



CITY OF DOVER

PLANNING TECHNICAL REVIEW COMMITTEE –AGENDA

Meeting Type: Regular Meeting
Meeting Location: 1st Floor Conference Room – City Hall, Dover NH
Meeting Date: **Thursday, February 20, 2020**
Meeting Time: **10:30 AM**

1. 10:30 AM - 11:15 AM: Site Review for CPI Management, LLC, (Owner: City of Dover), Assessor's Map 22, Lot 1, zoned CWD, and located at 31 River Street. (Proposal for Phase I will consist of a 4-story, 110-unit multi-family apartment building with a lower level parking garage and Phase II consists of a mixed use building with 55 residential units and 3040 s.f. of commercial space. The site is proposed to have 237 parking spaces. A related SUB & CUP applications will appear before the Planning Board). *(P20-11)

C-0960-007
January 31, 2020

Mr. Christopher G. Parker, AICP
Assistant City Manager: Director of Planning and Strategic Initiatives
City of Dover Planning and Community Development
288 Central Avenue
Dover, New Hampshire 03820

Re: **Site Review Application - Cochecho Waterfront Development – Phase I
River Street & Washington Street, Dover, New Hampshire 03820**

Dear Chris:

On behalf of CPI Management, LLC, we are pleased to submit the following materials to the Technical Review Committee (TRC) in support of a Site Review Permit Application for the above referenced project:

- Eight (8) copies of the Site Review Application dated January 31, 2020
- Eight (8) copies of the Cochecho Waterfront Development – Phase I Site Plans dated January 31, 2020
- Eight (8) copies of the Drainage Report dated January 31, 2020
- Eight (8) copies of the Projected Water and Wastewater Flows and Investment Fee Memo, dated January 31, 2020
- Eight (8) copies of the Proposed Residential Apartments – Traffic Evaluation Memorandum, dated January 22, 2020
- Eight (8) copies of the Landscape Operation & Maintenance Plan
- Eight (8) copies of the Utilil Will Server letter, dated January 23, 2020
- Check(s) in the amount of \$21,250.50 and \$448.00, payable to the City Dover, for the Site Review Application Fee and Public Notice Fee respectively
- One (1) CD containing digital (PDF) copies of the above listed information

The proposed project is a multi-family development located on a proposed 4.02-acre parcel of land along River Street and Washington Street in Dover, New Hampshire. The proposed 4.02-acre parcel is part of a larger 29.2-acre parcel owned by the City of Dover along the Cochecho River waterfront that will be redeveloped by a land development agreement reached between the applicant and City for the Cochecho Waterfront Development (CWD). The 4.02-acre parcel will be subdivided by the City for the applicant to develop as Phase 1 of the CWD. Phase 1 of the CWD will consist of a 4-story, 110-unit multi-family apartment building with a lower level parking garage (Building A) and a future 4-story, 55-unit multi-family apartment building (Building B). The project's site improvements include 237 on-site parking spaces (50 Building A lower level + 187 surface), stormwater management, utilities, lighting, and landscaping.

Please feel free to contact Patrick by phone at (603) 433-8818 or by email at pmcrimmins@tighebond.com if you have any questions or need any additional information. We look forward to working with the City staff on this important project in the City of Dover.

Sincerely,

TIGHE & BOND, INC.

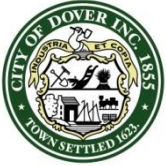


Patrick M. Crimmins, PE
Senior Project Manager



Craig M. Langton, PE
Project Engineer

Copy: CPI Management, LLC



City of Dover, New Hampshire SITE REVIEW APPLICATION

[Revision Date: June 4, 2019]

Office Use Only

Project #: _____

Date Received: _____

Amount Paid: _____

Time Received: _____

APPLICANT AND OWNER INFORMATION

Name of Applicant: CPI Management, LLC Telephone # 617-742-6000

Address of Applicant: 11 Beacon Street, Suite #1120, Boston, MA 02108

E-Mail Address: robs@cathartes.com

Name of Property Owner (if different from applicant): _____ Telephone # _____

Address of Property Owner: _____

PROPERTY INFORMATION

Address of Property: Washington Street and River Street

Assessor's Map # 22 Lot(s) # 1

Zoning District(s) Cochecho Waterfront Overlay District(s) N/A

Size of Parcel: 175,279 sq. ft. 4.02 ac. Property Deed: Book 225 Page: 493

Existing Use of Property: No Use / Natural Condition

SITE PLAN INFORMATION

Describe Proposed Use: Residential Development

Area of Parcel to be Developed: ±175,300 sq. ft.

If Multi-family Residential, Specify Number of Units & Buildings Proposed: 165 Units | 2 Buildings

Number of Parking Spaces: Existing 0 Proposed 237

Highway Access (check where applicable): ☒ City Street ☐ State Highway

Number of Employees Total: N/A In Maximum Shift: N/A

Disposition of Parcel:

Building Footprint 30,670 Proposed
16,800 Future sq. ft.

Total Building Area 120,410 Proposed
64,340 Future sq. ft.

Paved Area ±67,150 sq. ft.

Building Setbacks:

Front Yard N/A ft.

Rear Yard N/A ft.

Side Yard: Right N/A ft. Left N/A ft.

City Water? ☒ Yes ☐ No How far is city water from the property? ±41 ftCity Sewer? ☒ Yes ☐ No How far is city sewer from the property? ±24 ft**BUILDING INFORMATION**Type of Building to be Built: Multi-Family ResidentialHeight of Building: ±41 ft Finished Floor Elevation: 26.90 BLDG A
±25.20 BLDG B

Number of Seats (where applicable) _____

Estimated value of construction: _____ Refuse removal: Public/Private (circle one)

WAIVER REQUESTS

Site Review Regulations section(s) to be waived: _____

Justification for waiver request(s) (*attach additional sheets as needed*):

_____**SURVEYOR INFORMATION**Name of Surveyor and Company (Licensed in N.H.) Doucet Survey, Inc.Address 102 Kent Place, Newmarket, NH 03857 Telephone #: 603-659-6560

Professional License #: _____ E-mail address: _____

ENGINEER INFORMATIONName of Engineer and Company (Licensed in N.H.) Patrick Crimmins, PE | Tighe & Bond, Inc.Address 177 Corporate Drive, Portsmouth, NH 03801 Telephone #: 603-433-8818Professional License #: 12378 E-mail address: pmcrimmins@tighebond.com**ARCHITECT INFORMATION**Name of Architect and Company (Licensed in N.H.) Embarc StudioAddress 60 K Street, 3rd Floor, Boston, MA 02127 Telephone #: 617-766-8330

Professional License #: _____ E-mail address: _____

LANDSCAPE ARCHITECT INFORMATION

Name of Landscape Architect and Company (Licensed in N.H.) Woodburn & Company

Address 103 Kent Place, Newmarket, NH 03857 Telephone #: 603-659-5949

Professional License #: _____ E-mail address: _____

SOIL SCIENTIST INFORMATION

Name of Soil Scientist and Company (Licensed in N.H.) N/A

Address _____ Telephone #: _____

Professional License #: _____ E-mail address: _____

CONSERVATION EASEMENT HOLDER

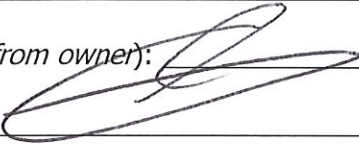
Name of Easement Holder: _____ Telephone # _____

Address Easement Holder: _____

SIGNATURES

I/We hereby submit this application to the City of Dover Planning Board and attest that to the best of my knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. Furthermore, I/we submit that the existing conditions sheet of the plan represents the lot in question, and that no alteration of the site shall take place during Planning Board review up to and including the pre-construction meeting. As applicant or as agent, I attest that I am duly authorized to act in this capacity.

Signature of Property Owner: _____ Date: _____

Signature of Applicant (*if different from owner*):  _____ Date: 1/27/20

Signature of Agent: _____ Date: _____

AUTHORIZATION TO ENTER SUBJECT PROPERTY

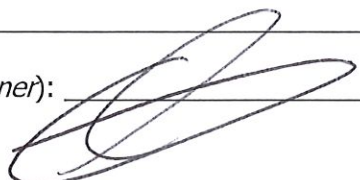
I, and my successors, hereby authorize members of the Dover Planning Board, Planning Department and other pertinent City Departments and boards to enter my property for the purpose of evaluating this application, including performing inspections during the application phase, post-approval phase, construction phase and occupancy phase. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

Signature of Property Owner: _____ Date: _____

AUTHORIZATION TO COMPLETE THE PROJECT ON SUBJECT PROPERTY

I, and my successors, hereby the City of Dover or its assigns to enter my property for the purpose of completing the site work as required by the approved plan should the letter or credit or other surety be called. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

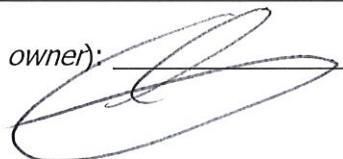
Signature of Property Owner: _____ Date: _____

Signature of Applicant (*if different from owner*):  _____ Date: 1/27/20

CERTIFICATION OF FEES

I, and my successors, hereby certify that I understand that the City of Dover collects impact fees, utility investment fees and inspection fees for projects developed in Dover. Said fees must be paid before a Certificate of Occupancy can be obtained for a structure, unless a different payment schedule is agreed to by the applicant and the City prior to approvals being issued by the Dover Planning Board. Additionally, should the property be in "Current Use" it will be subject to the Land Use Change Tax.

Signature of Property Owner: _____ Date: _____

Signature of Applicant (*if different from owner*):  _____ Date: 1/27/20

PLANNING BOARD FEE SCHEDULE

(Revised May 14, 2019)

Below are the fees associated with plan review. Please complete the information below and provide payment with your application submittal. **Plan review fees shall be paid prior to technical review committee (TRC) being scheduled.** For plans not requiring TRC review, **fees are due 21 days prior** to the Planning Board meeting. Staff will coordinate abutter/notice fees, which will be invoiced and must be paid 28 hours before the Planning Board meeting for an application to be heard. Fees shall be paid by cash or check made payable to "City of Dover."

A. Plan Review Fees

1. Application fee for the following (SELECT ALL THAT APPLY):
 - ☐ SUBDIVISION \$150.00 x # 1 new lots created= \$ 150.00
 - ☐ LOT LINE ADJUSTMENT \$100.00 X # of lots involved= \$ N/A
 - ☐ TRANSFER OF DEVELOPMENT RIGHTS Application fee \$150.00= \$ N/A
 - ☐ SITE REVIEW – RESIDENTIAL \$100.00 x # 165 per dwelling unit= \$ 16,500.00
 - ☐ SITE REVIEW – NON-RESIDENTIAL (not to exceed \$10,000)
 - o New construction \$.15 sq. ft. x # _____ sq. ft.= \$ N/A
 - o Additions (new floor space) \$.10 per sq. ft. x # _____ sq. ft.= \$ N/A
 - ☐ MOTEL/HOTEL \$35.00 x # ____ per lodging unit= \$ N/A
 - ☐ CHANGE OF USE (not to exceed \$5,000)
 - o Existing floor spaces \$.10 per sq. ft. x # _____ sq. ft. = \$ N/A
 - ☐ CONDITIONAL USE PERMIT \$150.00 x # _____ per application= \$ N/A
 - ☐ GRAVEL PIT/ EXCAVATIONS
 - o Application fee \$50.00= \$ N/A
 - o Permit fee \$75.00= \$ N/A
 - ☐ EXTENSIONS OF/AMENDMENTS TO/WAIVERS FOR AN APPROVED PLAN \$50.00 x # ____ per hour of review (3 hour minimum)= \$ N/A
 - ☐ REQUEST FOR REZONING Application fee \$150.00= \$ N/A
 - ☐ DRIVEWAY WAIVER Application fee \$100.00= \$ N/A
- SUB TOTAL=** \$ 16,650.00

AND

2. IMPERVIOUS PAVED AREA (for new development or additions to existing parking lots (not to exceed \$10,000) \$.07 sq. ft. x # 67,150 = \$ 4,700.50

TOTAL PLAN REVIEW FEE= \$ 21,250.50

B. Abutter Notification/Mailing Labels - this office will create and print the abutter list and provide labels in triplicate for each abutter. The applicant/owner will need to review the list and provide to this office the engineer, architect, licensed land surveyor (LLS), licensed landscape architect (LLA) and/or soil scientist whose professional seal appears on the plan with names and addresses for notices.

- ☐ Applicant & Owner, engineer, architect, LLS, LLA and/or soil scientist
 - o Certified letters fee # 5 of x \$8.00= \$ 40.00
 - ☐ Certified letters fee: # of abutters 8 X \$8.00= \$ 64.00
 - ☐ First Class Mail fee (for individual owner of units within a condominium or other collective form of ownership): # of abutters N/A X \$1.00= \$ N/A
 - ☐ Creating/Printing Abutter Labels in triplicate per sheet 8 x \$10.00= \$ 80.00
- SUB TOTAL=** \$ 184.00

C. Foster's newspaper public notice fee

TOTAL NOTICE FEE= \$ 80.00

TOTAL NOTICE FEE= \$ 448.00

The above amount must be paid 28 hours prior to the Planning Board meeting, to be heard.



City of Dover, New Hampshire **SITE PLAN REVIEW SUBMISSION CHECKLIST**

[Revision Date: June 4, 2019]

This site plan review checklist, as required by Chapter 149-6-B(2), should be completed by the applicant. It is intended to assist the applicant in the planning process of preparing a Site Plan Review application for Planning Board action. The size of the project will determine the types of information required for review, therefore, a **pre-application conference** with the Planning Department to determine the list of items that must be completed is strongly encouraged.

The first step would be to appear before the Technical Review Committee, to apply, eight (8) folded copies of the site plan with scale of not less than 1"=50' or 1"=100' for larger site plans, need to be provided, along with payment of plan review fees.

Two weeks prior to Planning Board, three (3) full size and twelve (12) half size (11x17), folded, copies of the plan set and materials, including response to TRC comments, will be due. Abutter/Notice Fees will be invoiced and need to be paid 28 hours prior to the Planning Board meeting.

The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan Review Regulations for full details.

APPLICANT: CPI Management, LLC c/o Cathartes File Number: TBD

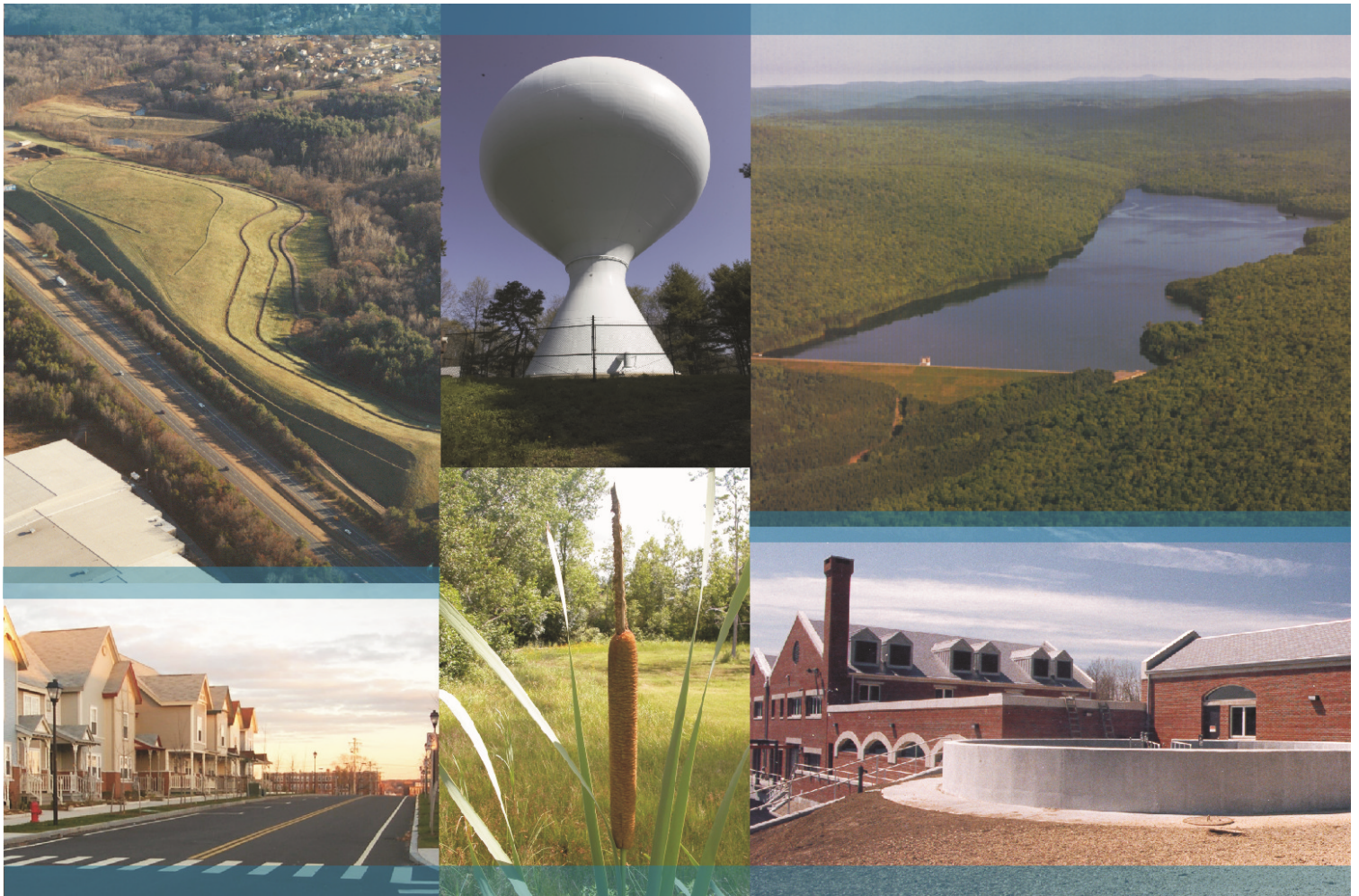
PROJECT TITLE: Cochecho Waterfront Development - Phase 1

PROPERTY LOCATION: Washington & River Street Tax Map: 22 Lot: 1

	Where/How Provided	Reviewed
1. Completed and signed Application form	Enclosed	
2. Plan Review Fees are provided	Enclosed	
3. Electronic copy of the engineered/surveyed plan layout	Enclosed	
4. Electronic copy of supplementary materials and application	Enclosed	
5. Traffic Impact Assessment and Analysis (Standard or Advanced)	Enclosed	
6. Waiver requests to the Site Plan Review Regulations, with written justification	N/A	
7. Conditional Use Permit applications	N/A	
8. A colored rendering of the streetscape that will be created along the existing public right-of-way	See landscape drawings	
9. A colored architectural plan showing all sides of buildings	See architectural drawings	
10. Folded copies of site plan w/scale of not less than 1"=50' or 1"=100' for larger site plans, for TRC. Plans shall contain the following items as appropriate:	Enclosed	
Location map at appropriate scale	See cover sheet	
Proposed Project name and title and Planning File #	See site plans	
Date, north arrow and scale	See site plans	
Names of all abutting property owners	See existing condition plans	
Name and address of owners and/or applicants	See cover sheet	
Signature & stamp of NH licensed land surveyor and/or engineer	See cover sheet	
Zoning District boundaries, including any special or overlay districts	See site plans	
Location of Conservation District areas	N/A	
Location, names and widths of existing and proposed streets, including pavement widths, grades, curbs and crosswalks	See site plans	
Location and widths of existing & proposed easements & right of ways	See site plans	
Location and width of existing and proposed access/egress ways	See site plans	

	Explain How Provided	Reviewed
Depict pedestrian walkways and accessible access	See site plans	
Existing and proposed property lines with dimensions and bearings tied into Dover's Geographic Information System coordinate system	See site plans	
Existing and proposed topographic information at two foot intervals	See grading & drainage plans	
Existing and proposed buildings and structure locations	See site plans	
Minimum building setbacks or build to lines on all lots	See site plans	
Location and size of existing and proposed electric, telephone, gas cable and other underground utilities	See utility plans	
Existing and proposed water lines and fire hydrants, including materials and capacity needed	See utility plans	
Location and materials of sanitary sewage facilities within project site and projected additional peak hour sewer load	See utility plans	
Existing and proposed stormwater lines and facilities	See grading & drainage plans	
Lighting plan depicting all existing and proposed exterior light fixtures and a lighting level analysis for parking lots	See photometrics plan	
Location of Flood Hazard Zone	See site plans	
Location of all bodies of water and watercourses	See site plans	
Location of wetlands and buffers	See existing conditions plans	
Neighborhood plan with aerial underlay showing how project relates to abutting uses within the plan set	See neighborhood plan	
Existing natural features and/or significant vegetation on property	See existing conditions plans	
Depict existing contours up to 100 ft. beyond project limits	See existing conditions plans	
Landscape plan depicting existing and proposed landscaping, prepared by a licensed Professional Landscape Architect	See landscape plans	
Location of parking layout delineating spaces and arrangement; note addressing maximum required spaces	See site plans	
Location, material and size of existing and proposed pavement area	See site plans	
Location of proposed fire lanes	See site plans	
Specify finished floor elevations of buildings	See grading & drainage plans	
Location of solid waste disposal facilities (dumpster, pad and screening, etc.), including required screening	See site plans	
Depict all service, storage, loading bays and utility areas	See utility plans	
All applicable Dover Common Site Plan notes	See G-101 and C-501	
11. Additional Information if appropriate		
Stormwater Management Plan depicting the existing & proposed storm drainage system and engineered drainage analysis	Enclosed	
Stormwater Management System Operation and Maintenance Plan	Enclosed	
Letter to Serve from Public and Private Utilities	Enclosed	
Erosion and Sedimentation Control Plan	Enclosed	
Landscape Operation and Maintenance Plan	See landscape plans	
Proposed restrictive covenants or homeowners association documents	N/A	
Dates and permit numbers of all required state and federal permits	See cover sheet	
If wetland buffer, indicate placards locations, as applicable	N/A	
Depict test boring locations, groundwater elevations and soil profiles and/or soils types call-outs	N/A	
Location of proposed drive-in facilities	N/A	
Provide additional exhibits/technical data determined appropriate by the Planning Board or its staff as required	TBD	

REVIEWED BY: _____ DATE _____ TRC DATE _____



Tighe&Bond

Proposed Multi-Family Development
Washington and River Street
Dover, NH 03820

Drainage Report

Prepared For:

**CPI Management, LLC
c/o Cathartes
11 Beacon Street, Suite #1120
Boston, MA 02108**

January 31, 2020

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Section 1

Narrative

The project site is located on a proposed 4.08-acre parcel of land along River Street and Washington Street in Dover, New Hampshire. This 4.08-acre parcel that will be subdivided from an existing 29.2-acre parcel owned by the City of Dover along the Cochecho River. The parcel is undeveloped, and the City of Dover is currently performing an excavation project on-site to prepare the parcel for future development as a part of the Cochecho Waterfront Development project.

The proposed work includes a multi-family building along River Street with associated site improvements that include off-street parking (both at surface and basement level), stormwater management, utilities, lighting and landscaping. Furthermore, the site has been designed to allow for a multi-family building along Washington Street.

1.1 On Site Soil Description

The majority of the site's topography slopes from east to west. There is a ledge-faced wall on the eastern limits of the site (approximate maximum height of about 42 feet) that sheets some runoff from above onto the site. The site's surface is currently composed of gravel with shallow bedrock below.

1.2 Pre- and Post-Development Flow Comparison

The pre-development and post-development watershed areas have been analyzed at two points of analysis (PA-1 and PA-2). PA-1 is located at the northern corner of the site, where runoff flows toward Washington Street and is ultimately collected in a municipal drainage system in Washington Street that discharges to the Cochecho River. PA-2 is located on the southern end of the site, where runoff flows toward an existing skatepark and River Street and ultimately discharges into the Cochecho River. The total contributing watershed areas for each point of analysis differed between the pre-development and post-development conditions due to varied existing and proposed features that altered subcatchments.

The peak discharge rates at PA-1 and PA-2 were determined by analyzing Type III 24-hour storm events. The rainfall data for these storm events was obtained from the data published by the Northeast Regional Climate Center at Cornell University. Since the site is located within a Coastal and Great Bay Community, an added factor of safety of 15% was included as required by Env-Wq 1503.08(I).

Table 1.1 – Comparison of Pre- and Post- Development Flows (cfs)				
	2-Year Storm	10-Year Storm	25-Year Storm	50-Year Storm
Pre-Development Watershed				
PA-1	4.33	6.66	8.49	10.18
PA-2	12.06	18.57	23.66	28.38
Post-Development Watershed				
PA-1	4.30	6.24	8.26	10.14
PA-2	9.28	14.81	19.13	23.13

1.3 Best Management Practices

All soil erosion and sediment control measures have been designed in accordance with the *NH Stormwater Manual, Volume 3: Erosion and Sediment Controls During Construction*. The intent of the outlined measures is to minimize erosion and sedimentation during construction, stabilize and protect the site from erosion after construction is complete and improve stormwater quality from the site. Best Management Practices for this project include:

- Temporary erosion and sediment control practices to be implemented during construction;
- Permanent stabilization practices to be implemented prior to the completion of construction.
- Stormwater pretreatment practices including deep sump catch basins
- Stormwater treatment practices including two (2) Contech Jellyfish Filter systems
- Stormwater detention practices including an underground detention basin

Section 2

NRCS Soil Survey Map



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 **Strafford County, New Hampshire**



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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Custom Soil Resource Report

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report Map—Hydrologic Soil Group



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

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 1:20,000.

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: Strafford County, New Hampshire
Survey Area Data: Version 19, Sep 16, 2019

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BzB	Buxton silt loam, 3 to 8 percent slopes	C/D	3.0	39.3%
Ma	Made land		0.8	10.7%
SfC	Suffield silt loam, 8 to 15 percent slopes	C	3.9	50.0%
Totals for Area of Interest			7.7	100.0%

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

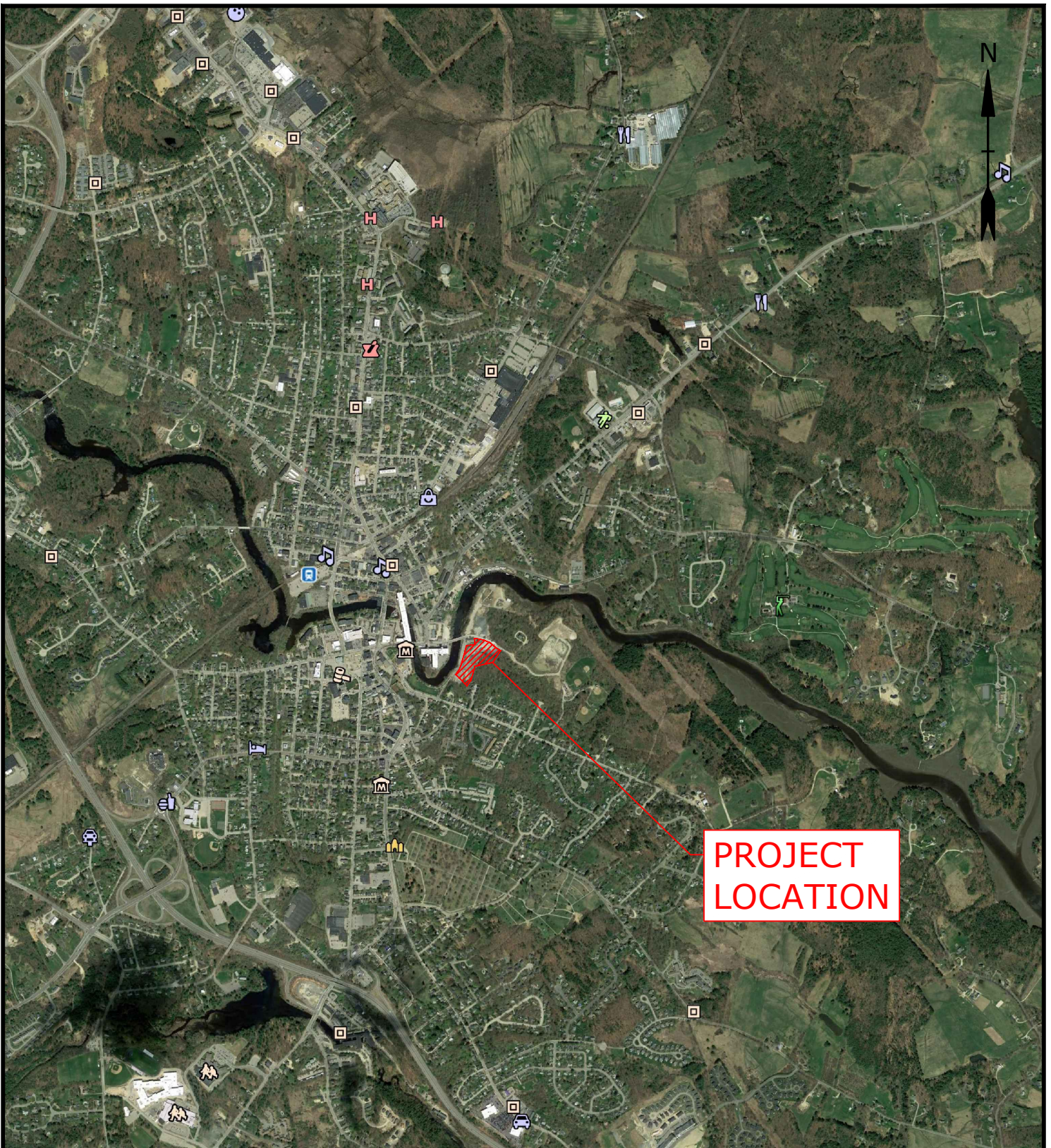
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Section 3

Aerial Photograph & Site Photographs

Jan 08, 2020-10:01am Plotted By: BCurcio
Tighe & Bond, Inc. J:\C0960 Cathartes\C-0960-007 Coheco Waterfront\Drawings_Figures\AutoCAD\Sheet\C0960-007-CS.dwg



PROJECT
LOCATION

PROPOSED MULTI-FAMILY DEVELOPMENT
DOVER, NH

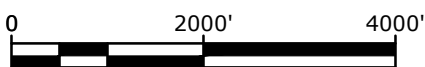
AERIAL IMAGE

DATE: 1/8/2020

SCALE: AS SHOWN

FIGURE: 2

Tighe&Bond
Engineers | Environmental Specialists



SCALE: 1" = 2000'



Photo 1: Looking North along River Street



Photo 2: Looking South along River Street



Photo 3: Looking East along the northern limits of the site



Photo 4: Looking into the site from the Northeastern Corner (location of proposed northern driveway entrance)



Photo 5: Looking South from the center of the site



Photo 6: Looking West from the center of the site



Photo 7: Looking North from within the site



Photo 8: Looking south from within the site (location of proposed southern driveway entrance)

Section 4

Groundwater Recharge Volume Calculations

Subgrade material of the development site is comprised of shallow bedrock. A wavier from NHDES Alteration of Terrain Regulation Env-Wq 1504.12 to provide groundwater recharge is required as infiltration is not practical due to the shallow bedrock.

Section 5 BMP Worksheets

The calculations for water quality volume (WQV) are provided on the following pages. These calculations comply with the requirements of the NHDES Alteration of Terrain Bureau and have been developed for each of the proposed stormwater management systems.



General Calculations - WQV and WQF (optional worksheet)

This worksheet may be useful when designing a BMP that does not fit into one of the specific worksheets already provided (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

2.70	ac	A = Area draining to the practice
1.53	ac	A_i = Impervious area draining to the practice
0.57	decimal	I = percent impervious area draining to the practice, in decimal form
0.56	unitless	R_v = Runoff coefficient = $0.05 + (0.9 \times I)$
1.51	ac-in	$WQV = 1'' \times R_v \times A$
5,489	cf	WQV conversion (ac-in $\times$ 43,560 sf/ac $\times$ 1ft/12")

Water Quality Flow (WQF)

1	inches	P = amount of rainfall. For WQF in NH, P = 1".
0.56	inches	Q = water quality depth. $Q = WQV/A$
95	unitless	CN = unit peak discharge curve number. $CN = 1000 / (10 + 5P + 10Q - 10 * [Q^2 + 1.25 * Q * P]^{0.5})$
0.5	inches	S = potential maximum retention. $S = (1000/CN) - 10$
0.106	inches	I_a = initial abstraction. $I_a = 0.2S$
3.0	minutes	T_c = Time of Concentration
625.0	cfs/mi ² /in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
1.477	cfs	$WQF = q_u \times WQV$. Conversion: to convert "cfs/mi ² /in * ac-in" to "cfs" multiply by 1mi ² /640ac

Designer's Notes: JELLYFISH FILTER - 01

Treatment: (1) Contech Jellyfish Model JF8-8-2- design capacity of 1.60 cfs

Treatment structures located pre-detention



General Calculations - WQV and WQF (optional worksheet)

This worksheet may be useful when designing a BMP that does not fit into one of the specific worksheets already provided (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

1.82	ac	A = Area draining to the practice
1.53	ac	A_i = Impervious area draining to the practice
0.84	decimal	I = percent impervious area draining to the practice, in decimal form
0.81	unitless	R_v = Runoff coefficient = $0.05 + (0.9 \times I)$
1.47	ac-in	$WQV = 1'' \times R_v \times A$
5,329	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = amount of rainfall. For WQF in NH, P = 1".
0.81	inches	Q = water quality depth. $Q = WQV/A$
98	unitless	CN = unit peak discharge curve number. $CN = 1000 / (10 + 5P + 10Q - 10 * [Q^2 + 1.25 * Q * P]^{0.5})$
0.2	inches	S = potential maximum retention. $S = (1000/CN) - 10$
0.037	inches	Ia = initial abstraction. $I_a = 0.2S$
1.5	minutes	T_c = Time of Concentration
700.0	cfs/mi ² /in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
1.606	cfs	$WQF = q_u \times WQV$. Conversion: to convert "cfs/mi ² /in * ac-in" to "cfs" multiply by 1mi ² /640ac

Designer's Notes: JELLYFISH FILTER - 02

Treatment: (1) Contech Jellyfish Model JF8-9-2- design capacity of 1.78 cfs

Treatment structures located pre-detention

Section 6

Drainage Analysis

6.1 Calculation Methods

The design storms analyzed in this study are the 2-year, 10-year, 25-year and 50-year 24-hour duration storm events. The stormwater modeling system, HydroCAD 10.0, was utilized to predict the peak runoff rates from these storm events. The peak discharge rates were determined by analyzing Type III 24-hour storm events. The rainfall data for these storm events was obtained from the data published by the Northeast Regional Climate Center at Cornell University, with an additional 15% added factor of safety as required by Env-Wq 1503.08(l).

The time of concentration was computed using the TR-55 Method, which provides a means of determining the time for an entire watershed to contribute runoff to a specific location via sheet flows, shallow concentrated flow and channel flow. Runoff curve numbers were calculated by estimating the coverage areas and then summing the curve number *for* the coverage area as a percent of the entire watershed.

References:

1. HydroCAD Stormwater Modeling System, by HydroCAD Software Solutions LLC, Chocorua, New Hampshire.
2. New Hampshire Stormwater Management Manual, Volume 2, Post-Construction Best Management Practices Selection and Design, December 2008.
3. "Extreme Precipitation in New York & New England." Extreme Precipitation in New York & New England by Northeast Regional Climate Center (NRCC), 26 June 2012.

6.2 Pre-Development Conditions

In order to analyze the pre-development condition, the site has been divided into two (2) watershed areas modeled at two (2) points of analysis. These points of analysis and their respective watersheds are depicted on the plan entitled "Pre-Development Drainage Plan," Sheet C-801.

The points of analysis and their contributing watershed areas are described below:

Point of Analysis 1 (PA-1)

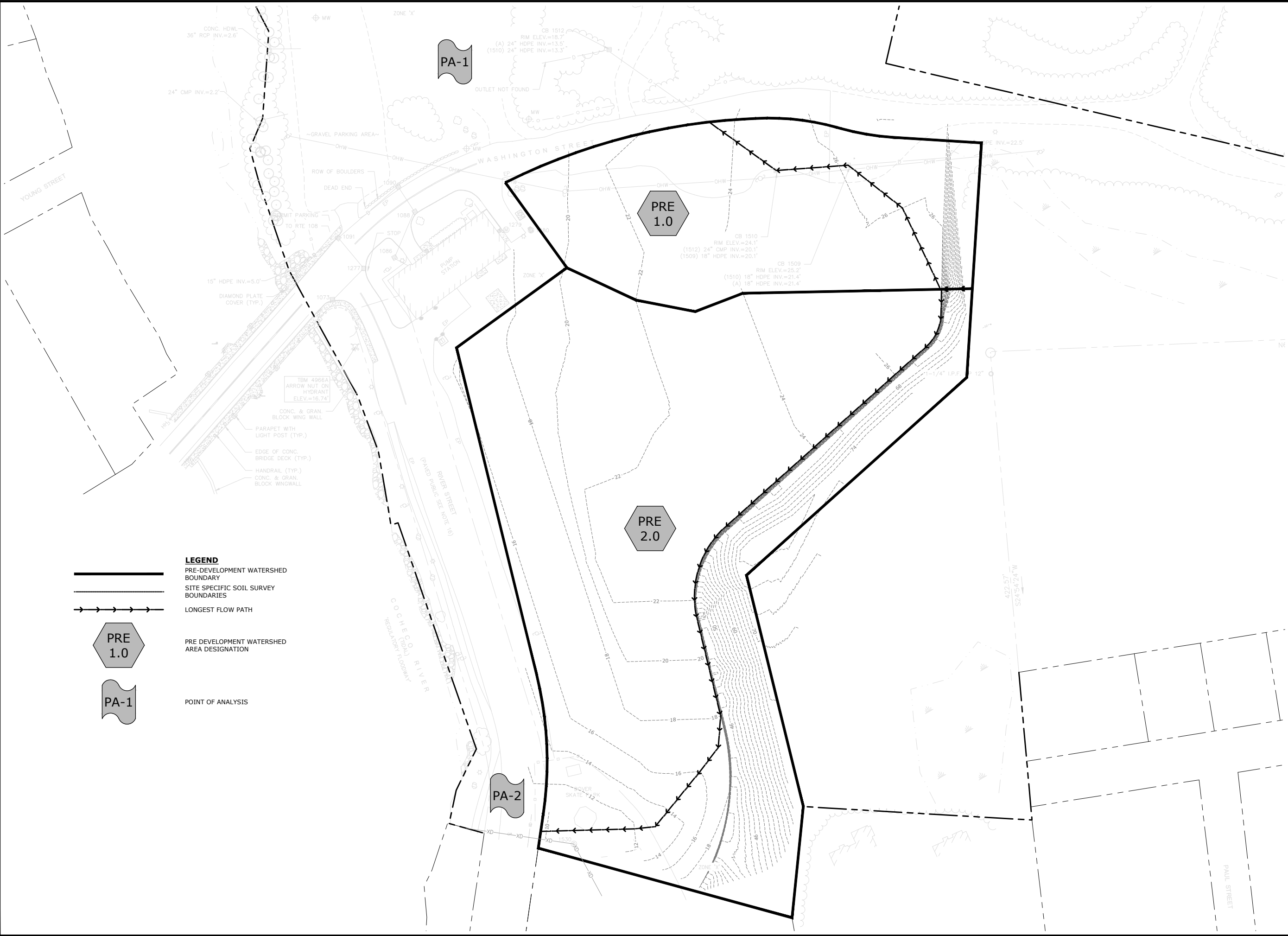
Pre-development Watershed (PRE-1.0) is comprised of gravel slopes across the northern portion of the site. Runoff travels via overland toward two (2) on-site catch basins or toward catch basins along Washington Street. Both drainage routes ultimately discharge via outfalls along the shore of the nearby Cochecho River. Additional runoff from the top of the ledge wall is included in the watershed.

Point of Analysis 2 (PA-2)

Pre-development Watershed 2.0 (PRE-2.0) is also comprised of shallow, gravelly slopes. Covering the majority of the central and southern portions of the site, runoff sheets toward and across River Street before directly discharging into the Cochecho River. Additional runoff from the top of the ledge wall is included in the watershed.

6.2.1 Pre-Development Calculations**6.2.2 Pre-Development Watershed Plans**

Last Save Date: January 30, 2020 11:10 PM By: CML
Plot Date: Thursday, January 30, 2020 Plotted By: Craig M. Langton
Plot File Location: J:\C0960 Catmarres\C-0960-007 Cochecho Waterfront Drawings Figures\AutoCAD\Sheet\C0960-007 DSGN.DWG Layout Tab: C-801



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Cochecho Waterfront Development Phase - I

Applicant:
CPI Management, LLC
c/o Cathartes

Owner:
City of Dover

Dover File #: P20-

Dover, New Hampshire

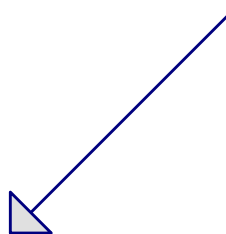
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MARK	DATE	DESCRIPTION
PROJECT NO:		C-0960-007
DATE:		January 31, 2020
FILE:		C0960-007-DSGN.DWG
DRAWN BY:		CML/BKC
CHECKED:		PMC
APPROVED:		BLM
PRE-DEVELOPMENT WATERSHED PLAN		
SCALE:		AS SHOWN
C-801		

PA-1

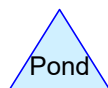
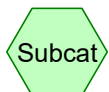


PRE-1.0

PRE-2.0



PA-2



Routing Diagram for C0960-007_Pre

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C0960-007_Pre

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Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
209,448	96	Gravel surface, HSG C (Bedrock) (PRE-1.0, PRE-2.0)
209,448	96	TOTAL AREA

C0960-007_Pre*Type III 24-hr 2-Year Rainfall=3.62"*

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Page 3

Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPRE-1.0:

Runoff Area=56,353 sf 0.00% Impervious Runoff Depth=3.16"
Flow Length=743' Tc=6.0 min CN=96 Runoff=4.33 cfs 14,858 cf

SubcatchmentPRE-2.0:

Runoff Area=153,095 sf 0.00% Impervious Runoff Depth=3.16"
Flow Length=728' Tc=5.1 min CN=96 Runoff=12.06 cfs 40,365 cf

Link PA-1:

Inflow=4.33 cfs 14,858 cf
Primary=4.33 cfs 14,858 cf

Link PA-2:

Inflow=12.06 cfs 40,365 cf
Primary=12.06 cfs 40,365 cf

Total Runoff Area = 209,448 sf Runoff Volume = 55,223 cf Average Runoff Depth = 3.16"
100.00% Pervious = 209,448 sf 0.00% Impervious = 0 sf

Summary for Subcatchment PRE-1.0:

Runoff = 4.33 cfs @ 12.09 hrs, Volume= 14,858 cf, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.62"

Area (sf)	CN	Description
* 56,353	96	Gravel surface, HSG C (Bedrock)
56,353		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	27	1.0000	5.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.15"
2.0	143	0.0056	1.20		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	65	0.0200	8.41	14.86	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
3.8	508	0.0035	2.22	6.96	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
6.0	743	Total			

Summary for Subcatchment PRE-2.0:

Runoff = 12.06 cfs @ 12.07 hrs, Volume= 40,365 cf, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.62"

	Area (sf)	CN	Description
*	153,095	96	Gravel surface, HSG C (Bedrock)
	153,095		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	27	1.0000	5.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.15"
5.0	701	0.0214	2.36		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	728	Total			

Summary for Link PA-1:

Inflow Area = 56,353 sf, 0.00% Impervious, Inflow Depth = 3.16" for 2-Year event
Inflow = 4.33 cfs @ 12.09 hrs, Volume= 14,858 cf
Primary = 4.33 cfs @ 12.09 hrs, Volume= 14,858 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 153,095 sf, 0.00% Impervious, Inflow Depth = 3.16" for 2-Year event
Inflow = 12.06 cfs @ 12.07 hrs, Volume= 40,365 cf
Primary = 12.06 cfs @ 12.07 hrs, Volume= 40,365 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPRE-1.0:

Runoff Area=56,353 sf 0.00% Impervious Runoff Depth=4.99"
Flow Length=743' Tc=6.0 min CN=96 Runoff=6.66 cfs 23,433 cf

SubcatchmentPRE-2.0:

Runoff Area=153,095 sf 0.00% Impervious Runoff Depth=4.99"
Flow Length=728' Tc=5.1 min CN=96 Runoff=18.57 cfs 63,662 cf

Link PA-1:

Inflow=6.66 cfs 23,433 cf
Primary=6.66 cfs 23,433 cf

Link PA-2:

Inflow=18.57 cfs 63,662 cf
Primary=18.57 cfs 63,662 cf

Total Runoff Area = 209,448 sf Runoff Volume = 87,095 cf Average Runoff Depth = 4.99"
100.00% Pervious = 209,448 sf 0.00% Impervious = 0 sf

Summary for Subcatchment PRE-1.0:

Runoff = 6.66 cfs @ 12.09 hrs, Volume= 23,433 cf, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.46"

Area (sf)	CN	Description
* 56,353	96	Gravel surface, HSG C (Bedrock)
56,353		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	27	1.0000	5.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.15"
2.0	143	0.0056	1.20		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	65	0.0200	8.41	14.86	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
3.8	508	0.0035	2.22	6.96	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
6.0	743	Total			

Summary for Subcatchment PRE-2.0:

Runoff = 18.57 cfs @ 12.07 hrs, Volume= 63,662 cf, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.46"

	Area (sf)	CN	Description
*	153,095	96	Gravel surface, HSG C (Bedrock)
	153,095		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	27	1.0000	5.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.15"
5.0	701	0.0214	2.36		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	728	Total			

Summary for Link PA-1:

Inflow Area = 56,353 sf, 0.00% Impervious, Inflow Depth = 4.99" for 10-Year event
Inflow = 6.66 cfs @ 12.09 hrs, Volume= 23,433 cf
Primary = 6.66 cfs @ 12.09 hrs, Volume= 23,433 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 153,095 sf, 0.00% Impervious, Inflow Depth = 4.99" for 10-Year event
Inflow = 18.57 cfs @ 12.07 hrs, Volume= 63,662 cf
Primary = 18.57 cfs @ 12.07 hrs, Volume= 63,662 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

C0960-007_Pre*Type III 24-hr 25-Year Rainfall=6.91"*

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Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPRE-1.0:

Runoff Area=56,353 sf 0.00% Impervious Runoff Depth=6.43"
Flow Length=743' Tc=6.0 min CN=96 Runoff=8.49 cfs 30,214 cf

SubcatchmentPRE-2.0:

Runoff Area=153,095 sf 0.00% Impervious Runoff Depth=6.43"
Flow Length=728' Tc=5.1 min CN=96 Runoff=23.66 cfs 82,084 cf

Link PA-1:

Inflow=8.49 cfs 30,214 cf
Primary=8.49 cfs 30,214 cf

Link PA-2:

Inflow=23.66 cfs 82,084 cf
Primary=23.66 cfs 82,084 cf

Total Runoff Area = 209,448 sf Runoff Volume = 112,298 cf Average Runoff Depth = 6.43"
100.00% Pervious = 209,448 sf 0.00% Impervious = 0 sf

Summary for Subcatchment PRE-1.0:

Runoff = 8.49 cfs @ 12.09 hrs, Volume= 30,214 cf, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.91"

Area (sf)	CN	Description
* 56,353	96	Gravel surface, HSG C (Bedrock)
56,353		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	27	1.0000	5.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.15"
2.0	143	0.0056	1.20		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	65	0.0200	8.41	14.86	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
3.8	508	0.0035	2.22	6.96	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
6.0	743	Total			

Summary for Subcatchment PRE-2.0:

Runoff = 23.66 cfs @ 12.07 hrs, Volume= 82,084 cf, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.91"

	Area (sf)	CN	Description
*	153,095	96	Gravel surface, HSG C (Bedrock)
	153,095		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	27	1.0000	5.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.15"
5.0	701	0.0214	2.36		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	728	Total			

Summary for Link PA-1:

Inflow Area = 56,353 sf, 0.00% Impervious, Inflow Depth = 6.43" for 25-Year event
Inflow = 8.49 cfs @ 12.09 hrs, Volume= 30,214 cf
Primary = 8.49 cfs @ 12.09 hrs, Volume= 30,214 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 153,095 sf, 0.00% Impervious, Inflow Depth = 6.43" for 25-Year event
Inflow = 23.66 cfs @ 12.07 hrs, Volume= 82,084 cf
Primary = 23.66 cfs @ 12.07 hrs, Volume= 82,084 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

C0960-007_Pre

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Type III 24-hr 50-Year Rainfall=8.26"

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Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPRE-1.0:

Runoff Area=56,353 sf 0.00% Impervious Runoff Depth=7.78"
Flow Length=743' Tc=6.0 min CN=96 Runoff=10.18 cfs 36,536 cf

SubcatchmentPRE-2.0:

Runoff Area=153,095 sf 0.00% Impervious Runoff Depth=7.78"
Flow Length=728' Tc=5.1 min CN=96 Runoff=28.38 cfs 99,259 cf

Link PA-1:

Inflow=10.18 cfs 36,536 cf
Primary=10.18 cfs 36,536 cf

Link PA-2:

Inflow=28.38 cfs 99,259 cf
Primary=28.38 cfs 99,259 cf

Total Runoff Area = 209,448 sf Runoff Volume = 135,796 cf Average Runoff Depth = 7.78"
100.00% Pervious = 209,448 sf 0.00% Impervious = 0 sf

Summary for Subcatchment PRE-1.0:

Runoff = 10.18 cfs @ 12.09 hrs, Volume= 36,536 cf, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.26"

Area (sf)	CN	Description
* 56,353	96	Gravel surface, HSG C (Bedrock)
56,353		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	27	1.0000	5.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.15"
2.0	143	0.0056	1.20		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	65	0.0200	8.41	14.86	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
3.8	508	0.0035	2.22	6.96	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
6.0	743	Total			

Summary for Subcatchment PRE-2.0:

Runoff = 28.38 cfs @ 12.07 hrs, Volume= 99,259 cf, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	153,095	96	Gravel surface, HSG C (Bedrock)
	153,095		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	27	1.0000	5.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.15"
5.0	701	0.0214	2.36		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	728	Total			

Summary for Link PA-1:

Inflow Area = 56,353 sf, 0.00% Impervious, Inflow Depth = 7.78" for 50-Year event
Inflow = 10.18 cfs @ 12.09 hrs, Volume= 36,536 cf
Primary = 10.18 cfs @ 12.09 hrs, Volume= 36,536 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 153,095 sf, 0.00% Impervious, Inflow Depth = 7.78" for 50-Year event
Inflow = 28.38 cfs @ 12.07 hrs, Volume= 99,259 cf
Primary = 28.38 cfs @ 12.07 hrs, Volume= 99,259 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

6.3 Post-Development Conditions

The post-development condition was analyzed by dividing the site into four (4) watershed areas. Stormwater runoff from these areas flow via underground drainage, grass-lined swales, and overland flow to the same points of analysis that were used in the pre-development condition (PA-1 and PA-2). At PA-1, runoff is directed to a proposed drain manhole and network under the future reconstruction of Washington street (design by others), where it will ultimately discharge to the Cochecho River via an existing outfall. At PA-2, runoff is collected by on-site underground drainage and conveyed to an existing drain manhole at the southern end of the site, where it discharges to the Cochecho River. These points of analysis and subcatchment areas are depicted on the plan entitled "Post-Development Drainage Plan," Sheet C-802.

The points of analysis and their contributing watershed areas are described below.

Point of Analysis 1 (PA-1)

Post-development Watershed 1.0 (POST-1.0) is comprised of mostly impervious surfaces in the center of the site (pavement, concrete sidewalks) as well as the future proposed multi-family structure (to be constructed at a later date.) Runoff is collected via off line deep-sump catch basins and roof leaders. This runoff is directed via underground drainage to a Bypass Structure (PDMH-03) which directs the Water Quality Flow (WQF) to the Contech Jellyfish Filter that is also sized to treat the WQF for the subcatchment area. An underground detention basin, in combination with an outlet control structure further downstream, stores and detains runoff from the subcatchment in order to meet the pre-development peak runoff rates. Stormwater then heads offsite to tie into a proposed drain manhole and network under the future reconstruction of Washington street (design by others).

Post-development watershed 1.1 (POST-1.1) is comprised mostly of minor drainage areas around the proposed future building. This runoff sheets toward Washington Street, where it will enter its proposed drainage network (design by others).

Point of Analysis 2 (PA-2)

Post-Development Watershed 2.0 (POST-2.0) is comprised of both impervious and non-impervious surfaces that direct runoff towards the southern end of the site. Runoff from a portion of the parking area at the north end of the site sheets toward a conveyance swale along the length of the ledge wall. This conveyance swale additionally directs runoff that may come from above the ledge wall, and feeds into a catch basin. The catch basin ties into a drainage network that directs runoff from the rest of the parking lot as well as a roof leader from the multi-family structure (to be constructed with this projects) to a bypass structure (PDHM-07) near the entrance of the site. This bypass structure directs the WQF to the Contech Jellyfish Filter that is also sized to treat the WQF for the subcatchment area. After being treated, runoff ties into an existing drain manhole before ultimately discharging to the Cochecho River.

Post-Development Watershed 2.1 (POST-2.1), similar to POST 1.1, and is comprised mostly of minor drainage areas around the proposed building. Runoff within this subcatchment sheets toward River Street, where it will enter its proposed drainage network (design by others).

6.3.1 Post-Development Calculations

6.3.2 Post-Development Watershed Plans

6.4 Peak Rate Comparisons

The following table summarizes and compares the pre- and post-development peak runoff rates for the 2-year, 10-year, 25-year and 50-year storm events at each point of analysis.

Point of Analysis	Pre/ Post 2-Year Storm (cfs)	Pre/ Post 10-Year Storm (cfs)	Pre/ Post 25-Year Storm (cfs)	Pre/ Post 50-Year Storm (cfs)
PA-1	4.33/ 4.30	6.66/ 6.24	8.49/ 8.26	10.18/ 10.14
PA-2	12.06/ 9.28	18.57/ 14.81	23.66/ 19.13	28.38/ 23.13

6.5 Mitigation Description

6.5.1 Mitigation Calculations

The proposed project area has been evaluated to treat the required water quality flow (WQF) per the requirements of Env-Wq 1500. These calculations have been provided in Section 5 of this report (BMP Worksheets).

6.5.2 Pre-Treatment Methods for Protecting Water Quality

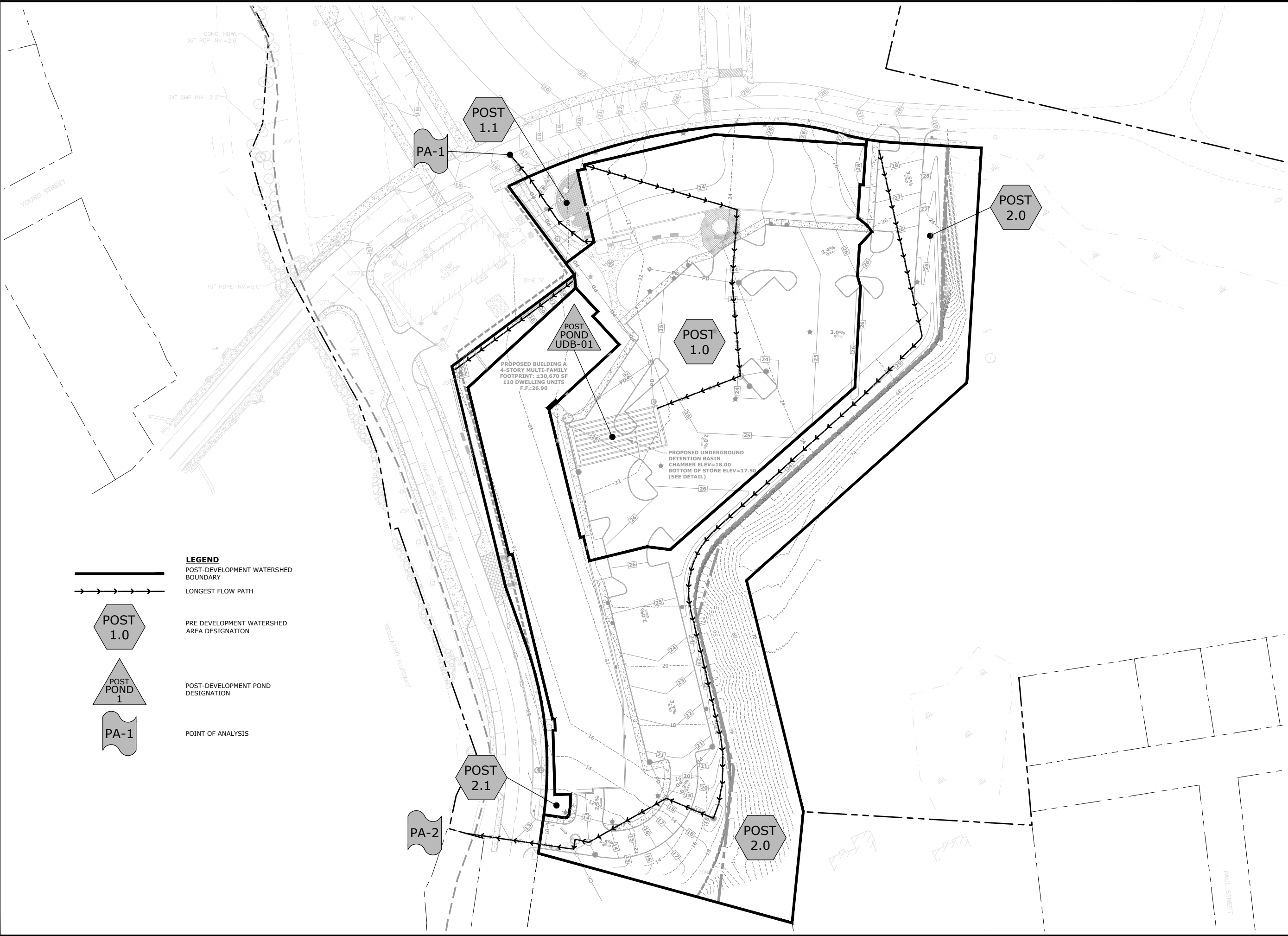
Pretreatment methods for protecting water quality on this site include deep-sump catch basins.

6.5.3 Treatment Methods for Protecting Water Quality

Treatment for the site is included by means of two (2) Contech Jellyfish stormwater filtration systems. The Jellyfish Filters were sized to treat the Water Quality Flow for their respective subcatchment areas.

The BMP Worksheets for this treatment practice has been included in Section 5 of this report.

Last Save Date: January 30, 2020 11:33 PM By: CML
Plot Date: Thursday, January 30, 2020 Plotted By: Craig M. Langton
Plot File Location: J:\C0960\Cartmsh\C-0960-007 Cochecho Waterfront\Drawings Figures\AutoCAD\Sheet\C0960-007 DSGN.DWG Layout Tab: C-802



POST-DEVELOPMENT WATERSHED BOUNDARY

LONGEST FLOW PATH

POST 1.0

PRE DEVELOPMENT WATERSHED AREA DESIGNATION

POST POND 1

POST-DEVELOPMENT POND DESIGNATION

PA-1

POINT OF ANALYSIS

Tighe&Bond

Engineers | Environmental Specialists

SCALE IN FEET

0 40 80

GRAPHIC SCALE

Cochecho Waterfront Development Phase - I

Applicant:
CPI Management, LLC
c/o Cathartes

Owner:
City of Dover

Dover File #: P20-

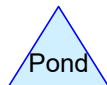
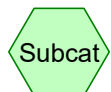
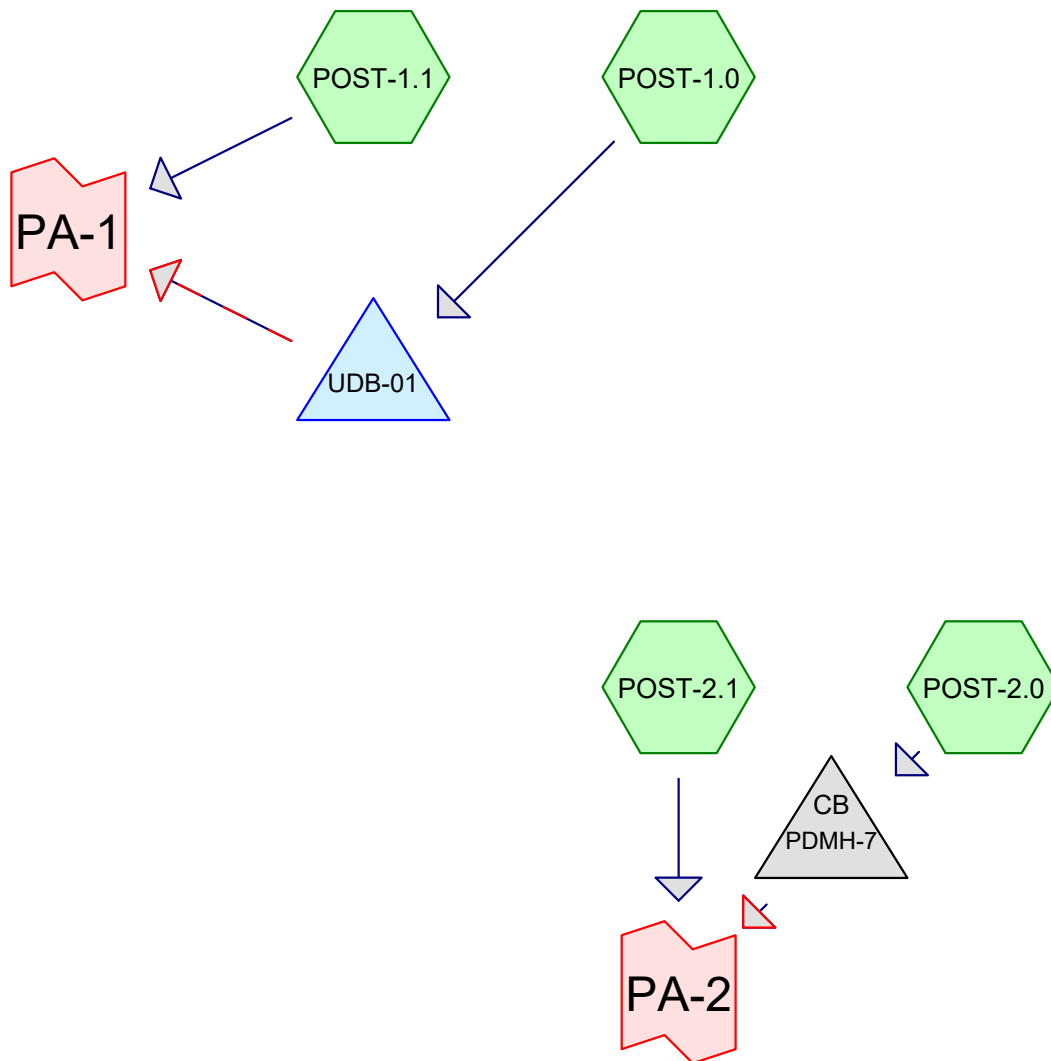
Dover, New Hampshire

A	1/31/2020	TRC SITE PLAN REVIEW
MARK	DATE	DESCRIPTION
PROJECT NO:		C-0960-007
DATE:		January 31, 2020
FILE:		C0960-007-DSGN.DWG
DRAWN BY:		CML/BKC
CHECKED BY:		PMC
APPROVED BY:		BLM

POST-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-802



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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
46,018	74	>75% Grass cover, Good, HSG C (POST-1.0, POST-1.1, POST-2.0, POST-2.1)
36,371	98	Ledge, HSG C (POST-2.0)
79,599	98	Paved parking, HSG C (POST-1.0, POST-1.1, POST-2.0, POST-2.1)
47,460	98	Unconnected roofs, HSG C (POST-1.0, POST-2.0)
209,448	93	TOTAL AREA

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Type III 24-hr 2-Year Rainfall=3.62"

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Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPOST-1.0: Runoff Area=79,455 sf 83.70% Impervious Runoff Depth=2.95"
Flow Length=417' Slope=0.0050 '/' Tc=3.6 min CN=94 Runoff=6.39 cfs 19,550 cf

SubcatchmentPOST-1.1: Runoff Area=6,949 sf 24.90% Impervious Runoff Depth=1.73"
Flow Length=110' Tc=3.2 min CN=80 Runoff=0.35 cfs 1,003 cf

SubcatchmentPOST-2.0: Runoff Area=117,891 sf 80.34% Impervious Runoff Depth=2.85"
Flow Length=682' Tc=4.0 min CN=93 Runoff=9.12 cfs 28,009 cf

SubcatchmentPOST-2.1: Runoff Area=5,153 sf 9.28% Impervious Runoff Depth=1.45"
Flow Length=134' Tc=6.8 min CN=76 Runoff=0.19 cfs 624 cf

Pond PDMH-7: Peak Elev=10.13' Inflow=9.12 cfs 28,009 cf
Primary=6.22 cfs 5,989 cf Secondary=2.90 cfs 22,019 cf Outflow=9.12 cfs 28,009 cf

Pond UDB-01: Peak Elev=19.48' Storage=0.079 af Inflow=6.39 cfs 19,550 cf
Primary=3.00 cfs 5,691 cf Secondary=1.05 cfs 13,796 cf Outflow=4.05 cfs 19,487 cf

Link PA-1: Inflow=4.30 cfs 20,490 cf
Primary=4.30 cfs 20,490 cf

Link PA-2: Inflow=9.28 cfs 28,632 cf
Primary=9.28 cfs 28,632 cf

Total Runoff Area = 209,448 sf Runoff Volume = 49,186 cf Average Runoff Depth = 2.82"
21.97% Pervious = 46,018 sf 78.03% Impervious = 163,430 sf

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Type III 24-hr 2-Year Rainfall=3.62"

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Summary for Subcatchment POST-1.0:

Runoff = 6.39 cfs @ 12.05 hrs, Volume= 19,550 cf, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.62"

Area (sf)	CN	Description
16,796	98	Unconnected roofs, HSG C
12,948	74	>75% Grass cover, Good, HSG C
49,711	98	Paved parking, HSG C
79,455	94	Weighted Average
12,948		16.30% Pervious Area
66,507		83.70% Impervious Area
16,796		25.25% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	100	0.0050	0.84		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
0.5	42	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	275	0.0050	4.20	7.43	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.6	417	Total			

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Type III 24-hr 2-Year Rainfall=3.62"

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Summary for Subcatchment POST-1.1:

Runoff = 0.35 cfs @ 12.05 hrs, Volume= 1,003 cf, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.62"

Area (sf)	CN	Description
5,219	74	>75% Grass cover, Good, HSG C
1,730	98	Paved parking, HSG C
6,949	80	Weighted Average
5,219		75.10% Pervious Area
1,730		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.80		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
2.6	45	0.1000	0.29		Sheet Flow, Grass: Short n= 0.150 P2= 3.62"
0.5	60	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.2	110	Total			

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Type III 24-hr 2-Year Rainfall=3.62"

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Summary for Subcatchment POST-2.0:

Runoff = 9.12 cfs @ 12.06 hrs, Volume= 28,009 cf, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.62"

Area (sf)	CN	Description
30,664	98	Unconnected roofs, HSG C
23,176	74	>75% Grass cover, Good, HSG C
27,680	98	Paved parking, HSG C
* 36,371	98	Ledge, HSG C
117,891	93	Weighted Average
23,176		19.66% Pervious Area
94,715		80.34% Impervious Area
30,664		32.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0290	1.70		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
0.5	58	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	524	0.0075	3.48	31.35	Channel Flow, Area= 9.0 sf Perim= 12.3' r= 0.73' n= 0.030 Earth, grassed & winding
4.0	682	Total			

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Type III 24-hr 2-Year Rainfall=3.62"

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Summary for Subcatchment POST-2.1:

Runoff = 0.19 cfs @ 12.11 hrs, Volume= 624 cf, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.62"

Area (sf)	CN	Description
4,675	74	>75% Grass cover, Good, HSG C
478	98	Paved parking, HSG C
5,153	76	Weighted Average
4,675		90.72% Pervious Area
478		9.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1600	0.34		Sheet Flow, Grass: Short n= 0.150 P2= 3.15"
3.9	50	0.0500	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.15"
0.4	34	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.8	134	Total			

Summary for Pond PDMH-7:

Inflow Area = 117,891 sf, 80.34% Impervious, Inflow Depth = 2.85" for 2-Year event
 Inflow = 9.12 cfs @ 12.06 hrs, Volume= 28,009 cf
 Outflow = 9.12 cfs @ 12.06 hrs, Volume= 28,009 cf, Atten= 0%, Lag= 0.0 min
 Primary = 6.22 cfs @ 12.06 hrs, Volume= 5,989 cf
 Secondary = 2.90 cfs @ 12.06 hrs, Volume= 22,019 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Peak Elev= 10.13' @ 12.06 hrs

Flood Elev= 13.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.00'	24.0" Round Culvert L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 9.00' / 8.70' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	8.50'	10.0" Round Culvert L= 7.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.50' / 8.25' S= 0.0357 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=6.01 cfs @ 12.06 hrs HW=10.11' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 6.01 cfs @ 4.86 fps)

Secondary OutFlow Max=2.87 cfs @ 12.06 hrs HW=10.11' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 2.87 cfs @ 5.25 fps)

Summary for Pond UDB-01:

Inflow Area = 79,455 sf, 83.70% Impervious, Inflow Depth = 2.95" for 2-Year event
 Inflow = 6.39 cfs @ 12.05 hrs, Volume= 19,550 cf
 Outflow = 4.05 cfs @ 12.14 hrs, Volume= 19,487 cf, Atten= 37%, Lag= 5.3 min
 Primary = 3.00 cfs @ 12.14 hrs, Volume= 5,691 cf
 Secondary = 1.05 cfs @ 12.14 hrs, Volume= 13,796 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
 Starting Elev= 18.00' Surf.Area= 0.073 ac Storage= 0.015 af
 Peak Elev= 19.48' @ 12.14 hrs Surf.Area= 0.073 ac Storage= 0.079 af (0.064 af above start)
 Flood Elev= 22.00' Surf.Area= 0.073 ac Storage= 0.187 af (0.173 af above start)

Plug-Flow detention time= 50.6 min calculated for 18,813 cf (96% of inflow)
 Center-of-Mass det. time= 17.8 min (798.7 - 780.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	17.50'	0.076 af	37.00'W x 86.00'L x 4.50'H Field A 0.329 af Overall - 0.140 af Embedded = 0.189 af x 40.0% Voids
#2A	18.00'	0.112 af	ADS N-12 36" x 32 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= -3.00' x 7.10 sf x 8 rows 35.00' Header x 7.10 sf x 2 = 497.0 cf Inside
		0.187 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	18.0" Round Culvert L= 37.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.25' S= 0.0203 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	18.60'	22.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Device 1	20.00'	16.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	21.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#5	Secondary	18.00'	6.0" Round Culvert L= 5.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.75' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=2.99 cfs @ 12.14 hrs HW=19.47' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 2.99 cfs of 7.28 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 2.99 cfs @ 3.91 fps)
 ↑ **3=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.05 cfs @ 12.14 hrs HW=19.47' TW=0.00' (Dynamic Tailwater)

↑ **5=Culvert** (Inlet Controls 1.05 cfs @ 5.33 fps)

Pond UDB-01: - Chamber Wizard Field A**Chamber Model = ADS N-12 36" (ADS N-12® Pipe)**

Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf

Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf

Row Length Adjustment= -3.00' x 7.10 sf x 8 rows

42.0" Wide + 12.0" Spacing = 54.0" C-C Row Spacing

4 Chambers/Row x 20.00' Long -3.00' Row Adjustment +3.50' Header x 2 = 84.00' Row Length +12.0" End Stone x 2 = 86.00' Base Length

8 Rows x 42.0" Wide + 12.0" Spacing x 7 + 12.0" Side Stone x 2 = 37.00' Base Width

6.0" Base + 42.0" Chamber Height + 6.0" Cover = 4.50' Field Height

32 Chambers x 142.0 cf -3.00' Row Adjustment x 7.10 sf x 8 Rows + 35.00' Header x 7.10 sf x 2 =
4,870.6 cf Chamber Storage32 Chambers x 177.1 cf -3.00' Row Adjustment x 8.86 sf x 8 Rows + 35.00' Header x 8.86 sf x 2 =
6,076.1 cf Displacement

14,318.9 cf Field - 6,076.1 cf Chambers = 8,242.9 cf Stone x 40.0% Voids = 3,297.2 cf Stone Storage

Chamber Storage + Stone Storage = 8,167.7 cf = 0.188 af

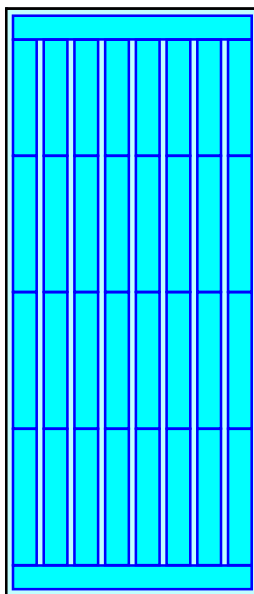
Overall Storage Efficiency = 57.0%

Overall System Size = 86.00' x 37.00' x 4.50'

32 Chambers

530.3 cy Field

305.3 cy Stone



Summary for Link PA-1:

Inflow Area = 86,404 sf, 78.97% Impervious, Inflow Depth > 2.85" for 2-Year event
Inflow = 4.30 cfs @ 12.12 hrs, Volume= 20,490 cf
Primary = 4.30 cfs @ 12.12 hrs, Volume= 20,490 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 123,044 sf, 77.37% Impervious, Inflow Depth = 2.79" for 2-Year event
Inflow = 9.28 cfs @ 12.06 hrs, Volume= 28,632 cf
Primary = 9.28 cfs @ 12.06 hrs, Volume= 28,632 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

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Type III 24-hr 10-Year Rainfall=5.46"

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Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPOST-1.0: Runoff Area=79,455 sf 83.70% Impervious Runoff Depth=4.76"
Flow Length=417' Slope=0.0050 '/' Tc=3.6 min CN=94 Runoff=10.03 cfs 31,532 cf

SubcatchmentPOST-1.1: Runoff Area=6,949 sf 24.90% Impervious Runoff Depth=3.30"
Flow Length=110' Tc=3.2 min CN=80 Runoff=0.67 cfs 1,910 cf

SubcatchmentPOST-2.0: Runoff Area=117,891 sf 80.34% Impervious Runoff Depth=4.65"
Flow Length=682' Tc=4.0 min CN=93 Runoff=14.47 cfs 45,685 cf

SubcatchmentPOST-2.1: Runoff Area=5,153 sf 9.28% Impervious Runoff Depth=2.92"
Flow Length=134' Tc=6.8 min CN=76 Runoff=0.39 cfs 1,254 cf

Pond PDMH-7: Peak Elev=10.64' Inflow=14.47 cfs 45,685 cf
Primary=11.02 cfs 12,542 cf Secondary=3.45 cfs 33,143 cf Outflow=14.47 cfs 45,685 cf

Pond UDB-01: Peak Elev=20.17' Storage=0.117 af Inflow=10.03 cfs 31,532 cf
Primary=4.57 cfs 11,194 cf Secondary=1.31 cfs 20,270 cf Outflow=5.88 cfs 31,464 cf

Link PA-1: Inflow=6.24 cfs 33,374 cf
Primary=6.24 cfs 33,374 cf

Link PA-2: Inflow=14.81 cfs 46,939 cf
Primary=14.81 cfs 46,939 cf

Total Runoff Area = 209,448 sf Runoff Volume = 80,381 cf Average Runoff Depth = 4.61"
21.97% Pervious = 46,018 sf 78.03% Impervious = 163,430 sf

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Type III 24-hr 10-Year Rainfall=5.46"

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Summary for Subcatchment POST-1.0:

Runoff = 10.03 cfs @ 12.05 hrs, Volume= 31,532 cf, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.46"

Area (sf)	CN	Description
16,796	98	Unconnected roofs, HSG C
12,948	74	>75% Grass cover, Good, HSG C
49,711	98	Paved parking, HSG C
79,455	94	Weighted Average
12,948		16.30% Pervious Area
66,507		83.70% Impervious Area
16,796		25.25% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	100	0.0050	0.84		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
0.5	42	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	275	0.0050	4.20	7.43	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.6	417	Total			

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Type III 24-hr 10-Year Rainfall=5.46"

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Summary for Subcatchment POST-1.1:

Runoff = 0.67 cfs @ 12.05 hrs, Volume= 1,910 cf, Depth= 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.46"

Area (sf)	CN	Description
5,219	74	>75% Grass cover, Good, HSG C
1,730	98	Paved parking, HSG C
6,949	80	Weighted Average
5,219		75.10% Pervious Area
1,730		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.80		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
2.6	45	0.1000	0.29		Sheet Flow, Grass: Short n= 0.150 P2= 3.62"
0.5	60	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.2	110	Total			

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Type III 24-hr 10-Year Rainfall=5.46"

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Summary for Subcatchment POST-2.0:

Runoff = 14.47 cfs @ 12.06 hrs, Volume= 45,685 cf, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.46"

Area (sf)	CN	Description
30,664	98	Unconnected roofs, HSG C
23,176	74	>75% Grass cover, Good, HSG C
27,680	98	Paved parking, HSG C
* 36,371	98	Ledge, HSG C
117,891	93	Weighted Average
23,176		19.66% Pervious Area
94,715		80.34% Impervious Area
30,664		32.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0290	1.70		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
0.5	58	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	524	0.0075	3.48	31.35	Channel Flow, Area= 9.0 sf Perim= 12.3' r= 0.73' n= 0.030 Earth, grassed & winding
4.0	682	Total			

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Type III 24-hr 10-Year Rainfall=5.46"

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Summary for Subcatchment POST-2.1:

Runoff = 0.39 cfs @ 12.10 hrs, Volume= 1,254 cf, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.46"

Area (sf)	CN	Description
4,675	74	>75% Grass cover, Good, HSG C
478	98	Paved parking, HSG C
5,153	76	Weighted Average
4,675		90.72% Pervious Area
478		9.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1600	0.34		Sheet Flow, Grass: Short n= 0.150 P2= 3.15"
3.9	50	0.0500	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.15"
0.4	34	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.8	134	Total			

Summary for Pond PDMH-7:

Inflow Area = 117,891 sf, 80.34% Impervious, Inflow Depth = 4.65" for 10-Year event
 Inflow = 14.47 cfs @ 12.06 hrs, Volume= 45,685 cf
 Outflow = 14.47 cfs @ 12.06 hrs, Volume= 45,685 cf, Atten= 0%, Lag= 0.0 min
 Primary = 11.02 cfs @ 12.06 hrs, Volume= 12,542 cf
 Secondary = 3.45 cfs @ 12.06 hrs, Volume= 33,143 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Peak Elev= 10.64' @ 12.06 hrs

Flood Elev= 13.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.00'	24.0" Round Culvert L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 9.00' / 8.70' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	8.50'	10.0" Round Culvert L= 7.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.50' / 8.25' S= 0.0357 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=10.69 cfs @ 12.06 hrs HW=10.61' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 10.69 cfs @ 5.39 fps)

Secondary OutFlow Max=3.41 cfs @ 12.06 hrs HW=10.61' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 3.41 cfs @ 6.26 fps)

Summary for Pond UDB-01:

Inflow Area = 79,455 sf, 83.70% Impervious, Inflow Depth = 4.76" for 10-Year event
 Inflow = 10.03 cfs @ 12.05 hrs, Volume= 31,532 cf
 Outflow = 5.88 cfs @ 12.15 hrs, Volume= 31,464 cf, Atten= 41%, Lag= 6.1 min
 Primary = 4.57 cfs @ 12.15 hrs, Volume= 11,194 cf
 Secondary = 1.31 cfs @ 12.15 hrs, Volume= 20,270 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
 Starting Elev= 18.00' Surf.Area= 0.073 ac Storage= 0.015 af
 Peak Elev= 20.17' @ 12.15 hrs Surf.Area= 0.073 ac Storage= 0.117 af (0.102 af above start)
 Flood Elev= 22.00' Surf.Area= 0.073 ac Storage= 0.187 af (0.173 af above start)

Plug-Flow detention time= 40.1 min calculated for 30,828 cf (98% of inflow)
 Center-of-Mass det. time= 16.9 min (785.7 - 768.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	17.50'	0.076 af	37.00'W x 86.00'L x 4.50'H Field A 0.329 af Overall - 0.140 af Embedded = 0.189 af x 40.0% Voids
#2A	18.00'	0.112 af	ADS N-12 36" x 32 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= -3.00' x 7.10 sf x 8 rows 35.00' Header x 7.10 sf x 2 = 497.0 cf Inside
		0.187 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	18.0" Round Culvert L= 37.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.25' S= 0.0203 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	18.60'	22.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Device 1	20.00'	16.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	21.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#5	Secondary	18.00'	6.0" Round Culvert L= 5.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.75' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=4.55 cfs @ 12.15 hrs HW=20.16' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 4.55 cfs of 10.10 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 4.27 cfs @ 5.59 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.27 cfs @ 1.28 fps)
 ↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.31 cfs @ 12.15 hrs HW=20.16' TW=0.00' (Dynamic Tailwater)

↑ **5=Culvert** (Inlet Controls 1.31 cfs @ 6.65 fps)

Pond UDB-01: - Chamber Wizard Field A**Chamber Model = ADS N-12 36" (ADS N-12® Pipe)**

Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf

Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf

Row Length Adjustment= -3.00' x 7.10 sf x 8 rows

42.0" Wide + 12.0" Spacing = 54.0" C-C Row Spacing

4 Chambers/Row x 20.00' Long -3.00' Row Adjustment +3.50' Header x 2 = 84.00' Row Length +12.0" End Stone x 2 = 86.00' Base Length

8 Rows x 42.0" Wide + 12.0" Spacing x 7 + 12.0" Side Stone x 2 = 37.00' Base Width

6.0" Base + 42.0" Chamber Height + 6.0" Cover = 4.50' Field Height

32 Chambers x 142.0 cf -3.00' Row Adjustment x 7.10 sf x 8 Rows + 35.00' Header x 7.10 sf x 2 = 4,870.6 cf Chamber Storage

32 Chambers x 177.1 cf -3.00' Row Adjustment x 8.86 sf x 8 Rows + 35.00' Header x 8.86 sf x 2 = 6,076.1 cf Displacement

14,318.9 cf Field - 6,076.1 cf Chambers = 8,242.9 cf Stone x 40.0% Voids = 3,297.2 cf Stone Storage

Chamber Storage + Stone Storage = 8,167.7 cf = 0.188 af

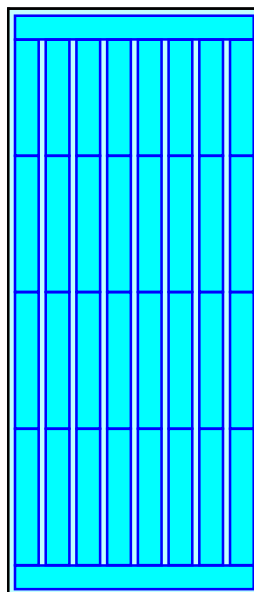
Overall Storage Efficiency = 57.0%

Overall System Size = 86.00' x 37.00' x 4.50'

32 Chambers

530.3 cy Field

305.3 cy Stone



Summary for Link PA-1:

Inflow Area = 86,404 sf, 78.97% Impervious, Inflow Depth > 4.64" for 10-Year event
Inflow = 6.24 cfs @ 12.14 hrs, Volume= 33,374 cf
Primary = 6.24 cfs @ 12.14 hrs, Volume= 33,374 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 123,044 sf, 77.37% Impervious, Inflow Depth = 4.58" for 10-Year event
Inflow = 14.81 cfs @ 12.06 hrs, Volume= 46,939 cf
Primary = 14.81 cfs @ 12.06 hrs, Volume= 46,939 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

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Type III 24-hr 25-Year Rainfall=6.91"

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Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPOST-1.0: Runoff Area=79,455 sf 83.70% Impervious Runoff Depth=6.20"
Flow Length=417' Slope=0.0050 '/' Tc=3.6 min CN=94 Runoff=12.86 cfs 41,045 cf

SubcatchmentPOST-1.1: Runoff Area=6,949 sf 24.90% Impervious Runoff Depth=4.61"
Flow Length=110' Tc=3.2 min CN=80 Runoff=0.92 cfs 2,670 cf

SubcatchmentPOST-2.0: Runoff Area=117,891 sf 80.34% Impervious Runoff Depth=6.08"
Flow Length=682' Tc=4.0 min CN=93 Runoff=18.64 cfs 59,753 cf

SubcatchmentPOST-2.1: Runoff Area=5,153 sf 9.28% Impervious Runoff Depth=4.18"
Flow Length=134' Tc=6.8 min CN=76 Runoff=0.55 cfs 1,794 cf

Pond PDMH-7: Peak Elev=11.03' Inflow=18.64 cfs 59,753 cf
Primary=14.83 cfs 18,473 cf Secondary=3.81 cfs 41,280 cf Outflow=18.64 cfs 59,753 cf

Pond UDB-01: Peak Elev=20.69' Storage=0.145 af Inflow=12.86 cfs 41,045 cf
Primary=6.25 cfs 16,254 cf Secondary=1.48 cfs 24,720 cf Outflow=7.73 cfs 40,974 cf

Link PA-1: Inflow=8.26 cfs 43,644 cf
Primary=8.26 cfs 43,644 cf

Link PA-2: Inflow=19.13 cfs 61,547 cf
Primary=19.13 cfs 61,547 cf

Total Runoff Area = 209,448 sf Runoff Volume = 105,262 cf Average Runoff Depth = 6.03"
21.97% Pervious = 46,018 sf 78.03% Impervious = 163,430 sf

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Type III 24-hr 25-Year Rainfall=6.91"

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Summary for Subcatchment POST-1.0:

Runoff = 12.86 cfs @ 12.05 hrs, Volume= 41,045 cf, Depth= 6.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.91"

Area (sf)	CN	Description
16,796	98	Unconnected roofs, HSG C
12,948	74	>75% Grass cover, Good, HSG C
49,711	98	Paved parking, HSG C
79,455	94	Weighted Average
12,948		16.30% Pervious Area
66,507		83.70% Impervious Area
16,796		25.25% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	100	0.0050	0.84		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
0.5	42	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	275	0.0050	4.20	7.43	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.6	417	Total			

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Type III 24-hr 25-Year Rainfall=6.91"

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Summary for Subcatchment POST-1.1:

Runoff = 0.92 cfs @ 12.05 hrs, Volume= 2,670 cf, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.91"

Area (sf)	CN	Description
5,219	74	>75% Grass cover, Good, HSG C
1,730	98	Paved parking, HSG C
6,949	80	Weighted Average
5,219		75.10% Pervious Area
1,730		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.80		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
2.6	45	0.1000	0.29		Sheet Flow, Grass: Short n= 0.150 P2= 3.62"
0.5	60	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.2	110	Total			

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Type III 24-hr 25-Year Rainfall=6.91"

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Summary for Subcatchment POST-2.0:

Runoff = 18.64 cfs @ 12.06 hrs, Volume= 59,753 cf, Depth= 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.91"

Area (sf)	CN	Description
30,664	98	Unconnected roofs, HSG C
23,176	74	>75% Grass cover, Good, HSG C
27,680	98	Paved parking, HSG C
* 36,371	98	Ledge, HSG C
117,891	93	Weighted Average
23,176		19.66% Pervious Area
94,715		80.34% Impervious Area
30,664		32.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0290	1.70		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
0.5	58	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	524	0.0075	3.48	31.35	Channel Flow, Area= 9.0 sf Perim= 12.3' r= 0.73' n= 0.030 Earth, grassed & winding
4.0	682	Total			

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Type III 24-hr 25-Year Rainfall=6.91"

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Summary for Subcatchment POST-2.1:

Runoff = 0.55 cfs @ 12.10 hrs, Volume= 1,794 cf, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.91"

Area (sf)	CN	Description
4,675	74	>75% Grass cover, Good, HSG C
478	98	Paved parking, HSG C
5,153	76	Weighted Average
4,675		90.72% Pervious Area
478		9.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1600	0.34		Sheet Flow, Grass: Short n= 0.150 P2= 3.15"
3.9	50	0.0500	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.15"
0.4	34	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.8	134	Total			

Summary for Pond PDMH-7:

Inflow Area = 117,891 sf, 80.34% Impervious, Inflow Depth = 6.08" for 25-Year event
 Inflow = 18.64 cfs @ 12.06 hrs, Volume= 59,753 cf
 Outflow = 18.64 cfs @ 12.06 hrs, Volume= 59,753 cf, Atten= 0%, Lag= 0.0 min
 Primary = 14.83 cfs @ 12.06 hrs, Volume= 18,473 cf
 Secondary = 3.81 cfs @ 12.06 hrs, Volume= 41,280 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Peak Elev= 11.03' @ 12.06 hrs

Flood Elev= 13.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.00'	24.0" Round Culvert L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 9.00' / 8.70' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	8.50'	10.0" Round Culvert L= 7.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.50' / 8.25' S= 0.0357 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=14.41 cfs @ 12.06 hrs HW=10.98' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 14.41 cfs @ 5.75 fps)

Secondary OutFlow Max=3.77 cfs @ 12.06 hrs HW=10.98' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 3.77 cfs @ 6.92 fps)

Summary for Pond UDB-01:

Inflow Area = 79,455 sf, 83.70% Impervious, Inflow Depth = 6.20" for 25-Year event
 Inflow = 12.86 cfs @ 12.05 hrs, Volume= 41,045 cf
 Outflow = 7.73 cfs @ 12.15 hrs, Volume= 40,974 cf, Atten= 40%, Lag= 5.8 min
 Primary = 6.25 cfs @ 12.15 hrs, Volume= 16,254 cf
 Secondary = 1.48 cfs @ 12.15 hrs, Volume= 24,720 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
 Starting Elev= 18.00' Surf.Area= 0.073 ac Storage= 0.015 af
 Peak Elev= 20.69' @ 12.15 hrs Surf.Area= 0.073 ac Storage= 0.145 af (0.130 af above start)
 Flood Elev= 22.00' Surf.Area= 0.073 ac Storage= 0.187 af (0.173 af above start)

Plug-Flow detention time= 35.1 min calculated for 40,257 cf (98% of inflow)
 Center-of-Mass det. time= 16.4 min (779.1 - 762.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	17.50'	0.076 af	37.00'W x 86.00'L x 4.50'H Field A 0.329 af Overall - 0.140 af Embedded = 0.189 af x 40.0% Voids
#2A	18.00'	0.112 af	ADS N-12 36" x 32 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= -3.00' x 7.10 sf x 8 rows 35.00' Header x 7.10 sf x 2 = 497.0 cf Inside
		0.187 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	18.0" Round Culvert L= 37.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.25' S= 0.0203 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	18.60'	22.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Device 1	20.00'	16.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	21.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#5	Secondary	18.00'	6.0" Round Culvert L= 5.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.75' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=6.25 cfs @ 12.15 hrs HW=20.69' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 6.25 cfs of 11.86 cfs potential flow)
- ↑ **2=Orifice/Grate** (Orifice Controls 5.05 cfs @ 6.61 fps)
- ↑ **3=Orifice/Grate** (Orifice Controls 1.21 cfs @ 3.62 fps)
- ↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.48 cfs @ 12.15 hrs HW=20.69' TW=0.00' (Dynamic Tailwater)

- ↑ **5=Culvert** (Inlet Controls 1.48 cfs @ 7.52 fps)

Pond UDB-01: - Chamber Wizard Field A**Chamber Model = ADS N-12 36" (ADS N-12® Pipe)**

Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf

Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf

Row Length Adjustment= -3.00' x 7.10 sf x 8 rows

42.0" Wide + 12.0" Spacing = 54.0" C-C Row Spacing

4 Chambers/Row x 20.00' Long -3.00' Row Adjustment +3.50' Header x 2 = 84.00' Row Length +12.0" End Stone x 2 = 86.00' Base Length

8 Rows x 42.0" Wide + 12.0" Spacing x 7 + 12.0" Side Stone x 2 = 37.00' Base Width

6.0" Base + 42.0" Chamber Height + 6.0" Cover = 4.50' Field Height

32 Chambers x 142.0 cf -3.00' Row Adjustment x 7.10 sf x 8 Rows + 35.00' Header x 7.10 sf x 2 =
4,870.6 cf Chamber Storage32 Chambers x 177.1 cf -3.00' Row Adjustment x 8.86 sf x 8 Rows + 35.00' Header x 8.86 sf x 2 =
6,076.1 cf Displacement

14,318.9 cf Field - 6,076.1 cf Chambers = 8,242.9 cf Stone x 40.0% Voids = 3,297.2 cf Stone Storage

Chamber Storage + Stone Storage = 8,167.7 cf = 0.188 af

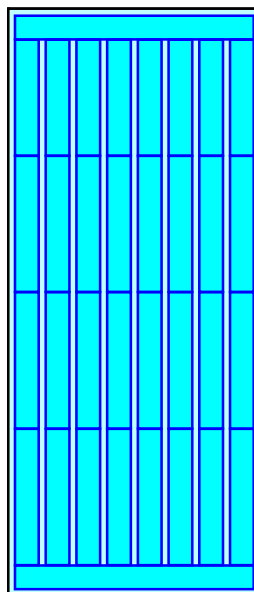
Overall Storage Efficiency = 57.0%

Overall System Size = 86.00' x 37.00' x 4.50'

32 Chambers

530.3 cy Field

305.3 cy Stone



Summary for Link PA-1:

Inflow Area = 86,404 sf, 78.97% Impervious, Inflow Depth > 6.06" for 25-Year event
Inflow = 8.26 cfs @ 12.13 hrs, Volume= 43,644 cf
Primary = 8.26 cfs @ 12.13 hrs, Volume= 43,644 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 123,044 sf, 77.37% Impervious, Inflow Depth = 6.00" for 25-Year event
Inflow = 19.13 cfs @ 12.06 hrs, Volume= 61,547 cf
Primary = 19.13 cfs @ 12.06 hrs, Volume= 61,547 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

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Type III 24-hr 50-Year Rainfall=8.26"

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Time span=0.00-25.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPOST-1.0: Runoff Area=79,455 sf 83.70% Impervious Runoff Depth=7.54"
Flow Length=417' Slope=0.0050 '/' Tc=3.6 min CN=94 Runoff=15.48 cfs 49,928 cf

SubcatchmentPOST-1.1: Runoff Area=6,949 sf 24.90% Impervious Runoff Depth=5.87"
Flow Length=110' Tc=3.2 min CN=80 Runoff=1.16 cfs 3,399 cf

SubcatchmentPOST-2.0: Runoff Area=117,891 sf 80.34% Impervious Runoff Depth=7.42"
Flow Length=682' Tc=4.0 min CN=93 Runoff=22.50 cfs 72,903 cf

SubcatchmentPOST-2.1: Runoff Area=5,153 sf 9.28% Impervious Runoff Depth=5.40"
Flow Length=134' Tc=6.8 min CN=76 Runoff=0.71 cfs 2,317 cf

Pond PDMH-7: Peak Elev=11.46' Inflow=22.50 cfs 72,903 cf
Primary=18.31 cfs 24,528 cf Secondary=4.19 cfs 48,374 cf Outflow=22.50 cfs 72,903 cf

Pond UDB-01: Peak Elev=21.44' Storage=0.171 af Inflow=15.48 cfs 49,928 cf
Primary=7.81 cfs 21,418 cf Secondary=1.69 cfs 28,437 cf Outflow=9.50 cfs 49,855 cf

Link PA-1: Inflow=10.14 cfs 53,254 cf
Primary=10.14 cfs 53,254 cf

Link PA-2: Inflow=23.13 cfs 75,220 cf
Primary=23.13 cfs 75,220 cf

Total Runoff Area = 209,448 sf Runoff Volume = 128,546 cf Average Runoff Depth = 7.36"
21.97% Pervious = 46,018 sf 78.03% Impervious = 163,430 sf

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Type III 24-hr 50-Year Rainfall=8.26"

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Summary for Subcatchment POST-1.0:

Runoff = 15.48 cfs @ 12.05 hrs, Volume= 49,928 cf, Depth= 7.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.26"

Area (sf)	CN	Description
16,796	98	Unconnected roofs, HSG C
12,948	74	>75% Grass cover, Good, HSG C
49,711	98	Paved parking, HSG C
79,455	94	Weighted Average
12,948		16.30% Pervious Area
66,507		83.70% Impervious Area
16,796		25.25% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	100	0.0050	0.84		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
0.5	42	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	275	0.0050	4.20	7.43	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.6	417	Total			

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Type III 24-hr 50-Year Rainfall=8.26"

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Summary for Subcatchment POST-1.1:

Runoff = 1.16 cfs @ 12.05 hrs, Volume= 3,399 cf, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.26"

Area (sf)	CN	Description
5,219	74	>75% Grass cover, Good, HSG C
1,730	98	Paved parking, HSG C
6,949	80	Weighted Average
5,219		75.10% Pervious Area
1,730		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	5	0.0200	0.80		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
2.6	45	0.1000	0.29		Sheet Flow, Grass: Short n= 0.150 P2= 3.62"
0.5	60	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.2	110	Total			

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Type III 24-hr 50-Year Rainfall=8.26"

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Summary for Subcatchment POST-2.0:

Runoff = 22.50 cfs @ 12.06 hrs, Volume= 72,903 cf, Depth= 7.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.26"

Area (sf)	CN	Description
30,664	98	Unconnected roofs, HSG C
23,176	74	>75% Grass cover, Good, HSG C
27,680	98	Paved parking, HSG C
* 36,371	98	Ledge, HSG C
117,891	93	Weighted Average
23,176		19.66% Pervious Area
94,715		80.34% Impervious Area
30,664		32.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0290	1.70		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.62"
0.5	58	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.5	524	0.0075	3.48	31.35	Channel Flow, Area= 9.0 sf Perim= 12.3' r= 0.73' n= 0.030 Earth, grassed & winding
4.0	682	Total			

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Type III 24-hr 50-Year Rainfall=8.26"

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Summary for Subcatchment POST-2.1:

Runoff = 0.71 cfs @ 12.10 hrs, Volume= 2,317 cf, Depth= 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=8.26"

Area (sf)	CN	Description
4,675	74	>75% Grass cover, Good, HSG C
478	98	Paved parking, HSG C
5,153	76	Weighted Average
4,675		90.72% Pervious Area
478		9.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	50	0.1600	0.34		Sheet Flow, Grass: Short n= 0.150 P2= 3.15"
3.9	50	0.0500	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.15"
0.4	34	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.8	134	Total			

Summary for Pond PDMH-7:

Inflow Area = 117,891 sf, 80.34% Impervious, Inflow Depth = 7.42" for 50-Year event
 Inflow = 22.50 cfs @ 12.06 hrs, Volume= 72,903 cf
 Outflow = 22.50 cfs @ 12.06 hrs, Volume= 72,903 cf, Atten= 0%, Lag= 0.0 min
 Primary = 18.31 cfs @ 12.06 hrs, Volume= 24,528 cf
 Secondary = 4.19 cfs @ 12.06 hrs, Volume= 48,374 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Peak Elev= 11.46' @ 12.06 hrs

Flood Elev= 13.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	9.00'	24.0" Round Culvert L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 9.00' / 8.70' S= 0.0600 '/ Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	8.50'	10.0" Round Culvert L= 7.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.50' / 8.25' S= 0.0357 '/ Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=17.88 cfs @ 12.06 hrs HW=11.40' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 17.88 cfs @ 5.69 fps)

Secondary OutFlow Max=4.14 cfs @ 12.06 hrs HW=11.40' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 4.14 cfs @ 7.59 fps)

Summary for Pond UDB-01:

Inflow Area = 79,455 sf, 83.70% Impervious, Inflow Depth = 7.54" for 50-Year event
 Inflow = 15.48 cfs @ 12.05 hrs, Volume= 49,928 cf
 Outflow = 9.50 cfs @ 12.15 hrs, Volume= 49,855 cf, Atten= 39%, Lag= 5.7 min
 Primary = 7.81 cfs @ 12.15 hrs, Volume= 21,418 cf
 Secondary = 1.69 cfs @ 12.15 hrs, Volume= 28,437 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs
 Starting Elev= 18.00' Surf.Area= 0.073 ac Storage= 0.015 af
 Peak Elev= 21.44' @ 12.15 hrs Surf.Area= 0.073 ac Storage= 0.171 af (0.157 af above start)
 Flood Elev= 22.00' Surf.Area= 0.073 ac Storage= 0.187 af (0.173 af above start)

Plug-Flow detention time= 32.1 min calculated for 49,218 cf (99% of inflow)
 Center-of-Mass det. time= 16.0 min (774.4 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	17.50'	0.076 af	37.00'W x 86.00'L x 4.50'H Field A 0.329 af Overall - 0.140 af Embedded = 0.189 af x 40.0% Voids
#2A	18.00'	0.112 af	ADS N-12 36" x 32 Inside #1 Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf Row Length Adjustment= -3.00' x 7.10 sf x 8 rows 35.00' Header x 7.10 sf x 2 = 497.0 cf Inside
		0.187 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	18.0" Round Culvert L= 37.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.25' S= 0.0203 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	18.60'	22.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Device 1	20.00'	16.0" W x 3.0" H Vert. Orifice/Grate C= 0.600
#4	Device 1	21.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#5	Secondary	18.00'	6.0" Round Culvert L= 5.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 17.75' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=7.80 cfs @ 12.15 hrs HW=21.44' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 7.80 cfs of 13.94 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 5.96 cfs @ 7.80 fps)
 ↑ **3=Orifice/Grate** (Orifice Controls 1.84 cfs @ 5.51 fps)
 ↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.69 cfs @ 12.15 hrs HW=21.44' TW=0.00' (Dynamic Tailwater)

↑ **5=Culvert** (Inlet Controls 1.69 cfs @ 8.59 fps)

Pond UDB-01: - Chamber Wizard Field A**Chamber Model = ADS N-12 36" (ADS N-12® Pipe)**

Inside= 36.1"W x 36.1"H => 7.10 sf x 20.00'L = 142.0 cf

Outside= 42.0"W x 42.0"H => 8.86 sf x 20.00'L = 177.1 cf

Row Length Adjustment= -3.00' x 7.10 sf x 8 rows

42.0" Wide + 12.0" Spacing = 54.0" C-C Row Spacing

4 Chambers/Row x 20.00' Long -3.00' Row Adjustment +3.50' Header x 2 = 84.00' Row Length +12.0" End Stone x 2 = 86.00' Base Length

8 Rows x 42.0" Wide + 12.0" Spacing x 7 + 12.0" Side Stone x 2 = 37.00' Base Width

6.0" Base + 42.0" Chamber Height + 6.0" Cover = 4.50' Field Height

32 Chambers x 142.0 cf -3.00' Row Adjustment x 7.10 sf x 8 Rows + 35.00' Header x 7.10 sf x 2 =
4,870.6 cf Chamber Storage32 Chambers x 177.1 cf -3.00' Row Adjustment x 8.86 sf x 8 Rows + 35.00' Header x 8.86 sf x 2 =
6,076.1 cf Displacement

14,318.9 cf Field - 6,076.1 cf Chambers = 8,242.9 cf Stone x 40.0% Voids = 3,297.2 cf Stone Storage

Chamber Storage + Stone Storage = 8,167.7 cf = 0.188 af

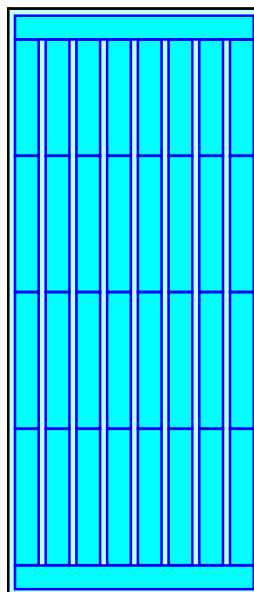
Overall Storage Efficiency = 57.0%

Overall System Size = 86.00' x 37.00' x 4.50'

32 Chambers

530.3 cy Field

305.3 cy Stone



Summary for Link PA-1:

Inflow Area = 86,404 sf, 78.97% Impervious, Inflow Depth > 7.40" for 50-Year event
Inflow = 10.14 cfs @ 12.14 hrs, Volume= 53,254 cf
Primary = 10.14 cfs @ 12.14 hrs, Volume= 53,254 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Summary for Link PA-2:

Inflow Area = 123,044 sf, 77.37% Impervious, Inflow Depth = 7.34" for 50-Year event
Inflow = 23.13 cfs @ 12.06 hrs, Volume= 75,220 cf
Primary = 23.13 cfs @ 12.06 hrs, Volume= 75,220 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.05 hrs

Section 7

Infiltration Feasibility

Subgrade material of the development site is comprised of shallow bedrock making stormwater infiltration is not practicable. The City of Dover is currently performing an excavation project to remove the bedrock to elevations that allow for development of the parcel.

A waiver from NHDES Alteration of Terrain Regulation Env-Wq 1504.13 to provide an Infiltration Feasibility Study is required as infiltration is not practical due to the shallow bedrock.

Section 8

Long Term Operation & Maintenance Plan

It is the intent of this Operation and Maintenance Plan to identify the areas of this site that need special attention and consideration, as well as implementing a plan to assure routine maintenance. By identifying the areas of concern as well as implementing a frequent and routine maintenance schedule the site will maintain a high-quality stormwater runoff.

8.1 Contact/Responsible Party

CPI Management, LLC
11 Beacon Street, Suite #1120
Boston, MA 02108

(Note: The contact information for the Contact/Responsible Party shall be kept current. If ownership changes, the Operation and Maintenance Plan must be transferred to the new party.)

8.2 Maintenance Items

Maintenance of the following items shall be recorded:

- Litter/Debris Removal
- Landscaping
- Catch basin Cleaning
- Pavement Sweeping
- Underground Detention System
- Contech Jellyfish Filter Maintenance

The following maintenance items and schedule represent the minimum action required. Periodic site inspections shall be conducted, and all measures must be maintained in effective operating condition. The following items shall be observed during site inspection and maintenance:

- Inspect vegetated areas, particularly slopes and embankments for areas of erosion. Replant and restore as necessary
- Inspect catch basins for sediment buildup
- Inspect site for trash and debris

8.3 Overall Site Operation & Maintenance Schedule

Overall Site Operation and Maintenance Schedule		
Maintenance Item	Frequency of Maintenance	Operation
Litter/Debris Removal - Trash and debris to be removed from site.	Weekly	Management Company
Pavement Sweeping - Sweep impervious areas to remove sand and litter.	Annually	Parking Lot Sweeper
Catch Basin (CB) Cleaning - CBs to be cleaned of solids and oils.	Annually	Vacuum Truck
Landscaping - Landscaped islands to be maintained and mulched.	Maintained as required and mulched each Spring	Management Company
Underground Detention Basin Visual observation of sediment levels within system	Annually	

Underground Detention System Inspection/Maintenance Requirements		
Inspection/Maintenance	Frequency	Action
Monitor inlet and outlet structures for sediment accumulation	Two (2) times annually	- Trash, debris and sediment to be removed - Any required maintenance shall be addressed
Deep Sump Catchbasins	Two (2) times annually	- Removal of sediment as warranted by inspection - No less than once annually
Monitor detention system for sediment accumulation	Two (2) times annually	- Trash, debris and sediment to be removed - Any required maintenance shall be addressed

Contech Jellyfish Filter System Inspection/Maintenance Requirements		
Inspection/ Maintenance	Frequency	Action
Inspect vault for sediment build up, static water, plugged media and bypass condition	One (1) time annually and after any rainfall event exceeding 2.5" in a 24-hr period	Maintenance required for any of the following: - >4" of sediment on the vault floor - >1/4" of sediment on top of the cartridge - .4" of static water above the cartridge bottom more than 24 hours after a rain event - If pore space between media is absent. - If vault is in bypass condition during an average rainfall event.
Replace Cartridges	As required by inspection, 1-5 years.	- Remove filter cartridges per manufacturer methods. - Vacuum sediment from vault. - Install new cartridges per manufacturer methods

8.3.1 Disposal Requirements

Disposal of debris, trash, sediment and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

8.3.2 Snow & Ice Management for Standard Asphalt and Walkways

Snow storage areas shall be located such that no direct untreated discharges are possible to receiving waters from the storage site (snow storage areas have been shown on the Site Plan). Salt storage areas shall be covered or located such that no direct untreated discharges are possible to receiving waters from the storage site. Salt and sand shall be used to the minimum extent practical (refer to the attached for de-icing application rate guideline from the New Hampshire Stormwater Management Manual, Volume 2,).

Deicing Application Rate Guidelines

24' of pavement (typical two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Pounds per two-lane mile			
			Salt Prewetted / Pretreated with Salt Brine	Salt Prewetted / Pretreated with Other Blends	Dry Salt*	Winter Sand (abrasives)
> 30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Freezing Rain	Apply Chemical	80 - 160	70 - 140	100 - 200*	Not recommended
30° ↓	Snow	Plow and apply chemical	80 - 160	70 - 140	100 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↑	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↓	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↑	Snow or Freezing Rain	Plow and apply chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↓	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↑	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↓	Snow or Freezing Rain	Plow and apply chemical	240 - 320	210 - 280	300 - 400*	500 for freezing rain
0° - 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 - 400	Not recommended	500 - 750 spot treatment as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 - 600**	Not recommended	500 - 750 spot treatment as needed

* Dry salt is not recommended. It is likely to blow off the road before it melts ice.

** A blend of 6 - 8 gal/ton MgCl₂ or CaCl₂ added to NaCl can melt ice as low as -10°.

Anti-icing Route Data Form				
Truck Station:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Route:				
Chemical:				
Application Time:				
Application Amount:				
Observation (first day):				
Observation (after event):				
Observation (before next application):				
Name:				

8.3.3 Invasive Species

With respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem is classified as an invasive species. Refer to the following fact sheet prepared by the University of New Hampshire Cooperative Extension entitled Methods for Disposing Non-Native Invasive Plants for recommended methods to dispose of invasive plant species.



Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle

Lonicera tatarica

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag “head first” at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can’t be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn’t be burned as the seeds may disperse by the hot air created by the fire.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarpping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don’t reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn’t used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don’t compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database /
Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Be diligent looking for seedlings for years in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

Woody Plants	Method of Reproducing	Methods of Disposal
Norway maple <i>(Acer platanoides)</i> European barberry <i>(Berberis vulgaris)</i> Japanese barberry <i>(Berberis thunbergii)</i> autumn olive <i>(Elaeagnus umbellata)</i> burning bush <i>(Euonymus alatus)</i> Morrow's honeysuckle <i>(Lonicera morrowii)</i> Tatarian honeysuckle <i>(Lonicera tatarica)</i> showy bush honeysuckle <i>(Lonicera x bella)</i> common buckthorn <i>(Rhamnus cathartica)</i> glossy buckthorn <i>(Frangula alnus)</i>	Fruit and Seeds 	Prior to fruit/seed ripening Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Use as firewood. ▪ Make a brush pile. ▪ Chip. ▪ Burn.
		After fruit/seed is ripe Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip once all fruit has dropped from branches. ▪ Leave resulting chips on site and monitor.
oriental bittersweet <i>(Celastrus orbiculatus)</i> multiflora rose <i>(Rosa multiflora)</i>	Fruits, Seeds, Plant Fragments 	Prior to fruit/seed ripening Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Make a brush pile. ▪ Burn.
		After fruit/seed is ripe Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.

Non-Woody Plants	Method of Reproducing	Methods of Disposal
garlic mustard (<i>Alliaria petiolata</i>) spotted knapweed (<i>Centaurea maculosa</i>) ▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. black swallow-wort (<i>Cynanchum nigrum</i>) ▪ May cause skin rash. Wear gloves and long sleeves when handling. pale swallow-wort (<i>Cynanchum rossicum</i>) giant hogweed (<i>Heracleum mantegazzianum</i>) ▪ Can cause major skin rash. Wear gloves and long sleeves when handling. dame's rocket (<i>Hesperis matronalis</i>) perennial pepperweed (<i>Lepidium latifolium</i>) purple loosestrife (<i>Lythrum salicaria</i>) Japanese stilt grass (<i>Microstegium vimineum</i>) mile-a-minute weed (<i>Polygonum perfoliatum</i>)	Fruits and Seeds 	Prior to flowering Depends on scale of infestation Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material. During and following flowering Do nothing until the following year or remove flowering heads and bag and let rot. Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material.
common reed (<i>Phragmites australis</i>) Japanese knotweed (<i>Polygonum cuspidatum</i>) Bohemian knotweed (<i>Polygonum x bohemicum</i>)	Fruits, Seeds, Plant Fragments Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.	Small infestation ▪ Bag all plant material and let rot. ▪ Never pile and use resulting material as compost. ▪ Burn. Large infestation ▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile. ▪ Monitor and remove any sprouting material. ▪ Pile, let dry, and burn.

January 2010

Managing Invasive Plants

Methods of Control

by Christopher Mattrick

They're out there. The problem of invasive plants is as close as your own backyard.

Maybe a favorite dogwood tree is struggling in the clutches of an Oriental bittersweet vine. Clawlike canes of multiflora rose are scratching at the side of your house. That handsome burning bush you planted few years ago has become a whole clump in practically no time ... but what happened to the azalea that used to grow right next to it?

If you think controlling or managing invasive plants on your property is a daunting task, you're not alone. Though this topic is getting lots of attention from federal, state, and local government agencies, as well as the media, the basic question for most homeowners is simply, "How do I get rid of the invasive plants in my own landscape?" Fortunately, the best place to begin to tackle this complex issue is in our own backyards and on local conservation lands. We hope the information provided here will help you take back your yard. We won't kid you—there's some work involved, but the payoff in beauty, wildlife habitat, and peace of mind makes it all worthwhile.

PLAN OF ATTACK

Three broad categories cover most invasive plant control: mechanical, chemical, and biological. Mechanical control means physically removing plants from the environment



Spraying chemicals to control invasive plants.

through cutting or pulling. Chemical control uses herbicides to kill plants and inhibit regrowth. Techniques and chemicals used will vary depending on the species. Biological controls use plant diseases or insect predators, typically from the targeted species' home range. Several techniques may be effective in controlling a single species, but there is usually one preferred method—the one that is most resource efficient with minimal impact on non-target species and the environment.

MECHANICAL CONTROL METHODS

Mechanical treatments are usually the first ones to look at when evaluating an invasive plant removal project. These procedures do not require special licensing or introduce chemicals into the environment. They do require permits in some situations, such as wetland zones. [See sidebar on page 23.] Mechanical removal is highly labor intensive and creates a significant amount of site disturbance, which can lead to rapid reinvasion if not handled properly.

Pulling and digging

Many herbaceous plants and some woody species (up to about one inch in diameter), if present in limited quantities, can be pulled out or dug up. It's important to remove as much of the root system as possible; even a small portion can restart the infestation. Pull plants by hand or use a digging fork, as shovels can shear off portions of the root system, allowing for regrowth. To remove larger woody stems (up to about three inches in diameter), use a Weed Wrench™, Root Jack, or Root Talon. These tools, available from several manufacturers, are designed to remove the aboveground portion of the plant as well as the entire root system. It's easiest to undertake this type of control in the spring or early summer when soils are moist and plants come out more easily.



Using tools to remove woody stems.



Volunteers hand pulling invasive plants.

Suffocation

Try suffocating small seedlings and herbaceous plants. Place double or triple layers of thick UV-stabilized plastic sheeting, either clear or black (personally I like clear), over the infestation and secure the plastic with stakes or weights. Make sure the plastic extends at least five feet past the edge of infestation on all sides. Leave the plastic in place for at least two years. This technique will kill everything beneath the plastic—invasive and non-invasive plants alike. Once the plastic is removed, sow a cover crop such as annual rye to prevent new invasions.

Cutting or mowing

This technique is best suited for locations you can visit and treat often. To be effective, you will need to mow or cut infested areas three or four times a year for up to five years. The goal is to interrupt the plant's ability to photosynthesize by removing as much leafy material as possible. Cut the plants at ground level and remove all resulting debris from the site. With this treatment, the infestation may actually appear to get worse at first, so you will need to be as persistent as the invasive plants themselves. Each time you cut the plants back, the root system gets slightly larger, but must also rely on its energy reserves to push up new growth. Eventually, you will exhaust these reserves and the plants will die. This may take many years, so you have to remain committed to this process once you start; otherwise the treatment can backfire, making the problem worse.

CHEMICAL CONTROL METHODS

Herbicides are among the most effective and resource-efficient tools to treat invasive species. Most of the commonly known invasive plants can be treated using only two herbicides—glyphosate (the active ingredient in Roundup™ and Rodeo™) and triclopyr (the active ingredient in Brush-B-Gone™ and Garlon™). Glyphosate is non-selective, meaning it kills everything it contacts. Triclopyr is selective and does not injure monocots (grasses, orchids, lilies, etc.). Please read labels and follow directions precisely for both environmental and personal safety. These are relatively benign herbicides, but improperly used they can still cause both short- and long-term health and environmental problems. Special aquatic formulations are required when working in wetland zones. You are required to have a state-issued pesticide applicator license when applying these chemicals on land you do not own. To learn more about the pesticide regulations in your state, visit or call your state's pesticide control division, usually part of the state's Department of Agriculture. In wetland areas, additional permits are usually required by the Wetlands Protection Act. [See sidebar on page 23.]

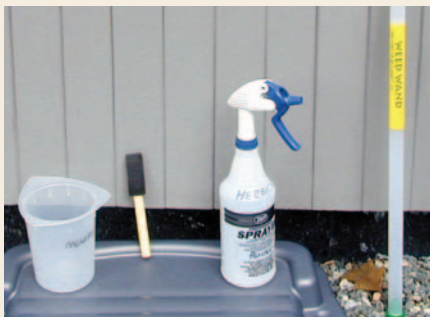
Foliar applications

When problems are on a small scale, this type of treatment is usually applied with a backpack sprayer or even a small handheld spray bottle. It is an excellent way to treat large monocultures of herbaceous plants, or to spot-treat individual plants that are difficult to remove mechanically, such as goutweed, swallowwort, or purple loosestrife. It is also an effective treatment for some woody species, such as Japanese barberry, multiflora rose, Japanese honeysuckle, and Oriental bittersweet that grow in dense masses or large numbers over many acres. The herbicide mixture should contain no more than five percent of the active ingredient, but it is important to follow the instructions on the product label. This treatment is most effective when the plants are actively growing, ideally when they are flowering or beginning to form fruit. It has been shown that plants are often more susceptible to this type of treatment if the existing stems are cut off and the regrowth is treated. This is especially true for Japanese knotweed. The target plants should be thoroughly wetted with the herbicide on a day when there is no rain in the forecast for the next 24 to 48 hours.

Cut stem treatments

There are several different types of cut stem treatments, but here we will review only the one most commonly used. All treatments of this type require a higher concentration of the active ingredient than is used in foliar applications. A 25 to 35 percent solution of the active ingredient should be used for cut stem treatments, but read and follow all label instructions. In most cases, the appropriate herbicide is glyphosate, except for Oriental bittersweet, on which triclopyr should be used. This treatment can be used on all woody stems, as well as phragmites and Japanese knotweed.

For woody stems, treatments are most effective when applied in the late summer and autumn—between late August and November. Stems should be cut close to the ground, but not so close that you will lose track of them. Apply herbicide directly to the cut surface as soon as possible after cutting. Delaying the application will reduce the effectiveness of the treatment. The herbicide can be applied with a sponge, paintbrush, or spray bottle.



Cut stem treatment tools.

For phragmites and Japanese knotweed, treatment is the same, but the timing and equipment are different. Plants should be treated anytime from mid-July through September, but the hottest, most humid days of the summer are best

for this method. Cut the stems halfway between two leaf nodes at a comfortable height. Inject (or squirt) herbicide into the exposed hollow stem. All stems in an infestation should be treated. A wash bottle is the most effective application tool, but you can also use an eyedropper, spray bottle, or one of the recently developed high-tech injection systems.

It is helpful to mix a dye in with the herbicide solution. The dye will stain the treated surface and mark the areas that have been treated, preventing unnecessary reapplication. You can buy a specially formulated herbicide dye, or use food coloring or laundry dye.

There is not enough space in this article to describe all the possible ways to control invasive plants. You can find other treatments, along with more details on the above-described methods, and species-specific recommendations on The Nature Conservancy Web site (tncweeds.ucdavis.edu). An upcoming posting on the Invasive Plant Atlas of New England (www.ipane.org) and the New England Wild Flower Society (www.newfs.org) Web sites will also provide further details.



Hollow stem injection tools.

Biological controls—still on the horizon

Biological controls are moving into the forefront of control methodology, but currently the only widely available and applied biocontrol relates to purple loosestrife. More information on purple loosestrife and other biological control projects can be found at www.invasiveplants.net.

DISPOSAL OF INVASIVE PLANTS

Proper disposal of removed invasive plant material is critical to the control process. Leftover plant material can cause new infestations or reinfest the existing project area. There are many appropriate ways to dispose of invasive plant debris. I've listed them here in order of preference.

- 1. Burn it**—Make a brush pile and burn the material following local safety regulations and restrictions, or haul it to your town's landfill and place it in their burn pile.
- 2. Pile it**—Make a pile of the woody debris. This technique will provide shelter for wildlife as well.
- 3. Compost it**—Place all your herbaceous invasive plant debris in a pile and process as compost. Watch the pile closely for resprouts and remove as necessary. Do not use the resulting compost in your garden. The pile is for invasive plants only.



Injecting herbicide into the hollow stem of phragmites.

4. Dry it/cook it—Place woody debris out on your driveway or any asphalt surface and let it dry out for a month. Place herbaceous material in a doubled-up black trash bag and let it cook in the sun for one month. At the end of the month, the material should be non-viable and you can dump it or dispose of it with the trash. The method assumes there is no viable seed mixed in with the removed material.

Care should be taken in the disposal of all invasive plants, but several species need extra attention. These are the ones that have the ability to sprout vigorously from plant fragments and should ideally be burned or dried prior to disposal: Oriental bittersweet, multiflora rose, Japanese honeysuckle, phragmites, and Japanese knotweed.

Christopher Mattrick is the former Senior Conservation Programs Manager for New England Wild Flower Society, where he managed conservation volunteer and invasive and rare plant management programs. Today, Chris and his family work and play in the White Mountains of New Hampshire, where he is the Forest Botanist and Invasive Species Coordinator for the White Mountain National Forest.



Controlling Invasive Plants in Wetlands

Special concerns; special precautions

Control of invasive plants in or around wetlands or bodies of water requires a unique set of considerations. Removal projects in wetland zones can be legal and effective if handled appropriately. In many cases, herbicides may be the least disruptive tools with which to remove invasive plants. You will need a state-issued pesticide license to apply herbicide on someone else's property, but all projects in wetland or aquatic systems fall under the jurisdiction of the Wetlands Protection Act and therefore require a permit. ***Yes, even hand-pulling that colony of glossy buckthorn plants from your own swampland requires a permit.*** Getting a permit for legal removal is fairly painless if you plan your project carefully.

1. Investigate and understand the required permits and learn how to obtain them. The entity charged with the enforcement of the Wetlands Protection Act varies from state to state. For more information in your state, contact:

ME: Department of Environmental Protection
www.state.me.us/dep/blwq/docstand/nrpapage.htm

NH: Department of Environmental Services
www.des.state.nh.us/wetlands/

VT: Department of Environmental Conservation
www.anr.state.vt.us/dec/waterq/permits/htm/pm_cud.htm

MA: Consult your local town conservation commission

RI: Department of Environmental Management
www.dem.ri.gov/programs/benviron/water/permits/fresh/index.htm

CT: Consult your local town Inland Wetland and Conservation Commission

2. Consult an individual or organization with experience in this area. Firsthand experience in conducting projects in wetland zones and navigating the permitting process is priceless. Most states have wetland scientist societies whose members are experienced in working in wetlands and navigating the regulations affecting them. A simple Web search will reveal the contact point for these societies. Additionally, most environmental consulting firms and some nonprofit organizations have skills in this area.
3. Develop a well-written and thorough project plan. You are more likely to be successful in obtaining a permit for your project if you submit a project plan along with your permit application. The plan should include the reasons for the project, your objectives in completing the project, how you plan to reach those objectives, and how you will monitor the outcome.
4. Ensure that the herbicides you plan to use are approved for aquatic use. Experts consider most herbicides harmful to water quality or aquatic organisms, but rate some formulations as safe for aquatic use. Do the research and select an approved herbicide, and then closely follow the instructions on the label.
5. If you are unsure—research, study, and most of all, ask for help. Follow the rules. The damage caused to aquatic systems by the use of an inappropriate herbicide or the misapplication of an appropriate herbicide not only damages the environment, but also may reduce public support for safe, well-planned projects.

8.3.4 Annual Updates and Log Requirements

The Owner and/or Contact/Responsible Party shall review this Operation and Maintenance Plan once per year for its effectiveness and adjust the plan and deed as necessary.

A log of all preventative and corrective measures for the stormwater system shall be kept on-site and be made available upon request by any public entity with administrative, health environmental or safety authority over the site including NHDES.

Stormwater Management Report						
Project Name						
BMP Description	Date of Inspection	Inspector	BMP Installed and Operating Properly?	Cleaning / Corrective Action Needed	Date of Cleaning / Repair	Performed By
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			
			☐ Yes ☐ No			

Cochecho Waterfront Development – Phase I Projected Water and Wastewater Flows and Investment Fee

To: Rob Simmons, Cathartes
FROM: Patrick M. Crimmins, P.E.
DATE: January 31, 2020

The following memo is to provide an estimate of the average, and peak, daily water and wastewater flows anticipated for the above-mentioned project.

The proposed project consists of a multi-family development. We have calculated the average daily flow in gallons per day (GPD) for the proposed project in accordance with Table 1008-1: Unit Design Flow Figures of NHDES Env-Wq 1000 as follows:

PROPOSED WATER & WASTEWATER AVERAGE DAILY FLOWS (GPD) AND FEES			
Proposed Use	Units	GPD	Total GPD
Dwelling (Building A)			
Studio Apartment	15	225 GPD/Bdrm	3,375 GPD
1 Bedroom Apartment	39	225 GPD/Bdrm	8,775 GPD
2 Bedroom Apartment	53	150 GPD/Bdrm	15,900 GPD
3 Bedroom Apartment	3	150 GPD/Bdrm	1,350 GPD
	Total Proposed Build A GPD		29,400 GPD
Dwelling (Building B)			
Studio Apartment	0	225 GPD/Bdrm	GPD
1 Bedroom Apartment	30	225 GPD/Bdrm	6,750 GPD
2 Bedroom Apartment	22	150 GPD/Bdrm	6,600 GPD
3 Bedroom Apartment	3	150 GPD/Bdrm	1,350 GPD
	Total Proposed Build A GPD		14,700 GPD
	Combined Proposed GPD		44,100 GPD
Combined Peak Daily Flow (2.5 Peaking Factor) GPD			110,250 GPD
Wastewater Rate (\$/GPD)	Water Rate (\$/GPD)	Proposed Water / Wastewater Fee	
\$5.40	\$9.05	\$637,245.00	

MEMORANDUM

Ref: 1981A

To: Rob Simmons
Cathartes

From: Stephen G. Pernaw, P.E., PTOE

Subject: Proposed Residential Apartments – Traffic Evaluation
Dover, New Hampshire

Date: January 22, 2020

This analysis has been prepared on behalf of Cathartes in order to assess the traffic impacts associated with the two proposed residential apartment buildings located at the corner of Washington Street and River Street in Dover, New Hampshire. This analysis has been prepared in accordance with the city's "*Traffic Impact Assessment and Analysis Standards*" regarding the "STANDARD" traffic impact analysis. The peak hour trip generation estimates contained herein are well below the requirements for an "Advanced" analysis. Although the daily trip estimates slightly exceed the requirement for a "STANDARD" analysis, further study is not considered to be essential as the daily traffic volume estimates do not affect traffic operations, intersection capacity or safety. Further, the proposed site has two separate driveways, and each will accommodate fewer than 1,000 vehicles per day.

PROPOSAL

According to the plan entitled "*Site Plan*," dated November 11, 2019, prepared by Embarc, access to the site is proposed via one full-access driveway that will intersect the east side of River Street and another driveway that will intersect the south side of Washington Street (see Attachment 1). At this juncture, the two proposed multi-story apartment buildings will contain up to 210 residential apartments.

EXISTING CONDITIONS

River Street functions as a short two-lane local street that extends between Washington Street (to the north and Henry Law Avenue (to the south). River Street currently provides access to the Dover Skate Park. There are no posted speed limit signs on River Street.

Washington Street has no outlet east of River Street; therefore it functions as a cul-de-sac roadway along the site frontage. Washington Street extends from the site in the westerly direction to the Whittier Street/Tolend Road intersection.

EXISTING TRAVELS ROUTES

Figure 1 shows the primary travel routes to/from the subject site. The inbound and outbound travel routes differ in certain cases as a result of the one-way sections on Washington Street, Main Street, and Central Avenue. Washington Street will be used for access to and from points north via NH9, NH108 and US4. River Street will be utilized for access to the Spaulding Turnpike (NH16) and points south and west via NH108, NH155 and NH9 via Hanson Street, Silver Street, and Central Avenue.

TRIP GENERATION

To estimate the quantity of vehicle-trips that will be produced by the proposed apartment buildings Pernaw & Company, Inc. considered the standard trip generation rates published by the Institute of Transportation Engineers (ITE)¹. Land Use Code 221 (Multifamily Housing / Mid-Rise) is the most applicable category and the number of dwelling units was used as the independent variable.

The trip generation analysis is summarized on Table 1 and it indicates that the proposed apartment buildings will generate approximately 71 vehicle-trips during the AM peak hour period and 90 vehicle-trips during the PM peak hour period on weekdays; split between the two site driveways.

Table 1		Trip Generation Summary - 210 Multifamily Dwelling Units		
		Weekday	Saturday	Sunday
Total	Entering	572 veh	528 veh	430 veh
	Exiting	<u>572 veh</u>	<u>528 veh</u>	<u>430 veh</u>
	Total	1,144 trips	1,056 trips	860 trips
AM Peak Hour	Entering	18 veh	-	-
	Exiting	<u>53 veh</u>	-	-
	Total	71 trips	-	-
Midday Peak Hour	Entering	-	47 veh	51 veh
	Exiting	-	<u>48 veh</u>	<u>31 veh</u>
	Total	-	95 trips	82 trips
Weekday PM Peak Hour	Entering	55 veh	NA	NA
	Exiting	<u>35 veh</u>	NA	NA
	Total	90 trips	NA	NA

¹ITE Land Use Code 221 - Multifamily Housing (Mid-Rise)

¹ Institute of Transportation Engineers, *Trip Generation*, Tenth edition (Washington, D.C., 2017).

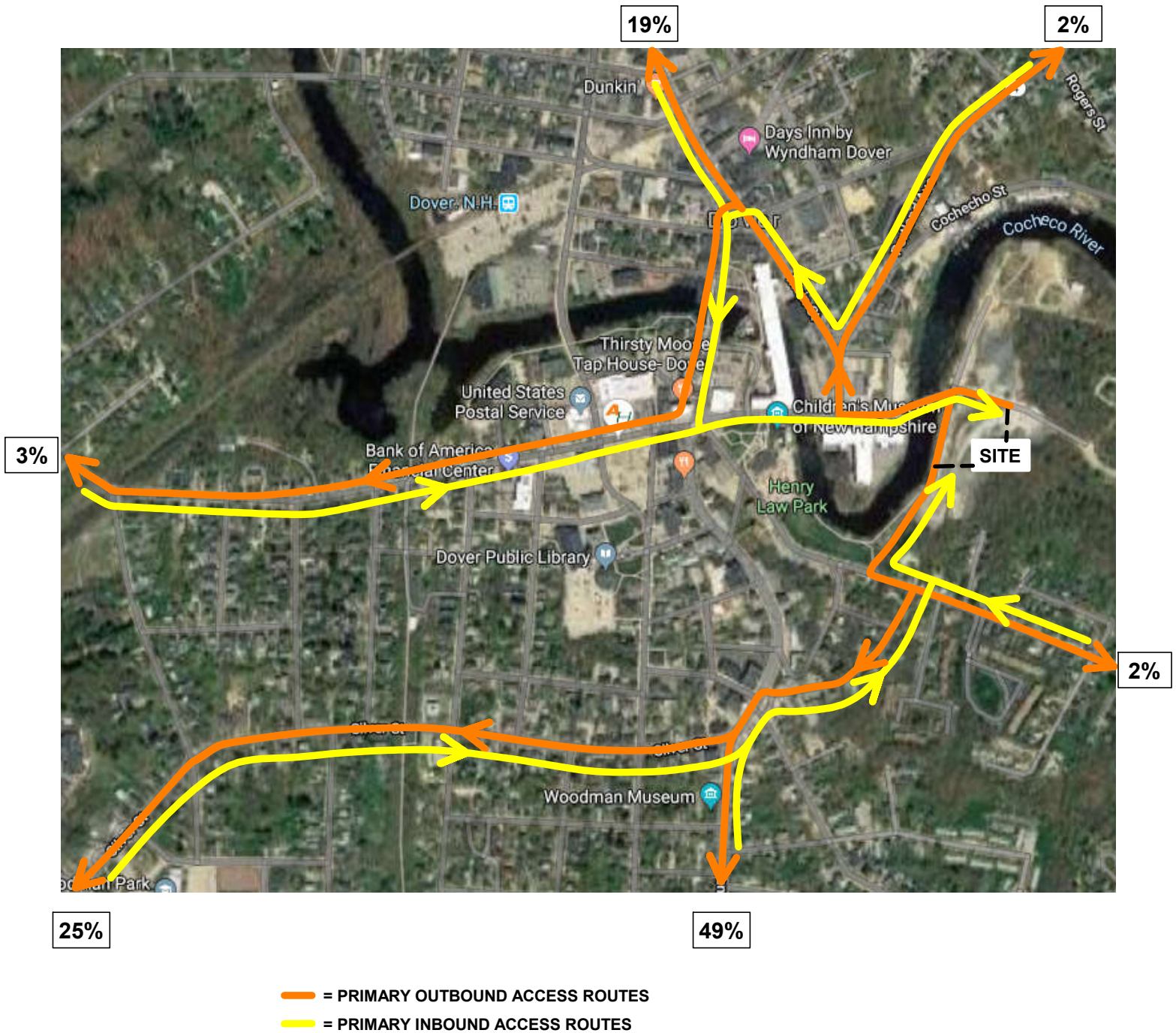


Figure 1

Primary Access Routes

Traffic Evaluation, Proposed Residential Apartments, Dover, New Hampshire

Table 2 summarizes the daily trip estimates for each driveway. In cases where the trip generation exceeds 1,000 average weekday trips or 100 peak hour trips, then an “Advanced” analysis must be completed. In this case, the trips generated by the 210 dwelling units during the AM and PM peak hour periods are below the 100 vehicle-trip threshold. Although these dwelling units are expected to generate more than 1,000 vehicle-trips on weekdays and Saturdays, the daily trip estimates for each driveway are well below this threshold. The computations pertaining to these analyses are attached (see Attachments 2 and 3).

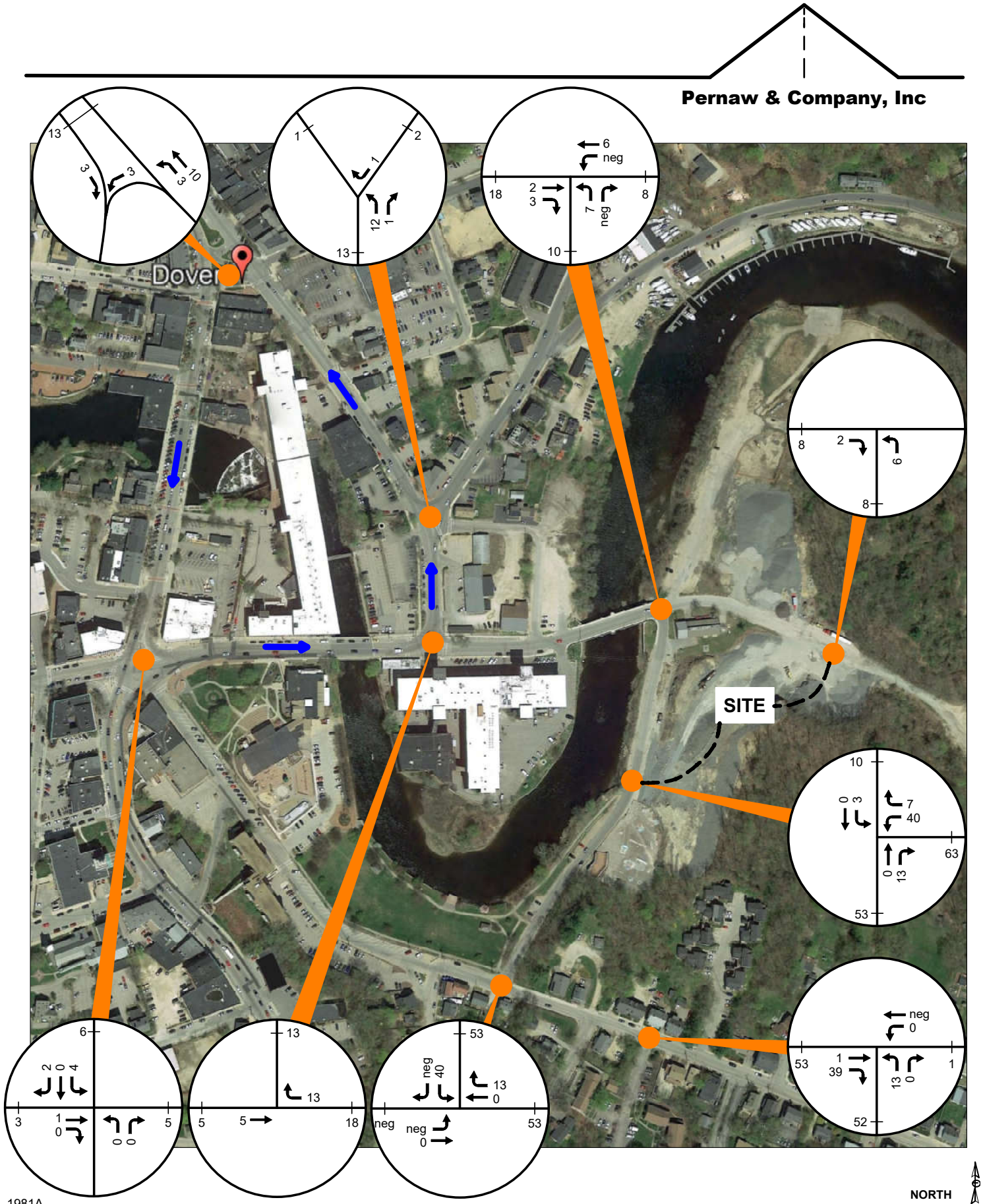
Table 2		Trip Generation Summary - Stratified by Driveway		
	Weekday	Saturday	Sunday	
Washington Street Driveway	274 veh	254 veh	206 veh	
River Street Driveway	870 veh	802 veh	654 veh	
Total	1,144 trips	1,056 trips	860 trips	

TRIP DISTRIBUTION

To determine in which direction the residents will travel on Washington Street and River Street, “journey to work” data from the latest census was utilized, as well as our familiarity of the study area. The majority of site traffic is expected to travel to and from the site via River Street - Henry Law Avenue - Hanson Street route, which is south of the subject site (see Attachment 4).

Trip Distribution Patterns	
To / From points north via Central Avenue	19%
To / From points north via Portland Avenue	2%
To / From points east via Henry Law Avenue	2%
To / From points north via Central Avenue	49%
To / From points south and west via Hanson Street	25%
To / From points west via Washington Street	3%
	100%

The distribution of the site-generated traffic is summarized schematically on Figure 2 (AM) and Figure 3 (PM) for the weekday peak hour periods. These diagrams show the net increases in traffic volumes throughout the study area as a result of the proposed development.



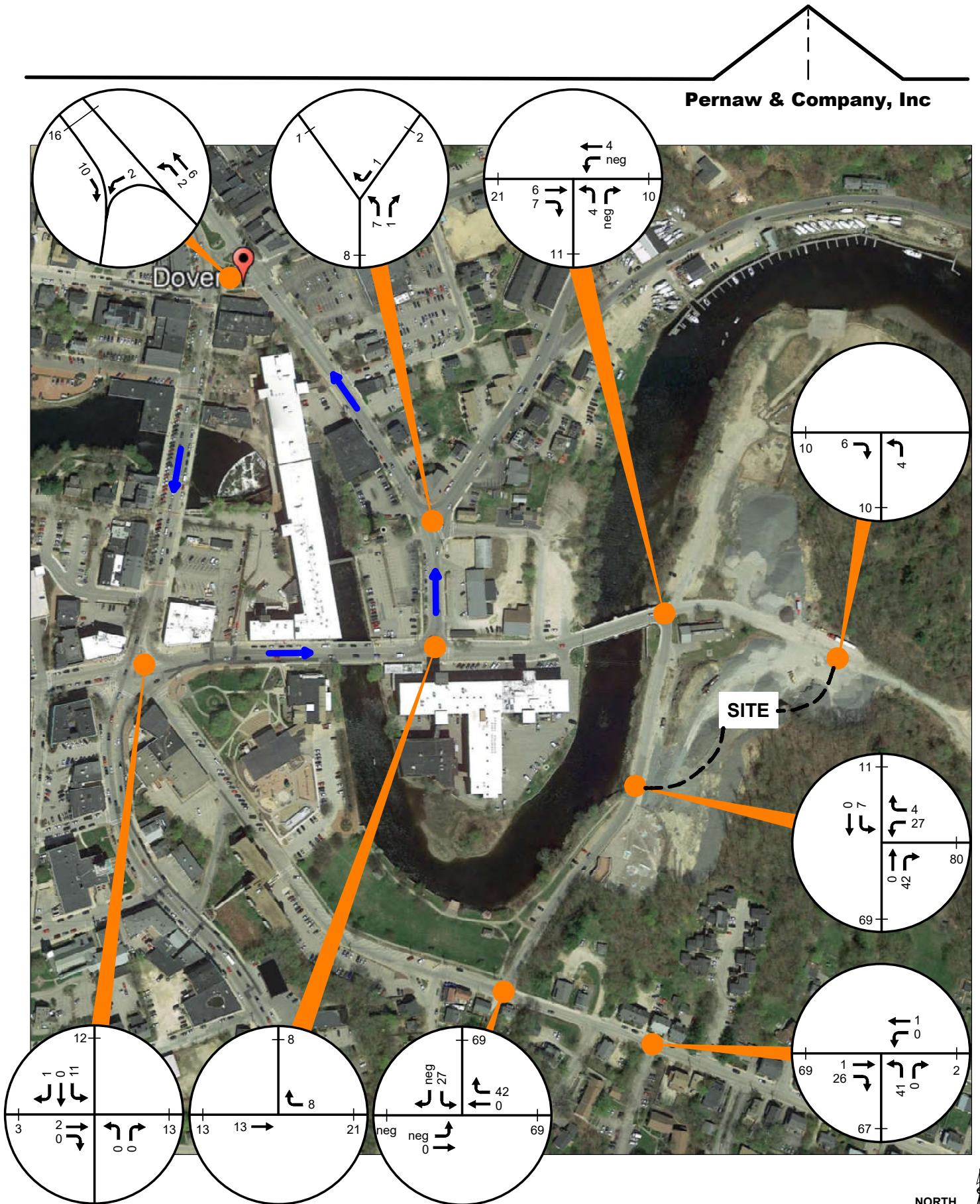
1981A

NORTH

Figure 2

Site Generated Traffic Volumes - AM Peak Hour

Traffic Evaluation, Proposed Residential Apartments, Dover, New Hampshire



1981A

NORTH

Figure 3

Site Generated Traffic Volumes - PM Peak Hour

Traffic Evaluation, Proposed Residential Apartments, Dover, New Hampshire

SIGHT DISTANCE

Sight distance at an intersection is an important safety consideration. The operator of a vehicle exiting from each site driveway should have an unobstructed view of approaching vehicles on River Street and Washington Street in order to safely enter the traffic flow on these streets. The sight distance looking left and right from both site driveways is documented photographically on Attachments 5 & 6. Adequate sight distances are obtainable at both site driveways due to the favorable horizontal and vertical alignment features of Washington Street and River Road in this area.

PUBLIC TRANSIT

The Dover Transportation Center on Chestnut Street is located approximately 0.6 miles from the subject site. From this location, rail service is available via Amtrak (Downeaster) and bus service is provided by the COAST regional bus system and Wildcat Transit.

The closest bus stop is located approximately 0.2 miles from the proposed apartment buildings on Washington Street (Henry Law Park stop). Bus Routes 33 & 101 serve this area. C&J Bus Lines also provides bus service at the Exit 9 Park-and-Ride facility on Indian Brook Road; located approximately 2.6 miles from the subject site.

CONCLUSIONS

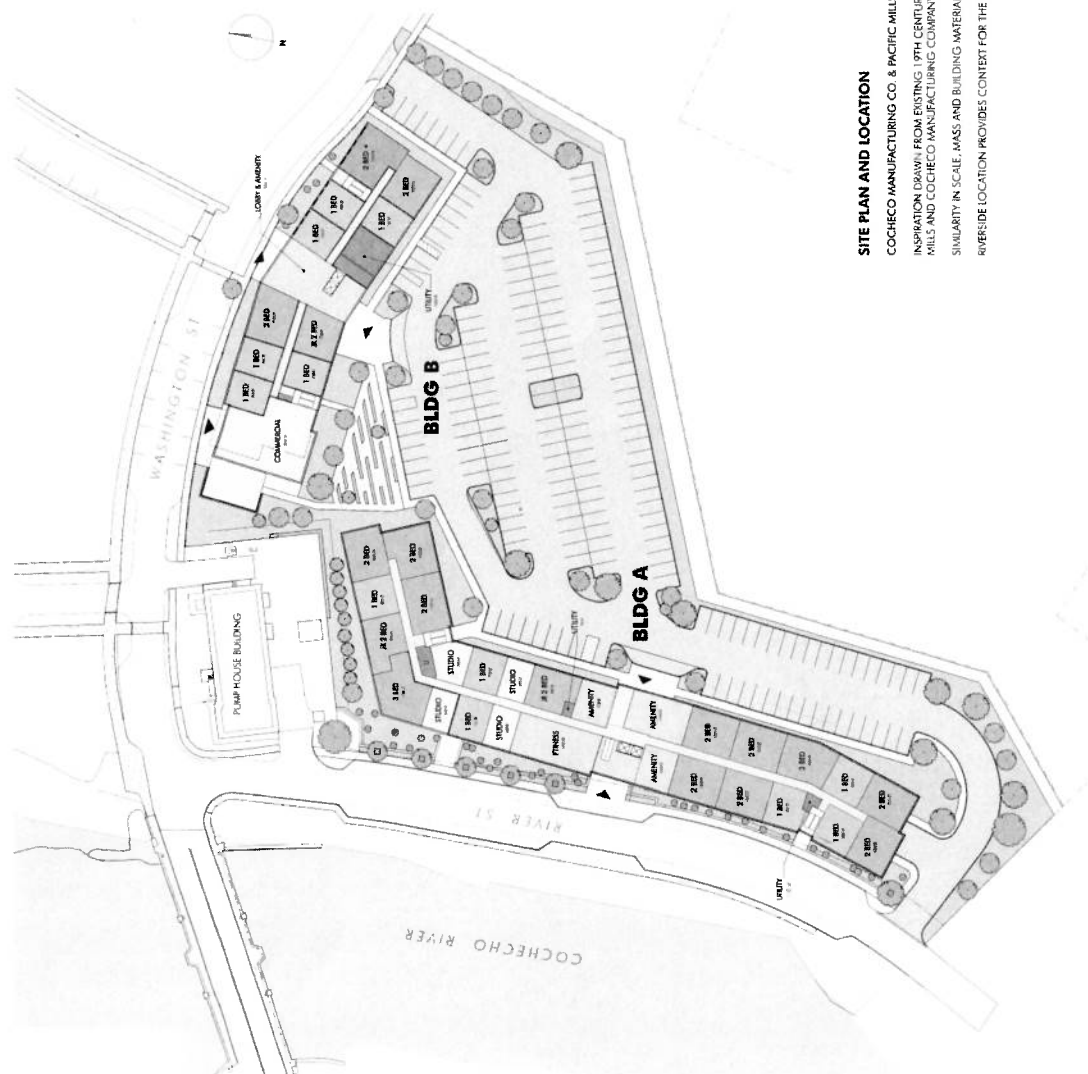
From a traffic engineering standpoint, the hourly rate of traffic flow is of most importance. The greatest impact will occur during the weekday PM peak hour period with +69 vehicles on the section of River Street south of the proposed development. This translates into approximately one additional vehicle per minute. This impact will diminish further as drivers disperse at adjacent intersections. Such increases are not expected to significantly alter the prevailing traffic operations, capacity or safety at nearby intersections.

Attachments



CC: Greg Mikolaities, P.E., August Consulting, PLLC

ATTACHMENTS



SITE PLAN AND LOCATION

COACHEO MANUFACTURING CO. & PACIFIC MILLS
 INSPIRATION (RAW) FROM EXISTING 19TH CENTURY PACIFIC
 MILLS AND COACHEO MANUFACTURING COMPANY BUILDINGS
 SIMILARITY IN SCALE, MASS AND BUILDING MATERIALS
 RIVERSIDE LOCATION PROVIDES CONTEXT FOR THE SITE

SITE PLAN
 COACHEO DEVELOPMENT - DOVER, NH
 11.11.2019

EMBARC



CONTEXT MAP

COACHEO SITE AS A CONTINUATION OF CENTRAL DOVER AND
 HISTORIC MILL BUILDING FABRIC

Trip Generation Summary

Alternative: Alternative 1

Phase:

Project: 1981A

Open Date: 11/20/2019

Analysis Date: 11/20/2019

ITE	Land Use	Weekday Average Daily Trips				Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic			
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
221	MID-RISE 1		572	571	1143		18	53	71		55	35	90
	210 Dwelling Units												
	Unadjusted Volume		572	571	1143		18	53	71		55	35	90
	Internal Capture Trips		0	0	0		0	0	0		0	0	0
	Pass-By Trips		0	0	0		0	0	0		0	0	0
	Volume Added to Adjacent Streets		572	571	1143		18	53	71		55	35	90

Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

Trip Generation Summary

Alternative: Alternative 1

Phase:

Project: 1981A

Open Date: 11/20/2019

Analysis Date: 11/20/2019

ITE	Land Use	Saturday Average Daily Trips			Saturday Peak Hour of Generator			Sunday			Sunday Peak Hour of Generator		
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
221	MID-RISE 1		528	528	1056		47	48	95		430	429	859
	210 Dwelling Units												
	Unadjusted Volume		528	528	1056		47	48	95		430	429	859
	Internal Capture Trips		0	0	0		0	0	0		0	0	0
	Pass-By Trips		0	0	0		0	0	0		0	0	0
	Volume Added to Adjacent Streets		528	528	1056		47	48	95		430	429	859

Total Saturday Average Daily Trips Internal Capture = 0 Percent

Total Saturday Peak Hour of Generator Internal Capture = 0 Percent

Total Sunday Internal Capture = 0 Percent

Total Sunday Peak Hour of Generator Internal Capture = 0 Percent

* - Custom rate used for selected time period.

A. Work Destination Report - Where Workers are Employed Who Live in the Selection Area - by County Subdivisions

	Count	Gateway %						Gateway Allocation						
		Wash A	Main B	Port-Coc C	Hanson D	H-Law E	Silver F	Wash A	Main B	Port-Coc C	Hanson D	H-Law E	Silver F	
Dover city (Strafford, NH)	3,755	0.10	0.35	0.05	0.20	0.05	0.25	376	1314	188	751	188	939	3756
Portsmouth city (Rockingham, NH)	3,102				1.00			0	0	0	3102	0	0	3102
Rochester city (Strafford, NH)	812		0.20				0.80	0	162	0	0	0	650	812
Durham town (Strafford, NH)	722				1.00			0	0	0	722	0	0	722
Somersworth city (Strafford, NH)	660		1.00					0	660	0	0	0	0	660
Newington town (Rockingham, NH)	462				1.00			0	0	0	462	0	0	462
Exeter town (Rockingham, NH)	449				1.00			0	0	0	449	0	0	449
Manchester city (Hillsborough, NH)	423						1.00	0	0	0	0	0	423	423
Concord city (Merrimack, NH)	399						1.00	0	0	0	0	0	399	399
Nashua city (Hillsborough, NH)	363						1.00	0	0	0	0	0	363	363
	11147							376	2136	188	5486	188	2774	11148
								3.4%	19.2%	1.7%	49.2%	1.7%	24.9%	100%
								3	19	2	49	2	25	100

Pernaw & Company, Inc

Looking Left



Looking Right



1981A

Attachment

Sight Distance Photographs - River Street/Vicinity of Proposed Site Driveway
Traffic Evaluation, Proposed Residential Apartments, Dover, New Hampshire

Pernaw & Company, Inc

Looking Left



Looking Right



1981A

Attachment

Sight Distance Photographs - Washington Street/Vicinity of Proposed Site Driveway
Traffic Evaluation, Proposed Residential Apartments, Dover, New Hampshire

Landscape Operation & Maintenance Plan Cochecho Waterfront – Phase One

Weekly Tasks

1. Mow and edge lawns if needed. Lawns to be cut to 3.5" height.
2. Prune back any shrubs overhanging curbs or sidewalks.
3. Prune back any groundcover overhanging curbs or sidewalks.
4. Remove litter and leaves from plants, planters, and parking lots.
5. Remove any broken or fallen branches from trees. Remove sucker growth from tree trunks.
6. Remove any weeds larger than 2 inches (5 cm) high or wide from planters. Weeds 2 inches (5 cm) and larger must be removed, not just killed.
7. Replace bark mulch which has been knocked or washed out of planters. Smooth mulch layer if it has been disturbed.
8. Replace decorative rock which has been knocked or washed out of drip strips. Smooth decorative rock surface if it has been disturbed.
9. Check plants for signs of stress, pests or disease. Request authorization to replace other dead or missing plants. Note: Maintenance contractor must request authorization to make replacements within one week of the damage becoming evident.
10. Sweep or blow clean all walkways, curbs, and gutters.
11. Treat for any signs of disease or pest infestation.
12. Complete any items required on the Monthly Checklist.
13. Hand water any plants that are dry and stressed.
14. Check the irrigation system (if there is a system). Make emergency repairs as needed or request authorization to make major repairs. Note: Maintenance contractor must request authorization for repairs within one week of the damage becoming evident.
15. Adjust the irrigation controllers for current water needs of plants.
16. **Gently prune shrubs at appropriate time of year based on species, for shape and form. DO NOT shear.**

Yearly Tasks

Early Spring

1. Prune any tree branches that interfere with public safety. Prune all parking lot and street trees yearly to encourage strong growth.
2. Apply granular fertilizer to shrubs beds and lawns. Be sure to make application prior to a moderate rainfall in drip-irrigated planters so the rain will wash the fertilizer in.
3. Submit receipts to owner's authorized representative as proof of fertilizer purchase.
4. Trim any perennial foliage left in the fall for winter interest to within six inches of the ground.
5. Add new mulch to planters where the mulch depth has been reduced to less than 2 inches (5 cm) thick. Mulch depth shall not exceed 2". Additional mulch not required where shrubs or groundcover completely hide the soil surface from view.
6. Where there is irrigation and after threat of frost is gone, flush out irrigation systems as needed and check for proper operation of each valve zone.

7. Clean or replace plugged sprinkler nozzles. Replace plugged drip emitters.
8. Replace irrigation controller program back-up batteries.

June:

No additional items

July:

No additional items

August:

No additional items

September:

1. Inventory all plant materials. Inventory shall include an exact count of all shrubs and trees, itemized by planter. Replace any dead or missing plants.

October:

1. Prepare irrigation system for winter. Make sure backflow preventer is well insulated or drained prior to first freeze. Blow out pipes using compressed air in areas where freezing could result in breakage.
2. Mow field areas.

November:

1. "WILT-PRUF" broadleaf evergreens when temperature permits.

December:

1. Prune any tree branches that interfere with public safety. Prune all parking lot and street trees yearly to encourage strong growth.



January 23, 2020

Rob Simmons
Cathartes
104 Washington Street LLC
11 Beacon Street, STE 1120
Boston, MA 02108

RE: Natural Gas Availability to Dover Waterfront Project Dover NH

Dear Rob,

Unitil's natural gas division has reviewed the requested site for natural gas service.

Unitil hereby confirms natural gas service will be available to the Dover Waterfront Project Phase I at River St Dover NH to serve 165 apartments.

Installation is pending an authorized installation agreement with Cathartes and street opening approval from the City of Dover DPW.

Let me know if you have any questions. You can email me at oliver@unitil.com. My phone number is 603-294-5174.

Sincerely,

A handwritten signature in blue ink, appearing to read "Janet Oliver", written over the printed name.

Janet Oliver

Senior Business Development Representative

CUSTOMER ENERGY SOLUTIONS

COCHECHO WATERFRONT DEVELOPMENT - PHASE I

RIVER STREET & WASHINGTON STREET

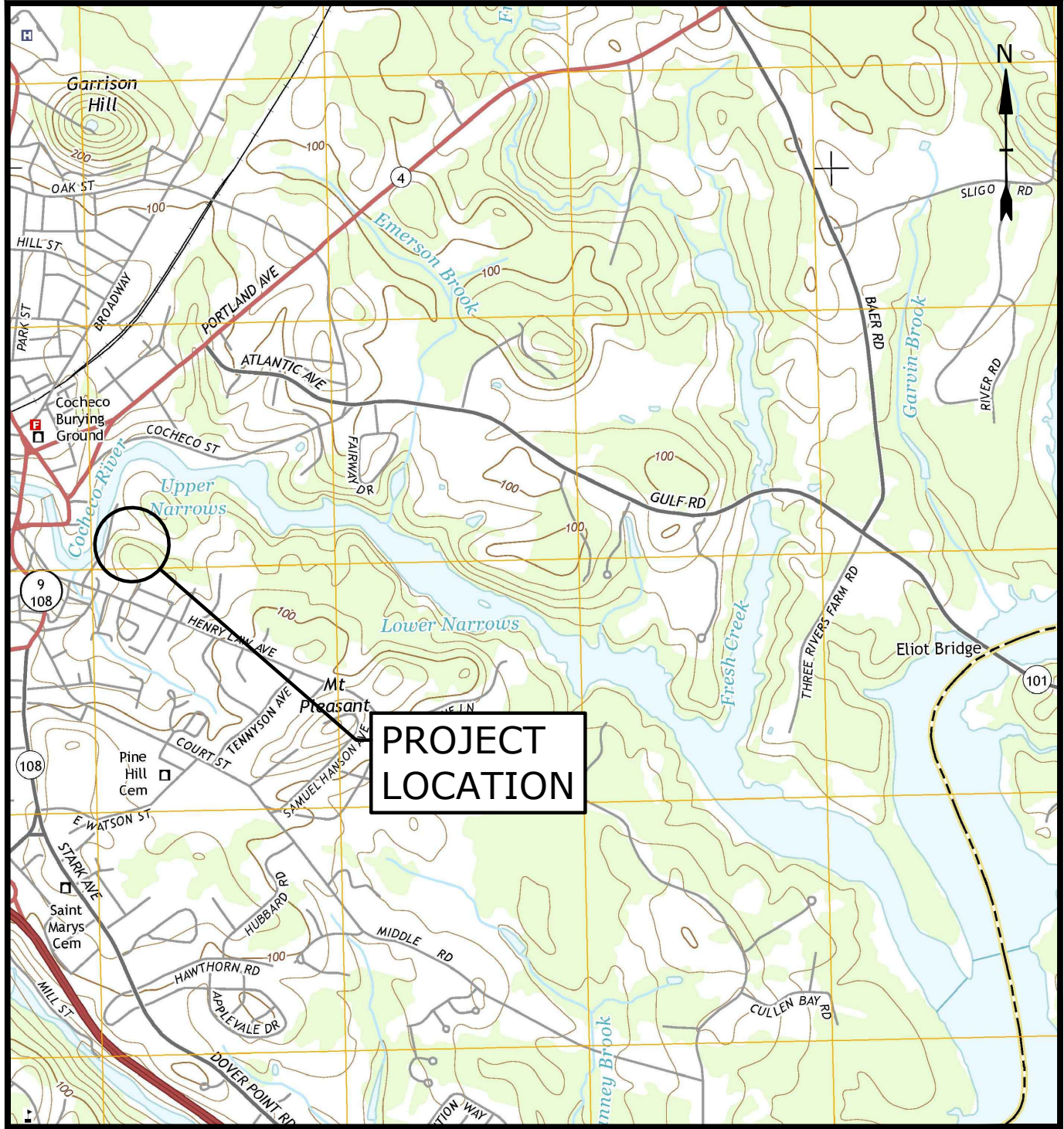
DOVER, NH

DOVER FILE #: P20-

JANUARY 31, 2020

LIST OF DRAWINGS		
SHEET NO.	SHEET TITLE	LAST REVISED
	COVER SHEET	01/31/2020
1 OF 4	EXISTING CONDITIONS PLAN	08/01/2017
2 OF 4	EXISTING CONDITIONS PLAN	08/01/2017
3 OF 4	EXISTING CONDITIONS PLAN	08/01/2017
4 OF 4	EXISTING CONDITIONS PLAN	08/01/2017
G-101	GENERAL NOTES, LEGEND, AND ABBREVIATIONS SHEET	01/31/2020
G-102	NEIGHBORHOOD PLAN	01/31/2020
C-101	EXISTING CONDITIONS & DEMOLITION PLAN	01/31/2020
C-102	SITE PLAN	01/31/2020
C-103	GRADING, DRAINAGE, & EROSION CONTROL PLAN	01/31/2020
C-104	UTILITIES PLAN	01/31/2020
L-1	COLOR LANDSCAPE MASTER PLAN	01/31/2020
L-1	LANDSCAPE MASTER PLAN	01/31/2020
L-2	PHASE ONE PLANTING PLAN	01/31/2020
L-3	PHASE TWO PLANTING PLAN	01/31/2020
C-501	EROSION CONTROL NOTES & DETAILS SHEET	01/31/2020
C-502	DETAILS SHEET	01/31/2020
C-503	DETAILS SHEET	01/31/2020
C-504	DETAILS SHEET	01/31/2020
C-505	DETAILS SHEET	01/31/2020
A-001	PARKING AND GROUND LEVEL PLANS	01/31/2020
A-002	TYPICAL UPPER FLOOR PLANS	01/31/2020
A-005	ROOF PLAN	01/31/2020
A-200	BUILDING ELEVATIONS	01/31/2020
A-201	BUILDING ELEVATIONS	01/31/2020
A-800	CONCEPT RENDERING	01/31/2020
1 OF 1	COCHECHO WATERFRONT SITE LIGHTING	01/24/2020

LIST OF PERMITS & APPROVALS		
FEDERAL	STATUS	DATE
NPDES - CONSTRUCTION GENERAL PERMIT	PENDING	
STATE		
NHDES - ALTERATION OF TERRAIN	PENDING	
NHDES - WETLANDS PERMIT	PENDING	
NHDES - SEWER CONNECTION PERMIT	PENDING	
LOCAL		
SITE PLAN REVIEW PERMIT	PENDING	



LOCATION MAP
SCALE: 1" = 2,000'

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL NOT RELY ON SCALED DIMENSIONS AND SHALL CONTACT THE ENGINEER FOR CLARIFICATION IF A REQUIRED DIMENSION IS NOT PROVIDED ON THE PLANS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS AND METHODS, AND FOR SITE CONDITIONS THROUGHOUT CONSTRUCTION. NEITHER THE PLANS NOR THE SEAL OF THE ENGINEER AFFIXED HEREON EXTEND TO OR INCLUDE SYSTEMS REQUIRED FOR THE SAFETY OF THE CONTRACTOR, THEIR EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING AND IMPLEMENTING SAFETY PROCEDURES AND SYSTEMS AS REQUIRED BY THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), AND ANY STATE OR LOCAL SAFETY REGULATIONS.
3. TIGHE & BOND ASSUMES NO RESPONSIBILITY FOR ANY ISSUES LEGAL OR OTHERWISE, RESULTING FROM CHANGES MADE TO THESE DRAWINGS WITHOUT WRITTEN AUTHORIZATION OF TIGHE & BOND.

PREPARED BY:

Tighe&Bond
Engineers | Environmental Specialists
177 CORPORATE DRIVE
PORTSMOUTH, NH 03801
603-433-8818

APPLICANT:

CPI MANAGEMENT, LLC
C/O CATHARTES
11 BEACON STREET, SUITE #1120
BOSTON, MA 02108

OWNER:

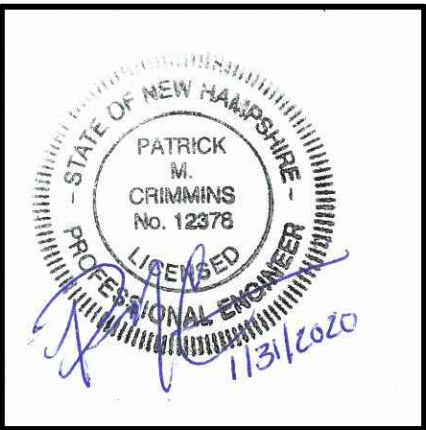
CITY OF DOVER
288 CENTRAL AVENUE
DOVER, NH 03820

SIGNATURE: _____

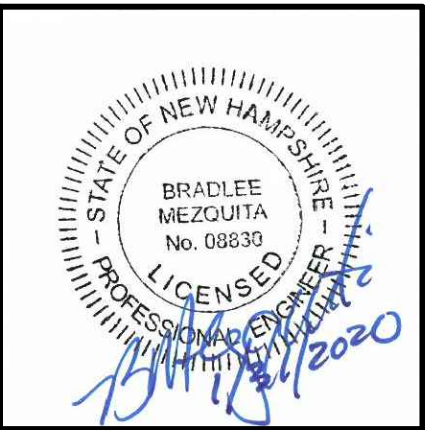
DATE: _____

SURVEYOR:

DOUCET SURVEY²
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10 Storers Street (Riverview Suite) Kennebunk, ME (207) 502-7005
<http://www.doucetsurvey.com>



PATRICK M. CRIMMINGS, PE



BRADLEE L. MEZQUITA, PE

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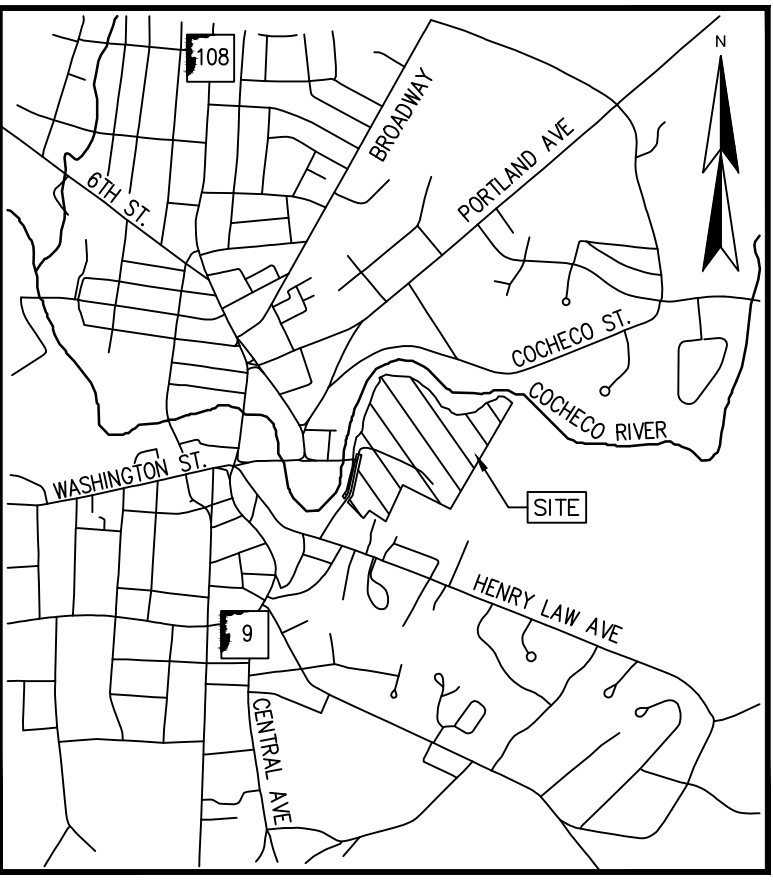
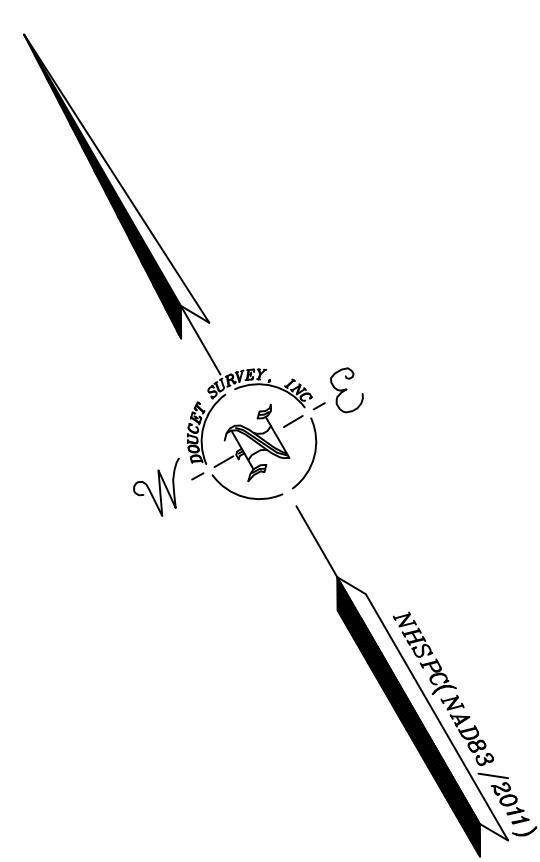
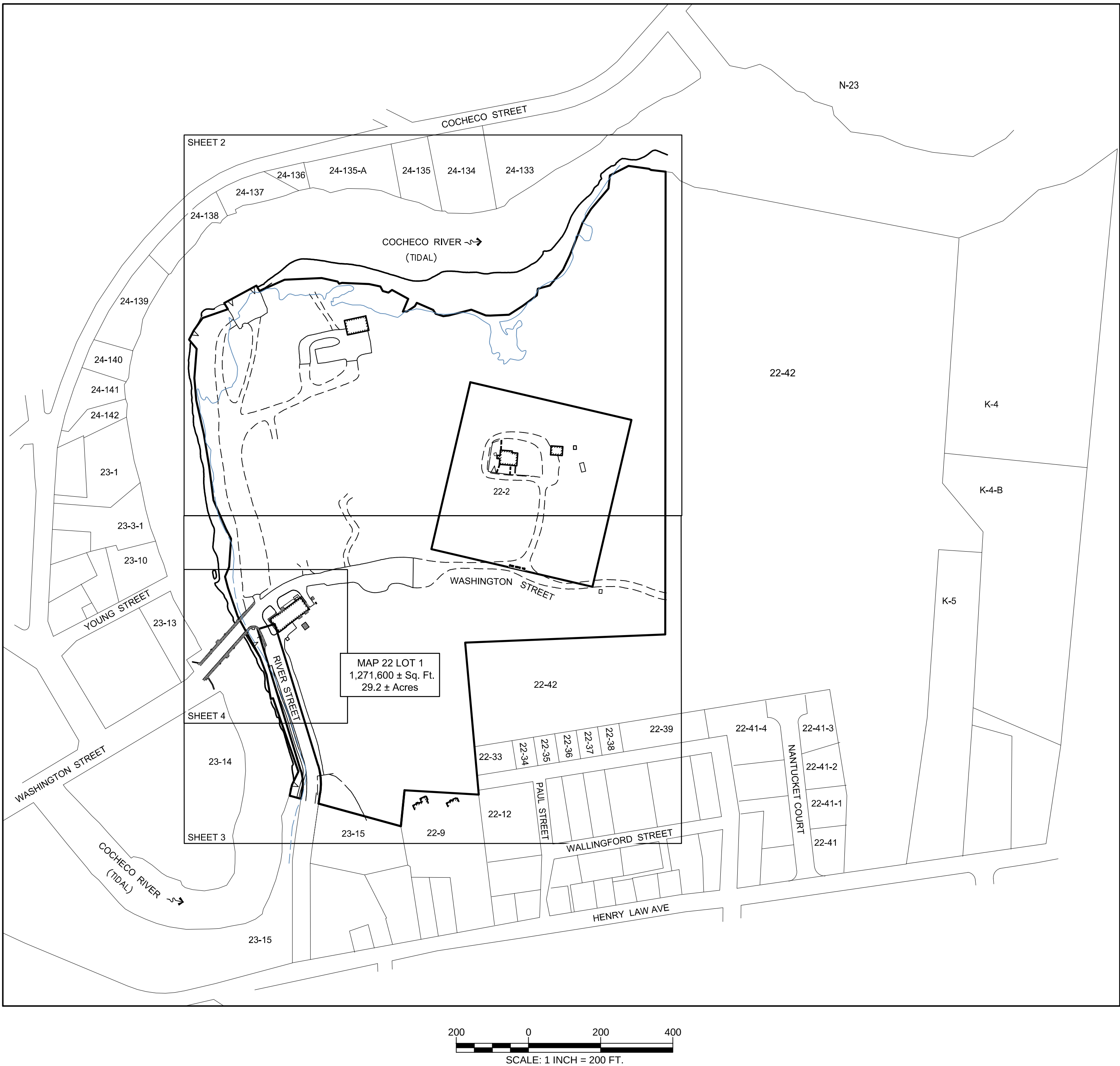
ARCHITECT:

EMBARC
ARCHITECTURE + DESIGN
60 K STREET, 3rd FLOOR
BOSTON MA, 02127



COMPLETE SET 27 SHEETS

ABUTTERS:
MAP 22 LOT 2
ELEANOR MARY DENNIS
32 GEORGE ST
DOVER, NH 03820
S.C.R.D. BK. 1758 PG. 223
MAP 22 LOT 9
MAP 22 LOT 12
GINA M KNOX REVOCABLE TRUST
9 INDEPENDENCE DR
DOVER, NH 03820-4945
S.C.R.D. BK. 3743 PG. 882
S.C.R.D. BK. 3743 PG. 879
MAP 22 LOT 33
KEVIN & CATHERINE MCENEANEY
8 GOLD POST ROAD
DOVER, NH 03820
S.C.R.D. BK. 663 PG. 300
MAP 22 LOT 34
KEVIN MCENEANEY
8 GOLD POST ROAD
DOVER, NH 03820
S.C.R.D. BK. 2194 PG. 633
MAP 22 LOT 35
ERIK SWEETSER & DIANE DUFFY
2 WALLINGFORD ST
DOVER, NH 03820
S.C.R.D. BK. 2147 PG. 155
MAP 22 LOT 36
TAYLOR FAMILY
REVOCABLE TRUST
10 WALLINGFORD ST
DOVER, NH 03820
S.C.R.D. BK. 4217 PG.
MAP 22 LOT 37
TAYLOR FAMILY
REVOCABLE TRUST
10 WALLINGFORD ST
DOVER, NH 03820
S.C.R.D. BK. 4217 PG. 775
MAP 22 LOT 38
TAYLOR FAMILY
REVOCABLE TRUST
10 WALLINGFORD ST
DOVER, NH 03820
S.C.R.D. BK. 3758 PG. 62
MAP 22 LOT 39
KEVIN & CATHERINE MCENEANEY
8 GOLD POST ROAD
DOVER, NH 03820
S.C.R.D. BK. 665 PG. 190
MAP 22 LOT 41
LUKE MURPHY
3 NANTUCKET CT
DOVER, NH 03820-3872
S.C.R.D. BK. 3300 PG. 399
MAP 22 LOT 41-1
MANUEL DE AQUIRRE
& LINSLEY SIKORSKI
7 NANTUCKET CT
DOVER, NH 03820
S.C.R.D. BK. 4411 PG. 449
MAP 22 LOT 41-2
ERIC & JESSICA CHAMPAGNE
11 NANTUCKET CT
DOVER, NH 03820
S.C.R.D. BK. 3284 PG. 340
MAP 22 LOT 41-3
PETER & SHARI GRIEVE
15 NANTUCKET CT
DOVER, NH 03820
S.C.R.D. BK. 3522 PG. 492
MAP 22 LOT 41-4
ALEXANDER & TATIANA ROMANYUK
14 NANTUCKET CT
DOVER, NH 03820
S.C.R.D. BK. 3316 PG. 90
MAP 22 LOT 42
CITY OF DOVER
288 CENTRAL AVE
DOVER, NH 03820
S.C.R.D. BK. 613 PG. 241
MAP 23 LOT 1
ED O'BRIEN & ROBERT MAIRS
PO BOX 28
DOVER, NH 03821-0028
S.C.R.D. BK. 995 PG. 828
MAP 23 LOT 3-1
BN FARM DOVER LLC
25 A PORTLAND AVENUE
DOVER, NH 03820
S.C.R.D. BK. 4305 PG. 816
MAP 23 LOT 10
JOSEPH & GLORIA ALLIS
2 JAN LANE
NEWMARKET, NH 03857-2187
S.C.R.D. BK. 608 PG. 57
MAP 23 LOT 13
JOSEPH & GLORIA ALLIS
REVOCABLE TRUST
2 JAN LANE
NEWMARKET, NH 03857-2187
S.C.R.D. BK. 1784 PG. 637
MAP 23 LOT 14
WASHINGTON STREET MILL LLC
3 PENSTOCK WAY
NEWMARKET, NH 03857
S.C.R.D. BK. 2349 PG. 238
MAP 23 LOT 15
CITY OF DOVER
C/O C/S RECREATION/
GYM & POOL
61 LOCUST ST #124
DOVER, NH 03820-3753
MAP 24 LOT 133
PUBLIC SERVICE CO OF NH
PO BOX 330
MANCHESTER, NH 03105-0330
MAP 24 LOT 134
TURGEON FAMILY LIMITED
PARTNERS
90 FLOWER DRIVE
BARRINGTON, NH 03825-4327
S.C.R.D. BK. 1997 PG. 54
MAP 24 LOT 135
WAKABAYASHI FAMILY TRUST
383 CENTRAL AVENUE STE 150
DOVER, NH 03820
S.C.R.D. BK. 3919 PG. 741
MAP 24 LOT 135-A
GEORGE MAGLARAS
33 COCHECO ST
DOVER, NH 03820
S.C.R.D. BK. 2612 PG. 358
MAP 24 LOT 136
GEORGE MAGLARAS
33 COCHECO ST
DOVER, NH 03820
S.C.R.D. BK. 1102 PG. 80
MAP 24 LOT 137
GEORGE MAGLARAS
33 COCHECO ST
DOVER, NH 03820
S.C.R.D. BK. 1207 PG. 803
MAP 24 LOT 138
GEORGE MAGLARAS
33 COCHECO ST
DOVER, NH 03820
S.C.R.D. BK. 1208 PG. 46
MAP 24 LOT 139
GEORGE MAGLARAS
33 COCHECO ST
DOVER, NH 03820
S.C.R.D. BK. 1049 PG. 122
MAP 24 LOT 140
GEORGE MAGLARAS &
ROBERT MAIRS
33 COCHECO ST
DOVER, NH 03820
S.C.R.D. BK. 4472 PG. 383
MAP 24 LOT 141
ROBERT MAIRS
PO BOX 28
DOVER, NH 03821-0028
S.C.R.D. BK. 1861 PG. 500
MAP 24 LOT 142
ROBERT MAIRS
PO BOX 28
DOVER, NH 03821-0028
S.C.R.D. BK. 1861 PG. 500
MAP N LOT 23
PUBLIC SERVICE CO OF NH
PO BOX 330
MANCHESTER, NH 03105-0330
MAP K LOT 4
CITY OF DOVER
288 CENTRAL AVE
DOVER, NH 03820
MAP K LOT 4-B
DOVER YOUTH SOFTBALL LEAGUE
PO BOX 1929
DOVER, NH 03821
S.C.R.D. BK. 4024 PG. 331
MAP K LOT 5
CHRISTOPHER PRIOR
150 HENRY LAW AVENUE
DOVER, NH 03820
S.C.R.D. BK. 3178 PG. 971



- LEGEND**
- EXISTING LOT LINE
 - APPROXIMATE ABUTTERS LOT LINE
 - STONE WALL
 - CHAIN LINK FENCE
 - STOCKADE FENCE
 - RETAINING WALL
 - EDGE OF RIVER
 - SEWER LINE
 - DRAIN LINE
 - UNDERGROUND ELECTRIC LINE
 - MAJOR CONTOUR LINE
 - MINOR CONTOUR LINE
 - TREE LINE
 - EDGE OF WETLAND
 - FLOOD LINE (SEE NOTE 9)
 - 0.2% ANNUAL CHANCE FLOOD HAZARD
 - CONCRETE
 - RIP RAP
 - UTILITY POLE
 - LIGHT POLE
 - BOUND FOUND
 - IRON PIPE/ROD FOUND
 - POST
 - BOLLARD
 - FIRE HYDRANT
 - WATER GATE VALVE
 - WATER SHUTOFF VALVE
 - SIGN
 - PAD MOUNTED TRANSFORMER
 - TELEPHONE BOX
 - CATCH BASIN
 - DRAIN MANHOLE
 - SEWER MANHOLE
 - MANHOLE
 - HAND HOLE
 - WETLAND AREA
 - CONIFEROUS TREE
 - DECIDUOUS TREE
 - MONITORING WELL
 - DRAINAGE FLOW DIRECTION ARROW
 - ROCK/BOULDER
 - LEDGE OUTCROP
 - MAP-LOT
 - TYP. BND. FND.
 - I.P.F.
 - CONC.
 - GRAN.
 - RET.
 - EP
 - EOG
 - VGC
 - SWL
 - DYL
 - HDWL
 - (K4)
 - VP

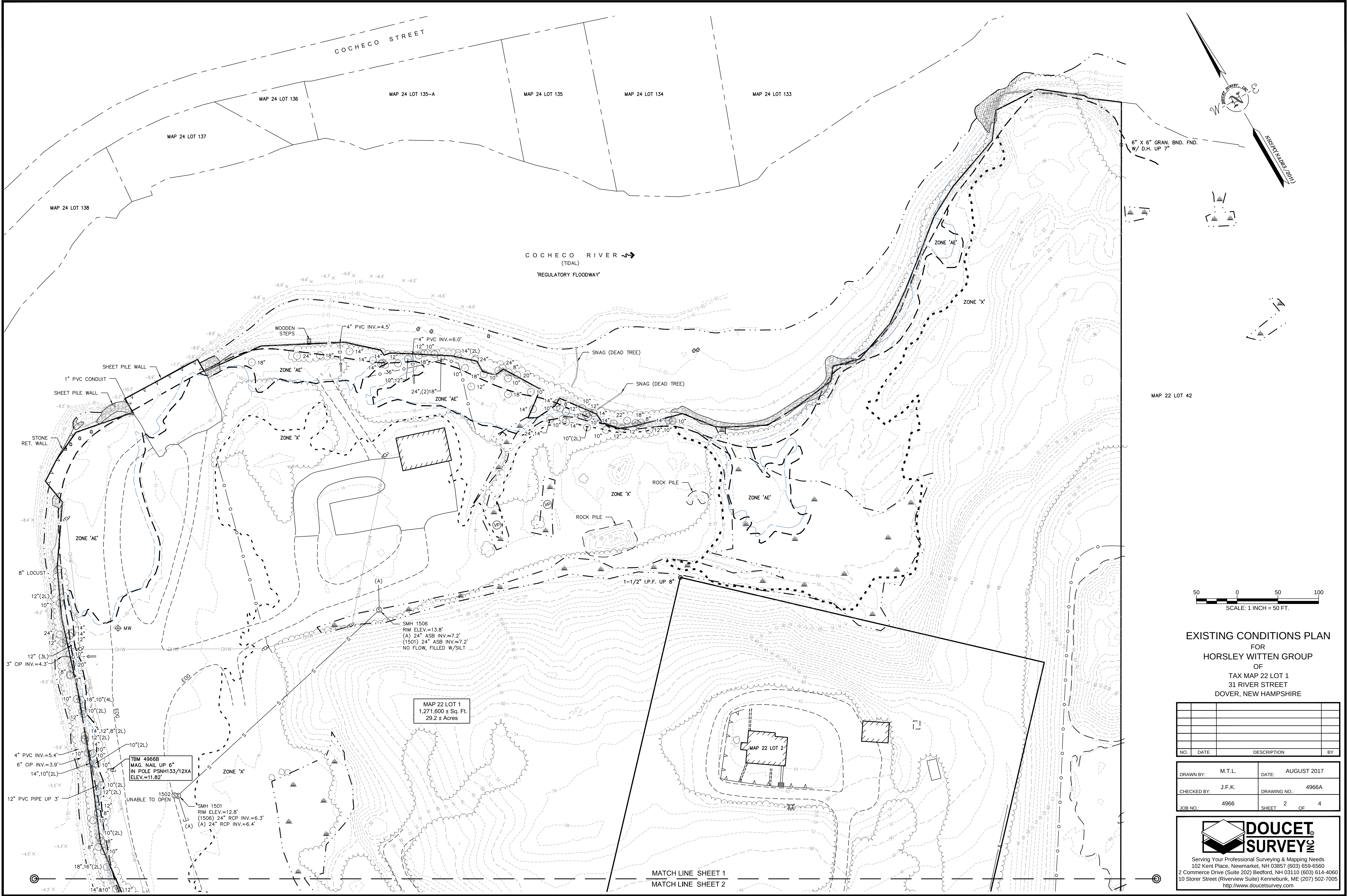
EXISTING CONDITIONS PLAN
FOR
HORSLEY WITTEN GROUP
OF
TAX MAP 22 LOT 1
31 RIVER STREET
DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	M.T.L.	DATE:	AUGUST 2017
CHECKED BY:	J.F.K.	DRAWING NO.:	4966A
JOB NO.	4966	SHEET	1 OF 4

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http://www.doucetsurvey.com

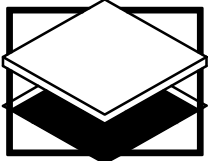
- REFERENCE PLANS:
- "SITE PLAN, DOVER BLUFF CONDOMINIUMS, HENRY LAW AVENUE, DOVER, NH, HAMPTON MANAGEMENT CORP." DATED MAY 20, 1985 BY NOLDESIGN, INC S.C.R.D. PLAN 27-47.
 - "PLAN OF LAND FOR ELEANOR M. McCOOLE NEAR RIVER STREET, DOVER, NEW HAMPSHIRE" DATED MAY 1991 BY K.E. MOORE, LAND SURVEYOR S.C.R.D. PLAN 32A-49.
 - PLAN OF LAND, LOT 22-1 & 22-42, HENRY LAW AVENUE, DOVER, NH PREPARED FOR CITY OF DOVER, COMMUNITY DEVELOPMENT - 288 CENTRAL AVE. - DOVER, NH" DATED MAY 15, 1991 BY CUOCO & CORMIER, INC. S.C.R.D. PLAN 40-53.
 - "PLAN OF GROUNDWATER MANAGEMENT ZONE, PREPARED FOR CITY OF DOVER, TAX MAP 22 LOT NO. 1, RIVER STREET, CITY OF DOVER, COUNTY OF STRAFFORD, STATE OF NEW HAMPSHIRE" DATED DECEMBER 2001 BY MCENEANEY SURVEY ASSOCIATES, INC. S.C.R.D. PLAN 65-16.
- NOTES:
- REFERENCE: TAX MAP 22, LOT 1
 - TOTAL PARCEL AREA: 1,271,596 SQ. FT. OR 29.19 AC.
 - OWNER OF RECORD: CITY OF DOVER
288 CENTRAL AVE.
DOVER, NH 03820
S.C.R.D. BOOK 225, PAGE 493
 - ZONE: COCHECO WATERFRONT DISTRICT (CWD)
DIMENSIONAL REQUIREMENTS:
MIN. LOT AREA N/A
MAX. BUILDING COVERAGE[2] 75%
MIN. FRONTAGE N/A
MIN. FRONT SETBACK 0 ft.
MIN. SIDE SETBACK 0 ft.
MIN. REAR SETBACK 0 ft.
ABUT. A STREET SETBACK 0 ft.
MAX. BUILDING HEIGHT 55 ft.
PRINCIPAL BUILDING 55 ft.
OUTBUILDING 55 ft.
 - [2] LOTS LOCATED IN THE COCHECO WATERFRONT DISTRICT (CWD) AND LOCATED SOUTH OF THE COCHECO RIVER MAY HAVE A MAXIMUM LOT COVERAGE OF 100% (ADDED 1-22-2003 BY ORD. NO. 35).
 - ZONING INFORMATION LISTED HEREON IS BASED ON THE CITY OF DOVER ZONING ORDINANCE DATED DECEMBER 2009, REVISED MAY 2016 AS AVAILABLE ON THE TOWN/CITY WEBSITE. ADDITIONAL REGULATIONS APPLY, AND REFERENCE IS HEREBY MADE TO THE EFFECTIVE ZONING ORDINANCE. THE LAND OWNER IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE MUNICIPAL, STATE AND FEDERAL REGULATIONS.
 - THE PARCEL IS EXEMPT FROM THE STATE OF NH SHORELAND PROTECTION DISTRICT PER RSA 483-B.12, MARCH 4, 2009.
 - FIELD SURVEY PERFORMED BY DOUCET SURVEY, INC. DURING SEPT. 2016, APRIL, MAY & JUNE 2017 USING A TRIMBLE S6 TOTAL STATION AND A TRIMBLE R6 SURVEY GRADE GPS WITH A TRIMBLE TSC3 DATA COLLECTOR AND A SOKKIA B21 AUTO LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.
 - JURISDICTIONAL WETLANDS AND HIGHEST OBSERVABLE TIDE LINE DELINEATED BY GZA GEONVIRONMENTAL, INC. DURING AUGUST 2016 IN ACCORDING TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHERN AND NORTHEAST REGION, VERSION 2.0, JANUARY 2012, US ARMY CORPS OF ENGINEERS.
 - AERIAL TOPOGRAPHY WAS CONDUCTED BY EASTERN TOPOGRAPHICS FROM IMAGES TAKEN ON APRIL 17, 2017 WITH A PHOTO SCALE OF 1:3300. CONTOURS AND OBJECTS SHOWN WITHIN OBSCURED AREAS ARE APPROXIMATE AND SHOULD BE VERIFIED BEFORE USE FOR DESIGN OR CONSTRUCTION PURPOSES.
 - FLOOD HAZARD ZONE: "X", "AE", 0.2% ANNUAL CHANCE FLOOD HAZARD & REGULATORY FLOODWAY", PER FIRM MAP 33017C0330E, DATED 9/30/15.
 - HORIZONTAL DATUM BASED ON NEW HAMPSHIRE STATE PLANE(2800) NAD83(2011) DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
 - VERTICAL DATUM IS BASED ON NAVD88 PER NHDOT DISK "D 50 RESET 1977" WITH A PUBLISHED ELEVATION OF 22.60'.
 - PROPER FIELD PROCEDURES WERE FOLLOWED IN ORDER TO GENERATE CONTOURS AT 1' & 2' INTERVALS. ANY MODIFICATION OF THIS INTERVAL WILL DIMINISH THE INTEGRITY OF THE DATA, AND DOUCET SURVEY, INC. WILL NOT BE RESPONSIBLE FOR ANY SUCH ALTERATION PERFORMED BY THE USER.
 - UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON OBSERVABLE PHYSICAL EVIDENCE AND PAINT MARKS FOUND ON-SITE.
 - THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES/TYPES IS SUBJECT TO NUMEROUS FIELD CONDITIONS, INCLUDING; THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS, MANHOLE CONFIGURATION, ETC.
 - THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES IN ACCORDANCE WITH AND IN RELATION TO THE CURRENT LEGAL DESCRIPTION, AND IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP, OR DEFINE THE LIMITS OF TITLE.
 - DUE TO THE COMPLEXITY OF RESEARCHING ROAD RECORDS AS A RESULT OF INCOMPLETE, UNORGANIZED, INCONCLUSIVE, OBLITERATED, OR LOST DOCUMENTS, THERE IS AN INHERENT UNCERTAINTY INVOLVED WHEN ATTEMPTING TO DETERMINE THE LOCATION AND WIDTH OF A ROADWAY RIGHT OF WAY. THE EXTENTS OF THE ROADS AS DEPICTED HEREON ARE BASED ON RESEARCH CONDUCTED AT THE STRAFFORD COUNTY REGISTRY OF DEEDS AND DOVER CITY CLERK'S OFFICE.
 - NO INFORMATION WAS FOUND RELATIVE TO THE CREATION OR WIDTH OF RIVER STREET OR WASHINGTON STREET IN THE VICINITY OF THE SUBJECT PARCEL. THE LOT LINE AS SHOWN HEREON IN THE VICINITY OF RIVER STREET IS PER REFERENCE PLAN 4. MONUMENTS SHOWN ON SAID PLAN ALONG RIVER STREET WERE NOT FOUND AND PRESUMABLY DESTROYED DURING ROAD CONSTRUCTION.
 - ALL ELECTRIC, GAS, TEL. WATER, SEWER AND DRAIN SERVICES ARE SHOWN IN SCHEMATIC FASHION, THEIR LOCATIONS ARE NOT PRECISE OR NECESSARILY ACCURATE. NO WORK WHATSOEVER SHALL BE UNDERTAKEN ON THIS SITE USING THIS PLAN TO LOCATE THE ABOVE SERVICES. CONSULT WITH THE PROPER AUTHORITIES CONCERNED WITH THE SUBJECT SERVICE LOCATIONS FOR INFORMATION REGARDING SUCH. CALL DIG-SAFE AT 1-888-DIG-SAFE.
 - WATER BOUNDARIES ARE DYNAMIC IN NATURE AND ARE SUBJECT TO CHANGE DUE TO NATURAL CAUSES SUCH AS EROSION OR ACCRETION. PARCEL BOUNDARY ALONG THE EDGE OF RIVER EXTENDS TO THE MEAN HIGH TIDE LINE.
 - NO ACCESS EASEMENT WAS FOUND BENEFITING MAP 22, LOT 2.



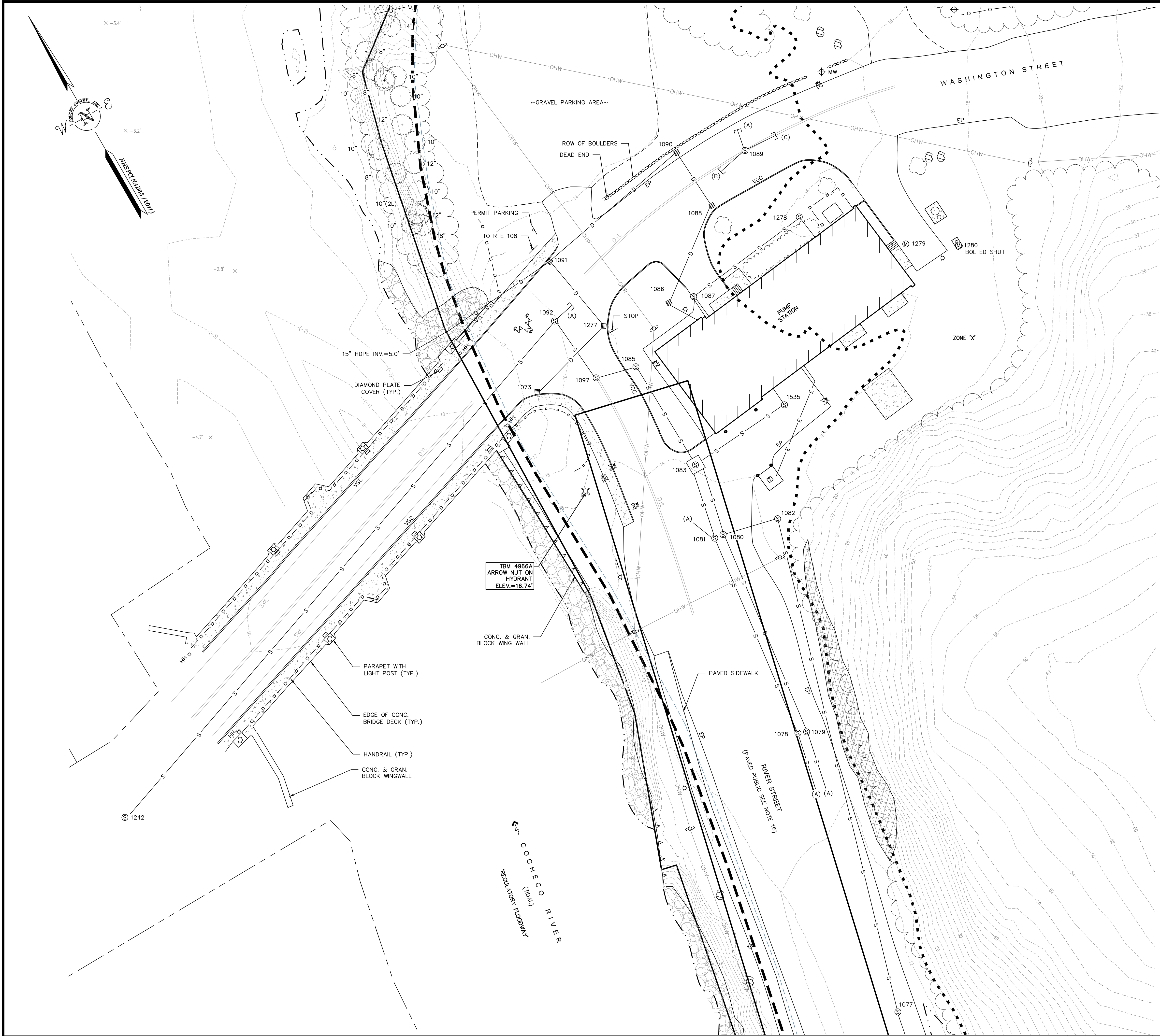
EXISTING CONDITIONS PLAN
FOR
HORSLEY WITTEN GROUP
OF
TAX MAP 22 LOT 1
31 RIVER STREET
DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

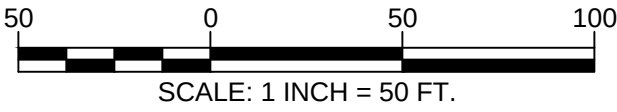
DRAWN BY:	M.T.L.	DATE:	AUGUST 2017
CHECKED BY:	J.F.K.	DRAWING NO.:	4966A
JOB NO.	4966	SHEET	2 OF 4

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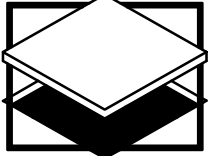
DRAINAGE STRUCTURES		SEWER STRUCTURES	
CB 1073	RIM ELEV.=16.7' (1277) 12" RCP INV.=11.4'	SMH 1077	SMH 1087
		RIM ELEV.=11.5' (A) 24" ASB INV.=8.0' (1082) 24" ASB INV.=8.0'	RIM ELEV.=15.2' SMH 1089--APPEARS TO BE DRAIN
CB 1086	RIM ELEV.=13.9' (BLDG) 12" PVC INV.=10.8' (1088) 12" HDPE INV.=10.8'	SMH 1078	RIM ELEV.=14.5' (A) UNKN. INV.=9.5' (PLUGGED) (B) 12" PVC INV.=9.8' (C) 12" PVC INV.=9.8'
		RIM ELEV.=12.5' (A) 36" RCP INV.=7.3' (1081) 36" RCP INV.=7.2'	
CB 1088	RIM ELEV.=14.1' (1086) 12" HDPE INV.=8.8' (1090) 12" RCP INV.=7.6'	SMH 1079	SMH 1092
		RIM ELEV.=12.4' (A) 24" ASB INV.=7.3' (1080) 24" RCP INV.=7.2'	RIM ELEV.=16.1' (1089) 12" PVC INV.=9.5' (1242) 18" PVC INV.=9.5' (1092) 18" PVC INV.=9.2'
CB 1090	RIM ELEV.=14.1' (1088) 12" RCP INV.=7.4' (1091) 12" RCP INV.=6.6'	SMH 1080	SMH 1097
		RIM ELEV.=12.9' (1079) 24" RCP INV.=7.0' (1082) 24" DIP INV.=7.0' (1083) 24" RCP INV.=7.0'	RIM ELEV.=15.5' (1092) 18" PVC INV.=9.3' (1085) 18" PVC INV.=9.4'
CB 1091	RIM ELEV.=15.2' (1277) 12" RCP INV.=10.8' (1090) 15" RCP INV.=5.7' (A) 15" HDPE (HOODED) WATER ELEV.=5.2'	SMH 1081	SMH 1242
		RIM ELEV.=13.0' (A) 15" PVC INV.=9.4' (1078) 36" RCP INV.=7.1' (1083) 36" RCP INV.=7.1'	RIM ELEV.=16.1' SMH 1278
CB 1277	RIM ELEV.=15.3' (1073) 12" RCP INV.=12.3' (1091) 12" RCP INV.=12.0'	SMH 1082	RIM ELEV.=16.3' RCP PIPES VISIBLE UNMEASUREABLE
DMH 1530	RIM ELEV.=13.1'		SMH 1529
			RIM ELEV.=14.5'
			SMH 1531
			RIM ELEV.=12.5'
		SMH 1083	SMH 1535
		RIM ELEV.=13.9' (1085) 18" RCP INV.=N/A RECESSED (1080) 24" RCP INV.=7.0' (1081) 36" RCP INV.=6.8' (1535) 42" RCP INV.=6.6'	RIM ELEV.=14.7' (1083) 42" RCP INV.=N/A RECESSED (BLDG) UNKN. INV.=N/A RECESSED
		SMH 1085	
		RIM ELEV.=15.3' (1097) 18" PVC INV.=9.5' (1083) 18" RCP INV.=9.3'	



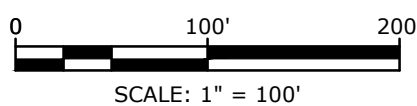
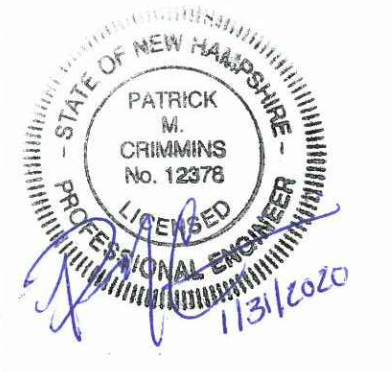
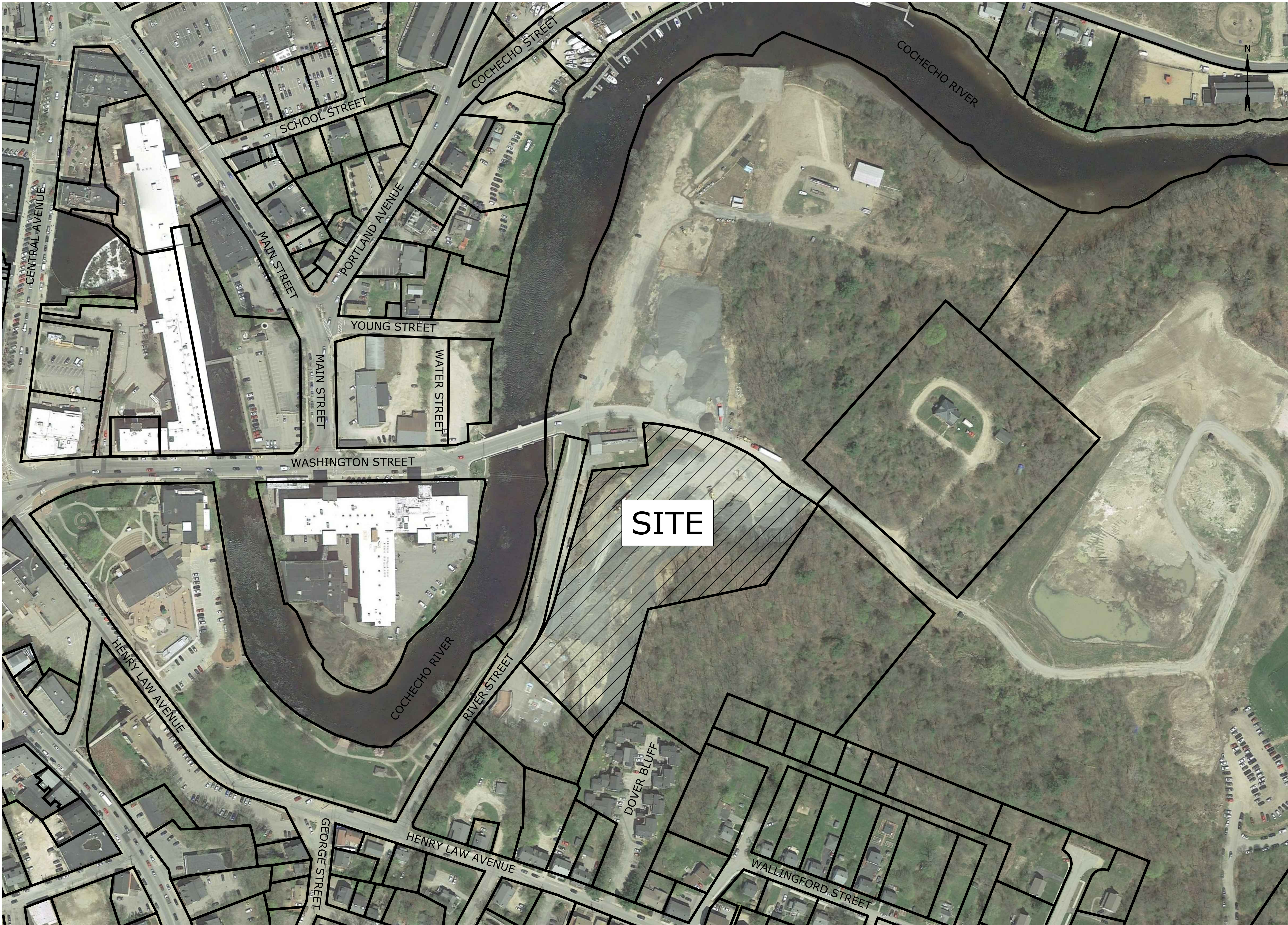
EXISTING CONDITIONS PLAN
FOR
HORSLEY WITTEN GROUP
OF
TAX MAP 22 LOT 1
31 RIVER STREET
DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	M.T.L.	DATE:	AUGUST 2017
CHECKED BY:	J.F.K.	DRAWING NO.:	4966A
JOB NO.	4966	SHEET	4 OF 4

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**Cochecho
Waterfront
Development
Phase - I**

Applicant:
CPI Management, LLC
c/o Cathartes

Owner:
City of Dover

Dover File #: P20-

Dover, New Hampshire

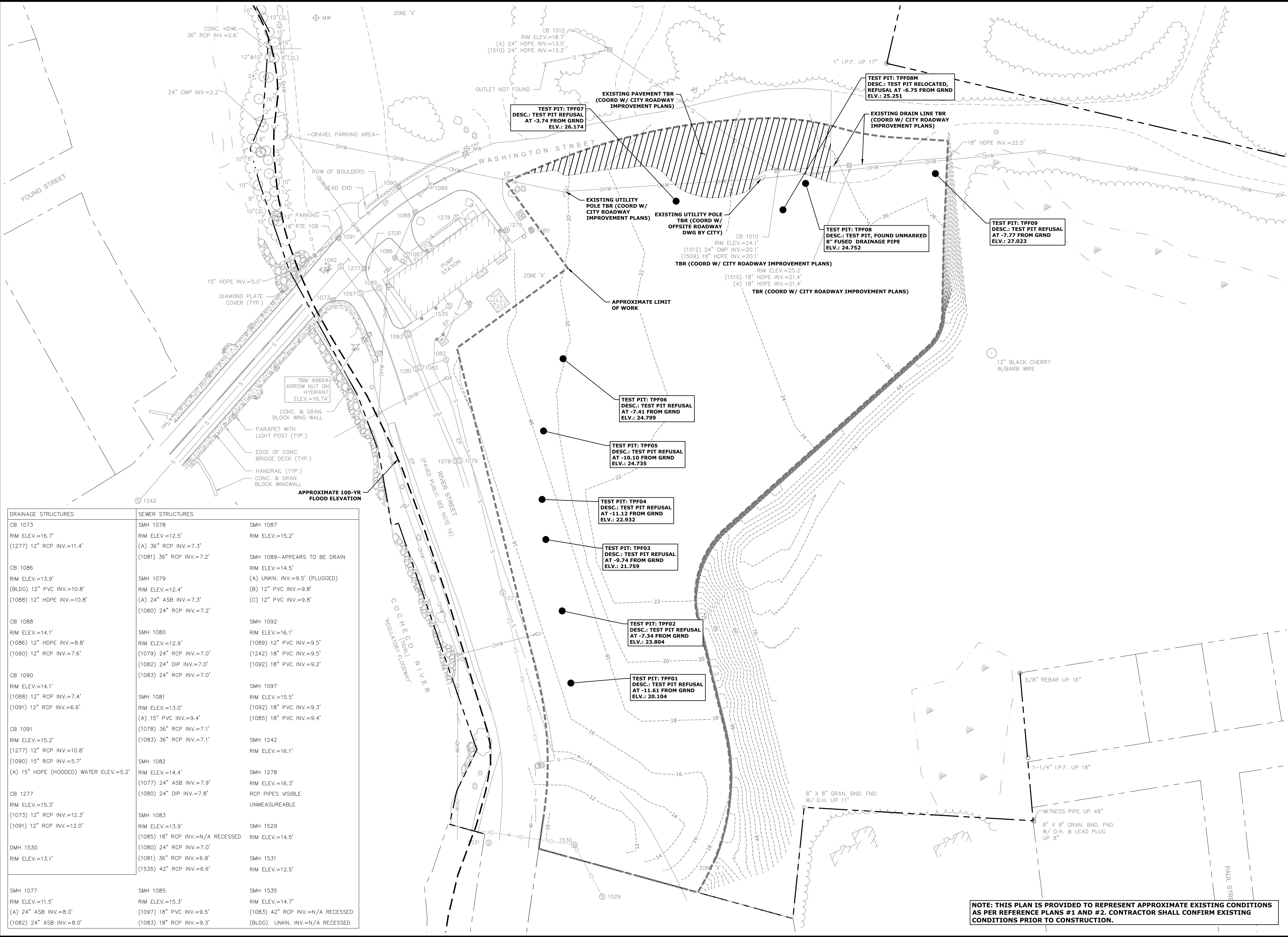
A	1/31/2020	TRC SITE PLAN REVIEW
MARK	DATE	DESCRIPTION

PROJECT NO:	C-0960-007
DATE:	January 31, 2020
FILE:	C0960-007-CS.DWG
DRAWN BY:	CML/BKC
CHECKED:	PMC
APPROVED:	BLM

NEIGHBORHOOD PLAN

SCALE: AS SHOWN

Last Save Date: January 31, 2020 9:40 AM By: CML
Plot Date: Friday, January 31, 2020 Plotted By: Craig M. Langton
File Location: Z:\C0960 Cataraugus\C-0960-007 Cochecho Waterfront Drawings Figures\AutoCAD\Sheet\C0960-007-DSGN.DWG Layout Tab: C-101



DRAINAGE STRUCTURES		SEWER STRUCTURES	
CB 1073 RIM ELEV.=16.7' (1277) 12" RCP INV.=11.4'		SMH 1078 RIM ELEV.=12.5' (A) 36" RCP INV.=7.3' (1081) 36" RCP INV.=7.2'	SMH 1087 RIM ELEV.=15.2' SMH 1089—APPEARS TO BE DRAIN RIM ELEV.=14.5' (A) UNKN. INV.=9.5' (PLUGGED) (B) 12" PVC INV.=9.8' (C) 12" PVC INV.=9.8'
CB 1086 RIM ELEV.=13.9' (BLDG) 12" PVC INV.=10.8' (1088) 12" HDPE INV.=10.8'		SMH 1079 RIM ELEV.=12.4' (A) 24" ASB INV.=7.3' (1080) 24" RCP INV.=7.2'	
CB 1088 RIM ELEV.=14.1' (1086) 12" HDPE INV.=8.8' (1090) 12" RCP INV.=7.6'		SMH 1080 RIM ELEV.=12.9' (1089) 12" RCP INV.=7.0' (1079) 24" RCP INV.=7.0' (1082) 24" DIP INV.=7.0' (1083) 24" RCP INV.=7.0'	SMH 1092 RIM ELEV.=16.1' (1089) 12" PVC INV.=9.5' (1242) 18" PVC INV.=9.5' (1092) 18" PVC INV.=9.2'
CB 1090 RIM ELEV.=14.1' (1088) 12" RCP INV.=7.4' (1091) 12" RCP INV.=6.6'		SMH 1081 RIM ELEV.=13.0' (A) 15" PVC INV.=9.4' (1078) 36" RCP INV.=7.1' (1083) 36" RCP INV.=7.1'	SMH 1097 RIM ELEV.=15.5' (1092) 18" PVC INV.=9.3' (1085) 18" PVC INV.=9.4'
CB 1091 RIM ELEV.=15.2' (1277) 12" RCP INV.=10.8' (1090) 15" RCP INV.=5.7' (A) 15" HDPE (HOODED) WATER ELEV.=5.2'		SMH 1082 RIM ELEV.=14.4' (1077) 24" ASB INV.=7.9' (1080) 24" DIP INV.=7.8'	SMH 1242 RIM ELEV.=16.1' SMH 1278 RIM ELEV.=16.3' RCP PIPES VISIBLE UNMEASUREABLE
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DMH 1530 RIM ELEV.=13.1'			
SMH 1077 RIM ELEV.=11.5' (A) 24" ASB INV.=8.0' (1082) 24" ASB INV.=8.0'		SMH 1085 RIM ELEV.=15.3' (1097) 18" PVC INV.=9.5' (1083) 18" RCP INV.=9.3'	SMH 1535 RIM ELEV.=14.7' (1083) 42" RCP INV.=N/A RECESSED (BLDG) UNKN. INV.=N/A RECESSED

Cochecho Waterfront Development Phase - I

Applicant:
CPI Management, LLC
c/o Cathartes

Owner:
City of Dover

Dover File #: P20-

Dover, New Hampshire

A	1/31/2020	TRC SITE PLAN REVIEW
MARK	DATE	DESCRIPTION
PROJECT NO:		C-0960-007
DATE:		January 31, 2020
FILE:		C0960-007-DSGN.DWG
DRAWN BY:		CML/BKC
CHECKED:		PMC
APPROVED:		BLM
EXISTING CONDITIONS & DEMOLITION PLAN		
SCALE:		AS SHOWN
C-101		

NOTE: THIS PLAN IS PROVIDED TO REPRESENT APPROXIMATE EXISTING CONDITIONS AS PER REFERENCE PLANS #1 AND #2. CONTRACTOR SHALL CONFIRM EXISTING CONDITIONS PRIOR TO CONSTRUCTION.

Last Save Date: January 31, 2020 9:40 AM By: CML
Plot Date: Friday, January 31, 2020 Plotted By: Craig M. Langton
288 File Location: J:\C0960\Cartables\C-0960-007 Cochecho Waterfront Drawings Figures\AutoCAD\Sheet\0960-007-DSGN.DWG Layout Tab: C-102

SITE DATA:
LOCATION: TAX MAP 22 LOT 1
WASHINGTON & RIVER STREET
DOVER, NEW HAMPSHIRE
OWNER: CITY OF DOVER
288 CENTRAL AVE
DOVER, NH 03820
ZONING DISTRICT: COCHECHO WATERFRONT DISTRICT (CWD)
OVERLAY DISTRICT: N/A
ALLOWED USE: WATER-RELATED LAND USES (MARINAS, WATERBORNE PASSENGER
TRANSPORTATION, WATER RELATED EDUCATION/RESOURCE CENTERS),
AND RESIDENTIAL

DIMENSIONAL REQUIREMENTS:

	REQUIRED	PROVIDED
MINIMUM LOT AREA:	N/A	±4.02 ACRES
MAXIMUM LOT COVERAGE:	100% ⁽¹⁾	±84.6%
MINIMUM FRONTAGE:	N/A	

MAXIMUM BUILDING HEIGHT:

PRINCIPAL:	55 FT	<55 FT
OUTBUILDING:	55 FT	<55 FT

⁽¹⁾ LOTS LOCATED IN THE COCHECHO WATERFRONT DISTRICT (CWD) AND LOCATED SOUTH OF THE COCHECHO RIVER MAY HAVE A MAXIMUM LOT COVERAGE OF 100% [ADDED 1-22-2003 BY ORD. NO. 35].

OFF STREET PARKING REQUIREMENTS:

	REQUIRED	PROPOSED
PARKING STALL LAYOUT:		
• STANDARD 90°	9' X 18'	9' X 18'

DRIVE AISLE WIDTH:

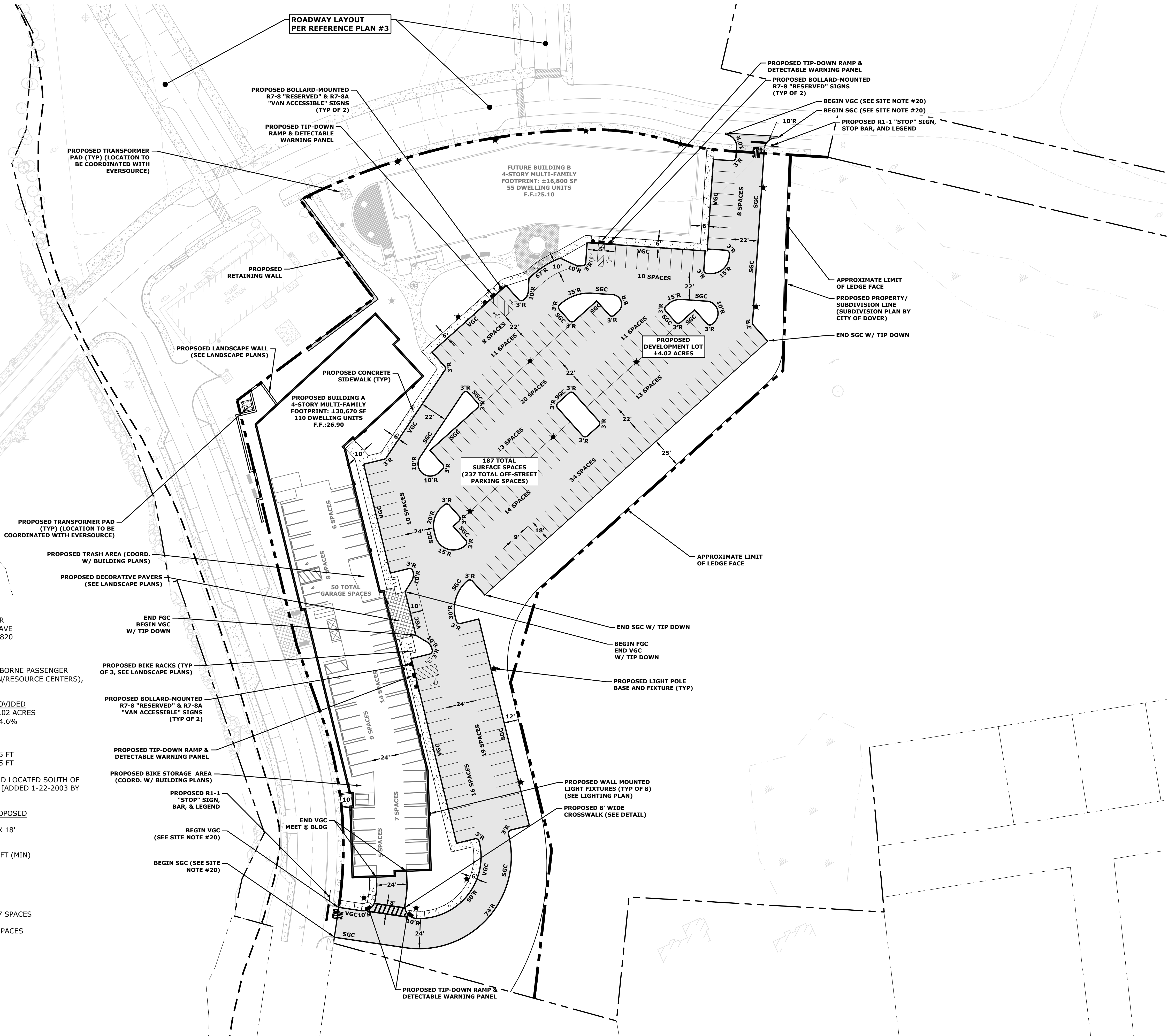
• 90° (2-WAY TRAFFIC)	22 FT	22 FT (MIN)
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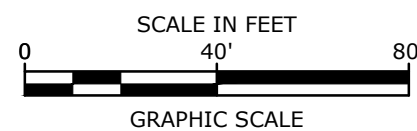
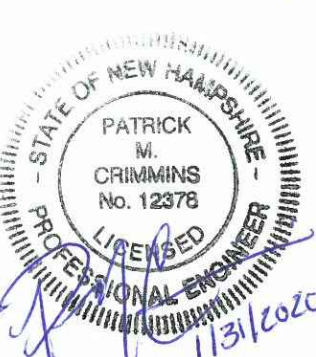
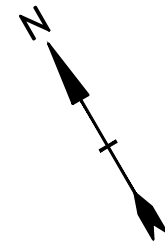
MAXIMUM PARKING SPACES:
RESIDENTIAL (NON-GBD-G):
1.4 SPACES / UNIT
+0.5 VISITOR SPACES / UNIT
= 1.4 SPACES / UNIT * 165 UNITS
+0.5 SPACES / UNIT * 165 UNITS =

≤314 SPACES	237 SPACES
-------------	------------

ADA PARKING SPACES:

8 SPACES	8 SPACES
----------	----------





Cochecho Waterfront Development Phase - I

Applicant:
CPI Management, LLC
c/o Cathartes

Owner:
City of Dover

Dover File #: P20-

Dover, New Hampshire

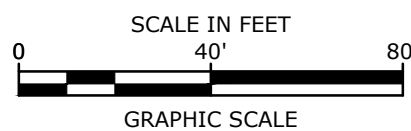
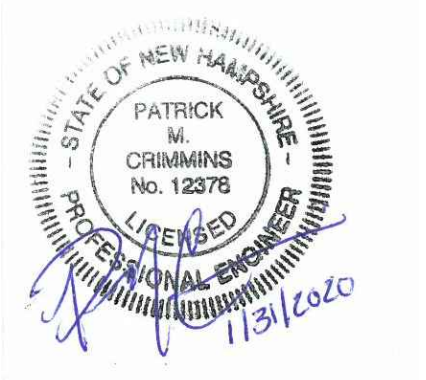
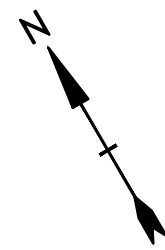
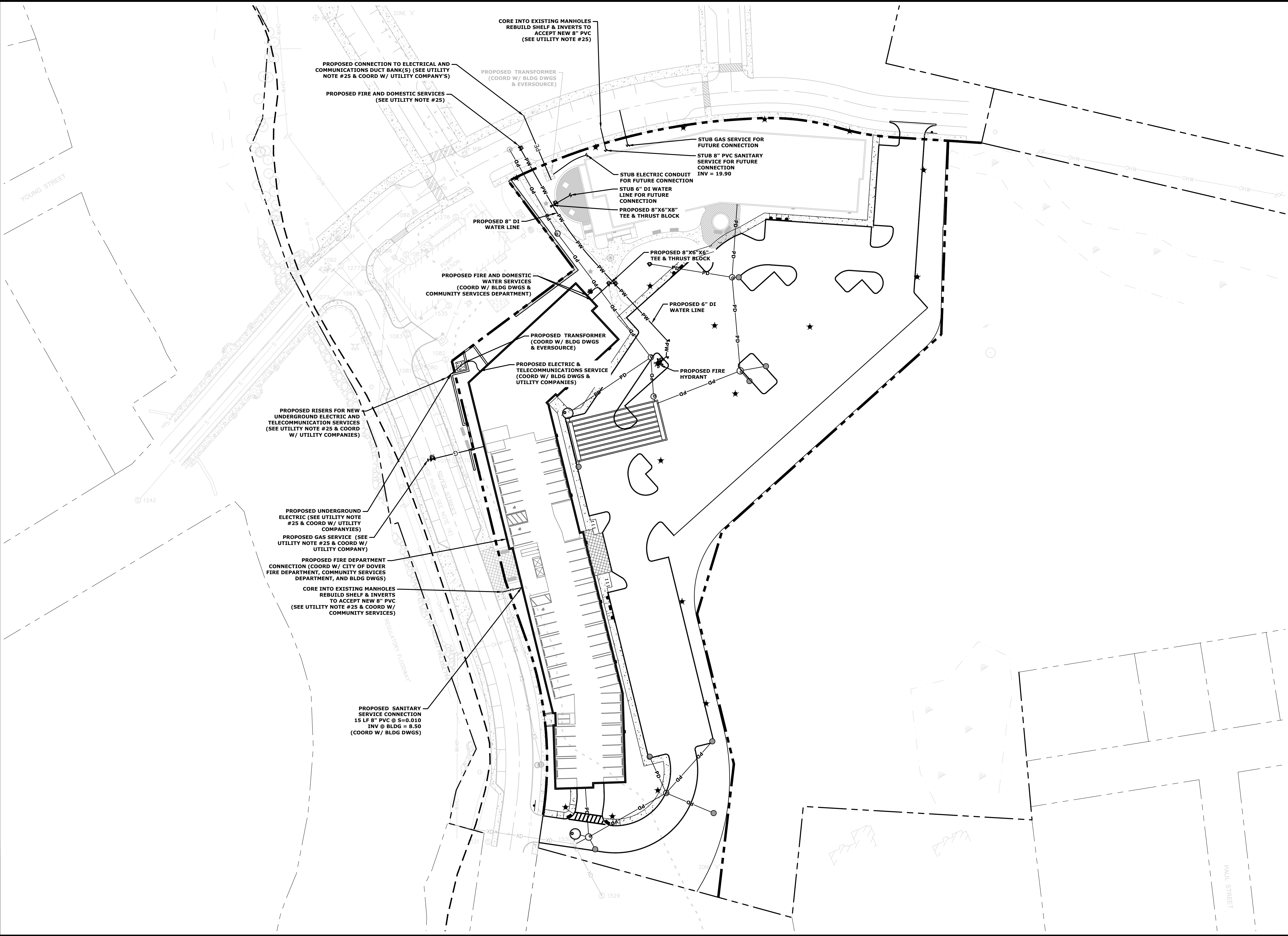
MARK	DATE	DESCRIPTION
A	1/31/2020	TRC SITE PLAN REVIEW
PROJECT NO: C-0960-007		
DATE: January 31, 2020		
FILE: C0960-007-DSGN.DWG		
DRAWN BY: CML/BKC		
CHECKED: PMC		
APPROVED: BLM		

GRADING, DRAINAGE, &
EROSION CONTROL PLAN

SCALE: AS SHOWN

C-103

Last Save Date: January 31, 2020 9:40 AM By: CML
Plot Date: Friday, January 31, 2020 Plotted By: Craig M. Langton
286 File Location: J:\C0960 Catartres\C-0960-007 Cochecho Waterfront Drawings Figures\AutoCAD\Sheet\C0960-007-DSGN.DWG Layout Tab: C-104



**Cochecho
Waterfront
Development
Phase - I**

Applicant:
CPI Management, LLC
c/o Cathartes

Owner:
City of Dover

Dover File #: P20-

Dover, New Hampshire

A	1/31/2020	TRC SITE PLAN REVIEW
MARK	DATE	DESCRIPTION
PROJECT NO: C-0960-007		
DATE: January 31, 2020		
FILE: C0960-007-DSGN.DWG		
DRAWN BY: CML/BKC		
CHECKED: PMC		
APPROVED: BLM		

UTILITY PLAN

SCALE: AS SHOWN

C-104



Cochecho Waterfront
LANDSCAPE MASTER PLAN
River Street, Dover, NH 03820

Drawn By: LF
Checked By: RW
Scale: 1" = 30'
Date: 2020-1-8
Revisions: 2020-1-31

L-1

Sheet 1 of 3



Cochecho Waterfront

LANDSCAPE MASTER PLAN

River Street, Dover, NH 03820

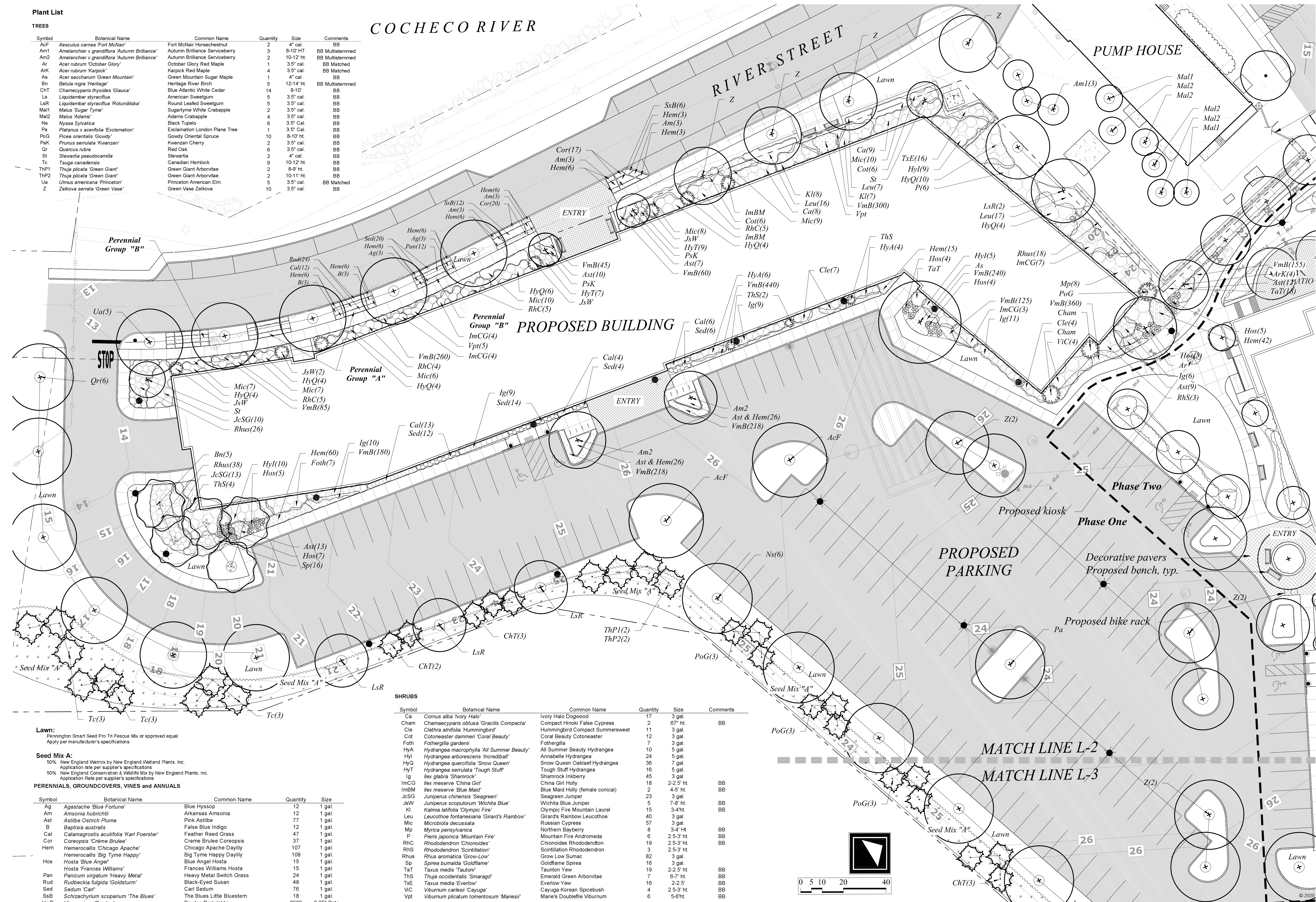
Drawn By:	LF
Checked By:	RW
Scale:	1" = 30'
Date:	2020-1-8
Revisions:	2020-1-31

Plant List

TREES

Symbol	Botanical Name	Common Name	Quantity	Size	Comments
AcF	<i>Aesculus carnea</i> 'Fort McNair'	Fort McNair Horsechestnut	2	4" cal.	BB
Am1	<i>Amelanchier x grandiflora</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	3	8-10' HT.	BB Multistemmed
Am2	<i>Amelanchier x grandiflora</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	2	10-12' ht.	BB Multistemmed
Ar	<i>Acer rubrum</i> 'October Glory'	October Glory Red Maple	1	3.5" cal.	BB Matched
ArK	<i>Acer rubrum</i> 'Karpis'	Karpick Red Maple	4	3.5" cal.	BB Matched
Bs	<i>Acer saccharum</i> 'Green Mountain'	Green Mountain Sugar Maple	1	4" cal.	BB
Bn	<i>Betula nigra</i> 'Heritage'	Heritage River Birch	5	12-14' ht.	BB Multistemmed
ChT	<i>Chamaecyparis thyoides</i> 'Glaucous'	Blue Atlantic White Cedar	14	8-10'	BB
Ls	<i>Liquidambar styraciflua</i>	American Sweetgum	5	3.5" cal.	BB
LsR	<i>Liquidambar styraciflua</i> 'Rotundiloba'	Round Leafed Sweetgum	5	3.5" cal.	BB
Mal1	<i>Malus</i> 'Sugar Tyme'	Sugartyme White Crabapple	2	3.5" cal.	BB
Mal2	<i>Malus</i> 'Adams'	Adams Crabapple	4	3.5" cal.	BB
Ns	<i>Nyssa sylvatica</i>	Black Tupelo	6	3.5" cal.	BB
Pa	<i>Platanus x acerifolia</i> 'Exclamation'	Exclamation London Plane Tree	1	3.5" Cal.	BB
PoG	<i>Picea orientalis</i> 'Gowdy'	Gowdy Oriental Spruce	10	8-10' ht.	BB
PsK	<i>Prunus serrulata</i> 'Kwanzan'	Kwanzan Cherry	2	3.5" cal.	BB
Qr	<i>Quercus rubra</i>	Red Oak	6	3.5" cal.	BB
St	<i>Stewartia pseudocornellia</i>	Stewartia	2	4" cal.	BB
Tc	<i>Tsuga canadensis</i>	Canadian Hemlock	9	10-12' ht.	BB
ThP1	<i>Thuja plicata</i> 'Green Giant'	Green Giant Arborvitae	2	8-9' ht.	BB
ThP2	<i>Thuja plicata</i> 'Green Giant'	Green Giant Arborvitae	2	10-11' ht.	BB
Ua	<i>Ulmus americana</i> 'Princeton'	Princeton American Elm	2	3.5" cal.	BB Matched
Z	<i>Zelkova serrata</i> 'Green Vase'	Green Vase Zelkova	10	3.5" cal.	BB

COCHECO RIVER



Lawn:
Pennington Smart Seed Pro Tri Fescue Mix or approved equal.
Apply per manufacturer's specifications

Seed Mix A:
50% New England Wetmix by New England Wetland Plants, Inc.
Application rate per supplier's specifications
50% New England Conservation & Wildlife Mix by New England Plants, Inc.
Application Rate per supplier's specifications

PERENNIALS, GROUNDCOVERS, VINES AND ANNUALS

Symbol	Botanical Name	Common Name	Quantity	Size
Ag	<i>Agastache</i> 'Blue Fortune'	Blue Hyssop	12	1 gal.
Am	<i>Amsonia hubrichtii</i>	Arkansas Amsonia	12	1 gal.
Ast	<i>Astilbe</i> 'Ostrich Plume'	Pink Astilbe	77	1 gal.
B	<i>Baptisia australis</i>	False Blue Indigo	12	1 gal.
Cal	<i>Calamagrostis acutifolia</i> 'Karl Foerster'	Feather Reed Grass	47	1 gal.
Cor	<i>Coreopsis</i> 'Crème Brûlée'	Crème Brûlée Coreopsis	37	1 gal.
Hem	<i>Hemerocallis</i> 'Chicago Apache'	Chicago Apache Daylily	107	1 gal.
Hem	<i>Hemerocallis</i> 'Big Tyme Happy'	Big Tyme Happy Daylily	108	1 gal.
Hos	<i>Hosta</i> 'Blue Angel'	Blue Angel Hosta	15	1 gal.
Hos	<i>Hosta</i> 'Frances Williams'	Frances Williams Hosta	15	1 gal.
Pan	<i>Panicum virgatum</i> 'Heavy Metal'	Heavy Metal Switch Grass	24	1 gal.
Rud	<i>Rudbeckia fulgida</i> 'Goldsturm'	Black-Eyed Susan	48	1 gal.
Sed	<i>Sedum</i> 'Carl'	Carl Sedum	76	1 gal.
SsB	<i>Schizachyrium scoparium</i> 'The Blues'	The Blues Little Bluestem	18	1 gal.
VmB	<i>Vinca minor</i> 'Bowles'	Bowles Periwinkle	2686	2.25" Pots

SHRUBS

Symbol	Botanical Name	Common Name	Quantity	Size	Comments
Ca	<i>Cornus alba</i> 'Ivory Halo'	Ivory Halo Dogwood	17	3 gal.	
Cham	<i>Chamaecyparis obtusa</i> 'Gracilis Compacta'	Compact Hinoki False Cypress	2	67" ht.	BB
Cle	<i>Clethra alnifolia</i> 'Hummingbird'	Hummingbird Compact Summersweet	11	3 gal.	
Cot	<i>Cotoneaster dammeri</i> 'Coral Beauty'	Coral Beauty Cotoneaster	12	3 gal.	
Foth	<i>Fothergilla gardenii</i>	Fothergilla	7	3 gal.	
HyA	<i>Hydrangea macrophylla</i> 'All Summer Beauty'	All Summer Beauty Hydrangea	10	5 gal.	
Hyl	<i>Hydrangea arborescens</i> 'Incrediball'	Annabelle Hydrangea	24	5 gal.	
HyQ	<i>Hydrangea quercifolia</i> 'Snow Queen'	Snow Queen Oakleaf Hydrangea	16	7 gal.	
HyT	<i>Hydrangea serrulata</i> 'Tough Stuff'	Tough Stuff Hydrangea	5	5 gal.	
Ig	<i>Ilex glabra</i> 'Shamrock'	Shamrock Inkberry	45	3 gal.	
ImCG	<i>Ilex meservei</i> 'China Girl'	China Girl Holly	18	2-2.5' ht.	BB
ImBM	<i>Ilex meservei</i> 'Blue Maid'	Blue Maid Holly (female conical)	2	4-5' ht.	BB
JcSG	<i>Juniperus chinensis</i> 'Seagreen'	Seagreen Juniper	23	3 gal.	
JsW	<i>Juniperus scopulorum</i> 'Wichita Blue'	Wichita Blue Juniper	5	7-8' ht.	BB
Kl	<i>Kalmia latifolia</i> 'Olympic Fire'	Olympic Fire Mountain Laurel	15	3-4' ht.	BB
Leu	<i>Leucothoe fontanesiana</i> 'Girard's Rainbow'	Girard's Rainbow Leucothoe	40	3 gal.	
Mic	<i>Microbiota decussata</i>	Russian Cypress	57	3 gal.	
Mp	<i>Myrica pensylvanica</i>	Northern Bayberry	8	3-4' ht.	BB
P	<i>Pieris japonica</i> 'Mountain Fire'	Mountain Fire Andromeda	6	2-5-3' ht.	BB
RhC	<i>Rhododendron</i> 'Chionoides'	Chionoides Rhododendron	19	2-5-3' ht.	BB
RhS	<i>Rhododendron</i> 'Scintillation'	Scintillation Rhododendron	3	2-5-3' ht.	BB
Rhus	<i>Rhus aromatica</i> 'Grow-Low'	Grow Low Sumac	82	3 gal.	
Sp	<i>Spiraea bumalda</i> 'Goldflame'	Goldflame Spiraea	16	3 gal.	
TaT	<i>Taxus medis</i> 'Tautoni'	Taunton Yew	19	2-2.5' ht.	BB
ThS	<i>Thuja occidentalis</i> 'Smaragd'	Emerald Green Arborvitae	7	6-7' ht.	BB
TxE	<i>Taxus media</i> 'Everlow'	Everlow Yew	16	2-2.5' ht.	BB
Vic	<i>Viburnum carlesii</i> 'Cayuga'	Cayuga Korean Spicebush	4	2-5-3' ht.	BB
Vpt	<i>Viburnum plicatum</i> 'mentosum	Marie's Doublefile Viburnum	6	5-6' ht.	BB

Plant List

TREES					
Symbol	Botanical Name	Common Name	Quantity	Size	Comments
AcF	<i>Aesculus carnea</i> 'Fort McNair'	Fort McNair Horsechestnut	2	4" cal.	BB
Am1	<i>Amelanchier x grandiflora</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	3	8-10' HT.	BB Multistemmed
Am2	<i>Amelanchier x grandiflora</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	2	10-12' ht.	BB Multistemmed
Ar	<i>Acer rubrum</i> 'October Glory'	October Glory Red Maple	1	3.5" cal.	BB Multistched
ArK	<i>Acer rubrum</i> 'Karpick'	Karpick Red Maple	4	3.5" cal.	BB Matched
As	<i>Acer saccharum</i> 'Green Mountain'	Green Mountain Sugar Maple	1	4" cal.	BB
Bn	<i>Betula nigra</i> 'Heritage'	Heritage River Birch	5	12-14' ht.	BB Multistemmed
ChT	<i>Chamaecyparis thyoides</i> 'Glaucia'	Blue Atlantic White Cedar	14	8-10'	BB
Ls	<i>Liquidambar styraciflua</i>	American Sweetgum	5	3.5" cal.	BB
LsR	<i>Liquidambar styraciflua</i> 'Rotundiloba'	Round Leaved Sweetgum	5	3.5" cal.	BB
Mat1	<i>Malus 'Sugar Tyme'</i>	Sugartyme White Crabapple	2	3.5" cal.	BB
Ma2	<i>Malus 'Adams'</i>	Adams Crabapple	4	3.5" cal.	BB
Ns	<i>Nyssa Sylvatica</i>	Black Tupelo	6	3.5" Cal.	BB
Pa	<i>Platanus x acerifolia</i> 'Exclamation'	Exclamation London Plane Tree	1	3.5" Cal.	BB
POG	<i>Picea orientalis</i> 'Gowdy'	Gowdy Oriental Spruce	10	8-10' ht.	BB
PsK	<i>Prunus serrulata</i> 'Kwanzen'	Kwanzan Cherry	2	3.5" cal.	BB
Qr	<i>Quercus rubra</i>	Red Oak	6	3.5" cal.	BB
St	<i>Stewartia pseudocamilla</i>	Stewartia	2	4" cal.	BB
Tc	<i>Tsuga canadensis</i>	Canadian Hemlock	9	10-12' ht.	BB
ThP1	<i>Thuja plicata</i> 'Green Giant'	Green Giant Arborvitae	2	8-9' ht.	BB
ThP2	<i>Thuja plicata</i> 'Green Giant'	Green Giant Arborvitae	2	10-11' ht.	BB
Ua	<i>Ulmus americana</i> 'Princeton'	Princeton American Elm	5	3.5" cal.	BB Matched
Z	<i>Zelkova serrata</i> 'Green Vase'	Green Vase Zelkova	10	3.5" cal.	BB

SHRUBS					
Symbol	Botanical Name	Common Name	Quantity	Size	Comments
Ca	<i>Cornus alba</i> 'Ivory Halo'	Ivory Halo Dogwood	17	3 gal.	
Chm	<i>Chamaecyparis obtusa</i> 'Gracilis Compacta'	Compact Hinoki False Cypress	2	6"7" ht.	BB
Cie	<i>Clethra alnifolia</i> 'Hummingbird'	Hummingbird Compact Summersweet	11	3 gal.	
Cot	<i>Coloneaster dammeri</i> 'Coral Beauty'	Coral Beauty Coloneaster	12	3 gal.	
Foth	<i>Fothergilla gardenii</i>	Fothergilla	7	3 gal.	
HyA	<i>Hydrangea macrophylla</i> 'All Summer Beauty'	All Summer Beauty Hydrangea	10	5 gal.	
HyI	<i>Hydrangea arborescens</i> 'Incredibal'	Annabelle Hydrangea	24	5 gal.	
HyQ	<i>Hydrangea quercifolia</i> 'Snow Queen'	Snow Queen Oakleaf Hydrangea	7	gal.	
HyT	<i>Hydrangea serrulata</i> 'Tough Stuff'	Tough Stuff Hydrangea	16	5 gal.	
Ig	<i>Ilex glabra</i> 'Shamrock'	Shamrock Inkberry	45	3 gal.	
ImC5	<i>Ilex meserve</i> 'China Girl'	China Girl Holly	18	2-2.5' ht.	BB
ImB	<i>Ilex meserve</i> 'Blue Maid'	Blue Maid Holly (female conical)	2	4-5' ht.	BB
JcS	<i>Juniperus chinensis</i> 'Seagreen'	Seagreen Juniper	23	3 gal.	
JsW	<i>Juniperus scopulorum</i> 'Wichita Blue'	Wichita Blue Juniper	5	7-8' ht.	BB
Kl	<i>Kalmia latifolia</i> 'Olympic Fire'	Olympic Fire Mountain Laurel	15	3-4"ht.	BB
Leu	<i>Leucothoe fontanesiana</i> 'Girard's Rainbow'	Girard's Rainbow Leucothoe	40	3 gal.	
Mic	<i>Microbiota decussata</i>	Russian Cypress	57	3 gal.	
Mp	<i>Myrica pensylvanica</i>	Northern Bayberry	8	3-4" ht.	BB
P	<i>Pieris japonica</i> 'Mountain Fire'	Mountain Fire Andromeda	6	2.5-3" ht.	BB
RhC	<i>Rhododendron 'Chionoides'</i>	Chionoides Rhododendron	19	2.5-3" ht.	BB
RhS	<i>Rhododendron 'Scintillation'</i>	Scintillation Rhododendron	3	2.5-3" ht.	BB
Rhus	<i>Rhus aromatica</i> 'Grow-Low'	Grow Low Sumac	82	3 gal.	
Sp	<i>Spiraea bumalda</i> 'Goldflame'	Goldflame Spiraea	16	3 gal.	
TaT	<i>Taxus meda</i> 'Tautoni'	Taunton Yew	19	2-2.5' ht.	BB
ThS	<i>Thuja occidentalis</i> 'Smaragd'	Emerald Green Arborvitae	7	6-7' ht.	BB
TxE	<i>Taxus media</i> 'Everlow'	Everlow Yew	16	2-2.5'	BB
VC	<i>Viburnum carlesii</i> 'Cayuga'	Cayuga Korean Spicebush	4	2.5-3" ht.	BB
Vpt	<i>Viburnum plicatum tomentosum</i> 'Mariesii'	Marie's Doublefile Viburnum	6	5-6"ht.	BB

PERENNIALS, GROUNDCOVERS, VINES and ANNUALS

Symbol	Botanical Name	Common Name	Quantity	Size
Ag	<i>Agastache</i> 'Blue Fortune'	Blue Hyssop	12	1 gal.
Am	<i>Ansonia rubriclidi</i>	Arkansas Ansonia	12	1 gal.
Ast	<i>Astilbe Ostrich Plume</i>	Pink Astilbe	77	1 gal.
B	<i>Baptisia australis</i>	False Blue Indigo	12	1 gal.
Cal	<i>Calamagrostis acutifolia</i> 'Karl Foerster'	Feather Reed Grass	47	1 gal.
Cor	<i>Coreopsis</i> 'Crème Brulee'	Crème Brulee Coreopsis	37	1 gal.
Hem	<i>Hemerocallis</i> 'Chicago Apache'	Chicago Apache Daylily	107	1 gal.
	<i>Hemerocallis</i> 'Big Tyme Happy'	Big Tyme Happy Daylily	108	1 gal.
Hos	<i>Hosta</i> 'Blue Angel'	Blue Angel Hosta	15	1 gal.
	<i>Hosta</i> 'Frances Williams'	Frances Williams Hosta	15	1 gal.
Pan	<i>Panicum virgatum</i> 'Heavy Metal'	Heavy Metal Switch Grass	24	1 gal.
Rud	<i>Rudbeckia fulgida</i> 'Goldsturm'	Black-Eyed Susan	48	1 gal.
Sed	<i>Sedum</i> 'Carl'	Carl Sedum	76	1 gal.
SsB	<i>Scizachyrium scoparium</i> 'The Blues'	The Blues Little Bluestem	18	1 gal.
Vmb	<i>Vinca minor</i> 'Bowles'	Bowles Periwinkle	2686	2.25" Pots

LANDSCAPE NOTES:

- Design is based on drawings by Tighe & Bond dated 2020-01-29 and may require adjustment due to actual field conditions.
- The contractor shall follow best management practices during construction and shall take all means necessary to stabilize and protect the site from erosion.
- Erosion Control shall be in place prior to construction.
- Erosion Control to consist of Hay Bales and Erosion Control Fabric shall be staked in place between the work and Water bodies, Wetlands and/or drainage ways prior to any construction.
- The Contractor shall verify layout and grades and inform the Landscape Architect or Client's Representative of any discrepancies or changes in layout and/or grade relationships prior to construction.
- It is the contractor's responsibility to verify drawings provided are to the correct scale prior to any bid, estimate or installation. A graphic scale bar has been provided on each sheet for this purpose. If it is determined that the scale of the drawing is incorrect, the landscape architect will provide a set of drawings at the correct scale, at the request of the contractor.
- Trees to Remain within the construction zone shall be protected from damage for the duration of the project by snow fence or other suitable means of protection to be approved by Landscape Architect or Client's Representative. Snow fence shall be located at the drip line at a minimum and shall include any and all surface roots. Do not fill or muck on the trunk flare. Do not disturb roots. In order to protect the integrity of the roots, branches, trunk and bark of the tree(s) no vehicles or construction equipment shall drive or park in on the area within the drip line(s) of the tree(s). Do not store any refuse or construction materials or portaflets within the tree protection area.
- This plan is for review purposes only, NOT for Construction. Construction Documents will be provided upon request.
- Location, support, protection, and restoration of all existing utilities and appurtenances shall be the responsibility of the Contractor.
- The Contractor shall verify exact location and elevation of all utilities with the respective utility owners prior to construction. Call DISSAFE at 1-888-344-7233.
- The Contractor shall procure any required permits prior to construction.
- Prior to any landscape construction activities Contractor shall test all existing loam and loam from off-site intended to be used for lawns and plant beds using a thorough sampling throughout the supply. Soil testing shall indicate levels of pH, nitrates, macro and micronutrients, texture, soluble salts, and organic matter. Contractor shall provide Landscape Architect with test results and recommendations from the testing facility along with soil amendment plans as necessary for the proposed plantings to thrive. All loam to be used on site shall be amended as approved by the Landscape Architect prior to placement.
- Contractor shall notify landscape architect or owner's representative immediately if at any point during demolition or construction a site condition is discovered which may negatively impact the completed project. This includes, but is not limited to, unforeseen drainage problems, unknown subsurface conditions, and discrepancies between the plan and the site. If a contractor is aware of a potential issue, and does not bring it to the attention of the landscape architect or owner's representative immediately, they may be responsible for the labor and materials associated with correcting the problem.
- The Contractor shall furnish and pin all plants shown on the drawings and listed thereon. All plants shall be nursery-grown under climatic conditions similar to those in the locality of the project. Plants shall conform to the botanical names and standards of size, culture, and quality for the highest grades and standards as adopted by the American Association of Nurserymen, Inc. in the American Standard of Nursery Stock, American Standards Institute, Inc. 280 Southern Building, Washington, D.C. 20006.
- A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the drawings. In the event that quantity discrepancies or material omissions occur in the plant materials list, the planting plans shall govern.
- All plants shall be legibly tagged with proper botanical name.
- The Contractor shall guarantee all plants for not less than one year from time of acceptance.
- Owner or Owner's Representative will inspect plants upon delivery for conformity to Specification requirements. Such approval shall not affect the right of inspection and rejection during or after the progress of the work. The Owner reserves the right to inspect and/or select all trees at the place of growth and reserves the right to approve a representative sample of each type of shrub, herbaceous perennial, annual, and ground cover at the place of growth. Such sample will serve as a minimum standard for all plants of the same species used in this work.
- No substitutions of plants may be made without prior approval of the Landscape Architect, Owner or the Owner's Representative for any reason.
- All landscaping shall be provided with the following:
 - Outside hose attachments spaced a maximum of 150 feet apart, and
 - An underground irrigation system, or
 - A temporary irrigation system designed for a two-year period of plant establishment.
- If an automatic irrigation system is installed, all irrigation valve boxes shall be located within planting bed areas.
- The contractor is responsible for all plant material from the time their work commences until final acceptance. This includes but is not limited to maintaining all plants in good condition, the security of the plant material once delivered to the site, and watering of plants. Plants shall be appropriately watered prior to, during and after planting. It is the contractor's responsibility to provide clean water suitable for plant health from off site, should it not be available on site.
- All dsiturbed areas will be dressed with 6" of topsoil and planted as noted on the plans or seeded except plant beds. Plant beds shall be prepared to a depth of 12" with 75% loam and 25% compost.
- Trees, ground cover, and shrub beds shall be mulched to a depth of 2" with one-year-old, well-composted, shredded native bark not longer than 4" in length and 3/4" in width, free of woodchips and sawdust. Mulch for ferns and herbaceous perennials shall be no longer than 1" in length. Trees in lawn areas shall be mulch min. saucer. Color of mulch shall be black.
- In no case shall mulch touch the stem of a plant nor shall mulch ever be more than 3" thick total (including previously applied mulch) over the root ball of any plant.
- Secondary lateral branches of deciduous trees overhanging vehicular and pedestrian travel ways shall be pruned up to a height of 6' to allow clear and safe passage of vehicles and pedestrians under tree canopy. Within the sight distance triangles at vehicle intersections the canopies shall be raised to 8' min.
- Show shall be stored a minimum of 5' from shrubs and trunks of trees.
- Landscape Architect is not responsible for the means and methods of the contractor.

1 Bench Detail
Scale: 1/2"=1'-0"



2 Tree Planting Detail
NTS - Not to Scale



Lawn:
Pennington Smart Seed Pro Tri Fescue Mix or approved equal.
Apply per manufacturer's specifications

Seed Mix A:
50% New England Wetmix by New England Wetland Plants, Inc.
Application rate per supplier's specifications
50% New England Conservation & Wildlife Mix by New England Plants, Inc.
Application Rate per supplier's specifications

Do not heavily prune the tree at planting. Prune only cross-over limbs, co-dominant leaders, and broken or dead branches. Some interior twigs and lateral branches may be pruned; however, Do NOT remove the terminal buds of branches that extend to the edge of the crown.

Trees less than 3" in caliper shall be staked with three stakes per tree, spaced evenly around the trunk with 12 gauge wire. Plastic hose sections shall be used at attachment to trees. Each wire shall be flagged with a visual marker. 5' long min. wooden stakes shall be used to anchor the wires. Stakes shall be driven at least 12" outside the edge of the planting pit into stable soil. Remove all staking NO LATER than the end of the first growing season after planting.

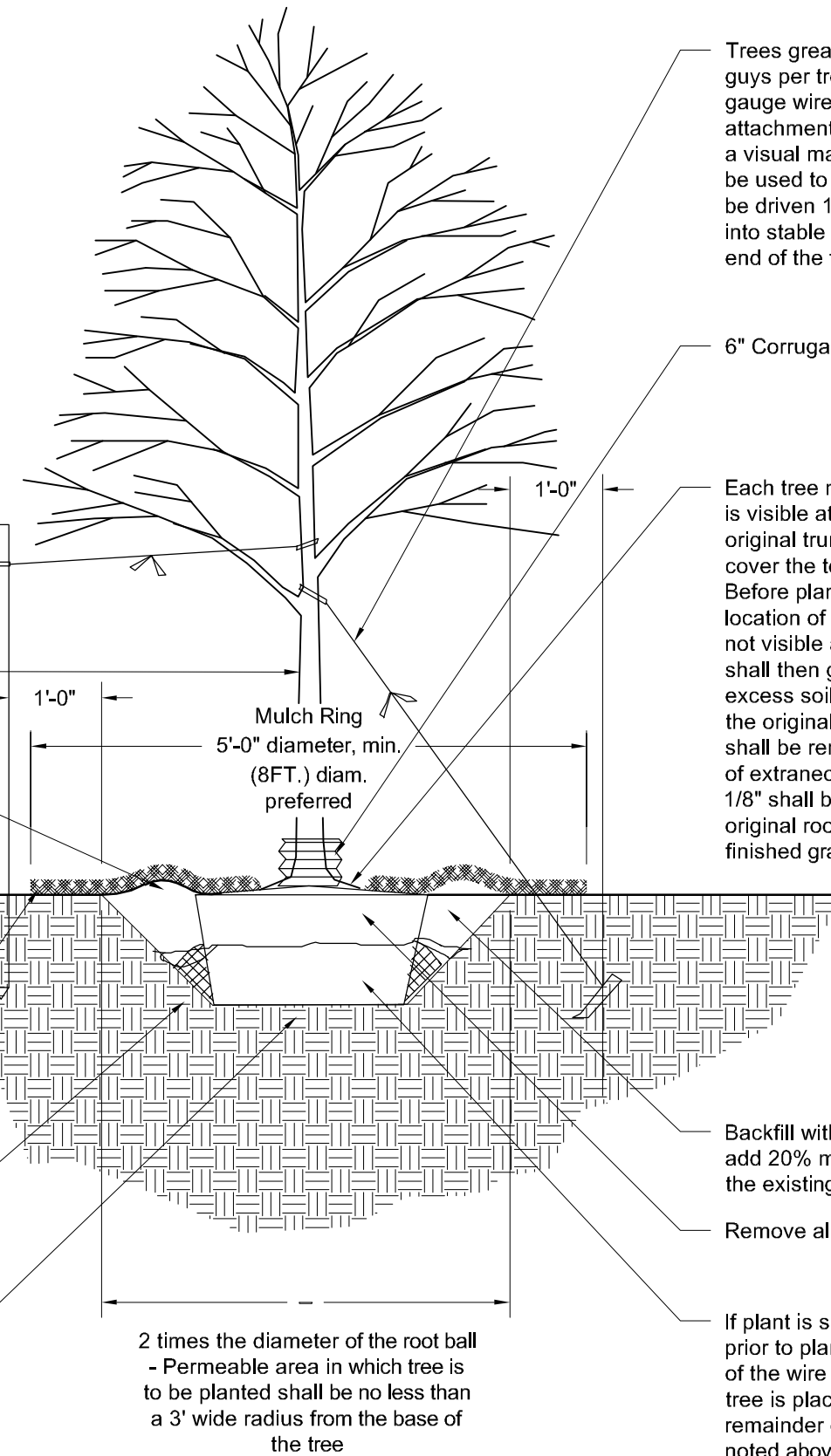
Mark the north side of the tree in the nursery. Rotate the tree to face north at the site whenever possible.

4 in. high earth saucer beyond edge of root ball

2 IN. max. Mulch. Do NOT place mulch in contact with tree trunk. Maintain the mulch weed-free for a minimum of three years after planting.

Tamp soil around root ball base firmly with foot pressure so that root ball does not shift.

Place root ball on unexcavated or tamped soil.



Trees greater than 3" in caliper shall be guyed with three guys per tree, spaced evenly around the trunk with 12 gauge wire. Plastic hose sections shall be used at attachment to trees. Each guy wire shall be flagged with a visual marker. 24" stakes or metal drive anchors shall be used to anchor the guy wires. Stakes/Anchors shall be driven 12" min. outside the edge of the planting pit into stable soil. Remove all guying NO LATER than the end of the first growing season after planting.

6" Corrugated PVC tree sock

Each tree must be planted such that the original trunk flare is visible at the top of the root ball. Trees where the original trunk flare is not visible may be rejected. Do NOT cover the top of the root ball with soil. Before planting Contractor shall inspect the rootball for the location of the original root flare. If the original root flare is not visible at the top of the root ball then the Contractor shall then gently remove from the top of the root ball any excess soil from nursery operations that may be covering the original root flare. All secondary and girdling roots shall be removed prior to planting. Trees with 4" or more of extraneous soil and/or adventitious roots greater than 1/8" shall be rejected. The tree shall be planted with the original root flare at or slightly (2-3") above surrounding finished grade.

Backfill with existing soil, in sandy and heavy clay soils add 20% max. by volume composted organic material to the existing soil.

Remove all twine, rope, wire, and burlap

If plant is shipped with a wire basket around the root ball, prior to planting, the contractor shall cut away the bottom of the wire basket, leaving the sides in place. Once the tree is placed and faced, the contractor shall remove the remainder of the wire basket and backfill the planting pit as noted above.

GENERAL PROJECT INFORMATION

PROJECT OWNER: CITY OF DOVER
288 CENTRAL AVE
DOVER, NEW HAMPSHIRE 03820
PROJECT NAME: COCHECHO WATERFRONT DEVELOPMENT - PHASE 1
PROJECT ADDRESS: WASHINGTON STREET & RIVER STREET
DOVER, NEW HAMPSHIRE 03820
PROJECT MAP / LOT: MAP 22 / LOT 1
PROJECT LATITUDE: 43°11'41.4"N
PROJECT LONGITUDE: 70°52'09.5"W

PROJECT DESCRIPTION

THE PROPOSED PROJECT CONSISTS OF TWO (2) MULTI-FAMILY BUILDINGS ALONG RIVER STREET AND WASHINGTON STREET, INCLUDING ASSOCIATED SITE IMPROVEMENTS.

DISTURBED AREA

THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 4.02 ACRES.

SOIL CHARACTERISTICS

BASED ON THE NRCS WEB SOIL SURVEY FOR STRAFFORD COUNTY - NEW HAMPSHIRE, THE SOILS ON SITE CONSIST OF BUXTON AND SUFFIELD SILT LOAM SOILS WHICH HAVE A SLOW INFILTRATION RATE WHEN THOROUGHLY WET. THESE SOILS HAVE A HYDROLOGIC SOIL GROUP RATING OF C/D.

NAME OF RECEIVING WATERS

THE STORMWATER RUNOFF FROM THE SITE WILL BE DISCHARGED VIA OVERLAND FLOW TO A CLOSED DRAINAGE SYSTEM THAT ULTIMATELY FLOWS TO THE COCHECHO RIVER. THE COCHECHO RIVER HAS BEEN LISTED AS IMPAIRED ACCORDING TO NHDES 2012 303(D) LIST, WATERBODY ID: NHST600030608-01.

CONSTRUCTION SEQUENCE OF MAJOR ACTIVITIES:

- BUILDING DEMOLITION AND SITE FEATURE DEMOLITION.
- CONSTRUCT TEMPORARY AND PERMANENT SEDIMENT, EROSION AND DETENTION CONTROL FACILITIES. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATIONS THAT WILL INFLUENCE STORMWATER RUNOFF SUCH AS:
 - NEW CONSTRUCTION
 - DISPOSAL OF SEDIMENT SPOIL, STUMP AND OTHER SOLID WASTE
 - CONTROL OF DUST
 - CONSTRUCTION OF ACCESS
 - NEARNESS OF CONSTRUCTION SITE TO RECEIVING WATERS
 - CONSTRUCTION DURING LATE WINTER AND EARLY SPRING
- ALL PERMANENT DITCHES, SWALES, DETENTION, RETENTION AND SEDIMENTATION BASINS TO BE STABILIZED USING THE VEGETATIVE AND NON-STRUCTURAL BMPS PRIOR TO DIRECTING RUNOFF TO THEM.
- CLEAR AND DISPOSE OF DEBRIS.
- CONSTRUCT TEMPORARY CULVERTS AND DIVERSION CHANNELS AS REQUIRED.
- GRADE AND GRAVEL ROADWAYS AND PARKING AREAS - ALL ROADS AND PARKING AREA SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
- BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
- DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, PERIMETER EROSION CONTROL MEASURES, SEDIMENT TRAPS, ETC., MULCH AND SEED AS REQUIRED.
- FINISH PAVING ALL ROADWAYS AND PARKING LOTS.
- INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES.
- COMPLETE PERMANENT SEEDING AND LANDSCAPING.
- REMOVE TRAPPED SEDIMENTS FROM COLLECTOR DEVICES AS APPROPRIATE AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES.

SPECIAL CONSTRUCTION NOTES:

- THE CONSTRUCTION SEQUENCE MUST LIMIT THE DURATION AND AREA OF DISTURBANCE. DISTURBED AREAS SHALL NOT EXCEED 5 ACRES AT ANY ONE TIME BEFORE BEING STABILIZED. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
- THE CITY OF DOVER COMMUNITY SERVICES DEPARTMENT OR THEIR DESIGNATED AGENT SHALL HAVE ACCESS TO THE SITE TO COMPLETE ROUTINE INSPECTIONS.
 - THE COMMUNITY SERVICES DEPARTMENT SHALL BE NOTIFIED 24-HOURS PRIOR TO INSTALLATION OF A STORMWATER BMP IN ORDER TO SCHEDULE AN INSPECTION. THESE INSPECTIONS SHALL BE COMPLETED DURING NORMAL WORKING HOURS.
- THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

EROSION CONTROL NOTES:

- ALL EROSION CONTROL MEASURES AND PRACTICES SHALL CONFORM TO THE "NEW HAMPSHIRE STORMWATER MANUAL VOLUME 3: EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION" PREPARED BY THE NHDES.
- PRIOR TO ANY WORK OR SOIL DISTURBANCE, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EROSION CONTROL MEASURES AS REQUIRED IN THE PROJECT MANUAL.
- CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL BARRIERS, INCLUDING HAY BALE, SILT FENCES, MULCH BERMS, SILT SACKS AND SILT SOCKS AS SHOWN IN THESE DRAWINGS AS THE FIRST ORDER OF WORK.
- SILT SACK INLET PROTECTION SHALL BE INSTALLED IN ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AND BE MAINTAINED FOR THE DURATION OF THE PROJECT.
- PERIMETER CONTROLS INCLUDING SILT FENCES, MULCH BERM, SILT SOCK, AND/OR HAY BALE BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT UNTIL NON-PAVED AREAS HAVE BEEN STABILIZED.
- THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
- ALL DISTURBED AREAS NOT OTHERWISE BEING TREATED SHALL RECEIVE 6" LOAM, SEED AND FERTILIZER.
- INSPECT ALL INLET PROTECTION AND PERIMETER CONTROLS WEEKLY AND AFTER EACH RAIN STORM OF 0.50 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
- CONSTRUCT EROSION CONTROL BLANKETS ON ALL SLOPES STEEPER THAN 3:1.

STABILIZATION:

- AN AREA SHALL BE CONSIDERED STABLE WHEN ONE OF THE FOLLOWING HAS OCCURRED:
 - BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
 - A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
 - A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED;
 - EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
- WINTER STABILIZATION PRACTICES:
 - ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS;
 - ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS;
 - AFTER OCTOBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT;

- STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES, AND DISTURBED AREAS, WHERE CONSTRUCTION ACTIVITY SHALL NOT OCCUR FOR MORE THAN TWENTY-ONE (21) CALENDAR DAYS BY THE FOURTEENTH (14TH) DAY AFTER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED IN THAT AREA. STABILIZATION MEASURES TO BE USED INCLUDE:
 - TEMPORARY SEEDING;
 - MULCHING;
- WHEN CONSTRUCTION ACTIVITY PERMANENTLY OR TEMPORARILY CEASES WITHIN 100 FEET OF NEARBY SURFACE WATERS OR DELINEATED WETLANDS, THE AREA SHALL BE STABILIZED WITHIN SEVEN (7) DAYS OR PRIOR TO A RAIN EVENT. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN THESE AREAS, SILT FENCES, MULCH BERMS, HAY BALE BARRIERS AND ANY EARTH/DIKES SHALL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.
- DURING CONSTRUCTION, RUNOFF WILL BE DIVERTED AROUND THE SITE WITH EARTH DIKES, PIPING OR STABILIZED CHANNELS WHERE POSSIBLE. SHEET RUNOFF FROM THE SITE WILL BE FILTERED THROUGH SILT FENCES, MULCH BERMS, HAY BALE BARRIERS, OR SILT SOCKS. ALL STORM DRAIN BASIN INLETS SHALL BE PROVIDED WITH FLARED END SECTIONS AND TRASH RACKS. THE SITE SHALL BE STABILIZED FOR THE WINTER BY NOVEMBER 15.

DUST CONTROL:

- THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD.
- DUST CONTROL METHODS SHALL INCLUDE, BUT BE NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING.
- DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE SITE TO ABUTTING AREAS.

STOCKPILES:

- LOCATE STOCKPILES A MINIMUM OF 50 FEET AWAY FROM CATCH BASINS, SWALES, AND CULVERTS.
- ALL STOCKPILES SHOULD BE SURROUNDED WITH TEMPORARY EROSION CONTROL MEASURES PRIOR TO THE ONSET OF PRECIPITATION.
- PERIMETER BARRIERS SHOULD BE MAINTAINED AT ALL TIMES, AND ADJUSTED AS NEEDED TO ACCOMMODATE THE DELIVERY AND REMOVAL OF MATERIALS FROM THE STOCKPILE. THE INTEGRITY OF THE BARRIER SHOULD BE INSPECTED AT THE END OF EACH WORKING DAY.
- PROTECT ALL STOCKPILES FROM STORMWATER RUN-OFF USING TEMPORARY EROSION CONTROL MEASURES SUCH AS BERMS, SILT SOCK, OR OTHER APPROVED PRACTICE TO PREVENT MIGRATION OF MATERIAL BEYOND THE IMMEDIATE CONFINES OF THE STOCKPILES.

OFF SITE VEHICLE TRACKING:

- THE CONTRACTOR SHALL CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE(S) PRIOR TO ANY EXCAVATION ACTIVITIES.

VEGETATION:

- TEMPORARY GRASS COVER:
 - SEEDBED PREPARATION:
 - APPLY FERTILIZER AT THE RATE OF 600 POUNDS PER ACRE OF 10-10-10. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF THREE (3) TONS PER ACRE;
 - SEEDING:
 - UTILIZE ANNUAL RYE GRASS AT A RATE OF 40 LBS/ACRE;
 - WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF TWO (2) INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED;
 - APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). HYDROSEEDINGS, WHICH INCLUDE MULCH, MAY BE LEFT ON SOIL SURFACE. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING;
 - MAINTENANCE:
 - TEMPORARY SEEDING SHALL BE PERIODICALLY INSPECTED. AT A MINIMUM, 95% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER BARRIERS, CHECK DAMS, ETC.).
- VEGETATIVE PRACTICE:
 - FOR PERMANENT MEASURES AND PLANTINGS:
 - LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF THREE (3) TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 6.5;
 - FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 800 POUNDS PER ACRE OF 10-20-20 FERTILIZER;
 - SOIL CONDITIONERS AND FERTILIZER SHALL BE APPLIED AT THE RECOMMENDED RATES AND SHALL BE THOROUGHLY WORKED INTO THE LOAM. LOAM SHALL BE RAKED UNTIL THE SURFACE IS FINELY PULVERIZED, SMOOTH AND EVEN, AND THEN COMPACTED TO AN EVEN SURFACE CONFORMING TO THE REQUIRED LINES AND GRADES WITH APPROVED ROLLERS WEIGHING BETWEEN 4-1/2 POUNDS AND 5-1/2 POUNDS PER INCH OF WIDTH;
 - SEED SHALL BE SOWN AT THE RATE SHOWN BELOW. SOWING SHALL BE DONE ON A CALM, DRY DAY, PREFERABLY BY MACHINE, BUT IF BY HAND, ONLY BY EXPERIENCED WORKMEN. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH;
 - HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AS INDICATED ABOVE;
 - THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED WITH GRASS SHALL BE RESEEDDED, AND ALL NOXIOUS WEEDS REMOVED;
 - THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED;
 - A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE APPLIED AT THE INDICATED RATE:

SEED MIX	APPLICATION RATE
TALL FESCUE	15 LBS/ACRE
CREeping REED FESCUE	10 LBS/ACRE
BIRDSFOOT TREFOLI	8 LBS/ACRE

IN NO CASE SHALL THE WEED CONTENT EXCEED ONE (1) PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL SEED LAWS. SEEDING SHALL BE DONE NO LATER THAN SEPTEMBER 15. IN NO CASE SHALL SEEDING TAKE PLACE OVER SNOW.
 - DORMANT SEEDING (SEPTEMBER 15 TO FIRST SNOWFALL):
 - FOLLOW PERMANENT MEASURES SLOPE, LIME, FERTILIZER AND GRADING REQUIREMENTS. APPLY SEED MIXTURE AT TWICE THE INDICATED RATE. APPLY MULCH AS INDICATED FOR PERMANENT MEASURES.

CONCRETE WASHOUT AREA:

- THE FOLLOWING ARE THE ONLY NON-STORMWATER DISCHARGES ALLOWED. ALL OTHER NON-STORMWATER DISCHARGES ARE PROHIBITED ON SITE:
 - THE CONCRETE DELIVERY TRUCKS SHALL, WHENEVER POSSIBLE, USE WASHOUT FACILITIES AT THEIR OWN PLANT OR DISPATCH FACILITY;
 - IF IT IS NECESSARY, SITE CONTRACTOR SHALL DESIGNATE SPECIFIC WASHOUT AREAS AND DESIGN FACILITIES TO HANDLE ANTICIPATED WASHOUT WATER;
 - CONTRACTOR SHALL LOCATE WASHOUT AREAS AT LEAST 150 FEET AWAY FROM STORM DRAINS, SWALES AND SURFACE WATERS OR DELINEATED WETLANDS;
 - INSPECT WASHOUT FACILITIES DAILY TO DETECT LEAKS OR TEARS AND TO IDENTIFY WHEN MATERIALS NEED TO BE REMOVED.

ALLOWABLE NON-STORMWATER DISCHARGES:

- FIRE-FIGHTING ACTIVITIES;
- FIRE HYDRANT FLUSHING;

- WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED;
- WATER USED TO CONTROL DUST;
- POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHING;
- ROUTINE EXTERNAL BUILDING WASH DOWN WHERE DETERGENTS ARE NOT USED;
- PAVEMENT WASH WATERS WHERE DETERGENTS ARE NOT USED;
- UNCONTAMINATED AIR CONDITIONING/COMPRESSOR CONDENSATION;
- UNCONTAMINATED GROUND WATER OR SPRING WATER;
- FOUNDATION OR FOOTING DRAINS WHICH ARE UNCONTAMINATED;
- UNCONTAMINATED EXCAVATION DEWATERING;
- LANDSCAPE IRRIGATION.

WASTE DISPOSAL:

- WASTE MATERIAL:
 - ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN A DUMPSTER;
 - NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ON SITE;
 - ALL PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
- HAZARDOUS WASTE:
 - ALL HAZARDOUS WASTE MATERIALS SHALL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER;
 - SITE PERSONNEL SHALL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
- SANITARY WASTE:
 - ALL SANITARY WASTE SHALL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

SPILL PREVENTION:

- CONTRACTOR SHALL BE FAMILIAR WITH SPILL PREVENTION MEASURES REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. AT A MINIMUM, CONTRACTOR SHALL FOLLOW THE BEST MANAGEMENT SPILL PREVENTION PRACTICES OUTLINED BELOW.
- THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
 - GOOD HOUSEKEEPING - THE FOLLOWING GOOD HOUSEKEEPING PRACTICE SHALL BE FOLLOWED ON SITE DURING CONSTRUCTION:
 - ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB SHALL BE STORED ON SITE;
 - ALL MATERIALS STORED ON SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE;
 - MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED;
 - THE SITE SUPERINTENDENT SHALL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS;
 - SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER;
 - WHENEVER POSSIBLE ALL OF A PRODUCT SHALL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
 - HAZARDOUS PRODUCTS - THE FOLLOWING PRACTICES SHALL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
 - PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE;
 - ORIGINAL LABELS AND MATERIAL SAFETY DATA SHALL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION;
 - SURPLUS PRODUCT THAT MUST BE DISPOSED OF SHALL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.
 - PRODUCT SPECIFIC PRACTICES - THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ON SITE:
 - PETROLEUM PRODUCTS:
 - ALL ON SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE LEAKAGE;
 - PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
 - FERTILIZERS:
 - FERTILIZERS USED SHALL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS;
 - ONCE APPLIED FERTILIZER SHALL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER;
 - STORAGE SHALL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER SHALL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
 - PAINTS:
 - ALL CONTAINERS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE;
 - EXCESS PAINT SHALL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM;
 - EXCESS PAINT SHALL BE DISPOSED OF PROPERLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
 - SPILL CONTROL PRACTICES - IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION, THE FOLLOWING PRACTICES SHALL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
 - MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES;
 - MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS SHALL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE;
 - ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY;
 - THE SPILL AREA SHALL BE KEPT WELL VENTILATED AND PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE;
 - SPILLS OF TOXIC OR HAZARDOUS MATERIAL SHALL BE REPORTED TO THE APPROPRIATE LOCAL, STATE OR FEDERAL AGENCIES AS REQUIRED;
 - THE SITE SUPERINTENDENT IS RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
 - VEHICLE FUELING AND MAINTENANCE PRACTICE:
 - CONTRACTOR SHALL MAKE AN EFFORT TO PERFORM EQUIPMENT/VEHICAL FUELING AND MAINTENANCE AT AN OFF-SITE FACILITY;
 - CONTRACTOR SHALL PROVIDE AN ON-SITE FUELING AND MAINTENANCE AREA THAT IS CLEAN AND DRY;
 - IF POSSIBLE THE CONTRACTOR SHALL KEEP AREA COVERED;
 - CONTRACTOR SHALL KEEP A SPILL KIT AT THE FUELING AND MAINTENANCE AREA;
 - CONTRACTOR SHALL REGULARLY INSPECT VEHICLES FOR LEAKS AND DAMAGE;
 - CONTRACTOR SHALL USE DRIP PANS, DRIP CLOTHS, OR ABSORBENT PADS WHEN REPLACING SPENT FLUID.

EROSION CONTROL OBSERVATIONS AND MAINTENANCE PRACTICES

THIS PROJECT EXCEEDS ONE (1) ACRE OF DISTURBANCE AND THUS REQUIRES A SWPPP. THE SWPPP SHALL BE PREPARED BY THE [CONTRACTOR]. THE CONTRACTOR SHALL BE FAMILIAR WITH THE SWPPP AND KEEP AN UPDATED COPY OF THE SWPPP ONSITE AT ALL TIMES.

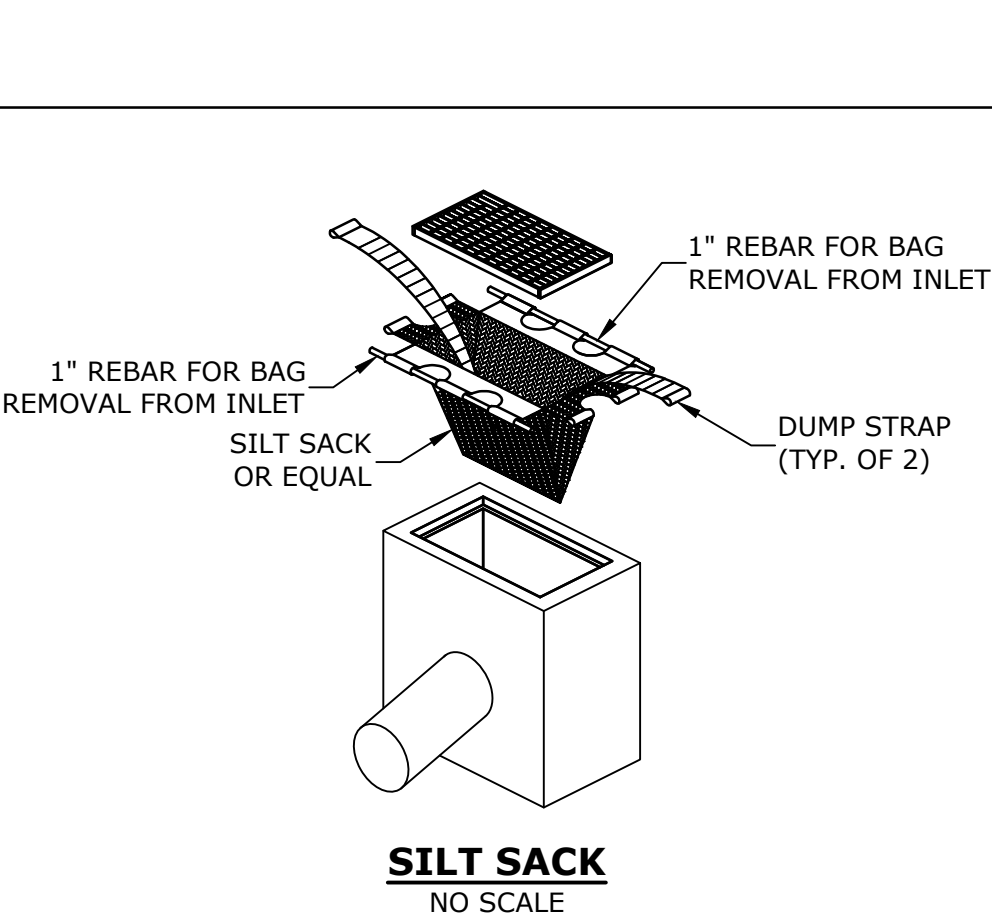
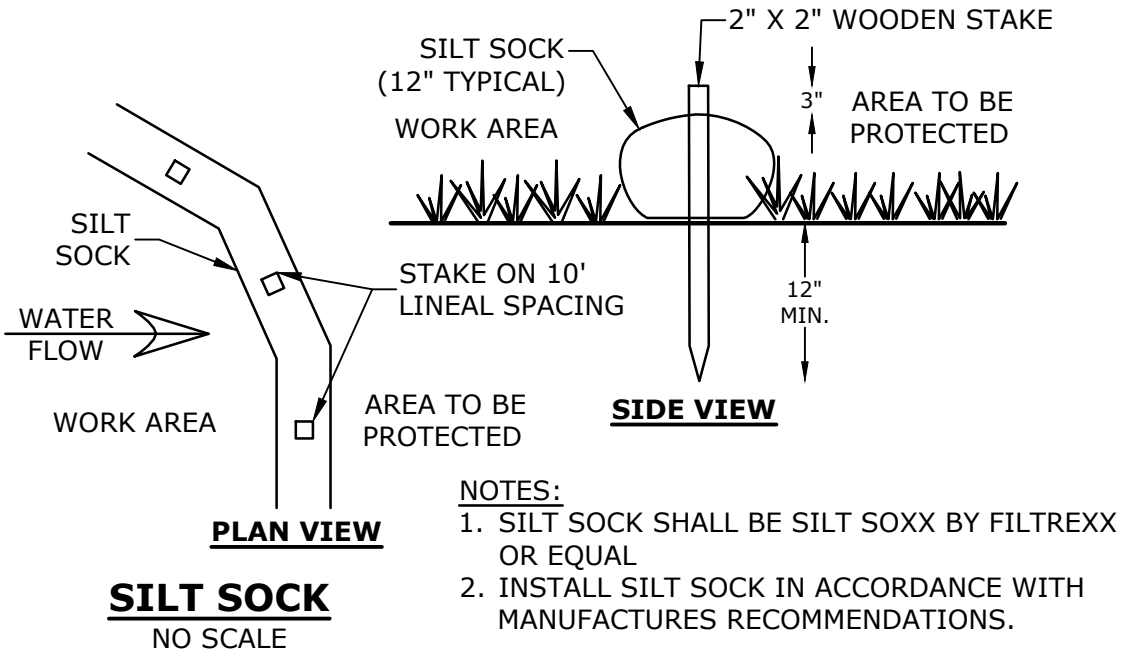
THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AS PART OF THIS PROJECT:

- OBSERVATIONS OF THE PROJECT FOR COMPLIANCE WITH THE SWPPP SHALL BE MADE BY THE [CONTRACTOR] AT LEAST ONCE A WEEK OR WITHIN 24 HOURS OF A STORM 0.25 INCHES OR GREATER;
- AN OBSERVATION REPORT SHALL BE MADE AFTER EACH OBSERVATION AND DISTRIBUTED TO THE ENGINEER, THE OWNER, THE CONTRACTOR, AND THE CITY OF DOVER COMMUNITY SERVICES DEPARTMENT;
- A REPRESENTATIVE OF THE SITE CONTRACTOR, SHALL BE RESPONSIBLE FOR MAINTENANCE

- AND REPAIR ACTIVITIES;
- IF A REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN 24 HOURS OF REPORT.

BLASTING NOTES:

- CONTRACTOR SHALL CONTACT THE NHDES PRIOR TO COMMENCING ANY BLASTING ACTIVITIES.
- FOR ANY PROJECT FOR WHICH BLASTING OF BEDROCK IS ANTICIPATED, THE APPLICANT SHALL SUBMIT:
 - A BLASTING PLAN THAT IDENTIFIES:
 - WHERE THE BLASTING ACTIVITIES ARE ANTICIPATED TO OCCUR;
 - THE ESTIMATED QUANTITY OF BLAST ROCK IN CUBIC YARDS; AND
 - SITE-SPECIFIC BLASTING BEST MANAGEMENT PRACTICES.
- IF MORE THAN 5000 CUBIC YARDS OF BLAST ROCK WILL BE GENERATED AND THERE ARE ONE OR MORE PUBLIC DRINKING WATER WELLS WITHIN 2000 FEET OF THE BLASTING ACTIVITIES, A PLAN TO MONITOR GROUNDWATER TO DETECT ANY CONTAMINATION IN SUFFICIENT TIME TO PROTECT THE WATER SUPPLY WELLS SHALL BE PROVIDED TO THE NHDES. THE GROUNDWATER MONITORING PLAN SHALL INCLUDE:
 - MONITORING FOR NITRATE AND NITRITE EITHER IN THE DRINKING WATER SUPPLY WELLS OR IN OTHER WELLS THAT ARE REPRESENTATIVE OF THE DRINKING WATER SUPPLY WELLS IN THE AREA:
 - THE GROUNDWATER SAMPLING PROGRAM MUST BE IMPLEMENTED ONCE APPROVED BY THE NHDES.
 - THE FOLLOWING BEST MANAGEMENT PROCEDURES FOR BLASTING SHALL BE COMPLIED WITH:
 - LOADING PRACTICES - THE FOLLOWING BLASTHOLE LOADING PRACTICES TO MINIMIZE ENVIRONMENTAL EFFECTS SHALL BE FOLLOWED:
 - DRILLING LOGS SHALL BE MAINTAINED BY THE DRILLER AND COMMUNICATED DIRECTLY TO THE BLASTER. THE LOGS SHALL INDICATE DEPTHS AND LENGTHS OF VOIDS, CAVITIES, AND FAULT ZONES OR OTHER WEAK ZONES ENCOUNTERED AS WELL AS GROUNDWATER CONDITIONS;
 - EXPLOSIVE PRODUCTS SHALL BE MANAGED ON-SITE SO THAT THEY ARE EITHER USED IN THE BOREHOLE, RETURNED TO THE DELIVERY VEHICLE, OR PLACED IN SECURE CONTAINERS FOR OFF-SITE DISPOSAL;
 - SPILLAGE AROUND THE BOREHOLE SHALL EITHER BE PLACED IN THE BOREHOLE OR CLEANED UP AND RETURNED TO AN APPROPRIATE VEHICLE FOR HANDLING OR PLACEMENT IN SECURED CONTAINERS FOR OFF-SITE DISPOSAL;
 - LOADED EXPLOSIVES SHALL BE DETONATED AS SOON AS POSSIBLE AND SHALL NOT BE LEFT IN THE BLASTHOLES OVERNIGHT, UNLESS WEATHER OR OTHER SAFETY CONCERNS REASONABLY DICTATE THAT DETONATION SHOULD BE POSTPONED;
 - LOADING EQUIPMENT SHALL BE CLEANED IN AN AREA WHERE WASTEWATER CAN BE PROPERLY CONTAINED AND HANDLED IN A MANNER THAT PREVENTS RELEASE OF CONTAMINANTS TO THE ENVIRONMENT;
 - EXPLOSIVES SHALL BE LOADED TO MAINTAIN GOOD CONTINUITY IN THE COLUMN LOAD TO PROMOTE COMPLETE DETONATION. INDUSTRY ACCEPTED LOADING PRACTICES FOR PRIMING, STEMMING, DECKING AND COLUMN RISE NEED TO BE ATTENDED TO.
 - EXPLOSIVE SELECTION - THE FOLLOWING BMPS SHALL BE FOLLOWED TO REDUCE THE POTENTIAL FOR GROUNDWATER CONTAMINATION WHEN EXPLOSIVES ARE USED:
 - EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT ARE APPROPRIATE FOR SITE CONDITIONS AND SAFE BLAST EXECUTION;
 - EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT HAVE THE APPROPRIATE WATER RESISTANCE FOR THE SITE CONDITIONS PRESENT TO MINIMIZE THE POTENTIAL FOR HAZARDOUS EFFECT OF THE PRODUCT UPON GROUNDWATER
 - PREVENTION OF MISFIRES. APPROPRIATE PRACTICES SHALL BE DEVELOPED AND IMPLEMENTED TO PREVENT MISFIRES.
 - MUCK PILES MANAGEMENT - MUCK PILES (THE BLASTED PIECES OF ROCK) AND ROCK PILES SHALL BE MANAGED IN A MANNER TO REDUCE THE POTENTIAL FOR CONTAMINATION BY IMPLEMENTING THE FOLLOWING MEASURES:
 - REMOVE THE MUCK PILE FROM THE BLAST AREA AS SOON AS REASONABLY POSSIBLE;
 - MANAGE THE INTERACTION OF BLASTED ROCK PILES AND STORMWATER TO PREVENT CONTAMINATION OF WATER SUPPLY WELLS OR SURFACE WATER.
 - SPILL PREVENTION AND SPILL MITIGATION MEASURES SHALL BE IMPLEMENTED TO PREVENT THE RELEASE OF FUEL AND OTHER RELATED SUBSTANCES TO THE ENVIRONMENT DURING BLASTING OPERATIONS. THE MEASURES TO PREVENT SUCH RELEASES SHALL BE DETAILED IN THE GROUNDWATER MONITORING REPORT AND COMPLY WITH THE MEASURES AND BEST MANAGEMENT PRACTICES LISTED ON THIS SHEET.



Cochecho Waterfront Development Phase - I

Applicant:
CPI Management, LLC
c/o Cathartes

Owner:
City of Dover

Dover File #: P20-

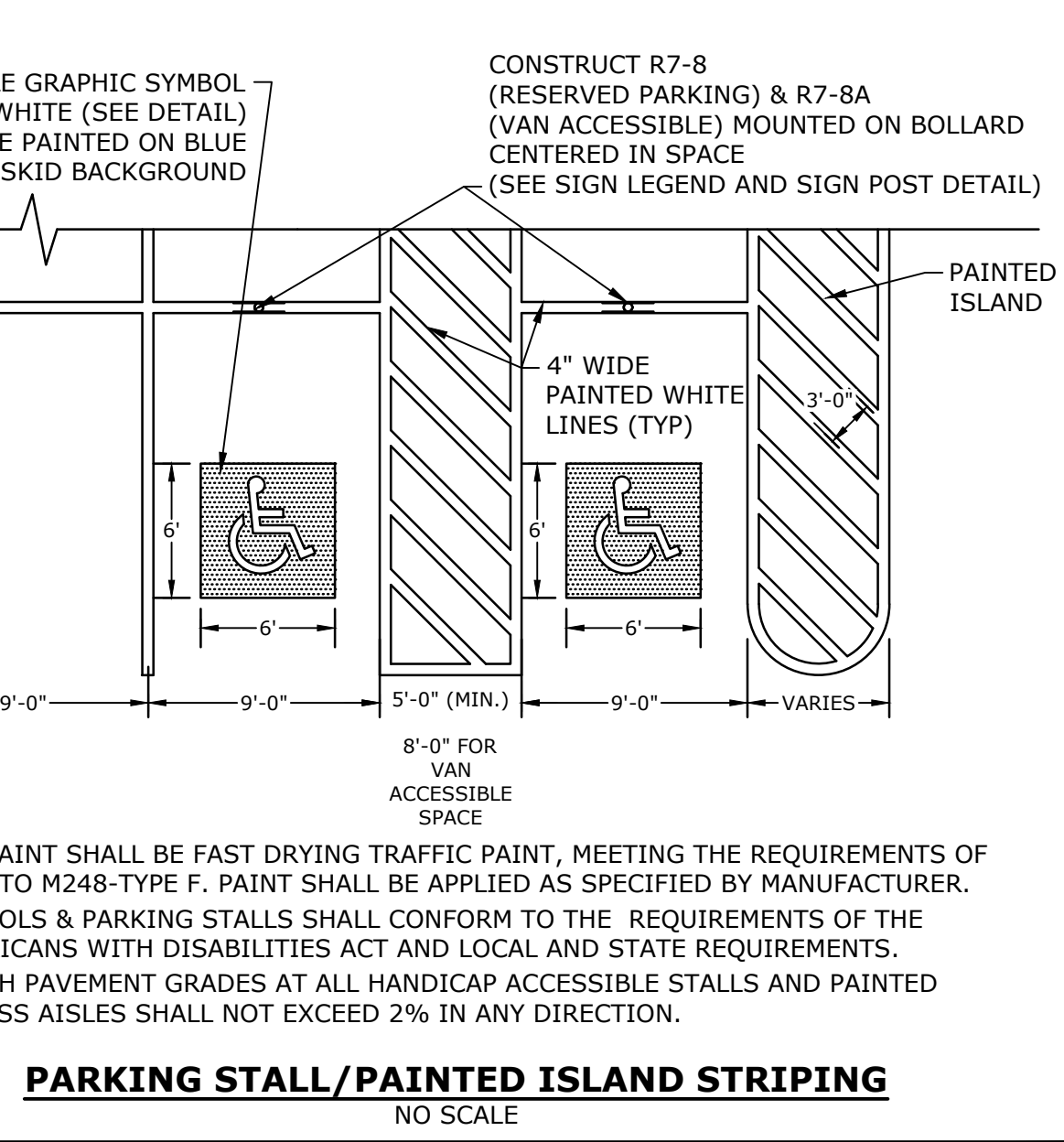
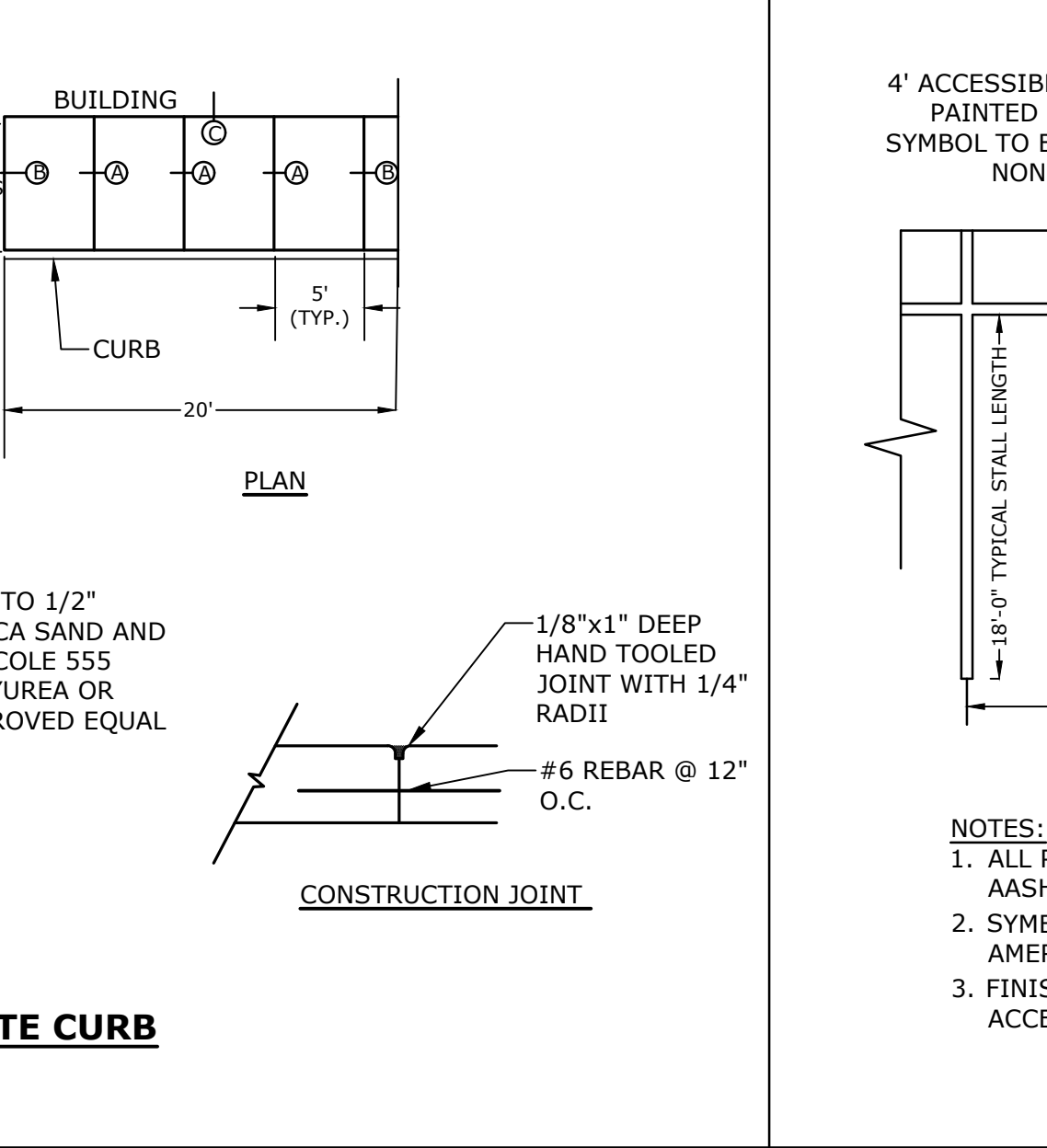
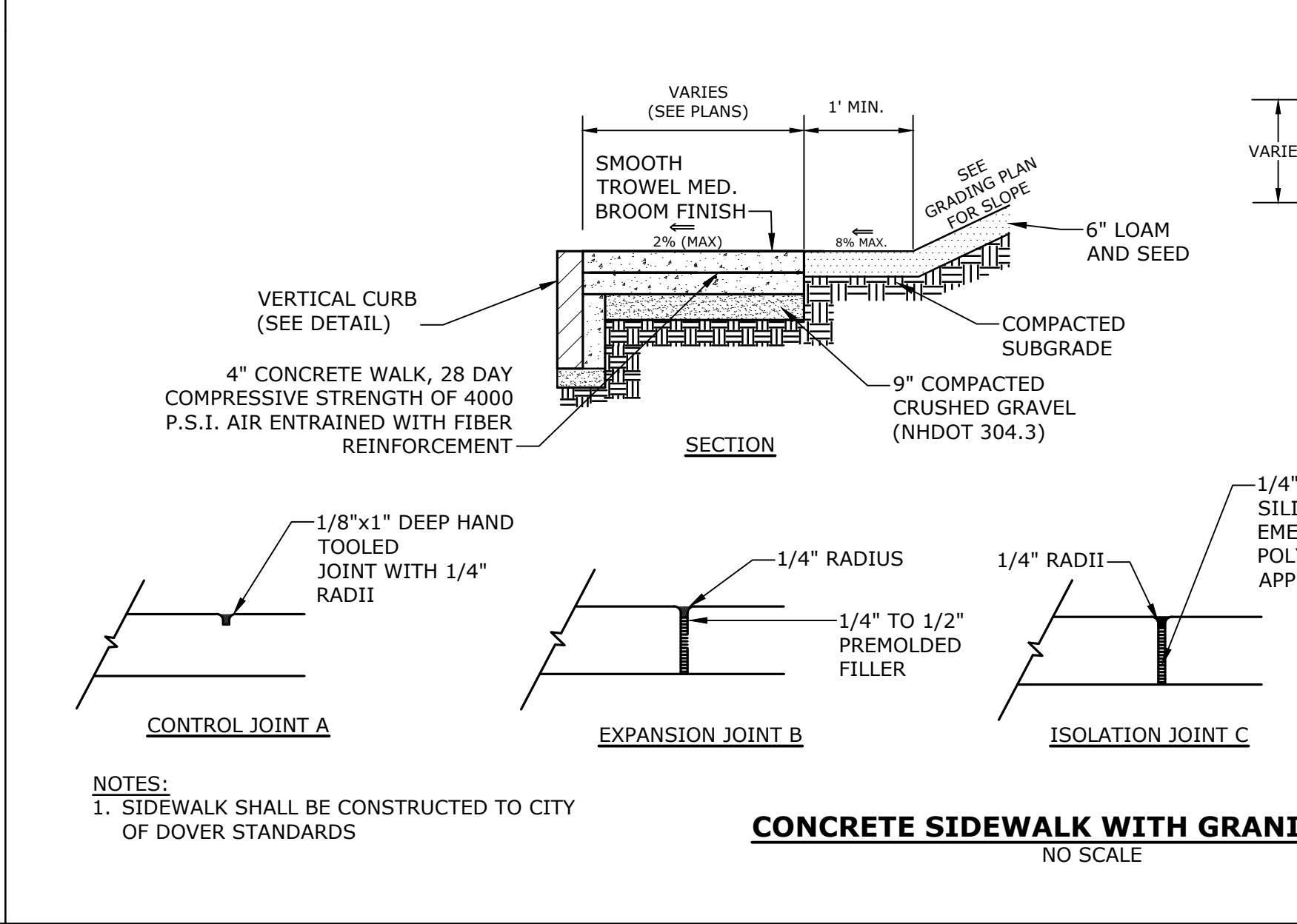
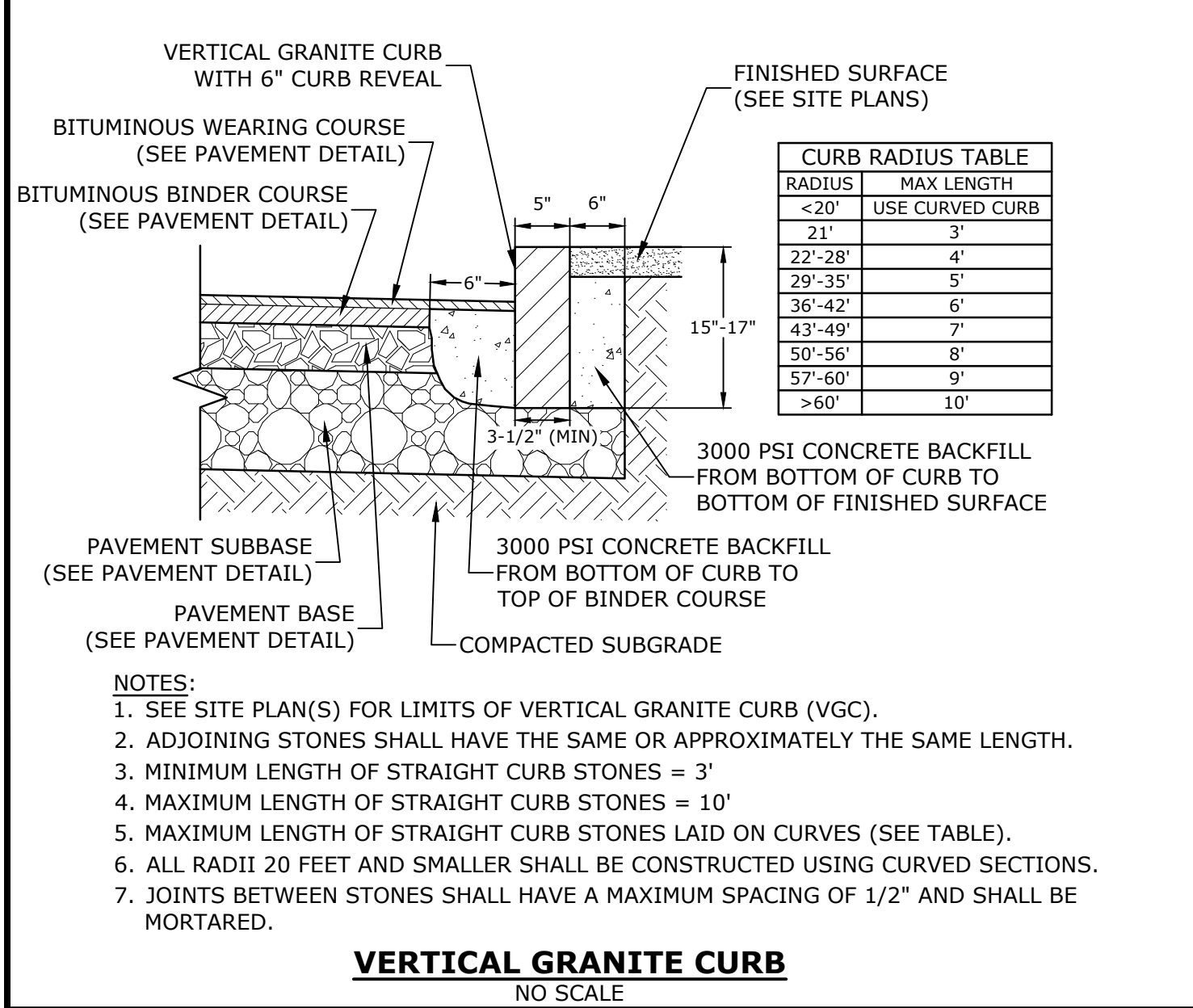
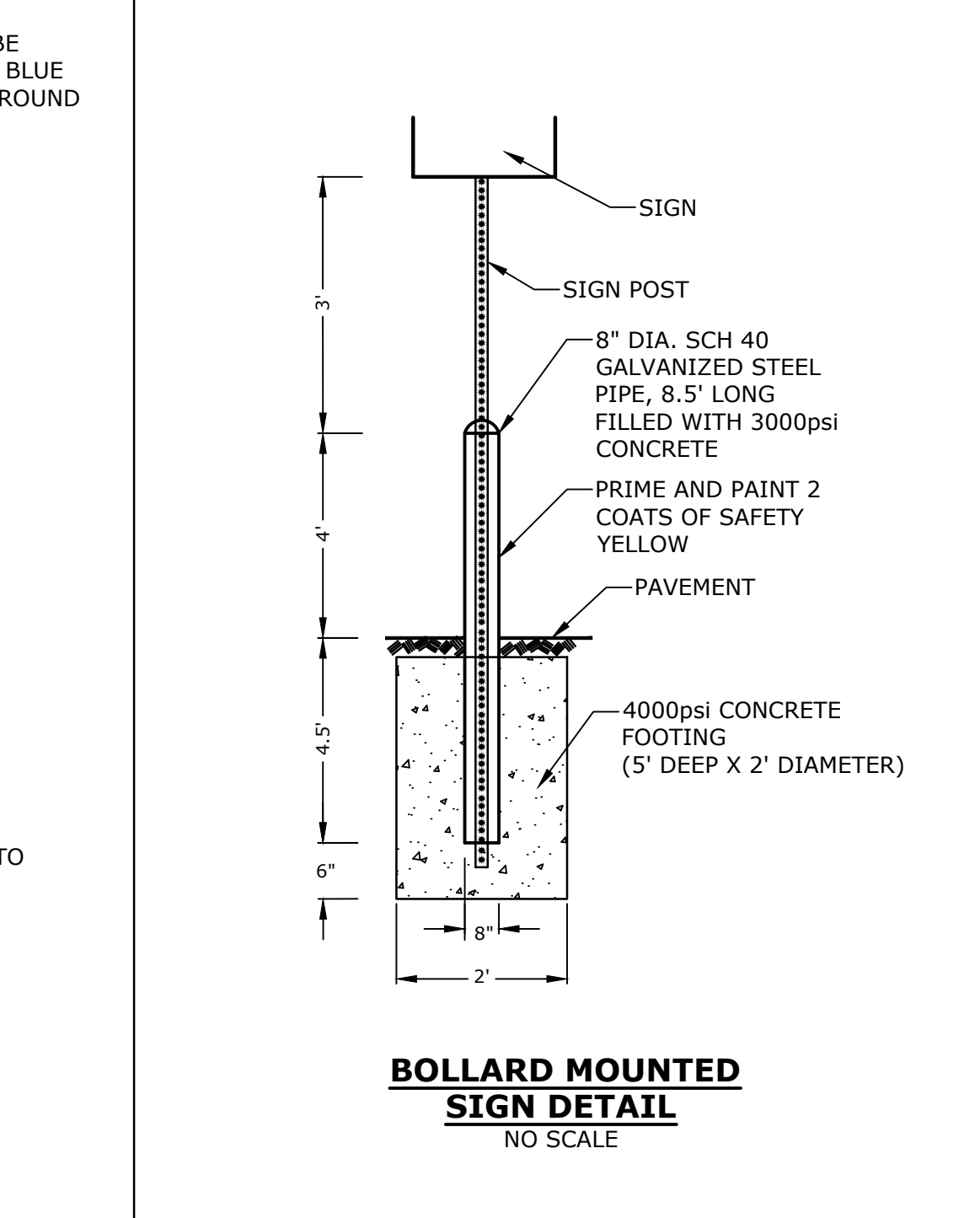
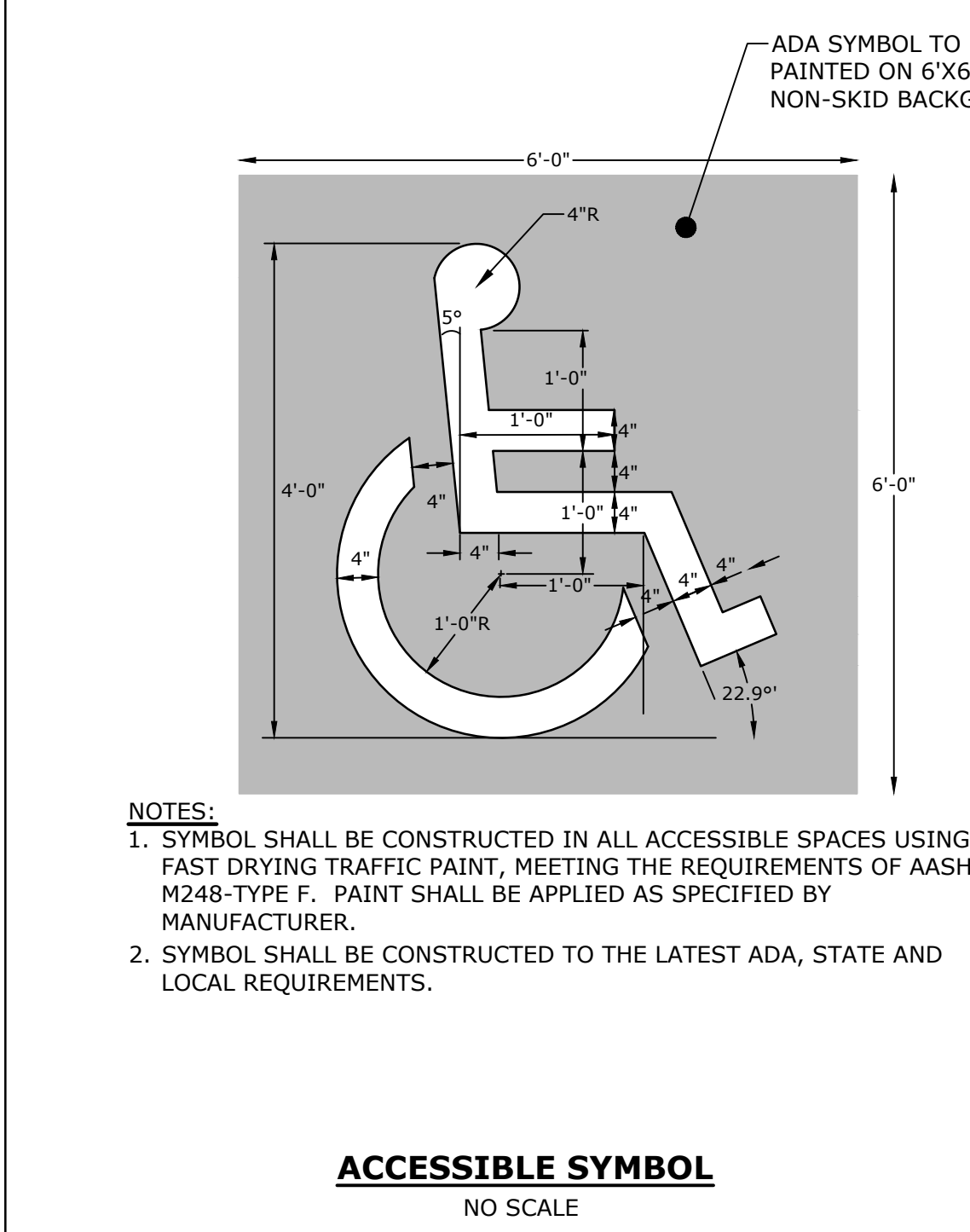
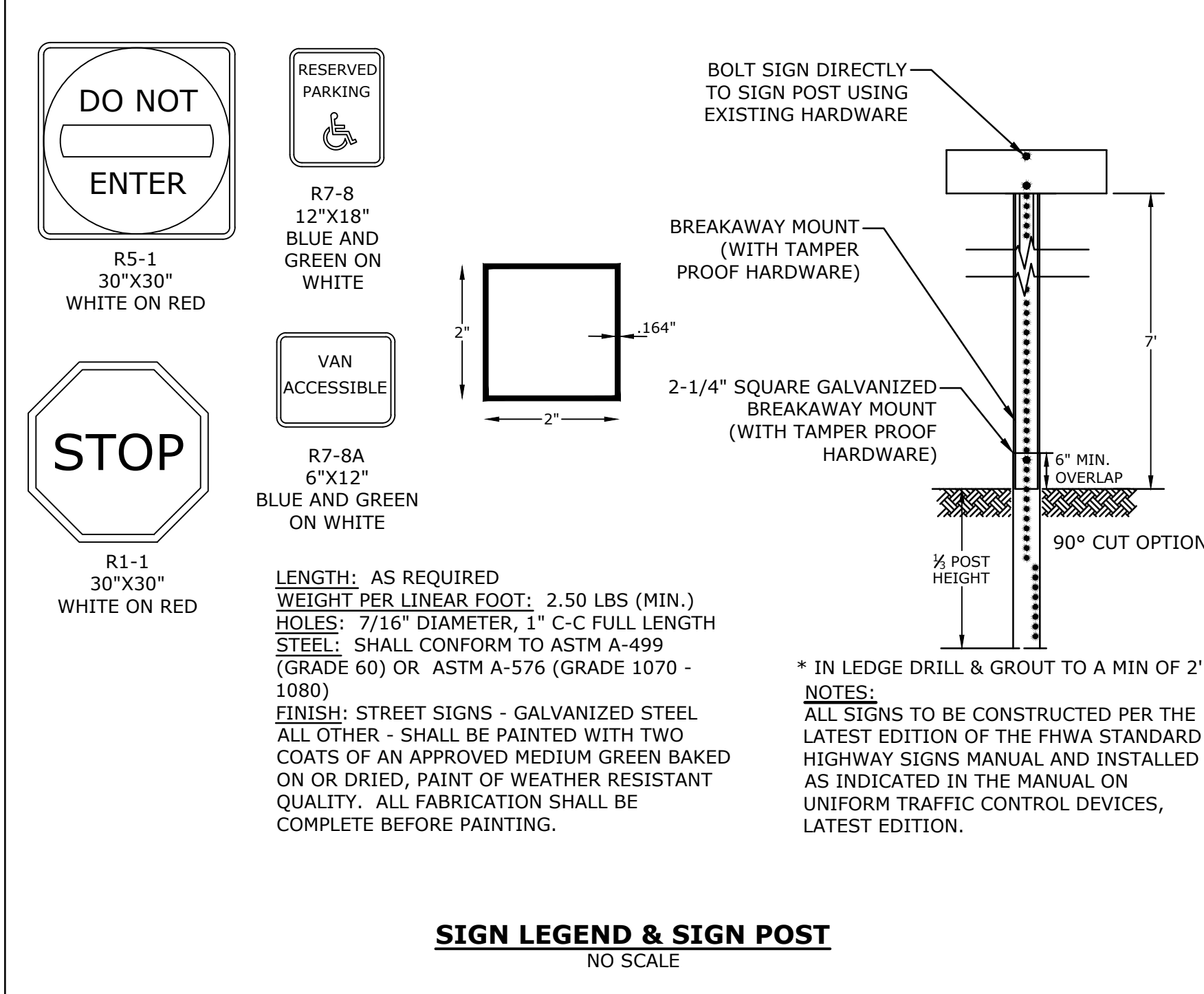
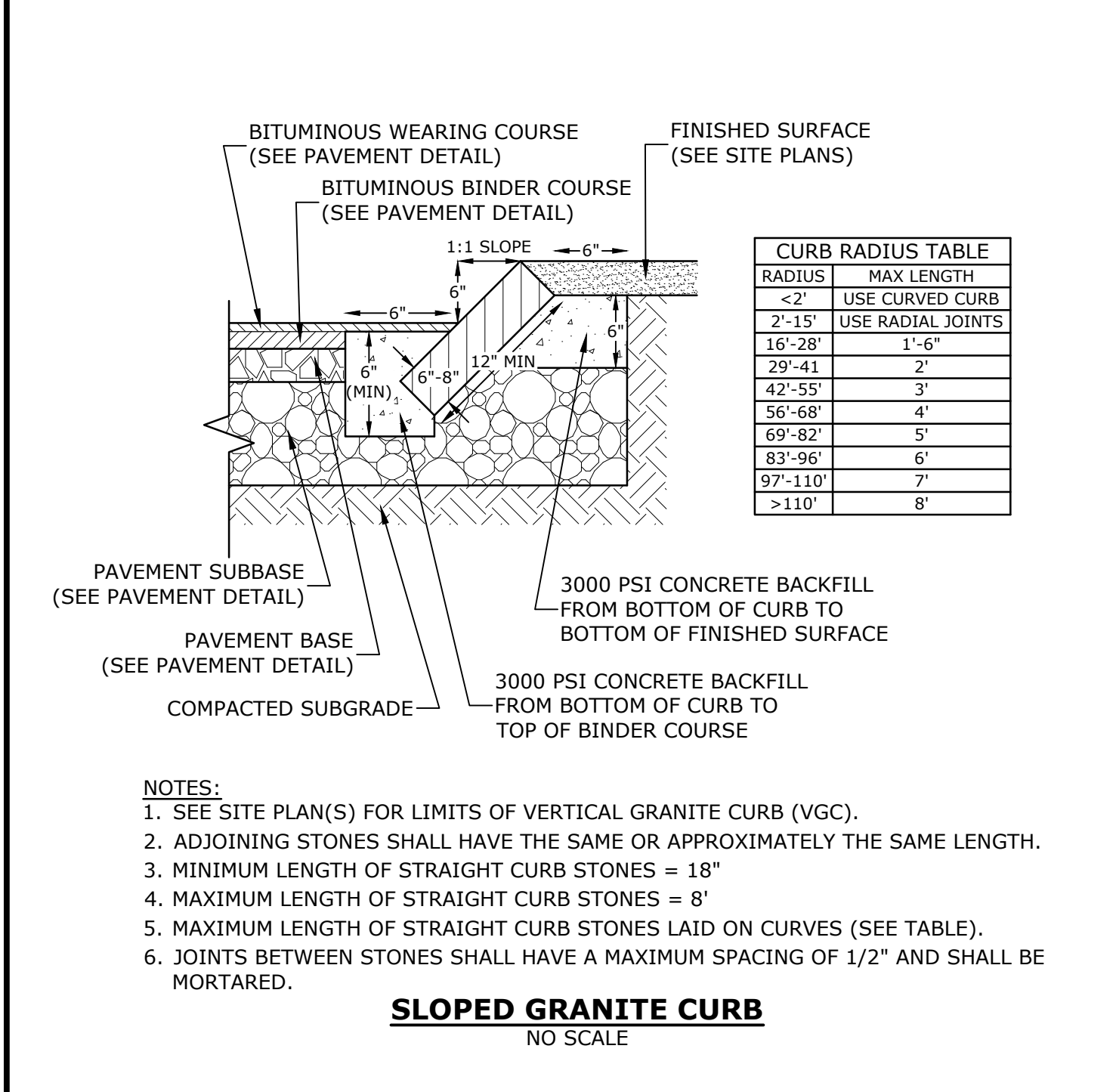
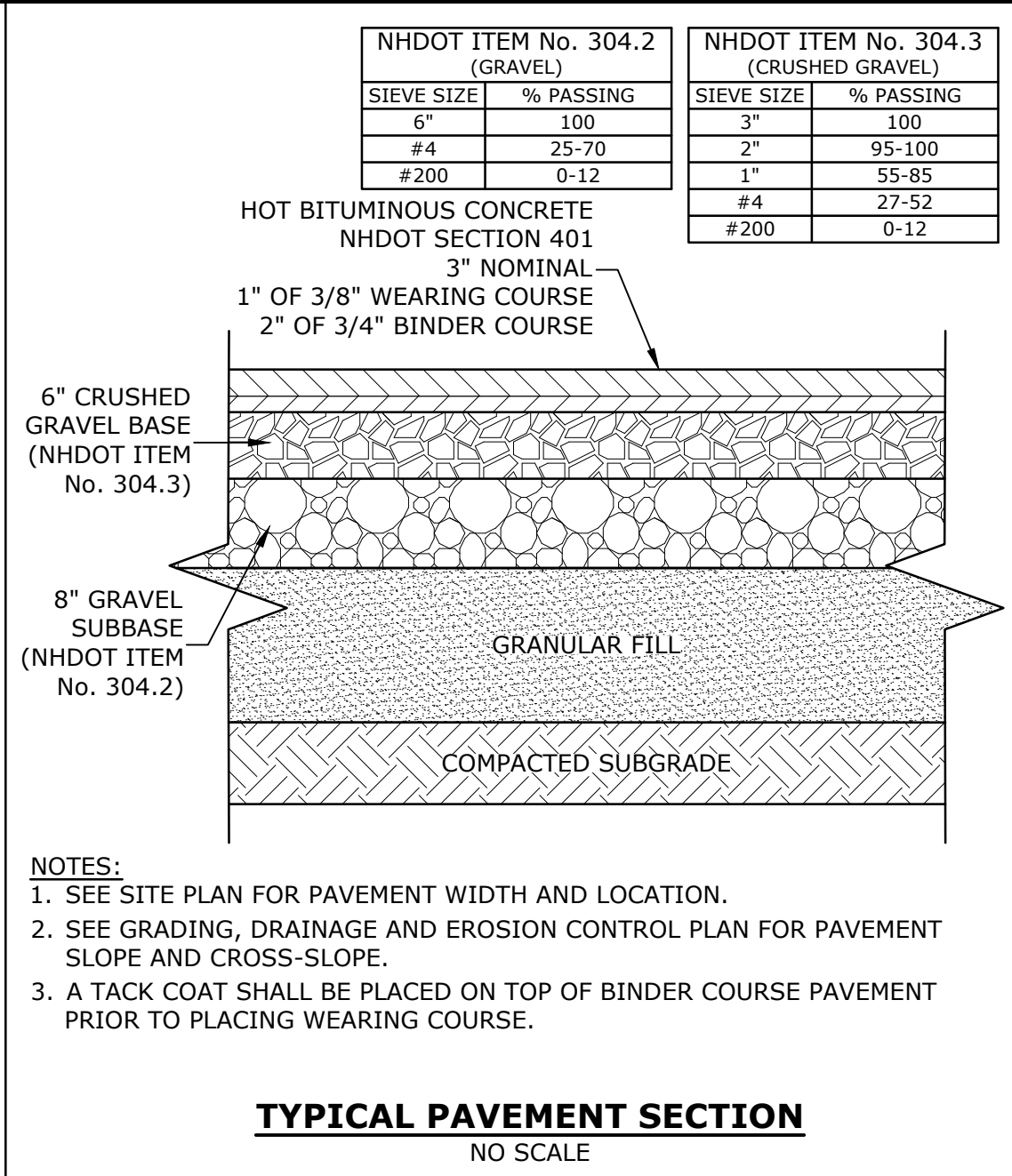
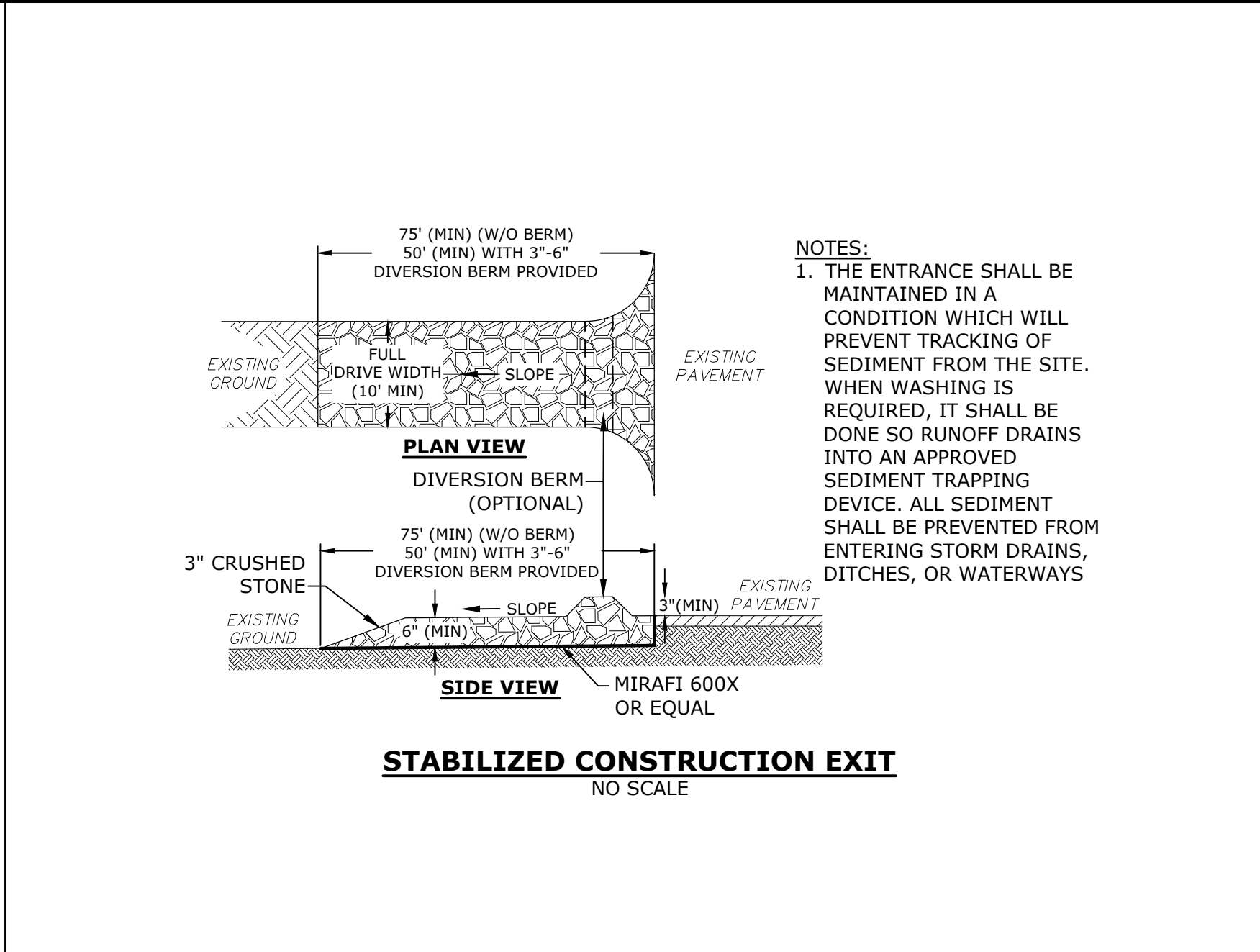
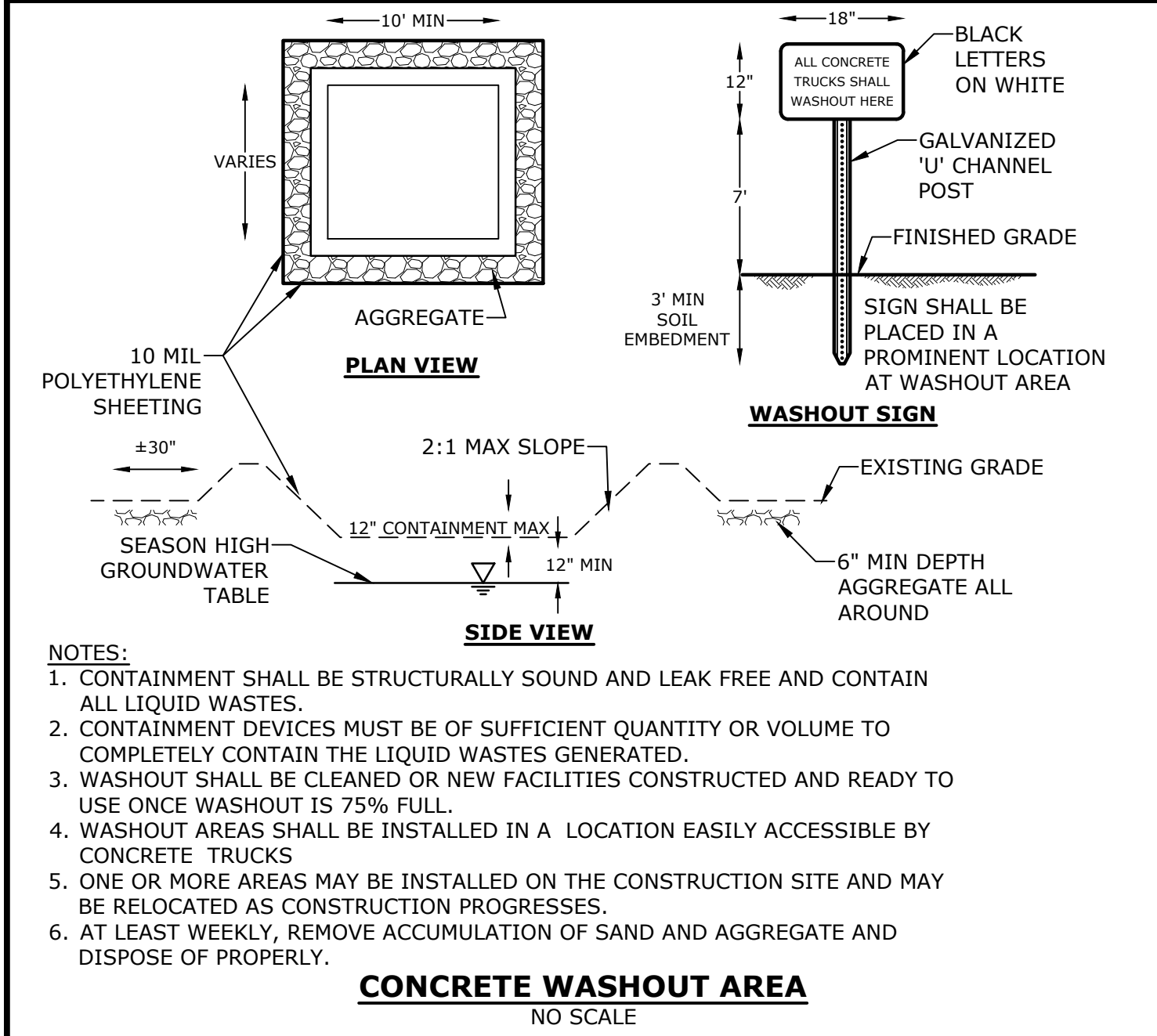
Dover, New Hampshire

A	1/31/2020	TRC SITE PLAN REVIEW
MARK	DATE	DESCRIPTION
PROJECT NO:	C-0960-007	
DATE:	January 31, 2020	
FILE:	C0960-007-DTLS.DWG	
DRAWN BY:	CML/BKC	
CHECKED:	PMC	
APPROVED:	BLM	

EROSION CONTROL NOTES & DETAILS SHEET

SCALE: AS SHOWN

C-501



Tighe&Bond
Engineers | Environmental Specialists

STATE OF NEW HAMPSHIRE
BRADLEE MEZQUITA
No. 08830
LICENSED PROFESSIONAL ENGINEER
1/13/2020

STATE OF NEW HAMPSHIRE
PATRICK M. CRIMMINS
No. 12878
LICENSED PROFESSIONAL ENGINEER
1/13/2020

Cochecho Waterfront Development Phase - I

Applicant:
CPI Management, LLC
c/o Cathartes

Owner:
City of Dover

Dover File #: P20-

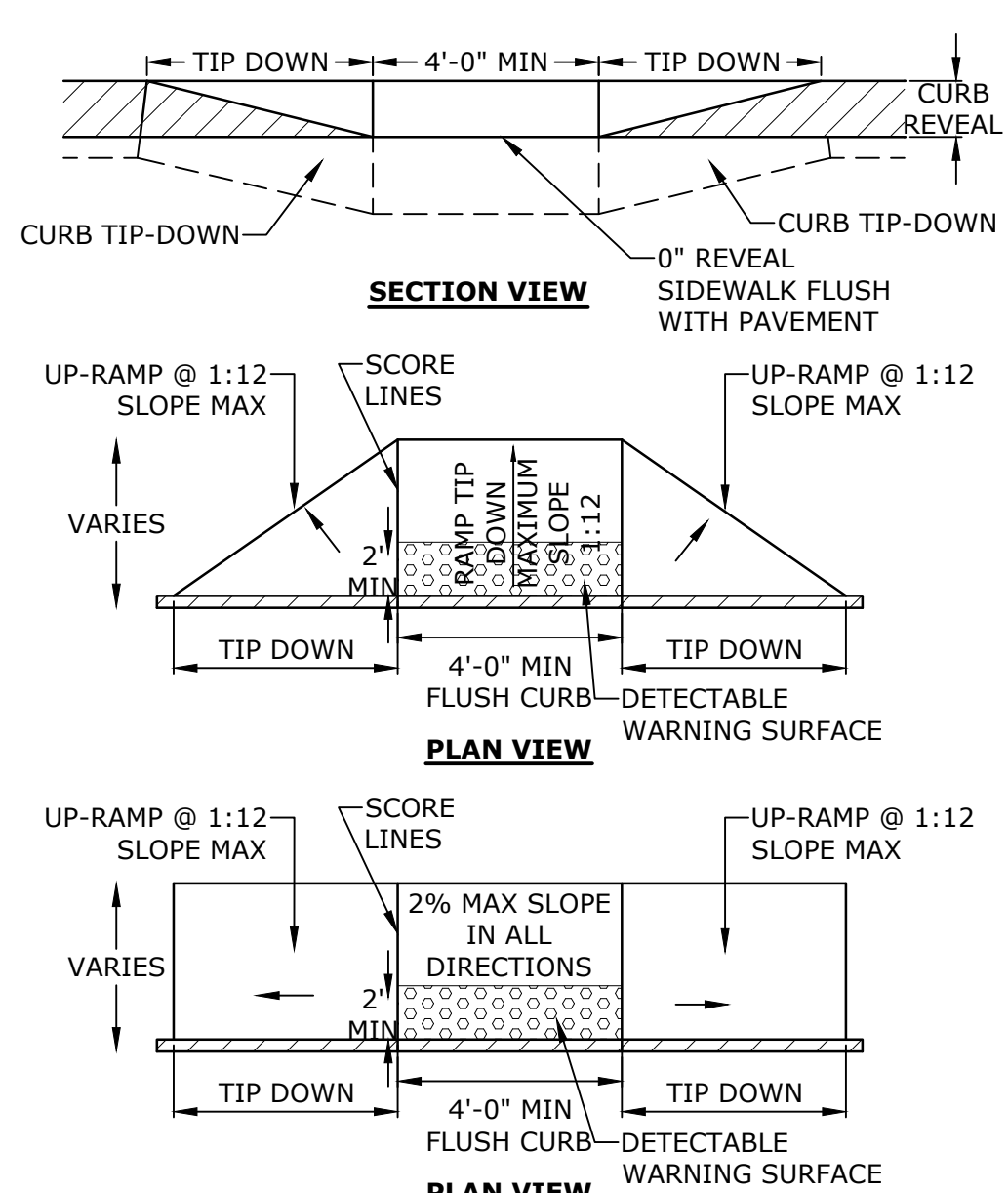
Dover, New Hampshire

MARK	DATE	DESCRIPTION
A	1/31/2020	TRC SITE PLAN REVIEW
PROJECT NO:	C-0960-007	
DATE:	January 31, 2020	
FILE:	C0960-007-DTSL.DWG	
DRAWN BY:	CML/BKC	
CHECKED:	PMC	
APPROVED:	BLM	

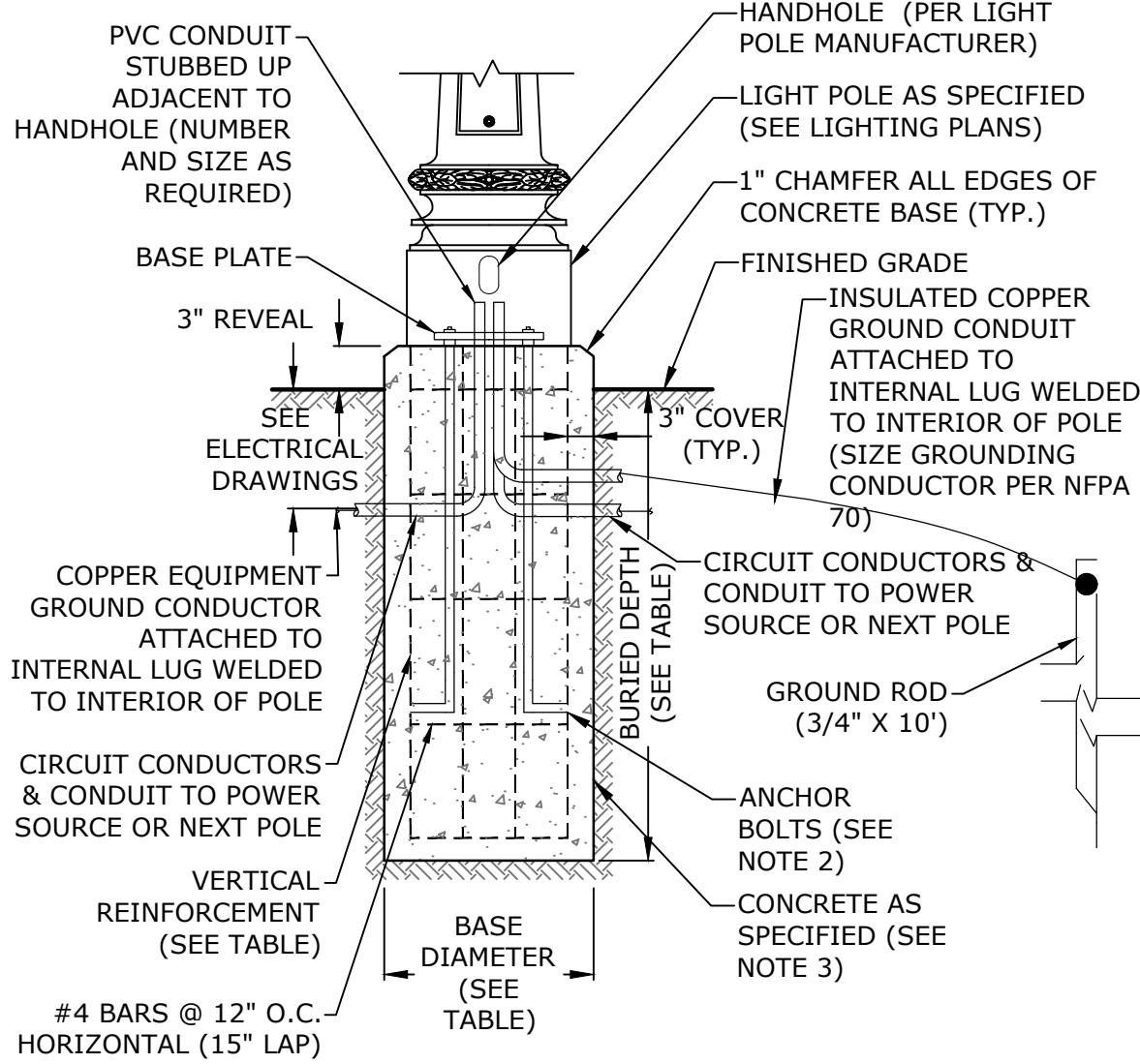
DETAILS SHEET

SCALE: AS SHOWN

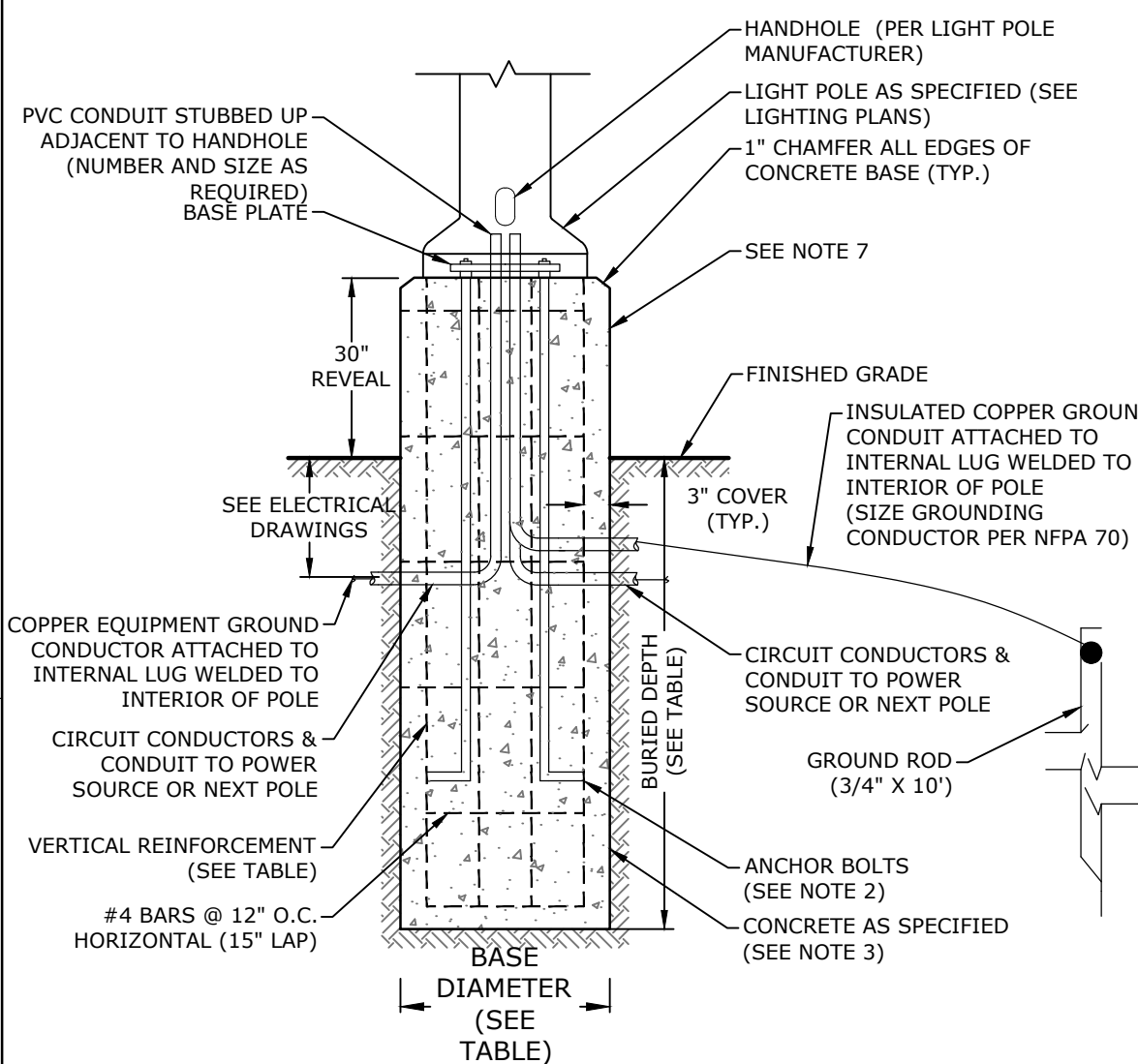
C-502



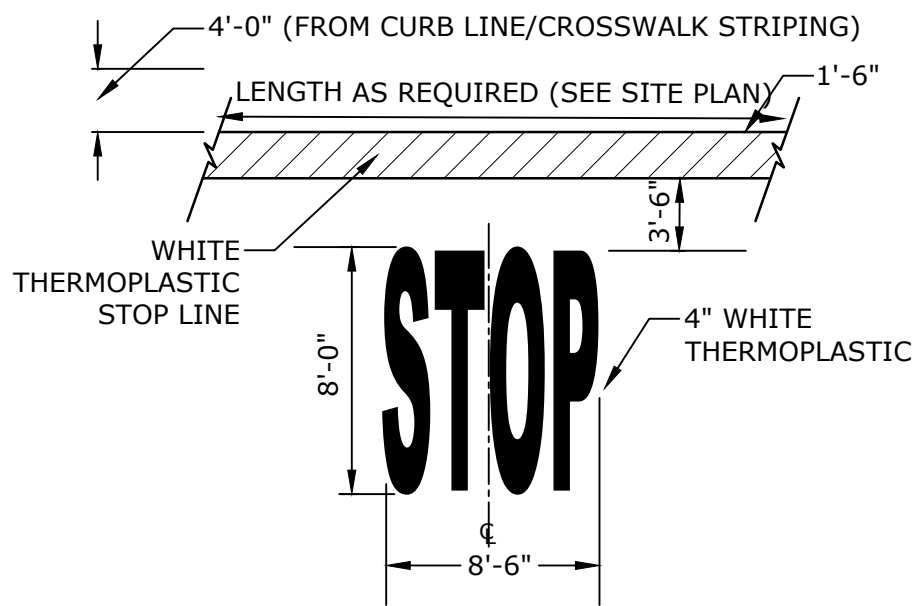
CONCRETE TIP-DOWN RAMPS WITH DETECTABLE WARNING PANEL
NO SCALE



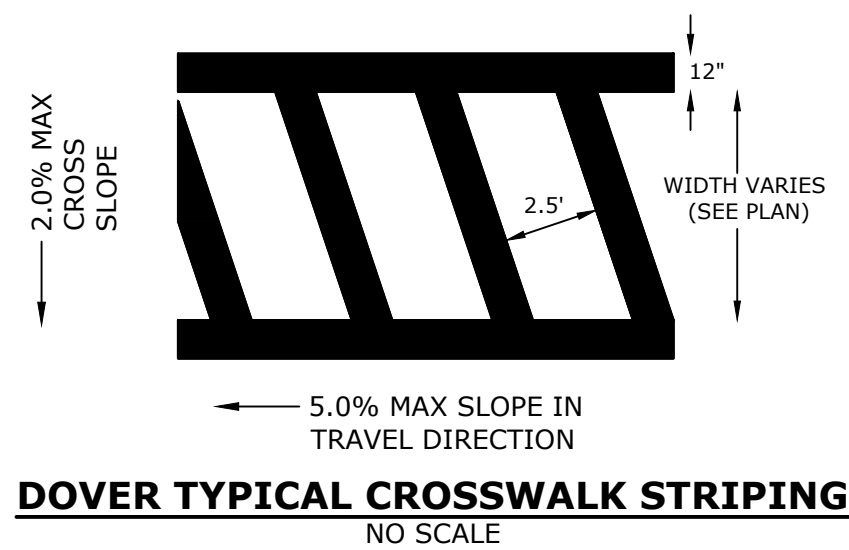
TYPICAL EXTERIOR PARKING LIGHT POLE BASE
NO SCALE



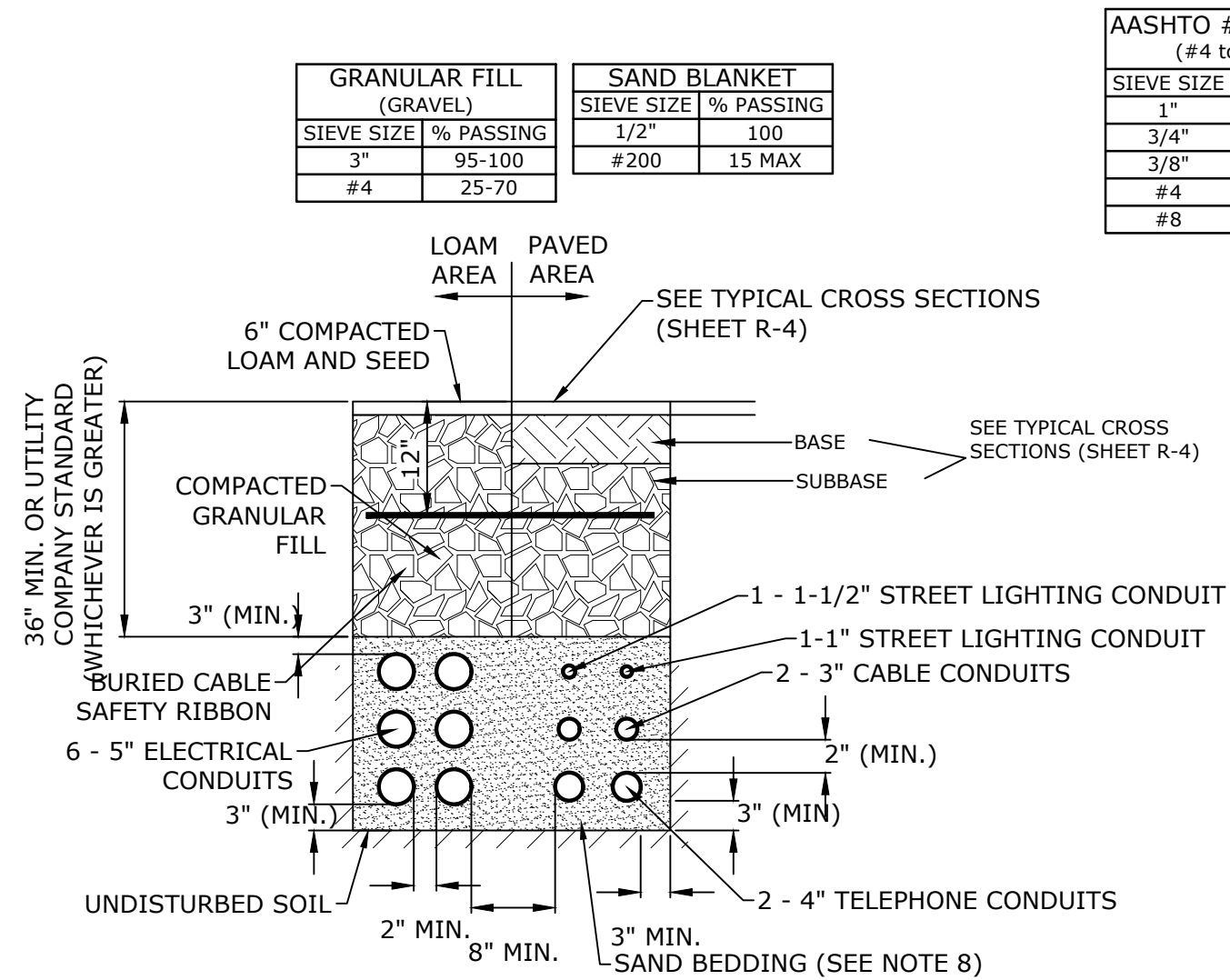
TYPICAL INTERIOR PARKING LIGHT POLE BASE
NO SCALE



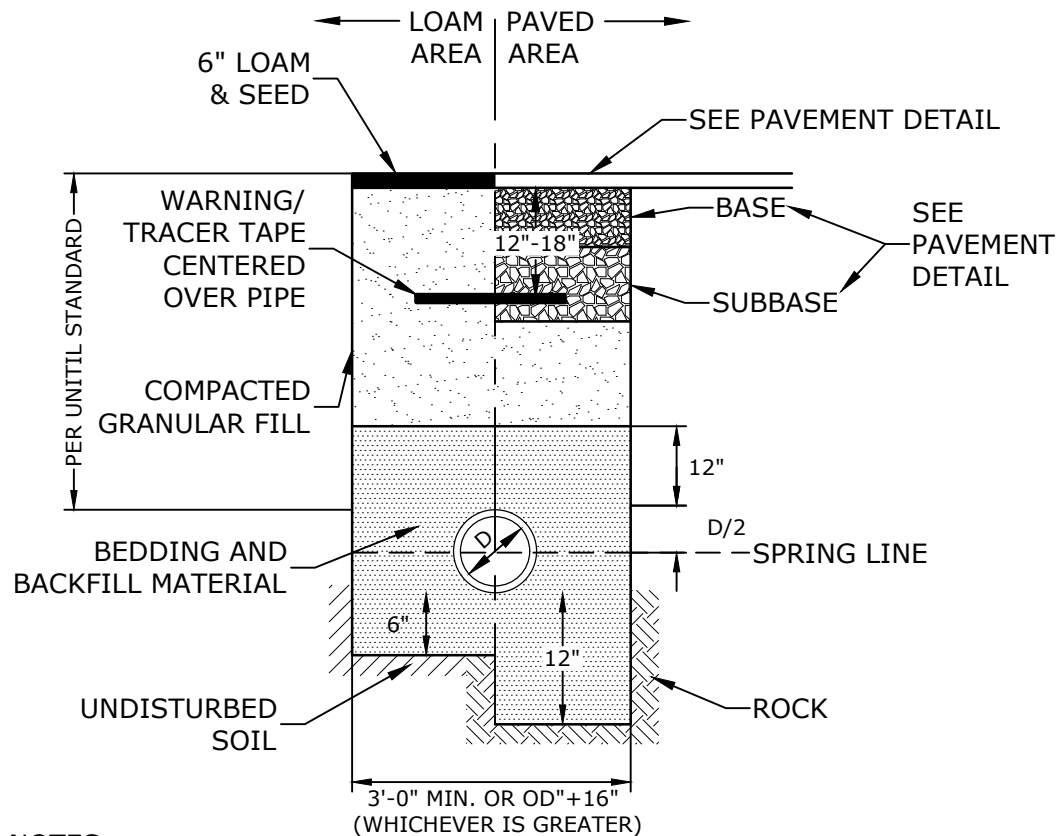
STOP BAR AND LEGEND
NO SCALE



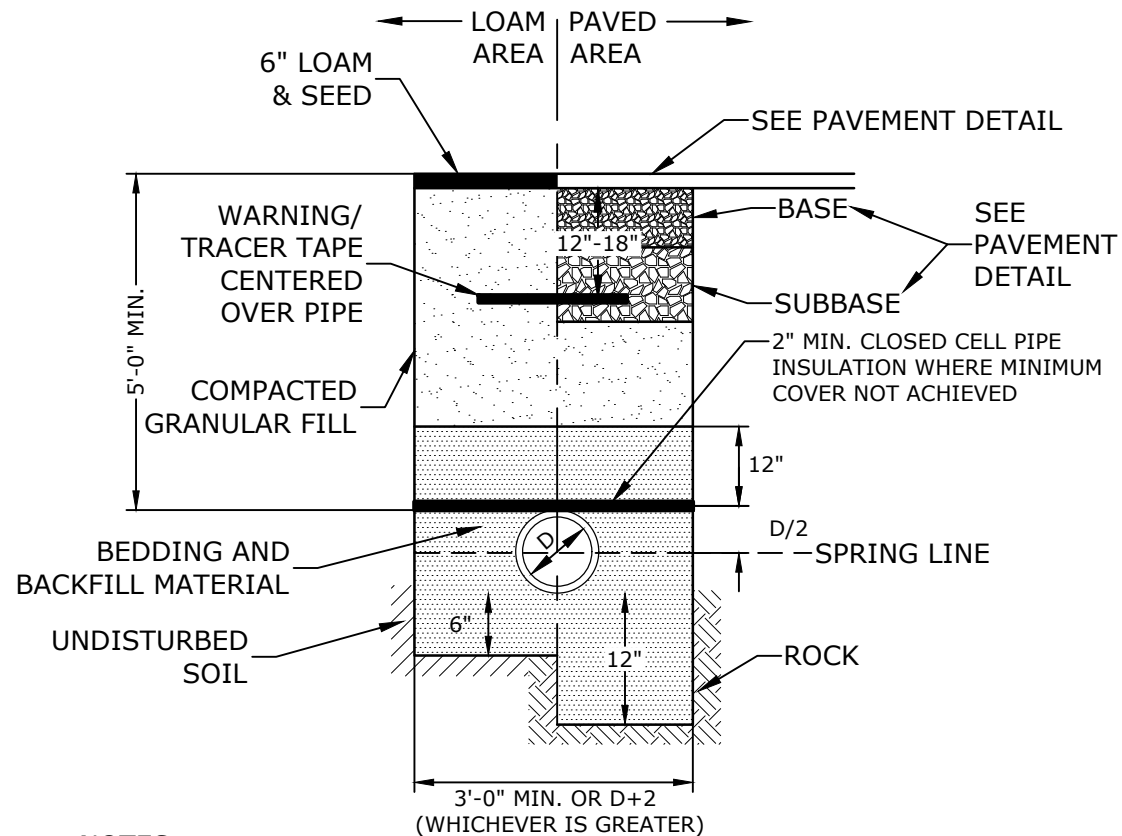
DOVER TYPICAL CROSSWALK STRIPING
NO SCALE



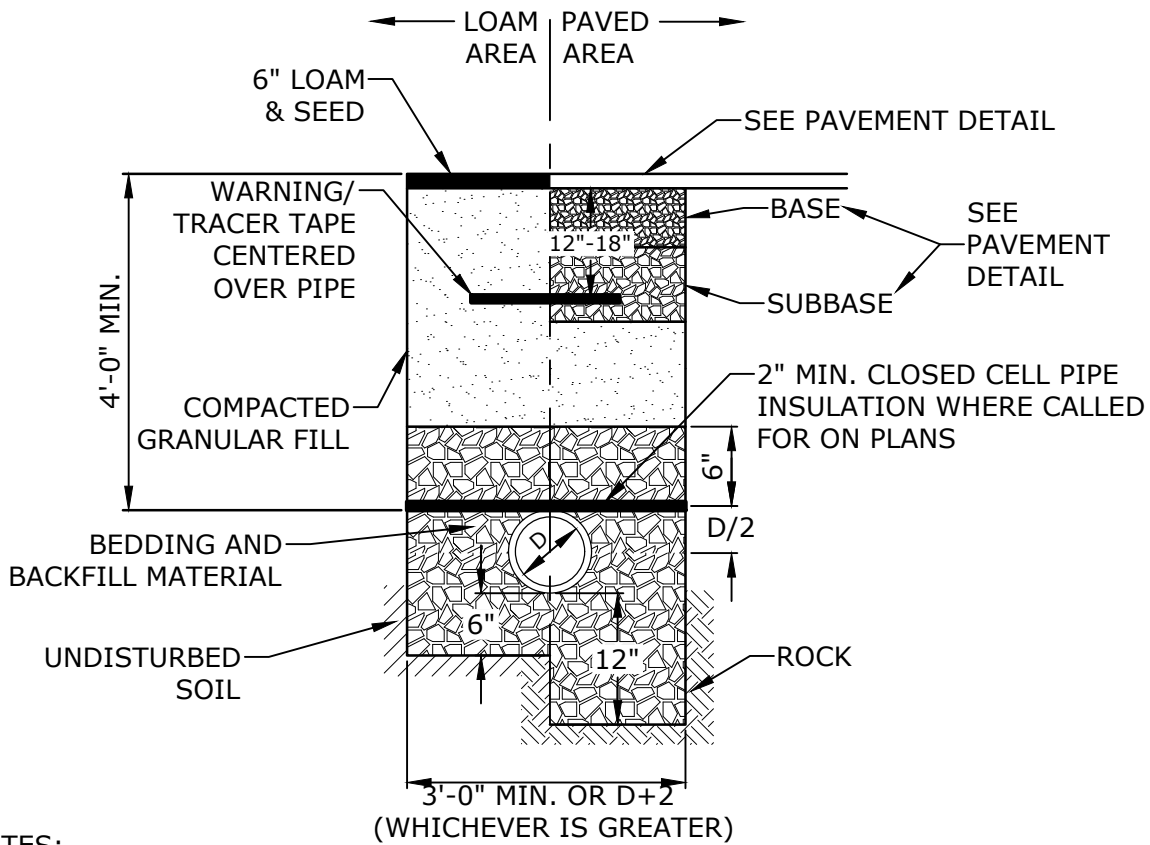
TYPICAL ELECTRICAL AND COMMUNICATION CONDUIT
NO SCALE



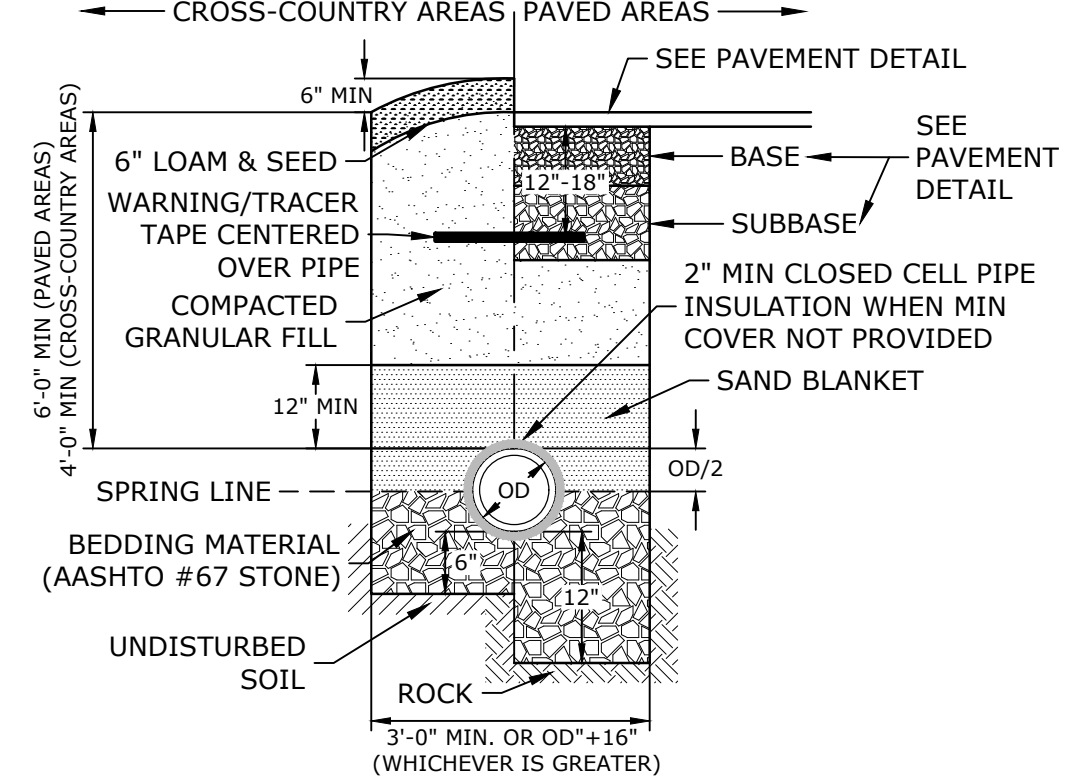
GAS TRENCH
NO SCALE



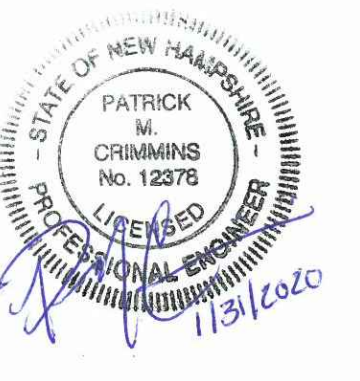
WATER TRENCH
NO SCALE



STORM DRAIN TRENCH
NO SCALE



SEWER TRENCH
NO SCALE



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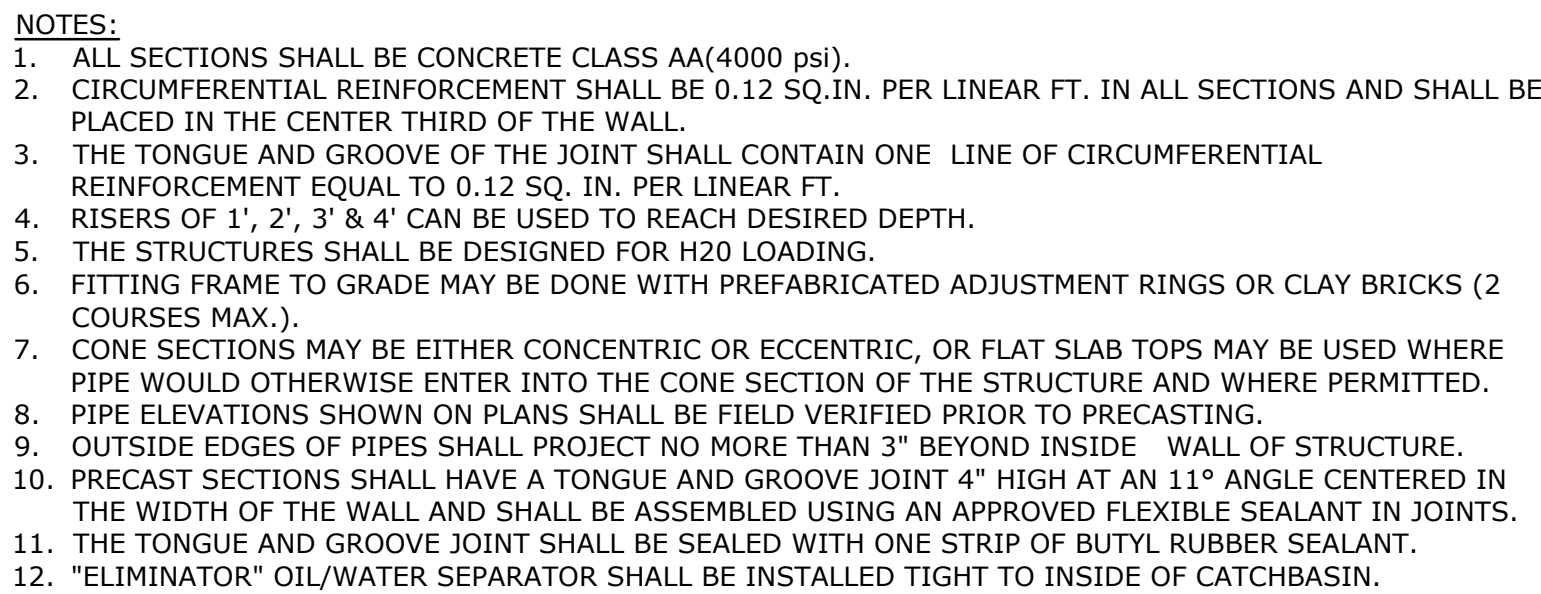
Dover, New Hampshire

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APPROVED: BLM		

DETAILS SHEET

SCALE: AS SHOWN

C-503



SECTION A-A

CONTRACTOR TO GROUT TO FINISHED GRADE
 GRADE RINGS/RISE
 MAINTENANCE ACCESS WALL
 INLET PIPE SEE GRADING PLAN
 SEPARATOR SKIRT
 6" MIN
 6" MIN
 8" ID
 3/4" CRUSHED STONE BASE
 31" MIN (HATCH)
 60" MIN (NO HATCH)
 3'-9" MIN
 VARIES
 CARTRIDGE DECK
 VARIES
 OUTLET PIPE GRADING PLAN
 FRAME AND COVER SHOWN (HATCH OPTION FLUSH WITH TOP OF STRUCTURE) RIM ELEV. = SEE GRADING PLAN

PLAN VIEW

DRAINDOWN CARTRIDGE
 MAINTENANCE ACCESS WALL
 CARTRIDGE DECK
 HI-FLO CARTRIDGE
 STEPS (LOCATION MAY VARY)
 52" MIN
 6" MIN
 FRAME AND COVER (DIAMETER VARIES)
 NO SCALE

DIAMETER	WALL THICKNESS (MIN.)	FLOOR THICKNESS (MIN.)
4"	5"	6"
5"	6"	8"
6"	7"	8"
8"	9"	10"

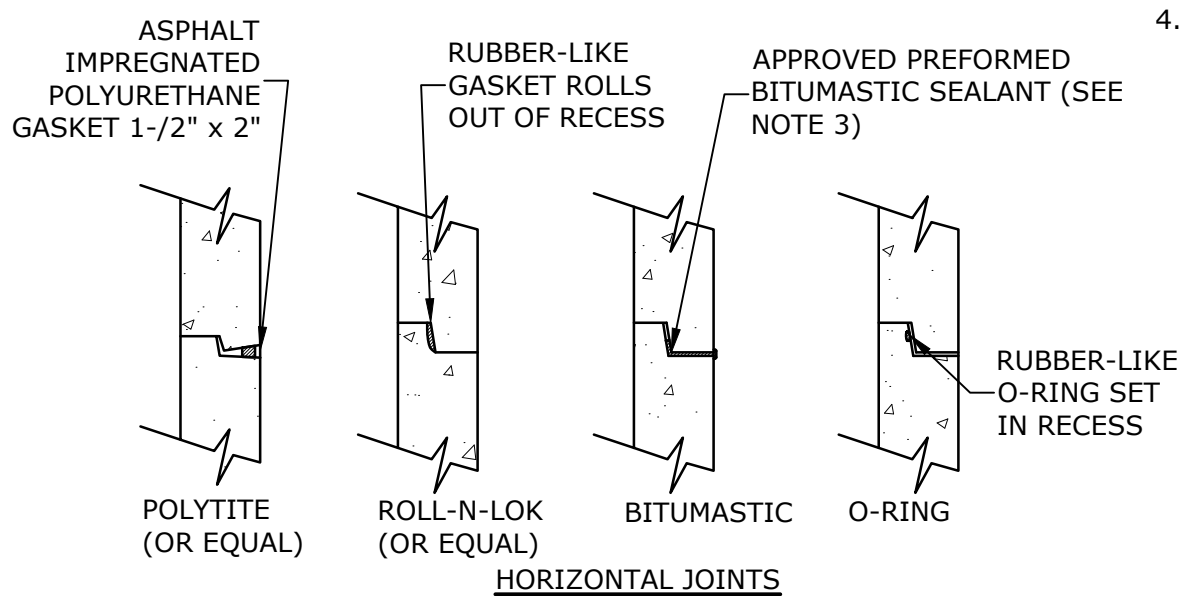
GENERAL NOTES:

1. TREATMENT UNIT SHALL BE CONTECH JELLYFISH FILTER UNIT OR EQUAL.
2. CONTRACTOR TO PROVIDE FINAL DIMENSIONS BASED ON APPROVED FLOWS AND ALL MATERIALS UNLESS NOTED OTHERWISE.
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 LOADING REQUIREMENTS. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

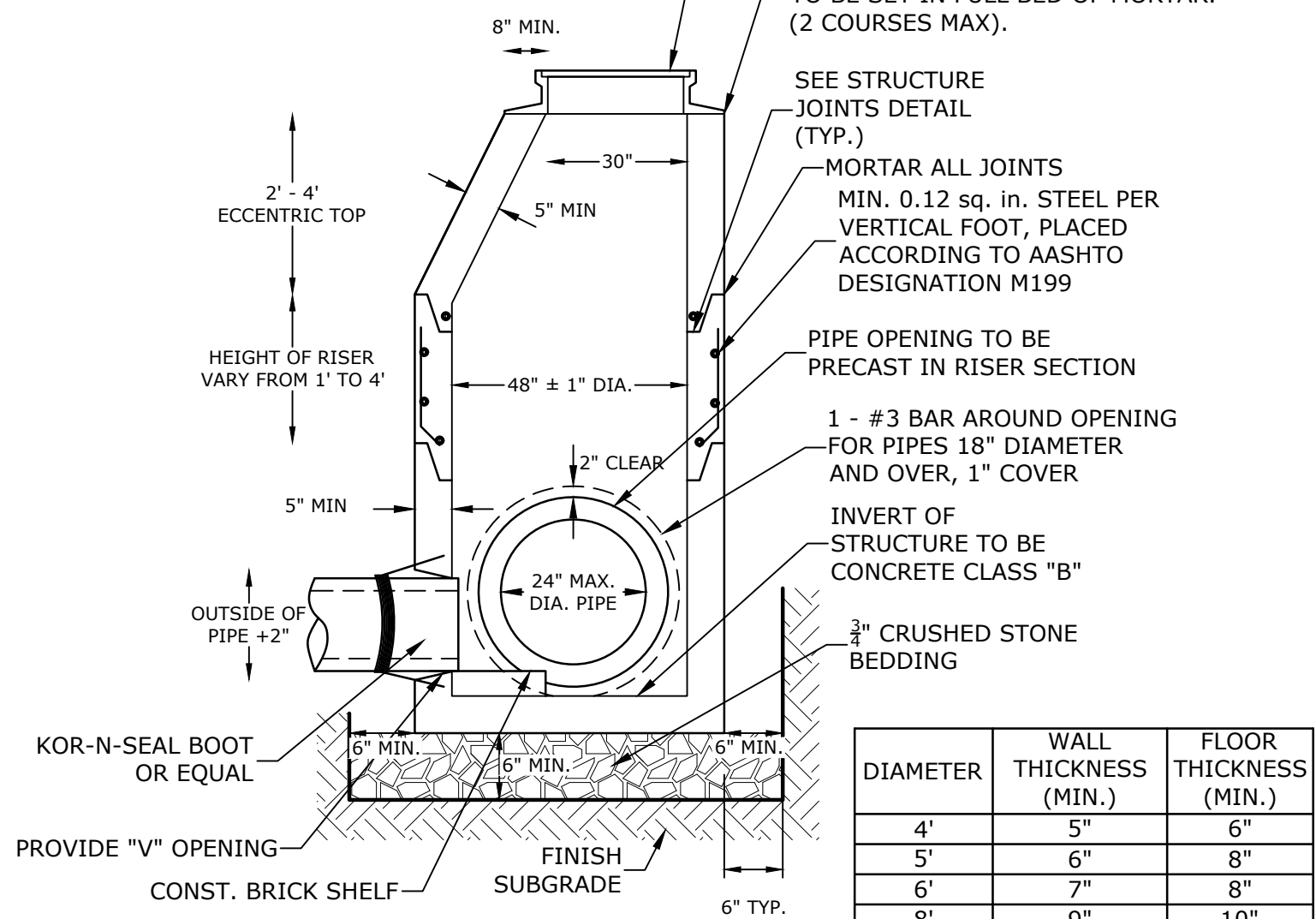
INSTALLATION NOTES

- A. CONTRACTOR SHALL PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED).
- B. CONTRACTOR SHALL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
- C. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
- D. CONTRACTOR SHALL POST NOTIFICATION BY CONTECH. SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS.

CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (866) 740-3318.

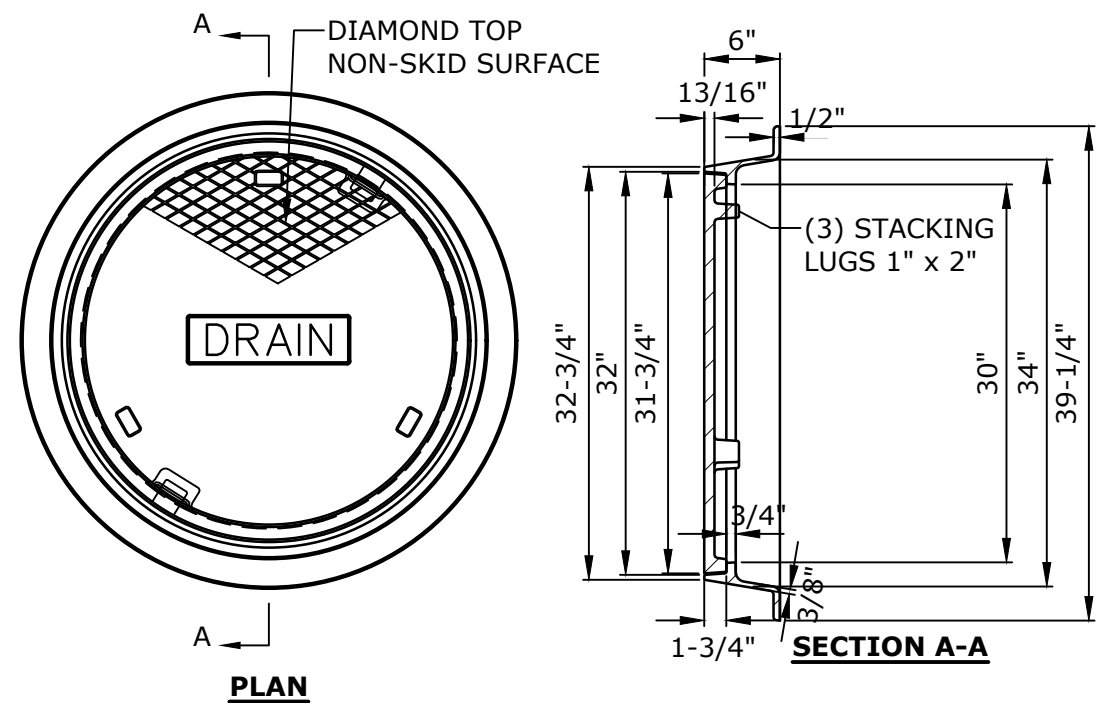


CORE HOLE SIZE				
PIPE SIZE	RCP CORE HOLE DIA.		PLASTIC CORE HOLE DIA.	
INCHES	INCHES	FEET	INCHES	FEET
12	18	1.5	18	1.5
18	26	2.2	24	2.0
24	34	2.8	32	2.7



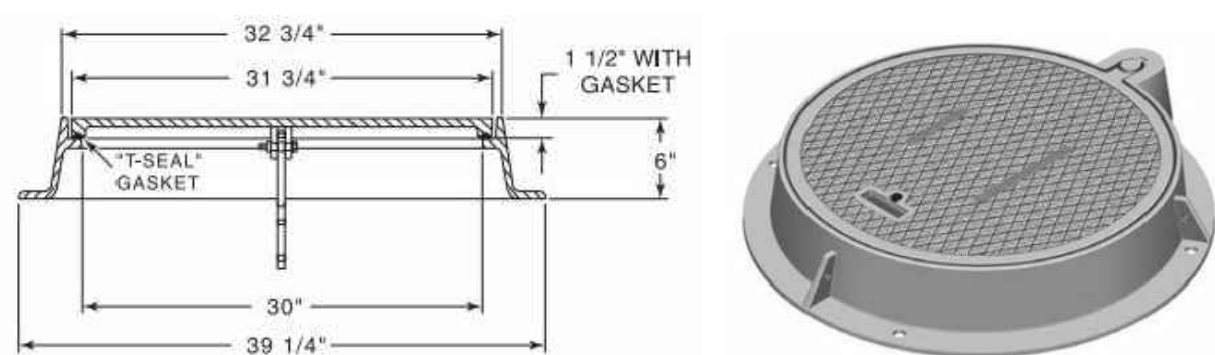
NOTES:

1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE.
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE AND THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H2O LOADING.
5. CONSTRUCT CRUSHED STONE BEDDING AND BACKFILL UNDER (6" MINIMUM THICKNESS)
6. THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
7. PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
8. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
9. PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
10. ALL STRUCTURES WITH MULTIPLE PIPES SHALL HAVE A MINIMUM OF 12" OF INSIDE SURFACE BETWEEN HOLES, NO MORE THAN 75% OF A HORIZONTAL CROSS SECTION SHALL BE HOLES, AND THERE SHALL BE NO HOLES CLOSER THAN 3" TO JOINTS.

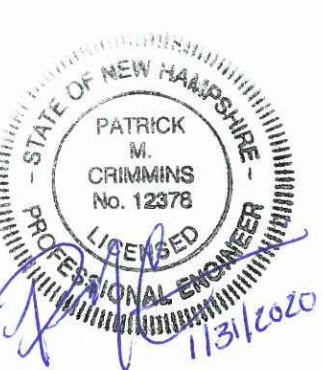
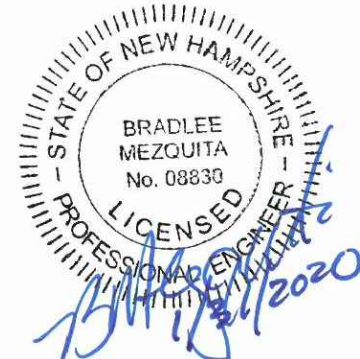


NOTES:

1. ALL DIMENSIONS ARE NOMINAL.
2. FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED PROVIDED:
 - A. THE FRAMES MEET OR EXCEED THE SPECIFIED LOAD RATING.
- 2.B. THE INTERIOR PERIMETER (SEAT AREA) DIMENSIONS OF THE FRAMES REMAIN THE SAME TO ALLOW CONTINUED USE OF EXISTING GRATES/COVERS AS THE EXISTING FRAMES ALLOW, WITHOUT SHIMS OR OTHER MODIFICATIONS OR ACCOMMODATIONS.
3. ALL OTHER PERTINENT REQUIREMENTS OF THE SPECIFICATIONS ARE MET.
3. LABEL TYPE OF MANHOLE WITH 3" HIGH LETTERS IN THE CENTER OF THE COVER.

[illegible]

Tighe & Bond
Engineers | Environmental Specialists



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City of Dover

Dover File #: P20-

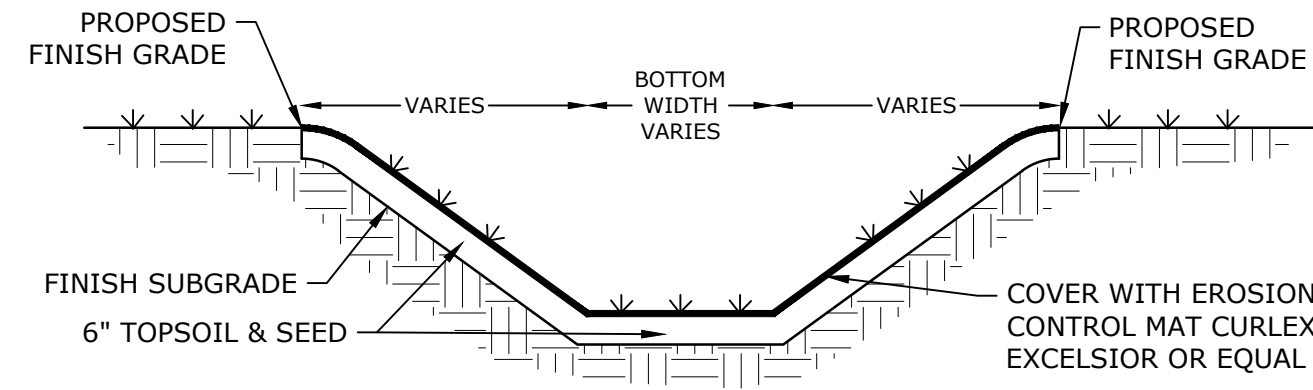
Dover, New Hampshire

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DRAWN BY:		CML/BKC
CHECKED:		PMC
APPROVED:		BLM

DETAILS SHEET

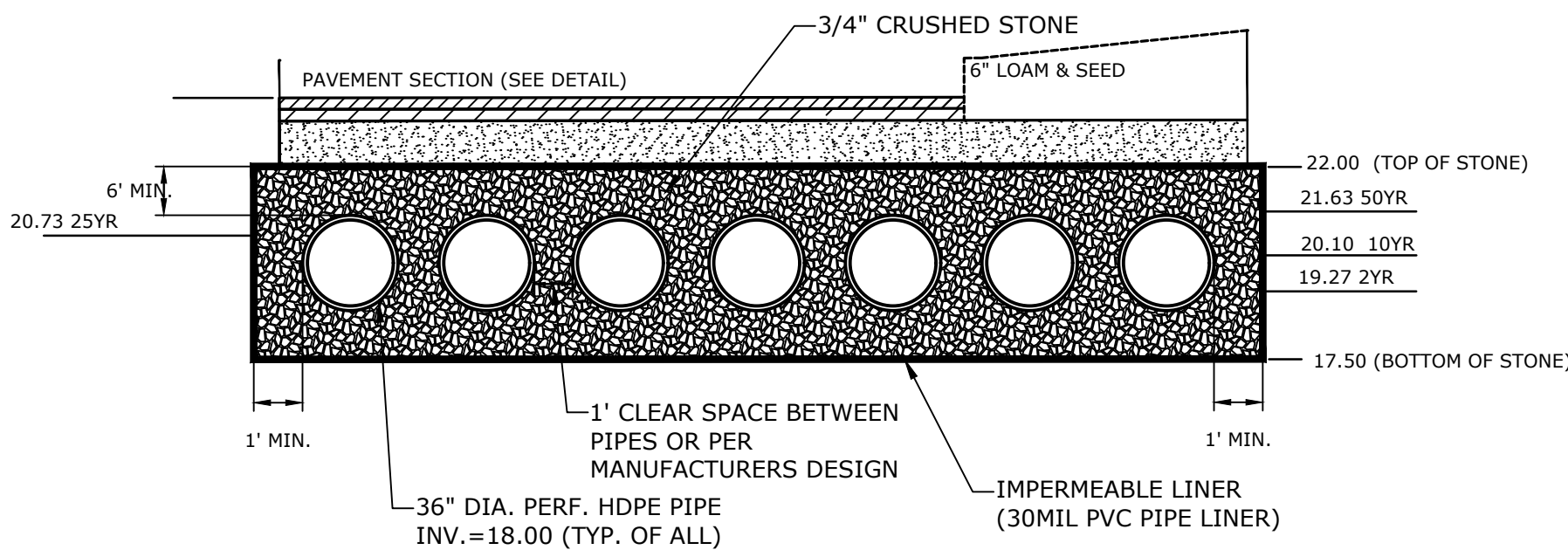
SCALE: AS SHOWN

C-504



- NOTES:**
1. THE FOUNDATION AREA OF THE WATERWAY SHALL BE CLEARED AND GRUBBED OF ALL TREES, BRUSH, STUMPS, AND OTHER OBJECTIONABLE MATERIAL. MATERIALS REMOVED SHALL BE DISPOSED OF SO THEY WILL NOT INTERFERE WITH THE CONSTRUCTION OR PROPER FUNCTIONING OF THE WATERWAY.
 2. THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE AND CROSS-SECTION AS REQUIRED TO MEET THE DESIGN CRITERIA. THE WATERWAY SHALL BE FREE OF IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
 3. EARTH FILLS REQUIRED TO MEET SUBGRADE REQUIREMENTS BECAUSE OF OVER EXCAVATION OR TOPOGRAPHY SHALL BE COMPACTED TO THE SAME DENSITY AS THE SURROUNDING SOIL TO PREVENT UNEQUAL SETTLEMENT THAT COULD CAUSE DAMAGE TO THE COMPLETED WATERWAY. EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE WATERWAY.
 4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER AS TO MINIMIZE EROSION AND AIR AND WATER POLLUTION. ALL APPROPRIATE STATE AND LOCAL LAWS AND REGULATIONS SHALL BE COMPLIED WITH FOR INSTALLATION.
 5. VEGETATION SHALL BE ESTABLISHED IN THE SWALE PRIOR TO ALLOWING STORMWATER RUNOFF TO FLOW THROUGH THE SWALE.
 6. MAINTENANCE OF THE VEGETATION IN THE GRASSED WATERWAY IS EXTREMELY IMPORTANT IN ORDER TO PREVENT RILLING, EROSION, AND FAILURE OF THE WATERWAY. MOWING SHOULD BE DONE FREQUENTLY ENOUGH TO CONTROL ENCROACHMENT OF WEEDS AND WOODY VEGETATION AND TO KEEP THE GRASSES IN A VIGOROUS CONDITION. THE VEGETATION SHOULD NOT BE MOWED TOO CLOSELY SO AS TO REDUCE THE EROSION RESISTANCE IN THE WATERWAY.
 7. THE WATERWAY SHOULD BE INSPECTED PERIODICALLY AND AFTER EVERY MAJOR STORM TO DETERMINE THE CONDITION OF THE WATERWAY. RILLS AND DAMAGED AREAS SHOULD BE PROMPTLY REPAIRED AND REVEGETATED AS NECESSARY TO PREVENT FURTHER DETERIORATION.
 8. PERIODIC APPLICATIONS OF LIME AND FERTILIZER MAY BE NEEDED TO MAINTAIN VIGOROUS GROWTH.

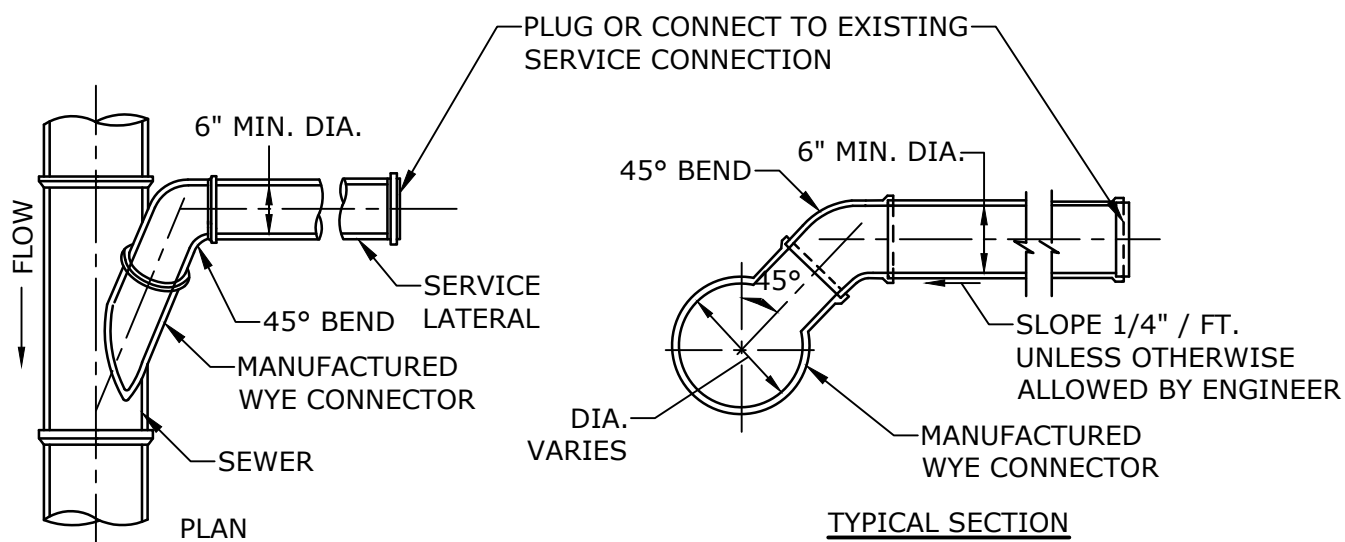
GRASS-LINED SWALE
NO SCALE



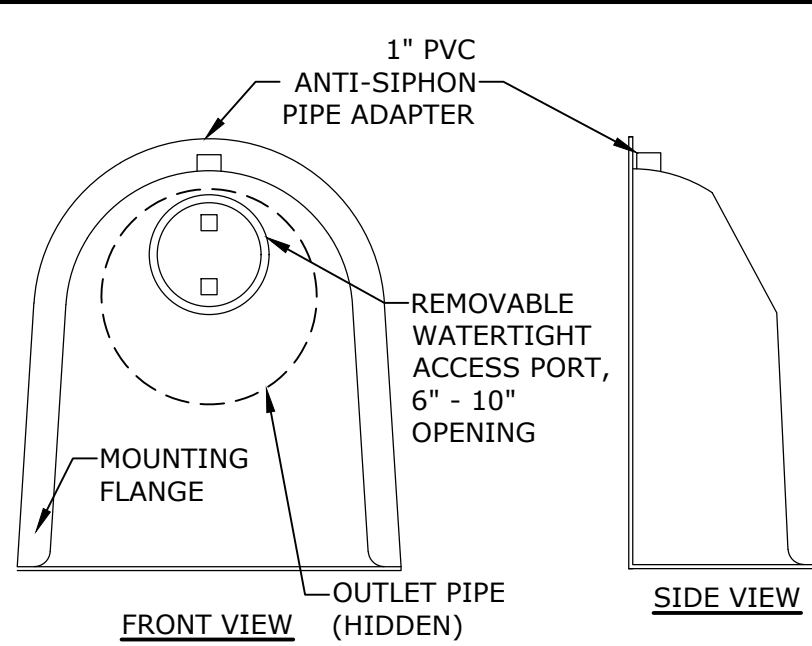
- NOTES:**
1. UNDERGROUND DETENTION SYSTEM TO BE ALUMINIZED 16 GAGE STEEL PIPE DESIGNED FOR H-20 LOADING. CONTRACTOR TO SUBMIT PIPE SPECIFICATIONS AND FINAL MANUFACTURES DESIGN TO ENGINEER FOR REVIEW AND APPROVAL.
 2. MANUFACTURER TO SUBMIT PLANS STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE.
 3. THE DESIGN ENGINEER SHALL PROVIDE SUFFICIENT INSPECTION TO CERTIFY THAT THE SYSTEM HAS BEEN INSTALLED PER THE PROPOSED DESIGN PLAN.
 4. DESIGN SHALL REQUIRE INSPECTION PORTS/COVERS SUCH THAT SYSTEM CAN BE CLEANED BY VACUUM TRUCK. MIN. ONE EACH CORNER.

TOTAL SYSTEMI 31 - 36" PIPES
620 LINEAR FEET OF PIPE

UNDERGROUND DETENTION BASIN
NO SCALE



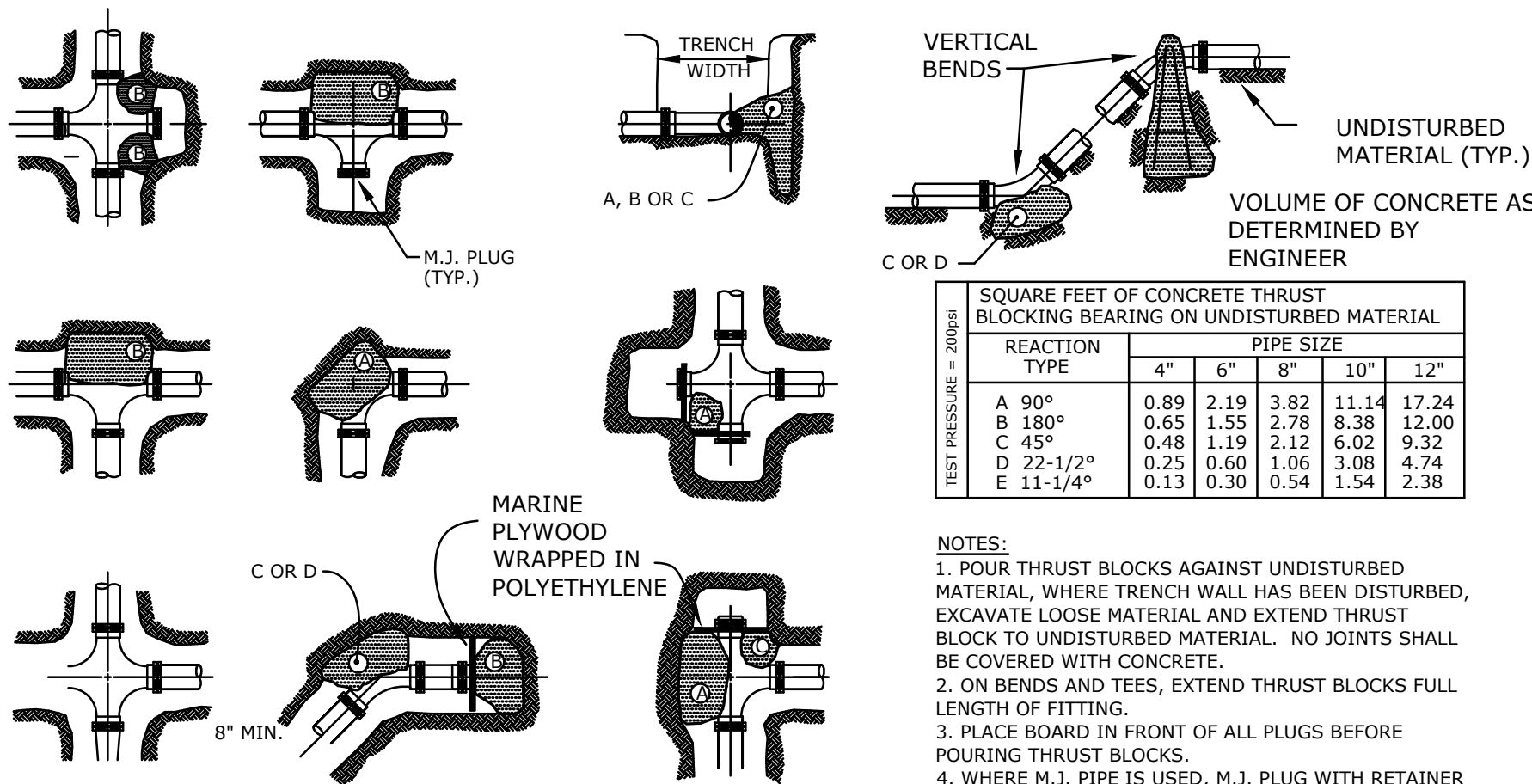
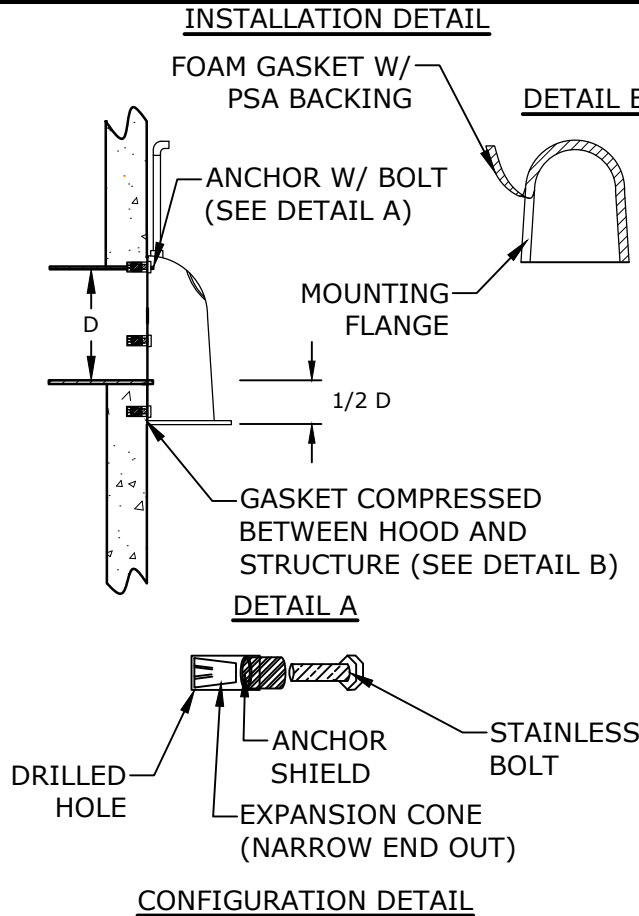
STANDARD SERVICE LATERAL CONNECTION
NO SCALE



PIPE SIZE (I.D.)	SNOUT MODEL REQ'D
12"	18R

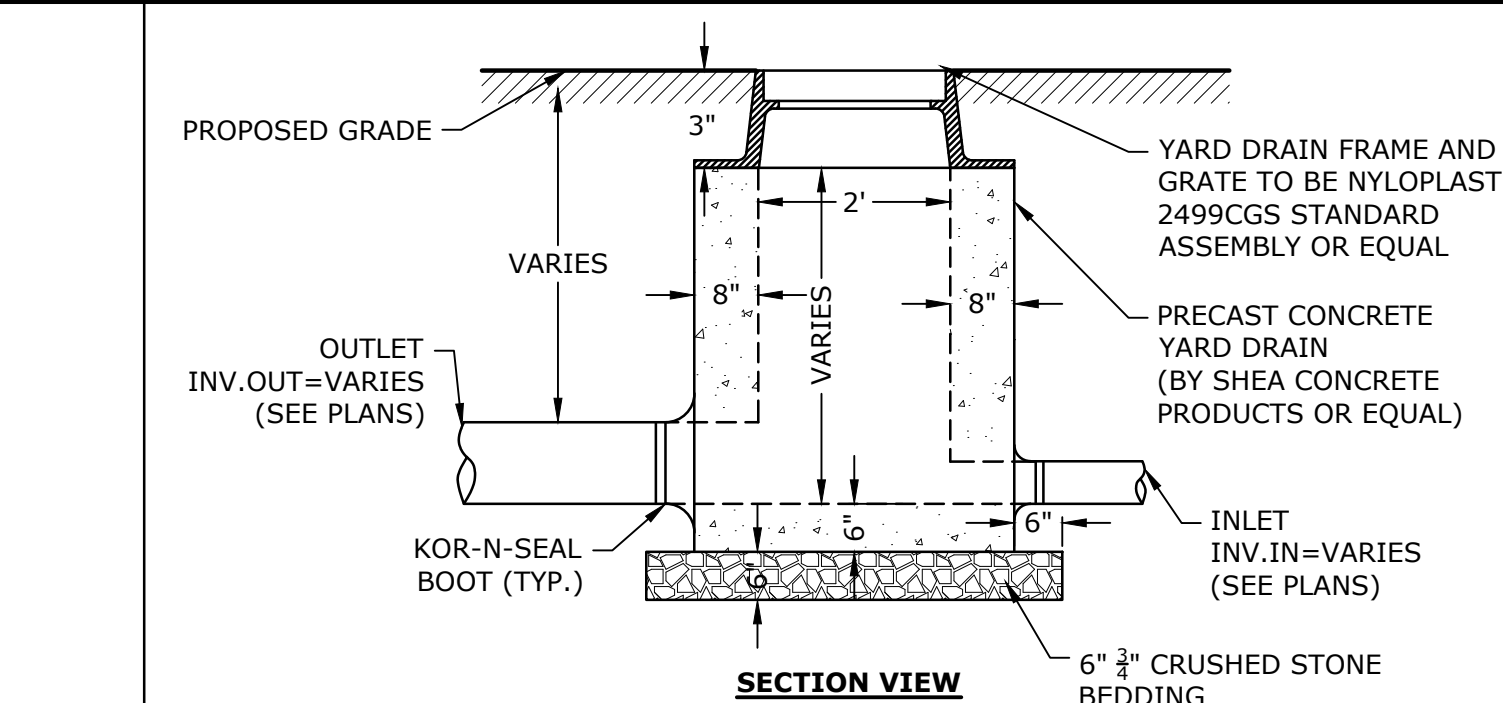
R=CIRCULAR STRUCTURE

SNOUT OIL-WATER-DEBRIS SEPARATOR
NO SCALE



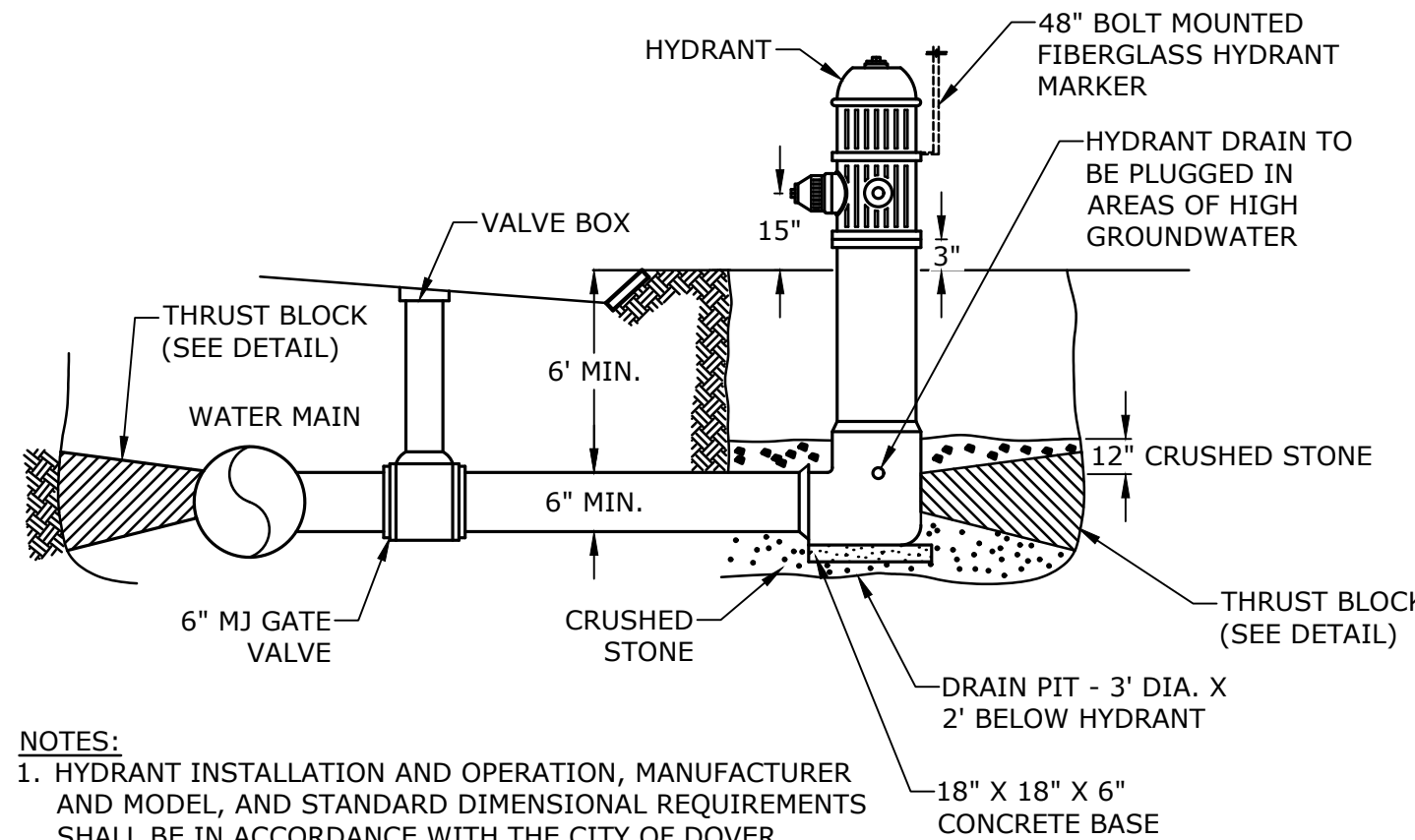
- NOTES:**
1. POUR THRUST BLOCKS AGAINST UNDISTURBED MATERIAL, WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL. NO JOINTS SHALL BE COVERED WITH CONCRETE.
 2. ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH OF FITTING.
 3. PLACE BOARD IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS.
 4. WHERE M.J. PIPE IS USED, M.J. PLUG WITH RETAINER GLAND MAY BE SUBSTITUTED FOR END BLOCKINGS.
 5. INSTALLATION AND STANDARD DIMENSIONAL REQUIREMENTS SHALL BE PER COMMUNITY SERVICES DEPARTMENT.

THRUST BLOCK DETAIL
NO SCALE



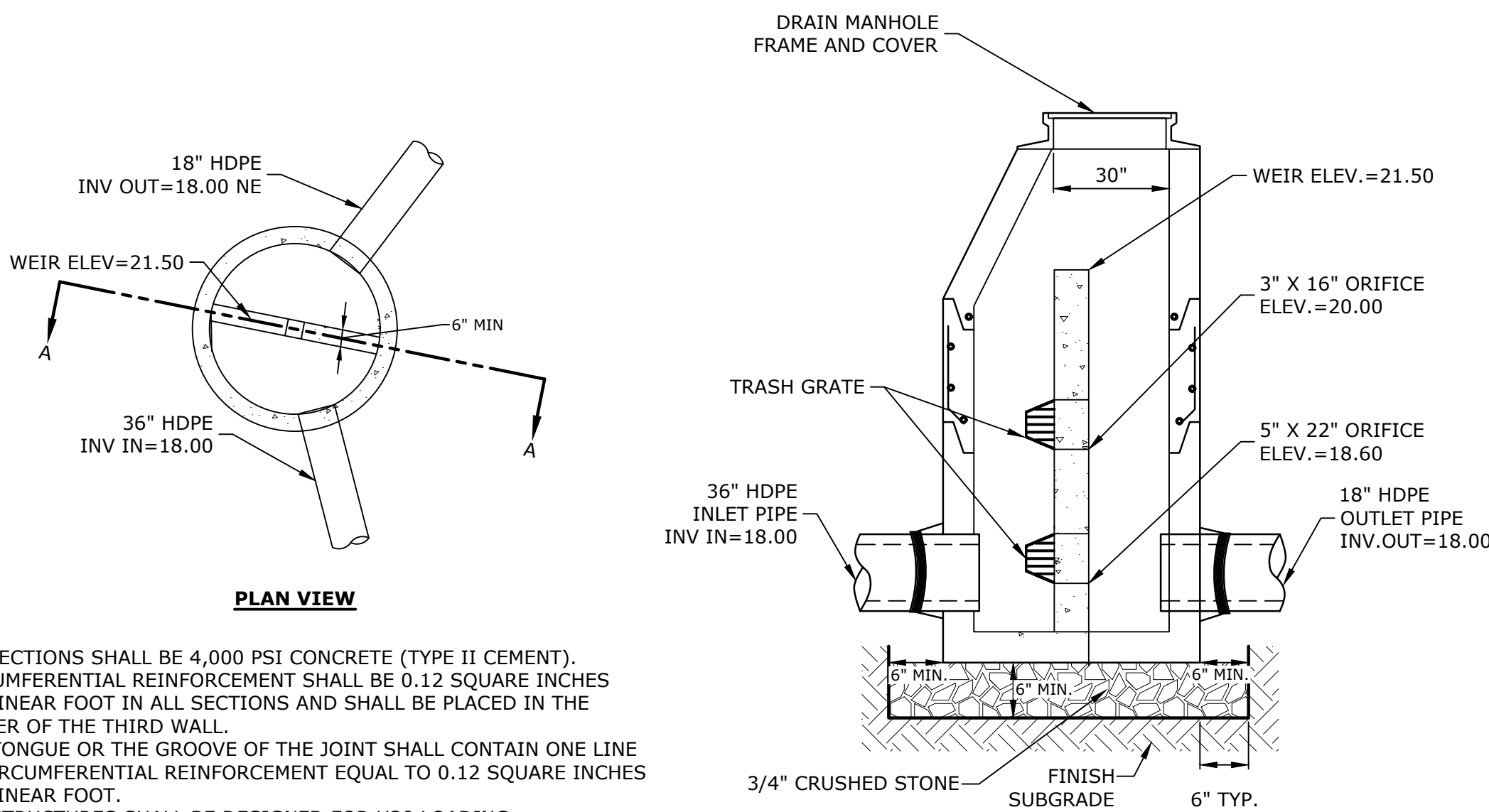
- NOTES:**
1. CONCRETE SHALL BE 4,000 PSI (TYPE II CEMENT)
 2. SEE SITE, GRADING, DRAINAGE, & EROSION CONTROL PLAN FOR LOCATIONS.
 3. THE STRUCTURES SHALL BE DESIGNED FOR H2O LOADING.
 4. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

YARD DRAIN
NO SCALE



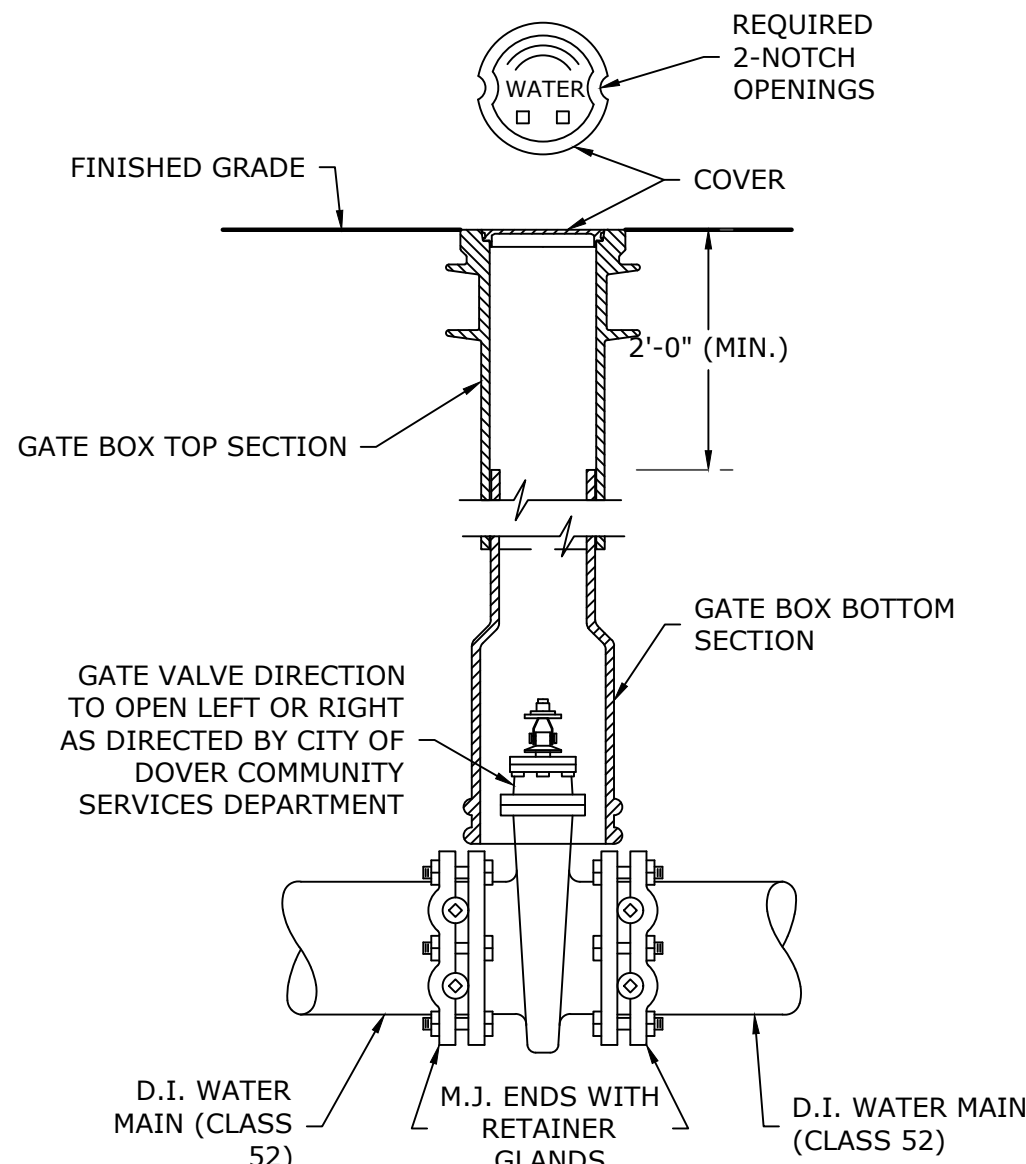
- NOTES:**
1. HYDRANT INSTALLATION AND OPERATION, MANUFACTURER AND MODEL, AND STANDARD DIMENSIONAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE CITY OF DOVER COMMUNITY SERVICES DEPARTMENT AND THE CITY OF DOVER FIRE DEPARTMENT.

FIRE HYDRANT
NO SCALE



- NOTES:**
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
 2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRD WALL.
 3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
 4. THE STRUCTURES SHALL BE DESIGNED FOR H2O LOADING.
 5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

POS-01
NO SCALE



WATER GATE VALVE
NO SCALE

Tighe&Bond
Engineers | Environmental Specialists



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c/o Cathartes

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Dover File #: P20-

Dover, New Hampshire

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DETAILS SHEET

SCALE: AS SHOWN

C-505

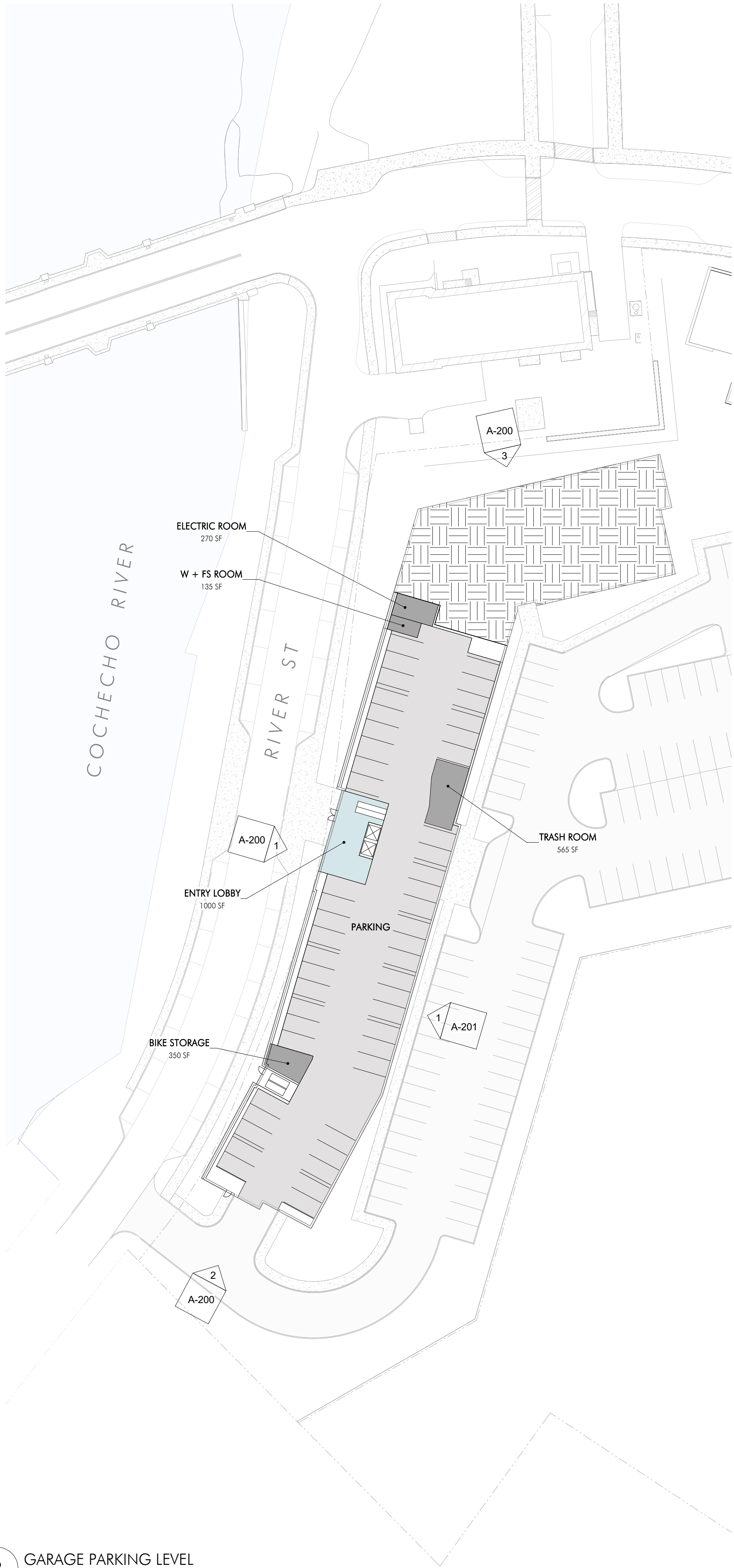
COACHEO WATERFRONT
COACHEO WATERFRONT DEVELOPMENT - PHASE 1
RIVER STREET DOVER, NH
PERMIT DRAWINGS

REVISIONS		
MARK	ISSUE	DATE

DRAWING INFORMATION	
ISSUE:	PERMIT DRAWINGS
DATE:	8/23/2019
PROJECT #:	19011
SCALE:	1" = 40'-0"

DRAWING TITLE
PARKING AND
GROUND LEVEL
PLANS
DRAWING NUMBER

A-001



GENERAL NOTE:
REFER TO CIVIL AND LANDSCAPE
DRAWINGS FOR SITE INFORMATION

COCHECHO WATERFRONT
COCHECHO WATERFRONT DEVELOPMENT - PHASE 1
RIVER STREET DOVER, NH
PERMIT DRAWINGS

REVISIONS		
MARK	ISSUE	DATE

DRAWING INFORMATION	
ISSUE:	PERMIT DRAWINGS
DATE:	8/23/2019
PROJECT #:	19011
SCALE:	As indicated

DRAWING TITLE
**TYPICAL UPPER
FLOOR PLANS**

DRAWING NUMBER
A-002
copyright: EMBARC STUDIO, LLC

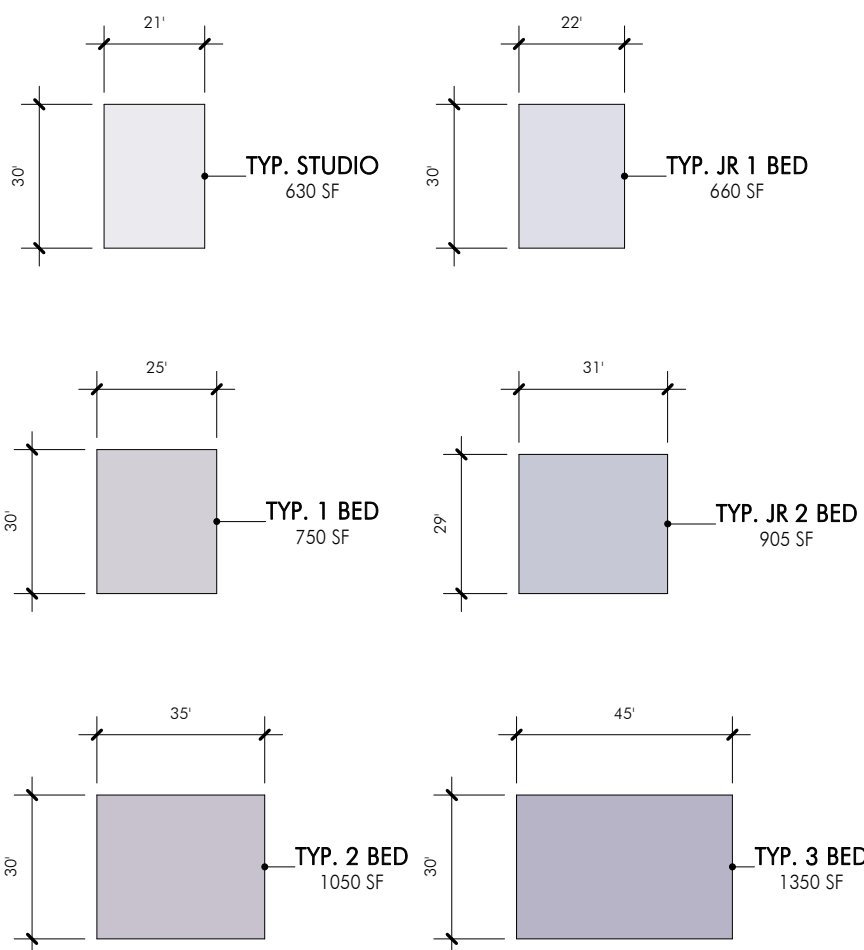


BUILDING B
FLOORS 2 - 5



BUILDING A
FLOORS 2 - 4

TYPICAL UNIT MODULES



PROJECT METRICS - BUILDING A

BUILDING GSF	GROSS	NRSF
GROUND FLOOR	30,670	21,350
SECOND FLOOR	30,670	27,025
THIRD FLOOR	30,670	27,025
FOURTH FLOOR	28,400	24,000
TOTAL BUILDING	120,410	99,400

TOTAL EFFICIENCY 83%

UNDER-BUILDING PARKING LEVEL SF 20,020
TOTAL GROSS SF W/ PARKING 140,430

PROJECT METRICS - BUILDING B

BUILDING GSF	GROSS	NRSF
GROUND FLOOR	16,670	12,960
SECOND FLOOR	15,890	13,720
THIRD FLOOR	15,890	13,720
FOURTH FLOOR	15,890	13,720
TOTAL BUILDING	64,340	54,120

TOTAL EFFICIENCY 84%

UNIT BREAKDOWN:	COUNT	AVERAGE SIZE	PERCENTAGE
STUDIO	15	630	13.6%
JR 1 BD	3	660	2.7%
1 BD	36	750	32.7%
JR 2 BD	10	905	9.1%
2 BD	43	1,050	39.1%
3 BD	3	1,340	2.7%
TOTAL UNITS	110	879	100%

TOTAL SITE PARKING

GARAGE SPACES: 50
SURFACE SPACES: 190
TOTAL SPACES: 240
TOTAL UNITS: 165 1.45 SPACES/UNIT

PENDING UPDATED CIVIL PLAN.
MIN. PARKING RATIO TO BE 1.0 SPACES/ UNIT

UNIT BREAKDOWN:	COUNT	AVERAGE SIZE	PERCENTAGE
STUDIO	0	630	0.0%
JR 1 BD	3	660	5.5%
1 BD	27	750	49.1%
JR 2 BD	4	905	7.3%
2 BD	18	1,050	32.7%
3 BD	3	1,350	5.5%
TOTAL UNITS	55	887	100%

165 UNITS TOTAL

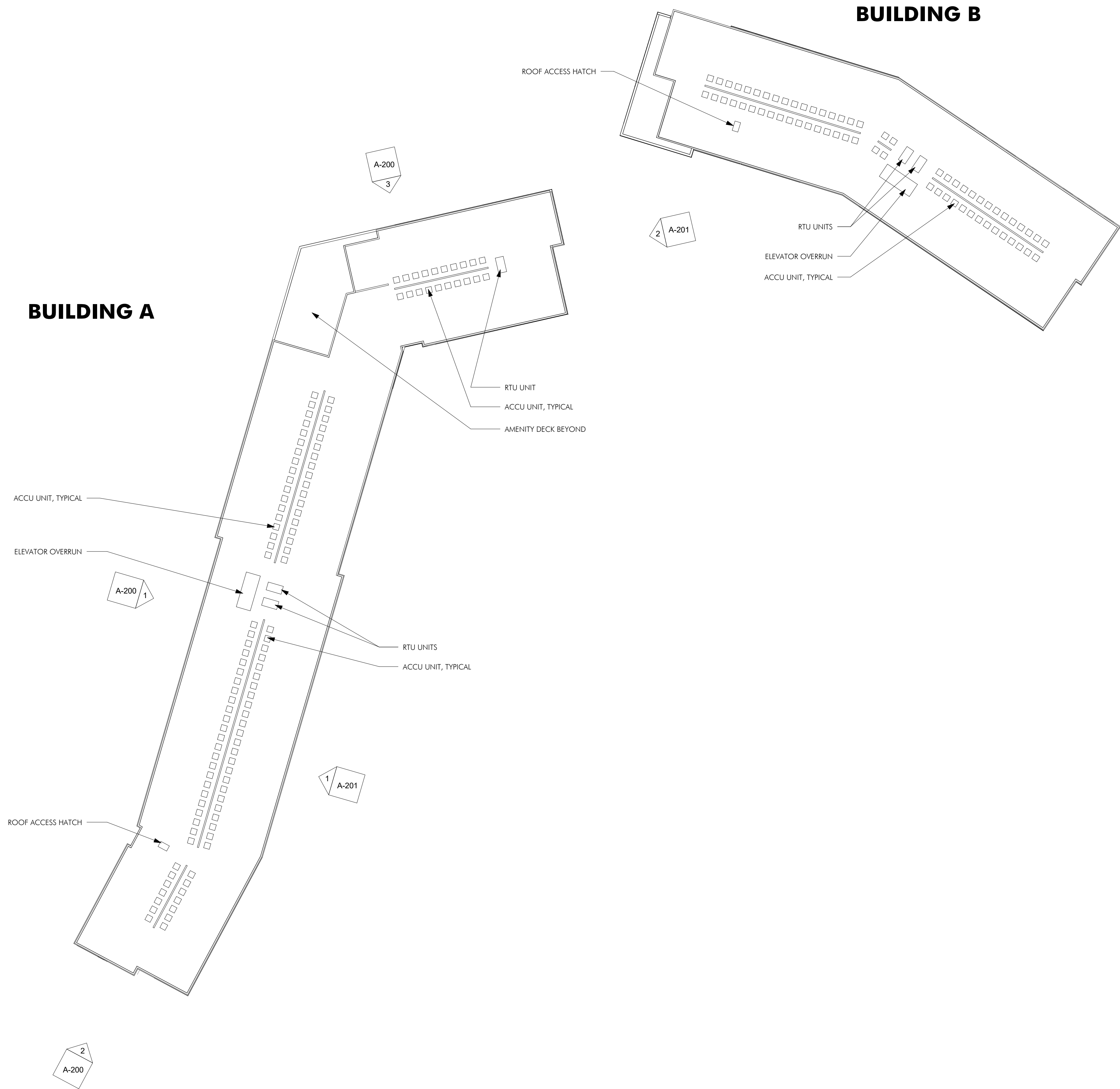
MARK	ISSUE	DATE
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ISSUE: PERMIT DRAWINGS
DATE: 8/23/2019
PROJECT #: 19011
SCALE: 1" = 30'-0"

ROOF PLAN

A-005



COCHECHO WATERFRONT
COCHECHO WATERFRONT DEVELOPMENT - PHASE 1
RIVER STREET DOVER, NH
PERMIT DRAWINGS

REVISIONS		
MARK	ISSUE	DATE

DRAWING INFORMATION	
ISSUE:	PERMIT DRAWINGS
DATE:	8/23/2019
PROJECT #:	19011
SCALE:	1/16" = 1'-0"

DRAWING TITLE
BUILDING
ELEVATIONS

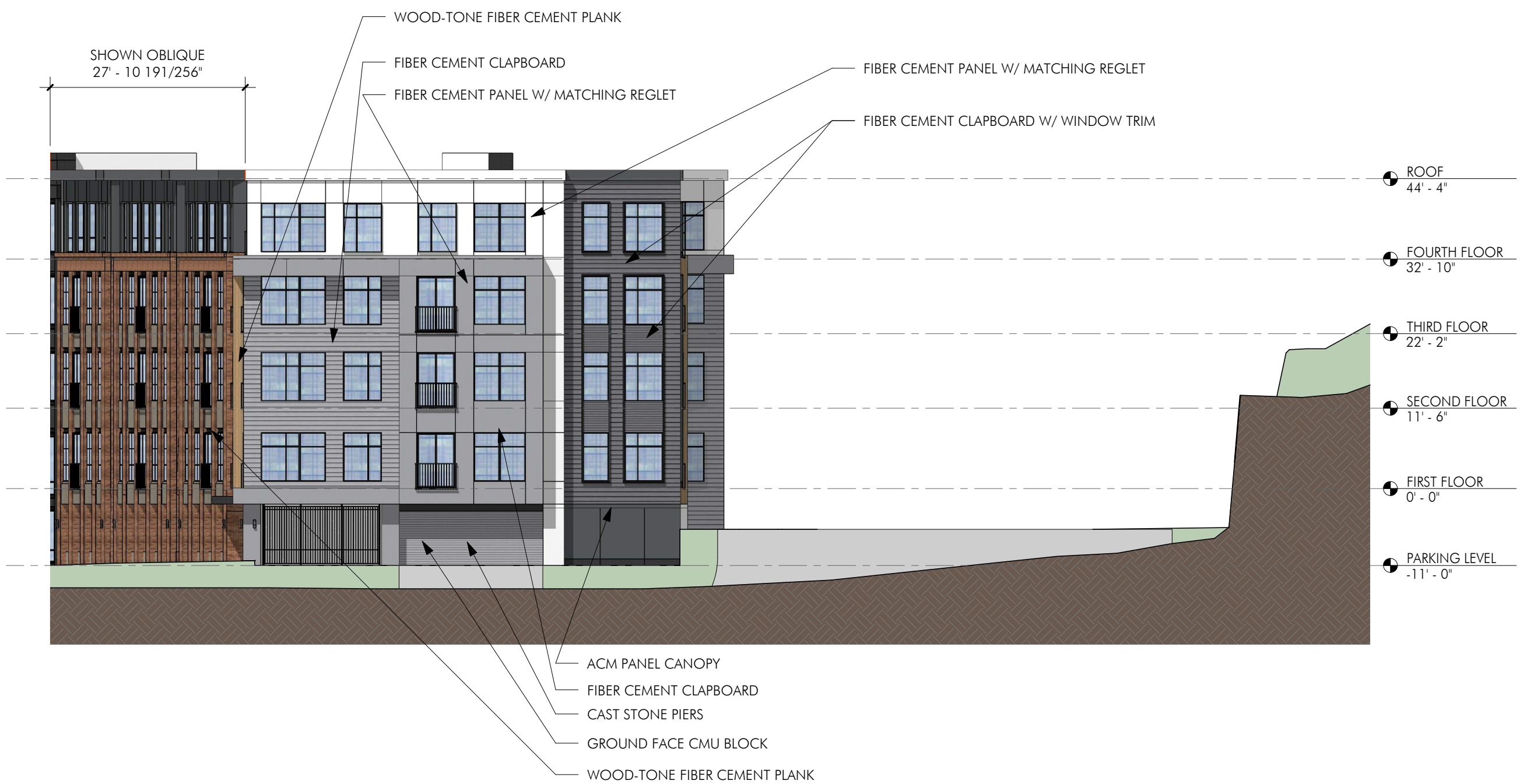
DRAWING NUMBER
A-200
copyright: EMBARC STUDIO, LLC



1 WEST ELEVATION - RIVER STREET - FRONT
1/16" = 1'-0"



3 NORTH ELEVATION - RIVER STREET ADJACENT PUMP HOUSE
1/16" = 1'-0"



2 SOUTH ELEVATION
1/16" = 1'-0"



1 EAST ELEVATION - REAR
1/16" = 1'-0"



2 EAST ELEVATION
1/16" = 1'-0"

ARCHITECT
EMBARC
60 K STREET, 3RD FLOOR
BOSTON, MA 02127
O: 617.766.8330
www.embarcstudio.com

OWNER
CATHARTES
100 SUMMER STREET

CONSULTANTS
CIVIL ENGINEER
TIGHE & BOND
177 CORPORATE DR., PORTSMOUTH NH

LANDSCAPE ARCHITECT
WOODBURN & COMPANY
103 KENT PLACE, NEWMARKET NH

COCHECHO WATERFRONT
COCHECHO WATERFRONT DEVELOPMENT - PHASE 1
RIVER STREET DOVER, NH
PERMIT DRAWINGS

REVISIONS		
MARK	ISSUE	DATE

DRAWING INFORMATION
ISSUE: PERMIT DRAWINGS
DATE: 8/23/2019
PROJECT #: 19011
SCALE: 1/16" = 1'-0"

DRAWING TITLE
**BUILDING
ELEVATIONS**

DRAWING NUMBER
A-201

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CONCEPT RENDERING FROM WASHINGTON STREET

ARCHITECT

EMBARC

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O: 617.766.8330
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OWNER

CATHARTES
100 SUMMER STREET

CONSULTANTS

CIVIL ENGINEER

TIGHE & BOND
177 CORPORATE DR., PORTSMOUTH NH

LANDSCAPE ARCHITECT

WOODBURN & COMPANY
103 KENT PLACE, NEWMARKET NH

COCHECHO WATERFRONT

COCHECHO WATERFRONT DEVELOPMENT - PHASE 1

RIVER STREET DOVER, NH

PERMIT DRAWINGS

REVISIONS

MARK	ISSUE	DATE

DRAWING INFORMATION

ISSUE: PERMIT DRAWINGS

DATE: 8/23/2019

PROJECT #: 19011

SCALE:

DRAWING TITLE

CONCEPT
RENDERING

DRAWING NUMBER

A-800

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