NOTICE OF PUBLIC HEARING
SUDBURY CONSERVATION COMMISSION
Monday, June 26, 2023 at 7:00 PM
Virtual Meeting

The Sudbury Conservation Commission will hold a public hearing to review the Notice of Intent filing to construct a new school building with parking, grading and associated utilities within the 100-foot Buffer Zone, pursuant to the Wetlands Protection Act and Sudbury Wetlands Administration Bylaw, at 502 Concord Road, Sudbury, MA. Joel Gordon, Applicant. The hearing will be held on Monday, June 26, 2023 at 7:00 pm, via remote participation.

Please see the Conservation Commission web page for further information.

https://sudbury.ma.us/conservationcommission/meeting/conservation-commission-meeting-monday-june-26-2023/

SUDBURY CONSERVATION COMMISSION
6/12/2023

CONNORSTONE ENGINEERING, INC.
10 SOUTHWEST CUTOFF, SUITE #7
NORTHBOROUGH, MASSACHUSETTS 01532
T: (508) 393-9727
121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
T: (978) 443-9566

Sudbury Conservation Commission
275 Old Lancaster Road
Sudbury, MA 01776

June 9, 2023

Subject: **Notice of Intent**
502 Concord Road
Sudbury, MA

Dear Members of the Commission;

On behalf of the applicant, Joel Gordon, please find the enclosed Notice of Intent and supporting documentation for the proposed project at 502 Concord Road, including:

1. The Notice of Intent application package including:
   - Completed NOI Form 3 – Notice of Intent
   - Wetland Delineation Report
   - Locus mapping
   - List of abutters and notification forms;

2. "Proposed Site Plans of 502 Concord Road, in Sudbury, MA," Prepared by Connorstone Engineering, Inc. dated June 1, 2023.

3. "Landscape Plan" of 502 Concord Road, in Sudbury, MA," by Cosmos Associates, Dated May 23, 2023.

4. "Stormwater Management Documentation," for 502 Concord Road, Sudbury, MA dated May 18, 2023.

5. Checks in the amount of $537.50 for the town portion of the NOI fee and $500 for the local Wetland Bylaw fee. The State share of the NOI fee has been forward to MassDEP.

Project Summary:

Existing Site Conditions: The site consists of a 1.2 acre lot located at 502 Concord Road, and is at the corner with New Bridge Road. Abutters to the south include a single family home on Concord Road and the Town of Sudbury (Nixon School). The parcel is shown as Assessors Map F10, Parcel 31 and is within the Residential C-2 zoning district. The site is currently developed as a single family home, and contains a 1,250 sq. ft. building, driveway, shed, and lawn areas. The overall existing impervious surface area is 3,570 square feet. Areas along the rear perimeter are undeveloped and wooded.

Wetland Resource Areas: Wetland resource areas have been delineated by Oxbow Associates in December of 2023. Those resource areas in include a drainage swale (regulated as wetlands) along the project side of New Bridge Road, which flows through a 12-inch culvert to a larger wetland complex on the opposite side of the road. A majority of the buffer zone on-site consists of maintained lawn areas with a fringe of brush along New Bridge Road.

The Natural Heritage and Endangered Species Program (NHESP) has not identified any areas on-site as lying within the reported Priority or Estimated Habitat Areas, and the site is not located within any flood hazard zones based upon the current Town of Sudbury Flood Insurance Rate Map.

Proposed Use & Site Changes: The project consists of a proposed School Building. The work will include demolition of the existing building and construction of a new 7,767 sq. ft. building along with access driveways, 35 parking spaces, and required utilities and infrastructure. The site driveway layout includes an entrance off Concord Road, then routing past the building and exiting onto New Bridge Road. The building will be connected to the public water, gas, and electric from Concord Road and the existing septic system would be replaced and upgraded for the proposed use. The work will result in a total post development impervious area of 29,100 square feet, or an increase of 25,530 sq. ft..

Temporary erosion controls include straw wattles with silt fencing have been proposed along the limit of work to avoid erosion issues during construction as well as silt sacks to be placed within the roadway catch basin. The development and land disturbance has been kept as far as practical from the resource areas, and the limit of work would be maintained essentially within the existing lawn areas. Supplemental plantings and preservation of mature existing trees have been provided on the attached Landscape Plan.

If you have any questions or require any additional information please contact this office at (508) 393-9727.

Sincerely,
Connorstone Engineering, Inc.

Vito Colonna, P.E.

c. MassDEP Northeast Region

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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

Provided by MassDEP:
MassDEP File Number
Document Transaction Number
Sudbury
City/Town

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

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

A. General Information

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

502 Concord Road — a. Street Address
Sudbury — b. City/Town
01776 — c. Zip Code

Latitude and Longitude:
42.39326 — d. Latitude
-71.40390 — e. Longitude

F10 — f. Assessors Map/Plat Number
31 — g. Parcel /Lot Number

2. Applicant:

Joel — a. First Name
Gordon — b. Last Name
c. Organization
502 Concord Road — d. Street Address
Sudbury — e. City/Town
Ma — f. State
01776 — g. Zip Code
857-205-1961 — h. Phone Number
i. Fax Number
admin@sudburymontessori.org — j. Email Address

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

Same as applicant — a. First Name
b. Last Name
c. Organization
d. Street Address
e. City/Town
f. State
g. Zip Code
h. Phone Number
i. Fax Number
j. Email address

4. Representative (if any):

Vito — a. First Name
Colonna — b. Last Name
Connorstone Engineering — c. Company
10 Southwest Cutoff, Suite #7 — d. Street Address
Northborough — e. City/Town
Ma — f. State
01532 — g. Zip Code
508-393-9727 — h. Phone Number
i. Fax Number
vc@csei.net — j. Email address

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

$1,050 — a. Total Fee Paid
$512.50 — b. State Fee Paid
$537.50 — c. City/Town Fee Paid

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sudbury
City/Town

A. General Information (continued)

6. General Project Description:

Construction of new educational building.

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

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

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

1. ☐ Yes ☒ No

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

2. Limited Project Type

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

8. Property recorded at the Registry of Deeds for:

Middlesex	
a. County	b. Certificate # (if registered land)
80855	223
c. Book	d. Page Number

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

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

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

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 – Notice of Intent
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

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

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

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

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☐ 200 ft. - All other projects

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

4. Proposed alteration of the Riverfront Area:

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

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

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

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

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

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Provided by MassDEP:
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Sudbury
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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

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

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

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

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

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

a. square feet of BVW
b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings
b. number of replacement stream crossings

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C. Other Applicable Standards and Requirements

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

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

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

   a. ☐ Yes ☒ No

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

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

   08/01/2021
   b. Date of map

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

   c. Submit Supplemental Information for Endangered Species Review*

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

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

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

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

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

   (b) ☐ Photographs representative of the site

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

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

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

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

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

(d) ☐ Vegetation cover type map of site

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

(f) OR Check One of the Following

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

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

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

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

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

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

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

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

North Shore - Hull to New Hampshire border:

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

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

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

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

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Bureau of Resource Protection - Wetlands
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Provided by MassDEP:
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C. Other Applicable Standards and Requirements (cont'd)

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

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

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

   b. ACEC

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

   a. ☐ Yes ☒ No

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

   a. ☐ Yes ☒ No

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

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

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

      2. ☐ A portion of the site constitutes redevelopment

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

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

      1. ☐ Single-family house

      2. ☐ Emergency road repair

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

D. Additional Information

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

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

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

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

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

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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

Provided by MassDEP:

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D. Additional Information (cont'd)

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

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

Proposed Site Plan of 502 Concord Road, Sudbury, MA
a. Plan Title

Connorstone Engineering, Inc.
b. Prepared By

Vito Colonna PE
c. Signed and Stamped by

June 1, 2023
d. Final Revision Date

1"=20'
e. Scale

f. Additional Plan or Document Title

g. Date

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

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

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

8. ☒ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

E. Fees

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

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

1519
2. Municipal Check Number

6/5/2023
3. Check date

1524
4. State Check Number

6/5/2023
5. Check date

Waverley Square Day Care, LLC
6. Payor name on check: First Name

7. Payor name on check: Last Name

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

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Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sudbury
City/Town

F. Signatures and Submittal Requirements

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

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

1. Signature of Applicant — 2. Date: 6/5/2023

3. Signature of Property Owner (if different) — 4. Date

5. Signature of Representative (If any) — 6. Date: 6/5/23

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

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

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

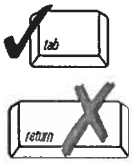
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

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

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



A. Applicant Information

1. Location of Project:

502 Concord Road	Sudbury
a. Street Address	b. City/Town
1524	$512.50
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Joel	Gordon
a. First Name	b. Last Name

c. Organization

502 Concord Road
d. Mailing Address

Sudbury	MA	01776
e. City/Town	f. State	g. Zip Code

857-205-1961		admin@sudburymontessori.org
h. Phone Number	i. Fax Number	j. Email Address

3. Property Owner (if different):

same as applicant	
a. First Name	b. Last Name

c. Organization

d. Mailing Address

e. City/Town	f. State	g. Zip Code

h. Phone Number	i. Fax Number	j. Email Address

B. Fees

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

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

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

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

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

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

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

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

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

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

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Cat.3 b. Non-Residential Building	1	$1,050	$1,050

Step 5/Total Project Fee: $1,050

Step 6/Fee Payments:

Total Project Fee:	$1,050 (a. Total Fee from Step 5)
State share of filing Fee:	$512.50 (b. 1/2 Total Fee **less** $12.50)
City/Town share of filling Fee:	$537.50 (c. 1/2 Total Fee **plus** $12.50)

C. Submittal Requirements

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

Department of Environmental Protection
Box 4062
Boston, MA 02211

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

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

OXBOW ASSOCIATES, INC.

December 22, 2022

Ms. Deborah Mayo
Connorstone Engineering, Inc.
121 Boston Post Road
Sudbury, MA 01776

Re: Wetland Resource Area Evaluation
502 Concord Road, Sudbury

Dear Ms. Mayo,

In response to your request, Oxbow Associates, Inc. (OA: specifically, R. Strohsahl) reviewed the above referenced site with specific regard to wetland resource areas on December 2, 2022. This evaluation was conducted in accordance with standard methodology for delineating vegetated wetlands under the Massachusetts Wetlands Protection Act (the "Act"; MGL Ch. 131, §40), its Regulations (310 CMR 10.00), and the Town of Sudbury Wetlands Administration Bylaw (Article XXII) and its Regulations.

Site Observations

The property is located east of Concord Road, west of New Bridge Road, and north of the General John Nixon Elementary School. The site encompasses approximately 1.1± acres and contains a single-family house with a paved driveway, concrete walkway, a wood deck at the rear of the house, and a manicured yard. Along the northwestern property boundary there is a stone retaining wall that descends approximately four feet from Concord Road to the maintained yard. Most of the property is mowed lawn with shrub and forested hedges along the periphery. Topography on the property slopes to the north toward a low point in the yard.

Along the southern edge of New Bridge Road there is an excavated ditch approximately three feet wide with an intermittent stream emanating from a 12-inch concrete culvert. Flow from the culvert originates from a catch basin located upgradient on the west side of Concord Road, where it captures runoff flowing southwest along the edge of the roadway. From the catch basin the stream flows southeast beneath the road into the ditch on the subject property. After entering the ditch, the stream continues to flow southeast before entering a 12-inch corrugated metal culvert, which directs the flow north beneath New Bridge Road. The stream had less than two inches of water during the evaluation, with a bottom composition generally consisting of organic muck overlying sandy subsoil.

Based on our observations, OA believes that the wetland resource areas located on and adjacent to the site include Inland Bank (310 CMR 10.54) and Bordering Vegetated

Wetland (BVW; 310 CMR 10.55) under the Act and Bylaw, and a Type II intermittent stream under the local Bylaw Regulations.

OA delineated relevant resource areas affecting the property with blue plastic flags in two series. Flags A1 through A6 delineate the greatest horizontal extent of the BVW extending from the stream edge onto the property. Flags B1 through B3 delineate the edge of the BVW on the north side of New Bridge Road. The BVWs were delineated based on topography, predominance of wetland vegetation, and indicators of hydrology which include hydric soils (redoximorphic features), silt-stained leaves, and limit of standing water.

Vegetation within the BVW includes red maple (*Acer rubrum*), eastern white pine (*Pinus strobus*), river birch (*Betula nigra*), glossy false buckthorn (*Frangula alnus*), multiflora rose (*Rosa multiflora*), purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), wool grass (*Scirpus cyperinus*), sensitive fern (*Onoclea sensibilis*), jewelweed (*Impatiens capensis*), and skunk cabbage (*Symplocarpus foetidus*).

Vegetation associated with the uplands on the property includes white pine, spruce (*Picea* spp.), dawn redwood (*Metasequoia glyptostroboides*), oaks (*Quercus*), red maple, glossy false buckthorn, winged euonymus (*Euonymus alatus*), and goldenrods (*Solidago* spp.)

According to the Massachusetts Natural Heritage and Endangered Species Program Atlas (15th Edition; MassGIS 2021), there is no Priority or Estimated Habitat for rare species, or certified or potential vernal pools immediately on or adjacent to the property.

Regulatory Implications and Recommendations

The wetland delineation provided is OA's interpretation of the resource area boundaries and they must be reviewed and approved by the Sudbury Conservation Commission (SCC) before they become legally affirmed boundaries. OA recommends you continue to work with your Professional Engineer to determine the exact distances between the proposed septic replacement project and the flagged resource areas.

In general, the SCC discourages any work or activity within 100 feet of a wetland resource area. Any activities proposed within 100 feet of the wetland boundary are subject to review by the SCC and the Massachusetts Department of Environmental Protection (DEP). Any activity proposed *within* BVW is subject to review by the SCC and the Army Corps of Engineers (ACOE), and may require filing for a 401 Water Quality Certificate with the DEP.

The Bylaw designates a 100-foot "adjacent upland resource area" (buffer zone) surrounding all freshwater wetlands. This buffer zone is used to protect the functions and values of protected resource areas and may be subdivided into four separate zones to determine the amount of allowable work in each. The area closest to the wetlands is usually determined to be part of the "No Disturbance Area," and allows virtually no activities or work to be completed. A minimum of 25 feet of natural vegetation is typically

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desirable between the edge of wetland resources and proposed activities and/or disturbance. The amount of allowable work in the remaining zones may increase the further it is from a resource or ecologically sensitive area.

The portion of the stream located on the property is not depicted on the latest USGS map or within USGS StreamStats program. The additional observations of low flow and the presence of a thick organic soil layer within the streambed indicates the stream's intermittent status.

The StreamStats analysis of the drainage characteristics downstream of this tributary to Bridge Brook has determined the drainage area is 0.037 square miles, well below the threshold of 0.5 square miles for a perennial stream as outlined in 310 CMR 10.58 (2)(a)1.c.i. As such, the stream is considered to be a Type II intermittent stream under the Bylaw. Under the Sudbury Board of Health Regulations for Subsurface Disposal of Sewage, the stream is not considered to be a "surface watercourse."

Inland Bank (310 CMR 10.54) is determined at the mean annual flood level, or the first observable break in slope, whichever is lower. Bank was not flagged during this evaluation, as it is located interior to the BVW flags, and no work is expected in this area. Impacts up to 10% of the total length or 50 feet (whichever is less) of Bank would not be deemed detrimental to the wildlife habitat functions of the Bank. Should any crossing be proposed over the stream, it must be designed to be span 1.2x the bankfull width and meet the appropriate Openness Ratio specified in the Massachusetts Stream Crossings Handbook.

Sudbury Board of Health requires leaching facilities to be a minimum of fifty (50) feet from vegetated wetlands not deemed surface watercourses. Should it be necessary for the leaching field to be placed closer than fifty feet from the BVW, a variance from the Board of Health will be required.

Summary

The GIS/GPS map we have provided can be used as a planning tool, however a Professional Land Surveyor or Engineer will need to complete a survey and plan of the existing and proposed conditions. The anticipated Notice of Intent application must include a site plan illustrating the existing conditions, property boundaries, existing structures, limits of driveway/pavement/vegetation, walkways, wetland boundaries, wetland buffers, topography, proposed erosion control barrier, any pertinent construction notes and details, as well as the proposed septic design.

Erosion and sediment controls should be incorporated into the project design to encircle the limit of work within the yard to prevent erosion, control sediment movement, and stabilize exposed and disturbed soils during construction of the septic system. Temporary erosion and sedimentation controls during construction include minimizing areas of exposed soil, directing and controlling runoff, and rapidly stabilizing exposed areas. Any soils left exposed for extended periods should be seeded for temporary vegetative cover.

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Following construction, exposed areas should be permanently vegetated with appropriate ground cover. Erosion and sedimentation control measures should remain functional until the exposed soil is seeded and stabilized.

If you have any questions, please do not hesitate to contact us.

Sincerely,

Ronald H. Strohsahl

Ronald Strohsahl, PWS
Senior Wetland Scientist

Encls. *Wetland Evaluation* Figure

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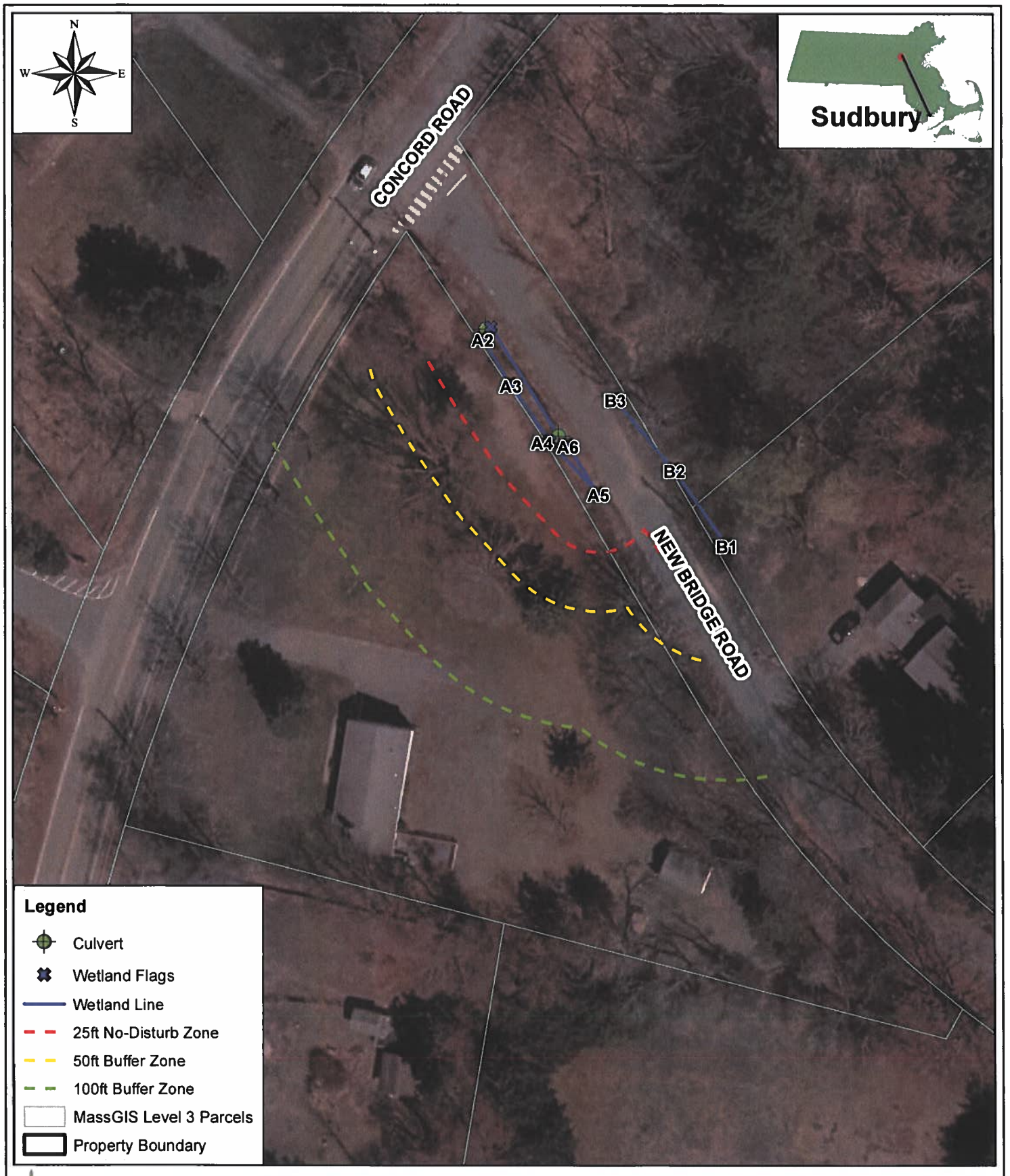


OXBOW ASSOCIATES, INC.

1:640

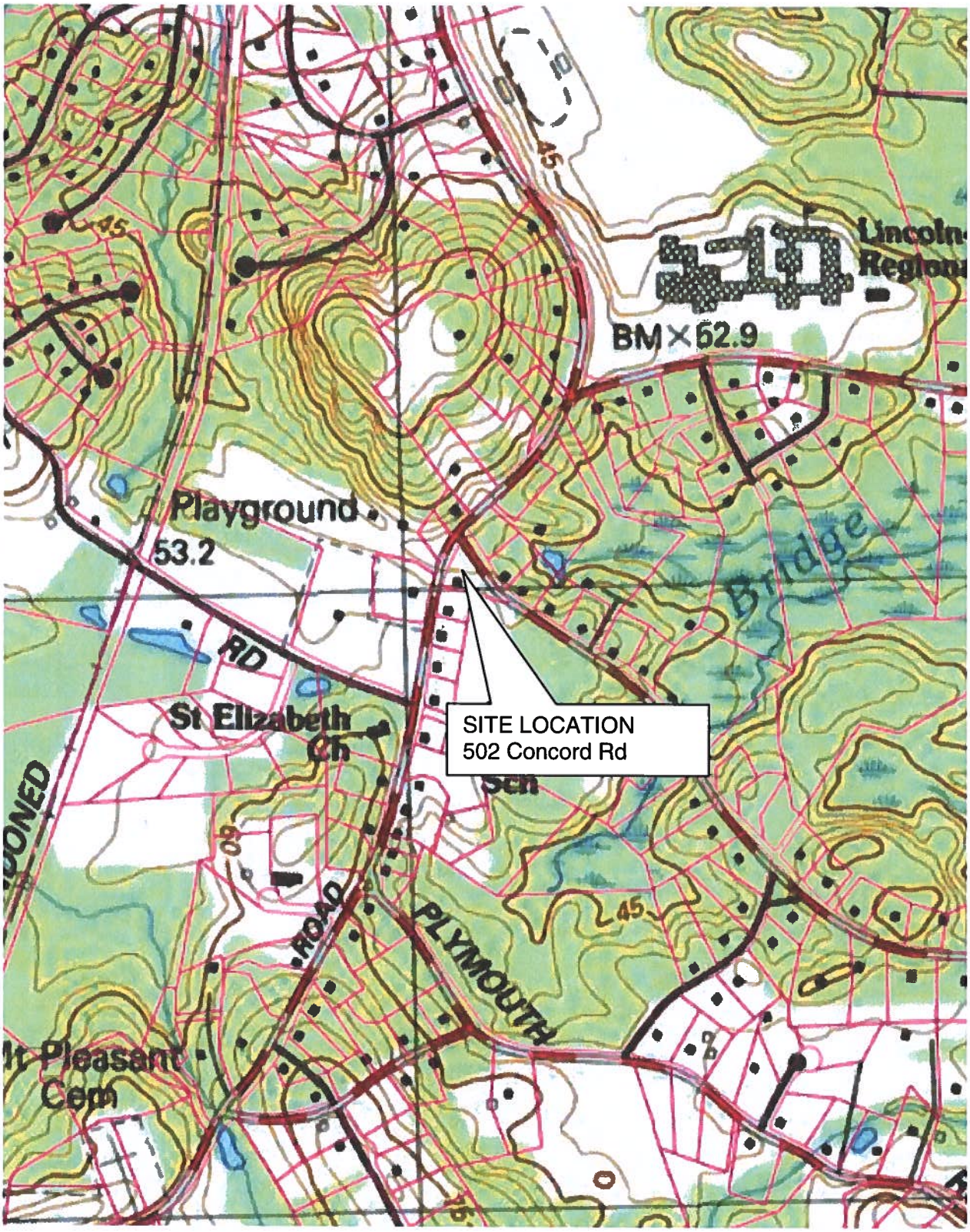
1 inch = 53.3 feet

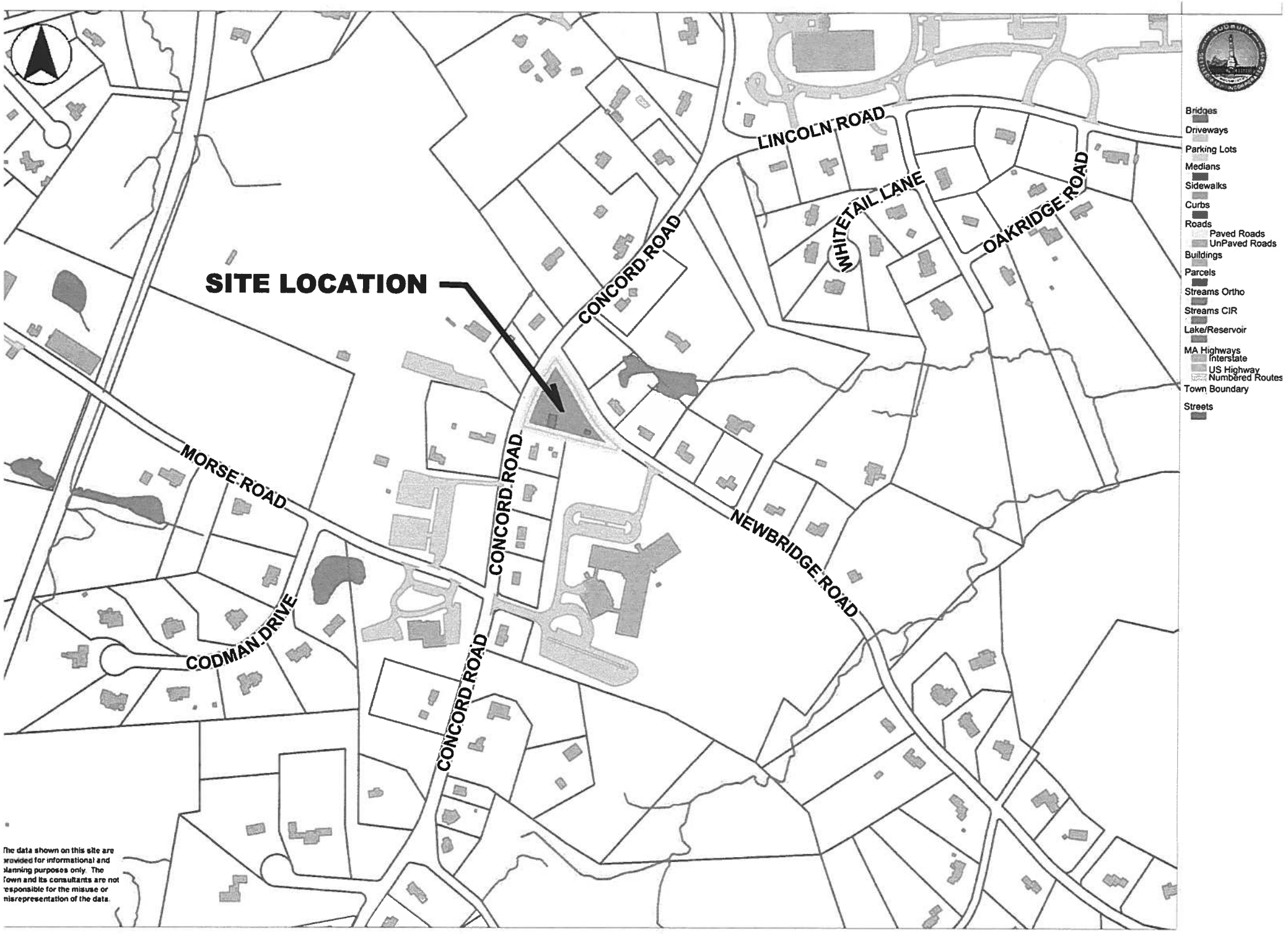
0 50 100

Feet

Wetland Evaluation
2021 Orthophoto
502 Concord Rd
Sudbury, MA
December 22, 2022

LOCUS MAP – USGS Mapping

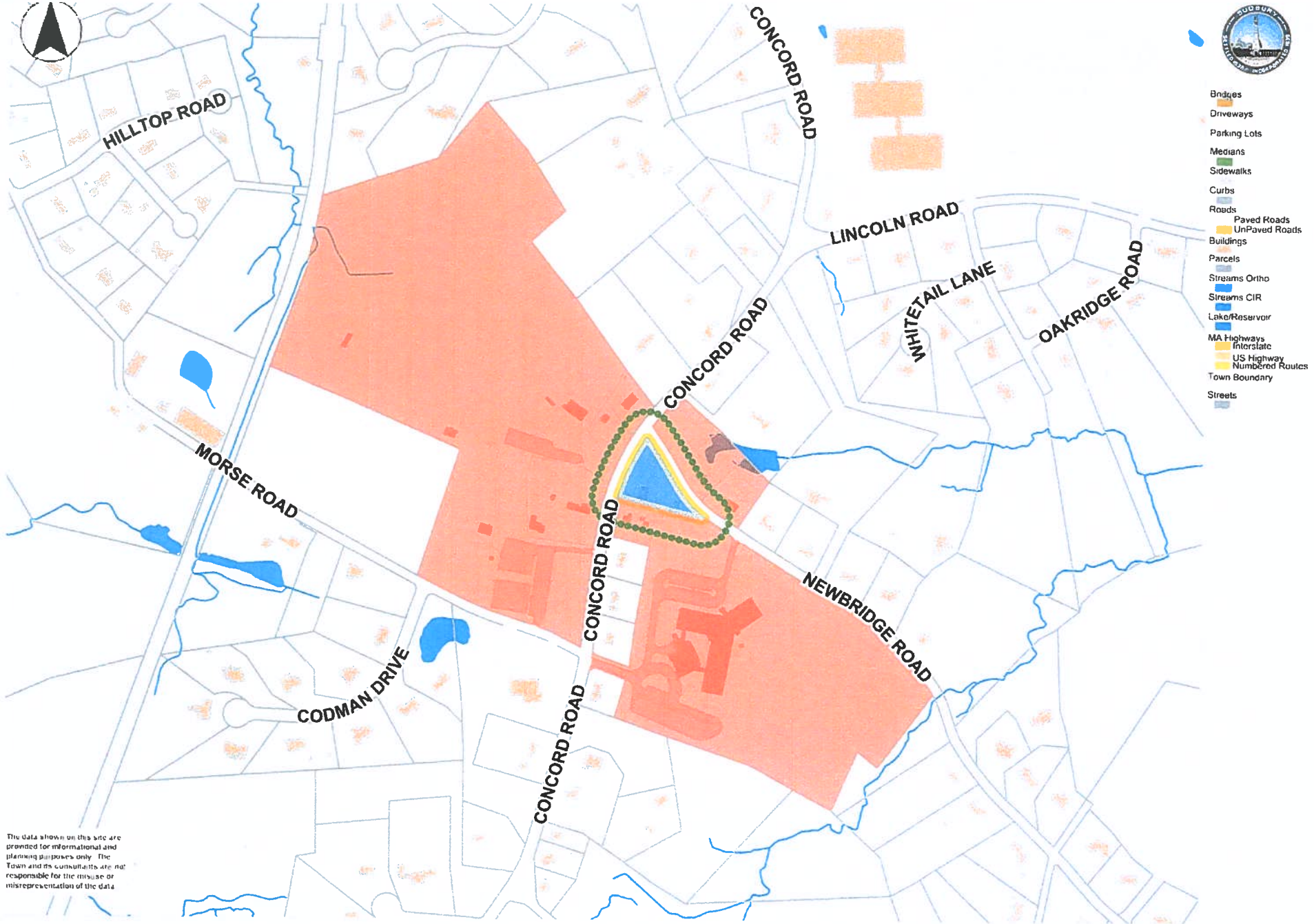



SITE LOCATION
LINCOLN ROAD
CONCORD ROAD
WHITETAIL LANE
OAKRIDGE ROAD
MORSE ROAD
CONCORD ROAD
NEWBRIDGE ROAD
CODMAN DRIVE
CONCORD ROAD
Bridges
Driveways
Parking Lots
Medians
Sidewalks
Curbs
Roads
Paved Roads
UnPaved Roads
Buildings
Parcels
Streams Ortho
Streams CIR
Lake/Reservoir
MA Highways
Interstate
US Highway
Numbered Routes
Town Boundary
Streets
The data shown on this site are provided for informational and planning purposes only. The Town and its consultants are not responsible for the misuse or misrepresentation of the data.
640
1280 ft
Printed on 02/02/2023 at 02:11 PM
MapsOnline

CERTIFIED LIST OF ABUTTERS & FORMS

abutters_id_field	abutters_owner1	abutters_owner2	abutters_address	abutters_town	abutters_state	abutters_zip	abutters_bookpage	abutters_location
F10-0001	TOWN OF SUDBURY	PARK & REC / DPW	278 OLD SUDBURY ROAD	SUDBURY	MA	01776	9599-151	503 CONCORD RD
F10-0002	ALLEN JOYCE T & STEPHEN M	TRUSTEES OF THE SJA CONCORD	497 CONCORD RD	SUDBURY	MA	01776	70215-76	497 CONCORD RD
F10-0003	PALMER DANIEL		509 CONCORD ROAD	SUDBURY	MA	01776	80916-27	509 CONCORD RD
F10-0004	ARORA SUNNY & TUTEJA SHWETA		515 CONCORD RD	SUDBURY	MA	01776	75164-572	515 CONCORD RD
F10-0021	GELSINON THOMAS G		P O BOX 162	SUDBURY	MA	01776	39071-055	NEW BRIDGE RD
F10-0022	MADDEN MARK & KATHRYN H		192 NEW BRIDGE RD	SUDBURY	MA	01776	67988-232	192 NEW BRIDGE RD
F10-0023	BARKER SIMON A & JULIE L		188 NEW BRIDGE RD	SUDBURY	MA	01776	45148-156	188 NEW BRIDGE RD
F10-0030	TOWN OF SUDBURY	SUDBURY PUBLIC SCHOOLS	40 FAIRBANK ROAD	SUDBURY	MA	01776	9391-100	472 CONCORD RD
F10-0031	GORDON JOEL & MONOSHINI		502 CONCORD RD	SUDBURY	MA	01776	80855-223	502 CONCORD RD
F10-0032	MILLER MARTIN SMITH &	MYRA FINN	496 CONCORD RD	SUDBURY	MA	01776	17424-381	496 CONCORD RD

List represents owners within 100' 502 Concord Rd
Cynthia Gerry
Sudbury Assessors
Office
3/10/2023



Gordon (Sudb. Montessori) 502 Concord Rd - Sudbury

Notification to Abutters Under the
Massachusetts Wetlands Protection Act
Sudbury Wetlands Administration Bylaw

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following:

A. The name of the Applicant is **Joel Gordon.**

B. The Applicant has filed a Notice of Intent with the Conservation Commission of the Town of **Sudbury** seeking permission to discharge to, remove, fill, dredge or alter an Area Subject to Protection (Wetland Resource Area and/or Buffer Zone) Under the Massachusetts Wetlands Protection Act (General Laws Chapter 131, Section 40) and Sudbury Wetlands Administration Bylaw.

C. The address of the lot where the activity is proposed: **502 Concord Road in Sudbury Ma .**

D. The activity consists of: **Construction of a Montessori School**

E. Copies of the Notice of Intent may be examined at **Sudbury Conservation Commission Office** between the hours of **10:00 am and 3:00 pm on Monday through Friday.** For more information, call: **978-440-5471**. Check One: This is the Applicant___, representative___, or other **X** (Conservation Commission Office).

F. Copies of the Notice of Intent may be obtained (upon payment of reproduction cost) from the **Applicant's representative (Connorstone Engineering)**, by calling this telephone number **(508) 393-9727** between the hours of **10 am – 4 pm** on the following days of the week: **Mon. – Fri.**

G. Information regarding the date, time, and place of the public hearing may be obtained from **Sudbury Conservation Commission Office** by calling this telephone number **978-440-5471** between the hours of **10:00 am and 3:00 pm on Monday through Friday**. This is the Applicant___, representative___, or other **X** (Conservation Commission Office).

H. **Public Participation will be via Virtual Means Only** - In light of the ongoing COVID-19 coronavirus outbreak, Governor Baker issued an emergency Order on March 12, 2020, allowing public bodies greater flexibility in utilizing technology in the conduct of meetings under the Open Meeting Law. The Town of Sudbury Conservation Commission greatly values the participation of its citizens in the public meeting process, but given the current circumstances and recommendations at both the state and federal levels to limit or avoid public gatherings, including Governor Baker's ban on gatherings of more than 10 people, together with the present closure of Sudbury Town Hall and other public buildings to the public, the Town has decided to implement the "remote participation" procedures allowed under Governor Baker's emergency Order for all boards, committees, and commissions.

Note: Public Hearing Notice, including its date, time, and place, will be published at least five (5) days in advance in the

MetroWest Daily News
(name of newspaper)

Note: Notice of the public hearing, including its date, time, and place, will be posted in the Town Hall not less than forty-eight (48) hours in advance.

Note: You also may contact your local Conservation Commission or the nearest Department of Environmental Protection (DEP) for more information about this application or the Wetlands Protection Act. To contact DEP, call Northeast region: 978-661-7600

AFFIDAVIT OF SERVICE
Under the Massachusetts Wetlands Protection Act
&
Sudbury Wetlands Administration Bylaw

I, Vito Colonna of Connorstone Engineering, Inc., hereby certify under the pains and penalties of perjury that on June 12, 2023 I gave notification to abutters in compliance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, and the DEP Guide to Abutter Notification dated April 8, 1994, in connection with the following matter:

A Notice of Intent filed under the Sudbury Wetlands Administration Bylaw and Massachusetts Wetlands Protection Act by *Joel Gordon* with the Sudbury Conservation Commission on June 12, 2023 for property located at 502 Concord Road in Sudbury Ma .

The form of the notification, and a list of the abutters to whom it was given and their addresses are attached to this Affidavit of Service.

Name

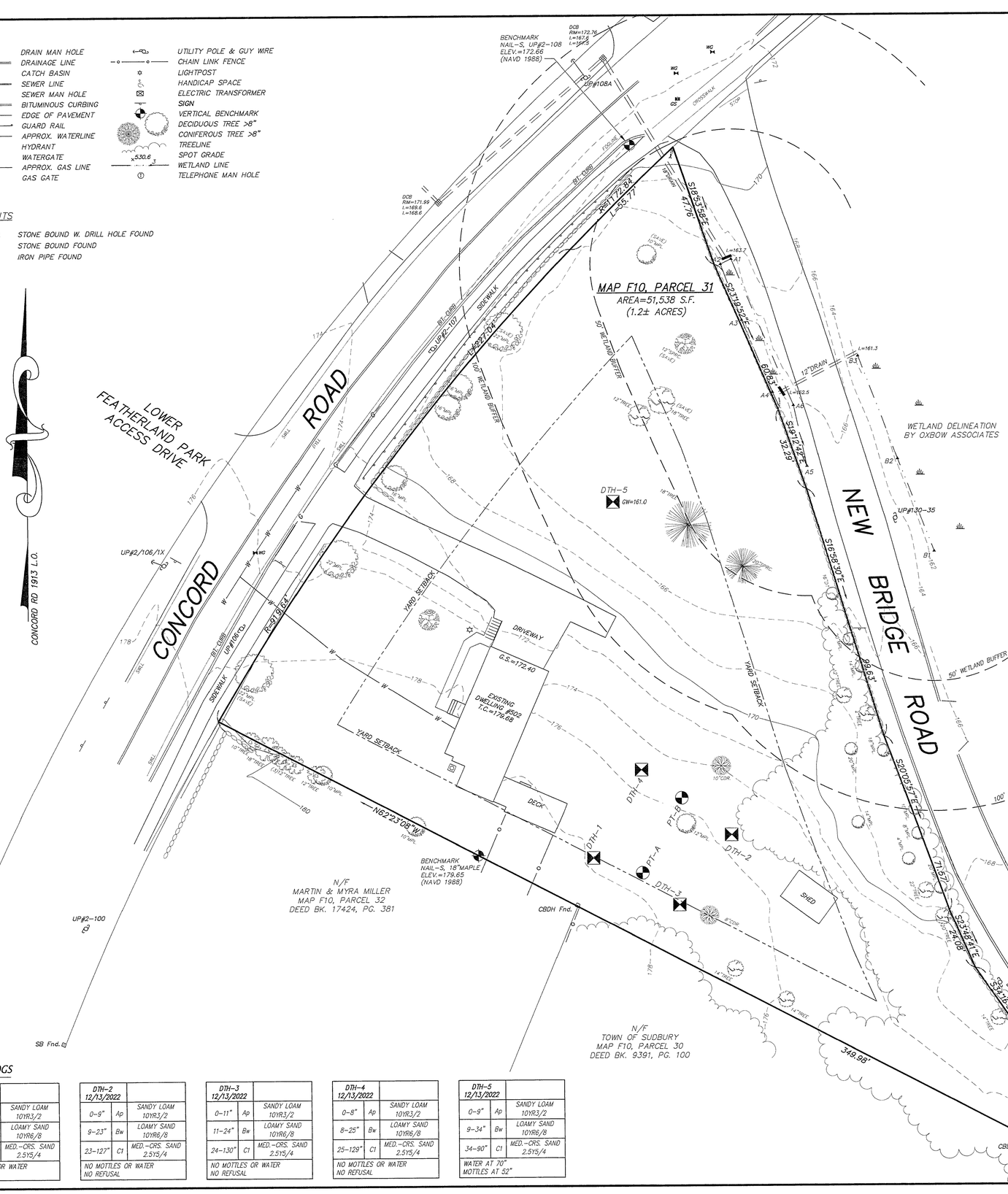
6/12/23
Date

LEGEND

ⓓ	DRAIN MAN HOLE		UTILITY POLE & GUY WIRE
	DRAINAGE LINE		CHAIN LINK FENCE
	CATCH BASIN	☼	LIGHTPOST
	SEWER LINE	♿	HANDICAP SPACE
Ⓢ	SEWER MAN HOLE	⊠	ELECTRIC TRANSFORMER
	BITUMINOUS CURBING		SIGN
	EDGE OF PAVEMENT		VERTICAL BENCHMARK
	GUARD RAIL		DECIDUOUS TREE >8"
W	APPROX. WATERLINE		CONIFEROUS TREE >8"
	HYDRANT		TREELINE
	WATERGATE	530.6	SPOT GRADE
G	APPROX. GAS LINE		WETLAND LINE
	GAS GATE	Ⓣ	TELEPHONE MAN HOLE

MONUMENTS

⊡ SBDH Fnd.	STONE BOUND W. DRILL HOLE FOUND
⊡ SB Fnd.	STONE BOUND FOUND
○ IP Fnd.	IRON PIPE FOUND



SOIL LOGS

DTH-1 12/13/2022		
0–7"	Ap	SANDY LOAM 10YR3/2
7–19"	Bw	LOAMY SAND 10YR6/8
19–135"	C1	MED.–CRS. SAND 2.5Y5/4
NO MOTTLES OR WATER NO REFUSAL		

DTH-2 12/13/2022		
0–9"	Ap	SANDY LOAM 10YR3/2
9–23"	Bw	LOAMY SAND 10YR6/8
23–127"	C1	MED.–CRS. SAND 2.5Y5/4
NO MOTTLES OR WATER NO REFUSAL		

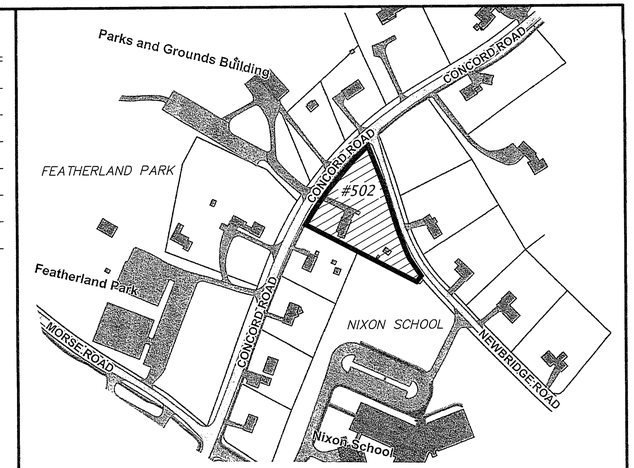
DTH-3 12/13/2022		
0–11"	Ap	SANDY LOAM 10YR3/2
11–24"	Bw	LOAMY SAND 10YR6/8
24–130"	C1	MED.–CRS. SAND 2.5Y5/4
NO MOTTLES OR WATER NO REFUSAL		

DTH-4 12/13/2022		
0–8"	Ap	SANDY LOAM 10YR3/2
8–25"	Bw	LOAMY SAND 10YR6/8
25–129"	C1	MED.–CRS. SAND 2.5Y5/4
NO MOTTLES OR WATER NO REFUSAL		

DTH-5 12/13/2022		
0–9"	Ap	SANDY LOAM 10YR3/2
9–34"	Bw	LOAMY SAND 10YR6/8
34–90"	C1	MED.–CRS. SAND 2.5Y5/4
WATER AT 70" MOTTLES AT 52"		

APPROVED BY:
SUDBURY PLANNING BOARD

DATE: _____



LOCUS MAP: 1"=200'

GENERAL NOTES:

1. PROPERTY LINES ARE BASED UPON EXISTING PLANS AND DEEDS OF RECORD AND DOES NOT REPRESENT A PROPERTY SURVEY.
2. EXISTING TOPOGRAPHY IS BASED UPON AN ON-GROUND TOPOGRAPHICAL SURVEY BY CONNORSTONE ENGINEERING, INC. IN DECEMBER 2022. NAVD DATUM OF 1988 UP#2-108, NAIL EL.=172.66
3. THE PARCEL IS LOCATED AT 502 CONCORD ROAD, AS SHOWN ON ASSESSORS MAP F10, PARCEL 31.
4. THE SITE IS NOT LOCATED WITHIN A FLOOD HAZARD ZONE AS SHOWN ON FEMA F.I.R.M. 25017C0369F DATED JULY 7, 2014.

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA No. 47635
PROFESSIONAL ENGINEER
6-1-23

ZONED: RESIDENCE "C"

LOT REQUIREMENTS	REQUIRED	PROPOSED
AREA	60,000 s.f.	51,538 s.f.
FRONTAGE	210 FEET	282.81 FEET CONCORD
		396.32 FEET NEW BRIDGE
FRONT YARD	40 FEET	20.8' FEET
SIDE YARD	20 FEET	33.3' FEET
REAR YARD	30 FEET	69.5' FEET
MAX. BUILDING COVERAGE =	40%	15.2%

PARKING TABULATION:

EDUCATIONAL PURPOSE: DAYCARE

1 PARKING SPACE PER EACH STAFF.
(20 STAFF = 20 SPACES REQUIRED)

1 SPACE FOR EACH 5 PERSONS OF RATED CAPACITY OF THE LARGEST AUDITORIUM
(NO AUDITORIUM PROPOSED)

TOTAL SPACES PROVIDED = 35 SPACES

SHEET INDEX

GRAPHIC SCALE: 1"=20'

0 5 10 15 20 25 30 40 50 75 100 FEET
0 1 2 3 4 5 10 15 20 25 30 METERS

OWNERS:
JOEL & MONOSHINI GORDON

CONNORSTONE ENGINEERING INC.
CIVIL ENGINEERS AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508-393-9727

121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
PHONE: 978-443-9566

PROPOSED SITE PLAN OF 502 CONCORD ROAD IN SUDBURY, MA

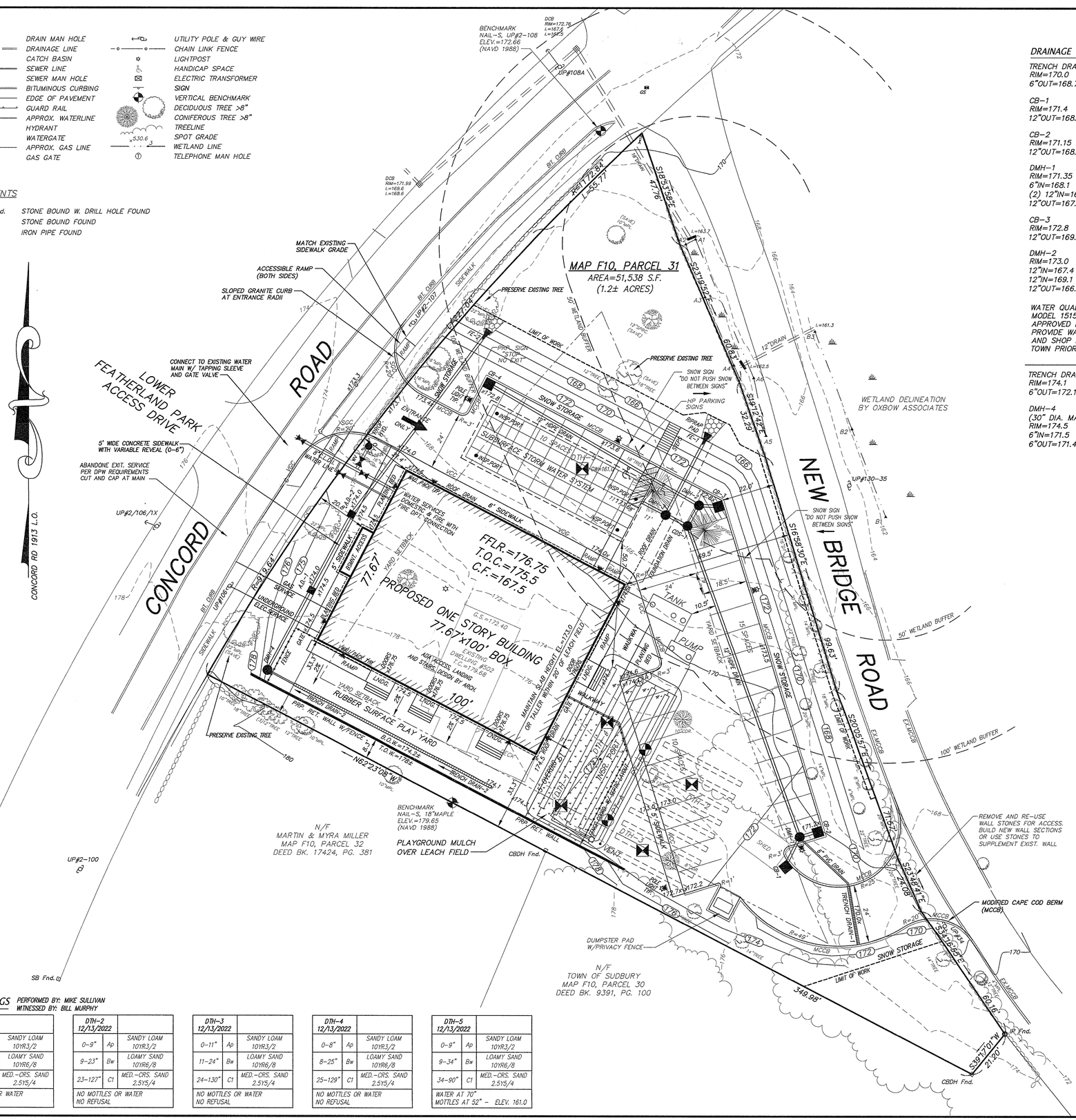
REVISED:	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VC
DATE: JUNE 1, 2023	
EXISTING CONDITIONS PLAN	
SCALE: 1"=20'	SHEET 1 OF 6.

LEGEND

DRAIN MAN HOLE	UTILITY POLE & GUY WIRE
DRAINAGE LINE	CHAIN LINK FENCE
CATCH BASIN	LIGHTPOST
SEWER LINE	HANDICAP SPACE
SEWER MAN HOLE	ELECTRIC TRANSFORMER
BITUMINOUS CURBING	SIGN
EDGE OF PAVEMENT	VERTICAL BENCHMARK
GUARD RAIL	DECIDUOUS TREE >8"
APPROX. WATERLINE	CONIFEROUS TREE >8"
HYDRANT	TREELINE
WATERGATE	SPOT GRADE
APPROX. GAS LINE	WETLAND LINE
GAS GATE	TELEPHONE MAN HOLE

MONUMENTS

SBDH Fnd.	STONE BOUND W. DRILL HOLE FOUND
SB Fnd.	STONE BOUND FOUND
IP Fnd.	IRON PIPE FOUND



SOIL LOGS

PERFORMED BY: MIKE SULLIVAN
WITNESSED BY: BILL MURPHY

DTH–1 12/13/2022		
0–7"	Ap	SANDY LOAM 10YR3/2
7–19"	Bw	LOAMY SAND 10YR6/8
19–135"	C1	MED.–CRS. SAND 2.5Y5/4
NO MOTTLES OR WATER		
NO REFUSAL		

DTH–2 12/13/2022		
0–9"	Ap	SANDY LOAM 10YR3/2
9–23"	Bw	LOAMY SAND 10YR6/8
23–127"	C1	MED.–CRS. SAND 2.5Y5/4
NO MOTTLES OR WATER		
NO REFUSAL		

DTH–3 12/13/2022		
0–11"	Ap	SANDY LOAM 10YR3/2
11–24"	Bw	LOAMY SAND 10YR6/8
24–130"	C1	MED.–CRS. SAND 2.5Y5/4
NO MOTTLES OR WATER		
NO REFUSAL		

DTH–4 12/13/2022		
0–8"	Ap	SANDY LOAM 10YR3/2
8–25"	Bw	LOAMY SAND 10YR6/8
25–129"	C1	MED.–CRS. SAND 2.5Y5/4
NO MOTTLES OR WATER		
NO REFUSAL		

DTH–5 12/13/2022		
0–9"	Ap	SANDY LOAM 10YR3/2
9–34"	Bw	LOAMY SAND 10YR6/8
34–90"	C1	MED.–CRS. SAND 2.5Y5/4
WATER AT 70" MOTTLES AT 52" – ELEV. 161.0		

DRAINAGE TABULATION

TRENCH DRAIN–1
RIM=170.0
6"OUT=168.7

CB–1
RIM=171.4
12"OUT=168.4

CB–2
RIM=171.15
12"OUT=168.15

DMH–1
RIM=171.35
6"IN=168.1
(2) 12"IN=168.0
12"OUT=167.8

CB–3
RIM=172.8
12"OUT=169.3

DMH–2
RIM=173.0
12"IN=167.4 (CB–4)
12"IN=169.1 (CB–3)
12"OUT=166.6

CB–4
RIM=172.8
12"OUT=169.3

DMH–3
RIM=173.35
12"IN=166.0 (CDS)
6"IN=167.0 (RD)
12"OUT=165.75
15"OUT=164.6 (DRYWELL)

CDS–1
CDS MODEL 1515–3–C
RIM=173.25
(2)12"IN=166.3
12"OUT=166.2

CONSTRUCTION NOTES:

1. EXISTING UTILITY LINES SHOWN ON THIS DRAWING ARE FROM AVAILABLE INFORMATION AND ARE APPROXIMATE LOCATIONS. THE ENGINEER DOES NOT GUARANTEE THEIR ACCURACY OR THAT ALL UTILITIES AND SUBSURFACE STRUCTURES ARE SHOWN. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION AND INVERT ELEVATIONS OF THE UTILITIES AND STRUCTURES, AS REQUIRED PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES WITH RECORD DATA SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. THE CONTRACTOR SHALL CONTACT DIG SAFE: 1–800–344–7233 (72 HOURS BEFORE DIGGING), AND TOWN DPW FOR UTILITY LOCATIONS PRIOR TO EXCAVATION. TEST PITS SHALL BE UTILIZED FOR UTILITY CONNECTIONS.
2. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
3. ALL MATERIALS AND CONSTRUCTION PRACTICES SHALL BE IN CONFORMANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE SUDBURY DEPARTMENT OF PUBLIC WORKS, OR THE LATEST EDITION OF THE MASSACHUSETTS HIGHWAY DEPARTMENT (MHD) CONSTRUCTION STANDARDS AND THE MHD 'STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES', WHICHEVER IS MORE STRINGENT.
4. THE WATER SYSTEM SHALL BE INSTALLED IN COMPLIANCE WITH THE TOWN OF SUDBURY DPW WATER DIVISION RULES AND REGULATIONS. CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH APPLICABLE PERMITS (TO BE OBTAINED BY THE CONTRACTOR). CONNECTION LOCATION AND SIZE TO BE CONFIRMED WITH ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION.
5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, TO KEEP ACCURATE AS–BUILT MEASUREMENTS / RECORDS OF ALL UNDERGROUND OR CONCEALED WORK.
6. THE LAYOUT AND INSTALLATION OF ELECTRIC, GAS, TELEPHONE AND CATV UTILITY CONNECTIONS AND SERVICES SHALL IN ACCORDANCE WITH THE REQUIREMENTS OF THE RESPECTIVE UTILITY. CONNECTION LOCATION AND SIZE TO BE CONFIRMED WITH ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR SHALL UTILIZE ALL MEASURES AND MATERIALS NECESSARY TO ENSURE THE SAFETY OF ALL PERSONS AND PROPERTIES AT THE SITE DURING CONSTRUCTION. ALL EXCAVATIONS SHALL CONFORM TO CURRENT OSHA STANDARDS.
8. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE HIS WORK WITH THE APPROPRIATE HIGHWAY & UTILITY DEPARTMENTS. WORK WITHIN THE HIGHWAY LAYOUT SHALL CONFORM TO THE CONDITIONS OF THE PERMIT ISSUED BY MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION OR THE LOCAL AUTHORITY.
9. ALL SIGN SIZES AND MATERIAL SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC DEVICES" (MUTCD) AND THE OFFICE OF TRAFFIC OPERATIONS, FEDERAL HIGHWAY ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION.
10. ALL RAMPS, CURB CUTS, SIDEWALKS, AND ACCESSIBLE SPACES SHALL COMPLY WITH THE AMERICANS WITH DISABILITIES ACT REGULATIONS AND WITH ARCHITECTURAL ACCESS BOARD REGULATIONS (521 CMR 1–47).
11. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
12. JOINTS BETWEEN PROPOSED BITUMINOUS CONCRETE PAVEMENT AND EXISTING PAVEMENT TO REMAIN SHALL BE SAWCUT AND SEALED WITH HOT POURED RUBBERIZED ASPHALT SEALER.

COORDINATION WITH PLANS BY OTHERS:

1. SEE PROJECT LANDSCAPE PLANS FOR SITE LIGHTING AND LANDSCAPING.
2. VERIFY BUILDING DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION.
3. COORDINATE BUILDING UTILITY CONNECTIONS (INVERT ELEV., LOCATION, AND SIZE) WITH ARCHITECTURAL PLANS PRIOR TO CONSTRUCTION. ANY DISCREPANCY SHALL Be REPORTED TO THE ENGINEER.

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
PROFESSIONAL ENGINEER
6-1-23

APPROVED BY:
SUDBURY PLANNING BOARD

DATE: _____

GRAPHIC SCALE: 1"=20'

0 5 10 15 20 25 30 40 50 75 100 FEET
0 1 2 3 4 5 10 15 20 25 30 METERS

OWNERS:
JOEL & MONOSHINI GORDON

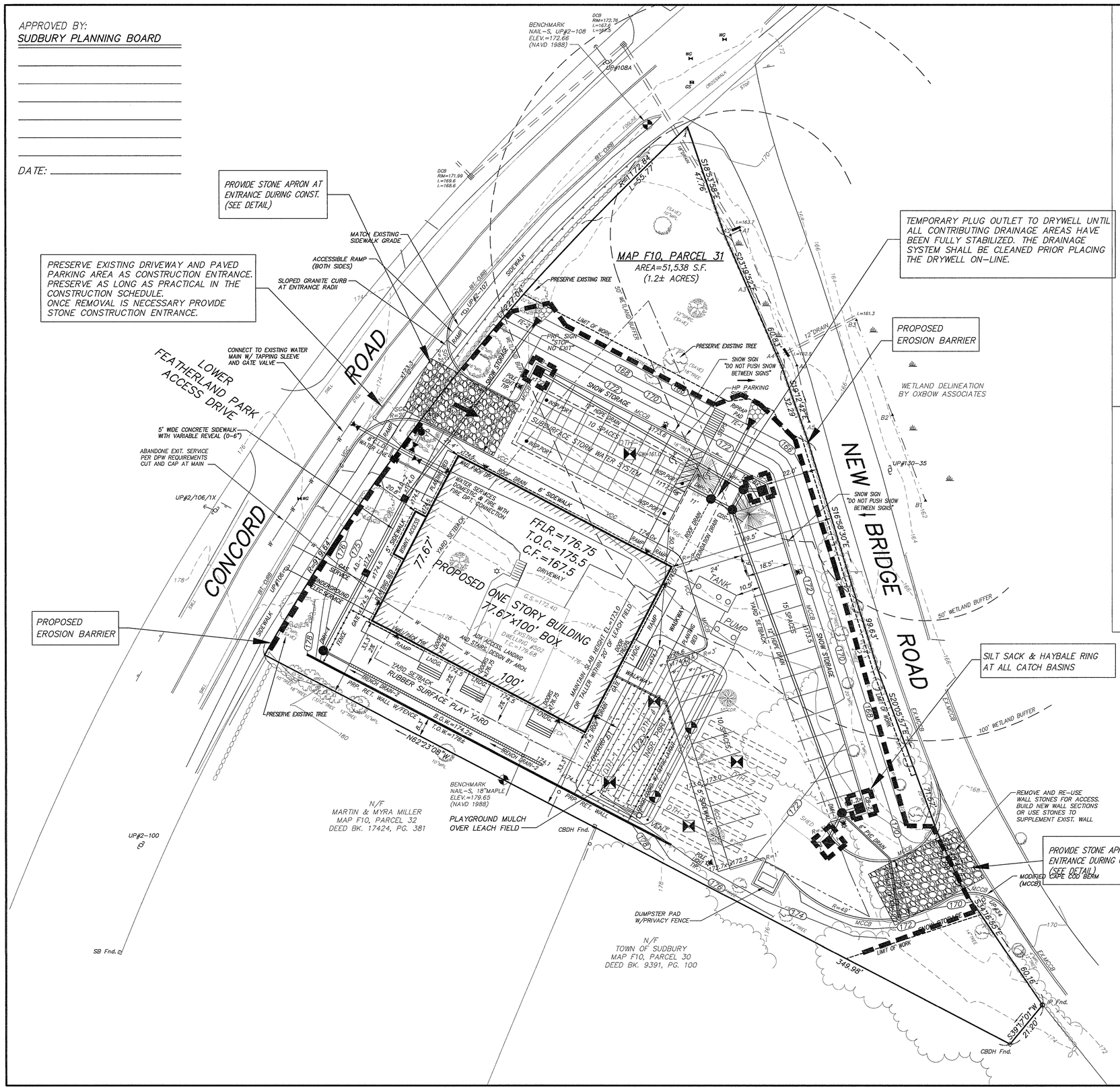
CONNORSTONE ENGINEERING INC.
CIVIL ENGINEERS AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508–393–9727
121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
PHONE: 978–443–9566

PROPOSED SITE PLAN OF 502 CONCORD ROAD IN SUDBURY, MA

	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VC
DATE: JUNE 1, 2023	

CONSTRUCTION PLAN

SCALE: 1"=20'	SHEET 2 OF 6.



APPROVED BY:
SUDBURY PLANNING BOARD

DATE: ______________

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.

2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

4. STONE APRON SHALL BE REPLACED AS DEPOSITED SOILS BUILD UP.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

NOTES:

1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3" DEEP. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.

2. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFATURERS RECOMMENDATIONS.

EROSION BARRIER

NOT TO SCALE

EROSION AND SEDIMENTATION CONTROL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE PLANS AND PERMIT CONDITIONS.

2. PRIOR TO INITIATING CONSTRUCTION, ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND DETAIL DRAWINGS.

3. THIS PLAN DEPICTS THE MINIMUM REQUIRED SEDIMENTATION AND EROSION CONTOLS. THE CONTRACTOR SHALL EMPLOY ADDITIONAL SEDIMENTATION AND EROSION CONTROL MEASURES AS NECESSITATED BY SITE CONDITIONS, OR AS DIRECTED BY THE OWNER, THE OWNER'S REPRESENTATIVE, OR THE CONSERVATION COMMISSION TO ENSURE PROTECTION OF ALL WETLAND RESOURCES AND CONTROL SEDIMENT TRANSPORT. IF SEDIMENTATION PLUMES OCCUR, THE CONTRACTOR SHALL STOP WORK AND INSTALL ADDITIONAL SEDIMENTATION CONTROL DEVICES IMMEDIATELY TO PREVENT FURTHER SEDIMENTATION.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY AND PERMANENT SEDIMENTATION AND EROSION CONTROLS UNTIL WORK IS COMPLETE AND ALL AREAS HAVE BEEN PERMANENTLY STABILIZED. AT SUCH TIME THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL SEDIMENTATION AND EROSION CONTROL MEASURES.

5. THE CONTRACTOR SHALL INSPECT SEDIMENTATION AND EROSION CONTROLS ON A DAILY BASIS AND IMMEDIATELY AFTER EACH RAINFALL; REPAIRS SHALL BE MADE BY THE END OF THE WORKING DAY. ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR WHEN THE VOLUME REACHES 1/4 TO 1/2 THE HEIGHT OF SILT FENCE OR SEDIMENT TRAP, OR AS DIRECTED BY THE LOCAL AUTHORITY.

6. SOIL STOCKPILES SHALL BE STABILIZED TO PREVENT EROSION, AND A PERIMETER SEDIMENT CONTROL SYSTEM SHALL BE INSTALLED. NO MATERIALS SUBJECT TO EROSION SHALL BE STOCKPILED OVERNIGHT WITHIN 100 FEET OF A WETLAND UNLESS COVERED.

7. DISTURBED AREAS SHALL BE STABILIZED BY LOAMING AND SEEDING, OR BY ANOTHER APPROVED METHOD, AS SOON AS POSSIBLE AFTER THE FINISHED GRADE HAS BEEN MET. DISTURBED AREAS WITH SLOPES 3:1 (H:V) OR GREATER SHALL BE COVERED WITH LOAM AND STABILIZED WITH HYDROSEED AND SOIL TACKIFIER. IF FINAL GRADING DOES NOT OCCUR DURING THE GROWING SEASON, THESE AREAS SHALL BE MULCHED WITH HAY SECURED.

8. DEWATERING OPERATIONS, IF REQUIRED, SHALL DISCHARGE ONTO STABILIZED AREAS, AND ALL DISCHARGE WATER IS TO PASS THROUGH SEDIMENTATION CONTROL DEVICES TO PREVENT IMPACTS UPON WATER BODIES, BORDERING VEGETATED WETLANDS, DRAINAGE SYSTEMS AND ABUTTING PROPERTIES. AT A MINIMUM ALL DISCHARGES SHALL BE INTERCEPTED BY HAYBALE CORRAL AND HAYBALE CHECK DAMS SPACED 10' APART.

9. STAKED WATTLES AND SILT FENCE SHALL BE INSTALLED ALONG THE EDGE OF PROPOSED DEVELOPMENT OR AS INDICATED ON THE PLANS. ADDITIONAL WATTLES AND SILT FENCE SHALL BE LOCATED AS CONDITIONS WARRANT, AND IN SOME AREAS STRUCTURES MAY HAVE TO BE DUPLICATED AT REGULAR INTERVALS.

10. STREET SWEEPING IN THE VICINITY OF THE PROJECT AREA SHALL BE PERFORMED AS NEEDED UNTIL THE PROJECT LIMITS HAVE BEEN STABILIZED. ALL SEDIMENT TRACKED ONTO PUBLIC RIGHT-OF-WAYS SHALL BE SWEPT AT THE END OF EACH WORKING DAY.

11. ALL EXISTING AND PROPOSED DRAINAGE SYSTEM INLETS, WHICH MAY RECEIVE STORMWATER FLOW FROM DISTURBED AREAS, SHALL BE PROVIDED WITH SILT SACKS. THE CONTRACTOR SHALL MAINTAIN THESE DEVICES PER THE MANUFACTURERS RECOMMENDATIONS UNTIL ALL WORK IS COMPLETED AND ALL AREAS HAVE BEEN ADEQUATELY STABILIZED.

12. DUST CONTROL MEASURES SHALL BE IMPLEMENTED AND MAINTAINED PROPERLY THROUGHOUT DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED. METHODS FOR DUST CONTROL SHALL INCLUDE WATER SPRINKLING AND/OR OTHER METHODS APPROVED BY THE ENGINEER.

13. ALL VEHICLES SHALL ENTER AND EXIT THE SIT VIA THE STABILIZED CONSTRUCTION ENTRANCE CONSISTING OF CRUSHED STONE TO A DEPTH OF 6" FOR THE FIRST 50 FEET FROM EXISTING PAVED STREETS. IF THE SITE CONDITIONS ARE SUCH THAT THE GRAVEL PAD DOES NOT REMOVE THE MAJORITY OF THE MUD AND DEBRIS, THEN THE TIRES SHALL BE WASHED BEFORE ANY VEHICLES ENTER ADJACENT ROADWAYS. ALL WATER USED FOR TIRE WASHING SHALL BE COLLECTED AND TREATED PRIOR TO ENTERING THE DRAINAGE SYSTEM. THE CONTRACTOR SHALL INSPECT THE CONSTRUCTION ENTRANCE DAILY AND AFTER HEAVY USE.

THE CONTRACTOR SHALL PROVIDE A PHASING PLAN TO THE OWNER FOR APPROVAL PRIOR TO THE START OF CONSTRUCTION.

NOTES:
1. SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)

PLACE BALES WITH ENDS TIGHTLY ABUTING. STONE BACKFILL WILL PREVENT EROSION OR FLOW AROUND THE BALES.

STRAW BALE/GRAVEL SEDIMENT BARRIER AT CATCH BASINS

NOT TO SCALE

VITO COLONNA
No. 47635
6-1-23

GRAPHIC SCALE: 1"=20'

OWNERS:
JOEL & MONOSHINI GORDON

CONNORSTONE
ENGINEERING INC.
CIVIL ENGINEERS AND LAND SURVEYORS
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121 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS 01776
PHONE: 978-443-9566

PROPOSED SITE PLAN
OF
502 CONCORD ROAD
IN
SUDBURY, MA

	DESCRIPTION:

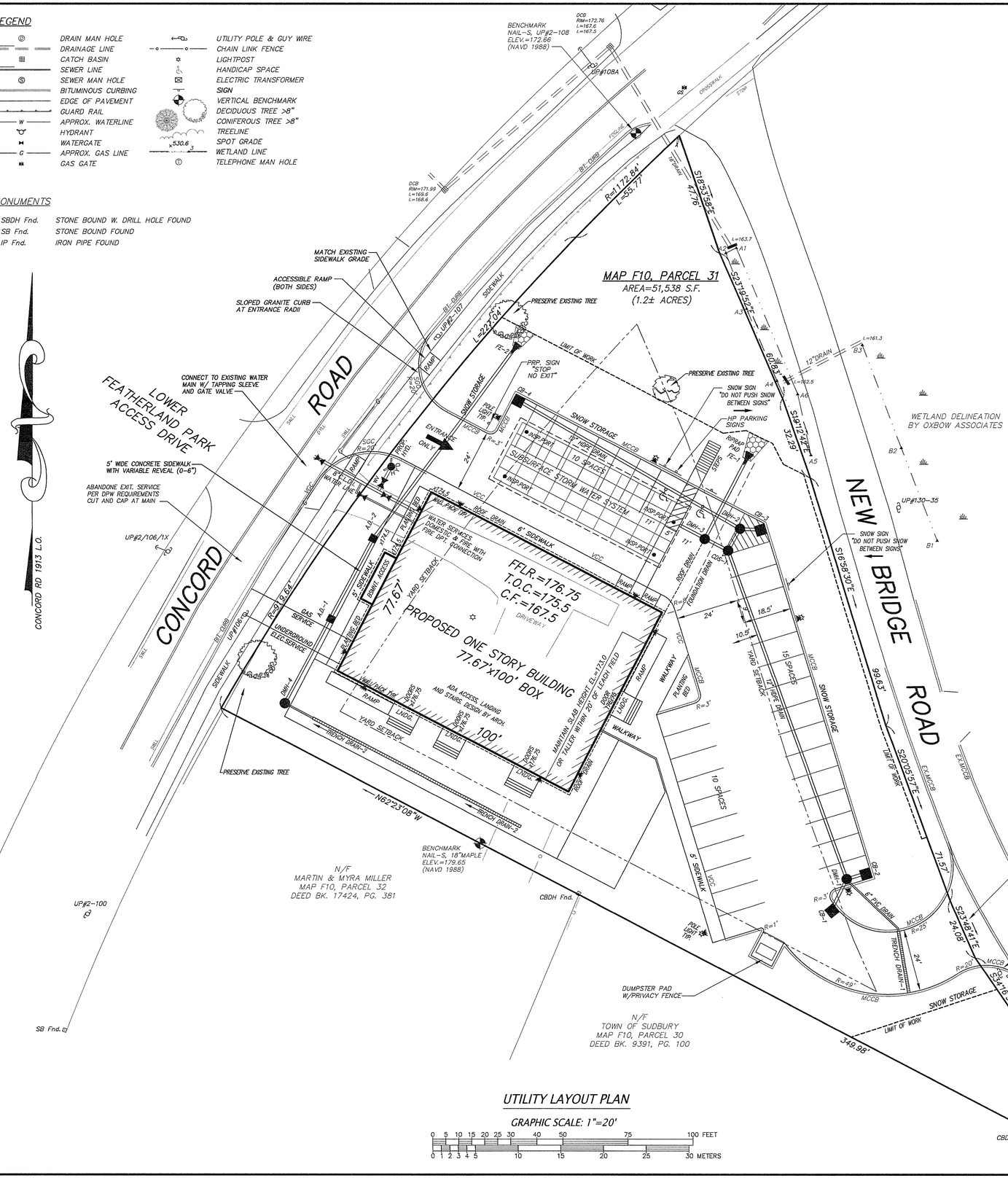
DRAWN BY: REM	CHECK BY: VC
DATE: JUNE 1, 2023	
EROSION CONTROL PLAN	
SCALE: 1"=20'	SHEET 3 OF 6.

LEGEND

ⓓ	DRAIN MAN HOLE	⟵○⟶	UTILITY POLE & GUY WIRE
	DRAINAGE LINE	○——○	CHAIN LINK FENCE
▦	CATCH BASIN	✲	LIGHTPOST
	SEWER LINE	♿	HANDICAP SPACE
Ⓢ	SEWER MAN HOLE	⊠	ELECTRIC TRANSFORMER
	BITUMINOUS CURBING		SIGN
	EDGE OF PAVEMENT		VERTICAL BENCHMARK
	GUARD RAIL		DECIDUOUS TREE >8"
W	APPROX. WATERLINE		CONIFEROUS TREE >8"
	HYDRANT		TREELINE
	WATERGATE	x530.6	SPOT GRADE
G	APPROX. GAS LINE		WETLAND LINE
	GAS GATE	Ⓣ	TELEPHONE MAN HOLE

MONUMENTS

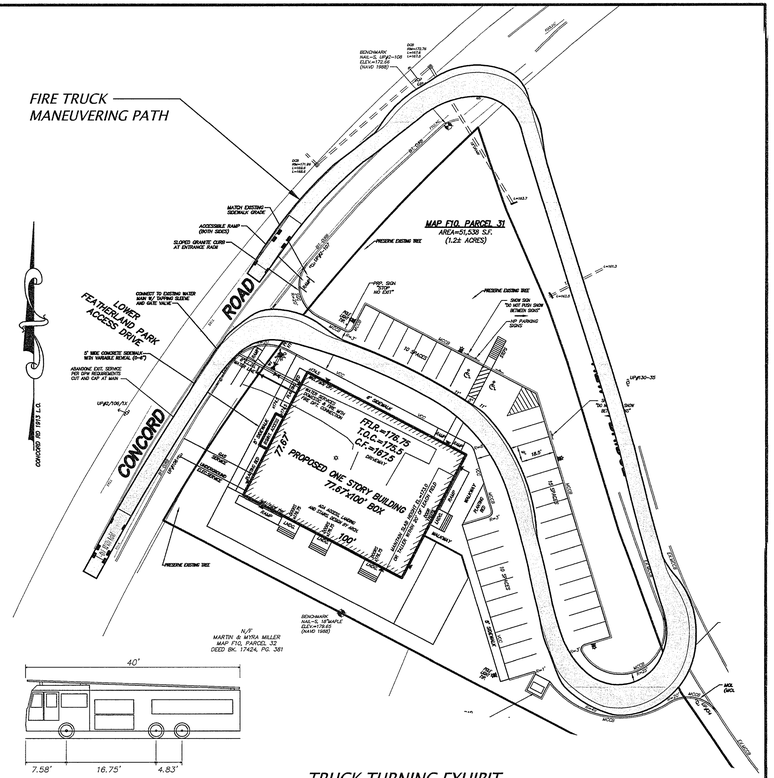
- ⊡ SBDH Fnd. STONE BOUND W. DRILL HOLE FOUND
- ⊡ SB Fnd. STONE BOUND FOUND
- ○ IP Fnd. IRON PIPE FOUND



UTILITY LAYOUT PLAN

GRAPHIC SCALE: 1"=20'

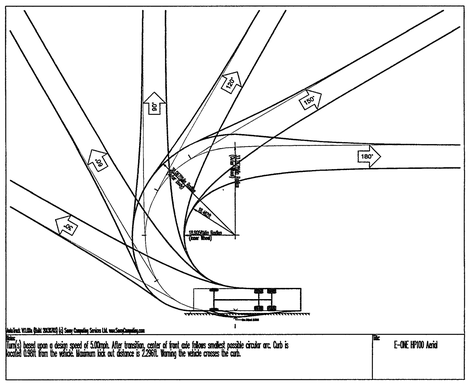
0 5 10 15 20 25 30 40 50 75 100 FEET
0 1 2 3 4 5 10 15 20 25 30 METERS



TRUCK TURNING EXHIBIT

SCALE: 1"=40'

E-ONE HP100 Aerial
40.0ft Overall Length
8.3ft Overall Width
11.0ft Overall Body Height
1.4ft Min Body Ground Clearance
8.3ft Track Width
6.0s Lock to Lock Time
45.0° Max Wheel Angle



APPROVED BY:
SUDBURY PLANNING BOARD

DATE: _____

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
PROFESSIONAL ENGINEER
6-1-23

OWNERS:
JOEL & MONOSHINI GORDON

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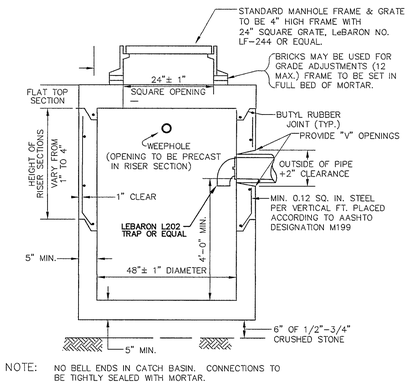
PROPOSED SITE PLAN
OF
502 CONCORD ROAD
IN
SUDBURY, MA

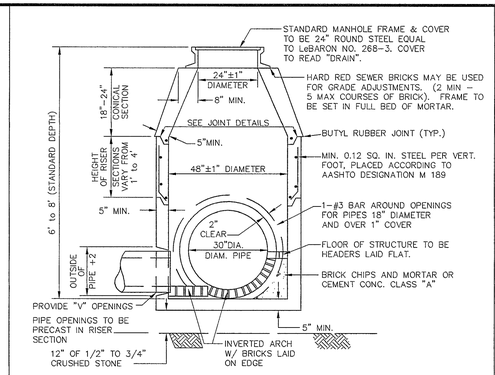
	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VC
DATE: JUNE 1, 2023	
UTILITY LAYOUT PLAN	
SCALE: 1"=20'	SHEET 4 OF 6.



NOTE: NO BELL ENDS IN CATCH BASIN. CONNECTIONS TO BE TIGHTLY SEALED WITH MORTAR.

PRECAST CONCRETE DRAIN CATCH BASIN DETAIL

NOT TO SCALE

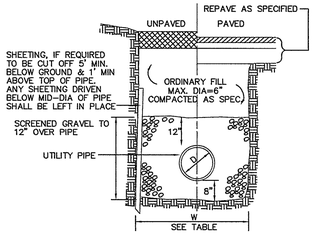


PRECAST CONCRETE DRAIN MANHOLE DETAIL

NOT TO SCALE

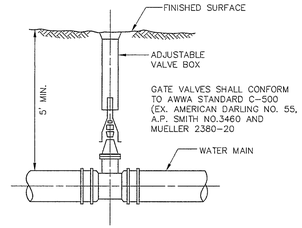
TRENCH WIDTH (W)		
D DIAMETER OF PIPE	W UNSHEETED	W SHEETED
TO 12"	3'	4'
14" TO 24"	4'	5'
30" TO 36"	5'	6'

PROVIDE DETECTABLE WARNING TAPE OVER ALL SEWER LINES, FORCE MAINS, AND SEWER SERVICES.



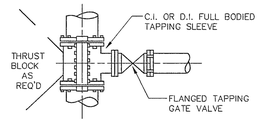
TYPICAL TRENCH DETAIL

NOT TO SCALE



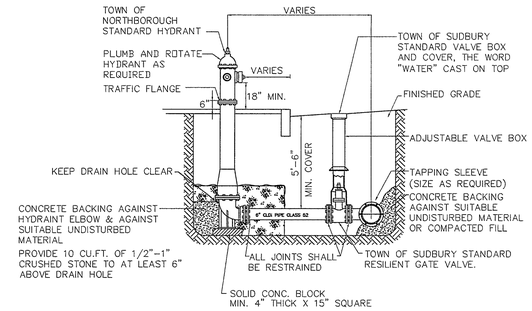
TYPICAL GATE VALVE

NOT TO SCALE



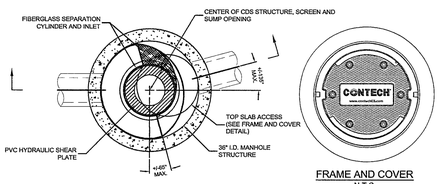
TAPPING SLEEVE AND VALVE DETAILS

NOT TO SCALE



TYPICAL HYDRANT & VALVE DETAIL

NOT TO SCALE

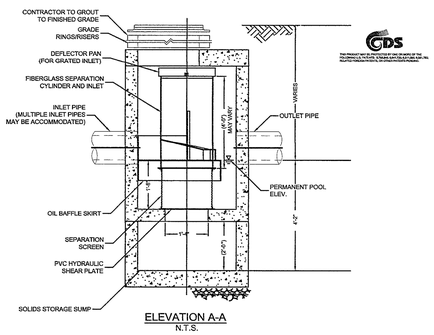


PLAN VIEW B-B

N.T.S.

FRAME AND COVER

N.T.S.



ELEVATION A-A

N.T.S.

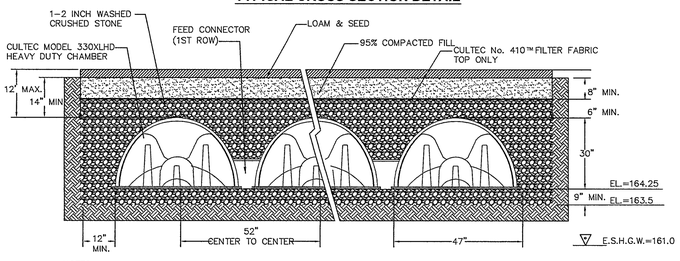
'CDS' 1515-3-C ONLINE TREATMENT STRUCTURE

NOT TO SCALE

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH CONSTRUCTION PRODUCTS REPRESENTATIVE. www.contech-cpi.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. AND CASTINGS SHALL HS20
5. STRUCTURE SHALL MEET AASHTO LOAD RATING, ASSUMING GROUNDWATER M306 MEET AASHTO ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
7. INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION AND PROCEDURES.

CULTEC RECHARGER R330XLHD CHAMBER SYSTEM
PAVED TRAFFIC APPLICATION
TYPICAL CROSS SECTION DETAIL

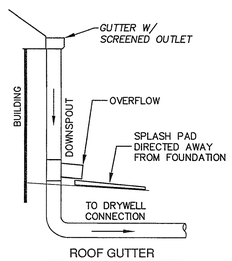


NOTES:

1. BOTTOM OF EXCAVATION SHALL BE WITNESSED BY THE ENGINEER TO VERIFY SOIL CONDITIONS & DEPTH TO GROUNDWATER
2. EXCAVATE MINIMUM 6 INCHES INTO NATURAL 'C' LAYER ANY FILL REQUIRED BELOW THE SYSTEM SHALL BE CLEAN FREE DRAINING FILL WITH LESS THAN 5% PASSING THE #200 SIEVE (C-33 WASHED SAND OR TITLE 5 FILL MEETS THIS REQUIREMENT)

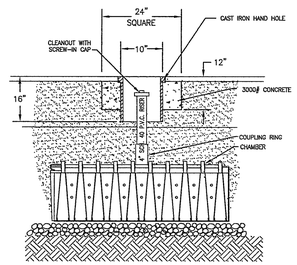
DRYWELL DETAIL

NOT TO SCALE



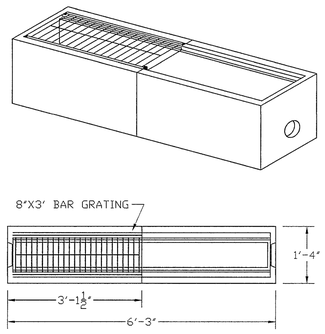
ROOF GUTTER CONNECTION SCHEMATIC

NOT TO SCALE

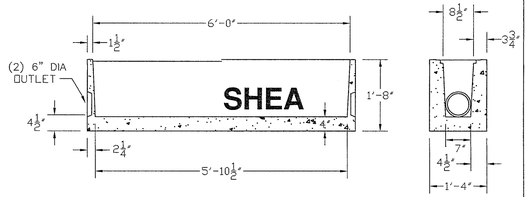


INSPECTION PORT DETAIL

NOT TO SCALE



PLAN VIEW



SIDE SECTION VIEW

END SECTION VIEW

NOTES:

1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. AVAILABLE IN 3' AND 6' SECTIONS.
3. AVAILABLE IN END OR MIDDLE SECTIONS.
4. CONFORMS TO H-20 LOADING.

TRENCH DRAIN

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
PROFESSIONAL ENGINEER
6-1-23

APPROVED BY:
SUDBURY PLANNING BOARD

DATE: _____

OWNER:
JOEL & MONOSHINI GORDON

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10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508-393-9727 FAX: 508-393-5242

PROJECT:
PROPOSED SITE PLAN
OF
502 CONCORD ROAD
IN
SUDBURY, MA

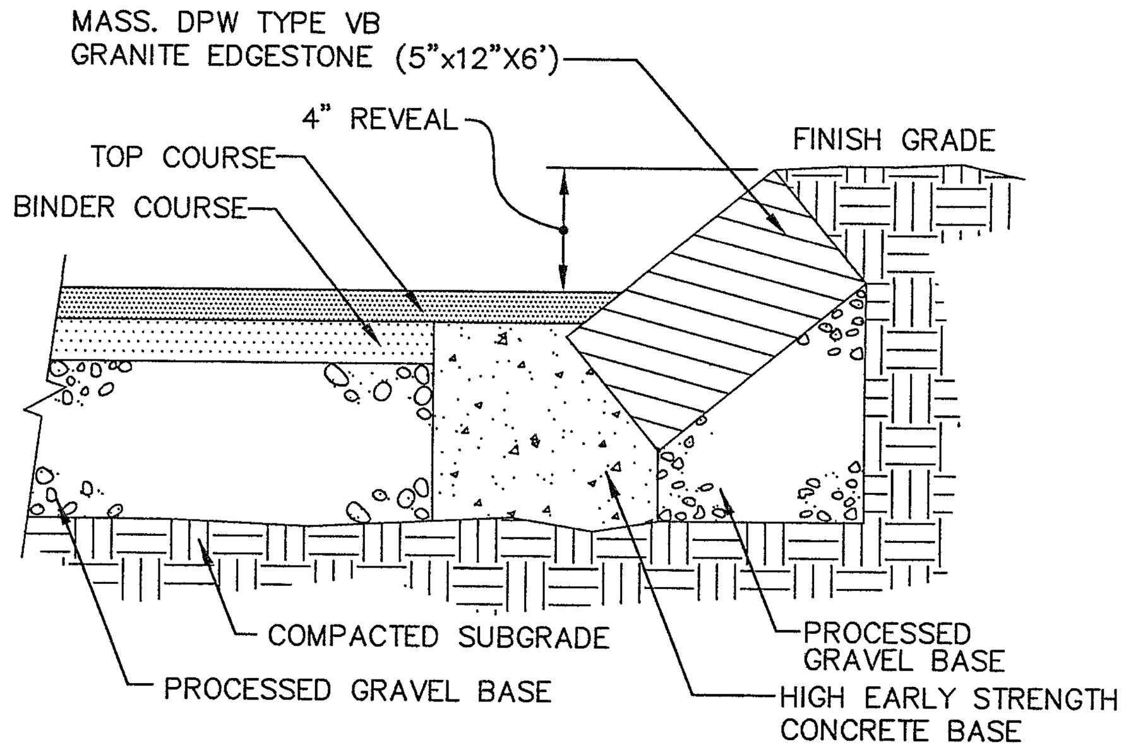
REVISED:	DESCRIPTION:

DRAWN BY: REM | CHECK BY: VC

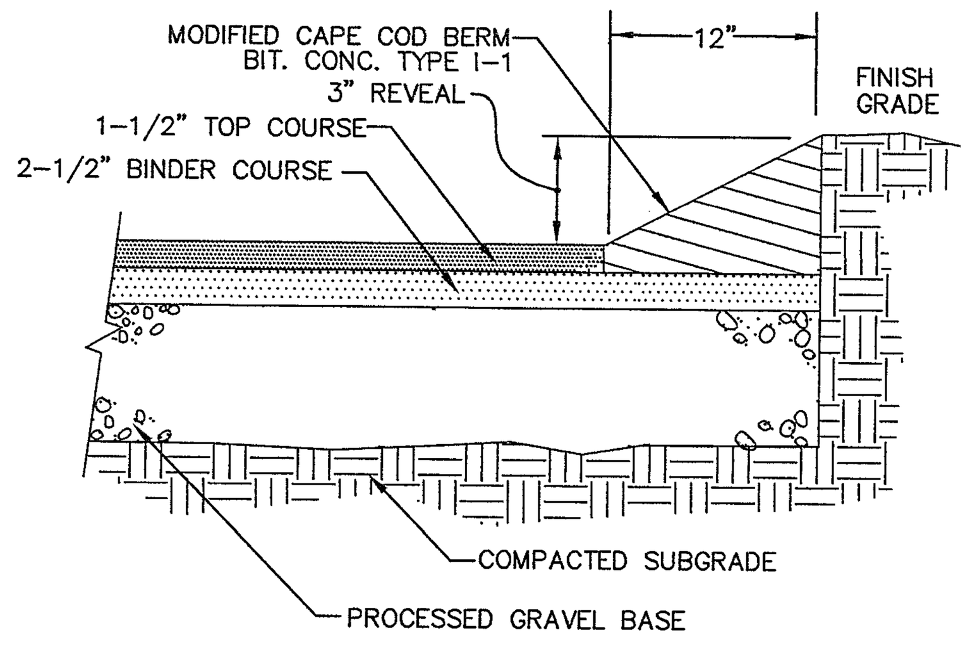
DATE: JUNE 1, 2023

CONSTRUCTION DETAILS

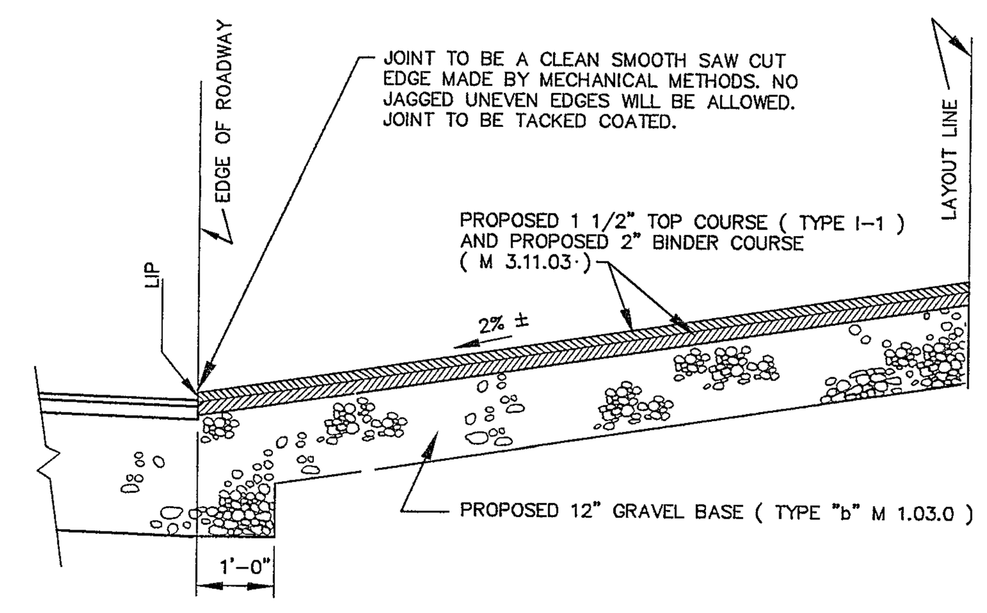
SCALE: NONE | SHEET 5 OF 6.



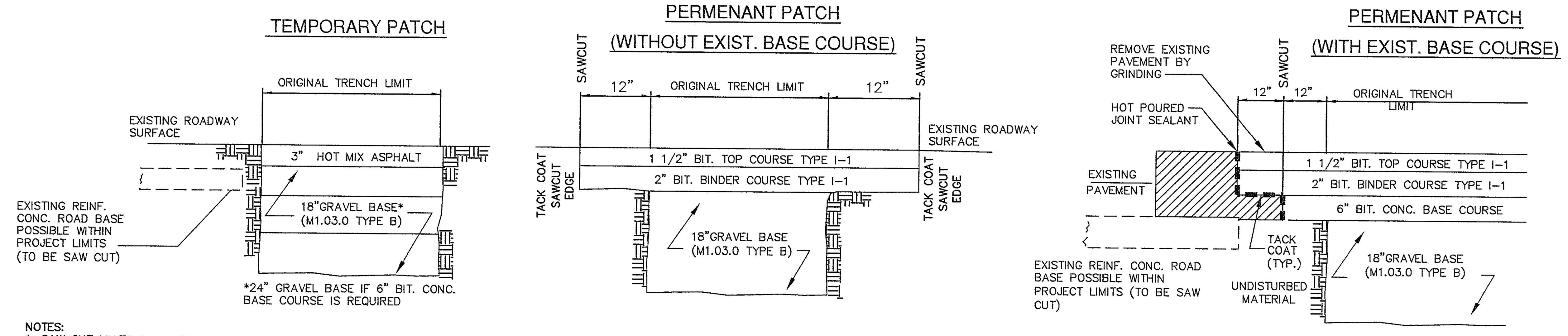
SLOPED GRANITE EDGING
NOT TO SCALE



MODIFIED CAPE COD BERM & TYPICAL PAVEMENT SECTION
NOT TO SCALE

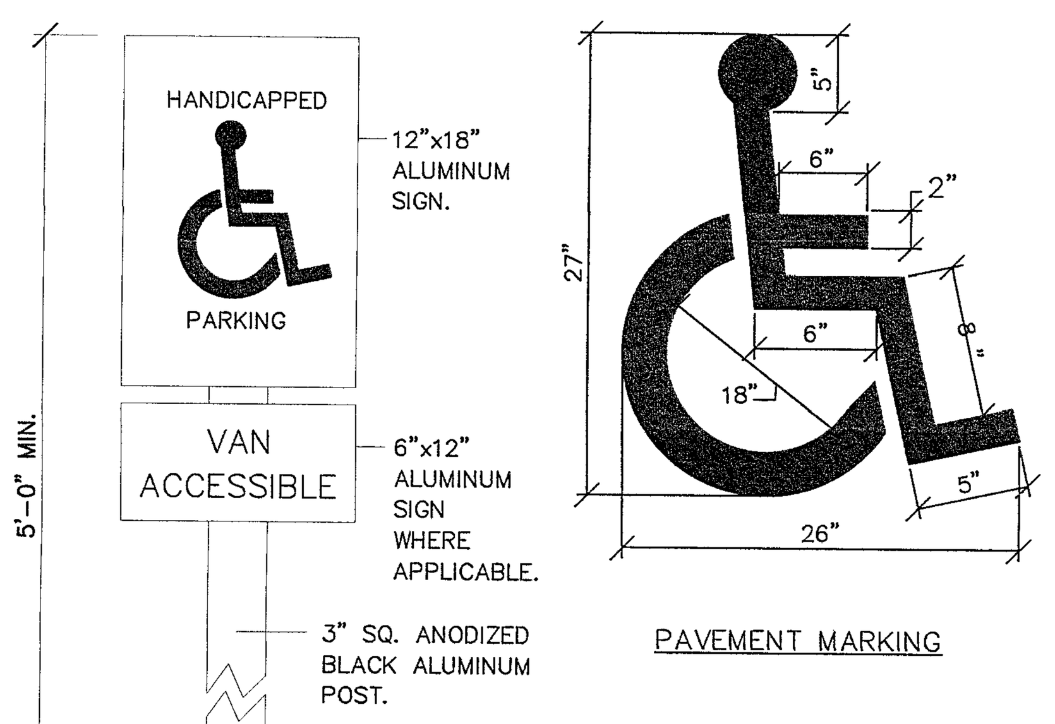


TYPICAL DRIVEWAY DETAIL
NOT TO SCALE



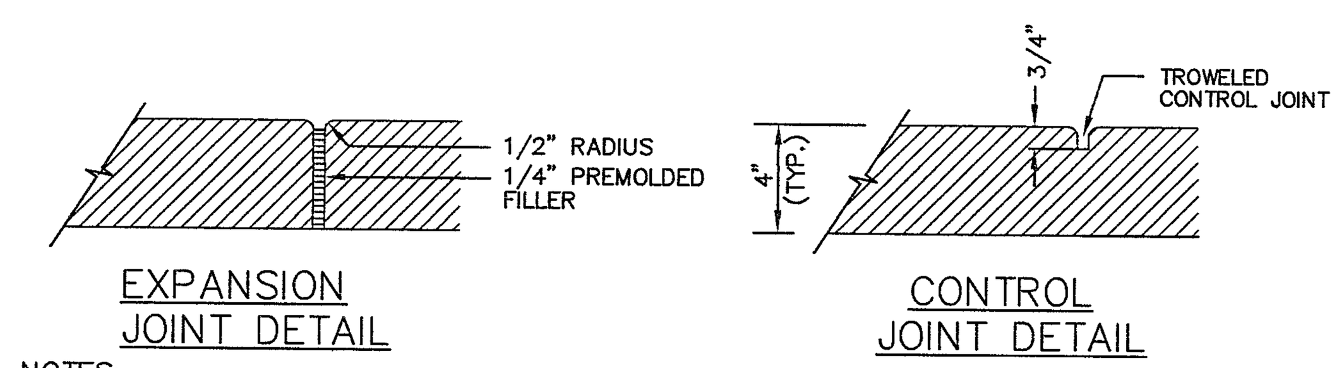
NOTES:
1. SAW CUT LIMITS SHALL BE SEALED WITH HOT POURED JOINT SEALANT.
2. GRAVEL COMPACTED IN 6" LIFTS WITH MECHANICAL COMPACTOR.
3. ALL BACKFILL TO BE COMPACTED IN ACCORDANCE WITH MDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES SECTION 150.64
4. PAVEMENT OUTSIDE OF THE INDICATED LIMITS THAT ARE DAMAGED BY THE CONTRACTOR'S OPERATION (INCLUDING BLASTING) SHALL BE REPLACED / REPAIRED AT THE CONTRACTOR'S EXPENCE.

TYPICAL TEMPORARY / PERMENANT PATCH DETAIL
NOT TO SCALE

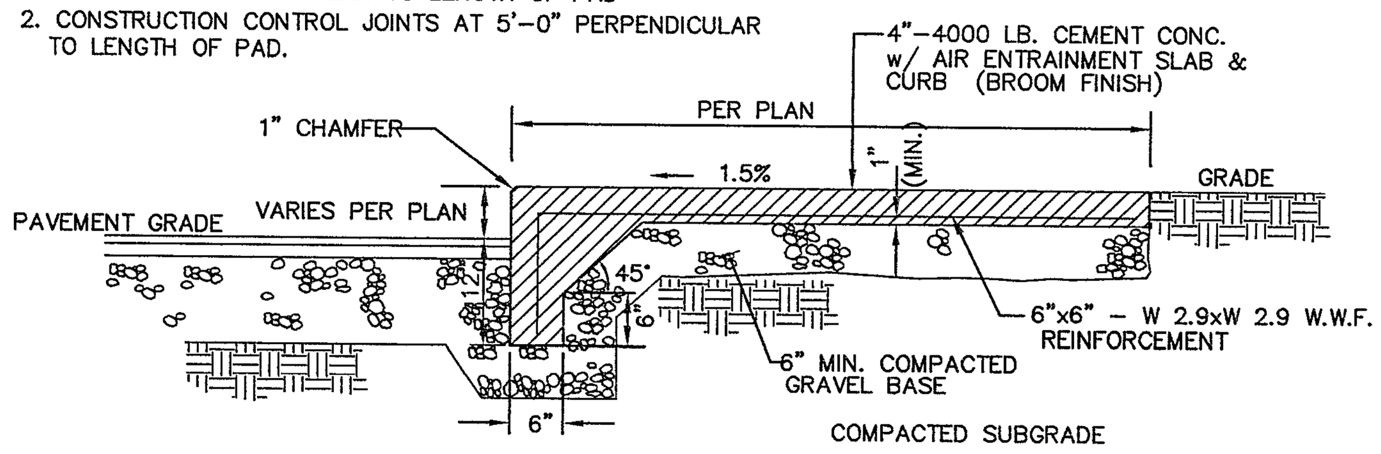


NOTE:
ALL HANDICAP PARKING & SIGNAGE SHALL BE IN CONFORMANCE WITH THE RULES & REGULATIONS OF THE ARCHITECTURAL BARRIERS BOARD.
SIGN(S) SHALL BE LOCATED SO THEY CANNOT BE OBSCURED BY A VEHICLE PARKED IN THE SPACE.

HANDICAP SIGN & PAVEMENT MARKING DETAIL
NOT TO SCALE

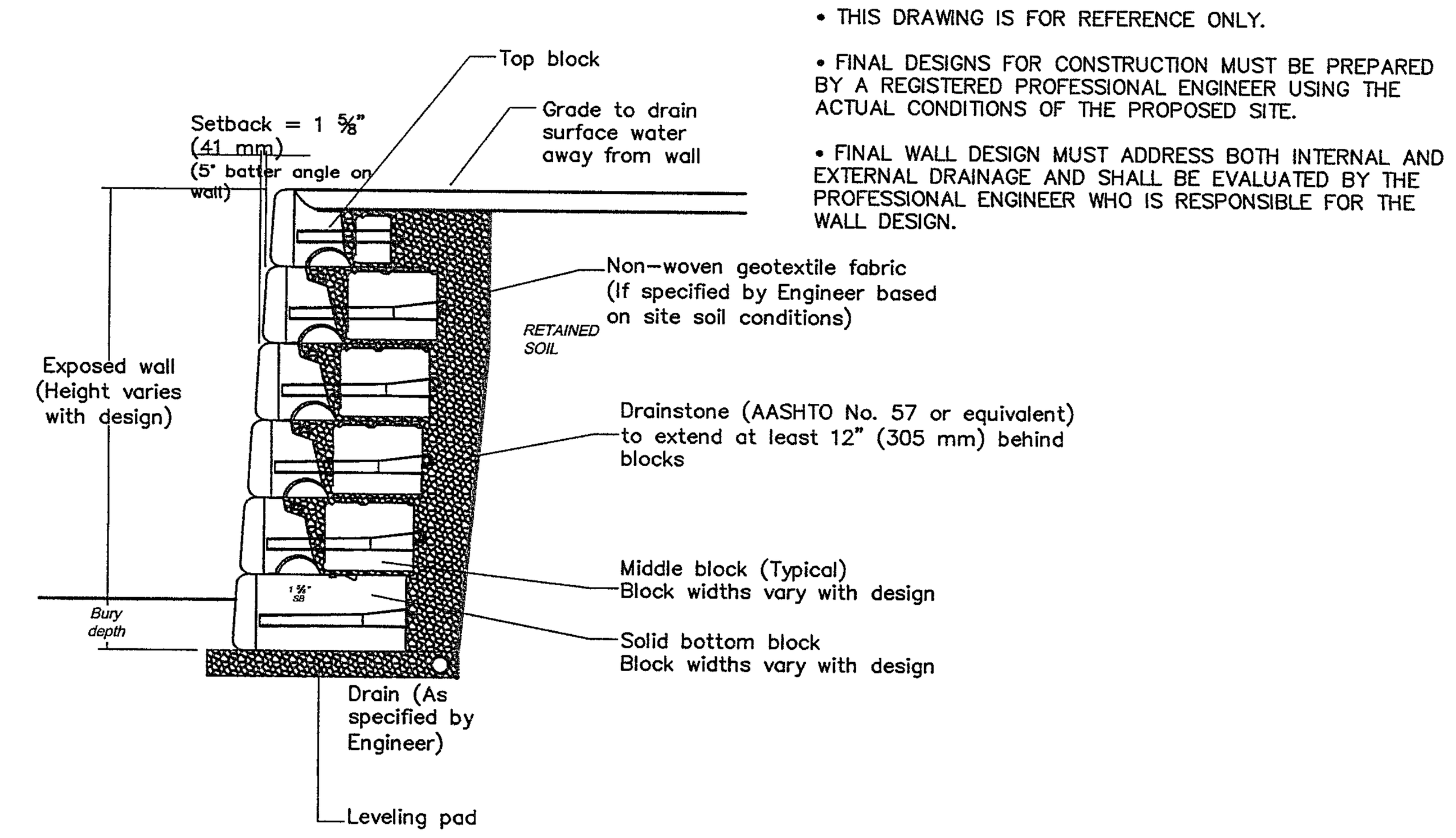


NOTES:
1. EXPANSION JOINTS AT 20'-0" OR EVERY 400 SQ. FT. OF PAD - PERPENDICULAR TO LENGTH OF PAD
2. CONSTRUCTION CONTROL JOINTS AT 5'-0" PERPENDICULAR TO LENGTH OF PAD.



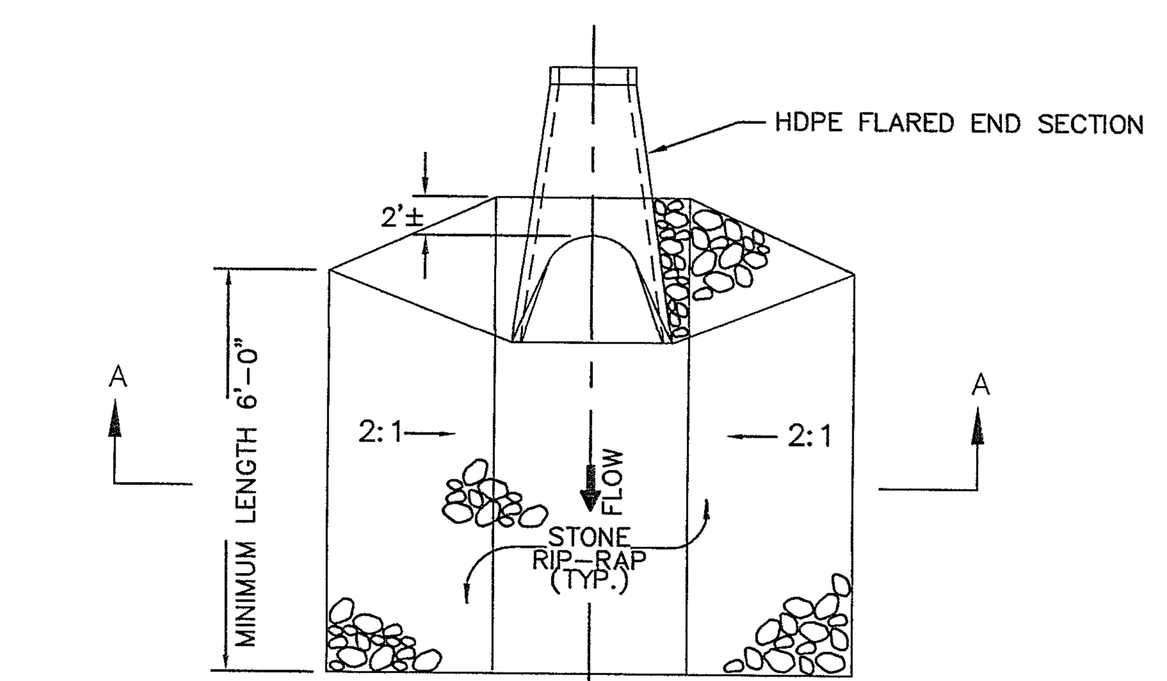
CONCRETE PAD / CURB DETAIL
NOT TO SCALE

• THIS DRAWING IS FOR REFERENCE ONLY.
• FINAL DESIGNS FOR CONSTRUCTION MUST BE PREPARED BY A REGISTERED PROFESSIONAL ENGINEER USING THE ACTUAL CONDITIONS OF THE PROPOSED SITE.
• FINAL WALL DESIGN MUST ADDRESS BOTH INTERNAL AND EXTERNAL DRAINAGE AND SHALL BE EVALUATED BY THE PROFESSIONAL ENGINEER WHO IS RESPONSIBLE FOR THE WALL DESIGN.

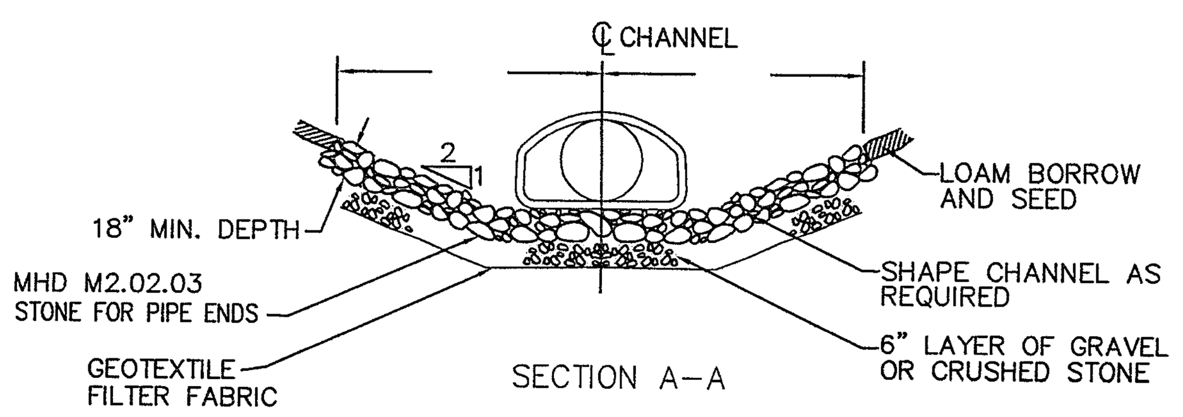


TYPICAL GRAVITY WALL DETAIL
NOT TO SCALE

REDI-ROCK

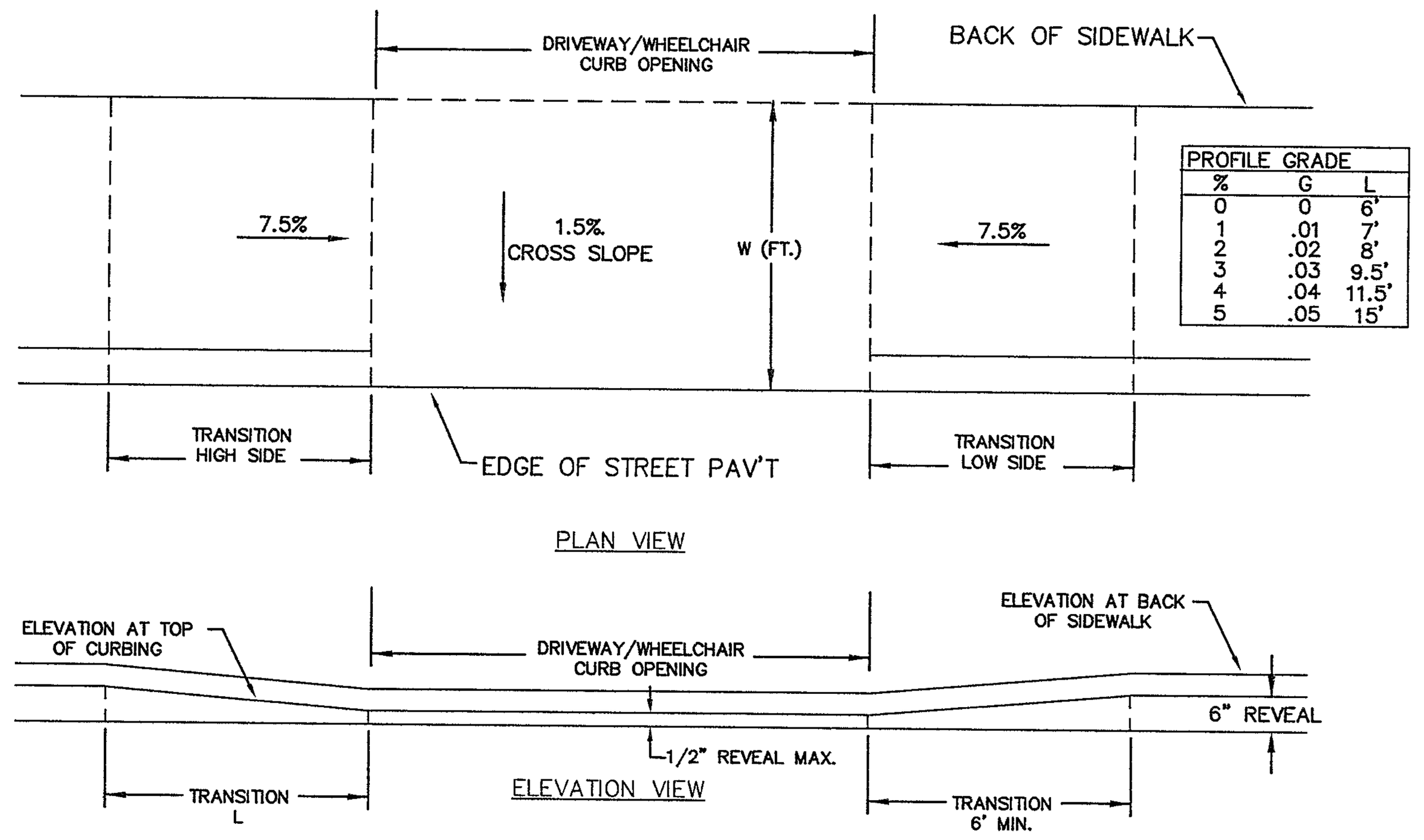


PLAN VIEW



SECTION A-A

RIP-RAP APRON
NOT TO SCALE



DRIVEWAY/WHEELCHAIR CURB-CUT RAMP
NOT TO SCALE

APPROVED BY:
SUDBURY PLANNING BOARD

DATE:

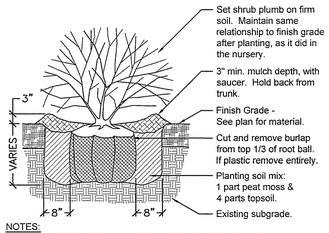
OWNER:
JOEL & MONOSHINI GORDON

CONNORSTONE ENGINEERING INC.
CIVIL ENGINEERS AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508-393-9727 FAX: 508-393-5242

PROJECT:
PROPOSED SITE PLAN OF 502 CONCORD ROAD IN SUDBURY, MA

COMMONWEALTH OF MASSACHUSETTS
VITO COLONNA
No. 47635
PROFESSIONAL ENGINEER
6-1-23

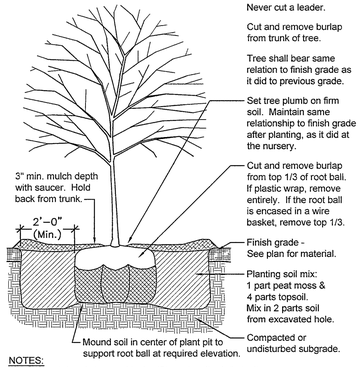
REVISED:	DESCRIPTION:
DRAWN BY: REM	CHECK BY: VC
DATE: JUNE 1, 2023	
CONSTRUCTION DETAILS	
SCALE: NONE	SHEET 6 OF 6.



NOTES:
1. New shrub beds to have a minimum of one foot planting soil.
2. Shrubs to be full and bushy.

3 TYPICAL SHRUB PLANTING

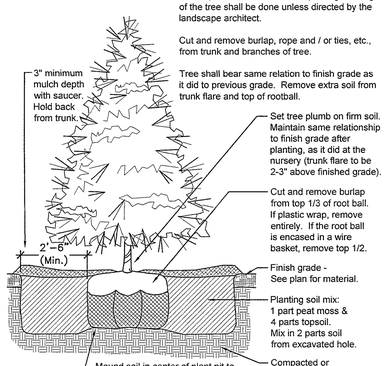
Scale: ¾" = 1' - 0"



NOTES:
1. Soak each tree twice weekly, for (3) weeks after fall planting
2. Soak each tree twice weekly, during spring and summer planting.
3. Contractor to provide a price for staking of each individual tree.

2 TYP. DECIDUOUS TREE PLANTING

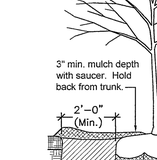
Scale: 1/2" = 1' - 0"



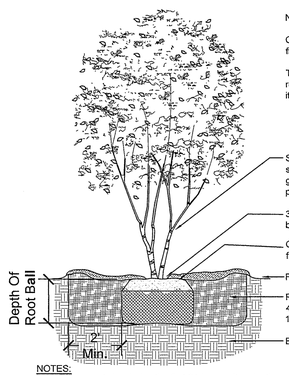
NOTES:
1. Flood saucer twice during the first 24-hours after planting.
2. Soak each tree twice weekly, for (3) weeks after fall planting.
3. Soak each tree twice weekly, during spring and summer planting.

1 TYP. EVERGREEN TREE PLANTING

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



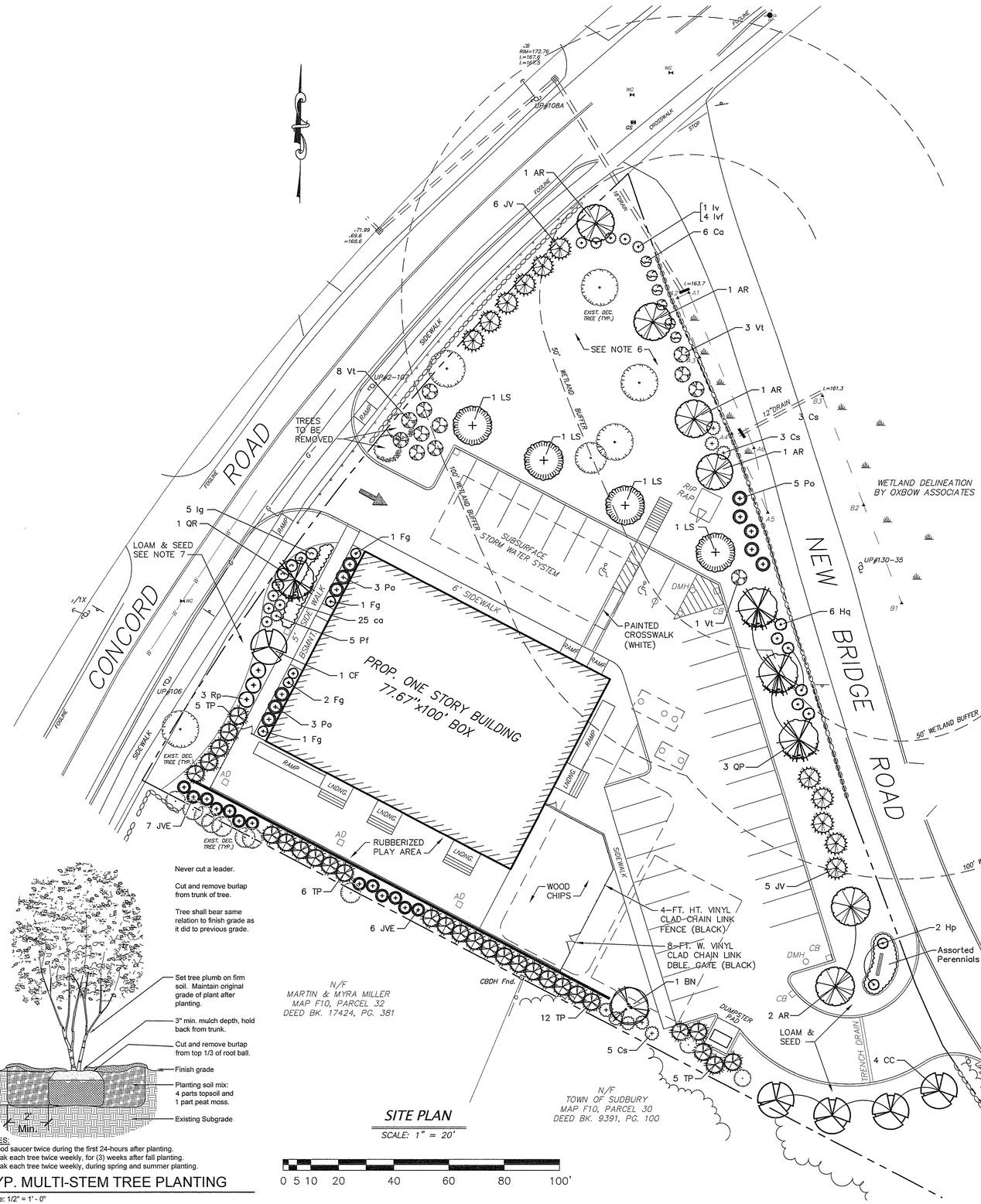
Call DIGSAFE, 1-888-344-7233, for location and marking of all utilities prior to any excavation. Private utilities may require additional marking and investigation.



NOTES:
1. Flood saucer twice during the first 24-hours after planting.
2. Soak each tree twice weekly, for (3) weeks after fall planting.
3. Soak each tree twice weekly, during spring and summer planting.

4 TYP. MULTI-STEM TREE PLANTING

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



PLANTING NOTES:

1. Trees and shrubs shall be uniform, full and bushy, and well branched specimen plants. All plants to be approved by the Landscape Architect.
2. Plants shall be balled and burlapped or container grown.
3. Plants to conform to the requirements established in 'American Standards For Nursery Stock', latest edition.
4. Plant beds to receive 3-inch minimum depth of shredded bark mulch.
5. Plant materials shall be guaranteed for 1-year after installation.
6. All disturbed areas located along the north and New Bridge Rd. edges, shall be seeded with New England Conservation / Wildlife Mix, with an application rate of 25 lbs. / acre (1750 s.f. / lb.). The seed mix shall be supplied by New England Wetland Plants, Inc., 14 Pearl Lane, South Hadley, MA 01075 (p. 413.548.8000).
7. All areas along Concord Road, labeled 'Loam & Seed' shall be covered with Jonathan Green, Black Beauty Ultra Supreme Grass Seed Blend.

PLANT LIST:

TREES - DECIDUOUS AND EVERGREEN:

Qty.	Sym.	Botanical Name	Common Name	Size
6	AR	Acer rubrum 'October Glory'	October Glory Red Maple	2.5 - 3" cal.
1	BN	Betula nigra 'Heritage	Heritage River Birch	10 - 12' clump
4	CC	Carpinus caroliniana	American Hornbeam	2 - 2 1/2" cal.
1	CF	Comus florida	Flowering Dogwood	2 - 2 1/2" cal.
4	LS	Liquidambar styraciflua 'Ward'	Cherekee American Sweetgum	2.5 - 3" cal.
11	JV	Juniperus virginiana	Eastern Redcedar	8 - 10' height
13	JVE	Juniperus virginiana 'Emerald Sentinel'	Emerald Sentinel Red Cedar	8 - 10' height
3	QP	Quercus palustris	Pin Oak	3 - 3.5" cal.
1	QR	Quercus rubra	Red Oak	3 - 3.5" cal.
28	TP	Thuja plicata 'Green Giant'	Green Giant Western Red Cedar	8 - 10' height

SHRUBS - DECIDUOUS AND EVERGREEN:

6	Ca	Clethra alnifolia	Summersweet	5 gallon pot
8	Cs	Comus sericea	Red-twig Dogwood	5 gallon pot
5	Fg	Fothergilla gardenii	Dwarf Fothergilla	7 gallon pot
2	Hp	Hydrangea paniculata 'Limelight'	Limelight Hydrangea	7 gallon pot
6	Hq	Hydrangea quercifolia	Oakleaf Hydrangea	7 gallon pot
6	Ig	Ilex glabra 'Shamrock'	Shamrock Inkberry	7 gallon pot
1	Iv	Ilex verticillata 'Jim Dandy' (male)	Jim Dandy Winterberry	5 gallon pot
4	Ivf	Ilex verticillata 'Red Sprite' (female)	Red Sprite Winterberry	5 gallon pot
5	Pf	Pieris floribunda	Mountain Andromeda	7 gallon pot
11	Po	Physocarpus opulifolius 'Diabolo'	Diabolo Purple Ninebark	7 gallon pot
3	Rp	Rhododendron 'PJM'	PJM Rhododendron	7 gallon pot
12	Vt	Viburnum trilobum	American Cranberrybush	5 gallon pot

PERENNIALS AND GRASSES:

25	ca	Calamagrostis 'Karl Foerster'	Karl Foerster Feather Rd. Grass	2 gallon pot
6	ep	Echinacea purpurea 'Kim's Knee High'	Kim's Knee High Coneflower	1 gallon pot
6	gs	Geranium sanguineum	Bloody Cranesbill	1 gallon pot
6	hp	Hosta 'Patriot'	Patriot Hosta	1 gallon pot
6	hh	Hemerocallis x 'Happy Returns'	Happy Returns Daylily	1 gallon pot
6	pa	Pennisetum alopecuroides 'Hameln'	Hameln Fountain Grass	1 gallon pot
6	rf	Rudbeckia fulgida 'Goldsturm'	Goldsturm Black-Eyed Susan	1 gallon pot
6	sa	Sedum x 'Autumn Joy'	Autumn Joy Sedum	1 gallon pot

REV	DATE	REVISION

SHEET	1 OF 1
DATE	5/23/2023
PLAN NO.	502 Concord-Landscp_5-2023.dwg
DRAWN BY	SGC / REC
CHECKED BY	SGC

LANDSCAPE PLAN
502 CONCORD ROAD
SUDBURY, MA

Cosmos Associates
Landscape Architects & Site Planners
5 Longview Street Natick, MA 01760
p: 508.654.6847 www.cosmosassociates.com

L-1

Stormwater Management Documentation

502 Concord Road
Sudbury, Massachusetts

May 18, 2023

Prepared by:
Connorstone Engineering, Inc.
121 Boston Post Road
Sudbury, MA

The purpose of this analysis is to summarize the design calculations, and design a stormwater management system in accordance with the Sudbury Stormwater Management Bylaw and Massachusetts DEP Stormwater Management Standards.

Site Description

Location: The site consists of a 1.2 acre lot located at 502 Concord Road, and is at the corner with New Bridge Road. Abutters to the south include a single family home on Concord Road and the Town of Sudbury (Nixon School).

Project Area: Approximately 1.2 acres (51,538 square feet)

Zoning District: Residence C-2

Assessors Map / Parcel: Map F10, Parcel 31

Site Conditions: The site is currently developed as a single family home, and contains a 1,250 sq. ft. building, driveway, shed, and lawn areas. The overall existing impervious surface area is 3,570 square feet. Areas along the rear perimeter are undeveloped and wooded.

Site Topography: The site slopes from the south property line to the northerly property line and a drainage swale (regulated as wetlands) and 12-inch culvert under New Bridge Road. Elevations range from 180 along the south property line to 166 - 164 along New Bridge Road.

Wetland Resource Areas: Wetland resource areas have been delineated to the northeast of site including a drainage swale (regulated as wetlands) along the project side of New Bridge Road, which flows through a 12-inch culvert under New Bridge Road to a larger wetland complex. The Natural Heritage and Endangered Species Program (NHESP) has not identified any areas on-site as lying within the reported Priority or Estimated Habitat Areas, and the site is not located within any flood hazard zones based upon the current Town of Sudbury Flood Insurance Rate Map. The delineation was provided by Oxbow Associates.

Proposed Project Summary

Proposed Use: The project consists of a proposed School Building. The work will include demolition of the existing building and construction of a new 7,767 sq. ft. building along with access driveways, 35 parking spaces, and required utilities and infrastructure. The site driveway layout includes an entrance off Concord Road, then routing past the building and exiting onto New Bridge Road. The building will be connected to the public water, gas, and electric from Concord Road and the existing septic system would be replaced and upgraded for the proposed use. The work will result in a total post development impervious area of 29,100 square feet, or an increase of 25,530 sq. ft.

Stormwater Management

Existing Conditions: Under the existing conditions, surface runoff from the site flows unmitigated overland to the north property line to the swale (wetland) and culvert leading under New Bridge Road.

Off-site Areas: An upgradient area of approximately 45,200 square feet flows onto the site, and was included within the drainage analysis. This area includes the rear half of the abutting residential lot and green space associated with Nixon School.

Proposed Conditions: A proposed drainage system has been provided in compliance with the MassDEP Stormwater Standards to mitigate potential stormwater impacts due to the proposed development. The proposed stormwater management system includes a large subsurface drywell under the parking areas to provide final treatment, detention, and groundwater recharge. Pretreatment of the paved parking areas prior to the drywell has been provided through a water quality structure (CDS structure). This structure would remove both sediment (TSS) and floatables (Hydrocarbons). The overall system would remove 96% of the annual total suspended solids and result in a net decrease in the rate of runoff leaving the site.

Additional information for each of the MassDEP Stormwater Standards has been provided in this report.

LOCUS MAP – USGS Mapping


SITE LOCATION
CONCORD ROAD
LINCOLN ROA
WHITETAI
MORSE ROAD
CONCORD ROAD
NEWBRIDGE ROAD
CODMAN DRIVE
CONCORD ROAD

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

5/18/23
Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

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

☒ An Illicit Discharge Compliance Statement is attached;

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

MA D.E.P. STORMWATER STANDARDS

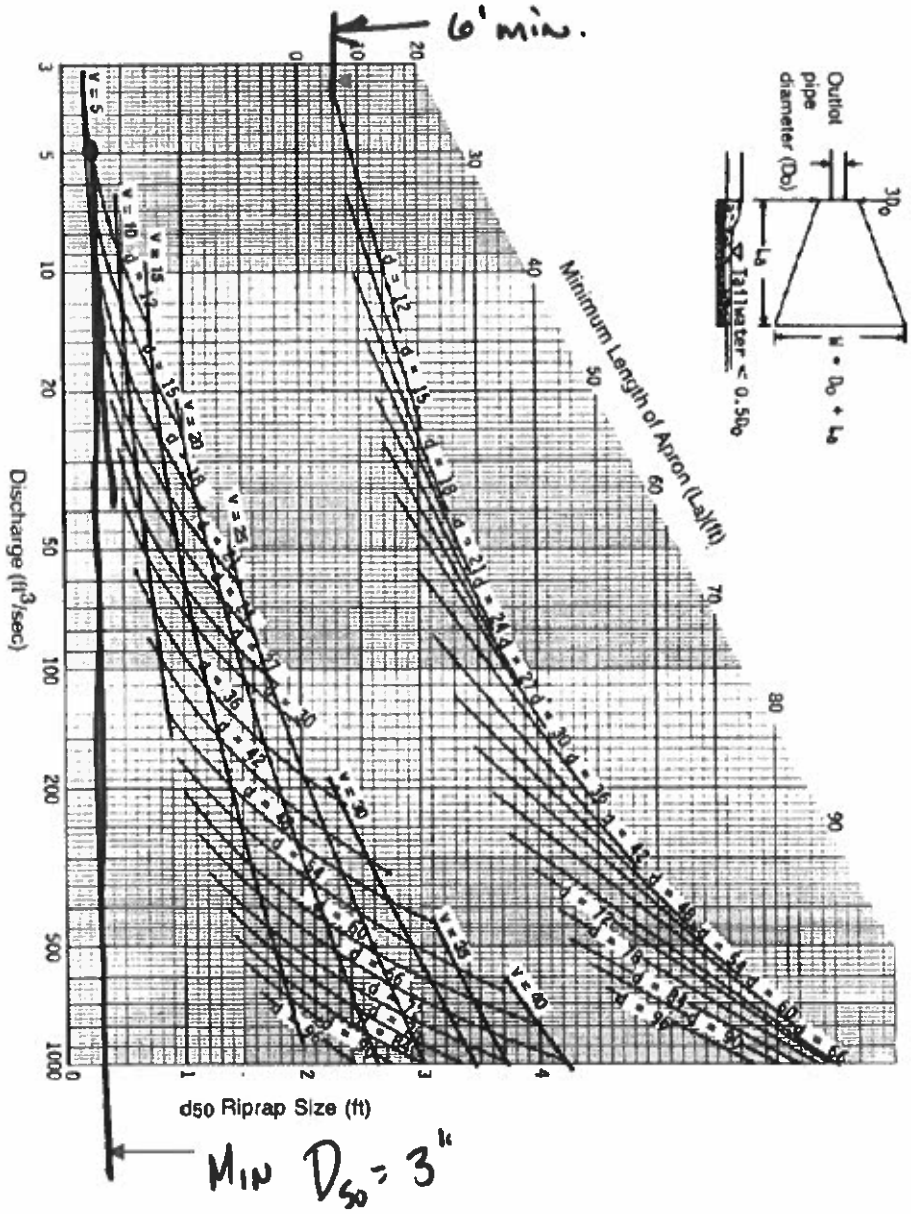
Standard 1: No New Untreated Discharges

There are two new treated discharges to the area subject to protection or the 100 foot buffer zone. An overflow for the subsurface drainage system is proposed and an outlet to direct upland flow away from the building.

Pipe Point Discharge Design:

1. Stormwater Discharge Velocity:
   12" FE-1: $Q_{100\ year}$= 3.8 cfs / $V_{100\ year}$ = 4.8 fps (100 year per HydroCAD analysis)
   8" FE-2: $Q_{Full\ Flow}$= 2.0 cfs / $V_{FULL\ FLOW}$ = 5.6 fps

2. Riprap sizing: Riprap Size = 3" D_{50} (6" minimum proposed at all outlets)
   Length= 6 feet



Standard 2: Peak Rate Attenuation

The project has been designed to decrease the rate and volume of runoff through the use of a drywell system.

The pre- and post-development stormwater runoff has been analyzed using HydroCAD 9.10, which is a stormwater modeling computer program utilizing a collection of techniques for the generation and routing of hydrographs, including Soil Conservation Service (SCS) Technical Release No. 20 (TR-20) and SCS Technical Release 55 (TR-55), *Urban Hydrology for Small Watersheds*..

Runoff from the development area flows toward a culvert under New Bridge Road. This culvert was used as the analysis point in the design. The results are as follows:

Analysis Point 1 – Culvert at New Bridge road

Storm Event	Peak Rate of Runoff Existing (Proposed)	Volume of Runoff Existing (Proposed)
1 inch	0.1 cfs (0.1 cfs)	0.01 ac-ft (0.01 ac-ft)
2-year (3.2 inches)	0.6 cfs (0.4 cfs)	0.08 ac-ft (0.04 ac-ft)
10-year (4.8 inches)	1.8 cfs (1.1 cfs)	0.19 ac-ft (0.10 ac-ft)
25-year (6.0 inches)	3.0 cfs (1.9 cfs)	0.31 ac-ft (0.18 ac-ft)
100-year (8.6 inches)	6.4 cfs (6.2 cfs)	0.61 ac-ft (0.42 ac-ft)

Standard 3: Stormwater Recharge

The proposed Stormwater management system has been designed to provide recharge of stormwater in excess of that required by Standard 3. Recharge has been provided through the proposed subsurface infiltration system.

Required Recharge Volume:

Post development Impervious Area = 29,100 S.F.
On-site Hydrologic Soil Group = "A" soils (0.6"/impervious area)
Recharge Volume = 29,100 S.F. x 0.6 / 12 = 1,455 cubic feet

Proposed Recharge Volume:

Drywell -1 = Volume up to outlet = 2,950 cubic feet

Draw Down Calculations

Proposed Drywell -1
= Volume / (Saturated Hydraulic Conductivity x Bottom Area)
= 2,950 cubic feet / (8.27 in/hr x 1,960 sq. ft. / 12 in/ft)
= 2 hours

Soil Conditions:

Soil testing performed for the septic system and stormwater has shown highly permeable sand with evidence of groundwater greater than 135 inches below grade within the septic area and 52" below existing grade in the drainage area. The bottom of the drywell has been set a minimum of two feet above groundwater elevation.

Mounding Analysis

Per the Massachusetts Stormwater Handbook a mounding analysis was performed utilizing the Hantush method. The application rate was based upon the treatment or recharge volume (whichever was greater), and the hydraulic conductivity was based upon the Rawles Rate associated with the soil texture as determined from on-site soil testing. The attached analysis verifies the resulting groundwater mound will not break out onto the ground surface and will drain within 72 hours.

Standard 4: Water Quality

The proposed project has been designed to provide treatment of site runoff prior to discharge through infiltration BMP's and a proprietary treatment structure. A recommended long-term pollution prevention plan has also been provided as part of the attached Operation and Maintenance Plan.

Runoff from the driveway and parking lot will be directed to a water quality structure (CDS) and then to a drywell for recharge and treatment. A water quality volume of 1-inch over the impervious area was used in the calculations.

Pretreatment:

Pretreatment prior to infiltration has been provided through a proprietary separator (CDS). The manufacturer and model was selected to match the existing treatment BMP's on-site. This structure has been sized to remove greater than 80% TSS. See the attached sizing sheet and manufacture's information.

Drywell Sizing:

Proposed TSS Removal Rate = 80%
Tributary Impervious Area = 25,810 s.f.
Water Quality Volume = 25,810 s.f. x 1-inch / 12 = 2,150 C.F.
Proposed Volume = Volume up to outlet = 2,950 cubic feet

1 **BMP**	2 **TSS removal**	3 **Starting TSS** (5 from previous BMP)	4 **TSS Removal** **(2 * 3)**	5 **Remaining TSS** **(3 - 4)**
CDS	>80%	100%	80%	20%
Drywell	80%	20%	16%	4%
		Total TSS Removal =	**96%**	

Standard 5: Land uses with higher pollutant Loads

Not applicable - The proposed use is not classified as a land use with higher pollutant loads.

Standard 6: Critical Areas

Not applicable – the site does not contain and critical areas.

Standard 7: Redevelopment

The site does not qualify as a redevelopment project.

Standard 8: Construction Period Controls

Erosion controls have been provided on the plans including perimeter erosion barriers down-gradient of all proposed work, and sedimentation and erosion control notes are provided on the plans. The project is less than 1 acre of disturbance, and would not fall under the NPDES General Construction Permit. A copy of the SWPPP has been attached with this report.

Standard 9: Operation and Maintenance Plan

The owner will be responsible for all future operation and maintenance of the proposed stormwater management system. A recommended Operation and Maintenance Plan has been provided with this report.

Standard 10: Illicit Discharges

Based upon site observations, no illicit discharges have been observed on the site. Illicit discharges are prohibited. The proposed building will be connected to the proposed on-site septic system. A signed illicit discharge statement is attached.

Illicit Discharge Compliance Statement

Project: 502 Concord Road Road
Sudbury, MA

Date: June, 2023

Engineer's Certification:

To the best of my knowledge, the attached plans, computations and specifications meet the requirements of Standard 10 of the Massachusetts Stormwater Handbook regarding illicit discharges to the stormwater management system. Based upon site observations no detectable illicit discharges exist on the site, and future illicit discharges are prohibited. The proposed and existing facility will be serviced by an on-site subsurface sewerage disposal system per Board of Health requirements. All current documents and attachments were prepared under my direction and qualified personnel properly gathered and evaluated the information submitted.

Name: Vito Colonna

Organization: Cornerstone Engineering

Signature: [signature]

Date: 6/4/2023

Owner Certification:

The Owner is responsible for future compliance with provisions of the Massachusetts Stormwater Management Policy, Sudbury Stormwater Management Bylaw, and responsible for identifying, eliminating, and preventing future illicit discharges

Name: Joel Gordon

Organization: Waverley Square Day Care LLC DBA Sudbury Montessori

Signature: [signature]

Date: 6/5/2023

STORMWATER DRAINAGE SYSTEM DESIGN

The parking lot drainage system has been designed from calculations based upon the 25-year design storm.

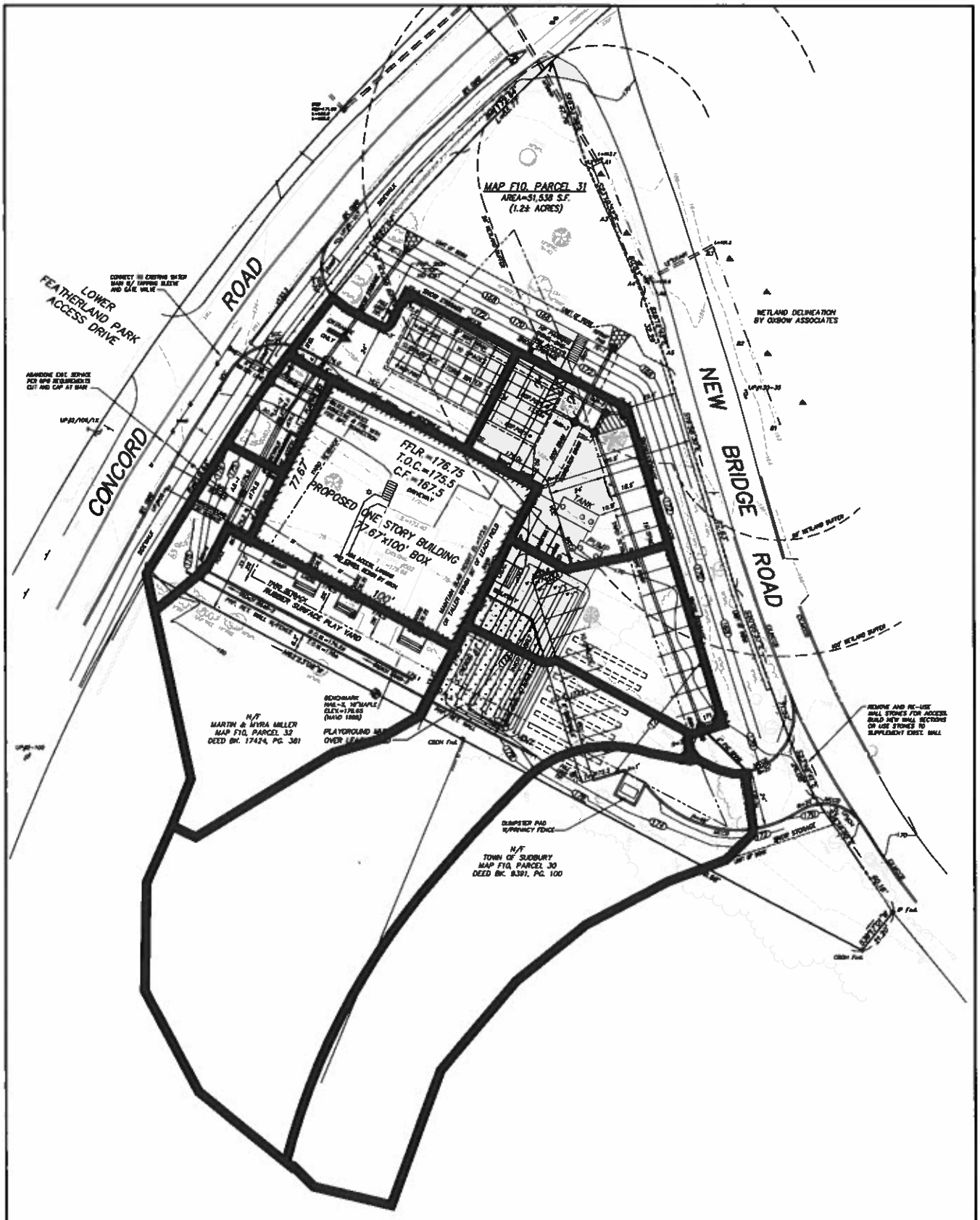
Storm intensities were determined from exhibit 8-14 *"Intensity – Duration – Frequency Curve for Worcester, Ma"* from the MassHighway Design Manual. The resulting analysis was performed using the rational method of determining peak storm flows. All storm sewer pipe sizes were determined using Manning's Equation for pipes flowing full.

The following table presents the hydraulic calculations performed for sizing the site drainage system. The structure references refer to those as shown on the site plan submitted with this report.

DRAIN PIPE SIZING CALCULATIONS

PROJECT 502 Concord Road LOCATION 502 Concord Road BY: VC n= 0.012
CLIENT Joel & Monoshini Gordon Sudbury, MA DATE: **5/31/2023** RETURN PERIOD **25 YEAR**

Line		Area	C	CA	Tc	rain	Inlet flow Q	Pipe flow Qd	Pipe Size	Pipe Length	Slope	flowing full		Rim (feet)		Inv. El.	
FROM	TO	ac			min.	in/hr	cfs	cfs	in	ft	ft/ft	Qf	Vf	Upper	Lower	Upper	Lower
TRENCH-1	DMH-1	0.30	0.25	0.08	12	5.0	0.38	**0.38**	6	25	0.024	**0.94**	4.80	170.00	171.35	168.70	168.10
CB-1	DMH-1	0.40	0.25	0.10	12	5.0	0.50	**0.50**	12	10	0.040	**7.72**	9.83	171.40	171.35	168.40	168.00
CB-2	DMH-1	0.12	0.95	0.11	5	6.5	0.74	**0.74**	12	5	0.030	**6.69**	8.52	171.15	171.35	168.15	168.00
DMH-1	CDS-1							**1.62**	12	130	0.012	**4.15**	5.28	171.35	173.25	167.80	166.30
CB-3	DMH-2	0.11	0.95	0.10	5	6.5	0.68	**0.68**	12	5	0.040	**7.72**	9.83	172.80	173.00	169.30	169.10
CB-4	DMH-2	0.08	0.95	0.08	5	6.5	0.49	**0.49**	12	95	0.020	**5.46**	6.95	172.80	173.00	169.30	167.40
DMH-2	CDS-1							**1.17**	12	10	0.030	**6.69**	8.52	173.00	173.25	166.60	166.30
CDS-1	DMH-3							**2.79**	12	10	0.020	**5.46**	6.95	173.25	173.35	166.20	166.00
Roof	DMH-3	0.18	0.95	0.17	5	6.5	1.11	**1.11**	8	210	0.024	**2.02**	5.79	---	173.35	172.00	167.00
DMH-3	Drywell							**3.90**	15	12	0.017	**9.04**	7.37	173.35	---	164.40	164.20
DMH-3	FE-1							**3.90**	12	35	0.021	**5.65**	7.20	173.30		165.75	165.00
TRENCH -2	DMH-4	0.21	0.50	0.11	5	6.5	0.68	**0.68**	6	12	0.050	**1.36**	6.92	174.10	174.50	172.10	171.50
DMH-4	AD-1							**0.68**	6	35	0.030	**1.05**	5.36	174.50	174.00	171.40	170.35
AD-1	AD-2	0.04	0.50	0.02	5	6.5	0.13	**0.81**	8	35	0.030	**2.27**	6.50	174.00	174.00	170.25	169.20
AD-2	FE-2	0.03	0.50	0.02	5	6.5	0.10	**0.91**	8	90	0.034	**2.43**	6.96	174.00	174.00	169.10	166.00



CATCH BASIN DRAINAGE AREAS
502 CONCORD ROAD
SUDBURY, MA
SCALE 1"=60'

CDS SIZING CALCULATIONS

Project:	**502 Concord Road**
Location:	**Sudbury, MA**
Prepared For:	**Connorstone Engineering**

CONTECH ENGINEERED SOLUTIONS

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$Q = (qu)\ (A)\ (WQV)$$

where:

Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
WQS	0.41	0.0006457	12.0	0.200	1.00	669.00	0.43

The WQf sizing calculation selects the minimum size CDS/Cascade/StormCeptor model capable of operating at the computed WQf peak flowrate prior to bypassing. It assumes free discharge of the WQf through the unit and ignores the routing effect of any upstream storm drain piping. As with all hydrodynamic separators, there will be some impact to the Hydraulic Gradient of the corresponding drainage system, and evaluation of this impact should be considered in the design.

CONTECH® ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

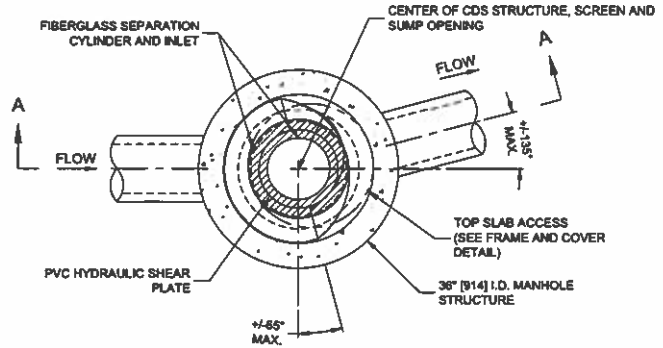
502 CONCORD ROAD SUDBURY, MA

Area	0.41 ac	Unit Site Designation	WQS
Weighted C	0.9	Rainfall Station #	68
t_c	12 min		
CDS Model	1515-3	CDS Treatment Capacity	**1.0 cfs**

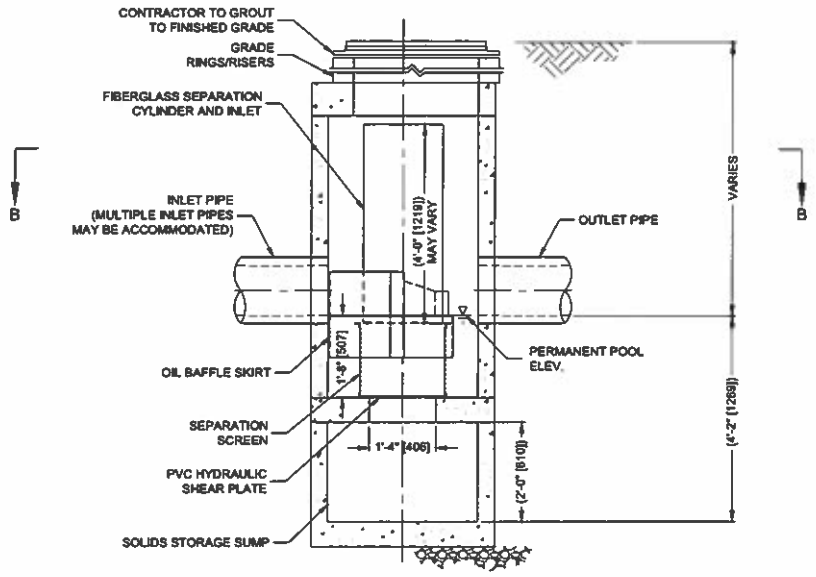
Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.01	0.01	9.3
0.04	9.5%	18.8%	0.01	0.01	9.5
0.06	8.7%	27.5%	0.02	0.02	8.7
0.08	10.1%	37.6%	0.03	0.03	10.1
0.10	7.2%	44.8%	0.04	0.04	7.1
0.12	6.0%	50.8%	0.04	0.04	6.0
0.14	6.3%	57.1%	0.05	0.05	6.2
0.16	5.6%	62.7%	0.06	0.06	5.5
0.18	4.7%	67.4%	0.07	0.07	4.6
0.20	3.6%	71.0%	0.07	0.07	3.5
0.25	8.2%	79.1%	0.09	0.09	7.9
0.50	14.9%	94.0%	0.19	0.19	13.8
0.75	3.2%	97.3%	0.28	0.28	2.8
1.00	1.2%	98.5%	0.37	0.37	1.0
1.50	0.7%	99.2%	0.56	0.56	0.5
2.00	0.8%	100.0%	0.74	0.74	0.5
					97.2
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**90.8%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.



PLAN VIEW B-B
N.T.S.

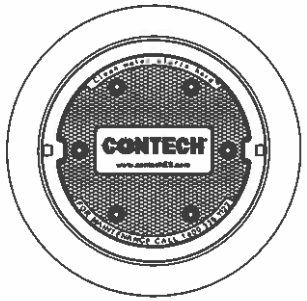


ELEVATION A-A
N.T.S.

CDS1515-3-C DESIGN NOTES

CDS1515-3-C RATED TREATMENT CAPACITY IS 1.0 CFS, OR PER LOCAL REGULATIONS.

THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

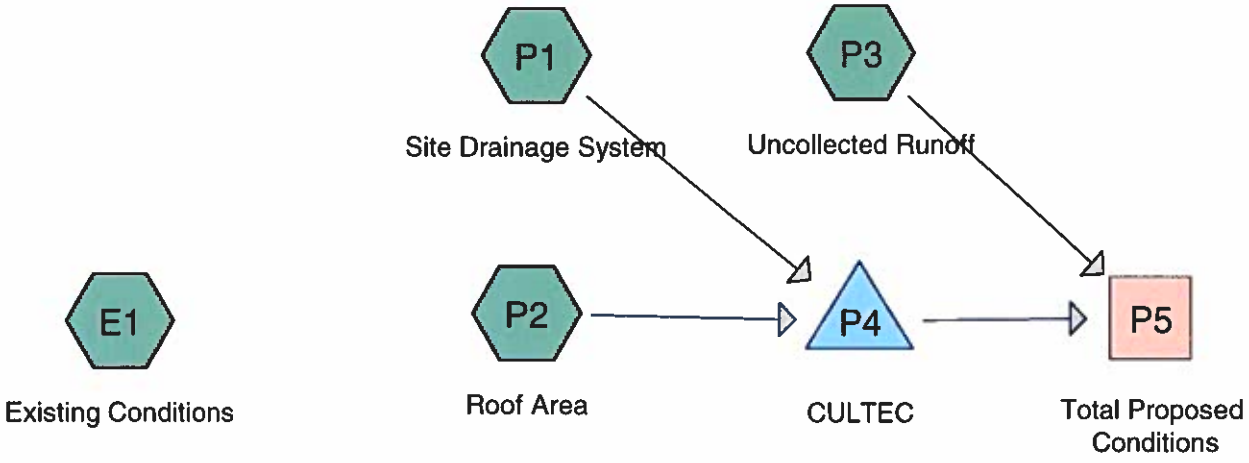
INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS1515-3-C
ONLINE CDS
STANDARD DETAIL

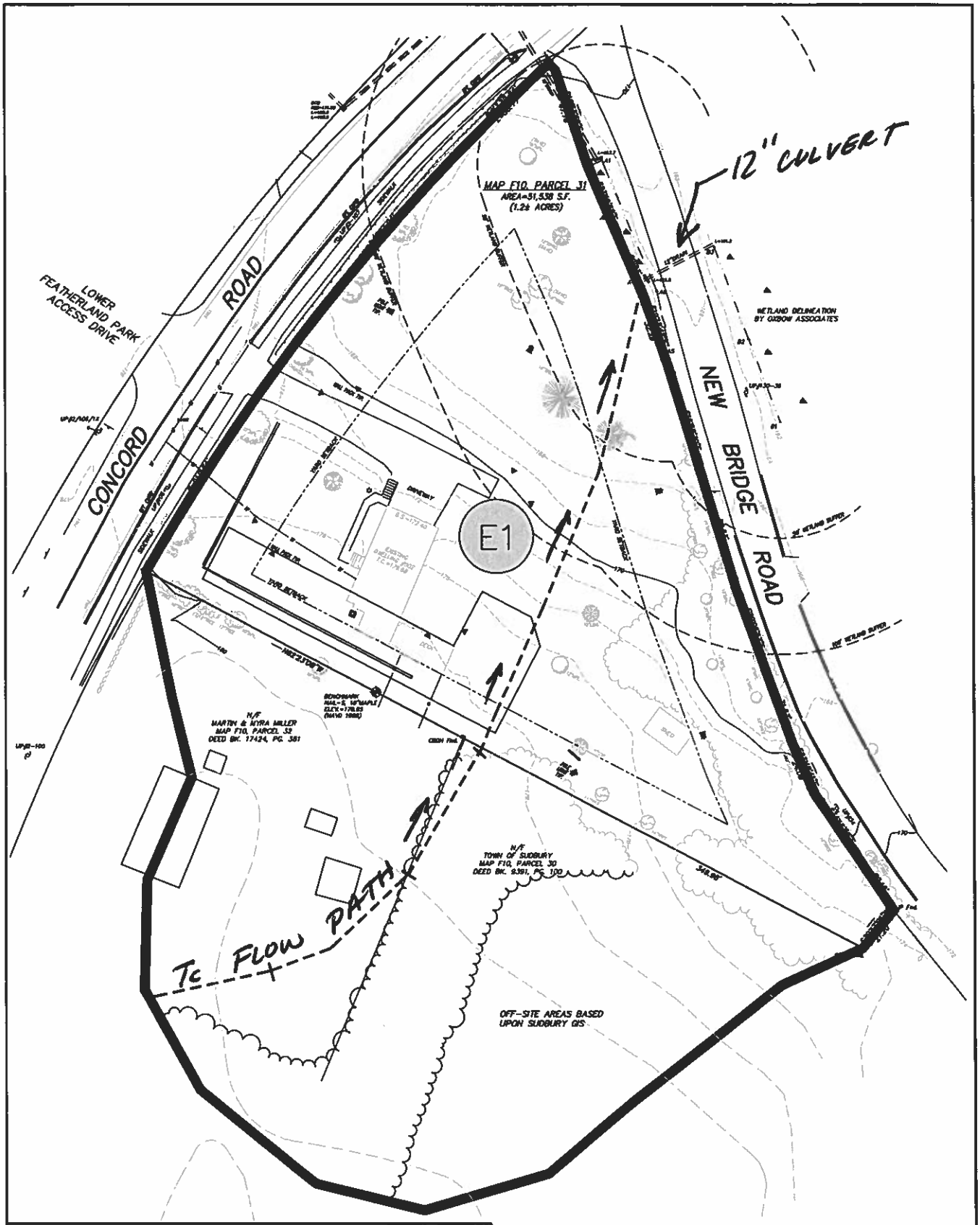
HYDROCAD CALCULATIONS

2-, 10-, 25-, and 100-Year Storm

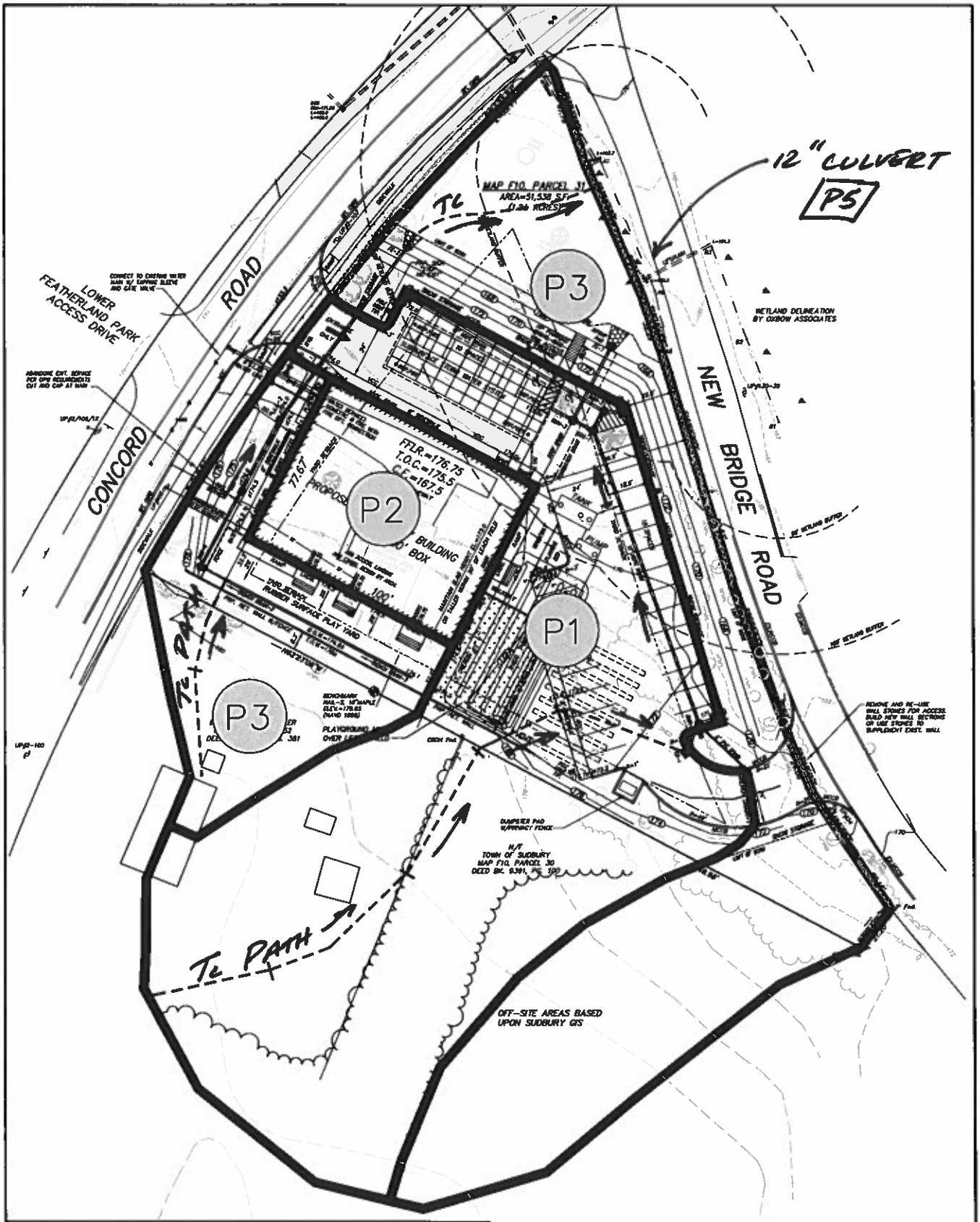


Subcat Reach Pond Link

Routing Diagram for Stormwater 2023
Prepared by Microsoft, Printed 6/2/2023



EXISTING DRAINAGE AREAS
502 CONCORD ROAD
SUDBURY, MA
SCALE 1"=60'



PROPOSED DRAINAGE AREAS
502 CONCORD ROAD
SUDBURY, MA
SCALE 1"=60'

Summary for Subcatchment E1: Existing Conditions

Runoff = 0.1 cfs @ 12.17 hrs, Volume= 0.01 af, Depth= 0.04"
Routed to nonexistent node ER

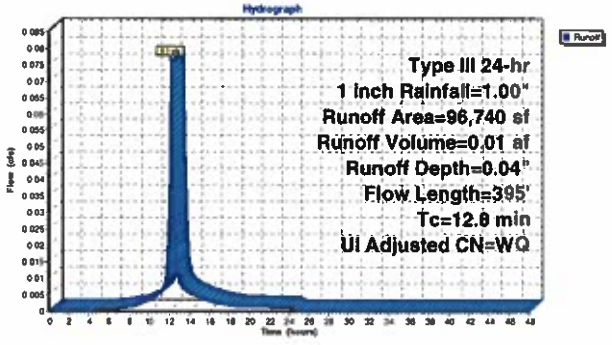
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Adj	Description
5,580	30	30	Woods, Good, HSG A
20,810	39	39	>75% Grass cover, Good, HSG A
760	98	98	Unconnected pavement, HSG A
2,510	55	55	Woods, Good, HSG B
19,070	61	61	>75% Grass cover, Good, HSG B
1,330	98	98	Unconnected pavement, HSG B
1,480	98	98	Unconnected roofs, HSG B
32,640	61	61	>75% Grass cover, Good, HSG B
11,500	55	55	Woods, Good, HSG B
1,060	98	98	Unconnected roofs, HSG B
96,740			Weighted Average
92,110			95.21% Pervious Area
4,630			4.79% Impervious Area
4,630			100.00% Unconnected

ON-SITE
OFF-SITE

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	210	0.0700	1.85		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
12.8	395	Total			

Subcatchment E1: Existing Conditions



Summary for Subcatchment P1: Site Drainage System

Runoff = 0.3 cfs @ 12.16 hrs, Volume= 0.03 af, Depth= 0.30"
Routed to Pond P4 : CULTEC

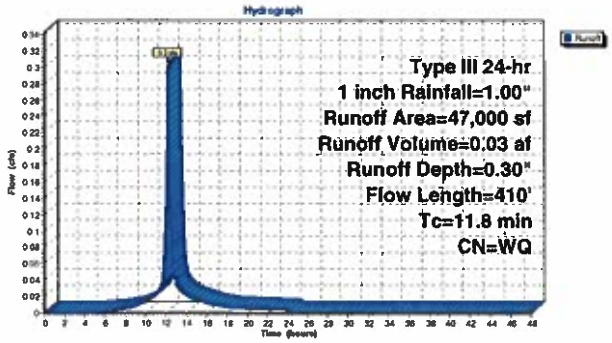
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description
6,460	98	Paved parking, HSG B
10,940	98	Paved parking, HSG A
2,800	61	>75% Grass cover, Good, HSG B
10,500	55	Woods, Good, HSG B
660	98	Unconnected roofs, HSG B
15,640	61	>75% Grass cover, Good, HSG B
47,000		Weighted Average
28,940		61.57% Pervious Area
18,060		38.43% Impervious Area
660		3.65% Unconnected

ON-SITE
OFF-SITE

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	40	0.1500	2.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	55	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	130	0.0120	5.38	4.23	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
11.8	410	Total			

Subcatchment P1: Site Drainage System



Summary for Subcatchment P2: Roof Area

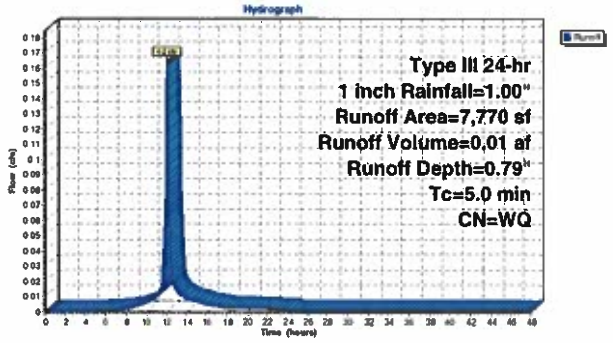
Runoff = 0.2 cfs @ 12.07 hrs, Volume= 0.01 af, Depth= 0.79"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description
5,880	98	Roofs, HSG B
1,890	98	Roofs, HSG A
7,770		Weighted Average
7,770		100.00% Impervious Area

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

Subcatchment P2: Roof Area



Summary for Subcatchment P3: Uncollected Runoff

Runoff = 0.1 cfs @ 12.11 hrs, Volume= 0.01 af, Depth= 0.08"
Routed to Reach P5 : Total Proposed Conditions

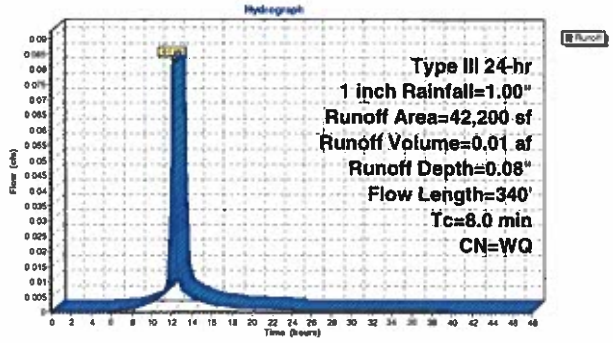
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description
2,825	61	>75% Grass cover, Good, HSG B
13,785	39	>75% Grass cover, Good, HSG A
535	98	Paved parking, HSG A
105	98	Paved parking, HSG B
3,260	61	>75% Grass cover, Good, HSG B
3,290	98	Paved parking, HSG B
1,000	55	Woods, Good, HSG B
17,000	61	>75% Grass cover, Good, HSG B
400	98	Unconnected roofs, HSG B
42,200		Weighted Average
37,870		89.74% Pervious Area
4,330		10.26% Impervious Area
400		9.24% Unconnected

ON-SITE
OFF-SITE

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0500	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	40	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	160	0.0300	6.50	2.27	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
1.5	90	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.0	340	Total			

Subcatchment P3: Uncollected Runoff

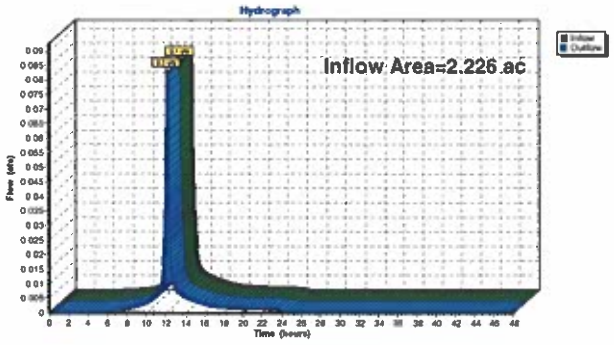


Summary for Reach P5: Total Proposed Conditions

Inflow Area = 2.226 ac, 31.10% Impervious, Inflow Depth = 0.04" for 1 inch event
Inflow = 0.1 cfs @ 12.11 hrs, Volume= 0.01 af
Outflow = 0.1 cfs @ 12.11 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach P5: Total Proposed Conditions



Summary for Pond P4: CULTEC

Inflow Area = 1.257 ac, 47.16% Impervious, Inflow Depth = 0.37" for 1 inch event
Inflow = 0.4 cfs @ 12.12 hrs, Volume= 0.04 af
Outflow = 0.4 cfs @ 12.18 hrs, Volume= 0.04 af, Atten= 8%, Lag= 3.4 min
Discarded = 0.4 cfs @ 12.18 hrs, Volume= 0.04 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Reach P5 : Total Proposed Conditions

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 163.60' @ 12.18 hrs Surf.Area= 1,961 sf Storage= 79 cf

Plug-Flow detention time= 3.3 min calculated for 0.04 af (100% of inflow)
Center-of-Mass det. time= 3.3 min (794.6 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	1,909 cf	**26.50'W x 74.00'L x 3.79'H Field A** 7,435 cf Overall - 2,664 cf Embedded = 4,772 cf x 40.0% Voids
#2A	164.25'	2,664 cf	**Cultec R-330XLHD x 50 Inside #1** Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
#3	164.40'	113 cf	**4.00'D x 9.00'H Manhole / DMH-3 -Impervious**
		4,686 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 161.00'
#2	Primary	165.75'	**12.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 165.75' / 165.00' S= 0.0214 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.4 cfs @ 12.18 hrs HW=163.60' (Free Discharge)
└**1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=163.50' (Free Discharge)
└**2=Culvert** (Controls 0.0 cfs)

Pond P4: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

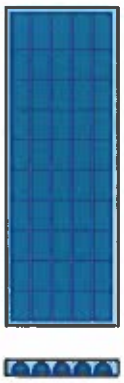
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +15.0" End Stone x 2 = 74.00' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 17.0" Side Stone x 2 = 26.50' Base Width
9.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.79' Field Height

50 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 2,663.7 cf Chamber Storage

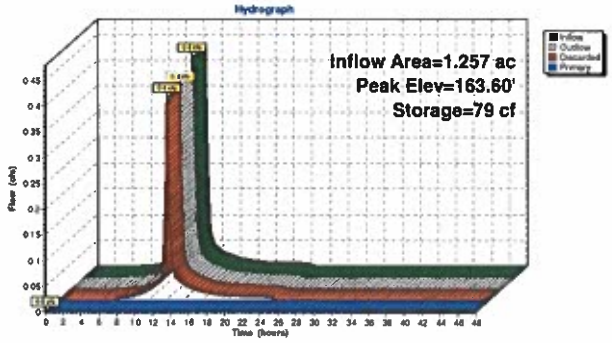
7,435.5 cf Field - 2,663.7 cf Chambers = 4,771.7 cf Stone x 40.0% Voids = 1,908.7 cf Stone Storage

Chamber Storage + Stone Storage = 4,572.4 cf = 0.10 af
Overall Storage Efficiency = 61.5%
Overall System Size = 74.00' x 26.50' x 3.79'

50 Chambers
275.4 cy Field
176.7 cy Stone



Pond P4: CULTEC



Summary for Subcatchment E1: Existing Conditions

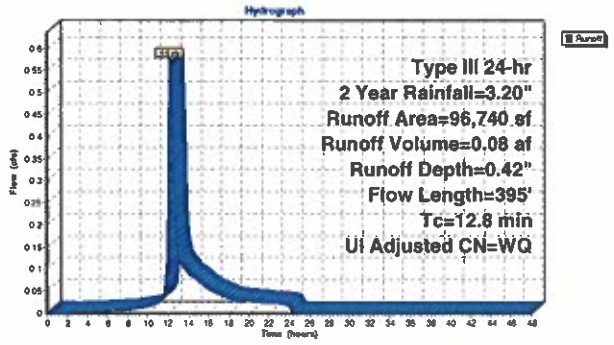
Runoff = 0.6 cfs @ 12.21 hrs, Volume= 0.08 af, Depth= 0.42"
Routed to nonexistent node ER

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Adj	Description
5,580	30	30	Woods, Good, HSG A
20,810	39	39	>75% Grass cover, Good, HSG A
760	98	98	Unconnected pavement, HSG A
2,510	55	55	Woods, Good, HSG B
19,070	61	61	>75% Grass cover, Good, HSG B
1,330	98	98	Unconnected pavement, HSG B
1,480	98	98	Unconnected roofs, HSG B
32,640	61	61	>75% Grass cover, Good, HSG B
11,500	55	55	Woods, Good, HSG B
1,060	98	98	Unconnected roofs, HSG B
96,740			Weighted Average
92,110			95.21% Pervious Area
4,630			4.79% Impervious Area
4,630			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	210	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	395	Total			

Subcatchment E1: Existing Conditions



Summary for Subcatchment P1: Site Drainage System

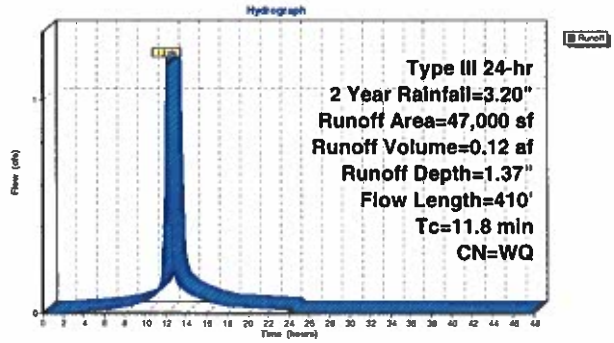
Runoff = 1.2 cfs @ 12.16 hrs, Volume= 0.12 af, Depth= 1.37"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
6,460	98	Paved parking, HSG B
10,940	98	Paved parking, HSG A
2,800	61	>75% Grass cover, Good, HSG B
10,500	55	Woods, Good, HSG B
660	98	Unconnected roofs, HSG B
15,640	61	>75% Grass cover, Good, HSG B
47,000		Weighted Average
28,940		61.57% Pervious Area
18,060		38.43% Impervious Area
660		3.65% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	40	0.1500	2.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	55	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	130	0.0120	5.38	4.23	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
11.8	410	Total			

Subcatchment P1: Site Drainage System



Summary for Subcatchment P2: Roof Area

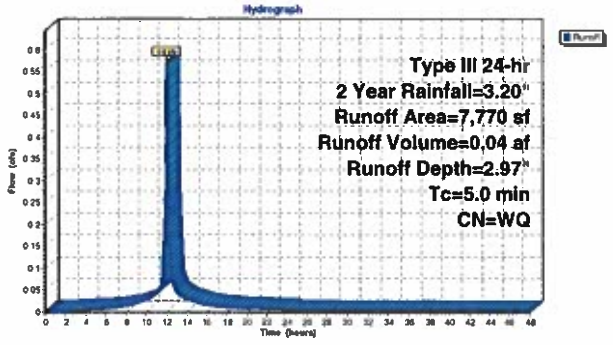
Runoff = 0.6 cfs @ 12.07 hrs, Volume= 0.04 af, Depth= 2.97"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
5,880	98	Roofs, HSG B
1,890	98	Roofs, HSG A
7,770		Weighted Average
7,770		100.00% Impervious Area

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

Subcatchment P2: Roof Area



Summary for Subcatchment P3: Uncollected Runoff

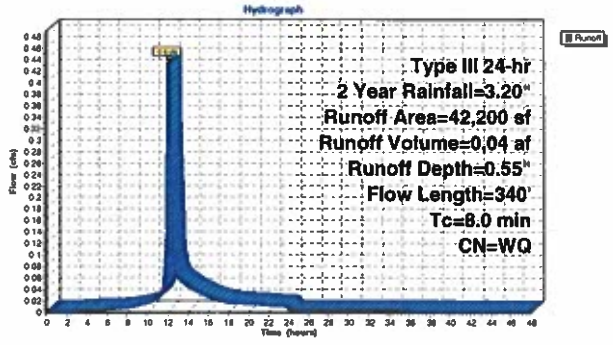
Runoff = 0.4 cfs @ 12.13 hrs, Volume= 0.04 af, Depth= 0.55"
Routed to Reach P5 : Total Proposed Conditions

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.20"

Area (sf)	CN	Description
2,825	61	>75% Grass cover, Good, HSG B
13,785	39	>75% Grass cover, Good, HSG A
535	98	Paved parking, HSG A
105	98	Paved parking, HSG B
3,260	61	>75% Grass cover, Good, HSG B
3,290	98	Paved parking, HSG B
1,000	55	Woods, Good, HSG B
17,000	61	>75% Grass cover, Good, HSG B
400	98	Unconnected roofs, HSG B
42,200		Weighted Average
37,870		89.74% Pervious Area
4,330		10.26% Impervious Area
400		9.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0500	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	40	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	160	0.0300	6.50	2.27	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
1.5	90	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.0	340	Total			

Subcatchment P3: Uncollected Runoff

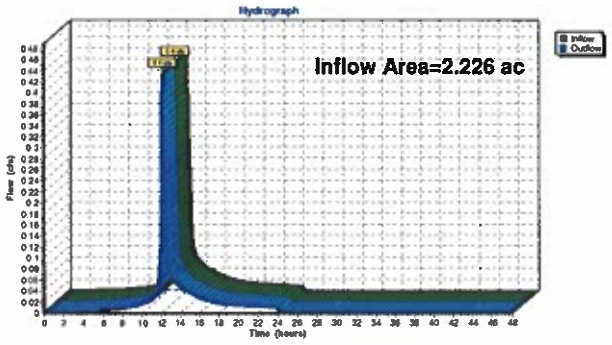


Summary for Reach P5: Total Proposed Conditions

Inflow Area = 2.226 ac, 31.10% Impervious, Inflow Depth = 0.24" for 2 Year event
Inflow = 0.4 cfs @ 12.13 hrs, Volume= 0.04 af
Outflow = 0.4 cfs @ 12.13 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach P5: Total Proposed Conditions



Summary for Pond P4: CULTEC

Inflow Area = 1.257 ac, 47.16% Impervious, Inflow Depth = 1.60" for 2 Year event
Inflow = 1.6 cfs @ 12.13 hrs, Volume= 0.17 af
Outflow = 0.6 cfs @ 12.49 hrs, Volume= 0.17 af, Atten= 62%, Lag= 22.0 min
Discarded = 0.6 cfs @ 12.49 hrs, Volume= 0.17 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Reach P5 : Total Proposed Conditions

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 164.67' @ 12.49 hrs Surf.Area= 1,961 sf Storage= 1,274 cf

Plug-Flow detention time= 12.4 min calculated for 0.17 af (100% of inflow)
Center-of-Mass det. time= 12.4 min (793.4 - 780.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	1,909 cf	**26.50'W x 74.00'L x 3.79'H Field A** 7,435 cf Overall - 2,664 cf Embedded = 4,772 cf x 40.0% Voids
#2A	164.25'	2,664 cf	**Cultec R-330XLHD** x 50 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
#3	164.40'	113 cf	4.00'D x 9.00'H Manhole / DMH-3 -Impervious
		4,686 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 161.00'
#2	Primary	165.75'	**12.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 165.75' / 165.00' S= 0.0214 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.6 cfs @ 12.49 hrs HW=164.67' (Free Discharge)
↳**1=Exfiltration** (Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=163.50' (Free Discharge)
↳**2=Culvert** (Controls 0.0 cfs)

Pond P4: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +15.0" End Stone x 2 = 74.00' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 17.0" Side Stone x 2 = 26.50' Base Width
9.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.79' Field Height

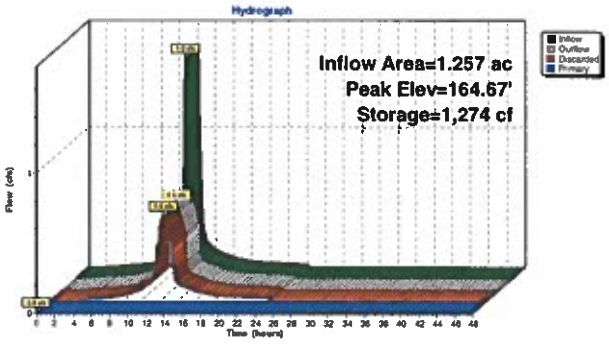
50 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 2,663.7 cf Chamber Storage

7,435.5 cf Field - 2,663.7 cf Chambers = 4,771.7 cf Stone x 40.0% Voids = 1,908.7 cf Stone Storage

Chamber Storage + Stone Storage = 4,572.4 cf = 0.10 af
Overall Storage Efficiency = 61.5%
Overall System Size = 74.00' x 26.50' x 3.79'

50 Chambers
275.4 cy Field
176.7 cy Stone

Pond P4: CULTEC



Summary for Subcatchment E1: Existing Conditions

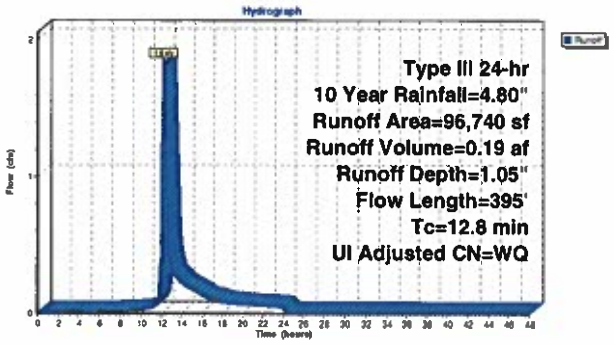
Runoff = 1.8 cfs @ 12.19 hrs, Volume= 0.19 af, Depth= 1.05"
Routed to nonexistent node ER

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Adj	Description
5,580	30	30	Woods, Good, HSG A
20,810	39	39	>75% Grass cover, Good, HSG A
760	98	98	Unconnected pavement, HSG A
2,510	55	55	Woods, Good, HSG B
19,070	61	61	>75% Grass cover, Good, HSG B
1,330	98	98	Unconnected pavement, HSG B
1,480	98	98	Unconnected roofs, HSG B
32,640	61	61	>75% Grass cover, Good, HSG B
11,500	55	55	Woods, Good, HSG B
1,060	98	98	Unconnected roofs, HSG B
96,740			Weighted Average
92,110			95.21% Pervious Area
4,630			4.79% Impervious Area
4,630			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	210	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	395	Total			

Subcatchment E1: Existing Conditions



Summary for Subcatchment P1: Site Drainage System

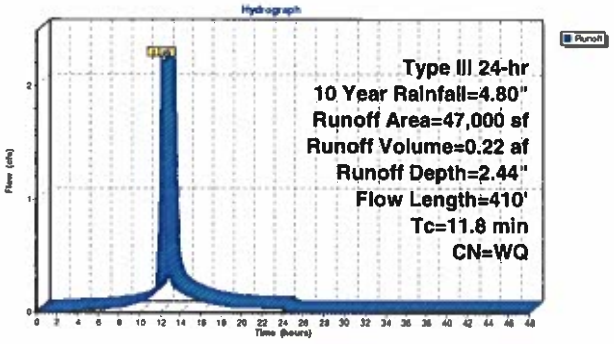
Runoff = 2.2 cfs @ 12.16 hrs, Volume= 0.22 af, Depth= 2.44"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
6,460	98	Paved parking, HSG B
10,940	98	Paved parking, HSG A
2,800	61	>75% Grass cover, Good, HSG B
10,500	55	Woods, Good, HSG B
660	98	Unconnected roofs, HSG B
15,640	61	>75% Grass cover, Good, HSG B
47,000		Weighted Average
28,940		61.57% Pervious Area
18,060		38.43% Impervious Area
660		3.65% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	40	0.1500	2.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	55	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	130	0.0120	5.38	4.23	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
11.8	410	Total			

Subcatchment P1: Site Drainage System



Summary for Subcatchment P2: Roof Area

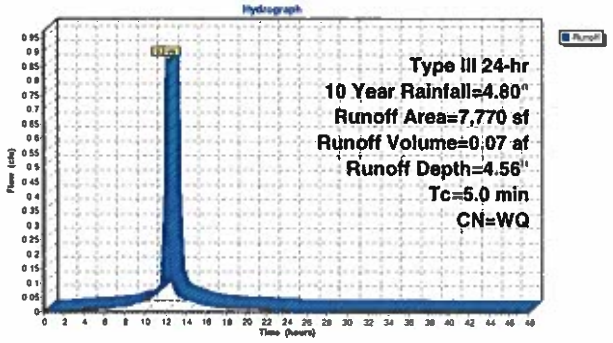
Runoff = 0.9 cfs @ 12.07 hrs, Volume= 0.07 af, Depth= 4.56"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
5,880	98	Roofs, HSG B
1,890	98	Roofs, HSG A
7,770		Weighted Average
7,770		100.00% Impervious Area

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

Subcatchment P2: Roof Area



Summary for Subcatchment P3: Uncollected Runoff

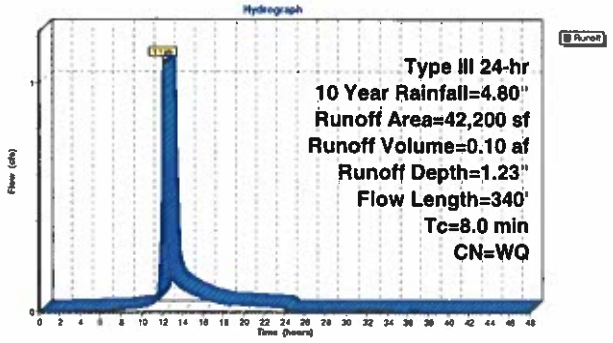
Runoff = 1.1 cfs @ 12.12 hrs, Volume= 0.10 af, Depth= 1.23"
Routed to Reach P5 : Total Proposed Conditions

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.80"

Area (sf)	CN	Description
2,825	61	>75% Grass cover, Good, HSG B
13,785	39	>75% Grass cover, Good, HSG A
535	98	Paved parking, HSG A
105	98	Paved parking, HSG B
3,260	61	>75% Grass cover, Good, HSG B
3,290	98	Paved parking, HSG B
1,000	55	Woods, Good, HSG B
17,000	61	>75% Grass cover, Good, HSG B
400	98	Unconnected roofs, HSG B
42,200		Weighted Average
37,870		89.74% Pervious Area
4,330		10.26% Impervious Area
400		9.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0500	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	40	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	160	0.0300	6.50	2.27	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
1.5	90	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.0	340	Total			

Subcatchment P3: Uncollected Runoff

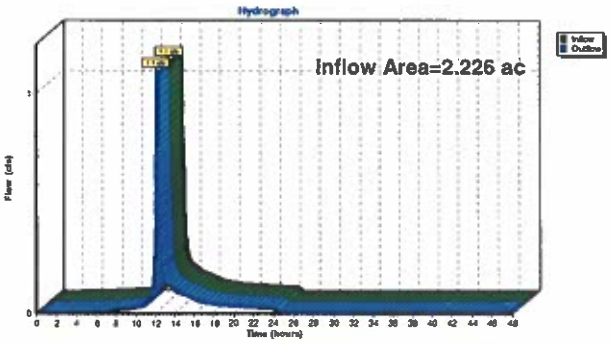


Summary for Reach P5: Total Proposed Conditions

Inflow Area = 2.226 ac, 31.10% Impervious, Inflow Depth = 0.53" for 10 Year event
Inflow = 1.1 cfs @ 12.12 hrs, Volume= 0.10 af
Outflow = 1.1 cfs @ 12.12 hrs, Volume= 0.10 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach P5: Total Proposed Conditions



Summary for Pond P4: CULTEC

Inflow Area = 1.257 ac, 47.16% Impervious, Inflow Depth = 2.74" for 10 Year event
Inflow = 2.8 cfs @ 12.13 hrs, Volume= 0.29 af
Outflow = 0.8 cfs @ 12.57 hrs, Volume= 0.29 af, Atten= 70%, Lag= 26.0 min
Discarded = 0.8 cfs @ 12.57 hrs, Volume= 0.29 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Reach P5 : Total Proposed Conditions

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 165.75' @ 12.57 hrs Surf.Area= 1,961 sf Storage= 2,963 cf

Plug-Flow detention time= 24.4 min calculated for 0.29 af (100% of inflow)
Center-of-Mass det. time= 24.4 min (805.5 - 781.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	1,909 cf	**26.50'W x 74.00'L x 3.79'H Field A** 7,435 cf Overall - 2,664 cf Embedded = 4,772 cf x 40.0% Voids
#2A	164.25'	2,664 cf	**Cultec R-330XLHD x 50 Inside #1** Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
#3	164.40'	113 cf	**4.00'D x 9.00'H Manhole / DMH-3 -Impervious**
		4,686 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 161.00'
#2	Primary	165.75'	**12.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 165.75' / 165.00' S= 0.0214 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.8 cfs @ 12.57 hrs HW=165.75' (Free Discharge)
└1=Exfiltration (Controls 0.8 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=163.50' (Free Discharge)
└2=Culvert (Controls 0.0 cfs)

Pond P4: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +15.0" End Stone x 2 = 74.00' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 17.0" Side Stone x 2 = 26.50' Base Width
9.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.79' Field Height

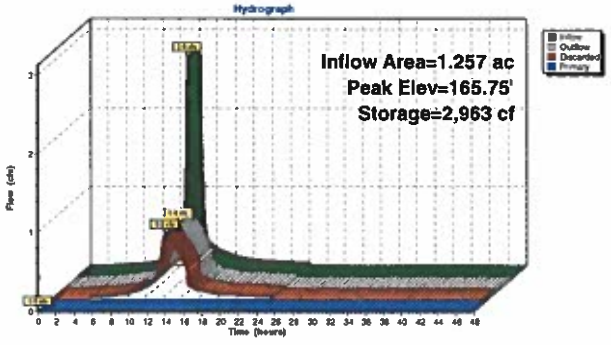
50 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 2,663.7 cf Chamber Storage

7,435.5 cf Field - 2,663.7 cf Chambers = 4,771.7 cf Stone x 40.0% Voids = 1,908.7 cf Stone Storage

Chamber Storage + Stone Storage = 4,572.4 cf = 0.10 af
Overall Storage Efficiency = 61.5%
Overall System Size = 74.00' x 26.50' x 3.79'

50 Chambers
275.4 cy Field
176.7 cy Stone

Pond P4: CULTEC



Summary for Subcatchment E1: Existing Conditions

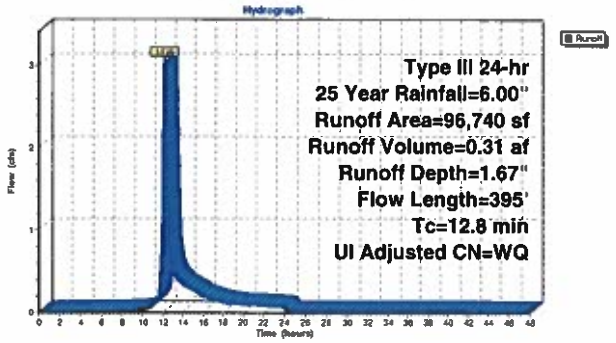
Runoff = 3.0 cfs @ 12.19 hrs, Volume= 0.31 af, Depth= 1.67"
Routed to nonexistent node ER

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Rainfall=6.00"

Area (sf)	CN	Adj	Description
5,580	30	30	Woods, Good, HSG A
20,810	39	39	>75% Grass cover, Good, HSG A
760	98	98	Unconnected pavement, HSG A
2,510	55	55	Woods, Good, HSG B
19,070	61	61	>75% Grass cover, Good, HSG B
1,330	98	98	Unconnected pavement, HSG B
1,480	98	98	Unconnected roofs, HSG B
32,640	61	61	>75% Grass cover, Good, HSG B
11,500	55	55	Woods, Good, HSG B
1,060	98	98	Unconnected roofs, HSG B
96,740			Weighted Average
92,110			95.21% Pervious Area
4,630			4.79% Impervious Area
4,630			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	210	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	395	Total			

Subcatchment E1: Existing Conditions



Summary for Subcatchment P1: Site Drainage System

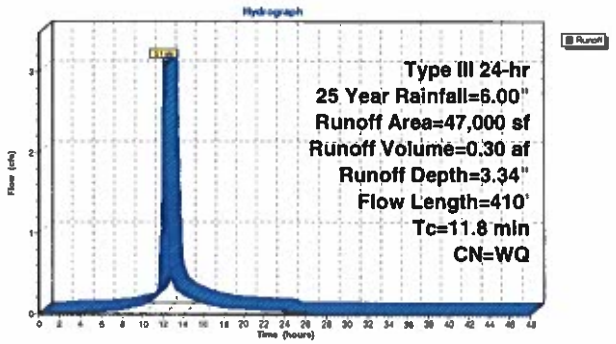
Runoff = 3.1 cfs @ 12.16 hrs, Volume= 0.30 af, Depth= 3.34"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Rainfall=6.00"

Area (sf)	CN	Description
6,460	98	Paved parking, HSG B
10,940	98	Paved parking, HSG A
2,800	61	>75% Grass cover, Good, HSG B
10,500	55	Woods, Good, HSG B
660	98	Unconnected roofs, HSG B
15,640	61	>75% Grass cover, Good, HSG B
47,000		Weighted Average
28,940		61.57% Pervious Area
18,060		38.43% Impervious Area
660		3.65% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	40	0.1500	2.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	55	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	130	0.0120	5.38	4.23	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
11.8	410	Total			

Subcatchment P1: Site Drainage System



Summary for Subcatchment P2: Roof Area

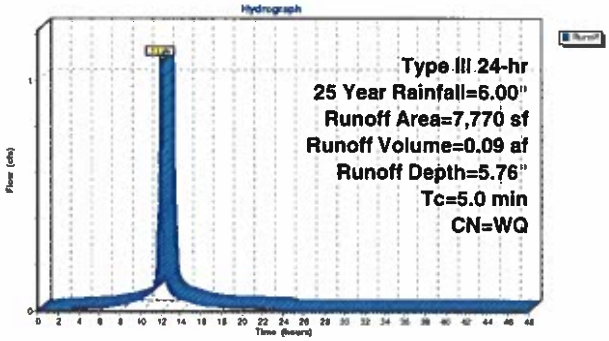
Runoff = 1.1 cfs @ 12.07 hrs, Volume= 0.09 af, Depth= 5.76"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Rainfall=6.00"

Area (sf)	CN	Description
5,880	98	Roofs, HSG B
1,890	98	Roofs, HSG A
7,770		Weighted Average
7,770		100.00% Impervious Area

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

Subcatchment P2: Roof Area



Summary for Subcatchment P3: Uncollected Runoff

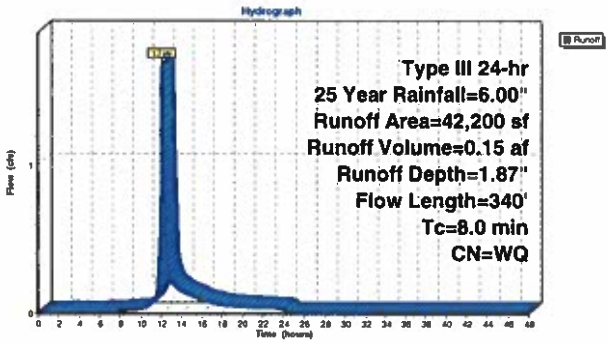
Runoff = 1.7 cfs @ 12.12 hrs, Volume= 0.15 af, Depth= 1.87"
Routed to Reach P5 : Total Proposed Conditions

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Rainfall=6.00"

Area (sf)	CN	Description
2,825	61	>75% Grass cover, Good, HSG B
13,785	39	>75% Grass cover, Good, HSG A
535	98	Paved parking, HSG A
105	98	Paved parking, HSG B
3,260	61	>75% Grass cover, Good, HSG B
3,290	98	Paved parking, HSG B
1,000	55	Woods, Good, HSG B
17,000	61	>75% Grass cover, Good, HSG B
400	98	Unconnected roofs, HSG B
42,200		Weighted Average
37,870		89.74% Pervious Area
4,330		10.26% Impervious Area
400		9.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0500	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	40	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	160	0.0300	6.50	2.27	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
1.5	90	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.0	340	Total			

Subcatchment P3: Uncollected Runoff

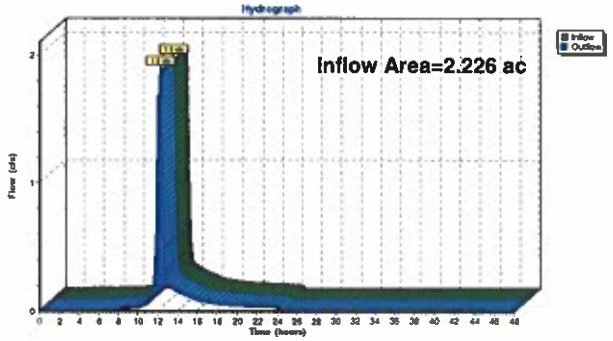


Summary for Reach P5: Total Proposed Conditions

Inflow Area = 2.226 ac, 31.10% Impervious, Inflow Depth = 0.97" for 25 Year event
Inflow = 1.9 cfs @ 12.36 hrs, Volume= 0.18 af
Outflow = 1.9 cfs @ 12.36 hrs, Volume= 0.18 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach P5: Total Proposed Conditions



Summary for Pond P4: CULTEC

Inflow Area = 1.257 ac, 47.16% Impervious, Inflow Depth = 3.68" for 25 Year event
Inflow = 3.8 cfs @ 12.14 hrs, Volume= 0.39 af
Outflow = 2.0 cfs @ 12.39 hrs, Volume= 0.39 af, Atten= 48%, Lag= 15.2 min
Discarded = 0.9 cfs @ 12.39 hrs, Volume= 0.36 af
Primary = 1.1 cfs @ 12.39 hrs, Volume= 0.03 af
Routed to Reach P5 : Total Proposed Conditions

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 166.28' @ 12.39 hrs Surf.Area= 1,961 sf Storage= 3,691 cf

Plug-Flow detention time= 25.2 min calculated for 0.39 af (100% of inflow)
Center-of-Mass det. time= 25.2 min (805.9 - 780.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	1,909 cf	**26.50'W x 74.00'L x 3.79'H Field A** 7,435 cf Overall - 2,664 cf Embedded = 4,772 cf x 40.0% Voids
#2A	164.25'	2,664 cf	**Cultec R-330XLHD x 50 Inside #1** Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
#3	164.40'	113 cf	**4.00'D x 9.00'H Manhole / DMH-3 -Impervious**
		4,686 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 161.00'
#2	Primary	165.75'	**12.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 165.75' / 165.00' S= 0.0214 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.9 cfs @ 12.39 hrs HW=166.28' (Free Discharge)
└**1=Exfiltration** (Controls 0.9 cfs)

Primary OutFlow Max=1.1 cfs @ 12.39 hrs HW=166.28' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.1 cfs @ 2.48 fps)

Pond P4: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +15.0" End Stone x 2 = 74.00' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 17.0" Side Stone x 2 = 26.50' Base Width
9.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.79' Field Height

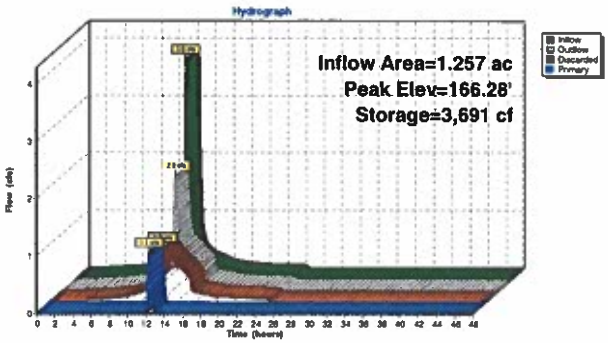
50 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 2,663.7 cf Chamber Storage

7,435.5 cf Field - 2,663.7 cf Chambers = 4,771.7 cf Stone x 40.0% Voids = 1,908.7 cf Stone Storage

Chamber Storage + Stone Storage = 4,572.4 cf = 0.10 af
Overall Storage Efficiency = 61.5%
Overall System Size = 74.00' x 26.50' x 3.79'

50 Chambers
275.4 cy Field
176.7 cy Stone

Pond P4: CULTEC



Summary for Subcatchment E1: Existing Conditions

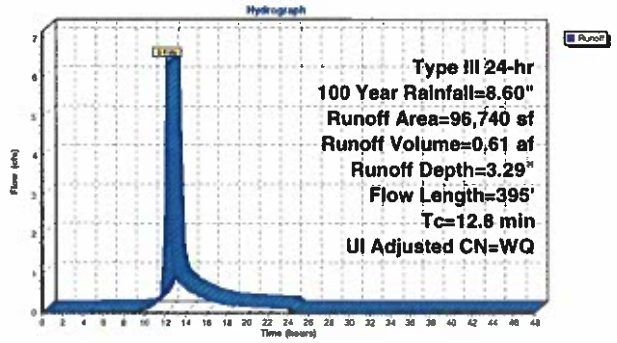
Runoff = 6.4 cfs @ 12.19 hrs, Volume= 0.61 af, Depth= 3.29"
Routed to nonexistent node ER

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.60"

Area (sf)	CN	Adj	Description
5,580	30	30	Woods, Good, HSG A
20,810	39	39	>75% Grass cover, Good, HSG A
760	98	98	Unconnected pavement, HSG A
2,510	55	55	Woods, Good, HSG B
19,070	61	61	>75% Grass cover, Good, HSG B
1,330	98	98	Unconnected pavement, HSG B
1,480	98	98	Unconnected roofs, HSG B
32,640	61	61	>75% Grass cover, Good, HSG B
11,500	55	55	Woods, Good, HSG B
1,060	98	98	Unconnected roofs, HSG B
96,740			Weighted Average
92,110			95.21% Pervious Area
4,630			4.79% Impervious Area
4,630			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	210	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	395	Total			

Subcatchment E1: Existing Conditions



Summary for Subcatchment P1: Site Drainage System

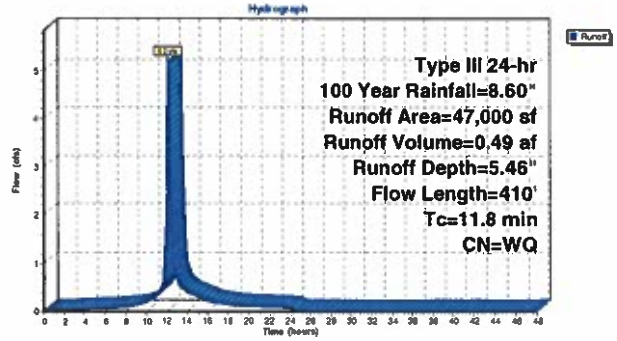
Runoff = 5.2 cfs @ 12.16 hrs, Volume= 0.49 af, Depth= 5.46"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.60"

Area (sf)	CN	Description
6,460	98	Paved parking, HSG B
10,940	98	Paved parking, HSG A
2,800	61	>75% Grass cover, Good, HSG B
10,500	55	Woods, Good, HSG B
660	98	Unconnected roofs, HSG B
15,640	61	>75% Grass cover, Good, HSG B
47,000		Weighted Average
28,940		61.57% Pervious Area
18,060		38.43% Impervious Area
660		3.65% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.2	70	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	65	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	40	0.1500	2.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	55	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.4	130	0.0120	5.38	4.23	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
11.8	410	Total			

Subcatchment P1: Site Drainage System



Summary for Subcatchment P2: Roof Area

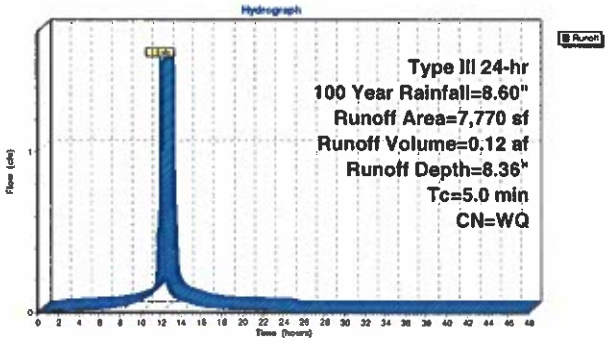
Runoff = 1.6 cfs @ 12.07 hrs, Volume= 0.12 af, Depth= 8.36"
Routed to Pond P4 : CULTEC

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.60"

Area (sf)	CN	Description
5,880	98	Roofs, HSG B
1,890	98	Roofs, HSG A
7,770		Weighted Average
7,770		100.00% Impervious Area

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

Subcatchment P2: Roof Area



Summary for Subcatchment P3: Uncollected Runoff

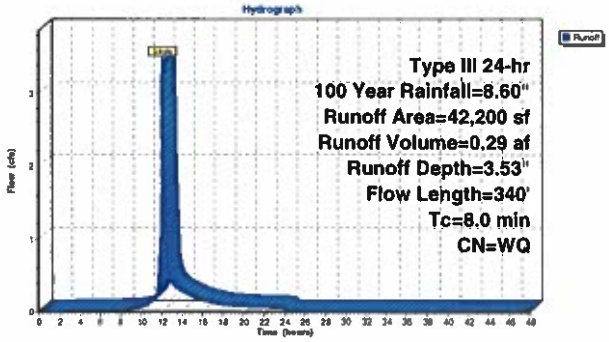
Runoff = 3.4 cfs @ 12.12 hrs, Volume= 0.29 af, Depth= 3.53"
Routed to Reach P5 : Total Proposed Conditions

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.60"

Area (sf)	CN	Description
2,825	61	>75% Grass cover, Good, HSG B
13,785	39	>75% Grass cover, Good, HSG A
535	98	Paved parking, HSG A
105	98	Paved parking, HSG B
3,260	61	>75% Grass cover, Good, HSG B
3,290	98	Paved parking, HSG B
1,000	55	Woods, Good, HSG B
17,000	61	>75% Grass cover, Good, HSG B
400	98	Unconnected roofs, HSG B
42,200		Weighted Average
37,870		89.74% Pervious Area
4,330		10.26% Impervious Area
400		9.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0500	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	40	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.4	160	0.0300	6.50	2.27	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.012
1.5	90	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.0	340	Total			

Subcatchment P3: Uncollected Runoff

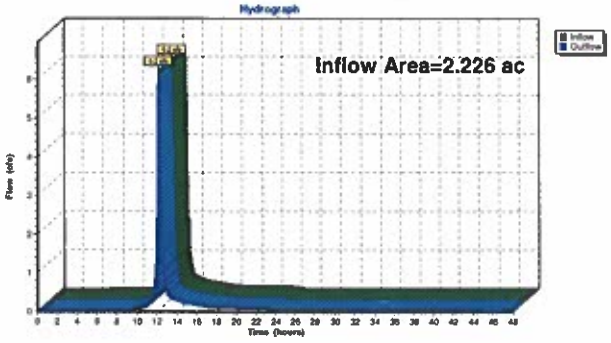


Summary for Reach P5: Total Proposed Conditions

Inflow Area = 2.226 ac, 31.10% Impervious, Inflow Depth = 2.24" for 100 Year event
Inflow = 6.2 cfs @ 12.19 hrs, Volume= 0.42 af
Outflow = 6.2 cfs @ 12.19 hrs, Volume= 0.42 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach P5: Total Proposed Conditions



Summary for Pond P4: CULTEC

Inflow Area = 1.257 ac, 47.16% Impervious, Inflow Depth = 5.87" for 100 Year event
Inflow = 6.2 cfs @ 12.14 hrs, Volume= 0.62 af
Outflow = 4.9 cfs @ 12.25 hrs, Volume= 0.62 af, Atten= 21%, Lag= 6.5 min
Discarded = 1.2 cfs @ 12.25 hrs, Volume= 0.49 af
Primary = 3.8 cfs @ 12.25 hrs, Volume= 0.13 af
Routed to Reach P5 : Total Proposed Conditions

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 167.24' @ 12.25 hrs Surf.Area= 1,961 sf Storage= 4,570 cf

Plug-Flow detention time= 23.5 min calculated for 0.62 af (100% of inflow)
Center-of-Mass det. time= 23.5 min (802.2 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	1,909 cf	**26.50'W x 74.00'L x 3.79'H Field A** 7,435 cf Overall - 2,664 cf Embedded = 4,772 cf x 40.0% Voids
#2A	164.25'	2,664 cf	**Cultec R-330XLHD** x 50 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 5 rows
#3	164.40'	113 cf	**4.00'D x 8.00'H Manhole / DMH-3** -Impervious
		4,686 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 161.00'
#2	Primary	165.75'	**12.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 165.75' / 165.00' S= 0.0214 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=1.2 cfs @ 12.25 hrs HW=167.24' (Free Discharge)
└1=Exfiltration (Controls 1.2 cfs)

Primary OutFlow Max=3.8 cfs @ 12.25 hrs HW=167.24' (Free Discharge)
└2=Culvert (Inlet Controls 3.8 cfs @ 4.80 fps)

Pond P4: CULTEC - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 5 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +15.0" End Stone x 2 = 74.00' Base Length
5 Rows x 52.0" Wide + 6.0" Spacing x 4 + 17.0" Side Stone x 2 = 26.50' Base Width
9.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.79' Field Height

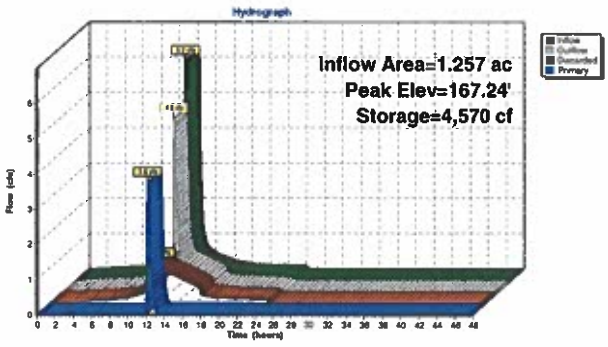
50 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 5 Rows = 2,663.7 cf Chamber Storage

7,435.5 cf Field - 2,663.7 cf Chambers = 4,771.7 cf Stone x 40.0% Voids = 1,908.7 cf Stone Storage

Chamber Storage + Stone Storage = 4,572.4 cf = 0.10 af
Overall Storage Efficiency = 61.5%
Overall System Size = 74.00' x 26.50' x 3.79'

50 Chambers
275.4 cy Field
176.7 cy Stone

Pond P4: CULTEC



STORMWATER OPERATION AND MAINTENANCE PLAN

STORMWATER OPERATION AND MAINTENANCE PLAN

502 Concord Road
Sudbury, MA

June 1, 2023

Stormwater Management System Owner:
and Responsible Party

Name: Joel Gordon

Signature:

This Operation and Maintenance Plan has been prepared in accordance with the Sudbury stormwater standards and recommendations outlined in the DEP stormwater handbook. This plan outlines the minimum efforts necessary to ensure that the stormwater collection and treatment system and sedimentation and erosion control system for this site operates in accordance with the design. Efforts in addition to the minimum listed herein may be required to ensure adequate stormwater management.

This plan includes general site restrictions, routing/non-routine operation and maintenance; reporting and record keeping; and an estimated budget.

General Site Conditions

The following conditions are imposed as part of this Plan.

- The Stormwater Permitting Authority or its designee shall be able to enter the property, with notice to the property owner, at reasonable times and in a reasonable manner for the purpose of inspection.
- Illicit discharges into stormwater management system are perpetually prohibited.
- The use of fertilizers should be limited to slow-release fertilizers, except at establishment of vegetation.
- Uncovered and/or uncontained road de-icing materials shall not be stored on-site.

Operation and Maintenance:

Schedule: The entire stormwater management system should be inspected twice per year and catch basins/CDS should be inspected four times per year.

Specific inspection and maintenance practices are listed under each component below. Upon completion of inspection, the inspector should specify any necessary corrective actions to be taken by ownership of the facility. The items to be inspected and maintained are described in the following sections.

Based on the observed conditions, the Responsible Party shall immediately schedule the appropriate maintenance. Some minor maintenance, such as the removal of blockages, debris and saplings in the basins may be conducted at the time of the inspection. More difficult maintenance activities, requiring special equipment, will have to be scheduled, such as the removal of excessive sediment or the repair of eroded areas. All sediment must be removed at least once per year.

JG

The actual removal of sediments and associated pollutants and trash occurs only when sumps are cleaned out; therefore, regular maintenance is required. The more frequent the cleaning, the less likely sediments will be resuspended and subsequently discharged. Frequent cleaning also results in more volume available for future storms and enhances the overall performance.

At a minimum, sumps should be inspected four times annually, and cleaned whenever the depth from water surface to sediment is less than 36 inches, or at least once per year.

Vacuum trucks are required for cleaning. Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations. At each inspection, record sediment depth, inspect internal components, structural condition, and inlet grate condition. Inspect outlet pipe and remove debris.

CDS Water Quality Unit & Deep Sump Catch Basins & Area Drains
Locations:

- CDS Unit – (one structure) located within the driveway to the north side of the building, with cover to grade.
- Catch Basins – (four structures) located within the parking lot.
- Area Drains – two located within front yard

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Drywells
One large Drywell is located under the parking areas to the north of the building with four (4) cleanouts to grade. The location is shown on the Site Plans.

Drywells should be inspected once after a major rainstorm within the first few months of installation. Thereafter, inspect drywells twice per year, with the inspections following rain events with 0.5 inches or more of precipitation, the drywell should be opened and inspected to see if it has fully drained and checked for accumulated debris and sediment. Drywells should drain within three days. If any is present or if the drywell does not drain within 72 hours of the end of a storm, then remediation is necessary. It may be possible to flood the system to suspend sediment and debris and remove it with a vacuum truck. Otherwise, replacement of the drywell may be required.

Roof drain connections should be checked to verify connections. Overflows should be checked for evidence of bypass. Roof gutters shall be maintained and cleaned a minimum of twice per year or whenever debris is noted.

Trench Drain
A trench drain is located across the entrance driveway and rear play yard. Trench drains should be inspected at least four times per year. Inspection can be performed through the inlet grate from the surface. Any sediment or debris noted should be removed. Access would be provided by removing the inlet grate. Disposal must be in accordance with applicable local, state, and federal guidelines and regulations.

Snow Removal
Snow shall not be plowed onto the abutting properties. Storage areas are noted on the site plans. If on-site storage is not sufficient, snow shall be properly removed from the site. The inlet grates shall be uncovered and functional immediately after snow plowing. Snow shall not be stockpiled above catch basins or other drainage inlets.

Street Sweeping
Street sweeping of the roadway should be performed at least twice per year, preferably in the spring after the snow has melted and in the fall, prior to snowfall. Disposal of the sweepings must be in accordance with applicable local, state, and federal guidelines and regulations.

Vegetation
The initial vegetation inspection shall occur four (4) weeks after final stabilization of the site; vegetation shall be dense (and aesthetically acceptable on all portions of the project, including the side slopes, buffer strips and the embankments). The inspector shall determine and document: (1) whether fertilizing is required (2) the areas where grass shall be mowed, and (3) the areas which shall be protected against erosion. In addition, recently seeded areas shall be inspected for failures.

Eroded areas shall be filled and compacted, if necessary, and reseeded as soon as possible. If an area erodes twice, then a geotextile fabric is to be installed to stabilize the area to allow vegetation to be established. These maintenance activities shall take place during the planting season. Areas affected by lack of rainfall shall be watered. If the stand is more than 60% damaged, it shall be reestablished, following the original preparation and seeding instructions. Areas of repeated erosion/scour problems shall be lined with riprap only after twice attempting to stabilize the area with geotextile fabric.

Driveway Surfaces
Paved driveway surfaces shall be inspected for settlement, cracking, potholes, and sediment/sand accumulation on the surface. Surfaces shall be swept a minimum of twice per year (spring and fall). Any structural deficiencies shall be reported to the Owner and repaired as required.

Reporting and Record Keeping
The responsible party will be responsible for maintaining accurate Maintenance Logs for all maintenance, inspections, repairs, replacements, and disposal (for disposal, the log shall indicate the type of material and the disposal location). The logs shall be kept on site be available for inspection by the Town municipal departments or other auditing authority. This will be a perpetual requirement of the Owners or their Designated Party.

The Site Maintenance Log will be completed as described above, and at a minimum will include:

a. The date of inspection or activity;
b. Name of inspector;
c. The condition of each BMP, including components such as:
    i. Pretreatment devices
    ii. Vegetation
    iii. Inlets and outlets
    iv. Swales
    v. Underground drainage
    vi. Sediment and debris accumulation.
    vii. Any nonstructural practices
    viii. Pavement condition
    ix. Roof drains and gutter conditions
    ix. Any other item that could affect the proper function of the stormwater management system
d. Description of the need for maintenance; and
e. For disposal include type of material and the disposal location;

Easements:

No drainage easements are currently proposed or required. The site does not contain any other access or utility easements.

Changes to Operation and Maintenance Plans

The owner(s) of the stormwater management system must notify the Stormwater Permitting Authority or its designated Reviewing Agent of changes in ownership or assignment of financial responsibility.

Emergency Response Plan / Spill Control Practices

On-site storage of hazardous materials shall not be allowed.

In the event of an accident in the driveway where a significant amount of gasoline or other petroleum product is released, the following procedure should be followed:

1. Immediately contact the following agencies:

Sudbury Fire Department	(508)443-2239
MassDEP Emergency response	(888) 304-1133

2. Provide support to agencies listed above, which may include contacting an outside contractor to provide clean-up or contacting a Licensed Site Professional (LSP) to lead the clean-up.

The outlet to the drainage system should be inspected. If there is evidence of discharge from the drainage system, additional corrective actions must be taken extending to the receiving water or beyond.

Stormwater Operations and Maintenance BMP Inspection Form

Project: **502 Concord Road** **Date:**

Owner: **By:**

Location: **502 Concord Road**
Sudbury, MA

Rain Events: **24 hrs** _____
72 hrs _____

Roof Drains

	Connected (y/n)	Condition	Action Required
Downspouts			

Stormwater Components

	Sediment Depth	Water Depth	Outlet Condition	Action Required
Drywell				
CDS				
CB-1				
CB-2				
CB-3				
CB-4				
Area Drains				
Trench Drain -1				
Trench Drain - 2				
FE-1/FE-2				

Pavement / Vegetation

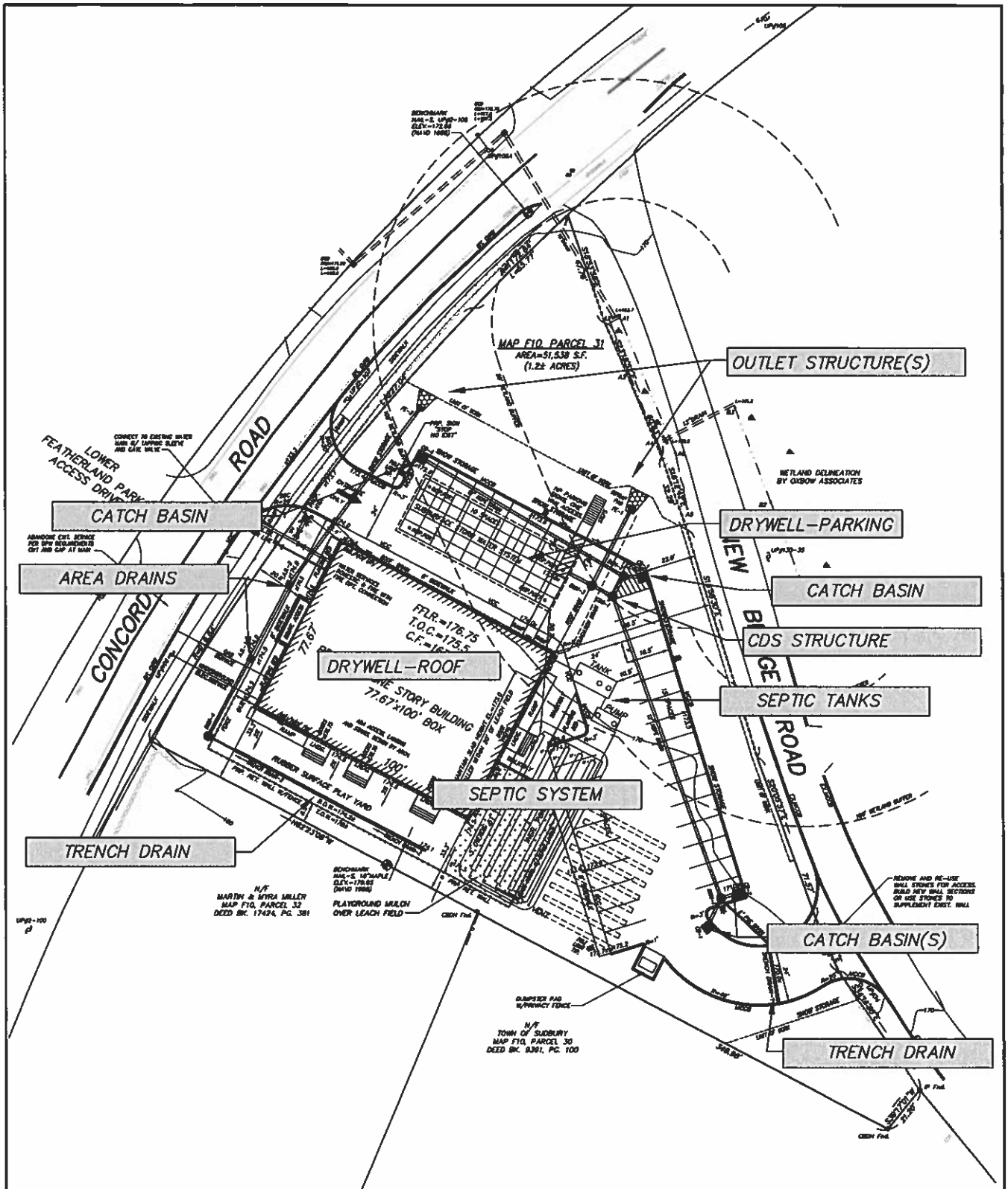
	Condition	Action Required
Driveway		
Vegetation		

Comments: _____

_____

_____

Signature: _____



STORMWATER COMPONENTS
502 CONCORD ROAD
SUDBURY, MA
SCALE 1"=60'

STORMWATER POLLUTION PREVENTION PLAN (SWPPP).

Stormwater Pollution Prevention Plan

for

502 Concord Road
Sudbury, MA

This Stormwater Pollution Prevention Pan has been prepared in accordance with the MA Department of Environmental Protection Stormwater Standards and NPDES General Construction Permit for Stormwater Discharges from Construction Activities. All work shall be in accordance with the order of conditions issued by the Local Conservation Commission.

1.1 Project Information

Project Name and Location:	502 Concord Road Sudbury, MA
Owner Name and Address:	_____ _____ _____
Site Operator:	_____ _____ _____
Accompanying Documents:	Plans titled "Proposed Site Plan for 502 Concord Road, Sudbury, MA" prepared by Connorstone Engineering, are to be considered a part of this document.
NDPES Tracking Number:	_____
Latitude/Longitude:	Lat: 42.39326 Long: -71.40397
Project Description:	School
Estimated Dates:	Start: Spring 2023 Completion: Spring 2024
Name of Receiving Waters:	Bridge Brook
Estimated Area of Disturbance:	< 1 Acre

1.2 Contact Information / Responsible Parties (complete prior to construction)

Operator(s):

Company Name:
Address:
Telephone #:
Area of Control: Entire Site

Project Manager(s) or Site Supervisor(s):

Company Name:
Name:
Address:
Telephone #:
Area of Control: Entire Site

This SWPPP was Prepared by:

Connorstone Engineering, Inc
121 Boston Post Road
Sudbury, MA
508-393-9727

Emergency 24-Hour Contact:

Company Name:
Name:
Address:
Telephone #:

Subcontractors:

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the Subcontractor Certifications/Agreement (Attached).

1.3 Existing Conditions

Location: The site consists of a 1.2 acre lot located at 502 Concord Road, and is at the corner with New Bridge Road. Abutters to the south include a single family home on Concord Road and the Town of Sudbury (Nixon School).

Project Area: Approximately 1.2 acres (51,538 square feet)

Zoning District: Residence C-2

Assessors Map / Parcel: Map F10, Parcel 31

Site Conditions: The site is currently developed as a single family home, and contains a 1,250 sq. ft. building, driveway, shed, and lawn areas. The overall existing impervious surface area is 3,570 square feet. Areas along the rear perimeter are undeveloped and wooded.

Site Topography: The site slopes from the south property line to the northerly property line and a drainage swale (regulated as wetlands) and 12-inch culvert under New Bridge Road. Elevations range from 180 along the south property line to 166 - 164 along New Bridge Road.

1.4 Proposed Development / Nature of Construction Activities

Proposed Use: The project consists of a proposed School Building. The work will include demolition of the existing building and construction of a new 7,767 sq. ft. building along with access driveways, 35 parking spaces, and required utilities and infrastructure. The site driveway layout includes an entrance off Concord Road, then routing past the building and exiting onto New Bridge Road. The building will be connected to the public water, gas, and electric from Concord Road and the existing septic system would be replaced and upgraded for the proposed use. The work will result in a total post development impervious area of 29,100 square feet, or an increase of 25,530 sq. ft.

1.5 Construction Site Estimates

Total parcel area	1.2 acres
Total land disturbance:	0.95 acres
Impervious area before construction:	0.08 acres
Impervious area after construction:	0.67 acres

1.6 Sensitive Areas / Wetland Resources

There are wetland areas to the north of were delineated by Oxbow Associates. Wetland resource areas have been delineated to the northeast of site including a drainage swale (regulated as wetlands) along the project side of New Bridge Road, which flows through a 12-inch culvert under New Bridge Road to a larger wetland complex. The site is not located within any flood hazard zones based upon the current Town of Sudbury Flood Insurance Rate Map.

1.7 Discharge Information

Stormwater flows through a culvert under New Bridge Road to wetlands system that is tributary to Bridge Brook. This river is not listed is not listed in the Massachusetts Integrated List of Waters as an impaired water body

1.8 Endangered Species Certification

The proposed project is not located in an Estimated or Priority Habitat of Rare Wildlife as indicated on the Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)

1.9 Potential Sources of Pollution

Potential sources of sediment to stormwater runoff:

- Clearing and grubbing operations
- Grading and site excavation operations
- Vehicle tracking
- Topsoil stripping and stockpiling
- Landscaping operations

Potential pollutants and sources, other than sediment, to stormwater runoff:

- Combined Staging Area—small fueling activities, minor equipment maintenance, sanitary facilities, and hazardous waste storage.
- Materials Storage Area—general building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
- Construction Activity—paving, curb/gutter installation, concrete pouring/mortar/stucco, and building construction.
- Concrete Washout Area

1.10 REQUIREMENT TO POST A NOTICE OF YOUR PERMIT COVERAGE.

The operator must post a sign or other notice conspicuously at a safe, publicly accessible location in close proximity to the project site. At a minimum, the notice must include the NPDES Permit tracking number and a contact name and phone number for obtaining additional project information. The notice must be located so that it is visible from the public road that is nearest to the active part of the construction site, and it must use a font large enough to be readily viewed from a public right-of-way.

2.1 General Construction Sequencing of Major Activities

Estimated Schedule: 12-18 months

General Sequencing Plan

1. Install sediment control barriers and construction entrance.
2. Remove the existing structures. Preserve the existing driveway as initial staging area for demolition. Once driveway is removed, install stone construction entrance.
3. Performe site grading to establish rough grade at parking area and site areas
4. Construction of proposed building foundation.
5. Install drainage system drywell, septic system, and utility connections. Drywell to remain off-line (except for clean roof runoff) until the drainage area is stabilized.
6. Construct parking lot and driveway through binder course pavement (final grading, gravel base, and binder course pavement).
7. Perform final landscaping and stabilization.
8. Install final top course pavement
9. Place drywell on-lilne to receive pavement runoff and remove the remaining siltation devises as the area becomes stable (obtain conservation commission inspection and approval prior to removal of erosion controls).

2.2 Erosion and Sediment Controls

General Conditions – Prior to initiating construction, all sedimentation and erosion control measures shall be installed as shown on the plans and detail drawings. This plan depicts the minimum required sedimentation and erosion controls. The contractor shall employ additional sedimentation and erosion control measures as necessitated by site conditions, or as directed by the owner, the owner's representative, or the conservation commission to ensure protection of all wetland resources and control sediment transport. If sedimentation plumes occur, the contractor shall stop work and install additional sedimentation control devices immediately to prevent further sedimentation.

Temporary Stabilization – Topsoil stockpiles and disturbed portions of the site where construction activity temporarily ceases for at least 14 days will be stabilized with a temporary seed and mulch no later than 14 days from the last construction activity in that area. The temporary seed shall be Erosion Control mix. Seeding shall be nutrient enriched hydroseed with tackifer and cellulose or other degradable fibers capable of retaining moisture.

Permanent Stabilization – Disturbed portion of the site where construction activity ceases shall be stabilized with permanent seed no later than 14 days after the last construction activity. The permanent seed mix consists of tall fescue, and annual rye. Prior to seeding, ground agricultural limestone shall be applied. Seeding shall be nutrient enriched hydroseed with tackifers and cellulose or other degradable fibers capable of retaining moisture.

Erosion Barrier (Perimeter Controls) – Erosion Barriers shall consist of staked hay bales and silt fence. Prior to the commencement of work, staked hay bales and silt fence shall be installed along the edge of proposed development, and as indicated on the plans. Additional erosion barriers shall be located as conditions warrant or as directed by the owner, his representatives, or the local authority.

Track out controls / Construction Entrance – A stabilized stone apron construction entrance shall be at all construction entrances to help prevent vehicle tracking of sediments. All vehicles shall enter and exit the sit via the stabilized construction entrance. The contractor shall inspect the construction entrance daily and after heavy use. If mud and soil clogs the voids in the crushed stone reducing the effectiveness, the pad shall be top dressed with new, clean stone. If the pad becomes completely clogged, replacement of the entire pad may be necessary. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

Track out controls / Street Sweeping – Street sweeping in the vicinity of the project area shall be performed as needed until the project limits have been stabilized. All sediment tracked outside the limit of work shall be swept at the end of each working day.

Inlet Protection – All existing and proposed drainage system inlets, which may receive stormwater flow from disturbed areas, shall be provided with inlet protection (catch basin inserts). The contractor shall maintain these devices until all work is completed and all areas have been adequately stabilized.

Temporary Sediment Traps– Sediment traps and/or basins shall be constructed as necessitated by field conditions. The minimum volume shall be 1800 cubic feet of storage for each acre of drainage area. Sediment traps/basins should be readily accessible for maintenance and sediment removal, and should remain in operation and be properly maintained until the site area is permanently stabilized by vegetation and/or when permanent structures are in place. Remove basin after drainage area has been permanently stabilized, inspected, and approved. Before removing dam, drain water and remove sediment; place waste material in designated disposal areas. Smooth site to blend with surrounding area and stabilize.

Dust Control – Dust control measures shall be implemented and maintained properly throughout dry weather periods until all disturbed areas have been permanently stabilized. Methods for dust control shall include water sprinkling and/or other methods approved by the engineer.

Soil Stockpiles – Soil stockpiles shall be stabilized to prevent erosion along with perimeter sedimentation controls. No materials subject to erosion shall be stockpiled overnight within 100 feet of a wetland unless covered.

Dewatering Operations – Dewatering operations, if required, shall discharge onto stabilized areas. All discharge water is to pass through sedimentation control devices to prevent impacts upon water bodies, bordering vegetated wetlands, drainage systems and abutting properties. No discharges from dewatering operations shall be discharged directly to the drainage system.

Snow Removal – Snow shall be plowed to the shoulder of the roadway. Any excess of that which can be stored on-site shall be removed. Snow shall not be plowed into the constructed wetland or into the 20-foot buffer zone to any wetland area. All catch basins shall be uncovered and functional immediately after snow plowing. Any snow piles shall be placed so that it will not interfere with runoff flow.

Topsoil – Topsoil shall be stripped and stockpiled on-site for reuse, unless otherwise noted on the plans (per stockpile requirements). Materials shall be re-used on-site to the maximum extent practical. Any excess shall be properly exported off-site.

Minimize Soil Compaction – Within the limits of the infiltration galley, the use of heavy equipment shall be limited to the maximum extent practical.

Vehicle Washing – Vehicle and equipment washing, other than hose down with clean water, shall not be allowed. All wash down water shall be directed to a sediment control device (not directly to any stormwater drainage system or wetland).

Fertilizer Discharge Restrictions.

- Apply at a rate and in amounts consistent with manufacturer's specifications,
- Apply during the growing season, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
- Avoid applying before heavy rains that could cause excess nutrients to be discharged;
- Never apply to frozen ground;
- Never apply to stormwater conveyance channels with flowing water; and
- Follow all other federal, state, tribal, and local requirements regarding fertilizer application.

Washing of Applicators and Containers used for Paint, Concrete, or Other Materials. - Direct all wash water into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation Handle washout or cleanout wastes as follows: Do not dump liquid wastes in storm sewers; Dispose of liquid wastes in accordance with applicable regulations; and. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes. Locate any washout or cleanout activities as far away as possible from surface waters and stormwater inlets or conveyances, and, to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.

2.3 Inspection and Maintenance Schedule

The responsible party shall be responsible for maintaining all temporary and permanent sedimentation and erosion controls until work is complete and all areas have been permanently stabilized. At such time all sedimentation and erosion control measures shall be removed. These are the inspection and maintenance practices that will be used to maintain erosion and sediment controls during construction.

Schedule:

- All control measures will be inspected at least once per week, and following any precipitation event of 0.5 inches.
- Depth of precipitation events shall be based upon NCDC reporting.

Maintenance Practices:

- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report of any deficiencies.
- Built up sediment shall be removed from the silt fence when it reaches a depth equal to one-third the height of the fence.
- The sediment traps shall be inspected for depth of sediment, and built up sediment will be removed when it reached 25 percent of the design capacity or at the end of the job. Check embankment for: settlement, seepage, or slumping along the toe or around pipe. Look for signs of piping. Repair immediately. Remove trash and other debris from principal spillway, emergency spillway, and pool area. Clean or replace gravel when sediment pool does not drain properly.
- Any diversion dikes will be inspected for breaches and promptly repaired.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts and healthy growth.
- Contractor to maintain a supply of erosion control devises on site at all times to repair any broken or damaged materials.

The site superintendent, will select three individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance reports. Personnel selected for inspection and maintenance responsibilities shall be a "qualified personnel" as defined in section 4. D of the GCP. Staff shall be trained in all inspection and maintenance practices for keeping the erosion and sediment controls used onsite in good working order.

An *inspection report* will be made after each inspection. Copies of the reports shall be maintained on site. At a minimum, the inspection report must include:

- The inspection date;
- Names, titles, and qualifications of personnel making the inspection;
- Weather information for the period since the last inspection including estimate of the beginning and duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
- Location(s) of discharges of sediment or other pollutants from the site;
- Location(s) of BMPs that need to be maintained;
- Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
- Location(s) where additional BMPs are needed that did not exist at the time of inspection; and
- Corrective action required including implementation dates.

The inspection report must be signed in accordance with Appendix G, Section 11 of the GCP.

2.5 Staff and Training Requirements.

Prior to the commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, you must ensure that the following personnel understand the requirements of this permit and their specific responsibilities with respect to those requirements:

- Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention measures);
- Personnel responsible for the application and storage of treatment chemicals (if applicable);
- Personnel who are responsible for conducting inspections as required in Part 4.1.1; and
- Personnel who are responsible for taking corrective actions.

Notes: (1) If the person requiring training is a new employee, who starts after you commence earth-disturbing or pollutant-generating activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit. (2) For emergency-related construction activities, the requirement to train personnel prior to commencement of earth-disturbing activities does not apply; however, such personnel must have the required training prior to NOI submission.

The operator is responsible for ensuring that all activities on the site comply with the requirements of the permit. The operator is not required to provide or document formal training for subcontractors or other outside service providers, but you must ensure that such personnel understand any requirements of the permit that may be affected by the work they are subcontracted to perform. At a minimum, personnel must be trained to understand the following if related to the scope of their job duties (e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections):

- The location of all stormwater controls on the site required by this permit, and how they are to be maintained;
- The proper procedures to follow with respect to the permit's pollution prevention requirements; and
- When and how to conduct inspections, record applicable findings, and take corrective actions.

3.1 Storage, Handling, and Waste Disposal

Building Products - Shall be covered or stored inside to prevent any discharge of pollutants. Comply with all application, disposal, and registration requirements.

Pesticides, herbicides, insecticides and fertilizers - Shall be covered or stored inside to prevent any discharge of pollutants. Comply with all application, disposal, and registration requirements.

Diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals- store chemicals in water-tight containers, and provide either (1) cover (e.g., plastic sheeting or temporary roofs) to prevent these containers from coming into contact with rainwater, or (2) a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., spill kits), or provide secondary containment (e.g., spill berms, decks, spill containment pallets). Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge

Hazardous Waste - Separate hazardous or toxic waste from construction and domestic waste. Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements; iii. Store all containers that will be stored outside within appropriately sized secondary containment (e.g., spill berms, decks, spill containment pallets) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., storing chemicals in covered area or having a spill kit available on site);

Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal, state, tribal, and local requirements. Site personnel will be instructed in these practices and the individual, who manages the day to day site operations, will be responsible for seeing that these procedures are followed.

Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge

Sanitary Waste – All sanitary waste will be collected from the portable units a minimum of once per week by the sanitary pumping company, licensed by the Commonwealth of Massachusetts and as required by the local regulation. Position units in a secure location where they cannot be tipped over.

Waste Materials – All waste materials will be collected and stored in a securely lidded metal dumpster rented from a licensed waster management company. The dumpster will meet all local and State solid waster management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied at least twice per month or more often if necessary, and the waste will be hauled to the waste management company. On work days, clean up and dispose of waste in designated waste containers. Clean up immediately if containers overflow. No construction waste materials will be buried onsite. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer. The individual managing the day-to-day site operations will be responsible for seeing that these procedures are followed.

3.2 Building Material Inventory for Pollution Prevention Plan

The materials or substances listed below are expected to be present onsite during construction:

- Concrete
- Petroleum based products including asphalt concrete/emulsions, fuel(s), oil, etc.
- Wood
- Fertilizers and tachifiers
- Paints (enamel, latex and oil based stains)
- Metal studs and products
- Masonry block
- Roofing shingles
- Gypsum and plaster
- Stone products

Construction equipment and maintenance materials will be stored at the combined staging area and materials storage areas. A watertight container will be used to store hand tools, small parts, and other construction materials.

3.2 Spill Prevention Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping – The following good housekeeping practices will be followed onsite during the construction project.

- An effort will be made to store only enough products to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in this appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers and with the original manufacturers' label.
- Substances will not be mixed with one another unless recommended by the manufactures.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturers' recommendation for proper use and disposal will be followed.
- The Site Superintendent will inspect daily to ensure proper use and disposal of materials.
- Hazardous Procedures – In accordance with industry standards and Applicable regulations

Product Specific Practices – The following product specific practices will be followed onsite:
Petroleum Products – Transport and delivery of fuel in approved containers only.
Fertilizers – In accordance with labeling
Paints – In accordance with labeling

Spill Control Practices – Any spills of hazardous materials shall be contained and cleaned up immediately. If appropriate, the Massachusetts Department of Environmental Protection (DEP) shall be notified. There shall, at all times when work is underway on-site, be an individual present who is trained in proper spill control practices.

In the event that hazardous material, gasoline or other petroleum is released, the following procedure should be followed:

1. Immediately contact the following agencies:
   Sudbury Fire Department (978) 443-2239
   MassDEP Emergency Response (888) 304-1133

2. Provide support to agencies listed above, which may include contacting an outside contractor to provide clean-up or contacting a Licensed Site Professional (LSP) to lead the clean-up.

Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a 24-hour period:

- Provide notice to the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–267–2675) in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 as soon as site staff have knowledge of the discharge; and

- Within 7 calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. You must also implement measures to prevent the reoccurrence of such releases and to respond to such releases.

Vehicle Fueling and Maintenance – All major equipment/vehicle fueling and maintenance will be performed off-site. When vehicle fueling must occur on-site, the fueling activity will occur in the staging area outside the buffer zone or resource area. Only minor equipment maintenance will occur on-site. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets in accordance with Part 3.1 of the GCP. Absorbent, spill-cleanup materials and spill kits will be available at the combined staging and materials storage area. Drip pans will be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.

3.3 Non-Storm Water Discharges

It is expected that the following non-storm water discharge will occur from the site during the construction period:

- Pavement wash waters (where no spills or leaks of toxic or hazardous material have occurred).
- Discharges from Fire Fighting activities
- Hydrant and water line flushing
- Landscape irrigation
- Vehicle wash
- Water for dust control
- Foundation / footing drains
- Construction dewatering water

4.0 Record Keeping / Updating of Documentation

This document is intended as a living document to be continuously revised and updated based on changing site conditions and the progression of construction. The SWPPP shall be continuously revised to indicate the condition and location of the various Best Management Practices.

Copies of the GCP, signed and certified NOI, and EPA notification of receipt must be included in the SWPPP. This SWPPP plan, the approved drawings made part of this document, inspection reports (made at least weekly), and required logs shall be maintained on site at all times. Inspection reports shall be retained with the SWPPP for at least three years.

The following inspection reports and logs shall be maintained:

- Inspection Reports
- Corrective Action Log
- SWPPP Amendment Log
- Grading and Stabilization Activities Log

5.0 Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

Contact information: _____

_____

Stormwater Construction Site Inspection Report

General Information			
Project Name	**502 Concord Road**		
	Sudbury, MA	**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Describe present phase of construction			

Type of Inspection:
❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ❑Yes ❑No
If yes, provide:
Within 24 Hours: _____ inches
Within 72 Hours: _____ inches
Within 7 days: _____ inches

Weather at time of this inspection?
❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds
❑ Other: Temperature:

Have any discharges occurred since the last inspection? ❑Yes ❑No
If yes, describe:

Are there any discharges at the time of inspection? ❑Yes ❑No
If yes, describe:

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Construction Entrance and Street Sweeping	❑Yes ❑No	❑Yes ❑No	
2	Sediment Basin (if Applicable)	❑Yes ❑No	❑Yes ❑No	Any Evidence of Overtopping_____ Sediment Depth_____
3	Erosion Barrier	❑Yes ❑No	❑Yes ❑No	Any Evidence of Overtopping_____ Sediment Depth_____
4	Soil Stockpile Protection / Stabilization	❑Yes ❑No	❑Yes ❑No	
5	Designated Construction Material Stockpile Areas	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
6	Catch Basin Inlet Protection	❑Yes ❑No	❑Yes ❑No	Any Evidence of Bypass_____
7	Vegetated Swale & Check Dam	❑Yes ❑No	❑Yes ❑No	
8	Are natural resource areas protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
9	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
10	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
11	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
12	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
13	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
14	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
15	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
16	(other)			

Non-Compliance

Describe any incidents of non-compliance not described above:

Additional Comments / Description of Current Site Work

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature:_____ **Date:**_____

SOIL MAPPING

Soil Map—Middlesex County, Massachusetts
(502 Concord Road, Sudbury)

Map Scale: 1:3,180 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

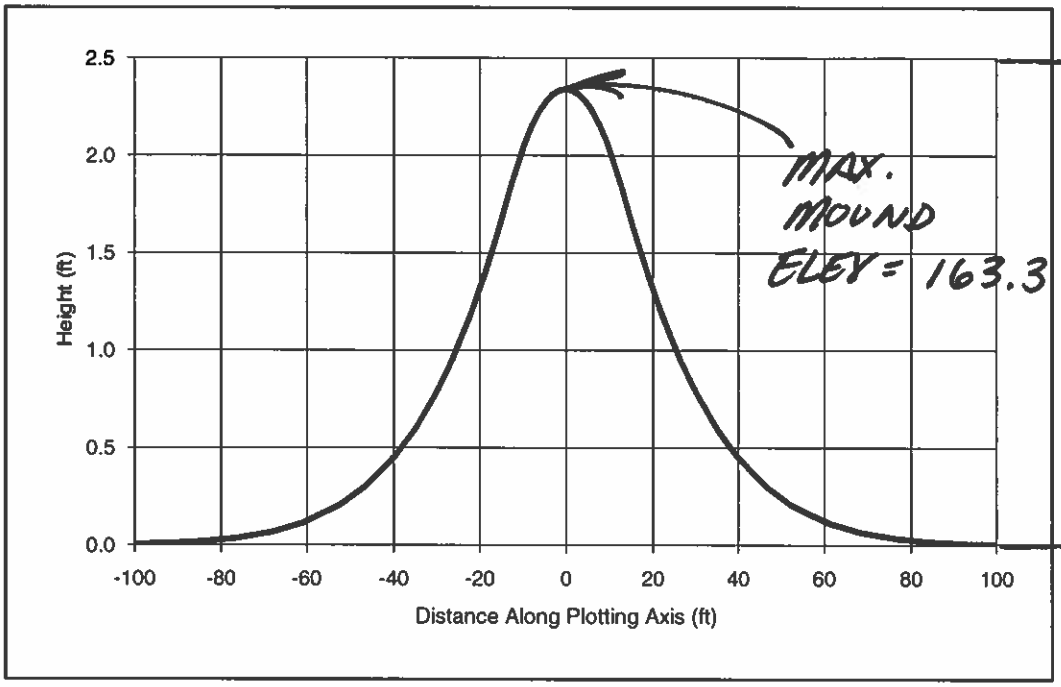
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
51A	Swansea muck, 0 to 1 percent slopes	0.7	1.9%
52A	Freetown muck, 0 to 1 percent slopes	2.8	7.3%
253D	Hinckley loamy sand, 15 to 25 percent slopes	5.6	14.7%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	3.5	9.2%
255A	Windsor loamy sand, 0 to 3 percent slopes	1.2	3.2%
255B	Windsor loamy sand, 3 to 8 percent slopes	0.0	0.0%
255C	Windsor loamy sand, 8 to 15 percent slopes	3.8	10.0%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	7.1	18.7%
307D	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony	5.1	13.5%
653	Udorthents, sandy	2.9	7.7%
654	Udorthents, loamy	5.3	13.8%
Totals for Area of Interest		**38.0**	**100.0%**

MOUNDING SUMMARY

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: CSEI

PROJECT: 502 Concord Road

ANALYST: vc

DATE: 6/2/2023 TIME: 1:35:48 PM

INPUT PARAMETERS

Application rate: 1.504 c.ft/day/sq. ft
Duration of application: 1 days
Fillable porosity: 0.28
Hydraulic conductivity: 16.54 ft/day (RAWLES)
Initial saturated thickness: 10 ft
Length of application area: 74 ft
Width of application area: 26.5 ft
No constant head boundary used
Plotting axis from Y-Axis: 90 degrees
Edge of recharge area:
positive X: 13.2 ft
positive Y: 0 ft
Total volume applied: 2949.344 c.ft ✓

WQV = 2,950

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
-100	0	-100	0
-84.1	0	-84	0.02
-68.2	0	-68	0.07
-52.3	0	-52	0.21
-39.8	0	-40	0.45
-30.1	0	-30	0.78
-22.2	0	-22	1.18
-15.5	0	-15	1.63
-9.7	0	-10	2.05
-5.8	0	-6	2.24
-3.2	0	-3	2.31
0	0	0	2.34
3.2	0	3	2.31
5.8	0	6	2.24
9.7	0	10	2.05
15.5	0	15	1.63
22.2	0	22	1.18
30.1	0	30	0.78
39.8	0	40	0.45
52.3	0	52	0.21
68.2	0	68	0.07
84.1	0	84	0.02
100	0	100	0

Hydrograph for Pond P4: CULTEC

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.0	0	163.50	0.0	0.0	0.0
1.00	0.0	2	163.50	0.0	0.0	0.0
2.00	0.0	6	163.51	0.0	0.0	0.0
3.00	0.0	8	163.51	0.0	0.0	0.0
4.00	0.1	11	163.51	0.1	0.1	0.0
5.00	0.1	13	163.52	0.1	0.1	0.0
6.00	0.1	15	163.52	0.1	0.1	0.0
7.00	0.1	19	163.52	0.1	0.1	0.0
8.00	0.1	24	163.53	0.1	0.1	0.0
9.00	0.2	35	163.54	0.2	0.2	0.0
10.00	0.3	49	163.56	0.2	0.2	0.0
11.00	0.4	82	163.60	0.4	0.4	0.0
12.00	**3.5**	**2,156**	**165.22**	**0.7**	**0.7**	**0.0**
13.00	**0.8**	**3,223**	**165.93**	**1.0**	**0.9**	**0.1**
14.00	0.5	2,389	165.37	0.7	0.7	0.0
15.00	0.4	1,416	164.76	0.6	0.6	0.0
16.00	0.3	500	164.14	0.5	0.5	0.0
17.00	0.2	41	163.55	0.2	0.2	0.0
18.00	0.2	32	163.54	0.2	0.2	0.0
19.00	0.1	27	163.53	0.1	0.1	0.0
20.00	0.1	25	163.53	0.1	0.1	0.0
21.00	0.1	23	163.53	0.1	0.1	0.0
22.00	0.1	20	163.53	0.1	0.1	0.0
23.00	0.1	18	163.52	0.1	0.1	0.0
24.00	0.1	16	163.52	0.1	0.1	0.0
25.00	0.0	0	163.50	0.0	0.0	0.0
26.00	0.0	0	163.50	0.0	0.0	0.0
27.00	0.0	0	163.50	0.0	0.0	0.0
28.00	0.0	0	163.50	0.0	0.0	0.0
29.00	0.0	0	163.50	0.0	0.0	0.0
30.00	0.0	0	163.50	0.0	0.0	0.0
31.00	0.0	0	163.50	0.0	0.0	0.0
32.00	0.0	0	163.50	0.0	0.0	0.0
33.00	0.0	0	163.50	0.0	0.0	0.0
34.00	0.0	0	163.50	0.0	0.0	0.0
35.00	0.0	0	163.50	0.0	0.0	0.0
36.00	0.0	0	163.50	0.0	0.0	0.0
37.00	0.0	0	163.50	0.0	0.0	0.0
38.00	0.0	0	163.50	0.0	0.0	0.0
39.00	0.0	0	163.50	0.0	0.0	0.0
40.00	0.0	0	163.50	0.0	0.0	0.0
41.00	0.0	0	163.50	0.0	0.0	0.0
42.00	0.0	0	163.50	0.0	0.0	0.0
43.00	0.0	0	163.50	0.0	0.0	0.0
44.00	0.0	0	163.50	0.0	0.0	0.0
45.00	0.0	0	163.50	0.0	0.0	0.0
46.00	0.0	0	163.50	0.0	0.0	0.0
47.00	0.0	0	163.50	0.0	0.0	0.0
48.00	0.0	0	163.50	0.0	0.0	0.0

DEWATERED @ 25 hrs (< 72 ✓ OK)

Stage-Area-Storage for Pond P4: CULTEC

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
163.50	1,961	0
163.60	1,981	78
163.70	2,001	157
163.80	2,021	235
163.90	2,041	314
164.00	2,062	392
164.10	2,082	471
164.20	2,102	549
164.30	2,122	670
164.40	2,142	833
164.50	2,162	997
164.60	2,182	1,160
164.70	2,202	1,322
164.80	2,222	1,485
164.90	2,242	1,646
165.00	2,263	1,805
165.10	2,283	1,963
165.20	2,303	2,120
165.30	2,323	2,277
165.40	2,343	2,433
165.50	2,363	2,588
165.60	2,383	2,740
165.70	2,403	2,889
165.80	2,423	3,036
165.90	2,443	3,179
166.00	2,464	3,319
166.10	2,484	3,455
166.20	2,504	3,586
166.30	2,524	3,713
166.40	2,544	3,833
166.50	2,564	3,944
166.60	2,584	4,045
166.70	2,604	4,136
166.80	2,624	4,217
166.90	2,644	4,297
167.00	2,665	4,376
167.10	2,685	4,456
167.20	2,705	4,536
167.30	**2,723**	4,609
167.40	2,723	4,610
167.50	2,723	4,611
167.60	2,723	4,613
167.70	2,723	4,614
167.80	2,723	4,615
167.90	2,723	4,616
168.00	2,723	4,618
168.10	2,723	4,619
168.20	2,723	4,620
168.30	2,723	4,621
168.40	2,723	4,623
168.50	2,723	4,624
168.60	2,723	4,625
168.70	2,723	4,626
168.80	2,723	4,628
168.90	2,723	4,629
169.00	2,723	4,630
169.10	2,723	4,631
169.20	2,723	4,633
169.30	2,723	4,634
169.40	2,723	4,635
169.50	2,723	4,637
169.60	2,723	4,638
169.70	2,723	4,639
169.80	2,723	4,640
169.90	2,723	4,642
170.00	2,723	4,643
170.10	2,723	4,644
170.20	2,723	4,645
170.30	2,723	4,647
170.40	2,723	4,648
170.50	2,723	4,649
170.60	2,723	4,650
170.70	2,723	4,652
170.80	2,723	4,653
170.90	2,723	4,654
171.00	2,723	4,655
171.10	2,723	4,657
171.20	2,723	4,658
171.30	2,723	4,659
171.40	2,723	4,660
171.50	2,723	4,662
171.60	2,723	4,663
171.70	2,723	4,664
171.80	2,723	4,665
171.90	2,723	4,667
172.00	2,723	4,668
172.10	2,723	4,669
172.20	2,723	4,670
172.30	2,723	4,672
172.40	2,723	4,673
172.50	2,723	4,674
172.60	2,723	4,675
172.70	2,723	4,677
172.80	2,723	4,678
172.90	2,723	4,679
173.00	2,723	4,680
173.10	2,723	4,682
173.20	2,723	4,683
173.30	2,723	4,684
173.40	2,723	**4,686**

OVERFLOW
ELEV = 165.75
VOL = 2,950