(J) – NEW CATCH BASIN 109				
(K) – NEW CATCH BASIN 110				
(L) – NEW CATCH BASIN 111				
(M) – NEW CATCH BASIN 112				
(N) – NEW CATCH BASIN 113				
(O) – NEW DRAIN MANHOLE 200				
(P) – NEW DRAIN MANHOLE 201				
(Q) – NEW DRAIN MANHOLE 202				
(R) – NEW DRAIN MANHOLE 203				
(S) – NEW DRAIN MANHOLE 204				
(T) – NEW DRAIN MANHOLE 205				
(U) – NEW DRAIN MANHOLE 206				
(V) – NEW DRAIN MANHOLE 207				
(W) – NEW DRAIN MANHOLE 208				
(X) – NEW DRAIN MANHOLE 209				
(Y) – NEW DRAIN MANHOLE 210				
(Z) – NEW DRAIN MANHOLE 211				
(AA) – NEW RECHARGE WELL 1				

BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(AB) – NEW RECHARGE WELL 2				
(AC) – NEW RECHARGE WELL 3				
(AD) – NEW RECHARGE WELL 4				
(AE) – NEW RECHARGE WELL 5				
(AF) – NEW RECHARGE WELL 6				
(AG) – NEW RECHARGE WELL 7				
(AH) – NEW RECHARGE WELL 8				
(AI) – NEW DRAIN CONNECTION				
(AJ) – NEW 2" FORCE MAIN FROM RETENTION TANK				
(AK) – NEW ACCESS STRUCTURE				
(AL) – NEW STORMWATER TANK				
(AM) – NEW SEWER CONNECTION				
(AN) – NEW SEWER CONNECTION				
(AO) – NEW SEWER MANHOLE 300				
(AP) – NEW SEWER CONNECTION				
(AQ) – NEW SEWER CONNECTION				
(AR) – NEW SEWER CONNECTION				
(AS) – NEW GUTTERMOUTH W/ DROP INLET				
(AT) – RELOCATE HYDRANT				N/A
(AU) – NEW 6" HYDRANT SERVICE				N/A
(AV) – NEW 8" FIRE PROTECTION SERVICE				N/A
(AW) – NEW 6" DOMESTIC SERVICE				N/A
(AX) – NEW 12" WATER MAIN				N/A
(AY) – NEW DRAIN CONNECTION				
(AZ) – SUMP DRAIN MANHOLE				
(BA) – DON'T DUMP PLAQUE (14)				N/A
4:1 I/I FEE				N/A
AS–BUILT				N/A

PROPOSED RECHARGE VOLUME CALCULATIONS:

Total Impervious Area (SF) = 102,615 SF
Required Reuse = 1.25" storm over Impervious Area

Required Storage Volume = Roof Area + Impervious Site Area
= 81,417 SF(Roof) x [1.25/12"] +21,198 SF(Site) x [1.25/12"] = 10,690 CF ◄

A 86,000 Gallon stormwater collection tank will be located in the building and the water will be pumped to recharge wells located in Port Lane, Congress Street, Silver Line way and Starboard Way, this system is designed to drawdown within 72 hours.

BWSC SITE PLAN #_____

BWSC USE ONLY

BUILDING ADDRESS:
777 CONGRESS STREET
BOSTON, MA 02210

WARD / PARCEL #:
WARD 06 PARCELS 02681000, 02678000 02678700

LAND USE CODE:
EXEMPT

METER NUMBERS:
TO BE ASSIGNED

ACCOUNT NUMBERS:
TO BE ASSIGNED

OWNER CONTACT:
MARK F. CALLAHAN
DIRECTOR OF DEVELOPMENT
LINCOLN PROPERTY COMPANY
52 STATE STREET, 8TH FLOOR
BOSTON, MA 02109
OFFICE: 617–951–4112

BUILDING USE: COMMERCIAL

SCALE:
1" = 20'
20 10 0 20 40

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

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www.nitscheng.com
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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL UTILITY PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	CMH/JMS
Date	10/03/2022
Scale	AS NOTED

DRAWING NUMBER:

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LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	45.15	S55°01'12"E
L2	97.62	S89°35'11"E
L3	48.82	S49°35'11"E
L4	4.81	N1°27'53"E
L5	2.59	S0°58'22"E
L6	12.46	S86°43'26"E
L7	42.22	S89°35'11"E
L8	22.49	N79°23'43"E
L9	4.21	N87°37'04"E
L10	144.64	S89°35'11"E
L11	1.81	S0°24'49"W
L12	76.81	N89°35'11"W
L13	4.35	N49°35'11"W
L14	10.62	N75°52'09"W

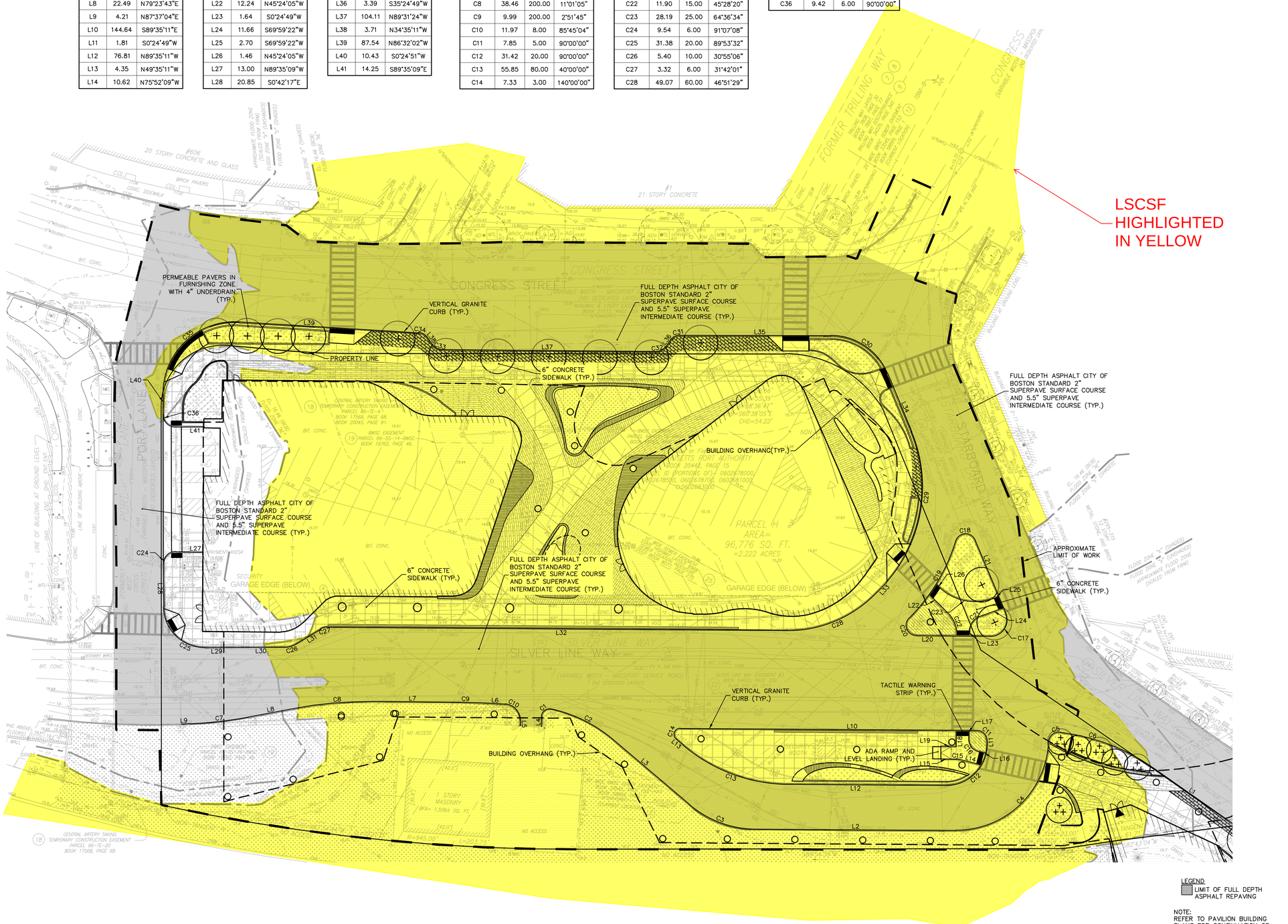
LINE TABLE		
LINE #	LENGTH	DIRECTION
L15	7.68	N89°29'37"W
L16	3.64	S75°52'09"E
L17	3.83	S0°24'51"W
L18	7.46	S0°24'51"W
L19	7.50	N89°35'09"W
L20	36.24	S89°35'11"E
L21	38.81	N22°49'34"W
L22	12.24	N45°24'05"W
L23	1.64	S0°24'49"W
L24	11.66	S69°59'22"W
L25	2.70	S69°59'22"W
L26	1.46	N45°24'05"W
L27	13.00	N89°35'09"W
L28	20.85	S0°42'17"E

LINE TABLE		
LINE #	LENGTH	DIRECTION
L29	10.91	N89°37'54"E
L30	28.20	N89°37'54"E
L31	14.12	N58°42'48"E
L32	224.08	S89°35'11"E
L33	6.79	N43°33'20"E
L34	30.76	N22°35'57"W
L35	73.43	N89°56'09"W
L36	3.39	S35°24'49"W
L37	104.11	N89°31'24"W
L38	3.71	N34°35'11"W
L39	87.54	N86°32'02"W
L40	10.43	S0°24'51"W
L41	14.25	S89°35'09"E

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C1	7.08	4.00	101°27'22"
C2	33.95	70.00	27°47'13"
C3	34.91	50.00	40°00'00"
C4	69.09	45.00	87°58'24"
C5	8.23	5.00	94°18'44"
C6	49.27	100.00	28°13'39"
C7	28.70	200.00	8°13'19"
C8	38.46	200.00	11°01'05"
C9	9.99	200.00	2°51'45"
C10	11.97	8.00	85°45'04"
C11	7.85	5.00	90°00'00"
C12	31.42	20.00	90°00'00"
C13	55.85	80.00	40°00'00"
C14	7.33	3.00	140°00'00"

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C15	1.43	6.00	13°37'27"
C16	7.99	6.00	76°17'00"
C17	15.81	8.00	113°14'23"
C18	12.23	5.00	140°09'04"
C19	44.36	90.00	28°14'30"
C20	11.77	5.00	134°51'03"
C21	9.71	8.00	69°34'33"
C22	11.90	15.00	45°28'20"
C23	28.19	25.00	64°36'34"
C24	9.54	6.00	91°07'08"
C25	31.38	20.00	89°53'32"
C26	5.40	10.00	30°55'06"
C27	3.32	6.00	31°42'01"
C28	49.07	60.00	46°51'29"

CURVE TABLE			
CURVE #	LENGTH	RADIUS	DELTA
C29	78.41	70.00	64°10'52"
C30	35.26	30.00	67°20'12"
C31	5.76	6.00	55°00'00"
C32	5.77	6.00	55°03'45"
C33	5.75	6.00	54°56'14"
C34	5.44	6.00	51°56'52"
C35	56.84	35.00	93°03'07"
C36	9.42	6.00	90°00'00"



LEGEND
LIMIT OF FULL DEPTH ASPHALT REPAVING

NOTE:
REFER TO PAVILION BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT

SCALE:
1" = 20'
20 10 0 20 40

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CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

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- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

LAYOUT AND MATERIALS PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

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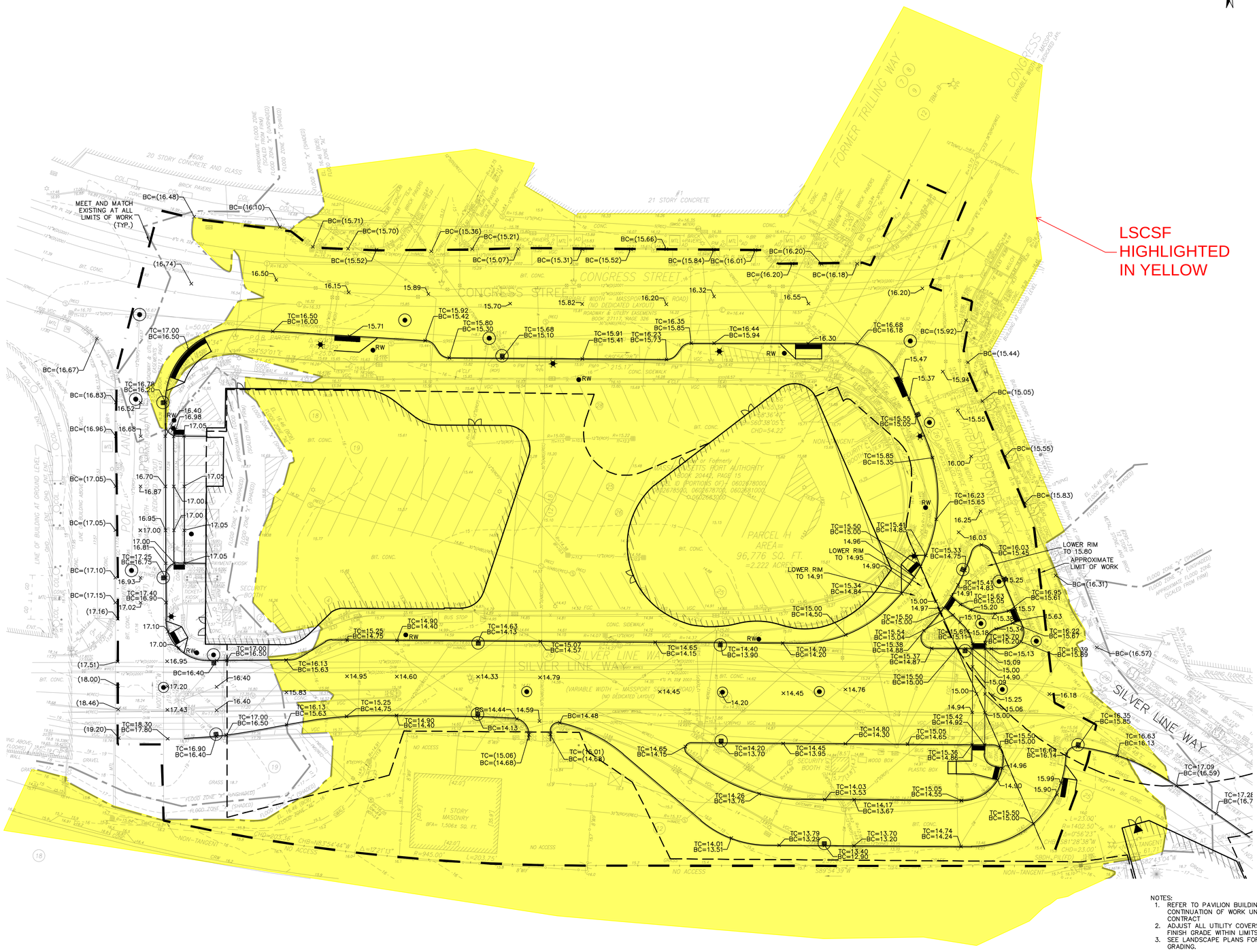

NOTES:
1. REFER TO PAVILION BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT
2. ADJUST ALL UTILITY COVERS, GATES, ETC. TO FINISH GRADE WITHIN LIMITS OF WORK.
3. SEE LANDSCAPE PLANS FOR SIDEWALK AND SITE GRADING.

SCALE:
1" = 20'
20 10 0 20 40

11/17/2021 9:58:35 AM

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

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PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55986
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL GRADING PLAN

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

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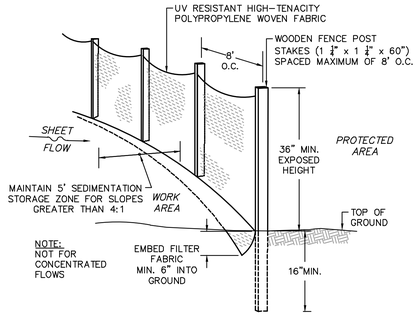
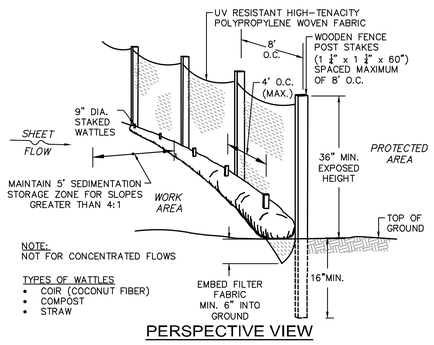
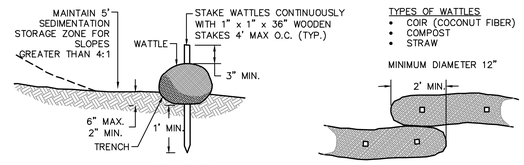


PERSPECTIVE VIEW



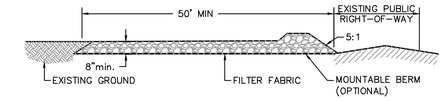
PERSPECTIVE VIEW



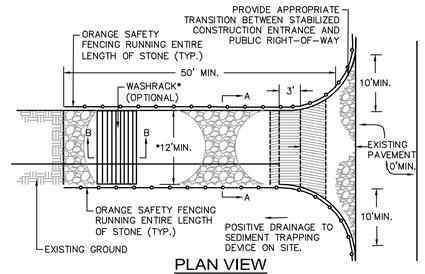
SECTION PLAN

WATTLES - SLOPE PROTECTION FOR SLOPES LESS THAN 10:1

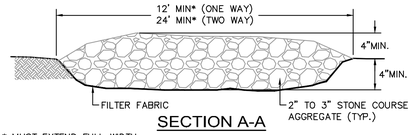
NOT TO SCALE



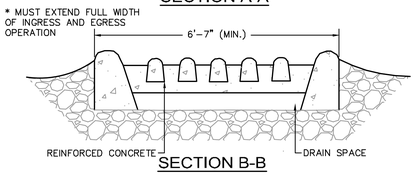
SIDE ELEVATION



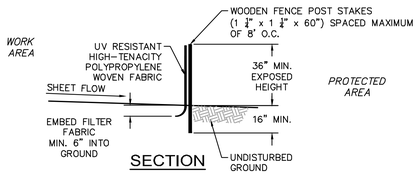
PLAN VIEW



SECTION A-A

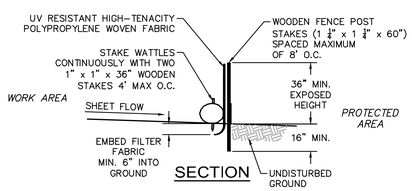


SECTION B-B



SECTION

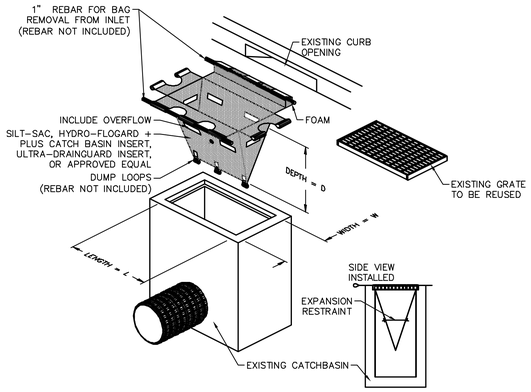
PERIMETER PROTECTION BARRIER



SECTION

PERIMETER PROTECTION BARRIER
SILT FENCE DETAIL WITH WATTLES

NOT TO SCALE



THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS SHEET, OVERLAND OR CONCENTRATED FLOWS (NOT GREATER THAN 1 CFS). THE METHOD CAN DRAIN FLAT AREA TO STEEP SLOPES. INLET CAPACITY WILL BE DECREASED WITH THIS METHOD AND THE CONTRACTOR SHALL EXPECT PONDING DURING HIGH FLOW EVENTS.

INLET PROTECTION
CATCH BASIN W/ SILTATION SACK

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

LENGTH – GREATER THAN OR EQUAL TO 50 FEET

WIDTH – TWELVE FOOT MINIMUM (ONE WAY), TWENTY FOUR FOOT MINIMUM (TWO WAY), BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.

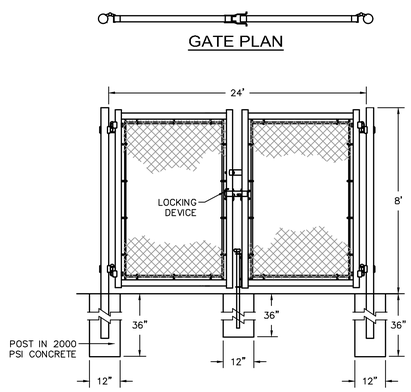
SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM SHALL BE PERMITTED.

THICKNESS – 8"

MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED.

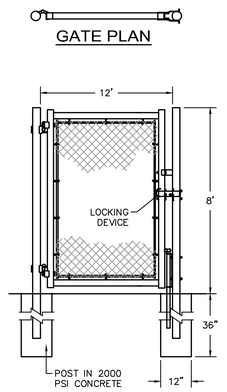
STABILIZED CONSTRUCTION ENTRANCE



DOUBLE GATE ELEVATION

24' WIDE DOUBLE GATE

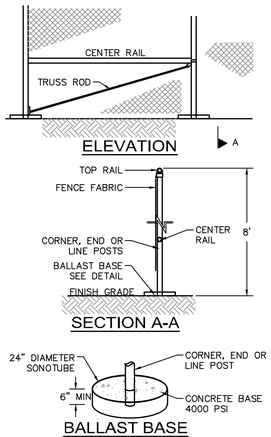
NOT TO SCALE



SINGLE GATE ELEVATION

12' WIDE EMERGENCY GATE

NOT TO SCALE



NOTES
1. END, GATE AND CORNER POSTS SHALL BE BRACED TO ADJACENT LINE POSTS. (MORE THAN 30° CHANGE IN DIRECTION CONSTITUTES A CORNER)
2. FABRIC SHALL BE 0.148" GAUGE MIN. WIRE, WOVEN INTO APPROXIMATELY 2" DIAMOND MESH.
3. ZINC-COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH PRIME WESTERN SPELTER OR EQUAL.
4. ALUMINUM COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH ALUMINUM ALLOY.
5. LINE POSTS SHALL BE 2½" O.D. END OR CORNER POSTS SHALL BE 3" O.D.
6. THE CONTRACTOR IS RESPONSIBLE FOR SURFACE RESTORATION ONCE THE FENCE IS REMOVED.
7. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE TEMPORARY CONSTRUCTION FENCE AT THE CONCLUSION OF THE PROJECT.

TEMPORARY CONSTRUCTION
CHAIN LINK FENCE WITH BALLAST BASE

NOT TO SCALE

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

Nitsch Engineering
www.nitscheng.com
2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472
- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Geotechnical Engineering
- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS — COLEMAN McLEAN HORSLEY — CIVIL — NO. 55986 — REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL DETAILS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

C7.00

11/17/2021 9:58:35 AM

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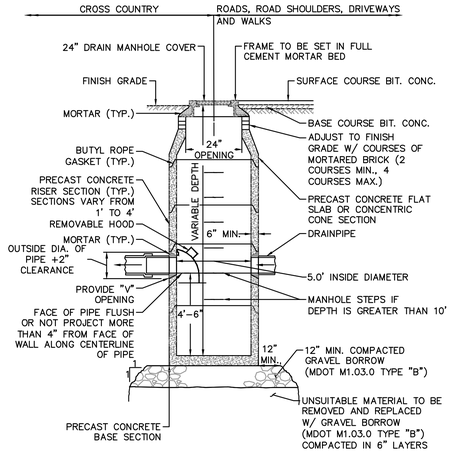
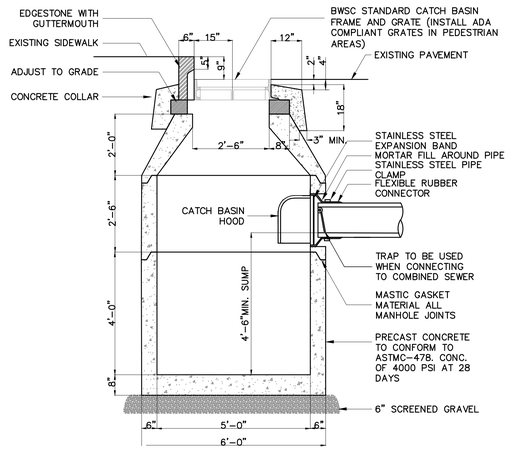


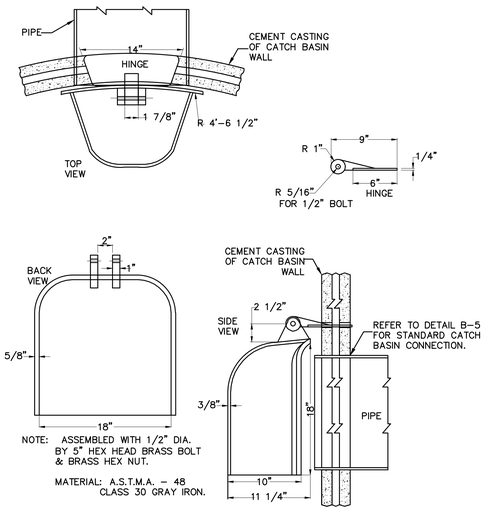
DRAIN MANHOLE WITH SUMP DETAIL

NOT TO SCALE



BWSC STANDARD CATCH BASIN

NOT TO SCALE



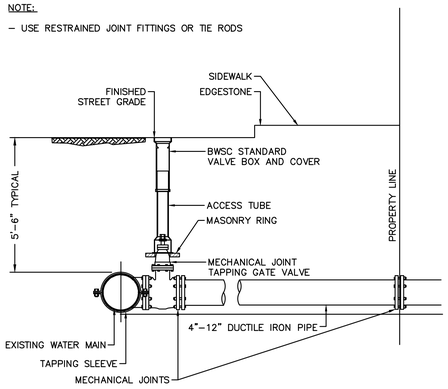
CATCH BASIN HOOD

NOT TO SCALE

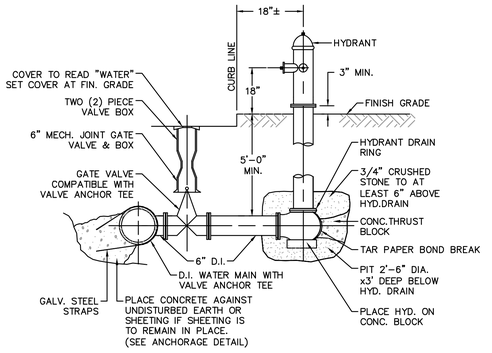
MEGALUG JOINT RESTRAINT

N.T.S.

NOTE:
MEGALUG JOINT RESTRAINT SHALL BE USED AT EACH BEND IN THE PIPE.



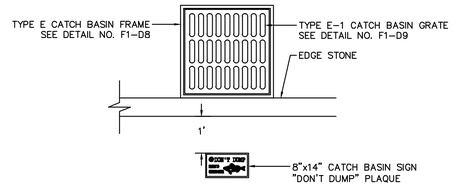
TYPICAL WATER PIPE CONNECTION WITH TAPPING SLEEVE AND GATE VALVE



NOTE: ALL JOINTS ON HYDRANT BRANCH TO BE RESTRAINED JOINTS

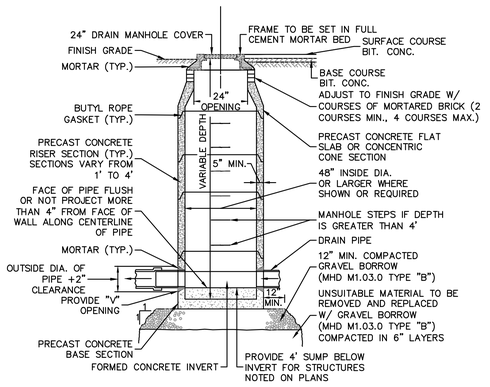
FIRE HYDRANT DETAIL

NOT TO SCALE



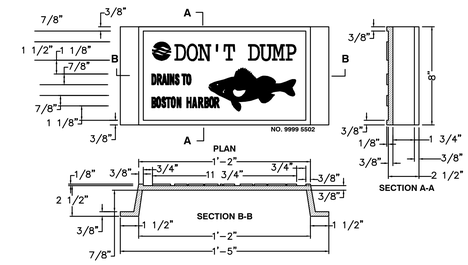
CATCH BASIN SIGN INSTALLATION

NOT TO SCALE



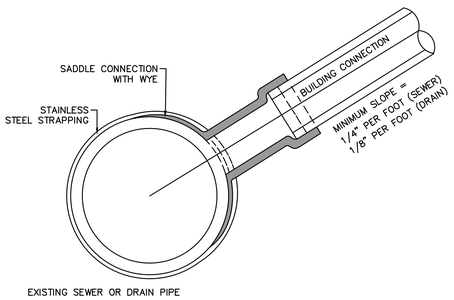
TYPICAL DRAIN MANHOLE DETAIL

NOT TO SCALE



BWSC "DON'T DUMP" PLAQUE DETAIL

NOT TO SCALE

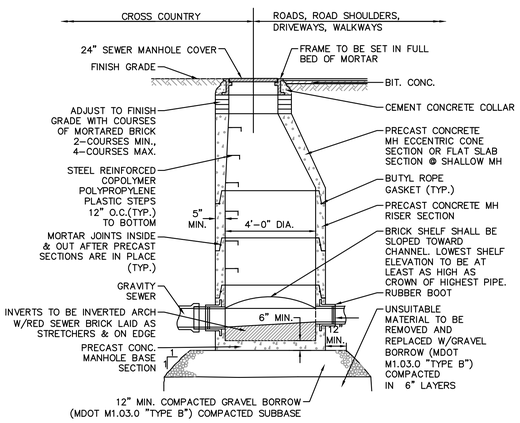


NOTES:

1. FULL PVC OR IRON SADDLE MAY BE USED TO CONNECT TO EXISTING PVC, CLAY, CONCRETE OR IRON PIPE.
2. SADDLES MUST HAVE RUBBER GASKETS AND SHALL BE TIGHTENED WITH STRAPS. SADDLES WILL NOT BE CEMENTED ONTO THE PIPE.
3. FULL WYE CONNECTION FITTINGS MAY BE USED.
4. PIPE SHALL BE CUT TO CONFORM TO THE OPENING IN THE SADDLE.
5. CONNECTIONS DIRECTLY INTO THE EXISTING PIPE WITHOUT A SADDLE OR A FULL WYE FITTING ARE NOT ALLOWED.

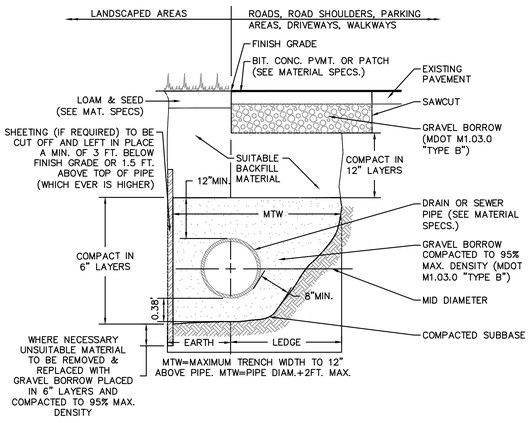
TYPICAL SADDLE CONNECTION DETAIL TO EXISTING DRAIN OR SEWER (6" TO 15")

NOT TO SCALE



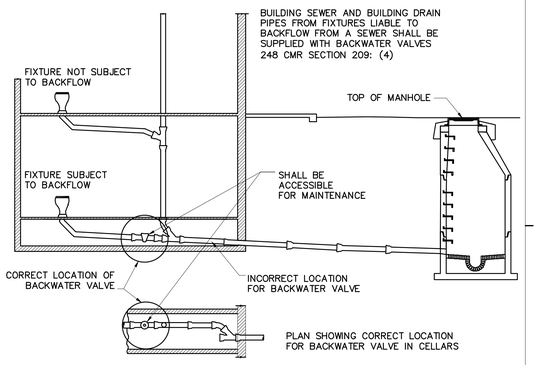
TYPICAL SEWER MANHOLE DETAIL

NOT TO SCALE



STANDARD TRENCH DETAIL FOR UTILITY PIPE

NOT TO SCALE



NOTE: ALL PLUMBING FIXTURES BELOW THE LEVEL OF THE TOP OF THE MANHOLE OF THE SEWER SERVICING THE FIXTURE(S) SHALL BE CONSIDERED AS BEING SUBJECT TO BACKFLOW AND SHALL BE SUPPLIED WITH BACKWATER VALVES.

BACK WATER VALVES TO BE LOCATED IN BUILDING AND DESIGNED, DETAILED, AND SPECIFIED BY THE PLUMBING ENGINEER. SHOWN FOR PERMITTING ONLY.

STANDARD BACKWATER VALVE

NOT TO SCALE

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:

Nitsch Engineering
www.nitscheng.com
2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472
- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION:

SEAPORT CIRCLE

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL DETAILS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	**CMH/JMS**
Date	**10/03/2022**
Scale	**AS NOTED**

DRAWING NUMBER:

C7.01

11/17/2021 9:58:35 AM

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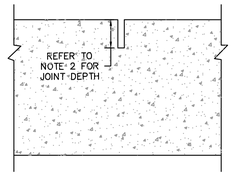
NOTES:

1. CONTROL JOINTS 5' O.C. UNLESS SHOWN OTHERWISE (6' MAX).
2. EDGES OF PAVEMENT AND JOINTS IN CONCRETE SHALL BE SAWCUT TO A DEPTH EQUAL TO AT LEAST ¼ OF THE CONCRETE THICKNESS OR 1 INCH WHICHEVER IS GREATER.
3. SAWCUTTING SHALL OCCUR 4–12 HOURS AFTER FINISHING WITH A WET–CUT SAW OR 1–4 HOURS WITH A EARLY ENTRY DRY–CUT SAW (ONCE JOINT RAVELING NO LONGER OCCURS)

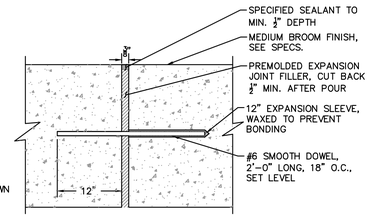


SAWCUT CONTROL JOINT DETAIL

NOT TO SCALE

NOTES:

1. DOWEL IS TYPICAL AT ALL EXPANSION JOINTS EXCEPT AGAINST VERTICAL WALLS AND CURBS.
2. EXPANSION JOINTS 20'–0" O.C. UNLESS OTHERWISE SHOWN
3. SAWCUT EDGES AND JOINTS ALL PANELS.

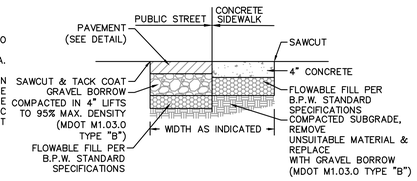


SAWCUT EXPANSION JOINT DETAIL

NOT TO SCALE

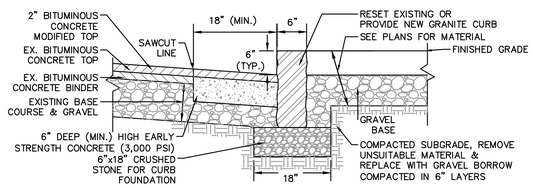
NOTES:

1. SURFACE FINISH TO MATCH SURROUNDING AREA.
2. PERMANENT RESTORATION WITHIN ROADWAY SHALL BE COMPLETED BY THE BOSTON PUBLIC WORKS DEPARTMENT



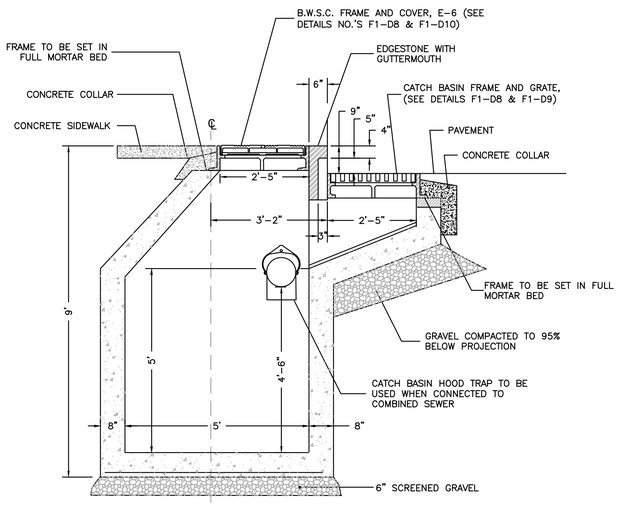
SURFACE RESTORATION WITHIN PUBLIC WAYS DETAIL

NOT TO SCALE



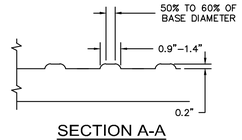
TYPICAL GRANITE CURB IN PUBLIC WAY SECTION DETAIL

NOT TO SCALE



STANDARD CATCH BASIN #13

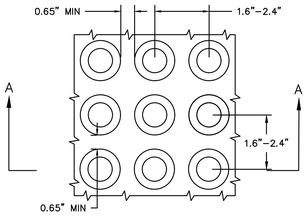
NOT TO SCALE



SECTION A-A

NOTES:

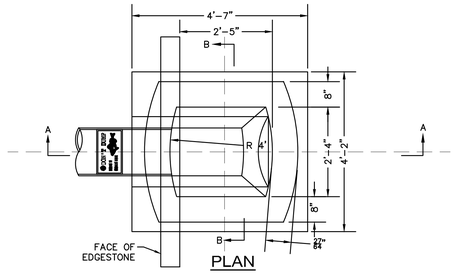
1. DETECTABLE WARNING PANELS SHALL BE PERMANENTLY APPLIED TO THE RAMP.
2. DETECTABLE WARNING PANELS SHALL CONTRAST VISUALLY WITH THE ADJACENT WALKWAY SURFACES PER THE FOLLOWING COLOR SCHEDULE:
   - PALE YELLOW ON CEMENT CONCRETE PEDESTRIAN RAMPS
3. DETECTABLE WARNING PANELS SHALL BE AS MANUFACTURED BY ADA SOLUTIONS, INC. OF NORTH BILLERICA, MA OR AN APPROVED EQUAL.
4. DETECTABLE WARNING PANELS SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS.



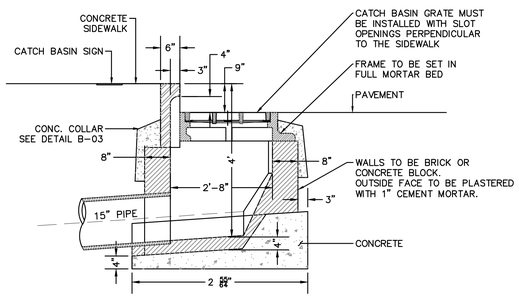
DETECTABLE WARNING PANEL

DETECTABLE WARNING PANEL FOR PEDESTRIAN RAMPS DETAIL

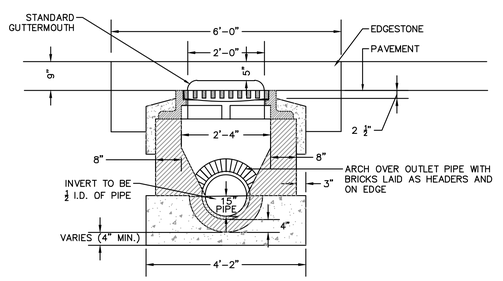
NOT TO SCALE



PLAN



SECTION A-A



SECTION B-B

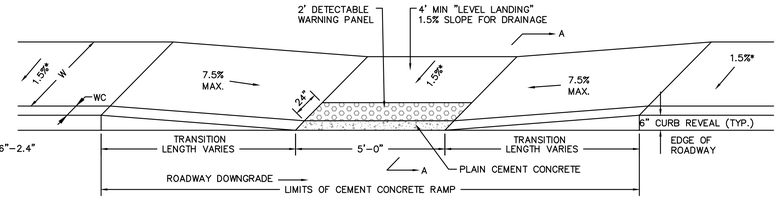
CITY OF BOSTON DROP INLET WITH GUTTERMOUTH PLAN AND SECTIONS

NOT TO SCALE

BOSTON CB

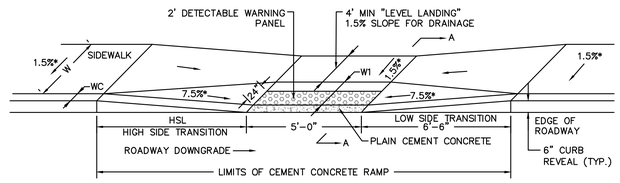
ROADWAY PROFILE GRADE	HIGH SIDE TRANSITION LENGTH
ROADWAY PROFILE GRADE %	HIGH SIDE TRANSITION LENGTH (FEET)
0	6'–6"
0–1	7'–8"
1–2	9'–0"
2–3	11'–0"
3–4	14'–0"
>4	15' (MAX.)

NOTE–BASED ON A DESIGN SLOPE OF 7.5% & A REVEAL OF 6"



PEDESTRIAN RAMP DETAIL (4' TO 6' WIDE)

NOT TO SCALE

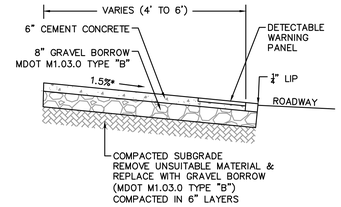


ROADWAY PROFILE GRADE	HIGH SIDE TRANSITION LENGTH
ROADWAY PROFILE GRADE %	HIGH SIDE TRANSITION LENGTH (FEET)
0	6'–6"
0–1	7'–8"
1–2	9'–0"
2–3	11'–0"
3–4	14'–0"
>4	15' (MAX.)

NOTE–BASED ON A DESIGN SLOPE OF 7.5% & A REVEAL OF 6"

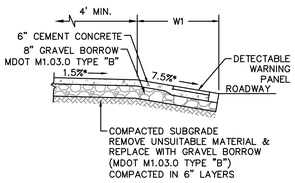
LEGEND:

HSL = HIGH SIDE TRANSITION LENGTH (VARIES–SEE CHART)
W = SIDEWALK WIDTH (USABLE WIDTH)
W1 = PERPENDICULAR RAMP LENGTH (W–4')
Wc = CURB WIDTH (VARIES 0"–6")
* = TOLERANCE FOR CONSTRUCTION (±0.5%)



SECTION A-A

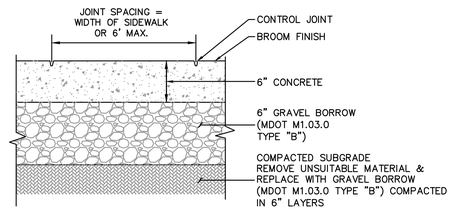
LEGEND
W = SIDEWALK WIDTH (VARIES 4' TO 6')
Wc = CURB WIDTH (VARIES 0" TO 6")
* = TOLERANCE FOR CONSTRUCTION (± 0.5%)



SECTION A-A

PEDESTRIAN RAMP DETAIL (6'-0" TO 12'-6" WIDE)

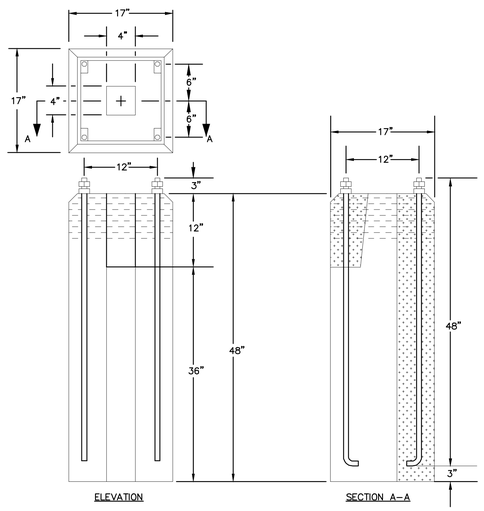
NOT TO SCALE



NOTES:
1. SURFACE FINISH TO MATCH SURROUNDING AREA.
2. REFER TO CITY OF BOSTON PUBLIC WORKS DEPARTMENT RULES AND SPECIFICATIONS FOR EXCAVATION ACTIVITY WITHIN THE CITY OF BOSTON FOR MATERIALS AND INSTALLATION REQUIREMENTS.
3. CONCRETE SIDEWALK WITH MEDIUM BROOM FINISH. DIRECTION OF FINISH TO BE PERPENDICULAR TO THE LONGITUDINAL DIRECTION OF PAVEMENT. CONTROL JOINTS SHALL BE PLACED AT 6' O.C., EXPANSION JOINTS 30' O.C.
4. CONTROL JOINTS SHOULD BE SAW CUT.

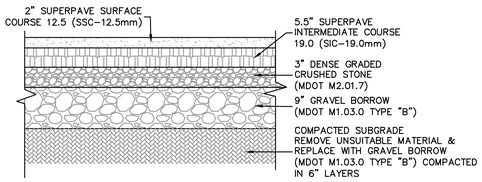
CONCRETE SIDEWALK DETAIL

NOT TO SCALE



CITY OF BOSTON PRECAST POLE BASE

NOT TO SCALE



HOT MIX ASPHALT PAVING (TWO COURSES) DETAIL

NOT TO SCALE

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
ARROWSTREET
ARCHITECTURE & DESIGN

MOODY•NOLAN

CONSULTANTS:
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- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION:
SEAPORT CIRCLE
MASSPORT PARCEL H

ISSUANCE:
60% MBTA DESIGN SUBMISSION

STAMP:
NOT FOR CONSTRUCTION

REVISIONS:

No.	Date	Description

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:
CIVIL DETAILS

Project No. 21008(NITSCH#13511.1)	
Dwn/Chk By	CMH/JMS
Date	10/03/2022
Scale	AS NOTED

DRAWING NUMBER:
C7.02

11/17/2021 9:58:35 AM

DEMOLITION NOTES:

1. SITE PREPARATION AND DEMOLITION SHALL INCLUDE THOSE AREAS WITHIN THE LIMIT OF WORK LINE AS SHOWN ON THE CONTRACT DOCUMENTS.
2. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
3. CONSULT ALL OF THE DRAWINGS AND SPECIFICATIONS FOR COORDINATION REQUIREMENTS BEFORE COMMENCING DEMOLITION.
4. THE CONTRACTOR SHALL COORDINATE SITE DEMOLITION EFFORTS WITH ALL TRADES THAT MAY BE AFFECTED BY THE WORK.
5. ALL ITEMS REQUIRING REMOVAL SHALL BE REMOVED TO FULL DEPTH TO INCLUDE BASE MATERIAL AND FOOTINGS OR FOUNDATIONS AS REQUIRED TO FACILITATE CONSTRUCTION, AND LEGALLY DISPOSED OF OFFSITE BY CONTRACTOR.
6. UTILITY PIPES DESIGNATED TO BE ABANDONED IN PLACE SHALL BE PLUGGED AT THEIR ENDS WITH WATERTIGHT BRICK MASONRY OR CEMENT MORTAR WITH A MINIMUM THICKNESS OF 8 INCHES.
7. UTILITY PIPES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE COMPLETE REMOVAL AND DISPOSAL OF THE ENTIRE LENGTH OF PIPE AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN THE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
8. UTILITY STRUCTURES DESIGNATED TO BE ABANDONED IN PLACE SHALL HAVE THEIR CAST IRON CASTINGS REMOVED AND DISPOSED, INLET AND OUTLET PIPES PLUGGED, THE BOTTOM OF THE STRUCTURES SHALL BE BROKEN, THE VOID OF THE STRUCTURES SHALL BE BACKFILLED AND COMPACTED TO 95% WITH ORDINARY BORROW OR FLOWABLE FILL, AND THE TOP OF THE STRUCTURE SHALL BE REMOVED SO THAT IT IS AT LEAST 36 INCHES BELOW FINISH GRADE.
9. UTILITY STRUCTURES DESIGNATED TO BE REMOVED SHALL CONSIST OF THE REMOVAL AND DISPOSAL OF CAST IRON CASTINGS, PLUGGING OF INLET AND OUTLET PIPES, REMOVAL OF THE STRUCTURE, AND BACKFILL AND 95% COMPACTION OF THE VOID WITH ORDINARY BORROW. WHEN HE VOID IS WITHIN THE FOOTPRINT OF THE NEW BUILDING, GRAVEL BORROW SHALL BE USED TO BACKFILL THE VOID.
10. ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFFSITE.
11. AT ALL LOCATIONS WHERE EXISTING CURBING, CONCRETE PAVEMENT OR BITUMINOUS CONCRETE ROADWAY ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE.
12. EXTEND DESIGNATED LIMIT OF WORK AS NECESSARY TO ACCOMPLISH ROUGH GRADING, EROSION CONTROL, TREE PROTECTION, AND SITE WORK AS REQUIRED BY THESE DRAWINGS AND SPECIFICATIONS.
13. THE CONTRACTOR SHALL REMOVE FROM THE SITE ALL RUBBISH AND DEBRIS FOUND THEREON. STORAGE OF SUCH MATERIALS ON THE PROJECT SITE WILL NOT BE PERMITTED. THE CONTRACTOR SHALL LEAVE THE SITE IN SAFE, CLEAN, AND LEVEL CONDITION UPON COMPLETION OF THE SITE DEMOLITION WORK.
14. REMOVE AND STOCKPILE ALL EXISTING SITE LIGHTS, BENCHES, TRASH RECEPTACLES, TRAFFIC SIGNS, GRANITE CURB, AND OTHER SITE IMPROVEMENTS WITHIN LIMIT OF WORK LINE UNLESS OTHERWISE NOTED.
15. THE CONTRACTOR SHALL REMOVE FROM THE AREA OF CONSTRUCTION PAVEMENT, CONCRETE, CURBING, POLES AND FOUNDATIONS, ISLANDS, TREE BERMS AND OTHER FEATURES WITHIN THE LIMITS OF CONSTRUCTION AS REQUIRED TO ACCOMMODATE NEW CONSTRUCTION WHETHER SPECIFIED ON THE DRAWINGS OR NOT.

BWSC & CONTRACTOR NOTES:

1. THE ESTIMATED SANITARY SEWAGE DISCHARGE IS 780 GALLONS PER DAY (GPD). THIS ESTIMATE IS BASED ON 310 C.M.R. 15.000 THE STATE ENVIRONMENTAL CODE, TITLE 5: STANDARD REQUIREMENTS FOR THE SITING, CONSTRUCTION, INSPECTION, UPGRADE AND EXPANSION OF ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS AND FOR THE TRANSPORT AND DISPOSAL OF SEPTAGE.
2. THE ESTIMATED DAILY WATER USE IS 858 GPD BASED ON THE ESTIMATED SANITARY SEWAGE DISCHARGE WITH A 10% PEAKING FACTOR. THE PEAK DOMESTIC FLOW BASED ON FIXTURE COUNTS IS APPROXIMATELY XX GPM [FROM MEP].
3. TWO XXXX" COMPOUND WATER METERS WILL BE EITHER NEPTUNE OR ELSTER AMCO COMPOUND TYPE METERS. THE METERS MUST BE PURCHASED BY THE CONTRACTOR. A METER TRANSMITTER UNIT (MTU) SHALL BE SUPPLIED BY THE COMMISSION AT THE OWNER'S EXPENSE. A FEE OF $325/MTU WILL BE PAID TO THE COMMISSION AT THE TIME OF FILING THE GENERAL SERVICE APPLICATION.
4. BACKWATER VALVES SHALL BE PROVIDED BY THE PLUMBER AT ALL GRAVITY SANITARY SEWER AND STORM DRAIN CONNECTIONS FOR ANY FIXTURE LOCATED AT AN ELEVATION BELOW THE TOP OF THE SEWER OR DRAIN MANHOLE.
5. THE CONTRACTOR SHALL NOTIFY THE BWSC CROSS-CONNECTION DEPARTMENT AT 617-989-7283 ONCE BACKWATER VALVES ARE INSTALLED FOR BWSC INSPECTION.
6. DYE TESTING SHALL BE PERFORMED ON NEW STORM DRAIN AND SANITARY SEWER CONNECTIONS AFTER INSTALLATION IS COMPLETE. DYE TESTS SHALL BE WITNESSED BY THE BWSC.
7. A PREREQUISITE FOR FILING A GENERAL SERVICE APPLICATION WITH THE BWSC FOR NEW CONSTRUCTION IS THE ROUGH CONSTRUCTION SIGN-OFF DOCUMENT FROM THE CITY OF BOSTON'S INSPECTIONAL SERVICES DEPARTMENT.
8. AN AS-BUILT PLAN (AUTOCAD 2016 OR EARLIER RELEASE) SHALL BE PROVIDED BY THE CONTRACTOR AND ENDORSED BY A CIVIL ENGINEER OR PROFESSIONAL LAND SURVEYOR SHOWING THE LOCATION, DEPTH, AND INVERT OF EVERY BEND, FITTING, VALVE, CLEANOUT AND ANCHOR. THE AS-BUILT DRAWING SHALL BE SUBMITTED TO THE BOSTON AND WATER SEWER COMMISSION FOR REVIEW AND APPROVAL.
9. WATER SHUT DOWN SHALL BE COORDINATED WITH BWSC WATER OPERATIONS, (617) 989-7276, 24 HOURS NOTICE REQUIRED.
10. PROVIDE "DON'T DUMP" PLAQUES AT ALL CATCH BASIN AND DRAIN INLET LOCATIONS. "DON'T DUMP" PLAQUES TO BE PURCHASED FROM BWSC.
11. THE CONTRACTOR SHALL PURCHASE THE NEW HYDRANT(S) FROM THE BWSC. THE CONTRACTOR SHALL PURCHASE THE HYDRANT(S) FROM THE COMMISSION WHEN FILING THE GENERAL SERVICE APPLICATION.
12. EXISTING WATER METER(S) TO BE REMOVED OR REPLACED SHALL BE RETURNED TO BWSC.
13. THE CONTRACTOR SHALL VIDEO INSPECT THE EXISTING 24"/36"/48" BWSC DRAIN MAIN IN MASSPORT HAUL ROAD PRIOR TO CONSTRUCTION AND AFTER CONSTRUCTION IS COMPLETE AND SUBMIT TO BWSC AND NITSCH ENGINEERING FOR REVIEW. THE INSPECTION SOFTWARE SHALL BE CAPABLE OF EXPORTING DIGITAL INSPECTION LOG DATA INTO AN MSACCESS DATABASE IN THE PIPELINE ASSESSMENT AND CERTIFICATION PROGRAM (PACP) STANDARD EXCHANGE FORMAT. THE INSPECTION SOFTWARE CODING SYSTEM SHALL BE PACP CERTIFIED (LATEST EDITION) AS PER THE NATIONAL ASSOCIATION OF SEWER SERVICE COMPANIES (NASSCO). THE SOFTWARE SHALL BE EQUIPPED WITH ALL MODULES NECESSARY FOR PACP INSPECTIONS AND SCORING. THE CONTRACTOR SHALL COORDINATE DIRECTLY WITH BWSC TO DETERMINE AN APPROVED VIDEO INSPECTION COMPANY AND DELIVERABLE.

EROSION AND SEDIMENT CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS" PREPARED BY DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF RESOURCE PROTECTION, AND THE CURRENT NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES.
2. MEANS OF EROSION AND SEDIMENT PROTECTION AS NOTED ON THE DRAWINGS INDICATE MINIMUM RECOMMENDED PROVISIONS. THE CONTRACTOR IS RESPONSIBLE FOR FINAL SELECTION AND PLACEMENT OF EROSION AND SEDIMENTATION CONTROLS BASED ON ACTUAL SITE CONDITIONS AND CONSTRUCTION CONDITIONS. ADDITIONAL MEANS OF PROTECTION SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED FOR CONTINUED OR UNFORESEEN EROSION PROBLEMS, OR AS DIRECTED BY CONTROLLING MUNICIPAL AUTHORITIES, AT NO ADDITIONAL EXPENSE TO THE OWNER.
3. AN EROSION CONTROL BARRIER SHALL BE INSTALLED ALONG THE EDGE OF PROPOSED DEVELOPMENT AS INDICATED IN THE PLAN PRIOR TO COMMENCEMENT OF DEMOLITION OR CONSTRUCTION OPERATIONS.
4. SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF AND DURING ALL PHASES OF CONSTRUCTION AND BE CONSTRUCTED PRIOR TO AND IMMEDIATELY AFTER ANY GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL ON THE SITE.
5. AFTER ANY SIGNIFICANT RAINFALL (GREATER THAN 0.25 INCHES OF RAINFALL WITHIN 24 HOURS), SEDIMENT CONTROL STRUCTURES SHALL BE INSPECTED FOR INTEGRITY. ANY DAMAGE SHALL BE CORRECTED IMMEDIATELY.
6. PERIODIC INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL STRUCTURES SHALL BE PROVIDED TO ENSURE THAT THE INTENDED PURPOSE IS ACCOMPLISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SEDIMENT LEAVING THE LIMIT OF WORK. SEDIMENT CONTROL MEASURES SHALL BE IN WORKING CONDITION AT THE END OF EACH WORKING DAY.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING SEDIMENT FROM ENTERING ANY STORM DRAINAGE SYSTEM AND FROM BEING CONVEYED TO ANY WETLAND RESOURCE AREA, PUBLIC WAYS, ABUTTING PROPERTY, OR OUTSIDE OF THE PROJECT LIMITS.
8. THE CONTRACTOR SHALL PROTECT ALL DRAINAGE SWALES AND GROUND SURFACES WITHIN THE LIMIT OF WORK FROM EROSIVE CONDITIONS. STRAW BALE, CRUSHED STONE OR EQUIVALENT CHECK DAMS ARE TO BE PROVIDED AT A MAXIMUM OF TWO HUNDRED (200) FOOT SPACING, OR LESS AS SITE-SPECIFIC CONDITIONS WARRANT, WITHIN ALL DRAINAGE SWALES AND DITCHES AND AT UPSTREAM SIDES OF ALL DRAINAGE INLETS.
9. ALL STOCK PILES SHALL BE PROTECTED AND LOCATED A MINIMUM OF 100' FROM EXISTING WETLAND RESOURCE AREAS & WITHIN THE LIMIT OF WORK.
10. ANY SEDIMENT TRACKED ONTO PAVED AREAS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.
11. ALL SEDIMENT RETAINED BY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE LEGALLY DISPOSED OF OFFSITE.
12. TEMPORARY DIVERSION DITCHES, PERMANENT DITCHES, CHANNELS, EMBANKMENTS, AND ANY DENUDED SURFACE THAT WILL BE EXPOSED FOR A PERIOD OF 14 CALENDAR DAYS OR MORE SHALL BE CONSIDERED CRITICAL VEGETATION AREAS. THESE AREAS SHALL BE STABILIZED/PROTECTED WITH APPROPRIATE EROSION CONTROL MATTING OR OTHER EROSION CONTROL METHODS.
13. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS DIRECTED BY THE PERMITTING AUTHORITY OR OWNER.
14. THE CONTRACTOR SHALL USE TEMPORARY SEEDING, MULCHING, OR OTHER APPROVED STABILIZATION MEASURES TO PROTECT EXPOSED AREAS DURING PROLONGED CONSTRUCTION OR OTHER LAND DISTURBANCE. STOCKPILES THAT WILL BE EXPOSED FOR LONGER THAN 14 DAYS SHALL BE STABILIZED.
15. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL EROSION AND SEDIMENT CONTROLS AT THE COMPLETION OF SITE CONSTRUCTION, BUT ONLY WHEN DIRECTED BY THE CITY OF BOSTON CONSERVATION AGENT. STABILIZE OR SEED BARE AREAS LEFT AFTER EROSION CONTROL REMOVAL.

EARTH MOVING AND GRADING NOTES:

1. ALL TOPSOIL ENCOUNTERED WITHIN THE WORK AREA SHALL BE STRIPPED TO ITS FULL DEPTH AND STOCKPILED FOR REUSE. EXCESS TOPSOIL SHALL BE REMOVED FROM THE SITE UNLESS OTHERWISE DIRECTED BY THE OWNER. TOPSOIL PILES SHALL REMAIN SEGREGATED FROM EXCAVATED SUBSURFACE SOIL MATERIALS.
2. GRADES WITHIN HANDICAP PARKING SPACES AND ACCESS AISLES SHALL NOT EXCEED 1.5% IN ANY DIRECTION.
3. CROSS SLOPES OF ALL PEDESTRIAN WALKS SHALL NOT EXCEED 1.5%.
4. RUNNING SLOPE OF ALL PEDESTRIAN WALKS SHALL NOT EXCEED 4.5%, UNLESS OTHERWISE NOTED.
5. THE CONTRACTOR SHALL EXERCISE CAUTION IN ALL EXCAVATION ACTIVITY DUE TO POSSIBLE EXISTENCE OF UNRECORDED UTILITY LINES.
6. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MINIMUM OF 1% UNLESS OTHERWISE NOTED.
7. PROVIDE POSITIVE DRAINAGE AWAY FROM FACE OF BUILDINGS AT ALL LOCATIONS.
8. PITCH EVENLY BETWEEN CONTOUR LINES AND BETWEEN SPOT GRADES. SPOT GRADE ELEVATIONS TAKE PRECEDENCE OVER CONTOUR LINES.
9. ALL PROPOSED TOP OF CURB ELEVATIONS ARE SIX INCHES (6") ABOVE BOTTOM OF CURB ELEVATIONS UNLESS OTHERWISE NOTED. ALL PROPOSED TOP OF CAPE COD BERM ELEVATIONS ARE FOUR INCHES (4") ABOVE BOTTOM OF CURB ELEVATION UNLESS OTHERWISE NOTED.
10. THE CONTRACTOR SHALL BLEND NEW GRADING SMOOTHLY INTO EXISTING GRADING AT LIMITS OF GRADING.
11. WHERE NEW PAVING MEETS EXISTING PAVING, MEET LINE AND GRADE OF EXISTING PAVING WITH SMOOTH TRANSITION BETWEEN EXISTING AND NEW SURFACES.
12. THE CONTRACTOR SHALL VERIFY EXISTING GRADES IN THE FIELD AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
13. PITCH TOPS OF ALL WALLS AT ONE-EIGHTH INCH (1/8") PER FOOT FROM BACK OF WALL TO FACE OF WALL.
14. SURPLUS MATERIALS SHALL BE REMOVED FROM THE SITE UNLESS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE. REFER TO EARTHWORK SPECIFICATIONS.
15. ANY AREAS OUTSIDE OF THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED BY THE CONTRACTOR TO THE PRE-CONSTRUCTION CONDITION/GRADE AT NO COST TO THE OWNER.
16. EXCAVATION REQUIRED WITHIN PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO OWNER.

GENERAL NOTES:

1. TOPOGRAPHIC DATA, PROPERTY LINE INFORMATION, AND EXISTING SITE FEATURES WERE OBTAINED FROM A PLAN ENTITLED "ALTA/NSPS LAND TITLE SURVEY PARCEL H-#30 TRILLING WAY BOSTON, MASS.", PREPARED BY FELDMAN LAND SURVEYORS, DRAFT DATED 04-22-2021.
2. FLOODPLAIN INFORMATION WAS OBTAINED FROM THE FLOOD INSURANCE RATE MAP (FIRM) NO. 25025C0081J. THE SITE IS IN ZONES AE AND X.
3. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82, SECTION 40, AS AMENDED, WHICH STATES THAT NO ONE MAY EXCAVATE IN THE COMMONWEALTH OF MASSACHUSETTS EXCEPT IN AN EMERGENCY WITHOUT 72 HOURS NOTICE, EXCLUSIVE OF SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS, TO NATURAL GAS PIPELINE COMPANIES, AND MUNICIPAL UTILITY DEPARTMENTS THAT SUPPLY GAS, ELECTRICITY, TELEPHONE, OR CABLE TELEVISION SERVICE IN OR TO THE CITY OR TOWN WHERE THE EXCAVATION IS TO BE MADE. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1-888-DIG-SAFE.
4. THE CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82A, ALSO REFERRED TO AS JACKIE'S LAW, AS DETAILED IN SECTION 520 CMR 14.00 OF THE CODE OF MASSACHUSETTS REGULATIONS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS AND SAFETY CODES IN THE CONSTRUCTION OF ALL IMPROVEMENTS.
6. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRESENCE AND LOCATIONS OF ALL UTILITIES WITHIN THE LIMIT OF WORK MUST BE DETERMINED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND CONTACTING THE CONTROLLING AUTHORITIES AND/OR UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THEIR LINES. THE CONTRACTOR SHALL KEEP A RECORD OF ANY DISCREPANCIES OR CHANGES IN THE LOCATIONS OF ANY UTILITIES SHOWN OR ENCOUNTERED DURING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER AND NITSCH ENGINEERING. ANY DAMAGE RESULTING FROM THE FAILURE OF THE CONTRACTOR TO MAKE THESE DETERMINATIONS AND CONTACTS SHALL BE BORNE BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL, THROUGHOUT CONSTRUCTION, TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, GRADING, SIDEWALKS AND SITE DETAILS OUTSIDE OF THE LIMIT OF WORK AS DEFINED ON THE DRAWINGS AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AS DIRECTED BY THE ENGINEER OR OWNER'S DESIGNATED REPRESENTATIVE ANY SUCH OR OTHER DAMAGE SO CAUSED.
8. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
9. PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE SITE AND CONSTRUCTION DOCUMENTS TO DEVELOP A THOROUGH UNDERSTANDING OF THE PROJECT, INCLUDING ANY SPECIAL CONDITIONS AND CONSTRAINTS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PROJECT SITE AND TO VERIFY ALL CONDITIONS IN THE FIELD AND REPORT DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER OR OWNER'S REPRESENTATION IMMEDIATELY.
11. THE CONTRACTOR SHALL CONDUCT ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ESTABLISHMENT AND USE OF ALL VERTICAL AND HORIZONTAL CONSTRUCTION CONTROLS.
13. ELEVATIONS REFER TO BOSTON CITY BASE(BCB).
14. THE CONTRACTOR SHALL COMPLY WITH THE ORDER OF CONDITIONS DATED XXXX XX, XXXX AND ISSUED BY THE XXXX CONSERVATION COMMISSION (DEP #XXX-XXX).
15. FOR SOIL INFORMATION REFER TO GEOTECHNICAL REPORT.

UTILITY NOTES:

1. ALL UTILITY CONNECTIONS ARE SUBJECT TO THE APPROVAL OF, AND GRANTING OF PERMITS BY, THE LOCAL MUNICIPALITY. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL PERMITS AND APPROVALS RELATED TO UTILITY WORK PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR OBTAINING ALL PERMISSIONS FOR, AND FOR CONDUCTING ALL PREPARATIONS RELATED TO, WORK AFFECTING ANY UTILITIES WITHIN THE JURISDICTION OF ANY NON-MUNICIPAL UTILITY COMPANY, INCLUDING BUT NOT LIMITED TO ELECTRIC, TELEPHONE, AND/OR GAS. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES, DEPARTMENTS, AND UTILITY COMPANIES, IN WRITING, AT LEAST 7 DAYS (OR PER UTILITY COMPANY REQUIREMENT) AND NOT MORE THAN 30 DAYS PRIOR TO ANY CONSTRUCTION.
3. THE CONTRACTOR SHALL MAINTAIN UTILITIES SERVICING BUILDINGS AND FACILITIES WITHIN OR OUTSIDE THE PROJECT LIMIT UNLESS THE INTERRUPTION OF SERVICE IS COORDINATED WITH THE OWNER.
4. ALL WATER, SEWER, AND DRAIN WORK SHALL BE PERFORMED ACCORDING TO THE REQUIREMENTS AND STANDARD SPECIFICATIONS OF THE LOCAL MUNICIPALITY.
5. GAS, TELECOMMUNICATIONS AND ELECTRIC SERVICES ARE TO BE DESIGNED BY EACH UTILITY COMPANY IN COORDINATION WITH THE MECHANICAL, ELECTRIC, AND PLUMBING CONSULTANTS.
6. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES OF NEW UTILITIES WITH GAS, TELECOMMUNICATION AND ELECTRICAL SERVICES.
7. INSTALL WATER LINES WITH A MINIMUM OF FIVE FEET OF COVER AND A MAXIMUM OF SEVEN FEET COVER FROM THE FINAL DESIGN GRADES.
8. MAINTAIN 10 FEET HORIZONTAL SEPARATION AND 18 INCHES VERTICAL SEPARATION (WATER OVER SEWER) BETWEEN SEWER AND WATER LINES. WHEREVER THERE IS LESS THAN 10 FEET OF HORIZONTAL SEPARATION AND 18 INCHES OF VERTICAL SEPARATION BETWEEN A PROPOSED OR EXISTING SEWER LINE TO REMAIN AND A PROPOSED OR EXISTING WATER LINE TO REMAIN BOTH WATER MAIN AND SEWER MAIN SHALL BE CONSTRUCTED OF MECHANICAL JOINT CEMENT LINED DUCTILE IRON PIPE FOR A DISTANCE OF 10-FEET ON EITHER SIDE OF THE CROSSING. ONE (1) FULL LENGTH OF WATER PIPE SHALL BE CENTERED OVER THE SEWER AT THE CROSSING.
9. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES EXCEPT THOSE NOTED TO BE ABANDONED AND/OR REMOVED & DISPOSED.
10. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR TRENCHING, BACKFILLING, AND SURFACE RESTORATION FOR GAS UTILITY SYSTEMS.
11. ALL ONSITE UTILITIES SHALL BE INSTALLED UNDERGROUND UNLESS OTHERWISE NOTED.
12. ALL EXISTING AND PROPOSED MANHOLE FRAMES, COVERS, VALVES, CLEANOUTS, CASTINGS, ETC. SHALL BE RAISED TO FINISHED GRADE PRIOR TO FINAL GRADING AND PAVING CONSTRUCTION.
13. ALL GRATES IN WALKWAYS SHALL BE ADA COMPLIANT.

PROPOSED LEGEND

- LIMIT OF WORK
- EXISTING UTILITY TO BE ABANDONED, REMOVED AND DISPOSED IF IN CONFLICT WITH NEW SITE IMPROVEMENTS, OR AS INDICATED ON DRAWINGS
- EROSION CONTROL BARRIER
- CONSTRUCTION FENCE
- W — DOMESTIC WATER PIPE
- FP — FIRE PROTECTION PIPE
- S — SANITARY SEWER PIPE
- D — STORM DRAIN PIPE
- G — GAS PIPE
- E — ELECTRIC DUCTBANK
- T/C — TELECOM DUCTBANK
- INLET PROTECTION
- ELEVATION CONTOURS
- MATCH LINE
- CENTERLINE
- CO — CLEANOUT
- AREA DRAIN
- ACCESS BASIN
- DRAIN MANHOLE
- WATER QUALITY STRUCTURE
- CATCH BASIN
- WATER QUALITY INLET
- SEWER MANHOLE
- TMH — TELECOM MANHOLE
- EMH — ELECTRIC MANHOLE
- WV — WATER VALVE
- HYD — FIRE HYDRANT

ABBREVIATIONS

AB	ACCESS BASIN
AD	AREA DRAIN
BC	BOTTOM OF CURB ELEVATION
BW	BOTTOM OF WALL ELEVATION
CB	CATCH BASIN
CCB	CAPE COD BERM
CI	CAST IRON
CJ	CONTROL JOINT
CL	CENTER LINE
CO	CLEANOUT
COP	CENTER OF PIPE
CP	CARRIER PIPE
CPP	CORRUGATED POLYETHYLENE PIPE
DCB	DOUBLE CATCH BASIN
DI	DUCTILE IRON PIPE CEMENT LINED
DMH	DRAIN MANHOLE
EHH	ELECTRIC HANDHOLE
EJ	EXPANSION JOINT
EMH	ELECTRIC MANHOLE
FD	FOUNDATION DRAIN
FFE	FINISHED FLOOR ELEVATION
HP	HIGH POINT
HYD	FIRE HYDRANT
INV	INVERT ELEVATION
LF	LINEAR FEET
LOW	LIMIT OF WORK
LP	LOW POINT
LW	LAB WASTE
M&P	MAINTAIN AND PROTECT
NIC	NOT IN CONTRACT
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
PD	PERIMETER DRAIN
PERF	PERFORATED
PVC	POLYVINYL CHLORIDE PIPE
R&D	REMOVE AND DISPOSE
R&S	REMOVE AND STOCKPILE
RD	ROOF DRAIN
RIM	RIM ELEVATION
SMH	SEWER MANHOLE
SS	SEWER SERVICE
TC	TOP OF CURB ELEVATION
TW	TOP OF WALL ELEVATION
THH	TELECOM HANDHOLE
TMH	TELECOM MANHOLE
TOP	TOP OF PIPE
TOD	TOP OF DUCT BANK
TYP	TYPICAL
UD	UNDERDRAIN
USD	UNDERSLAB DRAIN
VGC	VERTICAL GRANITE CURB
WQI	WATER QUALITY INLET
WQS	WATER QUALITY STRUCTURE
WV	WATER VALVE

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- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

CIVIL NOTES LEGEND AND ABBREVIATIONS

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

C1.00

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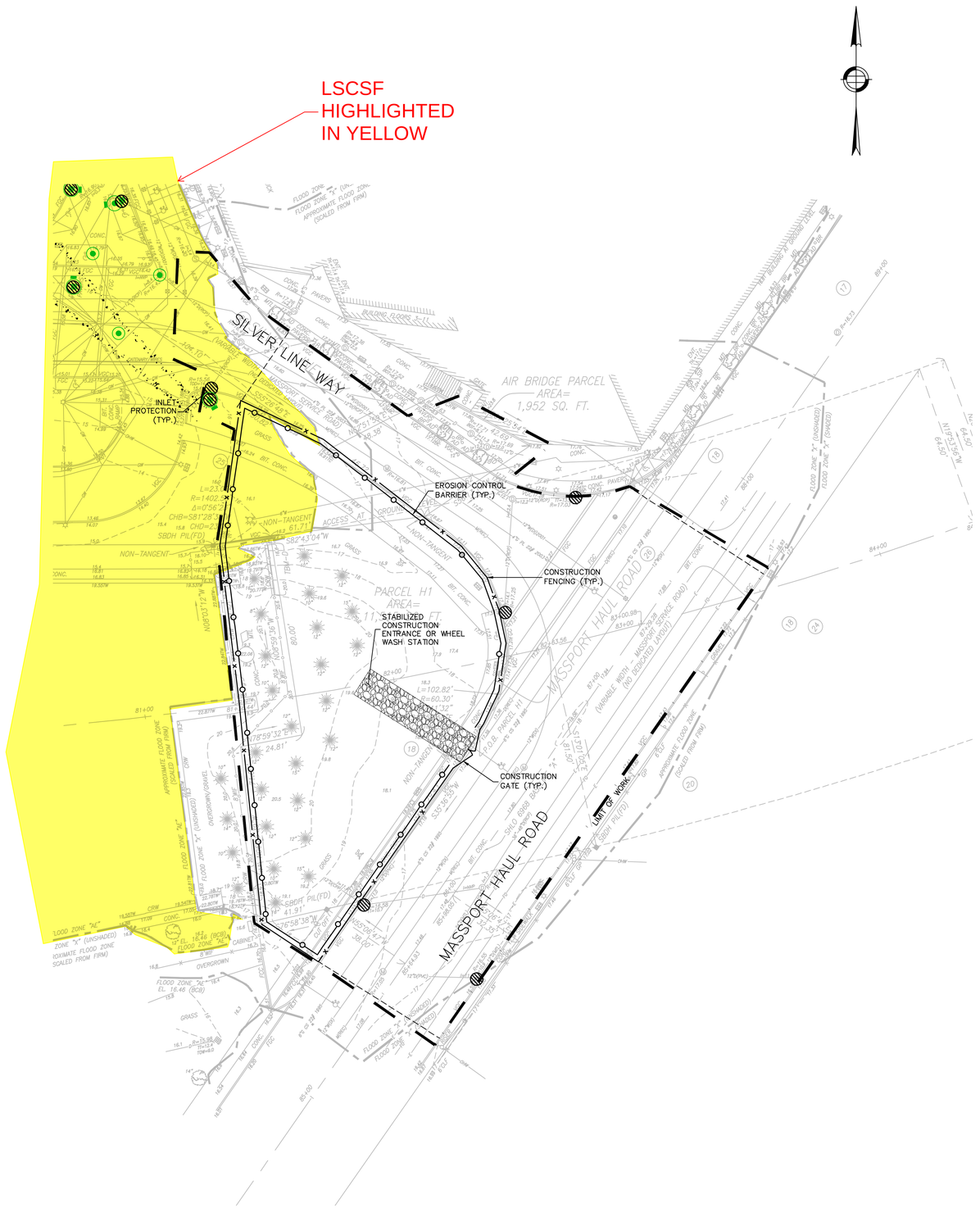

NOTE:
1. REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT.

SCALE:
1" = 20'
20 10 0 20 40

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects
460 Hillside Avenue, Suite J
Needham, Massachusetts 02494
781.858.3011

CONSULTANTS:

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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN MILEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

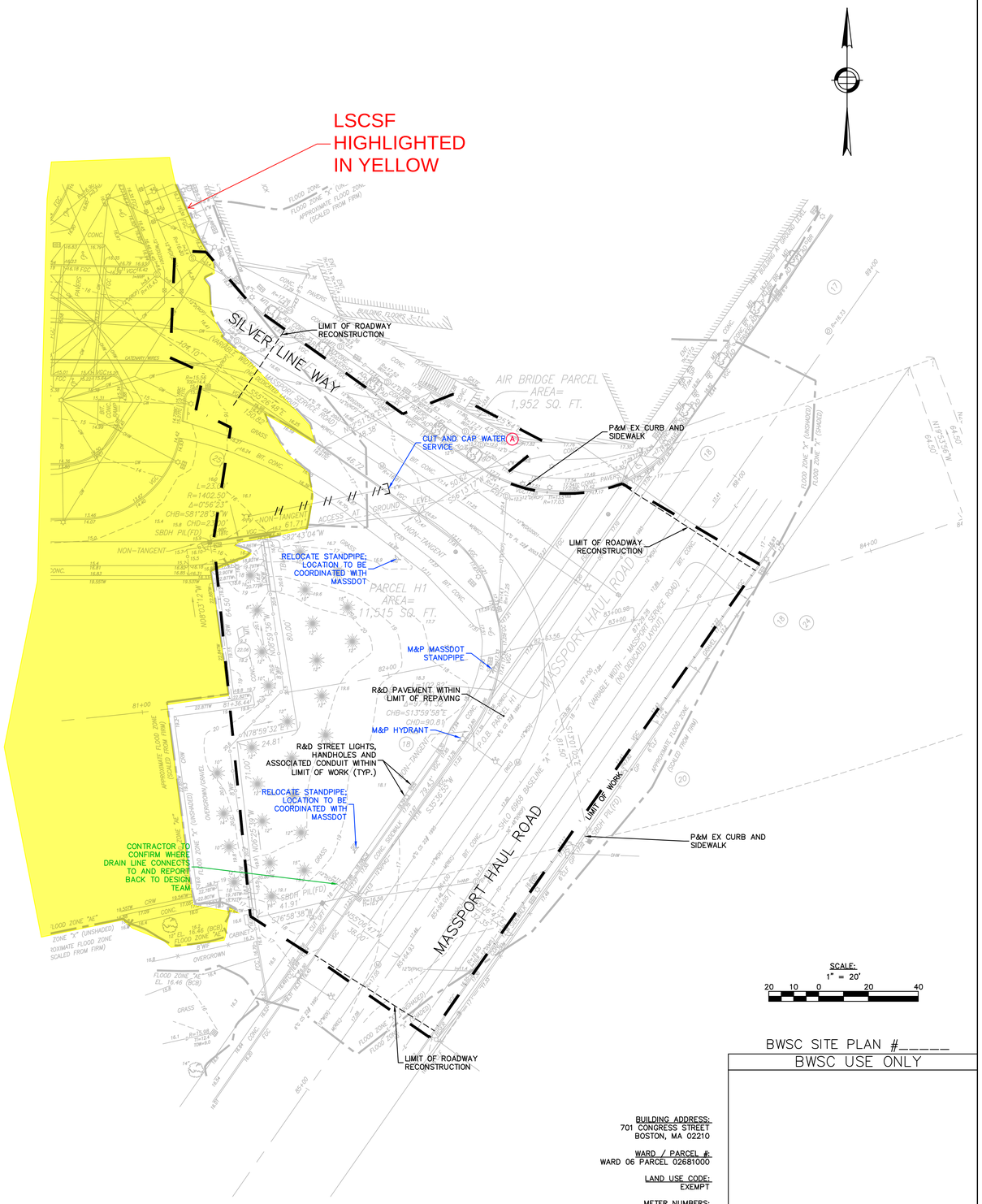
DRAWING TITLE:

EROSION AND SEDIMENTATION CONTROL PLAN

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

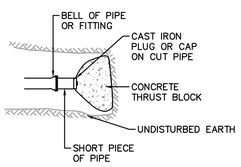
DRAWING NUMBER:

C2.00

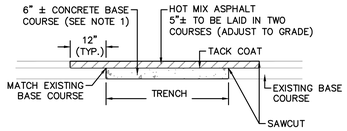


BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(A) – CUT AND CAP WATER SERVICE				



PLUG OR CAP DETAIL
NOT TO SCALE



NOTES:
1. PROPOSED CONCRETE BASE COURSE SHALL BE LEVEL WITH THE TOP OF THE EXISTING BASE COURSE

PAVEMENT RESTORATION OVER TRENCH DETAIL
NOT TO SCALE

NOTE:
1. REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT.

2. ALL UTILITIES NOT CALLED OUT TO BE DEMOLISHED SHALL BE PROTECTED AND MAINTAINED.

3. CONTRACTOR TO CONFIRM ACTIVE STATUS OF ALL LINES PRIOR TO DEMOLITION.

4. ALL UTILITIES WITHIN THE FOOTPRINT OF THE PROPOSED BUILDING SHALL BE DEMOLISHED OR REROUTED DEPENDING ON ACTIVITY STATUS.

BUILDING ADDRESS:
701 CONGRESS STREET
BOSTON, MA 02210

WARD / PARCEL #:
WARD 06 PARCEL 02681000

LAND USE CODE:
EXEMPT

METER NUMBERS:
TO BE ASSIGNED

ACCOUNT NUMBERS:
TO BE ASSIGNED

OWNER CONTACT:
MARK F. CALLAHAN
DIRECTOR OF DEVELOPMENT
LINCOLN PROPERTY COMPANY
52 STATE STREET, 8TH FLOOR
BOSTON, MA 02109
OFFICE: 617-951-4112

BUILDING USE: COMMERCIAL

BWSC SITE PLAN #_____
BWSC USE ONLY

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CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
STUDIO ENÉE architects
460 Hillside Avenue, Suite J
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PROJECT INFORMATION
SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:
60% MBTA DESIGN SUBMISSION

STAMP:
NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

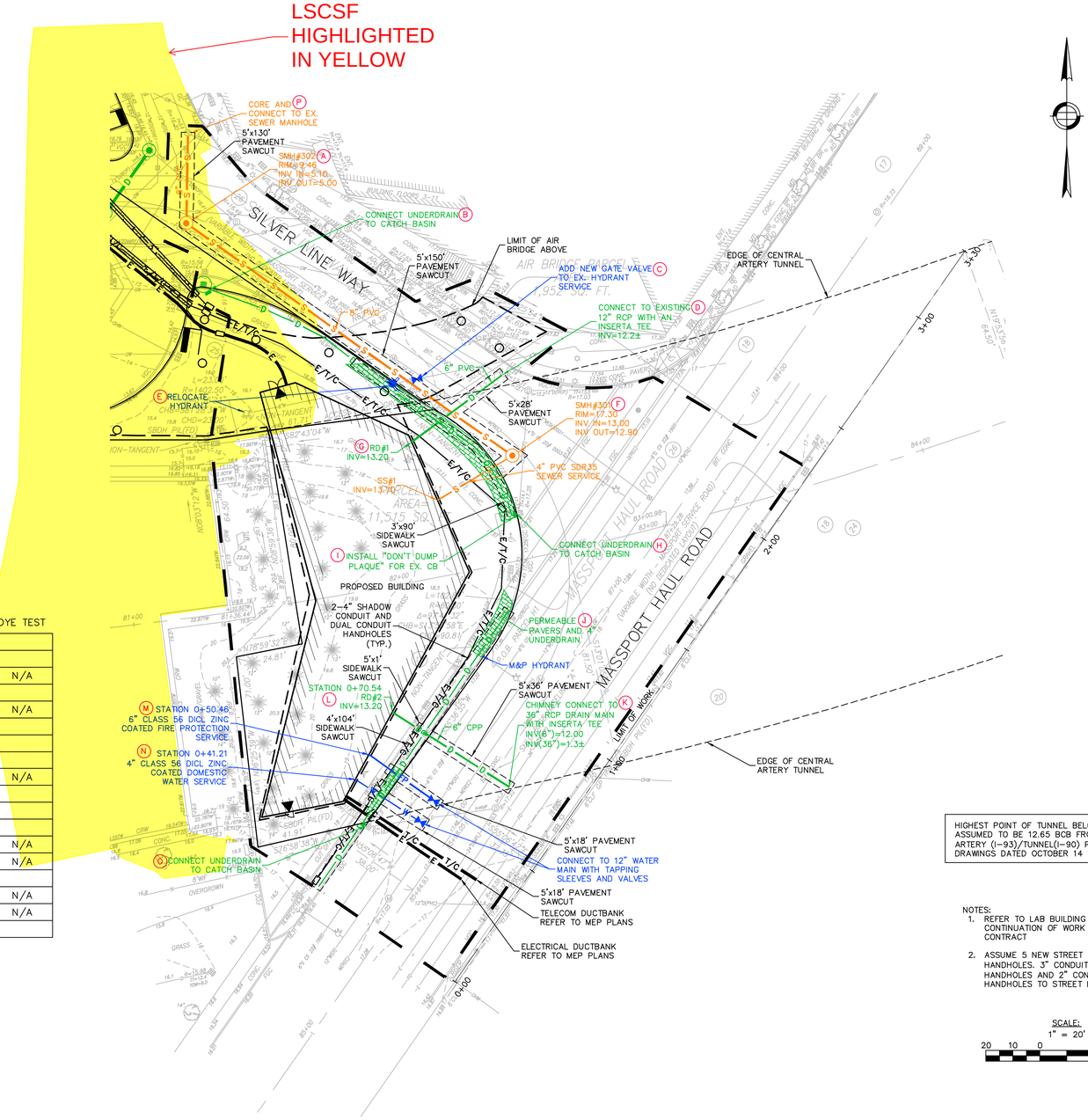
COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:
SITE CUT AND CAP PLAN

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:
C3.00



BWSC INSPECTION SIGNOFF

	INSPECTOR	DATE	COMMENT	DYE TEST
(A) – NEW SEWER MANHOLE 302				
(B) – NEW DRAIN CONNECTION				
(C) – NEW GATE VALVE				N/A
(D) – NEW DRAIN CONNECTION				
(E) – RELOCATE HYDRANT				N/A
(F) – NEW SEWER MANHOLE 301				
(G) – NEW ROOF DRAIN 1				
(H) – NEW DRAIN CONNECTION				
(I) – DON'T DUMP PLAQUE (2)				N/A
(J) – NEW 4" UNDERDRAIN				
(K) – NEW DRAIN CONNECTION				
(L) – NEW ROOF DRAIN 2				
(M) – NEW 6" FIRE PROTECTION SERVICE				N/A
(N) – NEW 4" DOMESTIC SERVICE				N/A
(O) – NEW DRAIN CONNECTION				
(P) – NEW SEWER CONNECTION				N/A
(Q) 4:1 I/I FEE				N/A
(R) AS-BUILT				

HIGHEST POINT OF TUNNEL BELOW PROJECT ASSUMED TO BE 12.65 BCB FROM CENTRAL ARTERY (I-93)/TUNNEL(I-90) PROJECT RECORD DRAWINGS DATED OCTOBER 14 1991

NOTES:
1. REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT
2. ASSUME 5 NEW STREET LIGHTS WITH 6 HANDHOLES, 3" CONDUIT BETWEEN HANDHOLES AND 2" CONDUIT FROM HANDHOLES TO STREET LIGHT

SCALE:
1" = 20'
20 10 0 20 40

BWSC SITE PLAN #_____
BWSC USE ONLY

OWNER:
MASSACHUSETTS PORT AUTHORITY
1 HARBORSIDE DRIVE, SUITE 200S
BOSTON, MA 02128

BUILDING ADDRESS:
701 CONGRESS STREET
BOSTON, MA 02210

WARD / PARCEL #:
WARD 06 PARCELS 02681000

LAND USE CODE:
EXEMPT

METER NUMBERS:
TO BE ASSIGNED

ACCOUNT NUMBERS:
TO BE ASSIGNED

CONTACT:

TEL.:

BUILDING USE: COMMERCIAL

CLIENT:
LINCOLN PROPERTY COMPANY

ARCHITECT:
STUDIO ENÉE architects
460 Hillside Avenue, Suite J
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PROJECT INFORMATION
SEAPORT CIRCLE PAVILION
MASSPORT PARCEL H

ISSUANCE:
60% MBTA DESIGN SUBMISSION

STAMP:
NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:
CIVIL UTILITY PLAN

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:
C4.00

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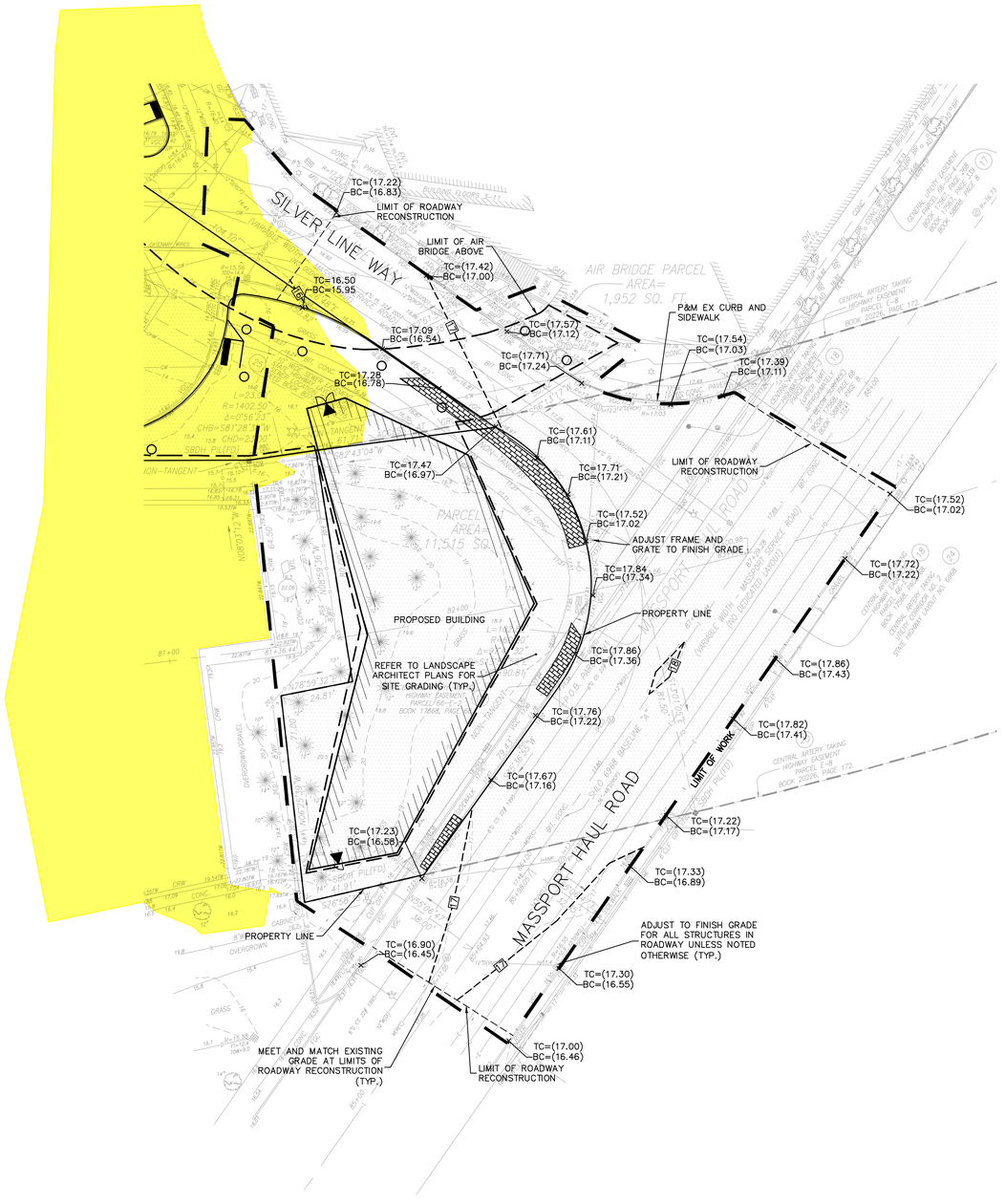

NOTES:
1. REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT
2. FFE AND SITE GRADING TO BE COORDINATED WITH LA AND ARCHITECT AT NEXT SUBMISSION

SCALE:
1" = 20'

20 10 0 20 40

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects

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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED
PROFESSIONAL ENGINEER

KEY PLAN

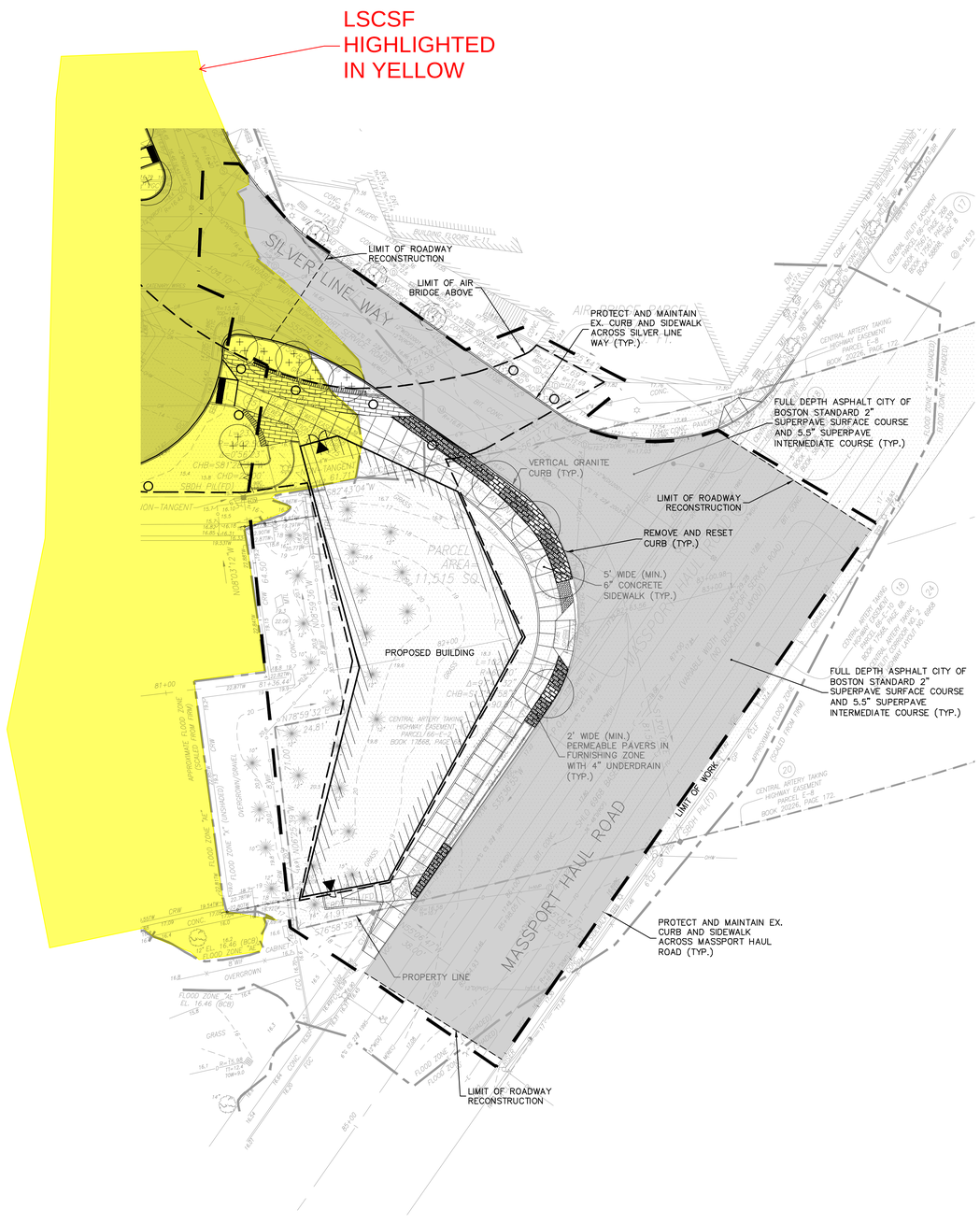
DRAWING TITLE:

CIVIL ROADWAY GRADING PLAN

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

C5.00



NOTE:
REFER TO LAB BUILDING PLANS FOR CONTINUATION OF WORK UNDER SEPARATE CONTRACT

SCALE:
1" = 20'
20 10 0 20 40

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects
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PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

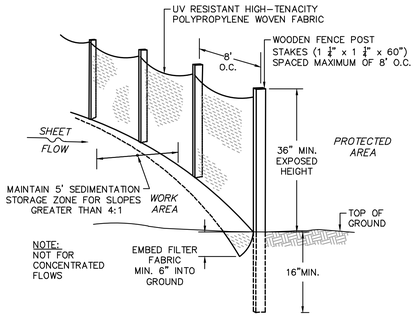
DRAWING TITLE:

LAYOUT AND MATERIALS PLAN

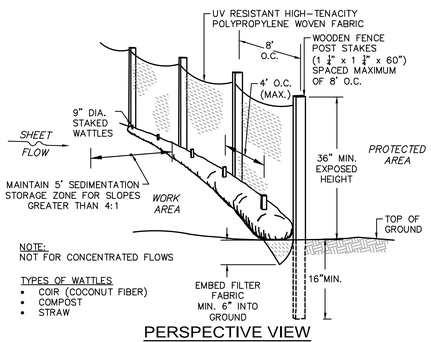
Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

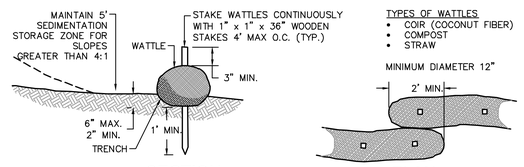
C6.00



PERSPECTIVE VIEW

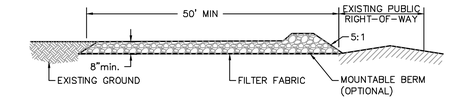


PERSPECTIVE VIEW

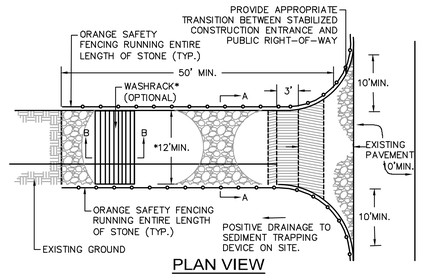


WATTLES - SLOPE PROTECTION FOR SLOPES LESS THAN 10:1

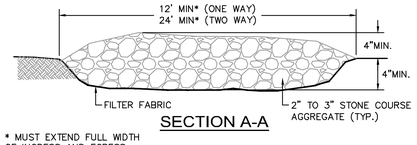
NOT TO SCALE



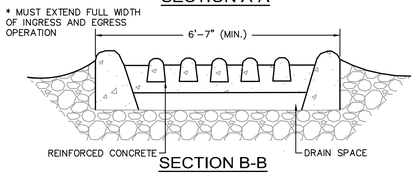
SIDE ELEVATION



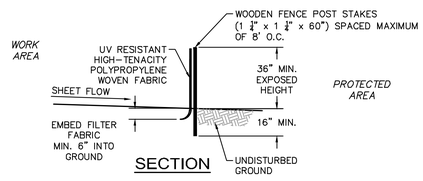
PLAN VIEW

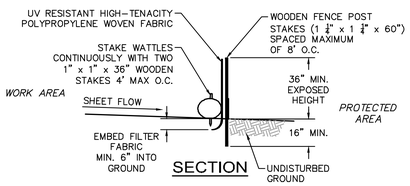


SECTION A-A



SECTION B-B

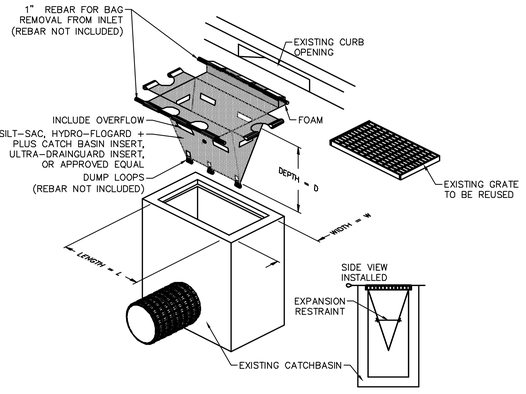




PERIMETER PROTECTION BARRIER
SILT FENCE DETAIL WITH WATTLES

NOT TO SCALE

PERIMETER PROTECTION BARRIER



THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS SHEET, OVERLAND OR CONCENTRATED FLOWS (NOT GREATER THAN 1 CFS). THE METHOD CAN DRAIN FLAT AREA TO STEEP SLOPES. INLET CAPACITY WILL BE DECREASED WITH THIS METHOD AND THE CONTRACTOR SHALL EXPECT PONDING DURING HIGH FLOW EVENTS.

INLET PROTECTION
CATCH BASIN W/ SILTATION SACK

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

LENGTH – GREATER THAN OR EQUAL TO 50 FEET

WIDTH – TWELVE FOOT MINIMUM (ONE WAY), TWENTY FOUR FOOT MINIMUM (TWO WAY), BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.

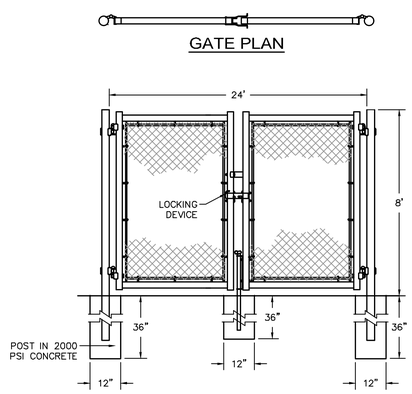
SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM SHALL BE PERMITTED.

THICKNESS – 8"

MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED.

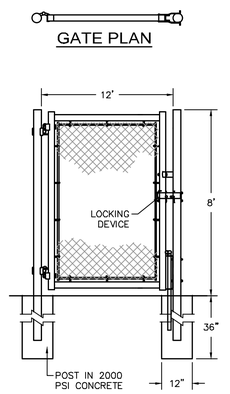
STABILIZED CONSTRUCTION ENTRANCE



DOUBLE GATE ELEVATION

24' WIDE DOUBLE GATE

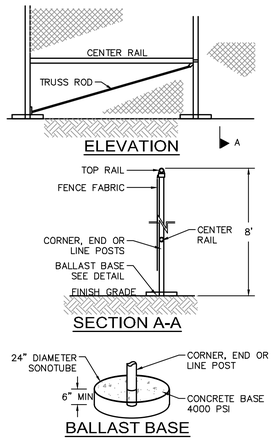
NOT TO SCALE



SINGLE GATE ELEVATION

12' WIDE EMERGENCY GATE

NOT TO SCALE



NOTES

1. END, GATE AND CORNER POSTS SHALL BE BRACED TO ADJACENT LINE POSTS. (MORE THAN 30° CHANGE IN DIRECTION CONSTITUTES A CORNER)
2. FABRIC SHALL BE 0.148" GAUGE MIN. WIRE, WOVEN INTO APPROXIMATELY 2" DIAMOND MESH.
3. ZINC-COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH PRIME WESTERN SPELTER OR EQUAL.
4. ALUMINUM COATED STEEL FABRIC BASE METAL SHALL BE COATED WITH ALUMINUM ALLOY.
5. LINE POSTS SHALL BE 2½" O.D. END OR CORNER POSTS SHALL BE 3" O.D.
6. THE CONTRACTOR IS RESPONSIBLE FOR SURFACE RESTORATION ONCE THE FENCE IS REMOVED.
7. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE TEMPORARY CONSTRUCTION FENCE AT THE CONCLUSION OF THE PROJECT.

TEMPORARY CONSTRUCTION
CHAIN LINK FENCE WITH BALLAST BASE

NOT TO SCALE

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

STUDIO ENÉE architects
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► Transportation Engineering
► Structural Engineering
► Green Infrastructure
► Planning
► GIS

PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55998
REGISTERED
PROFESSIONAL ENGINEER

KEY PLAN

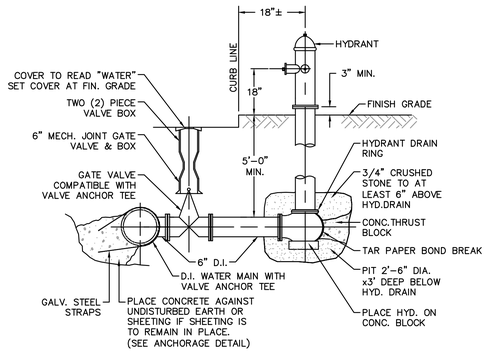
DRAWING TITLE:

CIVIL DETAILS

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

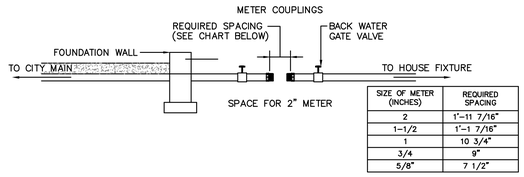
C7.00



NOTE: ALL JOINTS ON HYDRANT BRANCH TO BE RESTRAINED JOINTS

FIRE HYDRANT DETAIL

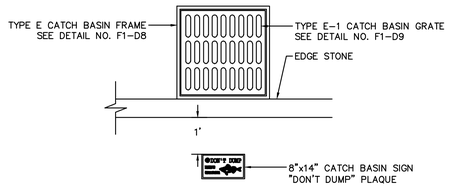
NOT TO SCALE



SIZE OF METER (INCHES)	REQUIRED SPACING
2	1'-11 7/16"
1-1/2	1'-1 7/16"
1	10 3/4"
3/4	9"
5/8"	7 1/2"

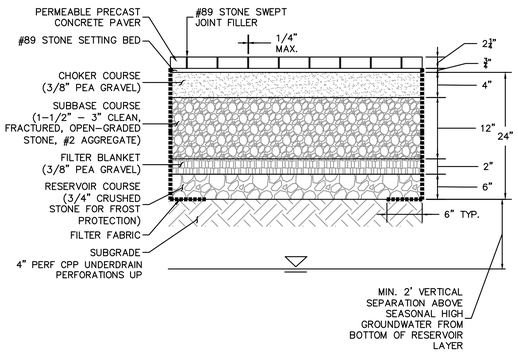
BWSC METER SPACING DETAIL

NOT TO SCALE



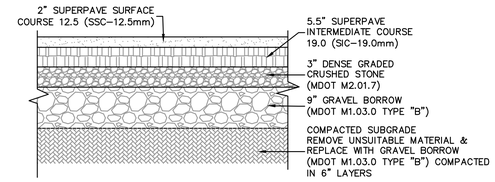
CATCH BASIN SIGN INSTALLATION

NOT TO SCALE



PERMEABLE PAVEMENT SYSTEM (TYP.)

NOT TO SCALE

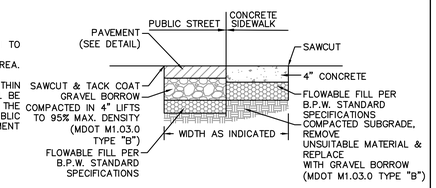


HOT MIX ASPHALT PAVING (TWO COURSES) DETAIL

NOT TO SCALE

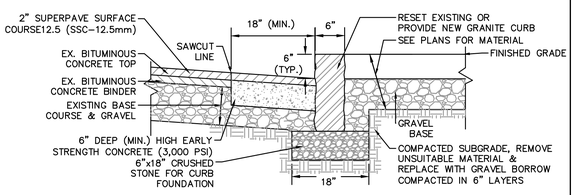
NOTES:

1. SURFACE FINISH TO MATCH SURROUNDING AREA.
2. PERMANENT RESTORATION WITHIN ROADWAY SHALL BE COMPLETED BY THE BOSTON PUBLIC WORKS DEPARTMENT



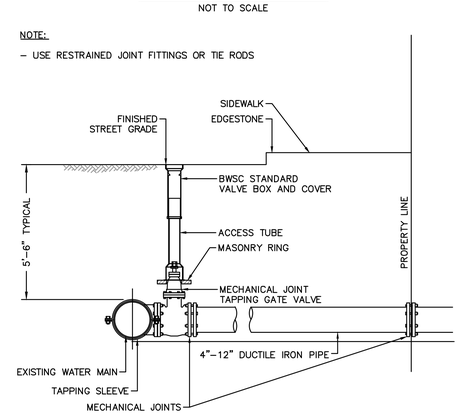
SURFACE RESTORATION WITHIN PUBLIC WAYS DETAIL

NOT TO SCALE



TYPICAL GRANITE CURB IN PUBLIC WAY SECTION DETAIL

NOT TO SCALE

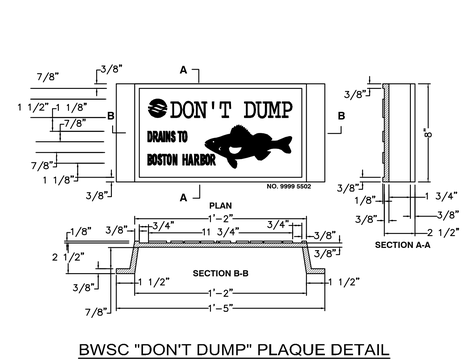


NOTE:

- USE RESTRAINED JOINT FITTINGS OR TIE RODS

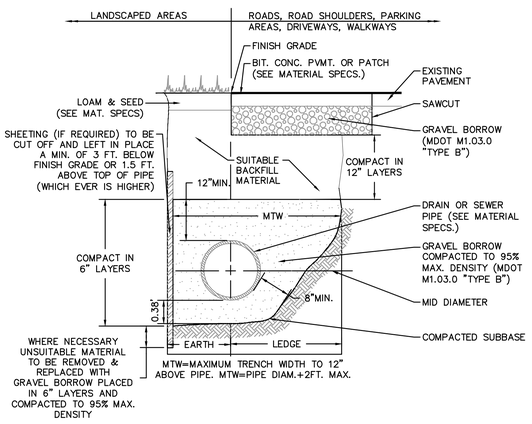
TYPICAL WATER PIPE CONNECTION WITH TAPPING SLEEVE AND GATE VALVE

NOT TO SCALE



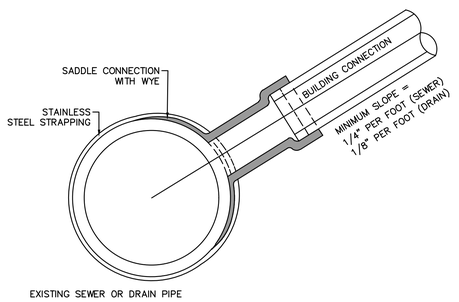
BWSC "DON'T DUMP" PLAQUE DETAIL

NOT TO SCALE



STANDARD TRENCH DETAIL FOR UTILITY PIPE

NOT TO SCALE

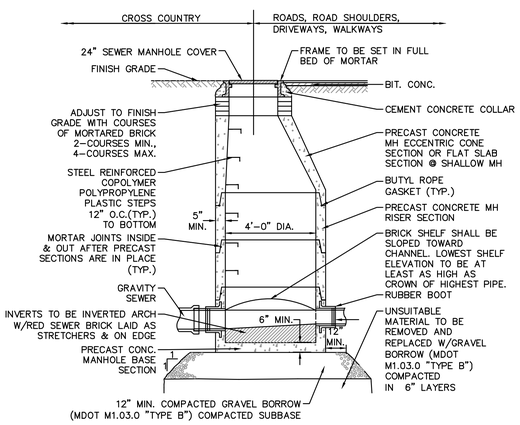


NOTES:

1. FULL PVC OR IRON SADDLE MAY BE USED TO CONNECT TO EXISTING PVC, CLAY, CONCRETE OR IRON PIPE.
2. SADDLES MUST HAVE RUBBER GASKETS AND SHALL BE TIGHTENED WITH STRAPS. SADDLES WILL NOT BE CEMENTED ONTO THE PIPE.
3. FULL WYE CONNECTION FITTINGS MAY BE USED.
4. PIPE SHALL BE CUT TO CONFORM TO THE OPENING IN THE SADDLE.
5. CONNECTIONS DIRECTLY INTO THE EXISTING PIPE WITHOUT A SADDLE OR A FULL WYE FITTING ARE NOT ALLOWED.

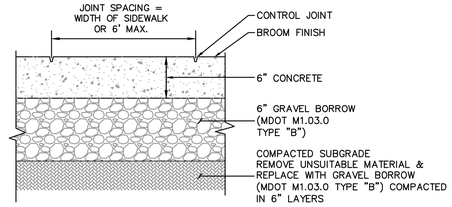
TYPICAL SADDLE CONNECTION DETAIL TO EXISTING DRAIN OR SEWER (6" TO 15")

NOT TO SCALE



TYPICAL SEWER MANHOLE DETAIL

NOT TO SCALE



NOTES:

1. SURFACE FINISH TO MATCH SURROUNDING AREA.
2. REFER TO CITY OF BOSTON PUBLIC WORKS DEPARTMENT RULES AND SPECIFICATIONS FOR EXCAVATION ACTIVITY WITHIN THE CITY OF BOSTON FOR MATERIALS AND INSTALLATION REQUIREMENTS.
3. CONCRETE SIDEWALK WITH MEDIUM BROOM FINISH. DIRECTION OF FINISH TO BE PERPENDICULAR TO THE LONGITUDINAL DIRECTION OF PAVEMENT. CONTROL JOINTS SHALL BE PLACED AT 6' O.C., EXPANSION JOINTS 30' O.C.
4. CONTROL JOINTS SHOULD BE SAW CUT.

CONCRETE SIDEWALK DETAIL

NOT TO SCALE

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CLIENT:

LINCOLN PROPERTY COMPANY

ARCHITECT:

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- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

PROJECT INFORMATION

SEAPORT CIRCLE PAVILION

MASSPORT PARCEL H

ISSUANCE:

60% MBTA DESIGN SUBMISSION

STAMP:

NOT FOR CONSTRUCTION

REVISIONS:

No.	Item	Date

PROJECT NORTH

10/19/2022
NITSCH#13511.1

COMMONWEALTH OF MASSACHUSETTS
COLEMAN McLEAN HORSLEY
CIVIL
NO. 55996
REGISTERED
PROFESSIONAL ENGINEER

KEY PLAN

DRAWING TITLE:

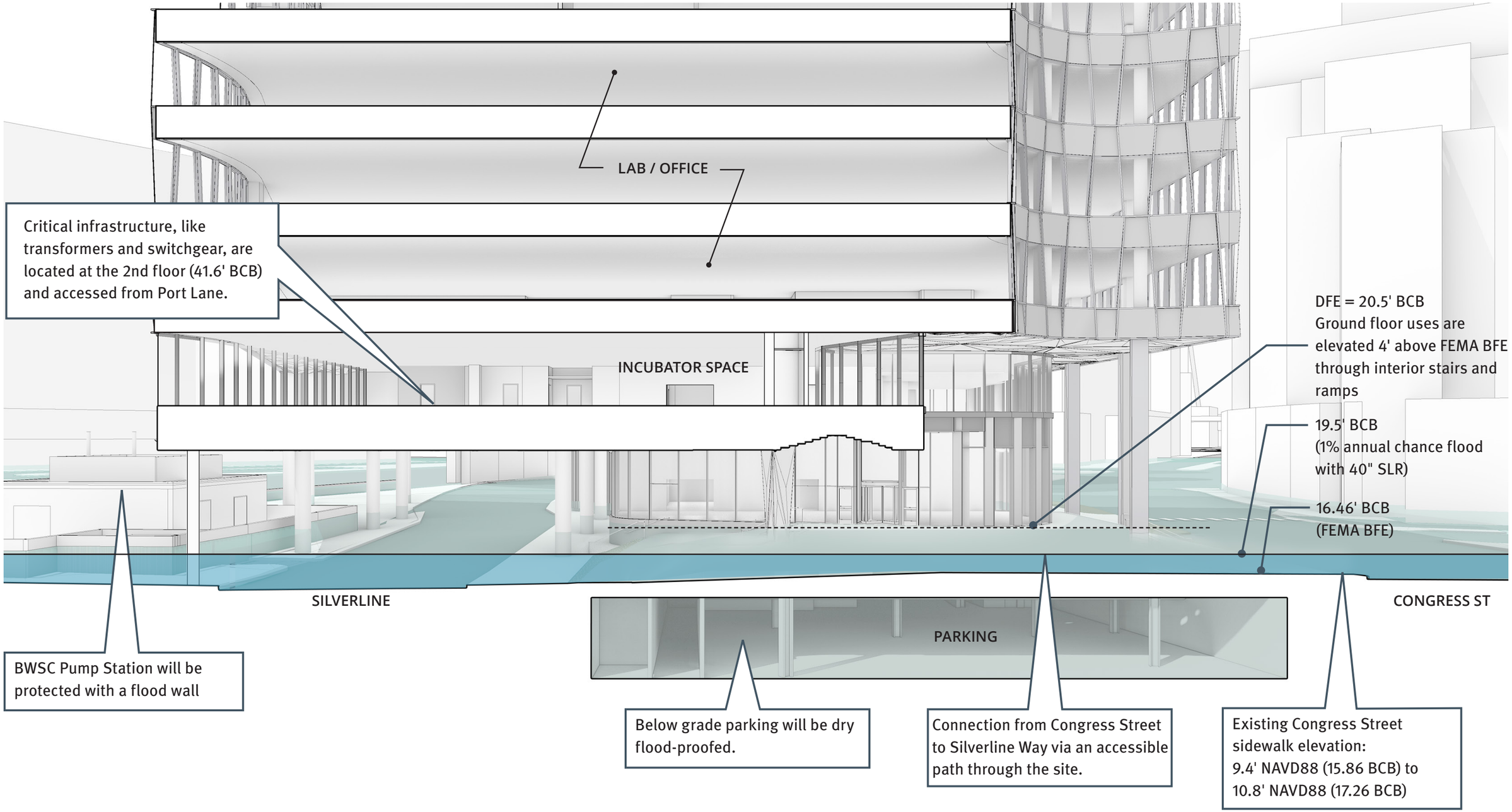
CIVIL DETAILS

Project No.	2102(NITSCH#13511.1)
Dwn/Chk By	CMH/JMS
Date	10/03/22
Scale	AS NOTED

DRAWING NUMBER:

C7.01

BUILDING SECTION AT TERRACE: RESILIENCY



Critical infrastructure, like transformers and switchgear, are located at the 2nd floor (41.6' BCB) and accessed from Port Lane.

BWSC Pump Station will be protected with a flood wall

Below grade parking will be dry flood-proofed.

Connection from Congress Street to Silverline Way via an accessible path through the site.

Existing Congress Street sidewalk elevation:
9.4' NAVD88 (15.86 BCB) to
10.8' NAVD88 (17.26 BCB)

Notification to Abutters

By Hand Delivery, Certified Mail (return receipt requested), or Certificates of Mailing

This is a notification required by law. You are receiving this notification because you have been identified as the owner of land abutting another parcel of land for which certain activities are proposed. Those activities require a permit under the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40).

In accordance with the second paragraph of the Massachusetts Wetlands Protection Act, and 310 CMR 10.05(4)(a) of the Wetlands Regulations, you are hereby notified that:

A. A Notice of Intent was filed with the Boston Conservation Commission on 10/19/2022 seeking permission to remove, fill, dredge, or alter an area subject to protection under M.G.L. c. 131 §40. The following is a description of the proposed activity/activities:

The Project involves the construction of a laboratory and office building connected via elevated walkway to a training/non-profit center.

B. The name of the applicant is: LO Parcel H, LLC.

C. The address of the land where the activity is proposed is: 777 Congress Street, South Boston Waterfront, Boston, MA

D. Copies of the Notice of Intent may be examined or obtained at the office of the Boston Conservation Commission, located at Boston City Hall, Environmental Department, Room 709, 1 City Hall Square, Boston, MA 02201. The regular business hours of the Commission are 9 AM to 5 PM, Monday through Friday, and the Commission may be reached at (617)635-3850.

E. Copies of the Notice of Intent may be obtained from the applicant or their representative by calling Mark Callahan, LO Parcel H, LLC, at (617)951-4112. An administrative fee may be applied for providing copies of the NOI and plans.

F. Information regarding the date, time, and location of the public hearing regarding the Notice of Intent may be obtained from the Boston Conservation Commission. Notice of the public hearing will be published at least five business days in advance, in the Boston Herald.

G. F. In accordance with the Chapter 107 of the Acts of 2022, the public hearing will take place virtually at https://zoom.us/j/6864582044. If you are unable to access the internet, you can call 1-929-205-6099, enter Meeting ID 686 458 2044 # and use # as your participant ID.

Notification provided pursuant to the above requirement does not automatically confer standing to the recipient to request Departmental Action for the underlying matter. See 310 CMR 10.05(7)(a)4.

致相邻地产业主的通知书

由专人递送、挂号信寄送（要求回执），或出具邮寄证明

根据法律要求，特此发出本通知书。您收到本通知书是因为，您已被确定为与另一地块相邻土地的所有者，该地块拟进行某些活动。这些活动需要依据《马萨诸塞州湿地保护法》（M.G.L. c. 131, § 40 条款）获取许可。

根据《马萨诸塞州湿地保护法》第二段，以及《湿地条例》310 CMR 10.05(4)(a)条款，特此通知贵方：

A. 2022 年 10 月 19 日已向波士顿保护委员会（Boston Conservation Commission）提交了一份《意向通知书》，请求允许移除、填充、疏浚或改造受 M.G.L.c.131§40 条款项下保护的区域。 以下是对该拟议单项/多项活动的描述：

该项目涉及一座实验室和办公楼的建设施工，将经由高架人行道与一家培训/非营利中心相连通。

B. 申请人名称：LO Parcel H，LLC。

C. 拟开展活动的地块地址为：马萨诸塞州波士顿市南波士顿海滨地区国会街 777 号（777 Congress Street, South Boston Waterfront, Boston, MA）

D. 该《意向通知书》副本可在波士顿保护委员会办公室查阅或获取，地址：马萨诸塞州波士顿市政厅广场 1 号波士顿市政厅环境部 709 室，邮编：02201（Boston City Hall, Environmental Department, Room 709, 1 City Hall Square, Boston, MA 02201）。委员会的正常工作时间为周一至周五上午 9 点至下午 5 点，可致电与委员会联系，电话：（617）635-3850。

E. 该《意向通知书》副本可从申请人或其代表处获得，可致电 Mark Callahan，LO Parcel H，LLC，电话：（617）951-4112。提供 NOI（《意向通知书》）和地块规划的副本可能需要支付行政费用。

F. 关于《意向通知书》公众听证会的日期、时间和地点的有关信息可从波士顿保护委员会获取。公众听证会的通知将至少提前五个工作日在《波士顿先驱报》发布。

G. 根據《馬薩諸塞州行政命令》（暫緩執行《公開會議法》聽證會將在網上 https://zoom.us/j/6864582044 進行。 如果無法上互聯網 (Internet)，則可致電 1-929-205-6099，輸入會議編號(ID) 686 458 2044＃，然後使用＃作為**您參與的編號**(ID.)

根据上述要求提供的通知书不会自动授予接收人就相关事宜请求主管部委行动的资格。参阅 310 CMR 10.05(7)(a)4。

Seaport Circle Landscape NOI Narrative

The existing trees to be removed located in Parcel H1 (see attached survey), are located above the Central Artery Taking Easement or what is commonly referred to as the I-90 Ted Williams Tunnel. The trees will be removed for construction of the Seaport Circle Pavilion building. The existing trees were installed as part of the Central Artery project and are assumed to have been planted in 2006. The species planted are a monoculture of Black Pines or *Pinus nigra* and range in caliper width from a minimum of 10" to a maximum of 19.2", with 12" being the prevalent caliper width. The trees appear to be in good condition. The rest of the vegetation in this area is lawn.

The existing trees to be removed located in the Air Bridge Parcel (see attached survey), will be removed for construction of the second story Seaport Circle Pedestrian Link to Parcel K. The two street trees to be removed are European Hophornbeams or *Ostrya carpinifolia*, each with a caliper width of 3". They were planted in 2012 and appear to be in good condition.

No existing trees will be removed from Parcel H. Parcel H is predominantly hardscape, and includes a surface parking lot as well as vehicular bus lanes for the MBTA Silver Line stop. While there are no existing trees in this area, the southernmost edge of the parcel contains grasses and some volunteer shrub species.

ZONING CLASSIFICATION

ZONING DISTRICT: GENERAL INDUSTRIAL "I-2"
OVERLAY DISTRICT: RESTRICTED PARKING OVERLAY DISTRICT

DIMENSIONAL TABLE PER – GENERAL INDUSTRIAL "I-2"

MINIMUM LOT SIZE	NONE*
MINIMUM LOT AREA	NONE*
MINIMUM LOT WIDTH	NONE*
MAXIMUM FLOOR AREA RATIO	2.0
MAXIMUM BUILDING HEIGHT	NONE
MINIMUM USABLE OPEN SPACE	NONE*
MINIMUM FRONT YARD	NONE*
MINIMUM SIDE YARD	**
MINIMUM REAR YARD	12 FEET*
MINIMUM SETBACK OF PARAPET	(H+L)/6

* SEE SECTION 13-4 OF CITY OF BOSTON ZONING CODE
** SEE SECTION 19-5 OF CITY OF BOSTON ZONING CODE

BOUNDARY DESCRIPTIONS PER COMMITMENT NO. BLC-28182 ISSUED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 15, 2021.

PARCELS H AND H1 SHOWN ON AN UNRECORDED PLAN ENTITLED "ALTA/NSPS LAND TITLE SURVEY, PARCEL H–#30TRILLING WAY, BOSTON, MASS.", DATED MARCH 17, 2021.

NOTE: PARCELS H AND H1 ARE MADE UP OF A PORTION OF VARIOUS CITY OF BOSTON ASSESSOR PARCELS. THUS, ATTACHED IS A COLOR-CODED PLAN OF ASSESSOR PARCELS AS SHOWN ON THE ASSESSOR'S MAP.

A. THE GREEN PARCEL SHOWN ON THE PLAN, ASSESSOR'S PARCEL ID: 0602678000.

B. THE BLUE PARCEL SHOWN ON THE PLAN, ASSESSOR'S PARCEL ID: 0602678000.

C. THE ORANGE PARCEL SHOWN ON THE PLAN, ASSESSOR'S PARCEL ID: 0602678500.

D. THE GOLD PARCEL SHOWN ON THE PLAN, ASSESSOR'S PARCEL ID: 0602681000.

E. THE PINK PARCEL SHOWN ON THE PLAN–NO ASSESSOR'S PARCEL ID. PART OF THIS PARCEL IS A PORTION OF PARCEL 66-E-3 FROM LAYOUT NO. 6968 WHICH IS A PORTION OF PARCEL E-8 THAT WAS TRANSFERRED BY THE MASSACHUSETTS DEPARTMENT OF HIGHWAYS TO THE MASSACHUSETTS TURNPIKE AUTHORITY (NOW THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION).

F. TWO GRAY PARCELS SHOWN ON THE PLAN, THE FIRST OF THESE BEING A PORTION OF PARCEL H ON THE ALTA PLAN IS A PORTION OF TRILLING WAY WHICH HAS BEEN DISCONTINUED. THERE IS NO ASSESSOR'S PARCEL ID FOR THIS PARCEL. THE SECOND GRAY PARCEL WHICH IS A PORTION OF PARCEL H–1 ON THE ALTA PLAN WAS A PORTION OF MASSPORT HAUL ROAD AND A PORTION OF ASSESSOR'S PARCEL ID:0602683000.

G. THE EASEMENT PARCELS 66-E-2, 66-E-3, AND 66-E-10 WERE TAKEN AS PART OF LAYOUT NO. 6968 AND ARE PERMANENT SUBSURFACE EASEMENTS. THESE WERE TRANSFERRED BY THE DEPARTMENT OF HIGHWAYS TO THE MASSACHUSETTS TURNPIKE AUTHORITY AND NOW MAKE UP A PORTION OF PARCEL E-8.

H. THE EASEMENT TO THE MASSACHUSETTS TURNPIKE AUTHORITY REGARDING THE SILVER LINE NOTED ABOVE, RUNS THROUGH PROPOSED PARCEL H SHOWN ON THE ALTA PLAN PROVIDED TO US BY YOUR OFFICE.

PARKING SUMMARY

117	STANDARD SPACES
5	HANDICAP SPACES
122	TOTAL SPACES

NOTES:

1. BENCH MARK INFORMATION:

   BENCH MARK USED:

   TBM–B: LEFT HYDRANT BOLT OVER MAIN OUTLET, LOCATED ON THE WESTERLY SIDE OF CONGRESS STREET APPROXIMATELY 130 FEET FROM THE SOUTHERLY SIDELINE OF NORTHERN AVENUE, AS SHOWN HEREON.
   ELEVATION = 17.86

   TBM–D: X–CUT SET ON A BOLT AT THE CORNER OF A STEEL FENCE ON THE SOUTHERLY SIDELINE OF SILVER LINE WAY APPROXIMATELY 115 FEET FROM THE WESTERLY SIDELINE OF MASSPORT HAUL ROAD.
   ELEVATION= 16.88

2. ELEVATIONS REFER TO BOSTON CITY BASE (BCB).

3. CONTOUR INTERVAL EQUALS ONE (1) FOOT.

4. THE PROPERTY SHOWN HEREON IS THE SAME PROPERTY DESCRIBED IN TITLE COMMITMENT NUMBER BLC–28182 ISSUED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 15, 2021.

5. THE SUBJECT PROPERTY HAS DIRECT ACCESS TO CONGRESS STREET, STARBOARD LANE, SILVER LINE WAY, AND PORT LANE, ALL MASSPORT SERVICE ROADS WITHOUT DEDICATED LAYOUTS.

6. BY GRAPHIC PLOTTING ONLY, THE PARCEL SHOWN HEREON LIES WITHIN ZONE "AE", AN AREA INSIDE OF THE 1% ANNUAL CHANCE FLOOD, BASE FLOOD ELEVATIONS DETERMINED; ZONE X" (SHADED)", AN AREA OF 0.2% ANNUAL CHANCE FLOOD; AND ZONE "X" (UNSHADED), AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (F.E.M.A.) FLOOD INSURANCE RATE MAP (F.I.R.M.) FOR SUFFOLK COUNTY, MASSACHUSETTS, MAP NUMBER 25025C0081J, CITY OF BOSTON COMMUNITY NUMBER 250286, PANEL NUMBER 0081, HAVING AN EFFECTIVE DATE OF MARCH 16, 2016.

7. ZONING INFORMATION AS SHOWN HEREON WAS NOT PROVIDED BY THE TITLE INSURER AS REQUIRED BY ITEM 6 (A OR B) OF TABLE "A" IN THE 2016 ALTA SURVEY REQUIREMENTS.

8. UNDER SECTION 5.E.iv OF THE STANDARDS, LOCATION OF SURFACE EVIDENCE OF UTILITIES IS INCLUDED IN EVERY ALTA/NSPS LAND TITLE SURVEY, INDEPENDENT OF ITEM 11 IN TABLE A.

9. THERE WAS NO OBSERVED EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS AT THE TIME OF SURVEY.

10. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO PROPOSED CHANGES IN STREET RIGHT OF WAY LINES.

11. PROPERTY LINE AND EASEMENT INFORMATION SHOWN PROVIDED BY MASSACHUSETTS PORT AUTHORITY IN A DRAWING NAMED "2442–05.DWG" RECEIVED ON 04/12/2021.

12. TUNNEL WALLS AND DETAIL WERE DRAFTED FROM LASER SCAN DATA COLLECTED ON JULY 15 AND 16, 2019.

13. UTILITY INFORMATION SHOWN IS BASED ON BOTH A FIELD SURVEY AND PLANS OF RECORD. THE LOCATIONS OF UNDERGROUND PIPES AND CONDUITS HAVE BEEN DETERMINED FROM THE AFOREMENTIONED RECORD PLANS AND ARE APPROXIMATE ONLY. WE CANNOT ASSUME RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES THAT ARE OMITTED OR INACCURATELY SHOWN ON SAID RECORD PLANS, SINCE SUBSURFACE UTILITIES CANNOT BE VISIBLY VERIFIED. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED AND THE ACTUAL LOCATION OF SUBSURFACE STRUCTURES SHOULD BE DETERMINED IN THE FIELD. CALL, TOLL FREE, THE DIG SAFE CALL CENTER AT 1–888–344–7233 SEVENTY–TWO HOURS PRIOR TO EXCAVATION.

14. THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF FELDMAN GEOSPATIAL ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO FELDMAN GEOSPATIAL'S SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY FELDMAN GEOSPATIAL.

LEGEND

SMH	SEWER MANHOLE	BC	BOTTOM OF CURB
DMH	DRAIN MANHOLE	BCB	BIT. CONC. BERM
EMH	ELECTRIC MANHOLE	[X.X"]	BUILDING DIMENSION
TMH	TELEPHONE MANHOLE	BFA	BUILDING FOOTPRINT AREA
MMH	MBTA MANHOLE	BH	BUILDING HEIGHT
MH	MANHOLE	BIT	BITUMINOUS
HYD	HYDRANT	BK	BACK
WSO	WATER SHUT OFF/WATER GATE	BOT=	BOTTOM ELEVATION
GSO	GAS SHUT OFF/GAS GATE	BT	BOTTOM TRAP
BWV	BOSTON WATER VALVE	BW	BOTTOM OF WALL
CB	CATCH BASIN	BWSC	BOSTON WATER AND SEWER COMMISSION
GW	GUY WIRE	(C)	CALCULATED
TCB	TRAFFIC CONTROL BOX	CC	CONCRETE CURB
UP	UTILITY POLE	CHB	CHORD BEARING
LP	LIGHT POLE	CHD	CHORD DISTANCE
WL	WALK LIGHT	COL	COLUMN
EH	ELECTRIC HANDHOLE	CONC	CONCRETE
BOL	BOLLARD	CRW	CONCRETE RETAINING WALL
PST	POST	Δ=	DELTA ANGLE
SGN	SIGN	DH	DRILL HOLE
AD	AREA DRAIN	EOT	EDGE OF TUNNEL
PM	PARKING METER	ENT	ENTRANCE
CO	CLEAN OUT	FD	FOUND
BR	BIKE RACK	FFE	FINISH FLOOR ELEVATION
SBC	STONE BOUND FOUND WITH DRILL HOLE	FGC	FLUSH CONCRETE CURB
OW	OBSERVATION WELL	FGG	FLUSH GRANITE CURB
SPC	STAND PIPE/SIAMESE CONNECTION	GD	GARAGE DOOR
UP w/ LT	UTILITY POLE W/ LIGHT	GRAN	GRANITE
TRANS	TRANSFORMER	I=	INVERT ELEVATION
TR	TRASH RECEPTACLE	INACC.	INACCESSIBLE
DPS	DISABLED PARKING SPACE	L=	ARC LENGTH
DT	DECIDUOUS TREE	LCC	LAND COURT CASE
CT	CONIFEROUS TREE	LSA	LANDSCAPED AREA
X	EXCEPTION NUMBER LISTED IN TITLE COMMITMENT	MTL	METAL
HC	HANDICAP RAMP	NVP	NO VISIBLE PIPES
GP	GATE POST	OHD	OVERHEAD DOOR
IVC	IRRIGATION CONTROL VALVE	OV	OVER
	CURB RETURN	PE	PIN IN LEAD
	INDICATES COMMON OWNERSHIP	POB	POINT OF BEGINNING
(#)	NUMBER OF PARKING SPACES	R=	RADIUS OR RIM ELEVATION
	PROPOSED SEWER EASEMENT	(R)	RECORD
	PROPOSED 20' WIDE FORCE MAIN SEWER EASEMENT	(REC)	RECORD
	PROPOSED SEWER EASEMENT	SB	STONE BOUND
	BWSC EASEMENT 66–SS–14–BWSC	SQ. FT.	SQUARE FEET
	BWSC EASEMENT 66–SS–15–BWSC	SWL	SOLID WHITE LINE
	BWSC EASEMENT 66–SS–16–BWSC	SYL	SOLID YELLOW LINE
	24' WIDE BWSC SEWER EASEMENT	T	TOP
	20' WIDE BWSC SEWER EASEMENT	TBM	TEMPORARY BENCH MARK
	SILVER LINE WAY EASEMENT	TC	TOP OF CURB
	10' WIDE SEWER EASEMENT	TH	THRESHOLD
	CENTRAL ARTERY TAKING EASEMENTS	TOD	TOP OF DEBRIS
		TOF	TOP OF FLOWABLE FILL
		TOR	TOP OF RUBBLE
		TOS	TOP OF SLURRY WALL
		TOT	TOP OF TUNNEL
		TOW	TOP OF WATER
		TP=	TOP OF PARAPET
		TR=	CENTERLINE OF TROUGH
		TSTK	TOP OF STAKE ELEVATION
		TT=	TOP OF TRAP
		TW	TOP OF WALL
		TWP	TOP OF WATER PROOFING
		VGC	VERTICAL GRANITE CURB
		WF	WROUGHT IRON FENCE
		C	CABLE TELEVISION
		CS	COMBINED SEWER
		D	DRAIN
		E	ELECTRIC
		G	GAS
		OW	OVERHEAD GUY WIRE
		FMC	FORCE MAIN SEWER
		M	MBTA
		OHW	OVERHEAD WIRES
		S	SEWER
		T	TELEPHONE
		W	WATER
		S(ABD)	ABANDONED
		12"D(CI)	PIPE SIZE AND MATERIAL
		CI	CAST IRON
		CPP	CORRUGATED PLASTIC PIPE
		FO	FIBER OPTIC
		PVC	POLYVINYL CHLORIDE
		RCP	REINFORCED CONCRETE PIPE
		WI	WROUGHT IRON FENCE

EXCEPTIONS FROM COVERAGE (SURVEY RELATED ONLY) SCHEDULE B, PART II, LISTED IN TITLE COMMITMENT NO. BLC–28182 ISSUED BY COMMONWEALTH LAND TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 15, 2021.

6. INTENTIONALLY OMITTED
7. ORDER BY THE CITY OF BOSTON PUBLIC IMPROVEMENT COMMISSION FOR THE LAYOUT AND CONSTRUCTION OF TRILLING WAY AS A PUBLIC HIGHWAY AND BETTERMENT ASSESSMENTS SET FORTH THEREIN, DATED NOVEMBER 26, 1963, RECORDED WITH SAID DEEDS, BOOK 7808, PAGE 30. (TRILLING WAY HAS BEEN DISCONTINUED)
8. ORDER BY THE CITY OF BOSTON PUBLIC IMPROVEMENT COMMISSION FOR THE LAYOUT AND CONSTRUCTION OF TRILLING WAY AS A PUBLIC HIGHWAY AND BETTERMENT ASSESSMENTS SET FORTH THEREIN, DATED OCTOBER 13, 1964, RECORDED WITH SAID DEEDS, BOOK 7897, PAGE 77. SEE PLAN NO. L–9391. (TRILLING WAY HAS BEEN DISCONTINUED)
9. ORDER BY THE CITY OF BOSTON PUBLIC IMPROVEMENT COMMISSION FOR THE DISCONTINUANCE OF TRILLING WAY AS A PUBLIC WAY, DATED JANUARY 15, 2004, RECORDED WITH SAID DEEDS, BOOK 34225, PAGE 340 AND SHOWN ON PLAN RECORDED THEREWITH AND AS APPROXIMATELY SHOWN ON THE SURVEY. (AS SHOWN HEREON)

   NOTE: TRILLING WAY IS NOT TAKEN IN FEE BY THE CITY OF BOSTON. THE FEE REMAINS IN MASSACHUSETTS PORT AUTHORITY. THE CITY OF BOSTON HAS DISCONTINUED THEIR PUBLIC WAY AS NOTED ABOVE.

10. INTENTIONALLY OMITTED.
11. INTENTIONALLY OMITTED.
12. GRANT OF EASEMENT AND EASEMENT AGREEMENT BETWEEN MASSACHUSETTS PORT AUTHORITY AND BOSTON WATER AND SEWER COMMISSION, DATED SEPTEMBER 4, 1984, RECORDED WITH SAID DEEDS, BOOK 11142, PAGE 256 AND SHOWN ON PLAN RECORDED THEREWITH, AS AFFECTED BY LAYOUT NO. 6968 AND ORDER OF TAKING BY DEPARTMENT OF HIGHWAYS ACTING ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS, DATED JUNE 10, 1992, RECORDED WITH SAID DEEDS, BOOK 17568, PAGE 68 AND SHOWN ON PLAN RECORDED THEREWITH, (FOR BETTER VIEWING SEE LO 6968 ENCLOSED HEREWITH), AS FURTHER AFFECTED BY AMENDMENT #1 TO EASEMENT AGREEMENT, DATED DECEMBER 23, 2003, RECORDED WITH SAID DEEDS, BOOK 33545, PAGE 153, AS FURTHER AFFECTED BY AN AGREEMENT REGARDING CONSTRUCTION WITHIN EASEMENT DATED NOVEMBER 30, 2017, RECORDED WITH SAID DEEDS, BOOK 58899, PAGE 1 AND AS APPROXIMATELY SHOWN ON THE SURVEY. (AS SHOWN HEREON)
13. INTENTIONALLY MOVED TO NOTE.
14. INTENTIONALLY MOVED TO REQUIREMENTS.
15. INTENTIONALLY OMITTED.
16. SALE/MITIGATION AGREEMENT BETWEEN COMMONWEALTH OF MASSACHUSETTS, ACTING BY AND THROUGH ITS PUBLIC WORKS DEPARTMENT AND MASSACHUSETTS PORT AUTHORITY DATED OCTOBER 3, 1991, RECORDED WITH SAID DEEDS, BOOK 17133, PAGE 122, AS AFFECTED BY AN AFFIDAVIT UNDER MGL C. 183 §5B (IN AS MUCH AS IT AFFECTS PARCEL 66–E–3 OF SAID TAKING), DATED NOVEMBER 30, 2017, RECORDED WITH SAID DEEDS, BOOK 58898, PAGE 8. (NOT PLOTTABLE)
17. WAIVER AND AGREEMENT BY AND BETWEEN MASSACHUSETTS PORT AUTHORITY AND MASSACHUSETTS DEPARTMENT OF HIGHWAYS FOR EMINENT DOMAIN TAKING OF COMMONWEALTH FLATS, SOUTH BOSTON, DATED MAY 20, 1992, RECORDED WITH SAID DEEDS, BOOK 17567, PAGE 268, AS AFFECTED BY A FIRST AMENDMENT TO WAIVER AND AGREEMENT, DATED JUNE 16, 1992, RECORDED WITH SAID DEEDS, BOOK 17567, PAGE 339, AS FURTHER AFFECTED BY AN AFFIDAVIT UNDER MGL C. 183, §5B (IN AS MUCH AS IT AFFECTS PARCEL 66–E–3 OF SAID TAKING), DATED NOVEMBER 30, 2017, RECORDED WITH SAID DEEDS, BOOK 58898, PAGE 8. (AS SHOWN HEREON)

EXCEPTIONS FROM COVERAGE CONTINUED.

18. LAYOUT NO. 6968 AND ORDER OF TAKING BY DEPARTMENT OF HIGHWAYS ACTING ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS, DATED JUNE 10, 1992, RECORDED WITH SAID DEEDS, BOOK 17568, PAGE 68 AND SHOWN ON PLAN RECORDED THEREWITH, (FOR BETTER VIEWING SEE LO 6968 IN THE FILE), (PARCELS 66–1E 20; 66–1E–4; 66–E–2; 66–E–3; 66–E–10; EXISTING 24' WIDE SANITARY EASEMENT), AS AFFECTED BY AN ORDER OF TAKING BY DEPARTMENT OF HIGHWAYS ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS FOR EXTENSION OF TEMPORARY EASEMENTS, DATED SEPTEMBER 20, 1995, RECORDED WITH SAID DEEDS, BOOK 20045, PAGE 91, (PARCEL 66–1E–4 EXTENDED UNTIL DEC. 31, 1996), AS FURTHER AFFECTED BY AN AFFIDAVIT UNDER MGL C.183, §5B (IN AS MUCH AS IT AFFECTS PARCEL 66–E–3 OF SAID TAKING), DATED NOVEMBER 30, 2017, RECORDED WITH SAID DEEDS, BOOK 58898, PAGE 8 AND AS APPROXIMATELY SHOWN ON THE SURVEY.
    (TEMPORARY CONSTRUCTION EASEMENTS HAVE EXPIRED) (AS SHOWN HEREON)
19. ORDER OF TAKING BY DEPARTMENT OF HIGHWAYS ACTING ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS, DATED APRIL 26, 1995, RECORDED WITH SAID DEEDS, BOOK 19762, PAGE 46 AND SHOWN ON PLAN RECORDED THEREWITH AND AS APPROXIMATELY SHOWN ON THE SURVEY. (PARCELS 66–SS–14–BWSC; 66–SS–15–BWSC; 66–SS–16–BWSC) (AS SHOWN HEREON)
20. EASEMENT GRANT AND TRANSFER BY DEPARTMENT OF HIGHWAYS ACTING ON BEHALF OF COMMONWEALTH OF MASSACHUSETTS TO MASSACHUSETTS TURNPIKE AUTHORITY DATED DECEMBER 13, 1995, RECORDED WITH SAID DEEDS, BOOK 20226, PAGE 172 AND SHOWN ON PLAN RECORDED THEREWITH, (PARCEL E–8 ON SAID PLAN), AS AFFECTED BY SUPPLEMENT NO. 1 TO 1995 EASEMENT GRANT AND TRANSFER, DATED JULY 1, 1997, RECORDED WITH SAID DEEDS, BOOK 21971, PAGE 320, (AFFECTS PORTIONS OF PARCEL E–8 WHICH ARE NON–LOCUS), AS FURTHER AFFECTED BY SUPPLEMENT NO. 2 TO 1995 EASEMENT GRANT AND TRANSFER, DATED JULY 1, 1999, RECORDED WITH SAID DEEDS, BOOK 24091, PAGE 39 AND AS APPROXIMATELY SHOWN ON THE SURVEY. (AS SHOWN HEREON)
21. ORDER OF TRANSFER THAT ALL PROPERTY HELD BY MASSACHUSETTS DEPARTMENT OF HIGHWAYS BE TRANSFERRED TO MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, DATED OCTOBER 28, 2009, RECORDED WITH SAID DEEDS, BOOK 45797, PAGE 65. (NOT PLOTTABLE)
22. EASEMENT AGREEMENT BETWEEN MASSACHUSETTS PORT AUTHORITY AND MASSACHUSETTS BAY TRANSPORTATION AUTHORITY REGARDING SILVER LINE WAY, DATED MAY 21, 2015, RECORDED WITH SAID DEEDS, BOOK 54633, PAGE 330 AND SHOWN ON PLAN 255 OF 2015 AND AS APPROXIMATELY SHOWN ON THE SURVEY. EASEMENT AREA 3 AFFECTS LOCUS.
    (AS SHOWN HEREON)
23. INTENTIONALLY MOVED TO NOTE.
24. UTILITY CORRIDOR NO. 2 AS SHOWN ON SHEET 2 OF PLAN FOR LAYOUT NO. 6968.
    (AS SHOWN HEREON)
25. EXISTING 10' WIDE SANITARY SEWER EASEMENT AS SHOWN ON SHEET 2 OF PLAN FOR LAYOUT NO. 6968. (AS SHOWN HEREON)
26. RIGHTS OF OTHERS TO USE STARBOARD LANE, SILVER LINE WAY AND MASSPORT HAUL ROAD AS PORTIONS OF THESE WAYS ARE PART OF PARCELS H AND H–1 AS SHOWN ON THE ALTA PLAN PROVIDED. (AS SHOWN HEREON)

    NOTE: THERE ARE NO DEDICATED LAYOUTS RECORDED FOR CONGRESS STREET, STARBOARD LANE, MASSPORT HAUL ROAD OR SILVER LINE WAY SHOWN ON THE ALTA PLAN. THESE STREETS ARE ALL LOCATED ON MASSACHUSETTS PORT AUTHORITY LAND.

    NOTE: ALTHOUGH SPECIFICALLY EXCLUDED FROM THE COVERAGE OF THIS POLICY, THE FOLLOWING ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY:

    A. ORDER OF CONDITIONS DEP FILE #6–272 BY THE BOSTON CONSERVATION COMMISSION DATED DECEMBER 7, 1984, RECORDED WITH SAID DEEDS, BOOK 11825, PAGE 101. (NOT LOCUS)

    B. ORDER OF CONDITIONS BY THE BOSTON CONSERVATION COMMISSION, DEP FILE #006–1426, DATED APRIL 6, 2015, RECORDED WITH SAID DEEDS, BOOK 55023, PAGE 19, AS AFFECTED BY A CERTIFICATE OF COMPLIANCE DATED AUGUST 24, 2016, RECORDED WITH SAID DEEDS, BOOK 58333, PAGE 87. (NOT LOCUS)

PARCEL H BOUNDARY DESCRIPTION (PER SURVEY)

A CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF BOSTON, COUNTY OF SUFFOLK, AND THE COMMONWEALTH OF MASSACHUSETTS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT OF TANGENCY ON THE SOUTHERLY SIDE OF CONGRESS STREET, FORMING AN INTERSECTION WITH THE WESTERLY SIDE OF PORT LANE;

RUNNING S 84°52'01 E, A DISTANCE OF 31.45 FEET TO A POINT OF CURVATURE;

THENCE RUNNING BY A CURVE TO THE LEFT HAVING AN ARC LENGTH OF 25.00 FEET, A RADIUS OF 282.29 FEET, AND A DELTA ANGLE OF 05°04'27" TO A POINT OF TANGENCY;

THENCE RUNNING S 89°56'28" E, A DISTANCE OF 215.17 FEET TO A POINT OF CURVATURE;

THENCE RUNNING BY A CURVE TO THE RIGHT HAVING AN ARC LENGTH OF 56.66 FEET, A RADIUS OF 55.39 FEET, A DELTA ANGLE OF 58°36'47", A CHORD BEARING OF S 60°38'05" E, AND A CHORD DISTANCE OF 54.22 FEET TO A POINT OF NON–TANGENCY. THE PREVIOUS FOUR COURSES BY THE SOUTHERLY SIDE OF SAID CONGRESS STREET;

THENCE TURNING AND RUNNING S 22°11'09" E, A DISTANCE OF 127.05 FEET TO A POINT;

THENCE TURNING AND RUNNING S 35°26'48" E, A DISTANCE OF 150.82 FEET TO A POINT. THE PREVIOUS TWO COURSES BY THE WESTERLY SIDE SAID STARBOARD LANE AND SILVER LINE WAY;

THENCE TURNING AND RUNNING S 82°43'03" W, A DISTANCE OF 61.71 FEET TO A POINT OF NON–TANGENCY;

THENCE RUNNING BY A CURVE TO THE RIGHT HAVING AN ARC LENGTH OF 23.00 FEET, A RADIUS OF 1402.50 FEET, A DELTA ANGLE OF 00°56'23", A CHORD BEARING OF S 81°28'37" W, AND A CHORD DISTANCE OF 23.00 FEET TO A POINT OF NON–TANGENCY;

THENCE TURNING AND RUNNING S 89°54'39" W, A DISTANCE OF 237.44 FEET TO A POINT OF CURVATURE;

THENCE RUNNING BY A CURVE TO THE RIGHT HAVING AN ARC LENGTH OF 203.75 FEET, A RADIUS OF 945.00 FEET, A DELTA ANGLE OF 12°21'23", A CHORD BEARING OF N 83°54'44" W, AND A CHORD DISTANCE OF 203.36 FEET TO A POINT OF NON–TANGENCY. THE PREVIOUS THREE COURSES BEING BY THE NORTHERLY SIDELINE OF INTERSTATE 90;

THENCE TURNING AND RUNNING N 00°01'35" W, A DISTANCE OF 193.97 FEET TO A POINT OF CURVATURE;

THENCE RUNNING BY A CURVE TO THE RIGHT HAVING AN ARC LENGTH OF 50.00 FEET, A RADIUS OF 30.11 FEET, AND A DELTA ANGLE OF 95°09'34" TO THE POINT OF BEGINNING. THE PREVIOUS TWO COURSES BY THE EASTERLY SIDE OF PORT LANE

SAID PARCEL CONTAINING 96,776 SQUARE FEET OR 2.222 ACRES.

PARCEL H1 BOUNDARY DESCRIPTION (PER SURVEY)

A CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF BOSTON, COUNTY OF SUFFOLK, AND THE COMMONWEALTH OF MASSACHUSETTS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT OF NON–TANGENCY OF A CURVE FORMING THE INTERSECTION OF THE SOUTHWESTERLY SIDELINE OF SILVER LINE WAY AND THE NORTHWESTERLY SIDELINE OF MASSPORT HAUL ROAD. THENCE;

RUNNING S 35°36'55" W BY SAID MASSPORT HAUL ROAD, A DISTANCE OF 79.43 FEET TO A POINT;

THENCE TURNING AND RUNNING S 76°58'38" W, A DISTANCE OF 41.91 FEET TO A POINT;

THENCE TURNING AND RUNNING N 06°25'39" W, A DISTANCE OF 71.00 FEET TO A POINT;

THENCE TURNING AND RUNNING N 78°59'32" E, A DISTANCE OF 24.81 FEET TO A POINT;

THENCE TURNING AND RUNNING N 08°59'36" W, A DISTANCE OF 80.00 FEET TO A POINT;

THENCE TURNING AND RUNNING N 82°43'03" E, A DISTANCE OF 61.71 FEET TO A POINT ON SAID SILVER LINE WAY;

THENCE RUNNING BY SAID SILVER LINE WAY BY A CURVE TO THE RIGHT, HAVING AN ARC LENGTH OF 102.82 FEET, A RADIUS OF 60.30 FEET, A DELTA ANGLE OF 97°41'32", A CHORD BEARING OF S 13°59'58" E, AND A CHORD DISTANCE OF 90.81 FEET TO THE POINT OF BEGINNING.

SAID PARCEL CONTAINING 11,515 SQUARE FEET.

FELDMAN GEOSPATIAL

BOSTON HEADQUARTERS
152 HAMPDEN STREET
BOSTON, MA 02119

WORCESTER OFFICE
27 MECHANIC STREET
WORCESTER, MA 01608

(617)357–9740
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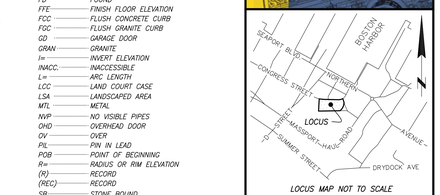
Right. From the Ground Up



LOCUS MAP NOT TO SCALE

TO: LO PARCEL H LLC & MASSACHUSETTS PORT AUTHORITY & COMMONWEALTH LAND TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 5, 7(A), 7(B)(1), 8, 9, 11(A), 13, 14, 16, 17, 18, AND 19 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED ON MARCH 17, 2021.

FELDMAN GEOSPATIAL

TIMOTHY R. AGURKIS, PLS (MA# 52782)
TAGURKIS@FELDMANGEO.COM

11–1–2022
DATE

TIMOTHY R. AGURKIS No.52782 REGISTERED LAND SURVEYOR COMMONWEALTH OF MASSACHUSETTS

ADDRESS:

PARCELS H & H1
#30 TRILLING WAY
BOSTON, MASS.

RESEARCH:	FIELD CHIEF:
PROJ MGR: TRA	APPROVED:
CALC: CEM	CADD: CEM
FIELD CHK:	CRD FILE: 17948

REVISIONS:

10/14/22	TEST PIT INFORMATION ADDED

DRAWING NAME:

ALTA/NSPS
LAND TITLE SURVEY

DATE: MARCH 17, 2021

20 0 10 20 40
SCALE: 1"=20'

SHEET NO. 1 OF 1

FILENAME: S:\PROJECTS\17900s\17948\DWG\17948-ALTA.dwg