

L-0700-021
June 21, 2021

Ms. Juliet Walker, Planning Director
City of Portsmouth Planning Department
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: **Site Review Permit & Lot Line Revision Applications
Lonza Biologics, Lynx Project– Proposed Parking Expansion & Generator**

Dear Juliet:

On behalf of Lonza Biologics, we are pleased to submit the following information to support a request to the Planning Board for a recommendation for approval to the Pease Development Authority (PDA) for Site Plan Review for a proposed parking expansion, generator pad, and lot line revision at Lonza's existing facility that is located at 101 International Drive:

- One (1) copy of the PDA Application for Site Review, dated June 21, 2021;
- One (1) copy of the PDA Application for Subdivision, dated June 21, 2021;
- One (1) copy of the Owner Authorization, dated June 17, 2021;
- One (1) full size & one (1) half size copy of the Site Plan Set, dated June 21, 2021;
- One (1) copy of the Drainage Analysis, dated June 21, 2021;
- One (1) copy of the Operations and Maintenance Plan, dated June 21, 2021;
- One (1) copy of the Light Fixture & Pole Cut Sheets;
- One (1) application fee calculation form for the Site Review & Lot Line Revision;
- One (1) Site Review Application Fee check in the amount of \$4,420.00;
- One (1) Lot Line Revision Application Fee check in the amount of \$250.00

The proposed project is located at 55 and 101 International Drive which is identified as Map 305 Lots 6 and 7 on the City of Portsmouth Tax Maps. The proposed project is to expand Lonza Biologics parking to support its growing product development services to the pharmaceutical and biologic industries. The project will include a Lot Line Revision between 55 International Drive, which includes the Pease Development Authority Offices, and 101 International Drive, Lonza's existing facilities, adding 2.66 acres to Map 305 Lot 6 to create a 46-acre parcel for Lonza's campus.

The proposed project includes the construction of a new 200 space parking lot adjacent to the existing parking garage. This additional parking is necessary to support Lonza's continued fit up of their existing 101C facility. The proposed parking lot would be accessed via the 22-space parking lot that has been previously approved by the PDA and the Portsmouth Planning Board. The proposed parking lot will have a single exit point onto Goose Bay Drive. The project will consist of associated site improvements such as lighting, landscaping, retaining wall and stormwater management that will include underground detention, and stormwater treatment via a proprietary filtration unit. The proposed project is providing stormwater treatment for all of the proposed paved surfaces plus an equivalent area of existing paved surfaces as required by the PDA.

During the approval process for the proposed Iron Parcel development, a traffic study was prepared concluding that the existing road networks has sufficient capacity to support an



additional 1,020 employees. The proposed Lynx project fit up that is driving the need for this additional parking will add an additional 200 employees to the facility. The approval for the Iron Parcel development stipulated that Lonza will need to conduct an additional traffic study after the Phase 1 of the Iron Parcel development is completed. As the additional 200 employees is less than the 1,020 contemplated under the Iron Parcel study, for now, those 200 employees will be subtracted from the Iron Parcel project study with the results being taken into account during the forthcoming additional traffic study after the completion of Phase 1.

Proposed electrical improvements along the southern end of the 101C building include a new generator with 3,312-gallon diesel fuel above ground storage tank (AST), a transformer pad, and associated site improvements which include a fence and relocated drain line. The proposed generator will be located within an existing paved area.

On May 20, 2021 and June 17, 2021, the PDA Board granted conceptual approval for these improvements. We respectfully request to be placed on the Technical Advisory Committee (TAC) meeting agenda for July 6, 2021. If you have any questions or need any additional information, please contact Patrick Crimmins by phone at (603) 433-8818 or by email at pmcrimmins@tighebond.com.

Sincerely,
TIGHE & BOND, INC.



Patrick M. Crimmins, PE
Senior Project Manager



Neil A. Hansen, PE
Project Engineer

Copy: Lonza Biologics (via email)
Pease Development Authority

J:\L\L0700 Lonza Biologics Expansion was 1576F\021_Lynx Project\Report_Evaluation\Applications\City of Portsmouth\20210621 TAC Submission\L-0700-021 TAC Cover Letter.docx

Owner's/Agent Letter of Authorization

This letter is to authorize Tighe & Bond, Inc. (Civil Engineer), to represent and submit on behalf of Lonza Biologics, Inc. (Applicant), applications and materials in all site design and permitting matters for the proposed project at 101 International Drive in Portsmouth, New Hampshire. This project includes the construction of a parking expansion area at the corner of Goose Bay and Corporate Drives, and associated site and stormwater improvements. This authorization shall relate to those activities that are required for local, state and federal permitting for the above project and include any required signatures for those applications.

Signature

Print Name

Date

Witness

Print Name

Date



Application for Site Review

| | | | |
|-----------------------------|-------------------------|-------------|----------------|
| For PDA Use Only | | | |
| Date Submitted: _____ | Municipal Review: _____ | Fee: _____ | |
| Application Complete: _____ | Date Forwarded: _____ | Paid: _____ | Check #: _____ |

Applicant Information

| | |
|--|--|
| Applicant: Lonza Biologics, Inc. | Agent: Tighe & Bond, Inc. |
| Address: 101 International Drive Portsmouth, NH 03801 | Address: 177 Corporate Drive Portsmouth, NH 03801 |
| Business Phone: 603-570-3625 | Business Phone: 603-433-8818 |
| Mobile Phone: | Mobile Phone: |
| Fax: | Fax: |


Site Information

| | | |
|--|------------------|-------------------------------------|
| Portsmouth Tax Map: 305 | Lot #: 006 & 007 | Zone: Airport, Business, Commercial |
| Site Address / Location : 55 & 101 International Drive, Portsmouth, NH 03801 | | |
| Site Address / Location : | | Area of On-site Wetlands: 4,087 SF |

Activity Information

| | |
|--|--|
| Change of Use: Yes [] No [X] | Existing Use: <u>Office/Research/Manufacturing</u> |
| | Proposed Use: <u>Office/Research/Manufacturing</u> |
| Description of Project: <p>The proposed project consists of the construction of 200 additional parking spaces to support the existing facilities operations. The spaces are proposed to be located at the corner of Goose Bay Drive and Corporate Drive next to Lonza's existing parking garage. There will also be associated site improvements to support the proposed project including stormwater treatment, site lighting and landscaping.</p> | |
| <i>All above information shall be shown on a site plan submitted with this application. Provide 3 full size hard copies and one PDF copy of all application materials as well as one half-size set of drawings to PDA. Applicant shall supply additional copies as may be required by applicable municipality. Refer to Chapter 400 of PDA land Use Controls for additional information.</i> | |

Certification

| | |
|---|--------------------------|
| I hereby certify under the penalties of perjury that the foregoing information and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I hereby apply for Site Review and acknowledge I will comply with all regulations and any conditions established by the Review Committee(s) and PDA Board in the development and construction of this project. | |
|  _____ Signature of Applicant | 6/21/21 _____ Date |
| _____ Patrick Crimmins _____ Printed Name | |

N:\Engineer\ ApplicationforSiteReview.xlsx

Pease Development Authority
55 International Drive, Portsmouth, NH 03801, (603) 433-6088



Subdivision Application

| | | | |
|-----------------------------|-------------------------|-------------|----------------|
| For PDA Use Only | | | |
| Date Submitted: _____ | Municipal Review: _____ | Fee: _____ | |
| Application Complete: _____ | Date Forwarded: _____ | Paid: _____ | Check #: _____ |

Applicant Information


| | |
|--|--|
| Applicant: Lonza Biologics, Inc. | Agent: Tighe & Bond, Inc. |
| Address: 101 International Drive Portsmouth, NH 03801 | Address: 177 Corporate Drive Portsmouth, NH 03801 |
| Business Phone: 603-570-3625 | Business Phone: 603-433-8818 |
| Mobile Phone: _____ | Mobile Phone: _____ |
| Fax: _____ | Fax: _____ |

Site Information

| | | | |
|---|--|--|--------------|
| Address / Location of Original Lot: | <u>55 & 101 International Drive, Portsmouth, NH 03801</u> | | |
| Portsmouth Tax Map: <u>305</u> | Lot #: <u>006 & 007</u> | Zone: <u>Airport, Business, Commercial</u> | |
| Proposed Activity (check one) | Subdivision _____ | Lot Line Adjustment | <u>X</u> |
| Existing Lot | Total # of Existing Lot(s) | | |
| | Existing Lot Area | <u>43.37 acres</u> | |
| Created Lot | Total # of Proposed Lot(s) | | |
| | Area of Proposed Lot(s) | <u>46.02 acres</u> | |
| <i>All above information shall be shown on a site plan submitted with this application. Provide 3 Full size hard copies and 1 PDF copy of all application materials as well as 1 half size set of drawings to PDA. Applicant shall supply additional copies as may be required by applicable municipality. Refer to Chapter 500 of PDA Land Use Controls for additional information</i> | | | |
| Checklist: | Application fee (as required) () | Abbutters List () | Drawings () |
| | Copies of approvals for any Required State/Federal permits (See Ch 500 of PDA LUC) | | () |

Certification

I hereby certify under the penalties of perjury that the foregoing information and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I hereby apply for Subdivision and acknowledge I will comply with all regulations and any conditions established by the Review Committee(s) and the PDA Board of Directors in the development and construction of this



 Signature of Applicant

6/21/21

 Date

Patrick Crimmins

 Printed Name

N:\Engineer\Subdivision Application.xlsx

LYNX PARKING EXPANSION

LONZA BIOLOGICS

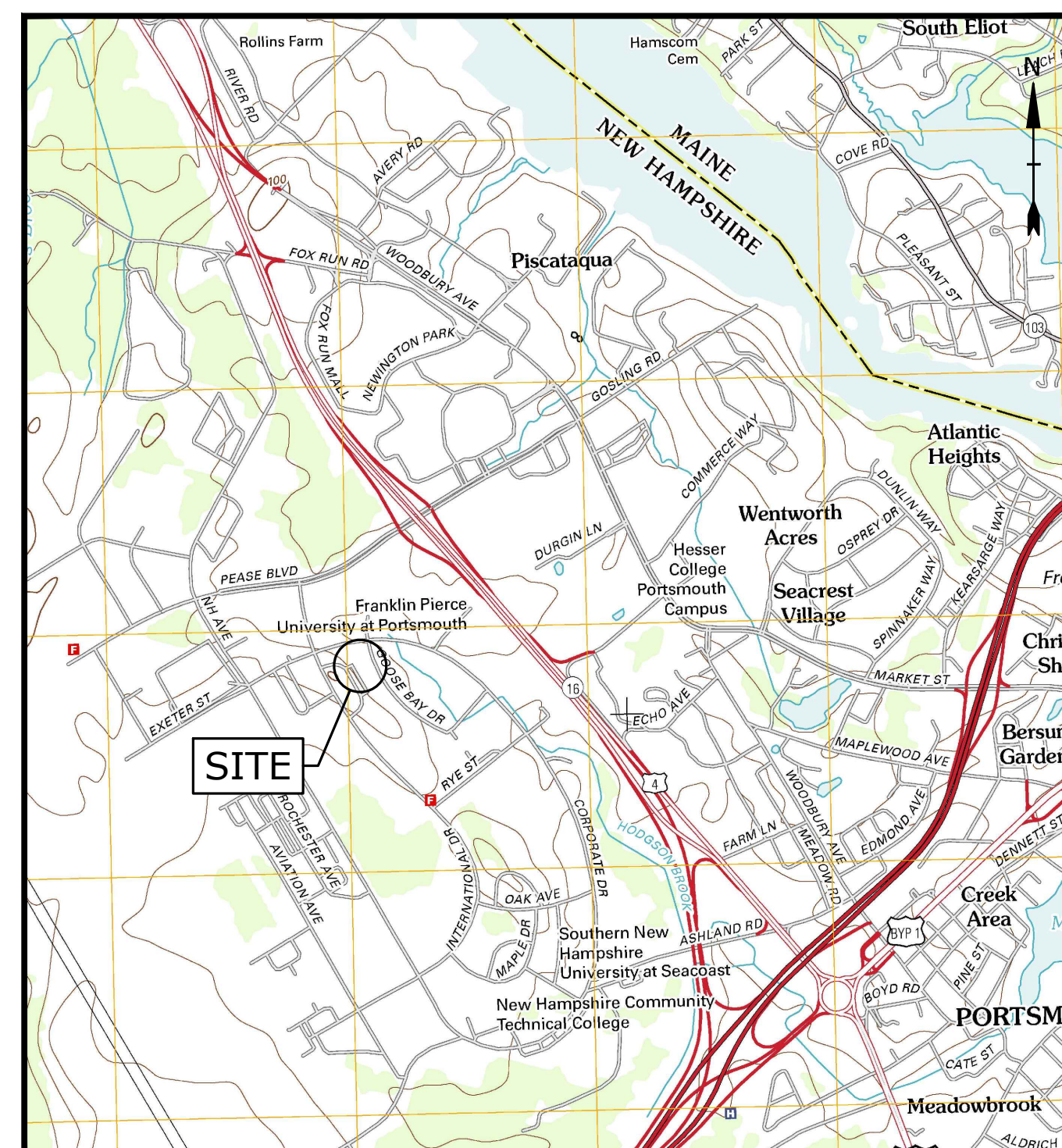
101 INTERNATIONAL DRIVE

PORTSMOUTH, NEW HAMPSHIRE

JUNE 21, 2021

| LIST OF DRAWINGS | | |
|------------------|---|--------------|
| SHEET NO. | SHEET TITLE | LAST REVISED |
| | COVER SHEET | 06/21/2021 |
| 1 of 2 | SUBDIVISION PLAN | 06/21/2021 |
| 2 of 2 | SUBDIVISION PLAN | 6/21/2021 |
| C-101 | OVERALL EXISTING CONDITIONS PLAN | 06/21/2021 |
| C-101.1 | DEMOLITION PLAN | 06/21/2021 |
| C-102 | OVERALL SITE PLAN | 06/21/2021 |
| C-102.1 | SITE PLAN | 06/21/2021 |
| C-103 | GRADING, DRAINAGE, AND EROSION CONTROL PLAN | 06/21/2021 |
| C-104 | UTILITIES PLAN | 06/21/2021 |
| C-105 | LANDSCAPE PLAN | 06/21/2021 |
| C-106 | PHOTOMETRIC PLAN | 06/21/2021 |
| C-201 | GENERATOR PAD PLAN | 06/21/2021 |
| C-501 | EROSION CONTROL NOTES AND DETAILS SHEET | 06/21/2021 |
| C-502 | DETAILS SHEET | 06/21/2021 |
| C-503 | DETAILS SHEET | 06/21/2021 |
| C-504 | DETAILS SHEET | 06/21/2021 |
| C-505 | DETAILS SHEET | 06/21/2021 |
| C-506 | DETAILS SHEET | 06/21/2021 |
| C-507 | DETAILS SHEET | 06/21/2021 |

| LIST OF PERMITS | | |
|--------------------------------------|---------|------|
| LOCAL | STATUS | DATE |
| SITE PLAN REVIEW PERMIT | PENDING | |
| STATE | | |
| NHDES - ALTERATION OF TERRAIN PERMIT | PENDING | |
| NHDES - WETLAND MINOR IMPACT PERMIT | | |



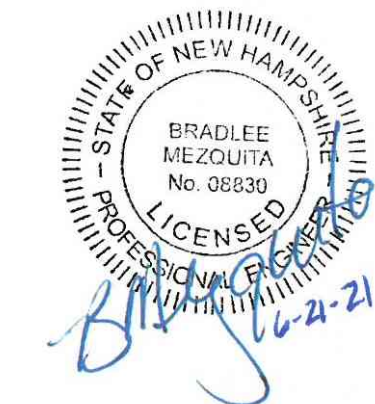
LOCATION MAP
SCALE: 1" = 2,000'

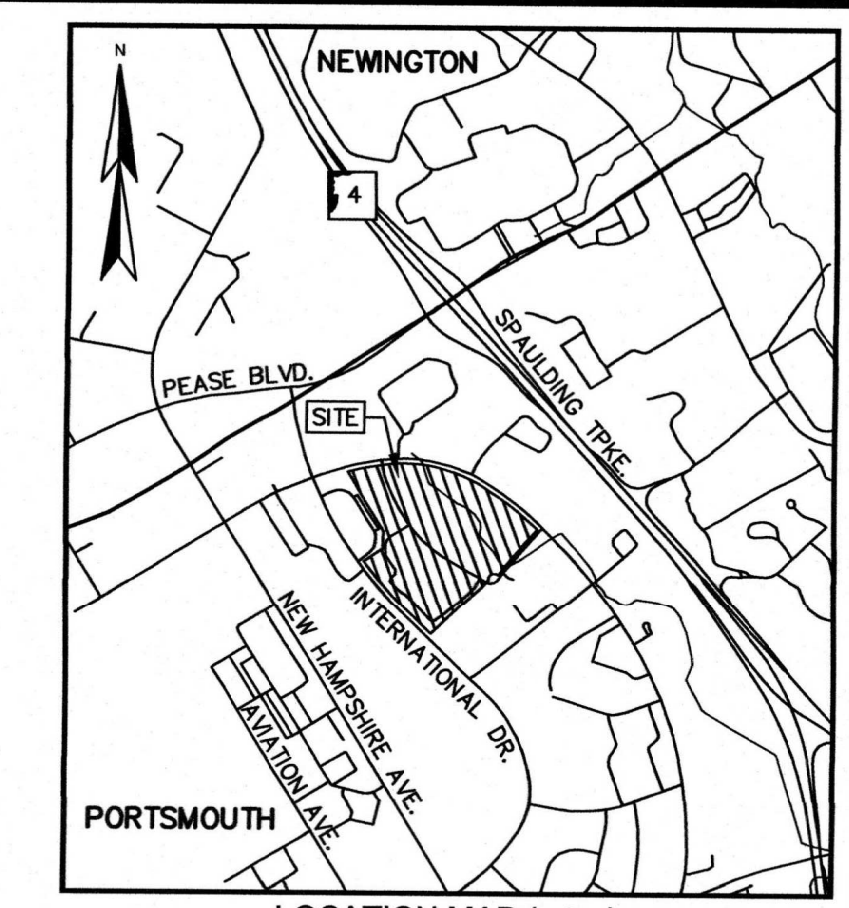
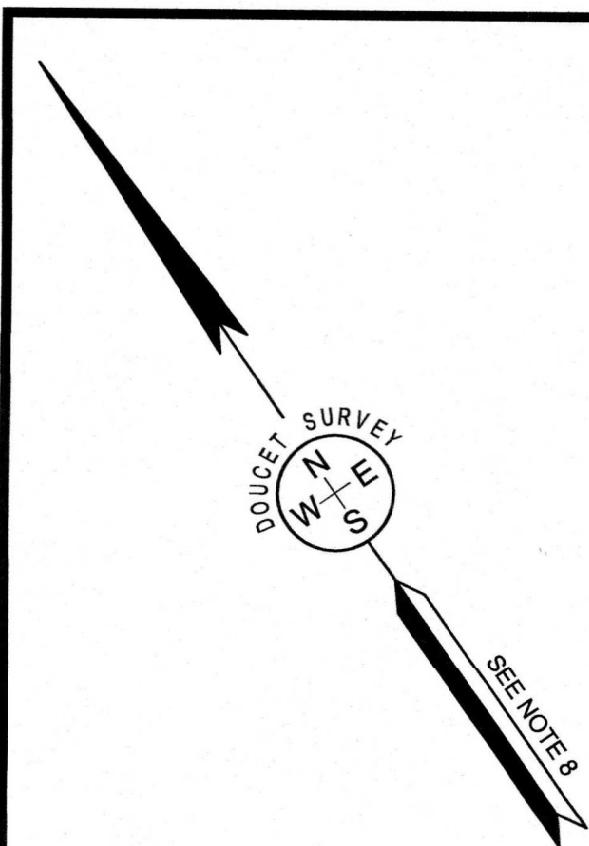
LESSOR: PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801

APPLICANT: LONZA BIOLOGICS
101 INTERNATIONAL DRIVE
PORTSMOUTH, NH 03801

CIVIL ENGINEER: **Tighe&Bond**
177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801

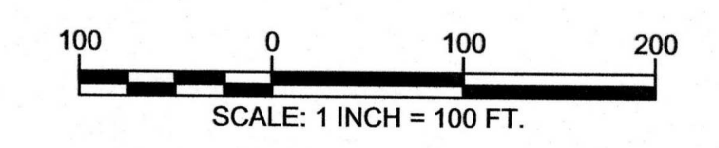
SURVEYOR: DOUCET SURVEY, INC.
102 KENT PLACE
NEWMARKET, NEW HAMPSHIRE 03857





LEGEND

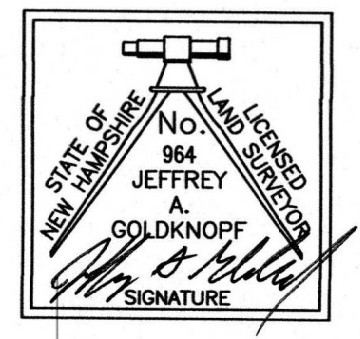
- LEASE LINE
- - - PROPOSED LEASE LINE
- - - PROPOSED EASEMENT/LICENSE
- - - LEASE/ROW/EASEMENT/LICENSE LINE TO BE ABANDONED
- - - APPROXIMATE ABUTTERS LOT LINE
- - - EASEMENT LINE
- BOUND FOUND
- DRILL HOLE FOUND
- IRON PIPE/ROD FOUND
- TYP.
- GRAN. GRANITE
- CONC. CONCRETE
- BND. FND. BOUND FOUND
- D.H.F. DRILL HOLE FOUND
- I.P.F. IRON PIPE FOUND
- 4"x4" GRANITE BOUND TO BE SET
- 5/8" REBAR W/ ID CAP TO BE SET



SUBDIVISION PLAN
FOR
LONZA BIOLOGICS, INC.
AND
THE PEASE DEVELOPMENT AUTHORITY
OF
TAX MAP 305 LOTS 1, 2, 5, 6, & 7
AND
GOOSE BAY DRIVE
INTERNATIONAL DRIVE - CORPORATE DRIVE
GOOSE BAY DRIVE
PORTSMOUTH, NEW HAMPSHIRE

| NO. | DATE | DESCRIPTION | BY |
|-----|------|-------------|----|
| | | | |
| | | | |

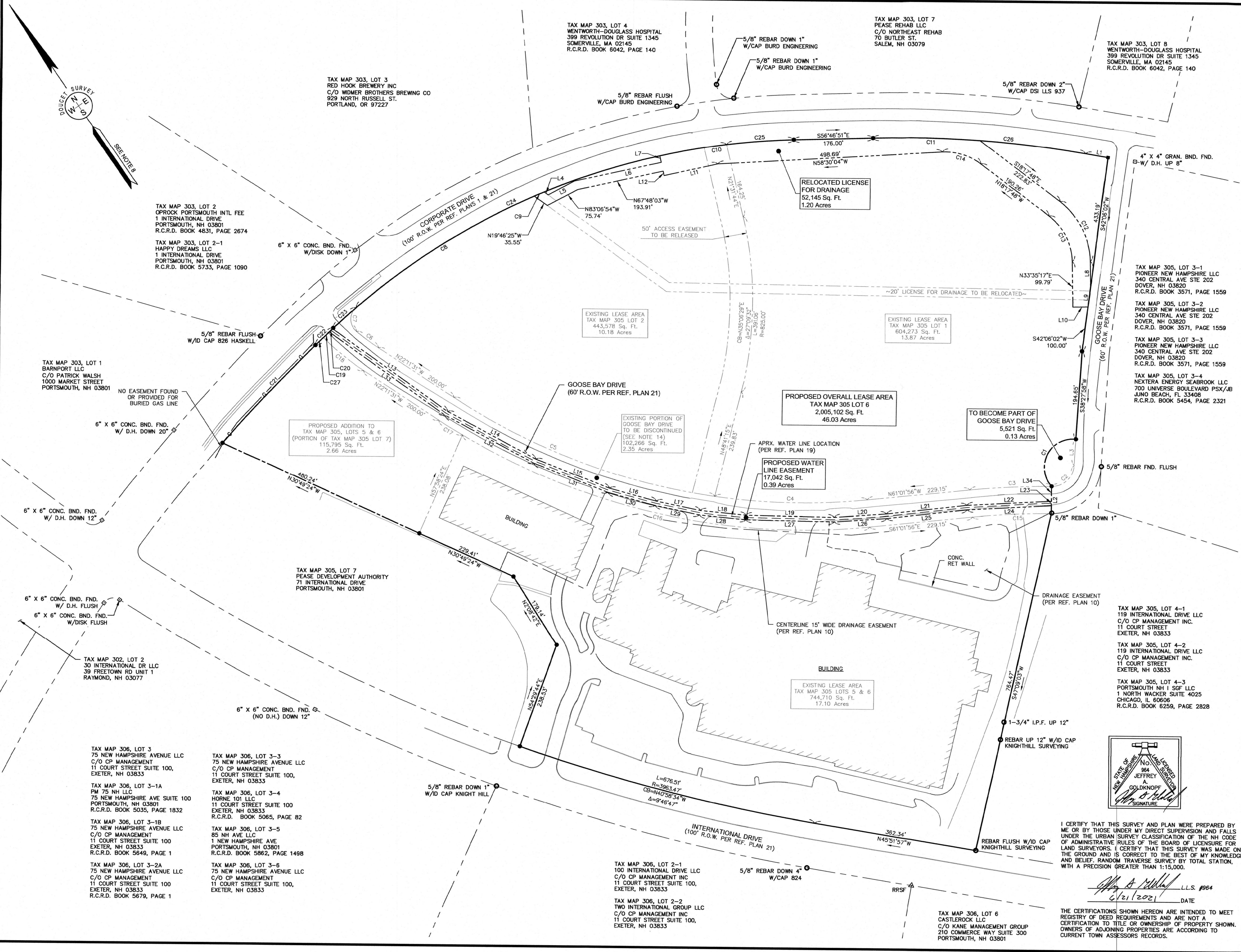
| | | | |
|-------------|--------|--------------|---------------|
| DRAWN BY: | W.D.C. | DATE: | JUNE 21, 2021 |
| CHECKED BY: | J.A.G. | DRAWING NO.: | 6228B |
| JOB NO.: | 6228 | SHEET | 1 OF 2 |



I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY ME OR BY THOSE UNDER MY DIRECT SUPERVISION AND FALLS UNDER THE URBAN SURVEY CLASSIFICATION OF THE NH CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS. I CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. RANDOM TRAVERSE SURVEY BY TOTAL STATION, WITH A PRECISION GREATER THAN 1:15,000.

Jeffrey Goldknopf L.L.S. #964
6/21/2021 DATE

THE CERTIFICATIONS SHOWN HEREON ARE INTENDED TO MEET REGISTRY OF DEED REQUIREMENTS AND ARE NOT A CERTIFICATION TO TITLE OR OWNERSHIP OF PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE ACCORDING TO CURRENT TOWN ASSESSORS RECORDS.



FILE NAME: C:\ONLINE\30 (PEASE)\Survey\305 (SUBDIVISION PLAN) (SHEET 1) (PLOTTED) (MAY 21, 2021) - 3051P.dwg
 LAYOUT NAME: 3018 (SUBDIVISION PLAN) (SHEET 1)

NOTES:

1. REFERENCE: TAX MAP 305, LOTS 5 & 6
PHYSICAL ADDRESS: 101 INTERNATIONAL DRIVE
TAX MAP 305, LOTS 1 & 2
PHYSICAL ADDRESS: 70 CORPORATE DRIVE
TAX MAP 305, LOT 7
PHYSICAL ADDRESS: 71 INTERNATIONAL DRIVE
2. PROPOSED LEASE AREA: TAX MAP 305, LOT 6: 1,889,305 SQ. FT. OR 43.37 AC.
3. OWNER OF RECORD: PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801
R.C.R.D. BOOK 4227, PAGE 001
4. LESSEE OF RECORD: TAX MAP 305, LOTS 5 & 6
LONZA BIOLOGICS, INC.
101 INTERNATIONAL DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801
R.C.R.D. BOOK 3015, PAGE 2559
(LEASE EXTENSIONS AND MODIFICATIONS
HAVE NOT BEEN RECORDED, BUT HAVE
BEEN PROVIDED BY THE LESSEE)
SEE REFERENCE PLAN 10
5. ZONE: AIRPORT, BUSINESS, AND COMMERCIAL (ABC)
DIMENSIONAL REQUIREMENTS:
MINIMUM LOT AREA 217,800 sq.ft. OR 5.0 AC.
MINIMUM STREET FRONTAGE 200 ft.
FRONT YARD SETBACK 70 ft.
SIDE SETBACK 30 ft.
REAR SETBACK 50 ft.
MINIMUM OPEN SPACE 25 %
MAXIMUM STRUCTURE HEIGHT SHALL NOT EXCEED FAA CRITERIA
WETLAND BUFFER 25 ft. (PER PDA REGULATIONS: WETLANDS LESS THAN 1/4 ACRE DO NOT HAVE A BUFFER)
ZONING INFORMATION LISTED HEREON WAS PROVIDED BY TIGHE & BOND. 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.
6. FIELD SURVEY PERFORMED BY B.T. & J.C.M. DURING MARCH 2018 USING A TRIMBLE S6 ROBOTIC TOTAL STATION WITH A TRIMBLE TSC3 DATA COLLECTOR. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.
7. FLOOD HAZARD ZONE: "X", PER FIRM MAP #3301500260F, MAP REVISED JANUARY 29, 2021.
8. HORIZONTAL DATUM BASED ON NH STATE PLANE 2800(NAD83/86) PER REFERENCE PLANS 10, 11, & 12.
9. 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.
10. TAX MAP 305, LOTS 1 & 2 ARE EITHER SUBJECT TO OR IN BENEFIT OF, BUT NOT LIMITED TO, THE FOLLOWING EASEMENTS/RIGHTS OF RECORD:
10.A. 50' WIDE ACCESS EASEMENT FOR THE BENEFIT OF LOT 305-2. (SHOWN PER REFERENCE PLAN 9)
10.B. APPROXIMATE LOCATION OF 20' WIDE LICENSE TO THE CITY OF PORTSMOUTH FOR THE PURPOSES OF MAINTAINING A DRAINAGE LINE. (SHOWN PER REFERENCE PLAN 9)
11. TAX MAP 305, LOTS 5 & 6 ARE EITHER SUBJECT TO OR IN BENEFIT OF, BUT NOT LIMITED TO, THE FOLLOWING EASEMENTS/RIGHTS OF RECORD:
11.A. 15' WIDE DRAINAGE EASEMENT. (SHOWN PER REFERENCE PLAN 10)
11.B. DRAINAGE EASEMENT. (SHOWN PER REFERENCE PLAN 10)
12. FINAL MONUMENTATION MAY BE DIFFERENT THAN THE PROPOSED MONUMENTATION SHOWN HEREON, DUE TO THE FACT THAT SITE CONDITIONS WILL DICTATE THE ACTUAL LOCATION AND TYPE OF MONUMENTS INSTALLED IN THE FIELD. PLEASE REFER TO EITHER THE "MONUMENTATION LOCATION PLAN" TO BE RECORDED OR CONTACT DOUCET SURVEY, INC. FOR CLARIFICATION OF MONUMENTS SET. (A RECORDED PLAN WILL BE PRODUCED AT THE DISCRETION OF DOUCET SURVEY, INC.).
13. IMPROVEMENTS SHOWN HEREON ARE APPROXIMATE.
14. REGARDING THE PORTION GOOSE BAY DRIVE TO BECOME PART OF THE PROPOSED LEASE AREA:
14.A. THE PEASE DEVELOPMENT AUTHORITY REPORTS THAT THE OWNERSHIP UNDERLYING ROADWAYS WITHIN THE TRADEPORT REMAINS VESTED IN THE PEASE DEVELOPMENT AUTHORITY.
14.B. THE PEASE DEVELOPMENT AUTHORITY REPORTS THAT THERE ARE UNDERLYING BLANKET UTILITY EASEMENTS ON LANDS IN THEIR OWNERSHIP. THIS MAY INCLUDE, BUT NOT BE LIMITED TO BURIED OR OVERHEAD ELECTRIC, TELECOMMUNICATIONS, GAS, WATER, AND SEWER.
15. THE APPLICANT WILL BE REQUESTING THE FOLLOWING WAIVER FROM THE CITY OF PORTSMOUTH PLANNING BOARD REGARDING SECTION IV.3.L. CUL-DE-SACS:
15.A. MAXIMUM LENGTH OF CUL-DE-SAC OF 500'
15.B. MINIMUM RADIUS OF CUL-DE-SAC PAVEMENT OF 50'

REFERENCE PLANS:

1. "R.O.W. WORKSHEET, CORPORATE DRIVE PREPARED FOR PEASE DEVELOPMENT AUTHORITY" DATED DEC. 21, 1992 BY RICHARD D. BARTLETT & ASSOCIATES, INC. SHEETS 1 AND 2. (NOT RECORDED)
2. "PEASE A.F.B. / PORTSMOUTH, N.H. REPAVE BASE STREETS, PORTSMOUTH AVE, ROCKINGHAM AVE." DATED 7 DEC 82 BY STRATEGIC AIR COMMAND CIVIL ENGINEERING. SHEET 4 OF 5. (NOT RECORDED)
3. "PORTSMOUTH AIR FORCE BASE, PORTSMOUTH, N.H. ROADS AND STORAGE AREA FY-56" DATED DEC 1955 BY WHITMAN & HOWARD ENGINEERS. INDEX PAGE AND SHEETS 2 - 5 OF 11. (NOT RECORDED)
4. "PEASE INTERNATIONAL TRADEPORT SUBDIVISION PLAT, INTERNATIONAL DRIVE LOTS BC11-001 & BC11-002, PORTSMOUTH, N.H." DATED FEBRUARY 5, 1993 BY RICHARD D. BARTLETT & ASSOCIATES INC. R.C.R.D. PLAN D-22536.
5. "SUBDIVISION PLAN OF LAND FOR REDHOOK ALE BREWERY, INC. CORPORATE DRIVE, COUNTY OF ROCKINGHAM, PORTSMOUTH, N.H." DATED DECEMBER 10, 1994 BY RICHARD P. MILLETTE AND ASSOCIATES. R.C.R.D. PLAN D-23978.
6. "ALTA/ACSM LAND TITLE SURVEY FOR RESPORT, LLC, ONE INTERNATIONAL DRIVE, COUNTY OF ROCKINGHAM, PORTSMOUTH, N.H." DATED FEBRUARY 27, 1998 BY MILLETTE, SPRAGUE & COLWELL, INC. R.C.R.D. PLAN D-26125.
7. "FRANKLIN PIERCE COLLEGE, PEASE INTERNATIONAL TRADEPORT, 73 CORPORATE DRIVE, PORTSMOUTH, NH" DATED JANUARY 15, 1998 BY RONALD R. BURD. R.C.R.D. PLAN D-26427.
8. "SUBDIVISION PLAN FOR LAND LEASED BY PEASE DEVELOPMENT AUTHORITY & KNOWN AS 119 INTERNATIONAL DRIVE LOCATED AT PEASE INTERNATIONAL TRADEPORT, PORTSMOUTH, N.H." DATED MARCH 1, 2000 BY KNIGHT HILL LAND SURVEYING SERVICES, INC. R.C.R.D. PLAN D-28059.
9. "SUBDIVISION PLAT PREPARED FOR 80 CORPORATE DRIVE LLC C/O BOULOS PROPERTY MANAGEMENT, LOCATION CORPORATE & GOOSE BAY DRIVES, PEASE INTERNATIONAL TRADEPORT - PORTSMOUTH, NH" DATED APRIL 11, 2000 BY FWS LAND SURVEYING P.L.L.C. R.C.R.D. PLAN D-28447.
10. "LEASE LINE REVISION PLAN FOR LONZA BIOLOGICS, INC. 101 INTERNATIONAL DRIVE, PORTSMOUTH, NEW HAMPSHIRE" DATED SEPT. 17, 2001 BY DOUCET SURVEY, INC. R.C.R.D. PLAN D-29538.
11. "SUBDIVISION PLAN OF LAND OF PEASE DEVELOPMENT AUTHORITY TO BE LEASED TO NORTHEAST REHABILITATION (A PORTION OF TAX MAP 303, LOT 6) 105 & 121 CORPORATE DRIVE, PEASE TRADEPORT, PORTSMOUTH, NEW HAMPSHIRE" DATED NOV. 5, 2008 BY DOUCET SURVEY, INC. R.C.R.D. PLAN D-35869.
12. "CONDOMINIUM SITE & FLOOR PLAN PREPARED FOR PIONEER NEW HAMPSHIRE, LLC, LAND OF PEASE DEVELOPMENT AUTHORITY, TAX MAP PARCEL 305-3 (108, 110, 112 & 114 CORPORATE DRIVE) PORTSMOUTH, NEW HAMPSHIRE" DATED APRIL 12, 2013 BY FIELDSTONE LAND CONSULTANTS, PLLC. SHEET 1 OF 5. R.C.R.D. PLAN D-37765.
13. "SUBDIVISION PLAN FOR PEASE DEVELOPMENT AUTHORITY, (TAX MAP 303, LOT 4) 67 CORPORATE DRIVE, PEASE TRADEPORT, PORTSMOUTH NEW HAMPSHIRE" DATED MAY 29, 2009 BY DOUCET SURVEY, INC. (NOT RECORDED)
14. "EXISTING CONDITIONS, BUILDING A, 80 CORPORATE DRIVE AND BUILDING B, 70 CORPORATE DRIVE, PORTSMOUTH, NH" DATED 4/14/2000 AND REVISED 6/05/2000 BY OPECHEE CONSTRUCTION CORPORATION. (NOT RECORDED)
15. "EXISTING CONDITIONS PLAN FOR TIGHE & BOND AND LONZA, LAND OF PEASE DEVELOPMENT AUTHORITY, (TAX MAP 305, LOTS 1 & 2), GOOSE BAY DRIVE & CORPORATE DRIVE, PORTSMOUTH, NEW HAMPSHIRE" DATED DECEMBER 23, 2015 BY DOUCET SURVEY, INC. (NOT RECORDED)
16. "119 INTERNATIONAL DRIVE CONDOMINIUM, CONDOMINIUM SITE PLAN, FOR PROPERTY OWNED BY PEASE DEVELOPMENT AUTHORITY, LEASED TO 119 INTERNATIONAL DRIVE, LLC, KNOWN AS PORTSMOUTH TAX MAP 305, LOT 4, PORTSMOUTH, NH" DATED OCT. 10, 2017 BY KNIGHT HILL LAND SURVEYING SERVICES, INC. R.C.R.D. PLAN 40449
17. "ALTA/NSPS LAND TITLE SURVEY FOR 130 INTERNATIONAL DRIVE, LLC AND PEASE DEVELOPMENT AUTHORITY, 130 INTERNATIONAL DRIVE, PORTSMOUTH, NH" DATED JULY 2017 AND REVISED THROUGH 8/9/17 BY DOUCET SURVEY, INC. (NOT RECORDED)
18. "ALTA/ACSM LAND TITLE SURVEY FOR 100 INTERNATIONAL DRIVE, LLC, 100 INTERNATIONAL DRIVE, PEASE INTERNATIONAL TRADEPORT, PORTSMOUTH, NH" DATED MARCH 30, 2006 BY DOUCET SURVEY, INC. (NOT RECORDED)
19. "CITY OF PORTSMOUTH, NEW HAMPSHIRE, FOR CONSTRUCTION, CORPORATE DRIVE AND GOOSE BAY DRIVE SEWER IMPROVEMENTS" DATED JULY 28, 2017 BY UNDERWOOD ENGINEERS, INC. (NOT RECORDED)
20. "SUBDIVISION PLAN FOR LONZA BIOLOGICS, INC. AND THE PEASE DEVELOPMENT AUTHORITY OF TAX MAP 305, LOTS 1, 2, 5 & 6 AND GOOSE BAY DRIVE, INTERNATIONAL DRIVE - CORPORATE DRIVE - GOOSE BAY DRIVE, PORTSMOUTH, NEW HAMPSHIRE" DATED APRIL 16, 2018 BY DOUCET SURVEY, INC (NOT RECORDED)
21. "APPENDIX VI, MUNICIPAL SERVICES AGREEMENT BETWEEN CITY OF PORTSMOUTH, TOWN OF NEWINGTON AND PEASE DEVELOPMENT AUTHORITY" EFFECTIVE AS OF JULY 1, 1998 (ROADWAY WIDTHS) (NOT RECORDED)
22. "THIRD AMENDED SITE/FLOOR PLAN ADDENDUM FOR 75 NEW HAMPSHIRE CONDOMINIUM SHOWING BUILDING 5 - UNIT 6 - LIMITED COMMON AREA" DATED JULY 2019 BY KNIGHT HILL LAND SURVEYING SERVICES, INC. R.C.R.D. PLAN D-41611
23. "LEASE LINE DISCONTINUANCE & EXISTING BUILDING UPDATE PLAN, 25, 29 RETAIL CONDOMINIUM" DATED DECEMBER 2018 AND REVISED JULY 20, 2017 BY KNIGHT HILL LAND SURVEYING SERVICES. R.C.R.D. PLAN D-40388
24. "SUBDIVISION PLAN AT 30 INTERNATIONAL DRIVE AT PEASE INTERNATIONAL TRADEPORT, PORTSMOUTH, NEW HAMPSHIRE" DATED JANUARY 1997 BY CLD CONSULTING ENGINEERS & SURVEYORS R.C.R.D. PLAN D-25370
25. "LEASE LINE REVISION FOR BARNPORT, LLC AND PEASE DEVELOPMENT AUTHORITY, 27 INTERNATIONAL DRIVE, PORTSMOUTH, NEW HAMPSHIRE" DATED APRIL 11, 2000 BY DOUCET SURVEY, INC. R.C.R.D. PLAN D-28254

| LINE | BEARING | DISTANCE |
|------|-------------|----------|
| L1 | S45°42'46"E | 50.48' |
| L2 | S34°54'07"W | 60.00' |
| L3 | S38°27'58"W | 58.32' |
| L4 | N19°46'25"W | 11.01' |
| L5 | N83°06'54"W | 66.09' |
| L6 | N67°48'03"W | 196.60' |
| L7 | S22°03'02"W | 14.87' |
| L8 | S33°35'17"W | 57.08' |
| L9 | S42°06'02"W | 43.59' |
| L10 | N55°44'33"W | 33.55' |
| L11 | N67°48'03"W | 122.22' |
| L12 | N22°11'57"E | 10.00' |
| L13 | N19°52'39"W | 313.89' |
| L14 | N27°09'05"W | 222.06' |
| L15 | N33°51'22"W | 175.26' |
| L16 | N40°07'36"W | 107.83' |
| L17 | N43°37'13"W | 99.98' |

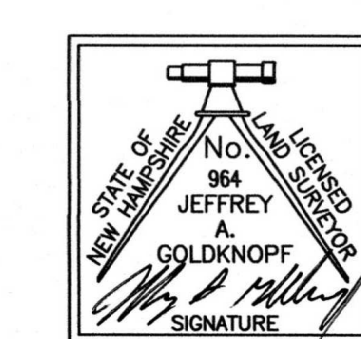
| LINE | BEARING | DISTANCE |
|------|-------------|----------|
| L18 | N49°42'47"W | 102.16' |
| L19 | N54°07'45"W | 195.64' |
| L20 | N59°11'41"W | 116.15' |
| L21 | N61°40'21"W | 179.46' |
| L22 | N58°20'21"W | 187.76' |
| L23 | S34°54'07"W | 10.02' |
| L24 | N58°20'21"W | 186.91' |
| L25 | N61°40'21"W | 179.39' |
| L26 | N59°11'41"W | 116.81' |
| L27 | N54°07'45"W | 196.47' |
| L28 | N49°42'47"W | 103.08' |
| L29 | N43°37'13"W | 100.81' |
| L30 | N40°07'36"W | 108.68' |
| L31 | N33°51'22"W | 176.39' |
| L32 | N27°09'05"W | 223.29' |
| L33 | N19°52'39"W | 316.47' |
| L34 | S34°54'07"W | 32.65' |

| CURVE | ARC LENGTH | RADIUS | DELTA ANGLE | CHORD BEARING | CHORD LENGTH |
|-------|------------|----------|-------------|---------------|--------------|
| C1 | 152.83' | 63.00' | 138°59'47" | S61°54'24"W | 118.02' |
| C2 | 75.52' | 50.06' | 86°26'09" | S81°41'02"W | 68.56' |
| C3 | 181.41' | 1752.84' | 5°55'47" | N58°03'47"W | 181.33' |
| C4 | 338.74' | 1420.00' | 13°40'04" | S54°11'54"E | 337.94' |
| C5 | 623.87' | 1420.00' | 25°10'21" | S34°46'41"E | 618.86' |
| C6 | 60.72' | 500.00' | 6°57'30" | S18°42'46"E | 60.69' |
| C7 | 60.50' | 35.00' | 99°01'56" | S34°16'57"W | 53.24' |
| C8 | 466.96' | 1540.26' | 17°22'14" | N87°30'58"W | 465.18' |
| C9 | 23.43' | 1540.26' | 0°52'17" | N78°23'43"W | 23.43' |
| C10 | 300.24' | 1540.26' | 11°10'07" | N62°21'55"W | 299.77' |
| C11 | 237.27' | 2450.00' | 5°32'56" | N54°00'23"W | 237.18' |
| C12 | 153.95' | 170.00' | 51°53'06" | N7°38'44"E | 148.74' |
| C13 | 117.72' | 130.00' | 51°53'06" | N7°38'44"E | 113.74' |
| C14 | 91.22' | 130.00' | 40°12'15" | N38°23'56"W | 89.36' |
| C15 | 175.20' | 1692.80' | 5°55'47" | N58°03'47"W | 175.12' |
| C16 | 942.18' | 1480.00' | 36°28'30" | S42°47'41"E | 926.35' |
| C17 | 61.10' | 1480.00' | 2°21'56" | N23°22'29"W | 61.10' |
| C18 | 115.23' | 560.00' | 11°47'23" | N16°17'50"W | 115.03' |
| C19 | 18.12' | 3710.06' | 0°16'48" | S80°54'45"W | 18.12' |
| C20 | 10.19' | 3710.06' | 0°09'26" | N81°07'52"E | 10.19' |
| C21 | 298.54' | 3710.06' | 4°36'38" | N78°05'40"E | 298.46' |
| C22 | 54.86' | 3710.06' | 0°50'50" | N80°49'24"E | 54.86' |
| C23 | 68.59' | 1540.26' | 2°33'06" | N82°31'22"E | 68.59' |
| C24 | 910.09' | 1540.26' | 33°51'16" | S79°16'27"E | 896.91' |
| C25 | 149.63' | 1540.26' | 5°33'58" | S59°33'50"E | 148.57' |
| C26 | 473.28' | 2450.00' | 11°04'05" | S51°14'49"E | 472.54' |
| C27 | 24.14' | 3710.06' | 0°22'22" | N80°35'10"E | 24.14' |

SUBDIVISION PLAN
FOR
LONZA BIOLOGICS, INC.
AND
THE PEASE DEVELOPMENT AUTHORITY
OF
TAX MAP 305 LOTS 1, 2, 5, 6, & 7
AND
GOOSE BAY DRIVE
INTERNATIONAL DRIVE - CORPORATE DRIVE
GOOSE BAY DRIVE
PORTSMOUTH, NEW HAMPSHIRE

| NO. | DATE | DESCRIPTION | BY |
|-----|------|-------------|----|
| | | | |
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|--------------------|---------------------|
| DRAWN BY: W.D.C. | DATE: JUNE 21, 2021 |
| CHECKED BY: J.A.G. | DRAWING NO.: 6228B |
| JOB NO.: 6228 | SHEET 2 OF 2 |



I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY ME OR BY THOSE UNDER MY DIRECT SUPERVISION AND FALLS UNDER THE URBAN SURVEY CLASSIFICATION OF THE NH CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS. I CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, RANDOM TRAVERSE SURVEY BY TOTAL STATION, WITH A PRECISION GREATER THAN 1:15,000.

Jeffrey A. Goldknopf L.L.S. #964
6/21/2021 DATE

THE CERTIFICATIONS SHOWN HEREON ARE INTENDED TO MEET REGISTRY OF DEED REQUIREMENTS AND ARE NOT A CERTIFICATION TO TITLE OR OWNERSHIP OF PROPERTY SHOW OWNERS OF ADJOINING PROPERTIES ARE ACCORDING TO CURRENT TOWN ASSESSORS RECORDS.

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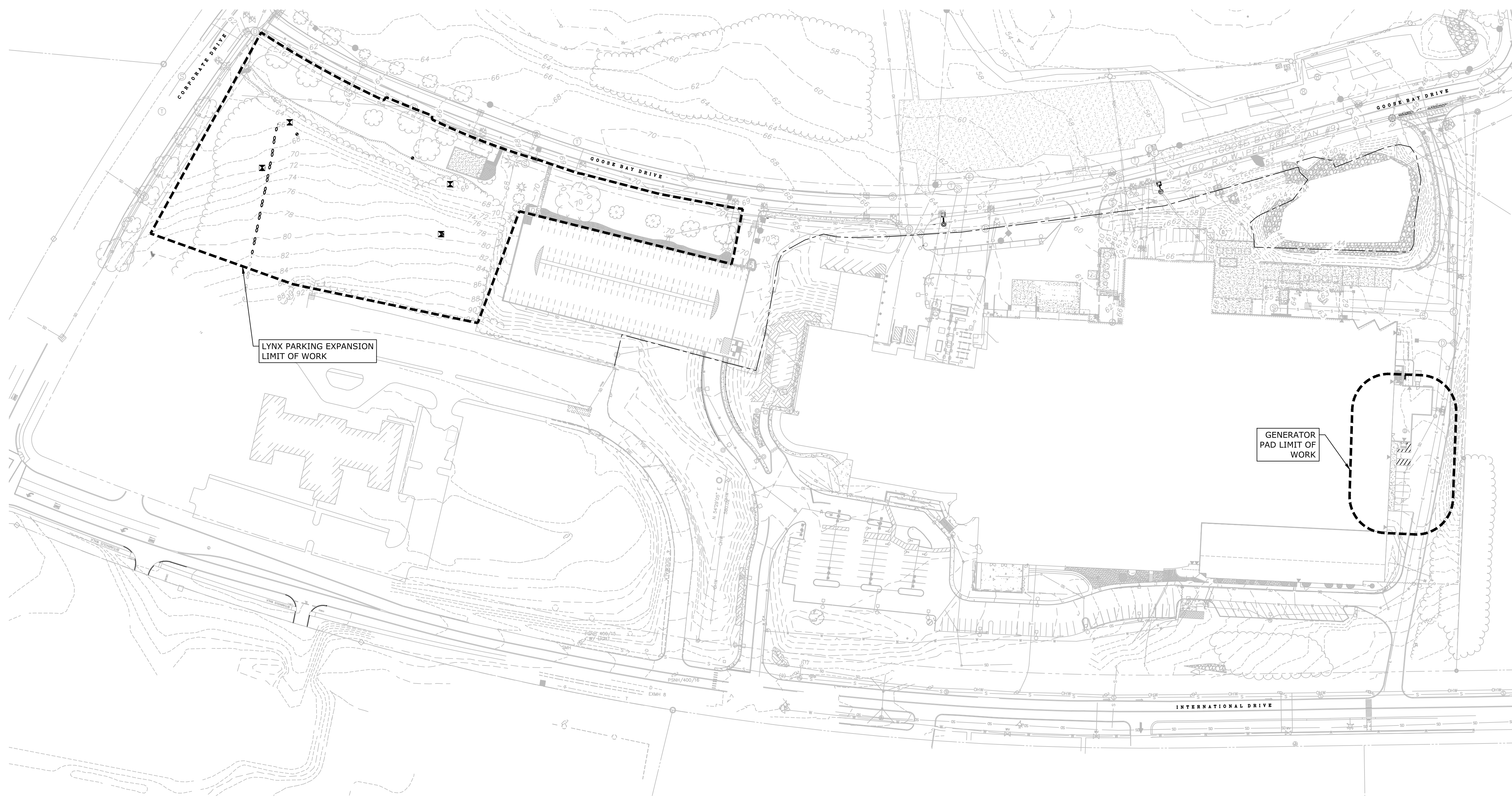
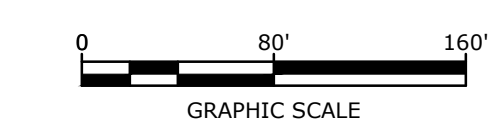
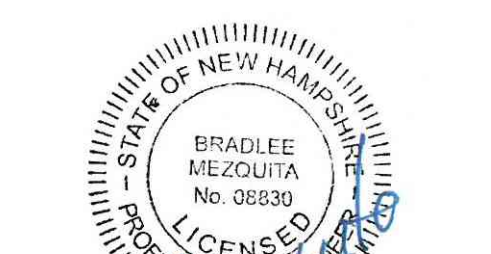
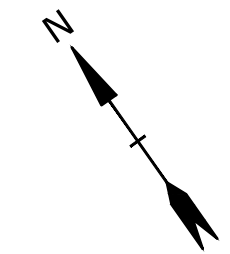
DEMOLITION NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
2. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES. CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
3. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES EXCEPT AS SPECIFIED IN NOTE #22.
4. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
5. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
6. SAW CUT AND REMOVE PAVEMENT ONE (1) FOOT OFF PROPOSED EDGE OF PAVEMENT OR EXISTING CURB LINE IN ALL AREAS WHERE PAVEMENT TO BE REMOVED ABUTS EXISTING PAVEMENT OR CONCRETE TO REMAIN.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
8. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ADDITIONAL PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS AND AS SPECIFIED IN NOTE #22.
10. UTILITIES SHALL BE TERMINATED AT THE MAIN LINE PER UTILITY COMPANY STANDARDS. THE CONTRACTOR SHALL REMOVE ALL ABANDONED UTILITIES LOCATED WITHIN THE LIMITS OF WORK.
11. CONTRACTOR SHALL VERIFY ORIGIN OF ALL DRAINS AND UTILITIES PRIOR TO REMOVAL/TERMINATION TO DETERMINE IF DRAINS OR UTILITY IS ACTIVE, AND SERVICES ANY ON OR OFF-SITE STRUCTURE TO REMAIN. THE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY SUCH UTILITY FOUND AND SHALL MAINTAIN THESE UTILITIES UNTIL PERMANENT SOLUTION IS IN PLACE.
12. PAVEMENT REMOVAL LIMITS ARE SHOWN FOR CONTRACTOR'S CONVENIENCE. ADDITIONAL PAVEMENT REMOVAL MAY BE REQUIRED DEPENDING ON THE CONTRACTOR'S OPERATION. CONTRACTOR TO VERIFY FULL LIMITS OF PAVEMENT REMOVAL PRIOR TO BID.
13. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE PADS, UTILITIES AND PAVEMENT WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT, CURBS, UNDER GROUND PIPING, AND POLES.

14. COORDINATE ALL WORK WITHIN THE PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH.
15. CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED BY THE CONTRACTOR, THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO REPLACE DISTURBED MONUMENTS.
16. PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS/CURB INLETS WITHIN CONSTRUCTION LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INLET PROTECTION BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE "HIGH FLOW SILT SACK" BY ACF ENVIRONMENTAL OR EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN EVENT OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED OR SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE BARRIER.
17. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.
18. THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFETY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.
19. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL UTILITIES TO BE REMOVED AND PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
20. THE CONTRACTOR SHALL ACQUIRE A PDA DIG PERMIT BEFORE ANY DISTURBANCE CAN TAKE PLACE. ALLOW 7 CALENDAR DAYS FOR PROCESSING.
21. BEFORE ANY DEWATERING IS PERFORMED, COORDINATION BETWEEN THE APPLICANT, PDA, NHDES AND THE AIR FORCE IS REQUIRED TO DETERMINE PROPER PROCEDURES AND PERMITTING REQUIRED.
22. ALL EXCESS SOIL RESULTING FROM THE CONSTRUCTION SHALL REMAIN ON SITE.
23. REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
24. THE CONTRACTOR SHALL PHASE DEMOLITION AND CONSTRUCTION AS REQUIRED TO PROVIDE CONTINUOUS SERVICE TO THE EXISTING BUSINESS THROUGHOUT THE CONSTRUCTION PERIOD. EXISTING BUSINESS SERVICES INCLUDE, BUT ARE NOT LIMITED TO ELECTRICAL, COMMUNICATION, FIRE PROTECTION, DOMESTIC WATER AND SEWER SERVICES. TEMPORARY SERVICES, IF REQUIRED, SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL AND UTILITY COMPANY STANDARDS. CONTRACTOR SHALL PROVIDE DETAILED CONSTRUCTION SCHEDULE TO OWNER PRIOR TO ANY DEMOLITION/CONSTRUCTION ACTIVITIES AND SHALL COORDINATE TEMPORARY SERVICES TO AFFECTED ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
25. CONSTRUCTION LAYDOWN AREA TO BE LOCATED ON THE IRON PARCEL SITE.

LEGEND

| | | | |
|--|------------------------|--|--------------------------|
| | LIMIT OF WORK | | CATCHBASIN |
| | PROPERTY LINE | | DRAIN MANHOLE |
| | CHAIN-LINK FENCE | | SEWER MANHOLE |
| | GUARDRAIL | | HYDRANT |
| | STORM DRAIN | | WATER VALVE |
| | SANITARY SEWER | | IRRIGATION CONTROL VALVE |
| | WATER | | ELECTRIC MANHOLE |
| | APPROXIMATE IRRIGATION | | UTILITY POLE |
| | TELEPHONE LINE | | MONUMENT |
| | GAS | | |
| | UNDERGROUND ELECTRIC | | |
| | OVERHEAD UTILITY | | |
| | MAJOR CONTOUR | | |
| | MINOR CONTOUR | | |
| | CONCRETE | | |
| | RIP RAP | | |
| | LANDSCAPING | | |



Last Saved: 6/15/2021 1:38pm By: JWR/ston
 Printed On: Jun 15, 2021 1:40:00
 Title & Content: L:\C\000 - Lynx Parking Expansion - Figures\AutoCAD\1-0700-021-C-DSGN.dwg

Lynx Parking Expansion

Lonza Biologics

Portsmouth, New Hampshire




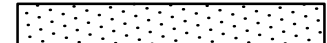

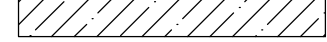










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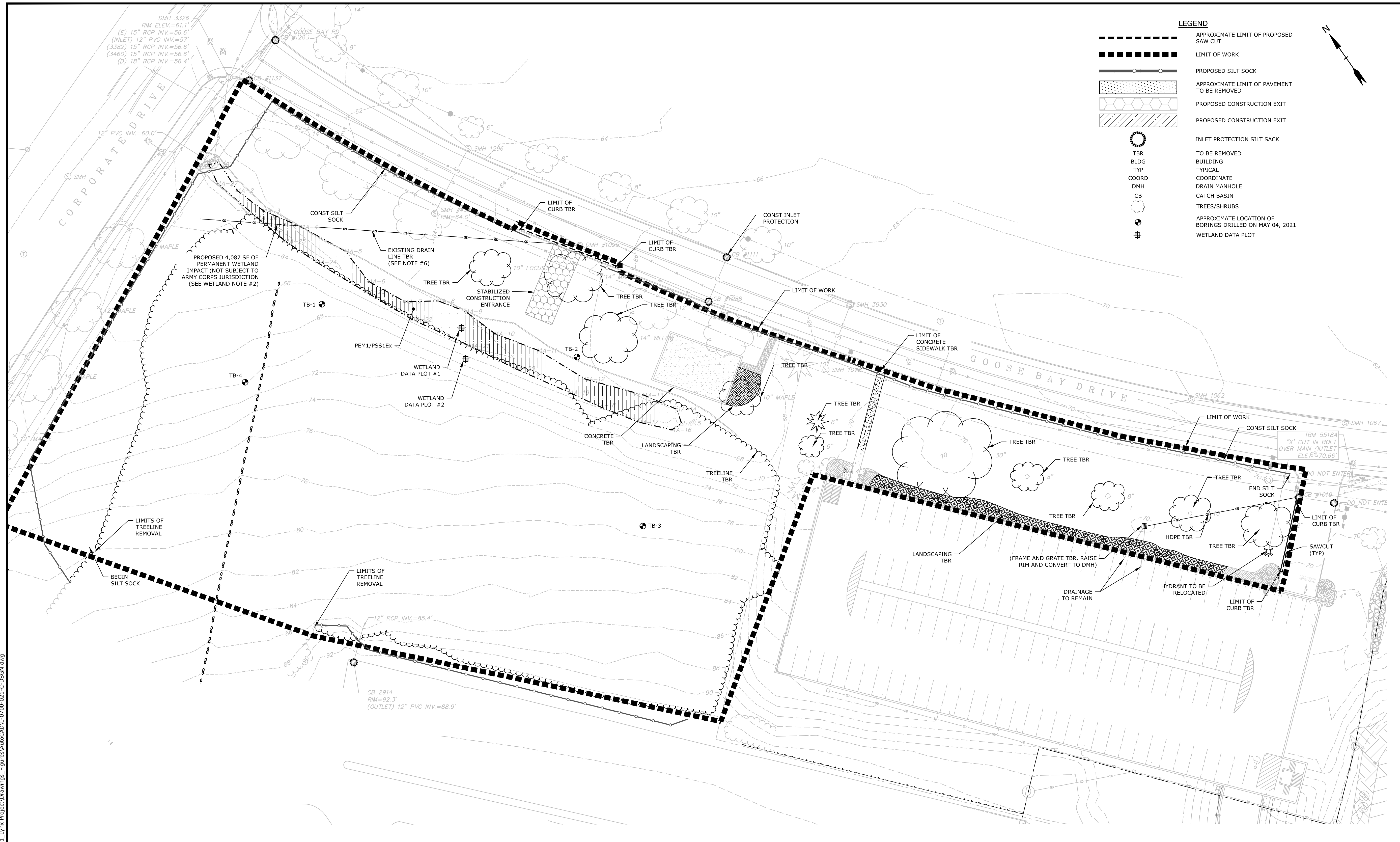
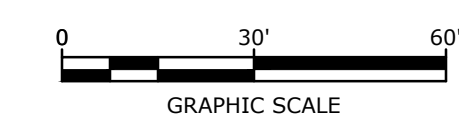
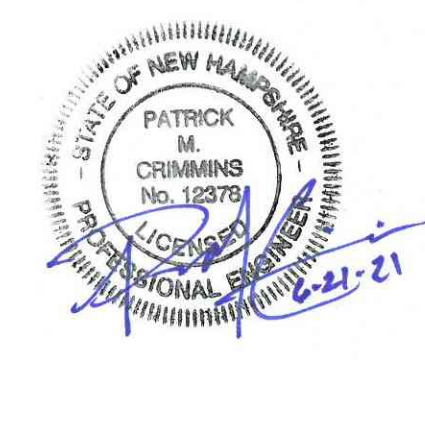
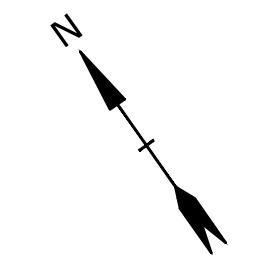
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| A | 6/21/2021 | TAC SUBMISSION |
| PROJECT NO: L-0700-021 | | |
| DATE: June 21, 2021 | | |
| FILE: L-0700-021-C-DSGN.DWG | | |
| DRAWN BY: JW/CJK | | |
| CHECKED BY: NAH/PMC | | |
| APPROVED BY: BLM | | |

OVERALL EXISTING CONDITIONS

SCALE: AS SHOWN

LEGEND

-  APPROXIMATE LIMIT OF PROPOSED SAW CUT
-  LIMIT OF WORK
-  PROPOSED SILT SOCK
-  APPROXIMATE LIMIT OF PAVEMENT TO BE REMOVED
-  PROPOSED CONSTRUCTION EXIT
-  PROPOSED CONSTRUCTION EXIT
-  INLET PROTECTION SILT SACK
-  TO BE REMOVED
-  BUILDING
-  TYPICAL
-  COORDINATE
-  DRAIN MANHOLE
-  CATCH BASIN
-  TREES/SHRUBS
-  APPROXIMATE LOCATION OF BORINGS DRILLED ON MAY 04, 2021
-  WETLAND DATA PLOT



PROPOSED 4,087 SF OF PERMANENT WETLAND IMPACT (NOT SUBJECT TO ARMY CORPS JURISDICTION (SEE WETLAND NOTE #2))

EXISTING DRAIN LINE TBR (SEE NOTE #6)

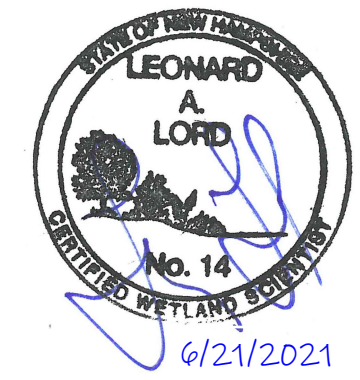
WETLAND DATA PLOT #1

WETLAND DATA PLOT #2

LIMITS OF TREELINE REMOVAL

LIMITS OF TREELINE REMOVAL

- WETLAND NOTES:**
- JURISDICTIONAL WETLANDS WERE DELINEATED AT THE PROJECT SITE ON APRIL 9, 2021 BY LEONARD A. LORD, PHD, NHCWS #14, NHCSS #19 OF TIGHE & BOND. WETLAND CRITERIA USED INCLUDED THE FOLLOWING:
 - CORPS OF ENGINEERING WETLANDS DELINEATION MANUAL, TECHNICAL REPORT Y-87-1 (JANUARY 1987)
 - REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION (JANUARY 2012)
 - FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4 (2018)
 - US ARMY CORPS OF ENGINEERS NORTHCENTRAL AND NORTHEAST 2016 REGIONAL WETLAND PLANT LIST (LICHVAR ET AL., 2016)
 - NHDES WETLAND BUREAU ADMINISTRATIVE RULES (2020)
 - THIS WETLAND IS A DITCH/SWALE THAT WAS CREATED IN AN UPLAND AREA. IT DOES NOT MEET THE NAVIGABLE WATERS PROTECTION RULE DEFINITION OF WATERS OF THE UNITED STATES AND, THEREFORE, IS NOT SUBJECT TO ARMY CORPS OF ENGINEERS JURISDICTION.



- NOTES:**
- THE EXISTING CONDITIONS INFORMATION SHOWN IS BASED ON SURVEY DRAWINGS PROVIDED BY DOUCET SURVEY TITLED "FOR TIGHE & BOND", DATED APRIL 23, 2021.
 - THE DRAWINGS ARE BASED ON THE FOLLOWING DATUMS: HORIZONTAL NAD83; VERTICAL NAVD88.
 - CONTOUR LINES INDICATE ELEVATION CHANGE IN TWO FOOT INTERVALS.
 - BORING LOCATIONS BASED ON TAPING AND LINE OF SIGHT FROM EXISTING FEATURES. LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
 - TIGHE & BOND BORINGS DRILLED BY NEW ENGLAND BORING CONTRACTORS OF DERRY, NH. ON MAY 04, 2021. BORINGS WERE OBSERVED BY A TIGHE & BOND REPRESENTATIVE ON A FULL TIME BASIS. REFER TO BORING LOGS IN APPENDIX B FOR MORE DETAILED INFORMATION.
 - PRIOR TO REMOVING THE EXISTING DRAIN LINE, CONTRACTOR SHALL VERIFY DRAIN LINE IS NOT CURRENTLY IN USE AND HAS BEEN DISCONNECTED FROM ANY STRUCTURES.

SEE SHEET C-101 FOR DEMOLITION NOTES

Lynx Parking Expansion

Lonza Biologics

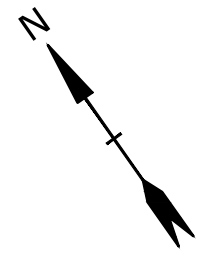
Portsmouth,
New Hampshire

| MARK | DATE | DESCRIPTION |
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| A | 6/21/2021 | TAC SUBMISSION |
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EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: AS SHOWN

Last Saved: 6/19/2021 10:06am By: M.Hansen
 Project: 21-101001000 - Lynx Parking Expansion
 Figure: AutoCAD - 0700-021-C-DSGN.dwg



SITE DATA BLOCK

LESSOR: PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DRIVE
PORTSMOUTH NH, 03801
APPLICANT: LONZA BIOLOGICS, INC.
101 INTERNATIONAL DRIVE
PORTSMOUTH NH, 03801
LOCATION: 101 INTERNATIONAL DRIVE 55 INTERNATIONAL DRIVE 70 & 80 CORPORATE DRIVE
PORTSMOUTH NH, 03801 PORTSMOUTH NH, 03801 PORTSMOUTH NH, 03801
MAP 305 LOT 6 MAP 305 LOT 7 MAP 305 LOTS 1&2
ZONING DISTRICT: AIRPORT BUSINESS AND COMMERCIAL ZONE (ABC)
PROPOSED USES: OFFICE/MANUFACTURING/RESEARCH AND DEVELOPMENT

DEVELOPMENT STANDARDS

| AREA, YARD, AND HEIGHT REQUIREMENTS | REQUIRED/ALLOWED | PROPOSED/PROVIDED |
|-------------------------------------|------------------|---------------------|
| MINIMUM LOT AREA | 5 ACRES | 46.02 ACRES |
| MINIMUM LOT FRONTAGE | 200 FEET | 1038 FEET |
| MINIMUM FRONT YARD | 70 FEET | 118± FEET |
| MINIMUM SIDE YARD | 30 FEET | 30± FEET (EXISTING) |
| MINIMUM REAR YARD | 50 FEET | 50± FEET (EXISTING) |
| MAXIMUM BUILDING HEIGHT | FAA CRITERIA | 86 FEET |
| MINIMUM OPEN SPACE | 25% OF LOT AREA | 44.3% |

OFF-STREET PARKING REQUIREMENTS:

PARKING SPACES REQUIRED:

| INDUSTRIAL: | LARGEST SHIFT: | |
|--------------------------|----------------|------------|
| 2 SPACES PER 3 EMPLOYEES | 740 EMPLOYEES | 494 SPACES |
| ON LARGEST SHIFT | 1250 EMPLOYEES | 834 SPACES |
| FUTURE EMPLOYEES | | |

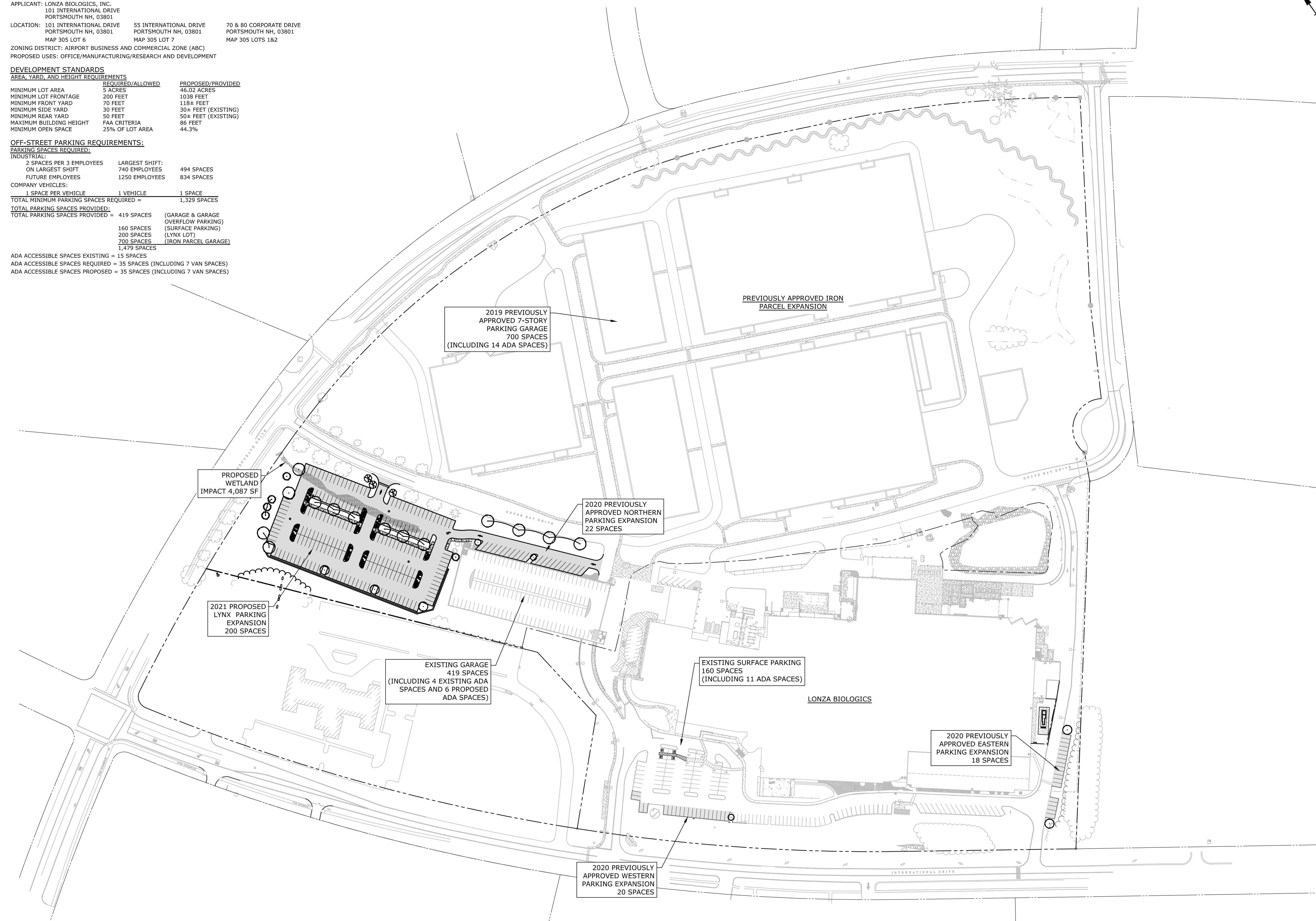
COMPANY VEHICLES:

| 1 SPACE PER VEHICLE | 1 VEHICLE | 1 SPACE |
|---|-----------|--------------|
| TOTAL MINIMUM PARKING SPACES REQUIRED = | | 1,329 SPACES |

TOTAL PARKING SPACES PROVIDED:

| | | |
|---------------------------------|--------------|------------------------------------|
| TOTAL PARKING SPACES PROVIDED = | 419 SPACES | (GARAGE & GARAGE OVERFLOW PARKING) |
| | 160 SPACES | (SURFACE PARKING) |
| | 200 SPACES | (LYNX LOT) |
| | 700 SPACES | (IRON PARCEL GARAGE) |
| | 1,479 SPACES | |

ADA ACCESSIBLE SPACES EXISTING = 15 SPACES
ADA ACCESSIBLE SPACES REQUIRED = 35 SPACES (INCLUDING 7 VAN SPACES)
ADA ACCESSIBLE SPACES PROPOSED = 35 SPACES (INCLUDING 7 VAN SPACES)



2019 PREVIOUSLY APPROVED 7-STORY PARKING GARAGE 700 SPACES (INCLUDING 14 ADA SPACES)

PREVIOUSLY APPROVED IRON PARCEL EXPANSION

2020 PREVIOUSLY APPROVED NORTHERN PARKING EXPANSION 22 SPACES

PROPOSED WETLAND IMPACT 4,087 SF

2021 PROPOSED LYNX PARKING EXPANSION 200 SPACES

EXISTING GARAGE 419 SPACES (INCLUDING 4 EXISTING ADA SPACES AND 6 PROPOSED ADA SPACES)

EXISTING SURFACE PARKING 160 SPACES (INCLUDING 11 ADA SPACES)

LONZA BIOLOGICS

2020 PREVIOUSLY APPROVED EASTERN PARKING EXPANSION 18 SPACES

2020 PREVIOUSLY APPROVED WESTERN PARKING EXPANSION 20 SPACES



Lynx Parking Expansion

Lonza Biologics

Portsmouth,
New Hampshire

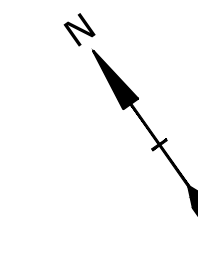
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OVERALL SITE PLAN

SCALE: AS SHOWN

C-102

Last Saved: 6/16/2021, 5:11:59pm By: Winstan
Project: 101 International Drive, Portsmouth, NH
Drawing: Lynx Parking Expansion - Figures AutoCAD - 0700-021-C-DSGN.dwg

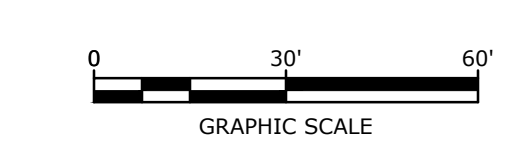
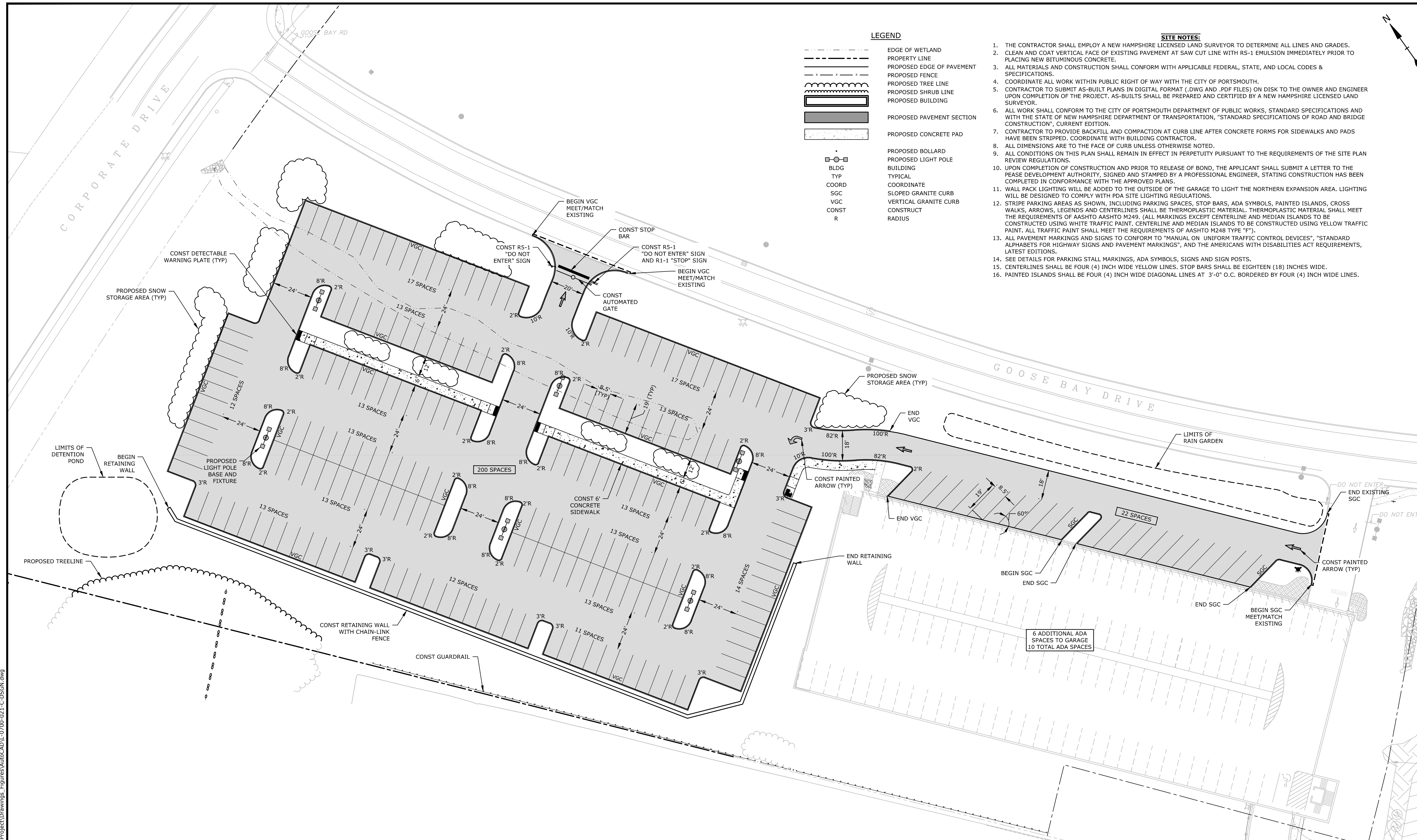


LEGEND

- EDGE OF WETLAND
- PROPERTY LINE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED FENCE
- PROPOSED TREE LINE
- PROPOSED SHRUB LINE
- PROPOSED BUILDING
- PROPOSED PAVEMENT SECTION
- PROPOSED CONCRETE PAD
- PROPOSED BOLLARD
- BLDG
- TYP
- COORD
- SGC
- VGC
- CONST
- R
- PROPOSED LIGHT POLE
- BUILDING
- TYPICAL
- COORDINATE
- SLOPED GRANITE CURB
- VERTICAL GRANITE CURB
- CONSTRUCT
- RADIUS

SITE NOTES:

1. THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED LAND SURVEYOR TO DETERMINE ALL LINES AND GRADES.
2. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAW CUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
3. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES & SPECIFICATIONS.
4. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAY WITH THE CITY OF PORTSMOUTH.
5. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
6. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
7. CONTRACTOR TO PROVIDE BACKFILL AND COMPACTION AT CURB LINE AFTER CONCRETE FORMS FOR SIDEWALKS AND PADS HAVE BEEN STRIPPED. COORDINATE WITH BUILDING CONTRACTOR.
8. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
9. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
10. UPON COMPLETION OF CONSTRUCTION AND PRIOR TO RELEASE OF BOND, THE APPLICANT SHALL SUBMIT A LETTER TO THE PEASE DEVELOPMENT AUTHORITY, SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, STATING CONSTRUCTION HAS BEEN COMPLETED IN CONFORMANCE WITH THE APPROVED PLANS.
11. WALL PACK LIGHTING WILL BE ADDED TO THE OUTSIDE OF THE GARAGE TO LIGHT THE NORTHERN EXPANSION AREA. LIGHTING WILL BE DESIGNED TO COMPLY WITH PDA SITE LIGHTING REGULATIONS.
12. STRIPE PARKING AREAS AS SHOWN, INCLUDING PARKING SPACES, STOP BARS, ADA SYMBOLS, PAINTED ISLANDS, CROSS WALKS, ARROWS, LEGENDS AND CENTERLINES SHALL BE THERMOPLASTIC MATERIAL. THERMOPLASTIC MATERIAL SHALL MEET THE REQUIREMENTS OF AASHTO M249. (ALL MARKINGS EXCEPT CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING WHITE TRAFFIC PAINT. CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING YELLOW TRAFFIC PAINT. ALL TRAFFIC PAINT SHALL MEET THE REQUIREMENTS OF AASHTO M248 TYPE "F").
13. ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS, LATEST EDITIONS.
14. SEE DETAILS FOR PARKING STALL MARKINGS, ADA SYMBOLS, SIGNS AND SIGN POSTS.
15. CENTERLINES SHALL BE FOUR (4) INCH WIDE YELLOW LINES. STOP BARS SHALL BE EIGHTEEN (18) INCHES WIDE.
16. PAINTED ISLANDS SHALL BE FOUR (4) INCH WIDE DIAGONAL LINES AT 3'-0" O.C. BORDERED BY FOUR (4) INCH WIDE LINES.



Lynx Parking Expansion

Lonza Biologics

Portsmouth, New Hampshire

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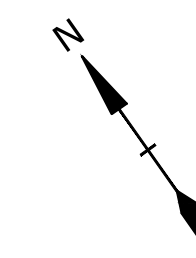
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| DATE: June 21, 2021 | | |
| FILE: L-0700-021-C-DSGN.DWG | | |
| DRAWN BY: JW/CJK | | |
| CHECKED BY: NAH/PMC | | |
| APPROVED BY: BLM | | |

SITE PLAN

SCALE: AS SHOWN

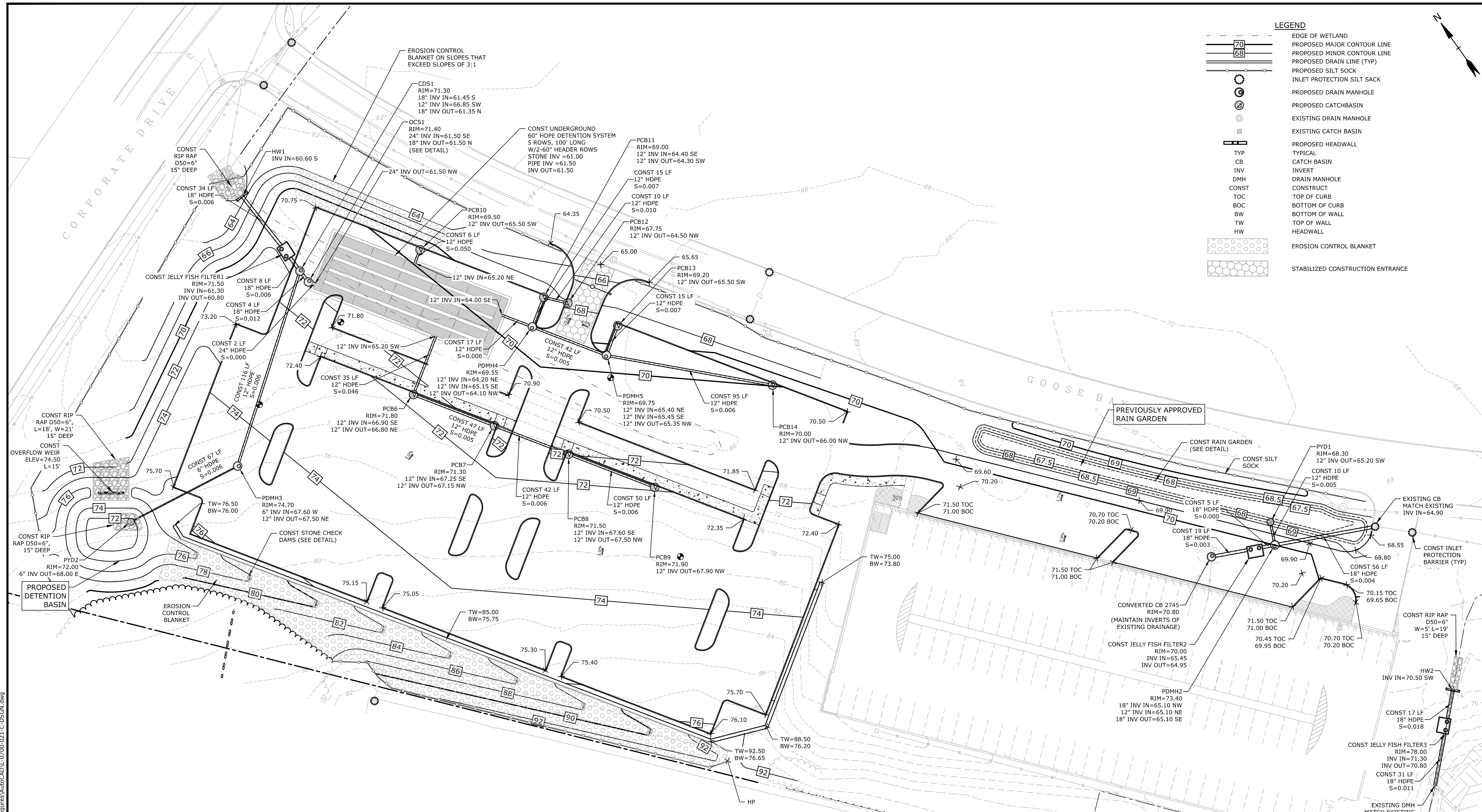
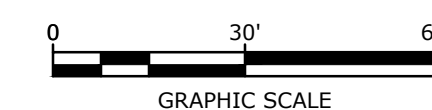
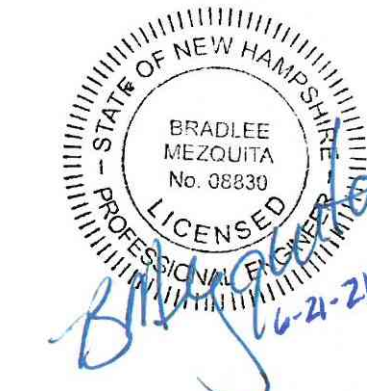
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 Figure & Legend: L-0700-021-C-DSGN.DWG
 Project: Lynx Parking Expansion



LEGEND

- EDGE OF WETLAND
- PROPOSED MAJOR CONTOUR LINE
- PROPOSED MINOR CONTOUR LINE
- PROPOSED DRAIN LINE (TYP)
- PROPOSED SILT SOCK
- INLET PROTECTION SILT SACK
- PROPOSED DRAIN MANHOLE
- PROPOSED CATCHBASIN
- EXISTING DRAIN MANHOLE
- EXISTING CATCH BASIN
- PROPOSED HEADWALL
- TYPICAL CATCH BASIN
- INVERT
- DRAIN MANHOLE
- CONSTRUCT TOP OF CURB
- CONSTRUCT BOTTOM OF CURB
- CONSTRUCT TOP OF WALL
- CONSTRUCT BOTTOM OF WALL
- HEADWALL
- EROSION CONTROL BLANKET
- STABILIZED CONSTRUCTION ENTRANCE



EROSION CONTROL NOTES:

1. INSTALL EROSION CONTROL BARRIERS AS SHOWN AS FIRST ORDER OF WORK.
2. SEE GENERAL EROSION CONTROL NOTES ON "EROSION CONTROL NOTES & DETAILS SHEET".
3. PROVIDE INLET PROTECTION AROUND ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. MAINTAIN FOR THE DURATION OF THE PROJECT.
4. INSTALL STABILIZED CONSTRUCTION EXIT(S).
5. INSPECT INLET PROTECTION AND PERIMETER EROSION CONTROL MEASURES DAILY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
6. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED, FERTILIZER AND MULCH.
7. CONSTRUCT EROSION CONTROL BLANKET ON ALL SLOPES STEEPER THAN 3:1.
8. PRIOR TO ANY WORK OR SOIL DISTURBANCE COMMENCING ON THE SUBJECT PROPERTY, INCLUDING MOVING OF EARTH, THE APPLICANT SHALL INSTALL ALL EROSION AND SILTATION MITIGATION AND CONTROL MEASURES AS REQUIRED BY STATE AND LOCAL PERMITS AND APPROVALS.
9. CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST AND WIND EROSION THROUGHOUT THE CONSTRUCTION PERIOD. DUST CONTROL MEASURES SHALL INCLUDE, BUT ARE NOT LIMITED TO, SPRINKLING WATER ON UNSTABLE SOILS SUBJECT TO ARID CONDITIONS.
10. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
11. ALL CATCH BASIN SUMPS AND PIPING SHALL BE THOROUGHLY CLEANED TO REMOVE ALL SEDIMENT AND DEBRIS AFTER THE PROJECT HAS BEEN FULLY PAVED. PROVIDE COPIES OF REPORT TO PEASE DEVELOPMENT AUTHORITY.
12. TEMPORARY SOIL STOCKPILE SHALL BE SURROUNDED WITH PERIMETER CONTROLS AND SHALL BE STABILIZED BY TEMPORARY EROSION CONTROL SEEDING. STOCKPILE AREAS TO BE LOCATED AS FAR AS POSSIBLE FROM THE DELINEATED EDGE OF WETLANDS.
13. SAFETY FENCING SHALL BE PROVIDED AROUND STOCKPILES OVER 10 FT.
14. CONCRETE TRUCKS WILL BE REQUIRED TO WASH OUT (IF NECESSARY) SHOOTS ONLY WITHIN AREAS WHERE CONCRETE HAS BEEN PLACED. NO OTHER WASH OUT WILL BE ALLOWED.

GRADING AND DRAINAGE NOTES:

1. COMPACTION REQUIREMENTS:
 - BELOW PAVED OR CONCRETE AREAS 95%
 - TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL 95%
 - BELOW LOAM AND SEED AREAS 90%
 - * ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557, METHOD C FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM-2922.
2. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION. CONTRACTOR TO VERIFY BENCHMARK LOCATIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
3. ALL STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE (HANCOR HI-Q, ADS N-12 OR EQUAL). ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
4. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE AND LAWN AREAS FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCES, EXITS, RAMPS AND LOADING DOCK AREAS ADJACENT TO THE BUILDING.
5. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CATCH BASINS AND DRAIN LINES, WITHIN THE LIMIT OF WORK, OF SEDIMENT IMMEDIATELY UPON COMPLETION OF CONSTRUCTION. PROVIDE COPIES OF REPORT TO PEASE DEVELOPMENT AUTHORITY.
6. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES.
7. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED FERTILIZER AND MULCH.
8. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.
9. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
10. SEE EXISTING CONDITIONS PLAN FOR BENCH MARK INFORMATION.
11. SEE UTILITY PLAN FOR ALL SITE UTILITY INFORMATION.
12. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.
13. ALL PROPOSED CATCH BASINS SHALL BE EQUIPPED WITH OIL/GAS SEPARATOR HOODS AND 4' SUMPS.
14. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.

Lynx Parking Expansion

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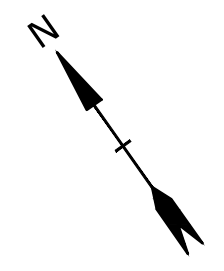
Portsmouth, New Hampshire

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| DATE: | June 21, 2021 |
| FILE: | L-0700-021-C-DSGN.DWG |
| DRAWN BY: | JW/CLK |
| CHECKED BY: | NAH/PMC |
| APPROVED BY: | BLM |

GRADING, DRAINAGE, AND EROSION CONTROL PLAN

SCALE: AS SHOWN

Last Saved: 6/16/2021 5:40pm By: Winsterson
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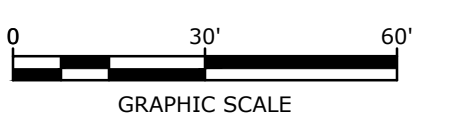
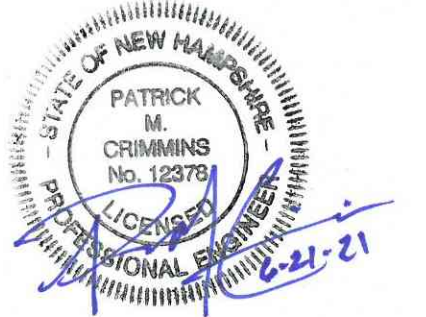
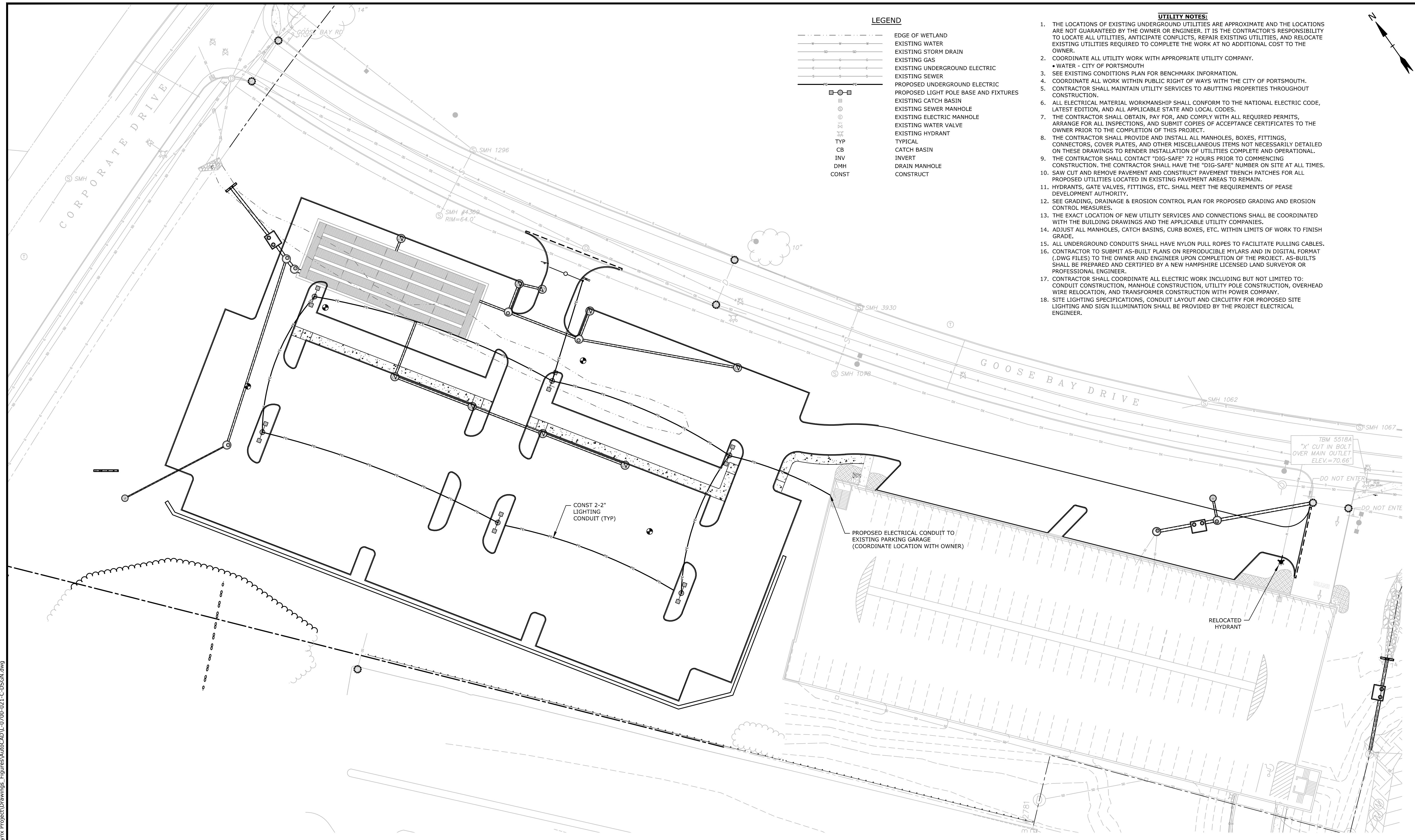


LEGEND

- EDGE OF WETLAND
- EXISTING WATER
- EXISTING STORM DRAIN
- EXISTING GAS
- EXISTING UNDERGROUND ELECTRIC
- EXISTING SEWER
- PROPOSED UNDERGROUND ELECTRIC
- PROPOSED LIGHT POLE BASE AND FIXTURES
- EXISTING CATCH BASIN
- EXISTING SEWER MANHOLE
- EXISTING ELECTRIC MANHOLE
- EXISTING WATER VALVE
- EXISTING HYDRANT
- TYPICAL
- CB CATCH BASIN
- INV INVERT
- DMH DRAIN MANHOLE
- CONST CONSTRUCT

UTILITY NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES, AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
2. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
3. WATER - CITY OF PORTSMOUTH
4. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION.
5. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH.
6. CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ADJACENT PROPERTIES THROUGHOUT CONSTRUCTION.
7. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
8. THE CONTRACTOR SHALL OBTAIN, PAY FOR, AND COMPLY WITH ALL REQUIRED PERMITS, ARRANGE FOR ALL INSPECTIONS, AND SUBMIT COPIES OF ACCEPTANCE CERTIFICATES TO THE OWNER PRIOR TO THE COMPLETION OF THIS PROJECT.
9. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
10. THE CONTRACTOR SHALL CONTACT "DIG-SAFE" 72 HOURS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE "DIG-SAFE" NUMBER ON SITE AT ALL TIMES.
11. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCHES FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
12. HYDRANTS, GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF PEASE DEVELOPMENT AUTHORITY.
13. SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR PROPOSED GRADING AND EROSION CONTROL MEASURES.
14. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE APPLICABLE UTILITY COMPANIES.
15. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
16. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES. CONTRACTOR TO SUBMIT AS-BUILT PLANS ON REPRODUCIBLE MYLARS AND IN DIGITAL FORMAT (DWG FILES) TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR OR PROFESSIONAL ENGINEER.
17. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
18. SITE LIGHTING SPECIFICATIONS, CONDUIT LAYOUT AND CIRCUITRY FOR PROPOSED SITE LIGHTING AND SIGN ILLUMINATION SHALL BE PROVIDED BY THE PROJECT ELECTRICAL ENGINEER.



Lynx Parking Expansion

Lonza Biologics

Portsmouth, New Hampshire

| MARK | DATE | DESCRIPTION |
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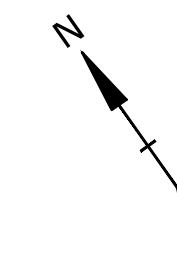
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UTILITY PLAN

SCALE: AS SHOWN

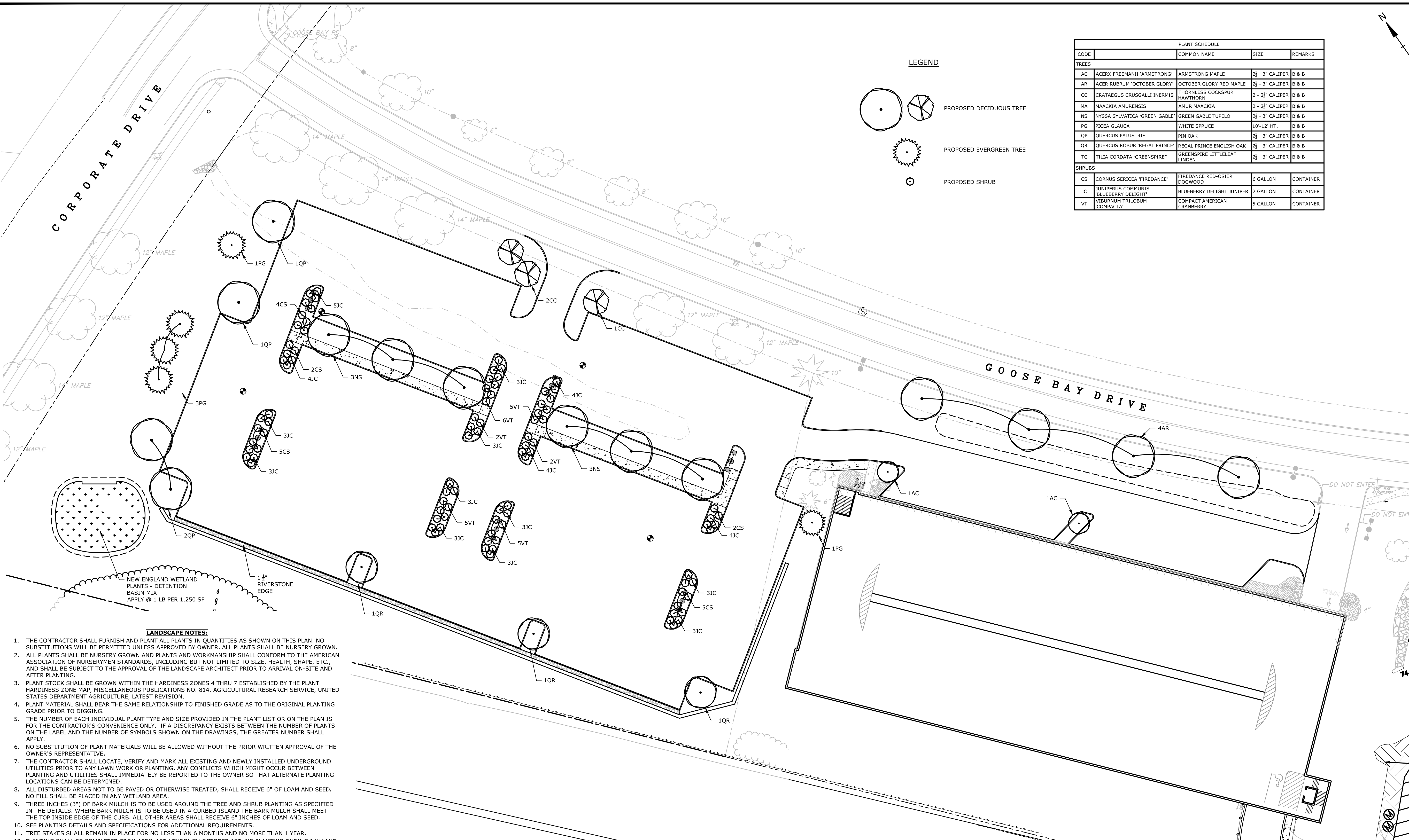
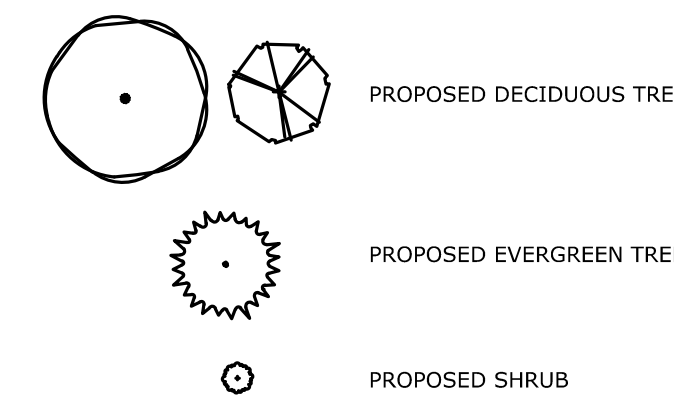
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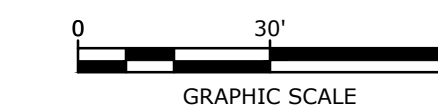
| PLANT SCHEDULE | | | |
|----------------|--|------------------------------|---------------------------|
| CODE | COMMON NAME | SIZE | REMARKS |
| TREES | | | |
| AC | ACER FREEMANTII 'ARMSTRONG' | ARMSTRONG MAPLE | 2 1/2" - 3" CALIPER B & B |
| AR | ACER RUBRUM 'OCTOBER GLORY' | OCTOBER GLORY RED MAPLE | 2 1/2" - 3" CALIPER B & B |
| CC | CRATAEGUS CRUGGALLI INERMIS | THORNLESS COCKSPUR HAWTHORN | 2 - 2 1/2" CALIPER B & B |
| MA | MAACKIA AMURENSIS | AMUR MAACKIA | 2 - 2 1/2" CALIPER B & B |
| NS | NYSSA SYLVATICA 'GREEN GABLE' | GREEN GABLE TUPELO | 2 1/2" - 3" CALIPER B & B |
| PG | PICEA GLAUCA | WHITE SPRUCE | 10'-12' HT. B & B |
| QP | QUERCUS PALUSTRIS | PIN OAK | 2 1/2" - 3" CALIPER B & B |
| QR | QUERCUS ROBUR 'REGAL PRINCE' | REGAL PRINCE ENGLISH OAK | 2 1/2" - 3" CALIPER B & B |
| TC | TILIA CORDATA 'GREENSPIRE' | GREENSPIRE LITTLELEAF LINDEN | 2 1/2" - 3" CALIPER B & B |
| SHRUBS | | | |
| CS | CORNUS SERICEA 'FIRE DANCE' | FIRE DANCE RED-OSIER DOGWOOD | 6 GALLON CONTAINER |
| JC | JUNIPERUS COMMUNIS 'BLUEBERRY DELIGHT' | BLUEBERRY DELIGHT JUNIPER | 2 GALLON CONTAINER |
| VT | VIBURNUM TRILOBUM 'COMPACTA' | COMPACT AMERICAN CRANBERRY | 5 GALLON CONTAINER |

LEGEND



LANDSCAPE NOTES:

1. THE CONTRACTOR SHALL FURNISH AND PLANT ALL PLANTS IN QUANTITIES AS SHOWN ON THIS PLAN. NO SUBSTITUTIONS WILL BE PERMITTED UNLESS APPROVED BY OWNER. ALL PLANTS SHALL BE NURSERY GROWN.
2. ALL PLANTS SHALL BE NURSERY GROWN AND PLANTS AND WORKMANSHIP SHALL CONFORM TO THE AMERICAN ASSOCIATION OF NURSERYMEN STANDARDS, INCLUDING BUT NOT LIMITED TO SIZE, HEALTH, SHAPE, ETC., AND SHALL BE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO ARRIVAL ON-SITE AND AFTER PLANTING.
3. PLANT STOCK SHALL BE GROWN WITHIN THE HARDINESS ZONES 4 THRU 7 ESTABLISHED BY THE PLANT HARDINESS ZONE MAP, MISCELLANEOUS PUBLICATIONS NO. 814, AGRICULTURAL RESEARCH SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE, LATEST REVISION.
4. PLANT MATERIAL SHALL BEAR THE SAME RELATIONSHIP TO FINISHED GRADE AS TO THE ORIGINAL PLANTING GRADE PRIOR TO DIGGING.
5. THE NUMBER OF EACH INDIVIDUAL PLANT TYPE AND SIZE PROVIDED IN THE PLANT LIST OR ON THE PLAN IS FOR THE CONTRACTOR'S CONVENIENCE ONLY. IF A DISCREPANCY EXISTS BETWEEN THE NUMBER OF PLANTS ON THE LABEL AND THE NUMBER OF SYMBOLS SHOWN ON THE DRAWINGS, THE GREATER NUMBER SHALL APPLY.
6. NO SUBSTITUTION OF PLANT MATERIALS WILL BE ALLOWED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE.
7. THE CONTRACTOR SHALL LOCATE, VERIFY AND MARK ALL EXISTING AND NEWLY INSTALLED UNDERGROUND UTILITIES PRIOR TO ANY LAWN WORK OR PLANTING. ANY CONFLICTS WHICH MIGHT OCCUR BETWEEN PLANTING AND UTILITIES SHALL IMMEDIATELY BE REPORTED TO THE OWNER SO THAT ALTERNATE PLANTING LOCATIONS CAN BE DETERMINED.
8. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED, SHALL RECEIVE 6" OF LOAM AND SEED. NO FILL SHALL BE PLACED IN ANY WETLAND AREA.
9. THREE INCHES (3") OF BARK MULCH IS TO BE USED AROUND THE TREE AND SHRUB PLANTING AS SPECIFIED IN THE DETAILS. WHERE BARK MULCH IS TO BE USED IN A CURBED ISLAND THE BARK MULCH SHALL MEET THE TOP INSIDE EDGE OF THE CURB. ALL OTHER AREAS SHALL RECEIVE 6" INCHES OF LOAM AND SEED.
10. SEE PLANTING DETAILS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
11. TREE STAKES SHALL REMAIN IN PLACE FOR NO LESS THAN 6 MONTHS AND NO MORE THAN 1 YEAR.
12. PLANTING SHALL BE COMPLETED FROM APRIL 15TH THROUGH OCTOBER 1ST. NO PLANTING DURING JULY AND AUGUST UNLESS SPECIAL PROVISIONS ARE MADE FOR DROUGHT.
13. PARKING AREA PLANTED ISLANDS TO HAVE MINIMUM OF 1'-0" TOPSOIL PLACED TO WITHIN 3 INCHES OF THE TOP OF CURB ELEVATION. REMOVE ALL CONSTRUCTION DEBRIS BEFORE PLACING TOPSOIL.
14. TREES SHALL BE PRUNED IN ACCORDANCE WITH THE LATEST EDITION OF ANSI A300 'TREES, SHRUBS AND OTHER WOOD PLANT MAINTENANCE STANDARD PRACTICES'.
15. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY, OR MORE OFTEN, IF NECESSARY DURING THE FIRST GROWING SEASON. LANDSCAPE CONTRACTOR SHALL COORDINATE WATERING SCHEDULE WITH OWNER DURING THE ONE (1) YEAR GUARANTEE PERIOD.
16. EXISTING TREES AND SHRUBS SHOWN ON THE PLAN ARE TO REMAIN UNDISTURBED. ALL EXISTING TREES AND SHRUBS SHOWN TO REMAIN ARE TO BE PROTECTED WITH A 4-FOOT SNOW FENCE PLACED AT THE DRIP LINE OF THE BRANCHES OR AT 8 FEET MINIMUM FROM THE TREE TRUNK. ANY EXISTING TREE OR SHRUB SHOWN TO REMAIN, WHICH IS REMOVED DURING CONSTRUCTION, SHALL BE REPLACED BY A TREE OF COMPARABLE SIZE AND SPECIES TREE OR SHRUB.
17. THE CONTRACTOR SHALL GUARANTEE ALL PLANTINGS TO BE IN GOOD HEALTHY, FLOURISHING AND ACCEPTABLE CONDITION FOR A PERIOD OF ONE (1) YEAR BEGINNING AT THE DATE OF ACCEPTANCE OF SUBSTANTIAL COMPLETION. ALL GRASSES, TREES AND SHRUBS THAT, IN THE OPINION OF THE LANDSCAPE ARCHITECT, SHOW LESS THAN 80% HEALTHY GROWTH AT THE END OF ONE YEAR PERIOD SHALL BE REPLACED BY THE CONTRACTOR.
18. UPON EXPIRATION OF THE CONTRACTOR'S ONE YEAR GUARANTEE PERIOD, THE OWNER SHALL BE RESPONSIBLE FOR LANDSCAPE MAINTENANCE INCLUDING WATERING DURING PERIODS OF DROUGHT.
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL PLANTING AND LAWNS AGAINST DAMAGE FROM ONGOING CONSTRUCTION. THIS PROTECTION SHALL BEGIN AT THE TIME THE PLANTING IS INSTALLED AND CONTINUE UNTIL THE FORMAL ACCEPTANCE OF ALL THE PLANTINGS.
20. PRE-PURCHASE PLANT MATERIAL AND ARRANGE FOR DELIVERY TO MEET PROJECT SCHEDULE AS REQUIRED IT MAY BE NECESSARY TO PRE-DIG CERTAIN SPECIES WELL IN ADVANCE OF ACTUAL PLANTING DATES.



Lynx Parking Expansion

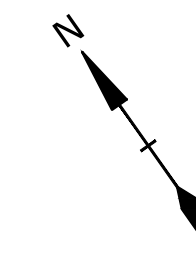
Lonza Biologics

Portsmouth, New Hampshire

| | | |
|--------------|-----------|-----------------------|
| MARK | DATE | DESCRIPTION |
| A | 6/21/2021 | TAC SUBMISSION |
| PROJECT NO: | | L-0700-021 |
| DATE: | | June 21, 2021 |
| FILE: | | L-0700-021-C-DSGN.DWG |
| DRAWN BY: | | JW/CJK |
| CHECKED BY: | | NAH/PMC |
| APPROVED BY: | | BLM |

LANDSCAPE PLAN

SCALE: AS SHOWN



| Symbol | Qty | Label | Arrangement | Description |
|--------|-----|-------|-------------|--|
| | 6 | S5-2 | BACK-BACK | GLEON-SA2C-740-U-5WQ/ SSS4A25ASFN2 (25' AFG) |
| | 4 | W4 | SINGLE | GWC-SA1C-740-U-SL4/WALL MTD 15' AFG |

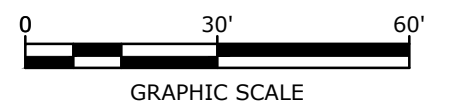
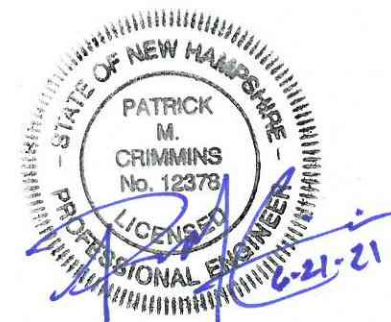
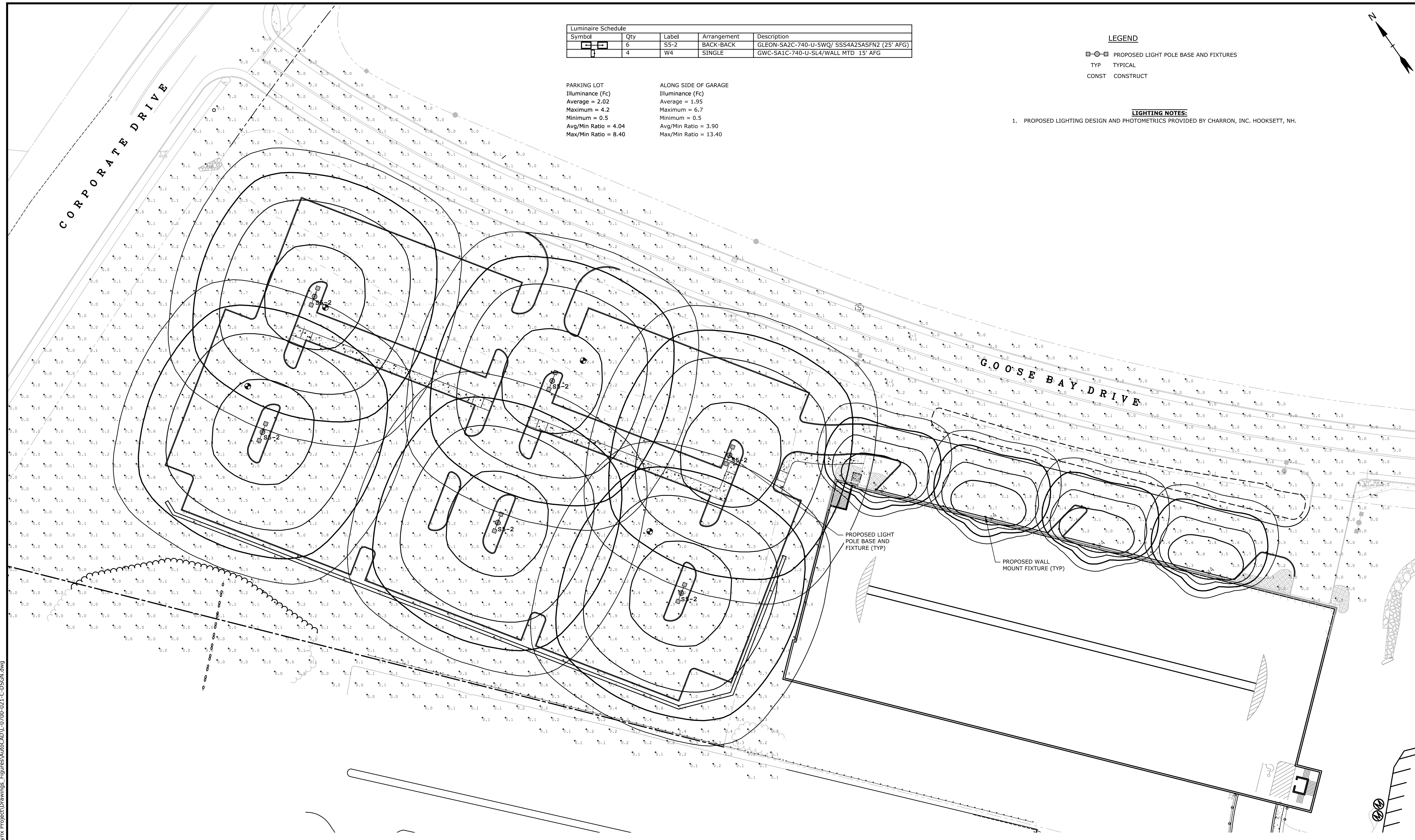
LEGEND

- PROPOSED LIGHT POLE BASE AND FIXTURES
- TYP TYPICAL
- CONST CONSTRUCT

LIGHTING NOTES:

1. PROPOSED LIGHTING DESIGN AND PHOTOMETRICS PROVIDED BY CHARRON, INC. HOOKSETT, NH.

| | |
|--|--|
| <p>PARKING LOT Illuminance (Fc) Average = 2.02 Maximum = 4.2 Minimum = 0.5 Avg/Min Ratio = 4.04 Max/Min Ratio = 8.40</p> | <p>ALONG SIDE OF GARAGE Illuminance (Fc) Average = 1.95 Maximum = 6.7 Minimum = 0.5 Avg/Min Ratio = 3.90 Max/Min Ratio = 13.40</p> |
|--|--|



Lynx Parking Expansion

Lonza Biologics

Portsmouth,
New Hampshire

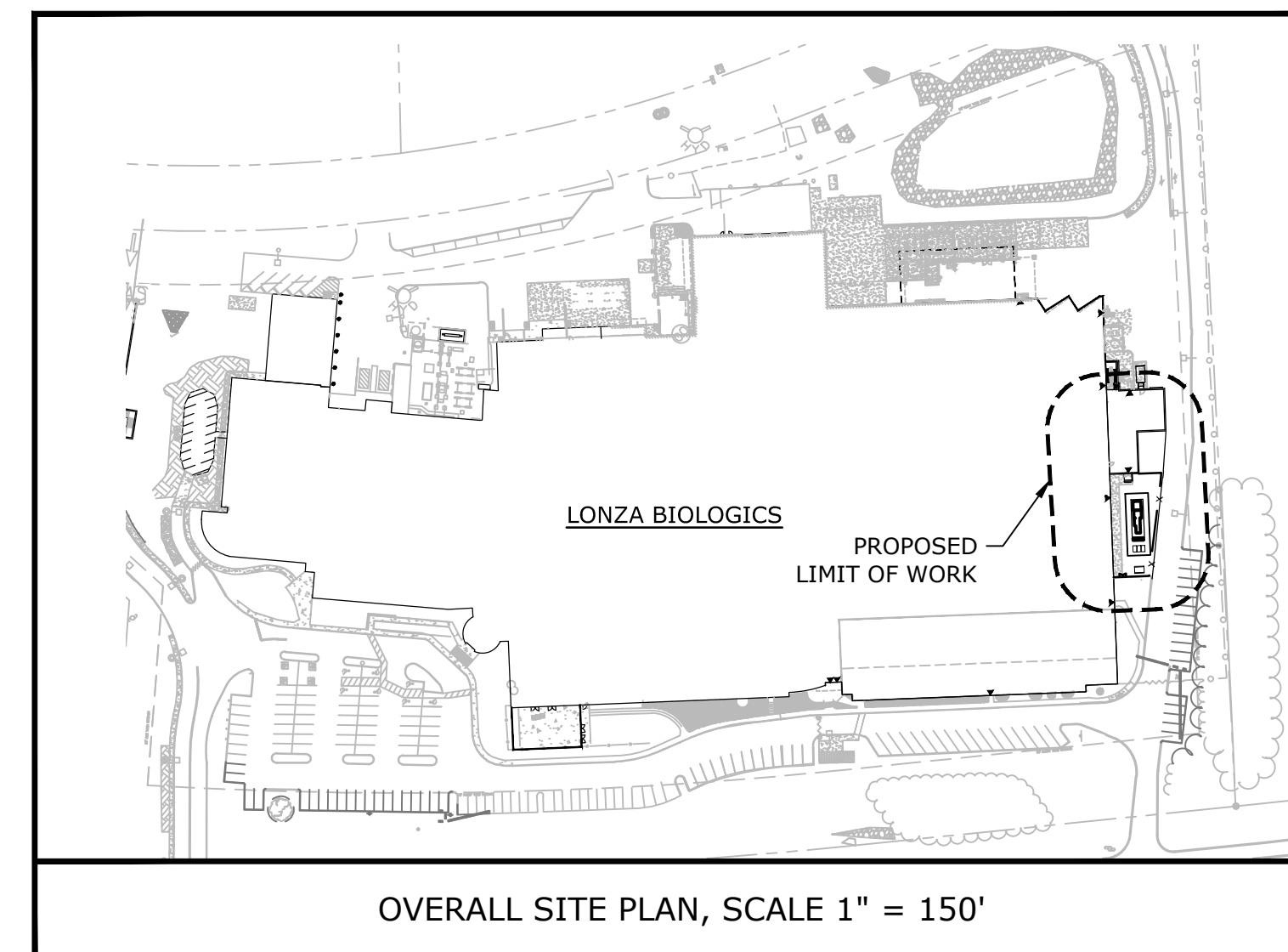
| MARK | DATE | DESCRIPTION |
|------|-----------|----------------|
| A | 6/21/2021 | TAC SUBMISSION |

| | |
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| APPROVED BY: | BLM |

PHOTOMETRIC LIGHTING PLAN

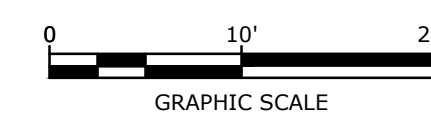
SCALE: AS SHOWN

C-106



STATE OF NEW HAMPSHIRE
 BRADLEE MEZOUTA
 No. 06830
 LICENSED PROFESSIONAL ENGINEER
 6-21-21

STATE OF NEW HAMPSHIRE
 PATRICK M. CRIMMINS
 No. 12878
 LICENSED PROFESSIONAL ENGINEER
 6-21-21



- LEGEND**
- PROPERTY LINE
 - PROPOSED EDGE OF PAVEMENT
 - PROPOSED VERTICAL GRANITE CURB
 - x-x- PROPOSED FENCE
 - PROPOSED PAVEMENT SECTION
 - PROPOSED CONCRETE PAD
 - PROPOSED BOLLARD
 - BLDG
 - TYP BUILDING
 - COORD TYPICAL
 - VIF VERIFY IN FIELD
 - VGC VERTICAL GRANITE CURB
 - CONST CONSTRUCT
 - R RADIUS
 - - - - - EXISTING CHAIN LINK FENCE
 - - - - - SETBACK
 - - - - - EXISTING TREE LINE
 - - - - - PROPOSED TREE LINE
 - - - - - EXISTING ELECTRIC LINE
 - - - - - EXISTING WATER LINE
 - - - - - EXISTING STORM DRAIN LINE

Proposed Generator

Lonza Biologics

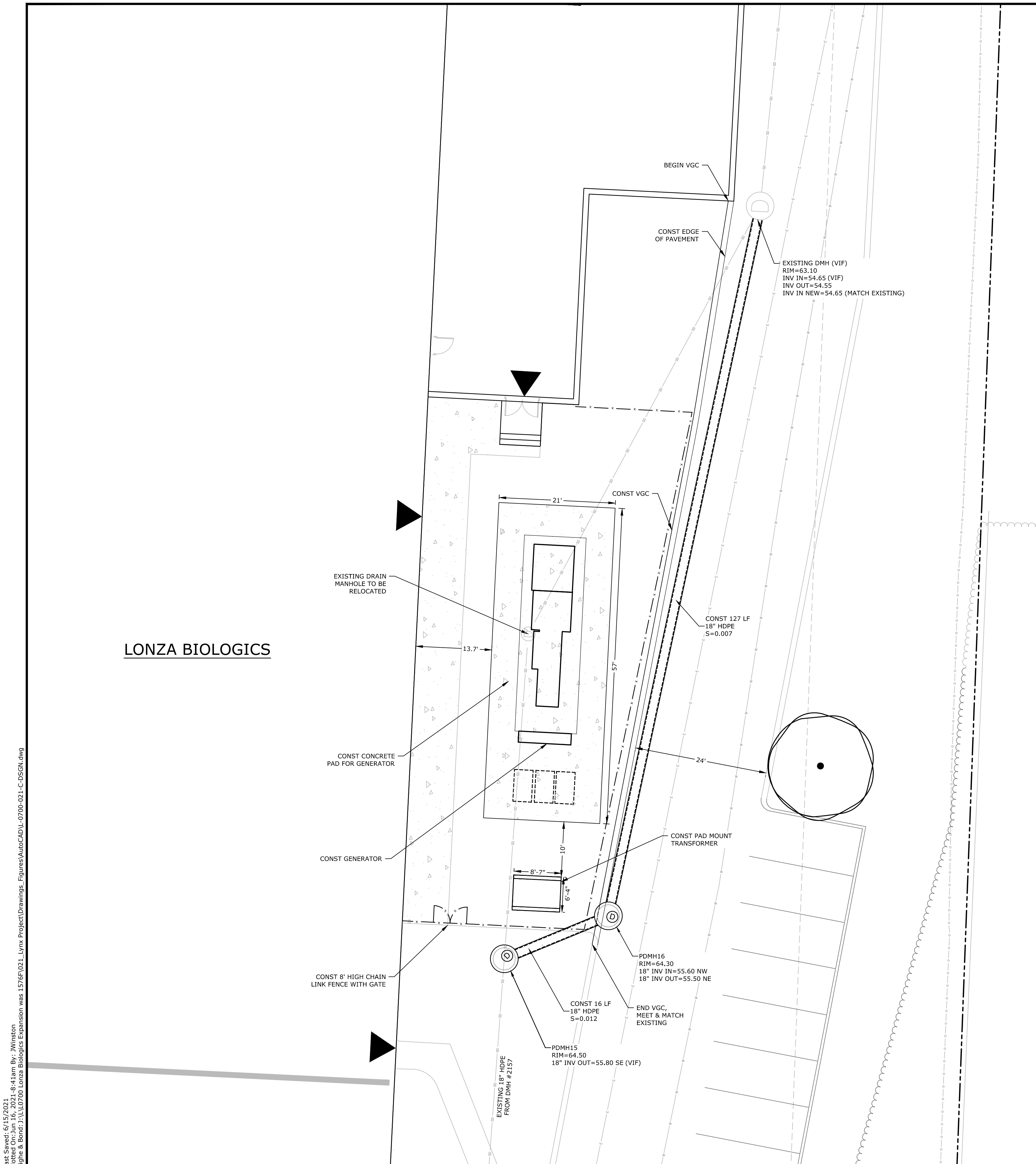
Portsmouth,
New Hampshire

| MARK | DATE | TAC SUBMISSION | DESCRIPTION |
|-----------------------------|-----------|----------------|-------------|
| A | 6/21/2021 | TAC SUBMISSION | |
| PROJECT NO: L-0700-021 | | | |
| DATE: June 21, 2021 | | | |
| FILE: L-0700-021-C-DSGN.DWG | | | |
| DRAWN BY: JRW | | | |
| CHECKED BY: NAH/PMC | | | |
| APPROVED BY: BLM | | | |

GENERATOR PAD PLAN

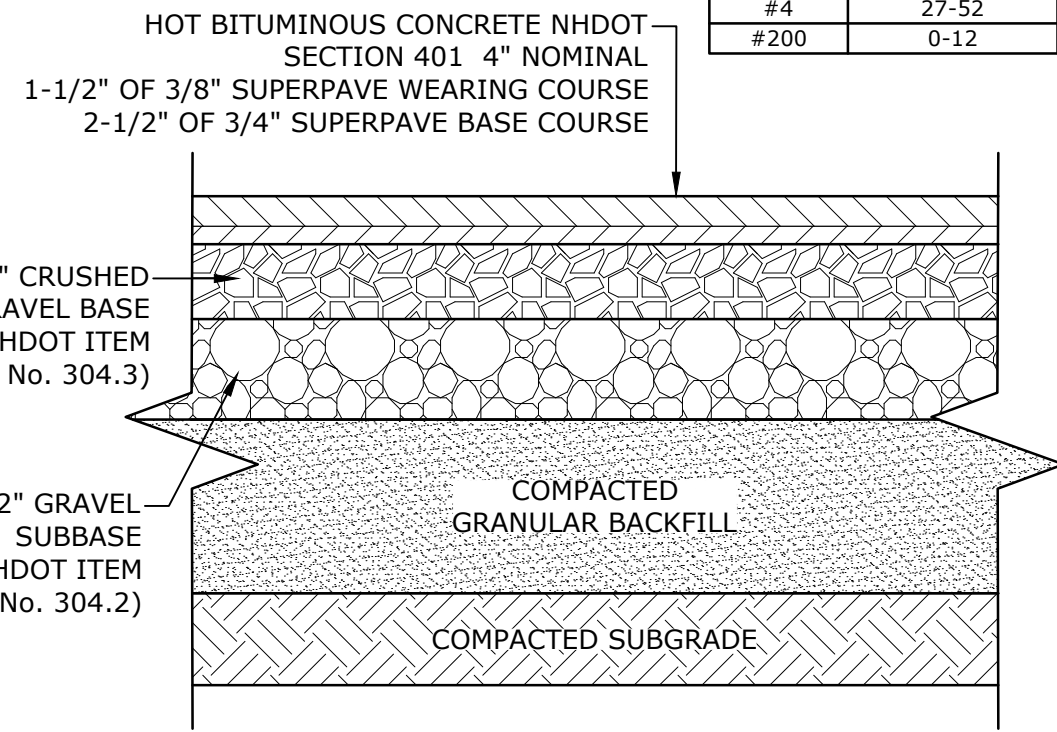
SCALE: AS SHOWN

SEE SHEETS C-101, C-102.1, C-103 & C-104 FOR DEMOLITION, SITE, GRADING, DRAINAGE AND EROSION CONTROL, AND UTILITY NOTES



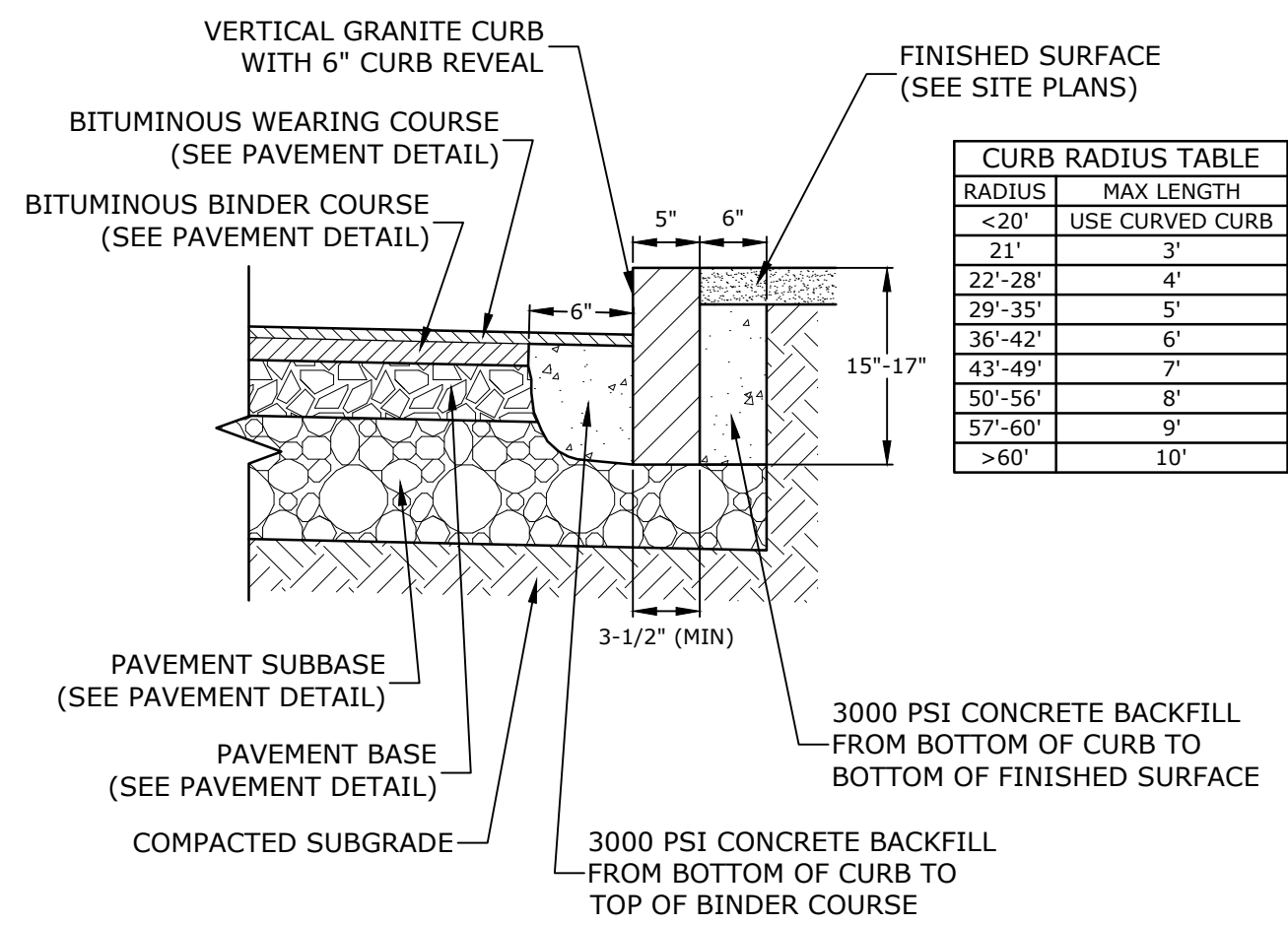
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 Figure & Legend: L:\0700-Lonza Biologics Expansion was 15766f021_Lonza Project\Drawings_Figures\AutoCAD\0700-021-C-DSGN.dwg

| NHDOT ITEM No. 304.2 (GRAVEL) | | NHDOT ITEM No. 304.3 (CRUSHED GRAVEL) | |
|----------------------------------|-----------|--|-----------|
| SIEVE SIZE | % PASSING | SIEVE SIZE | % PASSING |
| 6" | 100 | 3" | 100 |
| #4 | 25-70 | 2" | 95-100 |
| #200 | 0-12 | #4 | 55-85 |
| | | #200 | 0-12 |



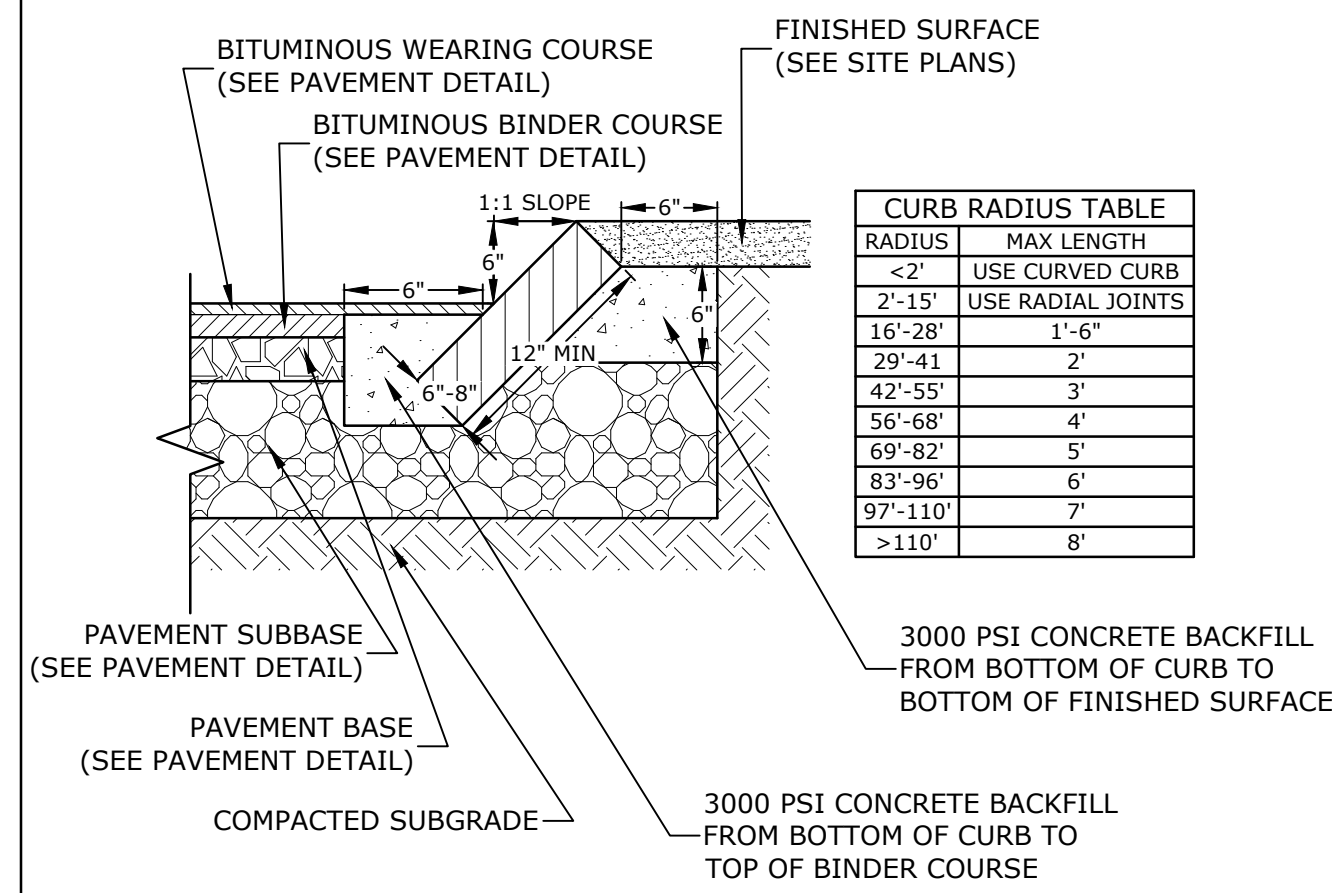
- NOTES:
- SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
 - SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
 - A TACK COAT SHALL BE PLACED ON TOP OF BINDER COURSE PAVEMENT PRIOR TO PLACING WEARING COURSE.
 - FINAL PAVEMENT DESIGN TO BE DETERMINED BY GEOTECHNICAL ENGINEER

TYPICAL PAVEMENT SECTION
NO SCALE



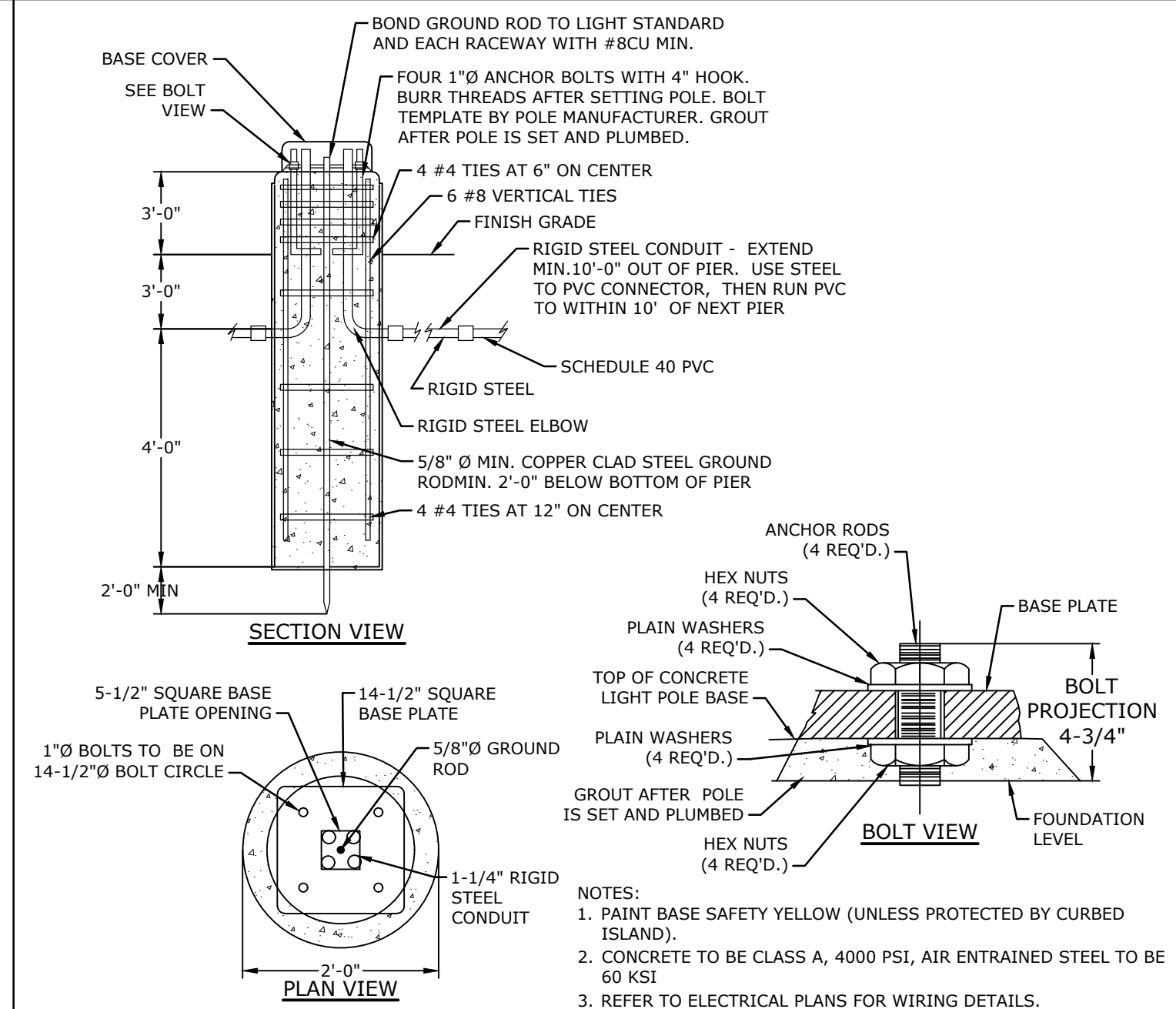
- NOTES:
- SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
 - ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
 - MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
 - MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
 - MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
 - ALL RADII 20 FEET AND SMALLER SHALL BE CONSTRUCTED USING CURVED SECTIONS.
 - JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

VERTICAL GRANITE CURB
NO SCALE



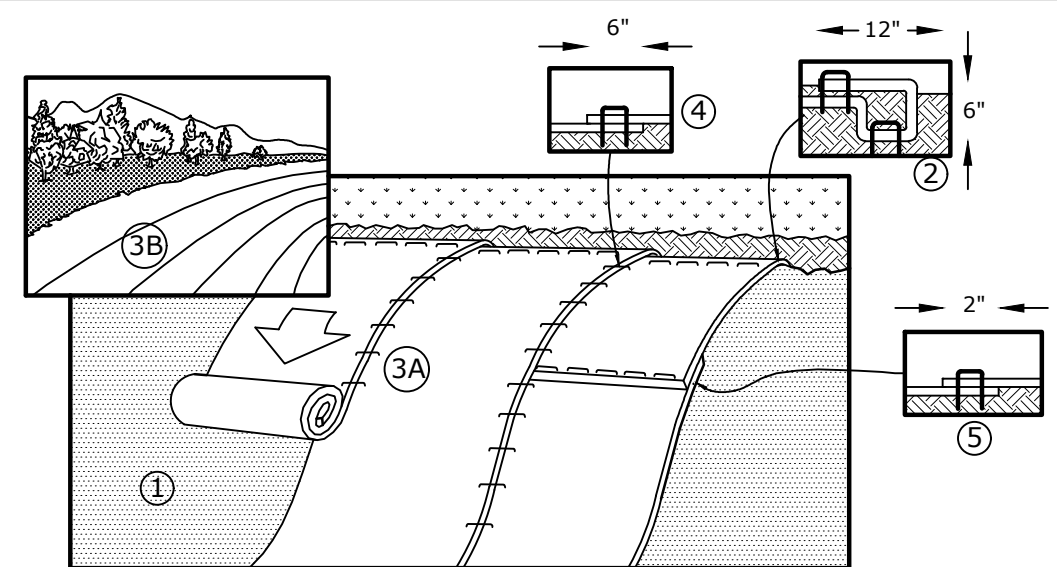
- NOTES:
- SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
 - ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
 - MINIMUM LENGTH OF STRAIGHT CURB STONES = 18"
 - MAXIMUM LENGTH OF STRAIGHT CURB STONES = 8"
 - MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
 - JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

SLOPED GRANITE CURB
NO SCALE



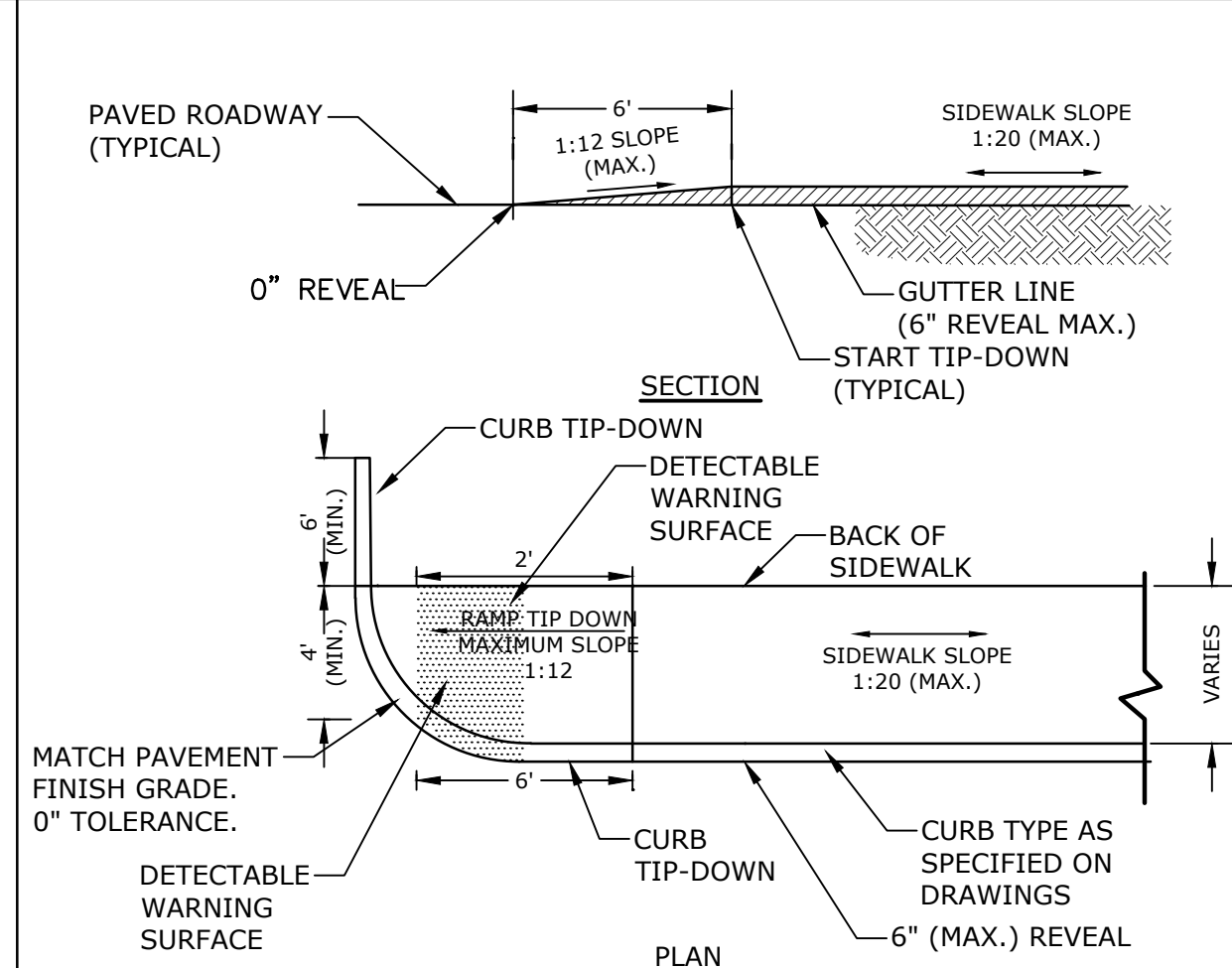
- NOTES:
- PAINT BASE SAFETY YELLOW (UNLESS PROTECTED BY CURBED ISLAND).
 - CONCRETE TO BE CLASS A, 4000 PSI, AIR ENTRAINED STEEL TO BE 60 KSI.
 - REFER TO ELECTRICAL PLANS FOR WIRING DETAILS.
 - LIGHT POLE BASE DETAIL FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL, TO INCLUDE PERFORMANCE SPECIFICATIONS, CALCULATIONS AND NH LICENSED STRUCTURAL ENGINEER'S STAMP FOR LIGHT POLE FOUNDATION.

TYPICAL LIGHT POLE BASE
NO SCALE



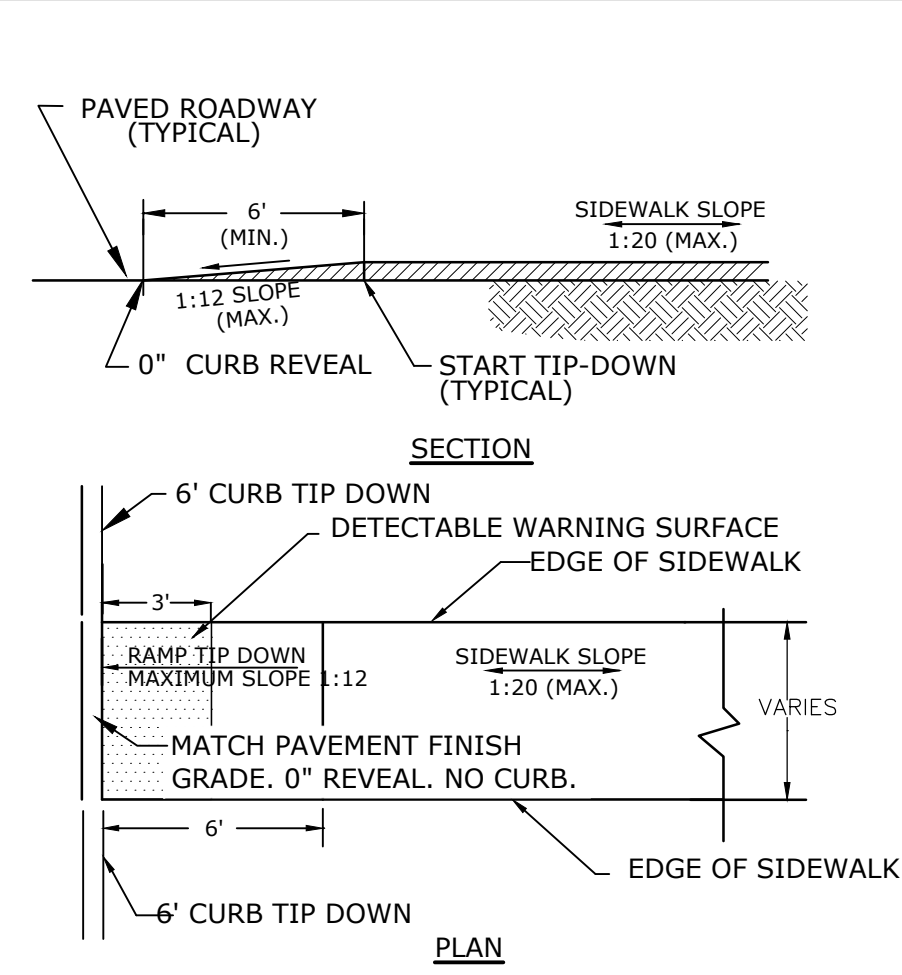
- NOTES:
- PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER AND SEED.
 - BEGIN AT THE TOP OF THE SLOPE, 36" OVER THE GRADE BREAK, BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UPSLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES SPACED 12" APART ACROSS THE WIDTH OF THE BLANKET.
 - ROLL THE BLANKETS DOWN THE SLOPE. ALL BLANKETS MUST BE SECURELY FASTENED TO THE SOIL SURFACE BY PLACING STAPLES IN APPROPRIATE LOCATIONS AS SHOWN ON THE STAPLE PATTERN GUIDE.
 - STAPLE LENGTHS SHALL BE A MINIMUM OF 8 INCHES.
 - EROSION CONTROL BLANKET SHALL BE INSTALLED WHERE SHOWN ON PLANS AND WHERE SLOPES EXCEED 3:1.

EROSION CONTROL BLANKET FOR SLOPE PROTECTION
NO SCALE



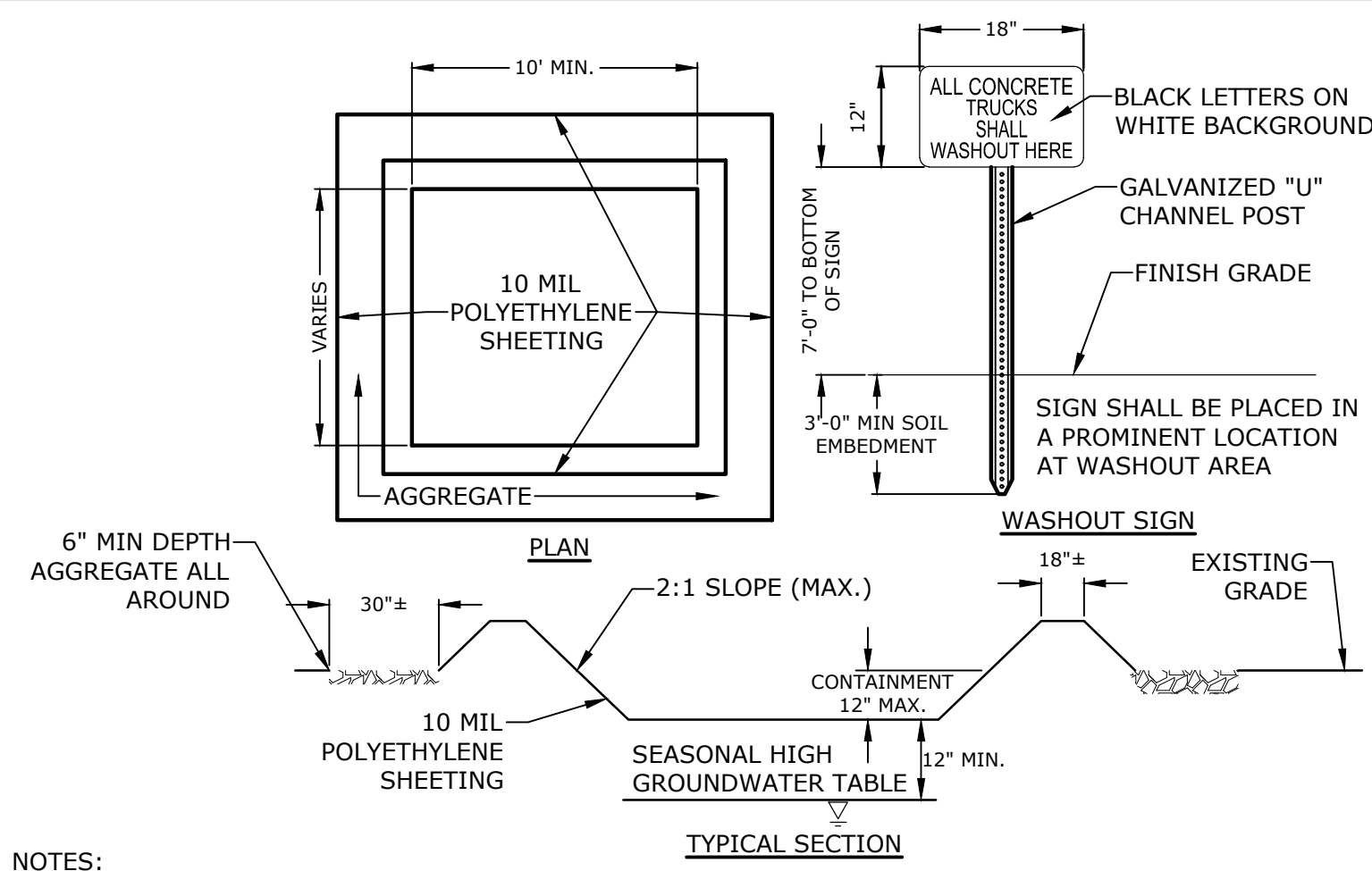
- NOTES:
- RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
 - PROVIDE 6" COMPACTED CRUSHED GRAVEL BASE BENEATH RAMPS.
 - DETECTABLE WARNING STRIP SHALL BE ADA SOLUTIONS, INC. CAST IN PLACE RAMP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

CORNER TIP DOWN RAMP
NO SCALE



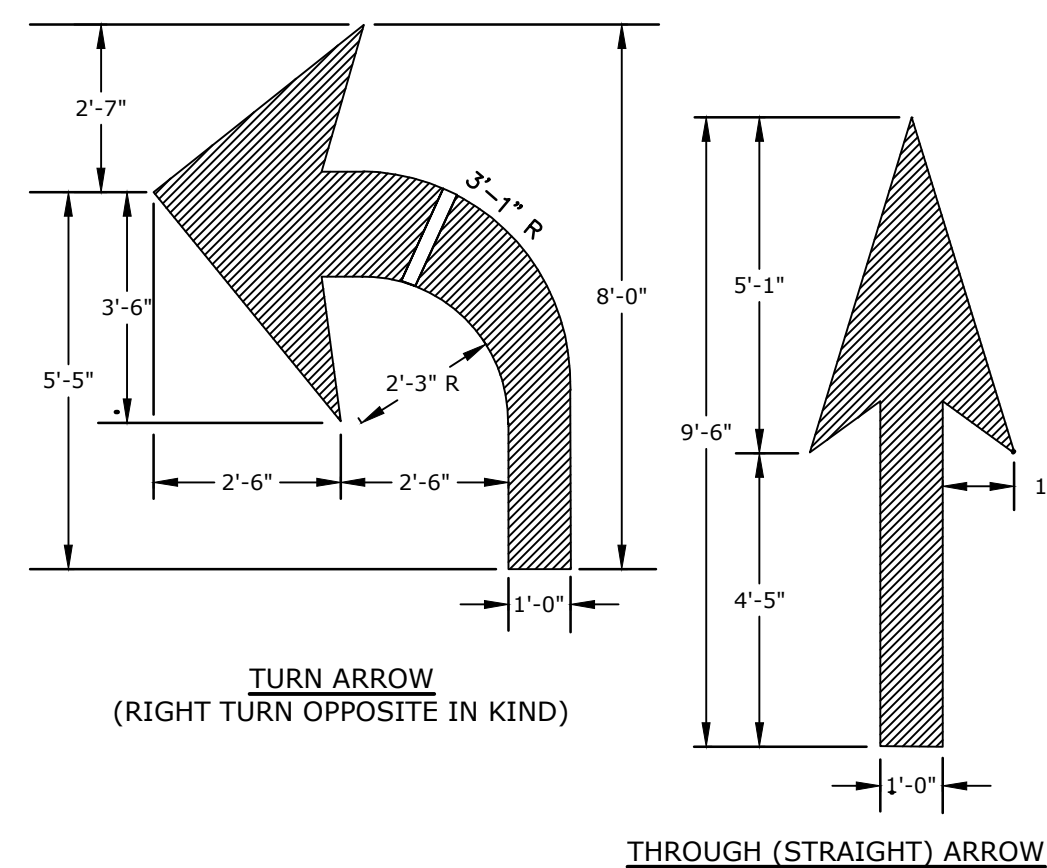
- NOTES:
- RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
 - PROVIDE 6" COMPACTED CRUSHED GRAVEL BASE BENEATH RAMPS.
 - DETECTABLE WARNING STRIP SHALL BE ADA SOLUTIONS, INC. CAST IN PLACE RAMP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

SIDEWALK TIP-DOWN RAMP
NO SCALE



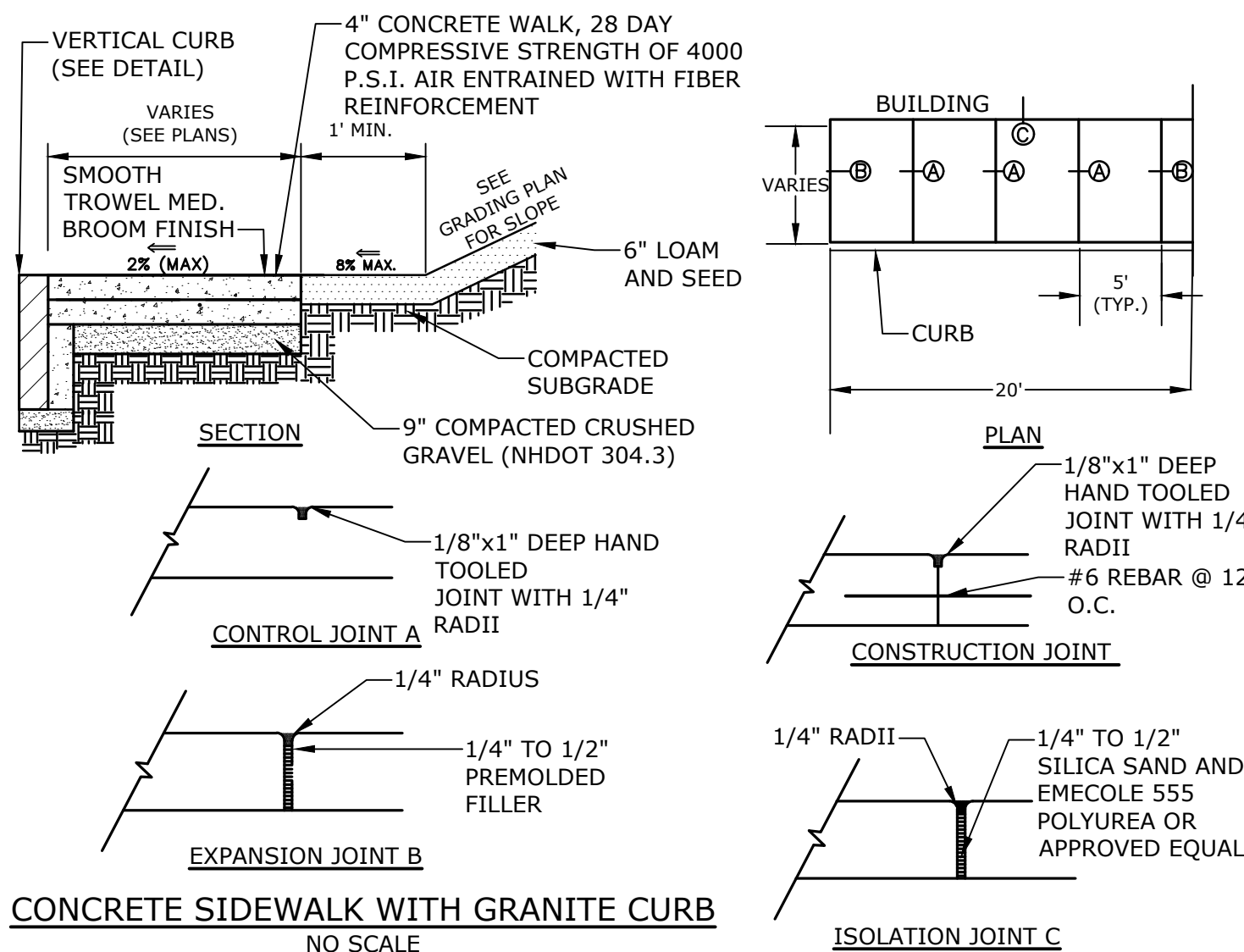
- NOTES:
- CONTAINMENT MUST BE STRUCTURALLY SOUND AND LEAK FREE AND CONTAIN ALL LIQUID WASTES.
 - CONTAINMENT DEVICES MUST BE OF SUFFICIENT QUANTITY OR VOLUME TO COMPLETELY CONTAIN THE LIQUID WASTES GENERATED.
 - WASHOUT MUST BE CLEANED OR NEW FACILITIES CONSTRUCTED AND READY TO USE ONCE WASHOUT IS 75% FULL.
 - WASHOUT AREA(S) SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
 - ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
 - AT LEAST WEEKLY REMOVE ACCUMULATION OF SAND AND AGGREGATE AND DISPOSE OF PROPERLY.

CONCRETE WASHOUT AREA
NO SCALE

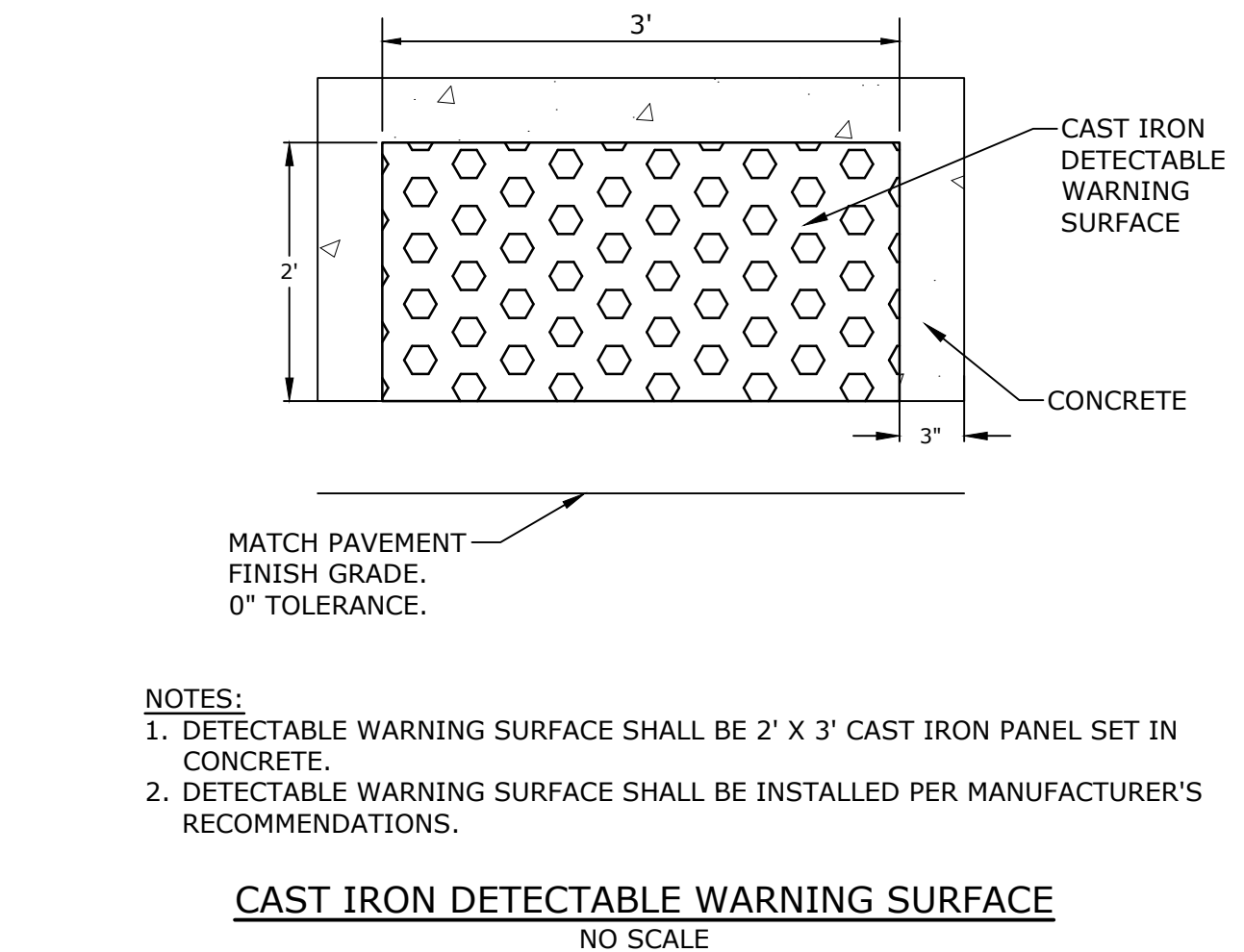


PAVEMENT MARKING NOTES:

- ALL WORDS AND SYMBOLS SHALL BE RETROREFLECTIVE WHITE AND SHALL CONFORM TO THE LATEST VERSION OF THE MUTCD.
- COMBINATION ARROWS MAY BE COMPRISED OF 2 SINGLE ARROWS (e.g. TURN AND THROUGH ARROWS). HOWEVER, THE SHAFTS OF THE ARROWS SHALL COINCIDE AS SHOWN.
- PREFORMED SYMBOLS SHALL BE PRE-CUT BY THE MANUFACTURER.
- WRONG-WAY ARROWS SHALL NOT BE SUBSTITUTED FOR THROUGH ARROWS.
- ALL SYMBOLS SHALL BE CONSTRUCTED USING FAST DRYING TRAFFIC PAINT MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY THE MANUFACTURER.



CONCRETE SIDEWALK WITH GRANITE CURB
NO SCALE



- NOTES:
- DETECTABLE WARNING SURFACE SHALL BE 2' X 3' CAST IRON PANEL SET IN CONCRETE.
 - DETECTABLE WARNING SURFACE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

CAST IRON DETECTABLE WARNING SURFACE
NO SCALE



| MARK | DATE | TAC SUBMISSION DESCRIPTION |
|--------------|-----------------------|----------------------------|
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| APPROVED BY: | BLM | |

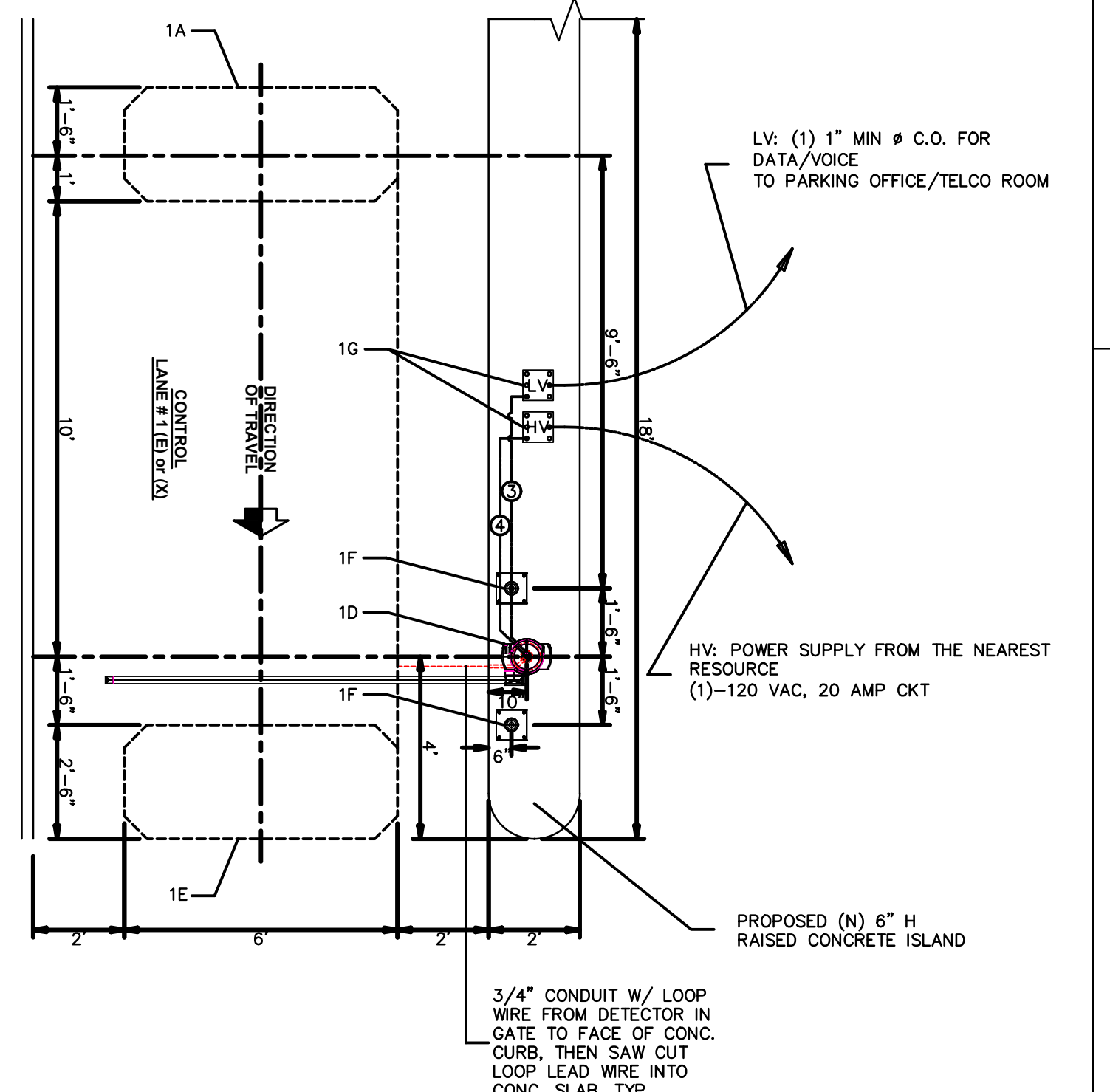
DETAILS

SCALE: AS SHOWN

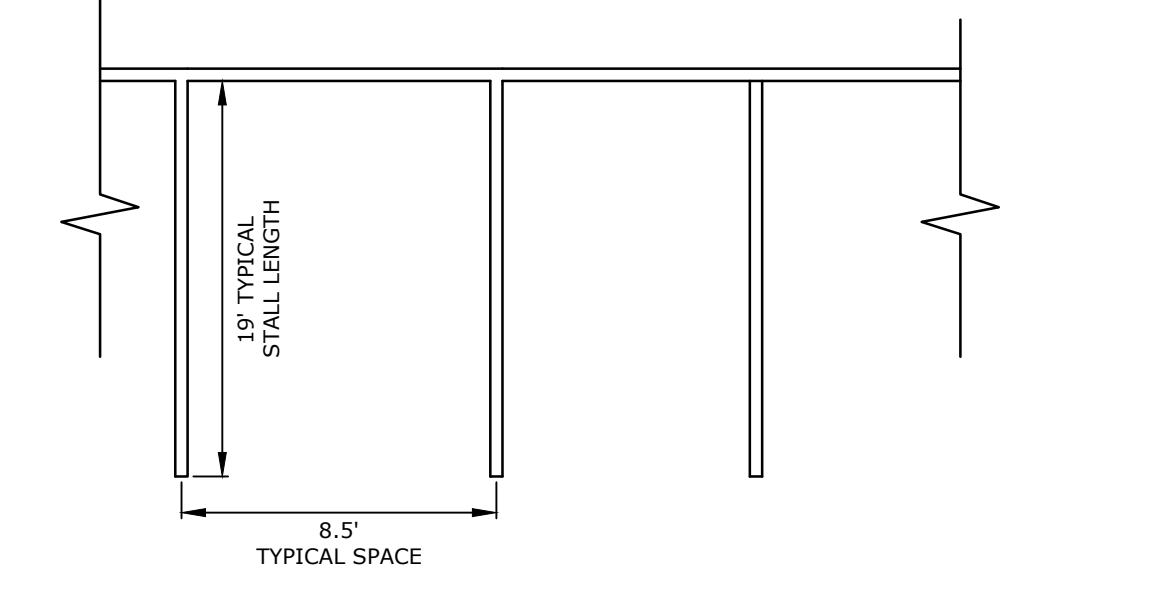
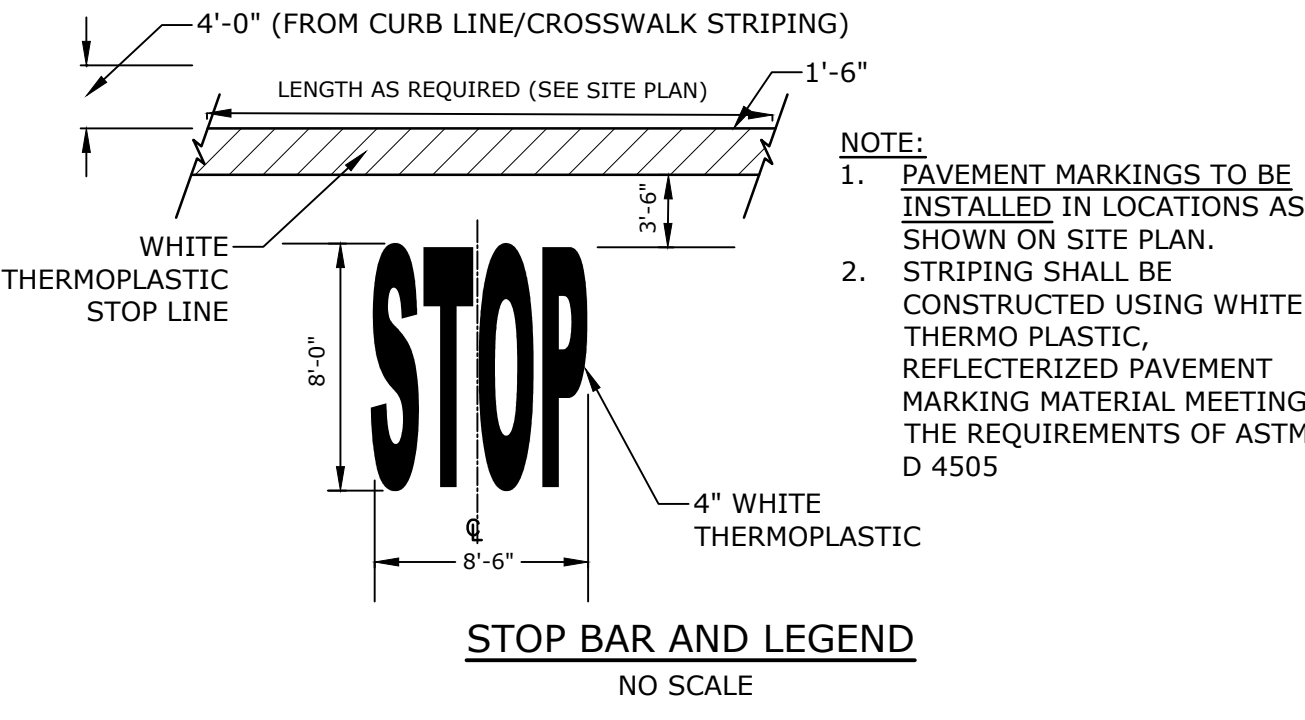
- LEGEND**
- ① 1" Ø C.O., ARCNET CABLE (DATA)
 - ② 22/4 CAT3, PVC (VOICE)
 - ③ 3/4" Ø C.O., 22/8 CABLE O.S., PVC (DATA)
 - ④ ONE (1) 115VAC, 20AMP CIRCUIT (POWER)

- CONTROL LANE GENERAL NOTES:**
- THIS DRAWING IS NOT TO BE USED FOR ELECTRICAL CIRCUITRY, REFER TO ELECTRICAL DRAWINGS.
 - _____ DENOTES CONDUIT AND WIRE FOR POWER OR PULL WIRE FOR CONTROLS BY ELECTRICAL CONTRACTOR.
 - _____ DENOTES CONDUIT AND WIRE BY ELECTRICAL CONTRACTOR.
 - C.O. (CONDUIT ONLY) DENOTES CONDUIT AND PULL WIRE.
 - STUB-UP CONDUIT 8" ABOVE TOP OF CONCRETE ISLAND PLUS 3'-0" OF WIRE FOR PARKING EQUIPMENT SUPPLIER.
 - ELECTRICAL CONTRACTOR SHALL VERIFY WITH PARKING EQUIPMENT SUPPLIER AS TO THE ACTUAL POWER REQUIREMENTS TO EACH LOCATION BEFORE START OF WORK.
 - ELECTRICAL CONTRACTOR SHALL VERIFY WITH INTERCOM SYSTEM SUPPLIER AS TO THE ACTUAL CONDUIT SIZE REQUIRED BEFORE START OF WORK.
 - CONCRETE CURBS SHALL BE 6" HIGH UNO.
 - FOR ADDITIONAL PARKING EQUIPMENT REQUIREMENTS, REFER TO SPECS.
 - COORDINATE WITH ELECTRICAL DRAWINGS.

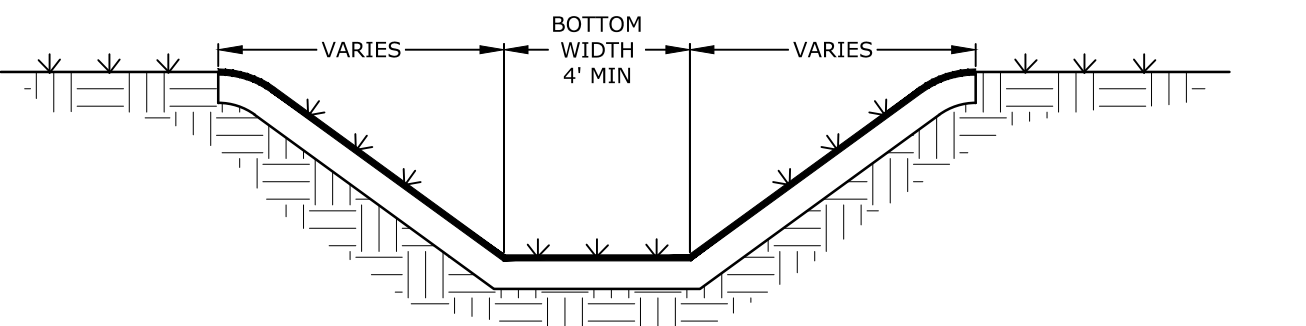
- PARKING CONTROL EQUIPMENT LIST:**
- CONTROL LANE #1 (E) or (X)
- 1A - ARMING LOOP DETECTOR ASSEMBLY
 - 1B - SKIDATA ENTRY/EXIT COLUMN UNLIMITED (See Detail)
 - 1C - TWO-WAY INTERCOM UNIT
 - 1D - SKIDATA BARRIER GATE (See Detail)
 - 1E - CLOSING LOOP DETECTOR ASSEMBLY
 - 1F - PROTECTION POST
 - 1G - INGROUND JUNCTION BOXES (6"X8"X4") FOR POWER & DATA



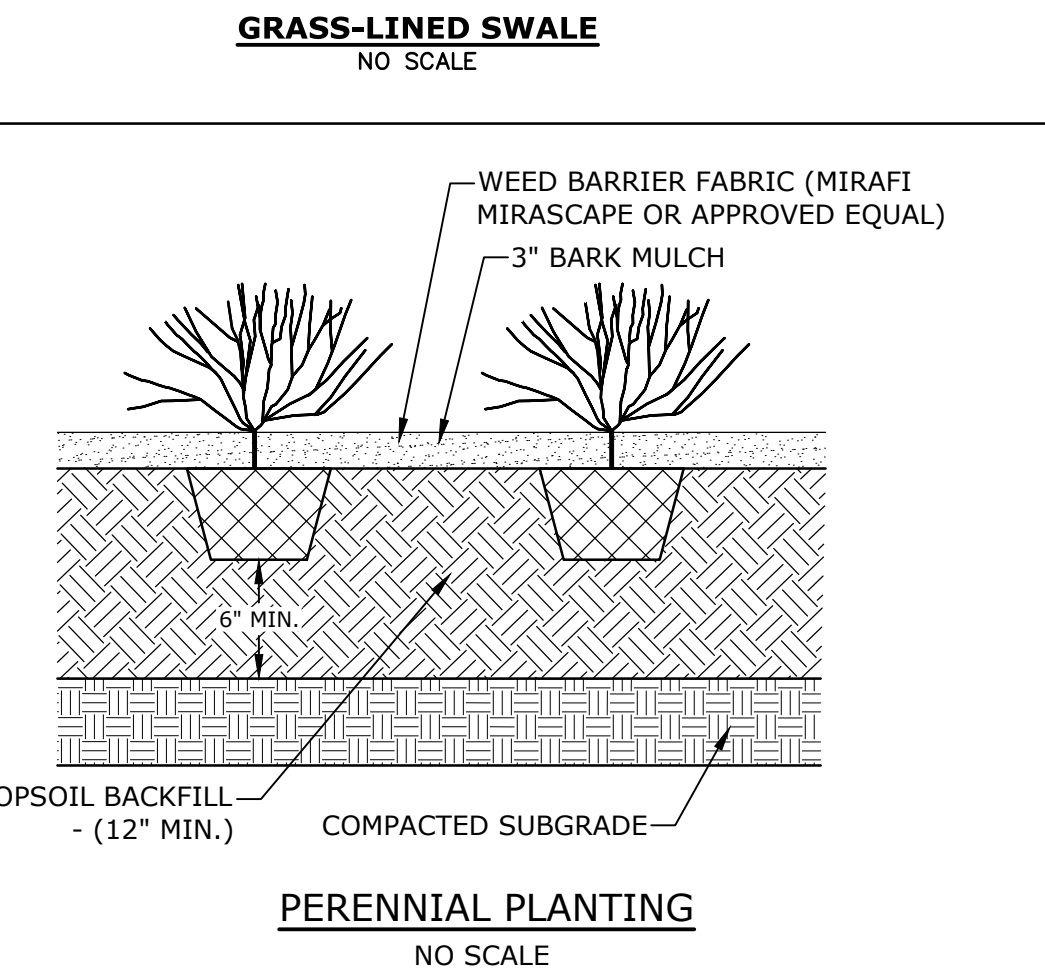
TYPICAL PARKING EQUIPMENT DETAILS
NO SCALE



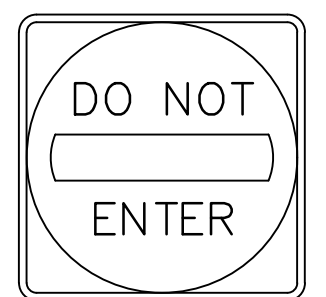
STALL STRIPING-SINGLE STRIPE
NO SCALE



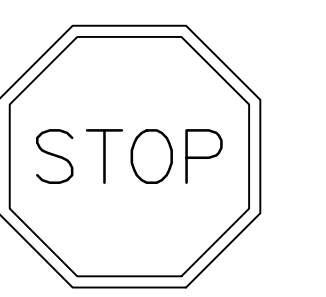
- NOTES:**
- THE FOUNDATION AREA OF THE WATERWAY SHALL BE CLEARED AND GRUBBED OF ALL OBJECTIONABLE MATERIAL. MATERIALS REMOVED SHALL BE DISPOSED OF SO THEY WILL NOT INTERFERE WITH THE CONSTRUCTION OR PROPER FUNCTIONING OF THE WATERWAY.
 - THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE AND CROSS-SECTION AS REQUIRED TO MEET THE DESIGN CRITERIA. THE WATERWAY SHALL BE FREE OF IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
 - 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.
 - 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.
 - INSTALL EROSION CONTROL MATTING WITHIN THE WATERWAY FOR ADDITIONAL STABILIZATION.
 - VEGETATION SHALL BE ESTABLISHED IN THE SWALE PRIOR TO ALLOWING STORMWATER RUNOFF TO FLOW THROUGH THE SWALE.
 - 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.
 - 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.
 - PERIODIC APPLICATIONS OF LIME AND FERTILIZER MAY BE NEEDED TO MAINTAIN VIGOROUS GROWTH.



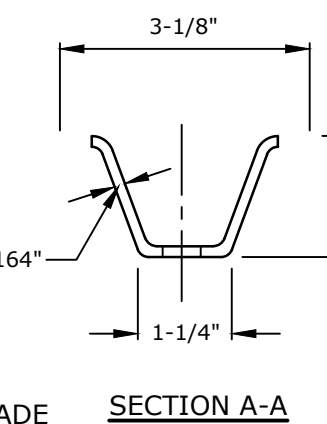
PERENNIAL PLANTING
NO SCALE



R5-1
30"X30"
WHITE ON RED

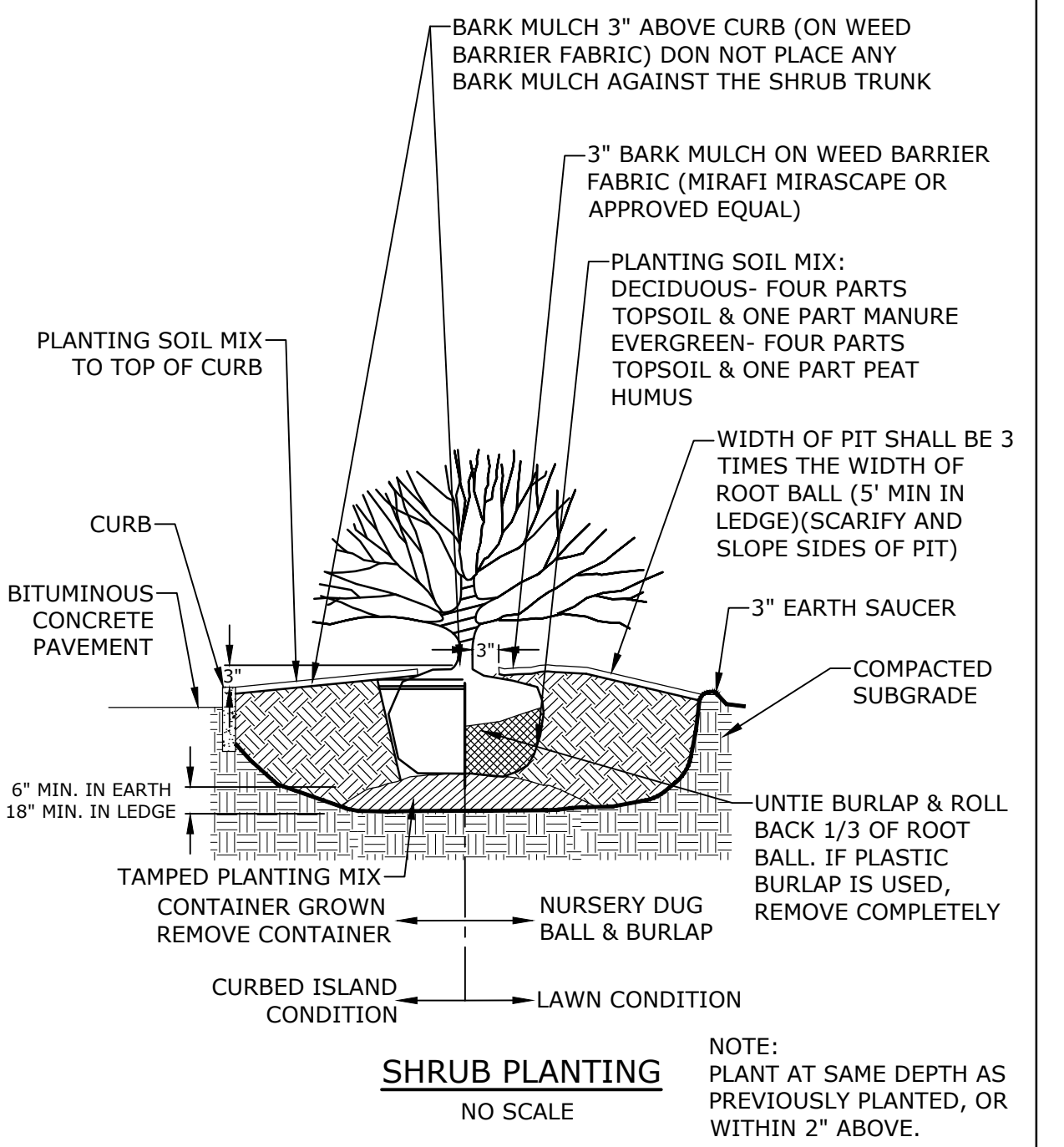
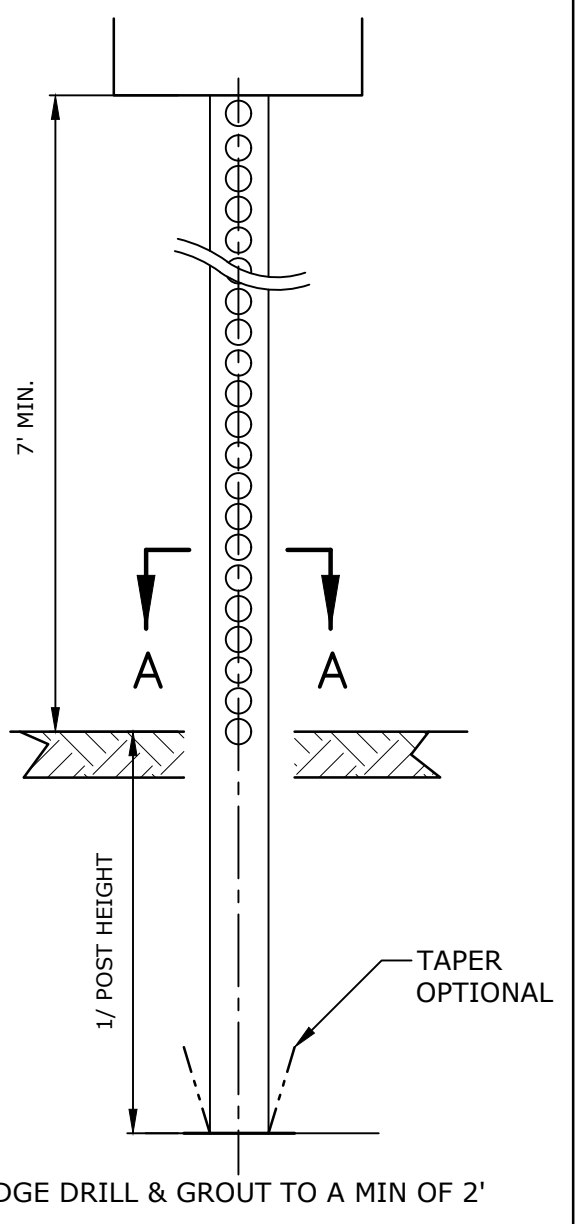


R1-1
30"X30"
WHITE ON RED

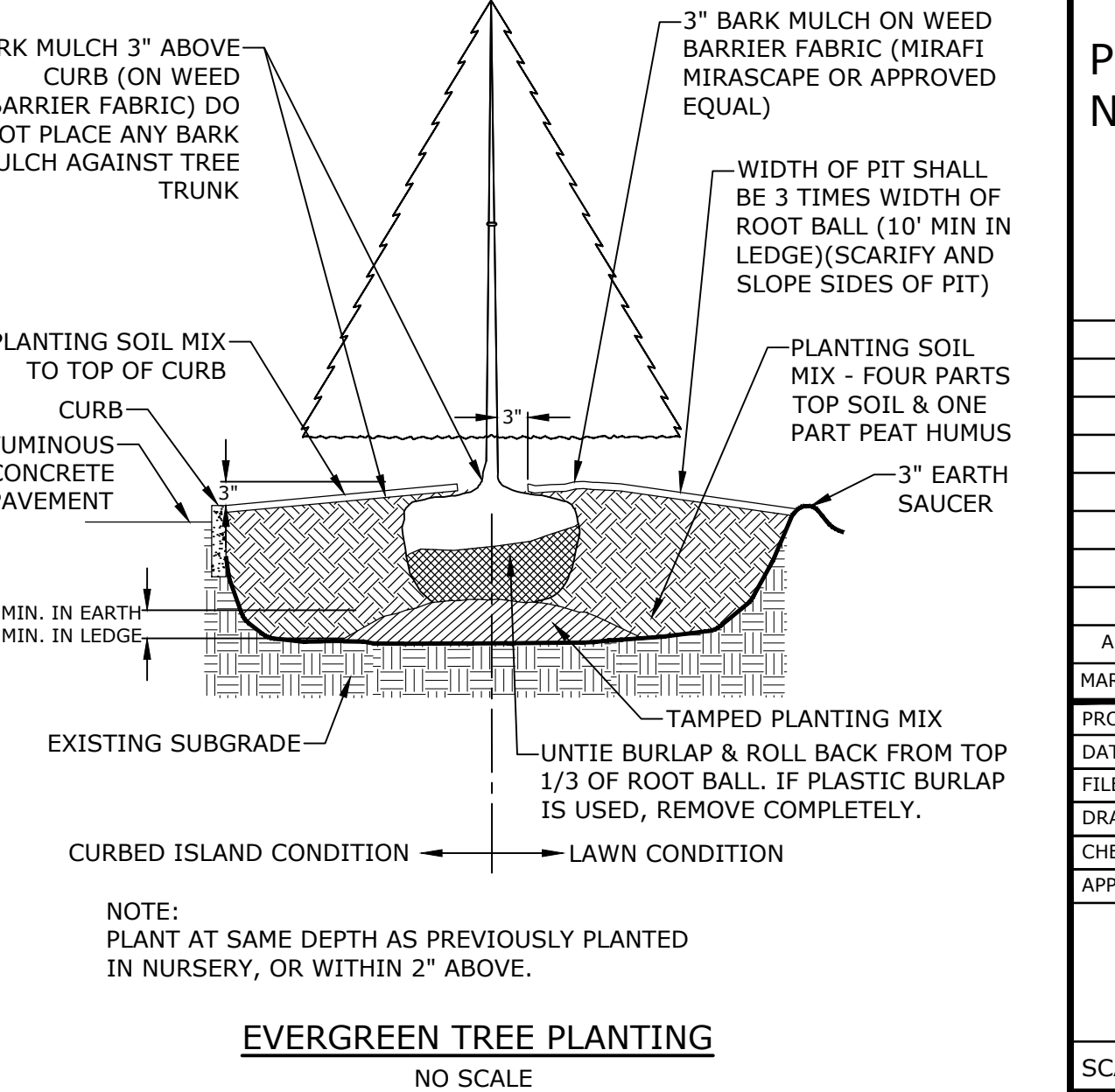
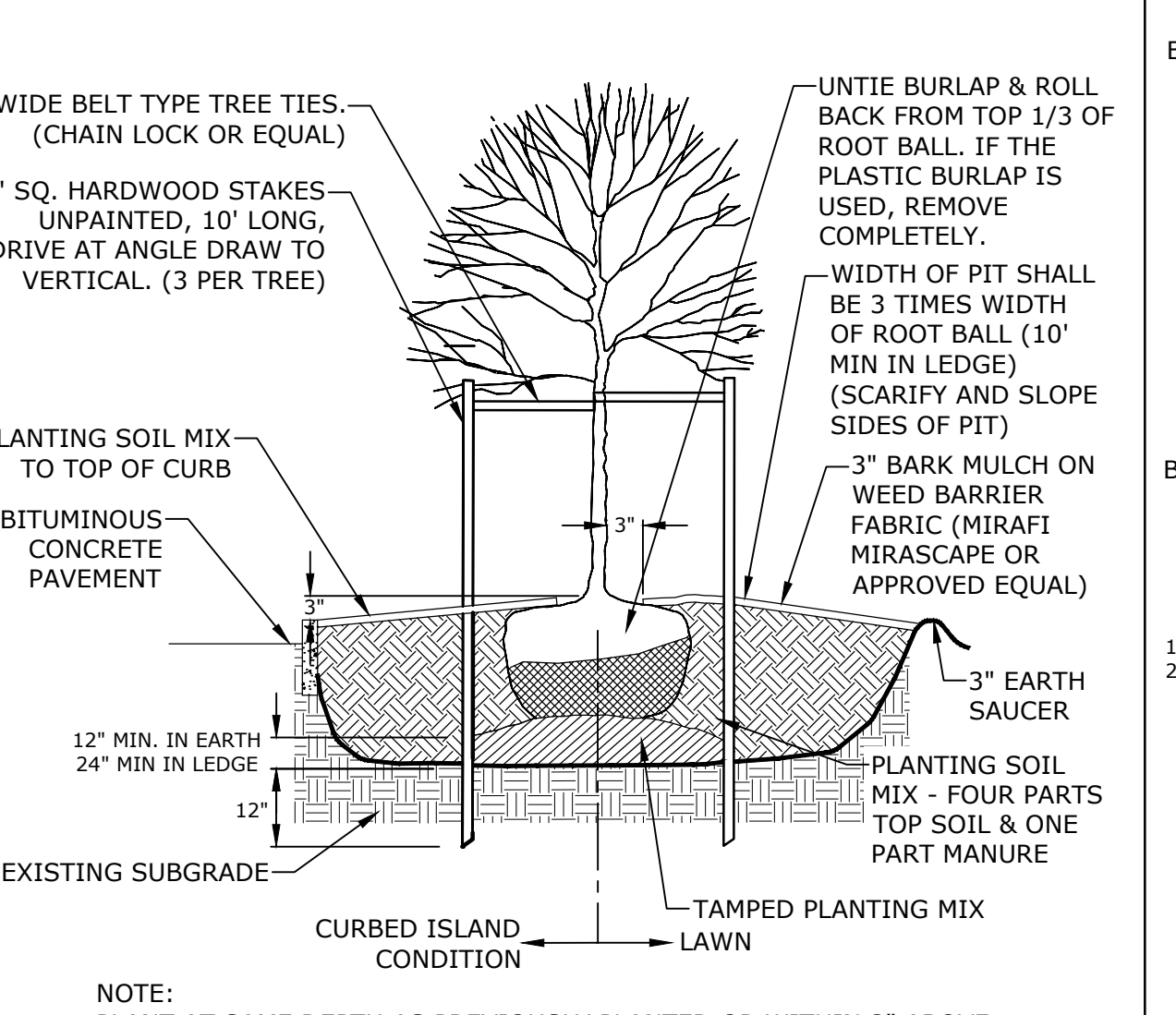


LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 3/8" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASSTM A-576 (GRADE 1070 - 1080)
FINISH: SHALL BE PAINTED WITH TWO COATS OF AN APPROVED MEDIUM GREEN BAKED ON OR DRIED, PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.
NOTE:
ALL SIGNS TO BE INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.

SIGN LEGEND & SIGN POST
NO SCALE



DECIDUOUS TREE PLANTING
NO SCALE



EVERGREEN TREE PLANTING
NO SCALE

STATE OF NEW HAMPSHIRE
BRADLEE MEZOUTA
No. 06830
PROFESSIONAL ENGINEER
10/15/2017
AUG 22 2021

STATE OF NEW HAMPSHIRE
PATRICK M. CRIMMINS
No. 12979
PROFESSIONAL ENGINEER
12/15/2017
AUG 22 2021

Lynx Parking Expansion

Lonza Biologics

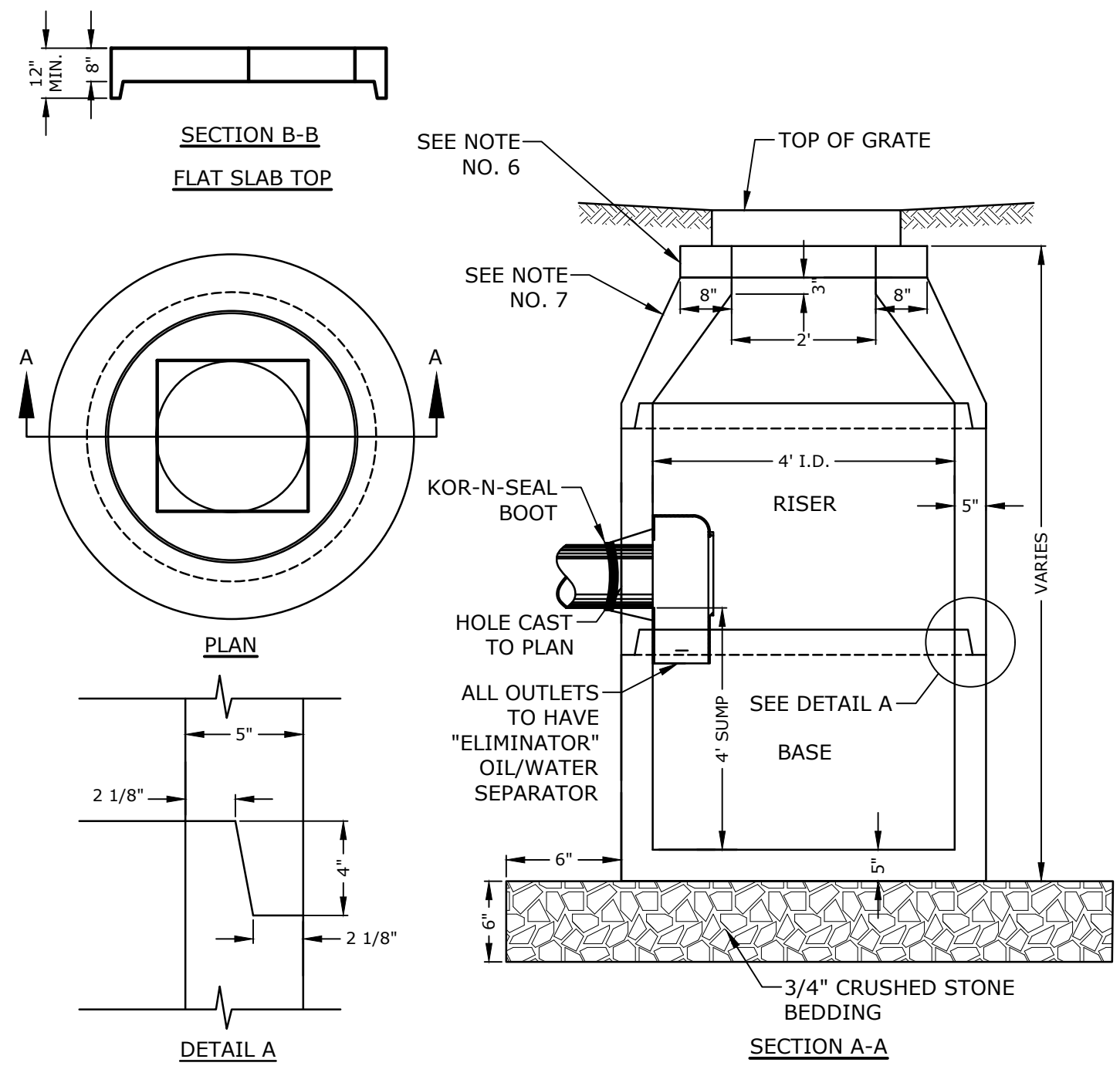
Portsmouth, New Hampshire

| MARK | DATE | TAC SUBMISSION | DESCRIPTION |
|------|-----------|----------------|-------------|
| A | 6/21/2021 | TAC SUBMISSION | |

| | |
|--------------|-----------------------|
| PROJECT NO: | L-0700-021 |
| DATE: | June 21, 2021 |
| FILE: | L-0700-021-C-DTLS.DWG |
| DRAWN BY: | JW/CJK |
| CHECKED BY: | NAH/PMC |
| APPROVED BY: | BLM |

DETAILS
SCALE: AS SHOWN

Last Saved: 6/17/2021 8:53am By: Wriston
 Project: On: Jun 17, 2021
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 Project: 17-200-Lonza Biologics Expansion was 15766021.Lynx ProjectDrawings-FiguresAutoCAD.dwg-0700-021-C-DTLS.dwg

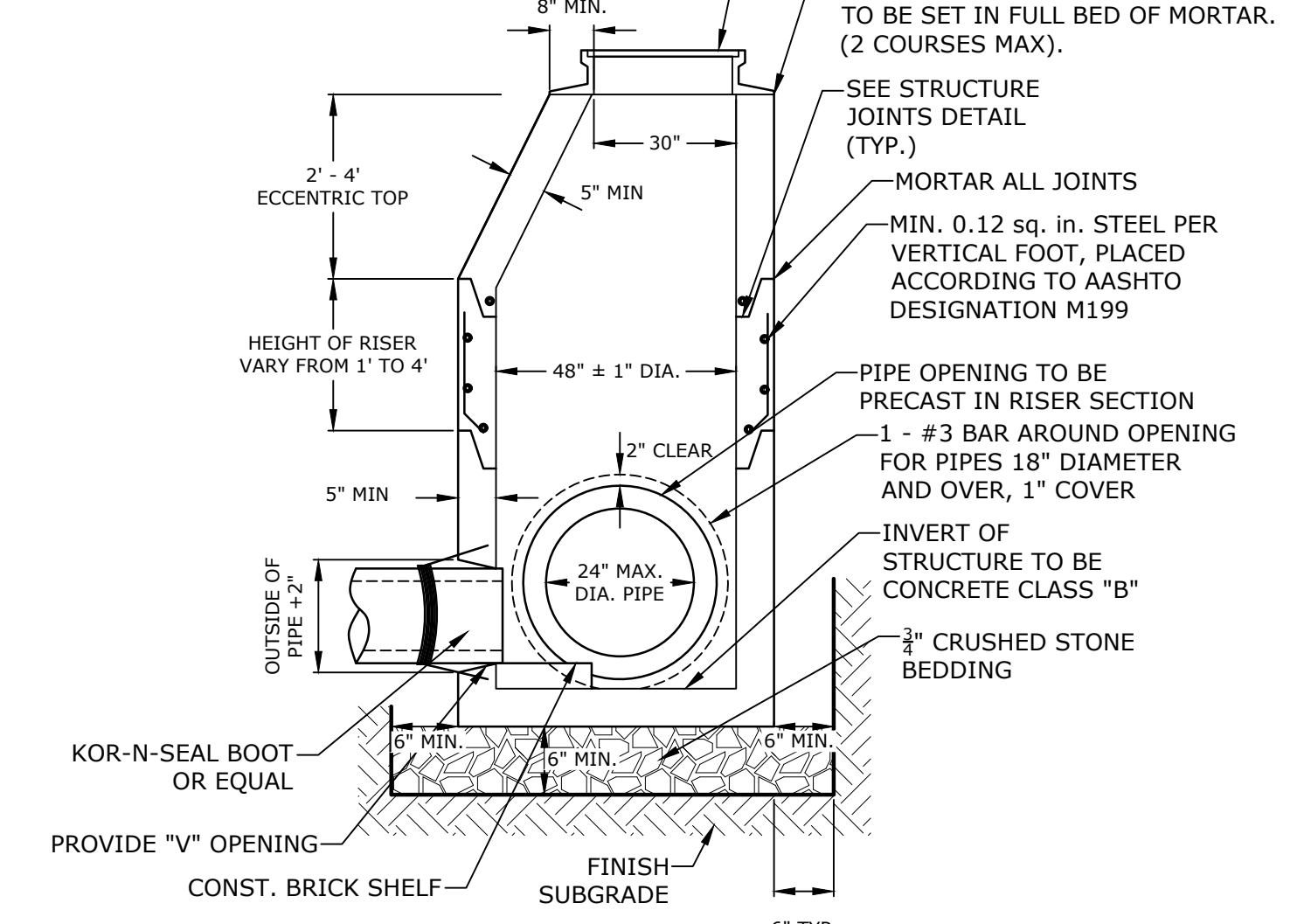


- NOTES:
- ALL SECTIONS SHALL BE CONCRETE CLASS AA(4000 PSI).
 - CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ. IN. PER LINEAR FT. IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
 - THE TONGUE AND GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FT.
 - RISERS OF 1', 2', 3' & 4' CAN BE USED TO REACH DESIRED DEPTH.
 - THE STRUCTURES SHALL BE DESIGNED FOR H2O LOADING.
 - FITTING FRAME TO GRADE MAY BE DONE WITH PREFABRICATED ADJUSTMENT RINGS OR CLAY BRICKS (2 COURSES MAX.).
 - CONE SECTIONS MAY BE EITHER CONCENTRIC OR ECCENTRIC, OR FLAT SLAB TOPS MAY BE USED WHERE PIPE WOULD OTHERWISE ENTER INTO THE CONE SECTION OF THE STRUCTURE AND WHERE PERMITTED.
 - PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
 - OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
 - 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.
 - THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
 - "ELIMINATOR" OIL/WATER SEPARATOR SHALL BE INSTALLED TIGHT TO INSIDE OF CATCHBASIN.

4' DIAMETER CATCHBASIN
NO SCALE

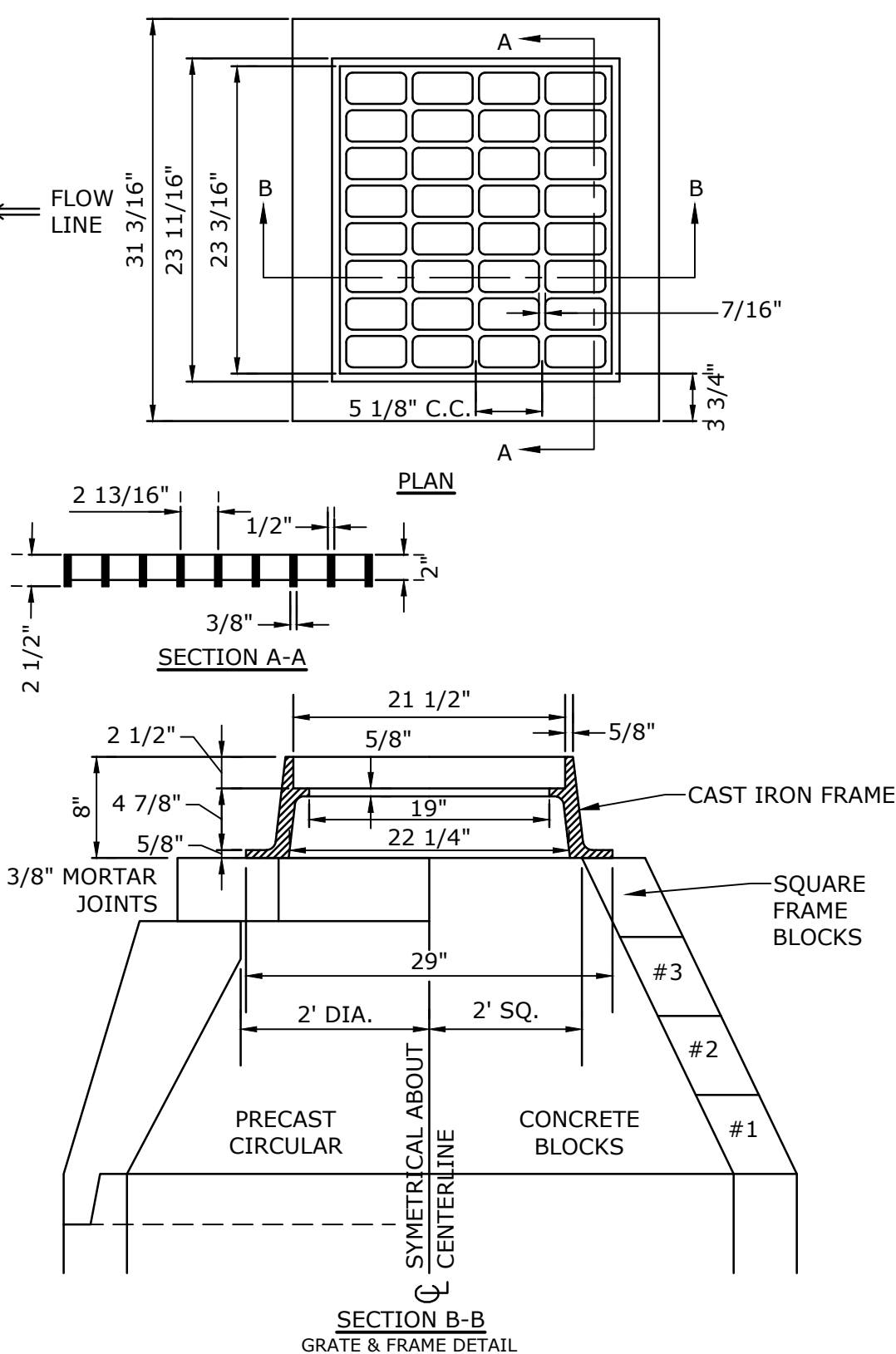
NHDOT ITEM No. 304.4
(CRUSHED STONE - FINE)

| SIEVE SIZE | % PASSING |
|------------|-----------|
| 2" | 100 |
| 1-1/2" | 85-100 |
| 3/4" | 45-75 |
| #4 | 10-45 |
| #200 | 0-5 |

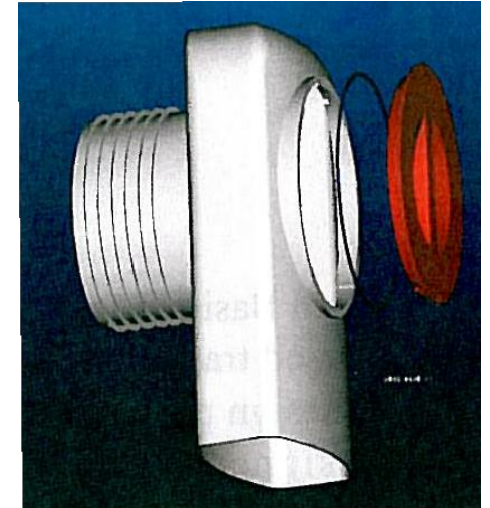


- NOTES:
- ALL SECTIONS SHALL BE 4,000 PSI CONCRETE.
 - CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
 - THE TONGUE AND THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
 - THE STRUCTURES SHALL BE DESIGNED FOR H2O LOADING.
 - CONSTRUCT CRUSHED STONE BEDDING AND BACKFILL UNDER (6" MINIMUM THICKNESS)
 - THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
 - PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
 - OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
 - 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.
 - 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.

4' DIAMETER DRAIN MANHOLE
NO SCALE



CATCH BASIN FRAME & GRATE
NO SCALE

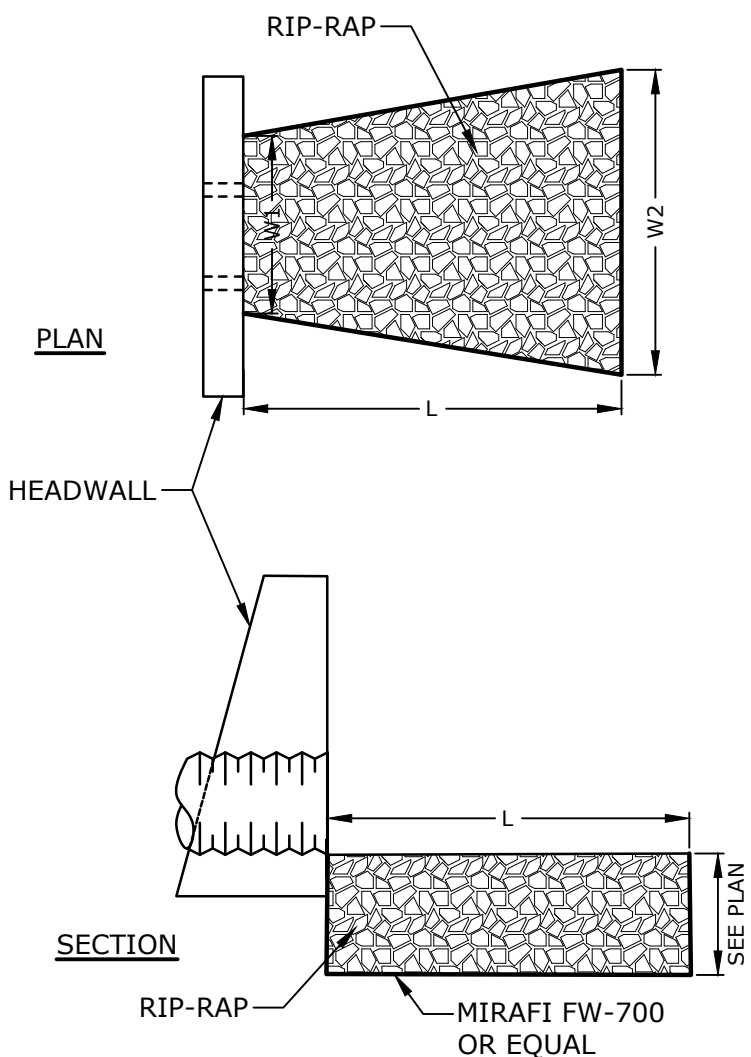


- NOTES:
- ALL CATCH BASIN OUTLETS TO HAVE "ELIMINATOR" OIL AND FLOATING DEBRIS TRAP MANUFACTURED BY KLEANSTREAM (NO EQUAL)
 - INSTALL DEBRIS TRAP TIGHT TO INSIDE OF STRUCTURE.
 - 1/4" HOLE SHALL BE DRILLED IN TOP OF DEBRIS TRAP

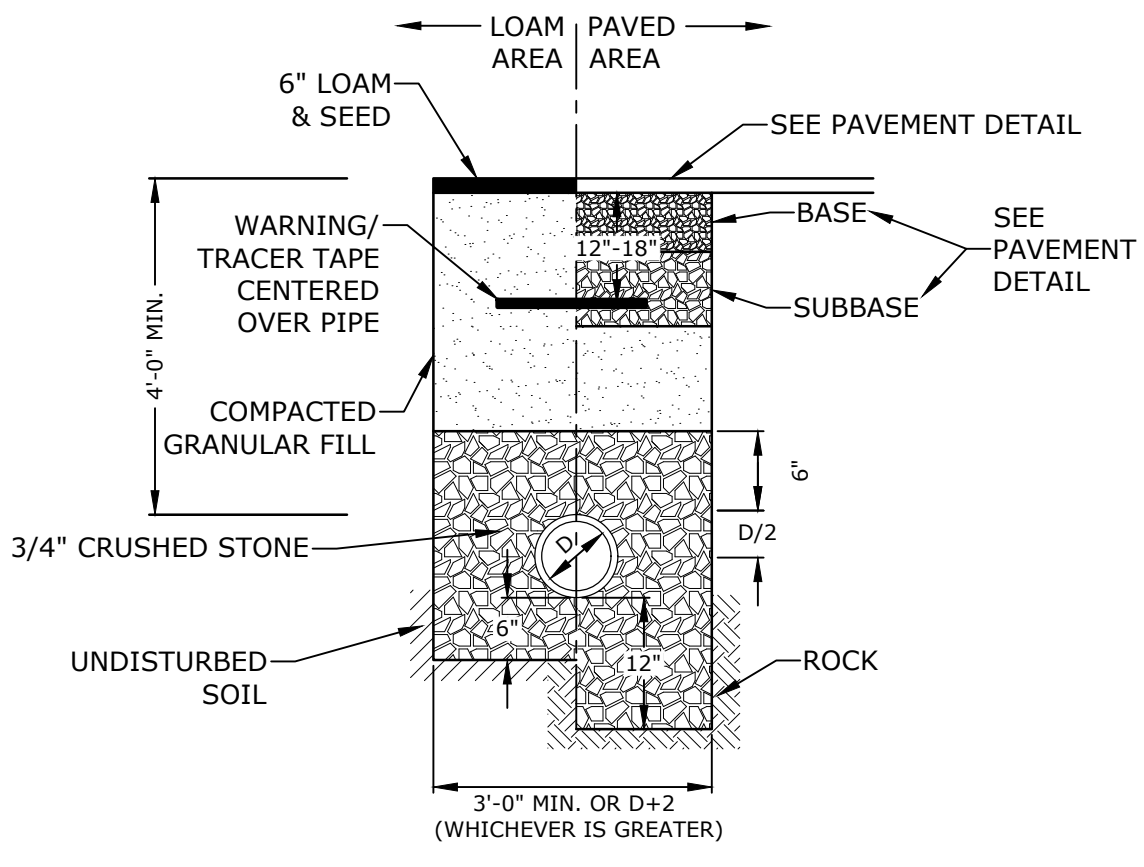
"ELIMINATOR" OIL FLOATING DEBRIS TRAP
NO SCALE

NOTES:

- STONE SIZE AND MAT DIMENSIONS DETAILED ON PLANS.
- STONE SHALL CONSIST OF SUB-ANGULAR FIELD STONE OR ROUGH UNHEWN QUARRY STONE OF APPROXIMATELY RECTANGULAR SHAPE. FLAT OR ROUND ROCKS ARE NOT ACCEPTABLE. THE STONE SHALL BE HARD AND OF SUCH QUALITY THAT IT WILL NOT DISINTEGRATE ON EXPOSURE TO WATER OR WEATHERING, BE CHEMICALLY STABLE AND IT SHALL BE SUITABLE IN ALL OTHER RESPECTS FOR THE PURPOSE INTENDED. THE BULK SPECIFIC GRAVITY (SATURATED SURFACE-DRY BASIS) OF THE INDIVIDUAL STONES SHALL BE AT LEAST 2.5.
- THE STONE SHALL BE COMPOSED OF A WELL-GRADED MIXTURE DOWN TO THE ONE-INCH SIZE PARTICLE SUCH THAT 50 PERCENT OF THE MIXTURE BY WEIGHT SHALL BE LARGER THAN THE D50 SIZE SPECIFIED. A WELL-GRADED MIXTURE IS DEFINED AS A MIXTURE COMPOSED PRIMARILY OF THE LARGER STONE SIZE BUT WITH A SUFFICIENT MIXTURE OF OTHER SIZES TO FILL THE PROGRESSIVELY SMALLER VOIDS BETWEEN THE STONES. THE DIAMETER OF THE LARGEST STONE SIZE IN SUCH A MIXTURE SHALL BE 1.5 TIMES THE D50 SIZE.

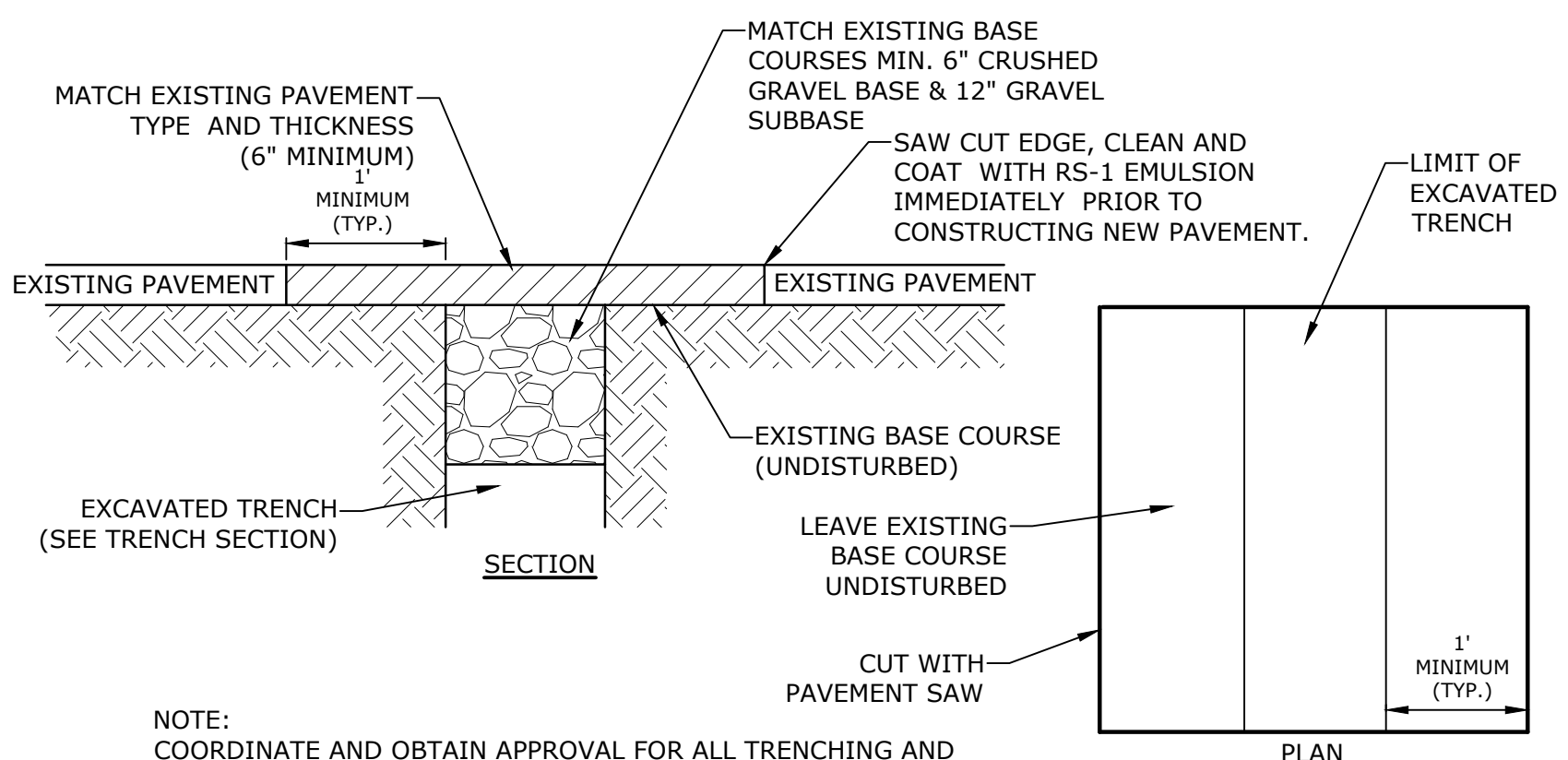


RIP-RAP APRON DETAIL
NO SCALE



- NOTE:
- CRUSHED STONE BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 6" ABOVE TOP OF PIPE.
 - ALL UTILITIES SHALL BE INSTALLED PER THE INDIVIDUAL UTILITY COMPANY STANDARDS. COORDINATE ALL INSTALLATIONS WITH INDIVIDUAL UTILITY COMPANIES AND THE CITY OF PORTSMOUTH.

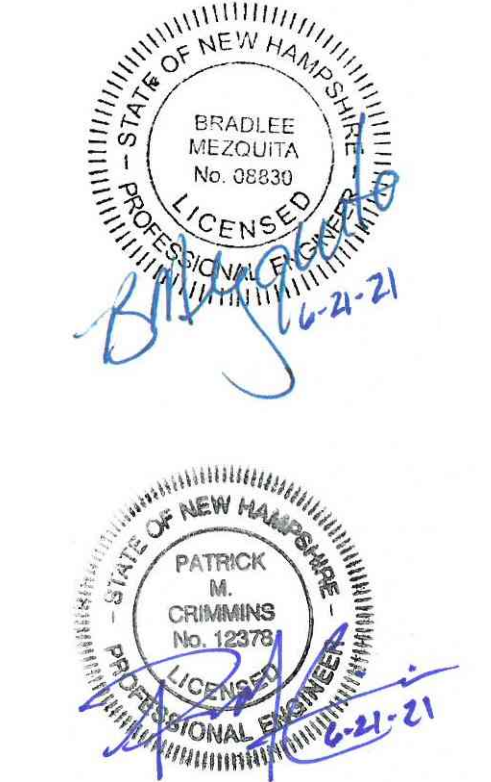
STORM DRAIN TRENCH
NO SCALE



- NOTE:
- COORDINATE AND OBTAIN APPROVAL FOR ALL TRENCHING AND PATCHING WITHIN CITY RIGHT OF WAY WITH TOWN OF EXETER DPW PRIOR TO COMMENCING WORK.

ROADWAY TRENCH PATCH
NO SCALE

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 Plotted On: Jun 17, 2021, 5:33am By: Wriston
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Lynx Parking Expansion

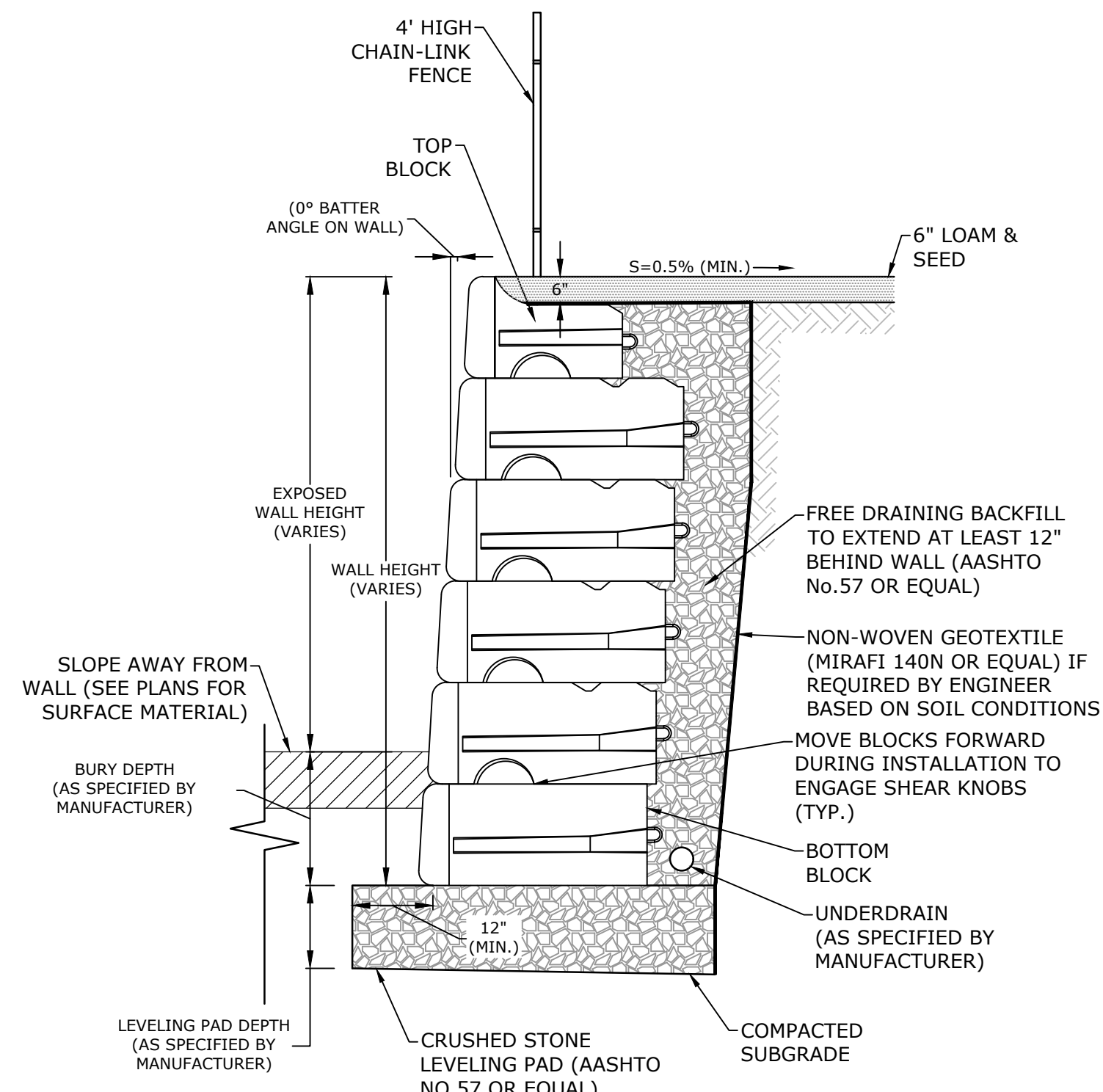
Lonza Biologics

Portsmouth, New Hampshire

| MARK | DATE | DESCRIPTION |
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| A | 6/21/2021 | TAC SUBMISSION |
| DATE: | June 21, 2021 | |
| FILE: | L-0700-021-C-DTLS.DWG | |
| DRAWN BY: | JW/CLK | |
| CHECKED BY: | NAH/PMC | |
| APPROVED BY: | BLM | |

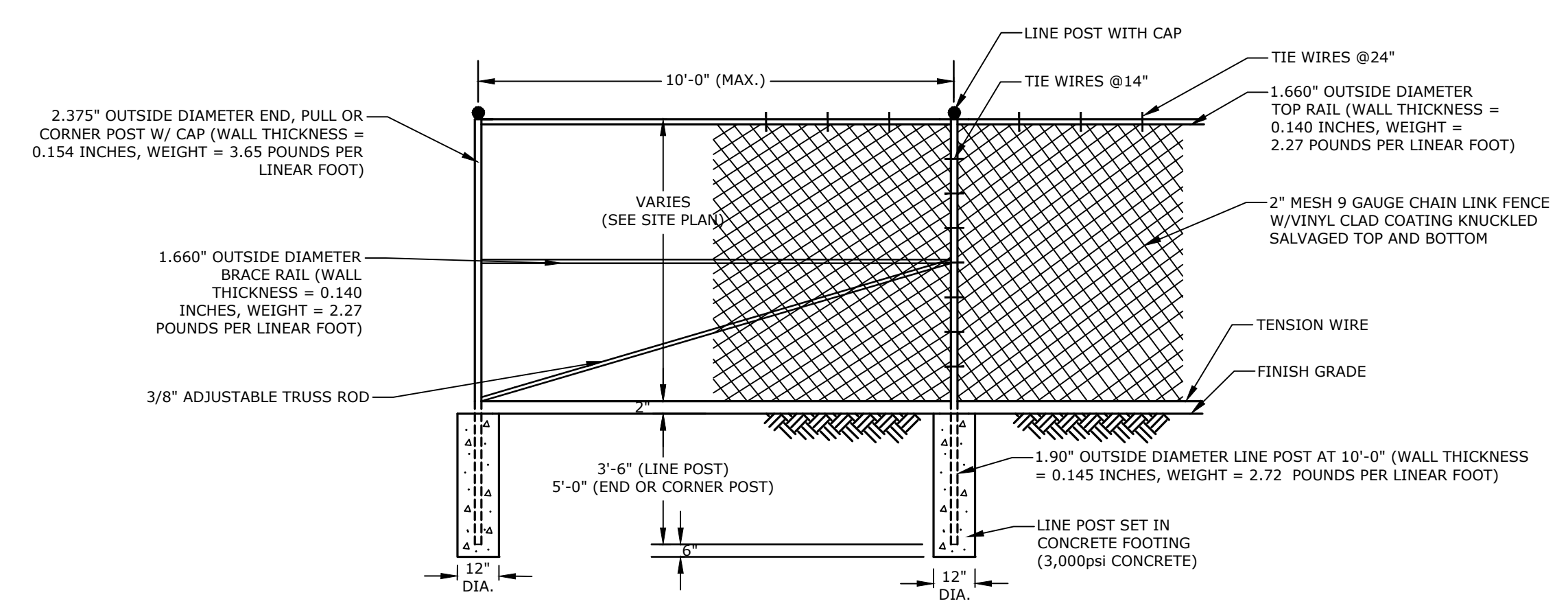
DETAILS

SCALE: AS SHOWN



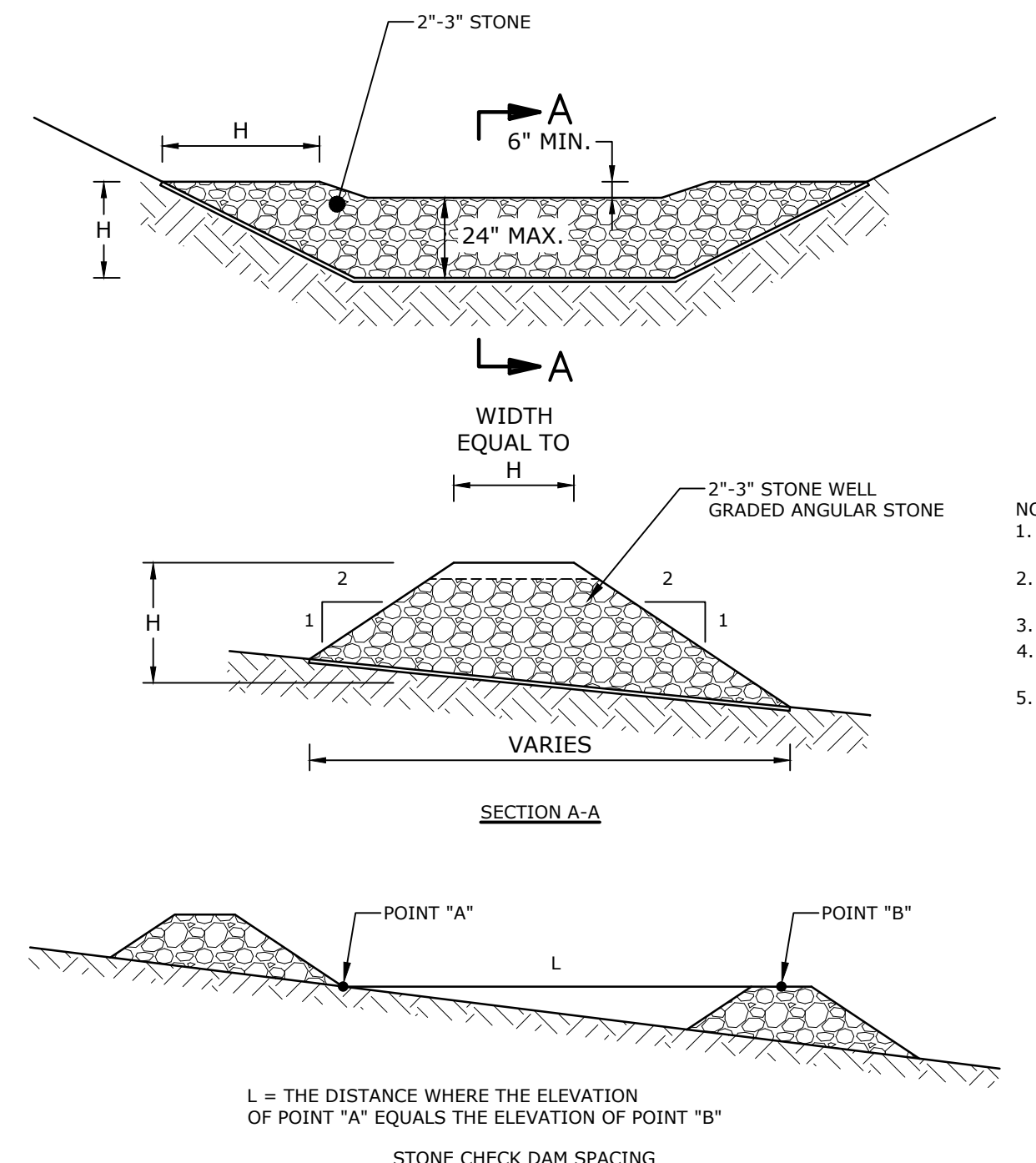
- NOTES:**
1. RETAINING WALL SHALL BE BY REDI ROCK LEDGESTONE OR APPROVED EQUAL.
 2. THE CONTRACTOR SHALL SUBMIT DESIGN AND CALCULATIONS FOR THE RETAINING WALL THAT SHALL BE STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE. CALCULATIONS SHALL INCLUDE A GLOBAL STABILITY ANALYSIS.
 3. MINIMUM DESIGN PARAMETERS:
 - GLOBAL STABILITY FACTOR OF SAFETY = 1.3
 - OVERTURNING FACTOR OF SAFETY = 1.5
 - SLIDING FACTOR OF SAFETY = 1.5
 - GEOGRID PULLOUT FACTOR OF SAFETY = 1.5
 - SEISMIC FACTOR OF SAFETY = 1.1
 4. WALL DESIGNS SHALL CONSIDER EFFECTS OF SLOPE, TRAFFIC LOADS, BUILDING LOADS, GUARDRAIL AND/OR FENCING AS REQUIRED.
 5. WALL DESIGN ENGINEER SHALL CONSIDER HEIGHT AND SPECIFY FENCE WHERE REQUIRED
 6. ALL INSTALLATION PROCEDURES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION MANUAL AND THE WALL DESIGN ENGINEER'S DESIGN PLANS AND SPECIFICATIONS.
 7. THE WALL DESIGN ENGINEER SHALL COMPLETE SUFFICIENT INSPECTIONS DURING CONSTRUCTION TO CERTIFY WORK IS COMPLETED IN ACCORDANCE WITH DESIGN.
 8. CONTRACTOR SHALL SUBMIT AS-BUILT DRAWINGS OF WALL WITH WALL DESIGNER'S CERTIFICATION TO OWNER.
 9. CONTRACTOR SHALL DIRECT SURFACE RUNOFF AWAY FROM THE WALL DURING CONSTRUCTION.
 10. ANY SURFACE DRAINAGE FEATURES, FINISH GRADING, PAVEMENT OR OTHER SURFACE TREATMENT SHALL BE INSTALLED IN THE AREA OF THE WALL IMMEDIATELY AFTER THE WALL IS COMPLETE OR OTHER MEASURES SHALL BE TAKEN TO PROTECT THE WALL FROM RUNOFF.
 11. CONTRACTOR SHALL SUPPLY SAMPLE TO THE OWNER FOR APPROVAL PRIOR TO WALL CONSTRUCTION.

TYPICAL BLOCK RETAINING WALL SECTION
NO SCALE



- NOTES:**
1. CORNER POSTS SHALL BE USED AT SHARP BREAKS IN GRADE AND CHANGES IN HORIZONTAL ALIGNMENT OF 15' OR MORE.
 2. POSTS, RAILS & BRACES SHALL BE TYPE 1, SCHEDULE 40 BLACK VINYL COATED PIPE.
 3. FABRIC TO BE BLACK VINYL COATED.
 4. TIE WIRES SHALL BE 9 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO LINE POSTS.
 5. TIE WIRES SHALL BE 13 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO RAILS AND BRACES.
 6. HOG RING TIES SHALL BE 12- 1/2 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO TENSION WIRE.

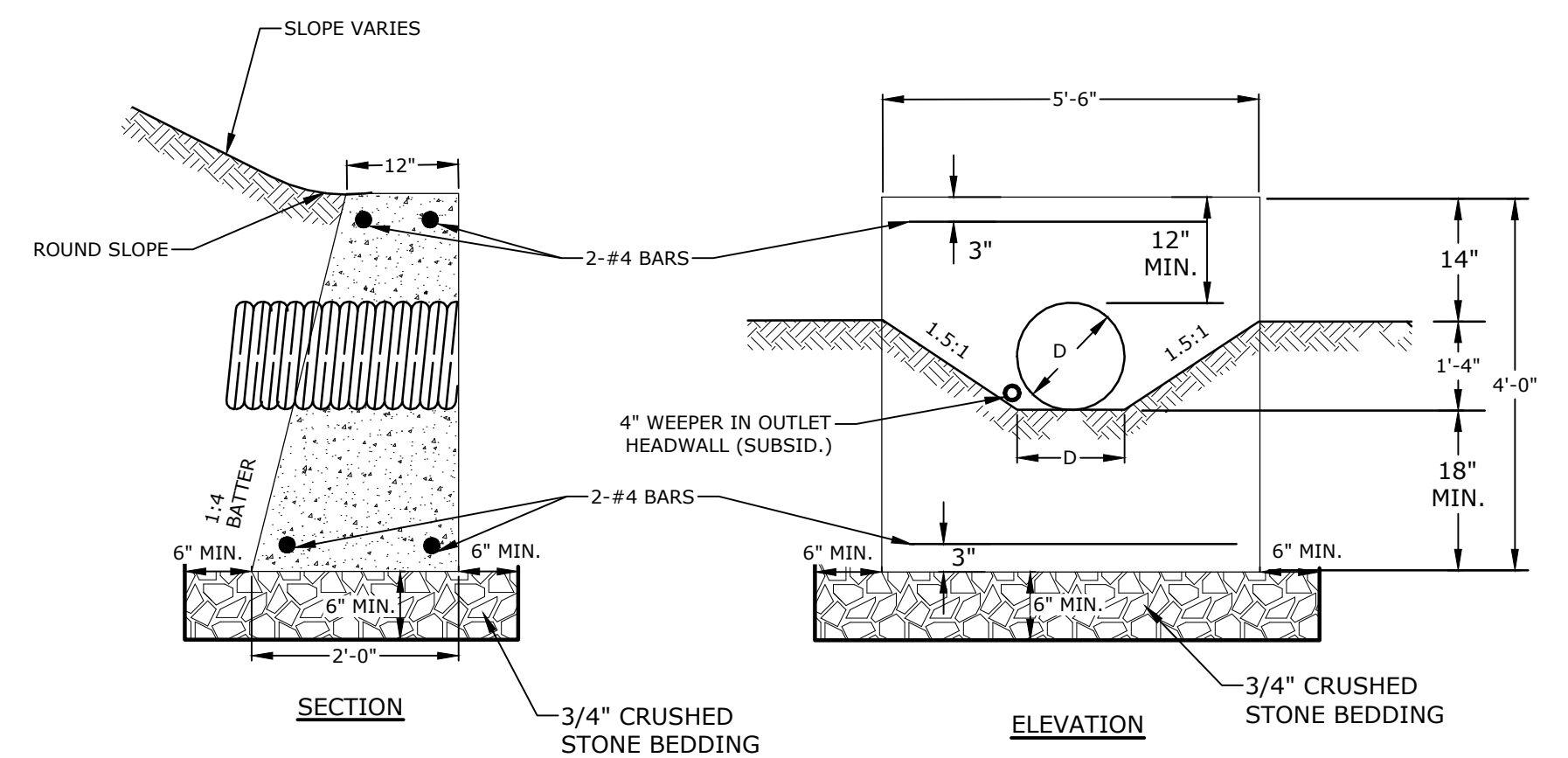
CHAIN LINK FENCE
NO SCALE



| BERM STONE SIZE | |
|----------------------------------|--|
| SIEVE DESIGNATION (US CUSTOMARY) | PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES |
| 12 IN | 100 |
| 6 IN | 84-100 |
| 3 IN | 68-83 |
| 1 IN | 42-55 |
| NO. 4 | 8-12 |

- NOTES:**
1. CHECK DAMS SHOULD BE INSTALLED BEFORE RUNOFF IS DIRECTED TO THE SWALE OR DRAINAGE DITCH.
 2. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE DAM SHOULD BE LESS THAN ONE ACRE.
 3. THE CHECK DAM SHOULD NOT BE USED IN A FLOWING STREAM.
 4. CHECK DAMS SHOWN ON THE DRAWINGS SHALL BE LEFT IN PLACE PERMANENTLY.
 5. CHECK DAMS INSTALLED AS PART OF TEMPORARY EROSION CONTROL MEASURE SHALL BE REMOVED ONCE THE SWALE OR DITCH HAS BEEN STABILIZED:
 - a. IN TEMPORARY DITCHES AND SWALES, CHECK DAMS SHOULD BE REMOVED AND THE DITCH FILLED IN WHEN IT IS NO LONGER NEEDED
 - b. IN PERMANENT STRUCTURES, CHECK DAMS SHOULD BE REMOVED WHEN PERMANENT LINING HAS BEEN ESTABLISHED. IF THE PERMANENT LINING IS VEGETATION, THEN THE CHECK DAM SHOULD BE RETAINED UNTIL THE GRASS HAS MATURED TO PROTECT THE DITCH OR SWALE. THE AREA BENEATH THE CHECK DAM MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER REMOVAL.

STONE CHECK DAM
NO SCALE



PRECAST CONCRETE HEADWALL
NO SCALE



Lynx Parking Expansion

Lonza Biologics

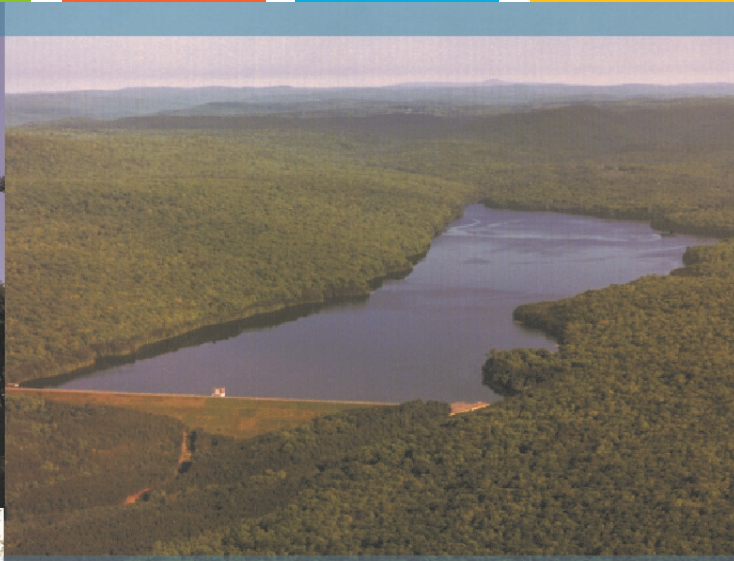
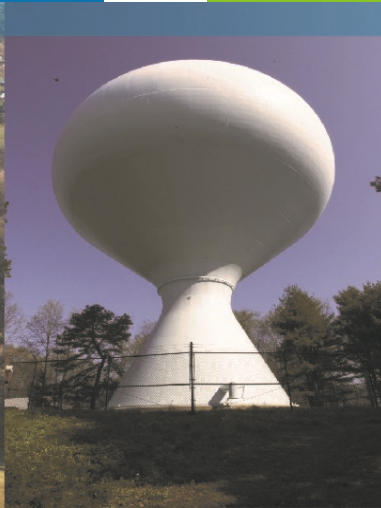
Portsmouth, New Hampshire

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| A | 6/21/2021 | TAC SUBMISSION |
| MARK | DATE | DESCRIPTION |
| PROJECT NO: | L-0700-021 | |
| DATE: | June 21, 2021 | |
| FILE: | L-0700-021-C-DTLS.DWG | |
| DRAWN BY: | JW/CLK | |
| CHECKED BY: | NAH/PMC | |
| APPROVED BY: | BLM | |

DETAILS

SCALE: AS SHOWN

C-507



Lynx Parking Expansion at Lonza Biologics, Inc.

City of Portsmouth, NH

Drainage Analysis

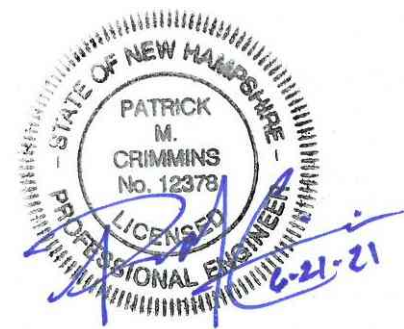
Prepared For:

Lonza Biologics, Inc.

101 International Drive

Portsmouth, New Hampshire 03801

June 21, 2021



Section 1 Narrative

| | | |
|-----|---|-----|
| 1.1 | On-Site Soil Description | 1-1 |
| 1.2 | Pre- & Post-Development Flow Comparison | 1-1 |
| 1.3 | Best Management Practices | 1-2 |

Section 2 BMP Worksheets**Section 3 Drainage Analysis**

| | | |
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| 3.1 | Calculation Methods..... | 3-1 |
| 3.2 | Pre-Development Conditions..... | 3-1 |
| 3.2.1 | Pre-Development Watershed Plan | 3-2 |
| 3.2.2 | Pre-Development Soil Plan | 3-2 |
| 3.2.3 | Pre-Development Calculation | 3-2 |
| 3.3 | Post-Development Conditions | 3-3 |
| 3.3.1 | Post-Development Watershed Plan | 3-4 |
| 3.3.2 | Post-Development Soil Plan | 3-4 |
| 3.3.3 | Post-Development Calculation..... | 3-4 |
| 3.4 | Peak Rate Comparisons..... | 3-5 |
| 3.5 | Mitigation Description | 3-5 |
| 3.5.1 | Mitigation Calculations | 3-5 |
| 3.5.2 | Pre-Treatment Methods for Protecting Water Quality | 3-5 |
| 3.5.3 | Treatment Methods for Protecting Water Quality | 3-5 |

Section 4 Rip Rap Apron Calculations

Section 1

Narrative

The proposed project is to expand Lonza Biologics parking to support its growing product development services to the pharmaceutical and biologic industries. Lonza's existing facilities are located at 101 International Drive. The project will merge 2.66 acres of 55 International Drive with 101 International Drive to create a 46-acre parcel for Lonza's campus. The proposed project includes the construction of a new 200 space parking lot adjacent to the existing parking garage. The project will consist of associated site improvements such as lighting, landscaping and stormwater management that will include underground detention, one (1) hydrodynamic separator, three (3) proprietary flow through treatment filtration devices and a small detention basin.

1.1 On-Site Soil Description

The site consists of terrain that is generally sloping from the southeast to the north of the site towards a culvert/closed drainage system at the corner of Corporate and Goose Bay Drives. The existing property has an approximate high point of elevation 92 near the Pease Development Authority parking lot.

A site-specific soils survey was conducted by Leonard Lord, PhD, CSS, CWS of Tighe & Bond, Inc on April 9, 2021 and can be found in Section 9 of this Report. Based on the soil survey, the runoff analyzed within these studies has been modeled using Hydrologic Soil Group C soils, as much of the site is comprised of Woodbridge, Udorthents, Endoaquents, and Ridgebury soils with three drainage classifications, poorly drained, somewhat poorly drained and mostly moderately well drained soils.

1.2 Pre- & Post-Development Flow Comparison

For the purposes of this analysis, runoff generated by the site has been analyzed at two (2) distinct points of analysis (PA-1 and PA-2). These points of analysis were chosen to be able to compare the Pre-Development and Post-Development flows. PA-1 is located at the existing 12" PVC culvert at the corner of Corporate and Goose Bay Drives. PA-2 is located at the existing Catch Basin near the existing parking garage entrance off Goose Bay Drive.

The peak discharge rates at these points of analysis 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 which can be found in Appendix A.

Additionally, the site is located within a Coastal and Great Bay Community, therefore an added factor of safety of 15% was included as required by Env-Wq 1503.08(I).

Table 1.2**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 | 6.98 | 14.26 | 20.20 | 25.90 |
| PA-2 | 7.38 | 12.91 | 17.32 | 21.50 |
| Post-Development Watershed | | | | |
| PA-1 | 4.40 | 13.25 | 15.28 | 24.85 |
| PA-2 | 7.00 | 12.14 | 17.25 | 21.31 |

The Peak Runoff Control Requirements of Env-Wq 1507.06 are required to be met for all points of analysis. As shown in Table 1.2 the Post-development flows are decreased from the Pre-development flows for all points of analysis.

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 treatment practices including three (3) Jellyfish Filters;
- Stormwater pre-treatment practices include a hydrodynamic separator (Cascade Separator® for pre-treatment; and
- Stormwater detention practices including an Underground Detention System and a Detention Pond.

Section 2

BMP Worksheets



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)

| | | |
|-------|----------|---|
| 3.44 | ac | A = Area draining to the practice |
| 2.31 | ac | A _i = Impervious area draining to the practice |
| 0.67 | decimal | I = Percent impervious area draining to the practice, in decimal form |
| 0.65 | unitless | R _v = Runoff coefficient = 0.05 + (0.9 x I) |
| 2.25 | ac-in | WQV = 1" x R _v x A |
| 8,172 | 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". |
| 0.65 | inches | Q = Water quality depth. Q = WQV/A |
| 96 | unitless | CN = Unit peak discharge curve number. CN = 1000 / (10 + 5P + 10Q - 10 * [Q ² + 1.25 * Q * P] ^{0.5}) |
| 0.4 | inches | S = Potential maximum retention. S = (1000/CN) - 10 |
| 0.076 | inches | I _a = Initial abstraction. I _a = 0.2S |
| 5.0 | minutes | T _c = Time of Concentration |
| 655.0 | cfs/mi ² /in | q _u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III. |
| 2.304 | cfs | WQF = q _u x WQV. Conversion: to convert "cfs/mi ² /in * ac-in" to "cfs" multiply by 1mi ² /640ac. |

Designer's Notes: _____

Jelly Fish #1 _____

Peak flow=7.35 cfs _____



CONTECH Stormwater Solutions Inc. Engineer
Date Prepared:

JBS
6/3/2021

Site Information

| | |
|--------------------------------------|------------------------------|
| Project Name | Lynx Parking Expansion - JF1 |
| Project State | NH |
| Project City | Portsmouth |
| Total Drainage Area, Ad | 3.44 ac |
| Post Development Impervious Area, Ai | 2.31 ac |
| Pervious Area, Ap | 1.13 ac |
| % Impervious | 67% |
| Runoff Coefficient, Rc | 0.65 |

Mass Loading Calculations

| | |
|--|------------------------|
| Mean Annual Rainfall, P | 50 in |
| Agency Required % Removal | 80% |
| Percent Runoff Capture | 90% |
| Mean Annual Runoff, Vt | 367701 ft ³ |
| Event Mean Concentration of Pollutant, EMC | 70 mg/l |
| Annual Mass Load, M total | 1605.88 lbs |

Filter System

| | |
|------------------|------------|
| Filtration Brand | Jelly Fish |
| Cartridge Length | 54 in |

Jelly Fish Sizing

| | |
|-------------------------------|-------------|
| Mass to be Captured by System | 1284.71 lbs |
| Water Quality Flow | 2.30 cfs |

Method to Use

FLOW BASED

Summary

| | | |
|------|---------------------|---------------|
| Flow | Treatment Flow Rate | 2.41 cfs |
| | Required Size | JFPD0808-12-3 |



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)

| | | |
|-------|----------|---|
| 0.93 | ac | A = Area draining to the practice |
| 0.93 | ac | A_i = Impervious area draining to the practice |
| 1.00 | decimal | I = Percent impervious area draining to the practice, in decimal form |
| 0.95 | unitless | R_v = Runoff coefficient = $0.05 + (0.9 \times I)$ |
| 0.88 | ac-in | $WQV = 1'' \times R_v \times A$ |
| 3,207 | 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". |
| 0.95 | inches | Q = Water quality depth. $Q = WQV/A$ |
| 100 | unitless | CN = Unit peak discharge curve number. $CN = 1000 / (10 + 5P + 10Q - 10 * [Q^2 + 1.25 * Q * P]^{0.5})$ |
| 0.0 | inches | S = Potential maximum retention. $S = (1000/CN) - 10$ |
| 0.009 | inches | I_a = Initial abstraction. $I_a = 0.2S$ |
| 5.0 | minutes | T_c = Time of Concentration |
| 655.0 | cfs/mi ² /in | q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III. |
| 0.904 | 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: _____

Jelly Fish #2 _____

Peak Flow = 6.52 cfs _____



CONTECH Stormwater Solutions Inc. Engineer
Date Prepared:

JBS
6/3/2021

Site Information

| | |
|--------------------------------------|------------------------------|
| Project Name | Lynx Parking Expansion - JF2 |
| Project State | NH |
| Project City | Portsmouth |
| Total Drainage Area, Ad | 0.93 ac |
| Post Development Impervious Area, Ai | 0.93 ac |
| Pervious Area, Ap | 0.00 ac |
| % Impervious | 100% |
| Runoff Coefficient, Rc | 0.95 |

Mass Loading Calculations

| | |
|--|------------------------|
| Mean Annual Rainfall, P | 50 in |
| Agency Required % Removal | 80% |
| Percent Runoff Capture | 90% |
| Mean Annual Runoff, Vt | 144320 ft ³ |
| Event Mean Concentration of Pollutant, EMC | 70 mg/l |
| Annual Mass Load, M total | 630.30 lbs |

Filter System

| | |
|------------------|------------|
| Filtration Brand | Jelly Fish |
| Cartridge Length | 40 in |

Jelly Fish Sizing

| | |
|-------------------------------|------------|
| Mass to be Captured by System | 504.24 lbs |
| Water Quality Flow | 0.90 cfs |

Method to Use

FLOW BASED

Summary

| | | |
|------|---------------------|--------------|
| Flow | Treatment Flow Rate | 0.94 cfs |
| | Required Size | JFPD0806-6-2 |



CONTECH Stormwater Solutions Inc. Engineer
Date Prepared:

JBS
6/3/2021

Site Information

| | |
|--------------------------------------|------------------------------|
| Project Name | Lynx Parking Expansion - JF3 |
| Project State | NH |
| Project City | Portsmouth |
| Total Drainage Area, Ad | 1.54 ac |
| Post Development Impervious Area, Ai | 0.55 ac |
| Pervious Area, Ap | 0.99 ac |
| % Impervious | 36% |
| Runoff Coefficient, Rc | 0.37 |

Mass Loading Calculations

| | |
|--|-----------------------|
| Mean Annual Rainfall, P | 50 in |
| Agency Required % Removal | 80% |
| Percent Runoff Capture | 90% |
| Mean Annual Runoff, Vt | 93436 ft ³ |
| Event Mean Concentration of Pollutant, EMC | 70 mg/l |
| Annual Mass Load, M total | 408.07 lbs |

Filter System

| | |
|------------------|------------|
| Filtration Brand | Jelly Fish |
| Cartridge Length | 54 in |

Jelly Fish Sizing

| | |
|-------------------------------|------------|
| Mass to be Captured by System | 326.46 lbs |
| Water Quality Flow | 0.59 cfs |

Method to Use

FLOW BASED

Summary

| | | |
|------|---------------------|--------------|
| Flow | Treatment Flow Rate | 0.62 cfs |
| | Required Size | JFPD0806-3-1 |



FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: _____ **Rain Garden (Previously Approved)**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

| | | | |
|---|----------|---|---------------------------|
| | | Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a). | |
| 0.51 | ac | A = Area draining to the practice | |
| 0.25 | ac | A _I = Impervious area draining to the practice | |
| 0.49 | decimal | I = Percent impervious area draining to the practice, in decimal form | |
| 0.49 | unitless | R _v = Runoff coefficient = 0.05 + (0.9 x I) | |
| 0.25 | ac-in | WQV = 1" x R _v x A | |
| 909 | cf | WQV conversion (ac-in x 43,560 sf/ac x 1ft/12") | |
| 227 | cf | 25% x WQV (check calc for sediment forebay volume) | |
| 682 | cf | 75% x WQV (check calc for surface sand filter volume) | |
| | | Method of Pretreatment? (not required for clean or roof runoff) | |
| | cf | V _{SED} = Sediment forebay volume, if used for pretreatment | ≥ 25%WQV |
| Calculate time to drain if system IS NOT underdrained: | | | |
| | sf | A _{SA} = Surface area of the practice | |
| | iph | K _{sat} _{DESIGN} = Design infiltration rate ¹ | |
| | Yes/No | If K _{sat} (prior to factor of safety) is < 0.50 iph, has an underdrain been provided? (Use the calculations below) | |
| - | hours | T _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN}) | ≤ 72-hrs |
| Calculate time to drain if system IS underdrained: | | | |
| | ft | E _{WQV} = Elevation of WQV (attach stage-storage table) | |
| | cfs | Q _{WQV} = Discharge at the E _{WQV} (attach stage-discharge table) | |
| - | hours | T _{DRAIN} = Drain time = 2WQV/Q _{WQV} | ≤ 72-hrs |
| | feet | E _{FC} = Elevation of the bottom of the filter course material ² | |
| | feet | E _{UD} = Invert elevation of the underdrain (UD), if applicable | |
| | feet | E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit) | |
| | feet | E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit) | |
| - | feet | D _{FC to UD} = Depth to UD from the bottom of the filter course | ≥ 1' |
| - | feet | D _{FC to ROCK} = Depth to bedrock from the bottom of the filter course | ≥ 1' |
| - | feet | D _{FC to SHWT} = Depth to SHWT from the bottom of the filter course | ≥ 1' |
| 68.67 | ft | Peak elevation of the 50-year storm event (infiltration can be used in analysis) | |
| 69.00 | ft | Elevation of the top of the practice | |
| YES | | 50 peak elevation ≤ Elevation of the top of the practice | ← yes |
| If a surface sand filter or underground sand filter is proposed: | | | |
| YES | ac | Drainage Area check. | < 10 ac |
| | cf | V = Volume of storage ³ (attach a stage-storage table) | ≥ 75%WQV |
| | inches | D _{FC} = Filter course thickness | 18", or 24" if within GPA |
| Sheet | | Note what sheet in the plan set contains the filter course specification. | |
| | Yes/No | Access grate provided? | ← yes |

Section 3 Drainage Analysis

3.1 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. A Type III storm pattern was used in the model.

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.

3.2 Pre-Development Conditions

To analyze the Pre-Development conditions, the site has been modeled utilizing two (2) distinct points of analysis (PA-1 and PA-2). These points of analysis and watersheds are depicted on the plan entitled "Pre-Development Watershed Plan", Sheet C-801.

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

Point of Analysis One (PA-1)

Point of Analysis 1 is comprised of one (1) subcatchment area (PRE-1.0). This area includes a portion of the paved area behind the existing Pease Development Authority building, a wooded area, a wetland area, and the grassed area along the edge of Corporate and Goose Bay Drives. Runoff from this area travels north via overland flow to a closed drainage system to Point of Analysis 1.

Point of Analysis Two (PA-2)

Point of Analysis 2 is comprised of two (2) subcatchment areas (PRE-2.0 & 2.1). This area includes the existing parking garage, grass area along Goose Bay Drive, and a portion of the parking and open area behind the existing Pease Development Authority building.

Runoff from Pre-2.0 is from the existing parking garage. Runoff from this area

enters a closed drainage system and is combined with runoff from Pre-2.1 downstream of the existing rip rap swale at PA-2.

Runoff from Pre-2.1 begins in the paved parking/driveway area of the Pease Development Authority building and travels northwest via overland flow to an existing closed drainage system and eventually to Point of Analysis 2. Runoff from PA-2 ultimately discharges to an existing on-site detention basin.

3.2.1 Pre-Development Watershed Plan

3.2.2 Pre-Development Soil Plan

3.2.3 Pre-Development Calculation

SITE SPECIFIC SOIL SURVEY HYDROLOGIC SOIL GROUP (HSG) LEGEND

| MAP NUMBER*/ DISTURBED SOIL NUMERATOR** | SOIL TYPE | HSG |
|--|----------------------|-----|
| 29C | WOODBIDGE | C |
| 299A/dcccc | UDORTHENTS, SMOOTHED | C |
| 500E/dcccc | UDORTHENTS, LOAMY | C |
| 600A/fcccc | ENDOAQUENTS, LOAMY | C |
| 926* | RIDGEBURY | C |

* INDICATES THE LOCATION OF THE SLOPE CLASS IDENTIFIER (A-F)
 ** SUPPLEMENTAL SYMBOLS ARE USED TO FURTHER CHARACTERIZE DISTURBED SOILS FOR ALTERATION OF TERRAIN PERMITS

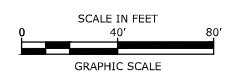
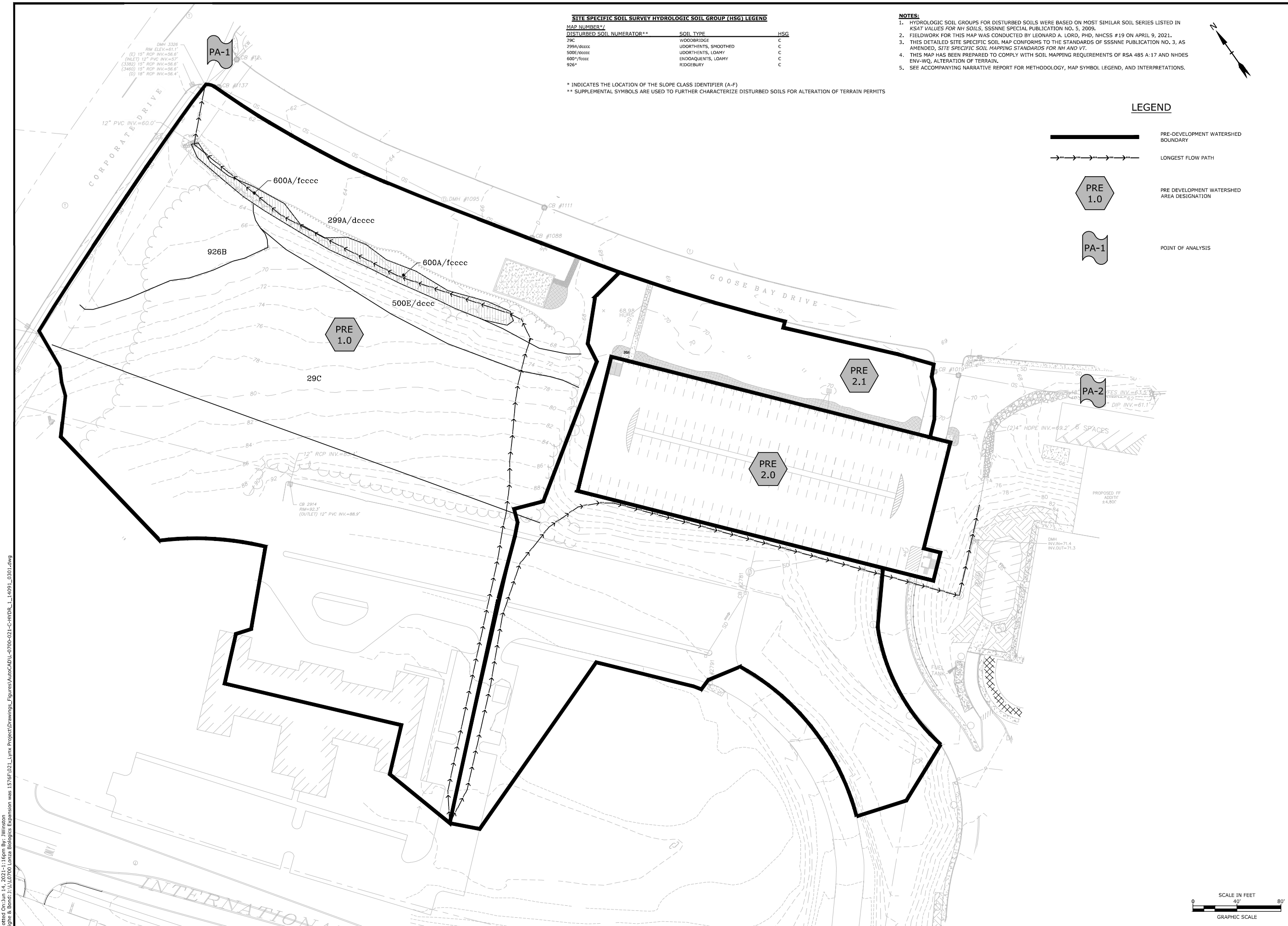
NOTES:

1. HYDROLOGIC SOIL GROUPS FOR DISTURBED SOILS WERE BASED ON MOST SIMILAR SOIL SERIES LISTED IN KSAT VALUES FOR NH SOILS, SSSNNE SPECIAL PUBLICATION NO. 5, 2009.
2. FIELDWORK FOR THIS MAP WAS CONDUCTED BY LEONARD A. LORD, PHD, NHCSS #19 ON APRIL 9, 2021.
3. THIS DETAILED SITE SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, SITE SPECIFIC SOIL MAPPING STANDARDS FOR NH AND VT.
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.



LEGEND

- PRE-DEVELOPMENT WATERSHED BOUNDARY
- LONGEST FLOW PATH
- PRE DEVELOPMENT WATERSHED AREA DESIGNATION
- POINT OF ANALYSIS



Lynx Parking Expansion

Lonza Biologics

Portsmouth,
New Hampshire

| MARK | DATE | DESCRIPTION |
|------|-----------|----------------|
| A | 6/21/2021 | TAC SUBMISSION |

PROJECT NO: L-0700-021
 DATE: June 21, 2021
 FILE: L-0700-021-C-HYDR_1_14091_0301.DWG
 DRAWN BY: JW/CJK
 CHECKED BY: NAH/PMC
 APPROVED BY: BLM

PRE-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-801

Last Saved: 6/14/2021 11:16pm By: Wriston
 Plotted On: Jun 14, 2021 11:16am
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SITE SPECIFIC SOIL SURVEY HYDROLOGIC SOIL GROUP (HSG) LEGEND


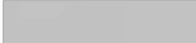

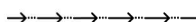



| MAP NUMBER*/ DISTURBED SOIL NUMERATOR** | SOIL TYPE | HSG |
|--|---------------------|-----|
| 29C | WOODBIDGE | C |
| 299A/dcccc | UDORTENTS, SMOOTHED | C |
| 500E/dcccc | UDORTENTS, LOAMY | C |
| 600A/fcccc | ENDOACQUENTS, LOAMY | C |
| 926* | RIDGEBURY | C |

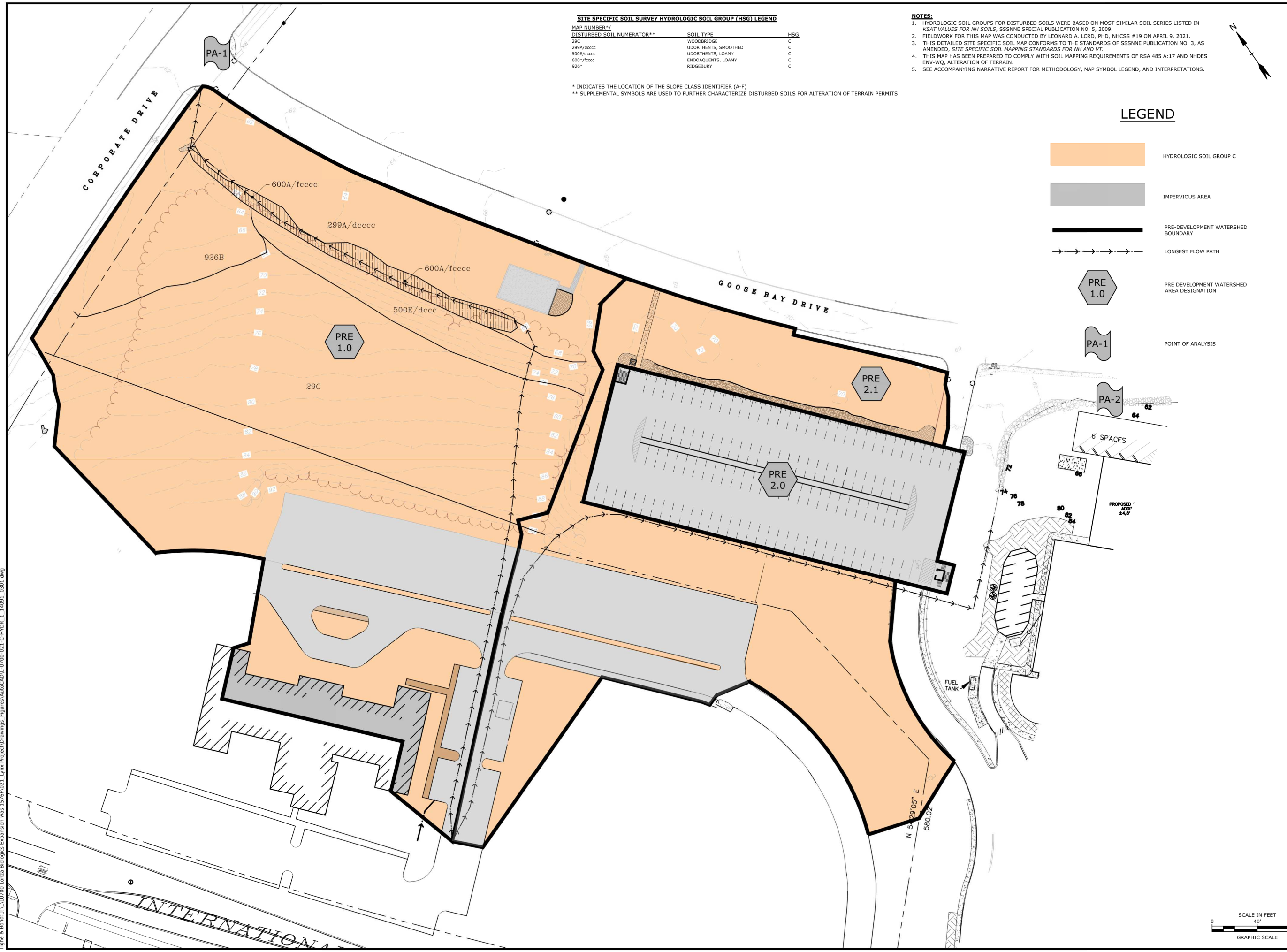
* INDICATES THE LOCATION OF THE SLOPE CLASS IDENTIFIER (A-F)
 ** SUPPLEMENTAL SYMBOLS ARE USED TO FURTHER CHARACTERIZE DISTURBED SOILS FOR ALTERATION OF TERRAIN PERMITS

NOTES:

1. HYDROLOGIC SOIL GROUPS FOR DISTURBED SOILS WERE BASED ON MOST SIMILAR SOIL SERIES LISTED IN KSAT VALUES FOR NH SOILS, SSSNNE SPECIAL PUBLICATION NO. 5, 2009.
2. FIELDWORK FOR THIS MAP WAS CONDUCTED BY LEONARD A. LORD, PH.D, NHCSS #19 ON APRIL 9, 2021.
3. THIS DETAILED SITE SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, SITE SPECIFIC SOIL MAPPING STANDARDS FOR NH AND VT.
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

LEGEND

-  HYDROLOGIC SOIL GROUP C
-  IMPERVIOUS AREA
-  PRE-DEVELOPMENT WATERSHED BOUNDARY
-  LONGEST FLOW PATH
-  PRE DEVELOPMENT WATERSHED AREA DESIGNATION
-  PRE DEVELOPMENT WATERSHED AREA DESIGNATION
-  POINT OF ANALYSIS



Lynx Parking Expansion

Lonza Biologics

Portsmouth,
New Hampshire

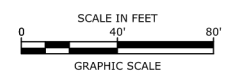
| MARK | DATE | DESCRIPTION |
|------|-----------|----------------|
| A | 6/21/2021 | TAC SUBMISSION |

PROJECT NO: L-0700-021
 DATE: June 21, 2021
 FILE: L-0700-021-C-HYDR_1_14091_0301.DWG
 DRAWN BY: JW/CJK
 CHECKED BY: NAH/PMC
 APPROVED BY: BLM

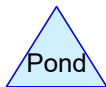
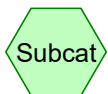
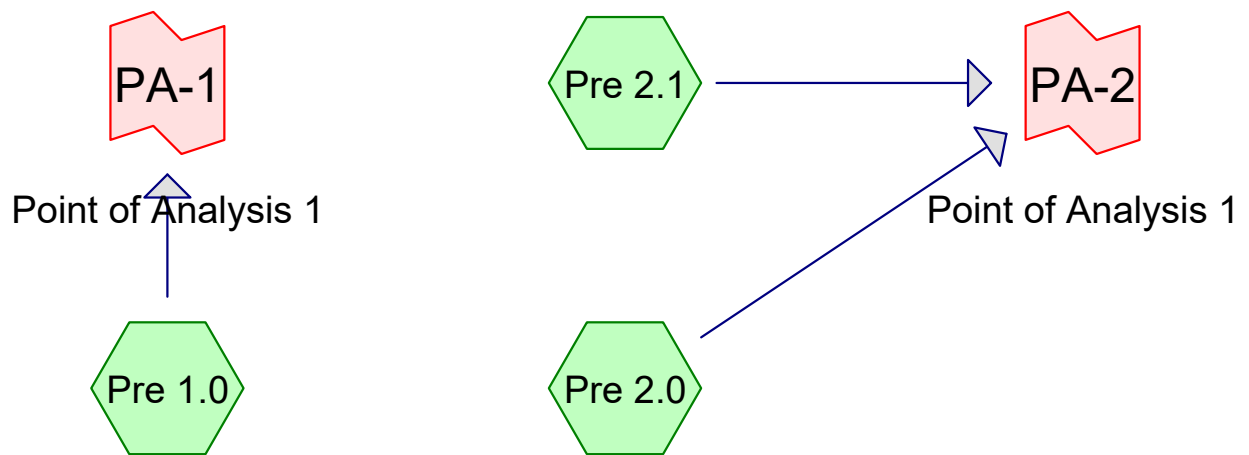
PRE-DEVELOPMENT SOIL PLAN

SCALE: AS SHOWN

C-803



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L-0700-021-PRE

Prepared by Tighe & Bond

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Page 2

Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|--|
| 3.015 | 74 | >75% Grass cover, Good, HSG C (Pre 1.0, Pre 2.1) |
| 0.039 | 89 | Gravel roads, HSG C (Pre 1.0) |
| 1.180 | 98 | Paved parking, HSG C (Pre 1.0, Pre 2.1) |
| 1.087 | 98 | Roofs, HSG C (Pre 1.0, Pre 2.0) |
| 1.996 | 70 | Woods, Good, HSG C (Pre 1.0) |
| 7.317 | 80 | TOTAL AREA |

L-0700-021-PRE

Prepared by Tighe & Bond

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Page 3

Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|---------------------------|
| 0.000 | HSG A | |
| 0.000 | HSG B | |
| 7.317 | HSG C | Pre 1.0, Pre 2.0, Pre 2.1 |
| 0.000 | HSG D | |
| 0.000 | Other | |
| 7.317 | | TOTAL AREA |

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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=187,430 sf 17.98% Impervious Runoff Depth>1.56"
Flow Length=862' Tc=8.5 min CN=77 Runoff=6.98 cfs 0.560 af

SubcatchmentPre 2.0: Runoff Area=40,595 sf 100.00% Impervious Runoff Depth>3.44"
Tc=5.0 min CN=98 Runoff=3.36 cfs 0.267 af

SubcatchmentPre 2.1: Runoff Area=90,717 sf 26.94% Impervious Runoff Depth>1.78"
Flow Length=762' Tc=6.8 min CN=80 Runoff=4.16 cfs 0.309 af

Link PA-1: Point of Analysis 1 Inflow=6.98 cfs 0.560 af
Primary=6.98 cfs 0.560 af

Link PA-2: Point of Analysis 1 Inflow=7.38 cfs 0.576 af
Primary=7.38 cfs 0.576 af

Total Runoff Area = 7.317 ac Runoff Volume = 1.137 af Average Runoff Depth = 1.86"
69.02% Pervious = 5.051 ac 30.98% Impervious = 2.267 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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=187,430 sf 17.98% Impervious Runoff Depth>3.12"
Flow Length=862' Tc=8.5 min CN=77 Runoff=14.26 cfs 1.118 af

SubcatchmentPre 2.0: Runoff Area=40,595 sf 100.00% Impervious Runoff Depth>5.35"
Tc=5.0 min CN=98 Runoff=5.14 cfs 0.415 af

SubcatchmentPre 2.1: Runoff Area=90,717 sf 26.94% Impervious Runoff Depth>3.41"
Flow Length=762' Tc=6.8 min CN=80 Runoff=7.98 cfs 0.592 af

Link PA-1: Point of Analysis 1 Inflow=14.26 cfs 1.118 af
Primary=14.26 cfs 1.118 af

Link PA-2: Point of Analysis 1 Inflow=12.91 cfs 1.007 af
Primary=12.91 cfs 1.007 af

Total Runoff Area = 7.317 ac Runoff Volume = 2.126 af Average Runoff Depth = 3.49"
69.02% Pervious = 5.051 ac 30.98% Impervious = 2.267 ac

Summary for Subcatchment Pre 1.0:

Runoff = 14.26 cfs @ 12.12 hrs, Volume= 1.118 af, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 86,963 | 70 | Woods, Good, HSG C |
| 65,062 | 74 | >75% Grass cover, Good, HSG C |
| * 1,703 | 89 | Gravel roads, HSG C |
| 26,959 | 98 | Paved parking, HSG C |
| 6,743 | 98 | Roofs, HSG C |
| 187,430 | 77 | Weighted Average |
| 153,728 | | 82.02% Pervious Area |
| 33,702 | | 17.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 1.1 | 100 | 0.0225 | 1.55 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.68" |
| 0.7 | 168 | 0.0357 | 3.84 | | Shallow Concentrated Flow, Paved Kv= 20.3 fps |
| 0.1 | 18 | 0.0417 | 3.29 | | Shallow Concentrated Flow, Unpaved Kv= 16.1 fps |
| 3.9 | 208 | 0.1260 | 0.89 | | Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 313 | 0.0184 | 2.03 | | Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps |
| 0.1 | 55 | 0.0545 | 10.59 | 8.32 | Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior |
| 8.5 | 862 | Total | | | |

Summary for Subcatchment Pre 2.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.14 cfs @ 12.07 hrs, Volume= 0.415 af, Depth> 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 40,595 | 98 | Roofs, HSG C |
| 40,595 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0 | | | | | Direct Entry, |

Summary for Subcatchment Pre 2.1:

Runoff = 7.98 cfs @ 12.10 hrs, Volume= 0.592 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 66,279 | 74 | >75% Grass cover, Good, HSG C |
| 24,438 | 98 | Paved parking, HSG C |
| 90,717 | 80 | Weighted Average |
| 66,279 | | 73.06% Pervious Area |
| 24,438 | | 26.94% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 1.1 | 100 | 0.0225 | 1.55 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.68" |
| 0.7 | 170 | 0.0353 | 3.81 | | Shallow Concentrated Flow, Paved Kv= 20.3 fps |
| 0.2 | 82 | 0.1620 | 6.48 | | Shallow Concentrated Flow, Unpaved Kv= 16.1 fps |
| 4.8 | 410 | 0.0010 | 1.43 | 1.13 | Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 |
| 6.8 | 762 | Total | | | |

Summary for Link PA-1: Point of Analysis 1

Inflow Area = 4.303 ac, 17.98% Impervious, Inflow Depth > 3.12" for 10 Year Storm event
Inflow = 14.26 cfs @ 12.12 hrs, Volume= 1.118 af
Primary = 14.26 cfs @ 12.12 hrs, Volume= 1.118 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2: Point of Analysis 1

Inflow Area = 3.015 ac, 49.53% Impervious, Inflow Depth > 4.01" for 10 Year Storm event
Inflow = 12.91 cfs @ 12.09 hrs, Volume= 1.007 af
Primary = 12.91 cfs @ 12.09 hrs, Volume= 1.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

L-0700-021-PRE

Type III 24-hr 25 Year Storm Rainfall=7.08"

Prepared by Tighe & Bond

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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=187,430 sf 17.98% Impervious Runoff Depth>4.43"
Flow Length=862' Tc=8.5 min CN=77 Runoff=20.20 cfs 1.589 af

SubcatchmentPre 2.0: Runoff Area=40,595 sf 100.00% Impervious Runoff Depth>6.84"
Tc=5.0 min CN=98 Runoff=6.52 cfs 0.531 af

SubcatchmentPre 2.1: Runoff Area=90,717 sf 26.94% Impervious Runoff Depth>4.76"
Flow Length=762' Tc=6.8 min CN=80 Runoff=11.05 cfs 0.827 af

Link PA-1: Point of Analysis 1 Inflow=20.20 cfs 1.589 af
Primary=20.20 cfs 1.589 af

Link PA-2: Point of Analysis 1 Inflow=17.32 cfs 1.358 af
Primary=17.32 cfs 1.358 af

Total Runoff Area = 7.317 ac Runoff Volume = 2.947 af Average Runoff Depth = 4.83"
69.02% Pervious = 5.051 ac 30.98% Impervious = 2.267 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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=187,430 sf 17.98% Impervious Runoff Depth>5.72"
Flow Length=862' Tc=8.5 min CN=77 Runoff=25.90 cfs 2.050 af

SubcatchmentPre 2.0: Runoff Area=40,595 sf 100.00% Impervious Runoff Depth>8.25"
Tc=5.0 min CN=98 Runoff=7.82 cfs 0.640 af

SubcatchmentPre 2.1: Runoff Area=90,717 sf 26.94% Impervious Runoff Depth>6.08"
Flow Length=762' Tc=6.8 min CN=80 Runoff=13.98 cfs 1.055 af

Link PA-1: Point of Analysis 1 Inflow=25.90 cfs 2.050 af
Primary=25.90 cfs 2.050 af

Link PA-2: Point of Analysis 1 Inflow=21.50 cfs 1.696 af
Primary=21.50 cfs 1.696 af

Total Runoff Area = 7.317 ac Runoff Volume = 3.746 af Average Runoff Depth = 6.14"
69.02% Pervious = 5.051 ac 30.98% Impervious = 2.267 ac

3.3 Post-Development Conditions

The post-development drainage condition is characterized by six (6) watershed areas modeled at the same points of analysis as the pre-development condition. These points of analysis and watersheds are depicted on the plan entitled "Post Development Watershed Plan", Sheets C-802.

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

Point of Analysis One (PA-1)

Point of Analysis 1 is comprised of three (3) subcatchment areas (Post 1.0, Post 1.1 & Post 1.2). PA-1 is located at the entrance of the closed drainage system at the corner of Corporate and Goose Bay Drives.

Runoff from Post 1.0 starts at the southern corner of the proposed paved parking and flows overland and then proposed to a closed drainage system where stormwater detention is utilized. Eventually the flow outlets thru hydrodynamic separator (Contech Cascade Separator®) and then flows through Jellyfish filter. Following the outlet of the treatment systems the flow meets the original point of the existing closed drainage system at Point of Analysis 1.

Runoff from Post 1.1 starts at the same origin as in the Pre-Development conditions, travels northeast via overland flow and to a conveyance swale where it enters a detention pond. The detention pond has been sized for the water quality volume which will flow to the downstream treatment train, which includes a hydrodynamic separator (Contech Cascade Separator®) as pre-treatment and a Jellyfish filter completing the treatment process. During higher flow storms, flows bypass the treatment and enter the proposed closed drainage system downstream. Runoff will ultimately outlet into the existing closed drainage system at the corner of Corporate and Goose Bay Drives.

Runoff from Post 1.2 starts at to the west of the proposed detention pond and runs along the edge of Corporate drive overland to the existing closed drainage system as mentioned in Post 1.0 & Post 1.1.

Point of Analysis Two (PA-2)

Point of Analysis 2 is comprised of three (3) subcatchment areas (Post 2.0, Post 2.1 & Post 2.2). PA-2 is located at the end of the existing rip rap swale and the flared end section downstream of the catchbasins located at the entrance of the existing parking garage.

Runoff from Post 2.0 starts at the same origin as in the Pre-Development conditions, travels northwest via overland flow and to an existing closed drainage system. The last segment of existing drainage pipe is proposed to be replaced and a Jellyfish filter added for additional treatment to the stormwater runoff. Downstream of the Jellyfish filter the stormwater will continue to the existing rip rap swale to PA-2.

Runoff from Post 2.1 is contained to the existing parking garage where the stormwater is captured via a closed drainage system and combined into Post 2.2 for treatment. The stormwater flow continues in an existing closed drainage

system to PA-2.

Runoff from Post 2.2 starts within the parking area adjacent to the existing parking garage and flows into a Rain Garden along Goose Bay Drive. A Yard Drain captures the runoff and enters a closed drainage system. The Rain Garden was a previously approved design.

3.3.1 Post-Development Watershed Plan

3.3.2 Post-Development Soil Plan

3.3.3 Post-Development Calculation

SITE SPECIFIC SOIL SURVEY HYDROLOGIC SOIL GROUP (HSG) LEGEND

| MAP NUMBER*/ DISTURBED SOIL NUMERATOR** | SOIL TYPE | HSG |
|--|----------------------|-----|
| 29C | WOODBIDGE | C |
| 299A/dcccc | UDORTHERTS, SMOOTHED | C |
| 500E/ccccc | UDORTHERTS, LOAMY | C |
| 600F/fccccc | ENDOQUENTS, LOAMY | C |
| 926* | RIDGEBURY | C |

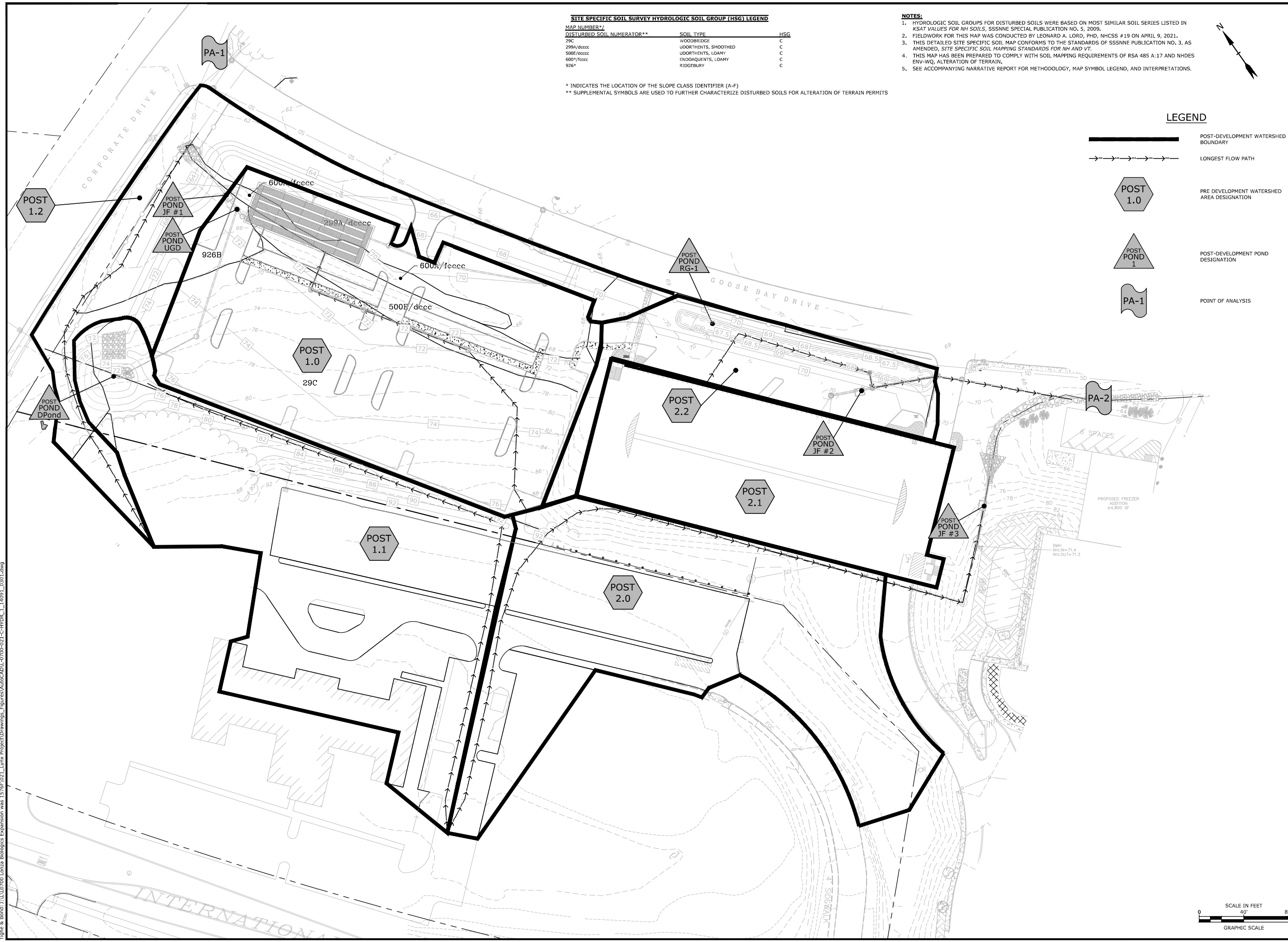
* INDICATES THE LOCATION OF THE SLOPE CLASS IDENTIFIER (A-F)
 ** SUPPLEMENTAL SYMBOLS ARE USED TO FURTHER CHARACTERIZE DISTURBED SOILS FOR ALTERATION OF TERRAIN PERMITS

- NOTES:**
1. HYDROLOGIC SOIL GROUPS FOR DISTURBED SOILS WERE BASED ON MOST SIMILAR SOIL SERIES LISTED IN KSAT VALUES FOR NH SOILS, SSSNNE SPECIAL PUBLICATION NO. 5, 2009.
 2. FIELDWORK FOR THIS MAP WAS CONDUCTED BY LEONARD A. LORD, PHD, NHCSS #19 ON APRIL 9, 2021.
 3. THIS DETAILED SITE SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, *SITE SPECIFIC SOIL MAPPING STANDARDS FOR NH AND VT*.
 4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ, ALTERATION OF TERRAIN.
 5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.



LEGEND

- POST-DEVELOPMENT WATERSHED BOUNDARY
- LONGEST FLOW PATH
- PRE DEVELOPMENT WATERSHED AREA DESIGNATION
- POST-DEVELOPMENT POND DESIGNATION
- POINT OF ANALYSIS



Lynx Parking Expansion

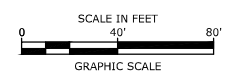
Lonza Biologics

Portsmouth, New Hampshire

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| MARK | DATE | DESCRIPTION |
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| A | 6/21/2021 | TAC SUBMISSION |

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| PROJECT NO: | L-0700-021 |
| DATE: | June 21, 2021 |
| FILE: | L-0700-021-C-HYDR_1_14091_0301.DWG |
| DRAWN BY: | JW/CJK |
| CHECKED BY: | NAH/PMC |
| APPROVED BY: | BLM |
| POST-DEVELOPMENT WATERSHED PLAN | |
| SCALE: | AS SHOWN |
| C-802 | |



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SITE SPECIFIC SOIL SURVEY HYDROLOGIC SOIL GROUP (HSG) LEGEND

| MAP NUMBER*/ DISTURBED SOIL NUMERATOR** | SOIL TYPE | HSG |
|--|----------------------|-----|
| 29C | WOODBIDGE | C |
| 299A/dcccc | UDORTHERTS, SMOOTHED | C |
| 500E/dcccc | UDORTHERTS, LOAMY | C |
| 600*/fcccc | ENDOACQUENTS, LOAMY | C |
| 926* | RIDGEBURY | C |




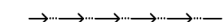



* INDICATES THE LOCATION OF THE SLOPE CLASS IDENTIFIER (A-F)
 ** SUPPLEMENTAL SYMBOLS ARE USED TO FURTHER CHARACTERIZE DISTURBED SOILS FOR ALTERATION OF TERRAIN PERMITS

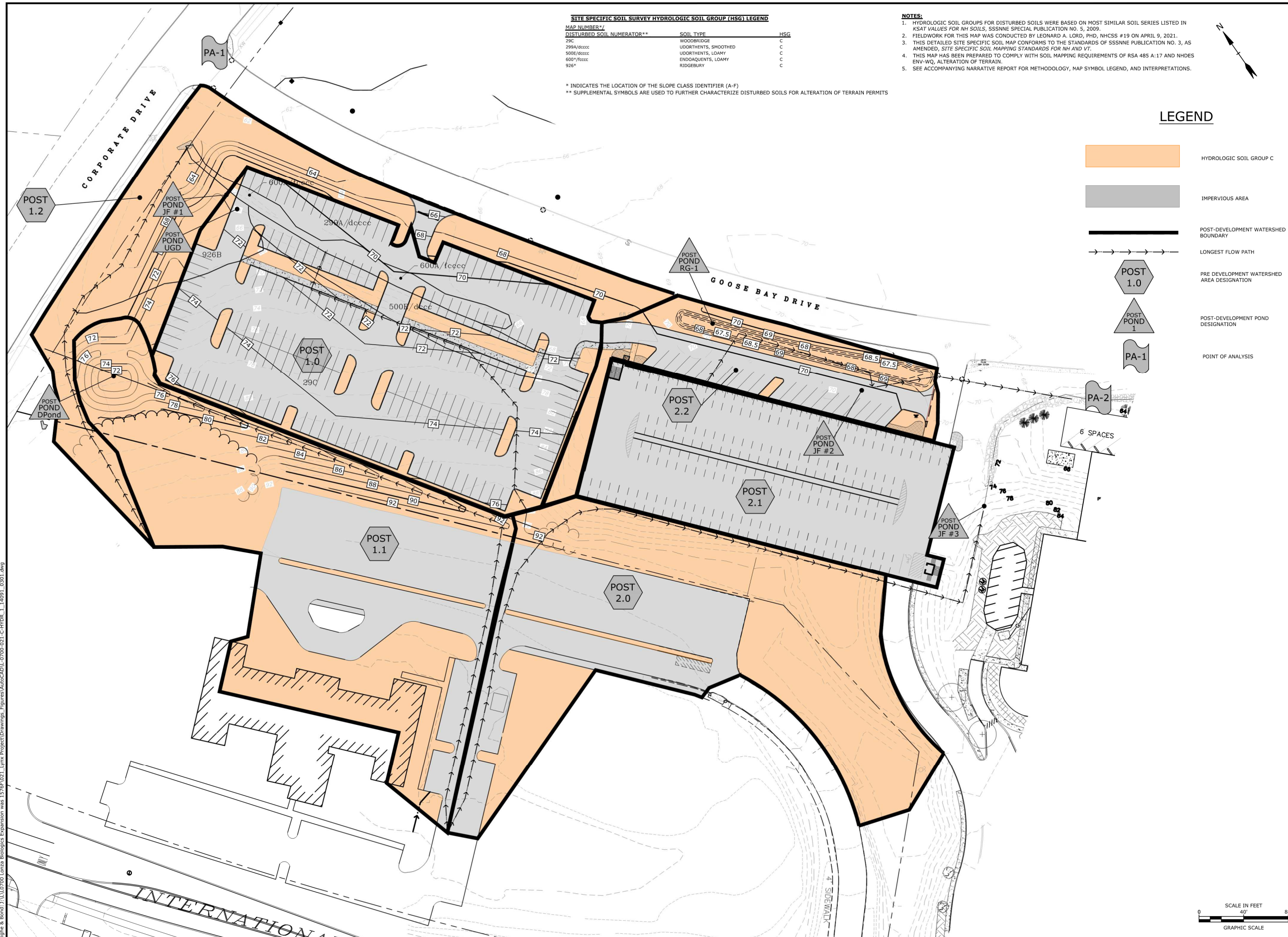
NOTES:

1. HYDROLOGIC SOIL GROUPS FOR DISTURBED SOILS WERE BASED ON MOST SIMILAR SOIL SERIES LISTED IN KSAT VALUES FOR NH SOILS, SSSNNE SPECIAL PUBLICATION NO. 5, 2009.
2. FIELDWORK FOR THIS MAP WAS CONDUCTED BY LEONARD A. LORD, PHD, NHCSS #19 ON APRIL 9, 2021.
3. THIS DETAILED SITE SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, SITE SPECIFIC SOIL MAPPING STANDARDS FOR NH AND VT.
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.



LEGEND

-  HYDROLOGIC SOIL GROUP C
-  IMPERVIOUS AREA
-  POST-DEVELOPMENT WATERSHED BOUNDARY
-  LONGEST FLOW PATH
-  PRE DEVELOPMENT WATERSHED AREA DESIGNATION
-  POST-DEVELOPMENT POND DESIGNATION
-  POINT OF ANALYSIS



Lynx Parking Expansion

Lonza Biologics

Portsmouth,
New Hampshire

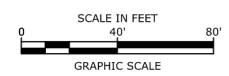
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| A | 6/21/2021 | TAC SUBMISSION |

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 DATE: June 21, 2021
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 APPROVED BY: BLM

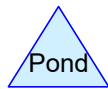
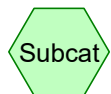
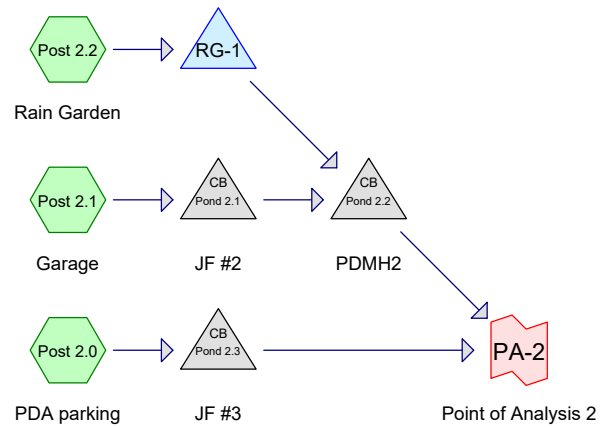
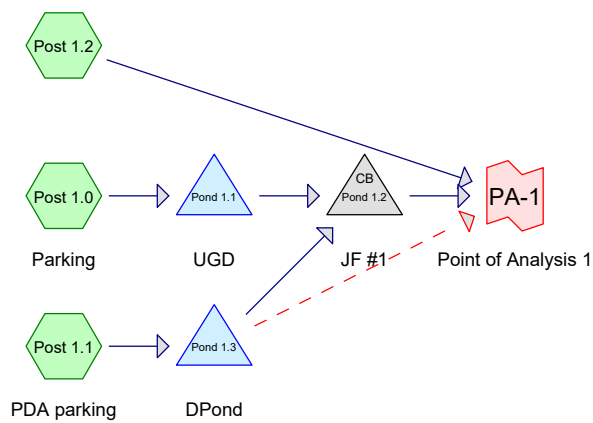
POST-DEVELOPMENT SOIL PLAN

SCALE: AS SHOWN

C-804



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 Project: Lynx Parking Expansion
 Figure: L-0700-021-C-HYDR_1_14091_0301.dwg



L-0700-021-POST

Prepared by Tighe & Bond

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Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---|
| 2.967 | 74 | >75% Grass cover, Good, HSG C (Post 1.0, Post 1.1, Post 1.2, Post 2.0, Post 2.2) |
| 4.065 | 98 | Paved parking, HSG C (Post 1.0, Post 1.1, Post 1.2, Post 2.0, Post 2.1, Post 2.2) |
| 0.285 | 70 | Woods, Good, HSG C (Post 1.1, Post 1.2) |
| 7.317 | 87 | TOTAL AREA |

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Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|-----------------|---------------|--|
| 0.000 | HSG A | |
| 0.000 | HSG B | |
| 7.317 | HSG C | Post 1.0, Post 1.1, Post 1.2, Post 2.0, Post 2.1, Post 2.2 |
| 0.000 | HSG D | |
| 0.000 | Other | |
| 7.317 | | TOTAL AREA |

L-0700-021-POST

Type III 24-hr 2 Year Storm Rainfall=3.68"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Parking Runoff Area=76,655 sf 87.15% Impervious Runoff Depth>3.11"
 Flow Length=337' Tc=6.0 min CN=95 Runoff=5.88 cfs 0.457 af

SubcatchmentPost 1.1: PDA parking Runoff Area=73,330 sf 46.11% Impervious Runoff Depth>2.17"
 Flow Length=625' Tc=5.0 min CN=85 Runoff=4.29 cfs 0.305 af

SubcatchmentPost 1.2: Runoff Area=39,267 sf 2.61% Impervious Runoff Depth>1.36"
 Flow Length=469' Tc=11.4 min CN=74 Runoff=1.16 cfs 0.102 af

SubcatchmentPost 2.0: PDA parking Runoff Area=66,913 sf 36.11% Impervious Runoff Depth>2.01"
 Flow Length=352' Tc=5.0 min CN=83 Runoff=3.63 cfs 0.257 af

SubcatchmentPost 2.1: Garage Runoff Area=40,595 sf 100.00% Impervious Runoff Depth>3.44"
 Tc=5.0 min CN=98 Runoff=3.36 cfs 0.267 af

SubcatchmentPost 2.2: Rain Garden Runoff Area=21,982 sf 48.49% Impervious Runoff Depth>2.26"
 Flow Length=235' Tc=5.0 min CN=86 Runoff=1.33 cfs 0.095 af

Pond Pond 1.1: UGD Peak Elev=63.88' Storage=0.100 af Inflow=5.88 cfs 0.457 af
 Outflow=1.86 cfs 0.457 af

Pond Pond 1.2: JF #1 Peak Elev=61.43' Inflow=3.37 cfs 0.761 af
 18.0" Round Culvert n=0.013 L=44.0' S=0.0091 '/' Outflow=3.37 cfs 0.761 af

Pond Pond 1.3: DPond Peak Elev=74.38' Storage=2,158 cf Inflow=4.29 cfs 0.305 af
 Primary=1.51 cfs 0.304 af Secondary=0.00 cfs 0.000 af Outflow=1.51 cfs 0.304 af

Pond Pond 2.1: JF #2 Peak Elev=66.34' Inflow=3.36 cfs 0.267 af
 18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=3.36 cfs 0.267 af

Pond Pond 2.2: PDMH2 Peak Elev=66.15' Inflow=3.36 cfs 0.283 af
 18.0" Round Culvert n=0.013 L=56.0' S=0.0018 '/' Outflow=3.36 cfs 0.283 af

Pond Pond 2.3: JF #3 Peak Elev=71.78' Inflow=3.63 cfs 0.257 af
 18.0" Round Culvert n=0.013 L=17.0' S=0.0206 '/' Outflow=3.63 cfs 0.257 af

Pond RG-1: Peak Elev=68.30' Storage=2,563 cf Inflow=1.33 cfs 0.095 af
 Discarded=0.02 cfs 0.021 af Primary=0.10 cfs 0.015 af Outflow=0.12 cfs 0.036 af

Link PA-1: Point of Analysis 1 Inflow=4.40 cfs 0.863 af
 Primary=4.40 cfs 0.863 af

Link PA-2: Point of Analysis 2 Inflow=7.00 cfs 0.540 af
 Primary=7.00 cfs 0.540 af

Total Runoff Area = 7.317 ac Runoff Volume = 1.483 af Average Runoff Depth = 2.43"
44.45% Pervious = 3.253 ac 55.55% Impervious = 4.065 ac

L-0700-021-POST

Type III 24-hr 10 Year Storm Rainfall=5.59"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Parking Runoff Area=76,655 sf 87.15% Impervious Runoff Depth>5.00"
 Flow Length=337' Tc=6.0 min CN=95 Runoff=9.20 cfs 0.733 af

SubcatchmentPost 1.1: PDA parking Runoff Area=73,330 sf 46.11% Impervious Runoff Depth>3.91"
 Flow Length=625' Tc=5.0 min CN=85 Runoff=7.66 cfs 0.549 af

SubcatchmentPost 1.2: Runoff Area=39,267 sf 2.61% Impervious Runoff Depth>2.84"
 Flow Length=469' Tc=11.4 min CN=74 Runoff=2.49 cfs 0.213 af

SubcatchmentPost 2.0: PDA parking Runoff Area=66,913 sf 36.11% Impervious Runoff Depth>3.71"
 Flow Length=352' Tc=5.0 min CN=83 Runoff=6.66 cfs 0.475 af

SubcatchmentPost 2.1: Garage Runoff Area=40,595 sf 100.00% Impervious Runoff Depth>5.35"
 Tc=5.0 min CN=98 Runoff=5.14 cfs 0.415 af

SubcatchmentPost 2.2: Rain Garden Runoff Area=21,982 sf 48.49% Impervious Runoff Depth>4.02"
 Flow Length=235' Tc=5.0 min CN=86 Runoff=2.35 cfs 0.169 af

Pond Pond 1.1: UGD Peak Elev=65.26' Storage=0.188 af Inflow=9.20 cfs 0.733 af
 Outflow=2.40 cfs 0.733 af

Pond Pond 1.2: JF #1 Peak Elev=61.53' Inflow=3.93 cfs 1.193 af
 18.0" Round Culvert n=0.013 L=44.0' S=0.0091 '/' Outflow=3.93 cfs 1.193 af

Pond Pond 1.3: DPond Peak Elev=74.79' Storage=2,728 cf Inflow=7.66 cfs 0.549 af
 Primary=1.56 cfs 0.459 af Secondary=7.44 cfs 0.089 af Outflow=9.00 cfs 0.549 af

Pond Pond 2.1: JF #2 Peak Elev=66.81' Inflow=5.14 cfs 0.415 af
 18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=5.14 cfs 0.415 af

Pond Pond 2.2: PDMH2 Peak Elev=66.58' Inflow=5.58 cfs 0.502 af
 18.0" Round Culvert n=0.013 L=56.0' S=0.0018 '/' Outflow=5.58 cfs 0.502 af

Pond Pond 2.3: JF #3 Peak Elev=72.24' Inflow=6.66 cfs 0.475 af
 18.0" Round Culvert n=0.013 L=17.0' S=0.0206 '/' Outflow=6.66 cfs 0.475 af

Pond RG-1: Peak Elev=68.40' Storage=2,840 cf Inflow=2.35 cfs 0.169 af
 Discarded=0.02 cfs 0.023 af Primary=1.31 cfs 0.087 af Outflow=1.33 cfs 0.110 af

Link PA-1: Point of Analysis 1 Inflow=13.25 cfs 1.495 af
 Primary=13.25 cfs 1.495 af

Link PA-2: Point of Analysis 2 Inflow=12.14 cfs 0.977 af
 Primary=12.14 cfs 0.977 af

Total Runoff Area = 7.317 ac Runoff Volume = 2.555 af Average Runoff Depth = 4.19"
44.45% Pervious = 3.253 ac 55.55% Impervious = 4.065 ac

Summary for Subcatchment Post 1.0: Parking

Runoff = 9.20 cfs @ 12.09 hrs, Volume= 0.733 af, Depth> 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,847 | 74 | >75% Grass cover, Good, HSG C |
| 66,808 | 98 | Paved parking, HSG C |
| 76,655 | 95 | Weighted Average |
| 9,847 | | 12.85% Pervious Area |
| 66,808 | | 87.15% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---|
| 2.4 | 22 | 0.0680 | 0.15 | | Sheet Flow, Grass: Dense n= 0.240 P2= 3.68" |
| 0.7 | 141 | 0.0255 | 3.24 | | Shallow Concentrated Flow, Paved Kv= 20.3 fps |
| 2.4 | 50 | 0.0060 | 0.35 | 0.28 | Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.130 |
| 0.2 | 42 | 0.0050 | 3.21 | 2.52 | Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 |
| 0.2 | 47 | 0.0050 | 3.21 | 2.52 | Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 |
| 0.1 | 35 | 0.0460 | 9.73 | 7.64 | Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 |
| 6.0 | 337 | Total | | | |

Summary for Subcatchment Post 1.1: PDA parking

[49] Hint: Tc<2dt may require smaller dt

Runoff = 7.66 cfs @ 12.07 hrs, Volume= 0.549 af, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 9,811 | 70 | Woods, Good, HSG C |
| 29,707 | 74 | >75% Grass cover, Good, HSG C |
| 33,812 | 98 | Paved parking, HSG C |
| 73,330 | 85 | Weighted Average |
| 39,518 | | 53.89% Pervious Area |
| 33,812 | | 46.11% Impervious Area |

L-0700-021-POST

Type III 24-hr 10 Year Storm Rainfall=5.59"

Prepared by Tighe & Bond

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| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|--|-------------------|----------------|--|
| 1.1 | 100 | 0.0225 | 1.55 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.68" |
| 0.7 | 168 | 0.0357 | 3.84 | | Shallow Concentrated Flow, Paved Kv= 20.3 fps |
| 1.8 | 357 | 0.0500 | 3.35 | | Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps |
| 3.6 | 625 | Total, Increased to minimum Tc = 5.0 min | | | |

Summary for Subcatchment Post 1.2:

Runoff = 2.49 cfs @ 12.16 hrs, Volume= 0.213 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 2,614 | 70 | Woods, Good, HSG C |
| 35,630 | 74 | >75% Grass cover, Good, HSG C |
| 1,023 | 98 | Paved parking, HSG C |
| 39,267 | 74 | Weighted Average |
| 38,244 | | 97.39% Pervious Area |
| 1,023 | | 2.61% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.6 | 85 | 0.0900 | 0.15 | | Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.68" |
| 1.7 | 329 | 0.0480 | 3.29 | | Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps |
| 0.1 | 55 | 0.0548 | 13.80 | 10.84 | Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior |
| 11.4 | 469 | Total | | | |

Summary for Subcatchment Post 2.0: PDA parking

[49] Hint: Tc<2dt may require smaller dt

Runoff = 6.66 cfs @ 12.07 hrs, Volume= 0.475 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

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Type III 24-hr 10 Year Storm Rainfall=5.59"

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| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 42,752 | 74 | >75% Grass cover, Good, HSG C |
| 24,161 | 98 | Paved parking, HSG C |
| 66,913 | 83 | Weighted Average |
| 42,752 | | 63.89% Pervious Area |
| 24,161 | | 36.11% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|--|-------------------|----------------|--|
| 1.1 | 100 | 0.0225 | 1.55 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.68" |
| 0.7 | 170 | 0.0353 | 3.81 | | Shallow Concentrated Flow, Paved Kv= 20.3 fps |
| 0.2 | 82 | 0.1620 | 6.04 | | Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps |
| 2.0 | 352 | Total, Increased to minimum Tc = 5.0 min | | | |

Summary for Subcatchment Post 2.1: Garage

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.14 cfs @ 12.07 hrs, Volume= 0.415 af, Depth> 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 40,595 | 98 | Paved parking, HSG C |
| 40,595 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0 | | | | | Direct Entry, |

Summary for Subcatchment Post 2.2: Rain Garden

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.35 cfs @ 12.07 hrs, Volume= 0.169 af, Depth> 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Storm Rainfall=5.59"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 11,323 | 74 | >75% Grass cover, Good, HSG C |
| 10,659 | 98 | Paved parking, HSG C |
| 21,982 | 86 | Weighted Average |
| 11,323 | | 51.51% Pervious Area |
| 10,659 | | 48.49% Impervious Area |

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Type III 24-hr 10 Year Storm Rainfall=5.59"

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| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|--|-------------------|----------------|--|
| 0.3 | 34 | 0.0440 | 1.63 | | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.68" |
| 1.6 | 135 | 0.0090 | 1.42 | | Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps |
| 0.1 | 10 | 0.0050 | 3.21 | 2.52 | Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior |
| 0.4 | 56 | 0.0020 | 2.66 | 4.70 | Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior |
| 2.4 | 235 | Total, Increased to minimum Tc = 5.0 min | | | |

Summary for Pond Pond 1.1: UGD

Inflow Area = 1.760 ac, 87.15% Impervious, Inflow Depth > 5.00" for 10 Year Storm event
 Inflow = 9.20 cfs @ 12.09 hrs, Volume= 0.733 af
 Outflow = 2.40 cfs @ 12.45 hrs, Volume= 0.733 af, Atten= 74%, Lag= 21.7 min
 Primary = 2.40 cfs @ 12.45 hrs, Volume= 0.733 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 65.26' @ 12.45 hrs Surf.Area= 0.101 ac Storage= 0.188 af
 Flood Elev= 66.50' Surf.Area= 0.101 ac Storage= 0.248 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 23.4 min (788.3 - 764.9)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|---|
| #1A | 61.00' | 0.000 af | 38.59'W x 114.17'L x 6.58'H Field A 0.666 af Overall - 0.301 af Embedded = 0.365 af x 0.0% Voids |
| #2A | 61.50' | 0.253 af | ADS N-12 60" x 25 Inside #1 Inside= 59.5"W x 59.5"H => 19.30 sf x 20.00'L = 386.0 cf Outside= 67.0"W x 67.0"H => 22.91 sf x 20.00'L = 458.2 cf 5 Rows of 5 Chambers 35.59' Header x 19.30 sf x 2 = 1,373.6 cf Inside |
| | | 0.253 af | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|---|
| #1 | Primary | 61.50' | 18.0" Round Culvert L= 44.0' Ke= 0.500 Inlet / Outlet Invert= 61.50' / 61.00' S= 0.0114 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 61.50' | 7.0" Vert. Orifice/Grate C= 0.600 |
| #3 | Device 1 | 65.50' | 5.0' long x 5.90' rise Sharp-Crested Rectangular Weir 2 End Contraction(s) |

Primary OutFlow Max=2.40 cfs @ 12.45 hrs HW=65.26' TW=61.53' (Dynamic Tailwater)

- ↑1=Culvert (Passes 2.40 cfs of 14.77 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 2.40 cfs @ 8.97 fps)
- ↑3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond Pond 1.2: JF #1

Inflow Area = 3.443 ac, 67.09% Impervious, Inflow Depth > 4.16" for 10 Year Storm event
 Inflow = 3.93 cfs @ 12.44 hrs, Volume= 1.193 af
 Outflow = 3.93 cfs @ 12.44 hrs, Volume= 1.193 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.93 cfs @ 12.44 hrs, Volume= 1.193 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 61.53' @ 12.44 hrs
 Flood Elev= 65.50'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 60.50' | 18.0" Round Culvert L= 44.0' Ke= 0.500 Inlet / Outlet Invert= 60.50' / 60.10' S= 0.0091 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |

Primary OutFlow Max=3.93 cfs @ 12.44 hrs HW=61.53' TW=0.00' (Dynamic Tailwater)

- ↑1=Culvert (Barrel Controls 3.93 cfs @ 4.30 fps)

Summary for Pond Pond 1.3: DPond

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.683 ac, 46.11% Impervious, Inflow Depth > 3.91" for 10 Year Storm event
 Inflow = 7.66 cfs @ 12.07 hrs, Volume= 0.549 af
 Outflow = 9.00 cfs @ 12.11 hrs, Volume= 0.549 af, Atten= 0%, Lag= 2.0 min
 Primary = 1.56 cfs @ 12.11 hrs, Volume= 0.459 af
 Secondary = 7.44 cfs @ 12.11 hrs, Volume= 0.089 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 74.79' @ 12.11 hrs Surf.Area= 1,497 sf Storage= 2,728 cf
 Flood Elev= 76.00' Surf.Area= 2,018 sf Storage= 4,859 cf

Plug-Flow detention time= 8.0 min calculated for 0.549 af (100% of inflow)
 Center-of-Mass det. time= 7.5 min (809.5 - 802.0)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 72.00' | 4,859 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 72.00 | 525 | 0 | 0 |
| 74.00 | 1,158 | 1,683 | 1,683 |
| 76.00 | 2,018 | 3,176 | 4,859 |

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| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|--|
| #1 | Primary | 68.00' | 6.0" Round Culvert L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.00' / 67.60' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf |
| #2 | Device 1 | 72.00' | 11.1" x 11.1" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #3 | Secondary | 74.50' | 15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |

Primary OutFlow Max=1.56 cfs @ 12.11 hrs HW=74.76' TW=61.47' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 1.56 cfs @ 7.94 fps)

↑2=Orifice/Grate (Passes 1.56 cfs of 6.85 cfs potential flow)

Secondary OutFlow Max=6.75 cfs @ 12.11 hrs HW=74.77' TW=0.00' (Dynamic Tailwater)

↑3=Sharp-Crested Rectangular Weir (Weir Controls 6.75 cfs @ 1.69 fps)

Summary for Pond Pond 2.1: JF #2

Inflow Area = 0.932 ac, 100.00% Impervious, Inflow Depth > 5.35" for 10 Year Storm event
 Inflow = 5.14 cfs @ 12.07 hrs, Volume= 0.415 af
 Outflow = 5.14 cfs @ 12.07 hrs, Volume= 0.415 af, Atten= 0%, Lag= 0.0 min
 Primary = 5.14 cfs @ 12.07 hrs, Volume= 0.415 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 66.81' @ 12.12 hrs

Flood Elev= 70.00'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 65.15' | 18.0" Round Culvert L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 65.15' / 65.10' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

Primary OutFlow Max=3.20 cfs @ 12.07 hrs HW=66.65' TW=66.51' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 3.20 cfs @ 1.81 fps)

Summary for Pond Pond 2.2: PDMH2

Inflow Area = 1.437 ac, 81.91% Impervious, Inflow Depth > 4.20" for 10 Year Storm event
 Inflow = 5.58 cfs @ 12.10 hrs, Volume= 0.502 af
 Outflow = 5.58 cfs @ 12.10 hrs, Volume= 0.502 af, Atten= 0%, Lag= 0.0 min
 Primary = 5.58 cfs @ 12.10 hrs, Volume= 0.502 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 66.58' @ 12.10 hrs

Flood Elev= 73.40'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|--|
| #1 | Primary | 65.00' | 18.0" Round Culvert L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 65.00' / 64.90' S= 0.0018 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

Primary OutFlow Max=5.53 cfs @ 12.10 hrs HW=66.57' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 5.53 cfs @ 3.72 fps)

Summary for Pond Pond 2.3: JF #3

Inflow Area = 1.536 ac, 36.11% Impervious, Inflow Depth > 3.71" for 10 Year Storm event
 Inflow = 6.66 cfs @ 12.07 hrs, Volume= 0.475 af
 Outflow = 6.66 cfs @ 12.07 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.0 min
 Primary = 6.66 cfs @ 12.07 hrs, Volume= 0.475 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 72.24' @ 12.07 hrs
 Flood Elev= 78.00'

| Device | Routing | Invert | Outlet Devices |
|--------|---------|--------|---|
| #1 | Primary | 70.85' | 18.0" Round Culvert L= 17.0' Ke= 0.500 Inlet / Outlet Invert= 70.85' / 70.50' S= 0.0206 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf |

Primary OutFlow Max=6.42 cfs @ 12.07 hrs HW=72.21' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 6.42 cfs @ 5.03 fps)

Summary for Pond RG-1:

Inflow Area = 0.505 ac, 48.49% Impervious, Inflow Depth > 4.02" for 10 Year Storm event
 Inflow = 2.35 cfs @ 12.07 hrs, Volume= 0.169 af
 Outflow = 1.33 cfs @ 12.20 hrs, Volume= 0.110 af, Atten= 43%, Lag= 7.5 min
 Discarded = 0.02 cfs @ 12.20 hrs, Volume= 0.023 af
 Primary = 1.31 cfs @ 12.20 hrs, Volume= 0.087 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 68.40' @ 12.20 hrs Surf.Area= 2,815 sf Storage= 2,840 cf
 Flood Elev= 69.00' Surf.Area= 3,813 sf Storage= 4,817 cf

Plug-Flow detention time= 160.0 min calculated for 0.110 af (65% of inflow)
 Center-of-Mass det. time= 62.9 min (861.9 - 799.0)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 64.75' | 4,817 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|-----------|------------------------|------------------------|
| 64.75 | 1,411 | 0.0 | 0 | 0 |
| 66.00 | 1,411 | 40.0 | 706 | 706 |
| 67.50 | 1,411 | 10.0 | 212 | 917 |
| 68.00 | 2,230 | 100.0 | 910 | 1,827 |
| 68.50 | 2,958 | 100.0 | 1,297 | 3,124 |
| 69.00 | 3,813 | 100.0 | 1,693 | 4,817 |

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| Device | Routing | Invert | Outlet Devices |
|--------|-----------|--------|---|
| #1 | Discarded | 64.75' | 0.300 in/hr Exfiltration over Surface area |
| #2 | Primary | 65.35' | 12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.35' / 65.30' S= 0.0050 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf |
| #3 | Device 2 | 68.30' | 11.1" x 11.1" Horiz. Orifice/Grate C= 0.600 |

Discarded OutFlow Max=0.02 cfs @ 12.20 hrs HW=68.40' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)**Primary OutFlow** Max=1.31 cfs @ 12.20 hrs HW=68.40' TW=66.26' (Dynamic Tailwater)↑**2=Culvert** (Passes 1.31 cfs of 5.54 cfs potential flow)↑**3=Orifice/Grate** (Orifice Controls 1.31 cfs @ 1.53 fps)**Summary for Link PA-1: Point of Analysis 1**

Inflow Area = 4.345 ac, 53.71% Impervious, Inflow Depth > 4.13" for 10 Year Storm event
 Inflow = 13.25 cfs @ 12.11 hrs, Volume= 1.495 af
 Primary = 13.25 cfs @ 12.11 hrs, Volume= 1.495 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA-2: Point of Analysis 2

Inflow Area = 2.973 ac, 58.24% Impervious, Inflow Depth > 3.95" for 10 Year Storm event
 Inflow = 12.14 cfs @ 12.08 hrs, Volume= 0.977 af
 Primary = 12.14 cfs @ 12.08 hrs, Volume= 0.977 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 25 Year Storm Rainfall=7.08"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Parking Runoff Area=76,655 sf 87.15% Impervious Runoff Depth>6.48"
 Flow Length=337' Tc=6.0 min CN=95 Runoff=11.76 cfs 0.950 af

SubcatchmentPost 1.1: PDA parking Runoff Area=73,330 sf 46.11% Impervious Runoff Depth>5.33"
 Flow Length=625' Tc=5.0 min CN=85 Runoff=10.28 cfs 0.747 af

SubcatchmentPost 1.2: Runoff Area=39,267 sf 2.61% Impervious Runoff Depth>4.10"
 Flow Length=469' Tc=11.4 min CN=74 Runoff=3.61 cfs 0.308 af

SubcatchmentPost 2.0: PDA parking Runoff Area=66,913 sf 36.11% Impervious Runoff Depth>5.10"
 Flow Length=352' Tc=5.0 min CN=83 Runoff=9.06 cfs 0.653 af

SubcatchmentPost 2.1: Garage Runoff Area=40,595 sf 100.00% Impervious Runoff Depth>6.84"
 Tc=5.0 min CN=98 Runoff=6.52 cfs 0.531 af

SubcatchmentPost 2.2: Rain Garden Runoff Area=21,982 sf 48.49% Impervious Runoff Depth>5.44"
 Flow Length=235' Tc=5.0 min CN=86 Runoff=3.13 cfs 0.229 af

Pond Pond 1.1: UGD Peak Elev=65.84' Storage=0.220 af Inflow=11.76 cfs 0.950 af
 Outflow=5.80 cfs 0.950 af

Pond Pond 1.2: JF #1 Peak Elev=62.08' Inflow=7.35 cfs 1.524 af
 18.0" Round Culvert n=0.013 L=44.0' S=0.0091 '/' Outflow=7.35 cfs 1.524 af

Pond Pond 1.3: DPond Peak Elev=74.83' Storage=2,790 cf Inflow=10.28 cfs 0.747 af
 Primary=1.57 cfs 0.574 af Secondary=9.06 cfs 0.173 af Outflow=10.63 cfs 0.747 af

Pond Pond 2.1: JF #2 Peak Elev=67.74' Inflow=6.52 cfs 0.531 af
 18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=6.52 cfs 0.531 af

Pond Pond 2.2: PDMH2 Peak Elev=67.27' Inflow=8.26 cfs 0.677 af
 18.0" Round Culvert n=0.013 L=56.0' S=0.0018 '/' Outflow=8.26 cfs 0.677 af

Pond Pond 2.3: JF #3 Peak Elev=72.72' Inflow=9.06 cfs 0.653 af
 18.0" Round Culvert n=0.013 L=17.0' S=0.0206 '/' Outflow=9.06 cfs 0.653 af

Pond RG-1: Peak Elev=68.56' Storage=3,304 cf Inflow=3.13 cfs 0.229 af
 Discarded=0.02 cfs 0.024 af Primary=2.10 cfs 0.146 af Outflow=2.12 cfs 0.170 af

Link PA-1: Point of Analysis 1 Inflow=15.28 cfs 2.005 af
 Primary=15.28 cfs 2.005 af

Link PA-2: Point of Analysis 2 Inflow=17.25 cfs 1.329 af
 Primary=17.25 cfs 1.329 af

Total Runoff Area = 7.317 ac Runoff Volume = 3.419 af Average Runoff Depth = 5.61"
44.45% Pervious = 3.253 ac 55.55% Impervious = 4.065 ac

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Type III 24-hr 50 Year Storm Rainfall=8.49"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Parking Runoff Area=76,655 sf 87.15% Impervious Runoff Depth>7.88"
 Flow Length=337' Tc=6.0 min CN=95 Runoff=14.17 cfs 1.156 af

SubcatchmentPost 1.1: PDA parking Runoff Area=73,330 sf 46.11% Impervious Runoff Depth>6.68"
 Flow Length=625' Tc=5.0 min CN=85 Runoff=12.75 cfs 0.938 af

SubcatchmentPost 1.2: Runoff Area=39,267 sf 2.61% Impervious Runoff Depth>5.36"
 Flow Length=469' Tc=11.4 min CN=74 Runoff=4.70 cfs 0.402 af

SubcatchmentPost 2.0: PDA parking Runoff Area=66,913 sf 36.11% Impervious Runoff Depth>6.44"
 Flow Length=352' Tc=5.0 min CN=83 Runoff=11.32 cfs 0.825 af

SubcatchmentPost 2.1: Garage Runoff Area=40,595 sf 100.00% Impervious Runoff Depth>8.25"
 Tc=5.0 min CN=98 Runoff=7.82 cfs 0.640 af

SubcatchmentPost 2.2: Rain Garden Runoff Area=21,982 sf 48.49% Impervious Runoff Depth>6.80"
 Flow Length=235' Tc=5.0 min CN=86 Runoff=3.87 cfs 0.286 af

Pond Pond 1.1: UGD Peak Elev=66.17' Storage=0.236 af Inflow=14.17 cfs 1.156 af
 Outflow=11.01 cfs 1.156 af

Pond Pond 1.2: JF #1 Peak Elev=63.37' Inflow=12.57 cfs 1.837 af
 18.0" Round Culvert n=0.013 L=44.0' S=0.0091 '/' Outflow=12.57 cfs 1.837 af

Pond Pond 1.3: DPond Peak Elev=74.87' Storage=2,858 cf Inflow=12.75 cfs 0.938 af
 Primary=1.57 cfs 0.680 af Secondary=11.10 cfs 0.257 af Outflow=12.67 cfs 0.937 af

Pond Pond 2.1: JF #2 Peak Elev=68.32' Inflow=7.82 cfs 0.640 af
 18.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=7.82 cfs 0.640 af

Pond Pond 2.2: PDMH2 Peak Elev=67.63' Inflow=9.94 cfs 0.842 af
 18.0" Round Culvert n=0.013 L=56.0' S=0.0018 '/' Outflow=9.94 cfs 0.842 af

Pond Pond 2.3: JF #3 Peak Elev=73.35' Inflow=11.32 cfs 0.825 af
 18.0" Round Culvert n=0.013 L=17.0' S=0.0206 '/' Outflow=11.32 cfs 0.825 af

Pond RG-1: Peak Elev=68.67' Storage=3,650 cf Inflow=3.87 cfs 0.286 af
 Discarded=0.02 cfs 0.025 af Primary=2.50 cfs 0.202 af Outflow=2.53 cfs 0.227 af

Link PA-1: Point of Analysis 1 Inflow=24.85 cfs 2.496 af
 Primary=24.85 cfs 2.496 af

Link PA-2: Point of Analysis 2 Inflow=21.31 cfs 1.667 af
 Primary=21.31 cfs 1.667 af

Total Runoff Area = 7.317 ac Runoff Volume = 4.247 af Average Runoff Depth = 6.97"
44.45% Pervious = 3.253 ac 55.55% Impervious = 4.065 ac

3.4 Peak Rate Comparisons

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

Table 3.4

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 | 6.98 | 14.26 | 20.20 | 25.90 |
| PA-2 | 7.38 | 12.91 | 17.32 | 21.50 |
| Post-Development Watershed | | | | |
| PA-1 | 4.40 | 13.25 | 15.28 | 24.85 |
| PA-2 | 7.00 | 12.14 | 17.25 | 21.31 |

3.5 Mitigation Description

3.5.1 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 6 of this report (BMP Worksheets).

3.5.2 Pre-Treatment Methods for Protecting Water Quality

Pre-Treatment methods for protecting water quality on this site includes a hydrodynamic separator (Contech Cascade Separator®).

3.5.3 Treatment Methods for Protecting Water Quality

Treatment for the site is included by means of 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 have been included in Section 2 of this report.

Section 4

Rip Rap Apron Calculations

Tighe & Bond

Engineers | Environmental Specialists

Project: Lynx Parking Expansion
 Location: Lonza Biologics, Portsmouth, NH
 T&B #: L0700-021
 Calculations By: JRW
 Checked By: NAH
 Date: 6/9/2021

APRON DESIGN

Terms: Rip-Rap Apron 1

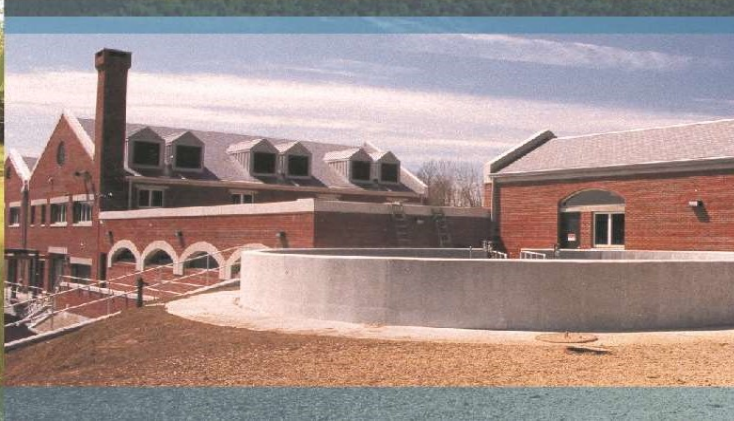
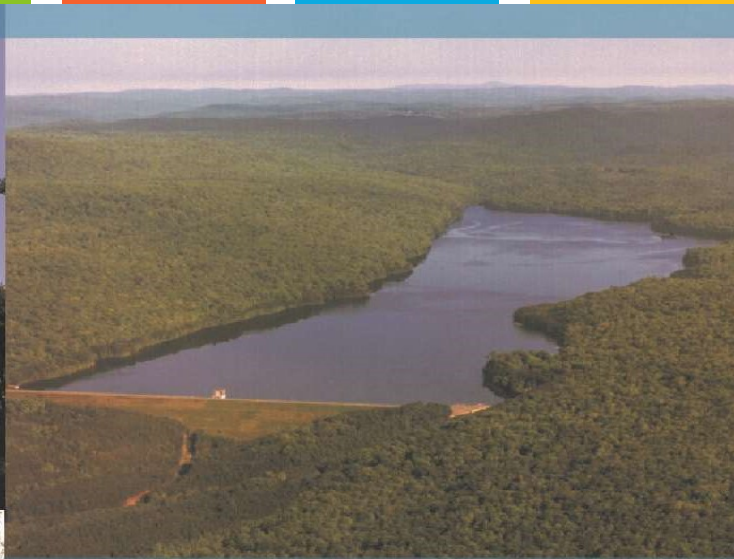
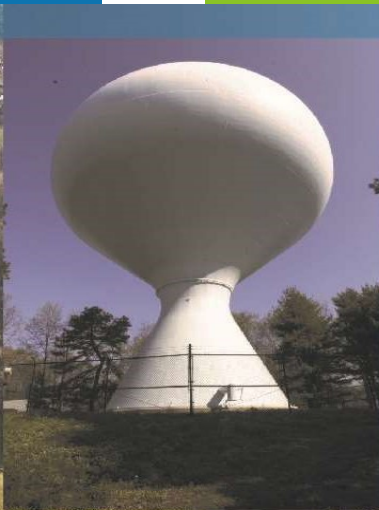
length of apron (ft.) L_a
 discharge from pipe (cfs) Q (25 YR STORM EVENT)
 pipe dia. or channel width (ft.) Do
 tailwater depth (ft.) T_w
 width of apron (at outlet)(ft) $W1$
 width of apron (downstream)(ft) $W2$
 median stone diameter (ft.) d_{50}

Equations Used:

Length of Apron (L_a)
 when $T_w < .5 * Do$ $L_a = \frac{1.8(Q)}{Do^{(3/2)}} + 7Do$
 when $T_w \geq .5 * Do$ $L_a = \frac{3(Q)}{Do^{(3/2)}} + 7Do$
 Width of Apron ($W1$)
 $W1 = 3Do$
 Width of Apron ($W2$)
 when $T_w < .5 * Do$ $W2 = 3Do + La$
 when $T_w \geq .5 * Do$ $W2 = 3Do + 0.4La$
 Median Diameter $d_{50} = \frac{0.02 * Q^{(1.3)}}{(T_w * Do)}$

| Input: | | | |
|---------------------------|--|------|-----|
| Q (cfs) | | 9.06 | cfs |
| Do (ft.) | | 1.50 | ft |
| T_w (ft.) | | 0.60 | ft |
| Output: | | | |
| Width of Apron ($W1$) | | 5 | ft. |
| Width of Apron ($W2$)* | | 24 | ft. |
| Length of Apron (L_a) | | 19 | ft. |
| Median Diameter | | 0.50 | ft. |
| Riprap min. depth | | 1.13 | ft. |

*When there is a well defined channel downstream of the apron, $W2$ shall be greater than the bottom width of the channel.



Lynx Parking Expansion at Lonza Biologics, Inc.

City of Portsmouth, NH

Operation and Maintenance Manual

Prepared For:

Lonza Biologics, Inc.

101 International Drive

Portsmouth, New Hampshire 03801

June 21, 2021

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Section 1

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.

1.1 Contact/Responsible Party

Lonza Biologics
101 International Drive
Portsmouth, NH 03801

(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.)

1.2 Maintenance Items

Maintenance of the following items shall be recorded:

- Litter/Debris Removal
- Landscaping
- Catchbasin Cleaning
- Pavement Sweeping
- Underground Detention System
- Detention Basin
- Rain Garden
- Contech Jellyfish Filtration System
- Contech Cascade Separator
- Rip Rap Outlets

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

1.3 Overall Site Operation & Maintenance Schedule

| Maintenance Item | Frequency of Maintenance |
|--|---|
| Litter/Debris Removal | Weekly |
| Pavement Sweeping - Sweep impervious areas to remove sand and litter. | Annually |
| Landscaping - Landscaped islands to be maintained and mulched. | Maintained as required and mulched each Spring |
| Catch Basin (CB) Cleaning - CB to be cleaned of solids and oils. | Annually |
| Rain Garden - Trash and debris to be removed. - Any required maintenance shall be addressed. | Two (2) times annually After any rainfall event exceeding 2.5" in a 24-hr period |
| Contech Jelly Fish Units | In accordance with Manufacturer's Recommendations |
| Contech Cascade Separator® | In accordance with Manufacturer's Recommendations |
| Underground Detention Basin - Visual observation of sediment levels within system | Annually |
| Porous Pavement - Clean using a vacuum sweeper | Bi-Annually |

1.3.1 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.

1.4 Underground Detention System Maintenance Requirements

| Underground Detention System Inspection/Maintenance Requirements | | |
|---|------------------------|---|
| Inspection/ Maintenance | Frequency | Action |
| Monitor inlet and outlet structures for sediment accumulation | Two (2) times annually | <ul style="list-style-type: none"> - Trash, debris and sediment to be removed - Any required maintenance shall be addressed |
| Deep Sump Catchbasins | Two (2) times annually | <ul style="list-style-type: none"> - Removal of sediment as warranted by inspection - No less than once annually |
| Monitor detention system for sediment accumulation | Two (2) times annually | <ul style="list-style-type: none"> - Trash, debris and sediment to be removed - Any required maintenance shall be addressed |

1.5 Detention Basin Maintenance Requirements

| Detention Basin Inspection/Maintenance Requirements | | |
|--|---|--|
| Inspection/ Maintenance | Frequency | Action |
| Monitor Sediment Accumulation | Annually | <ul style="list-style-type: none"> - Install and maintain a staff gage or other measuring devise, to indicate depth of sediment accumulation and level at which clean-out is required |
| Visual inspection | Annually | <ul style="list-style-type: none"> - Remove trash and debris as needed - Remove any woody vegetation - Inspect and repair embankments - Inspect check dam |
| Mowing | Periodically (At least two (2) times annually) | <ul style="list-style-type: none"> - Embankments shall be mowed |

1.6 Rain Garden Maintenance Requirements

| Rain Garden Inspection/Maintenance Requirements | | |
|--|--|--|
| Inspection/ Maintenance | Frequency | Action |
| Monitor to ensure that Rain Gardens function effectively after storms | Two (2) times annually and after any rainfall event exceeding 2.5" in a 24-hr period | <ul style="list-style-type: none"> - Trash and debris to be removed - Any required maintenance shall be addressed |
| Inspect Vegetation | Annually | <ul style="list-style-type: none"> - Inspect the condition of all Rain Garden vegetation - Prune back overgrowth - Replace dead vegetation - Remove any invasive species |
| Inspect Drawdown Time - The system shall drawdown within 48-hours following a rainfall event. | Annually | <ul style="list-style-type: none"> - Assess the condition of the facility to determine measures required to restore the filtration function, including but not limited to removal of accumulated sediments or reconstruction of the filter. |

1.7 Contech Jellyfish Filter System Maintenance Requirements

| 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 |

**Jellyfish[®] Filter
Owner's Manual**



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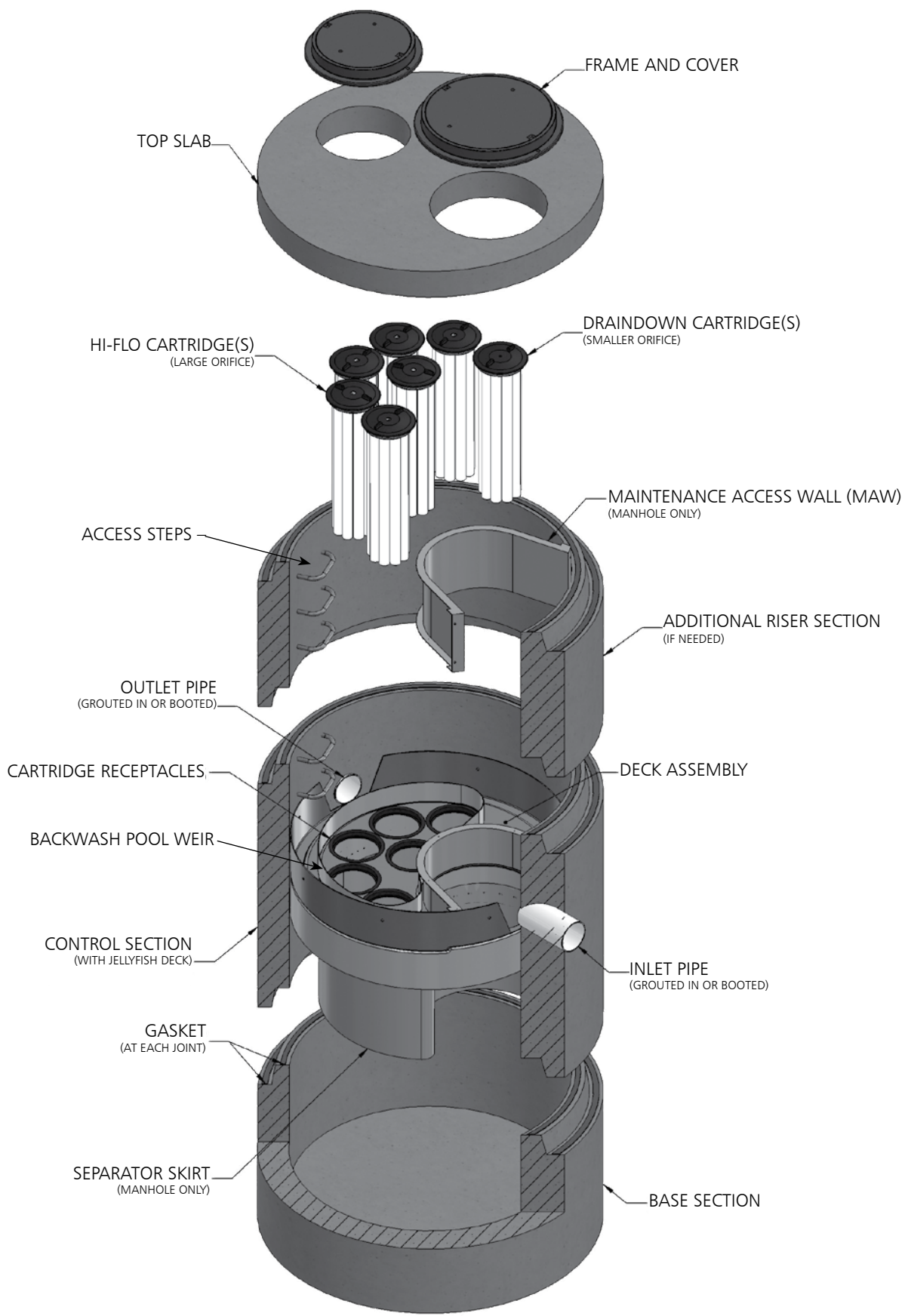
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THANK YOU FOR PURCHASING THE JELLYFISH® FILTER!

Contech Engineered Solutions would like to thank you for selecting the Jellyfish Filter to meet your project’s stormwater treatment needs. With proper inspection and maintenance, the Jellyfish Filter is designed to deliver ongoing, high levels of stormwater pollutant removal.

If you have any questions, please feel free to call us or e-mail us:

Contech Engineered Solutions
9025 Centre Pointe Drive, Suite 400 | West Chester, OH 45069
513-645-7000 | 800-338-1122
www.ContechES.com
info@conteches.com



WARNINGS / CAUTION

1. FALL PROTECTION may be required.
2. WATCH YOUR STEP if standing on the Jellyfish Filter Deck at any time; Great care and safety must be taken while walking or maneuvering on the Jellyfish Filter Deck. Attentive care must be taken while standing on the Jellyfish Filter Deck at all times to prevent stepping onto a lid, into or through a cartridge hole or slipping on the deck.
3. The Jellyfish Filter Deck can be SLIPPERY WHEN WET.
4. If the Top Slab, Covers or Hatches have not yet been installed, or are removed for any reason, great care must be taken to NOT DROP ANYTHING ONTO THE JELLYFISH FILTER DECK. The Jellyfish Filter Deck and Cartridge Receptacle Rings can be damaged under high impact loads. This type of activity voids all warranties. All damaged items to be replaced at owner's expense.
5. Maximum deck load 2 persons, total weight 450 lbs.

Safety Notice

Jobsite safety is a topic and practice addressed comprehensively by others. The inclusions here are intended to be reminders to whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s) and Contractor(s). OSHA and Canadian OSH, and Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Contractor's responsibility and outside the scope of Contech Engineered Solutions.

Confined Space Entry

Secure all equipment and perform all training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to proceed safely at all times.

Personal Safety Equipment

Contractor is responsible to provide and wear appropriate personal protection equipment as needed including, but not limited to safety boots, hard hat, reflective vest, protective eyewear, gloves and fall protection equipment as necessary. Make sure all equipment is staffed with trained and/or certified personnel, and all equipment is checked for proper operation and safety features prior to use.

- Fall protection equipment
- Eye protection
- Safety boots
- Ear protection
- Gloves
- Ventilation and respiratory protection
- Hard hat
- Maintenance and protection of traffic plan

Chapter 1

1.0 – Owner Specific Jellyfish Filter Product Information

Below you will find a reference page that can be filled out according to your Jellyfish Filter specification to help you easily inspect, maintain and order parts for your system.

| | |
|--|--|
| Owner Name: | |
| Phone Number: | |
| Site Address: | |
| Site GPS Coordinates/unit location: | |
| Unit Location Description: | |
| Jellyfish Filter Model No.: | |
| Contech Project & Sequence Number | |
| No. of Hi-Flo Cartridges | |
| No. of Cartridges: | |
| Length of Draindown Cartridges: | |
| No. of Blank Cartridge Lids: | |
| Bypass Configuration (Online/Offline): | |

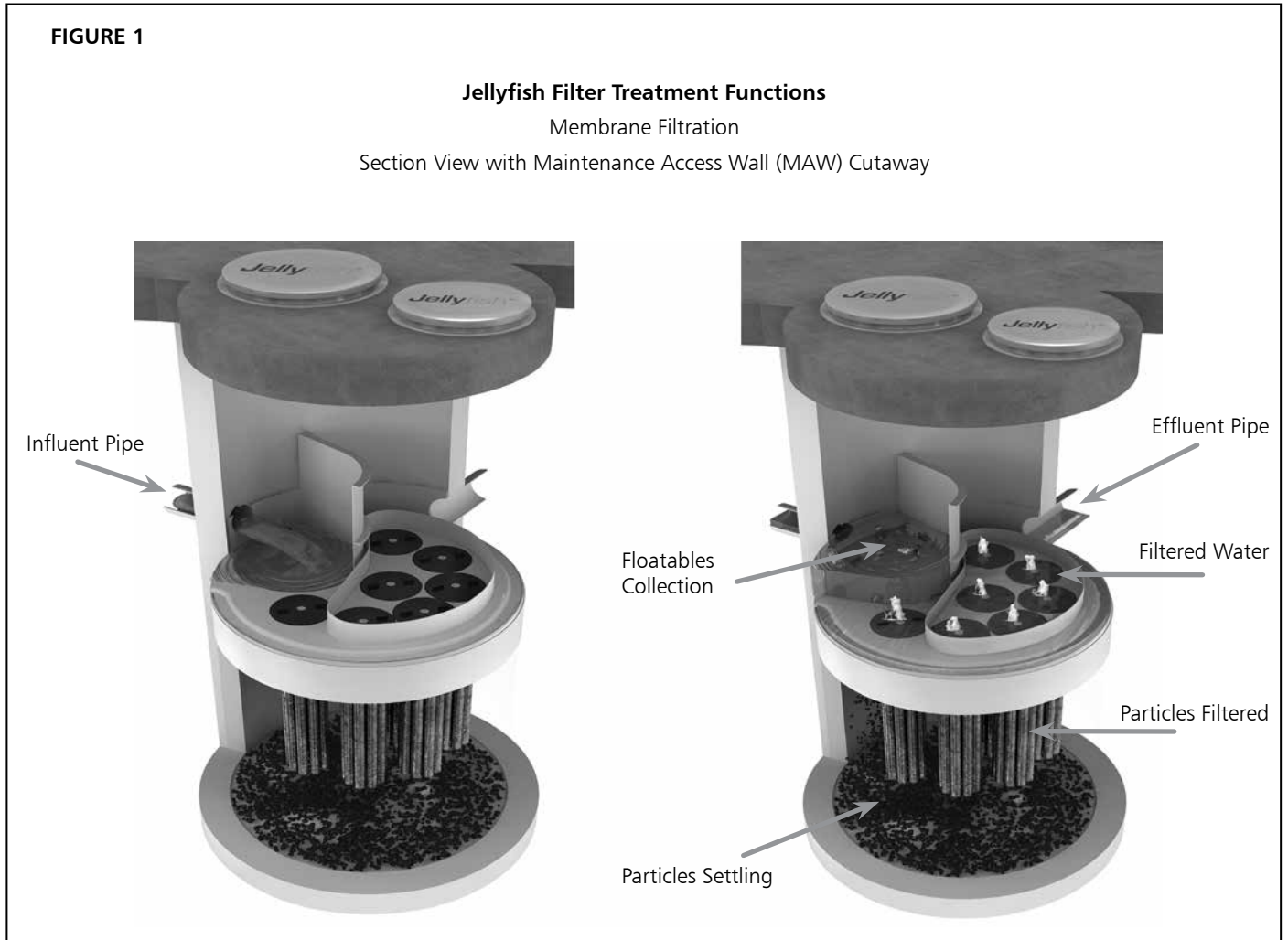
Notes:

Chapter 2

2.0 – Jellyfish Filter System Operations and Functions

The Jellyfish Filter is an engineered stormwater quality treatment technology that removes a high level and wide variety of stormwater pollutants. Each Jellyfish Filter cartridge consists of eleven membrane - encased filter elements (“filtration tentacles”) attached to a cartridge head plate. The filtration tentacles provide a large filtration surface area, resulting in high flow and high pollutant removal capacity.

The Jellyfish Filter functions are depicted in Figure 1 below.



Jellyfish Filter cartridges are backwashed after each peak storm event, which removes accumulated sediment from the membranes. This backwash process extends the service life of the cartridges and increases the time between maintenance events.

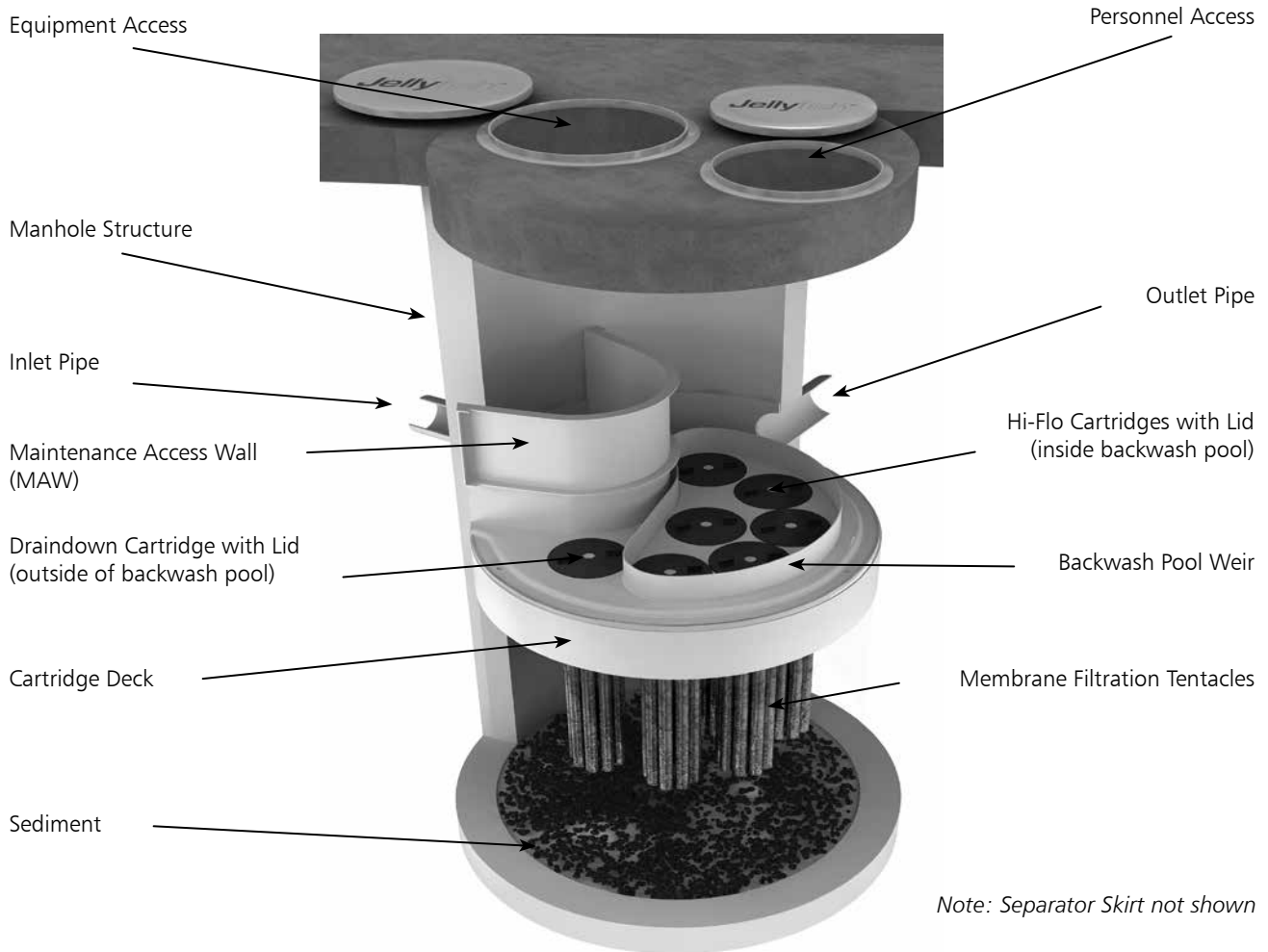
For additional details on the operation and pollutant capabilities of the Jellyfish Filter please refer to additional details on our website at www.ContechES.com.

2.1 – Components and Cartridges

The Jellyfish Filter and components are depicted in Figure 2 below.

FIGURE 2

Jellyfish Filter Components



Tentacles are available in various lengths as depicted in Table 1 below.

Table 1 – Cartridge Lengths / Weights and Cartridge Lid Orifice Diameters

| Cartridge Lengths | Dry Weight | Hi-Flo Orifice Diameter | Draindown Orifice Diameter |
|----------------------|-------------------|-------------------------|----------------------------|
| 15 inches (381 mm) | 10 lbs (4.5 kg) | 35 mm | 20 mm |
| 27 inches (686 mm) | 14.5 lbs (6.6 kg) | 45 mm | 25 mm |
| 40 inches (1,016 mm) | 19.5 lbs (8.9 kg) | 55 mm | 30 mm |
| 54 inches (1,372 mm) | 25 lbs (11.4 kg) | 70 mm | 35 mm |

2.2 – Jellyfish Membrane Filtration Cartridge Assembly

The Jellyfish Filter utilizes multiple membrane filtration cartridges. Each cartridge consists of removable cylindrical filtration “tentacles” attached to a cartridge head plate. Each filtration tentacle has a threaded pipe nipple and o-ring. To attach, insert the top pipe nipples with the o-ring through the head plate holes and secure with locking nuts. Hex nuts to be hand tightened and checked with a wrench as shown below.

2.3 – Jellyfish Membrane Filtration Cartridge Installation

- Cartridge installation will be performed by trained individuals and coordinated with the installing site Contractor. Flow diversion devices are required to be in place until the site is stabilized (final paving and landscaping in place). Failure to address this step completely will reduce the time between required maintenance.
- Descend to the cartridge deck (see Safety Notice and page 3).
- Refer to Contech's submittal drawings to determine proper quantity and placement of Hi-Flo, Draindown and Blank cartridges with appropriate lids. Lower the Jellyfish membrane filtration cartridges into the cartridge receptacles within the cartridge deck. It is possible that not all cartridge receptacles will be filled with a filter cartridge. In that case, a blank headplate and blank cartridge lid (no orifice) would be installed.



Cartridge Assembly

Do not force the tentacles down into the cartridge receptacle, as this may damage the membranes. Apply downward pressure on the cartridge head plate to seat the lubricated rim gasket (thick circular gasket surrounding the circumference of the head plate) into the cartridge receptacle. (See Figure 3 for details on approved lubricants for use with rim gasket.)

- Examine the cartridge lids to differentiate lids with a small orifice, a large orifice, and no orifice.
 - Lids with a small orifice are to be inserted into the Draindown cartridge receptacles, outside of the backwash pool weir.
 - Lids with a large orifice are to be inserted into the Hi-Flo cartridge receptacles within the backwash pool weir.
 - Lids with no orifice (blank cartridge lids) and a blank headplate are to be inserted into unoccupied cartridge receptacles.
- To install a cartridge lid, align both cartridge lid male threads with the cartridge receptacle female threads before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation.

3.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system. Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

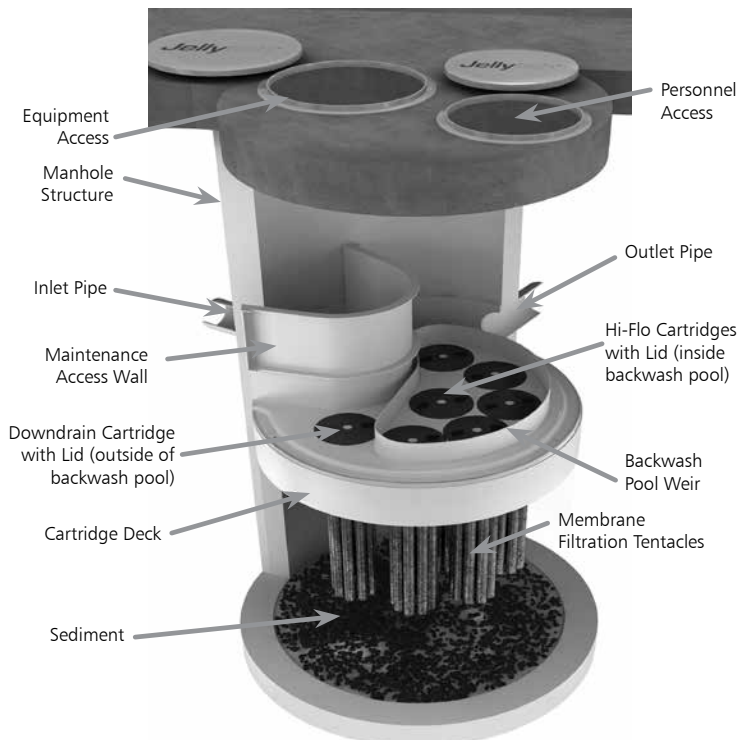
- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed

4.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent.*



Note: Separator Skirt not shown

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

5.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

5.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.



Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment ($\geq 1/16''$) accumulated on the deck surface should be removed.

5.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

6.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

7.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage.*
3. Perform Inspection Procedure prior to maintenance activity.

4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. *Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.*
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

7.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. *Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs.*
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

7.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.
2. Position tentacles in a container (or over the MAW), with the



Cartridge Removal & Lifting Device



threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.

3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. *Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane.*
4. Collected rinse water is typically removed by vacuum hose.

5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

7.3 Sediment and Floatables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.
3. Pressure wash cartridge deck and receptacles to remove all



Rinsing Cartridge with Contech Rinse Tool

sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.

4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.
6. For larger diameter Jellyfish Filter manholes (≥ 8 -ft) and some



Vacuuming Sump Through MAW

vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

7.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. *Caution: Do not force the cartridge downward; damage may occur.*
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

7.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

7.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

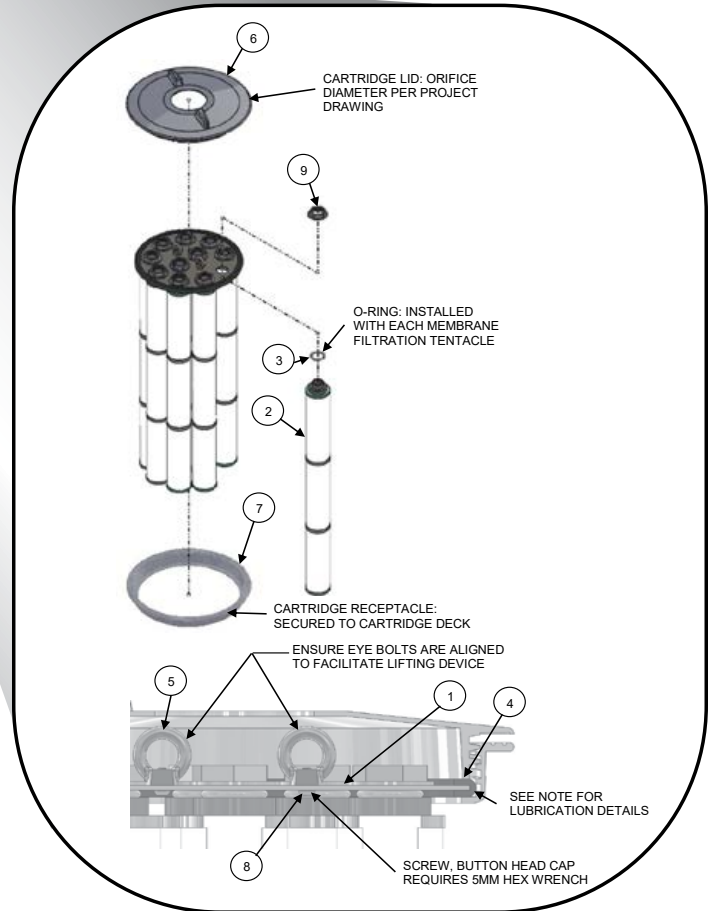
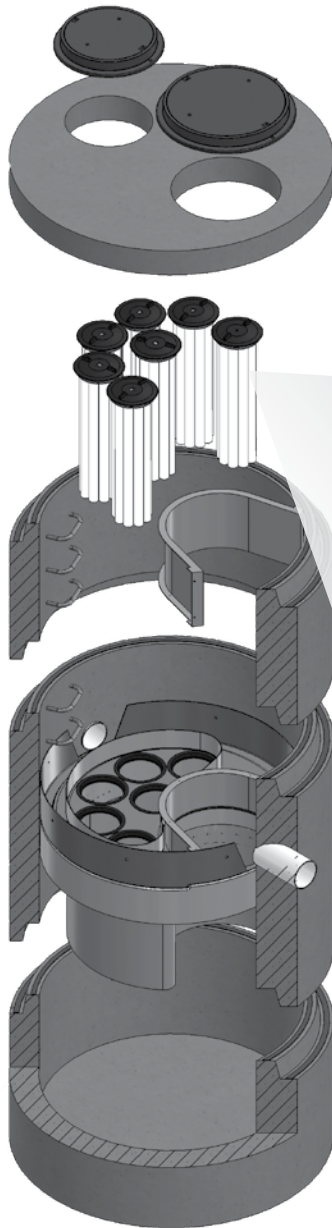


TABLE 1: BOM

| ITEM NO. | DESCRIPTION |
|----------|----------------------------------|
| 1 | JF HEAD PLATE |
| 2 | JF TENTACLE |
| 3 | JF O-RING |
| 4 | JF HEAD PLATE GASKET |
| 5 | JF CARTRIDGE EYELET |
| 6 | JF 14IN COVER |
| 7 | JF RECEPTACLE |
| 8 | BUTTON HEAD CAP SCREW M6X14MM SS |
| 9 | JF CARTRIDGE NUT |

TABLE 2: APPROVED GASKET LUBRICANTS

| PART NO. | MFR | DESCRIPTION |
|-----------|-----------|----------------------|
| 78713 | LA-CO | LUBRI-JOINT |
| 40501 | HERCULES | DUCK BUTTER |
| 30600 | OATEY | PIPE LUBRICANT |
| PSLUBXL1Q | PROSELECT | PIPE JOINT LUBRICANT |

NOTES:

Head Plate Gasket Installation:

Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lid (Item 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:

Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner: _____ Jellyfish Model No.: _____

Location: _____ GPS Coordinates: _____

Land Use: Commercial: _____ Industrial: _____ Service Station: _____

Road/Highway: _____ Airport: _____ Residential: _____ Parking Lot: _____

| | | | | | |
|---|--|--|--|--|--|
| Date/Time: | | | | | |
| Inspector: | | | | | |
| Maintenance Contractor: | | | | | |
| Visible Oil Present: (Y/N) | | | | | |
| Oil Quantity Removed | | | | | |
| Floatable Debris Present: (Y/N) | | | | | |
| Floatable Debris removed: (Y/N) | | | | | |
| Water Depth in Backwash Pool | | | | | |
| Cartridges externally rinsed/re-commissioned: (Y/N) | | | | | |
| New tentacles put on Cartridges: (Y/N) | | | | | |
| Sediment Depth Measured: (Y/N) | | | | | |
| Sediment Depth (inches or mm): | | | | | |
| Sediment Removed: (Y/N) | | | | | |
| Cartridge Lids intact: (Y/N) | | | | | |
| Observed Damage: | | | | | |
| Comments: | | | | | |

1.8 Contech Cascade Separator Maintenance Requirements

| Contech Cascade Separator® Inspection/Maintenance Requirements | | |
|---|--|--|
| Inspection/ Maintenance | Frequency | Action |
| Visual Inspection | Twice per year at a minimum (spring and fall) | -Visually inspect for blockages or obstruction in the inlet chamber, flumes or outlet channel - Sediment removal once 50% of maximum storage has been reached |

Cascade Separator[®] Inspection and Maintenance Guide



Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

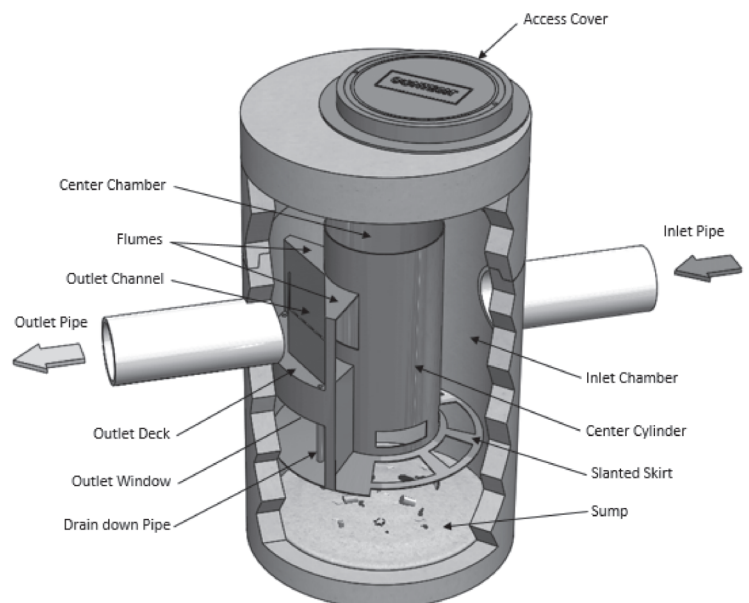
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

| Model Number | Diameter | | Distance from Water Surface to Top of Sediment Pile | | Sediment Storage Capacity | |
|--------------|----------|-----|---|-----|---------------------------|----------------|
| | ft | m | ft | m | y ³ | m ³ |
| CS-3 | 3 | 0.9 | 1.5 | 0.5 | 0.4 | 0.3 |
| CS-4 | 4 | 1.2 | 1.5 | 0.5 | 0.7 | 0.5 |
| CS-5 | 5 | 1.3 | 1.5 | 0.5 | 1.1 | 0.8 |
| CS-6 | 6 | 1.8 | 1.5 | 0.5 | 1.6 | 1.2 |
| CS-8 | 8 | 2.4 | 1.5 | 0.5 | 2.8 | 2.1 |
| CS-10 | 10 | 3.0 | 1.5 | 0.5 | 4.4 | 3.3 |
| CS-12 | 12 | 3.6 | 1.5 | 0.5 | 6.3 | 4.8 |

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

| Cascade Model: | | Location: | | | |
|----------------|--|--|--------------------------------|-----------------------|----------|
| Date | Depth Below Invert to Top of Sediment ¹ | Floatable Layer Thickness ² | Describe Maintenance Performed | Maintenance Personnel | Comments |
| | | | | | |
| | | | | | |
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1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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1.9 Rip Rap Maintenance Requirements

| Rip Rap Inspection/Maintenance Requirements | | |
|---|-----------|---|
| Inspection/ Maintenance | Frequency | Action |
| Visual Inspection | Annually | <ul style="list-style-type: none"> - Visually inspect for damage and deterioration - Repair damages immediately |

1.10 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: | | | | |

Section 2

Chloride Management Plan

Winter Operational Guidelines

The following Chloride Management Plan is for the Lonza Biologics – Lynx Parking Expansion in Portsmouth, New Hampshire. The Plan includes operational guidelines including: winter operator certification requirements, weather monitoring, equipment calibration requirements, mechanical removal, and salt usage evaluation and monitoring. Due to the evolving nature of chloride management efforts, the Chlorides Management Plan will be reviewed annually, in advance of the winter season, to reflect the current management standards.

2.1 Background Information

The Lonza Biologics – Lynx Parking Expansion located within the Upper Hodgson Brook Watershed in Newington and Portsmouth, New Hampshire. The Upper Hodgson Brook is identified as a chloride-impaired waterbody.

2.2 Operational Guidelines – Chloride Management

All Lonza Biologics private contractors engaged at the Lonza Biologics premises for the purposes of winter operational snow removal and surface maintenance, are responsible for assisting in meeting compliance for the following protocols. Lonza Biologics private contractors are expected to minimize the effects of the use of de-icing, anti-icing and pretreatment materials by adhering to the strict guidelines outlined below.

The Lonza Biologics winter operational de-icing, anti-icing and pretreatment materials will adhere to the following protocols:

2.2.1 Winter Operator Certification Requirements

All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance must be current UNHT2 Green SnowPro Certified operators or equivalent and will use only pre-approved methods for spreading abrasives on private roadways and parking lots. All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance shall provide to Lonza Biologics management two copies of the annual UNHT2 Green SnowPro certificate or equivalent for each operator utilized on the Lonza Biologics premises. The annual UNHT2 Green SnowPro certificate or equivalent for each operator will be available on file in the Lonza Biologics Facilities Management office and be present in the vehicle/carrier at all times.

2.2.2 Improved Weather Monitoring

Lonza Biologics will coordinate weather information for use by winter maintenance contractors. This information in conjunction with site specific air/ground surface temperature monitoring will ensure that private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance will make more informed decisions as to when and to what extent de-icing, anti-icing and pretreatment materials are applied to private roadways, sidewalks, and parking lots.

2.2.3 Equipment Calibration Requirements

All equipment utilized on the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance will conform to the following calibration requirements.

2.2.3.1 Annual Calibration Requirements

All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance shall provide two copies of the annual calibration report for each piece of equipment utilized on the Lonza Biologics premises. Each calibration report shall include the vehicle/carrier VIN number and the serial numbers for each component including, but not limited to, spreader control units, salt aggregate spreader equipment, brining/pre-wetting equipment, ground speed orientation unit, and air/ground surface temperature monitor. Annual calibration reports will be available on file in the Lonza Biologics Facilities Management office and be present in the vehicle/carrier at all times.

Prior to each use, each vehicle/carrier operator will perform a systems check to verify that unit settings remain within the guidelines established by the Lonza Biologics Management Team in order to accurately dispense material. All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance will be subject to spot inspections by members of the Lonza Biologics Management Team to ensure that each vehicle/carrier is operating in a manner consistent with the guidelines set herein or State and Municipal regulations. All units will be recalibrated, and the updated calibration reports will be provided each time repairs or maintenance procedures affect the hydraulic system of the vehicle/carrier.

2.2.4 Increased Mechanical Removal Capabilities

All private contractors engaged at the Lonza Biologics premises will endeavor to use mechanical removal means on a more frequent basis for roadways, parking lots and sidewalks. Dedicating more manpower and equipment to increase snow removal frequencies prevents the buildup of snow and the corresponding need for de-icing, anti-icing and pretreatment materials. Shortened maintenance

routes, with shorter service intervals, will be used to stay ahead of snowfall. Minimized snow and ice packing will reduce the need for abrasives, salt aggregates, and/or brining solution to restore surfaces back to bare surface states after winter precipitation events.

After storm events the Lonza Biologics management team will be responsible for having the streets swept to recapture un-melted de-icing materials, when practical.

2.3 Salt Usage Evaluation and Monitoring

All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance shall provide two copies of a storm report, which includes detailed information regarding treatment areas and the use of de-icing, anti-icing and pretreatment materials applied for the removal of snow and surface maintenance on the Lonza Biologics premises. Lonza Biologics will maintain copies of Summary Documents, including copies of the Storm Reports, operator certifications, equipment used for roadway and sidewalk winter maintenance, calibration reports and amount of de-icing materials used.

2.4 Summary

The above-described methodologies are incorporated into the Lonza Biologics Operational Manual and are to be used to qualify and retain all private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance. This section of the Manual, is intended to be an adaptive management document that is modified as required based on experience gained from past practices and technological advancements that reflect chloride BMP standards. All Lonza Biologics employees directly involved with winter operational activities are required to review this document and the current standard Best Management Practices published by the UNH Technology Transfer (T2) program annually. All Lonza Biologics employees directly involved with winter operational activities, and all private contractors engaged at the Lonza Biologics premises for the purposes of winter operational snow removal and surface maintenance, must be current UNHT2 Green SnowPro Certified operators or equivalent and undergo the necessary requirements to maintain this certification annually.

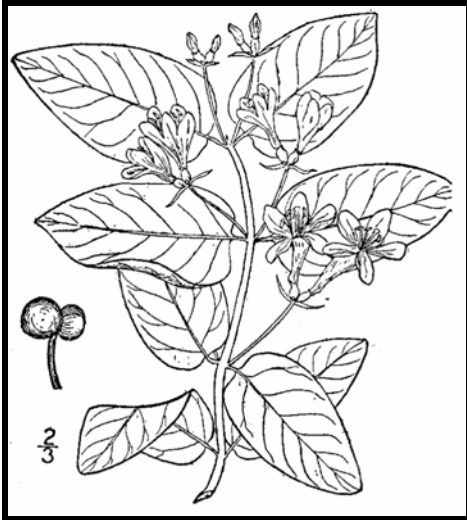
Section 3

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.



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.

Tarping 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> |  | <p>Prior to fruit/seed ripening</p> <p>Seedlings and small plants</p> <ul style="list-style-type: none"> ▪ Pull or cut and leave on site with roots exposed. No special care needed. <p>Larger plants</p> <ul style="list-style-type: none"> ▪ Use as firewood. ▪ Make a brush pile. ▪ Chip. ▪ Burn. |
| | | <p>After fruit/seed is ripe</p> <p>Don't remove from site.</p> <ul style="list-style-type: none"> ▪ 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> |  | <p>Prior to fruit/seed ripening</p> <p>Seedlings and small plants</p> <ul style="list-style-type: none"> ▪ Pull or cut and leave on site with roots exposed. No special care needed. <p>Larger plants</p> <ul style="list-style-type: none"> ▪ Make a brush pile. ▪ Burn. |
| | | <p>After fruit/seed is ripe</p> <p>Don't remove from site.</p> <ul style="list-style-type: none"> ▪ 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 |
|--|---|---|
| <p>garlic mustard (<i>Alliaria petiolata</i>)</p> <p>spotted knapweed (<i>Centaurea maculosa</i>)</p> <ul style="list-style-type: none"> ▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. <p>black swallow-wort (<i>Cynanchum nigrum</i>)</p> <ul style="list-style-type: none"> ▪ May cause skin rash. Wear gloves and long sleeves when handling. <p>pale swallow-wort (<i>Cynanchum rossicum</i>)</p> <p>giant hogweed (<i>Heracleum mantegazzianum</i>)</p> <ul style="list-style-type: none"> ▪ Can cause major skin rash. Wear gloves and long sleeves when handling. <p>dame's rocket (<i>Hesperis matronalis</i>)</p> <p>perennial pepperweed (<i>Lepidium latifolium</i>)</p> <p>purple loosestrife (<i>Lythrum salicaria</i>)</p> <p>Japanese stilt grass (<i>Microstegium vimineum</i>)</p> <p>mile-a-minute weed (<i>Polygonum perfoliatum</i>)</p> | <p>Fruits and Seeds</p>  | <p>Prior to flowering</p> <p>Depends on scale of infestation</p> <p>Small infestation</p> <ul style="list-style-type: none"> ▪ Pull or cut plant and leave on site with roots exposed. <p>Large infestation</p> <ul style="list-style-type: none"> ▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material. <hr/> <p>During and following flowering</p> <p>Do nothing until the following year or remove flowering heads and bag and let rot.</p> <p>Small infestation</p> <ul style="list-style-type: none"> ▪ Pull or cut plant and leave on site with roots exposed. <p>Large infestation</p> <ul style="list-style-type: none"> ▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material. |
| <p>common reed (<i>Phragmites australis</i>)</p> <p>Japanese knotweed (<i>Polygonum cuspidatum</i>)</p> <p>Bohemian knotweed (<i>Polygonum x bohemicum</i>)</p> | <p>Fruits, Seeds, Plant Fragments</p> <p>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.</p> | <p>Small infestation</p> <ul style="list-style-type: none"> ▪ Bag all plant material and let rot. ▪ Never pile and use resulting material as compost. ▪ Burn. <p>Large infestation</p> <ul style="list-style-type: none"> ▪ 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

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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.

Section 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.

Copies of the Stormwater Maintenance report shall be submitted to the Pease Development Authority on an annual basis.

| Stormwater Management Report | | | | | | |
|-------------------------------------|---------------------------|------------------|--|--|----------------------------------|---------------------|
| Lynx Parking Expansion | | | 101 International Drive | | | |
| BMP Description | Date of Inspection | Inspector | BMP Installed and Operating Properly? | Cleaning / Corrective Action Needed | Date of Cleaning / Repair | Performed By |
| Deep Sump CB's | | | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| Underground Detention | | | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| Jellyfish Filter 1 | | | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| Jellyfish Filter 2 | | | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| Jellyfish Filter 3 | | | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| Rain Garden | | | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |

Steel Poles



SSS SQUARE STRAIGHT STEEL

| | | |
|-------------|--|------|
| Catalog # | | Type |
| Project | | |
| Comments | | Date |
| Prepared by | | |

FEATURES

- ASTM Grade steel base plate with ASTM A366 base cover
- Hand hole assembly 3" x 5" on 5" and 6" pole; and 2" x 4" on 4" pole
- 10'-39' mounting heights
- Drilled or tenon (specify)

DESIGN CONSIDERATIONS

Wind induced vibrations resulting from steady, unidirectional winds and other aerodynamic forces, as well as vibration and coefficient of height factors for non-grounded mounted installations (e.g., installations on bridges or buildings) are not included in this document. The information contained herein is for general guidance only and is not a replacement for professional judgement. Consult with a professional, and local and federal standards, before ordering to ensure product is appropriate for the intended purpose and installation location. Also, please review Eaton's Light Pole White Paper for risk factors and design considerations. [Learn more.](#)

Specifications and dimensions subject to change without notice. Consult your lighting representative at Eaton or visit www.eaton.com/lighting for available options, accessories and ordering information.

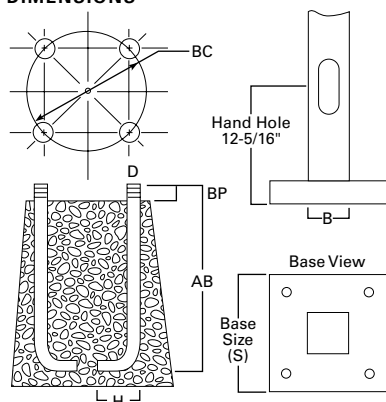
ORDERING INFORMATION

SAMPLE NUMBER: SSA5A20SFM1XG

| Product Family | Shaft Size (Inches) ¹ | Wall Thickness (Inches) | Mounting Height (Feet) | Base Type | Finish | Mounting Type | Number and Location of Arms | Arm Lengths (Feet) | Options (Add as Suffix) |
|---------------------------|----------------------------------|----------------------------------|--|---------------------|--|--|--|--|--|
| SSS=Square Straight Steel | 4=4" 5=5" 6=6" | A=0.120" M=0.188" X=0.250" | 10=10' 15=15' 20=20' 25=25' 30=30' 35=35' 39=39' | S=Square Steel Base | F=Dark Bronze G=Galvanized Steel J=Summit White K=Carbon Bronze L=Dark Platinum R=Hartford Green S=Silver T=Graphite Metallic V=Grey W=White X=Custom Color Y=Black | 2=2-3/8" O.D. Tenon (4" Long) 3=3-1/2" O.D. Tenon (5" Long) 4=4" O.D. Tenon (6" Long) 9=3" O.D. Tenon (4" Long) 6=2-3/8" O.D. Tenon (6" Long) 7=4" O.D. Tenon (10" Long) A=Type A Drilling C=Type C Drilling E=Type E Drilling F=Type F Drilling G=Type G Drilling J=Type J Drilling K=Type K Drilling M=Type M Drilling N=Type N Drilling R=Type R Drilling S=Standard Upsweep Arm Z=Type Z Drilling | 1=Single 2=2 at 180° 3=Triple ² 4=4 at 90° 5=2 at 90° X=None | X=None 2=2' 3=2.5' 4=4' 6=6' 8=8' | A=1/2" Tapped Hub ³ B=3/4" Tapped Hub ³ C=Convenience Outlet ⁴ E=GFCI Convenience Outlet ⁴ G=Ground Lug H=Additional Hand Hole ⁵ V=Vibration Dampener |

NOTES: 1. All shaft sizes nominal. 2. Square poles are 3 at 90°, round poles are 3 at 120°. 3. Tapped Hub is located 5' below the pole top and on the same side of pole as hand hole, unless specified otherwise. 4. Outlet is located 4' above base and on same side of pole as hand hole, unless specified otherwise. Receptacle not included, provision only. 5. Additional hand hole is located 12" below pole top and 90° from standard hand hole location, unless otherwise specified.

DIMENSIONS



See technical information.

Effective Projected Area (At Pole Top)

| Mounting Height (Feet) | Catalog Number ^{1,2} | Wall Thickness (Inches) | Base Square ³ (Inches) | Bolt Circle Diameter (Inches) | Anchor Bolt Projection ³ (Inches) | Shaft Size ³ (Inches) | Anchor Bolt Diameter x Length x Hook (Inches) | Net Weight (Pounds) | Maximum Effective Projected Area (Square Feet) ⁴ | | | | Max. Fixture Load - Includes Bracket (Pounds) |
|------------------------|-------------------------------|-------------------------|-----------------------------------|-------------------------------|--|----------------------------------|---|---------------------|---|--------|---------|---------|---|
| | | | | | | | | | 80 mph | 90 mph | 100 mph | 110 mph | |
| MH | | | S | BC | BP | B | D x AB x H | | | | | | |
| 10 | SSS4A10S | 0.120 | 10-1/2 | 11 | 4-1/2 | 4 | 3/4 x 25 x 3 | 85 | 30.0 | 22.0 | 17.0 | 13.0 | 100 |
| 15 | SSS4A15S | 0.120 | 10-1/2 | 11 | 4-1/2 | 4 | 3/4 x 25 x 3 | 118 | 15.0 | 11.5 | 8.7 | 6.5 | 100 |
| 20 | SSS4A20S | 0.120 | 10-1/2 | 11 | 4-1/2 | 4 | 3/4 x 25 x 3 | 150 | 8.7 | 5.9 | 3.9 | 2.5 | 150 |
| 20 | SSS5A20S | 0.120 | 10-1/2 | 11 | 4-1/2 | 5 | 3/4 x 25 x 3 | 183 | 15.4 | 11.1 | 7.9 | 5.5 | 150 |
| 25 | SSS4A25S | 0.120 | 10-1/2 | 11 | 4-1/2 | 4 | 3/4 x 25 x 3 | 181 | 3.7 | 1.7 | 0.3 | -- | 200 |
| 25 | SSS5A25S | 0.120 | 10-1/2 | 11 | 5 | 5 | 3/4 x 25 x 3 | 222 | 9.3 | 6.0 | 3.5 | 1.6 | 200 |
| 25 | SSS6A25S | 0.120 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 284 | 9.9 | 6.1 | 3.5 | 1.2 | 200 |
| 30 | SSS5A30S | 0.120 | 10-1/2 | 11 | 4-1/2 | 5 | 3/4 x 25 x 3 | 260 | 4.7 | 2.1 | -- | -- | 200 |
| 30 | SSS5M30S | 0.188 | 10-1/2 | 11 | 4-1/2 | 5 | 3/4 x 25 x 3 | 392 | 10.4 | 6.4 | 3.5 | 1.5 | 200 |
| 30 | SSS6A30S | 0.120 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 330 | 4.3 | 1.4 | -- | -- | 200 |
| 30 | SSS6M30S | 0.188 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 489 | 19.0 | 13.0 | 8.7 | 5.6 | 200 |
| 35 | SSS5M35S | 0.188 | 10-1/2 | 11 | 4-1/2 | 5 | 3/4 x 25 x 3 | 453 | 5.8 | 2.8 | -- | -- | 200 |
| 35 | SSS6M35S | 0.188 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 564 | 12.8 | 7.2 | 3.7 | 1.0 | 200 |
| 35 | SSS6X35S | 0.250 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 738 | 16.5 | 11.0 | 6.8 | 3.5 | 200 |
| 39 | SSS6M39S | 0.188 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 618 | 7.3 | 3.0 | -- | -- | 300 |
| 39 | SSS6X39S | 0.250 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 816 | 13.0 | 7.0 | 3.7 | 0.8 | 300 |

Effective Projected Area (Two Feet Above Pole Top)

| Mounting Height (Feet) | Catalog Number ^{1,2} | Wall Thickness (Inches) | Base Square ³ (Inches) | Bolt Circle Diameter (Inches) | Anchor Bolt Projection ³ (Inches) | Shaft Size ³ (Inches) | Anchor Bolt Diameter x Length x Hook (Inches) | Net Weight (Pounds) | Maximum Effective Projected Area (Square Feet) ⁴ | | | | Max. Fixture Load - Includes Bracket (Pounds) |
|------------------------|-------------------------------|-------------------------|-----------------------------------|-------------------------------|--|----------------------------------|---|---------------------|---|--------|---------|---------|---|
| | | | | | | | | | 80 mph | 90 mph | 100 mph | 110 mph | |
| MH | | | S | BC | BP | B | D x AB x H | | | | | | |
| 10 | SSS4A10S | 0.120 | 10-1/2 | 11 | 4-1/2 | 4 | 3/4 x 25 x 3 | 85 | 23.0 | 17.5 | 14.0 | 11.0 | 100 |
| 15 | SSS4A15S | 0.120 | 10-1/2 | 11 | 4-1/2 | 4 | 3/4 x 25 x 3 | 118 | 13.4 | 10.0 | 7.5 | 5.7 | 100 |
| 20 | SSS4A20S | 0.120 | 10-1/2 | 11 | 4-1/2 | 4 | 3/4 x 25 x 3 | 150 | 7.6 | 5.2 | 3.4 | 2.1 | 150 |
| 20 | SSS5A20S | 0.120 | 10-1/2 | 11 | 4-1/2 | 5 | 3/4 x 25 x 3 | 183 | 13.8 | 9.9 | 7.1 | 4.9 | 150 |
| 25 | SSS4A25S | 0.120 | 10-1/2 | 11 | 4-1/2 | 4 | 3/4 x 25 x 3 | 181 | 3.4 | 1.6 | 0.3 | -- | 200 |
| 25 | SSS5A25S | 0.120 | 10-1/2 | 11 | 5 | 5 | 3/4 x 25 x 3 | 222 | 8.5 | 5.5 | 3.2 | 1.5 | 200 |
| 25 | SSS6A25S | 0.120 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 284 | 9.1 | 5.6 | 3.0 | 1.2 | 200 |
| 30 | SSS5A30S | 0.120 | 10-1/2 | 11 | 4-1/2 | 5 | 3/4 x 25 x 3 | 260 | 1.8 | -- | -- | -- | 200 |
| 30 | SSS5M30S | 0.188 | 10-1/2 | 11 | 4-1/2 | 5 | 3/4 x 25 x 3 | 392 | 9.6 | 5.9 | 1.9 | 0.2 | 200 |
| 30 | SSS6A30S | 0.120 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 330 | 4.1 | 1.3 | -- | -- | 200 |
| 30 | SSS6M30S | 0.188 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 489 | 18.5 | 12.5 | 8.4 | 5.3 | 200 |
| 35 | SSS5M35S | 0.188 | 10-1/2 | 11 | 4-1/2 | 5 | 3/4 x 25 x 3 | 453 | 5.5 | 2.4 | -- | -- | 200 |
| 35 | SSS6M35S | 0.188 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 564 | 11.8 | 7.0 | 3.5 | 1.0 | 200 |
| 35 | SSS6X35S | 0.250 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 738 | 16.0 | 10.5 | 6.4 | 3.4 | 200 |
| 39 | SSS6M39S | 0.188 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 618 | 7.0 | 2.4 | -- | -- | 300 |
| 39 | SSS6X39S | 0.250 | 12-1/2 | 12-1/2 | 5 | 6 | 1 x 36 x 4 | 816 | 12.0 | 6.7 | 3.0 | 0.5 | 300 |

NOTES:

1. Catalog number includes pole with hardware kit. Anchor bolts not included. Before installing, make sure proper anchor bolts and templates are obtained.
2. Tenon size or machining for rectangular arms must be specified. Hand hole position relative to drill location.
3. Shaft size, base square, anchor bolts and projections may vary slightly. All dimensions nominal.
4. EPAs based on shaft properties with wind normal to flat. EPAs calculated using base wind velocity as indicated plus 30% gust factor.

| | | | | | |
|-------------|--|-----------|--|------|--|
| Project | | Catalog # | | Type | |
| Prepared by | | Notes | | Date | |



McGraw-Edison

GLEON Galleon

Area / Site Luminaire

Typical Applications

Outdoor • Parking Lots • Walkways • Roadways • Building Areas

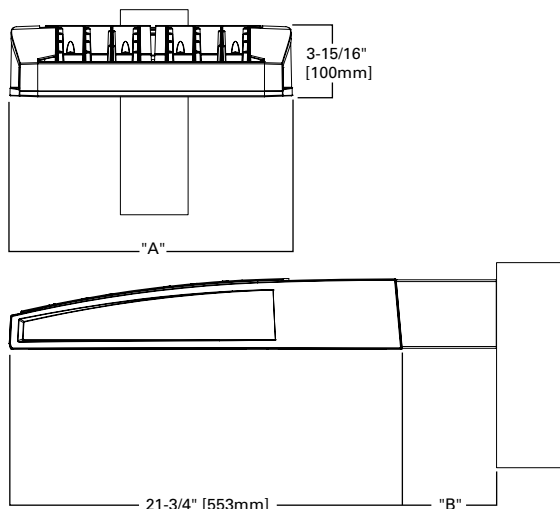
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Quick Facts

- Lumen packages range from 4,200 - 80,800 (34W - 640W)
- Efficacy up to 156 lumens per watt

Dimensional Details



Product Certifications



Product Features



Connected Systems

- WaveLinX
- Enlighted

| Number of Light Squares | "A" Width | "B" Standard Arm Length | "B" Extended Arm Length ¹ | "B" Quick Mount Arm Length | "B" Quick Mount Extended Arm Length |
|-------------------------|-----------|-------------------------|--------------------------------------|----------------------------|-------------------------------------|
| 1-4 | 15-1/2" | 7" | 10" | 10-5/8" | 16-9/16" |
| 5-6 | 21-5/8" | 7" | 10" | 10-5/8" | 16-9/16" |
| 7-8 | 27-5/8" | 7" | 13" | 10-5/8" | -- |
| 9-10 | 33-3/4" | 7" | 16" | -- | -- |

NOTES:
For arm selection requirements and additional line art, see Mounting Details section.

Ordering Information

SAMPLE NUMBER: GLEON-SA4C-740-U-T4FT-GM


| Product Family ^{1,2} | Light Engine | | Color Temperature | Voltage | Distribution | Mounting | Finish |
|-------------------------------|---|--|---|--|--|--|--|
| | Configuration | Drive Current | | | | | |
| GLEON=Galleon | SA1=1 Square SA2=2 Squares SA3=3 Squares SA4=4 Squares SA5=5 Squares ⁴ SA6=6 Squares SA7=7 Squares ⁵ SA8=8 Squares ⁵ SA9=9 Squares ⁶ SA0=10 Squares ⁶ | A=600mA B=800mA C=1000mA D=1200mA ¹⁶ | 722=70CRI, 2200K 727=70CRI, 2700K 730=70CRI, 3000K 735=70CRI, 3500K 740=70CRI, 4000K 750=70CRI, 5000K 760=70CRI, 6000K 827=80CRI, 2700K 830=80CRI, 3000K AMB=Amber, 590nm ^{14,16} | U=120-277V 1=120V 2=208V 3=240V 4=277V 8=480V ^{7,8} 9=347V ⁷ | T2=Type II T2R=Type II Roadway T3=Type III T3R=Type III Roadway T4FT=Type IV Forward Throw T4W=Type IV Wide 5NQ=Type V Narrow 5MQ=Type V Square Medium 5WQ=Type V Square Wide SL2=Type II w/Spill Control SL3=Type III w/Spill Control SL4=Type IV w/Spill Control SLL=90° Spill Light Eliminator Left SLR=90° Spill Light Eliminator Right RW=Rectangular Wide Type I AFL=Automotive Frontline | [Blank]=Arm for Round or Square Pole EA=Extended Arm ⁹ MA=Mast Arm Adapter ¹⁰ WM=Wall Mount QM=Quick Mount Arm (Standard Length) ¹¹ QMEA=Quick Mount Arm (Extended Length) ¹² | AP=Grey BZ=Bronze BK=Black DP=Dark Platinum GM=Graphite Metallic WH=White |

| Options (Add as Suffix) | Controls and Systems Options (Add as Suffix) | Accessories (Order Separately) |
|--|---|--|
| <p>DIM=External 0-10V Dimming Leads^{19,20} F=Single Fuse (120, 277 or 347V Specify Voltage) FF=Double Fuse (208, 240 or 480V Specify Voltage) 20K=Series 20kV UL 1449 Surge Protective Device 2L=Two Circuits^{17,18} HA=50°C High Ambient HSS=Installed House Side Shield²⁸ GRSBK=Glare Reducing Shield, Black²³ GRSWH=Glare Reducing Shield, White²³ LCF=Light Square Trim Painted to Match Housing²⁷ MT=Installed Mesh Top TH=Tool-less Door Hardware CC=Coastal Construction finish³ L90=Optics Rotated 90° Left R90=Optics Rotated 90° Right CE=CE Marking²⁹ AHD145=After Hours Dim, 5 Hours²² AHD245=After Hours Dim, 6 Hours²² AHD255=After Hours Dim, 7 Hours²² AHD355=After Hours Dim, 8 Hours²² DALI=DALI Drivers</p> | <p>BPC=Button Type Photocontrol PR=NEMA 3-PIN Photocontrol Receptacle PR7=NEMA 7-PIN Photocontrol Receptacle²¹ SPB2=Dimming Occupancy Sensor with Bluetooth Interface, 8' - 20' Mounting³⁴ SPB4=Dimming Occupancy Sensor with Bluetooth Interface, 21' - 40' Mounting³⁴ MS-L20=Motion Sensor for ON/OFF Operation, 9' - 20' Mounting Height²⁴ MS-L40W=Motion Sensor for ON/OFF Operation, 21' - 40' Mounting Height²⁴ MS/X-L20=Bi-Level Motion Sensor, 9' - 20' Mounting Height^{24,25} MS/X-L40W=Bi-Level Motion Sensor, 21' - 40' Mounting Height^{24,25} MS/DIM-L20=Motion Sensor for Dimming Operation, 9' - 20' Mounting Height²⁴ MS/DIM-L40W=Motion Sensor for Dimming Operation, 21' - 40' Mounting Height²⁴ ZW=WaveLinX Module and 4-PIN Receptacle ZD=WaveLinX Module with DALI driver and 4-PIN Receptacle SWPD4XX=WaveLinX Sensor Only, 15'-40'^{13,32,33} SWPD5XX=WaveLinX Sensor Only, 15'-40'^{13,32,33} WOBXX=WaveLinX Sensor with Bluetooth, 7'-15'^{13,32} WOFXX=WaveLinX Sensor with Bluetooth, 15'-40'^{13,32} LWR-LW=Enlightened Sensor, 8'-16' Mounting Height²⁶ LWR-LN=Enlightened Sensor, 16'-40' Mounting Height²⁶ DIM10-MS/DIM-L08=Synapse Occupancy Sensor (<8' Mounting)¹⁹ DIM10-MS/DIM-L20=Synapse Occupancy Sensor (9'-20' Mounting)¹⁹ DIM10-MS/DIM-L40=Synapse Occupancy Sensor (21'-40' Mounting)¹⁹</p> | <p>OA/RA1016=NEMA Photocontrol Multi-Tap - 105-285V OA/RA1027=NEMA Photocontrol - 480V OA/RA1201=NEMA Photocontrol - 347V OA/RA1013=Photocontrol Shorting Cap OA/RA1014=120V Photocontrol MA1252=10kV Surge Module Replacement MA1036-XX=Single Tenon Adapter for 2-3/8" O.D. Tenon MA1037-XX=2@180° Tenon Adapter for 2-3/8" O.D. Tenon MA1197-XX=3@120° Tenon Adapter for 2-3/8" O.D. Tenon MA1188-XX=4@90° Tenon Adapter for 2-3/8" O.D. Tenon MA1189-XX=2@90° Tenon Adapter for 2-3/8" O.D. Tenon MA1190-XX=3@90° Tenon Adapter for 2-3/8" O.D. Tenon MA1191-XX=2@120° Tenon Adapter for 2-3/8" O.D. Tenon MA1038-XX=Single Tenon Adapter for 3-1/2" O.D. Tenon MA1039-XX=2@180° Tenon Adapter for 3-1/2" O.D. Tenon MA1192-XX=3@120° Tenon Adapter for 3-1/2" O.D. Tenon MA1193-XX=4@90° Tenon Adapter for 3-1/2" O.D. Tenon MA1194-XX=2@90° Tenon Adapter for 3-1/2" O.D. Tenon MA1195-XX=3@90° Tenon Adapter for 3-1/2" O.D. Tenon FSIR-100=Wireless Configuration Tool for Occupancy Sensor²⁴ GLEON-MT1=Field Installed Mesh Top for 1-4 Light Squares GLEON-MT2=Field Installed Mesh Top for 5-6 Light Squares GLEON-MT3=Field Installed Mesh Top for 7-8 Light Squares GLEON-MT4=Field Installed Mesh Top for 9-10 Light Squares GLEON-QM=Quick Mount Arm Kit¹¹ GLEON-QMEA=Quick Mount Extended Arm Kit¹² LS/HSS=Field Installed House Side Shield^{28,30} LS/GRSBK=Glare Reducing Shield, Black^{23,30} LS/GRSWH=Glare Reducing Shield, White^{23,30} LS/PFS=Perimeter Shield, Black¹⁵ WOLC-7P-10A=WaveLinX Outdoor Control Module^{18,31} SWPD4-XX=WaveLinX Wireless Sensor, 7'-15' Mounting Height^{13,19,22,33} SWPD5-XX=WaveLinX Wireless Sensor, 15'-40' Mounting Height^{13,19,22,33}</p> |

NOTES:

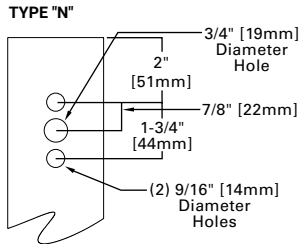
- Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications. Refer to our white paper WP513001EN for additional support information.
- DesignLights Consortium® Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details.
- Coastal construction finish salt spray tested to over 5,000-hours per ASTM B117, with a scribe rating of 9 per ASTM D1654. Not available with TH option.
- Not compatible with MS/4-LXX or MS/1-LXX sensors.
- Not compatible with extended quick mount arm (QMEA).
- Not compatible with standard quick mount arm (QM) or extended quick mount arm (QMEA).
- Requires the use of an internal step down transformer when combined with sensor options. Not available with sensor at 1200mA. Not available in combination with the HA high ambient and sensor options at 1A.
- 480V must utilize Wye system only. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems.)
- May be required when two or more luminaires are oriented on a 90° or 120° drilling pattern. Refer to arm mounting requirement table.
- Factory installed.
- Maximum 3 light squares.
- Maximum 6 light squares.
- Requires ZW or ZD receptacle.
- Narrow-band 590nm +/- 5nm for wildlife and observatory use. Choose drive current A; supplied at 500mA drive current only. Available with 5WQ, 5MQ, SL2, SL3 and SL4 distributions. Can be used with HSS option.
- Set of 4 pcs. One set required per Light Square.
- Not available with HA option.
- 2L is not available with MS, MS/X or MS/DIM at 347V or 480V. 2L in SA2 through SA4 requires a larger housing, normally used for SA5 or SA6. Extended arm option may be required when mounting two or more fixtures per pole at 90° or 120°. Refer to arm mounting requirement table.
- Not available with Enlightened wireless sensors.
- Cannot be used with other control options.
- Low voltage control lead brought out 18" outside fixture.
- Not available if any "MS" sensor is selected. Motion sensor has an integral photocell.
- Requires the use of BPC photocontrol or the PR7 or PR photocontrol receptacle with photocontrol accessory. See After Hours Dim supplemental guide for additional information.
- Not for use with T4FT, T4W or SL4 optics. See IES files for details.
- The FSIR-100 configuration tool is required to adjust parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Cooper Lighting Solutions for more information.
- Replace X with number of Light Squares operating in low output mode.
- Enlightened wireless sensors are factory installed only requiring network components LWP-EM-1, LWP-GW-1 and LWP-PoE8 in appropriate quantities.
- Not available with house side shield (HSS).
- Not for use with 5NQ, 5MQ, 5WQ or RW optics. A black trim plate is used when HSS is selected.
- CE is not available with the LWR, MS, MS/X, MS/DIM, BPC, PR or PR7 options. Available in 120-277V only.
- One required for each Light Square.
- Requires PR7.
- Replace XX with sensor color (WH, BZ or BK.)
- WAC Gateway required to enable field-configurability. Order WAC-PoE and WPOE-120 (10V to PoE injector) power supply if needed.
- Smart device with mobile application required to change system defaults. See controls section for details.

LumenSafe Integrated Network Security Camera Technology Options (Add as Suffix)

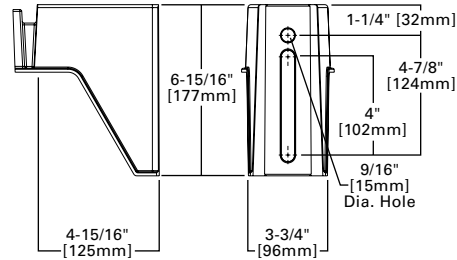
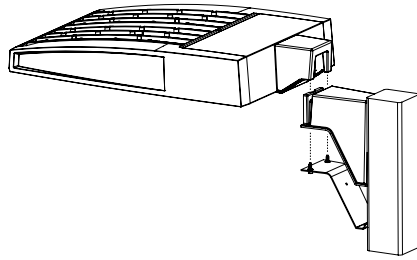
| Product Family | Camera Type | Data Backhaul |
|--|---|--|
| L=LumenSafe Technology  | D=Standard Dome Camera H=Hi-Res Dome Camera Z=Remote PTZ Camera | C=Cellular, No SIM A=Cellular, AT&T V=Cellular, Verizon S=Cellular, Sprint R=Cellular, Rogers W=Wi-Fi Networking w/ Omni-Directional Antenna E=Ethernet Networking |

Mounting Details

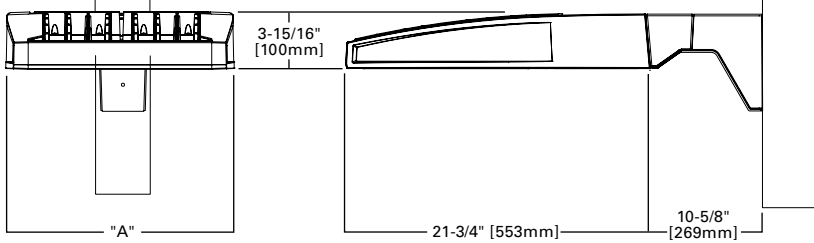
Standard Arm (Drilling Pattern)



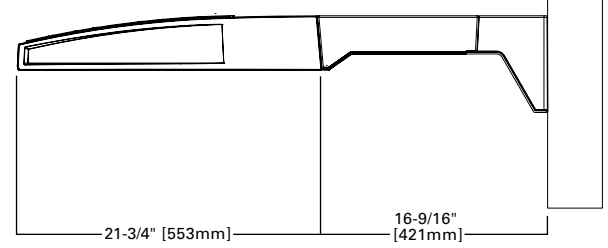
Quick Mount Arm (Includes fixture adapter)



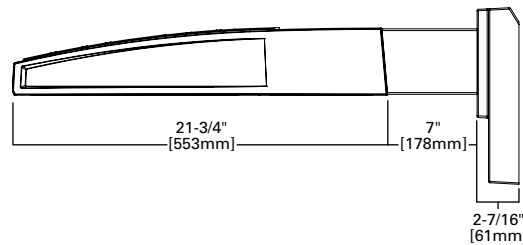
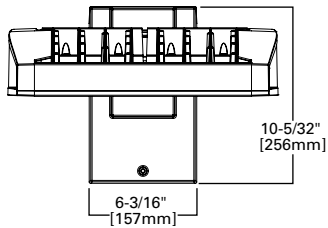
QM Quick Mount Arm (Standard)



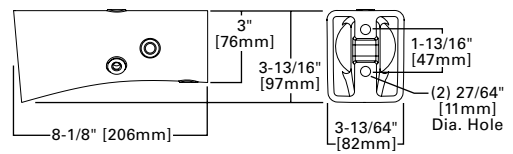
QMEA Quick Mount Arm (Extended)



Standard Wall Mount

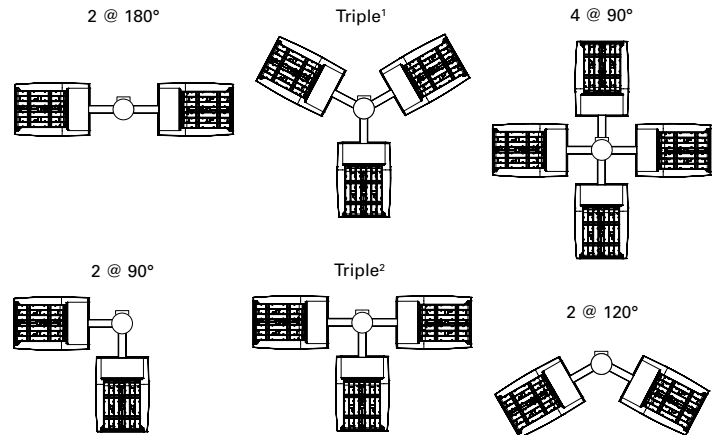


Mast Arm Mount



Arm Mounting Requirements

| Number of Light Squares | Standard Arm @ 90° Apart | Standard Arm @ 120° Apart | Quick Mount Arm @ 90° Apart | Quick Mount Arm @ 120° Apart |
|-------------------------|--------------------------|---------------------------|-----------------------------|------------------------------|
| 1 | Standard | Standard | QM Extended | Quick Mount |
| 2 | Standard | Standard | QM Extended | Quick Mount |
| 3 | Standard | Standard | QM Extended | Quick Mount |
| 4 | Standard | Standard | QM Extended | Quick Mount |
| 5 | Extended | Standard | QM Extended | Quick Mount |
| 6 | Extended | Standard | QM Extended | Quick Mount |
| 7 | Extended | Extended | -- | Quick Mount |
| 8 | Extended | Extended | -- | Quick Mount |
| 9 | Extended | Extended | -- | -- |
| 10 | Extended | Extended | -- | -- |

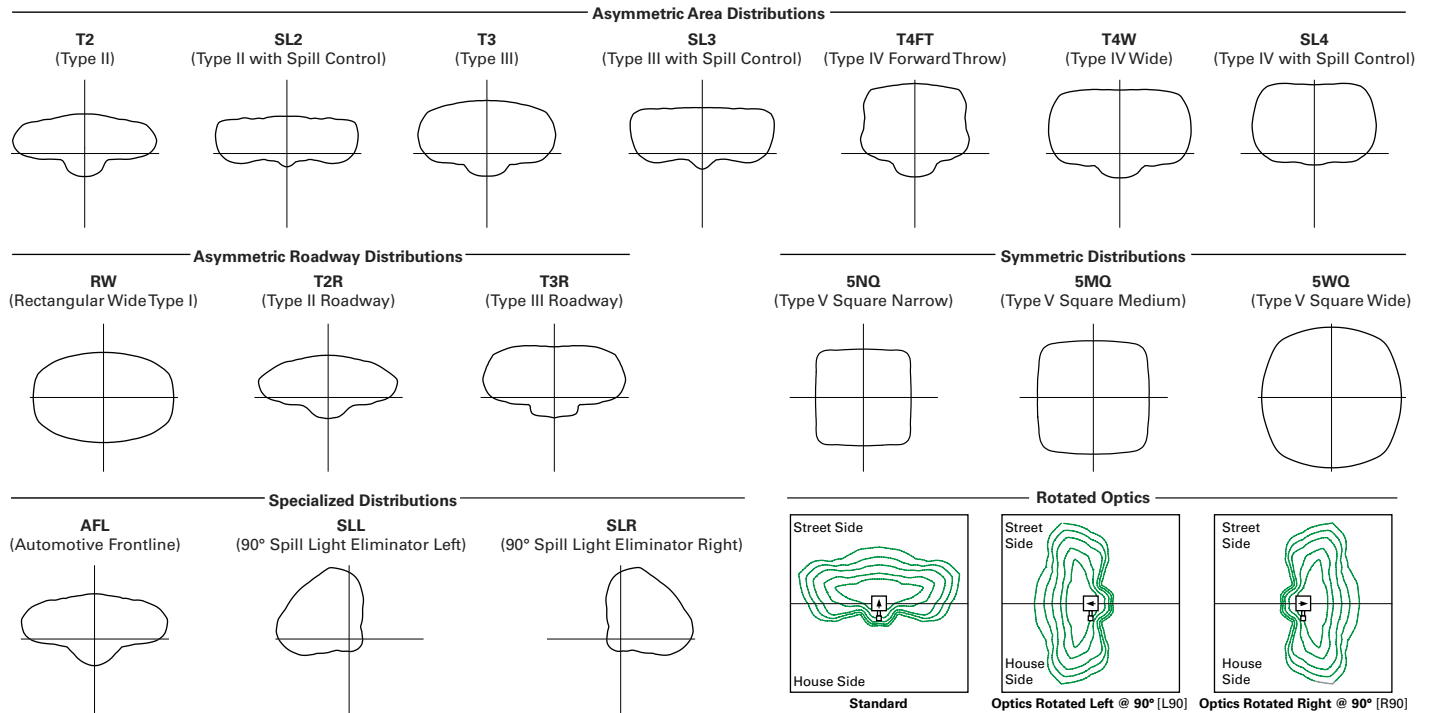


NOTES: 1 Round poles are 3 @ 120°. Square poles are 3 @ 90°. 2 Round poles are 3 @ 90°.

Fixture Weights and EPAs

| Number of Light Squares | Weight with Standard and Extended Arm (lbs.) | EPA with Standard and Extended Arm (Sq. Ft.) | Weight with Quick Mount Arm (lbs.) | EPA with Quick Mount Arm (Sq. Ft.) | Weight with Quick Mount Extended Arm (lbs.) | EPA with Quick Mount Extended Arm (Sq. Ft.) |
|-------------------------|--|--|------------------------------------|------------------------------------|---|---|
| 1-4 | 33 | 0.96 | 35 | 1.11 | 38 | 1.11 |
| 5-6 | 44 | 1.00 | 46 | 1.11 | 49 | 1.11 |
| 7-8 | 54 | 1.07 | 56 | 1.11 | -- | -- |
| 9-10 | 63 | 1.12 | -- | -- | -- | -- |

Optical Distributions



Product Specifications

Construction

- Extruded aluminum driver enclosure
- Heavy-wall, die-cast aluminum end caps
- Die-cast aluminum heat sinks
- Patent pending interlocking housing and heat sink

Optics

- Patented, high-efficiency injection-molded AccuLED Optics technology
- 16 optical distributions
- 3 shielding options including HSS, GRS and PFS
- IDA Certified (3000K CCT and warmer only)

Electrical

- LED drivers are mounted to removable tray

assembly for ease of maintenance

- Standard with 0-10V dimming
- Standard with Cooper Lighting Solutions proprietary circuit module designed to withstand 10kV of transient line surge
- Suitable for operation in -40°C to 40°C ambient environments. Optional 50°C high ambient (HA) configuration.

Mounting

- Standard extruded arm includes internal bolt guides and round pole adapter
- Extended arms (EA and QMEA) may be required in 90° or 120° pole mount configurations, see arm mounting requirements table

- Mast arm (MA) factory installed
- Wall mount (WM) option available
- Quick mount arm (QM and QMEA) includes pole adapter and factory installed fixture mount for fast installation to square or round poles

Finish

- Super housing durable TGIC polyester powder coat paint, 2.5 mil nominal thickness
- Heat sink is powder coated black
- RAL and custom color matches available
- Coastal Construction (CC) option available

Warranty

- Five year warranty

Energy and Performance Data

Lumen Maintenance (TM-21)

| Drive Current | Ambient Temperature | 25,000 hours* | 50,000 hours* | 60,000 hours* | 100,000 hours** | Theoretical L70 hours** |
|---------------|---------------------|---------------|---------------|---------------|-----------------|-------------------------|
| Up to 1A | 25°C | 99.4% | 99.0% | 98.9% | 98.3% | > 2.4M |
| | 40°C | 98.7% | 98.3% | 98.1% | 97.4% | > 1.9M |
| | 50°C | 98.2% | 97.2% | 96.8% | 95.2% | > 851,000 |
| 1.2A | 25°C | 99.4% | 99.0% | 98.9% | 98.3% | > 2.4M |
| | 40°C | 98.5% | 97.9% | 97.7% | 96.7% | > 1.3M |

* Supported by IES TM-21 standards

** Theoretical values represent estimations commonly used; however, refer to the IES position on LED Product Lifetime Prediction, IES PS-10-18, explaining proper use of IES TM-21 and LM-80.

Lumen Multiplier

| Ambient Temperature | Lumen Multiplier |
|---------------------|------------------|
| 0°C | 1.02 |
| 10°C | 1.01 |
| 25°C | 1.00 |
| 40°C | 0.99 |
| 50°C | 0.97 |

[View GLEON IES files](#)

Nominal Power Lumens (1.2A)

Supplemental Performance Guide**

| Number of Light Squares | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|---------------------------------|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Nominal Power (Watts) | 67 | 129 | 191 | 258 | 320 | 382 | 448 | 511 | 575 | 640 | |
| Input Current @ 120V (A) | 0.58 | 1.16 | 1.78 | 2.31 | 2.94 | 3.56 | 4.09 | 4.71 | 5.34 | 5.87 | |
| Input Current @ 208V (A) | 0.33 | 0.63 | 0.93 | 1.27 | 1.57 | 1.87 | 2.22 | 2.52 | 2.8 | 3.14 | |
| Input Current @ 240V (A) | 0.29 | 0.55 | 0.80 | 1.10 | 1.35 | 1.61 | 1.93 | 2.18 | 2.41 | 2.71 | |
| Input Current @ 277V (A) | 0.25 | 0.48 | 0.70 | 0.96 | 1.18 | 1.39 | 1.69 | 1.90 | 2.09 | 2.36 | |
| Input Current @ 347V (A) | 0.20 | 0.39 | 0.57 | 0.78 | 0.96 | 1.15 | 1.36 | 1.54 | 1.72 | 1.92 | |
| Input Current @ 480V (A) | 0.15 | 0.30 | 0.43 | 0.60 | 0.73 | 0.85 | 1.03 | 1.16 | 1.28 | 1.45 | |
| Optics | | | | | | | | | | | |
| T2 | 4000K Lumens | 7,972 | 15,580 | 23,245 | 30,714 | 38,056 | 45,541 | 53,857 | 61,024 | 68,072 | 75,366 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 119 | 121 | 122 | 119 | 119 | 119 | 120 | 119 | 118 | 118 |
| T2R | 4000K Lumens | 8,462 | 16,539 | 24,680 | 32,609 | 40,401 | 48,348 | 57,176 | 64,783 | 72,266 | 80,010 |
| | BUG Rating | B1-U0-G2 | B2-U0-G2 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 126 | 128 | 129 | 126 | 126 | 127 | 128 | 127 | 126 | 125 |
| T3 | 4000K Lumens | 8,125 | 15,879 | 23,693 | 31,307 | 38,787 | 46,417 | 54,893 | 62,197 | 69,381 | 76,818 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 121 | 123 | 124 | 121 | 121 | 122 | 123 | 122 | 121 | 120 |
| T3R | 4000K Lumens | 8,306 | 16,232 | 24,220 | 32,001 | 39,651 | 47,447 | 56,114 | 63,580 | 70,924 | 78,523 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 124 | 126 | 127 | 124 | 124 | 124 | 125 | 124 | 123 | 123 |
| T4FT | 4000K Lumens | 8,173 | 15,970 | 23,831 | 31,488 | 39,014 | 46,686 | 55,212 | 62,558 | 69,783 | 77,261 |
| | BUG Rating | B1-U0-G3 | B2-U0-G3 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 122 | 124 | 125 | 122 | 122 | 122 | 123 | 122 | 121 | 121 |
| T4W | 4000K Lumens | 8,067 | 15,764 | 23,522 | 31,080 | 38,510 | 46,082 | 54,499 | 61,751 | 68,881 | 76,263 |
| | BUG Rating | B2-U0-G2 | B3-U0-G3 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 120 | 122 | 123 | 120 | 120 | 121 | 122 | 121 | 120 | 119 |
| SL2 | 4000K Lumens | 7,958 | 15,552 | 23,206 | 30,662 | 37,989 | 45,462 | 53,763 | 60,920 | 67,952 | 75,235 |
| | BUG Rating | B2-U0-G3 | B3-U0-G3 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 119 | 121 | 121 | 119 | 119 | 119 | 120 | 119 | 118 | 118 |
| SL3 | 4000K Lumens | 8,124 | 15,877 | 23,690 | 31,302 | 38,784 | 46,410 | 54,885 | 62,189 | 69,372 | 76,805 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 121 | 123 | 124 | 121 | 121 | 121 | 123 | 122 | 121 | 120 |
| SL4 | 4000K Lumens | 7,719 | 15,085 | 22,510 | 29,741 | 36,850 | 44,097 | 52,148 | 59,089 | 65,913 | 72,977 |
| | BUG Rating | B1-U0-G3 | B2-U0-G4 | B2-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 115 | 117 | 118 | 115 | 115 | 115 | 116 | 116 | 115 | 114 |
| 5NQ | 4000K Lumens | 8,380 | 16,375 | 24,436 | 32,287 | 40,003 | 47,870 | 56,610 | 64,144 | 71,552 | 79,221 |
| | BUG Rating | B3-U0-G1 | B3-U0-G2 | B4-U0-G2 | B5-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 |
| | Lumens per Watt | 125 | 127 | 128 | 125 | 125 | 125 | 126 | 126 | 124 | 124 |
| 5MQ | 4000K Lumens | 8,534 | 16,676 | 24,885 | 32,881 | 40,739 | 48,752 | 57,653 | 65,326 | 72,868 | 80,679 |
| | BUG Rating | B3-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 127 | 129 | 130 | 127 | 127 | 128 | 129 | 128 | 127 | 126 |
| 5WQ | 4000K Lumens | 8,556 | 16,723 | 24,951 | 32,968 | 40,847 | 48,881 | 57,808 | 65,499 | 73,063 | 80,894 |
| | BUG Rating | B3-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 128 | 130 | 131 | 128 | 128 | 128 | 129 | 128 | 127 | 126 |
| SLL/SLR | 4000K Lumens | 7,140 | 13,951 | 20,817 | 27,506 | 34,081 | 40,783 | 48,231 | 54,649 | 60,959 | 67,492 |
| | BUG Rating | B1-U0-G3 | B2-U0-G3 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 107 | 108 | 109 | 107 | 107 | 107 | 108 | 107 | 106 | 105 |
| RW | 4000K Lumens | 8,304 | 16,228 | 24,215 | 31,994 | 39,641 | 47,437 | 56,100 | 63,566 | 70,907 | 78,504 |
| | BUG Rating | B3-U0-G1 | B4-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 124 | 126 | 127 | 124 | 124 | 124 | 125 | 124 | 123 | 123 |
| AFL | 4000K Lumens | 8,335 | 16,287 | 24,302 | 32,110 | 39,784 | 47,610 | 56,303 | 63,796 | 71,163 | 78,790 |
| | BUG Rating | B1-U0-G1 | B2-U0-G2 | B3-U0-G2 | B3-U0-G3 | B3-U0-G3 | B3-U0-G3 | B4-U0-G4 | B4-U0-G4 | B4-U0-G4 | B4-U0-G5 |
| | Lumens per Watt | 124 | 126 | 127 | 124 | 124 | 125 | 126 | 125 | 124 | 123 |

* Nominal data for 70 CRI. ** For additional performance data, please reference the Galleon Supplemental Performance Guide.

Nominal Power Lumens (1A)

 Supplemental Performance Guide**

| Number of Light Squares | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Nominal Power (Watts) | | 59 | 113 | 166 | 225 | 279 | 333 | 391 | 445 | 501 | 558 |
| Input Current @ 120V (A) | | 0.51 | 1.02 | 1.53 | 2.03 | 2.55 | 3.06 | 3.56 | 4.08 | 4.60 | 5.07 |
| Input Current @ 208V (A) | | 0.29 | 0.56 | 0.82 | 1.11 | 1.37 | 1.64 | 1.93 | 2.19 | 2.46 | 2.75 |
| Input Current @ 240V (A) | | 0.26 | 0.48 | 0.71 | 0.96 | 1.19 | 0.41 | 1.67 | 1.89 | 2.12 | 2.39 |
| Input Current @ 277V (A) | | 0.23 | 0.42 | 0.61 | 0.83 | 1.03 | 1.23 | 1.45 | 1.65 | 1.84 | 2.09 |
| Input Current @ 347V (A) | | 0.17 | 0.32 | 0.50 | 0.64 | 0.82 | 1.00 | 1.14 | 1.32 | 1.50 | 1.68 |
| Input Current @ 480V (A) | | 0.14 | 0.24 | 0.37 | 0.48 | 0.61 | 0.75 | 0.91 | 0.99 | 1.12 | 1.28 |
| Optics | | | | | | | | | | | |
| T2 | 4000K Lumens | 7,267 | 14,201 | 21,190 | 28,000 | 34,692 | 41,515 | 49,096 | 55,627 | 62,053 | 68,703 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 123 | 126 | 128 | 124 | 124 | 125 | 126 | 125 | 124 | 123 |
| T2R | 4000K Lumens | 7,715 | 15,077 | 22,497 | 29,725 | 36,829 | 44,073 | 52,122 | 59,056 | 65,876 | 72,937 |
| | BUG Rating | B1-U0-G2 | B2-U0-G2 | B3-U0-G3 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 131 | 133 | 136 | 132 | 132 | 132 | 133 | 133 | 131 | 131 |
| T3 | 4000K Lumens | 7,408 | 14,475 | 21,598 | 28,539 | 35,358 | 42,313 | 50,039 | 56,698 | 63,246 | 70,024 |
| | BUG Rating | B1-U0-G2 | B2-U0-G2 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 126 | 128 | 130 | 127 | 127 | 127 | 128 | 127 | 126 | 125 |
| T3R | 4000K Lumens | 7,571 | 14,798 | 22,078 | 29,172 | 36,145 | 43,253 | 51,153 | 57,959 | 64,653 | 71,581 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 128 | 131 | 133 | 130 | 130 | 130 | 131 | 130 | 129 | 128 |
| T4FT | 4000K Lumens | 7,451 | 14,559 | 21,725 | 28,703 | 35,564 | 42,558 | 50,330 | 57,027 | 63,613 | 70,430 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 126 | 129 | 131 | 128 | 127 | 128 | 129 | 128 | 127 | 126 |
| T4W | 4000K Lumens | 7,354 | 14,371 | 21,442 | 28,333 | 35,105 | 42,007 | 49,681 | 56,291 | 62,792 | 69,521 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 125 | 127 | 129 | 126 | 126 | 126 | 127 | 126 | 125 | 125 |
| SL2 | 4000K Lumens | 7,254 | 14,178 | 21,155 | 27,951 | 34,631 | 41,443 | 49,011 | 55,533 | 61,944 | 68,584 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 123 | 125 | 127 | 124 | 124 | 124 | 125 | 125 | 124 | 123 |
| SL3 | 4000K Lumens | 7,406 | 14,474 | 21,596 | 28,534 | 35,355 | 42,307 | 50,033 | 56,690 | 63,237 | 70,014 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 126 | 128 | 130 | 127 | 127 | 127 | 128 | 127 | 126 | 125 |
| SL4 | 4000K Lumens | 7,037 | 13,751 | 20,519 | 27,112 | 33,592 | 40,198 | 47,538 | 53,864 | 60,087 | 66,524 |
| | BUG Rating | B1-U0-G3 | B2-U0-G4 | B2-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 119 | 122 | 124 | 120 | 120 | 121 | 122 | 121 | 120 | 119 |
| 5NQ | 4000K Lumens | 7,640 | 14,928 | 22,275 | 29,431 | 36,465 | 43,637 | 51,606 | 58,472 | 65,226 | 72,218 |
| | BUG Rating | B3-U0-G1 | B3-U0-G2 | B4-U0-G2 | B5-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 |
| | Lumens per Watt | 129 | 132 | 134 | 131 | 131 | 131 | 132 | 131 | 130 | 129 |
| 5MQ | 4000K Lumens | 7,779 | 15,203 | 22,684 | 29,973 | 37,137 | 44,441 | 52,555 | 59,549 | 66,427 | 73,545 |
| | BUG Rating | B3-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 132 | 135 | 137 | 133 | 133 | 133 | 134 | 134 | 133 | 132 |
| 5WQ | 4000K Lumens | 7,800 | 15,243 | 22,744 | 30,052 | 37,236 | 44,560 | 52,697 | 59,708 | 66,603 | 73,742 |
| | BUG Rating | B3-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 132 | 135 | 137 | 134 | 133 | 134 | 135 | 134 | 133 | 132 |
| SLL/SLR | 4000K Lumens | 6,510 | 12,719 | 18,977 | 25,075 | 31,067 | 37,176 | 43,967 | 49,817 | 55,569 | 61,525 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B2-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 110 | 113 | 114 | 111 | 111 | 112 | 112 | 112 | 111 | 110 |
| RW | 4000K Lumens | 7,570 | 14,793 | 22,073 | 29,165 | 36,137 | 43,243 | 51,140 | 57,945 | 64,637 | 71,564 |
| | BUG Rating | B3-U0-G1 | B4-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 |
| | Lumens per Watt | 128 | 131 | 133 | 130 | 130 | 130 | 131 | 130 | 129 | 128 |
| AFL | 4000K Lumens | 7,598 | 14,847 | 22,154 | 29,272 | 36,267 | 43,400 | 51,326 | 58,156 | 64,872 | 71,824 |
| | BUG Rating | B1-U0-G1 | B2-U0-G2 | B3-U0-G2 | B3-U0-G3 | B3-U0-G3 | B3-U0-G3 | B4-U0-G4 | B4-U0-G4 | B4-U0-G4 | B4-U0-G4 |
| | Lumens per Watt | 129 | 131 | 133 | 130 | 130 | 130 | 131 | 131 | 129 | 129 |

* Nominal data for 70 CRI. ** For additional performance data, please reference the Galleon Supplemental Performance Guide.

Nominal Power Lumens (800mA)

 Supplemental Performance Guide**

| Number of Light Squares | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Nominal Power (Watts) | | 44 | 85 | 124 | 171 | 210 | 249 | 295 | 334 | 374 | 419 |
| Input Current @ 120V (A) | | 0.39 | 0.77 | 1.13 | 1.54 | 1.90 | 2.26 | 2.67 | 3.03 | 3.39 | 3.80 |
| Input Current @ 208V (A) | | 0.22 | 0.44 | 0.62 | 0.88 | 1.06 | 1.24 | 1.50 | 1.68 | 1.87 | 2.12 |
| Input Current @ 240V (A) | | 0.19 | 0.38 | 0.54 | 0.76 | 0.92 | 1.08 | 1.30 | 1.46 | 1.62 | 1.84 |
| Input Current @ 277V (A) | | 0.17 | 0.36 | 0.47 | 0.72 | 0.83 | 0.95 | 1.19 | 1.31 | 1.42 | 1.67 |
| Input Current @ 347V (A) | | 0.15 | 0.24 | 0.38 | 0.49 | 0.63 | 0.77 | 0.87 | 1.01 | 1.15 | 1.52 |
| Input Current @ 480V (A) | | 0.11 | 0.18 | 0.29 | 0.37 | 0.48 | 0.59 | 0.66 | 0.77 | 0.88 | 0.96 |
| Optics | | | | | | | | | | | |
| T2 | 4000K Lumens | 5,871 | 11,474 | 17,121 | 22,622 | 28,029 | 33,542 | 39,667 | 44,944 | 50,134 | 55,508 |
| | BUG Rating | B1-U0-G2 | B2-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 133 | 135 | 138 | 132 | 133 | 135 | 134 | 135 | 134 | 132 |
| T2R | 4000K Lumens | 6,233 | 12,181 | 18,176 | 24,016 | 29,756 | 35,608 | 42,111 | 47,714 | 53,224 | 58,929 |
| | BUG Rating | B1-U0-G1 | B2-U0-G2 | B2-U0-G2 | B3-U0-G3 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 142 | 143 | 147 | 140 | 142 | 143 | 143 | 143 | 142 | 141 |
| T3 | 4000K Lumens | 5,986 | 11,695 | 17,450 | 23,057 | 28,568 | 34,186 | 40,430 | 45,809 | 51,099 | 56,576 |
| | BUG Rating | B1-U0-G2 | B2-U0-G2 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 136 | 138 | 141 | 135 | 136 | 137 | 137 | 137 | 137 | 135 |
| T3R | 4000K Lumens | 6,117 | 11,955 | 17,838 | 23,569 | 29,203 | 34,946 | 41,328 | 46,827 | 52,235 | 57,832 |
| | BUG Rating | B1-U0-G2 | B2-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 139 | 141 | 144 | 138 | 139 | 140 | 140 | 140 | 140 | 138 |
| T4FT | 4000K Lumens | 6,019 | 11,763 | 17,551 | 23,190 | 28,734 | 34,384 | 40,663 | 46,074 | 51,396 | 56,904 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 137 | 138 | 142 | 136 | 137 | 138 | 138 | 138 | 137 | 136 |
| T4W | 4000K Lumens | 5,942 | 11,610 | 17,324 | 22,891 | 28,363 | 33,940 | 40,138 | 45,480 | 50,732 | 56,169 |
| | BUG Rating | B1-U0-G2 | B2-U0-G2 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 135 | 137 | 140 | 134 | 135 | 136 | 136 | 136 | 136 | 134 |
| SL2 | 4000K Lumens | 5,862 | 11,454 | 17,091 | 22,583 | 27,980 | 33,484 | 39,598 | 44,867 | 50,048 | 55,411 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 133 | 135 | 138 | 132 | 133 | 134 | 134 | 134 | 134 | 132 |
| SL3 | 4000K Lumens | 5,985 | 11,694 | 17,447 | 23,053 | 28,565 | 34,182 | 40,424 | 45,804 | 51,092 | 56,568 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B2-U0-G3 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 136 | 138 | 141 | 135 | 136 | 137 | 137 | 137 | 137 | 135 |
| SL4 | 4000K Lumens | 5,685 | 11,111 | 16,577 | 21,905 | 27,140 | 32,478 | 38,409 | 43,520 | 48,546 | 53,748 |
| | BUG Rating | B1-U0-G2 | B1-U0-G3 | B2-U0-G4 | B2-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 |
| | Lumens per Watt | 129 | 131 | 134 | 128 | 129 | 130 | 130 | 130 | 130 | 128 |
| 5NQ | 4000K Lumens | 6,172 | 12,061 | 17,997 | 23,778 | 29,462 | 35,256 | 41,694 | 47,242 | 52,699 | 58,347 |
| | BUG Rating | B2-U0-G1 | B3-U0-G1 | B4-U0-G2 | B4-U0-G2 | B5-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 |
| | Lumens per Watt | 140 | 142 | 145 | 139 | 140 | 142 | 141 | 141 | 141 | 139 |
| 5MQ | 4000K Lumens | 6,285 | 12,283 | 18,328 | 24,217 | 30,004 | 35,907 | 42,462 | 48,112 | 53,669 | 59,421 |
| | BUG Rating | B3-U0-G1 | B4-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 143 | 145 | 148 | 142 | 143 | 144 | 144 | 144 | 144 | 142 |
| 5WQ | 4000K Lumens | 6,303 | 12,317 | 18,377 | 24,281 | 30,085 | 36,001 | 42,575 | 48,241 | 53,812 | 59,579 |
| | BUG Rating | B3-U0-G1 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 143 | 145 | 148 | 142 | 143 | 145 | 144 | 144 | 144 | 142 |
| SLL/SLR | 4000K Lumens | 5,260 | 10,276 | 15,332 | 20,259 | 25,101 | 30,037 | 35,522 | 40,249 | 44,898 | 49,708 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B2-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 |
| | Lumens per Watt | 120 | 121 | 124 | 118 | 120 | 121 | 120 | 121 | 120 | 119 |
| RW | 4000K Lumens | 6,116 | 11,952 | 17,834 | 23,563 | 29,196 | 34,938 | 41,317 | 46,817 | 52,224 | 57,819 |
| | BUG Rating | B3-U0-G1 | B3-U0-G2 | B4-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 |
| | Lumens per Watt | 139 | 141 | 144 | 138 | 139 | 140 | 140 | 140 | 140 | 138 |
| AFL | 4000K Lumens | 6,139 | 11,996 | 17,899 | 23,650 | 29,302 | 35,064 | 41,468 | 46,987 | 52,412 | 58,030 |
| | BUG Rating | B1-U0-G1 | B2-U0-G2 | B2-U0-G2 | B3-U0-G2 | B3-U0-G3 | B3-U0-G3 | B3-U0-G3 | B3-U0-G3 | B4-U0-G4 | B4-U0-G4 |
| | Lumens per Watt | 140 | 141 | 144 | 138 | 140 | 141 | 141 | 141 | 140 | 138 |

* Nominal data for 70 CRI. ** For additional performance data, please reference the Galleon Supplemental Performance Guide.

Nominal Power Lumens (600mA)

 Supplemental Performance Guide**

| Number of Light Squares | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|---------------------------------|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Nominal Power (Watts) | 34 | 66 | 96 | 129 | 162 | 193 | 226 | 257 | 290 | 323 | |
| Input Current @ 120V (A) | 0.30 | 0.58 | 0.86 | 1.16 | 1.44 | 1.73 | 2.03 | 2.33 | 2.59 | 2.89 | |
| Input Current @ 208V (A) | 0.17 | 0.34 | 0.49 | 0.65 | 0.84 | 0.99 | 1.14 | 1.30 | 1.48 | 1.63 | |
| Input Current @ 240V (A) | 0.15 | 0.30 | 0.43 | 0.56 | 0.74 | 0.87 | 1.00 | 1.13 | 1.30 | 1.43 | |
| Input Current @ 277V (A) | 0.14 | 0.28 | 0.41 | 0.52 | 0.69 | 0.81 | 0.93 | 1.04 | 1.22 | 1.33 | |
| Input Current @ 347V (A) | 0.11 | 0.19 | 0.30 | 0.39 | 0.49 | 0.60 | 0.69 | 0.77 | 0.90 | 0.99 | |
| Input Current @ 480V (A) | 0.08 | 0.15 | 0.24 | 0.30 | 0.38 | 0.48 | 0.53 | 0.59 | 0.71 | 0.77 | |
| Optics | | | | | | | | | | | |
| T2 | 4000K Lumens | 4,787 | 9,357 | 13,961 | 18,448 | 22,856 | 27,353 | 32,347 | 36,651 | 40,884 | 45,265 |
| | BUG Rating | B1-U0-G1 | B2-U0-G2 | B2-U0-G3 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 |
| | Lumens per Watt | 141 | 142 | 145 | 143 | 141 | 142 | 143 | 143 | 141 | 140 |
| T2R | 4000K Lumens | 5,083 | 9,934 | 14,822 | 19,585 | 24,266 | 29,038 | 34,341 | 38,911 | 43,404 | 48,055 |
| | BUG Rating | B1-U0-G1 | B1-U0-G2 | B2-U0-G2 | B2-U0-G2 | B3-U0-G3 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 |
| | Lumens per Watt | 150 | 151 | 154 | 152 | 150 | 150 | 152 | 151 | 150 | 149 |
| T3 | 4000K Lumens | 4,880 | 9,537 | 14,231 | 18,803 | 23,296 | 27,878 | 32,970 | 37,358 | 41,671 | 46,137 |
| | BUG Rating | B1-U0-G1 | B2-U0-G2 | B2-U0-G2 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 144 | 145 | 148 | 146 | 144 | 144 | 146 | 145 | 144 | 143 |
| T3R | 4000K Lumens | 4,988 | 9,749 | 14,547 | 19,220 | 23,814 | 28,497 | 33,703 | 38,188 | 42,598 | 47,162 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B2-U0-G3 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 |
| | Lumens per Watt | 147 | 148 | 152 | 149 | 147 | 148 | 149 | 149 | 147 | 146 |
| T4FT | 4000K Lumens | 4,909 | 9,591 | 14,312 | 18,911 | 23,432 | 28,040 | 33,161 | 37,574 | 41,913 | 46,404 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 144 | 145 | 149 | 147 | 145 | 145 | 147 | 146 | 145 | 144 |
| T4W | 4000K Lumens | 4,845 | 9,468 | 14,128 | 18,668 | 23,130 | 27,678 | 32,732 | 37,088 | 41,371 | 45,805 |
| | BUG Rating | B1-U0-G2 | B2-U0-G2 | B2-U0-G3 | B3-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 143 | 143 | 147 | 145 | 143 | 143 | 145 | 144 | 143 | 142 |
| SL2 | 4000K Lumens | 4,779 | 9,341 | 13,937 | 18,416 | 22,818 | 27,305 | 32,292 | 36,589 | 40,813 | 45,188 |
| | BUG Rating | B1-U0-G2 | B2-U0-G3 | B2-U0-G3 | B3-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B4-U0-G5 | B4-U0-G5 |
| | Lumens per Watt | 141 | 142 | 145 | 143 | 141 | 141 | 143 | 142 | 141 | 140 |
| SL3 | 4000K Lumens | 4,879 | 9,536 | 14,229 | 18,800 | 23,294 | 27,874 | 32,965 | 37,351 | 41,666 | 46,130 |
| | BUG Rating | B1-U0-G2 | B1-U0-G3 | B2-U0-G3 | B2-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 |
| | Lumens per Watt | 144 | 144 | 148 | 146 | 144 | 144 | 146 | 145 | 144 | 143 |
| SL4 | 4000K Lumens | 4,637 | 9,059 | 13,519 | 17,863 | 22,132 | 26,486 | 31,322 | 35,490 | 39,589 | 43,831 |
| | BUG Rating | B1-U0-G2 | B1-U0-G3 | B2-U0-G4 | B2-U0-G4 | B2-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 |
| | Lumens per Watt | 136 | 137 | 141 | 138 | 137 | 137 | 139 | 138 | 137 | 136 |
| 5NQ | 4000K Lumens | 5,033 | 9,835 | 14,676 | 19,392 | 24,026 | 28,751 | 34,002 | 38,526 | 42,975 | 47,581 |
| | BUG Rating | B2-U0-G1 | B3-U0-G1 | B3-U0-G2 | B4-U0-G2 | B4-U0-G2 | B4-U0-G2 | B5-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G3 |
| | Lumens per Watt | 148 | 149 | 153 | 150 | 148 | 149 | 150 | 150 | 148 | 147 |
| 5MQ | 4000K Lumens | 5,126 | 10,015 | 14,946 | 19,747 | 24,468 | 29,281 | 34,628 | 39,236 | 43,766 | 48,457 |
| | BUG Rating | B3-U0-G1 | B3-U0-G2 | B4-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 |
| | Lumens per Watt | 151 | 152 | 156 | 153 | 151 | 152 | 153 | 153 | 151 | 150 |
| 5WQ | 4000K Lumens | 5,139 | 10,043 | 14,985 | 19,801 | 24,533 | 29,359 | 34,721 | 39,339 | 43,883 | 48,586 |
| | BUG Rating | B3-U0-G1 | B4-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 | B5-U0-G4 | B5-U0-G5 | B5-U0-G5 |
| | Lumens per Watt | 151 | 152 | 156 | 153 | 151 | 152 | 154 | 153 | 151 | 150 |
| SLL/SLR | 4000K Lumens | 4,289 | 8,380 | 12,502 | 16,520 | 20,469 | 24,494 | 28,967 | 32,823 | 36,613 | 40,537 |
| | BUG Rating | B1-U0-G2 | B1-U0-G3 | B2-U0-G3 | B2-U0-G4 | B3-U0-G4 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 | B3-U0-G5 |
| | Lumens per Watt | 126 | 127 | 130 | 128 | 126 | 127 | 128 | 128 | 126 | 126 |
| RW | 4000K Lumens | 4,987 | 9,746 | 14,543 | 19,215 | 23,808 | 28,491 | 33,695 | 38,178 | 42,587 | 47,151 |
| | BUG Rating | B2-U0-G1 | B3-U0-G1 | B4-U0-G2 | B4-U0-G2 | B4-U0-G2 | B5-U0-G3 | B5-U0-G3 | B5-U0-G3 | B5-U0-G4 | B5-U0-G4 |
| | Lumens per Watt | 147 | 148 | 151 | 149 | 147 | 148 | 149 | 149 | 147 | 146 |
| AFL | 4000K Lumens | 5,007 | 9,782 | 14,597 | 19,285 | 23,896 | 28,594 | 33,817 | 38,317 | 42,742 | 47,322 |
| | BUG Rating | B1-U0-G1 | B1-U0-G1 | B2-U0-G2 | B2-U0-G2 | B3-U0-G2 | B3-U0-G3 | B3-U0-G3 | B3-U0-G3 | B3-U0-G3 | B3-U0-G3 |
| | Lumens per Watt | 147 | 148 | 152 | 149 | 148 | 148 | 150 | 149 | 147 | 147 |

* Nominal data for 70 CRI. ** For additional performance data, please reference the Galleon Supplemental Performance Guide.

Control Options

0-10V (DIM)

This fixture is offered standard with 0-10V dimming driver(s). The DIM option provides 0-10V dimming wire leads for use with a lighting control panel or other control method.

Photocontrol (BPC, PR and PR7)

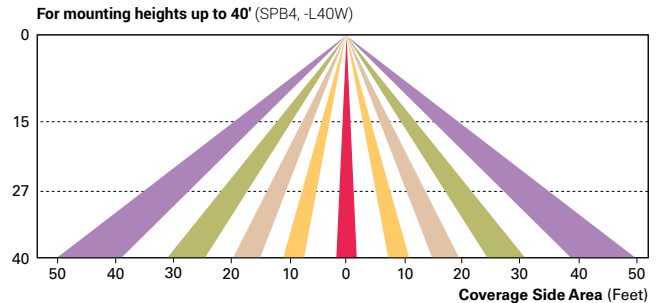
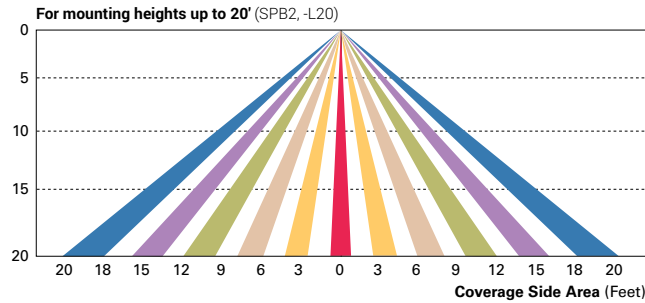
Optional button-type photocontrol (BPC) and photocontrol receptacles (PR and PR7) provide a flexible solution to enable “dusk-to-dawn” lighting by sensing light levels. Advanced control systems compatible with NEMA 7-pin standards can be utilized with the PR7 receptacle.

After Hours Dim (AHD)

This feature allows photocontrol-enabled luminaires to achieve additional energy savings by dimming during scheduled portions of the night. The dimming profile will automatically take effect after a “dusk-to-dawn” period has been calculated from the photocontrol input. Specify the desired dimming profile for a simple, factory-shipped dimming solution requiring no external control wiring. Reference the After Hours Dim supplemental guide for additional information.

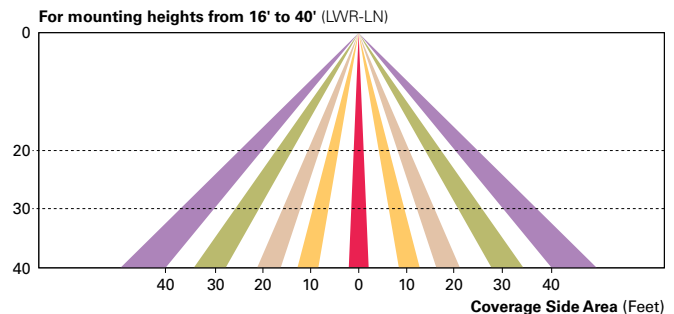
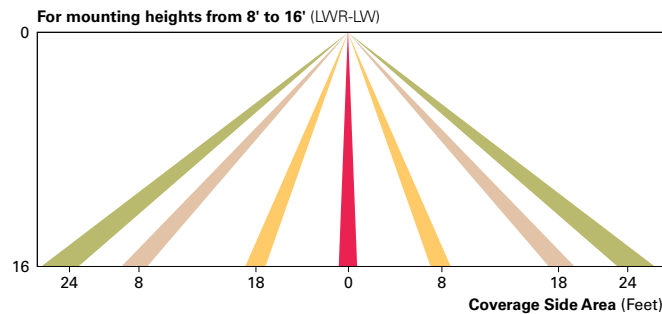
Dimming Occupancy Sensor (SPB, MS/DIM-LXX, MS/X-LXX and MS-LXX)

These sensors are factory installed in the luminaire housing. When the SPB or MS/DIM sensor options are selected, the occupancy sensor is connected to a dimming driver and the entire luminaire dims when there is no activity detected. When activity is detected, the luminaire returns to full light output. The MS/DIM sensor is factory preset to dim down to approximately 50 percent power with a time delay of five minutes. The MS-LXX sensor is factory preset to turn the luminaire off after five minutes of no activity. The MS/X-LXX is also preset for five minutes and only controls the specified number of light engines to maintain steady output from the remaining light engines. SPB motion sensors require the Sensor Configuration mobile application by Wattstopper to change factory default dimming level, time delay, sensitivity and other parameters. Available for iOS and Android devices. The SPB sensor is factory preset to dim down to approximately 10% power with a time delay of five minutes. The MS/DIM occupancy sensors require the FSIR-100 programming tool to adjust factory defaults.



Enlighted Wireless Control and Monitoring System (LWR-LW and LWR-LN)

Enlighted is a connected lighting solution that combines a broad selection of energy-efficient LED luminaires with a powerful integrated wireless sensor system. The sensor controls the lighting system in compliance with the latest energy codes and collects valuable data about building performance and use. Software applications turn the granular data into information through energy dashboards and specialized apps that make it simple and help optimize the use of building resources, beyond lighting.



WaveLinX Wireless Outdoor Lighting Control Module (WOLC-7P-10A)

The 7-pin wireless outdoor lighting control module enables WaveLinX to control outdoor area, site and flood lighting. WaveLinX controls outdoor lighting using schedules to provide ON, OFF and dimming controls based on astronomic or time schedules based on a 7 day week.

LumenSafe Integrated Network Security Camera (LD)

Cooper Lighting Solutions brings ease of camera deployment to a whole new level. No additional wiring is needed beyond providing line power to the luminaire. A variety of networking options allows security integrators to design the optimal solution for active surveillance. As the ideal solution to meet the needs for active surveillance, the LumenSafe integrated network camera is a streamlined, outdoor-ready fixed dome that provides HDTV 1080p video. This IP camera is optimally designed for deployment in the video management system or security software platform of choice.

Synapse (DIM10)

SimplySNAP integrated wireless controls system by Synapse. Includes factory installed DIM10 Synapse control module and MS/DC motion sensor; requires additional Synapse system components for operation. Contact Synapse at www.synapsewireless.com for product support, warranty and terms and conditions.

| | | | | | |
|-------------|--|-----------|--|------|--|
| Project | | Catalog # | | Type | |
| Prepared by | | Notes | | Date | |



McGraw-Edison

GWC Galleon Wall

Wall Mount Luminaire

Typical Applications

Exterior Wall • Walkway

Interactive Menu

- Ordering Information [page 2](#)
- Product Specifications [page 2](#)
- Optical Configurations [page 3](#)
- Energy and Performance Data [page 4](#)
- Control Options [page 6](#)

Product Certifications



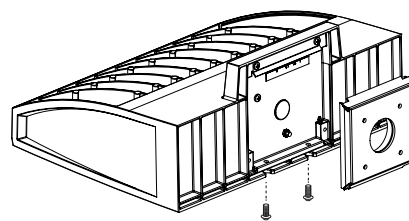
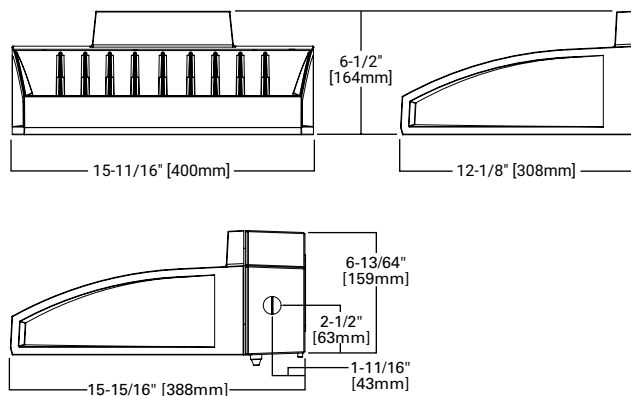
Quick Facts

- Choice of thirteen high-efficiency, patented AccuLED Optics™
- Downward and inverted wall mounting configurations
- Eight lumen packages from 3,215 up to 17,056
- Efficacies up to 154 lumens per watt

Connected Systems

- WaveLinx
- Enlighted

Dimensional Details



Ordering Information

SAMPLE NUMBER: GWC-SA2C-740-U-T4FT-GM

| Product Family ¹ | Light Engine | | Color Temperature | Voltage | Distribution | Finish |
|---|--|---|---|--|--|--|
| | Configuration | Drive Current | | | | |
| GWC=Galleon Wall | SA1=1 Square SA2=2 Squares ² | A=615mA B=800mA C=1000mA D=1200mA ⁴ | 722=70CRI, 2200K 727=70CRI, 2700K 730=70CRI, 3000K 735=70CRI, 3500K 740=70CRI, 4000K 750=70CRI, 5000K 760=70CRI, 6000K 827=80CRI, 2700K 830=80CRI, 3000K AMB=Amber, 590nm ^{3,4} | U=120-277V 1=120V 2=208V 3=240V 4=277V 8=480V ^{6,7} 9=347V ⁶ | T2=Type II T3=Type III T4F=Type IV Forward Throw T4W=Type IV Wide SL2=Type II w/Spill Control SL3=Type III w/Spill Control SL4=Type IV w/Spill Control SLL=90° Spill Light Eliminator Left SLR=90° Spill Light Eliminator Right RW=Rectangular Wide Type I 5NQ=Type V Square Narrow 5MQ=Type V Square Medium 5WQ=Type V Square Wide | AP=Grey BZ=Bronze BK=Black DP=Dark Platinum GM=Graphite Metallic WH=White |
| Options (Add as Suffix) | | | Controls and Systems Options (Add as Suffix) | | Accessories (Order Separately) | |
| F=Single Fused (120, 277 or 347V. Must Specify Voltage) FF=Double Fused (208, 240 or 480V. Must Specify Voltage) 10K=10kV Surge Module 20K=Series 20kV UL 1449 Surge Protective Device DIM=External 0-10V Dimming Leads ^{9,10} CBP=Battery Pack with Back Box, Cold Weather Rated ^{2,4,14,33} CBP-CEC=Battery Pack with Back Box, Cold Weather Rated, CEC compliant ^{2,4,14} L90=Optics Rotated 90° Left R90=Optics Rotated 90° Right HSS=Factory Installed House Side Shield ²³ GRSBK=Factory Installed Glare Shield, BK ^{4,27} GRSWH=Factory Installed Glare Shield, WH ^{4,27} UPL=Uplight Housing ¹³ HA=50°C High Ambient ¹² LCF=Light Square Trim Plate Painted to Match Housing ²² MT=Factory Installed Mesh Top CC=Coastal Construction finish ⁵ CE=CE Marking and Small Terminal Block ²⁴ AHD145=After Hours Dim, 5 Hours ¹⁶ AHD245=After Hours Dim, 6 Hours ¹⁶ AHD255=After Hours Dim, 7 Hours ¹⁶ AHD355=After Hours Dim, 8 Hours ¹⁶ DALI=DALI Driver ¹¹ | | | BPC=Button Type Photocontrol (120, 208, 240 or 277V. Must Specify Voltage) PR=NEMA 3-PIN Twistlock Photocontrol Receptacle PR7=NEMA 7-PIN Twistlock Photocontrol Receptacle ¹⁵ SPB1=Dimming Occupancy Sensor with Bluetooth Interface, <8' Mounting ^{19,34} SPB2=Dimming Occupancy Sensor with Bluetooth Interface, 8' - 20' Mounting ^{19,34} SPB4=Dimming Occupancy Sensor with Bluetooth Interface, 21' - 40' Mounting ^{19,34} MS-LXX=Motion Sensor for On/Off Operation ^{17,18,19} MS/DIM-LXX=Motion Sensor for Dimming Operation ^{17,18,19} ZW=WaveLinX-enabled 4-PIN Twistlock Receptacle ^{29,30} ZD=WaveLinX Module with DALI driver and 4-PIN Receptacle ^{29,30} SWPD4XX=WaveLinX Sensor Only, 7' - 15' ^{31,32} SWPD5XX=WaveLinX Sensor Only, 15' - 40' ^{31,32} WOBXX=WaveLinX Sensor with Bluetooth, 7' - 15' ^{31,32} WOFXX=WaveLinX Sensor with Bluetooth, 15' - 40' ^{31,32} LWR-LW=Enlighted Wireless Sensor, Wide Lens for 8'-16' Mounting Height ^{19,20,21} LWR-LN=Enlighted Wireless Sensor, Narrow Lens for 16'-40' Mounting Height ^{19,20,21} | | OA/RA1013=Photocontrol Shorting Cap ²⁸ OA/RA1016=NEMA Photocontrol - Multi-Tap 105-285V ²⁸ OA/RA1201=NEMA Photocontrol - 347V ²⁸ OA/RA1027=NEMA Photocontrol - 480V ²⁸ MA1252=10kV Circuit Module Replacement MA1059XX=Thru-branch Back Box (Must Specify Color) LS/HSS=Field Installed House Side Shield ^{23,25} LS/GRSBK=Glare Shield, Black ^{8,25,27} LS/GRSWH=Glare Shield, White ^{8,25,27} LS/PFS=Perimeter Shield, Black FSIR-100=Wireless Configuration Tool for Occupancy Sensor ¹⁷ WOLC-7P-10A=WaveLinX Outdoor Control Module (7-pin) ^{26,29} SWPD4-XX=WaveLinX Wireless Sensor, 7' - 15' Mounting Height ^{29,30,31,32} SWPD5-XX=WaveLinX Wireless Sensor, 15' - 40' Mounting Height ^{29,30,31,32} | |
| <p>NOTES:</p> <ol style="list-style-type: none"> DesignLight Consortium® Qualified. Refer to www.designlights.org, Qualified Products List under Family Models for details. Two light squares with CBP options limited to 25°C. Not available in combination with sensor options at 1200mA. Narrow-band 590nm +/- 5nm for wildlife and observatory use. Choose drive current A; supplied at 500mA drive current only. Available with 5WQ, 5MQ, SL2, SL3 and SL4 distributions. Can be used with HSS option. Not available with HA option. Coastal construction finish salt spray tested to over 5,000-hours per ASTM B117, with a scribe rating of 9 per ASTM D1654. Require the use of a step down transformer. Not available in combination with sensor options at 1200mA. 480V must use Wye system only. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems). Reserved. Cannot be used with other control options. Low voltage control leads extended 18" from fixture. Not available in 1200mA. When used with CBP or HA options, only available with single light square. Not available in 1200mA, UPL or CBP options. Available with single light square. Not available with SL2, SL3, SL4, HA, CBP, PR or PR7 options. Operates a single light square only. Operates at -20°C to +40°C. Backbox is non-IP rated. Control option limited to BPC. Compatible with standard 3-PIN photocontrols, 5-PIN or 7-PIN ANSI controls. Requires the use of BPC photocontrol or the PR7 or PR photocontrol receptacle with photocontrol accessory. See After Hours Dim supplemental guide for additional information. The FSIR-100 configuration tool is required to adjust parameters such as high and low modes, sensitivity, time delay and cutoff. Consult your lighting representative at Cooper Lighting Solutions for more information. Replace LXX with L08 (<8' mounting), L20 (8'-20' mounting) or L40W (21'-40' mounting.) Includes integral photosensor. Enlighted wireless sensors are factory installed requiring network components in appropriate quantities. White sensor shipped on all housing color options. Not available with HSS or GRS options. Not for use with 5NQ, 5MQ, 5WQ or RW optics. The light square trim plate is painted black when the HSS option is selected. CE is not available with the 1200, DALI, LWR, MS, MS/DIM, BPC, PR or PR7 options. Available in 120-277V only. One required for each light square. Requires PR7. Not for use with T4FT, T4W or SL4 optics. Cannot be used in conjunction with additional photocontrol or other controls systems (BPC, PR, PR7, MS, LWR). WAC Gateway required to enable field-configurability: Order WAC-PoE and WPOE-120 (10V to PoE injector) power supply if needed. Requires ZW or ZD receptacle. Replace XX with sensor color (WH, BZ, or BK). Specify 120V or 277V. Smart device with mobile application required to change system defaults. See controls section for details. | | | | | | |

Product Specifications

Construction

- Driver enclosure thermally isolated from optics for optimal thermal performance
- Die-cast aluminum heat sinks
- IP66 rated housing
- 1.5G vibration rated

Optics

- Patented, high-efficiency injection-molded AccuLED Optics technology
- 13 optical distributions
- IDA Certified (3000K CCT and warmer only)

Electrical

- LED driver assembly mounted for ease of maintenance
- Standard with 0-10V dimming
- Optional 10kV or 20kV surge module
- Suitable for operation in -40C to 40C ambient environments. Optional 50C high ambient (HA) configuration.

Mounting

- Gasketed and zinc plated rigid steel mounting attachment

- "Hook-N-Lock" mechanism for easy installation

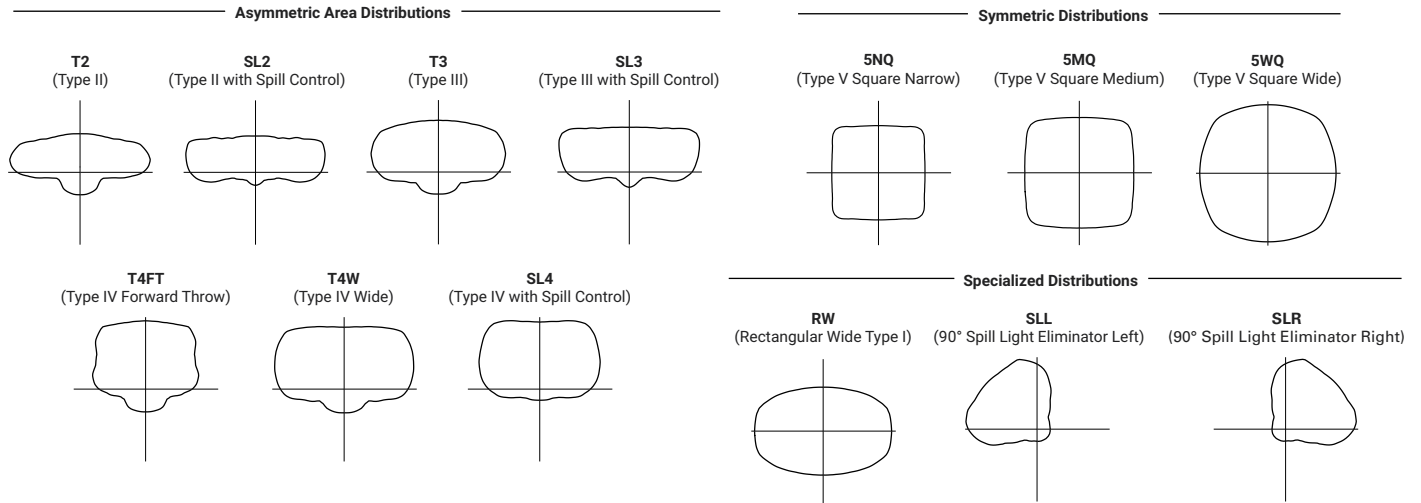
Finish

- Housing finished in super durable TGIC polyester powder coat paint, 2.5 mil nominal thickness
- Heat sink is powder coated black
- RAL and custom color matches available
- Coastal Construction (CC) option available

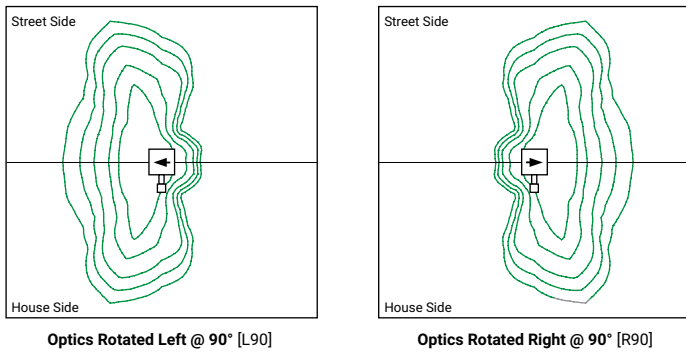
Warranty

- Five-year warranty

Optical Distributions



Optic Orientation



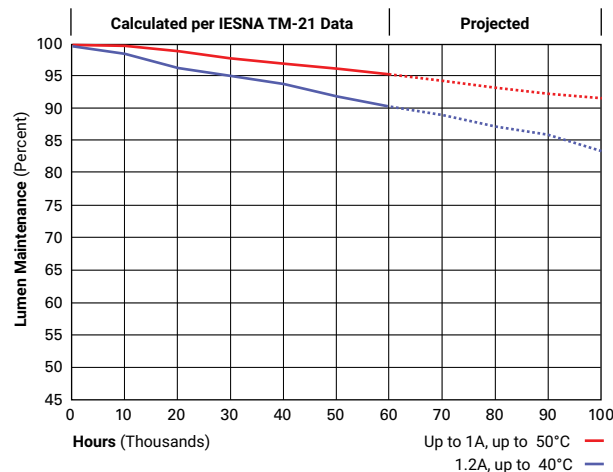
Energy and Performance Data

Lumen Multiplier

| Ambient Temperature | Lumen Multiplier |
|---------------------|------------------|
| 0°C | 1.02 |
| 10°C | 1.01 |
| 25°C | 1.00 |
| 40°C | 0.99 |
| 50°C | 0.97 |

Lumen Maintenance

| Drive Current | Ambient Temperature | TM-21 Lumen Maintenance (60,000 Hours) | Projected L70 (Hours) |
|---------------|---------------------|--|-----------------------|
| Up to 1A | Up to 50°C | > 95% | > 416,000 |
| 1.2A | Up to 40°C | > 90% | > 205,000 |



Energy and Performance Data

 View GWC Galleon Wall IES files

4000K/5000K/6000K CCT, 70 CRI

| Number of Light Squares | | 1 | | | | 2 | | | |
|--------------------------|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Drive Current | | 615mA | 800mA | 1050mA | 1.2A | 615mA | 800mA | 1050mA | 1.2A |
| Nominal Power (Watts) | | 34 | 44 | 59 | 67 | 66 | 86 | 113 | 129 |
| Input Current @ 120V (A) | | 0.30 | 0.39 | 0.51 | 0.58 | 0.58 | 0.77 | 1.02 | 1.16 |
| Input Current @ 208V (A) | | 0.17 | 0.22 | 0.29 | 0.33 | 0.34 | 0.44 | 0.56 | 0.63 |
| Input Current @ 240V (A) | | 0.15 | 0.19 | 0.26 | 0.29 | 0.30 | 0.38 | 0.48 | 0.55 |
| Input Current @ 277V (A) | | 0.14 | 0.17 | 0.23 | 0.25 | 0.28 | 0.36 | 0.42 | 0.48 |
| Input Current @ 347V (A) | | 0.11 | 0.15 | 0.17 | 0.20 | 0.19 | 0.24 | 0.32 | 0.39 |
| Input Current @ 480V (A) | | 0.08 | 0.11 | 0.14 | 0.15 | 0.15 | 0.18 | 0.24 | 0.30 |
| Optics | | | | | | | | | |
| T2 | Lumens | 4,883 | 5,989 | 7,412 | 8,131 | 9,543 | 11,703 | 14,485 | 15,891 |
| | BUG Rating | B1-U0-G1 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B2-U0-G2 | B2-U0-G2 | B2-U0-G3 | B2-U0-G3 |
| | Lumens per Watt | 144 | 136 | 126 | 121 | 145 | 136 | 128 | 123 |
| T3 | Lumens | 4,978 | 6,105 | 7,556 | 8,288 | 9,729 | 11,929 | 14,764 | 16,196 |
| | BUG Rating | B1-U0-G1 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B2-U0-G2 | B2-U0-G2 | B2-U0-G2 | B2-U0-G3 |
| | Lumens per Watt | 146 | 139 | 128 | 124 | 147 | 139 | 131 | 126 |
| T4FT | Lumens | 5,008 | 6,140 | 7,599 | 8,337 | 9,783 | 11,998 | 14,850 | 16,290 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B1-U0-G3 | B2-U0-G3 | B2-U0-G3 | B2-U0-G3 | B2-U0-G3 |
| | Lumens per Watt | 147 | 140 | 129 | 124 | 148 | 140 | 131 | 126 |
| T4W | Lumens | 4,942 | 6,060 | 7,502 | 8,229 | 9,658 | 11,843 | 14,658 | 16,080 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B2-U0-G2 | B2-U0-G2 | B2-U0-G2 | B2-U0-G3 | B3-U0-G3 |
| | Lumens per Watt | 145 | 138 | 127 | 123 | 146 | 138 | 130 | 125 |
| SL2 | Lumens | 4,874 | 5,979 | 7,399 | 8,117 | 9,528 | 11,684 | 14,461 | 15,863 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B2-U0-G3 | B2-U0-G3 | B2-U0-G3 | B2-U0-G3 | B3-U0-G3 |
| | Lumens per Watt | 143 | 136 | 125 | 121 | 144 | 136 | 128 | 123 |
| SL3 | Lumens | 4,976 | 6,104 | 7,555 | 8,287 | 9,727 | 11,927 | 14,763 | 16,194 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B1-U0-G3 | B2-U0-G3 | B2-U0-G3 | B2-U0-G3 |
| | Lumens per Watt | 146 | 139 | 128 | 124 | 147 | 139 | 131 | 126 |
| SL4 | Lumens | 4,729 | 5,799 | 7,178 | 7,873 | 9,239 | 11,333 | 14,025 | 15,387 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B1-U0-G3 | B1-U0-G3 | B1-U0-G3 | B2-U0-G4 | B2-U0-G4 |
| | Lumens per Watt | 139 | 132 | 122 | 118 | 140 | 132 | 124 | 119 |
| 5NQ | Lumens | 5,134 | 6,296 | 7,793 | 8,547 | 10,033 | 12,303 | 15,226 | 16,704 |
| | BUG Rating | B2-U0-G1 | B2-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G2 | B3-U0-G2 |
| | Lumens per Watt | 151 | 143 | 132 | 128 | 152 | 143 | 135 | 129 |
| 5MQ | Lumens | 5,228 | 6,412 | 7,935 | 8,705 | 10,216 | 12,529 | 15,508 | 17,011 |
| | BUG Rating | B3-U0-G1 | B3-U0-G1 | B3-U0-G2 | B3-U0-G2 | B3-U0-G2 | B4-U0-G2 | B4-U0-G2 | B4-U0-G2 |
| | Lumens per Watt | 154 | 146 | 134 | 130 | 155 | 146 | 137 | 132 |
| 5WQ | Lumens | 5,242 | 6,428 | 7,956 | 8,728 | 10,244 | 12,563 | 15,548 | 17,056 |
| | BUG Rating | B3-U0-G1 | B3-U0-G2 | B3-U0-G2 | B3-U0-G2 | B4-U0-G2 | B4-U0-G2 | B4-U0-G2 | B4-U0-G2 |
| | Lumens per Watt | 154 | 146 | 135 | 130 | 155 | 146 | 138 | 132 |
| SLL/SLR | Lumens | 4,373 | 5,365 | 6,640 | 7,283 | 8,547 | 10,481 | 12,973 | 14,231 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B1-U0-G3 | B2-U0-G3 | B2-U0-G3 | B2-U0-G3 |
| | Lumens per Watt | 129 | 122 | 113 | 109 | 130 | 122 | 115 | 110 |
| RW | Lumens | 5,087 | 6,238 | 7,721 | 8,472 | 9,941 | 12,190 | 15,088 | 16,553 |
| | BUG Rating | B2-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G2 | B4-U0-G2 | B4-U0-G2 |
| | Lumens per Watt | 150 | 142 | 131 | 126 | 151 | 142 | 134 | 128 |

* Nominal lumen data for 70 CRI. BUG rating for 4000K/5000K. Refer to IES files for 3000K BUG ratings.

3000K CCT, 80 CRI

| Number of Light Squares | | 1 | | | | 2 | | | |
|---------------------------------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Drive Current | | 615mA | 800mA | 1050mA | 1.2A | 615mA | 800mA | 1050mA | 1.2A |
| Nominal Power (Watts) | | 34 | 44 | 59 | 67 | 66 | 86 | 113 | 129 |
| Input Current @ 120V (A) | | 0.30 | 0.39 | 0.51 | 0.58 | 0.58 | 0.77 | 1.02 | 1.16 |
| Input Current @ 208V (A) | | 0.17 | 0.22 | 0.29 | 0.33 | 0.34 | 0.44 | 0.56 | 0.63 |
| Input Current @ 240V (A) | | 0.15 | 0.19 | 0.26 | 0.29 | 0.30 | 0.38 | 0.48 | 0.55 |
| Input Current @ 277V (A) | | 0.14 | 0.17 | 0.23 | 0.25 | 0.28 | 0.36 | 0.42 | 0.48 |
| Input Current @ 347V (A) | | 0.11 | 0.15 | 0.17 | 0.20 | 0.19 | 0.24 | 0.32 | 0.39 |
| Input Current @ 480V (A) | | 0.08 | 0.11 | 0.14 | 0.15 | 0.15 | 0.18 | 0.24 | 0.30 |
| Optics | | | | | | | | | |
| T2 | Lumens | 3,880 | 4,759 | 5,890 | 6,461 | 7,583 | 9,300 | 11,510 | 12,628 |
| | BUG Rating | B1-U0-G1 | B1-U0-G1 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B2-U0-G2 | B2-U0-G3 |
| | Lumens per Watt | 114 | 108 | 100 | 96 | 115 | 108 | 102 | 98 |
| T3 | Lumens | 3,956 | 4,851 | 6,004 | 6,586 | 7,731 | 9,479 | 11,732 | 12,870 |
| | BUG Rating | B1-U0-G1 | B1-U0-G1 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B2-U0-G2 | B2-U0-G2 | B2-U0-G2 |
| | Lumens per Watt | 116 | 110 | 102 | 98 | 117 | 110 | 104 | 100 |
| T4FT | Lumens | 3,980 | 4,879 | 6,038 | 6,625 | 7,774 | 9,534 | 11,800 | 12,945 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B2-U0-G3 | B2-U0-G3 | B2-U0-G3 |
| | Lumens per Watt | 117 | 111 | 102 | 99 | 118 | 111 | 104 | 100 |
| T4W | Lumens | 3,927 | 4,816 | 5,961 | 6,539 | 7,675 | 9,411 | 11,648 | 12,778 |
| | BUG Rating | B1-U0-G1 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B2-U0-G2 | B2-U0-G2 | B2-U0-G2 | B2-U0-G3 |
| | Lumens per Watt | 116 | 109 | 101 | 98 | 116 | 109 | 103 | 99 |
| SL2 | Lumens | 3,873 | 4,751 | 5,880 | 6,450 | 7,571 | 9,285 | 11,491 | 12,605 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B2-U0-G3 | B2-U0-G3 | B2-U0-G3 |
| | Lumens per Watt | 114 | 108 | 100 | 96 | 115 | 108 | 102 | 98 |
| SL3 | Lumens | 3,954 | 4,851 | 6,004 | 6,585 | 7,729 | 9,478 | 11,731 | 12,868 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B2-U0-G3 | B2-U0-G3 |
| | Lumens per Watt | 116 | 110 | 102 | 98 | 117 | 110 | 104 | 100 |
| SL4 | Lumens | 3,758 | 4,608 | 5,704 | 6,256 | 7,342 | 9,006 | 11,145 | 12,227 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B1-U0-G3 | B1-U0-G3 | B1-U0-G3 | B1-U0-G3 |
| | Lumens per Watt | 111 | 105 | 97 | 93 | 111 | 105 | 99 | 95 |
| 5NQ | Lumens | 4,080 | 5,003 | 6,193 | 6,792 | 7,973 | 9,776 | 12,099 | 13,274 |
| | BUG Rating | B2-U0-G0 | B2-U0-G1 | B2-U0-G1 | B2-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G2 |
| | Lumens per Watt | 120 | 114 | 105 | 101 | 121 | 114 | 107 | 103 |
| 5MQ | Lumens | 4,154 | 5,095 | 6,305 | 6,917 | 8,118 | 9,956 | 12,323 | 13,518 |
| | BUG Rating | B2-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G2 | B3-U0-G2 | B4-U0-G2 | B4-U0-G2 |
| | Lumens per Watt | 122 | 116 | 107 | 103 | 123 | 116 | 109 | 105 |
| 5WQ | Lumens | 4,166 | 5,108 | 6,322 | 6,936 | 8,140 | 9,983 | 12,355 | 13,553 |
| | BUG Rating | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G2 | B3-U0-G2 | B4-U0-G2 | B4-U0-G2 | B4-U0-G2 |
| | Lumens per Watt | 123 | 116 | 107 | 104 | 123 | 116 | 109 | 105 |
| SLL/SLR | Lumens | 3,475 | 4,263 | 5,276 | 5,787 | 6,792 | 8,329 | 10,309 | 11,309 |
| | BUG Rating | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G2 | B1-U0-G3 | B1-U0-G3 | B2-U0-G3 | B2-U0-G3 |
| | Lumens per Watt | 102 | 97 | 89 | 86 | 103 | 97 | 91 | 88 |
| RW | Lumens | 4,042 | 4,957 | 6,135 | 6,732 | 7,900 | 9,687 | 11,990 | 13,154 |
| | BUG Rating | B2-U0-G1 | B2-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G1 | B3-U0-G2 | B3-U0-G2 |
| | Lumens per Watt | 119 | 113 | 104 | 100 | 120 | 113 | 106 | 102 |

* Nominal lumen data for 70 CRI. BUG rating for 4000K/5000K. Refer to IES files for 3000K BUG ratings.

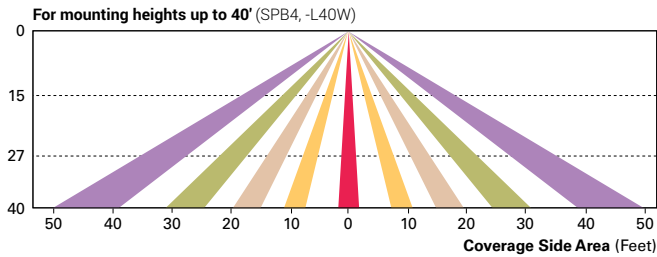
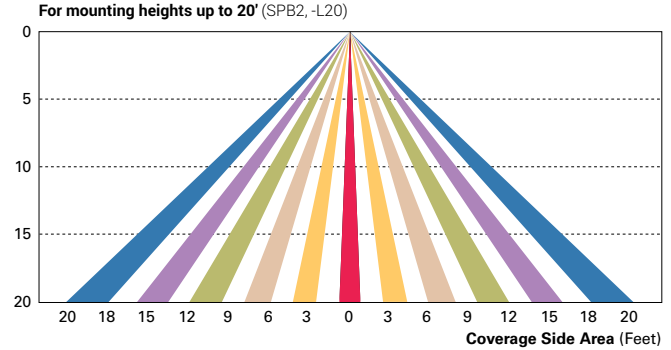
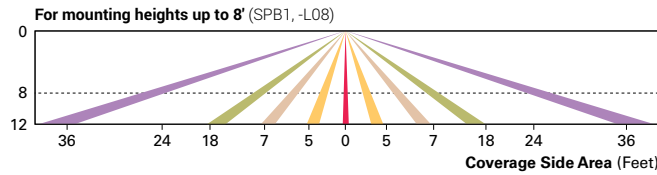
Control Options

0-10V This fixture is offered standard with 0-10V dimming driver(s). The DIM option provides 0-10V dimming wire leads for use with a lighting control panel or other control method.

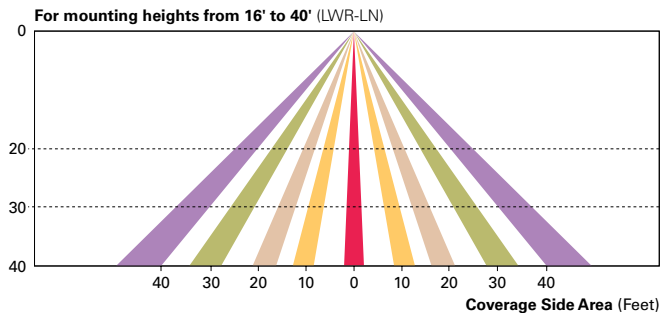
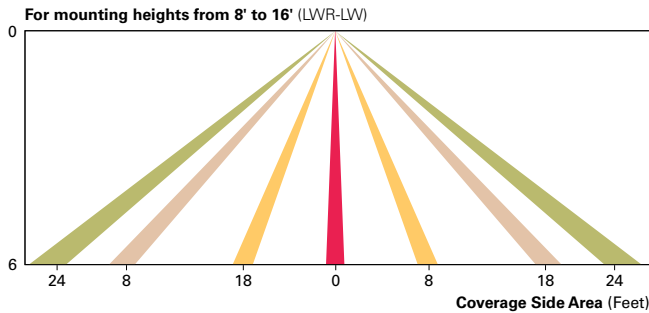
Photocontrol (BPC, PR, and PR7) Optional button-type photocontrol (BPC) and photocontrol receptacles (PR and PR7) provide a flexible solution to enable “dusk-to-dawn” lighting by sensing light levels. Advanced control systems compatible with NEMA 7-pin standards can be utilized with the PR7 receptacle.

After Hours Dim (AHD) This feature allows photocontrol-enabled luminaires to achieve additional energy savings by dimming during scheduled portions of the night. The dimming profile will automatically take effect after a “dusk-to-dawn” period has been calculated from the photocontrol input. Specify the desired dimming profile for a simple, factory-shipped dimming solution requiring no external control wiring. Reference the After Hours Dim supplemental guide for additional information.

Dimming Occupancy Sensor (SPB, MS/DIM-LXX and MS-LXX) These sensors are factory installed in the luminaire housing. When the SPB or MS/DIM sensor options are selected, the occupancy sensor is connected to a dimming driver and the entire luminaire dims when there is no activity detected. When activity is detected, the luminaire returns to full light output. The MS/DIM sensor is factory preset to dim down to approximately 50 percent power with a time delay of five minutes. The MS-LXX sensor is factory preset to turn the luminaire off after five minutes of no activity. SPB motion sensors require the Sensor Configuration mobile application by Wattstopper to change factory default dimming level, time delay, sensitivity and other parameters. Available for iOS and Android devices. The SPB sensor is factory preset to dim down to approximately 10% power with a time delay of five minutes. The MS/DIM occupancy sensors require the FSIR-100 programming tool to adjust factory defaults.



Enlighted Wireless Control and Monitoring System (LWR-LW and LWR-LN) The Enlighted control system is a connected lighting solution, combining LED luminaires with an integrated wireless sensor system. The sensor controls the lighting system in compliance with the latest energy codes while collecting valuable data about building performance and use. Software applications utilizing energy dashboards maximize data inputs to help optimize the use of other resources beyond lighting.



WaveLinx Wireless Outdoor Lighting Control Module (WOLC-7P-10A) The 7-pin wireless outdoor lighting control module enables WaveLinx to control outdoor area, site and flood lighting. WaveLinx controls outdoor lighting using schedules to provide ON, OFF and dimming controls based on astronomic or time schedules based on a 7 day week.

Site Plan Review Application Fee

Project: 55 & 101 International Drive

Map/Lot: 305/6 & 305/7

Applicant: Lonza Biologics, Inc.

All development

Base fee \$500

\$500.00

Plus \$5.00 per \$1,000 of site costs

Site costs

\$500,000

+ **\$2,500.00**

Plus \$10.00 per 1,000 S.F. of site development area

Site development area

142,000 S.F.

+ **\$1,420.00**

Fee

\$4,420.00

Maximum fee: \$15,000.00

Fee received by: _____

Date: _____

Note: Initial application fee may be based on the applicant's estimates of site costs and site development area. Following site plan approval, the application fee will be recalculated based on the approved site plan and site engineer's corresponding site cost estimate as approved by the Department of Public Works, and any additional fee shall be paid prior to the issuance of a building permit.

Subdivision Application Fee

Project: 55 & 101 International Drive

Map/Lot: 305/6 & 305/7

Applicant: Lonza Biologics, Inc.

| |
|--|
| <input type="checkbox"/> Residential subdivision <i>\$500 plus \$200 per lot</i> Number of lots <input type="text"/> Fee <input type="text" value="\$0.00"/> |
| <input type="checkbox"/> Non-residential subdivision <i>\$700 plus \$300 per lot</i> Number of lots <input type="text"/> Fee <input type="text" value="\$0.00"/> |
| <input checked="" type="checkbox"/> Lot line revision/verification <i>\$250</i> Fee <input type="text" value="\$250.00"/> |
| <input type="checkbox"/> Filing of condominium site <i>\$100</i> Fee <input type="text" value="\$0.00"/> |
| <input type="checkbox"/> Lot consolidation <i>\$175</i> Fee <input type="text" value="\$0.00"/> |

Total fee

Fee received by: _____

Date: _____