

TOWN OF VERNON
Planning & Zoning Commission (PZC)
Meeting Notice & Agenda
Thursday, August 18, 2022, 7:30 PM
Town Council Chambers 3rd Floor
14 Park Place
Vernon, CT 06066

AGENDA

1. **Call to Order & Roll Call by Roland Klee, Chairman**
2. **Administrative Actions/Requests**
 - 2.1 Amendment/Adoption of Agenda - Additional business to be considered under agenda item #6 "Other Business" requires a Commission vote.
 - 2.2 Approval of the Minutes from **July 21, 2022**
3. **New Application(s) for receipt, if any:**
4. **Public Hearing(s) and Action on Applications:**
 - 4.1 **PZ-2022-13, 43 & 45 South Frontage Rd.** An application of David O'Connell (Shawmut Equipment Company Inc.) for a Site Plan and Special Permit to build a structure to conduct retail sales, rental, parts sales and service of new and used construction vehicles (cranes), at 43 & 45 South Frontage Rd. (Tax Map 29, Block 134A, Parcels 11A & 11B). The property is zoned Commercial.
5. **8-24 Referrals, If any**
6. **Other Business/Discussion**
7. **Public Comments Received**
8. **Adjournment**

Roland Klee, Chair
Planning & Zoning Commission

APPLICATION

1



July 15, 2022

Vernon Planning & Zoning Commission
Attn. Shaun Gaitley
55 West Main Street, 2nd Floor
Vernon, CT 06066

Re: Shawmut Equipment
43 & 45 South Frontage Road

Dear Shaun,

On behalf of the Shawmut Equipment Company, I am pleased to submit the attached application for a approval of a Site Plan of Development and Special Permit associated with the development of a new crane sales and service facility at 43 & 45 South Frontage Road in Vernon. The subject parcel consists of two lots totaling approximately 8.7 acres that were historically used for contractor storage and bus parking surrounded by Tunnel Road to the south, I-84 to the west, the I-84 interchange 54 off-ramp to the north and South Frontage Road to the east. The site is zoned commercial.

The proposed development will involve the construction of a 24,913 s.f. main building and a 2,400 s.f. cold storage building for Shawmut's crane sales and service business. Access to the site will be provided via the existing curb cut off of South Frontage Road. The proposed outdoor storage and display area for the cranes will have a crushed stone surface to promote infiltration into the existing, underlying sandy soils. Runoff from new impervious areas will be directed to a new infiltration basin designed to provide treatment, ground water recharge, and peak flow attenuation in accordance with the Connecticut Stormwater Quality Manual.

The proposed site will provide 23 parking spaces for employees and customers in accordance with the requirements of the Zoning Regulations. The traffic generated from the business is anticipated to be minimal and not have a negative impact on the surrounding roadway network.

If there are any questions, or you require further information, please call me at (860) 623-0569.

Very truly yours,

Timothy A. Coon, P.E.
J.R. Russo & Associates, LLC

Attachments

cc: Shawmut Equipment



TOWN OF VERNON PLANNING & ZONING COMMISSION (PZC)
APPLICATION
(Revised March 2021)

The PZC may require additional information to be provided by the applicant in the course of reviewing the application and during the monitoring of the project. Provide all the information requested.

APPLICANT(S)

NAME: David O'Connell
COMPANY: Shawmut Equipment Company Inc.
ADDRESS: 20 Tolland Turnpike, Manchester, CT 06042
TELEPHONE: 860-643-4161 E-MAIL: dave@shawmutequipment.com

PROPERTY OWNER(S)

NAME: Shawmut Equipment & Realty - CT, LLC
ADDRESS: 20 Tolland Turnpike, Manchester, CT 06042
TELEPHONE: 860-643-4161 EMAIL: dave@shawmutequipment.com

If the applicant is not the property owner, include a letter from the property owner authorizing the applicant to seek approval by the PZC, if no signature accompanies the application. (ZR Section 2.3)

PROPERTY

ADDRESS: 43 & 45 South Frontage Road
ASSESSOR'S ID CODE: MAP # 29 BLOCK # 134A LOT/PARCEL # 11A + 11B
LAND RECORD REFERENCE TO DEED DESCRIPTION: VOLUME: 2768 PAGE 52

DOES THIS SITE CONTAIN A WATERCOURSE AND/OR WETLANDS? (SEE THE INLAND WETLANDS MAP AND REGULATIONS)

 NO X YES

 NO REGULATED ACTIVITY WILL BE DONE

 X REGULATED ACTIVITY WILL BE DONE

 X IWC APPLICATION HAS BEEN SUBMITTED

ZONING DISTRICT COMMERCIAL

IS THIS PROPERTY LOCATED WITHIN FIVE HUNDRED (500) FEET OF A MUNICIPAL BOUNDARY?

 X NO
 YES: _____

CHECK IF HISTORIC STATUS APPLIES:

 LOCATED IN HISTORIC DISTRICT: _____

 INDIVIDUAL HISTORIC PROPERTY

PROJECT SUMMARY

Describe the project briefly in regard to the purpose of the project and the activities that will occur. Attach to this application a complete and detailed description with maps and documentation as required by the "Town of Vernon Zoning Regulations" and "Town of Vernon Subdivision Regulations".

PURPOSE: Construction of a Crane Sales & Service Dealership

GENERAL ACTIVITIES: Sales, rentals, parts and service of cranes.

APPROVAL REQUESTED

SUBDIVISION OR RESUBDIVISION

- ☐ SUBDIVISION (SUB. SEC. 4, 5, 6)
- ☐ RESUBDIVISION (SUB. SEC. 4, 5, 6)
- ☐ MINOR MODIFICATION OF SUBDIVISION OR RESUBDIVISION (SUB. SEC. 4.6)
- ☐ AMENDMENT OF SUBDIVISION REGULATIONS (SUB. SEC. II)

SEE SUBDIVISION REGULATIONS SEC. 4 FOR APPLICATION FEE SCHEDULES.

☒ **SOIL EROSION AND SEDIMENT CONTROL PLAN (ESCP)** (ZR SEC. 2.117; 18) (SUB. 6.14)

☒ **SITE PLAN OF DEVELOPMENT (POD)** (ZR SEC. 14)

- ☐ POD APPROVAL (ZR SEC. 14.1.1.1; 14.1.2)
- ☐ MODIFICATION OF AN APPROVED POD (ZR SEC. 14.1.1.1)
- ☐ MINOR MODIFICATION OF A SITE POD (ZR SEC. 14.1.1.2)

☒ **SPECIAL PERMIT(S)** (ZR SECTION 17.3) SECTION: 4.9.14 + 4.9.15.4

☐ OTHER SPECIAL PERMIT(S). CITE ZR SECTION AND DESCRIBE ACTIVITY:

ZONING:

- ☐ SITE SPECIFIC CHANGE OF ZONING DISTRICT AND MAP (ZR SEC. 1.2; 1.3; 4)
- ☐ AMENDMENT OF ZONING REGULATIONS (SEC. 1.2; 1.3; 4)

CERTIFICATION AND SIGNATURE

The applicant, undersigned, has reviewed the "Town of Vernon Planning and Zoning Regulations" and completed the application with complete and accurate information:

Property Owner, Applicant, or Applicant's Agent:



APPLICANT OR AGENT SIGNATURE

David O'Connell

PRINTED NAME

DATE

7-8-2022



OWNER'S SIGNATURE, IF DIFFERENT

David O'Connell

PRINTED NAME

DATE

7-8-2022

Tunnel Road Northeast LLC
14 Evarts Road
North Hartland, VT 05052

Allegato Industries LLC
12 Penfield Avenue
Ellington, CT 06029

133 Tunnel LLC
111 Main Street
East Hartford, CT 06108

GMR Vernon Keynote LLC
c/o Ryan LLC
100 Oliver St., Suite 1840
Boston, MA 02110

State of Connecticut
24 Wolcott Hill Road
Wethersfield, CT 06109-1152

Wyllys Falls LLC
5 Glen Road
Manchester, CT 06040




South Frontage Realty II LLC
85 South Frontage Road
Vernon, CT 06066

Exit 66 Professional Building LLC
76 South Frontage Road
Vernon, CT 06066

Conservation Forest LLC
75 Gerber Road East
South Windsor, CT 06074

LID CHECKLIST

Applicants must complete and submit the following checklist with the application.

Date: <u>7-07-2022</u>		Project: <u>Shawmut Equipment</u>	
Conformance with the following criteria shall be initialed in the spaces provided below by a Connecticut Registered Professional Engineer, Land Surveyor, or Certified Soils Scientist as appropriate. If conditions cannot be met comments addressing each item should be provided by the applicant in the space provided below. Comments will be reviewed with Town Staff at the scheduled Development Staff Meeting and documented.			
Item	Description	Verified	Comments
1	An Existing Conditions Plan is provided documenting sensitive natural resources including but not limited to existing wetlands (as designated by a Certified Soils Scientist in Connecticut), streams, ponds, vernal pools, flood zones, stream channel encroachment lines, soil types and infiltration rates, wells, tree lines, property boundaries, and other items that may be requested by the Town.		
2	Utilizing the Existing Conditions Plan as a guide, development has been located to maximize preservation of contiguous natural sensitive areas.		
3	Proposed site developments for residential or two family dwellings on more than one individual parcel, all commercial, industrial, and retail developments have been guided by the applicable requirements of the Town's Low Impact Development Stormwater Quality Manual and the Connecticut Storm Water Quality Manual.		
4	Bioretention Basins or Rain Gardens have been incorporated within yards, median strips, cul-de-sacs islands, and parking lot islands.		Display areas to be crushed stone to promote infiltration. Runoff from all impervious areas diverted to infiltration basin for treatment and recharge.

Date: 7-07-22

Project: Shawmut Equipment

Conformance with the following criteria shall be initialed in the spaces provided below by a Connecticut Registered Professional Engineer, Land Surveyor, or Certified Soils Scientist as appropriate. If conditions cannot be met comments addressing each item should be provided below. Comments will be reviewed with Town Staff at the scheduled development staff meeting and documented.

Item	Description	Verified	Comments
5	Dry Wells have been incorporated into the design to control roof and pavement runoff.		Roof runoff conveyed to infiltration basin.
6	Permeable (Porous) Pavement has been incorporated into areas of low traffic, parking lots, residential and light commercial use driveways, walkways, bike paths, etc.		Crushed stone to be used in display areas. Infiltration also provided at infiltration basin.
7	Natural areas including woodlands, regulated wetland areas, naturally vegetated areas have been preserved/ and or replicated to the maximum extent practical.	TAC	
8	Post Development stormwater runoff is at or less than the predevelopment runoff.	TAC	
9	Stormwater infiltration has been provided by the use of underground storage units, devices, and/or infiltration swales/trenches.	TAC	
10	Level spreaders/vegetation have been provided at storm drainage outfalls to enhance water quality and mitigate erosion.	TAC	

Date: 7-07-22

Project: Shawmut Equipment

Conformance with the following criteria shall be initialed in the spaces provided below by a Connecticut Registered Professional Engineer, Land Surveyor, or Certified Soils Scientist as appropriate. If conditions cannot be met comments addressing each item should be provided below. Comments will be reviewed with Town Staff at the scheduled development staff meeting and documented.

Item	Description	Verified	Comments
11	On-Site retention/detention facilities have been provided to address water quality and storm water runoff.	TAC	
12	Rain Barrels, cisterns, and/or other rainwater harvesting techniques to reuse rainwater for irrigation and other non-potable uses are incorporated into the design.		Not applicable.
13	An Erosion and Sedimentation Control Plan conforming to the Standards of the Connecticut Guidelines for Soil Erosion and Sediment Control is included in the design.	TAC	
14	A yearly maintenance plan of all components of best management practices associated with storm water management has been provided.	TAC	
15	Impervious area percentages for pre and post development have been provided.	TAC	
16	When conflicts exist between the Town's Low Impact Development Stormwater Quality Manual and the Connecticut Storm Water Quality Manual the State Manual shall govern.	TAC	

Record & Return to:
Reid and Riege, P.C. (MxR)
One Financial Plaza
Hartford, CT 06183

WARRANTY DEED - STATUTORY FORM

EXIT 97 ASSOCIATES (NORTH), LLC, a Connecticut limited liability company with a place of business in Manchester, Connecticut (hereinafter "Grantor")

for consideration of ONE HUNDRED FIFTY THOUSAND and 00/100ths (\$150,000.00) Dollars paid

grant to **SHAWMUT EQUIPMENT REALTY-CT, LLC**, a Connecticut limited liability company with a place of business in Manchester, Connecticut (hereinafter "Grantee")

with **WARRANTY COVENANTS** two certain pieces or parcels of land known as **43 and 45 South Frontage Road**, situated in the Town of Vernon, County of Tolland and State of Connecticut and more particularly described in

Schedule A attached hereto

SAID PREMISES ARE CONVEYED SUBJECT TO:

Any and all provisions of any ordinance, municipal regulation or public or private law.

Taxes in favor of the Town of Vernon on the Grand List of October 1, 2020, which taxes the Grantee herein assumes and agrees to pay.

Termination of all rights of access to and from South Frontage Road and drainage rights as set forth in a Certificate of Condemnation by the State of Connecticut dated June 16, 1976 and recorded in Volume 292, Page 209 of the Vernon Land Records. (Affects Second Parcel as referenced on Schedule A).

Denial of all rights of ingress and egress to and from Interstate Route 84 and South Frontage Road and a reservation of drainage rights as set forth in a Quit Claim Deed from the State of Connecticut to Conyers Construction Company dated November 14, 1980 and recorded in Volume 398, Page 172 of the Vernon Land Records. (Affects First Parcel as referenced on Schedule A).

Terms and provision of a Utility Easement Agreement between Norman A. Hall and Gladys R. Hall and Exit 97 Associates (North) dated October 25, 1991 and recorded in Volume 853, Page 260 of the Vernon Land Records.

Those matters shown on Map Nos. 1423, 5200 and 5201 on file in the Vernon Town Clerk's Office.

SCHEDULE A

Two certain parcels of land situated in the Town of Vernon, County of Tolland and State of Connecticut, on the southerly side of Interstate Route 86, Routes 15 and 44, Wilbur Cross Highway, at Tunnel Road

FIRST PARCEL containing 7.2 acres, more or less, bounded and described as follows:

NORTHWESTERLY, NORTHERLY
& NORTHEASTERLY:

by the southerly non-access highway line of Interstate Route 86, routes 15 and 44, Wilbur Cross Highway, a total distance of 1241 feet, more or less, by a line designated "Release & Highway Line Non Access" as shown on the map hereinafter referred to;

SOUTHEASTERLY:

by land now or formerly of Conyers Construction Company, Inc., 692 feet, more or less;

NORTHEASTERLY:

by land now or formerly of Conyers Construction Company, Inc., 86 feet, more or less;

SOUTHEASTERLY &
SOUTHERLY:

by the northerly non-access highway line of South Frontage Road, a total distance of 495 feet, more or less, as shown on said map; and

SOUTHWESTERLY:

by the northeasterly non-access highway line of Tunnel Road, 266 feet, more or less, by a line designated "Release & Highway Line Non Access", as shown on said map.

For a more particular description of the above described premises, reference is made to a map to be filed in the Vernon Town Clerk's Office entitled "Town of Vernon, Map Showing Land Released To Conyers Construction Company, Inc. By The State of Connecticut, I-86, Scale 1" = 40' January 1980, Frank M. D'Addabbo Deputy Transportation Commissioner- Bureau of Highways, Town No. 146, Project No. 146-99, Serial No. 13A, Sheet 1 of 1 Sheet".

SECOND PACEL of land situated in the Town of Vernon, County of Tolland and State of Connecticut, being more particularly bounded and described as follows:

NORTHWESTERLY:

by the First Parcel described herein, 692 feet, more or less;

EASTERLY: by land now or formerly of the State of Connecticut,
145 feet, more or less;

SOUTHEASTERLY: by land now or formerly of the State of Connecticut,
562 feet, more or less; and

SOUTHWESTERLY: by the First Parcel described herein, 86 feet, more
or less.

Further reference is made to a certain map or plan entitled "Town of Vernon Map Showing Land Released To Conyers Construction Company Inc. By The State of Connecticut I-86 Scale 1" = 40' January 1980 Frank M. D'Addabbo Deputy Transportation Commissioner—Bureau of Highways I hereby certify that this map is substantially correct to the best of my knowledge and belief O. Paquette Title Division Engineer-Surveys Dated November 5, 1980".

Together with a Utility Easement Agreement between Norman A. Hall and Gladys R. Hall and Exit 97 Associates (North) dated October 25, 1991 and recorded in Volume 853, Page 260 of the Vernon Land Records.

DRAFT MINUTES

RECEIVED BY EMAIL

TOWN OF VERNON
Planning & Zoning Commission (PZC)
Thursday, July 21, 2022, 7:30 PM
Town Council Chambers 3rd Floor
14 Park Place
Vernon, CT 06066

RECEIVED
VERNON TOWN CLERK
22 JUL 25 AM 8:30

DRAFT Minutes

1. **Call to Order & Roll Call by Roland Klee, Chairman @ 7:31 PM**

- Regular members present: Roland Klee, Mike Baum, Robin Lockwood, Joseph Miller, Mike Mitchell and Iris Mullan
- Alternate Member:
- Absent Members: Carl Bard and alternate Yelena Damsky
- Staff present: Shaun Gately, Director of Development Services
- Recording secretary: Jill Rocco

2. **Administrative Actions/Requests**

- 2.1 Amendment/Adoption of Agenda - Additional business to be considered under agenda item #6 "Other Business" requires a Commission vote.

Robin Lockwood **MOVED** to **ADOPT** the agenda. Joseph Miller seconded and the motion carried unanimously.

- 2.2 Approval of the Minutes from **June 16, 2022**

Robin Lockwood **MOVED** to **APPROVE** the minutes from June 16, 2022. Joseph Miller seconded and the motion carried with Mike Mitchell abstaining.

3. **New Application(s) for receipt, if any:**

3.2 PZ-2022-13, 43 & 45 South Frontage Rd. An application of David O'Connell (Shawmut Equipment Company Inc.) for a Site Plan and Special Permit to build a structure to conduct retail sales, rental, parts sales and service of new and used construction vehicles (cranes), at 43 & 45 South Frontage Rd. (Tax Map 29, Block 134A, Parcels 11A & 11B). The property is zoned Commercial.

Shaun Gately, Director of Development Services recommended a Public Hearing date of August 18, 2022.

Robin Lockwood **MOVED** to **RECEIVE PZ-2022-13 43 & 45 South Frontage Rd.** on August 18, 2022. Iris Mullan seconded and the motion carried unanimously.

4. **Public Hearing(s) and Action on Applications:**

4.1 PZ 2022-12, 273 Talcottville Rd. An Application of Larissa A. Addison, Esq. for a Site Plan and Special Permit to change an approved Site Plan from commercial use to a proposed Early Educational Facility at 273 Talcottville Rd. (Tax Map 03, Block 04, Parcel 9C). The Special Permit modification requested includes Section 14.1.1.1 (Plan of Development (POD) and Sec. 4.24.4.3.10 (education facility). The property is zoned PDZ Gerber Farm Area District.

- Shaun Gately, Director of Development Services, read the Public Notice published in the Journal Inquirer on July 14, 2022 and July 16, 2022.
- Roland Klee, Chairman, read the Public Hearing rules.
- Shaun Gately, Director of Development Services, explained the details of the application.
- Dustin Priebe, Insite Real Estate, Oakbrook, IL, spoke in regards to the application regarding the site plan, including traffic, gated playground, drainage, lighting, signage, landscaping and sidewalks.
- Commission members asked questions.
- Applicant responded.
- Discussion ensued.
- Shaun Gately, Director of Development Services, read the staff comments from the Design Review Committee.
- Roland Klee, Chairman opened the floor for Public comment.
- No one spoke in favor or in opposition of the application.

Robin Lockwood **MOVED** to **CLOSE** the Public Hearing at 7:57 PM. Mike Mitchell seconded and the motion carried unanimously.

Mike Mitchell **MOVED** that the Planning and Zoning Commission **APPROVE** PZ-2022-12, Kindercare, a Site Plan of Development with Special Permits located at 273 Talcottville Rd. This approval is based upon a finding that the applicant's proposed plan of development meets the town of Vernon's site plan requirements under section 14. They are utilizing an existing curb cuts which serve multiple parcels in accordance with Sections 12.5 (access management) of our zoning regulations. and that the special permits requested meet and exceed the review criteria set forth in Section 17.3.1, subject to the Site Plan dated June 29, 2022, prepared by Freeman Companies, the additional details set presented on 7-21-22, and the original site and special permits approved as part of the PZ-2016-01. Robin Lockwood seconded and the motion carried unanimously.

5. **8-24 Referrals, If any**

NONE

6. **Other Business/Discussion**

Discussion regarding:

Upkeep of Parks and the POCD.

New Town Planner Ashley Stephens starts August 1, 2022.

20 Mountain Street.

Renewal of Members and their term expirations.

Impervious parking regulations.

7. **Public Comments Received**

Town Council member Maryann Levesque, 183 Bolton Road, was present and thanked the Commission for the work they do.

8. **Adjournment**

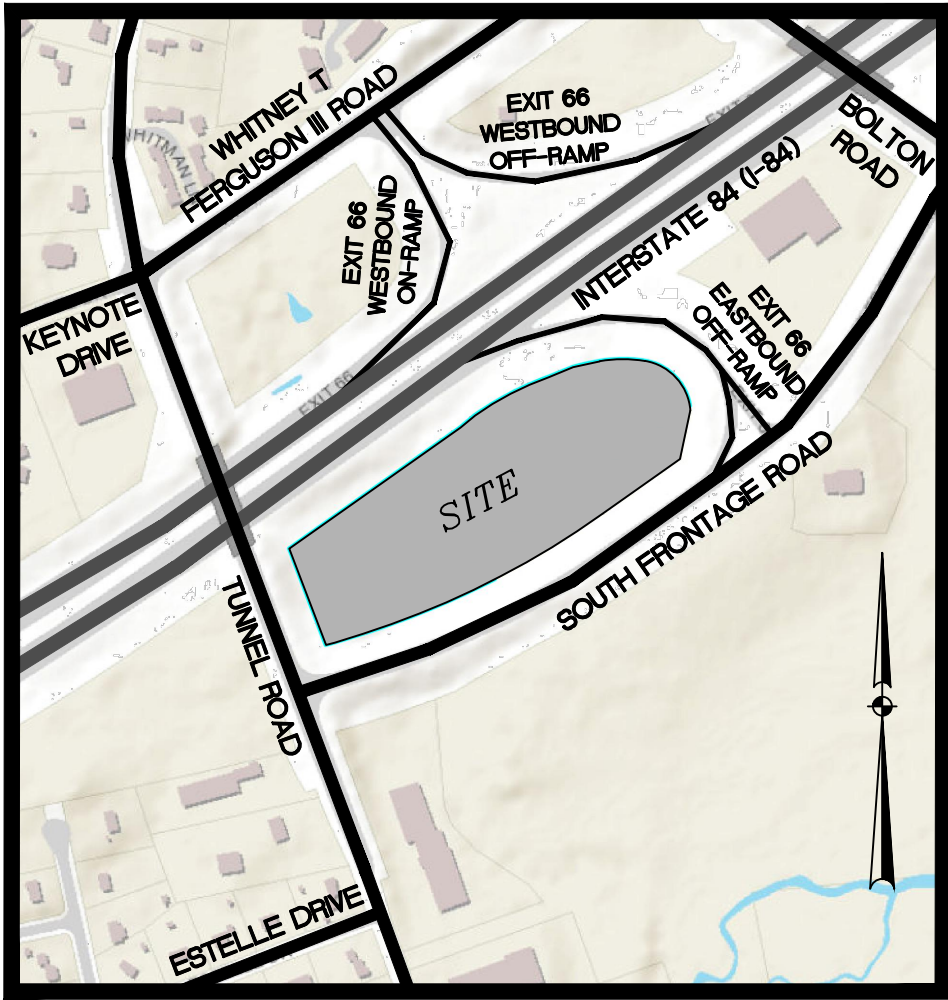
Robin Lockwood **MOVED** to **ADJOURN** at 8:11 PM. Mike Mitchell seconded and the motion carried unanimously.

Jill Rocco
Recording Secretary

Shawmut Equipment Company, Inc.

43 & 45 South Frontage Road
Vernon, Connecticut 06066

Map 29 Block 134A Lots 0011A & 0011B Zone: C



KEY PLAN MAP
1"=500'

Applicant

Shawmut Equipment Company, Inc.
20 Tolland Turnpike
Manchester, CT 06042

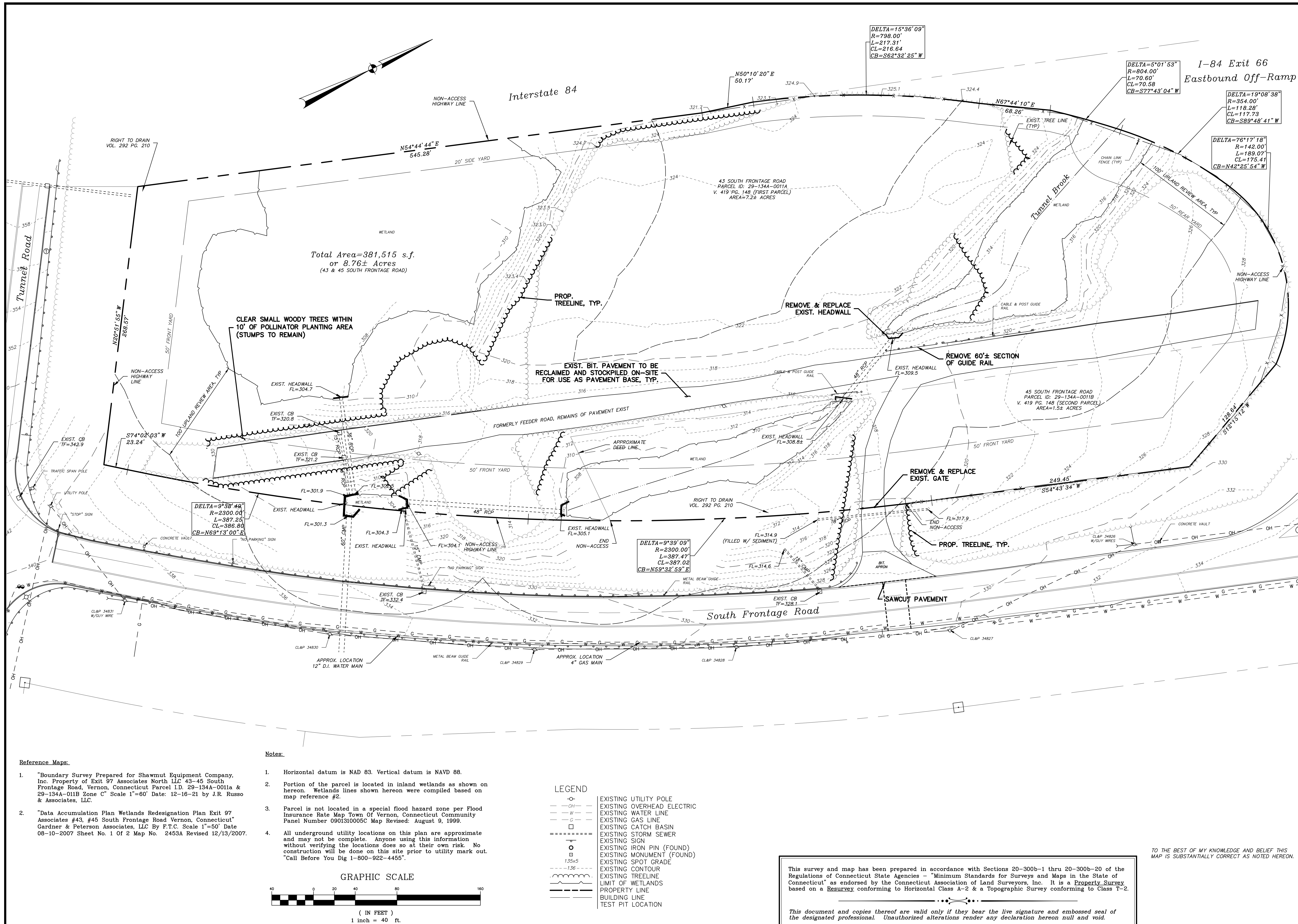
Owner

Shawmut Equipment Realty-CT, LLC
20 Tolland Turnpike
Manchester, CT 06042

Prepared By

J.R. Russo & Associates, LLC
P.O. Box 938
East Windsor, CT 06088
860-623-0569

DRAWING INDEX		
SHEET TITLE	SHEET NO.	LATEST REVISION
CIVIL		
COVER SHEET	1 of 9	7-15-22
EXISTING CONDITIONS & DEMOLITION PLAN	2 of 9	6-24-22
LAYOUT PLAN	3 of 9	6-24-22
GRADING & EROSION CONTROL PLAN	4 of 9	6-24-22
UTILITY PLAN	5 of 9	7-15-22
CONSTRUCTION NOTES & DETAILS	6 of 9	6-24-22
DETAILS	7 of 9	7-15-22
DETAILS	8 of 9	6-24-22
DETAILS	9 of 9	6-24-22



RUSSO
SURVEYORS-ENGINEERS
SERVING CT & MA

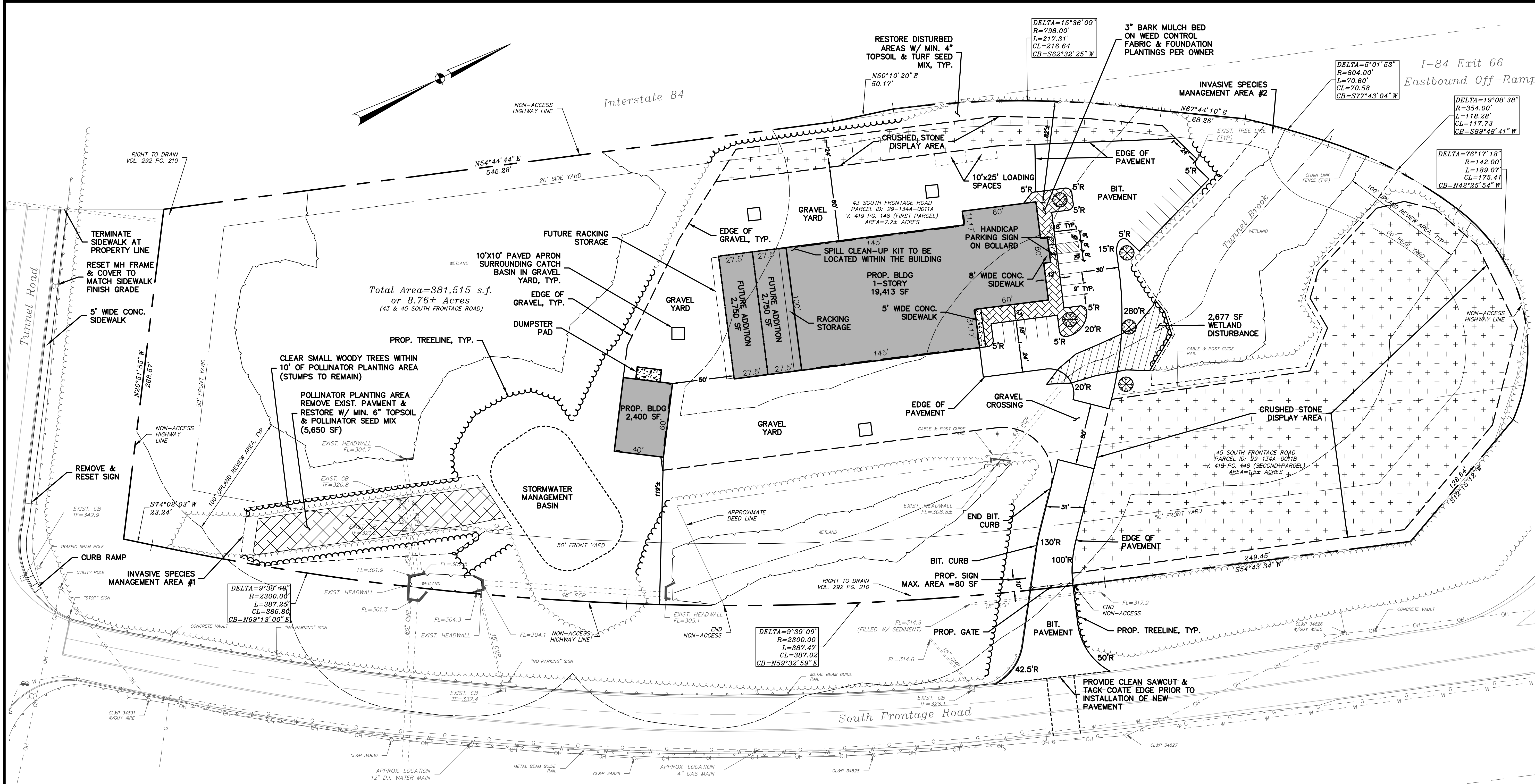
J.R. Russo & Associates, LLC
1190 Main Rd East Windsor CT 06028 • CT 860.623.0969 • MA 403.785.1818
www.jrusso.com • rjrusso@russo.com

REVISIONS	
BY: LF/TAC	CHK: JEU

Prepared For
Shawmut Equipment Company, Inc.
43 & 45 South Frontage Road
Vernon, Connecticut
Parcel ID: 29-134A-0011A & 29-234A-0011B

Existing Conditions & Demolition Plan

DATE	6-24-22
SCALE	1"=40'
JOB NUMBER	2021-013
SHEET	2 of 9



Reference Maps:

- "Boundary Survey Prepared for Shawmut Equipment Company, Inc. Property of Exit 97 Associates North LLC 43-45 South Frontage Road, Vernon, Connecticut Parcel I.D. 29-134A-0011a & 29-134A-0011B Zone C" Scale 1"=60' Date: 12-16-21 by J.R. Russo & Associates, LLC.
- "Data Accumulation Plan Wetlands Redesignation Plan Exit 97 Associates #43, #45 South Frontage Road Vernon, Connecticut" Gardner & Peterson Associates, LLC By P.T.C. Scale 1"=50' Date 08-10-2007 Sheet No. 1 Of 2 Map No. 2453A Revised 12/13/2007.

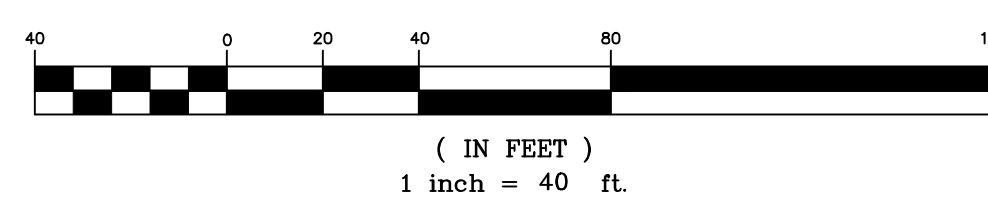
Notes:

- Horizontal datum is NAD 83. Vertical datum is NAVD 88.
- Portion of the parcel is located in inland wetlands as shown on hereon. Wetlands lines shown hereon were compiled based on map reference #2.
- Parcel is not located in a special flood hazard zone per Flood Insurance Rate Map Town Of Vernon, Connecticut Community Panel Number 0901310005C Map Revised: August 9, 1999.
- All underground utility locations on this plan are approximate and may not be complete. Anyone using this information without verifying the locations does so at their own risk. No construction will be done on this site prior to utility mark out. "Call Before You Dig 1-800-922-4455".
- The owner shall maintain a spill kit for emergency spills. All spills will be cleaned up immediately upon discovery. Spent absorbent materials and rags will be hauled off-site immediately after a spill is cleaned up and disposed of in accordance with applicable regulations. Spills exceeding DEEP established reportable quantities shall be reported to the DEEP. Material safety data sheets, a material inventory, and emergency contact information shall be maintained on-site.

LEGEND

○	EXISTING UTILITY POLE
●	PROPOSED UTILITY POLE
—	EXISTING OVERHEAD ELECTRIC
—	PROPOSED OVERHEAD ELECTRIC
—	EXISTING UNDERGROUND ELECTRIC
—	PROPOSED UNDERGROUND ELECTRIC
—	EXISTING WATER LINE
—	PROPOSED WATER LINE
—	EXISTING FIRE PROTECTION
—	PROPOSED FIRE PROTECTION
—	EXISTING GAS LINE
—	PROPOSED GAS LINE
—	EXISTING CATCH BASIN
—	PROPOSED CATCH BASIN
—	EXISTING DRAINAGE MANHOLE
—	PROPOSED DRAINAGE MANHOLE
—	EXISTING STORM SEWER
—	PROPOSED STORM SEWER
—	EXISTING SIGN
—	PROPOSED SIGN
—	EXISTING IRON PIN (FOUND)
—	PROPOSED IRON PIN (TO BE SET)
—	EXISTING MONUMENT (FOUND)
—	PROPOSED MONUMENT (TO BE SET)
—	EXISTING SPOT GRADE
—	PROPOSED SPOT GRADE
—	EXISTING CONTOUR
—	PROPOSED CONTOUR
—	EXISTING TREELINE
—	PROPOSED TREELINE
—	LIMIT OF WETLANDS
—	PROPERTY LINE
—	BUILDING LINE
—	STAKED HAYBALES OR SILT FENCE
—	TEST PIT LOCATION

GRAPHIC SCALE



This survey and map has been prepared in accordance with Sections 20-300b-1 thru 20-300b-20 of the Regulations of Connecticut State Agencies - "Minimum Standards for Surveys and Maps in the State of Connecticut" as endorsed by the Connecticut Association of Land Surveyors, Inc. It is a Property Survey based on a Resurvey conforming to Horizontal Class A-2 & a Topographic Survey conforming to Class T-2.

This document and copies thereof are valid only if they bear the live signature and embossed seal of the designated professional. Unauthorized alterations render any declaration hereon null and void.

DATA BLOCK (ZONE COMMERCIAL)

	REQUIREMENT	PROPOSED
MIN. AREA:	22,000 S.F.	381,514± S.F.
MIN. WIDTH:	100'	268.57'
FRONT YARD:	50'	81.7±'
SIDE YARD:	50'	—
REAR YARD:	20'	—
MIN. FLOOR AREA:	1,000 S.F.	27,200 S.F.
MAX. LOT COVERAGE:	60%	27.6%
MAX. BLDG. HEIGHT:	35' (2-STORY)	29' 8" (1-STORY)

* BLDG HEIGHT IN EXCESS OF 35' OR 2 STORIES REQUIRES SPECIAL PERMIT

PARKING CALCULATION

OFFICE:	1 SPACES/250 S.F. x 4,800 S.F. =	19 SPACES
MAINTENANCE AREA:	1 SPACE/2 EMPLOY. x 8 EMPLOY. =	4 SPACES
TOTAL PROPOSED:		23 SPACES (INCLUDES 2 ADA SPACES)

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

REVISIONS

BY: LF/TAC CHK: JEU

Prepared For
Shawmut Equipment Company, Inc.
43 & 45 South Frontage Road
Vernon, Connecticut
Parcel ID: 29-134A-0011A & 29-234A-0011B

Layout Plan

DATE

6-24-22

SCALE

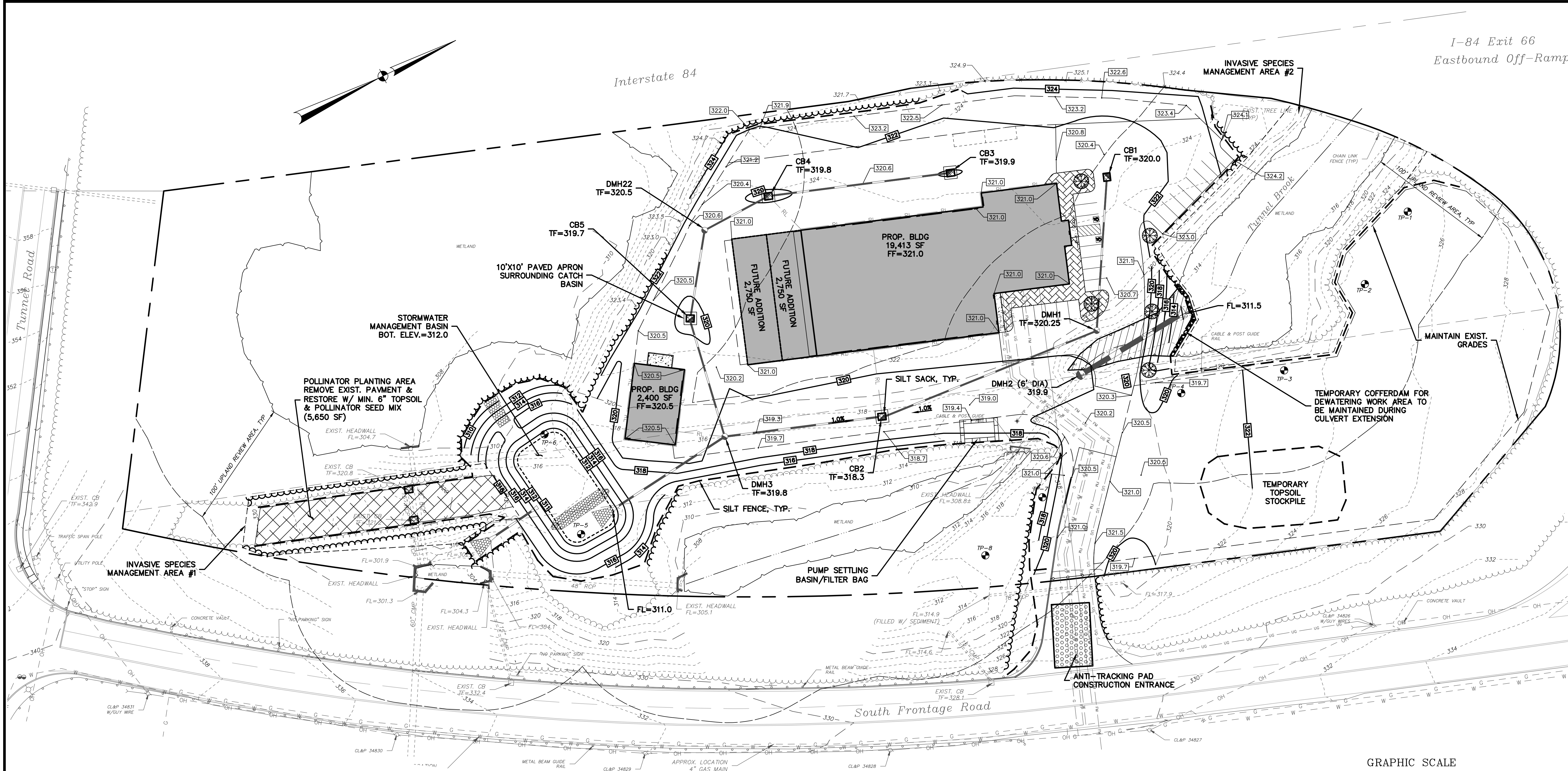
1"=40'

JOB NUMBER

2021-013

SHEET

3 of 9



Reference Maps:

1. "Boundary Survey Prepared for Shawmut Equipment Company, Inc. Property of Exit 97 Associates North LLC 43-45 South Frontage Road, Vernon, Connecticut Parcel I.D. 29-134A-0011a & 29-134A-011B Zone C" Scale 1"=60' Date: 12-16-21 by J.R. Russo & Associates, LLC.
2. "Data Accumulation Plan Wetlands Redesignation Plan Exit 97 Associates #43, #45 South Frontage Road Vernon, Connecticut" Gardner & Peterson Associates, LLC By F.T.C. Scale 1"=50' Date 08-10-2007 Sheet No. 1 Of 2 Map No. 2453A Revised 12/13/2007.

Notes:

1. Horizontal datum is NAD 83. Vertical datum is NAVD 88.
2. Portion of the parcel is located in inland wetlands as shown on hereon. Wetlands lines shown hereon were compiled based on map reference #2.
3. Parcel is not located in a special flood hazard zone per Flood Insurance Rate Map Town Of Vernon, Connecticut Community Panel Number 0901310005C Map Revised: August 9, 1999.
4. All underground utility locations on this plan are approximate and may not be complete. Anyone using this information without verifying the locations does so at their own risk. No construction will be done on this site prior to utility mark out. "Call Before You Dig 1-800-922-4455".
5. The owner shall maintain a spill kit for emergency spills. All spills will be cleaned up immediately upon discovery. Spent absorbent materials and rags will be hauled off-site immediately after a spill is cleaned up and disposed of in accordance with applicable regulations. Spills exceeding DEEP established reportable quantities shall be reported to the DEEP. Material safety data sheets, a material inventory, and emergency contact information shall be maintained on-site.

LEGEND

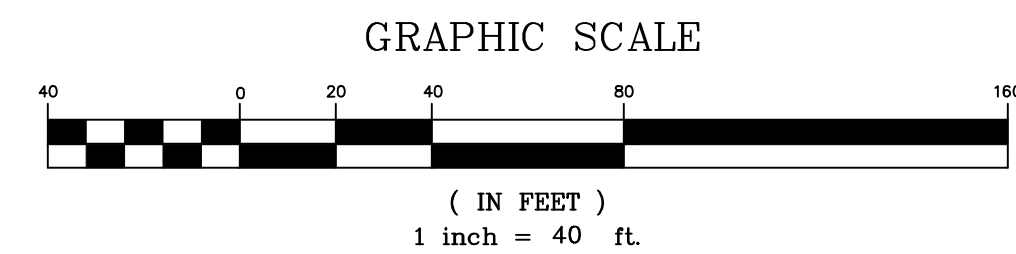
—○—	EXISTING UTILITY POLE
—●—	PROPOSED UTILITY POLE
—★—	PROPOSED LIGHT POLE
—OH—	EXISTING OVERHEAD ELECTRIC
—UG—	PROPOSED OVERHEAD ELECTRIC
—W—	PROPOSED UNDERGROUND ELECTRIC
—W—	EXISTING WATER LINE
—TP—	PROPOSED WATER LINE
—G—	PROPOSED FIRE PROTECTION
—G—	EXISTING GAS LINE
—C—	PROPOSED GAS LINE
—□—	EXISTING CATCH BASIN
—■—	PROPOSED CATCH BASIN
—○—	PROPOSED DRAINAGE MANHOLE
—○—	EXISTING STORM SEWER
—○—	PROPOSED STORM SEWER
—○—	EXISTING SIGN
—○—	PROPOSED SIGN
—○—	EXISTING IRON PIN (FOUND)
—○—	PROPOSED IRON PIN (TO BE SET)
—○—	EXISTING MONUMENT (FOUND)
—○—	PROPOSED MONUMENT (TO BE SET)
—○—	EXISTING SPOT GRADE
—○—	EXISTING CONTOUR
—○—	PROPOSED SPOT GRADE
—○—	PROPOSED CONTOUR
—○—	EXISTING TREELINE
—○—	PROPOSED TREELINE
—○—	LIMIT OF WETLANDS
—○—	PROPERTY LINE
—○—	BUILDING LINE
—○—	STAKED HAYBALES OR SILT FENCE
—○—	TEST PIT LOCATION

Test Pit Data

Observed by Jim Aldrich and J.R. Russo & Associates LLC, 4-26-2022

TP#1	0' - 4"	Topsoil/Duff
	4' - 104"	Red-Brown Very Fine Loamy Sand Fill
	104' - 128"	Buried Topsoil/Organics
	Possible Mottles @ 86"	
	Seepage @ 86"	
	No Ledge	
TP#2	0' - 4"	Topsoil/Duff
	4' - 80"	Red-Brown Loamy Sand Fill
	80' - 86"	Buried Topsoil
	86' - 120"	Olive Saturated Loamy Sand
	Mottles @ 80"	
	Weeping @ 90"	
	No Ledge	
TP#3	0' - 5"	Pavement
	5' - 16"	Process Gravel
	16' - 72"	Red-Brown Loamy Sand Fill
	72' - 110"	Olive Damp Sandy Loam
	Possible Mottles @ 66"	
	Weeping @ 74"	
	No Ledge	
TP#4	0' - 60"	Red-Brown Very Fine Loamy Sand Fill
	60' - 96"	Light Brown Very Fine Sandy Loam Fill
	96' - 110"	Buried Topsoil
	110' - 115"	Olive Fine Sandy Loam
	Mottles @ 64"	
	Weeping @ 70"	
	No Ledge	

TP#5	0' - 7"	Topsoil/Duff
	7' - 48"	Red-Brown Fine Loamy Sand Fill
	48' - 70"	Light Brown Fine Sandy Loam & Topsoil Mixed Fill
	70' - 105"	Gray Moist Fine Sandy Loam
	Possible Mottles @ 70"	
	Weeping @ 86"	
	No Ledge	
TP#6	0' - 14"	Topsoil/Duff
	14' - 26"	Light Brown Fine Sandy Loam w/ Gravel
	26' - 106"	Red-Brown Fine Sandy Loam W/ Gravel & Stones
	Possible Mottles @ 80"	
	Weeping @ 86"	
	No Ledge	
TP#7	0' - 5"	Topsoil/Duff
	5' - 86"	Red-Brown Loamy Sand Fill
	86' - 92"	Buried Topsoil
	92' - 112"	Gray Mottled Very Fine Sandy Loam
	Possible Mottles @ 64"	
	Weeping @ 72"	
	No Ledge	
TP#8	0' - 4"	Topsoil/Duff
	4' - 64"	Red-Brown Fine Loamy Sand Fill
	64' - 74"	Buried Topsoil
	74' - 96"	Gray Mottled Fine Sandy Loam
	Possible Mottles @ 60"	
	Weeping @ 62"	
	No Ledge	



I-84 Exit 66
Eastbound Off-Ramp



J.R. Russo & Associates, LLC
1390 Main Rd East Windsor CT 06028 • CT 860.663.0969 • MA 483.785.1818
www.jrusso.com • jrusso@russo.com

REVISIONS

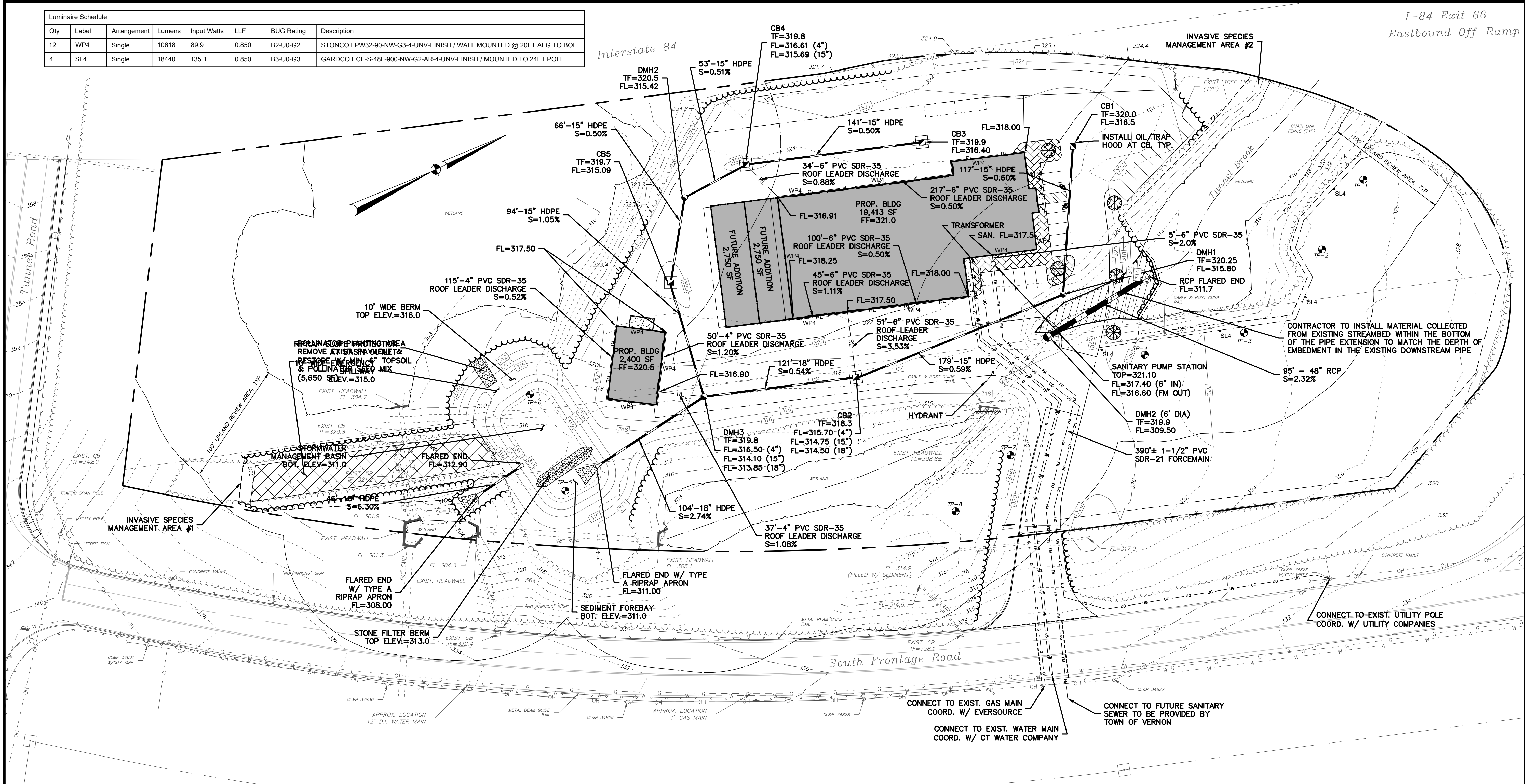
BY: LF/TAC CHK: JEU

Prepared For
Shawmut Equipment Company, Inc.
43 & 45 South Frontage Road
Vernon, Connecticut
Parcel ID: 29-134A-0011A & 29-234A-0011B

Grading & Erosion Control Plan

DATE
6-24-22
SCALE
1"=40'
JOB NUMBER
2021-013
SHEET
4 of 9

Luminaire Schedule							
Qty	Label	Arrangement	Lumens	Input Watts	LLF	BUG Rating	Description
12	WP4	Single	10618	89.9	0.850	B2-U0-G2	STONCO LPW32-90-NW-G3-4-UNV-FINISH / WALL MOUNTED @ 20FT AFG TO BOF
4	SL4	Single	18440	135.1	0.850	B3-U0-G3	GARDCO ECF-S-48L-900-NW-G2-AR-4-UNV-FINISH / MOUNTED TO 24FT POLE

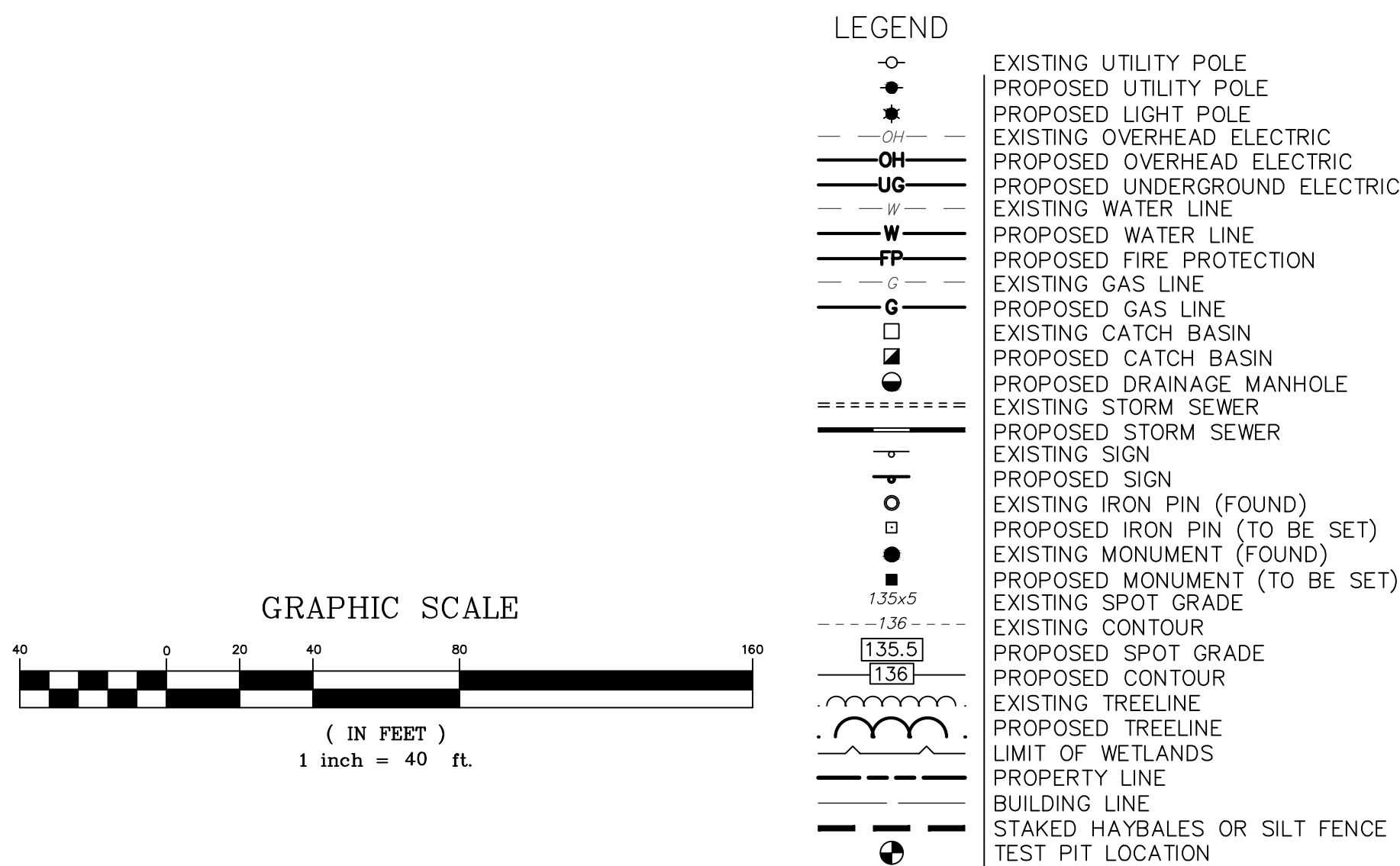


Reference Maps:

1. "Boundary Survey Prepared for Shawmut Equipment Company, Inc. Property of Exit 97 Associates North LLC #43-45 South Frontage Road, Vernon, Connecticut Parcel I.D. 29-134A-001a & 29-134A-011B Zone C" Scale 1"=60' Date: 12-16-21 by J.R. Russo & Associates, LLC.
2. "Data Accumulation Plan Wetlands Redesignation Plan Exit 97 Associates #43, #45 South Frontage Road Vernon, Connecticut" Gardner & Peterson Associates, LLC By F.T.C. Scale 1"=50' Date 08-10-2007 Sheet No. 1 Of 2 Map No. 2453A Revised 12/13/2007.

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Test Pit Data
Observed by Jim Aldrich and J.R. Russo & Associates
LLC, 4-26-2022

TP#1
0"- 4" Topsoil/Duff
4"-104" Red-Brown Very Fine Loamy Sand Fill
104"- 128" Buried Topsoil/Organics
Possible Mottles @ 86"
Seepage @ 86"
No Ledge

TP#2
 0" - 4" Topsoil/Duff
 4" - 80" Red-Brown Loamy Sand Fill
 80" - 86" Buried Topsoil
 86"-120" Olive Saturated Loamy Sand
 Mottles @ 80"
 Weeping @ 90"
 No Ledge

TP#3

0"- 5"	Pavement
5"- 16"	Process Gravel
16"- 72"	Red-Brown Loamy Sand Fill
72"-110"	Olive Damp Sandy Loam
Possible Mottles @ 66"	
Weeping @ 74"	
No Ledge	


TP#4
 0" - 60" Red-Brown Very Fine Loamy Sand Fill
 60" - 96" Light Brown Very Fine Sandy Loam Fill
 96"-110" Buried Topsoil
 110" - 115" Olive Fine Sandy Loam
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<u>TP#5</u>	
0" - 7"	Topsoil/Duff
7" - 48"	Red-Brown Fine Loamy Sand Fill
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70"-105"	Gray Moist Fine Sandy Loam
Possible Mottles @ 70"	
Weeping @ 96"	
No Ledge	

TF#6
 0" - 14" Topsoil/Duff
 14" - 26" Light Brown Fine Sandy Loam w/
 Gravel
 26"-106" Red-Brown Fine Sandy Loam W/
 Gravel & Stones
 Possible Mottles @ 80"
 Weeping @ 86"
 No Ledge

TP#7
 0"- 5" Topsoil/Duff
 5"- 86 Red-Brown Loamy Sand Fill
 86"- 92" Buried Topsoil
 92"-112" Gray Mottled Very Fine Sandy Loam
 Possible Mottles @ 64"
 Weeping @ 72"
 No Ledge

TP#8	
0" - 4"	Topsoil/Duff
4" - 64"	Red-Brown Fine Loamy Sand Fill
64" - 74"	Buried Topsoil
74" - 96"	Gray Mottled Fine Sandy Loam
Possible Mottles	@ 60"
Weeping @ 62"	
No Ledge	

 RUSSO SURVEYORS • ENGINEERS SERVING CT & MA		J.R. Russo & Associates, LLC 150 Graham Rd East Windsor CT 06088 • CT 860.622.0269 • MA 483.785.9158 www.jrussosurveyors.com • info@jrussosurveyors.com	
REVISIONS			
BY: LF/TAC		CHK: JEU	
<p><i>Prepared For</i></p> <p><i>Shawmut Equipment Company, Inc.</i></p> <p>43 & 45 South Frontage Road</p> <p>Vernon, Connecticut</p> <p>Parcel ID: 29-134A-0011A & 29-234A-0011B</p>			
Utility Plan			
DATE			
6-24-22			
SCALE			
1" = 40'			
JOB NUMBER			
2021-013			
SHEET			
5 of 9			

S:\Acad\2021 Civil 3D\2021-013 Shawmut Equipment\ Russo Drawings\2021-013.dwg

PERMANENT SEEDING (PS)

SPECIFICATIONS

Time Of Year
Seeding dates in Connecticut are normally April 1 through June 15 and August 15 through October 1. Spring seedings give the best results and spring seedings of all mixes with legumes is recommended. There are two exceptions to the above dates. The first exception is when seedings will be made in the areas of Connecticut known as the Coastal Slope and the Connecticut River Valley. The Coastal Slope includes the coastal towns of New London, Middlesex, New Haven, and Fairfield counties. In these areas, with the exception of crown vetch (when crown vetch is seeded in late summer, at least 35% of the seed should be hard seed (unscarified), the final fall seeding dates can be extended and additional 15 days. The second exception is frost crack or dormant seeding, the seed is applied during the time of year when no germination can be expected, normally November through February. Germination will take place when weather conditions improve, mulching is extremely important to protect the seed from wind and surface erosion and to provide erosion protection until the seeding becomes established.

Site Preparation

Grade in accordance with the Land Grading measure which is in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.

Install all necessary surface water controls.

For areas to be mowed remove all surface stones 2 inches or larger. Remove all other debris such as wire, cable tree roots, pieces of concrete, clods, lumps, or other unsuitable material.

Seed Selection

Lawn Areas: Premium Seed Mix for Sun and Shade.
Stormwater Basin: New England Erosion Control/Restoration Mix by New England Wetland Plants, Inc. or approved equal.

Seedbed Preparation

Apply topsoil, if necessary, in accordance with the Topsoiling measure which is in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.

Apply ground limestone and fertilizer according to soil test recommendations (such as those offered by the University of Connecticut Soil Testing Laboratory or other reliable source).

Where soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 300 pounds per acre or 7.5 pounds per 1,000 square feet of 10–10–10 or equivalent and limestone at 4 tons per acre or 200 pounds per 1,000 square feet.

Work lime and fertilizer into the soil to a depth of 3 to 4 inches with a disc or other suitable equipment.

Inspect seedbed just before seeding. If the soil is compacted, crusted or hardened, scarify the area prior to seeding.

Seed Application

Apply selected seed at rates per manufacturer's recommendations uniformly by hand, cyclone seeder, drill, cultipacker type seeder or hydroseeder (slurry including seed, fertilizer). Normal seeding depth is from 0.25 to 0.5 inch. Increase seeding rates by 10% when hydroseeding or frost crack seeding. Seed warm season grasses during the spring period only.

Mulching

See guidelines in the Mulch For Seed measures.

MAINTENANCE

Inspect temporary soil protection area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater during the first growing season.

Where seed has been moved or where soil erosion has occurred, determine the cause of the failure and repair as needed.

TEMPORARY SEEDING (TS)

SPECIFICATIONS

Site Preparation

Install needed erosion control measures such as diversions, grade stabilization structures, sedimentation basins and grassed waterways in accordance with the approved plan.

Grade according to plans and allow for the use of appropriate equipment for seedbed preparation, seeding, mulch application and mulch anchoring.

Seedbed Preparation

Loosen the soil to a depth of 3–4 inches with a slightly roughened surface. If the area has been recently loosened or disturbed, no further roughening is required. Soil preparation can be accomplished by tracking with a bulldozer, discing, harrowing, raking or dragging with a section of chain link fence.

Apply ground limestone and fertilizer according to soil test recommendations (such as those offered by the University of Connecticut Soil Testing Laboratory or other reliable source).

If soil testing is not feasible on small or variable sites, or where timing is critical, fertilizer may be applied at the rate of 300 pounds per acre or 7.5 pounds per 1,000 square feet of 10–10–10 or equivalent.

Seeding

Apply seed uniformly by hand, cyclone seeder, drill, cultipacker type seeder or hydroseeder. The temporary seed shall be Rye (grain) applied at a rate of 120 pounds per acre. Increase seeding rates by 10% when hydroseeding.

Mulching

See guidelines in the Mulch For Seed measures.

MAINTENANCE

Inspect temporary seeding area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater for seed and mulch movement and fill erosion.

Where seed has been moved or where soil erosion has occurred, determine the cause of the failure and repair as needed.

MULCH FOR SEED (MS)

SPECIFICATIONS

Materials

Types of Mulches within this specification include, but are not limited to:

1. Hay: The dried stems and leafy parts of plants cut and harvested, such as alfalfa, clovers, other forage legumes and the finer stemmed, leafy grasses. The average stem length should not be less than 4 inches. Hay that can be windblown should be anchored to hold it in place.

2. Straw: Cut and dried stems of herbaceous plants, such as wheat, barley, cereal rye, or brome. The average stem length should not be less than 4 inches. Straw that can be windblown should be anchored to hold it in place.

3. Cellulose Fiber: Fiber origin is either virgin wood, post-industrial/pre-consumer wood or post consumer wood complying with materials specification (collectively referred to as "wood fiber"), newspaper, kraft paper, cardboard (collectively referred to as "paper fiber") or a combination of wood and paper fiber. Paper fiber, in particular, shall not contain boron, which inhibits seed germination. The cellulose fiber must be manufactured in such a manner that after the addition to and agitation in slurry tanks with water, the fibers in the slurry become uniformly suspended to form a homogeneous product. Subsequent to hydraulic spraying on the ground, the mulch shall allow for the absorption and percolation of moisture and shall not form a tough crust such that it interferes with seed germination or growth. Generally applied with tackifier and fertilizer. Refer to manufacturer's specifications for application rates needed to attain 80%–95% coverage without interfering with seed germination or plant growth. Not recommended as a mulch for use when seeding occurs outside of the recommended seeding dates.

Tackifiers within this specification include, but are not limited to: Water soluble materials that cause mulch particles to adhere to one another, generally consisting of either a natural vegetable gum blended with gelling and hardening agents or a blend of hydrophilic polymers, resins, viscosifiers, sticking aids and gums. Good for areas intended to be mowed. Cellulose fiber mulch may be applied as a tackifier to other mulches, provided the application is sufficient to cause the other mulches to adhere to one another. Emulsified asphalts are specifically prohibited for use as tackifiers due to their potential for causing water pollution following its application.

Nettings within this specification include, but are not limited to: Prefabricated openwork fabrics made of cellulose cords, ropes, threads, or biodegradable synthetic material that is woven, knotted or molded in such a manner that it holds mulch in place until vegetation growth is sufficient to stabilize the soil. Generally used in areas where no mowing is planned.

Site Preparation

Grade according to plans and allow for the use of appropriate equipment for seedbed preparation, seeding, mulch application and mulch anchoring.

Application

Timing: Applied immediately following seeding. Some cellulose fiber may be applied with seed to assist in marking where seed has been sprayed, but expect to apply a second application of cellulose fiber to meet the requirements of Mulch For Seed in the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.

Spreading: Mulch material shall be spread uniformly by hand or machine resulting in 80%–95% coverage of the disturbed soil when seeding within the recommended seeding dates. Applications that are uneven can result in excessive mulch smothering the germinating seeds. For hay or straw anticipate an application rate of 2 tons per acre. For cellulose fiber follow manufacturer's recommended application rates to provide 80%–95% coverage.

When seeding outside the recommended seeding dates, increase mulch application rate to provide between 95%–100% coverage of the disturbed soil. For hay or straw anticipate an application rate to 2.5 to 3 tons per acre.

When spreading hay mulch by hand, divide the area to be mulched into approximately 1,000 square feet and place 1.5–2 bales of hay in each section to facilitate uniform distribution.

For cellulose fiber mulch, expect several spray passes to attain adequate coverage, to eliminate shadowing, and to avoid slippage.

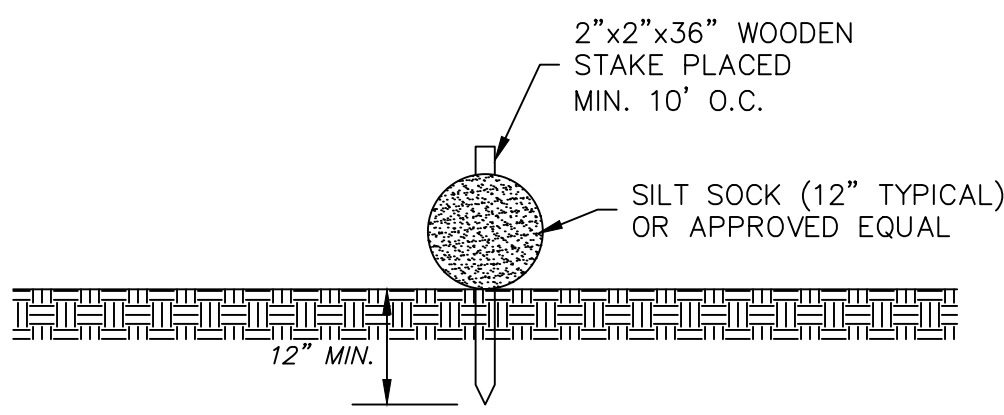
Anchoring: Expect the need for mulch anchoring along the shoulders of actively traveled roads, fill tops and long open slopes not protected by wind breaks.

When using netting, the most critical aspect is to ensure that the netting maintains substantial contact with the underlying mulch and the mulch, in turn, maintains continuous contact with the soil surface. Without such contact, the material is useless and erosion can be expected to occur.

MAINTENANCE

Inspect mulch for seed area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater until the grass has germinated to determine maintenance needs.

Where mulch has been moved or where soil erosion has occurred, determine the cause of the failure and repair as needed.

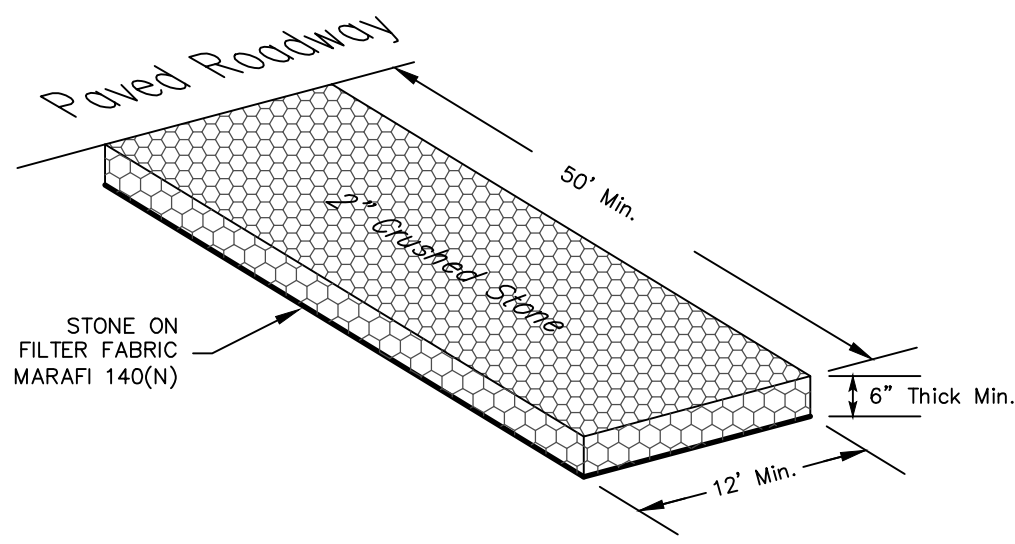


NOTE: MAY BE USED AS ALTERNATIVE TO GEOTEXTILE SILT FENCE.

PERIMETER SEDIMENT BARRIER

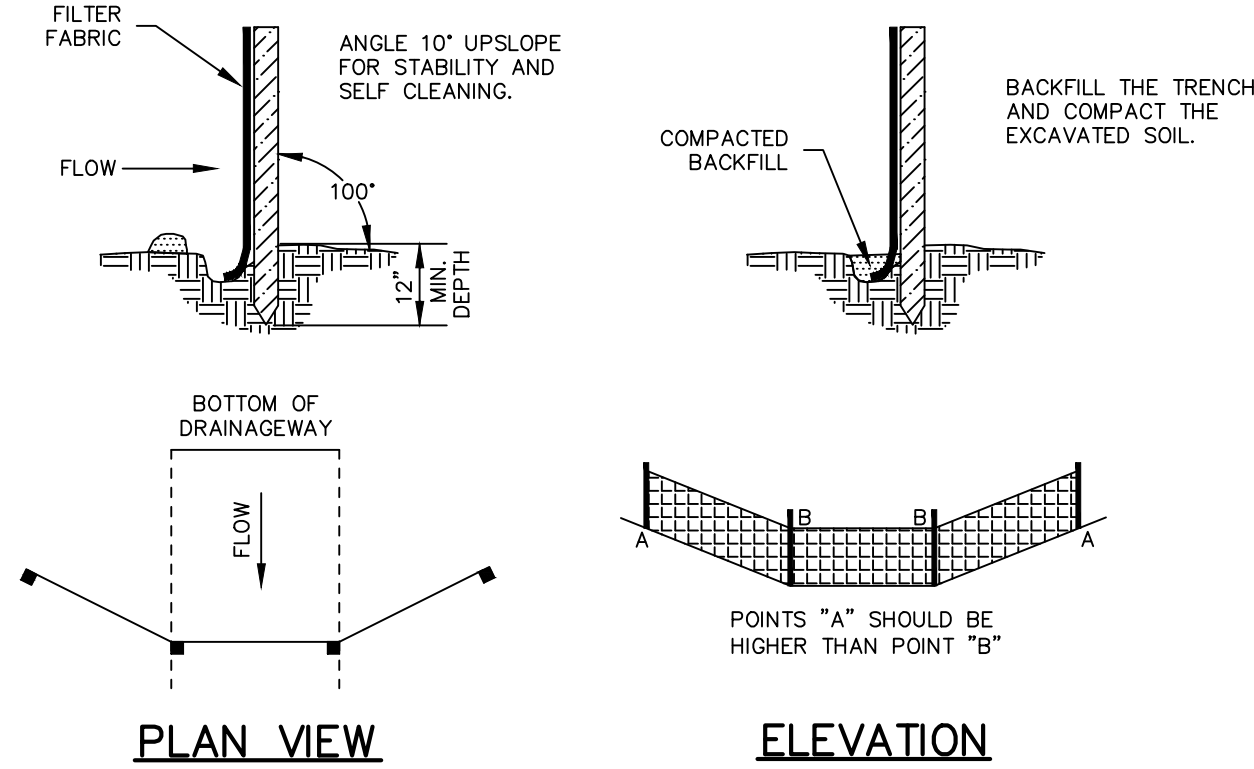
SOIL EROSION & SEDIMENT CONTROL NOTES

- The contractor/developer shall notify the Town Staff prior to construction in accordance with the local approvals and permits.
- All soil erosion and sediment control work shall be done in strict accordance with the Connecticut Guidelines For Soil Erosion and Sediment Control latest edition.
- Any additional erosion/sediment control deemed necessary by the engineer during construction, shall be installed by the developer. In addition, the developer shall be responsible for the repair/replacement and/or maintenance of all erosion control measures until all disturbed areas are stabilized to the satisfaction of the town staff.
- All soil erosion and sediment control operations shall be in place prior to any grading operations and installation of proposed structures or utilities and shall be left in place until construction is completed and/or area is stabilized.
- In all areas, removal of trees, bushes and other vegetation as well as disturbance of the soil is to be kept to an absolute minimum while allowing proper development of the site. During construction, expose as small an area of soil as possible for as short a time as possible.
- The developer shall practice effective dust control per the soil conservation service handbook during construction and until all areas are stabilized or surface treated. The developer shall be responsible for the cleaning of nearby streets of any debris from these construction activities.
- All fill areas shall be compacted sufficiently for their intended purpose and as required to reduce slipping, erosion or excess saturation. Fill intended to support buildings, structures, conduits, etc., shall be compacted in accordance with local requirements or codes.
- Topsoil is to be stripped and stockpiled in amounts necessary to complete finished grading of all exposed areas requiring topsoil. The stockpiled topsoil is to be located as designated on the plans. Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding.
- Any and all fill material is to be free of brush, rubbish, timber, logs vegetative matter and stumps in amounts that will be detrimental to constructing stable fills. Maximum side slopes of exposed surfaces of earth to be 3:1 or as otherwise specified by local authorities.
- Soil stabilization should be completed within 5 days of clearing or inactivity in construction.
- Waste Materials – All waste materials (including wastewater) shall be disposed of in accordance with local, state and federal law. Litter shall be picked up at the end of each work day.
- The Contractor shall maintain on-site additional erosion control materials as a contingency in the event of a failure or when required to shore up existing BMPs. At a minimum, the on-site contingency materials should include 30 feet of silt fence and 5 straw haybales with 10 stakes.



ANTI-TRACKING PAD DETAIL (CE)

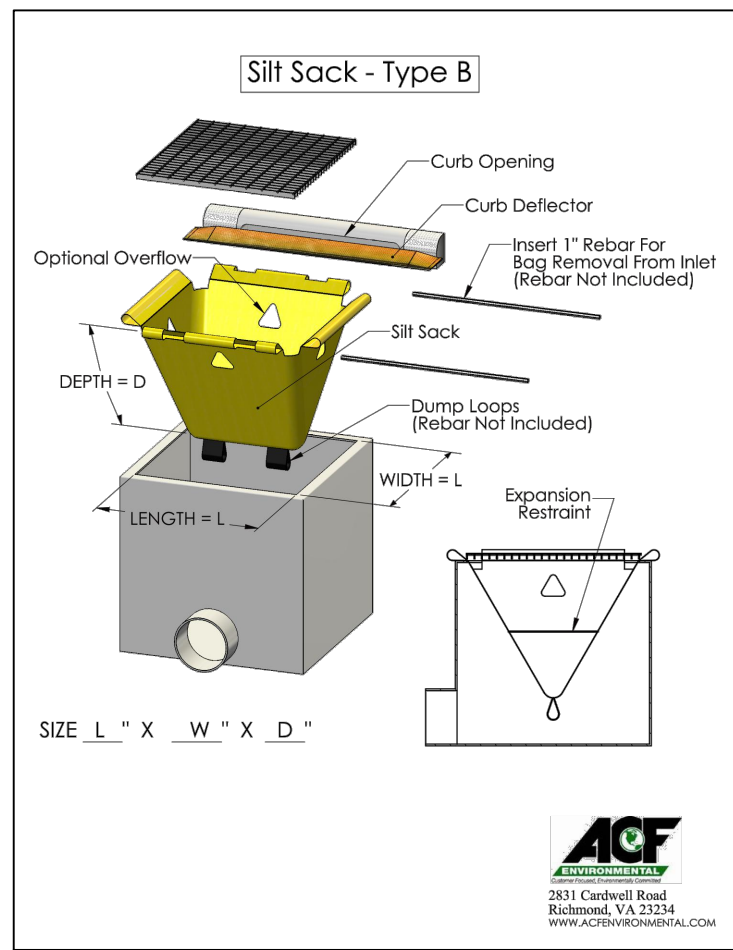
NOT TO SCALE



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, STORRS, CONNECTICUT

GEOTEXTILE SILT FENCE (GSF)

NOT TO SCALE



NOTE: SILT SACK SHALL BE SIZED TO FIT EACH INLET GRATE (SINGLE OR DOUBLE) AND SHALL BE CLEANED AND MAINTAINED UNTIL THE CONTRIBUTING WATERSHED IS STABILIZED WITH VEGETATION AND/OR COMPACTED PROCESSED STONE BASE.

CB INLET PROTECTION (SILT SACK)

NOT TO SCALE

POLLINATOR PLANTING AREA CONSTRUCTION SEQUENCE (+5,650 SQFT)

- PRIOR TO ALL WORK, EROSION CONTROL BARRIERS SHALL BE INSTALLED AS DETAILED ON THE GRADING & EROSION CONTROL PLAN.
- THE POLLINATOR PLANTING AREA IS AN OLD ROADWAY AND IS CURRENTLY COVERED BY ASPHALT. ASPHALT MILLINGS ARE INTENDED TO BE RECLAIMED AS A PART OF THE PROJECT TO BE UTILIZED ELSEWHERE ON-SITE. FOLLOWING RESTORATION, 6" OF CLEAN TOPSOIL WILL BE PLACED OVER AN ADEQUATE BASE (FREE-DRAINING MATERIAL). ONCE FINAL TOPSOIL IS IN PLACE, IT SHALL BE GRADED TO ACHIEVE A RELATIVELY SMOOTH SURFACE.
- ONCE TOPSOIL IS IN PLACE, SEED WITH NEW ENGLAND WETLAND PLANTS INC. (413) 548-8000 WILDFLOWER MIX AT A RATE OF 1 LB/1,900 SQUARE FEET. SEEDING SHOULD BE APPROPRIATELY TIMED (SPRING OR FALL) TO PROMOTE SUCCESSFUL ESTABLISHMENT. THIS MITIGATION AREA IS INTENDED TO BE COMPOSED OF NATIVE WILDFLOWERS. SOIL CONDITIONING ACTIVITIES, INCLUDING RAKING, MAY BE COMBINED WITH THE SEED APPLICATION PROCESS. THE APPLICANT SHALL BE RESPONSIBLE FOR THE CAREFUL INSTALLATION, MAINTENANCE (INCLUDING WATERING), AND ESTABLISHMENT OF NATIVE PLANT MATERIAL IN THESE AREAS. THE EROSION CONTROL BARRIERS SHALL BE DISASSEMBLED FOLLOWING SUCCESSFUL STABILIZATION OF THIS AREA. SEDIMENT COLLECTED BY THESE DEVICES WILL BE REMOVED AND DISPOSED OF IN A MANNER THAT PREVENTS EROSION AND TRANSPORT TO A WATERWAY OR WETLAND.

INVASIVE SPECIES MANAGEMENT AREAS

- INVASIVE NON-NATIVE SPECIES SHALL BE MECHANICALLY REMOVED, UNDER THE SUPERVISION OF A WETLAND SCIENTIST, FROM THE INVASIVE SPECIES MANAGEMENT AREAS DURING CONSTRUCTION. THE PREFERRED METHOD FOR INITIAL REMOVAL IS PULLING THE INVASIVE SHRUBS AND VINES WITH A SMALL MACHINE (E.G., MINI EXCAVATOR) SO THAT THE ROOTS ARE REMOVED.
- DISPOSAL OF INVASIVE PLANT MATERIAL SHALL COMPLY WITH CT DEEP GUIDELINES.
- ANY HERBICIDE USED FOR INVASIVE ERADICATION OR CONTROL SHALL BE APPLIED BY A LICENSED PESTICIDE APPLICATOR.
- THESE AREAS WILL BE SUBJECT TO MONITORING TO PREVENT COLONIZATION AND PROLIFERATION OF INVASIVE SPECIES UNDER THE PROVISIONS OUTLINED IN THE "MONITORING" SECTION BELOW

MONITORING

- MONITORING OF THE POLLINATOR PLANTING AREA AND INVASIVE SPECIES MANAGEMENT AREAS WILL BE CONDUCTED AS FOLLOWS. THESE AREAS WILL BE MONITORED FOR THE FIRST FIVE (5) GROWING SEASONS FOLLOWING CONSTRUCTION. MONITORING REPORTS WILL BE SUBMITTED ANNUALLY NO LATER THAN DECEMBER 15 OF EACH YEAR. MONITORING REPORTS SHALL INCLUDE THE PERCENT SURVIVAL OF POLLINATOR PLANTINGS, OBSERVATIONS OF INVASIVE SPECIES, AND EXTENT OF HERBIVORY AND VEGETATION DEVELOPMENT. REMEDIAL ACTIONS RECOMMENDED AND/OR COMPLETED WILL ALSO BE PROVIDED. THE FIRST YEAR OF MONITORING WILL BE THE FIRST YEAR THAT THIS AREA HAS BEEN THROUGH A FULL GROWING SEASON AFTER COMPLETION OF CONSTRUCTION AND PLANTING. FOR MONITORING PURPOSES, A GROWING SEASON STARTS NO LATER THAN MARCH 31. IF THE SUCCESS STANDARDS ARE NOT MET, RECOMMENDATIONS FOR ADDITIONAL MONITORING/CORRECTIVE ACTIONS WILL BE REQUIRED.
- THE POLLINATOR PLANTING AREA WILL BE ASSESSED USING THE FOLLOWING SUCCESS STANDARDS: STANDARD 1: AT LEAST 85% SURVIVABILITY OF THE PLANTED NATIVE VEGETATION. STANDARD 2: THE PLANTING AREA IS PROPERLY STABILIZED.
- THE INVASIVE SPECIES MANAGEMENT AREAS WILL BE ASSESSED USING THE FOLLOWING SUCCESS STANDARD: ALL OCCURRENCES OF INVASIVE SPECIES SHALL BE IDENTIFIED AND ERADICATED FROM THE INVASIVE SPECIES MANAGEMENT AREAS ANNUALLY FOR THE DURATION OF MONITORING.

CHECKLIST FOR EROSION CONTROL PLAN

PROJECT: Shawmut Equipment Company, LLC
LOCATION: 43–45 South Frontage Road, Vernon, CT
PROJECT DESCRIPTION: Construction of a crane sales & service facility
PARCEL AREA: 8.8 acres
RESPONSIBLE PERSONNEL: Jim Aldrich (860) 647–7544 ext. 101
EROSION AND SEDIMENT CONTROL PLAN PREPARER: J.R. Russo & Associates, LLC

CHECKLIST:

Work Description Erosion & Sediment Control Measures	Location	Date Installed	Initials	Date Removed	Initials
Install construction entrance	As shown on plan.				
Install perimeter sediment barriers	As shown on plan.				
Install inlet protection at CBs	As installed				

MAINTENANCE OF MEASURES:

Location	Description or Number	Date	Initials

Project Dates:

Date of groundbreaking for project:

Date of final stabilization:

PROJECT NARRATIVE AND CONSTRUCTION SEQUENCE

This project is located at 43–45 South Frontage Road in Vernon, Connecticut. The proposed activity is the construction of a 24,913 square foot crane sales and service facility with a 2,400 square foot cold storage building. The suggested schedule of construction is as follows:

OVERALL SITE DEVELOPMENT

- Install construction anti-tracking pad (CE).
- Install sediment barriers (GSF) at project perimeters.
- Clear and grub trees and shrubs to be removed. All wood debris and stumps are to be disposed of off-site.
- Reclaim existing pavement and stockpile on-site for re-use.
- Strip topsoil. Spread min. 6" in former paved areas to be restored w/ vegetation and seed with pollinator seed mix. Stockpile suitable amount of remaining topsoil for reuse on-site in areas shown. Stockpiles shall be surrounded by sediment barriers (GSF).
- Rough grade area surrounding proposed building.
- Begin building construction.
- Construct stormwater management basin and install drainage. Seed basin as soon as practicable.
- Install other site utilities.
- Install gravel parking lot and driveway base. Install crushed stone in display areas.
- Install dumpster pad and sidewalks.
- Pave binder course.
- Stabilize disturbed areas to receive topsoil and permanently seed as soon as possible.
- Install landscaping and perform invasive species management.
- Install pavement top course in all areas. Sweep binder course and apply tack coat prior to placing pavement top course.
- Apply paint striping.
- Remove sediment barriers after site is fully stabilized.

CULVERT EXTENSION

- Install pump settling basin or filter bag, temporary cofferdam and pump receptacle.
- Pump stream flows around work area to maintain dry conditions for installation of culvert extension.
- Excavate to subgrade. Stockpile existing stream bed material for re-use as embedment to be placed in bottom of new culvert extension.
- Install manhole, culvert and pipe end. Backfill and compact.
- Install existing stream bed material within new pipe sections to match the depth of embedment in the existing downstream culvert.
- Install topsoil, seed and erosion control blanket on disturbed areas.
- Remove cofferdam.

Construction of this site is anticipated to begin in the Fall of 2022 and be complete by Summer of 2023, pending approvals. Temporary erosion control measures shall be installed prior to any soil disturbance and maintained throughout construction until soils have been stabilized with permanent vegetation.

The Contractor shall keep the area of disturbance to a minimum and establish vegetative cover on exposed soils as soon as practical. All soil and erosion control measures shall be installed and maintained in accordance with these plans and the "Connecticut DEEP Guidelines for Soil Erosion and Sediment Control", as amended. The Contractor shall verify all conditions noted on the plans and shall immediately notify the Engineer of any discrepancies.

The developer shall be responsible for the repair/replacement/maintenance of all erosion control measures until all disturbed areas are stabilized. Accumulated sediment shall be removed as required to keep silt fence functional. In all cases, deposits shall be removed when the accumulated sediment has reached one-half above the ground height of the silt fence. This material is to be spread and stabilized in areas not subject to erosion, or to be used in areas which are not to be paved or built on. Silt fence (GSF) is to be replaced as necessary to maintain proper filtering action. Silt fence (GSF) are to remain in place and shall be maintained to insure efficient sediment capture until all areas above the erosion checks are stabilized and vegetation has been established.

POST CONSTRUCTION MAINTENANCE NOTES:

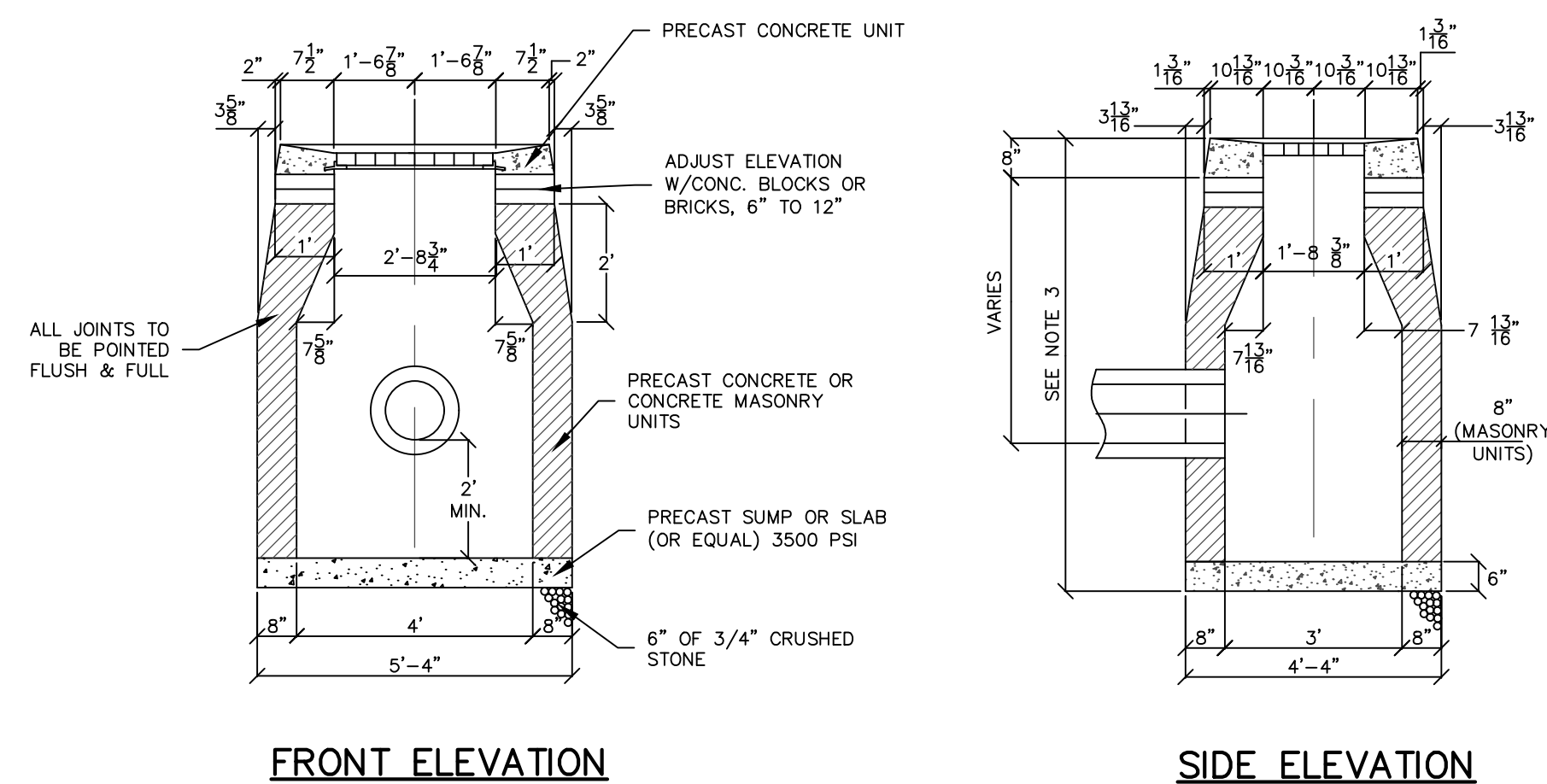
The property owner shall be responsible for performing the following post construction maintenance schedule:

- Maintain lawn & landscape areas with minimal pesticides.
- Sweep parking lot and paved areas at least once per year in the spring.
- Inspect catch basins and storm manholes at least twice per year, including after sweeping. Clean at least once per year in April and as necessary to prevent the discharge of pollutants from structures. Remove accumulated oil, trash and excessive sediment with vac-truck. Check condition of hoods (if applicable).
- Inspect infiltration basins annually for evidence of hydrocarbons and remove by vac-truck. Repair eroded areas and replace riprap and vegetation as required. Dredge bottom of forebay to remove accumulated sediment every 10 years or when significant volume reduction is observed. Mow infiltration basin on a regular basis to maintain as lawn area for filtering of pollutants. Inspect inlet pipes monthly and remove trash and debris as needed.

Prepared For
Shawmut Equipment Company, Inc.
43 & 45 South Frontage Road
Vernon, Connecticut
Parcel ID: 29–134A–0011A & 29–234A–0011B

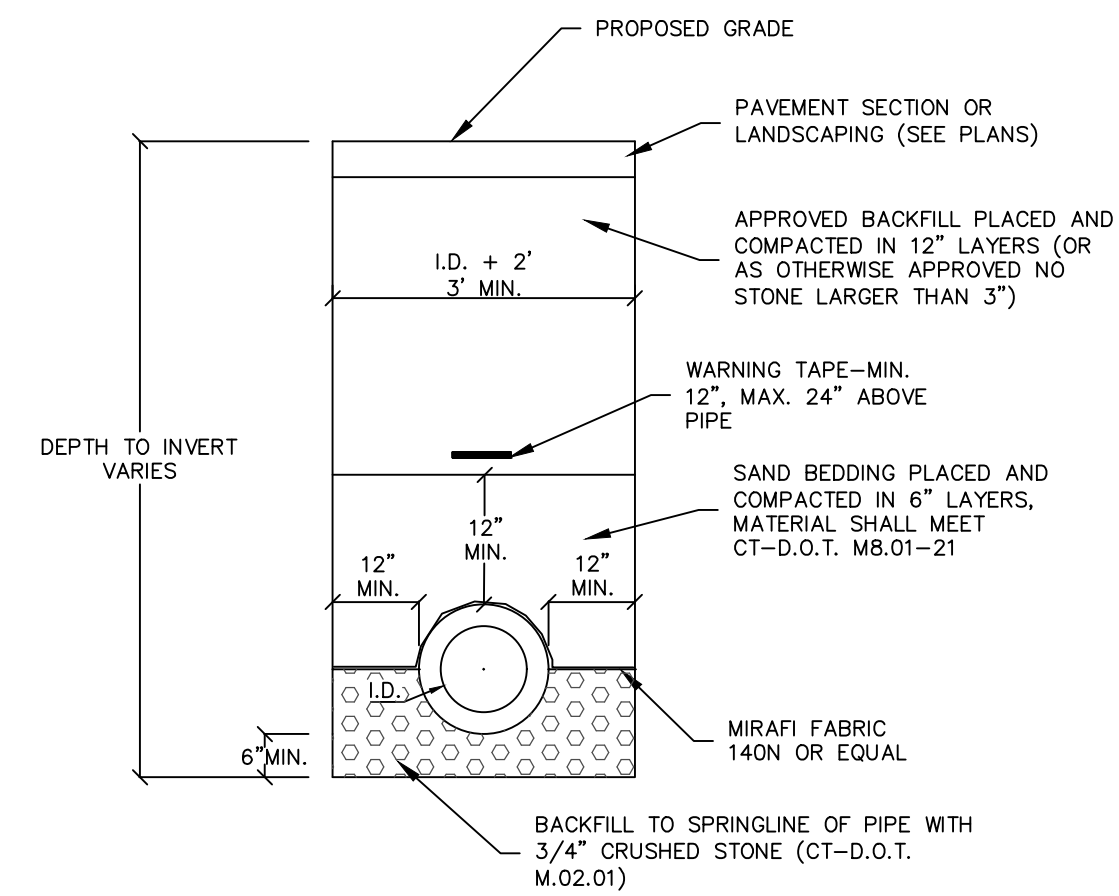
Erosion Control Notes

DATE
6–24–22
SCALE
Not to Scale
JOB NUMBER
2021–013
SHEET
6 of 9

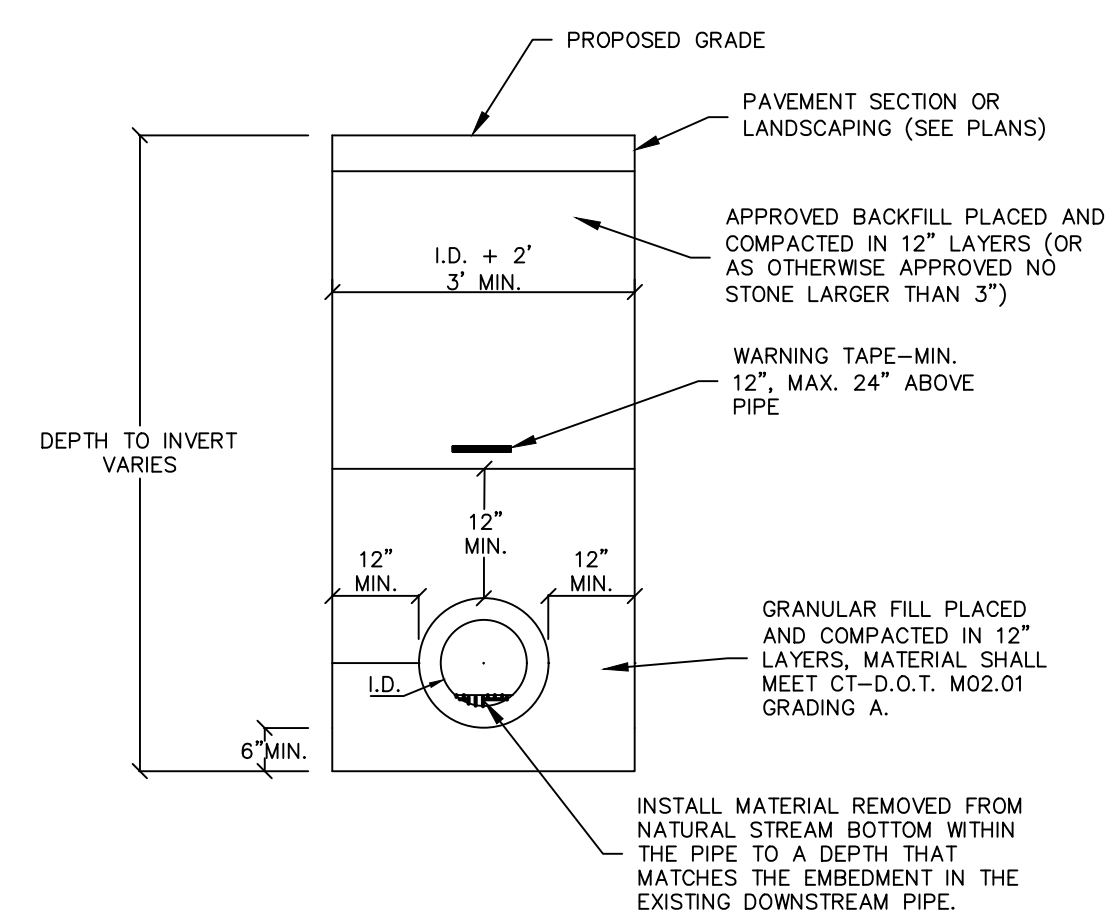


NOTES:

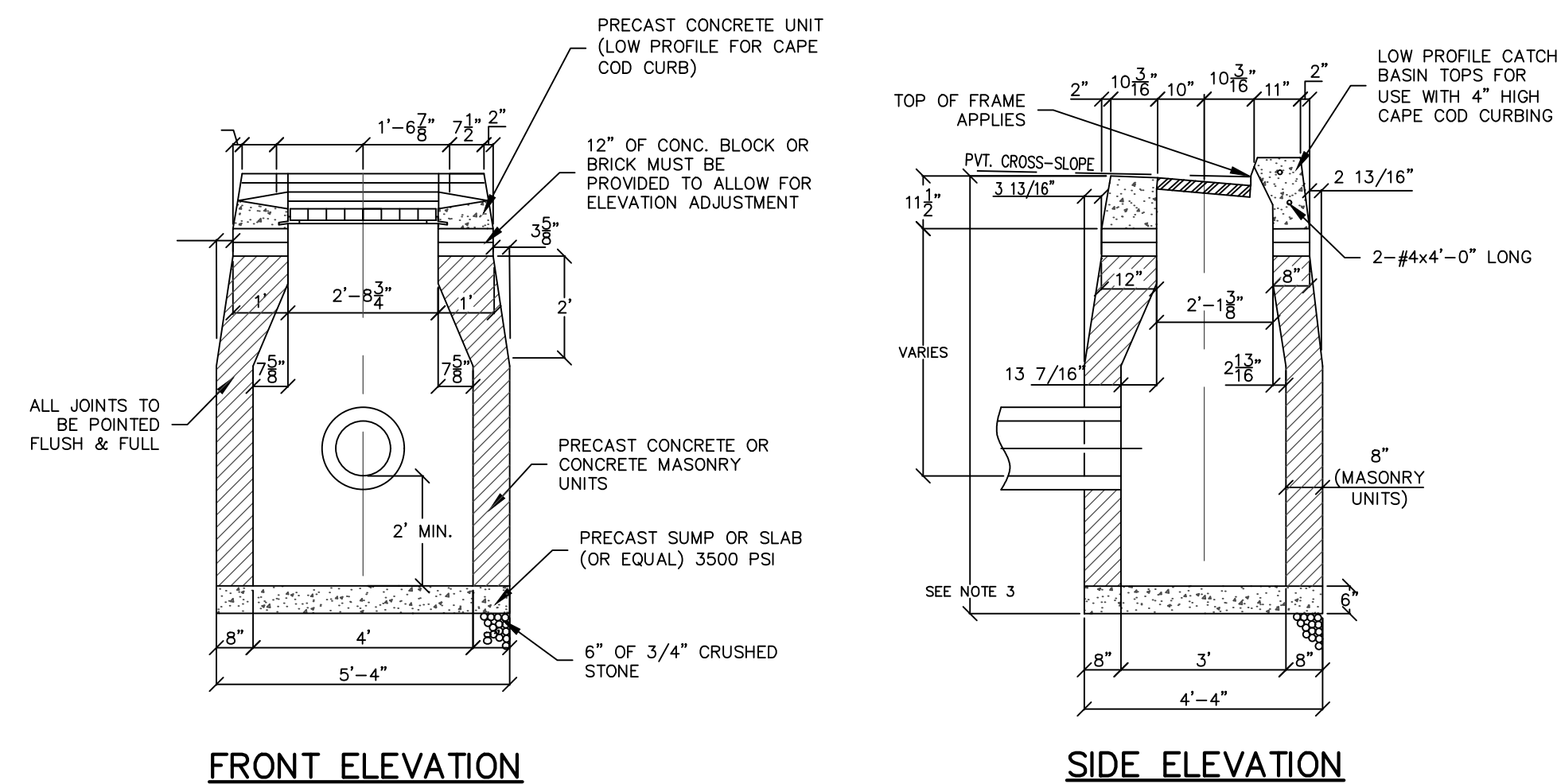
1. MINIMUM COVER OVER TOP OF PIPE SHALL BE 1'-0".
2. WALL THICKNESS SHALL BE SUFFICIENT TO MEET HS 20 LOADING.
3. WALL THICKNESS FOR STRUCTURES OVER 10' HIGH IS 12" FOR CONCRETE BLOCK UNITS, INSIDE DIMENSIONS REMAIN THE SAME.
4. ALL PIPES SHALL BE CUT FLUSH WITH INSIDE WALLS.
5. ALL BRICKS SHALL BE CONCRETE.



HDPE STORM DRAIN DETAIL



RCP CULVERT EXTENSION

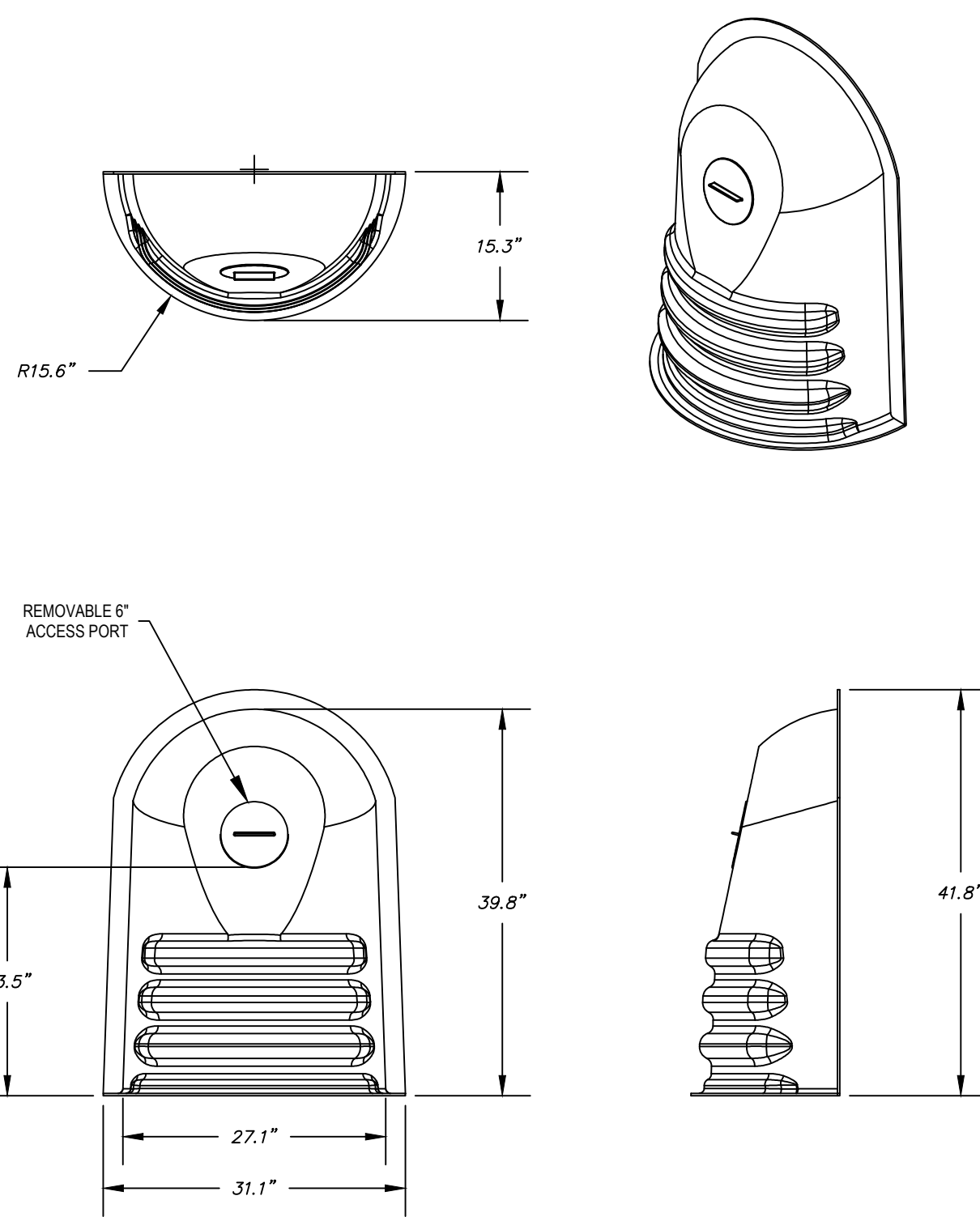


NOTES:

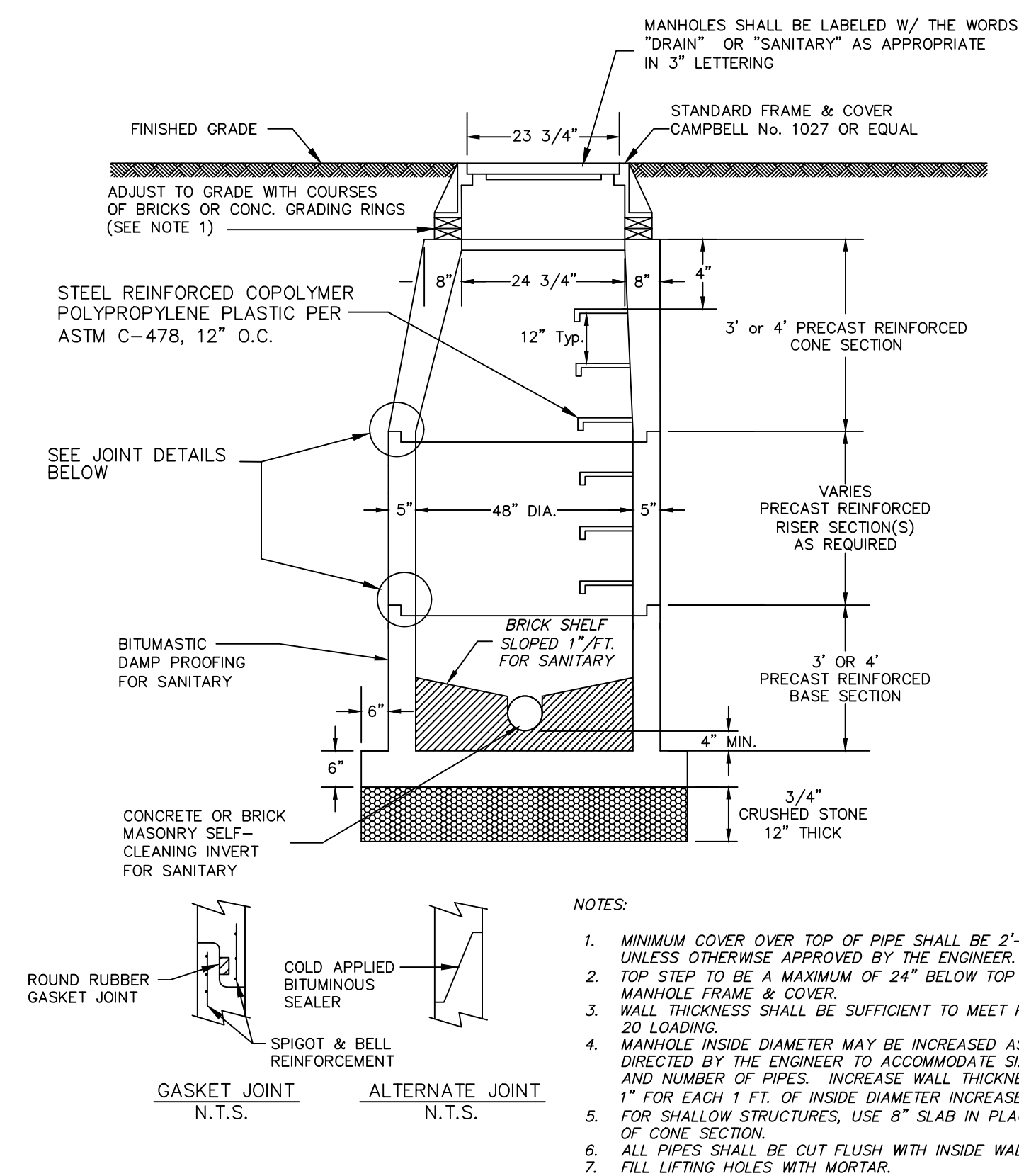
1. MINIMUM COVER OVER TOP OF PIPE SHALL BE 2'-0".
2. WALL THICKNESS SHALL BE SUFFICIENT TO HOLD ITS 20 LOADING.
3. WALL THICKNESS FOR STRUCTURES OVER 10' HIGH IS 12" FOR CONCRETE BLOCK UNITS, INSIDE DIMENSIONS REMAIN THE SAME.
4. ALL PIPES SHALL BE CUT FLUSH WITH INSIDE WALLS.
5. ALL BRICKS SHALL BE CONCRETE.

TYPE "C" CATCH BASIN

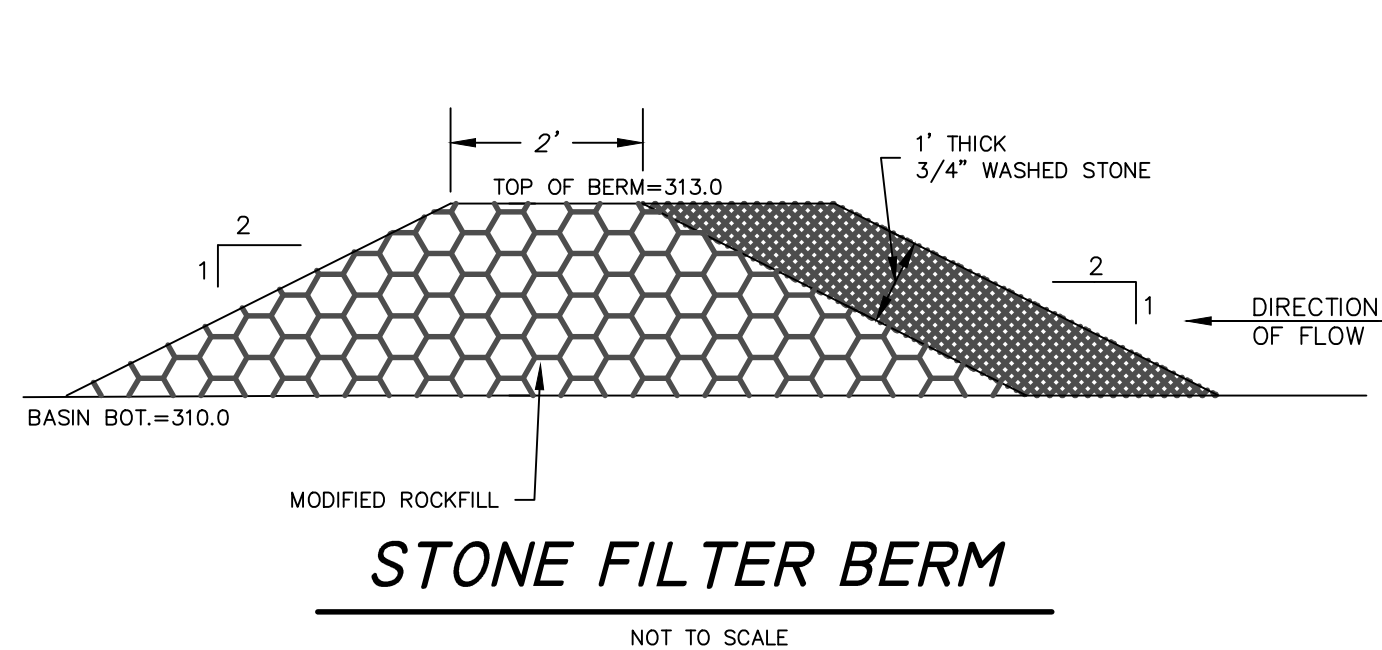
NOT TO SCALE



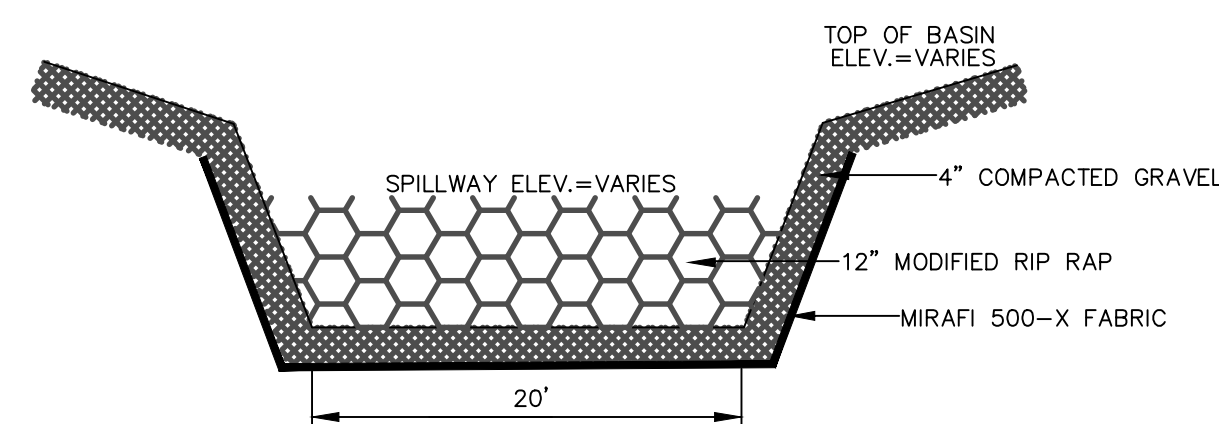
NYROPLAST ENVIROHOOD DETAIL



PRECAST CONCRETE MANHOLE



STONE FILTER BERM



EMERGENCY SPILLWAY

[illegible]

REVISIONS	
BY: LF/TAC	CHK: JEU

Prepared For Shawmut Equipment Company, Inc.
43 & 45 South Frontage Road
Vernon, Connecticut
Parcel ID: 29-134A-0011A & 29-234A-0011B

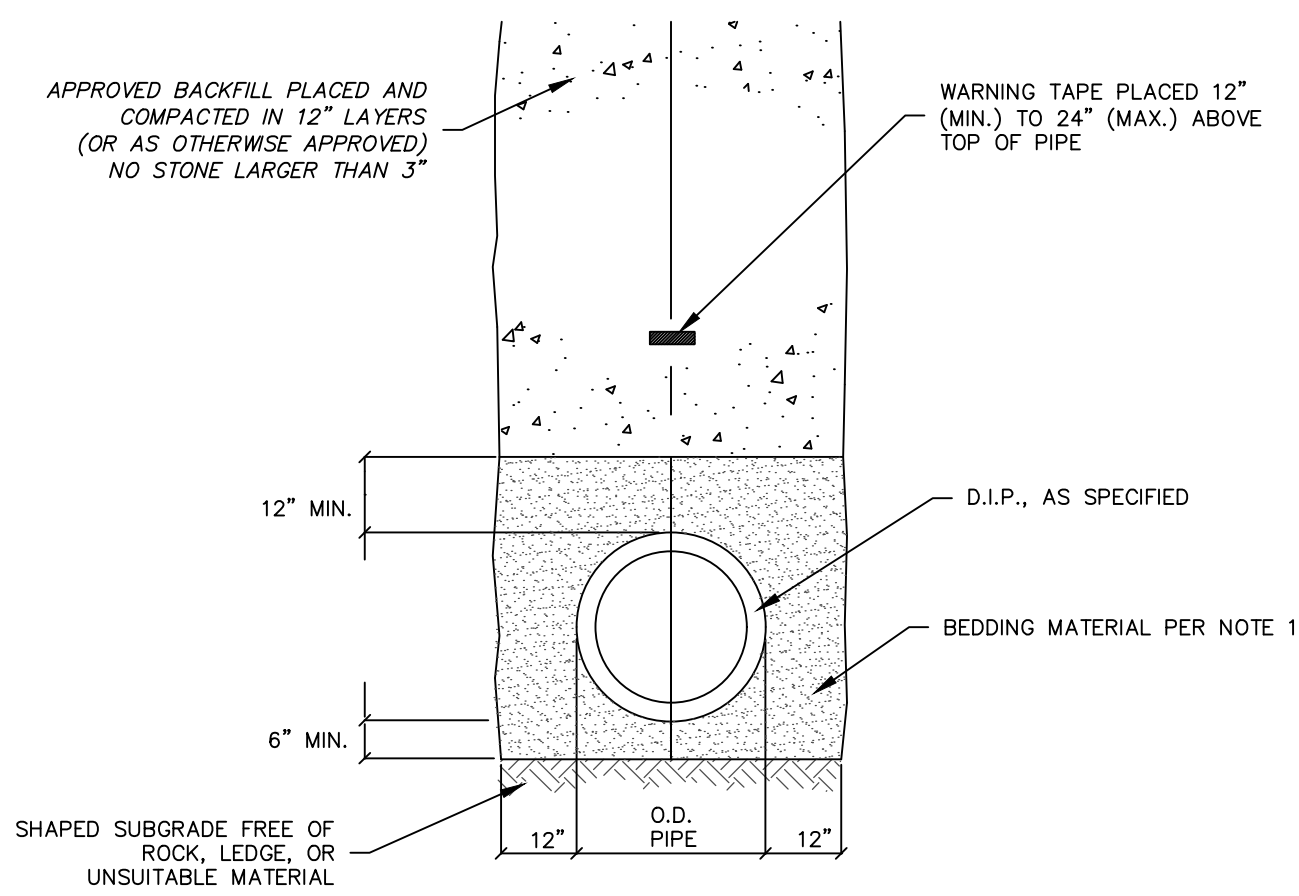
Details

DATE
6-24-22

SCALE
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JOB NUMBER
2021-013

SHEET
8 of 9

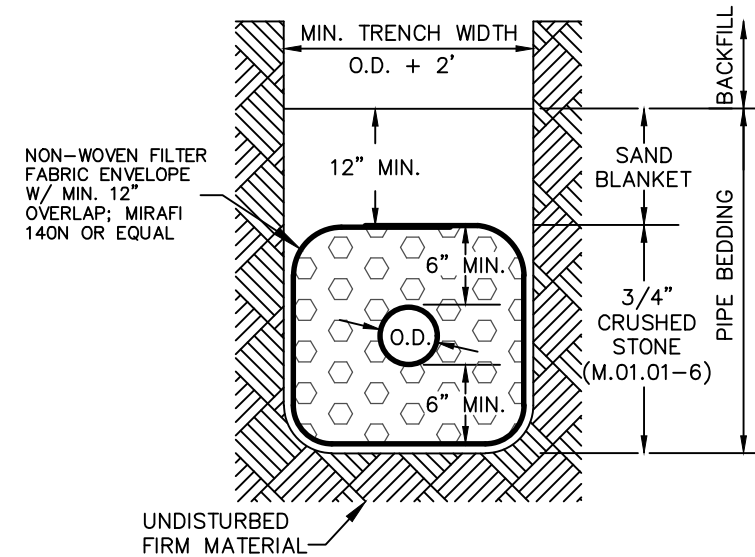


NOTE:

1. BEDDING SAND SHALL BE AS SPECIFIED IN D.O.T. FORM 816, "STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, AND INCIDENTAL CONSTRUCTION", SECTION M.08.01 #21-BEDDING MATERIAL: "THIS MATERIAL SHALL BE SAND OR SANDY SOIL, ALL OF WHICH PASSES A 3/8" SIEVE, AND NOT MORE THAN 10% PASSES A No. 200 SIEVE. WHEN GROUND WATER IS ENCOUNTERED THE ENGINEER MAY ALLOW No. 6 STONE CONFORMING TO ARTICLE M.01.01 TO BE USED INSTEAD OF SAND OR SANDY SOIL."

FORCE MAIN TRENCH

NOT TO SCALE

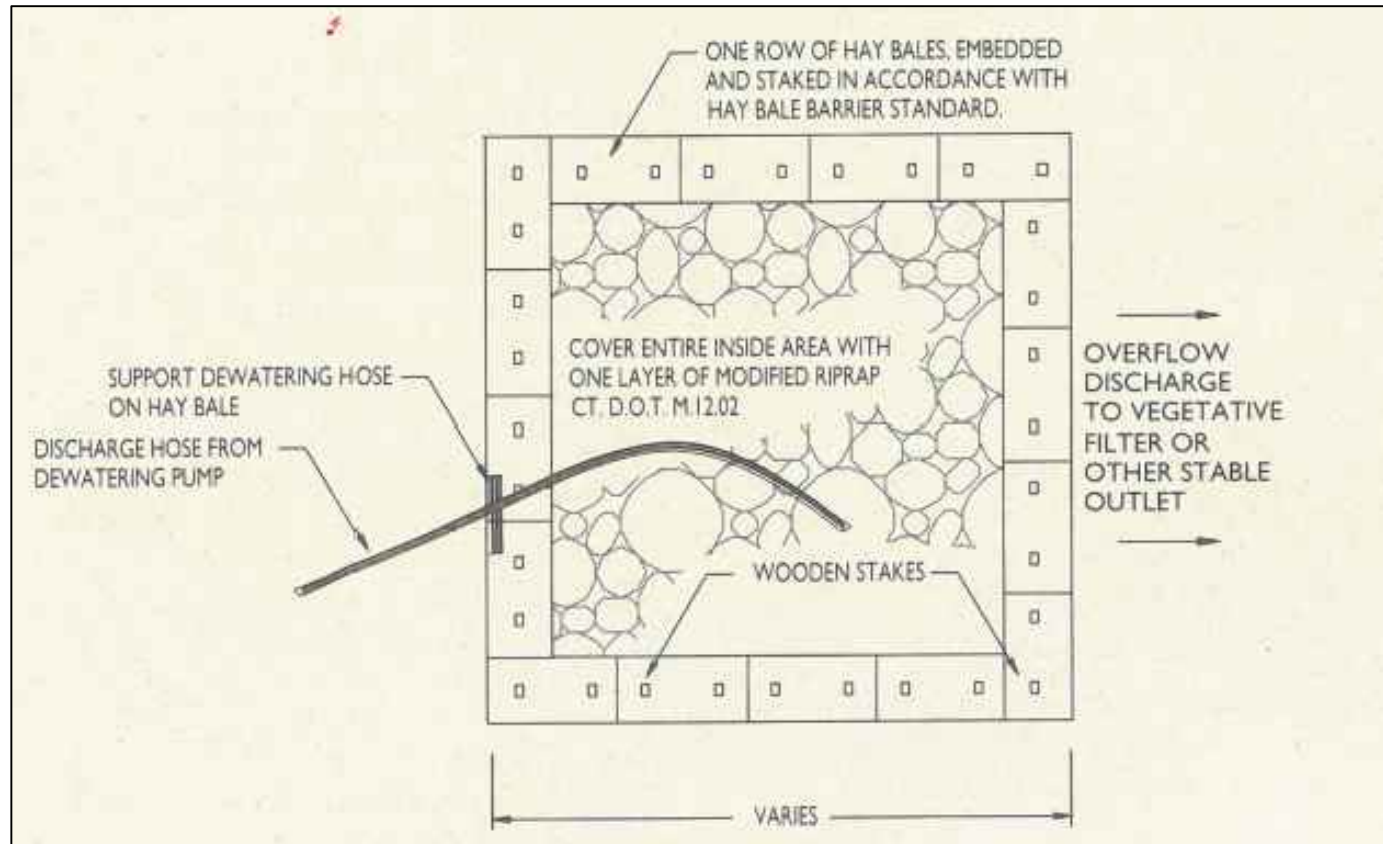


NOTES:

1. PROVIDE WARNING TAPE 12-24" ABOVE TOP OF PIPE.
2. BACKFILL SHALL BE SUITABLE NATIVE MATERIAL UNLESS DETERMINED TO BE UNSUITABLE BY THE ENGINEER OR GRANULAR FILL M.02.01 PLACED AND COMPACTED IN 12" LOOSE LIFTS.
3. UNDER PAVED AREAS COMPACT BACKFILL TO 95% OF THE MATERIAL'S MAXIMUM DRY DENSITY AS DETERMINED BY A STANDARD PROCTOR TEST. UNDER UNPAVED AREAS COMPACT TO SOIL.
4. UNSUITABLE TRENCH MATERIAL TO BE REMOVED AND REPLACED WITH 3/4" CRUSHED STONE AS DIRECTED BY ENGINEER.

TYPICAL SANITARY SEWER TRENCH SECTION

NOT TO SCALE

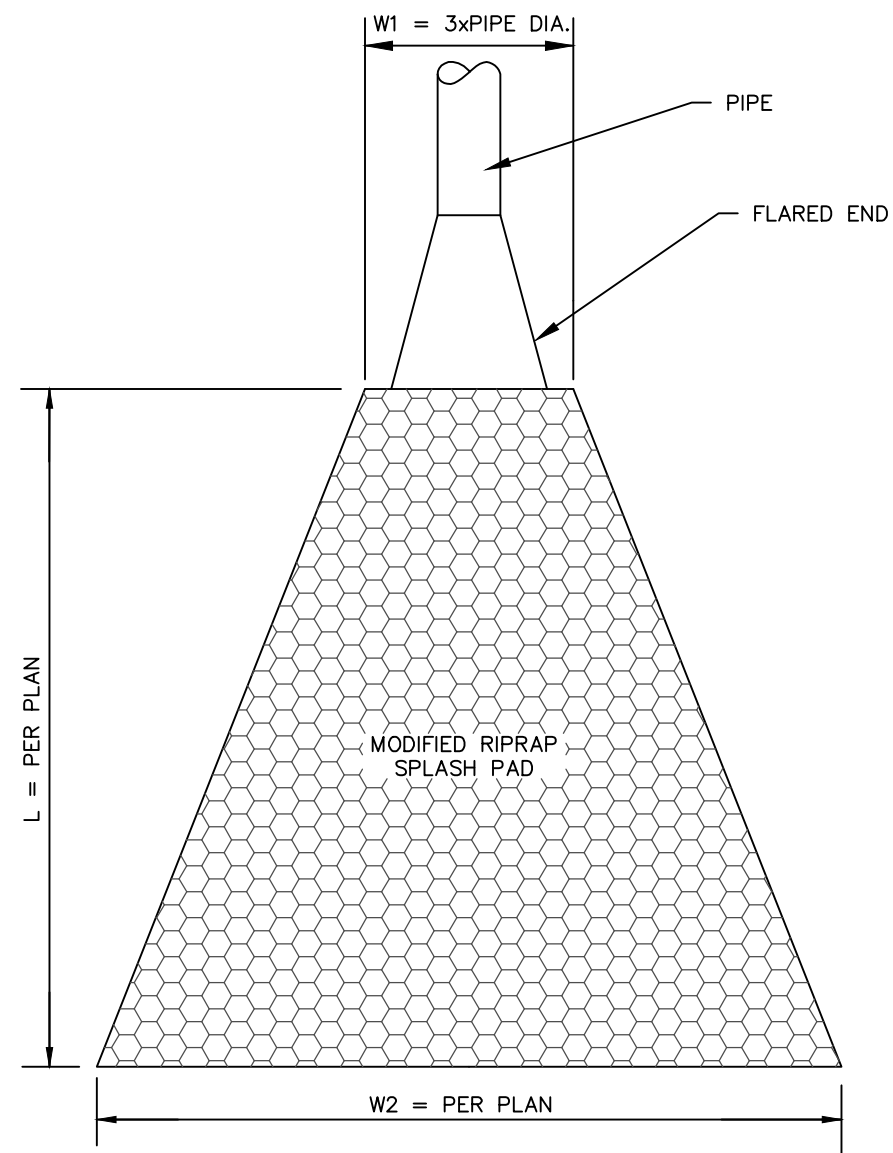


NOTES:

1. CUBIC FEET OF STORAGE REQUIRED = PUMP DISCHARGE RATE (GPM) X 16
2. CONTRACTOR MAY SUBSTITUTE SUITABLY SIZED SEDIMENT FILTER/DEWATERING BAG

PUMP SETTLING BASIN

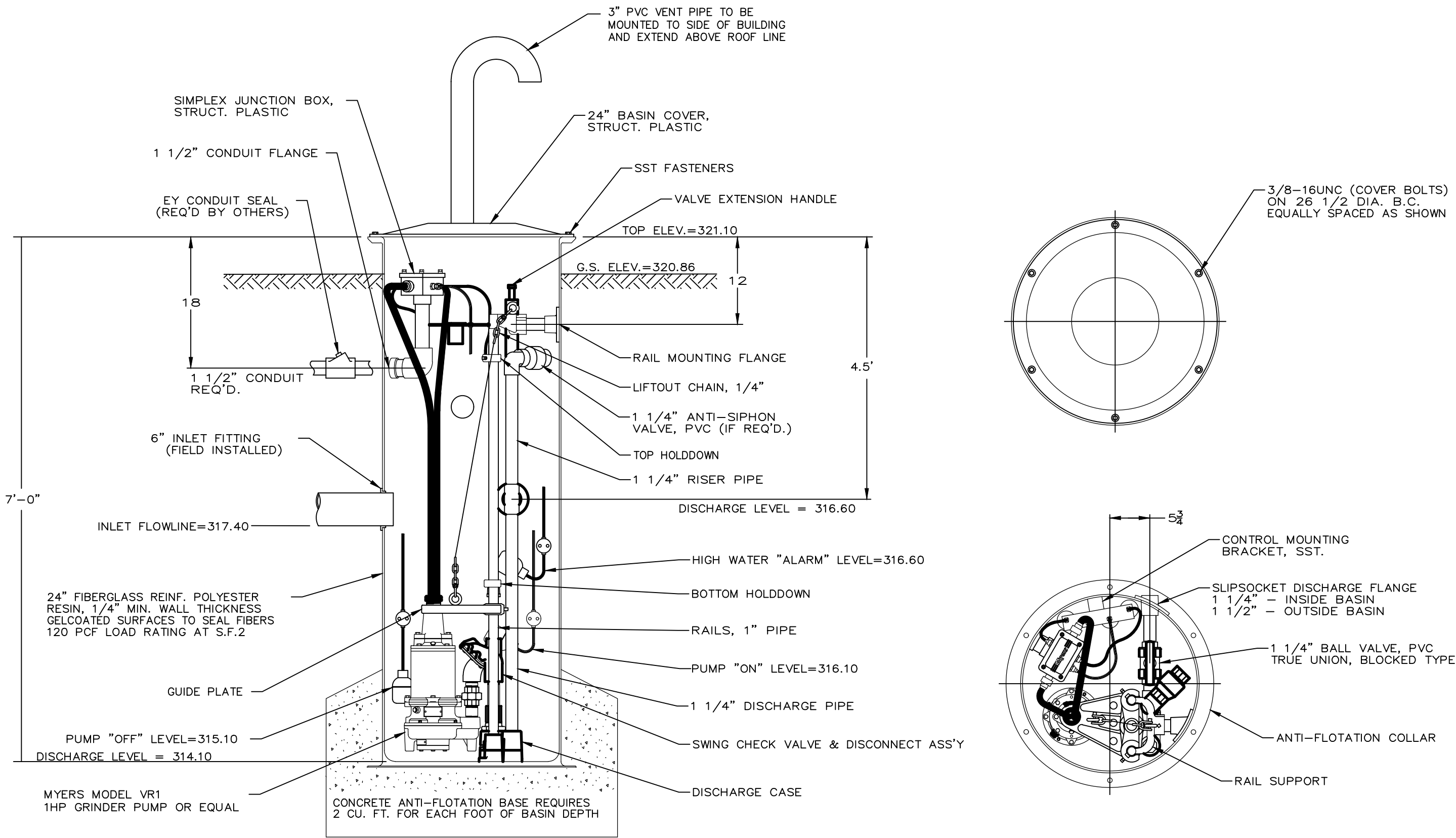
NOT TO SCALE



NOTE:
MODIFIED RIPRAP APRON (12" THICK) ON 6" GRANULAR BASE (M.02.01) ON MIRAFI 140N FABRIC OR EQUAL

TYPE A RIPRAP APRON (OP)

N.T.S.

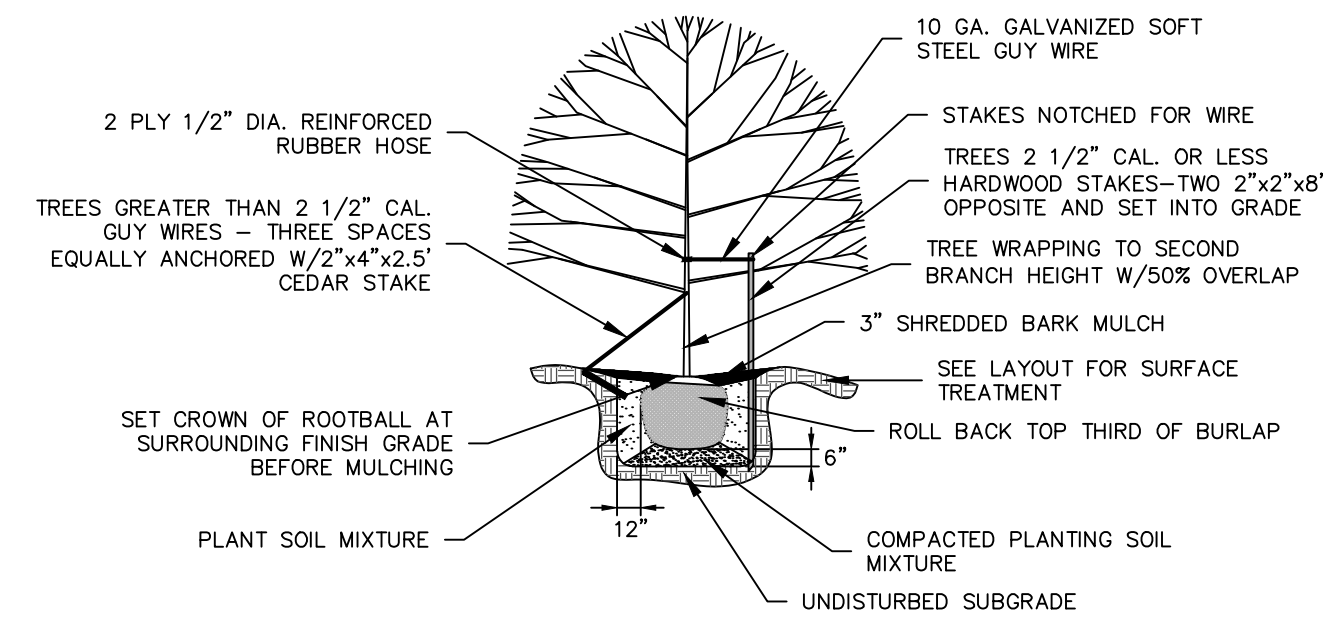


PUMP STATION SPECIFICATIONS:

1. PUMP - MYERS SUBMERSIBLE GRINDER PUMP MODEL VR1, 1 HP, 3450 RPM, 230V, SINGLE PHASE, OR APPROVED EQUAL
2. SIMPLEX SLIDE RAIL SYSTEM - TO BE COMPATIBLE WITH PUMP
3. FLOAT SWITCHES W/MOUNTING BRACKET TO BE COMPATIBLE WITH PUMP.
4. SIMPLEX PUMP CONTROL PANEL - TO BE COMPATIBLE WITH PUMP WITH ALARM PACKAGE NEMA 4X, CONTACTOR, CIRCUIT BREAKER, HOA SWITCH, ALARM HORN & LIGHT, & LOCKABLE LATCH.
5. HIGH WATER AND PUMP FAILURE TO BE CONNECTED TO VISUAL AND AUDIO ALARMS IN OCCUPIED SPACE.
6. MOTORS, CONDUIT, LIGHTS, BOXES, SWITCHES, CONTROLS, SHALL BE EXPLOSION PROOF WHEN LOCATED WITHIN THE PUMP CHAMBER BELOW THE ACCESS HATCH.
7. ALL ELECTRICAL WIRING SHALL CONFORM TO ALL STATE AND LOCAL REQUIREMENTS. ALL BOXES, SWITCHES, CONTROLS, CONDUITS, ETC. TO BE RATED FOR NEMA 4X.
8. CONTROL PANEL TO BE INSTALLED WITHIN THE BUILDING. ALARM MUST BE POWERED BY SEPARATE ELECTRICAL CIRCUIT THAN THE PUMP.
9. ALL COMPONENTS SHALL BE COMPATIBLE AND INSTALLED PER MANUFACTURER'S INSTRUCTIONS.

36" DUPLEX GRINDER PUMP SYSTEM

NOT TO SCALE



TREE PLANTING

NOT TO SCALE

REVISIONS

BY: LF/TAC CHK: JEU

Prepared For
Shawmut Equipment Company, Inc.
43 & 45 South Frontage Road
Vernon, Connecticut
Parcel ID: 29-134A-0011A & 29-234A-0011B

Details

DATE

6-24-22

SCALE

Not to Scale

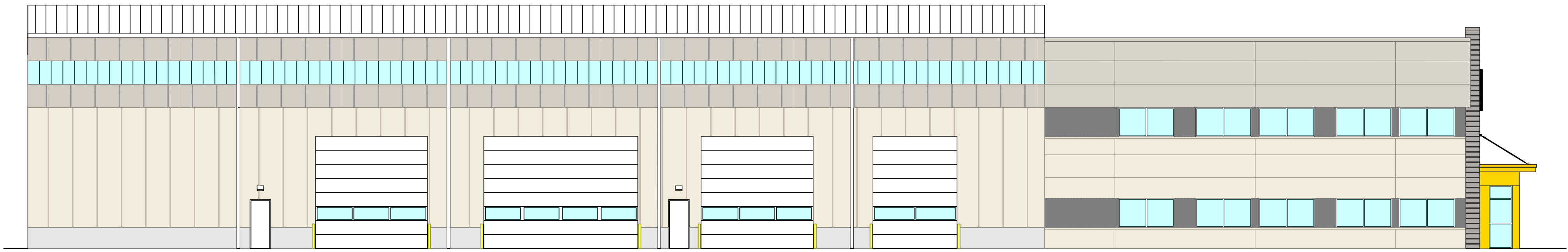
JOB NUMBER

2021-013

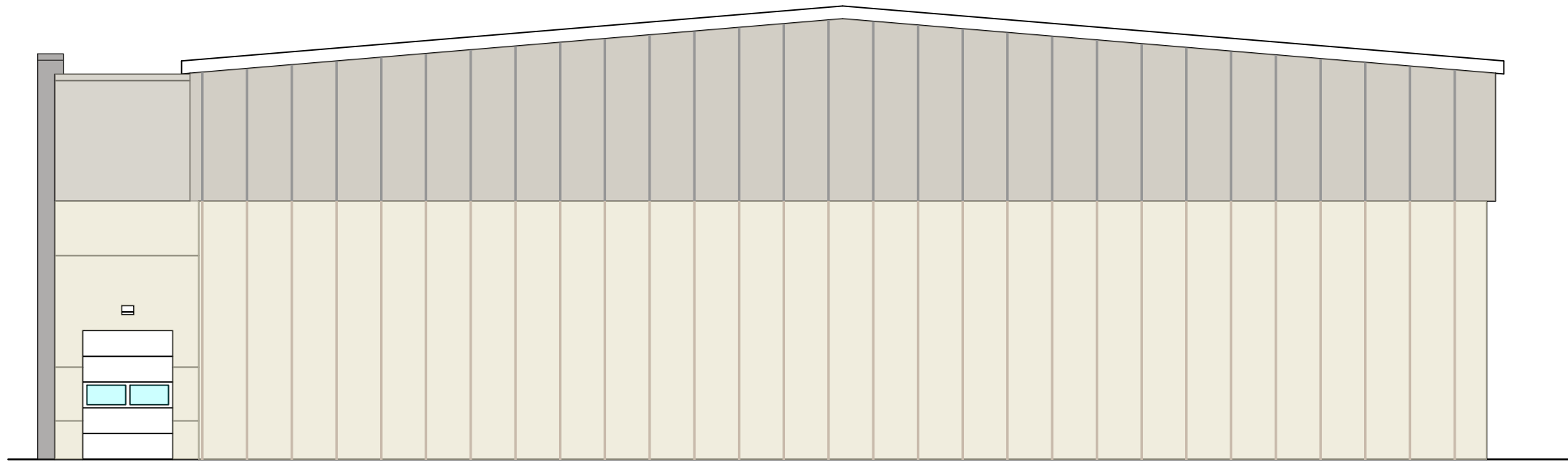
SHEET

9 of 9

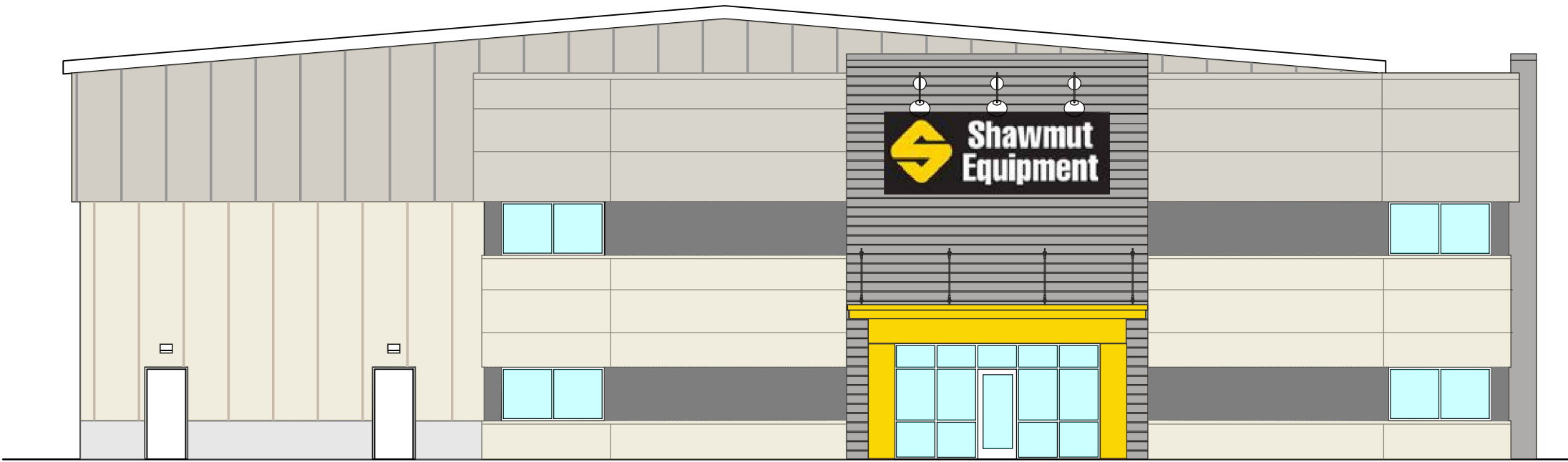




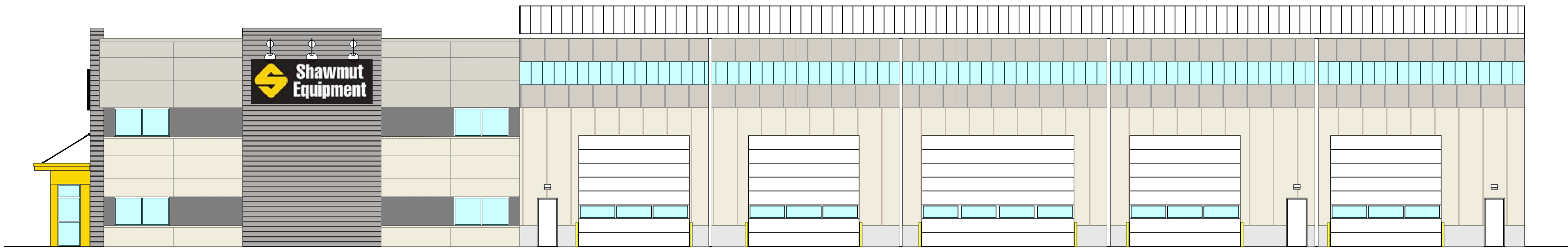
— SOUTH ELEVATION
SCALE: 3/32" = 1'-0"



— WEST ELEVATION
SCALE: 3/32" = 1'-0"



— EAST ELEVATION
SCALE: 3/32" = 1'-0"



— NORTH ELEVATION
SCALE: 3/32" = 1'-0"

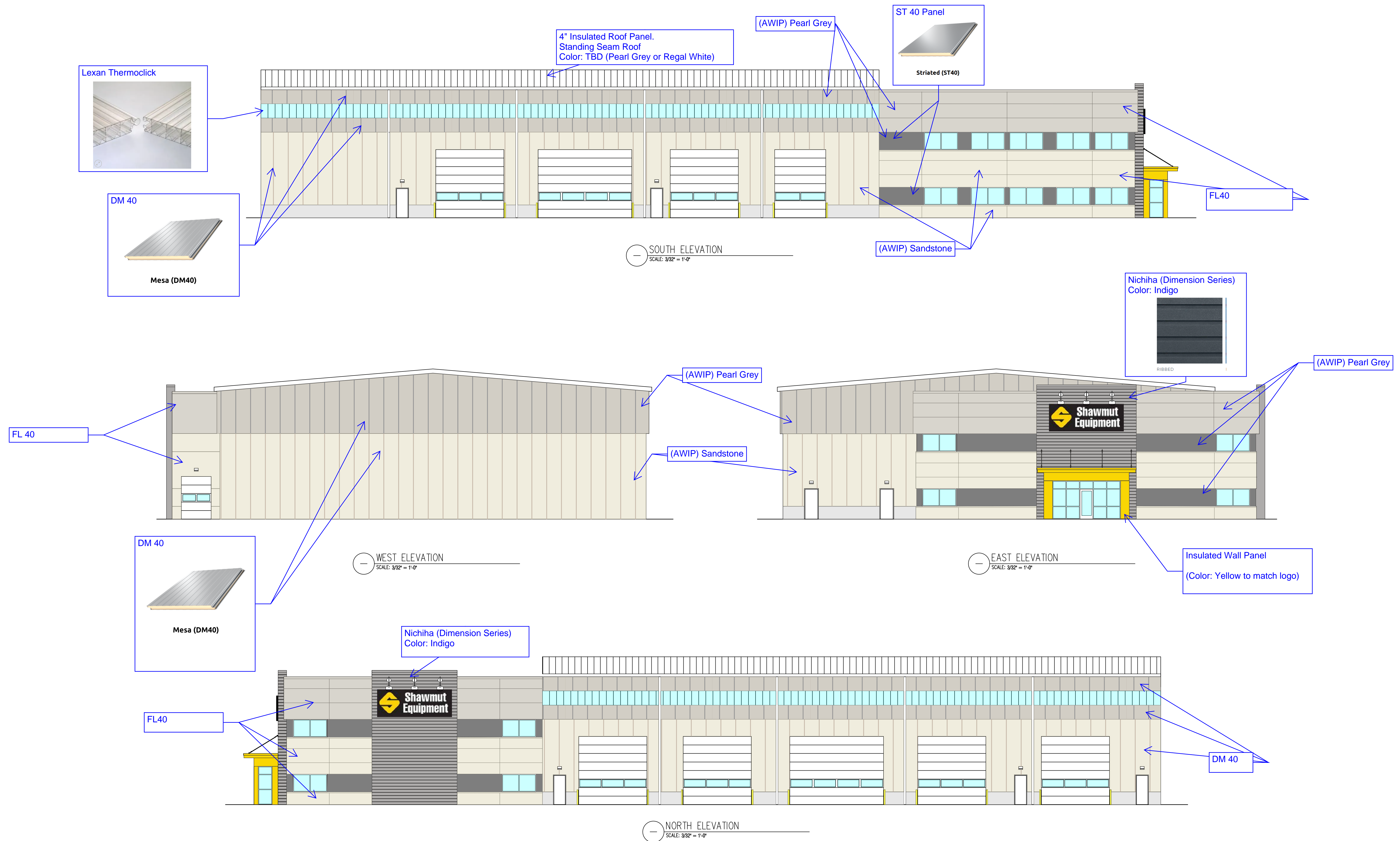


EXTERIOR ELEVATIONS

**STEPHEN FLESHMAN
ARCHITECT**

99 APPLE ROAD
BRIMFIELD, MA 01010

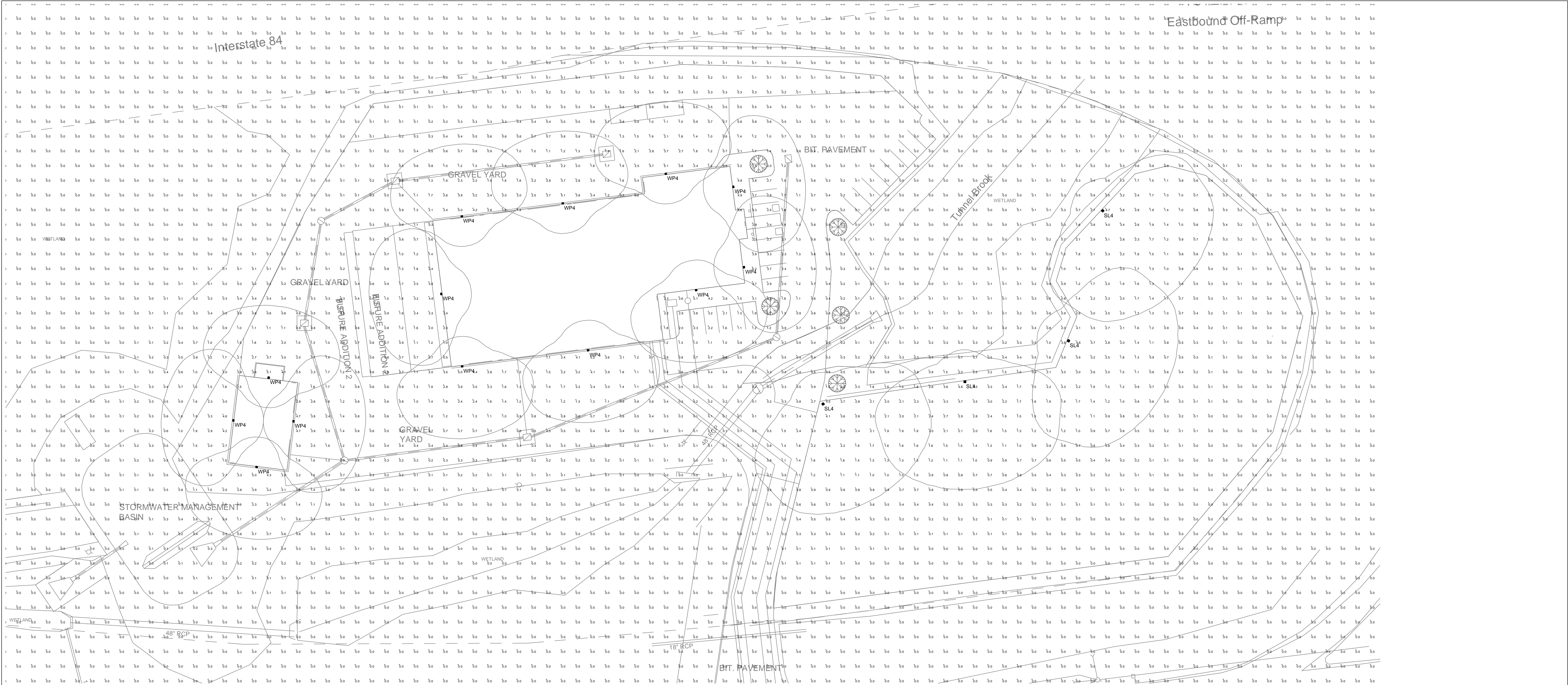
P: 508.347.7188
F: 508.347.8939
E: FLESHMAN@SF-ARCH.COM



EXTERIOR ELEVATIONS

**STEPHEN FLESHMAN
ARCHITECT**

99 APPLE ROAD
BRIMFIELD, MA 01010
P: 508.347.7188
F: 508.347.8939
E: FLESHMAN@SF-ARCH.COM



JOB NAME: SHAWMUT EQUIPMENT COMPANY
APEX LIGHTING SOLUTIONS
WORKPLANE/CALC PLANE: AT FINISH GRADE
MOUNTING HEIGHT: SEE LUMINAIRE SCHEDULE
APPS: LED
SALES: RT
SPECIFIER: PROGRESSIVE ENG

Luminaire Schedule							
Qty	Label	Arrangement	Lumens	Input Watts	LLF	BUG Rating	Description
13	WP4	Single	10618	89.9	0.850	B2-U0-G2	STONCO LPW32-90-NW-G3-4-UNV-FINISH / WALL MOUNTED @ 20FT AFG TO BOF
4	SL4	Single	18440	135.1	0.850	B3-U0-G3	GARDCO ECF-S-48L-900-NW-G2-AR-4-UNV-FINISH / MOUNTED TO 24FT POLE

Calculation Summary						
Label	Grid Height		Avg	Max	Min	
CalcPs_1	0		0.19	5.2	0.0	N.A.
BUILDING PARKING LOT			1.14	5.2	0.0	N.A.
RIGHT LOT			0.82	4.7	0.0	N.A.

GENERAL DISCLAIMER:

Calculations have been performed according to IES standards and good practice. Some differences between measured values and calculated results may occur due to tolerances in calculation methods, testing procedures, component performance, measurement techniques and field conditions such as voltage and temperature variations. Input data used to generate the attached calculations such as room dimensions, reflectances, furniture and architectural elements significantly affect the lighting calculations. If the real environment conditions do not match the input data, differences will occur between measured values and calculated values.

* LLF Determined Using Current Published Lamp Data

NOTE TO REVIEWER:

Total Light Loss Factor (LLF) applied at time of design is determined by applying the Lamp Lumen Depreciation (LLD) from current lamp manufacturer's catalog, a Luminaire Dirt Depreciation Factor (LDD) based on IES recommended values and a Ballast Factor (BF) from current ballast specification sheets. Application of an incorrect Light Loss Factor (LLF) will result in forecasts of performance that will not accurately depict actual results.

For proper comparison of photometric layouts, it is essential that you insist all designers use correct Light Loss Factors.



THE POINT WHERE ALL ASCENDING LINES CONVERGE

telephone 860.632.8766
www.apexlightingsolutions.com

PROJECT TITLE:

SHAWMUT EQUIPMENT COMPANY

DRAWING TITLE:

SITE LIGHTING
PHOTOMETRIC CALCULATION

SCALE : 1"=30'-0"

DATE: 7/14/22

DRAWN BY: LED

SHEET:

SL-1

DRAINAGE REPORT
Shawmut Equipment Company, Inc.
43 & 45 South Frontage Road
Vernon, CT

June 16, 2022

Prepared for:

Shawmut Equipment Company, Inc.
20 Tolland Turnpike
Manchester, Connecticut 06042

Project No. 2021-013

Prepared by:

J.R. Russo & Associates, LLC
Land Surveyors & Professional Engineers
P.O. Box 938
East Windsor, CT 06088
(860) 623-0569

I. INTRODUCTION

A. Project Description

Shawmut Equipment Company, Inc. is proposing the development of a 24,913 s.f. main building and 2,400 s.f. storage building for their crane sales and service business at 43 & 45 South Frontage Road in Vernon. The majority of the proposed outdoor storage and display area for the cranes will have a crushed stone surface to promote infiltration into the existing, underlying sandy soils. Runoff from new impervious areas will be directed to a new infiltration basin designed to provide treatment, ground water recharge, and peak flow attenuation in accordance with the Connecticut Stormwater Quality Manual.

B. Existing Conditions

The development area consists of two existing parcels at 43 & 45 South Frontage Road in Vernon. The existing parcels have a combined area of 8.76 acres. The parcels are surrounded by roads including Interstate 84 (I-84) to the north, South Frontage Road to the south, Tunnel Road to the west, and the I-84 Exit 66 eastbound off-ramp to the east. In addition, the paved remnants of a former road identified as the Feeder Road runs through the site from east to west. Access to the site is via an existing curb cut off of South Frontage Road.

Several wetlands associated with Tunnel Brook and other piped discharges from the drainage systems of the surrounding roadways are located at the site. These wetlands have been mapped and are shown on the Site Plans. Tunnel Brook, which is culverted under I-84, daylights just north of the site and traverses across the site from the northeast to the southwest, including several culverted sections on-site. The brook leaves the site at a headwall near the southwest corner and is piped southerly under South Frontage Road.

The site was formerly used for contractor storage and bus parking and was maintained as dirt and gravel yards. The Pre-Development Drainage Area Map in Appendix 3 shows the site from 1990. Based on more recent photographs, it appears that the site was vacated sometime between 1995 and 2005, and has subsequently become overgrown with vegetation.

Based on a review of the USDA Soil Survey of Connecticut, the soil on the site is Udorthents-Urban land complex and the soil in the surrounding area is Manchester gravelly sandy loam (see Soils Map in Appendix 2). The USDA Soil Survey defines groups of soils into Hydrologic Soil Groups (HSG) according to their runoff-producing characteristics. Soils are assigned to four groups (A, B, C, and D Groups). In group A, are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They typically are deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a hardpan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other nearly impervious material. The classification of the Manchester gravelly sandy loam is HSG A and the Udorthents-Urban land complex is HSG B/D.

On April 26, 2022, a series of 8 test pits were performed in the area of the proposed development to confirm the existing soil conditions. Test pits were excavated to depths ranging from 96-128 inches. Soils encountered included up to 14 inches of topsoil over red-brown fine sandy loam fill subsoils to a depth of 48-104 inches, overlying buried topsoil and olive fine sandy loam. Soil mottling indicative of the seasonal high water table was encountered in all test pits at depths ranging from 60-86 inches. Test pit logs are provided on the Site Plans. Based on the loamy sand soils encountered in the test pits, the HSG A soil classification was used for runoff calculations in the drainage design except for the wetland areas where HSG D was used.

II. STORMWATER RUNOFF ANALYSIS

A. Methodology

Peak runoff flow rates were determined for pre- and post-development conditions using Applied Microcomputer System's HydroCAD™ Stormwater Modeling System. This computer software employs the SCS Technical Release 55 and 20 (TR-55 & TR-20) methodology. The potential stormwater impacts downstream were evaluated for the 2-yr, 10-yr, 25-yr, and 100-yr; 24-hour storm events. The rainfall for these storm events was taken from NOAA Atlas 14 provided in Appendix 1. Based on the present drainage patterns, all runoff from the proposed development area flows into the wetlands and ultimately Tunnel Brook. As a result, the headwall at the southwest corner of the site where the brook discharges through a metal pipe under South Frontage Road was selected as the design point.

B. Pre-Development Hydrology

For the pre-development modeling, the site was modeled as the historical contractor yard. The pre-development site was modeled as seven subcatchments. Subcatchments 1S & 2S include the approximately 2.2 acres that drain into the northeastern wetland. Subcatchments 3S & 4S include the approximately 3.1 acres that drain into the northwestern wetland. Subcatchment 5S includes the approximately 5.5 acres that drain into the southern wetland. Subcatchment 6S includes the approximately 1.1 acres that drain into the southwestern wetland. Subcatchment 7S includes approximately 0.12 acres that drain into the southwestern wetland through a pipe crossing underneath the site's existing driveway. The pre-development drainage area map is provided in Appendix 3. For the purpose of the calculations, the eastern portion of the site was modeled as gravel surface. However, as a conservative measure, the area north of the Feeder Road between the northeastern and northwestern wetlands was modeled as fallow, bare soil. The wetlands were modeled as woods with HSG D. The pre-development runoff characteristics of the contributing area is provided on the HydroCAD data sheets in Appendix 4. The pre-development discharge rates from the site during the design storms are summarized in Table 1 below.

C. Post-Development Hydrology

New pavement will be limited to the access drive and parking lot at the eastern end of the building. The remaining access drive around the building will be gravel. Runoff from the paved and gravel areas will be collected via a series of catch basins and diverted to a new infiltration

basin. The infiltration basin has been designed in accordance with the CT Storm Water Quality Manual to provide treatment, groundwater recharge, and peak flow attenuation. The display areas on the eastern and northern portion of the site will be finished with crushed stone to promote infiltration. These crushed stone areas were modeled based on the underlying sands as fallow, bare soil.

As discussed above, several test pits were completed at the site to verify soil conditions. Test pits were located within the vicinity of the proposed infiltration basin. The test pits indicated subsoils of loamy sand. Therefore, the Rawls Rate of 2.41 inches/hour for loamy sand was used as the infiltration rate for the design of the infiltration basin. The basin was designed to allow over 2 feet of separation to the seasonal high water table that was encountered in the test pits.

The infiltration basin collects runoff from majority of the development area. It will be equipped with a forebay separated from the main part of the basin by a stone filter berm. The bottom of the basin will be set at elevation 311.0. The basin will be equipped with an 18" pipe as its primary outlet at an elevation of 312.9. The pipe will discharge at the edge of the southwestern wetland. The basin will also be equipped with an emergency 10-foot wide earthen spillway at elevation 315.0 that discharges to the edge of the northwestern wetland. The proposed storage capacity of the infiltration basin below the primary outlet was sized to exceed the water quality volume. Likewise, the surface basin forebay was sized to contain a minimum of 25% of the WQV per the requirements for infiltration basins. WQV calculations are provided in Appendix 6.

The same design point for the pre-development analysis was used for the post development analysis. The post development site was divided into 14 subcatchments. Subcatchments S1-S5 include the areas that will be collected by the catch basins and discharged into the infiltration basin. Subcatchments S6-S8 include the areas of roof runoff that will be collected and piped towards the basin. Subcatchment S9 includes the area that will directly sheet flow into the basin. Subcatchment S10 includes the area that will continue to drain overland directly into the northeastern wetland. Subcatchment S11 includes the area that will continue to drain overland directly into the southern wetland. Subcatchment 12S includes the area that will drain into the southwestern wetland through the pipe crossing underneath the site's driveway. Subcatchment S13 includes the area that will continue to drain overland directly into the northwestern wetland. Subcatchment S14 includes the area that will continue to drain overland directly into the southwestern wetland.

The post development drainage area map is provided in Appendix 3. The post development runoff characteristics of the subcatchments are provided on the HydroCAD data sheets in Appendix 5. As shown in the Table 1, the post-development peak rates of runoff from the site to the design point will be less than the pre-development rates.

**TABLE 1 – COMPARISON OF PRE- & POST-DEVELOPMENT
DISCHARGE RATES (CFS) TO DESIGN POINT**

	2-year	10-year	25-year	100-year
Pre-Development	4.21	14.39	22.51	36.51
Post Development	0.74	7.77	14.91	25.86

D. Pipe Sizing

The piping proposed at the site consists of smooth bore corrugated high density polyethylene pipe with smooth interior walls (CPEP-S). The roughness coefficient used for this pipe type is 0.012. The analysis provided in Appendix 5 indicates headwater elevation in the structure at each pipe inlet for the 25-year design storm and compares it to the flood elevation, which corresponds to the top of frame of the structure. The calculations indicate that all proposed pipes will have sufficient capacity to convey the 25-year storm event without surcharging out of the top of the structures.

E. Outlet Protection

Outfall protection for all pipe discharges will consist of Type A riprap aprons. Outlet protection for the infiltration's spillway will consist of a 12" thick modified riprap slope extended 5 feet beyond the toe of the slope.

F. Summary of Results

The proposed design and analysis indicates that the proposed development will not result in negative impacts downstream.

Appendix 1:
RAINFALL DATA



NOAA Atlas 14, Volume 10, Version 3
Location name: Vernon Rockville, Connecticut,
USA*

Latitude: 41.8324°, Longitude: -72.4632°
Elevation: 314.12 ft**

* source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.331 (0.253-0.433)	0.402 (0.307-0.526)	0.518 (0.394-0.680)	0.615 (0.466-0.813)	0.748 (0.551-1.03)	0.848 (0.614-1.20)	0.954 (0.672-1.39)	1.07 (0.718-1.60)	1.24 (0.805-1.92)	1.39 (0.877-2.18)
10-min	0.469 (0.358-0.613)	0.570 (0.435-0.746)	0.735 (0.559-0.965)	0.872 (0.660-1.15)	1.06 (0.780-1.46)	1.20 (0.869-1.69)	1.35 (0.952-1.97)	1.52 (1.02-2.27)	1.76 (1.14-2.72)	1.96 (1.24-3.08)
15-min	0.551 (0.421-0.721)	0.670 (0.511-0.877)	0.864 (0.658-1.14)	1.02 (0.776-1.36)	1.25 (0.918-1.72)	1.41 (1.02-1.99)	1.59 (1.12-2.32)	1.79 (1.20-2.66)	2.07 (1.34-3.20)	2.31 (1.46-3.63)
30-min	0.746 (0.570-0.976)	0.908 (0.693-1.19)	1.17 (0.892-1.54)	1.39 (1.05-1.84)	1.69 (1.25-2.34)	1.92 (1.39-2.70)	2.16 (1.52-3.15)	2.43 (1.63-3.62)	2.82 (1.82-4.34)	3.14 (1.98-4.93)
60-min	0.941 (0.719-1.23)	1.15 (0.875-1.50)	1.48 (1.13-1.95)	1.76 (1.33-2.32)	2.14 (1.57-2.95)	2.42 (1.75-3.42)	2.73 (1.92-3.98)	3.07 (2.05-4.57)	3.56 (2.30-5.49)	3.96 (2.51-6.23)
2-hr	1.21 (0.930-1.58)	1.47 (1.12-1.91)	1.88 (1.44-2.46)	2.23 (1.69-2.93)	2.70 (2.00-3.72)	3.05 (2.23-4.30)	3.43 (2.45-5.03)	3.89 (2.61-5.77)	4.58 (2.97-7.02)	5.17 (3.28-8.07)
3-hr	1.40 (1.07-1.81)	1.69 (1.30-2.19)	2.16 (1.66-2.82)	2.56 (1.95-3.35)	3.10 (2.31-4.26)	3.50 (2.56-4.93)	3.94 (2.82-5.78)	4.47 (3.01-6.62)	5.30 (3.44-8.10)	6.02 (3.83-9.36)
6-hr	1.76 (1.36-2.28)	2.13 (1.65-2.76)	2.74 (2.11-3.56)	3.25 (2.49-4.24)	3.94 (2.95-5.40)	4.45 (3.28-6.25)	5.01 (3.62-7.33)	5.71 (3.86-8.40)	6.81 (4.43-10.3)	7.77 (4.95-12.0)
12-hr	2.18 (1.69-2.81)	2.66 (2.06-3.43)	3.45 (2.66-4.45)	4.10 (3.15-5.32)	4.99 (3.75-6.81)	5.65 (4.17-7.89)	6.38 (4.62-9.28)	7.28 (4.93-10.6)	8.69 (5.68-13.1)	9.91 (6.34-15.2)
24-hr	2.57 (2.00-3.29)	3.17 (2.47-4.07)	4.16 (3.23-5.35)	4.98 (3.84-6.44)	6.11 (4.60-8.30)	6.93 (5.15-9.64)	7.85 (5.71-11.4)	9.00 (6.11-13.1)	10.8 (7.09-16.2)	12.4 (7.96-18.9)
2-day	2.89 (2.27-3.69)	3.62 (2.83-4.62)	4.81 (3.75-6.16)	5.80 (4.50-7.47)	7.16 (5.43-9.71)	8.15 (6.09-11.3)	9.26 (6.80-13.4)	10.7 (7.29-15.5)	13.0 (8.56-19.4)	15.1 (9.71-22.9)
3-day	3.15 (2.47-4.00)	3.94 (3.09-5.02)	5.25 (4.10-6.70)	6.33 (4.93-8.13)	7.82 (5.95-10.6)	8.91 (6.68-12.3)	10.1 (7.46-14.7)	11.7 (7.99-16.9)	14.3 (9.41-21.2)	16.6 (10.7-25.0)
4-day	3.38 (2.66-4.29)	4.22 (3.32-5.37)	5.61 (4.40-7.16)	6.77 (5.27-8.67)	8.35 (6.36-11.3)	9.50 (7.14-13.1)	10.8 (7.97-15.6)	12.5 (8.53-17.9)	15.2 (10.0-22.5)	17.7 (11.4-26.6)
7-day	4.01 (3.17-5.07)	4.97 (3.92-6.29)	6.53 (5.13-8.29)	7.82 (6.12-9.98)	9.60 (7.33-12.9)	10.9 (8.20-15.0)	12.4 (9.12-17.7)	14.2 (9.74-20.3)	17.2 (11.4-25.3)	19.9 (12.9-29.7)
10-day	4.65 (3.68-5.87)	5.66 (4.48-7.15)	7.32 (5.77-9.27)	8.69 (6.81-11.1)	10.6 (8.09-14.1)	12.0 (9.00-16.3)	13.5 (9.94-19.2)	15.4 (10.6-21.9)	18.5 (12.2-27.1)	21.1 (13.7-31.5)
20-day	6.67 (5.31-8.38)	7.75 (6.16-9.75)	9.52 (7.54-12.0)	11.0 (8.65-13.9)	13.0 (9.95-17.1)	14.5 (10.9-19.5)	16.1 (11.8-22.4)	18.0 (12.4-25.4)	20.7 (13.8-30.2)	23.0 (15.0-34.1)
30-day	8.40 (6.70-10.5)	9.50 (7.57-11.9)	11.3 (8.98-14.2)	12.8 (10.1-16.2)	14.9 (11.4-19.5)	16.5 (12.3-21.9)	18.1 (13.1-24.8)	19.8 (13.7-27.8)	22.3 (14.9-32.2)	24.2 (15.8-35.7)
45-day	10.6 (8.44-13.2)	11.7 (9.34-14.6)	13.6 (10.8-17.0)	15.1 (11.9-19.0)	17.2 (13.2-22.3)	18.9 (14.1-24.9)	20.5 (14.8-27.7)	22.1 (15.4-30.9)	24.2 (16.2-34.9)	25.7 (16.8-37.8)
60-day	12.4 (9.91-15.4)	13.5 (10.8-16.9)	15.4 (12.3-19.3)	17.0 (13.5-21.4)	19.2 (14.7-24.8)	20.9 (15.6-27.4)	22.5 (16.3-30.3)	24.1 (16.8-33.5)	25.9 (17.4-37.2)	27.2 (17.8-39.9)

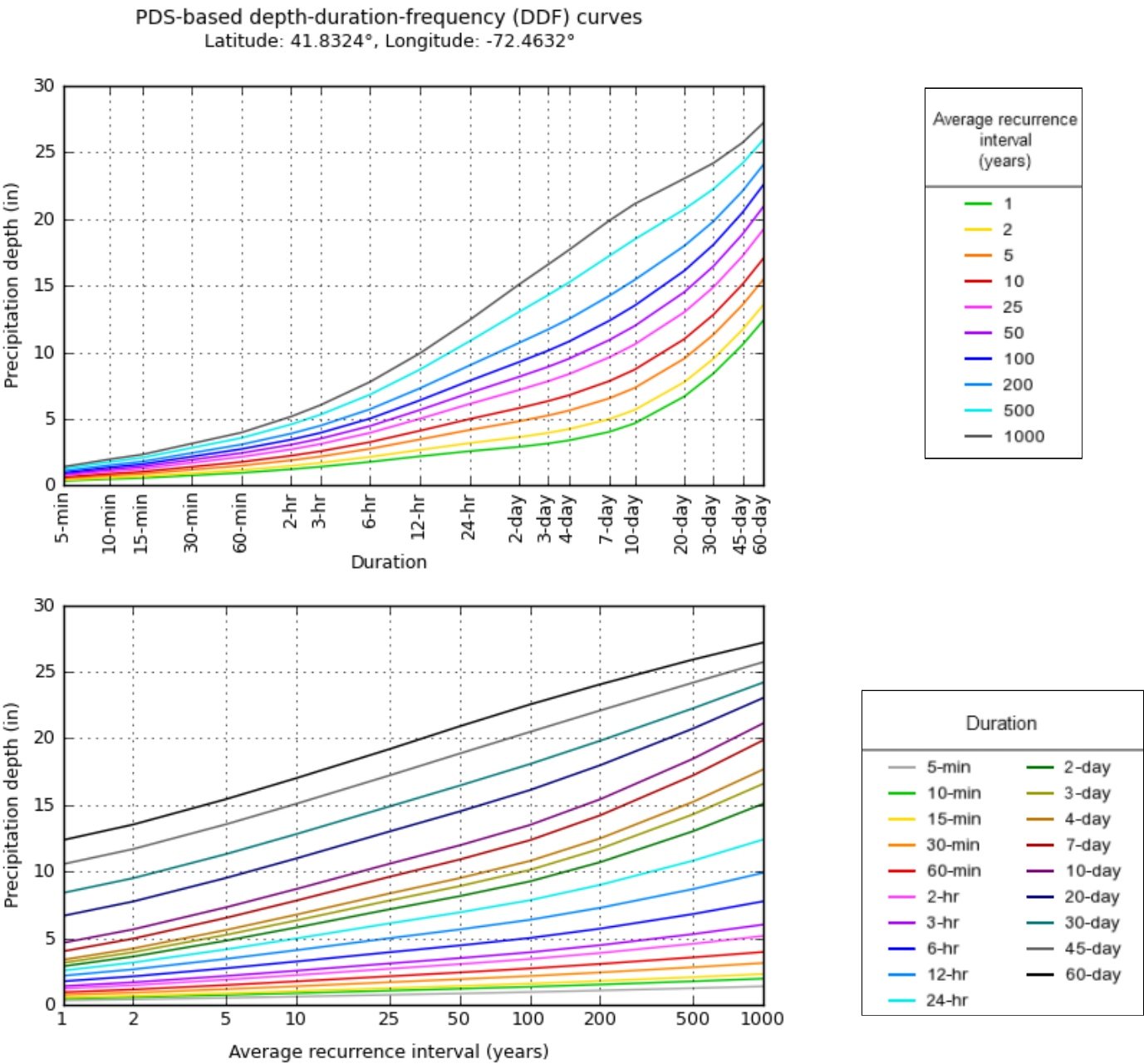
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



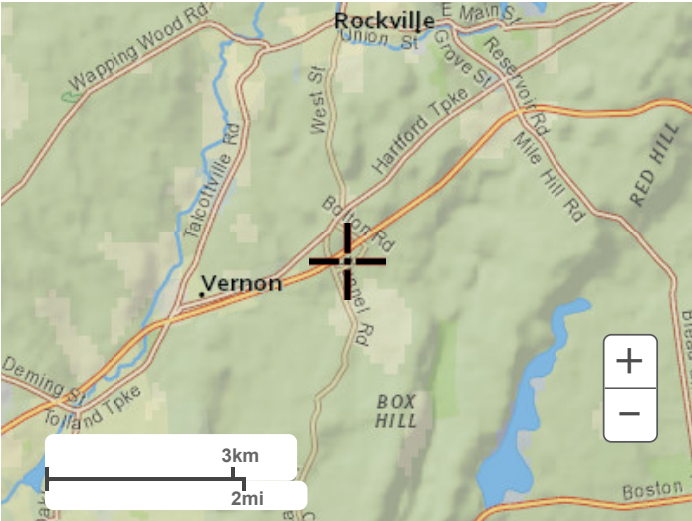
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Mon Nov 8 16:28:51 2021

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Maps & aerials

Small scale terrain



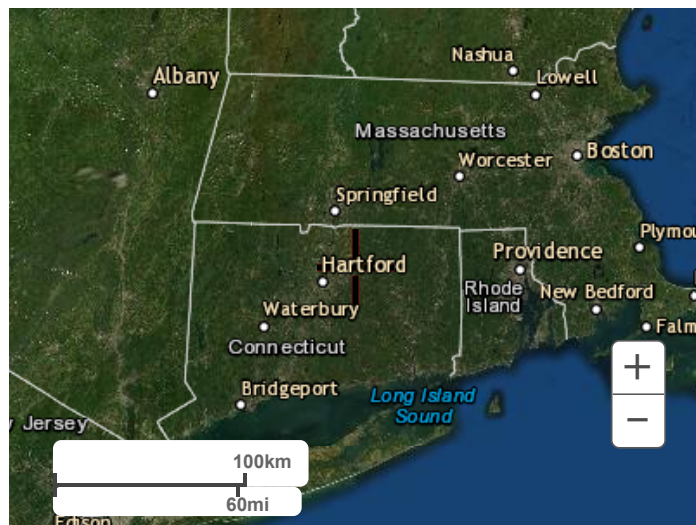
Large scale terrain



Large scale map



Large scale aerial



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Appendix 2:
NRCS SOILS INFORMATION



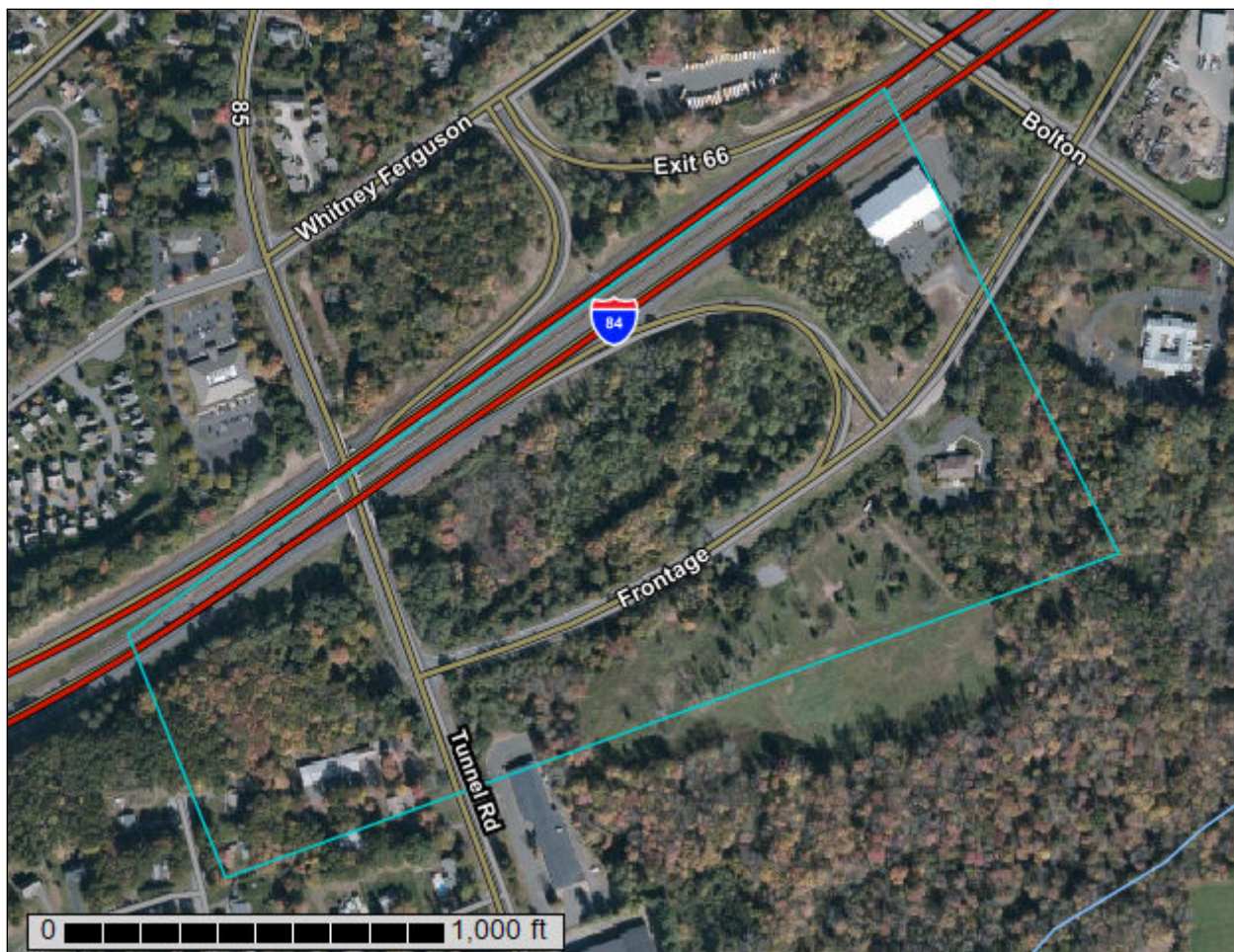
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for State of Connecticut



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 21, Sep 7, 2021

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

Date(s) aerial images were photographed: Sep 3, 2019—Oct 22, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Wilbraham silt loam, 0 to 3 percent slopes	1.6	2.8%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	0.0	0.0%
33B	Hartford sandy loam, 3 to 8 percent slopes	0.1	0.1%
35B	Penwood loamy sand, 3 to 8 percent slopes	0.0	0.0%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	13.1	22.5%
109	Fluvaquents-Udifluvents complex, frequently flooded	3.0	5.2%
303	Pits, quarries	5.0	8.6%
306	Udorthents-Urban land complex	35.3	60.7%
Totals for Area of Interest		58.1	100.0%

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

5—Wilbraham silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2wh26

Elevation: 0 to 770 feet

Mean annual precipitation: 36 to 53 inches

Mean annual air temperature: 41 to 54 degrees F

Frost-free period: 140 to 220 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Wilbraham and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wilbraham

Setting

Landform: Ground moraines, drumlins, hills, drainageways, depressions

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Head slope, base slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Red coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam

Bw1 - 8 to 19 inches: silt loam

Bw2 - 19 to 25 inches: silt loam

Cd - 25 to 61 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 16 to 35 inches to densic material

Drainage class: Poorly drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 0 to 10 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F144AY009CT - Wet Till Depressions

Hydric soil rating: Yes

Minor Components

Ludlow

Percent of map unit: 10 percent

Landform: Hills, drumlins

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Crest, base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Menlo

Percent of map unit: 5 percent

Landform: Drainageways, depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

17—Timakwa and Natchaug soils, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t2qx

Elevation: 0 to 1,420 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Timakwa and similar soils: 45 percent

Natchaug and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timakwa

Setting

Landform: Depressions

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Herbaceous and woody organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 12 inches: muck

Oa2 - 12 to 37 inches: muck

2Cg1 - 37 to 47 inches: very gravelly loamy coarse sand

2Cg2 - 47 to 60 inches: gravelly loamy very fine sand

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: RareNone
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 14.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands
Hydric soil rating: Yes

Description of Natchaug

Setting

Landform: Depressions, depressions, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loamy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy till

Typical profile

Oa1 - 0 to 12 inches: muck
Oa2 - 12 to 31 inches: muck
2Cg1 - 31 to 39 inches: silt loam
2Cg2 - 39 to 79 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.01 to 14.17 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: RareNone
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 17.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands

Custom Soil Resource Report

Hydric soil rating: Yes

Minor Components

Whitman

Percent of map unit: 7 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Maybid

Percent of map unit: 3 percent
Landform: Drainageways, terraces, depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Catden

Percent of map unit: 3 percent
Landform: Depressions, depressions, fens, depressions, kettles, marshes, bogs, swamps
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 2 percent
Landform: Drainageways, outwash deltas, depressions, outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

33B—Hartford sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lmw
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hartford and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hartford

Setting

Landform: Terraces, outwash plains

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy glaciofluvial deposits derived from sandstone and/or basalt

Typical profile

Ap - 0 to 8 inches: sandy loam

Bw1 - 8 to 20 inches: sandy loam

Bw2 - 20 to 26 inches: loamy sand

2C - 26 to 65 inches: stratified very gravelly coarse sand to loamy fine sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A

Ecological site: F145XY008MA - Dry Outwash

Hydric soil rating: No

Minor Components

Penwood

Percent of map unit: 5 percent

Landform: Terraces, outwash plains

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Ellington

Percent of map unit: 5 percent

Landform: Terraces, outwash plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Manchester

Percent of map unit: 5 percent

Landform: Terraces, outwash plains, kames, eskers

Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Branford

Percent of map unit: 5 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

35B—Penwood loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ln1
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Penwood and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Penwood

Setting

Landform: Terraces, outwash plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits derived from sandstone and shale

Typical profile

Ap - 0 to 8 inches: loamy sand
Bw1 - 8 to 18 inches: loamy sand
Bw2 - 18 to 30 inches: sand
C - 30 to 60 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.62 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F145XY008MA - Dry Outwash

Hydric soil rating: No

Minor Components

Branford

Percent of map unit: 5 percent

Landform: Terraces, outwash plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Hartford

Percent of map unit: 5 percent

Landform: Terraces, outwash plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Manchester

Percent of map unit: 5 percent

Landform: Terraces, outwash plains, kames, eskers

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Ellington

Percent of map unit: 3 percent

Landform: Terraces, outwash plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Unnamed, gravelly substratum

Percent of map unit: 2 percent

Hydric soil rating: No

37C—Manchester gravelly sandy loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9ln6

Elevation: 0 to 1,200 feet

Mean annual precipitation: 43 to 54 inches

Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 185 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Manchester and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Manchester

Setting

Landform: Terraces, outwash plains, kames, eskers

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Sandy and gravelly glaciofluvial deposits derived from sandstone and shale and/or basalt

Typical profile

Ap - 0 to 9 inches: gravelly sandy loam

Bw - 9 to 18 inches: gravelly loamy sand

C - 18 to 65 inches: stratified extremely gravelly coarse sand to very gravelly loamy sand

Properties and qualities

Slope: 3 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Ecological site: F145XY008MA - Dry Outwash

Hydric soil rating: No

Minor Components

Hartford

Percent of map unit: 5 percent

Landform: Terraces, outwash plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Penwood

Percent of map unit: 5 percent

Landform: Terraces, outwash plains

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Ellington

Percent of map unit: 3 percent

Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Branford

Percent of map unit: 3 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, nongravelly surface

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed, gravelly loamy sand surface

Percent of map unit: 2 percent
Hydric soil rating: No

109—Fluvaquents-Udifluvents complex, frequently flooded

Map Unit Setting

National map unit symbol: 9ljw
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents, frequently flooded, and similar soils: 50 percent
Udifluvents, frequently flooded, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents, Frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

A - 0 to 4 inches: silt loam
Cg1 - 4 to 14 inches: fine sand
Cg2 - 14 to 21 inches: very fine sand
Ab1 - 21 to 38 inches: silt loam
Ab2 - 38 to 45 inches: fine sandy loam
C'g3 - 45 to 55 inches: sand

Custom Soil Resource Report

A'b3 - 55 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: FrequentNone

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6w

Hydrologic Soil Group: B/D

Hydric soil rating: Yes

Description of Udifluvents, Frequently Flooded

Setting

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

A - 0 to 2 inches: fine sandy loam

C - 2 to 4 inches: loamy fine sand

Ap - 4 to 12 inches: fine sandy loam

AC - 12 to 18 inches: fine sandy loam

C1 - 18 to 35 inches: loamy sand

C2 - 35 to 38 inches: very gravelly loamy sand

C3 - 38 to 60 inches: very gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.57 to 35.99 in/hr)

Depth to water table: About 72 inches

Frequency of flooding: FrequentNone

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6w

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 5 percent

Landform: Flood plains

Hydric soil rating: Yes

Rippowam

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: Yes

Saco

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Occum

Percent of map unit: 2 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Pootatuck

Percent of map unit: 2 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

303—Pits, quarries

Map Unit Setting

National map unit symbol: 9lmc

Elevation: 0 to 2,000 feet

Mean annual precipitation: 40 to 54 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 120 to 185 days

Farmland classification: Not prime farmland

Map Unit Composition

Pits, quarries: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Quarries

Setting

Landform: Ridges, hills

Typical profile

R - 0 to 0 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 50 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)

Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: Unranked

Minor Components

Hollis

Percent of map unit: 5 percent

Landform: Ridges, hills

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Holyoke

Percent of map unit: 3 percent

Landform: Ridges, hills

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Farmington

Percent of map unit: 2 percent

Landform: Ridges, hills

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg

Elevation: 0 to 2,000 feet

Mean annual precipitation: 43 to 56 inches

Mean annual air temperature: 45 to 55 degrees F

Custom Soil Resource Report

Frost-free period: 120 to 185 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent

Urban land: 35 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Drift

Typical profile

A - 0 to 5 inches: loam

C1 - 5 to 21 inches: gravelly loam

C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)

Depth to water table: About 54 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 8 percent

Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent

Custom Soil Resource Report

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent

Hydric soil rating: No

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Appendix 3:
DRAINAGE AREA MAPS

AREA 4S
(12,320 S.F.)

AREA 1S
(49,907 S.F.)

AREA 3S
(120,720 S.F.)

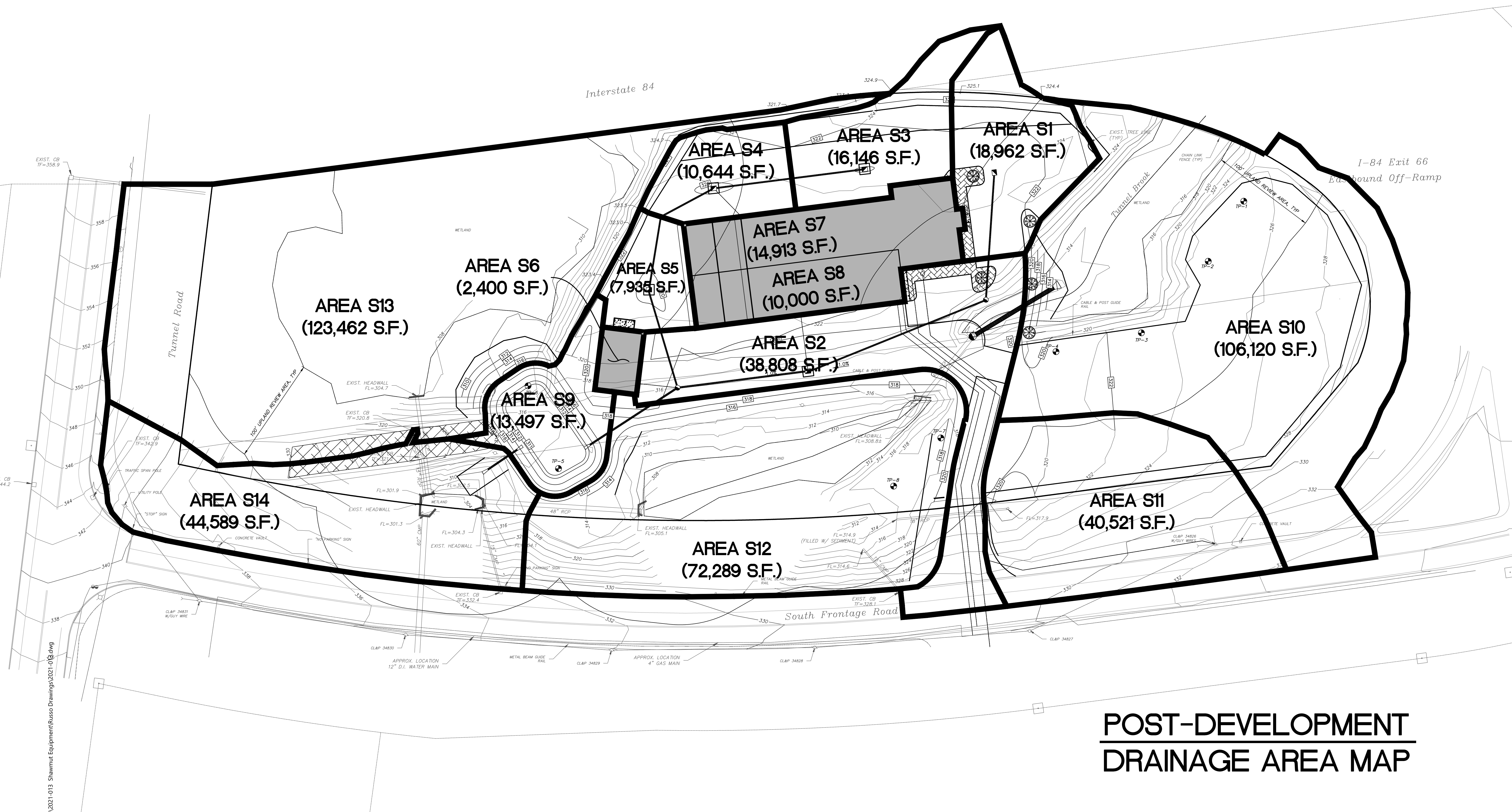
AREA 5S
(239,243 S.F.)

AREA 2S
(44,914 S.F.)

AREA 6S
(47,745 S.F.)

AREA 7S
(5,347 S.F.)

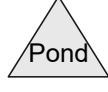
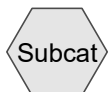
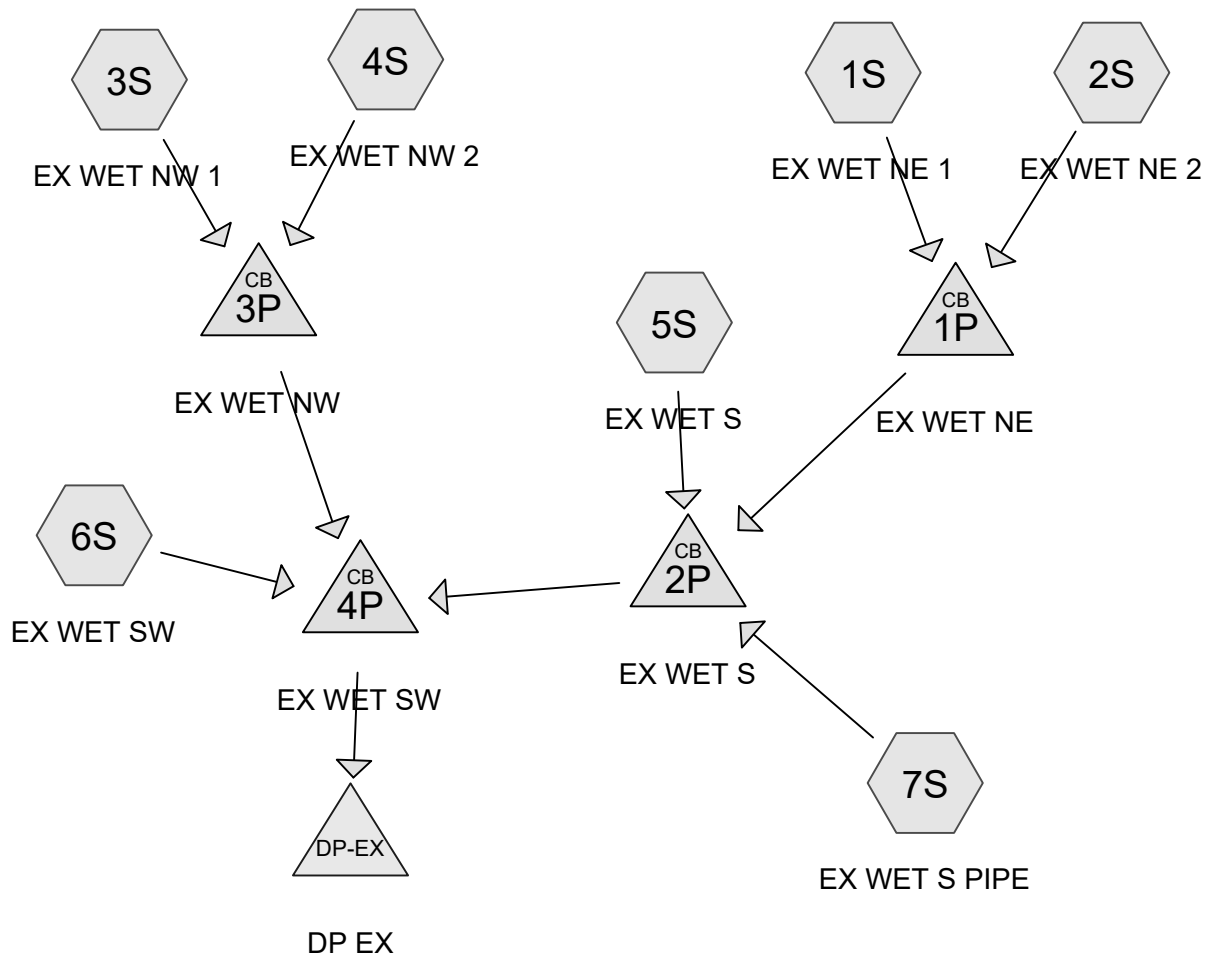
PRE-DEVELOPMENT
DRAINAGE AREA MAP



**POST-DEVELOPMENT
DRAINAGE AREA MAP**

Appendix 4:

PRE-DEVELOPMENT HYDROCAD ANALYSIS



2021-013 Shawmut Historical

Type III 24-hr 100-year Rainfall=7.85"

Prepared by J.R. Russo & Associates LLC

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Summary for Subcatchment 1S: EX WET NE 1

Runoff = 4.72 cfs @ 12.18 hrs, Volume= 0.414 af, Depth= 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.85"

Area (sf)	CN	Description
11,034	30	Woods, Good, HSG A
14,884	96	Gravel surface, HSG A
21,859	77	Fallow, bare soil, HSG A
2,130	30	Brush, Good, HSG A
49,907	70	Weighted Average
49,907		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	79	0.0644	0.12		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
0.2	21	0.0644	1.61		Sheet Flow, IM Smooth surfaces n= 0.011 P2= 3.20"
0.9	151	0.0311	2.84		Shallow Concentrated Flow, D Unpaved Kv= 16.1 fps
0.3	44	0.2051	2.26		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
12.5	295	Total			

Summary for Subcatchment 2S: EX WET NE 2

Runoff = 5.00 cfs @ 12.08 hrs, Volume= 0.343 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.85"

Area (sf)	CN	Description
17,776	77	Woods, Good, HSG D
3,736	77	Fallow, bare soil, HSG A
13,489	30	Woods, Good, HSG A
1,603	96	Gravel surface, HSG A
8,310	98	Paved parking, HSG A
44,914	67	Weighted Average
36,604		81.50% Pervious Area
8,310		18.50% Impervious Area

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

2021-013 Shawmut Historical

Prepared by J.R. Russo & Associates LLC

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Type III 24-hr 100-year Rainfall=7.85"

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Summary for Subcatchment 3S: EX WET NW 1

Runoff = 7.89 cfs @ 12.10 hrs, Volume= 0.595 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.85"

Area (sf)	CN	Description
9,832	77	Fallow, bare soil, HSG A
52,760	77	Woods, Good, HSG D
58,062	30	Woods, Good, HSG A
66	30	Brush, Good, HSG A
120,720	54	Weighted Average
120,720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	59	0.3010	0.21		Sheet Flow, W
					Woods: Light underbrush n= 0.400 P2= 3.20"
0.2	41	0.3010	3.40		Sheet Flow, D
					Smooth surfaces n= 0.011 P2= 3.20"
0.0	11	0.0579	3.87		Shallow Concentrated Flow, D
					Unpaved Kv= 16.1 fps
1.2	84	0.0579	1.20		Shallow Concentrated Flow, W
					Woodland Kv= 5.0 fps
6.2	195	Total			

Summary for Subcatchment 4S: EX WET NW 2

Runoff = 0.42 cfs @ 12.50 hrs, Volume= 0.058 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.85"

Area (sf)	CN	Description
6,100	77	Fallow, bare soil, HSG A
4,290	30	Brush, Good, HSG A
1,930	30	Woods, Good, HSG A
12,320	53	Weighted Average
12,320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.3	100	0.0110	0.06		Sheet Flow, W
					Woods: Light underbrush n= 0.400 P2= 3.20"
5.6	323	0.0372	0.96		Shallow Concentrated Flow, W
					Woodland Kv= 5.0 fps
32.9	423	Total			

Summary for Subcatchment 5S: EX WET S

Runoff = 20.46 cfs @ 12.18 hrs, Volume= 1.829 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.85"

Area (sf)	CN	Description
10,904	77	Woods, Good, HSG D
74,342	30	Woods, Good, HSG A
30,741	98	Paved parking, HSG A
43,023	96	Gravel surface, HSG A
73,222	77	Fallow, bare soil, HSG A
7,011	30	Brush, Good, HSG A
239,243	67	Weighted Average
208,502		87.15% Pervious Area
30,741		12.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	48	0.0574	1.81		Sheet Flow, IM Smooth surfaces n= 0.011 P2= 3.20"
1.8	12	0.0212	0.11		Sheet Flow, G Grass: Short n= 0.150 P2= 3.20"
6.0	41	0.0821	0.11		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	78	0.0351	0.94		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
1.6	291	0.0351	3.02		Shallow Concentrated Flow, IM Unpaved Kv= 16.1 fps
0.1	22	0.0351	3.80		Shallow Concentrated Flow, IM Paved Kv= 20.3 fps
0.1	26	0.0351	3.02		Shallow Concentrated Flow, IM Unpaved Kv= 16.1 fps
1.7	95	0.0351	0.94		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
13.1	613	Total			

Summary for Subcatchment 6S: EX WET SW

Runoff = 1.30 cfs @ 12.12 hrs, Volume= 0.125 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.85"

2021-013 Shawmut Historical

Type III 24-hr 100-year Rainfall=7.85"

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Area (sf)	CN	Description
695	77	Woods, Good, HSG D
33,229	30	Woods, Good, HSG A
4,573	98	Paved parking, HSG A
4,836	77	Fallow, bare soil, HSG A
4,412	30	Brush, Good, HSG A
47,745	42	Weighted Average
43,172		90.42% Pervious Area
4,573		9.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	42	0.1232	0.14		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.1232	2.55		Sheet Flow, D Smooth surfaces n= 0.011 P2= 3.20"
0.4	91	0.0616	4.00		Shallow Concentrated Flow, D Unpaved Kv= 16.1 fps
0.4	126	0.0704	5.39		Shallow Concentrated Flow, IM Paved Kv= 20.3 fps
6.4	317	Total			

Summary for Subcatchment 7S: EX WET S PIPE

Runoff = 0.38 cfs @ 12.12 hrs, Volume= 0.030 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.85"

Area (sf)	CN	Description
2,570	30	Woods, Good, HSG A
1,801	98	Paved parking, HSG A
331	96	Gravel surface, HSG A
645	30	Brush, Good, HSG A
5,347	57	Weighted Average
3,546		66.32% Pervious Area
1,801		33.68% Impervious Area

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Type III 24-hr 100-year Rainfall=7.85"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	29	0.0379	1.39		Sheet Flow, IM Smooth surfaces n= 0.011 P2= 3.20"
0.9	9	0.0585	0.16		Sheet Flow, G Grass: Short n= 0.150 P2= 3.20"
6.3	62	0.1629	0.16		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
0.0	4	0.1629	2.02		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
0.2	105	0.0286	10.89	19.24	Pipe Channel, PIPE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012 Concrete pipe, finished
0.3	28	0.1036	1.61		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
8.0	237	Total			

Summary for Pond 1P: EX WET NE

Inflow Area = 2.177 ac, 8.76% Impervious, Inflow Depth = 4.18" for 100-year event
 Inflow = 8.65 cfs @ 12.11 hrs, Volume= 0.757 af
 Outflow = 8.65 cfs @ 12.12 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.6 min
 Primary = 8.65 cfs @ 12.12 hrs, Volume= 0.757 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 310.52' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	309.50'	48.0" Round Culvert L= 75.0' Ke= 0.500 Inlet / Outlet Invert= 309.50' / 308.50' S= 0.0133 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 12.57 sf

Primary OutFlow Max=8.65 cfs @ 12.12 hrs HW=310.52' TW=307.01' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 8.65 cfs @ 3.43 fps)

Summary for Pond 2P: EX WET S

Inflow Area = 7.792 ac, 12.04% Impervious, Inflow Depth = 4.03" for 100-year event
 Inflow = 28.66 cfs @ 12.17 hrs, Volume= 2.616 af
 Outflow = 28.66 cfs @ 12.18 hrs, Volume= 2.616 af, Atten= 0%, Lag= 0.6 min
 Primary = 28.66 cfs @ 12.18 hrs, Volume= 2.616 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 307.14' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	305.10'	48.0" Round Culvert L= 153.0' Ke= 0.500 Inlet / Outlet Invert= 305.10' / 304.10' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 12.57 sf

Primary OutFlow Max=28.65 cfs @ 12.18 hrs HW=307.14' TW=303.33' (Dynamic Tailwater)

↑**1=Culvert** (Barrel Controls 28.65 cfs @ 6.47 fps)

Summary for Pond 3P: EX WET NW

Inflow Area = 3.054 ac, 0.00% Impervious, Inflow Depth = 2.57" for 100-year event
 Inflow = 8.01 cfs @ 12.10 hrs, Volume= 0.653 af
 Outflow = 8.01 cfs @ 12.11 hrs, Volume= 0.653 af, Atten= 0%, Lag= 0.6 min
 Primary = 8.01 cfs @ 12.11 hrs, Volume= 0.653 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 305.77' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	304.70'	36.0" Round Culvert L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 304.70' / 302.50' S= 0.0232 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf

Primary OutFlow Max=8.00 cfs @ 12.11 hrs HW=305.77' TW=303.23' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 8.00 cfs @ 3.53 fps)

Summary for Pond 4P: EX WET SW

Inflow Area = 11.942 ac, 8.73% Impervious, Inflow Depth = 3.41" for 100-year event
 Inflow = 36.51 cfs @ 12.15 hrs, Volume= 3.395 af
 Outflow = 36.51 cfs @ 12.16 hrs, Volume= 3.395 af, Atten= 0%, Lag= 0.6 min
 Primary = 36.51 cfs @ 12.16 hrs, Volume= 3.395 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 303.34' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	301.30'	60.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 301.30' / 290.00' S= 0.0856 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 19.63 sf

Primary OutFlow Max=36.49 cfs @ 12.16 hrs HW=303.34' TW=0.00' (Dynamic Tailwater)

↑**1=Culvert** (Inlet Controls 36.49 cfs @ 4.86 fps)

Summary for Pond DP-EX: DP EX

Inflow Area = 11.942 ac, 8.73% Impervious, Inflow Depth = 3.41" for 100-year event
 Inflow = 36.51 cfs @ 12.16 hrs, Volume= 3.395 af
 Primary = 36.51 cfs @ 12.17 hrs, Volume= 3.395 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

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Type III 24-hr 2-year Rainfall=3.17"

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Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: EX WET NE 1 Runoff Area=49,907 sf 0.00% Impervious Runoff Depth=0.81"
 Flow Length=295' Tc=12.5 min CN=70 Runoff=0.78 cfs 0.077 af

Subcatchment2S: EX WET NE 2 Runoff Area=44,914 sf 18.50% Impervious Runoff Depth=0.67"
 Tc=5.0 min CN=67 Runoff=0.70 cfs 0.058 af

Subcatchment3S: EX WET NW 1 Runoff Area=120,720 sf 0.00% Impervious Runoff Depth=0.22"
 Flow Length=195' Tc=6.2 min CN=54 Runoff=0.22 cfs 0.050 af

Subcatchment4S: EX WET NW 2 Runoff Area=12,320 sf 0.00% Impervious Runoff Depth=0.19"
 Flow Length=423' Tc=32.9 min CN=53 Runoff=0.01 cfs 0.004 af

Subcatchment5S: EX WET S Runoff Area=239,243 sf 12.85% Impervious Runoff Depth=0.67"
 Flow Length=613' Tc=13.1 min CN=67 Runoff=2.82 cfs 0.307 af

Subcatchment6S: EX WET SW Runoff Area=47,745 sf 9.58% Impervious Runoff Depth=0.01"
 Flow Length=317' Tc=6.4 min CN=42 Runoff=0.00 cfs 0.001 af

Subcatchment7S: EX WET S PIPE Runoff Area=5,347 sf 33.68% Impervious Runoff Depth=0.30"
 Flow Length=237' Tc=8.0 min CN=57 Runoff=0.02 cfs 0.003 af

Pond 1P: EX WET NE Peak Elev=309.88' Inflow=1.30 cfs 0.135 af
 48.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/ Outflow=1.30 cfs 0.135 af

Pond 2P: EX WET S Peak Elev=305.80' Inflow=4.06 cfs 0.445 af
 48.0" Round Culvert n=0.012 L=153.0' S=0.0065 '/ Outflow=4.06 cfs 0.445 af

Pond 3P: EX WET NW Peak Elev=304.87' Inflow=0.22 cfs 0.054 af
 36.0" Round Culvert n=0.012 L=95.0' S=0.0232 '/ Outflow=0.22 cfs 0.054 af

Pond 4P: EX WET SW Peak Elev=301.96' Inflow=4.21 cfs 0.501 af
 60.0" Round Culvert n=0.025 L=132.0' S=0.0856 '/ Outflow=4.21 cfs 0.501 af

Pond DP-EX: DP EX Inflow=4.21 cfs 0.501 af
 Primary=4.21 cfs 0.501 af

Total Runoff Area = 11.942 ac Runoff Volume = 0.501 af Average Runoff Depth = 0.50"
91.27% Pervious = 10.899 ac 8.73% Impervious = 1.043 ac

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Type III 24-hr 10-year Rainfall=4.98"

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Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: EX WET NE 1 Runoff Area=49,907 sf 0.00% Impervious Runoff Depth=2.02"
 Flow Length=295' Tc=12.5 min CN=70 Runoff=2.15 cfs 0.193 af

Subcatchment2S: EX WET NE 2 Runoff Area=44,914 sf 18.50% Impervious Runoff Depth=1.79"
 Tc=5.0 min CN=67 Runoff=2.17 cfs 0.154 af

Subcatchment3S: EX WET NW 1 Runoff Area=120,720 sf 0.00% Impervious Runoff Depth=0.91"
 Flow Length=195' Tc=6.2 min CN=54 Runoff=2.26 cfs 0.210 af

Subcatchment4S: EX WET NW 2 Runoff Area=12,320 sf 0.00% Impervious Runoff Depth=0.85"
 Flow Length=423' Tc=32.9 min CN=53 Runoff=0.12 cfs 0.020 af

Subcatchment5S: EX WET S Runoff Area=239,243 sf 12.85% Impervious Runoff Depth=1.79"
 Flow Length=613' Tc=13.1 min CN=67 Runoff=8.80 cfs 0.819 af

Subcatchment6S: EX WET SW Runoff Area=47,745 sf 9.58% Impervious Runoff Depth=0.31"
 Flow Length=317' Tc=6.4 min CN=42 Runoff=0.11 cfs 0.028 af

Subcatchment7S: EX WET S PIPE Runoff Area=5,347 sf 33.68% Impervious Runoff Depth=1.09"
 Flow Length=237' Tc=8.0 min CN=57 Runoff=0.12 cfs 0.011 af

Pond 1P: EX WET NE Peak Elev=310.17' Inflow=3.82 cfs 0.347 af
 48.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/' Outflow=3.82 cfs 0.347 af

Pond 2P: EX WET S Peak Elev=306.37' Inflow=12.44 cfs 1.177 af
 48.0" Round Culvert n=0.012 L=153.0' S=0.0065 '/' Outflow=12.44 cfs 1.177 af

Pond 3P: EX WET NW Peak Elev=305.25' Inflow=2.27 cfs 0.230 af
 36.0" Round Culvert n=0.012 L=95.0' S=0.0232 '/' Outflow=2.27 cfs 0.230 af

Pond 4P: EX WET SW Peak Elev=302.54' Inflow=14.39 cfs 1.435 af
 60.0" Round Culvert n=0.025 L=132.0' S=0.0856 '/' Outflow=14.39 cfs 1.435 af

Pond DP-EX: DP EX Inflow=14.39 cfs 1.435 af
 Primary=14.39 cfs 1.435 af

Total Runoff Area = 11.942 ac Runoff Volume = 1.435 af Average Runoff Depth = 1.44"
91.27% Pervious = 10.899 ac 8.73% Impervious = 1.043 ac

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Type III 24-hr 25-year Rainfall=6.11"

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Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: EX WET NE 1 Runoff Area=49,907 sf 0.00% Impervious Runoff Depth=2.89"
 Flow Length=295' Tc=12.5 min CN=70 Runoff=3.13 cfs 0.276 af

Subcatchment2S: EX WET NE 2 Runoff Area=44,914 sf 18.50% Impervious Runoff Depth=2.61"
 Tc=5.0 min CN=67 Runoff=3.23 cfs 0.225 af

Subcatchment3S: EX WET NW 1 Runoff Area=120,720 sf 0.00% Impervious Runoff Depth=1.50"
 Flow Length=195' Tc=6.2 min CN=54 Runoff=4.26 cfs 0.347 af

Subcatchment4S: EX WET NW 2 Runoff Area=12,320 sf 0.00% Impervious Runoff Depth=1.42"
 Flow Length=423' Tc=32.9 min CN=53 Runoff=0.22 cfs 0.034 af

Subcatchment5S: EX WET S Runoff Area=239,243 sf 12.85% Impervious Runoff Depth=2.61"
 Flow Length=613' Tc=13.1 min CN=67 Runoff=13.19 cfs 1.196 af

Subcatchment6S: EX WET SW Runoff Area=47,745 sf 9.58% Impervious Runoff Depth=0.65"
 Flow Length=317' Tc=6.4 min CN=42 Runoff=0.38 cfs 0.060 af

Subcatchment7S: EX WET S PIPE Runoff Area=5,347 sf 33.68% Impervious Runoff Depth=1.74"
 Flow Length=237' Tc=8.0 min CN=57 Runoff=0.21 cfs 0.018 af

Pond 1P: EX WET NE Peak Elev=310.31' Inflow=5.65 cfs 0.501 af
 48.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/' Outflow=5.65 cfs 0.501 af

Pond 2P: EX WET S Peak Elev=306.69' Inflow=18.54 cfs 1.715 af
 48.0" Round Culvert n=0.012 L=153.0' S=0.0065 '/' Outflow=18.54 cfs 1.715 af

Pond 3P: EX WET NW Peak Elev=305.47' Inflow=4.30 cfs 0.380 af
 36.0" Round Culvert n=0.012 L=95.0' S=0.0232 '/' Outflow=4.30 cfs 0.380 af

Pond 4P: EX WET SW Peak Elev=302.87' Inflow=22.51 cfs 2.155 af
 60.0" Round Culvert n=0.025 L=132.0' S=0.0856 '/' Outflow=22.51 cfs 2.155 af

Pond DP-EX: DP EX Inflow=22.51 cfs 2.155 af
 Primary=22.51 cfs 2.155 af

Total Runoff Area = 11.942 ac Runoff Volume = 2.155 af Average Runoff Depth = 2.17"
91.27% Pervious = 10.899 ac 8.73% Impervious = 1.043 ac

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Type III 24-hr 100-year Rainfall=7.85"

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Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment1S: EX WET NE 1 Runoff Area=49,907 sf 0.00% Impervious Runoff Depth=4.34"
 Flow Length=295' Tc=12.5 min CN=70 Runoff=4.72 cfs 0.414 af

Subcatchment2S: EX WET NE 2 Runoff Area=44,914 sf 18.50% Impervious Runoff Depth=4.00"
 Tc=5.0 min CN=67 Runoff=5.00 cfs 0.343 af

Subcatchment3S: EX WET NW 1 Runoff Area=120,720 sf 0.00% Impervious Runoff Depth=2.58"
 Flow Length=195' Tc=6.2 min CN=54 Runoff=7.89 cfs 0.595 af

Subcatchment4S: EX WET NW 2 Runoff Area=12,320 sf 0.00% Impervious Runoff Depth=2.47"
 Flow Length=423' Tc=32.9 min CN=53 Runoff=0.42 cfs 0.058 af

Subcatchment5S: EX WET S Runoff Area=239,243 sf 12.85% Impervious Runoff Depth=4.00"
 Flow Length=613' Tc=13.1 min CN=67 Runoff=20.46 cfs 1.829 af

Subcatchment6S: EX WET SW Runoff Area=47,745 sf 9.58% Impervious Runoff Depth=1.37"
 Flow Length=317' Tc=6.4 min CN=42 Runoff=1.30 cfs 0.125 af

Subcatchment7S: EX WET S PIPE Runoff Area=5,347 sf 33.68% Impervious Runoff Depth=2.90"
 Flow Length=237' Tc=8.0 min CN=57 Runoff=0.38 cfs 0.030 af

Pond 1P: EX WET NE Peak Elev=310.52' Inflow=8.65 cfs 0.757 af
 48.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/' Outflow=8.65 cfs 0.757 af

Pond 2P: EX WET S Peak Elev=307.14' Inflow=28.66 cfs 2.616 af
 48.0" Round Culvert n=0.012 L=153.0' S=0.0065 '/' Outflow=28.66 cfs 2.616 af

Pond 3P: EX WET NW Peak Elev=305.77' Inflow=8.01 cfs 0.653 af
 36.0" Round Culvert n=0.012 L=95.0' S=0.0232 '/' Outflow=8.01 cfs 0.653 af

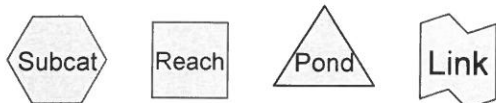
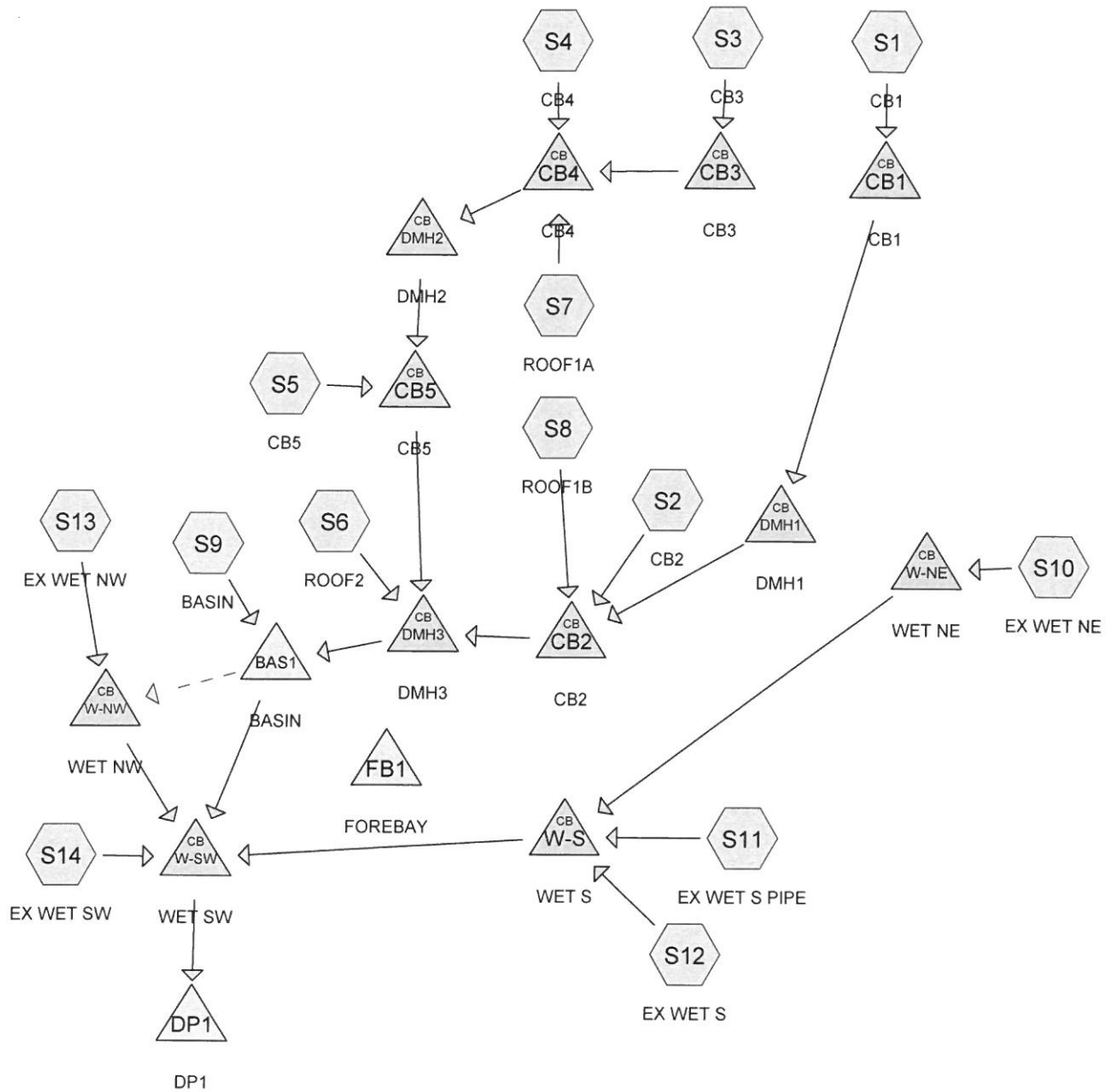
Pond 4P: EX WET SW Peak Elev=303.34' Inflow=36.51 cfs 3.395 af
 60.0" Round Culvert n=0.025 L=132.0' S=0.0856 '/' Outflow=36.51 cfs 3.395 af

Pond DP-EX: DP EX Inflow=36.51 cfs 3.395 af
 Primary=36.51 cfs 3.395 af

Total Runoff Area = 11.942 ac Runoff Volume = 3.395 af Average Runoff Depth = 3.41"
91.27% Pervious = 10.899 ac 8.73% Impervious = 1.043 ac

Appendix 5:

POST-DEVELOPMENT HYDROCAD ANALYSIS



Routing Diagram for 2021-013 Shawmut
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2021-013 Shawmut

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Post Development
Type III 24-hr 25-year Rainfall=6.11"

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Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S1: CB1	Runoff Area=18,962 sf 58.36% Impervious Runoff Depth=3.48" Flow Length=140' Tc=15.3 min CN=76 Runoff=1.33 cfs 0.126 af
Subcatchment S10: EX WET NE	Runoff Area=106,120 sf 2.74% Impervious Runoff Depth=1.99" Flow Length=497' Tc=11.7 min CN=60 Runoff=4.45 cfs 0.405 af
Subcatchment S11: EX WET S PIPE	Runoff Area=40,521 sf 19.48% Impervious Runoff Depth=1.91" Flow Length=500' Tc=12.0 min CN=59 Runoff=1.60 cfs 0.148 af
Subcatchment S12: EX WET S	Runoff Area=72,289 sf 0.00% Impervious Runoff Depth=0.53" Flow Length=63' Slope=0.2618 '/' Tc=5.3 min CN=40 Runoff=0.40 cfs 0.074 af
Subcatchment S13: EX WET NW	Runoff Area=123,462 sf 0.00% Impervious Runoff Depth=1.27" Flow Length=195' Tc=8.5 min CN=51 Runoff=3.17 cfs 0.300 af
Subcatchment S14: EX WET SW	Runoff Area=44,589 sf 0.00% Impervious Runoff Depth=0.19" Flow Length=317' Tc=12.4 min CN=33 Runoff=0.03 cfs 0.016 af
Subcatchment S2: CB2	Runoff Area=38,808 sf 40.62% Impervious Runoff Depth=5.41" Tc=5.0 min CN=94 Runoff=5.37 cfs 0.401 af
Subcatchment S3: CB3	Runoff Area=16,146 sf 0.62% Impervious Runoff Depth=3.58" Flow Length=221' Tc=23.5 min CN=77 Runoff=0.98 cfs 0.110 af
Subcatchment S4: CB4	Runoff Area=10,644 sf 0.94% Impervious Runoff Depth=4.51" Tc=5.0 min CN=86 Runoff=1.31 cfs 0.092 af
Subcatchment S5: CB5	Runoff Area=7,935 sf 1.26% Impervious Runoff Depth=4.95" Tc=5.0 min CN=90 Runoff=1.04 cfs 0.075 af
Subcatchment S6: ROOF2	Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>5.87" Tc=5.0 min CN=98 Runoff=0.34 cfs 0.027 af
Subcatchment S7: ROOF1A	Runoff Area=14,913 sf 100.00% Impervious Runoff Depth>5.87" Tc=5.0 min CN=98 Runoff=2.12 cfs 0.167 af
Subcatchment S8: ROOF1B	Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>5.87" Tc=5.0 min CN=98 Runoff=1.42 cfs 0.112 af
Subcatchment S9: BASIN	Runoff Area=13,407 sf 0.00% Impervious Runoff Depth=0.48" Tc=5.0 min CN=39 Runoff=0.06 cfs 0.012 af
Pond BAS1: BASIN	Peak Elev=314.18' Storage=15,372 cf Inflow=12.70 cfs 1.124 af Discarded=0.34 cfs 0.592 af Primary=6.17 cfs 0.554 af Secondary=0.00 cfs 0.000 af Outflow=6.51 cfs 1.146 af
Pond CB1: CB1	Peak Elev=317.80' Inflow=1.33 cfs 0.126 af 15.0" Round Culvert n=0.012 L=117.0' S=0.0060 '/' Outflow=1.33 cfs 0.126 af

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Pond CB2: CB2

Peak Elev=317.71' Inflow=7.52 cfs 0.640 af
18.0" Round Culvert n=0.012 L=121.0' S=0.0054 '/' Outflow=7.52 cfs 0.640 af

Pond CB3: CB3

Peak Elev=318.41' Inflow=0.98 cfs 0.110 af
15.0" Round Culvert n=0.012 L=141.0' S=0.0050 '/' Outflow=0.98 cfs 0.110 af

Pond CB4: CB4

Peak Elev=318.40' Inflow=3.87 cfs 0.370 af
15.0" Round Culvert n=0.012 L=53.0' S=0.0051 '/' Outflow=3.87 cfs 0.370 af

Pond CB5: CB5

Peak Elev=317.63' Inflow=4.88 cfs 0.445 af
15.0" Round Culvert n=0.012 L=94.0' S=0.0105 '/' Outflow=4.88 cfs 0.445 af

Pond DMH1: DMH1

Peak Elev=317.75' Inflow=1.33 cfs 0.126 af
15.0" Round Culvert n=0.012 L=179.0' S=0.0059 '/' Outflow=1.33 cfs 0.126 af

Pond DMH2: DMH2

Peak Elev=318.04' Inflow=3.87 cfs 0.370 af
15.0" Round Culvert n=0.012 L=66.0' S=0.0050 '/' Outflow=3.87 cfs 0.370 af

Pond DMH3: DMH3

Peak Elev=316.82' Inflow=12.67 cfs 1.112 af
18.0" Round Culvert n=0.012 L=104.0' S=0.0274 '/' Outflow=12.67 cfs 1.112 af

Pond DP1: DP1

Inflow=14.91 cfs 1.497 af
Primary=14.91 cfs 1.497 af

Pond FB1: FOREBAY

Peak Elev=0.00' Storage=0 cf

Pond W-NE: WET NE

Peak Elev=310.22' Inflow=4.45 cfs 0.405 af
48.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/' Outflow=4.45 cfs 0.405 af

Pond W-NW: WET NW

Peak Elev=305.36' Inflow=3.17 cfs 0.300 af
36.0" Round Culvert n=0.012 L=95.0' S=0.0232 '/' Outflow=3.17 cfs 0.300 af

Pond W-S: WET S

Peak Elev=305.99' Inflow=6.40 cfs 0.627 af
48.0" Round Culvert n=0.012 L=153.0' S=0.0065 '/' Outflow=6.40 cfs 0.627 af

Pond W-SW: WET SW

Peak Elev=302.56' Inflow=14.91 cfs 1.497 af
60.0" Round Culvert n=0.025 L=132.0' S=0.0856 '/' Outflow=14.91 cfs 1.497 af

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Summary for Subcatchment S1: CB1

Runoff = 1.33 cfs @ 12.21 hrs, Volume= 0.126 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
2,609	30	Woods, Good, HSG A
11,067	98	Paved parking, HSG A
3,441	39	>75% Grass cover, Good, HSG A
1,845	77	Fallow, bare soil, HSG A
18,962	76	Weighted Average
7,895		41.64% Pervious Area
11,067		58.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	63	0.0270	0.08		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
1.0	15	0.1333	0.25		Sheet Flow, GR Grass: Short n= 0.150 P2= 3.20"
0.8	19	0.0489	0.42		Sheet Flow, CS Fallow n= 0.050 P2= 3.20"
0.1	3	0.0489	0.98		Sheet Flow, IM Smooth surfaces n= 0.011 P2= 3.20"
0.2	40	0.0415	4.14		Shallow Concentrated Flow, IM Paved Kv= 20.3 fps
15.3	140	Total			

Summary for Subcatchment S10: EX WET NE

Runoff = 4.45 cfs @ 12.17 hrs, Volume= 0.405 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
26,920	30	Woods, Good, HSG A
15,099	77	Woods, Good, HSG D
14,584	39	>75% Grass cover, Good, HSG A
46,605	77	Fallow, bare soil, HSG A
2,912	98	Paved parking, HSG A
106,120	60	Weighted Average
103,208		97.26% Pervious Area
2,912		2.74% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	46	0.0557	1.77		Sheet Flow, IM Smooth surfaces n= 0.011 P2= 3.20"
3.1	25	0.0220	0.13		Sheet Flow, G Grass: Short n= 0.150 P2= 3.20"
5.4	29	0.0530	0.09		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	43	0.0530	1.15		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
0.2	15	0.0530	1.61		Shallow Concentrated Flow, G Short Grass Pasture Kv= 7.0 fps
1.7	286	0.0308	2.83		Shallow Concentrated Flow, CS Unpaved Kv= 16.1 fps
0.3	53	0.1396	2.62		Shallow Concentrated Flow, G Short Grass Pasture Kv= 7.0 fps
11.7	497	Total			

Summary for Subcatchment S11: EX WET S PIPE

Runoff = 1.60 cfs @ 12.18 hrs, Volume= 0.148 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
12,363	30	Woods, Good, HSG A
7,894	98	Paved parking, HSG A
8,435	39	>75% Grass cover, Good, HSG A
11,829	77	Fallow, bare soil, HSG A
40,521	59	Weighted Average
32,627		80.52% Pervious Area
7,894		19.48% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	31	0.0613	1.70		Sheet Flow, IM Smooth surfaces n= 0.011 P2= 3.20"
4.1	37	0.0243	0.15		Sheet Flow, G Grass: Short n= 0.150 P2= 3.20"
4.6	32	0.0959	0.12		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
0.1	13	0.0959	1.55		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
0.1	16	0.0813	2.00		Shallow Concentrated Flow, G Short Grass Pasture Kv= 7.0 fps
2.1	218	0.0298	1.73		Shallow Concentrated Flow, CS Nearly Bare & Untilled Kv= 10.0 fps
0.1	14	0.0500	1.57		Shallow Concentrated Flow, G Short Grass Pasture Kv= 7.0 fps
0.1	6	0.0500	1.12		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
0.2	105	0.0286	10.89	19.24	Pipe Channel, PIPE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	28	0.1036	1.61		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
12.0	500	Total			

Summary for Subcatchment S12: EX WET S

Runoff = 0.40 cfs @ 12.30 hrs, Volume= 0.074 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
41,997	30	Woods, Good, HSG A
19,388	39	>75% Grass cover, Good, HSG A
10,904	77	Woods, Good, HSG D
72,289	40	Weighted Average
72,289		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	63	0.2618	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Subcatchment S13: EX WET NW

Runoff = 3.17 cfs @ 12.14 hrs, Volume= 0.300 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
57,625	30	Woods, Good, HSG A
52,760	77	Woods, Good, HSG D
13,077	39	>75% Grass cover, Good, HSG A
123,462	51	Weighted Average
123,462		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	11	0.3010	0.32		Sheet Flow, G
					Grass: Short n= 0.150 P2= 3.20"
6.6	89	0.3010	0.22		Sheet Flow, W
					Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	95	0.0579	1.20		Shallow Concentrated Flow, W
					Woodland Kv= 5.0 fps
8.5	195	Total			

Summary for Subcatchment S14: EX WET SW

Runoff = 0.03 cfs @ 13.85 hrs, Volume= 0.016 af, Depth= 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
34,303	30	Woods, Good, HSG A
695	77	Woods, Good, HSG D
9,591	39	>75% Grass cover, Good, HSG A
44,589	33	Weighted Average
44,589		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	11	0.1232	0.23		Sheet Flow, G Grass: Short n= 0.150 P2= 3.20"
9.5	89	0.1232	0.16		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	22	0.0616	1.24		Shallow Concentrated Flow, W Woodland Kv= 5.0 fps
0.7	69	0.0616	1.74		Shallow Concentrated Flow, G Short Grass Pasture Kv= 7.0 fps
1.1	126	0.0704	1.86		Shallow Concentrated Flow, G Short Grass Pasture Kv= 7.0 fps
12.4	317	Total			

Summary for Subcatchment S2: CB2

Runoff = 5.37 cfs @ 12.07 hrs, Volume= 0.401 af, Depth= 5.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
15,762	98	Paved parking, HSG A
1,770	39	>75% Grass cover, Good, HSG A
21,276	96	Gravel surface, HSG A
38,808	94	Weighted Average
23,046		59.38% Pervious Area
15,762		40.62% Impervious Area

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

Summary for Subcatchment S3: CB3

Runoff = 0.98 cfs @ 12.32 hrs, Volume= 0.110 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
2,391	30	Woods, Good, HSG A
8,387	96	Gravel surface, HSG A
100	98	Paved parking, HSG A
1,496	39	>75% Grass cover, Good, HSG A
3,772	77	Fallow, bare soil, HSG A
16,146	77	Weighted Average
16,046		99.38% Pervious Area
100		0.62% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.1	95	0.0168	0.07		Sheet Flow, W Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	5	0.1188	0.19		Sheet Flow, GR Grass: Short n= 0.150 P2= 3.20"
0.1	11	0.1188	2.41		Shallow Concentrated Flow, GR Short Grass Pasture Kv= 7.0 fps
0.3	54	0.0454	3.43		Shallow Concentrated Flow, IM Unpaved Kv= 16.1 fps
0.6	56	0.0100	1.61		Shallow Concentrated Flow, IM Unpaved Kv= 16.1 fps
23.5	221	Total			

Summary for Subcatchment S4: CB4

Runoff = 1.31 cfs @ 12.07 hrs, Volume= 0.092 af, Depth= 4.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
1,086	39	>75% Grass cover, Good, HSG A
7,227	96	Gravel surface, HSG A
2,231	77	Fallow, bare soil, HSG A
100	98	Paved parking, HSG A
10,644	86	Weighted Average
10,544		99.06% Pervious Area
100		0.94% Impervious Area

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

Summary for Subcatchment S5: CB5

Runoff = 1.04 cfs @ 12.07 hrs, Volume= 0.075 af, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
6,950	96	Gravel surface, HSG A
100	98	Paved parking, HSG A
885	39	>75% Grass cover, Good, HSG A
7,935	90	Weighted Average
7,835		98.74% Pervious Area
100		1.26% Impervious Area

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

Summary for Subcatchment S6: ROOF2

Runoff = 0.34 cfs @ 12.07 hrs, Volume= 0.027 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
2,400	98	Roofs, HSG A
2,400		100.00% Impervious Area

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

Summary for Subcatchment S7: ROOF1A

Runoff = 2.12 cfs @ 12.07 hrs, Volume= 0.167 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
14,913	98	Roofs, HSG A
14,913		100.00% Impervious Area

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

Summary for Subcatchment S8: ROOF1B

Runoff = 1.42 cfs @ 12.07 hrs, Volume= 0.112 af, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
10,000	98	Roofs, HSG A
10,000		100.00% Impervious Area

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

Summary for Subcatchment S9: BASIN

Runoff = 0.06 cfs @ 12.32 hrs, Volume= 0.012 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.11"

Area (sf)	CN	Description
13,407	39	>75% Grass cover, Good, HSG A
13,407		100.00% Pervious Area

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

Summary for Pond BAS1: BASIN

Inflow Area = 3.058 ac, 40.87% Impervious, Inflow Depth > 4.41" for 25-year event
 Inflow = 12.70 cfs @ 12.10 hrs, Volume= 1.124 af
 Outflow = 6.51 cfs @ 12.33 hrs, Volume= 1.146 af, Atten= 49%, Lag= 13.6 min
 Discarded = 0.34 cfs @ 12.33 hrs, Volume= 0.592 af
 Primary = 6.17 cfs @ 12.33 hrs, Volume= 0.554 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 314.18' @ 12.33 hrs Surf.Area= 6,173 sf Storage= 15,372 cf
 Flood Elev= 316.00' Surf.Area= 7,902 sf Storage= 28,203 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 162.1 min (944.3 - 782.2)

Volume	Invert	Avail.Storage	Storage Description
#1	311.00'	28,203 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
311.00	3,582	0	0
312.00	4,333	3,958	3,958
314.00	6,005	10,338	14,296
316.00	7,902	13,907	28,203

Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	312.90'	18.0" Round Culvert L= 46.0' Ke= 0.500 Inlet / Outlet Invert= 312.90' / 310.00' S= 0.0630 '/' Cc= 0.900

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#3 Secondary 315.00' n= 0.012, Flow Area= 1.77 sf
10.0' long x 16.0' breadth Broad-Crested Rectangular Weir
 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.34 cfs @ 12.33 hrs HW=314.18' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.34 cfs)**Primary OutFlow** Max=6.17 cfs @ 12.33 hrs HW=314.18' TW=302.49' (Dynamic Tailwater)↑**2=Culvert** (Inlet Controls 6.17 cfs @ 3.85 fps)**Secondary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=311.00' TW=304.70' (Dynamic Tailwater)↑**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond CB1: CB1**

Inflow Area = 0.435 ac, 58.36% Impervious, Inflow Depth = 3.48" for 25-year event
 Inflow = 1.33 cfs @ 12.21 hrs, Volume= 0.126 af
 Outflow = 1.33 cfs @ 12.22 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.6 min
 Primary = 1.33 cfs @ 12.22 hrs, Volume= 0.126 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 317.80' @ 12.12 hrs

Flood Elev= 320.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.50'	15.0" Round Culvert L= 117.0' Ke= 0.500 Inlet / Outlet Invert= 316.50' / 315.80' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.35 cfs @ 12.22 hrs HW=317.16' TW=316.55' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 1.35 cfs @ 2.99 fps)**Summary for Pond CB2: CB2**

Inflow Area = 1.556 ac, 54.34% Impervious, Inflow Depth > 4.93" for 25-year event
 Inflow = 7.52 cfs @ 12.07 hrs, Volume= 0.640 af
 Outflow = 7.52 cfs @ 12.08 hrs, Volume= 0.640 af, Atten= 0%, Lag= 0.6 min
 Primary = 7.52 cfs @ 12.08 hrs, Volume= 0.640 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 317.71' @ 12.10 hrs

Flood Elev= 318.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	314.50'	18.0" Round Culvert L= 121.0' Ke= 0.500 Inlet / Outlet Invert= 314.50' / 313.85' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

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Primary OutFlow Max=6.95 cfs @ 12.08 hrs HW=317.54' TW=316.73' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 6.95 cfs @ 3.93 fps)**Summary for Pond CB3: CB3**

Inflow Area = 0.371 ac, 0.62% Impervious, Inflow Depth = 3.58" for 25-year event
 Inflow = 0.98 cfs @ 12.32 hrs, Volume= 0.110 af
 Outflow = 0.98 cfs @ 12.33 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.6 min
 Primary = 0.98 cfs @ 12.33 hrs, Volume= 0.110 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 318.41' @ 12.13 hrs

Flood Elev= 319.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	316.40'	15.0" Round Culvert L= 141.0' Ke= 0.500 Inlet / Outlet Invert= 316.40' / 315.69' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.99 cfs @ 12.33 hrs HW=317.06' TW=316.68' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 0.99 cfs @ 2.20 fps)**Summary for Pond CB4: CB4**

Inflow Area = 0.957 ac, 36.24% Impervious, Inflow Depth > 4.64" for 25-year event
 Inflow = 3.87 cfs @ 12.07 hrs, Volume= 0.370 af
 Outflow = 3.87 cfs @ 12.08 hrs, Volume= 0.370 af, Atten= 0%, Lag= 0.6 min
 Primary = 3.87 cfs @ 12.08 hrs, Volume= 0.370 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 318.40' @ 12.12 hrs

Flood Elev= 319.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.69'	15.0" Round Culvert L= 53.0' Ke= 0.500 Inlet / Outlet Invert= 315.69' / 315.42' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.95 cfs @ 12.08 hrs HW=317.69' TW=317.58' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 1.95 cfs @ 1.59 fps)**Summary for Pond CB5: CB5**

Inflow Area = 1.140 ac, 30.65% Impervious, Inflow Depth > 4.69" for 25-year event
 Inflow = 4.88 cfs @ 12.09 hrs, Volume= 0.445 af
 Outflow = 4.88 cfs @ 12.10 hrs, Volume= 0.445 af, Atten= 0%, Lag= 0.6 min
 Primary = 4.88 cfs @ 12.10 hrs, Volume= 0.445 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

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Peak Elev= 317.63' @ 12.11 hrs

Flood Elev= 319.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.09'	15.0" Round Culvert L= 94.0' Ke= 0.500 Inlet / Outlet Invert= 315.09' / 314.10' S= 0.0105 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=4.76 cfs @ 12.10 hrs HW=317.60' TW=316.81' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 4.76 cfs @ 3.88 fps)**Summary for Pond DMH1: DMH1**

Inflow Area = 0.435 ac, 58.36% Impervious, Inflow Depth = 3.48" for 25-year event
 Inflow = 1.33 cfs @ 12.22 hrs, Volume= 0.126 af
 Outflow = 1.33 cfs @ 12.23 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.6 min
 Primary = 1.33 cfs @ 12.23 hrs, Volume= 0.126 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 317.75' @ 12.11 hrs

Flood Elev= 320.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.80'	15.0" Round Culvert L= 179.0' Ke= 0.500 Inlet / Outlet Invert= 315.80' / 314.75' S= 0.0059 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.38 cfs @ 12.23 hrs HW=316.54' TW=315.94' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 1.38 cfs @ 2.65 fps)**Summary for Pond DMH2: DMH2**

Inflow Area = 0.957 ac, 36.24% Impervious, Inflow Depth > 4.64" for 25-year event
 Inflow = 3.87 cfs @ 12.08 hrs, Volume= 0.370 af
 Outflow = 3.87 cfs @ 12.09 hrs, Volume= 0.370 af, Atten= 0%, Lag= 0.6 min
 Primary = 3.87 cfs @ 12.09 hrs, Volume= 0.370 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 318.04' @ 12.11 hrs

Flood Elev= 320.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	315.42'	15.0" Round Culvert L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 315.42' / 315.09' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.06 cfs @ 12.09 hrs HW=317.82' TW=317.55' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 3.06 cfs @ 2.50 fps)

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Summary for Pond DMH3: DMH3

Inflow Area = 2.750 ac, 45.44% Impervious, Inflow Depth > 4.85" for 25-year event
 Inflow = 12.67 cfs @ 12.09 hrs, Volume= 1.112 af
 Outflow = 12.67 cfs @ 12.10 hrs, Volume= 1.112 af, Atten= 0%, Lag= 0.6 min
 Primary = 12.67 cfs @ 12.10 hrs, Volume= 1.112 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 316.82' @ 12.10 hrs

Flood Elev= 319.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	313.85'	18.0" Round Culvert L= 104.0' Ke= 0.500 Inlet / Outlet Invert= 313.85' / 311.00' S= 0.0274 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=12.67 cfs @ 12.10 hrs HW=316.82' TW=313.72' (Dynamic Tailwater)

1=Culvert (Inlet Controls 12.67 cfs @ 7.17 fps)

Summary for Pond DP1: DP1

Inflow Area = 11.942 ac, 12.54% Impervious, Inflow Depth = 1.50" for 25-year event
 Inflow = 14.91 cfs @ 12.21 hrs, Volume= 1.497 af
 Primary = 14.91 cfs @ 12.22 hrs, Volume= 1.497 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Summary for Pond FB1: FOREBAY

Volume	Invert	Avail.Storage	Storage Description
#1	311.00'	2,085 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
311.00	710	0	0
312.00	1,029	870	870
313.00	1,401	1,215	2,085

Summary for Pond W-NE: WET NE

Inflow Area = 2.436 ac, 2.74% Impervious, Inflow Depth = 1.99" for 25-year event
 Inflow = 4.45 cfs @ 12.17 hrs, Volume= 0.405 af
 Outflow = 4.45 cfs @ 12.18 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.6 min
 Primary = 4.45 cfs @ 12.18 hrs, Volume= 0.405 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

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Peak Elev= 310.22' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	309.50'	48.0" Round Culvert L= 75.0' Ke= 0.500 Inlet / Outlet Invert= 309.50' / 308.50' S= 0.0133 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 12.57 sf

Primary OutFlow Max=4.44 cfs @ 12.18 hrs HW=310.22' TW=305.99' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 4.44 cfs @ 2.89 fps)**Summary for Pond W-NW: WET NW**

Inflow Area = 2.834 ac, 0.00% Impervious, Inflow Depth = 1.27" for 25-year event
 Inflow = 3.17 cfs @ 12.14 hrs, Volume= 0.300 af
 Outflow = 3.17 cfs @ 12.15 hrs, Volume= 0.300 af, Atten= 0%, Lag= 0.6 min
 Primary = 3.17 cfs @ 12.15 hrs, Volume= 0.300 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 305.36' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	304.70'	36.0" Round Culvert L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 304.70' / 302.50' S= 0.0232 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf

Primary OutFlow Max=3.17 cfs @ 12.15 hrs HW=305.36' TW=302.49' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 3.17 cfs @ 2.76 fps)**Summary for Pond W-S: WET S**

Inflow Area = 5.026 ac, 4.94% Impervious, Inflow Depth = 1.50" for 25-year event
 Inflow = 6.40 cfs @ 12.18 hrs, Volume= 0.627 af
 Outflow = 6.40 cfs @ 12.19 hrs, Volume= 0.627 af, Atten= 0%, Lag= 0.6 min
 Primary = 6.40 cfs @ 12.19 hrs, Volume= 0.627 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 305.99' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	305.10'	48.0" Round Culvert L= 153.0' Ke= 0.500 Inlet / Outlet Invert= 305.10' / 304.10' S= 0.0065 '/' Cc= 0.900 n= 0.012, Flow Area= 12.57 sf

Primary OutFlow Max=6.40 cfs @ 12.19 hrs HW=305.99' TW=302.56' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 6.40 cfs @ 4.66 fps)

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Summary for Pond W-SW: WET SW

Inflow Area = 11.942 ac, 12.54% Impervious, Inflow Depth = 1.50" for 25-year event
Inflow = 14.91 cfs @ 12.20 hrs, Volume= 1.497 af
Outflow = 14.91 cfs @ 12.21 hrs, Volume= 1.497 af, Atten= 0%, Lag= 0.6 min
Primary = 14.91 cfs @ 12.21 hrs, Volume= 1.497 af

Routing by Sim-Route method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 302.56' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	301.30'	60.0" Round Culvert L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 301.30' / 290.00' S= 0.0856 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 19.63 sf

Primary OutFlow Max=14.91 cfs @ 12.21 hrs HW=302.56' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 14.91 cfs @ 3.83 fps)

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Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S1: CB1	Runoff Area=18,962 sf 58.36% Impervious Runoff Depth=1.13" Flow Length=140' Tc=15.3 min CN=76 Runoff=0.42 cfs 0.041 af
Subcatchment S10: EX WET NE	Runoff Area=106,120 sf 2.74% Impervious Runoff Depth=0.40" Flow Length=497' Tc=11.7 min CN=60 Runoff=0.53 cfs 0.081 af
Subcatchment S11: EX WET S PIPE	Runoff Area=40,521 sf 19.48% Impervious Runoff Depth=0.36" Flow Length=500' Tc=12.0 min CN=59 Runoff=0.17 cfs 0.028 af
Subcatchment S12: EX WET S	Runoff Area=72,289 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=63' Slope=0.2618 '/' Tc=5.3 min CN=40 Runoff=0.00 cfs 0.000 af
Subcatchment S13: EX WET NW	Runoff Area=123,462 sf 0.00% Impervious Runoff Depth=0.14" Flow Length=195' Tc=8.5 min CN=51 Runoff=0.09 cfs 0.034 af
Subcatchment S14: EX WET SW	Runoff Area=44,589 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=317' Tc=12.4 min CN=33 Runoff=0.00 cfs 0.000 af
Subcatchment S2: CB2	Runoff Area=38,808 sf 40.62% Impervious Runoff Depth=2.51" Tc=5.0 min CN=94 Runoff=2.61 cfs 0.187 af
Subcatchment S3: CB3	Runoff Area=16,146 sf 0.62% Impervious Runoff Depth=1.19" Flow Length=221' Tc=23.5 min CN=77 Runoff=0.32 cfs 0.037 af
Subcatchment S4: CB4	Runoff Area=10,644 sf 0.94% Impervious Runoff Depth=1.81" Tc=5.0 min CN=86 Runoff=0.54 cfs 0.037 af
Subcatchment S5: CB5	Runoff Area=7,935 sf 1.26% Impervious Runoff Depth=2.14" Tc=5.0 min CN=90 Runoff=0.47 cfs 0.032 af
Subcatchment S6: ROOF2	Runoff Area=2,400 sf 100.00% Impervious Runoff Depth=2.94" Tc=5.0 min CN=98 Runoff=0.18 cfs 0.013 af
Subcatchment S7: ROOF1A	Runoff Area=14,913 sf 100.00% Impervious Runoff Depth=2.94" Tc=5.0 min CN=98 Runoff=1.09 cfs 0.084 af
Subcatchment S8: ROOF1B	Runoff Area=10,000 sf 100.00% Impervious Runoff Depth=2.94" Tc=5.0 min CN=98 Runoff=0.73 cfs 0.056 af
Subcatchment S9: BASIN	Runoff Area=13,407 sf 0.00% Impervious Runoff Depth=0.00" Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af
Pond BAS1: BASIN	Peak Elev=313.15' Storage=9,519 cf Inflow=5.87 cfs 0.487 af Discarded=0.30 cfs 0.479 af Primary=0.34 cfs 0.051 af Secondary=0.00 cfs 0.000 af Outflow=0.64 cfs 0.530 af
Pond CB1: CB1	Peak Elev=316.83' Inflow=0.42 cfs 0.041 af 15.0" Round Culvert n=0.012 L=117.0' S=0.0060 '/' Outflow=0.42 cfs 0.041 af

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Pond CB2: CB2Peak Elev=315.64' Inflow=3.54 cfs 0.284 af
18.0" Round Culvert n=0.012 L=121.0' S=0.0054 '/' Outflow=3.54 cfs 0.284 af**Pond CB3: CB3**Peak Elev=316.73' Inflow=0.32 cfs 0.037 af
15.0" Round Culvert n=0.012 L=141.0' S=0.0050 '/' Outflow=0.32 cfs 0.037 af**Pond CB4: CB4**Peak Elev=316.53' Inflow=1.74 cfs 0.157 af
15.0" Round Culvert n=0.012 L=53.0' S=0.0051 '/' Outflow=1.74 cfs 0.157 af**Pond CB5: CB5**Peak Elev=315.88' Inflow=2.20 cfs 0.190 af
15.0" Round Culvert n=0.012 L=94.0' S=0.0105 '/' Outflow=2.20 cfs 0.190 af**Pond DMH1: DMH1**Peak Elev=316.14' Inflow=0.42 cfs 0.041 af
15.0" Round Culvert n=0.012 L=179.0' S=0.0059 '/' Outflow=0.42 cfs 0.041 af**Pond DMH2: DMH2**Peak Elev=316.24' Inflow=1.74 cfs 0.157 af
15.0" Round Culvert n=0.012 L=66.0' S=0.0050 '/' Outflow=1.74 cfs 0.157 af**Pond DMH3: DMH3**Peak Elev=315.08' Inflow=5.87 cfs 0.487 af
18.0" Round Culvert n=0.012 L=104.0' S=0.0274 '/' Outflow=5.87 cfs 0.487 af**Pond DP1: DP1**Inflow=0.74 cfs 0.194 af
Primary=0.74 cfs 0.194 af**Pond FB1: FOREBAY**

Peak Elev=0.00' Storage=0 cf

Pond W-NE: WET NEPeak Elev=309.74' Inflow=0.53 cfs 0.081 af
48.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/' Outflow=0.53 cfs 0.081 af**Pond W-NW: WET NW**Peak Elev=304.81' Inflow=0.09 cfs 0.034 af
36.0" Round Culvert n=0.012 L=95.0' S=0.0232 '/' Outflow=0.09 cfs 0.034 af**Pond W-S: WET S**Peak Elev=305.39' Inflow=0.70 cfs 0.109 af
48.0" Round Culvert n=0.012 L=153.0' S=0.0065 '/' Outflow=0.70 cfs 0.109 af**Pond W-SW: WET SW**Peak Elev=301.57' Inflow=0.74 cfs 0.194 af
60.0" Round Culvert n=0.025 L=132.0' S=0.0856 '/' Outflow=0.74 cfs 0.194 af

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Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S1: CB1	Runoff Area=18,962 sf 58.36% Impervious Runoff Depth=2.52" Flow Length=140' Tc=15.3 min CN=76 Runoff=0.96 cfs 0.091 af
Subcatchment S10: EX WET NE	Runoff Area=106,120 sf 2.74% Impervious Runoff Depth=1.29" Flow Length=497' Tc=11.7 min CN=60 Runoff=2.71 cfs 0.262 af
Subcatchment S11: EX WET S PIPE	Runoff Area=40,521 sf 19.48% Impervious Runoff Depth=1.22" Flow Length=500' Tc=12.0 min CN=59 Runoff=0.95 cfs 0.095 af
Subcatchment S12: EX WET S	Runoff Area=72,289 sf 0.00% Impervious Runoff Depth=0.23" Flow Length=63' Slope=0.2618 ' Tc=5.3 min CN=40 Runoff=0.09 cfs 0.032 af
Subcatchment S13: EX WET NW	Runoff Area=123,462 sf 0.00% Impervious Runoff Depth=0.74" Flow Length=195' Tc=8.5 min CN=51 Runoff=1.48 cfs 0.174 af
Subcatchment S14: EX WET SW	Runoff Area=44,589 sf 0.00% Impervious Runoff Depth=0.04" Flow Length=317' Tc=12.4 min CN=33 Runoff=0.00 cfs 0.003 af
Subcatchment S2: CB2	Runoff Area=38,808 sf 40.62% Impervious Runoff Depth=4.29" Tc=5.0 min CN=94 Runoff=4.32 cfs 0.318 af
Subcatchment S3: CB3	Runoff Area=16,146 sf 0.62% Impervious Runoff Depth=2.61" Flow Length=221' Tc=23.5 min CN=77 Runoff=0.71 cfs 0.081 af
Subcatchment S4: CB4	Runoff Area=10,644 sf 0.94% Impervious Runoff Depth=3.45" Tc=5.0 min CN=86 Runoff=1.01 cfs 0.070 af
Subcatchment S5: CB5	Runoff Area=7,935 sf 1.26% Impervious Runoff Depth=3.86" Tc=5.0 min CN=90 Runoff=0.82 cfs 0.059 af
Subcatchment S6: ROOF2	Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>4.74" Tc=5.0 min CN=98 Runoff=0.28 cfs 0.022 af
Subcatchment S7: ROOF1A	Runoff Area=14,913 sf 100.00% Impervious Runoff Depth>4.74" Tc=5.0 min CN=98 Runoff=1.73 cfs 0.135 af
Subcatchment S8: ROOF1B	Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>4.74" Tc=5.0 min CN=98 Runoff=1.16 cfs 0.091 af
Subcatchment S9: BASIN	Runoff Area=13,407 sf 0.00% Impervious Runoff Depth=0.20" Tc=5.0 min CN=39 Runoff=0.01 cfs 0.005 af
Pond BAS1: BASIN	Peak Elev=313.83' Storage=13,299 cf Inflow=10.04 cfs 0.872 af Discarded=0.33 cfs 0.556 af Primary=3.79 cfs 0.345 af Secondary=0.00 cfs 0.000 af Outflow=4.12 cfs 0.901 af
Pond CB1: CB1	Peak Elev=317.03' Inflow=0.96 cfs 0.091 af 15.0" Round Culvert n=0.012 L=117.0' S=0.0060 ' Outflow=0.96 cfs 0.091 af

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Pond CB2: CB2Peak Elev=316.56' Inflow=5.98 cfs 0.500 af
18.0" Round Culvert n=0.012 L=121.0' S=0.0054 '/' Outflow=5.98 cfs 0.500 af**Pond CB3: CB3**Peak Elev=317.10' Inflow=0.71 cfs 0.081 af
15.0" Round Culvert n=0.012 L=141.0' S=0.0050 '/' Outflow=0.71 cfs 0.081 af**Pond CB4: CB4**Peak Elev=317.05' Inflow=3.04 cfs 0.286 af
15.0" Round Culvert n=0.012 L=53.0' S=0.0051 '/' Outflow=3.04 cfs 0.286 af**Pond CB5: CB5**Peak Elev=316.52' Inflow=3.84 cfs 0.345 af
15.0" Round Culvert n=0.012 L=94.0' S=0.0105 '/' Outflow=3.84 cfs 0.345 af**Pond DMH1: DMH1**Peak Elev=316.64' Inflow=0.96 cfs 0.091 af
15.0" Round Culvert n=0.012 L=179.0' S=0.0059 '/' Outflow=0.96 cfs 0.091 af**Pond DMH2: DMH2**Peak Elev=316.81' Inflow=3.04 cfs 0.286 af
15.0" Round Culvert n=0.012 L=66.0' S=0.0050 '/' Outflow=3.04 cfs 0.286 af**Pond DMH3: DMH3**Peak Elev=315.99' Inflow=10.04 cfs 0.867 af
18.0" Round Culvert n=0.012 L=104.0' S=0.0274 '/' Outflow=10.04 cfs 0.867 af**Pond DP1: DP1**Inflow=7.77 cfs 0.912 af
Primary=7.77 cfs 0.912 af**Pond FB1: FOREBAY**

Peak Elev=0.00' Storage=0 cf

Pond W-NE: WET NEPeak Elev=310.06' Inflow=2.71 cfs 0.262 af
48.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/' Outflow=2.71 cfs 0.262 af**Pond W-NW: WET NW**Peak Elev=305.14' Inflow=1.48 cfs 0.174 af
36.0" Round Culvert n=0.012 L=95.0' S=0.0232 '/' Outflow=1.48 cfs 0.174 af**Pond W-S: WET S**Peak Elev=305.76' Inflow=3.66 cfs 0.389 af
48.0" Round Culvert n=0.012 L=153.0' S=0.0065 '/' Outflow=3.66 cfs 0.389 af**Pond W-SW: WET SW**Peak Elev=302.20' Inflow=7.77 cfs 0.912 af
60.0" Round Culvert n=0.025 L=132.0' S=0.0856 '/' Outflow=7.77 cfs 0.912 af

2021-013 Shawmut

Prepared by {enter your company name here}

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Post Development
Type III 24-hr 100-year Rainfall=7.85"

Printed 6/16/2022

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Time span=1.00-72.00 hrs, dt=0.01 hrs, 7101 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S1: CB1	Runoff Area=18,962 sf 58.36% Impervious Runoff Depth=5.02" Flow Length=140' Tc=15.3 min CN=76 Runoff=1.92 cfs 0.182 af
Subcatchment S10: EX WET NE	Runoff Area=106,120 sf 2.74% Impervious Runoff Depth=3.22" Flow Length=497' Tc=11.7 min CN=60 Runoff=7.47 cfs 0.654 af
Subcatchment S11: EX WET S PIPE	Runoff Area=40,521 sf 19.48% Impervious Runoff Depth=3.11" Flow Length=500' Tc=12.0 min CN=59 Runoff=2.72 cfs 0.241 af
Subcatchment S12: EX WET S	Runoff Area=72,289 sf 0.00% Impervious Runoff Depth=1.19" Flow Length=63' Slope=0.2618 '/' Tc=5.3 min CN=40 Runoff=1.60 cfs 0.164 af
Subcatchment S13: EX WET NW	Runoff Area=123,462 sf 0.00% Impervious Runoff Depth=2.26" Flow Length=195' Tc=8.5 min CN=51 Runoff=6.33 cfs 0.534 af
Subcatchment S14: EX WET SW	Runoff Area=44,589 sf 0.00% Impervious Runoff Depth=0.60" Flow Length=317' Tc=12.4 min CN=33 Runoff=0.23 cfs 0.051 af
Subcatchment S2: CB2	Runoff Area=38,808 sf 40.62% Impervious Runoff Depth=7.13" Tc=5.0 min CN=94 Runoff=6.98 cfs 0.530 af
Subcatchment S3: CB3	Runoff Area=16,146 sf 0.62% Impervious Runoff Depth=5.14" Flow Length=221' Tc=23.5 min CN=77 Runoff=1.40 cfs 0.159 af
Subcatchment S4: CB4	Runoff Area=10,644 sf 0.94% Impervious Runoff Depth=6.19" Tc=5.0 min CN=86 Runoff=1.76 cfs 0.126 af
Subcatchment S5: CB5	Runoff Area=7,935 sf 1.26% Impervious Runoff Depth=6.66" Tc=5.0 min CN=90 Runoff=1.38 cfs 0.101 af
Subcatchment S6: ROOF2	Runoff Area=2,400 sf 100.00% Impervious Runoff Depth>7.61" Tc=5.0 min CN=98 Runoff=0.44 cfs 0.035 af
Subcatchment S7: ROOF1A	Runoff Area=14,913 sf 100.00% Impervious Runoff Depth>7.61" Tc=5.0 min CN=98 Runoff=2.73 cfs 0.217 af
Subcatchment S8: ROOF1B	Runoff Area=10,000 sf 100.00% Impervious Runoff Depth>7.61" Tc=5.0 min CN=98 Runoff=1.83 cfs 0.146 af
Subcatchment S9: BASIN	Runoff Area=13,407 sf 0.00% Impervious Runoff Depth=1.09" Tc=5.0 min CN=39 Runoff=0.26 cfs 0.028 af
Pond BAS1: BASIN	Peak Elev=314.72' Storage=18,865 cf Inflow=16.98 cfs 1.523 af Discarded=0.37 cfs 0.636 af Primary=8.80 cfs 0.901 af Secondary=0.00 cfs 0.000 af Outflow=9.17 cfs 1.538 af
Pond CB1: CB1	Peak Elev=320.27' Inflow=1.92 cfs 0.182 af 15.0" Round Culvert n=0.012 L=117.0' S=0.0060 '/' Outflow=1.92 cfs 0.182 af

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Post Development

Type III 24-hr 100-year Rainfall=7.85"

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Pond CB2: CB2

Peak Elev=320.07' Inflow=9.89 cfs 0.857 af
18.0" Round Culvert n=0.012 L=121.0' S=0.0054 '/' Outflow=9.89 cfs 0.857 af

Pond CB3: CB3

Peak Elev=321.35' Inflow=1.40 cfs 0.159 af
15.0" Round Culvert n=0.012 L=141.0' S=0.0050 '/' Outflow=1.40 cfs 0.159 af

Pond CB4: CB4

Peak Elev=321.31' Inflow=5.15 cfs 0.502 af
15.0" Round Culvert n=0.012 L=53.0' S=0.0051 '/' Outflow=5.15 cfs 0.502 af

Pond CB5: CB5

Peak Elev=320.00' Inflow=6.48 cfs 0.603 af
15.0" Round Culvert n=0.012 L=94.0' S=0.0105 '/' Outflow=6.48 cfs 0.603 af

Pond DMH1: DMH1

Peak Elev=320.18' Inflow=1.92 cfs 0.182 af
15.0" Round Culvert n=0.012 L=179.0' S=0.0059 '/' Outflow=1.92 cfs 0.182 af

Pond DMH2: DMH2

Peak Elev=320.70' Inflow=5.15 cfs 0.502 af
15.0" Round Culvert n=0.012 L=66.0' S=0.0050 '/' Outflow=5.15 cfs 0.502 af

Pond DMH3: DMH3

Peak Elev=318.58' Inflow=16.72 cfs 1.495 af
18.0" Round Culvert n=0.012 L=104.0' S=0.0274 '/' Outflow=16.72 cfs 1.495 af

Pond DP1: DP1

Inflow=25.86 cfs 2.546 af
Primary=25.86 cfs 2.546 af

Pond FB1: FOREBAY

Peak Elev=0.00' Storage=0 cf

Pond W-NE: WET NE

Peak Elev=310.44' Inflow=7.47 cfs 0.654 af
48.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/' Outflow=7.47 cfs 0.654 af

Pond W-NW: WET NW

Peak Elev=305.65' Inflow=6.33 cfs 0.534 af
36.0" Round Culvert n=0.012 L=95.0' S=0.0232 '/' Outflow=6.33 cfs 0.534 af

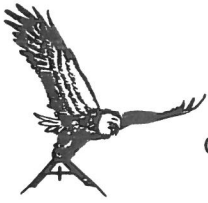
Pond W-S: WET S

Peak Elev=306.32' Inflow=11.49 cfs 1.059 af
48.0" Round Culvert n=0.012 L=153.0' S=0.0065 '/' Outflow=11.49 cfs 1.059 af

Pond W-SW: WET SW

Peak Elev=302.99' Inflow=25.86 cfs 2.546 af
60.0" Round Culvert n=0.025 L=132.0' S=0.0856 '/' Outflow=25.86 cfs 2.546 af

Appendix 6:
MISCELLANEOUS CALCULATIONS



J.R. RUSSO & ASSOCIATES, LLC
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CONN (860) 623-0569 • MASS (413) 785-1158
www.jrrusso.com

JOB 2021-013

SHEET NO. 1 OF 1

CALCULATED BY CJC DATE 6-7-2022

CHECKED BY _____ DATE _____

SCALE _____

Water Quality Volume (WQV) Calculations

$$WQV = (1") RA / 12$$
$$R = 0.05 + 0.009 I$$

I = percent impervious coverage
R = volumetric runoff coefficient
A = contributing area

$$A = 135,544 \text{ s.f.}$$

$$I = \frac{96,746 \text{ s.f. impervious}}{135,544 \text{ s.f. total}} = 71.38\%$$

$$R = 0.05 + 0.009(71.38) = 0.692$$

$$WQV = (1") (0.692) (135,544 \text{ s.f.}) / 12 = \boxed{7,821 \text{ c.f.}}$$

$$\text{Forebay } WQV = 0.25(WQV) = 0.25(7821) = \boxed{1,955 \text{ c.f.}}$$



Stonco LytePro LED large wall sconce LPW32 features outstanding value in a compact, architectural design. This powerful and precise combination offers outstanding energy savings with excellent photometric performance. LPW32 is ideal for building perimeters and corridors in addition to wall lighting applications requiring strong lateral spacing and forward pattern projection.

Project: _____

Location: _____

Cat.No: _____

Type: _____

Lamps: _____ Qty: _____

Notes: _____

Ordering guide

Example: LPW32-70-NW-G3-3-120-PCB-BZ

Prefix		Wattage	LED Color/Gen	Distribution	Emergency	Voltage			
LPW32									
LPW32	LytePro 32 LED Large Wall Sconce	70 70W	NW-G3 Neutral White 4000K 70 CRI Generation 3	2 Type 2 3 Type 3 4 Type 4	-- None EBP Emergency Battery Pack ^{1,2,3}	120	120V		
		90 90W				208	208V		
		50 50W ¹				240	240V		
		WW-G3 Warm White 3000K 70 CRI Generation 3				277	277V		
						347	347V		
						480	480V		
						UNV	120-277V (50/60Hz)		
HVU	347-480V (50/60Hz)								
Options									
Dimming controls		Motion sensing		Photocontrol		Location		Finish	
FAWS	Field Adjustable Wattage Selector ⁴	IMRI3	Motion sensor #3 Lens ^{2,5}	PCB	Photocontrol Button ^{2,6}	BAC ⁸	Meets the requirements of the Buy American Act of 1933 (BAA)	<u>Textured</u>	
								BK	Black
BL	Bi-level functionality ^{2,4}							WH	White
								BZ	Bronze
								DGY	Dark Gray
								MGY	Medium Gray
								<u>Customer specified</u>	
								RAL	Specify optional color or RAL (ex: OC-LGP or OC-RAL7024)
CC	Custom color (Must supply color chip for required factory quote)								

Stocked luminaires – Ordering guide

Catalog Number	Description	Master Pack, Qty	UPC Code
LPW32-G3-8-DGY	LPW32, 70W, 650mA, 4000K, Type 3, 120-277V, Dark gray textured paint	3	622252813889
LPW32-G3-8-BZ	LPW32, 70W, 650mA, 4000K, Type 3, 120-277V, Bronze textured paint	3	622252813896

Stocked accessories – Ordering guide (Must be ordered separately)⁹

Catalog Number	Description	Master Pack, Qty	UPC Code
LPWCVRPLT-BZ ⁷	LPW Universal wall cover mounting plate, Bronze textured paint	(none)	190096144860

¹ Emergency battery backup (EBP) available with 50W configuration only

² Not available in 347 or 480V

³ Not available with BL, FAWS or PCB

⁴ Not available with other control options.

⁵ Available only with BL dimming option

⁶ Must specify voltage

⁷ Other colors available upon request as made-to-order

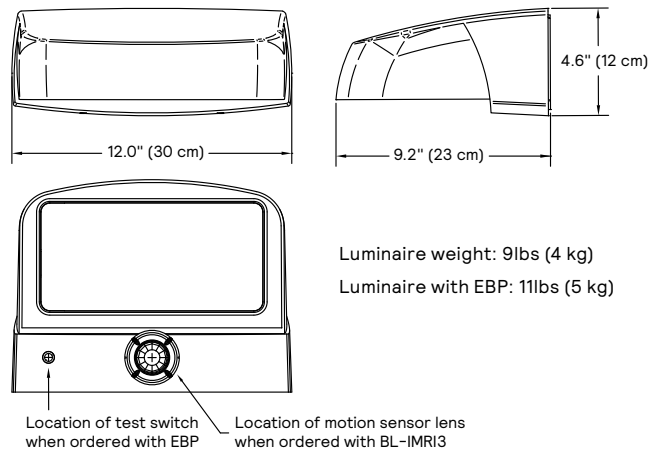
⁸ Failure to properly select the "BAC" suffix could result in you receiving product that is not BAA compliant product with no recourse for an RMA or refund. This BAC designation hereunder does not address (i) the applicability of, or availability of a waiver under, the Trade Agreements Act, or (ii) the "Buy America" domestic content requirements imposed on states, localities, and other non-federal entities as a condition of receiving funds administered by the Department of Transportation or other federal agencies.

⁹ Consult Signify to confirm whether specific accessories are BAA-compliant.

LPW32 LytePro

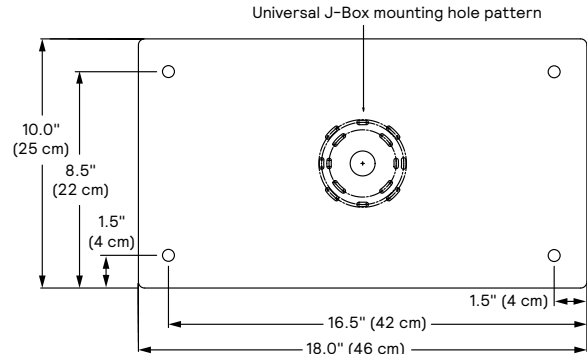
LED large wall sconce

Dimensions



Accessory dimensions (ordered separately)

LPWCVRPLT-BZ LPW Universal wall cover mounting plate, 0.08" aluminum, bronze textured paint (used to cover larger pre-existing opening or surfaces, field installed). Offers same J-Box pattern as luminaire or may be lagged to wall using (4) knockouts.



LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
LPW-32-50-NW-G3	32	400	4000	45	6026	B2-U0-G1	133	5899	B1-U0-G1	130	5,710	B1-U0-G2	126
LPW-32-70-NW-G3	32	650	4000	65	8,425	B2-U0-G1	130	8,248	B1-U0-G2	128	8,139	B1-U0-G2	126
LPW-32-90-NW-G3	32	900	4000	90	10,992	B2-U0-G2	122	10,761	B2-U0-G2	120	10,618	B2-U0-G2	118
LPW-32-50-WW-G3	32	400	3000	45	5455	B1-U0-G1	120	5340	B1-U0-G1	118	5,169	B1-U0-G1	114
LPW-32-70-WW-G3	32	650	3000	65	7,626	B1-U0-G1	118	7,466	B1-U0-G2	116	7,367	B1-U0-G2	114
LPW-32-90-WW-G3	32	900	3000	89	9,951	B2-U0-G2	112	9,742	B2-U0-G2	109	9,613	B2-U0-G2	108

LED Wattage and Lumen Values - Emergency mode

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts		Type 2		Type 3		Type 4	
				Normal Mode	Emergency Mode	Normal Mode	Emergency Mode	Normal Mode	Emergency Mode	Normal Mode	Emergency Mode
LPW-32-50-NW-G3-EBP	32	400	4000	45	10	6026	1871	5899	1832	5710	1774
LPW-32-50-WW-G3-EBP	32	400	3000	45	10	5455	1695	5340	1659	5169	1606

Values from photometric tests performed in accordance with IESNA LM-79 and are representative of the configurations shown.

Actual performance may vary due to installation and environmental variables, LED and driver tolerances, and field measurement considerations. It is highly recommended to confirm performance with a photometric layout.

NOTE: Some data may be scaled based on tests of similar (but not identical) luminaires. Contact factory for configurations not shown.

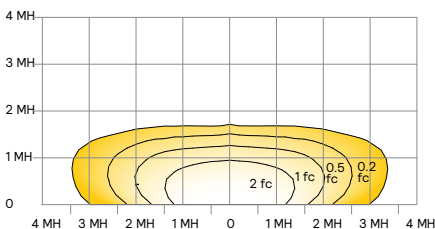
Predicted lumen depreciation data

Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions. L₇₀ is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-11. Published L₇₀ hours limited to 6 times actual LED test hours

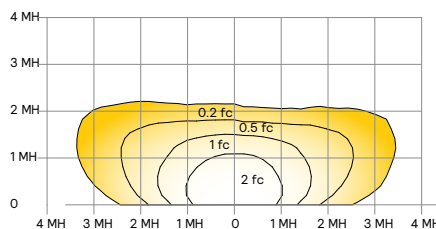
Ambient Temperature °C	Calculated L ₇₀ Hours	L ₇₀ per TM-21	Lumen Maintenance % at 60,000 hrs
up to 40°C	>200,000 hours	>54,000 hours	>95%

Optical distributions

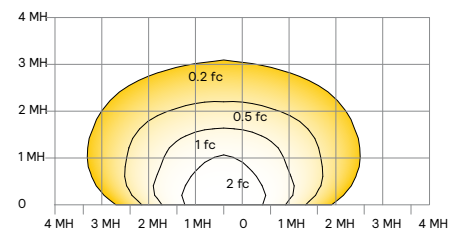
Based on LPW32-70-NW-G3 at 20' mounting height



Type 2



Type 3



Type 4

LPW32 20' mounting height			
Mounting height	18 ft	20 ft	23 ft
Multiplier	1.05	1.00	0.93

LPW32 20' mounting height			
Mounting height	18 ft	20 ft	23 ft
Multiplier	1.14	1.00	0.79

LPW32 20' mounting height			
Mounting height	18 ft	20 ft	23 ft
Multiplier	1.16	1.00	0.76

LPW32 LytePro

LED large wall sconce

General Description

LytePro LED large wall sconce LPW32 combines excellent performance, design and value to meet the needs of the energy and budget conscious. The LPW32 is available for use in downward facing, surface wall mount applications, over recessed j-boxes or where power can be directly fed through back surface, whereby connections splices can be made inside the luminaire housing. Two SKU's are available as in-stock configurations (2-day quick ship).

Housing

Die-cast housing houses both the LED and driver assemblies. Design incorporates an integrated heat sink to maximize thermal performance and reliability. Backplate is corrosion free, composite polycarbonate, with built-in level bubble, offers integral interlocking hook and mount design for easy installation.

Mounting

Easy interlocking hook and mount housing/backplate design for easy installation. Mounts over 3.5", 4" octagonal j-boxes and single gang switch boxes or can be directly lagged to surface. Ensure proper steps for gasket/sealing luminaire to surface.

IP Rating

Optical compartment is IP65 rated sealed with tempered glass, gasket and frame.

LED Board and Array

Provides up to 114 lm/W in LPW32 at the system level. Standard color temp is 4000K or 3000K +/- 250K, minimum 70 CRI.

Electrical

Driver efficiency (>90% standard). 120-277V and 347-480V available. All drivers are dimmable.. Temp range: -40°C (-40°F) to 40°C (104°F). Open/short circuit protection. Inherent surge protection up to (6KVA). RoHS compliant.

Surge protection (SP1): Surge protection device tested in accordance with ANSI/IEEE C62.45 per ANSI/IEEE C62.41.2 Scenario I Category C High Exposure 10kV/10kA waveforms for Line-Ground, Line-Neutral and Neutral-Ground, and in accordance with DOE MSSLC Model Specification for LED Roadway Luminaires Appendix D Electrical Immunity High test level 10kV/10kA.

Listings

Product is cETLus listed suitable for Wet Locations. Suitable for use in ambients from -40°C to 40°C (-40°F to 104°F). DesignLights Consortium® qualified.

Finish

Each luminaire receives a fade and abrasion resistant, electrostatically applied, thermally cured, triglycidal isocyanurate (TGIC) textured polyester powdercoat finish.

Emergency Option

Emergency Battery Backup (EBP): Emergency battery packs included integral to the luminaire, allowing for a consistent look between emergency and non-emergency luminaires. A separate surface mount accessory box is not required. EBP is suitable for use in ambient temperature conditions from 0°C (32°F) to 40°C (104°F) available on 50W configuration only. System is designed to have a secondary driver with relay to immediately detect AC power loss to power luminaire for a minimum of 90 minutes from the time power is lost. Available with 120-277V, or 'UNV' only.

Dimming Control Options

Field Adjustable Wattage Selector (FAWS): Luminaire equipped with the ability to manually adjust the wattage in the field to reduce total luminaire lumen output and light levels. Comes pre-set to the highest position at the lumen output selected. Use chart below to estimate reduction in lumen output desired. Cannot be used with other control options or motion response.

FAWS Position	Percent of Typical Lumen Output
1	25%
2	50%
3	55%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

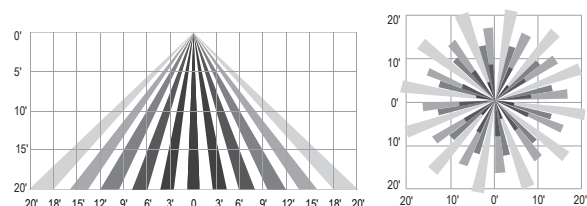
Note: Typical value accuracy +/- 5%

Motion Response Options

Bi-Level Infrared Motion Response (BL): Motion Response module is mounted integral to luminaire factory pre-programmed to 50% dimming when not ordered with other control options. BL is set/operates in the following fashion: The motion sensor is set to a constant 50%. When motion is detected by the PIR sensor, the luminaire returns to full power/light output. Dimming on low is factory set to 50% with 5 minutes default in "full power" prior to dimming back to low. When no motion is detected for 5 minutes, the motion response system reduces the wattage by 50%, to 50% of the normal constant wattage reducing the light level. Other dimming settings can be provided if different dimming levels are required. This can also be done with FSIR-100 Wireless Remote Programming Tool (contact Technical Support for details).

Infrared Motion Response Lenses (IMRI3): Infrared Motion Response Integral module is available with sensor lens #3 (IMRI3) is designed for mounting heights up to 20' with a 40' diameter coverage area. See charts for approximate detection patterns:

IMRI3 Luminaire with #3 lens



Warranty

LPW32 luminaires, the LED arrays, and the drivers are all covered by a 5-year limited warranty. See www.signify.com/warranties for details.



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Gardco EcoForm Gen-2 combines economy with performance in an LED area luminaire. Capable of delivering up to 27,800 lumens or more in a compact, low profile LED luminaire, EcoForm offers a new level of customer value. EcoForm features an innovative retrofit arm kit, simplifying site conversions to LED by eliminating the need to drill additional holes in most existing poles. Integral control systems available for further energy savings. Includes Service Tag, our innovative way to provide assistance throughout the life of the product.

Project: _____
 Location: _____
 Cat.No: _____
 Type: _____
 Lamps: _____ Qty: _____
 Notes: _____

Ordering guide

example: ECF-S-64L-900-NW-G2-AR-5-120-HIS-MGY

Prefix	Number of LEDs	Drive Current	LED Color - Generation	Mounting	Distribution	Voltage
ECF-S						
ECF-S EcoForm site and area, small	32L 32 LEDs (2 modules)	365 365mA	WW-G2 Warm White 3000K, 70CRI Generation 2 NW-G2 Neutral White 4000K, 70CRI Generation 2 CW-G2 Cool White 5000K, 70CRI Generation 2	AR ² Arm Mount (standard)	Type 2 2 Type 2 2-90 Rotated left 90° 2-270 Rotated right 270°	120 120V 208 208V 240 240V 277 277V 347 347V 480 480V
		530 530mA				
		700 700mA				
	48L 48 LEDs (3 modules)	1A 1050mA		The following mounting kits must be ordered separately (See accessories)	Type 3 3 Type 3 3-90 Rotated left 90° 3-270 Rotated right 270°	208 208V 240 240V 277 277V 347 347V 480 480V
		1.2A 1200mA				
		900 900mA				
	64L 64 LEDs (4 modules)	1A 1050mA		SF ³ Slip Fitter Mount (fits to 2 3/8" O.D. tenon)	Type 4 4 Type 4 4-90 Rotated left 90° 4-270 Rotated right 270°	120-277V (50/60Hz) HVV 347-480V (50/60Hz)
		1.2A ¹⁹ 1200mA				
		900 900mA				
				WS Wall mount with surface conduit rear entry permitted		
				RAM ² Retrofit arm mount kit		
					Type 5 5 Type 5 5W Type 5W	

Options					
Dimming controls	Motion sensing lens	Photo-sensing	Electrical	Luminaire	Finish
DD^{4,18} 0-10V External dimming (for controls by others) DCC^{4,5,6,18} Dual Circuit Control FAWS^{4,5,18} Field Adjustable Wattage Selector LLC^{4,6,7,8,18} Integral wireless module BL^{1,4,7,18} Bi-level functionality SRDR^{4,5,6,8,17} SR driver connected to Zhaga socket DynaDimmer: Automatic Profile Dimming CS50^{4,8} Safety 50% Dimming, 7 hours CM50^{4,8} Median 50% Dimming, 8 hours CS30^{4,8} Safety 30% Dimming, 7 hours CM30^{4,8} Median 30% Dimming, 8 hours	IMRI3¹⁵ Integral with #3 lens IMRI7¹⁶ Integral with #7 lens	PCB^{8,9} Photocontrol Button TLRD5^{10,17} Twist Lock Receptacle 5 Pin TLRD7^{10,17} Twist Lock Receptacle 7 Pin TLRPC^{9,10,11,17} Twist Lock Receptacle w/ Photocell	Fusing F1⁹ Single (120, 277, 347VAC) F2⁹ Double (208, 240, 480VAC) Pole Mount Fusing FP1⁹ Single (120, 277, 347VAC) FP2⁹ Double (208, 240, 480VAC) FP3⁹ Canadian Double Pull (208, 240, 480VAC) Surge Protection (10kA standard) SP2 Increased 20kA	Square Pole Adapter included in standard product TB¹² Terminal Block RPA¹³ Round Pole Adapter (fits to 3"- 3.9" O.D. pole) HIS¹⁴ Internal House Side Shield	Textured BK Black WH White BZ Bronze DGY Dark Gray MGY Medium Gray Customer specified RAL Specify optional color or RAL (ex: RAL7024) CC Custom color (Must supply color chip for required factory quote)

- BL-IMRI3/7 equipped with out-boarded sensor housing when voltage is HVU (347-480V)
- Mounts to a 4" round pole with adapter included for square poles.
- Limited to a maximum of 45 degrees aiming above horizontal.
- Not available with other dimming control options.
- Not available with motion sensor.
- Not available with photocontrol.
- Must specify a motion sensor lens.
- Not available in 347 or 480V
- Must specify input voltage.
- TLRD5, TLRD7 and TLRPC receptacle pins 4 & 5 are capped off when ordered with any of the Dimming controls DD or FAWS or LLC.
- Not available in 480V. Order photocell separately with TLRD5/7.
- Not available with DCC.
- Not available with SF and WS. RPAs provided with black finish standard.
- HIS not available with Type 5, 5W, BLC, BLC-90, BLC-270, LCL or RCL optics.
- Not available with DD, DCC, and FAWS dimming control options.
- Not available with DD, DCC, FAWS and LLC dimming control options.
- When ordering SRDR, controller (by others) to be used on socket must be SR compatible (See specifications for more details). Consult factory for lead time. All 7 pins in NEMA receptacle are connected to SR driver. SRDR not available with TLRD5 or TLRPC.
- 0-10V dimming driver standard.
- LCL and RCL not available with 48L-1.2A or 64L-1A.

ECF-S EcoForm small

Area luminaire

EcoForm Accessories²¹ (ordered separately, field installed)

Shielding Accessories

Footnotes

20. Not available with Type 5 or 5W optics

21. Consult Signify to confirm whether specific accessories are BAA-compliant.

House Side shield

Standard optic orientation:

HIS-32-H²⁰ Internal House Side Shield for 32 LEDs (2 modules)

HIS-48-H²⁰ Internal House Side Shield for 48 LEDs (3 modules)

HIS-64-H²⁰ Internal House Side Shield for 64 LEDs (4 modules)

Optic at 90 or 270 orientation:

HIS-32-V²⁰ Internal House Side Shield for 32 LEDs (2 modules)

HIS-48-V²⁰ Internal House Side Shield for 48 LEDs (3 modules)

HIS-64-V²⁰ Internal House Side Shield for 64 LEDs (4 modules)

Luminaire Accessories

ECF-BD-G2

Bird deterrent

ECF-RAM-G2-(F)

Retrofit Arm mount kit

ECF-SF-G2-(F)

Slip Fitter Mount (fits to 2 3/8" O.D. tenon)

ECF-WS-G2-(F)

Wall mount with surface conduit rear entry permitted

EcoForm PTF2

(pole top fitter fits 23/8-21/2" OD x 4" depth tenon)

EcoForm PTF3

(pole top fitter fits 3-31/2" OD x 6" depth tenon)

EcoForm PTF4

(pole top fitter fits 31/2-4" OD x 6" depth tenon)

PTF2-ECF-S/L-1-90-(F)

1 luminaire at 90°

PTF2-ECF-S/L-2-90-(F)

2 luminaires at 90°

PTF2-ECF-S/L-2-180-(F)

2 luminaires at 180°

PTF2-ECF-S/L-3-90-(F)

3 luminaires at 90°

PTF2-ECF-S/L-4-90-(F)

4 luminaires at 90°

PTF2-ECF-S/L-3-120-(F)

3 luminaires at 120°

PTF3-ECF-S/L-1-90-(F)

1 luminaire at 90°

PTF3-ECF-S/L-2-90-(F)

2 luminaires at 90°

PTF3-ECF-S/L-2-180-(F)

2 luminaires at 180°

PTF3-ECF-S/L-3-90-(F)

3 luminaires at 90°

PTF3-ECF-S/L-4-90-(F)

4 luminaires at 90°

PTF3-ECF-S/L-3-120-(F)

3 luminaires at 120°

PTF4-ECF-S/L-1-90-(F)

1 luminaire at 90°

PTF4-ECF-S/L-2-90-(F)

2 luminaires at 90°

PTF4-ECF-S/L-2-180-(F)

2 luminaires at 180°

PTF4-ECF-S/L-3-90-(F)

3 luminaires at 90°

PTF4-ECF-S/L-4-90-(F)

4 luminaires at 90°

PTF4-ECF-S/L-3-120-(F)

3 luminaires at 120°

(F) = Specify finish

Ready to Go configurations (when ordered with the "RS-" catalog code, the following configurations will ship in 2 weeks):

Catalog Number	12NC	Catalog Number	12NC
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-BZ	912401466002	RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-BK	912401534560
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-MGY	912401466003	RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-BZ	912401466016
RS-ECF-S-32L-1A-NW-G2-AR-3-UNV-BK	912401534554	RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-MGY	912401466017
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-BZ	912401466004	RS-ECF-S-64L-1A-NW-G2-AR-4-UNV-BK	912401534561
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-MGY	912401466005	RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-BZ	912401466018
RS-ECF-S-32L-1A-NW-G2-AR-4-UNV-BK	912401534555	RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-MGY	912401466019
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-BZ	912401466006	RS-ECF-S-64L-1A-NW-G2-AR-5-UNV-BK	912401534562
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-MGY	912401466007	RS-ECF-RAM-G2-DGY	912401466487
RS-ECF-S-32L-1A-NW-G2-AR-5-UNV-BK	912401534556	RS-ECF-RAM-G2-MGY	912401466488
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-BZ	912401466008	RS-ECF-RAM-G2-WH	912401466485
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-MGY	912401466009	RS-ECF-RAM-G2-BZ	912401466486
RS-ECF-S-48L-1A-NW-G2-AR-3-UNV-BK	912401534557	RS-ECF-RAM-G2-BK	912401466484
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-BZ	912401466010	RS-HIS-32-H	912401466489
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-MGY	912401466011	RS-HIS-48-H	912401466491
RS-ECF-S-48L-1A-NW-G2-AR-4-UNV-BK	912401534558	RS-HIS-64-H	912401466493
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-BZ	912401466012		
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-MGY	912401466013		
RS-ECF-S-48L-1A-NW-G2-AR-5-UNV-BK	912401534559		
RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-BZ	912401466014		
RS-ECF-S-64L-1A-NW-G2-AR-3-UNV-MGY	912401466015		

ECF-S EcoForm small

Area lumineaire

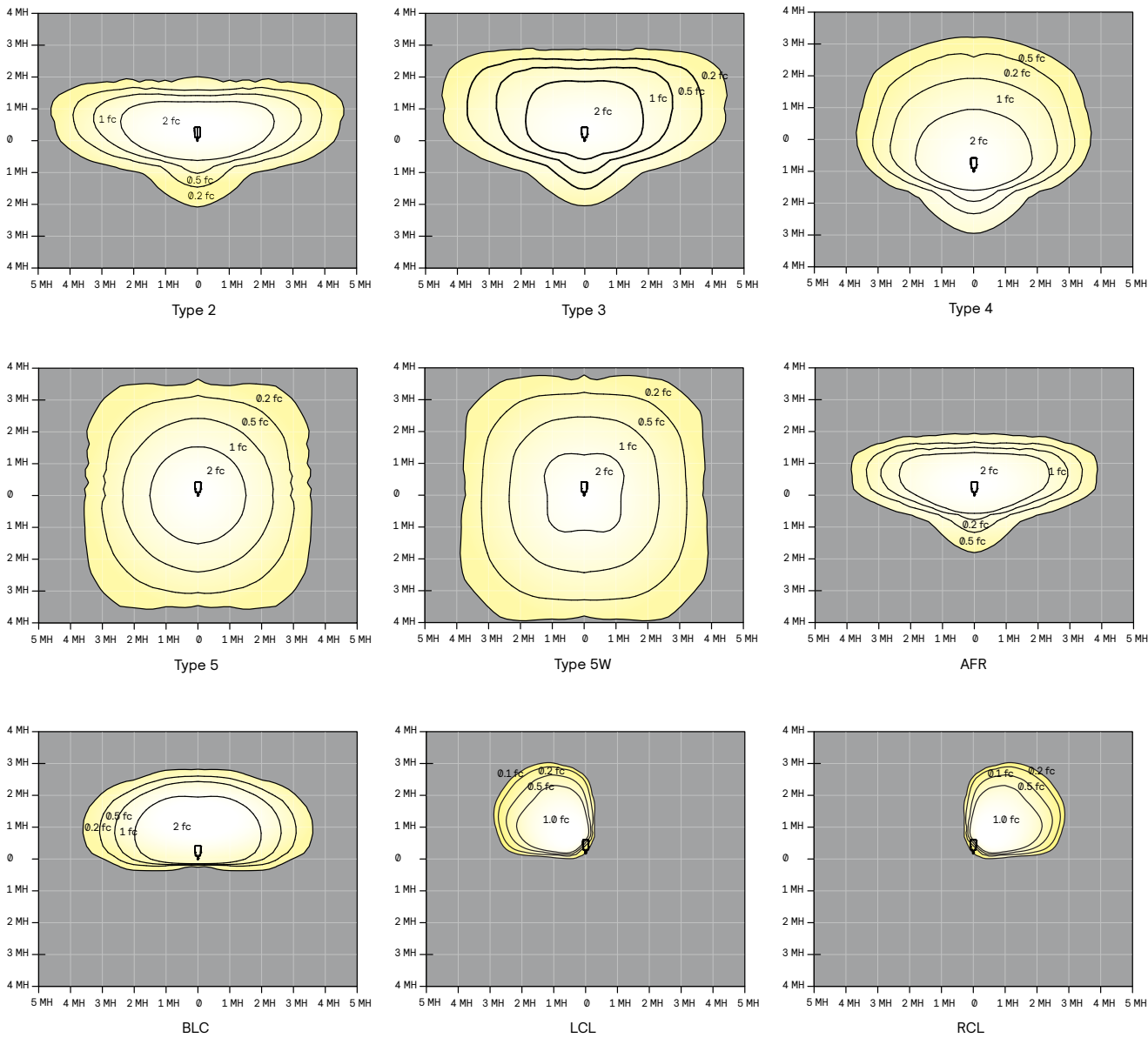
Predicted Lumen Depreciation Data

Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions. L70 is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-11. Published L70 hours limited to 6 times actual LED test hours

Ambient Temperature °C	Driver mA	Calculated L70 Hours	L70 per TM-21	Lumen Maintenance % at 60,000 hrs
25°C	up to 1200 mA	>100,000 hours	>120,000 hours	>99%

Optical Distributions

Based on configuration ECF-S-48L-1A-NW-G2 (159W) mounted at 20ft.



ECF-S EcoForm small

Area luminaire

3000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,508	B1-U0-G1	138	5,428	B1-U0-G2	136	5,637	B1-U0-G2	141	5,790	B3-U0-G1	145	5,604	B3-U0-G1	140
ECF-S-32L-530-WW-G2-x	32	530	3000	56	7,159	B2-U0-G2	129	7,055	B1-U0-G2	127	7,327	B1-U0-G2	132	7,526	B3-U0-G2	135	7,284	B3-U0-G2	131
ECF-S-32L-700-WW-G2-x	32	700	3000	73	9,234	B2-U0-G2	127	9,034	B2-U0-G2	124	9,452	B2-U0-G2	130	9,707	B4-U0-G2	133	9,395	B4-U0-G2	129
ECF-S-32L-1A-WW-G2-x	32	1050	3000	106	13,001	B3-U0-G2	123	12,719	B2-U0-G2	120	13,306	B2-U0-G3	126	13,665	B4-U0-G2	129	13,227	B4-U0-G2	125
ECF-S-32L-1.2A-WW-G2-x	32	1200	3000	122	14,421	B3-U0-G3	119	14,108	B2-U0-G3	116	14,760	B2-U0-G3	121	15,158	B4-U0-G2	125	14,671	B4-U0-G2	121
ECF-S-48L-900-WW-G2-x	48	900	3000	135	17,115	B3-U0-G3	127	16,744	B3-U0-G3	124	17,518	B2-U0-G3	130	17,990	B4-U0-G2	133	17,413	B5-U0-G3	129
ECF-S-48L-1A-WW-G2-x	48	1050	3000	159	19,381	B3-U0-G3	122	18,960	B3-U0-G3	119	19,836	B3-U0-G4	125	20,372	B5-U0-G3	128	19,717	B5-U0-G3	124
ECF-S-48L-1.2A-WW-G2-x	48	1200	3000	183	21,515	B3-U0-G3	118	21,048	B3-U0-G4	115	22,020	B3-U0-G4	121	22,616	B5-U0-G3	124	21,888	B5-U0-G3	120
ECF-S-64L-900-WW-G2-x	64	900	3000	178	22,652	B3-U0-G3	127	22,161	B3-U0-G4	125	23,185	B3-U0-G4	130	23,810	B5-U0-G3	134	23,045	B5-U0-G3	130
ECF-S-64L-1A-WW-G2-x	64	1050	3000	206	25,520	B3-U0-G3	124	24,966	B3-U0-G4	121	26,120	B3-U0-G4	127	26,150	B5-U0-G3	127	25,964	B5-U0-G4	126

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,706	B2-U0-G1	143	3,691	B0-U0-G1	94	2,449	B0-U0-G1	62
ECF-S-32L-530-WW-G2-x	32	530	3000	56	7,417	B2-U0-G1	133	5,005	B0-U0-G2	91	3,183	B0-U0-G1	58
ECF-S-32L-700-WW-G2-x	32	700	3000	73	9,567	B2-U0-G2	131	6,409	B0-U0-G2	89	4,106	B0-U0-G1	57
ECF-S-32L-1A-WW-G2-x	32	1050	3000	106	13,467	B3-U0-G2	128	9,024	B1-U0-G2	87	5,793	B0-U0-G2	56
ECF-S-32L-1.2A-WW-G2-x	32	1200	3000	122	14,939	B3-U0-G2	123	10,010	B1-U0-G2	84	6,426	B0-U0-G2	54
ECF-S-48L-900-WW-G2-x	48	900	3000	135	17,731	B3-U0-G2	131	11,880	B1-U0-G2	89	7,626	B0-U0-G2	57
ECF-S-48L-1A-WW-G2-x	48	1050	3000	159	20,076	B3-U0-G2	127	13,453	B1-U0-G2	86	8,636	B0-U0-G2	55
ECF-S-48L-1.2A-WW-G2-x	48	1200	3000	183	22,288	B3-U0-G2	122	14,934	B1-U0-G3	83			
ECF-S-64L-900-WW-G2-x	64	900	3000	178	23,465	B3-U0-G2	132	15,723	B1-U0-G3	90	10,093	B0-U0-G2	58
ECF-S-64L-1A-WW-G2-x	64	1050	3000	206	26,437	B4-U0-G3	128	17,714	B1-U0-G3	87			

4000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-NW-G2-x	32	365	4000	40	5,798	B1-U0-G1	145	5,713	B1-U0-G2	143	5,934	B1-U0-G2	148	6,094	B3-U0-G1	152	5,898	B3-U0-G2	147
ECF-S-32L-530-NW-G2-x	32	530	4000	56	7,536	B2-U0-G2	135	7,426	B1-U0-G2	133	7,713	B1-U0-G2	138	7,922	B3-U0-G2	142	7,667	B3-U0-G2	138
ECF-S-32L-700-NW-G2-x	32	700	4000	73	9,720	B2-U0-G2	133	9,509	B2-U0-G2	130	9,949	B2-U0-G2	136	10,218	B4-U0-G2	140	9,889	B4-U0-G2	136
ECF-S-32L-1A-NW-G2-x	32	1050	4000	106	13,685	B3-U0-G2	130	13,388	B2-U0-G3	127	14,006	B2-U0-G3	133	14,384	B4-U0-G2	136	13,923	B4-U0-G2	132
ECF-S-32L-1.2A-NW-G2-x	32	1200	4000	122	15,180	B3-U0-G3	125	14,851	B2-U0-G3	122	15,537	B2-U0-G3	128	15,956	B4-U0-G2	131	15,443	B4-U0-G2	127
ECF-S-48L-900-NW-G2-x	48	900	4000	135	18,016	B3-U0-G3	133	17,625	B3-U0-G3	130	18,440	B3-U0-G3	136	18,937	B4-U0-G3	140	18,329	B5-U0-G3	136
ECF-S-48L-1A-NW-G2-x	48	1050	4000	159	20,401	B3-U0-G3	129	19,958	B3-U0-G4	126	20,880	B3-U0-G4	132	21,444	B5-U0-G3	135	20,755	B5-U0-G3	131
ECF-S-48L-1.2A-NW-G2-x	48	1200	4000	183	22,647	B3-U0-G3	124	22,156	B3-U0-G4	121	23,179	B3-U0-G4	127	23,806	B5-U0-G3	130	23,040	B5-U0-G3	126
ECF-S-64L-900-NW-G2-x	64	900	4000	178	23,844	B3-U0-G3	134	23,327	B3-U0-G4	131	24,405	B3-U0-G4	137	25,063	B5-U0-G3	141	24,258	B5-U0-G4	136
ECF-S-64L-1A-NW-G2-x	64	1050	4000	206	26,863	B3-U0-G3	130	26,280	B3-U0-G4	128	27,495	B3-U0-G4	134	27,526	B5-U0-G3	134	27,330	B5-U0-G4	133

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-NW-G2-x	32	365	4000	40	6,006	B2-U0-G1	150	3,991	B0-U0-G1	101	2,633	B0-U0-G1	67
ECF-S-32L-530-NW-G2-x	32	530	4000	56	7,807	B2-U0-G1	140	5,412	B0-U0-G2	99	3,423	B0-U0-G1	62
ECF-S-32L-700-NW-G2-x	32	700	4000	73	10,070	B2-U0-G2	138	6,930	B0-U0-G2	96	4,415	B0-U0-G1	61
ECF-S-32L-1A-NW-G2-x	32	1050	4000	106	14,176	B3-U0-G2	134	9,756	B1-U0-G2	94	6,229	B0-U0-G2	60
ECF-S-32L-1.2A-NW-G2-x	32	1200	4000	122	15,725	B3-U0-G2	129	10,822	B1-U0-G2	90	6,910	B0-U0-G2	58
ECF-S-48L-900-NW-G2-x	48	900	4000	135	18,664	B3-U0-G2	138	12,843	B1-U0-G2	96	8,200	B0-U0-G2	62
ECF-S-48L-1A-NW-G2-x	48	1050	4000	159	21,133	B3-U0-G2	133	14,544	B1-U0-G3	93	9,286	B0-U0-G2	59
ECF-S-48L-1.2A-NW-G2-x	48	1200	4000	183	23,461	B3-U0-G2	128	16,145	B1-U0-G3	90			
ECF-S-64L-900-NW-G2-x	64	900	4000	178	24,700	B3-U0-G2	139	16,998	B1-U0-G3	97	10,853	B0-U0-G2	62
ECF-S-64L-1A-NW-G2-x	64	1050	4000	206	27,828	B4-U0-G3	135	19,150	B1-U0-G3	94			

ECF-S EcoForm small

Area luminaire

5000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type 2			Type 3			Type 4			Type 5			Type 5W		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-CW-G2-x	32	365	5000	40	5,798	B1-U0-G1	145	5,713	B1-U0-G2	143	5,934	B1-U0-G2	148	6,094	B3-U0-G1	152	5,898	B3-U0-G2	147
ECF-S-32L-530-CW-G2-x	32	530	5000	56	7,536	B2-U0-G2	135	7,426	B1-U0-G2	133	7,713	B1-U0-G2	138	7,922	B3-U0-G2	142	7,667	B3-U0-G2	138
ECF-S-32L-700-CW-G2-x	32	700	5000	73	9,720	B2-U0-G2	133	9,509	B2-U0-G2	130	9,949	B2-U0-G2	136	10,218	B4-U0-G2	140	9,889	B4-U0-G2	136
ECF-S-32L-1A-CW-G2-x	32	1050	5000	106	13,685	B3-U0-G2	130	13,388	B2-U0-G3	127	14,006	B2-U0-G3	133	14,384	B4-U0-G2	136	13,923	B4-U0-G2	132
ECF-S-32L-1.2A-CW-G2-x	32	1200	5000	122	15,180	B3-U0-G3	125	14,851	B2-U0-G3	122	15,537	B2-U0-G3	128	15,956	B4-U0-G2	131	15,443	B4-U0-G2	127
ECF-S-48L-900-CW-G2-x	48	900	5000	135	18,016	B3-U0-G3	133	17,625	B3-U0-G3	130	18,440	B3-U0-G3	136	18,937	B4-U0-G3	140	18,329	B5-U0-G3	136
ECF-S-48L-1A-CW-G2-x	48	1050	5000	159	20,401	B3-U0-G3	129	19,958	B3-U0-G4	126	20,880	B3-U0-G4	132	21,444	B5-U0-G3	135	20,755	B5-U0-G3	131
ECF-S-48L-1.2A-CW-G2-x	48	1200	5000	183	22,647	B3-U0-G3	124	22,156	B3-U0-G4	121	23,179	B3-U0-G4	127	23,806	B5-U0-G3	130	23,040	B5-U0-G3	126
ECF-S-64L-900-CW-G2-x	64	900	5000	178	23,844	B3-U0-G3	134	23,327	B3-U0-G4	131	24,405	B3-U0-G4	137	25063	B5-U0-G3	141	24258	B5-U0-G4	136
ECF-S-64L-1A-CW-G2-x	64	1050	5000	206	26,863	B3-U0-G3	130	26,280	B3-U0-G4	128	27,495	B3-U0-G4	134	27526	B5-U0-G3	134	27330	B5-U0-G4	133

Ordering Code	Total LEDs	LED Current (mA)	Color Temp.	Average System Watts	Type AFR			BLC			LCL or RCL		
					Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)	Lumen Output	BUG Rating	Efficacy (LPW)
ECF-S-32L-365-CW-G2-x	32	365	5000	40	6,006	B2-U0-G1	150	3,991	B0-U0-G1	101	2,633	B0-U0-G1	67
ECF-S-32L-530-CW-G2-x	32	530	5000	56	7,807	B2-U0-G1	140	5,412	B0-U0-G2	99	3,423	B0-U0-G1	62
ECF-S-32L-700-CW-G2-x	32	700	5000	73	10,070	B2-U0-G2	138	6,930	B0-U0-G2	96	4,415	B0-U0-G1	61
ECF-S-32L-1A-CW-G2-x	32	1050	5000	106	14,176	B3-U0-G2	134	9,756	B1-U0-G2	94	6,229	B0-U0-G2	60
ECF-S-32L-1.2A-CW-G2-x	32	1200	5000	122	15,725	B3-U0-G2	129	10,822	B1-U0-G2	90	6,910	B0-U0-G2	58
ECF-S-48L-900-CW-G2-x	48	900	5000	135	18,664	B3-U0-G2	138	12,843	B1-U0-G2	96	8,200	B0-U0-G2	62
ECF-S-48L-1A-CW-G2-x	48	1050	5000	159	21,133	B3-U0-G2	133	14,544	B1-U0-G3	93	9,286	B0-U0-G2	59
ECF-S-48L-1.2A-CW-G2-x	48	1200	5000	183	23,461	B3-U0-G2	128	16,145	B1-U0-G3	90			
ECF-S-64L-900-CW-G2-x	64	900	5000	178	24,700	B3-U0-G2	139	16,998	B1-U0-G3	97	10,853	B0-U0-G2	62
ECF-S-64L-1A-CW-G2-x	64	1050	5000	206	27,828	B4-U0-G3	135	19,150	B1-U0-G3	94			

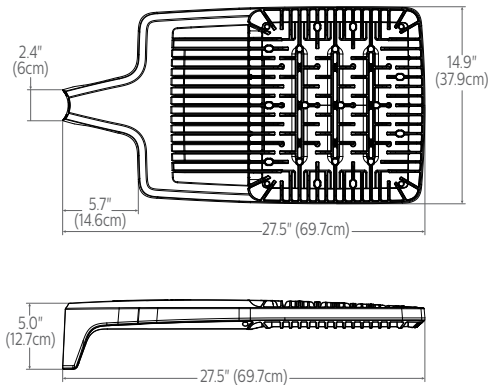
ECF-S EcoForm small

Area lumineuse

Dimensions

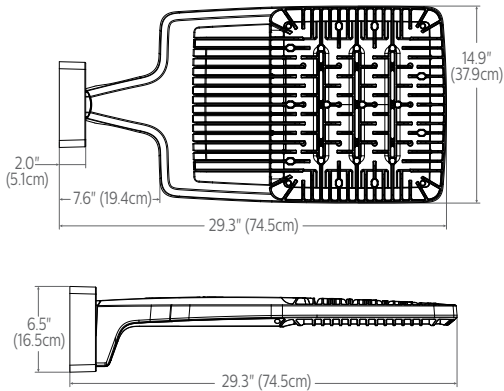
Standard Arm (AR)

Weight: 22 Lbs (9.9 Kg) EPA: 0.21ft² (.019m²)



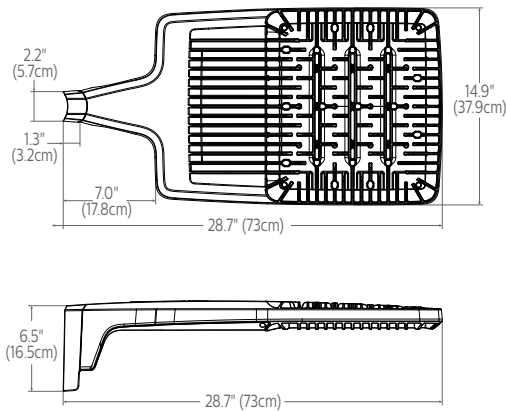
Wall (WS)

Weight: 27 Lbs. (12. 2Kg) EPA: 0.27ft² (.025m²)



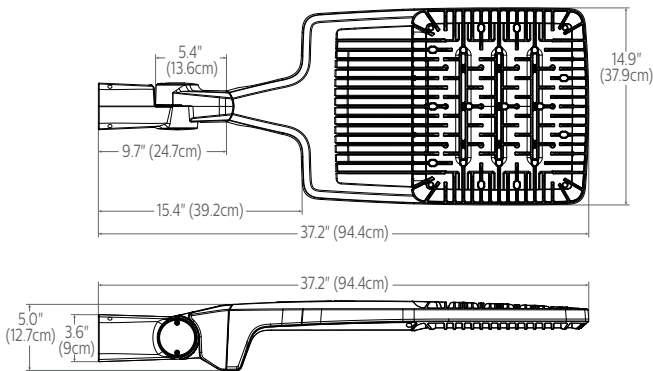
Retrofit Arm (RAM)

Weight: 24 Lbs (10.9 Kg) EPA: 0.24ft² (.022m²)

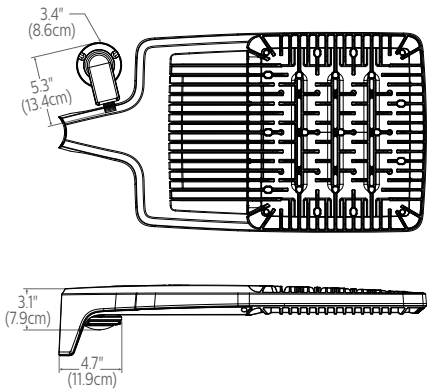


Slip fitter (SF)

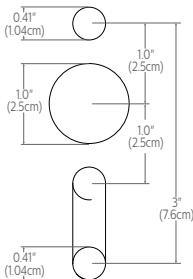
Weight: 27 Lbs (12.2 Kg) EPA: 0.33ft² (.031m²)



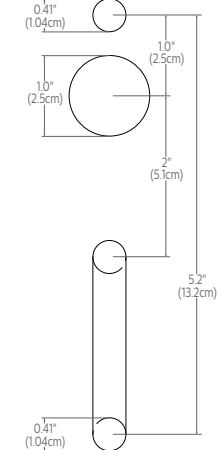
Outboard IMR-HVU sensor



Standard Arm (AR) drill pattern



Retrofit Arm (RAM) drill pattern



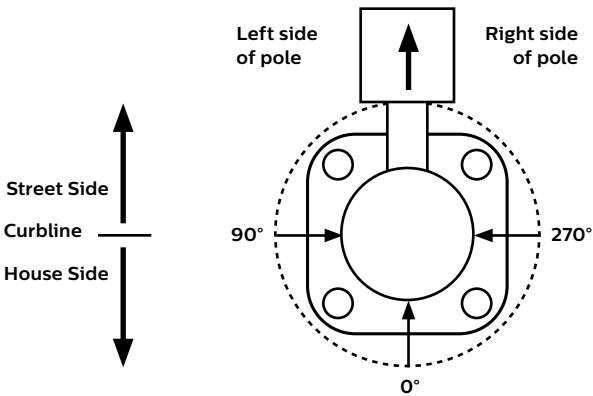
ECF-S EcoForm small

Area luminaire

Optical Orientation Information

Standard Optic Position

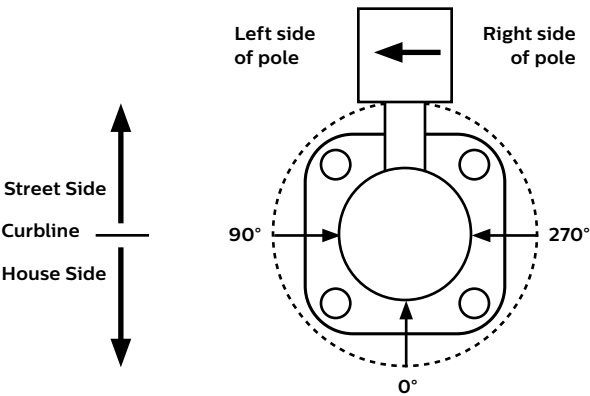
Luminaires ordered with asymmetric optical systems in the standard optic position will have the optical system oriented as shown below:



Note: The hand hole will normally be located on the pole at the 0° point.

Optic Rotated Left (90°) Optic Position

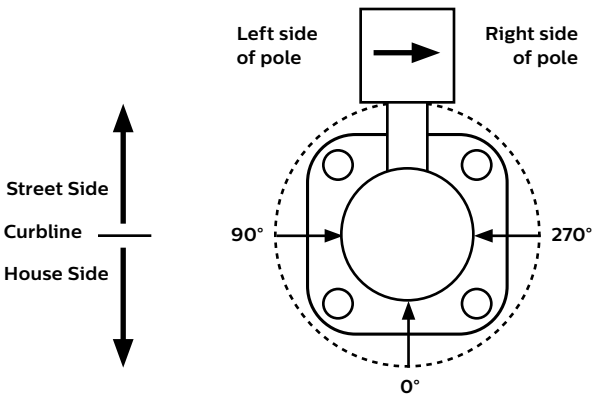
Luminaires ordered with optical systems in the Optic Rotated Left (90°) optic position will have the optical system oriented as shown below (Type 5 and 5W optics are not available with factory set rotatable optics):



Note: The hand hole will normally be located on the pole at the 0° point.

Optic Rotated Right (270°) Optic Position

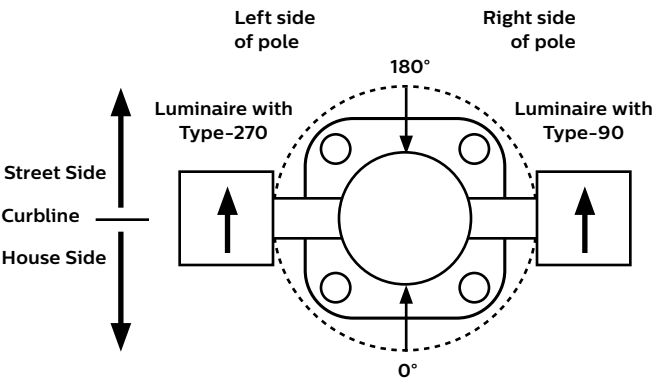
Luminaires ordered with optical systems in the Optic Rotated Right (270°) optic position will have the optical system oriented as shown below (Type 5 and 5W optics are not available with factory set rotatable optics):



Note: The hand hole will normally be located on the pole at the 0° point.

Twin Luminaire Assemblies with Type-90/Type-270 Rotated Optical Systems

Twin luminaire assemblies installed with rotated optical systems are an excellent way to direct light toward the interior of the site (Street Side) without additional equipment. It is important, however, that care be exercised to insure that luminaires are installed in the proper location.



Luminaires with Optic Rotated Right (270°) are installed on the LEFT Side of Pole

Luminaires with Optic Rotated Left (90°) are installed on the RIGHT Side of Pole

Note: The hand hole location will depend on the drilling configuration ordered for the pole.

ECF-S EcoForm small

Area luminaire

Specifications

Housing

One-piece die cast aluminum housing with integral arm and separate, self-retained hinged, one-piece die cast door frame. Luminaire housing rated to IP65, tested in accordance to Section 9 of IEC 60598-1.

Vibration resistance

Luminaire is tested and rated 3G over 100,000 cycles conforming to standards set forth by ANSI C136.31-2018. Testing includes vibration in three axes, all performed on the same luminaire.

Light engine

Light engine comprises of a module of 16-LED aluminum metal clad board fully sealed with optics offered in multiples of 2, 3, and 4 modules or 32, 48, and 64 LEDs. Module is RoHS compliant. Color temperatures: 3000K +/-125K, 4000K, 5000K +/- 200K. Minimum CRI of 70. LED light engine is rated IP66 in accordance to Section 9 of IEC 60598-1.

Energy saving benefits

System efficacy up to 152 lms/W with significant energy savings over Pulse Start Metal Halide luminaires. Optional control options provide added energy savings during unoccupied periods.

Optical systems

Type 2, 3, 4, 5, 5W, and AFR distributions available. Internal Shield option mounts to LED optics and is available with Type 2, 3, 4, and AFR distributions, including a dedicated BLC, LCL, and RCL optics to provide the best backlight control possible for those stringent requirements around property lines. Types 2, 3, 4, AFR, and BLC when specified and used as rotated, are factory set only. Performance tested per LM-79 and TM-15 (IESNA) certifying its photometric performance. Luminaire designed with 0% uplight (U0 per IESNA TM-15).

Mounting

Standard luminaire arm mounts to 4" O.D. round poles. Can also be used with 5" O.D. poles. Square pole adapter included with every luminaire. Round Pole Adapter (RPA) required for 3-3.9" poles. EcoForm features a retrofit arm kit. When specified with the retrofit arm (RAM) option, EcoForm seamlessly simplifies site conversions to LED by eliminating the need for additional pole drilling on most existing poles. RAM will be boxed separately. Also optional are slipfitter and wall mounting accessories. Note that only fixed mounts (AR, RAM, WS) are required to meet IDA compliance. SF mounting will not meet IDA.

Control options

0-10V dimming (DD): Access to 0-10V dimming leads supplied through back of luminaire (for secondary dimming controls by others). Cannot be used with other control options.

Dual Circuit Control (DCC): Luminaire equipped with the ability to have two separate circuits controlling drivers and light engines independently. Permits separate switching of separate modules controlled by use of two sets of leads, one for each circuit. Not recommended to be used with other control options, motion response, or photocells.

Sensor Ready Zhaga Socket Connector (SRDR): Product equipped with Sensor Ready drivers connected to 4-pin Zhaga Book 18 compliant receptacle designed for sensor and other control system applications. Receptacle is rated IP66 assembly in a compact design that provides a sealed electrical interface and rated UV resistance, mounted on underside of the luminaire, protective dust cap included. When a controller not provided by Signify is used with Sensor Ready Zhaga socket connector, the controller must be certified to work with the Xitanium SR LED drivers as part of the SR certified program. SRDR can be used with NEMA 7-pin twist lock receptacle, which is mounted on top of the luminaire.

Automatic Profile Dimming (CS/CM/CE/CA): Standard dimming profiles provide flexibility towards energy savings goals while optimizing light levels during specific dark hours. Dimming profiles include two dimming settings including dim to 30% or 50% of the total lumen output. When used in combination with not programmed motion response it overrides the controller's schedule when motion is detected. After 5 minutes with no motion, it will return to the automatic dimming profile schedule. Automatic dimming profile scheduled with the following settings:

- **CS50/CS30:** Security for 7 hours night duration (Ex., 11 PM – 6 AM)
- **CM50/CM30:** Median for 8 hours night duration (Ex., 10 PM – 6 AM)

All above profiles are calculated from mid point of the night. Dimming is set for 6 hours after the mid point and 1 or 2 hours before depending of the duration of dimming. Cannot be used with other dimming control options.

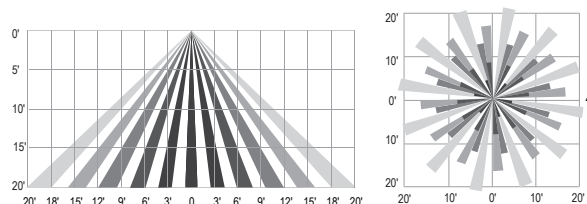
Field Adjustable Wattage Selector (FAWS): Luminaire equipped with the ability to manually adjust the wattage in the field to reduce total luminaire lumen output and light levels. Comes pre-set to the highest position at the lumen output selected. Use chart below to estimate reduction in lumen output desired. Cannot be used with other control options or motion response.

FAWS Position	Percent of Typical Lumen Output
1	25%
2	50%
3	55%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

Note: Typical value accuracy +/- 5%

Wireless system (LLC): Optional wireless controller integral to luminaire ready to be connected to a Limelight system (sold by others). The system allows you to wirelessly manage the entire site, independent lighting groups or individual luminaires while on-site or remotely. Based on a high-density mesh network with an easy to use web-based portal, you can conveniently access, monitor and manage your lighting network remotely. Wireless controls can be combined with site and area, pedestrian, and parking garage luminaires as well, for a completely connected outdoor solution. Equipped with motion response with #3 lens for 8-25' mounting heights. Also available with remote pod accessory where pod is mounted separate from luminaire to pole or wall.

LLC wireless controller with #3 lens



Motion response options

Bi-Level Infrared Motion Response (BL-IMRI): Motion Response module is mounted integral to luminaire factory pre-programmed to 50% dimming when not ordered with other control options. BL-IMRI is set/operates in the following fashion: The motion sensor is set to a constant 50%. When motion is detected by the PIR sensor, the luminaire returns to full power/light output. Dimming on low is factory set to 50% with 5 minutes default in "full power" prior to dimming back to low. When no motion is detected for 5 minutes, the motion response system reduces the wattage by 50%, to 50% of the normal constant wattage reducing the light level. Other dimming settings can be provided if different dimming levels are required. This can also be done with FSIR-100 Wireless Remote Programming Tool (contact Technical Support for details).

Infrared Motion Response with Other Controls: When used in combination with other controls (Automatic Dimming Profile), motion response device will simply override controller's schedule with the added benefits of a combined dimming profile and sensor detection. In this configuration, the motion response device cannot be re-programmed with FSIR-100 Wireless Remote Programming Tool. The profile can only be re-programmed via the controller.

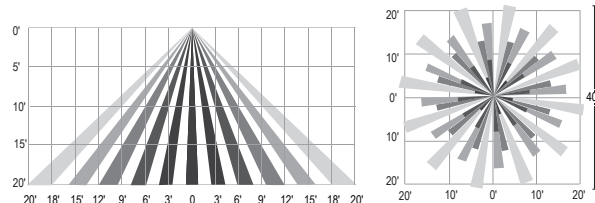
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Area luminaire

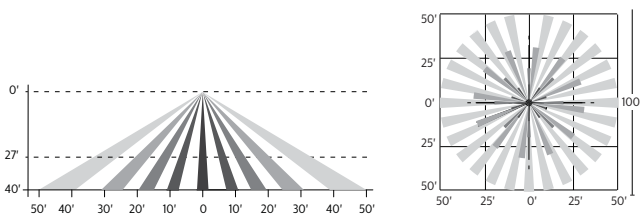
Specifications

Infrared Motion Response Lenses (IMRI3/IMRI7): Infrared Motion Response Integral module is available with two different sensor lens types to accommodate various mounting heights and occupancy detection ranges. Lens #3 (IMRI3) is designed for mounting heights up to 20' with a 40' diameter coverage area. Lens #7 is designed for higher mounting heights up to 40' with larger coverage areas up to 100' diameter coverage area. See charts for approximate detection patterns:

IMRI3 Luminaire or remote mount controller with #3 lens



IMRI7 Luminaire or remote mount controller with #7 lens



Electrical

Twist-Lock Receptacle (TLRD5/TLRD7/ TLRPC): Twist Lock Receptacle with 5 pins enabling dimming or with 7 pins with additional functionality (by others) can be used with a twistlock photoelectric cell or a shorting cap. Dimming Receptacle Type B (5-pin) and Type D-24 (7-pin) in accordance to ANSI C136.41. Can be used with third-party control system. Receptacle located on top of luminaire housing. When specifying receptacle with twistlock photoelectric cell, voltage must be specified. When ordering 7-pin Twist-lock receptacle (TLRD7), all 7 pins are wired to respective pins with the Sensor Ready (SR) driver, and photocell or shorting cap is not included. When ordering a twist-lock receptacle with a photocell (TLRPC), the receptacle used is a 5-pin receptacle, so pins 6 and 7 are not available (no SR driver). 0-10V dimming leads (pins 4 and 5) are connected if not ordered with any other dimming option.

Buy American Act of 1933 (BAA):

This product is manufactured in one of our US factories and, as of the date of this document, this product was considered a commercially available off-the-shelf (COTS) item meeting the requirements of the BAA. This BAA designation hereunder does not address (i) the applicability of, or availability of a waiver under, the Trade Agreements Act, or (ii) the "Buy America" domestic content requirements imposed on states, localities, and other non-federal entities as a condition of receiving funds administered by the Department of Transportation or other federal agencies. Prior to ordering, please visit www.signify.com/baa to view a current list of BAA-compliant products to confirm this product's current compliance.

Driver: Driver efficiency (>90% standard). 120-480V available (restrictions apply). Open/short circuit protection. All drivers are 0-10V dimming to 10% power standard, except when using Sensor Ready (SR) drivers, which uses DALI protocol (options CS50/CM50/CS30/CM30, SRDR, and TR7). Drivers are RoHS and FCC Title 47 CFR Part 15 compliant.

Button Photocontrol (PCB): Button style design for internal luminaires mounting applications. The photocontrol is constructed of a high impact UV stabilized polycarbonate housing. Rated voltage of 120V or 208-277V with a load rating of 1000 VA. The photocell will turn on with 1-4Fc of ambient light.

Surge protection (SP1/SP2): Surge protection device tested in accordance with ANSI/IEEE C62.45 per ANSI/IEEE C62.41.2 Scenario I Category C High Exposure 10kV/10kA waveforms for Line-Ground, Line-Neutral and Neutral-Ground, and in accordance with DOE MSSLC Model Specification for LED Roadway Luminaires Appendix D Electrical Immunity High test level 10kV/10kA. 20kV / 10kA surge protection device that provides extra protection beyond the SP1 10kV/10kA level.

Listings

UL/cUL wet location listed to the UL 1598 standard, suitable for use in ambient temperatures from -40° to 40°C (-40° to 104°F). Most EcoForm configurations are qualified under Premium and Standard DesignLights Consortium® categories. Consult DLC Qualified Products list to confirm your specific luminaire selection is approved. CCTs 3000K and warmer are Dark Sky Approved.

Finish

Each standard color luminaire receives a fade and abrasion resistant, electrostatically applied, thermally cured, triglycidal isocyanurate (TGIC) textured polyester powdercoat finish. Standard colors include bronze (BZ), black (BK), white (WH), dark gray (DGY), and medium gray (MGY). Consult factory for specs on optional or custom colors.

Service Tag

Each individual luminaire is uniquely identifiable, thanks to the Service tag application. With a simple scan of a QR code, placed on the inside of the mast door, you gain instant access to the luminaire configuration, making installation and maintenance operations faster and easier, no matter what stage of the luminaire's lifetime. Just download the APP and register your product right away. For more details visit: signify.com

Warranty

EcoForm luminaires feature a 5-year limited warranty. See signify.com/warranties for complete details and exclusions.





North Central District Health Department

□ Enfield—31 North Main Street, Enfield, CT 06082 * (860) 745-0383 Fax (860) 745-3188

□ Vernon—375 Hartford Turnpike, Room 120, Vernon, CT 06066 * (860) 872-1501 Fax (860) 872 1531

□ Windham—Town Hall, 979 Main Street, Willimantic, CT 06226 * (860) 465-3033 Fax (860) 465-3034

□ Stafford—Town Hall, 1 Main Street, Stafford Springs, CT 06076 * (860) 684-5609 Fax (860) 684-1768

Patrice A. Sulik, MPH, R.S.
Director of Health

August 2, 2022

Mr. Shaun Gately
Vernon Interim Town Planner
55 West Main Street
Vernon, Connecticut 06066

Re: Planning & Zoning Commission Application PZ-2022-13 – Shawmut Site Plans
43 & 45 South Frontage Road
Vernon, Connecticut

Dear Shaun:

I am writing regarding the Planning & Zoning Commission Application at the above referenced address.

North Central District Health Department (NCDHD) has the following comments regarding the proposed Shawmut site plans:

- Public Water and Public Sewer are available for this property. Any building(s) with plumbing shall connect to these utilities.
 - In the case that public sewers will not be available for this property for whatever reason(s), the NCDHD must be contacted.
- The 36" Duplex Grinder Pump System shall be a minimum of 75 feet to any water supply well.
- Any dumpsters shall reside on a concrete surface or a similar surface.

Should anyone have any additional questions regarding this matter, I am reachable via email at bbielawiec@ncdhd.org. You can also call me at the NCDHD office at 860-745-0383, extension 114.

Sincerely,

Brian Bielawiec
Registered Sanitarian



TOWN OF VERNON

55 WEST MAIN STREET, VERNON, CT 06066

Tel: (860) 870-3663

Fax: (860) 870-3683

David A. Smith, PELS
TOWN ENGINEER

August 1, 2022

Mr. David O'Connell
Shawmut Equipment Realty – CT LLC
20 Tolland Turnpike
Manchester, CT. 06042

Re: Approval of Application IWC-2022-05 of David O'Connell for Shawmut Equipment for a Wetlands Permit for Construction of an Equipment Sales and Service Center including associated grading, driveways, utilities, and storm water management system, at 43 and 45 South Frontage Road (Assessor's ID: Map 29, Block 134A, Parcels 11A and 11B)

Dear Mr. O'Connell,

At its meeting of July 26, 2022, the Vernon Inland Wetlands Commission (IWC) approved the application IWC-2022-05 of David O'Connell/ Shawmut Equipment Realty - LLC for a Wetlands Permit for Construction of an Equipment Sales and Service Center including associated grading, driveways, utilities, and storm water management system, at 43 and 45 South Frontage Road (Assessor's ID: Map 29, Block 134A, Parcels 11A and 11B) in accordance with:

This approval is granted based on testimony received at a Public Hearing opened on July 26th, and closed on that date; based on the documentation submitted by the applicant or otherwise received at the Public Hearing.

The Wetlands Permit is granted based on the Commission's findings that the application presents no adverse impact to wetlands and watercourses as evaluated by the criteria of Section 10.2 of the Vernon Inland Wetlands Regulations, with the following conditions:

- Specify vegetative stabilization measures for disturbed and new slopes
- Maintain existing tree canopy around the display area to the extent possible or provide additional trees to replace lost canopy
- Install CB hoods at all basins and Increase sump sizes in gravel areas
- Notify this office when S and E controls are in place
- Provide a copy of the recorded Permit to this office

Sincerely,

David A. Smith, Vernon Town Engineer

cc Craig Perry, Wetlands Enforcement Officer
IWC-2022-05 file



Design Review Commission

TOWN OF VERNON

14 PARK PLACE, VERNON, CT 06066

Tel: (860) 870-3667

Fax: (860) 870-3683

E-mail: sgately@vernon-ct.gov

August 4, 2022

Planning and Zoning Commission
14 Park Place
Vernon, CT. 06066

Attn: Roland Klee, Chairperson

On 8-3-22 the Design Review Commission was presented Application **PZ-2022-13**, at 43 & 45 South Frontage Rd. An application of David O'Connell (Shawmut Equipment Company Inc.) for a Site Plan and Special Permit to build a structure to conduct retail sales, rental, parts sales and service of new and used construction vehicles (cranes), at 43 & 45 South Frontage Rd. (Tax Map 29, Block 134A, Parcels 11A & 11B). The applicant presented their application as it was submitted to the Planning and Zoning Commission and provided visual representations of what the structures and site will look like. The Design Review commission reviewed the application/ plans and endorsed them as they were presented, with the stipulation that the applicant return to the DRC once they identify what their site signage will look like.

A copy of the minutes can be forwarded, if needed, once they are completed, and please let me know if you need further clarification.

Sincerely,

Shaun Gately
Director of Development Services



CENTRAL CONSERVATION DISTRICT, INC.

AVON • BLOOMFIELD • BOLTON • BRISTOL • BURLINGTON • CANTON • COVENTRY • EAST GRANBY • EAST WINDSOR • EAST HARTFORD • ELLINGTON
ENFIELD • FARMINGTON • GLASTONBURY • GRANBY • HARTFORD • MANCHESTER • PLAINVILLE • SIMSBURY • SOMERS • SOUTH WINDSOR
STAFFORD • SUFFIELD • WEST HARTFORD • WETHERSFIELD • TOLLAND • VERNON • WILLINGTON • WINDSOR • WINDSOR LOCKS

Date: August 4, 2022

To: Shaun Gately, Acting Town Planner
Town of Vernon Planning & Zoning Commission

From: Barbara Kelly, Program Coordinator, Registered Professional Soil Scientist, SSSSNE
Certified Erosion Control Professional CPESC #2180

Re: E&S Plan Review – Shawmut Equipment Company, Inc. 43-45 Frontage Road, Vernon,
Connecticut

This review is conducted pursuant to Section 18 of the Town of Vernon Zoning Regulations. The review is limited to certification of the erosion control plan, based on compliance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (Guidelines).

District staff inspected the site on August 2nd, 2022. An 11-sheet plan dated June 24, 2022 prepared by J R Russo titled "Shawmut Equipment Company, Inc., 42-45 Frontage Road Vernon, Connecticut" (Plan) and a "Wetland Impact Assessment" dated June 27, 2022, prepared by Davison Environmental, LLC were reviewed.

The Plan proposes the construction of a 19,400+ square foot building, a 2,400 square foot building, paved driveway and parking, a crushed stone display area and a stormwater management basin on 8.76 acres located at 43 & 45 South Frontage Road. About 100' of Tunnel Brook will be piped and the associated wetlands will be filled. A pollinator planting will replace a 5.650 square foot area of pavement. Post development, stormwater from the entrance drive and the crushed stone display area in the northeast portion of the site will flow overland to reach Tunnel Brook. Stormwater from the rest of the developed area will enter catch basins, flow through the new stormwater basin, and be discharged to a wetland associated with an un-piped 50-60' stretch of Tunnel Brook before exiting the site via 60" CMP.

Background

Based on the Natural Resources Conservation Service Web Soil Survey, soils throughout the majority of the proposed construction area are mapped as Udorthents-Urban land complex signifying soil that historically has been altered, and is no longer classified as a native soil type. The erosion hazard of these well-drained soils is considered severe. Paved and compacted gravel areas as well as piped stretches of Tunnel Brook are remnants of the previous land use.

The Plan appropriately calls for a construction entrance and perimeter controls, staked hay bales or silt fence, downslope of soil disturbance. The "Soil Erosion and Sediment Control Notes" address dust control and the maintenance of E&S measures. The notes also call for soil stabilization within 5 days of clearing or inactivity. A sequence of work is provided for the "Culvert Extension".

Observations & Recommendation

Proposed construction extends to the top of the steep slopes that abut the wetlands and Tunnel Brook.

- E&S inspections should ensure that site work has not inadvertently created areas of concentrated flows which would cause severe erosion on the steep slopes.

Smooth incised portions of channel along with dangling roots at the channel's edge in the northernmost portion of Tunnel Brook provide evidence of recent heavy flows. Culvert extension is proposed in the downstream portion of this segment of Tunnel Brook.

- Ensure that the pump, pump settling basin or filter bag, pump receptacles, and coffer dam will have the capacity to handle potential stormwater flows.
- Check weather forecasts to schedule work and complete the culvert extension expeditiously.

Comment

Based on the observed site conditions, with proper implementation and maintenance, the soil erosion and sediment control measures shown in the Plan are adequate and appropriate. The District certifies that the Plan complies with the **2002 Connecticut Guidelines for Soil Erosion and Sediment Control**.

Thank you for the opportunity to comment.

July 21, 2022

Vernon Planning & Zoning Commission
Attn. Shaun Gaitley
55 West Main Street, 2nd Floor
Vernon, CT 06066

Re: Traffic Statement
Shawmut Equipment
43 & 45 South Frontage Road

Dear Shaun,

Shawmut Equipment Company, Inc. has operated a crane sales and service business at their current location at 20 Tolland Turnpike in Manchester, Connecticut since 1957. They have recently purchased the property at 43 & 45 South Frontage Road with the intention of building a new facility to relocate their business to Vernon. The property at 43 & 45 South Frontage Road consists of approximately 8.7 acres that were historically used for contractor storage and bus parking. The property is surrounded by Tunnel Road to the south, I-84 to the west, the I-84 interchange 54 off-ramp to the north, and South Frontage Road to the east. Access to the site is restricted to small section along South Frontage Road. The site is zoned commercial.

The proposed development will involve the construction of a 24,913 s.f. main building and a 2,400 s.f. cold storage building. Normal hours of operation will be 7:00 am to 5:00 pm. Access to the site will be provided via the existing curb cut off of South Frontage Road. The proposed site will provide 23 parking spaces for employees and customers in accordance with the requirements of the Zoning Regulations.

Background Traffic:

The Connecticut Department of Transportation (DOT) maintains several traffic monitoring stations in the vicinity of the site (see attached map). Station VERN-049 is located on South Frontage Road directly in front of the project site. A printout of the data collected at this station in March of 2017 (prior to Covid-19) indicates an annualized number of trips along South Frontage Road in 2017 of 1700. The peak hours trips were 93 during the AM peak hour (7:00 am -8:00 am) and 202 during the PM peak hour (4:00 pm – 5:00 pm). The data for the stations on Tunnel Road at the intersection with South Frontage Road (VERN-030 and VERN-087) and the station at the east end of South Frontage Road (VERN-90) are also attached. These reports indicated 5,100 to 5,200 AADT on Tunnel Road and 5700 AADT on the eastern section of South Frontage Road.

Trip Generation:

The new facility is anticipated to have approximately 22 employees. Several of these employees include sales and service personnel who are often on the road or working directly on remote job sites. Thus, on average, only about 50-75% of the actual employees are expected to commute to the site on a daily basis. Using the higher 75% number, this corresponds to approximately 17 employees coming and going to the facility each day.

The majority of the sales and rentals are transacted over the phone or internet. Therefore, on-site customer traffic is also limited. Based on their experience at their current location, on average approximately 5 customers come to the site on a daily basis. Other traffic includes small truck deliveries (e.g. Fed-Ex,

Amazon, etc.) which, based on their experience is also limited to approximately 5 deliveries per day. These trips are scattered throughout the course of the day.

Crane deliveries to and from the site are also infrequent. Some days there are none and others there are a handful. On average, cranes arrive or depart approximately 3 times per day, again spread throughout the course of the day.

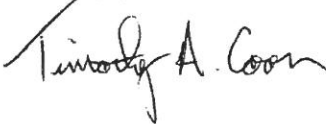
Conservatively assuming all employees leave and return to the site at least once during the course of the day (for a total of 34 trips), the total average daily trips generated by the site are 81 trips per day. Peak hour trips are anticipated to be limited to approximately 17 in the morning and 17 in the afternoon representing the employees arriving and leaving.

Conclusion:

As described above, the proposed development at 43 & 45 South Frontage Road is anticipated to generate minimal traffic compared to the existing background traffic on the surrounding roadways. As a result, the development is not expected to have a significant impact to traffic operations on the surrounding roadway network.

If there are any questions, or you require further information, please call me at (860) 623-0569.

Very truly yours,

A handwritten signature in black ink that reads "Timothy A. Coon". The signature is written in a cursive style with a large, stylized 'T' and 'C'.

Timothy A. Coon, P.E.
J.R. Russo & Associates, LLC

Attachments

cc: Shawmut Equipment



Status: OK

South Frontage Rd - West End

VERN-049 - North & South

Route 541 - 0.04 mi (S Frontage Rd)-E of SR 533 (Tunnel Rd)

Town.....	Vernon	29-Mar	30-Mar
Station.....	49	Wed	Thu
Location.....	41.831192,-72.465187	12:00am	10
2015-Major Collector 5.....	2015-Urban	01:00am	7
Start Report.....	29-Mar-2017 08:00AM	02:00am	2
End Report.....	30-Mar-2017 08:00AM	03:00am	2
Axle Correction Factor.....	None	04:00am	12
Annualized ADT.....	1600	05:00am	23
24-Hour Count....	1683 * G4(0.98) = 1649.3	06:00am	58
UnRounded AADT.....	1649.3 / 1 = 1649.3	07:00am	<u>93</u> AM PEAK
OK 2020 Fri 27-Mar	800	08:00am	87
OK <u>2017 Wed 29-Mar -this report-...</u>	<u>1600</u>	09:00am	80
OK 2014 Tue 22-Jul	1700	10:00am	90
REV 2011 Wed 13-Jul	1800	11:00am	90
OK 2008 Thu 06-Mar	1800	12:00pm	81
		01:00pm	94
		02:00pm	103
		03:00pm	147
		04:00pm	<u>202</u> PM PEAK
		05:00pm	180
		06:00pm	108
		07:00pm	70
		08:00pm	71
		09:00pm	39
		10:00pm	25
		11:00pm	9
Totals		1476	207

Status: OK

North

Combined

South

Tunnel Road- North of Intersection

VERN-087 - Combined - n/s

Route 533 - 3.65 mi (Tunnel Rd)-N of Sr541 (South Frontage Rd)

Town.....	Vernon	29-Mar	30-Mar	31-Mar
Station.....	87	Wed	Thu	Fri
Location.....	41.831529,-72.466249	12:00am	20	20
A.K.A.....	87 2087	01:00am	14	19
2015-Minor Arterial 4.....	2015-Urban	02:00am	10	8
HPMS Section ID.....		03:00am	8	5
Start Report.....	29-Mar-2017 07:00AM	04:00am	24	14
End Report.....	31-Mar-2017 07:00AM	05:00am	65	72
2017:VERN-030 Axle Correction.....	0.99	06:00am	287	139
Annualized ADT.....	5100	07:00am	461	450
24-Hour Count.....	5193 * G4(0.98) = 5089.1	08:00am	316	366
Day 1.....	+ 5362 * G4(0.98) = 10343.9	09:00am	263	272
UnRounded...10343.9 / 2 * ACF(0.9918) =	5130	10:00am	233	241
OK 2020 Fri 27-Mar	2800	11:00am	243	246
OK 2017 Wed 29-Mar -this report-.....	5100	12:00pm	298	278
REV 2011 Wed 13-Jul	5200	01:00pm	279	311
OK 2008 Thu 06-Mar	5400	02:00pm	373	381
		03:00pm	424	406
		04:00pm	473	464
		05:00pm	429	472
		06:00pm	315	352
		07:00pm	250	267
		08:00pm	192	194
		09:00pm	112	123
		10:00pm	60	67
		11:00pm	44	44
		Totals	4765	5362
				277

Status: OK

South Frontage Road - East End

VERN-090 - North & South

Route 541 - 0.38 mi (S Frontage Rd)-SW of Bolton Road

Town.....	Vernon	29-Mar	30-Mar
Station.....	90	Wed	Thu
Location.....	41.834371,-72.460012	12:00am	44
2015-Major Collector	5.....2015-Urban	01:00am	31
Start Report.....	29-Mar-2017 07:00AM	02:00am	11
End Report.....	30-Mar-2017 07:00AM	03:00am	10
Axle Correction Factor.....	None	04:00am	30
Annualized ADT.....	5700	05:00am	46
24-Hour Count....	5808 * G4(0.98) = 5691.8	06:00am	144
UnRounded AADT.....	5691.8 / 1 = 5691.8	07:00am	269
OK 2020 Fri 27-Mar	2400	08:00am	218
OK <u>2017 Wed 29-Mar -this report-...</u>	<u>5700</u>	09:00am	214
OK 2014 Tue 22-Jul	4600	10:00am	186
REV 2011 Wed 13-Jul	5400	11:00am	231
OK 2008 Thu 06-Mar	5700	12:00pm	244
		01:00pm	277
		02:00pm	399
		03:00pm	516
		04:00pm	690
		05:00pm	691
		06:00pm	468
		07:00pm	351
		08:00pm	269
		09:00pm	236
		10:00pm	143
		11:00pm	90
		Totals	5492 316



David A. Smith, P.E., L.S.
Town Engineer

Vernon-ct.gov

Memo

To: Ashley Stephens, Vernon Town Planner

From: David Smith, Town Engineer

Date: 8/8/22

RE: PZC 2022-13, Shawmut Crane, 43 and 45 South Frontage Road, Site Plan Review

I have reviewed the plans and supporting documents submitted by J. R. Russo for the above referenced application. Additionally, Craig and I walked the site as part of the Inland Wetlands review. The Vernon IWC held a Public Hearing on July 26th for this project, IWC 2022-05, at which time the Commission received testimony from the applicant and their consultants. The application was approved with only a few minor conditions. That approval letter is attached for your convenience.

These properties were previously developed as part of the Highway upgrades many decades ago and have from time to time, have been used as a construction yard. It is presently overgrown but the remains of the paved road network and the drainage system are still present. The applicant proposes to utilize some of that drainage piping as part of their current proposal, and will be removing much of the old pavement. The applicant's extensive use of gravel surfaces for the display areas and the retention basin are consistent with our LID regulations.

Adequate safeguards are proposed to eliminate the likelihood of any short-term impacts to the wetlands and the design features have been developed to eliminate any long-term negative impacts to the wetlands and other water resources in the surrounding area. Our office will be monitoring the construction once it begins and will work with the contractor to insure these measures are maintained.

Please let me know if you require any additional information from our office.



The applicant proposes to construct a 24,913 s.f main building and a 2,400 s.f. cold storage building for Shawmut's crane sales and service business. Access to the site will be provided via the existing curb cut off of South Frontage Rd. Normal hours of operation will be 7:00 am to 5:00 pm. The property will provide 23 parking spaces for employees and customers. The applicant submitted an application with a site plan set, drainage plan, LID Checklist, traffic statement, photometric calculation, and architectural elevations, all included in the agenda packet.



EXTERIOR ELEVATIONS

**STEPHEN FLESHMAN
ARCHITECT**

36 Arding Road
Birmingham, B1 3AA
P. 0121 477 1188
F. 0121 477 1020

STAFF REVIEWS:

Traffic Authority: This commission approved the application for Shawmut at their Meeting on 8-11-22.

Design Review Commission: The Design Review Committee endorsed the application/ plans when they were presented at their 8-3-22 meeting. Their only stipulation is that the applicant return to the DRC once they identify what their site signage will look like.

Conservation: The Central Conservation District stated with proper implementation and maintenance, the soil erosion and sediment control measures in the Plan are adequate and appropriate. This meets the town's requirements under section 2.117.

Town Engineer: The engineer has no concerns with this application. He has walked the site and will be monitoring the construction once it begins.

Fire Marshal: No comment.

Wetlands Commission: At the July 26, 2022 meeting, the IWC approved application IWC-2022-05 for Shawmut Equipment Reality- LLC for construction of an equipment sales and service center including associated grading, driveways, utilities, and storm water management system. They found no adverse impact to wetlands and watercourses.

Zoning Enforcement: The ZEO has reviewed the plans and concurs that the application complies with the zoning regulations.

Health Department: The North Central District Health Department (NCDHD) has reviewed the application and provided the following comments: any building with plumbing shall connect to the public water and sewer; 36" duplex grinder pump system shall be a minimum of 75 feet to any water supply well; any dumpsters shall reside on a concrete surface.

Town Planner Summary:

This application meets section 4.9.2.12 as a permitted use.

4.9.2.12: Salesroom or display area for retail sales of new vehicles or rental of vehicles, including vehicle sale lots for display of new vehicles.

Shawmut has provided their franchise agreement to show they sell new vehicles as well as rent them.

This application requires two special permits. One for the servicing of cranes under Section 4.9.4.14 and the aggregate square footage for all structures on any parcel exceeding 25,000 square feet under Section 4.9.4.15.4.

The commercial zone allows for a large variety of allowed uses and uses by special permit that are consistent with the Plan of Conservation and Development. This site has previously been used for contractor storage and bus parking which makes this application consistent with the previous use. This property is identified in the POCD as part of the future development as 'Interchange 66 Node'. This area includes uses for industrial, commercial, and vacant land. This application would fit into the Interchange 66 Node.

Regarding the Natural Diversity Data Base areas in Vernon, we have spoken with the applicant who has submitted the NDDDB review form to the State. The applicant will need to apply for a storm water management permit through the DEEP and the NDDDB review is part of that process. This is not a requirement regarding approval of a special permit.

The applicant's proposed plan of development meets the town of Vernon's site plan requirements under section 14. They are utilizing an existing curb cuts which serve multiple parcels in accordance with Sections 12.5 (access management) of our zoning regulations.

In order to approve a Site Plan, the Commission must find that the applicant meets the general site plan permit criteria of Section 14.1.2.

In order to approve a special permit, the Commission must find that the applicant meets the general special permit criteria of Section 17.3.1., specifically:

- 17.3.1.1 It shall not create a hazardous condition relative to public health and safety
- 17.3.1.2 It shall not be compatible with neighboring uses;
- 17.3.1.3 It shall not create a nuisance;
- 17.3.1.4 It shall not hinder the future sound development of the community;
- 17.3.1.5 It shall conform to all applicable sections of this ordinance;
- 17.3.1.6 N/A
- 17.3.1.7 N/A

In my judgement, the commission could make the finding that the protective provisions of Section 14.1.2 and 17.3.1 have been met. I would suggest adding a condition stating that the repair is solely intended for accessory use of services to cranes and is not transferable to another use.

Public Comments Received

August 8, 2022

Roland Klee, Chairperson
Planning and Zoning Commission
Town of Vernon
55 West Main Street
Vernon' CT 06606

Dear Chairperson Klee:

I am writing to express my opposition PZ-2022-13, 43 &45 South Frontage Road, for the development of commercial space for retail sales and services of construction vehicles (cranes). My name is David McQuade and I live at 20 Whitney Ferguson Rd. Vernon, CT.

My opposition flows from the following:

- The proposed site sits in a Department of Energy and Environment Natural Diversity Base. The application does little to protect this land and the species in this zone.
- As defined in 2.129 and 2.32 of Vernon's zoning regulations, the application fails to address the potential for discharge of "Toxic or Hazardous" materials which could potentially impact aquifers and wetlands on both sides of South Frontage Road. Please be mindful the Class A Tankerhoosen River is just south of this proposed development.
- As defined in 3.4 of Vernon's zoning regulations, proper provisions need to be made for the collection and disposal of storm drainage. With no sewers being available on South Frontage Road, this presents the real possibility of winter safety issues.
- Any plans for future sewage connections by this proposed business and others should require reimbursement to the Town of Vernon for the buildout for this entire sewage line.
- Both Tunnel and Bolton Roads already carry significant traffic. Vernon's Plan of Conservation and Development cited traffic congestion from these feeder roads to Route 30 (Hartford Turnpike), with 17,000 vehicles traveling this road each day with accompanying "crash hotspots." The prosed project would add to this vehicle density. Clearly a public safety issue (17.3.1.1).
- The visual impact of 50 foot or larger cranes proposed for sale and service is not compatible with neighboring uses as required under 17.3.1.2 of the zoning regulations. Surrounding areas have tenants engaged in small business, health care, accounting, and law housed in modest commercial structures.

I respectfully ask the members of the Planning and Zoning Commission to reject site plan and special permit application "PZ-2022-13" since such application would create a hazardous condition relative to public health and safety (Sec. 17.3.1.1), is not compatible with neighboring uses (Sec 17.3.1.2), will create a nuisance (Sec.17.3.1.3), and will hinder the future development of the community (Sec.17.3.1.4).

Thank you for your time and consideration of my testimony.

David McQuade