St. Paul's School New Squash Center
85, 87, 89 Dunbarton Road
Concord, New Hampshire

PROJECT NARRATIVE

The approximately 1.83-acre site (Site) is located at 85, 87, 89 Dunbarton Road in Concord, New Hampshire, listed as Tax Map 724Z Lot 1-10A and Map 811Z Lot 1-A. The site currently houses the Athletic and Fitness Center (AFC) for St. Paul's School. This project proposes to relocate the existing squash courts—currently situated elsewhere on campus—to a new addition integrated with the AFC building.

The project area is located behind the existing AFC building and currently functions as a secondary egress route, a parking lot, and a facility/maintenance access zone. The site includes two parking lot areas with a total of 90 parking spaces including 5 accessible parking spaces, with a center landscape island. The site is situated within a hill with steep slopes and a significant grade change to an unnamed brook and wetland to the South. There is also an access road leading to Matthes Cages building for authorized use by facility maintenance vehicles. The site is located within the St. Paul's School campus, bounded by Dunbarton Road to the north, a residential property owned by the school to the west, an unnamed brook/wetland to the south, and the Turkey River to the east. The Turkey River is located approximately 300 feet East of the Site. According to the City of Concord Zoning Map, the property and surrounding area are within the Institutional District.

St. Paul's School proposes an approximately 17,600 square-foot building addition that will connect to the AFC's first and second floor and be elevated on columns. This will allow for minimal earth disturbance and will create a canopy area below that maintains secondary egress to the adjacent parking lot area. The existing parking lot will remain with minor layout and landscaping revisions. A new 12-foot-wide access road will connect the upper parking area to the lower facility maintenance zone and AFC egress door. Minor parking lot revisions will allow for the addition of 7 new parking spaces well maintaining the existing 5 accessible parking spaces. Additionally, there will be stormwater improvements to the site to mitigate any new stormwater runoff from the proposed increased impervious surface. These will include additional catch basins, drainage manholes, a 3-foot wide riprap outlet control edge at the edge of pavement, and a subsurface infiltration gallery located in the bottom parking area. Minor regrading will be included to redirect stormwater into the subsurface gallery. Overall, these improvements will enhance stormwater management and environmental performance on this site.

Nobis Group®
18 Chenell Drive
Concord, NH 03301
T (603) 224-4182

September 17, 2025 – Revised October 30th, 2025
File No. 100811.040

City of Concord – Planning Board
41 Green Street
Concord, NH 03301
(603) 522-6205

Re: Waiver Request for Major Site Plan Application
St. Paul's School New Squash Center
Tax Map 724Z/Lot 1-10A & Map 811Z Lot 1-A
85, 87, 89 Dunbarton Road
Concord, NH 03303

On behalf of St. Paul's School, the applicant requests a waiver from the following sections of the City of Concord Site Plan Regulations:

1. Section 12.02(1)(a)
2. Section 12.04(4)
3. Section 12.07
4. Section 15.02(8)
5. Section 15.03(1)
6. Section 15.03(2)
7. Section 15.03(18)
8. Section 15.03(19)
9. Section 15.03(22)
10. Section 15.03(23)(c)
11. Section 15.04(1)
12. Section 15.04(2)
13. Section 15.04(22)
14. Section 15.04(27)
15. Section 16.02(7)
16. Section 16.02(22)
17. Section 18.13
18. Section 18.17
19. Section 29-1-2(a)(1)
20. Section 26.02

Nobis Group®
18 Chenell Drive
Concord, NH 03301
T (603) 224-4182

5 Criteria for Waivers:

1) The granting of the waiver will not be detrimental to the public safety, health, or welfare or injurious to other property;

Granting the above waivers will not be detrimental to the public safety as most of the waivers are to omit information on the plans that do not enhance the plans and project. This project will enhance the public safety, health and welfare of the public and will be a great improvement for the City of Concord.

2) The conditions upon which the request for a waiver is based are unique to the property for which the waiver is sought and are not applicable generally to other property;

The Site is unique in that it houses multiple different athletic facilities for St. Paul's School including the Stovell Tennis Courts, the Athletic and Fitness Center (AFC), and Matthes Cage Athletic Facility. The rest of this site includes the associated parking for these facilities and access road and sidewalk as a secondary egress to the AFC building. The site is also bound by steep slopes and wetlands to the south and the Turkey River located approximately 300 feet to the east. The existing infrastructure and natural boundaries limit the available space for site improvements and creates a set of conditions that are specific to this site.

3) *Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, a particular and unnecessary hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations are carried out;*

The site is confined by the existing building, associated parking lot, and steep slopes. The proposed project will involve an addition to the AFC building for St. Paul's School new squash center and will involve a new layout for the existing access road, improvements within the parking lot area, as well as stormwater management improvements. Due to the limited available space and the site's challenging topography, strict adherence to the regulations would impose a substantial and unnecessary hardship on the property owner

4) Specific circumstances relative to the site plan or conditions of the land where a site plan is proposed indicate that the waiver will properly carry out, or not be contrary to, the spirit and intent of these regulations;

Granting the waivers will still allow the Board and the public to conduct a full review of the project, meeting the spirit and intent of the regulations.

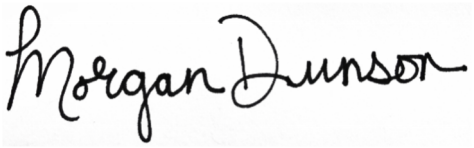
5) The waivers will not in any manner vary the provisions of the Zoning Ordinance, Master Plan Reports, or Zoning Map.

The waivers do not vary from the Zoning Ordinance, Master Plan or Zoning Map.

If you have questions or require additional information, please contact us at (603) 290-5328 or mdunson@nobis-group.com.

Sincerely,

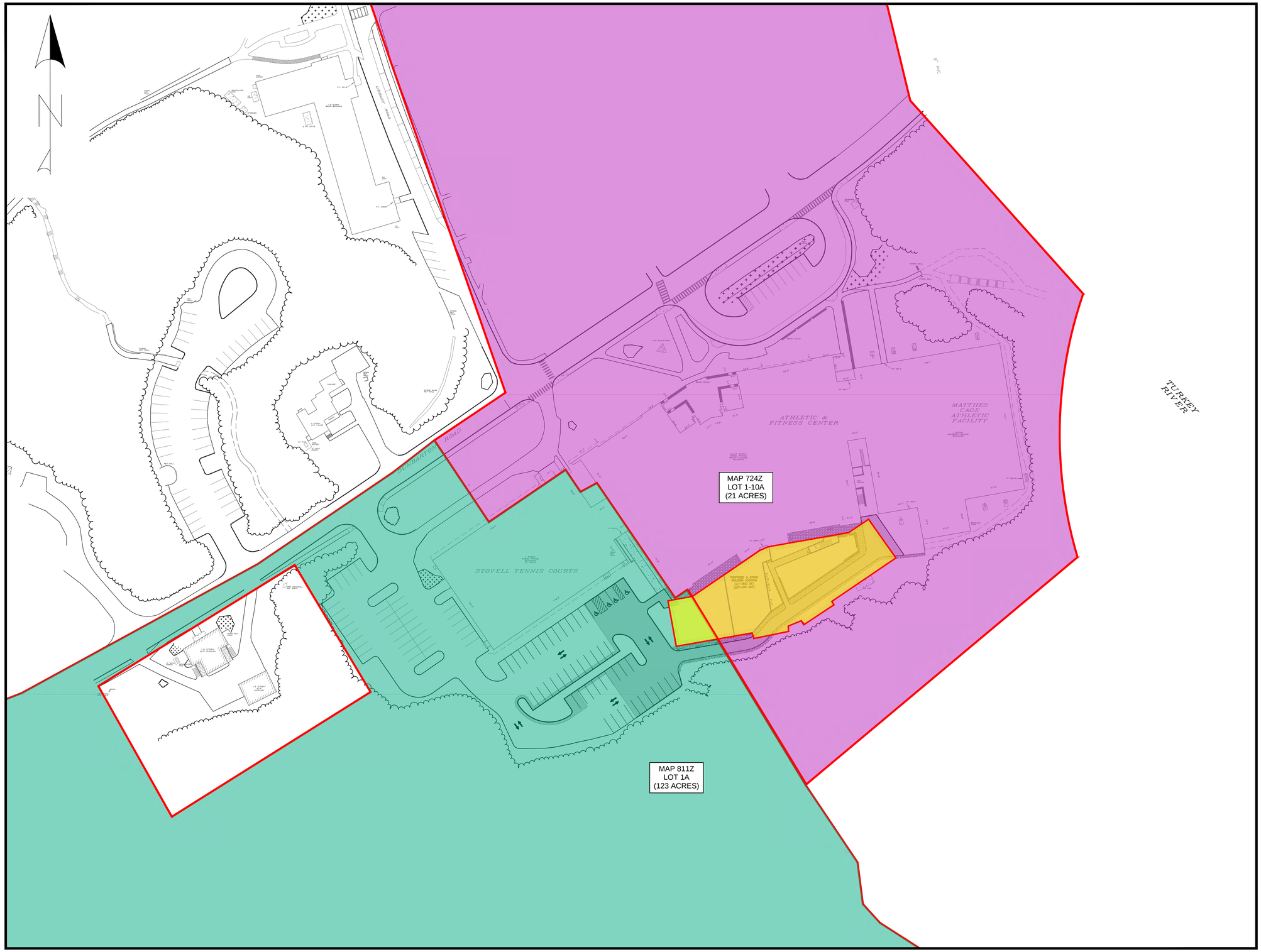
NOBIS GROUP®



Morgan Dunson
Project Engineer

ST. PAUL SQUASH FACILITY - 87 DUNBARTON RD. - Waiver Requests 9/17/2025 - revised 10/30/2025			
No.	**Section**	**Regulation Wording**	**Waiver Request**
1	29.2-1-2(a)(1)	Per Section 29.2-1-2(a)(1), any person or entity which seeks to undertake new development within the City of Concord, shall pay impact fees to the City in the manner and in the amounts set forth in the ordinance. Per Article 29.2-1-2(e)(1) of the Zoning Ordinance, an applicant may apply for a waiver of all or part of the impact fees that are payable with respect to new development or redevelopment. Per Article 29.2-1-2(e)(4)(a) of the Zoning Ordinance, an applicant for the development of permitted nonresidential uses shall qualify for a waiver of the transportation facilities impact fees. The Clerk determines the impact fee at the time of building permit application, and the applicant must request the waiver prior to the date of the	The proposed project is a permitted non-residential use. A waiver is requested to defer all impact fees.
2	12.02(1)(a)	***All Applications:*** The following information shall be required on all plans and drawings except for the Preliminary Conceptual Consultation Phase: (1) Title Block: (a) Title of plan; (b) Name and address of the owner and applicant; (c) The date the plan was prepared and date of subsequent revisions; and (d) Name, address and seal of the licensed professionals who prepared the plan. (2) Scale. (3) North Arrow and Bar Scale except for detail drawings	A waiver is requested for the Existing Conditions Plat as they are based on the Owner of Record not a specific project and have a different title of plan than the rest of the civil plans.
3	12.04(4)	***Location Plan*** **:** Each site plan application shall have on the site plan, or a cover sheet, a detailed location plan prepared at a minimum scale of 1"= 400' showing clearly the following information: (1) Proposed property to be developed; (2) Property lines; (3) Abutter's property lines; (4) Names and locations of nearby and adjacent City streets; (5) Names and locations of adjacent water bodies and watercourses; (6) Names and locations of nearby and adjacent parks, schools, churches, and other significant physical and man made features; (7) Nearest street intersections; (8) The tax assessor's map, block and lot number for abutters and the properties to be developed; (9) Zoning district designations and boundaries; and (10) Other special information which may be required by the Planning Board.	A waiver is requested to not name and provide nearby and adjacent city streets as at scale there are no city streets within the campus site. All adjacent streets including Interstate 89 and private roads are shown at scale in the location plan.
4	12.07	***Wetland Delineations:*** Wetland delineations are to be prepared by a New Hampshire Certified Wetland Scientist who shall sign and seal the exisitng condition plan and site plan. The date of the wetland delineation shall be noted on plans.	Wetland delineations were delineated by John J. St. John, CWS #221 in july 2024 as noted on the existing conditions and site plan overview plan. The seal of the wetland scientist is only provided on the existing conditions plan. A waiver is requested to not provide the seal of the wetland scientist on the site plans. Wetland scientist do not seal site plans, only the project engineer. Our site plans do reference the existing conditions plan which is stamped.
5	15.02(8)	***Site Plan Regulations: Addresses:*** The address of each existing and proposed building or use shall be noted on the site plan as approved by the City Engineer, aswell as, addresses for abutting properties.	A waiver is requested to not provide the address of each existing buildings on the site plan. All buildings within the project area have the addresses provided and all addresses outside of the project area are provided in the location plan.
6	15.03(1)	***Exisiting Conditions Plan: Property Lines***: The property lines of the parcel to be developed with bearings and dimensions;	A waiver is requested to not provide the propery lines of the parcel to be developed. All abutting parcels at scale are owned by St. Paul's School and their property lines are shown in the location plan.
7	15.03(2)	***Exisiting Conditions Plan: Abutters:*** The full names and addresses of all property owners and abutters as indicated in the records of the City Tax Assessor not more than five (5) days before the filing of the application. The Tax Assessor's Map-Block-Lot number for each parcel;	A waiver is requested to not provide all property owners and abutters on the exisiting conditions plan as all property owners and abutters are St. Paul's School.
8	15.03(18)	***Exisiting Conditions Plan: Lighting:*** The type and location of existing outdoor lighting;	A waiver is requested to not show the type of existing lighting on the existing conditions plan, locations are shown.
9	15.03(19)	***Exisiting Conditions Plan: Setbacks and Buffers:*** Setbacks and buffer yards shall be shown and dimensioned including wetland buffers, Shoreland Protection District buffers, buffers to bluffs, and Residential District buffers;	A waiver is requested to not show the building setbacks as this lot is not near property lines and is well within the St. Paul's School Campus.
10	15.03(22)	***Exisiting Conditions Plan: Abutting Properties*** **:** Existing abutting properties including intersecting property lines, buildings, wells and septic systems, owners name and address, property address, and Tax Assessors Map-Block-Lot number.;	A waiver is requested to not include abutting properties intersecting property lines, owners name and address, property address, and Tax Assessors Map-Block-Lot number as they are provided in the location map and are all St. Paul's School.
11	15.03(23)(c)	***Existing Condition Plan: Tabulations:*** *Square feet of each existing building broken down by floor and use category;*	A waiver is requested to not provide square footage of each existing building broken down by floor and use category as the entire AFC and Squash addition are the same use.
12	15.04(1)	***Proposed Site Plan: Property Lines:*** The property lines of the parcel to be developed withbearings and dimensions;	A waiver is requested to not provide the propery lines of the parcel to be developed. All abutting parcels at scale are owned by St. Paul's School and their property lines are shown in the location plan.
13	15.04(2)	***Proposed Site Plan: Abutting Property:*** Existing abutting properties including intersecting property lines, buildings, wells and septic systems, owners name and address, property address, and Tax Assessors Map-Block-Lot number. The full names and addresses of all property owners and abutters shall be provided as	A waiver is requested to not include abutting properties intersecting property lines, owners name and address, property address, and Tax Assessors Map-Block-Lot number as they are provided in the location map and are all St. Paul's School.
14	15.04(22)	***Proposed Site Plan: Setbacks and Buffers:*** The location and dimensions of all yard setbacks, wetland buffers, Shoreland Protection District buffers, buffers to bluffs, and Residential District Buffers;	A waiver is requested to not show the building setbacks as this lot is not near property lines and is well within the St. Paul's School Campus.
15	15.04(27)	***Proposed Site Plan: Fire Suppression:*** Any existing or proposed fire alarm service and fire suppression system shall be noted on the plans. All fire lanes and fire access shall be noted, shown on the plans and dimensioned as required in Section 28, Fire Protection;	A waiver is requested to not provide fire access lanes a currently there is none, fire supression will be connected to the AFC internally.
16	16.02(7)	***Site Plan Requirements: Addresses:*** The address of each existing and proposed building and/or unit shall be noted on the plan as approved by the City Engineer.	A waiver is requested to not provide the address of each existing buildings on the site plan. All buildings within the project area have the addresses provided and all addresses outside of the project area are provided in the location plan.

17	16.02(22)	***Site Plan Requirements: Construction Details:*** Construction details shall be provided for all utilities, driveways and parking areas, pavement markings, sidewalks and patios, drainage facilities and structures, informational, regulatory and directional signage, outdoor recreation facilities, common mailboxes, street furniture, solid waste receptacles, buffer walls and fences, retaining walls, landscaping, and site lighting. Unless specifically waived by the Planning Board, construction details shall be provided which conform to the City of Concord Construction Standards and Details.	A waiver is requested for the following Construction Details: a. SD-6 (Catch Basin) to allow no sumps within the catch basin(s) proposed within the level-1 build out area, this is requsted as there is shallow ledge within the project area and multiple site constraints with existing/proposed building foundations/footings. The catch basins within the parking lot area connected to the proposed subsurface gallery will include the required sump. b. M-4 (Parking Space Layout) for the accessible parking layout, as a sidewalk is not proposed and parking space stalls are shown as 9' wide. c.To allow Cape Cod Berm Curbing where being replaced with existing CCB in the parkig lot areas. All other new curbing is proposed as granite.
18	18.13	***Interior Parking Lot Landscaping:*** Perimeter parking lot landscaping shall be provided as set in Article 28-7, Access Circulation and Parking of the City of Concord Zoning Ordinance, and Section 27, Landscaping and Erosion Control. Where the provision of off-street parking for fifty (50) or more vehicles is required, there shall be landscaped open space within the perimeter of the parking lot in the minimum amount of five (5) percent of the gross parking lot area. Where more than 375 parking spaces are required, landscaped open space shall be provided within the perimeter of the parking lot in the minimum amount of six (6) percent of the gross parking lot area. Where more than 750 parking spaces are required, landscaped open space shall be provided within the perimeter of the parking lot in the minimum amount of seven (7) percent of the gross parking lot area. Internal parking lot islands and permeable parking lot paving shall be considered as part of the overall parking lot area, while perimeter landscaping, sidewalks, patios, impervious vehicular storage areas for the sale and rental of vehicles and paved outside storage areas, where allowed, shall not be included in the area used to determine the amount of interior parking lot area required. Internal parking lot landscape islands shall be a minimum of nine (9) feet in width.	A waiver is requested to provide internal parking lot landscaping calcs based on only the project area.
19	18.17	***Tree Plantings:*** Tree plantings in and around parking areas shall be provided as set forth in Article 28-7, Access Circulation and Parking of the City of Concord Zoning Ordinance, and Section 27, Landscaping and Erosion Control of these regulations. One tree shall be planted for each 1000 square feet of any proposed parking area including parking spaces, internal landscape islands, access aisles, driveways, fire lanes, and other vehicular circulation areas. Perimeter landscaping, sidewalks, patios, impervious vehicular storage areas for the sale and rental of vehicles, and paved outside storage areas, where allowed, shall not be included in the area used to determine the amount of tree planting required. Trees required shall be planted within the internal parking lot islands, around the perimeter of the parking area within twenty (20) feet or the parking lot, or in landscaped areas between buildings and the parking field. Existing trees preserved on the site may count on a one for one basis when located within twenty (20) feet of any parking lot, access aisle, vehicular sale or rental area, driveway or loading area.	The proposed development is within a forested area of the property with large trees. A waiver is requested to provide proposed trees within the project area (parking lot areas & access road) with a density of 1 Tree per 2,000 SF as stated in the City of Concord's Zoning Ordinance Section 28-7-10(d).
20	26.02	***Mechanical Equipment:*** Roof top and ground mounted mechanical equipment shall be provided with full screening from both abutting properties and public rights of way. In the Industrial (IN) Zoning District, the Board may reduce or eliminate this requirement where the proposed equipment will not be readily viewed outside the IN District. Where grades or unusually large equipment is required and full screening is not possible, the Board shall require appropriate screening, baffling, cosmetic treatments or a combination of measures, to reduce the visual, glare and noise impacts of said equipment on abutting properties and the public right-of-way. Roof top mechanical equipment shall be provided with solid opaque or louvered screens which are designed to block views, glare and noise from abutting properties. Screens shall be as high as the tallest mechanical unit. Solar collectors shall be mounted so that reflective glare off-site and into adjacent buildings is minimized.	A waiver is requested to not provide screening of mechanical equipment. The proposed development is uniquely situated within the core of a 2,000-acre school campus, behind the existing AFC building, and is entirely surrounded by school-owned property. Due to its secluded location, the roof-mounted mechanical equipment will not be visible from any surrounding parcels. The nearest abutting development is a faculty residence to the west, with wetlands and the Turkey River to the south and east, further minimizing any potential visual impact. Given the context of the campus and the absence of public or residential exposure, screening the mechanical equipment would not provide any aesthetic or functional benefit to the development or surrounding area. Refer to the architectural renderings. The MEP roof equipment is not near any property lines with an approximate 200-ft distance to the south property line which provides adequate screening/buffer.



SASAKI
110 CHAUNCY STREET BOSTON MA 02111 USA
P 617 926 330 F 617 924 2748 W SASAKI.COM

nobis
Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

NOT ISSUED FOR CONSTRUCTION

No.	Description	Date

DRAWING ISSUE & REVISION HISTORY

Seal

ST. PAUL'S SCHOOL
NEW SQUASH CENTER

85, 87, 89 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

TAX MAP:
MAP 724Z/ LOT 1-10A
MAP 811Z LOT 1-A

OWNER/APPLICANT:
ST. PAUL'S SCHOOL
325 PLEASANT STREET
CONCORD, NEW HAMPSHIRE

Nobis Project No: **100811.040**
Sasaki Project No: **250018.00**
Drawn By: **NOBIS - MGD/CMB**
Checked By: **NOBIS - JCN/NCP**
Approved By: **NOBIS - JCN**
Issue Date: **09.17.2025**

0 50' 100'
GRAPHIC SCALE
1 INCH = 50 FEET

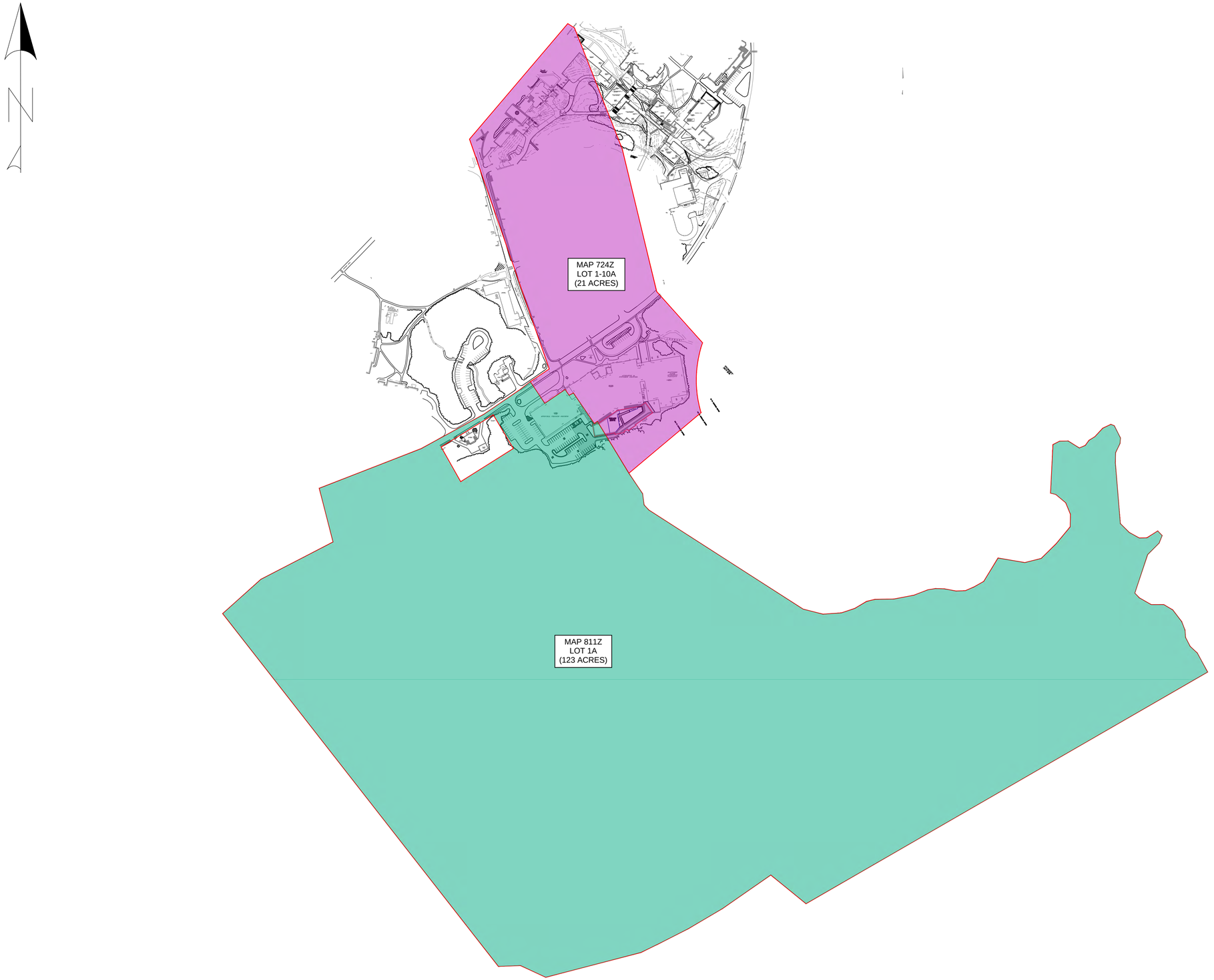
SHEET TITLE

PARCEL BOUNDARIES

EXHIBIT
D

J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-200-SITE.dwg 10/6/2025 10:52 AM

Plot Date: 10/6/2025 File: J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-200-SITE.dwg Saved By: mdunson



SASAKI
110 CHAUNCY STREET BOSTON MA 02111 USA
P 617 926 330 F 617 924 2748 W SASAKI.COM

nobis
Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

NOT ISSUED
FOR
CONSTRUCTION

No.	Description	Date

DRAWING ISSUE & REVISION HISTORY

Seal

ST. PAUL'S SCHOOL
NEW SQUASH CENTER

85, 87, 89 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

TAX MAP:
MAP 724Z/ LOT 1-10A
MAP 811Z LOT 1-A

OWNER/APPLICANT:
ST. PAUL'S SCHOOL
325 PLEASANT STREET
CONCORD, NEW HAMPSHIRE

Nobis Project No: **100811.040**
Sasaki Project No: **250018.00**
Drawn By: **NOBIS - MGD/CMB**
Checked By: **NOBIS - JCN/NCP**
Approved By: **NOBIS - JCN**
Issue Date: **09.17.2025**

0 200' 400'
GRAPHIC SCALE
1 INCH = 200 FEET

SHEET TITLE

PARCEL
BOUNDARIES

EXHIBIT
E

J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-200-SITE.dwg 10/6/2025 10:38 AM

Plot Date: 10/6/2025 File: J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-200-SITE.dwg Saved By: mdunson

NH NATURAL HERITAGE BUREAU REVIEW

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: Morgan Dunson
18 Chenell Dr
Concord, NH 03301

From: NH Natural Heritage Bureau

Date: 1/29/2025 (This letter is valid through 1/29/2026)

Re: Review by NH Natural Heritage Bureau of request dated 1/29/2025

Permit Types: Concord
Alteration of Terrain Permit

NHB ID: NHB25-0298

Applicant: Morgan Dunson

Location: Concord
Tax Map: 724Z, Tax Lot: 1-12
Address: 87 Dunbarton Rd

Proj. Description: The proposed project consist of constructing a 16,000 SF building addition for Squash program at St. Paul's School. The addition will be connected to the existing Athletic Fitness Center.

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

MAP OF PROJECT BOUNDARIES FOR: NHB25-0298

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

CITY OF CONCORD

New Hampshire's Main Street™

Zoning Board of Adjustment

AnneMarie Skinner, AICP
City Planner

November 8, 2024

Ari B. Pollack
Gallagher, Callahan & Gartrell, P.C.
214 N Main St
Concord, NH 03301

RE: Notice of Decision – ZBA 0230-2024

Dear Mr. Pollack:

At a meeting of the Concord Zoning Board of Adjustment, held on November 6, 2024, the Board voted on the following:

> Ari Pollack with Gallagher, Callahan, & Gartrell, on behalf of St. Paul's School, requests approvals for variances from Section 28-7-2(e)(B) *Table of Off-Street Parking Requirements*, to allow 96 parking spaces where 1,334 parking spaces are required; Section 28-7-5 *Requirements for Handicapped Accessible Parking Spaces*, to allow 5 accessible parking spaces where 24 accessible parking spaces are required; and Section 28-4-3(c)(1) *Wetland Buffers and Setbacks – Certain Uses Prohibited in Buffers*, to allow construction of a building or structure in 8,200 square feet of wetland buffer where construction of a building in a wetland buffer is prohibited, at Tax Map Lot 724Z 1 and Tax Map Lot 811Z 1, generally located at 87 Dunbarton Rd, in the Institutional (IS) District and the Open Space Residential (OS) District. **(ZBA-0230-2024)**

With a vote of 5-0, the Board approved the three variance requests.

The appeal was granted for the request as submitted and approved by the Board based on information presented to the Board and oral testimony. If there is a significant change at any time in the future, you are hereby advised to discuss any proposed changes with the City Planner. If the use or construction authorized by this approval has not commenced within the two-year anniversary date of the original decision, it shall be deemed to have expired and authorization shall be considered null and void as specified in Section 28-9-3(b)(5) of the Zoning Ordinance.

This project also requires Planning Board approval. Granting of a variance does not authorize construction or use prior to the application for and issuance of a building permit, if applicable. Written findings of fact and minutes shall be available for public inspection at the Planning Division within five business days of the vote.

If you have any questions, please contact City Planner, AnneMarie Skinner, at askinner@concordnh.gov or (603) 230-3636.

Zoning Board of Adjustment

/AMS

CITY OF CONCORD

New Hampshire's Main Street™

Zoning Board of Adjustment

AnneMarie Skinner, AICP
City Planner

November 8, 2024

Ari B. Pollack
Gallagher, Callahan & Gartrell, P.C.
214 N Main St
Concord, NH 03301

RE: Notice of Decision – ZBA 0230-2024

Dear Mr. Pollack:

At a meeting of the Concord Zoning Board of Adjustment, held on November 6, 2024, the Board voted on the following:

> Ari Pollack with Gallagher, Callahan, & Gartrell, on behalf of St. Paul's School, requests approvals for variances from Section 28-7-2(e)(B) *Table of Off-Street Parking Requirements*, to allow 96 parking spaces where 1,334 parking spaces are required; Section 28-7-5 *Requirements for Handicapped Accessible Parking Spaces*, to allow 5 accessible parking spaces where 24 accessible parking spaces are required; and Section 28-4-3(c)(1) *Wetland Buffers and Setbacks – Certain Uses Prohibited in Buffers*, to allow construction of a building or structure in 8,200 square feet of wetland buffer where construction of a building in a wetland buffer is prohibited, at Tax Map Lot 724Z 1 and Tax Map Lot 811Z 1, generally located at 87 Dunbarton Rd, in the Institutional (IS) District and the Open Space Residential (OS) District. **(ZBA-0230-2024)**

With a vote of 5-0, the Board approved the three variance requests.

The appeal was granted for the request as submitted and approved by the Board based on information presented to the Board and oral testimony. If there is a significant change at any time in the future, you are hereby advised to discuss any proposed changes with the City Planner. If the use or construction authorized by this approval has not commenced within the two-year anniversary date of the original decision, it shall be deemed to have expired and authorization shall be considered null and void as specified in Section 28-9-3(b)(5) of the Zoning Ordinance.

This project also requires Planning Board approval. Granting of a variance does not authorize construction or use prior to the application for and issuance of a building permit, if applicable. Written findings of fact and minutes shall be available for public inspection at the Planning Division within five business days of the vote.

If you have any questions, please contact City Planner, AnneMarie Skinner, at askinner@concordnh.gov or (603) 230-3636.

Zoning Board of Adjustment

/AMS

NHDES ALTERATION OF TERRAIN PERMIT APPLICATION & STORMWATER MANAGEMENT PLAN

ST. PAUL'S SCHOOL NEW SQUASH CENTER
87 DUNBARTON ROAD
CONCORD, NH 03301

FOR

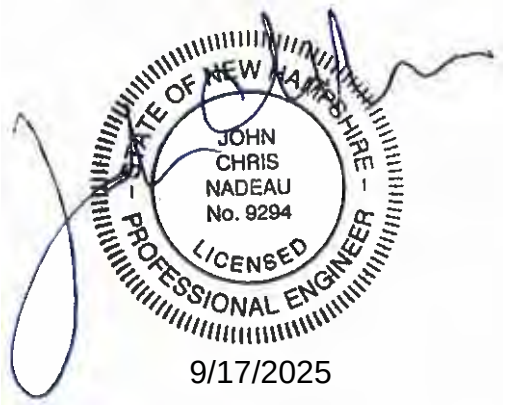
ST. PAUL'S SCHOOL

325 PLEASANT STREET
CONCORD, NH 03301

BY
NOBIS GROUP®

(800) 394-4182

www.nobis-group.com



Nobis Project No. 100811.040

SEPTEMBER 17, 2025

TABLE OF CONTENTS

Pre-Development Drainage Area Plan – Figure 3
Post-Development Drainage Area Plan – Figure 4

HYDRAULIC CALCULATIONS

Extreme Precipitation Tables
Existing Conditions
- Drainage Diagram
- Area Listing
- Soil Listing
- 2 Year Storm – Node Listing
- 10 Year Storm – Node Listing
- 25 Year Storm – Node Listing
- 50 Year Storm – Node Listing
- 100 Year Storm – Node Listing
- 10 Year Storm – Full Summary

Proposed Conditions
- Drainage Diagram
- Area Listing
- Soil Listing
- 2 Year Storm – Node Listing
- 10 Year Storm – Node Listing
- 25 Year Storm – Node Listing
- 50 Year Storm – Node Listing
- 100 Year Storm – Node Listing
- 10 Year Storm – Full Summary

SITE SPECIFIC SOIL SURVEY REPORT

Narrative
Map Unit Key and Soil Descriptions
Test Pit Logs
SSSNE Soil Map Pre-Development (Color) – Figure 5
SSSNE Soil Map Post-Development (Color) – Figure 6

INFILTRATION FEASIBILITY REPORT

INFILTRATION TO GROUNDWATER (5H1) FORM

INSPECTION AND MAINTENANCE MANUAL

BMP PLAN

NHDES ALTERATION OF TERRAIN APPLICATION

ALTERATION OF TERRAIN PERMIT APPLICATION

Water Division / Alteration of Terrain Bureau
Land Resources Management Program
Check the status of your application

RSA / Rule: RSA 485-A:17, Env-Wq 1500

Administrative Use Only	Administrative Use Only	Administrative Use Only	File Number:
			Check No.
			Amount:
			Initials:

1. APPLICANT INFORMATION (INTENDED PERMIT HOLDER)		
Applicant Name: St. Paul's School	Contact Name: Derek Russell	
Email: drussell@sps.edu	Daytime Telephone: 603-229-4600	
Mailing Address: 325 Pleasant Street		
Town or City: Concord	State: NH	ZIP: 03301
2. APPLICANT'S AGENT INFORMATION *If none, check box:* ☐		
Agent's Name:	Contact Name:	
Email:	Daytime Telephone:	
Address:		
Town or City:	State:	ZIP:
3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT) *If more than one, check box:* ☐ *Attach additional sheets as necessary.*		
Owner's Name:	Contact Name:	
Email:	Daytime Telephone:	
Mailing Address:		
Town or City:	State:	ZIP:
4. PROPERTY OWNER'S AGENT INFORMATION *If none, check box:* ☐		
Business Name:	Contact Name:	
Email:	Daytime Telephone:	
Address:		
Town or City:	State:	ZIP:
5. CONSULTANT INFORMATION *If none, check box:* ☐		
Engineering Firm: Nobis Group	Contact Name: John C. Nadeau	
Email: cnadeau@nobis-group.com	Daytime Telephone: (603) 724-6227	
Address: 18 Chenell Drive		
Town or City: 18 Chenell Drive	State: NH	ZIP: 03301

6. PROJECT TYPE

☐ Excavation Only	☐ Residential	☐ Commercial	☐ Golf Course	■ School	☐ Municipal
☐ Agricultural	☐ Land Conversion	☐ Other:			

7. PROJECT LOCATION INFORMATION

Project Name: St. Paul's School New Squash Center

Street or Road Address: 87 Dunbarton Road

Town or City: Concord		County: Merrimack	
Tax Map: 724	Block: Z	Lot Number: 1-12	Unit:

Post-development, will the proposed project withdraw from or directly discharge to any of the following?

If yes, identify the purpose.

Stream or Wetland?	■ Yes ☐ No	☐ Withdrawal ■ Discharge
Purpose: Stormwater		
Artificial pond created by impounding a stream or wetland?	☐ Yes ■ No	☐ Withdrawal ☐ Discharge
Purpose:		
Unlined pond dug into the water table?	☐ Yes ■ No	☐ Withdrawal ☐ Discharge
Purpose:		

Post-development, will the proposed project discharge to:

- Within one-quarter mile of a surface water impaired for phosphorus and/or nitrogen? ■ No ☐ Yes
- Within one-quarter mile of a Class A surface water or within the watershed area of an Outstanding Resource Water? ■ No ☐ Yes
- Within one-quarter mile of a lake or pond not covered previously? ■ No ☐ Yes

Project area is approximately 730-ft from Library Pond to the North.

Is the project a high load area? ☐ Yes ■ No

If yes, specify the type of high load land use or activity:

Is the project within a Water Supply Intake Protection Area (WSIPA)? ☐ Yes ■ No

Is the project within a Groundwater Protection Area (GPA)? ☐ Yes ■ No

Will the well setbacks identified in Env-Wq 1508.02 be met? ■ Yes ☐ No

Is any part of the property within the 100-year floodplain? ■ Yes ☐ No Project area is not within 100-year floodplain.

If yes, cut volume, in cubic feet, within the 100-year floodplain: 0 CY

Fill volume, in cubic feet, within the 100-year floodplain: 0 CY

☐ Project *is* within ¼ mile of a designated river	Name of River:

■ Project *is not* within ¼ mile of a designated river.

☐ Project *is* within a Coastal/Great Bay Region community.

■ Project *is not* within a Coastal/Great Bay Region community.

8. BRIEF PROJECT DESCRIPTION *(Please do not reply "see attached")*

St. Paul's School plans to relocate the existing Squash Courts to be a part of the AFC building at 87 Dunbarton Road in Concord, New Hampshire. This area is currently used as a secondary form of egress and loading area for the AFC and includes a parking lot and paved access road for authorized facility vehicles. This proposed development consists of the addition to the AFC building, new parking and access road layout, site grading and drainage improvements.

9. IF APPLICABLE, DESCRIBE ANY WORK STARTED PRIOR TO RECEIVING PERMIT.

N/A

10. ADDITIONAL REQUIRED INFORMATION

A. Date a copy of the application was sent to the municipality, as required by Env-Wq 1503.05(e) (Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the governing body of each municipality in which the project is proposed).

☐ Proof of delivery is attached	Date:

B. Date a copy of the application was sent to the local river advisory committee, if required by Env-Wq 1503.05(e) (Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the Local River Advisory Committee, if the project is within ¼ mile of a designated river).

☐ Proof of delivery is attached	Date:

C. Type of plan required:

☐ Land Conversion ■ Detailed Development ☐ Excavation, Grading and Reclamation ☐ Steep Slope

D. Additional plans required:

■ Stormwater Drainage and Hydrologic Soil Groups ☐ Source Control ☐ Chloride Management

E. Total area of disturbance in square feet: 46,378 SF of disturbance (Project area = 79,732 SF - DAP limits)

F. Additional impervious cover as a result of the project, in square feet (*use "-"to indicate a net reduction in impervious coverage):* 12,721 SF

Total final impervious cover, in square feet: 46,081 SF

G. Total undisturbed cover, in square feet: Within project area = 33,354 SF

H. Number of lots proposed: N/A

I. Total length of roadway, in linear feet: N/A

J. Name(s) of receiving water(s): Turkey River

K. Identify all other NHDES permits required for the project. For each, indicate whether an application has been filed and is pending. If the required approval has been issued, provide the permit number, registration date, or approval letter number, as applicable.

Type of Approval	Application Filed?	Pending?	If Issued
1. Water Supply Approval	☐ Yes ☐ No ■ N/A	☐	Permit number:
2. Wetlands Permit	☐ Yes ☐ No ■ N/A	☐	Permit number:
3. Shoreland Permit	☐ Yes ☐ No ■ N/A	☐	Registration date:
4. UIC Registration	☐ Yes ☐ No ■ N/A	☐	Approval letter date:
5. Large/Small Community Well Approval	☐ Yes ☐ No ■ N/A	☐	Permit number:
6. Large Groundwater Withdrawal Permit	☐ Yes ☐ No ■ N/A	☐	Permit number:
7. Other: Stormwater Infiltration to Groundwater Registration	■ Yes ☐ No		

L. List all species identified as threatened or endangered or of concern: None.

M. Using the NHDES OneStop Data Mapper, with the "surface water impairment" layer turned on, list the impairments identified for each receiving water. If no pollutants are listed, enter "N/A."

N/A

N. Did the applicant or applicant's agent have a pre-application meeting with Alteration of Terrain Bureau staff?

☐ Yes ■ No	If yes, name of staff member:

O. Will blasting of bedrock be required? ☐ Yes ■ No

If yes, estimated quantity of blast rock, in cubic yards:

If yes, standard blasting best management practices notes must be placed on the plans.

NOTE: *If greater than 5,000 cubic yards of blast rock will be generated, a groundwater monitoring program must be developed and submitted to NHDES. Contact Alteration of Terrain Bureau staff for additional detail.*

11. CHECK ALL APPLICATION ATTACHMENTS THAT APPLY *(Submit with application in the order listed below)*

LOOSE:

- ■ Signed application form, with attached proof(s) of delivery.
- ■ Check for the application fee, calculated using the fee schedule available on the NHDES land development page.
- ■ Color copy of a USGS map with the property boundaries outlined (1" = 2,000' scale).
- ■ If the applicant is not the property owner, proof that the applicant will have a legal right to undertake the project on the property if a permit is issued to the applicant.

BOUND, IN A REPORT, IN THE FOLLOWING ORDER:

- ■ Copy of the signed application form and application checklist.
- ■ Copy of the check.
- ■ Copy of the USGS map with the property boundaries outlined (1" = 2,000' scale).
- ■ Narrative of the project with a summary table of the peak discharge rate for the off-site discharge points.
- ■ Printout of NHDES OneStop Mapper with "Surface Water Impairments" layer turned on.
- ■ Printout of NHDES OneStop Mapper with Alteration of Terrain screening layers turned on.
- ■ Printout of the DataCheck Tool results letter and any relevant correspondence with New Hampshire Fish and Game.
- ■ United States Department of Agriculture (USDA) Web Soil Survey Map with project's watershed outlined.
- ■ Aerial photograph (1" = 2,000' scale with the site boundaries outlined).
- ■ Photographs representative of the site.
- ■ Groundwater recharge volume calculations (include one Alteration of Terrain Permitting Best Management Practices Worksheet per permit application).
- ■ Drainage analysis, stamped by a professional engineer (see "Application Checklist" at the end of this document).
- ■ Riprap apron or other energy dissipation or stability calculations.
- ■ Site Specific Soil Survey report, stamped and with a certification note prepared by the soil scientist that the survey was done in accordance with the Site Specific Soil Mapping standards of the Society of Soil Scientists of Northern New England.
- ■ Infiltration Feasibility Report (example online) [Env-Wq 1503.08(f)(3)].
- ■ Registration and Notification Form for Stormwater Infiltration to Groundwater (Underground Injection Control Registration-for underground systems only, including drywells and trenches).
- ■ Inspection and maintenance manual with, if applicable, long term maintenance agreements [Env-Wq 1503.08(g)].
- ☐ Source control plan.

PLANS:

- ■ One set of design plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details).
- ■ Pre- and post-development color-coded soil plans on 11" x 17" (see Application Checklist for details).
- ■ Pre- and post-construction drainage area plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details).

100-YEAR FLOODPLAIN REPORT:

- ☐ All information required in Env-Wq 1503.09, submitted as a separate report.

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

- ☐ See Application Checklist (Attachment A) for details.
- ■ Review application for completeness. Confirm information listed on the application is included with submittal.

12. REQUIRED SIGNATURES

By signing below, I certify that:

- The information contained in or otherwise submitted with this application is true, complete, and not misleading to the best of my knowledge and belief;
- I understand that the submission of false, incomplete, or misleading information constitutes grounds for the department to deny the application, revoke any permit that is granted based on the information, and/or refer the matter to the board of professional engineers established by RSA 310-A:3 if I am a professional engineer; and
- I understand that I am subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641:3.

■ **APPLICANT** ☐ **APPLICANT'S AGENT**:	
Signature:	Date: August 14, 2025
Name (print or type): Dr. C. Brooks Seay	Title: Vice Rector, Finance/Admin
☐ **PROPERTY OWNER** ☐ **PROPERTY OWNER'S AGENT:**	
Signature:	Date:
Name (print or type):	Title:

ALTERATION OF TERRAIN ATTACHMENT A: PERMIT APPLICATION CHECKLIST

Check each box to indicate the item has been provided or indicate why it does not apply.

DESIGN PLANS

- [x] Plans printed on 34 - 36" by 22 - 24" white paper.
- [x] Professional Engineer stamp.
- [x] Wetland delineation.
- [x] Temporary erosion control measures.
- [x] Treatment for all stormwater runoff from impervious surfaces such as roadways (including gravel roadways), parking areas, and nonresidential roof runoff. Guidance on treatment BMPs can be found in the New Hampshire Stormwater Management Manual.
- [x] Pre-existing 2-foot contours.
- [x] Proposed 2-foot contours.
- [ ] Drainage easements protecting the drainage/treatment structures. No drainage easements existing or proposed in project area.
- [x] Compliance with state statute governing fill and dredge in wetlands, RSA 482- A. Note that artificial detention in wetlands is prohibited.
- [x] Compliance with the New Hampshire Shoreland Protection Act, RSA 483-B.
- [ ] Benching – needed if you have more than 20 feet change in elevation on a 2:1 slope, 30 feet change in elevation on a 3:1 slope, 40 feet change in elevation on a 4:1 slope. No benching needed.
- [ ] Check to see if any proposed ponds require state dam permits.

DETAILS

- [x] Typical roadway x-section.
- [ ] Detention basin with inverts noted on the outlet structure. None proposed.
- [ ] Stone berm level spreader. None proposed.
- [x] Outlet protection – riprap aprons.
- [x] A general installation detail for an erosion control blanket.
- [x] Silt fences or mulch berm.
- [x] Storm drain inlet protection. Note that since hay bales must be embedded 4 inches into the ground, they are not to be used on hard surfaces such as pavement.
- [ ] Hay bale barriers. None proposed.
- [ ] Stone check dams. None proposed.
- [x] Gravel construction exit.
- [ ] Temporary sediment trap. None proposed.
- [x] The treatment BMPs proposed.
- [x] Any innovative BMPs proposed.

CONSTRUCTION SEQUENCE / EROSION CONTROL

■ Note that the project must be managed to meet the requirements and intent of RSA 430:53 and Agr 3800 relative to invasive species.

■ Note that perimeter controls shall be installed prior to earth moving operations.

■ Note that temporary water diversion (swales, basins, etc.) must be used as necessary until areas are stabilized.

■ Note that ponds and swales shall be installed early on in the construction sequence (before rough grading the site).

■ Note that all ditches and swales shall be stabilized prior to directing runoff to them.

■ Note that all roadways and parking lots shall be stabilized within 72 hours of achieving finished grade.

■ Note that all cut and fill slopes shall be seeded or loamed within 72 hours of achieving finished grade

■ Note that all erosion controls shall be inspected weekly AND after every half-inch of rainfall.

■ Note the limits on the open area allowed, see Env-Wq 1505.02 for detailed information.

Example note: The smallest practical area shall be disturbed during construction, but in no case shall exceed 5 acres at any one time before disturbed areas are stabilized.

■ Note the definition of the word “stable.”

Example note: An area shall be considered stable if one of the following has occurred:

- Base course gravels have been installed in areas to be paved.
- A minimum of 85 percent vegetated growth has been established.
- A minimum of 3 inches of non-erosive material such stone or riprap has been installed.
- Or, erosion control blankets have been properly installed.

■ Note the limit of time an area may be exposed.

Example note: All areas shall be stabilized within 45 days of initial disturbance.

■ Provide temporary and permanent seeding specifications. Note that although reed canary grass is listed in the Green Book; it is a problematic species according to the Wetlands Bureau and therefore should not be specified.

■ Provide winter construction notes that meet or exceed our standards.

Standard Winter Notes:

- All proposed vegetated areas that do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.
- All ditches or swales which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.
- After October 15, incomplete road or parking surfaces where work has stopped for the winter season shall be protected with a minimum of 3 inches of crushed gravel per NHDOT item 304.3.

☐ Note at the end of the construction sequence that “Lot disturbance, other than that shown on the approved plans, shall not commence until after the roadway has the base course to design elevation and the associated drainage is complete and stable.” – This note is applicable to single/duplex family subdivisions, when lot development is not part of the permit. Project does not include single/duplex family subdivisions.

DRAINAGE ANALYSES

Please provide double-side 8 ½" × 11" sheets where possible but, **do not** reduce the text such that more than one page fits on one side.

☐ Professional Engineer stamp.

☐ Rainfall amount obtained from the Northeast Regional Climate Center. Include extreme precipitation table as obtained from this source.

☐ Drainage analyses, in the following order:

- Pre-development analysis: Drainage diagram.
- Pre-development analysis: Area Listing and Soil Listing.
- Pre-development analysis: Node listing 1-year (if applicable), 2-year, 10-year and 50-year.
- Pre-development analysis: Full summary of the 10-year storm.
- Post-development analysis: Drainage diagram.
- Post-development analysis: Area Listing and Soil Listing.
- Post-development analysis: Node listing for the 2-year, 10-year and 50-year.
- Post-development analysis: Full summary of the 10-year storm.

☐ Review the Area Listing and Soil Listing reports

- Hydrologic Soil Groups (HSG) match the HSGs on the soil maps provided.
- There is the same or less HSG A soil area after development (check for each HSG).
- There is the same or less "woods" cover in the post-development.
- Undeveloped land was assumed to be in "good" condition.
- The amount of impervious cover in the analyses is correct.

Note: A good check is to subtract the total impervious area used in the pre-analysis from the total impervious area used in the post-analysis. For residential projects without demolition occurring, a good check is to take this change in impervious area, subtract out the roadway and divide the remaining by the number of houses or units proposed. Do these numbers make sense?

☐ Check the storage input used to model the ponds.

☐ Check to see if the artificial berms pass the 50-year storm, i.e., make sure the constructed berms on ponds are not overtopped.

☐ Check the outlet structure proposed and make sure it matches that modeled.

☐ Check to see if the total areas in the pre and post analyses are same.

☐ Confirm the correct NRCS storm type was modeled (Coos, Carroll and Grafton counties are Type II, all others Type III).

PRE- AND POST-CONSTRUCTION DRAINAGE AREA PLANS

☐ Plans printed on 34 - 36" by 22 - 24" on white paper.

☐ Submit these plans separate from the soil plans.

☐ A north arrow.

☐ A scale.

☐ Labeled subcatchments, reaches and ponds.

- [x] Tc lines.
- [x] A clear delineation of the subcatchment boundaries.
- [ ] Roadway station numbers. Project does not have roadway station numbers.
- [x] Culverts and other conveyance structures.

PRE- AND POST-CONSTRUCTION COLOR-CODED SOIL PLANS

- [x] 11" × 17" sheets suitable, as long as it is readable.
- [x] Submit these plans separate from the drainage area plans.
- [x] A north arrow.
- [x] A scale.
- [x] Name of the soil scientist who performed the survey and date the soil survey took place.
- [x] 2-foot contours (5-foot contours if application is for a gravel pit) as well as other surveyed features.
- [x] Delineation of the soil boundaries and wetland boundaries.
- [x] Delineation of the subcatchment boundaries.
- [x] Soil series symbols (e.g., 26).
- [x] A key or legend identifying each soil series symbol and its associated soil series name (for example: 26 = Windsor).
- [x] The hydrologic soil group color coding (A = Green, B = yellow, C= orange, D=red, Water=blue, and Impervious = gray).

Please note that excavation projects (including gravel pits) have similar requirements to those above, with the following common exceptions or additions: Not an excavation project.

- [ ] Drainage report is not needed if site does not have off-site flow.
- [ ] 5-foot contours are allowed rather than 2-foot.
- [ ] No Professional Engineer stamp is needed on the plans.
- [ ] Add a note to the plans that the applicant must provide NHDES a written update of the project and revised plans documenting the project status every five years from the date of the Alteration of Terrain permit.
- [ ] Add reclamation notes.
- [ ] A description of the subsurface conditions to the planned depth of excavation, including the elevation of the location of the Seasonal High Water Table (SHWT), as observed and described by a certified soil scientist, or an individual holding a valid permit as a permitted designer as issued by the department's Subsurface Systems Bureau.

For more resources, refer to the Natural Resources Conservation Service Vegetating New Hampshire Sand and Gravel Pits publication.

Alteration of Terrain
Permit Application Fee Schedule

The permit application fee is based upon the proposed area of disturbance, in square feet. The following tables illustrate the fee structure.

Fee schedule for projects not in the Protected Shoreland

Area of disturbance in square feet (sf)	Fee
<99,999*	$500 + $0.005/sf *$500+($0.005*46,387SF)= $732.0
100,000 to 149,999	$500 + $0.005/sf
150,000 to 199,999	$6,250
200,000 to 299,999	$8,750
300,000 to 399,999	$11,250
400,000 to 499,999	$13,750**

*** For projects not in the protected shoreland, the threshold for needing an AoT permit is 100,000 sf. However, in some cases a permit may be necessary for projects disturbing less than 100,000 sf (for more information see "larger plan of development" defined in Env-Wq 1502.39).** PROJECT FALLS WITHIN CATEGORY

****An additional fee of $2,500 shall be assessed for each additional area of up to 100,000 square feet to be disturbed**

Fee schedule for projects in the Protected Shoreland

Area of disturbance in square feet (sf)	Fee
<49,999*	$500 + $0.005/sf
50,000 to 99,999	$5,000
100,000 to 149,999	$5,000
150,000 to 199,999	$6,250
200,000 to 299,999	$8,750
300,000 to 399,999	$11,250
400,000 to 499,999	$13,750 **

*** For projects in the protected shoreland, the threshold for needing an AoT permit is typically 50,000 sf. However, in some cases a permit may be necessary for projects disturbing less than 50,000 sf (for more information see "larger plan of development" defined in Env-Wq 1502.39 and the steep slope rule defined in Env-Wq 1502.58(c)).**
****An additional fee of $2,500 shall be assessed for each additional area of up to 100,000 square feet to be disturbed.**

Fee schedule for AoT permit amendment requests
Permit transfer amendments: $0
Time Extension amendments: $0
Project or plan change amendment: $500 for each request
Please make checks payable to: "Treasurer State of New Hampshire."

Effective **July 1st, 2025**

OWNER AUTHORIZATION FOR ENTITY

I, Caroline Brooks Seay, as the duly authorized
(print name)

CFO of St. Paul's School
(member, manager, etc.) (name of entity)

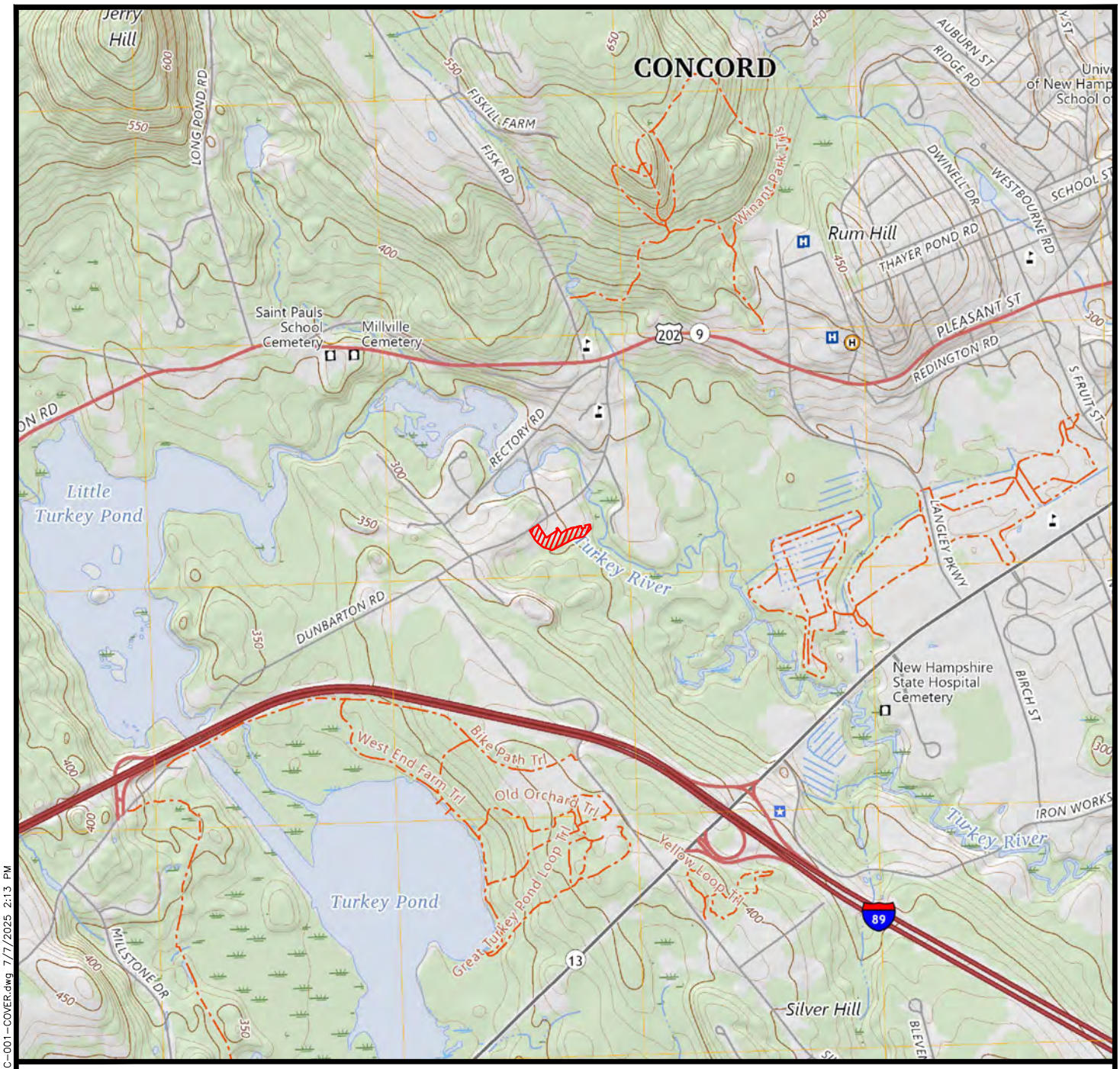
by my signature below, hereby authorize Nobis Engineering to
(name of applicant)

Submit Zoning Board of Adjustment/Planning Board/Planning Division applications and applicable materials for presentation to Concord Planning Division/Concord Zoning Board of Adjustment/Concord Planning Board for the proposed development at:

87 Dunbarton Road, Concord, NH. 03301
(address of site)

(Signature) 

(Date) August 14, 2025



NORTH

USGS TOPOGRAPHIC MAP

CONCORD, NH
2025

APPROXIMATE SCALE
1 INCH = 2,000 FEET

Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

FIGURE 1

LOCUS PLAN

ST. PAUL'S SCHOOL - SQUASH ADDITION
87 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

DRAWN BY: CMB	CHECKED BY: JCN
PROJECT NO. 100811.040	DATE: AUGUST 2025

J:\100811.040 SPS – New Squash Center – Sasaki\CAD\DWG\100811.040–C–001–COVER.dwg 7/7/2025 2:13 PM

NARRATIVE

Project Description

The site (Site) is located at 87 Dunbarton Road in Concord, New Hampshire, identified as Tax Map 724Z Lot 1-10A and Map 811Z Lot 1-A. The site currently houses the Athletic and Fitness Center (AFC) for St. Paul's School. This project proposes to relocate the existing squash courts—currently situated elsewhere on campus—to a new addition integrated with the AFC building.

The New Squash Center will be constructed on the south side of the AFC, in an area presently used for secondary egress, parking, and facility/maintenance access. A portion of the existing parking lot drains to a subsurface infiltration gallery, which will remain unchanged. The remainder of the site currently discharges stormwater directly to adjacent wetlands without treatment. The site is located within the St. Paul's School campus, bounded by Dunbarton Road to the north, a residential property owned by the school to the west, an unnamed brook/wetland to the south, and the Turkey River to the east. The project area lies approximately 300 feet from the Turkey River, and no disturbance is proposed within the 250-foot Shoreland Buffer.

The proposed building addition will connect to the AFC's second floor and be elevated on columns, creating a canopy area below that maintains secondary egress. The existing parking lot will remain with minor layout and landscaping revisions. A new 12-foot-wide access road will connect the upper parking area to the lower facility maintenance zone and AFC egress door. Site access will continue via Dunbarton Road, a private road. Stormwater management improvements include a closed drainage system with catch basins, manholes, and a subsurface infiltration gallery (PD-1). The site will be regraded to direct runoff toward Best Management Practices (BMPs), while maintaining the overall topography and existing flow patterns.

The purpose of this report is to demonstrate that the proposed Site improvements will not adversely affect surrounding resources by implementing specific (BMPs) to control stormwater quality and quantity.

Existing Site Conditions

The project area is located behind the existing AFC building and currently functions as a secondary egress route, a parking lot, and a facility/maintenance access zone. The site includes two distinct parking lot areas with differing stormwater management conditions:

Parking Lot Area-1 (northern portion): This section is served by a closed drainage system that includes catch basins, drainage piping, and an existing subsurface infiltration gallery (to remain as-is), providing treatment for stormwater runoff.

Parking Lot Area-2 (southern portion): This area lacks any formal stormwater treatment and discharges directly to the adjacent wetlands via sheet flow. It features bituminous asphalt curbing with periodic 2-foot-wide breaks approximately every 20 feet, allowing runoff to escape the curb line.

The parking lot was constructed above the surrounding wetlands and sits approximately 8 to 10 feet higher than the wetland elevation. Runoff from Area-2 flows through the curb breaks and descends steep, wooded slopes to the south, ultimately reaching the wetlands. Additionally, the site includes an access road leading to the Matthes Cages building, which is situated roughly 15 feet below the elevation of the parking lot. Stormwater from this road also sheet flows directly to the untreated wetlands.

In total, approximately 18,686 square feet of existing impervious surface within the project area discharges stormwater untreated to the wetlands, eventually flowing into the Turkey River.

Proposed Site Conditions

The proposed development consists of an approximately 17,600 square-foot building addition to the AFC building. This new building addition will be internally connected to second floor of the AFC building and will include a secondary egress leading to the adjacent parking lot area. The building addition will be elevated on columns to minimize earth disturbances and creating an under-canopy area beneath the structure.

Improvements within the parking lot area include expanding the landscaping and minor regrading within Area-2 to redirect stormwater runoff toward a new subsurface infiltration gallery (PD-1) for treatment. Approximately 12,320 square-feet of the new building addition will be directed to PD1, which is a separate closed drainage system specifically designed to manage and treat runoff from the new impervious surfaces. PD-1 operates independently and is not connected to the existing on-site drainage infrastructure. The remaining 5,280 square-feet of the building addition is classified as clean roof surface, with runoff conveyed to DMH-3 and discharged southward toward the wetlands by FES-3. The access road and lower paved surface near Matthes Cages will continue to sheet flow toward the wetlands. However, a 3-ft wide riprap outlet control edge is proposed at the pavement

edge, representing an improvement over current condition. The remaining existing parking lot within Area-2 that is to remain as-is will be upgraded with rip rap erosion controls at each of the existing curb breaks.

The existing overall topography will be maintained and stormwater treatment will be improved by the proposed BMP measures significantly improving existing conditions.

18,686 SF = Existing untreated impervious area.
17,600 SF = New building addition (12,320 SF treated in gallery PD1 & 5,280 SF is untreated)
12,951 SF = Proposed increase of impervious area (min. amount to be treated by project addition)
15,902 SF = Impervious area treated in proposed gallery PD1. (greater than proposed increase)
16,355 SF = Proposed untreated impervious area (improves site treatment by 2,331 SF)

Soils

Based on the Site-Specific Soils Report, the soils within the areas of the proposed Site improvements generally consist of Canton, Hollis, Chatfield, Scarboro, Newfields, Leicester, and Udorthent soils. The property's soils fall within Hydrologic Soil Groups (HSG) A, B, C, and D, with HSG B being predominant.

The soils within the proposed subsurface infiltration gallery (PD-1) consist of Udorthents (500B/hchbb) soils, classified as HSG B, which are moderately well-draining. The native soil surrounding the parking area is Canton (42D) which is consistent to the rest of the school's campus. Due to the proximity and history of the campus, it is assumed the native soil under the parking lot areas are Canton (42D), classified as HSG B. The infiltration rate used for PD-1 is 3 inches per hour, based on the assumed native Canton soils.

According to the published Ksat number for Canton Soils from SSSNNE Special Publication No. 5, the infiltration rate for Canton soils is 6 inches per hour. However, NHDES requires a factor of safety of 2 be applied to this value, resulting in an infiltration rate of 3 inches per hour. Additional test pits and infiltration testing will be conducted within the proposed infiltration ponds to determine the actual infiltration rate.

Points of Interest

The site's topography will remain largely unchanged, and existing stormwater flow patterns will be preserved. The primary modification to the stormwater model involves the change in ground cover resulting from the new building addition.

For both the pre-development and post-development hydrologic models, two Points of Interest (POIs) are used in the analysis: **POI 1:** Represents Parking Lot Area-1, which drains into the existing subsurface gallery via a closed drainage system. **POI 2:** Encompasses the remainder of the site, including areas that discharge directly toward the existing wetlands along the southern edge of the property.

Although these POIs represent distinct drainage pathways, both ultimately discharge to the Turkey River, located to the east of the property.

Erosion and Sediment Control Practices / Site Stabilization

Temporary erosion/sediment control during construction will include use of sediment logs, hydro-seeding, and inlet protection at catch basins, along with a tracking control pad at the construction entrance in accordance with best management practices.

The contractor will be responsible for all temporary erosion and sediment control measures during construction, while the project owner will be responsible for maintaining all permanent erosion and sediment control measures as may be required.

Summary of Results

The following table summarizes the peak stormwater discharge rates and volumes for both existing and proposed conditions at two Points of Interest (POIs), across multiple storm events:

POI DESCRIPTION	STORM EVENT							
		2 Yr (cfs)	10 Yr (cfs)	25 Yr (cfs)	50Yr (cfs)	100 Yr (cfs)	2 Yr (ac-ft)	10-Yr (ac-ft)
POI 1 (EXISITING SUBSURFACE GALLERY)	EXIST.	0.89	1.50	1.98	2.42	2.94	0.064	0.110
	PROP. =	0.84	1.45	1.93	2.37	2.89	0.061	0.106
POI 2 (WETLANDS)	EXIST.	0.99	2.37	3.60	4.79	6.25	0.080	0.177
	PROP. =	0.86	1.86	2.75	3.60	4.65	0.072	0.144

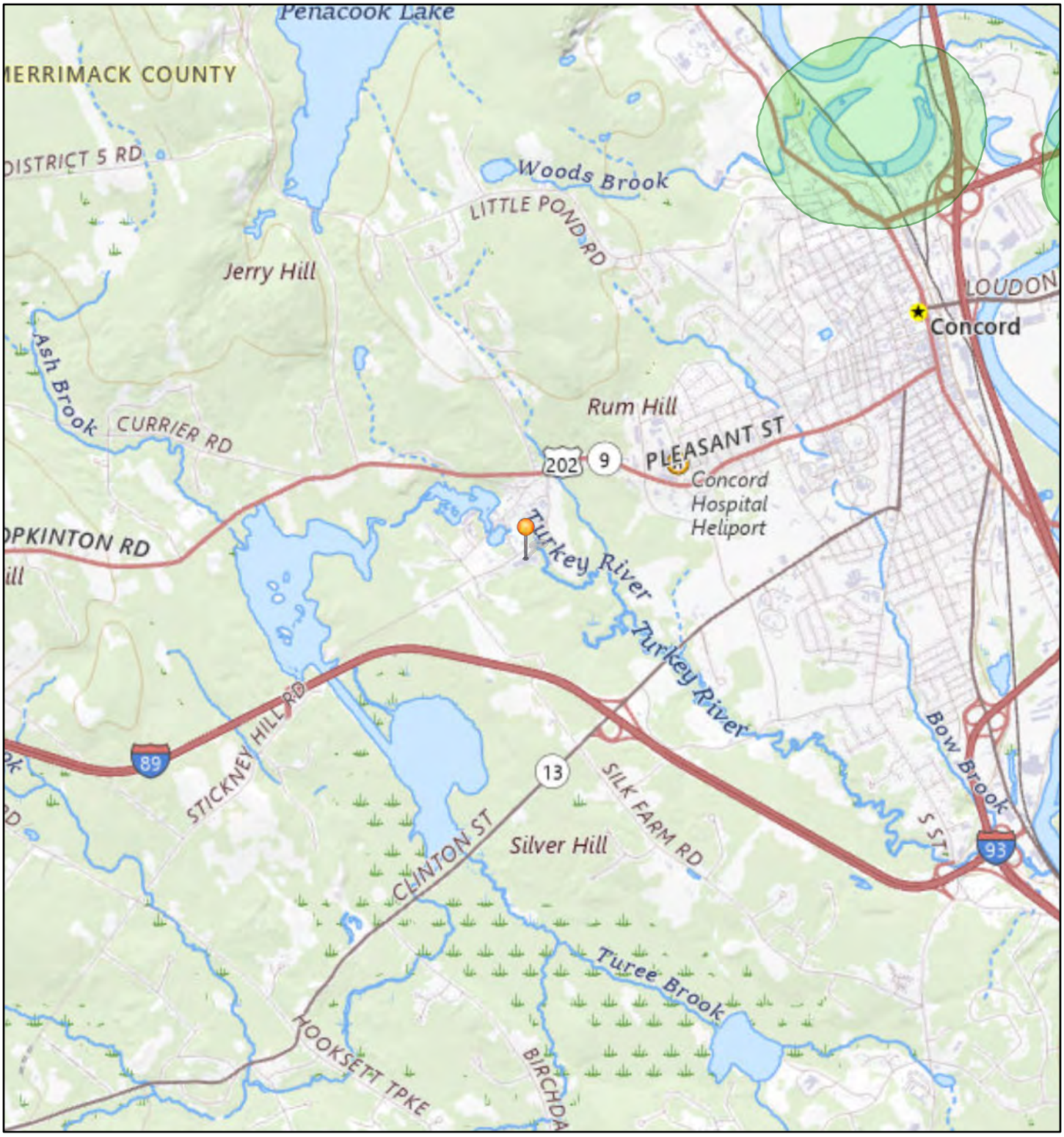
Conclusions

The preceding table and following calculations reflect the results of the proposed Site improvements on the peak stormwater discharge rates. The peak flow has been retained on the Site and therefore will not impact off-site systems or downgradient properties in the modeled storm events. The post-development peak flow rates and volumes will be less than or equal to the existing flow rates and volumes as a result of attenuation and infiltration provided by the proposed subsurface gallery.

Calculations are included for the 2-year, 10-year, 25-year, 50-year, and 100-year storm events.

WEB GIS INFORMATION

87 Dunbarton Rd. Concord, NH- Surface Water Impairments



7/7/2025, 12:57:58 PM

1:59,298

0 0.38 0.75 1.5 mi

0 0.5 1 2 km

ArcGIS World Geocoding Service

Surface Water Impairment (with a Qtr Mile Buffer - Total Phosphorus, Total Nitrogen, Chloride

Layers

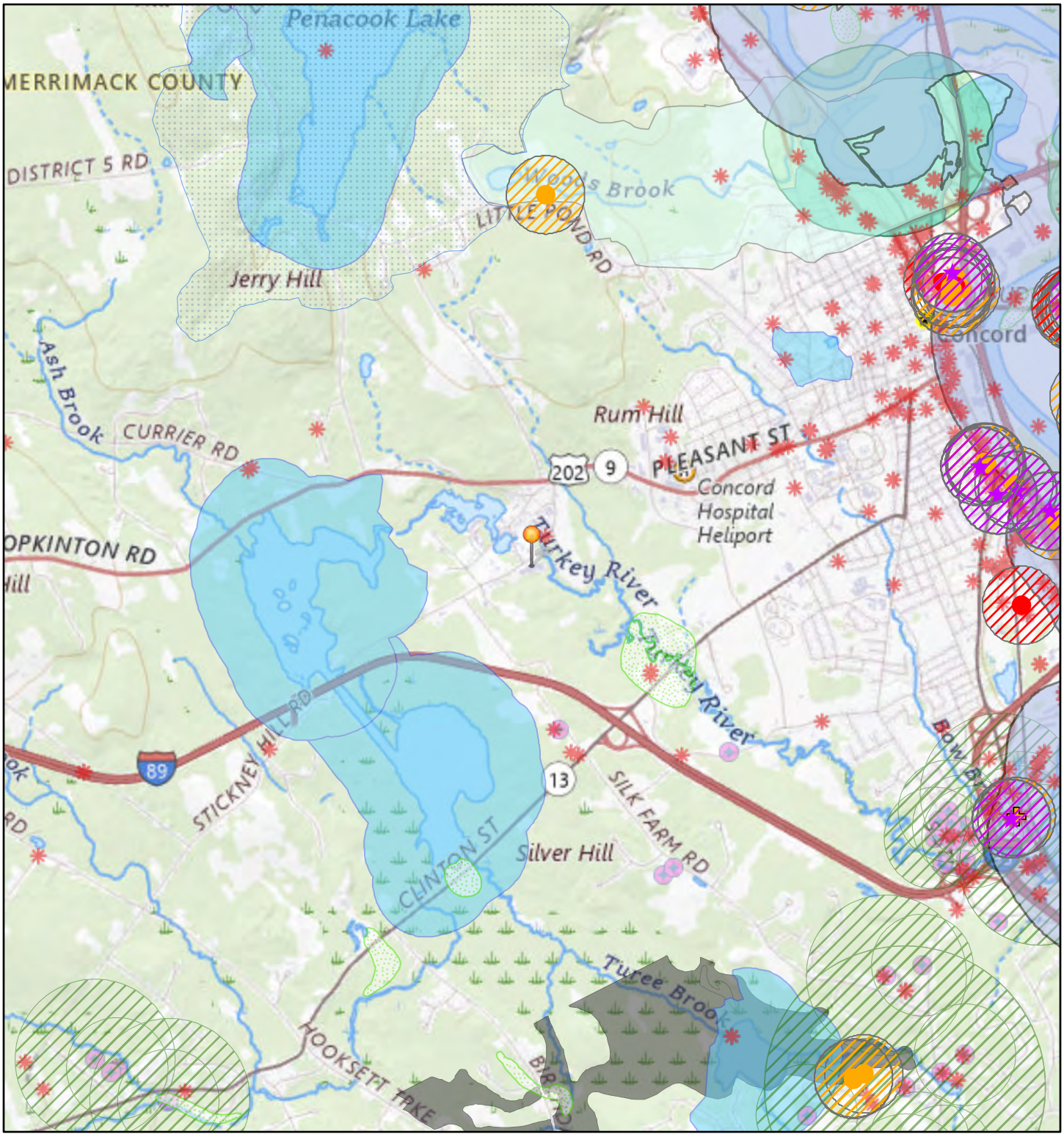
Red: Band_1

Green: Band_2

Blue: Band_3

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road data; Natural Earth Data; U.S.

87 Dunbarton Rd. Concord, NH- AOT Screening



7/8/2025, 9:53:05 AM

1:59,298

0 0.38 0.75 1.5 mi

0 0.5 1 2 km

ArcGIS World Geocoding Service

Site with PFAS > AGQS 2016

PWS PFAS Samples with 1000ft Buffer

PFAS > MCL (2020)

EMD PFAS Groundwater Station Samples with 1000ft Buffer

PFAS > MCL (2020) Groundwater Stations

PFOA+PFOS > 70 ppt (AGQS 2016) Groundwater Stations

PWS PFAS Samples with 1000ft Buffer

PFAS > MCL (2020)

Remediation Sites

Designated Rivers Quarter Mile Buffer

Groundwater Classification Areas GA2

Wellhead Protection Areas

Public Water Supply Wells

Class A - All Features

Watersheds with Chloride Impairments

Surface Water Impairment (with a Qtr Mile Buffer - Total Phosphorus, Total Nitrogen, Chloride

All Lakes with a Quarter Mile Buffer

Prime Wetlands of New Hampshire

Layers

Red: Band_1

Green: Band_2

Blue: Band_3

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road data; Natural Earth Data; U.S.

NH NATURAL HERITAGE BUREAU REVIEW

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: Morgan Dunson
18 Chenell Dr
Concord, NH 03301

From: NH Natural Heritage Bureau

Date: 1/29/2025 (This letter is valid through 1/29/2026)

Re: Review by NH Natural Heritage Bureau of request dated 1/29/2025

Permit Types: Concord
Alteration of Terrain Permit

NHB ID: NHB25-0298

Applicant: Morgan Dunson

Location: Concord
Tax Map: 724Z, Tax Lot: 1-12
Address: 87 Dunbarton Rd

Proj. Description: The proposed project consist of constructing a 16,000 SF building addition for Squash program at St. Paul's School. The addition will be connected to the existing Athletic Fitness Center.

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

MAP OF PROJECT BOUNDARIES FOR: NHB25-0298

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

NRCS SOIL INFORMATION

Hydrologic Soil Group—Merrimack and Belknap Counties, New Hampshire
(87 Dunbarton Rd.-Concord,NH)

Map Scale: 1:1,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Merrimack and Belknap Counties, New Hampshire
Survey Area Data: Version 30, Sep 3, 2024

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

Date(s) aerial images were photographed: Oct 6, 2022—Oct 22, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
250B	Chatfield-Montauk-Hollis complex, 0 to 8 percent slopes, very rocky	B	2.1	91.7%
799C	Urban land-Canton complex, 0 to 15 percent slopes		0.2	8.3%
Totals for Area of Interest			**2.3**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

FEMA

71°34'49"W 43°11'39"N

71°34'11"W 43°11'12"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

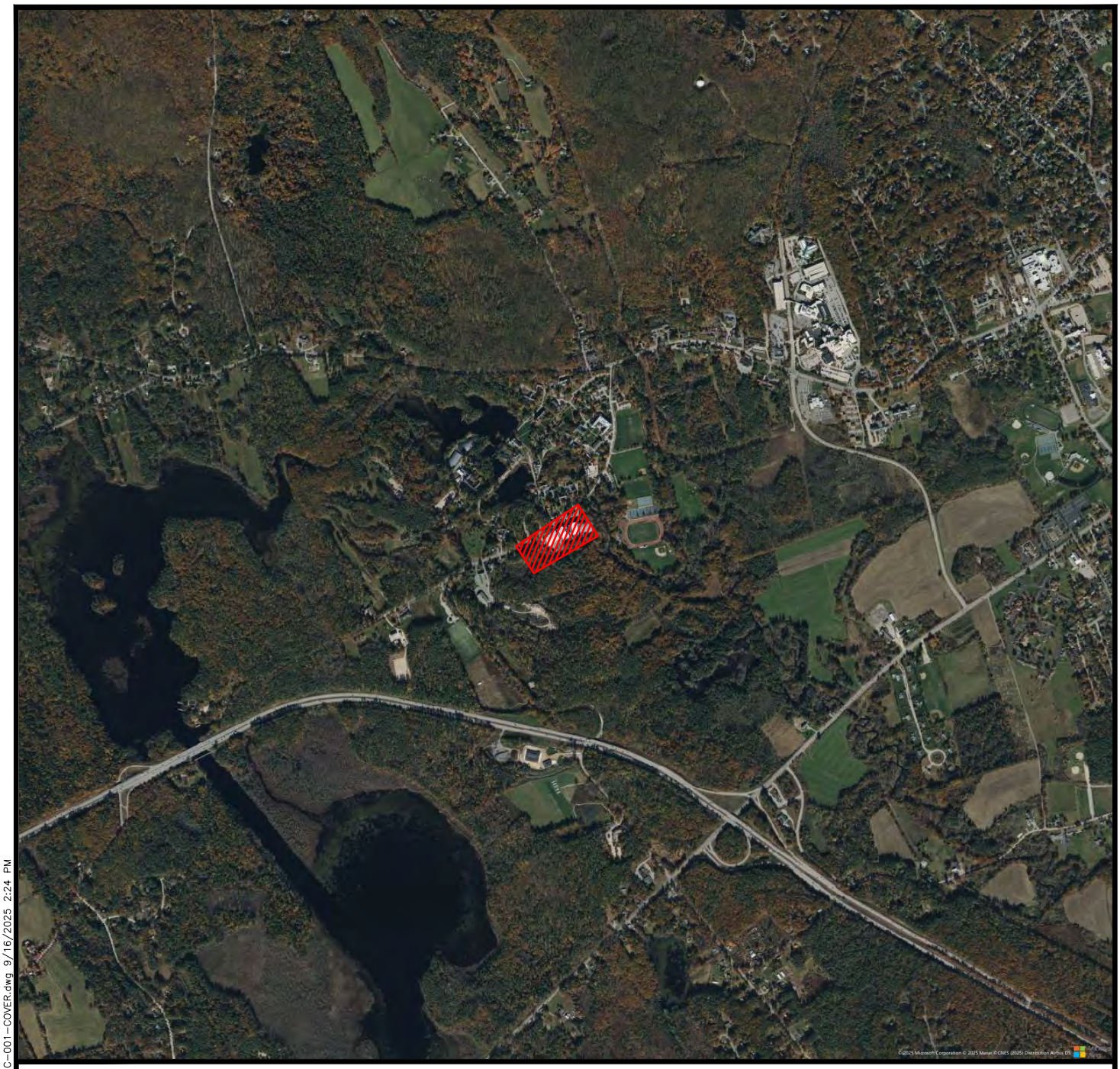
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/17/2025 at 8:39 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

AERIAL SITE PHOTOGRAPH



NORTH

2025 GOOGLE IMAGERY

CONCORD, NH

APPROXIMATE SCALE
1 INCH = 2,000 FEET

Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

FIGURE 2

AERIAL PHOTO

ST. PAUL'S SCHOOL - SQUASH ADDITION
87 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

DRAWN BY: CMB	CHECKED BY: JCN
PROJECT NO. 100811.040	DATE: AUGUST 2025

SITE PHOTGRAPHS

St. Paul's Squash Addition
87 Dunbarton Rd.
Concord, NH 03301

Site Photos

Photo #1- View of existing main site area

Nobis Group®
18 Chenell Drive
Concord, NH 03301
T (603) 224-4182

Photo #2- Back View of existing main site area to the northwest

Photo #3- Back View of existing main site building

Photo #4- Back View of existing main site area to the northeast

Photo #5- Back View of existing main site area to the northeast

Photo #6- Back View of existing main site area to the northeast

Photo #7- View of existing parking area

Photo #8- View of existing parking area to the northeast

Photo #9- View of existing parking area to the west

SITE DESIGN CRITERIA

GROUNDWATER RECHARGE VOLUME (GRV)

(Env-Wq 1504.12)

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.22	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
0.10	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.17	inches	Rd = Weighted groundwater recharge depth	
0.055	ac-in	GRV = AI * Rd	
200	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
	← Y/N	Is a stage-storage table attached showing that the GRV can be stored below the lowest invert of the outlet structure (if applicable)? Multiple stormwater control measures may be used to meet the GRV requirements.	

Provide calculations/discussion below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

The proposed Subsurface infiltration gallery PD-1 provides 3,438 CF of storage, exceeding the GRV requirement.

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Subsurface Gallery-1 (Pd-1)**

Enter the type of infiltration practice (such as basin, trench) and the node name in the drainage analysis, if applicable.

Yes		Have you reviewed Env-Wq 1508.07(a) to ensure that infiltration is allowed?	**← yes**
0.37	ac	A = Area draining to the practice	
0.36	ac	A_I = Impervious area draining to the practice	
0.98	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.94	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.34	ac-in	WQV= 1" x Rv x A	
1,243	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
311	cf	25% x WQV (check calc for sediment forebay volume)	
Isolator Row		Method of pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
3,438	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
1,271	sf	A_{SA} = Surface area of the bottom of the pond	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
3.9	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
299.75	feet	E_{BTM} = Elevation of the bottom of the basin	
299.90	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
299.90	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
(0.15)	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
(0.1)	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
		If a trench is proposed, does material meet Env-Wq 1508.07(k)(2) requirements.[4]	**← yes**
yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
1.0	:1	If a basin is proposed, pond side slopes.	**≥3:1**
301.30	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
302.94	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
304.50	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Test Pit #2 and #3 are the closest to the proposed subsurface gallery. Refer to Infiltration Feasibility.

It is assumed depth to ESHWT is adequate and confirmation test will need to be performed before installation.

Stage-Area-Storage for Pond PD1: SUBSURFACE GALLERY-1 (D1, CB1, D2)

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
299.00	1,271	0
299.10	1,287	51
299.20	1,303	102
299.30	1,319	153
299.40	1,334	203
299.50	1,350	254
299.60	1,366	305
299.70	1,382	356
299.80	1,397	434
299.90	1,413	540
300.00	1,429	645
300.10	1,445	750
300.20	1,460	854
300.30	1,476	958
300.40	1,492	1,062
300.50	1,507	1,165
300.60	1,523	1,267
300.70	1,539	1,369
300.80	1,555	1,471
300.90	1,570	1,571
301.00	1,586	1,672
301.10	1,602	1,771
301.20	1,618	1,870
301.30	1,633	1,967
301.40	1,649	2,064
301.50	1,665	2,161
301.60	1,680	2,256
301.70	1,696	2,350
301.80	1,712	2,443
301.90	1,728	2,535
302.00	1,743	2,626
302.10	1,759	2,715
302.20	1,775	2,803
302.30	1,791	2,889
302.40	1,806	2,974
302.50	1,822	3,057
302.60	1,838	3,138
302.70	1,853	3,217
302.80	1,869	3,294
302.90	1,885	3,368
303.00	1,901	3,438
303.10	1,916	3,504
303.20	1,932	3,565
303.30	1,948	3,621
303.40	1,964	3,676
303.50	1,979	3,728
303.60	1,995	3,779
303.70	2,011	3,829
303.80	2,026	3,880
303.90	2,042	3,931
304.00	2,058	3,982
304.10	2,074	4,033
304.20	2,089	4,084
304.30	2,105	4,135
304.40	2,121	4,185
304.50	**2,137**	**4,236**

DMH-2 INV OUT = 303.0

The 100-year storm was used in this analysis as the outlet is only utilized for the 100-year.

RIPRAP OUTLET APRON SIZING CALCULATIONS

FES-1

Do=	Diameter of pipe or width of channel(ft)	Do=	1
Q=	Discharge from pipe or channel(cfs)	Q100=	0.56
La=	Length of apron(ft)	Tw =	0.1
Wa=	Width of apron at the outlet(ft)	Tw<1/2Do?	YES
Tw=	Tailwater at outlet(depth above invert(ft))	Well defined channel?	yes
W =	Width of apron at the downstream end(ft)		

Wa= 3*Do = 3

When Tailwater depth at the outlet of the pipe or channel is less than one half the diameter of the pipe or one half the width of the channel

$$La = \frac{1.8*Q}{Do^{3/2}} + 7*Do = 8.008$$

When Tailwater depth at the outlet of the pipe or channel is equal to or greater than one half the diameter of the pipe or one half the width of the channel

$$La = \frac{3.0*Q}{Do^{3/2}} + 7*Do = N/A$$

When Tailwater depth at the outlet of the pipe or channel is less than one half the diameter of the pipe or one half the width of the channel

*W= 3*Do+La = 11.008

When Tailwater depth at the outlet of the pipe or channel is equal to or greater than one half the diameter of the pipe or one half the width of the channel

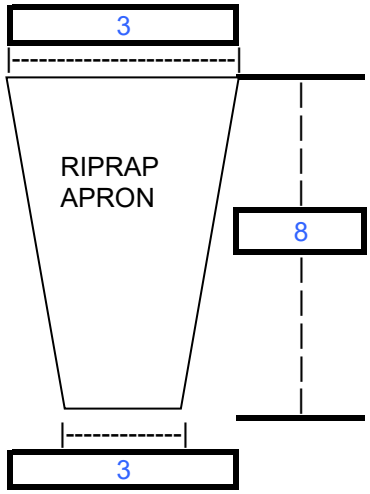
*W= 3*Do+0.4*La = N/A

*Where there is a stable well-defined channel downstream of the apron the bottom width of the apron shall be equal to the width of the channel

Rip-Rap size (need depth of TW)

$$D_{50=} \frac{0.02*Q^{(4/3)}}{T_w*D_o} = 0.09 \text{ feet} \quad 1.11 \text{ inches}$$

$D_{50=}$ 4 inches



Rip-Rap thickness:

$2.25*D_{50}=$ 9 inches

nobis

RIPRAP OUTLET APRON SIZING CALCULATIONS

FES-2

Do=	Diameter of pipe or width of channel(ft)	Do=	1
Q=	Discharge from pipe or channel(cfs)	Q10=	0.48
La=	Length of apron(ft)	Tw =	0.1
Wa=	Width of apron at the outlet(ft)	Tw<1/2Do?	YES
Tw=	Tailwater at outlet(depth above invert(ft))	Well defined channel?	no
W =	Width of apron at the downstream end(ft)		

Wa= 3*Do = 3

When Tailwater depth at the outlet of the pipe or channel is less than one half the diameter of the pipe or one half the width of the channel

$$La = \frac{1.8*Q}{Do^{3/2}} + 7*Do = 7.864$$

When Tailwater depth at the outlet of the pipe or channel is equal to or greater than one half the diameter of the pipe or one half the width of the channel

$$La = \frac{3.0*Q}{Do^{3/2}} + 7*Do = N/A$$

When Tailwater depth at the outlet of the pipe or channel is less than one half the diameter of the pipe or one half the width of the channel

*W= 3*Do+La = 10.864

When Tailwater depth at the outlet of the pipe or channel is equal to or greater than one half the diameter of the pipe or one half the width of the channel

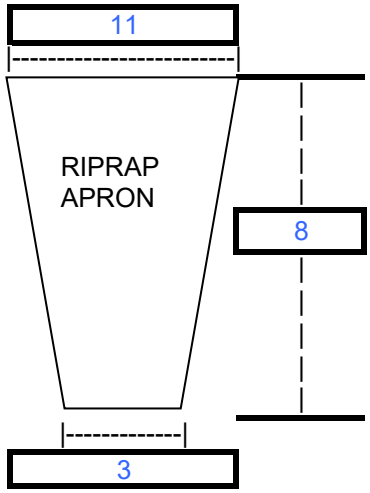
*W= 3*Do+0.4*La = N/A

*Where there is a stable well-defined channel downstream of the apron the bottom width of the apron shall be equal to the width of the channel

Rip-Rap size (need depth of TW)

$$D_{50=} \frac{0.02*Q^{(4/3)}}{T_w*D_o} =$$ 0.08 feet 0.90 inches

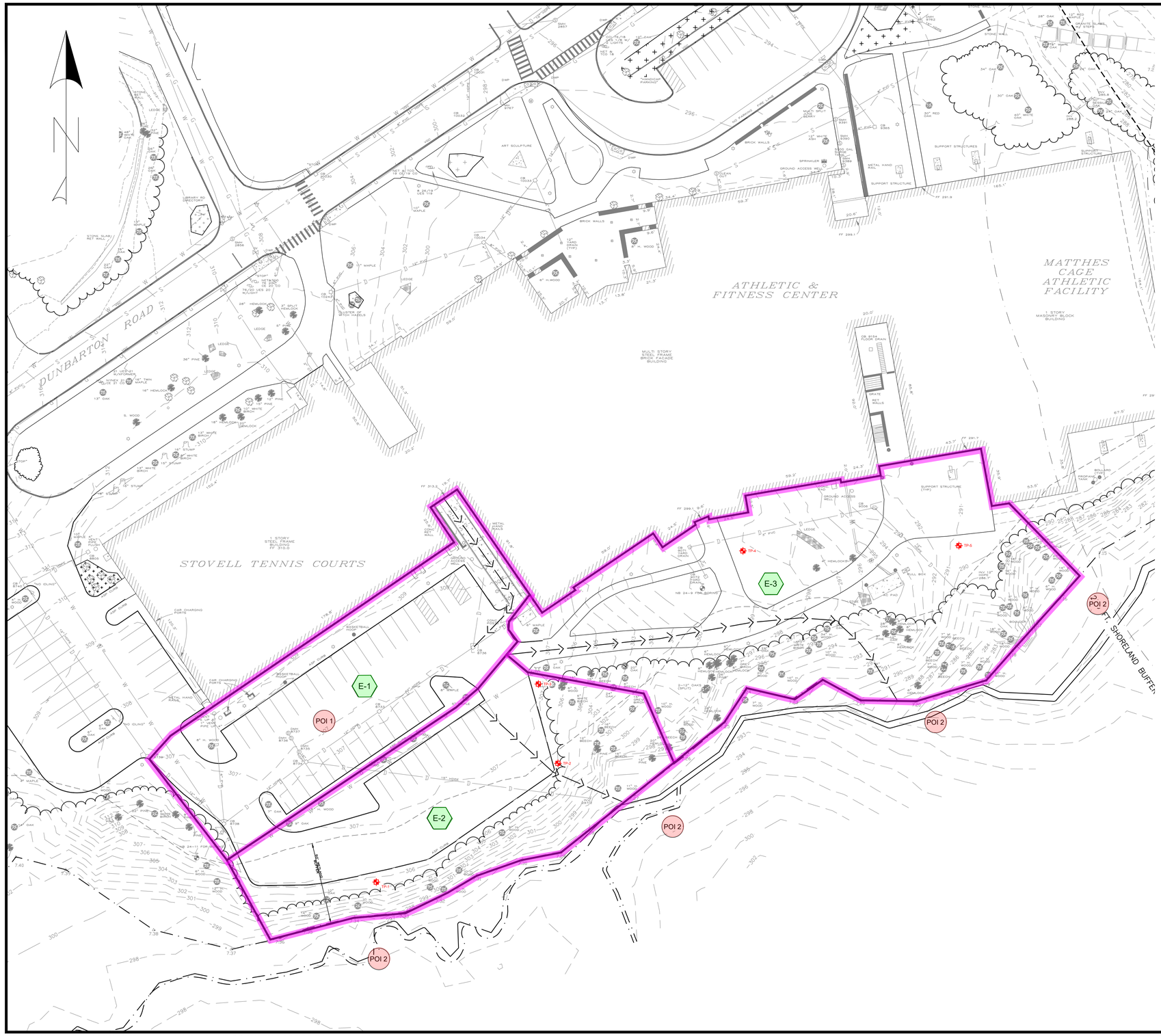
$D_{50=}$ 4 inches



Rip-Rap thickness:

$2.25*D_{50}=$ 9 inches

DRAINAGE AREA PLANS



LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW PATH (TIME OF CONCENTRATION)
- E-1 — EXISTING CONDITIONS SUBCATCHMENT DESIGNATION
- POI 1 — POINT OF INTEREST
- R-1 — REACH
- Pd1 — POND

NOTES:

1. SOIL ON-SITE CONSIST OF CANTON, CHATFIELD, SCARBORO, NEW FIELDS, LEICESTER, AND UDORTHENTS, 0 TO 25+% PERCENT SLOPES BASED SITE SPECIFIC SOIL SURVEY PERFORMED BY THOMAS E. SOKOLOSKI, CERTIFIED SOIL SCIENTIST #063, OF TES ENVIRONMENTAL CONSULTANTS, L.L.C IN BOW, NEW HAMPSHIRE, ON JULY 17, 2025.
2. IN AREAS WHERE Tc WAS CALCULATED AS LESS THAN 6 MINUTES, "DIRECT ENTRY" METHOD WAS USED IN THE HYDROCAD MODEL. THESE Tc LINES ARE NOT SHOWN

SASAKI
110 CHAUNCY STREET BOSTON MA 02111 USA
P 617 926 330 F 617 924 2748 W SASAKI.COM

nobis
Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

NOT ISSUED FOR CONSTRUCTION

No.	Description	Date

DRAWING ISSUE & REVISION HISTORY

Seal

STATE OF NEW HAMPSHIRE
JOHN CHRIS NADEAU
No. 9294
LICENSED PROFESSIONAL ENGINEER
9/17/2025

ST. PAUL'S SCHOOL
NEW SQUASH CENTER

85, 87, 89 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

TAX MAP:
MAP 724Z/ LOT 1-10A
MAP 811Z LOT 1-A

OWNER/APPLICANT:
ST. PAUL'S SCHOOL
325 PLEASANT STREET
CONCORD, NEW HAMPSHIRE

Nobis Project No: **100811.040**
Sasaki Project No: **250018.00**
Drawn By: **NOBIS - MGD/CMB**
Checked By: **NOBIS - JCN/NCP**
Approved By: **NOBIS - JCN**
Issue Date: **09.17.2025**

0 30' 60'
GRAPHIC SCALE

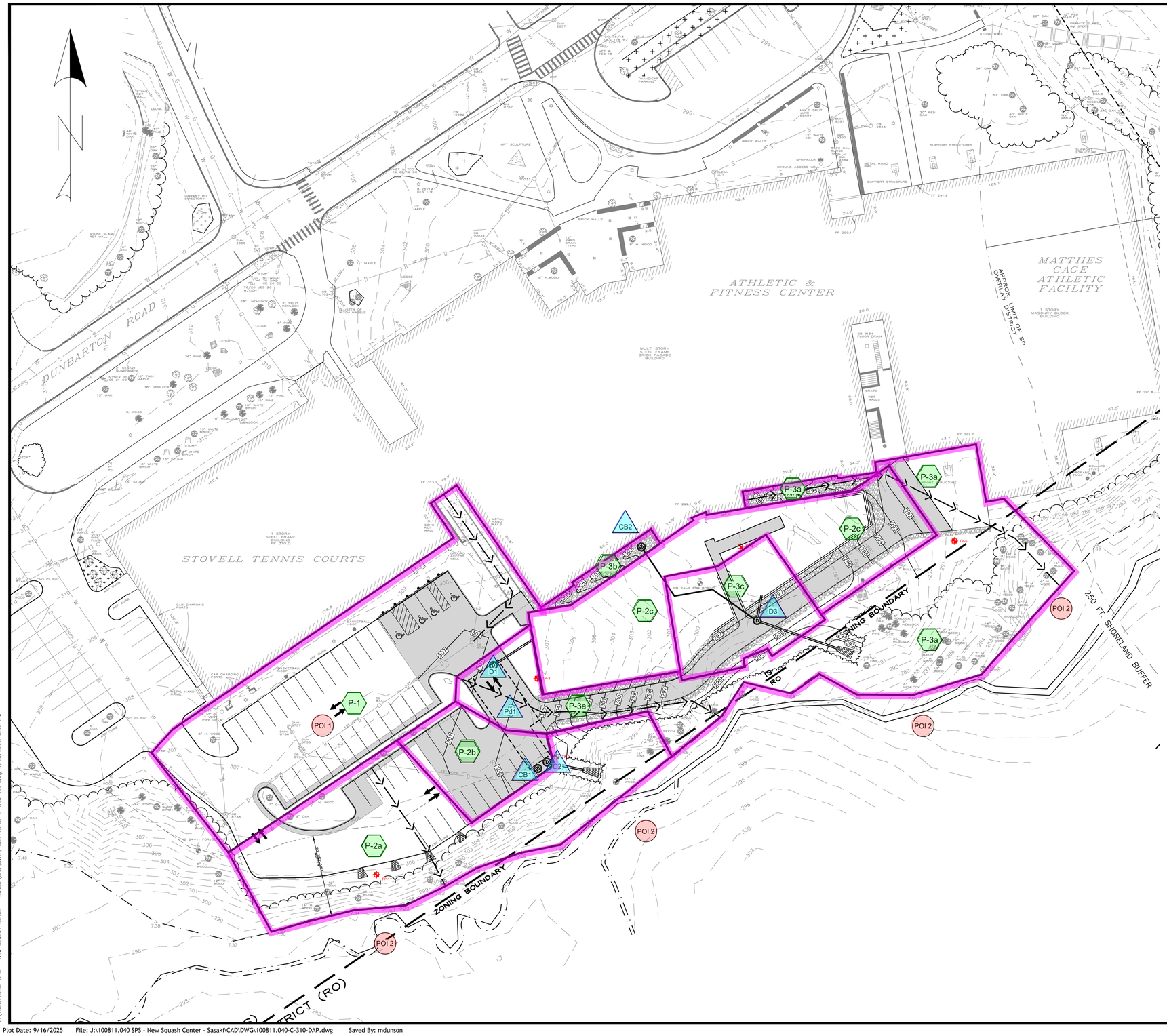
SHEET TITLE

PRE-DEVELOPMENT DRAINAGE AREA PLAN

FIGURE
3

J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-310-DAP.dwg 9/16/2025 3:07 PM

Plot Date: 9/16/2025 File: J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-310-DAP.dwg Saved By: mdunson



LEGEND

- DRAINAGE AREA BOUNDARY
- FLOW PATH (TIME OF CONCENTRATION)
- P-1 — PROPOSED CONDITIONS SUBCATCHMENT DESIGNATION
- POI 1 — POINT OF INTEREST
- R-1 — REACH
- Pd1 — POND

NOTES:

1. SOIL ON-SITE CONSIST OF CANTON, CHATFIELD, SCARBORO, NEW FIELDS, LEICESTER, AND UDORTHENTS, 0 TO 25+% PERCENT SLOPES BASED SITE SPECIFIC SOIL SURVEY PERFORMED BY THOMAS E. SOKOLOSKI, CERTIFIED SOIL SCIENTIST #063, OF TES ENVIRONMENTAL CONSULTANTS, L.L.C IN BOW, NEW HAMPSHIRE, ON JULY 17, 2025.
2. IN AREAS WHERE Tc WAS CALCULATED AS LESS THAN 6 MINUTES, "DIRECT ENTRY" METHOD WAS USED IN THE HYDROCAD MODEL. THESE Tc LINES ARE NOT SHOWN

SASAKI
110 CHAUNCY STREET BOSTON MA 02111 USA
P 617 926 330 F 617 924 2748 W SASAKI.COM

nobis
Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

NOT ISSUED FOR CONSTRUCTION

No.	Description	Date

DRAWING ISSUE & REVISION HISTORY

Seal

STATE OF NEW HAMPSHIRE
JOHN CHRIS NADEAU
No. 9294
LICENSED PROFESSIONAL ENGINEER
9/17/2025

ST. PAUL'S SCHOOL NEW SQUASH CENTER

85, 87, 89 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

TAX MAP:
MAP 724Z/ LOT 1-10A
MAP 811Z LOT 1-A

OWNER/APPLICANT:
ST. PAUL'S SCHOOL
325 PLEASANT STREET
CONCORD, NEW HAMPSHIRE

Nobis Project No: **100811.040**
Sasaki Project No: **250018.00**
Drawn By: **NOBIS - MGD/CMB**
Checked By: **NOBIS - JCN/NCP**
Approved By: **NOBIS - JCN**
Issue Date: **09.17.2025**

0 30' 60'
GRAPHIC SCALE

SHEET TITLE

POST-DEVELOPMENT DRAINAGE AREA PLAN

FIGURE
4

J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-310-DAP.dwg 9/16/2025 3:06 PM

Plot Date: 9/16/2025 File: J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-310-DAP.dwg Saved By: mdunson

HYDRAULIC CALCULATIONS

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point	
Smoothing	Yes
State	
Location	
Latitude	43.191 degrees North
Longitude	71.575 degrees West
Elevation	90 feet
Date/Time	Wed Aug 06 2025 10:29:58 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.49	0.65	0.80	1.01	**1yr**	0.69	0.99	1.17	1.48	1.87	2.37	2.55	**1yr**	2.09	2.46	2.89	3.59	4.12	**1yr**
2yr	0.31	0.48	0.60	0.79	1.00	1.25	**2yr**	0.86	1.15	1.45	1.81	2.26	2.82	3.15	**2yr**	2.49	3.03	3.50	4.19	4.78	**2yr**
5yr	0.37	0.58	0.73	0.97	1.24	1.58	**5yr**	1.07	1.44	1.83	2.28	2.83	3.50	3.99	**5yr**	3.10	3.84	4.43	5.20	5.90	**5yr**
10yr	0.42	0.66	0.83	1.13	1.48	1.89	**10yr**	1.27	1.71	2.19	2.73	3.36	4.13	4.78	**10yr**	3.66	4.59	5.29	6.13	6.91	**10yr**
25yr	0.50	0.79	1.01	1.39	1.85	2.37	**25yr**	1.59	2.14	2.76	3.44	4.23	5.15	6.06	**25yr**	4.55	5.83	6.69	7.63	8.52	**25yr**
50yr	0.57	0.91	1.17	1.63	2.19	2.84	**50yr**	1.89	2.54	3.30	4.10	5.03	6.08	7.27	**50yr**	5.38	6.99	7.99	9.00	9.99	**50yr**
100yr	0.64	1.04	1.35	1.91	2.60	3.39	**100yr**	2.25	3.02	3.95	4.90	5.97	7.19	8.72	**100yr**	6.36	8.38	9.55	10.62	11.72	**100yr**
200yr	0.74	1.21	1.57	2.24	3.09	4.04	**200yr**	2.67	3.58	4.71	5.84	7.10	8.51	10.46	**200yr**	7.53	10.06	11.43	12.54	13.75	**200yr**
500yr	0.89	1.47	1.91	2.77	3.88	5.10	**500yr**	3.35	4.50	5.96	7.37	8.92	10.63	13.32	**500yr**	9.41	12.80	14.48	15.64	17.00	**500yr**

Lower Confidence Limits

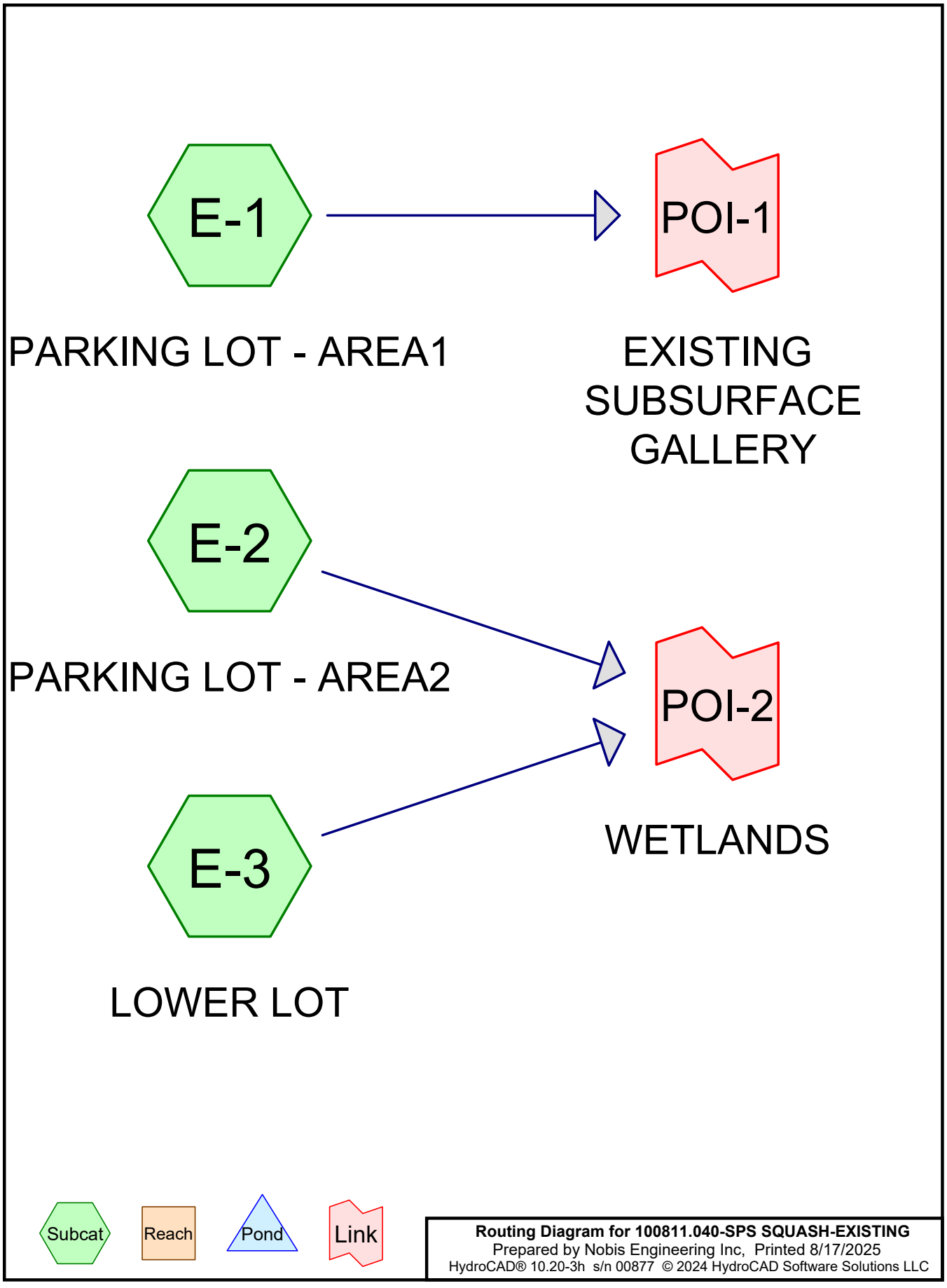
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.21	0.32	0.39	0.53	0.65	0.86	**1yr**	0.56	0.84	1.04	1.34	1.58	2.01	2.39	**1yr**	1.78	2.30	2.64	3.24	3.77	**1yr**
2yr	0.30	0.46	0.57	0.77	0.95	1.14	**2yr**	0.82	1.12	1.30	1.72	2.20	2.73	3.03	**2yr**	2.42	2.92	3.39	4.05	4.64	**2yr**
5yr	0.34	0.52	0.65	0.89	1.13	1.36	**5yr**	0.98	1.33	1.53	1.99	2.56	3.24	3.67	**5yr**	2.87	3.53	4.06	4.83	5.51	**5yr**
10yr	0.37	0.57	0.71	0.99	1.28	1.53	**10yr**	1.11	1.50	1.73	2.23	2.86	3.68	4.24	**10yr**	3.26	4.08	4.65	5.49	6.26	**10yr**
25yr	0.43	0.65	0.81	1.15	1.51	1.78	**25yr**	1.31	1.74	2.03	2.58	3.31	4.34	5.11	**25yr**	3.84	4.92	5.52	6.52	7.42	**25yr**
50yr	0.47	0.71	0.88	1.27	1.71	2.00	**50yr**	1.48	1.96	2.30	2.90	3.71	4.93	5.89	**50yr**	4.36	5.66	6.28	7.42	8.27	**50yr**
100yr	0.52	0.78	0.98	1.41	1.94	2.25	**100yr**	1.67	2.20	2.61	3.26	4.15	5.60	6.79	**100yr**	4.95	6.53	7.16	8.46	9.36	**100yr**
200yr	0.57	0.85	1.08	1.57	2.19	2.52	**200yr**	1.89	2.47	2.94	3.67	4.67	6.35	7.81	**200yr**	5.62	7.51	8.14	9.66	10.59	**200yr**
500yr	0.65	0.97	1.24	1.81	2.57	2.94	**500yr**	2.22	2.87	3.47	4.30	5.46	7.48	9.40	**500yr**	6.62	9.04	9.56	11.54	12.48	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.45	0.55	0.74	0.91	1.10	**1yr**	0.79	1.07	1.19	1.60	1.99	2.52	2.77	**1yr**	2.23	2.66	3.17	3.88	4.40	**1yr**
2yr	0.33	0.51	0.63	0.85	1.04	1.25	**2yr**	0.90	1.22	1.40	1.83	2.33	2.92	3.27	**2yr**	2.58	3.15	3.65	4.34	4.96	**2yr**
5yr	0.41	0.63	0.79	1.08	1.37	1.58	**5yr**	1.19	1.55	1.79	2.28	2.89	3.77	4.33	**5yr**	3.34	4.16	4.81	5.57	6.31	**5yr**
10yr	0.49	0.76	0.94	1.31	1.70	1.92	**10yr**	1.46	1.88	2.15	2.70	3.42	4.62	5.37	**10yr**	4.09	5.16	5.98	6.75	7.63	**10yr**
25yr	0.63	0.96	1.20	1.71	2.25	2.50	**25yr**	1.94	2.44	2.76	3.38	4.25	6.01	7.15	**25yr**	5.32	6.87	7.94	8.70	9.76	**25yr**
50yr	0.76	1.16	1.44	2.07	2.79	3.05	**50yr**	2.41	2.98	3.33	4.02	5.02	7.36	8.88	**50yr**	6.51	8.54	9.86	10.55	12.03	**50yr**
100yr	0.93	1.40	1.75	2.53	3.47	3.73	**100yr**	3.00	3.65	4.02	4.77	5.94	9.02	11.06	**100yr**	7.98	10.63	12.25	12.79	14.59	**100yr**
200yr	1.12	1.68	2.13	3.09	4.31	4.56	**200yr**	3.72	4.46	4.86	5.66	7.03	11.04	13.76	**200yr**	9.77	13.23	15.27	15.52	17.68	**200yr**
500yr	1.45	2.16	2.78	4.04	5.75	5.96	**500yr**	4.96	5.82	6.24	7.10	8.79	14.46	18.40	**500yr**	12.80	17.70	20.44	20.05	22.83	**500yr**

Powered by ACIS Northeast Regional Climate Center

Existing Conditions



Routing Diagram for 100811.040-SPS SQUASH-EXISTING
Prepared by Nobis Engineering Inc, Printed 8/17/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	2.82	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.13	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.15	2
4	50-Year	Type III 24-hr		Default	24.00	1	6.08	2
5	100-Year	Type III 24-hr		Default	24.00	1	7.19	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.006	39	>75% Grass cover, Good, HSG A (E-3)
0.481	61	>75% Grass cover, Good, HSG B (E-1, E-2, E-3)
0.103	80	>75% Grass cover, Good, HSG D (E-3)
0.002	96	Gravel surface, HSG A (E-3)
0.736	98	Paved parking, HSG B (E-1, E-2, E-3)
0.028	98	Paved parking, HSG D (E-3)
0.027	30	Woods, Good, HSG A (E-3)
0.411	55	Woods, Good, HSG B (E-2, E-3)
0.037	77	Woods, Good, HSG D (E-3)
1.830	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.035	HSG A	E-3
1.628	HSG B	E-1, E-2, E-3
0.000	HSG C	
0.167	HSG D	E-3
0.000	Other	
1.830		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.006	0.481	0.000	0.103	0.000	0.590	>75% Grass cover, Good	E-1, E-2, E-3
0.002	0.000	0.000	0.000	0.000	0.002	Gravel surface	E-3
0.000	0.736	0.000	0.028	0.000	0.764	Paved parking	E-1, E-2, E-3
0.027	0.411	0.000	0.037	0.000	0.475	Woods, Good	E-2, E-3
0.035	**1.628**	**0.000**	**0.167**	**0.000**	**1.830**	**TOTAL AREA**	

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: PARKING LOT - AREA1 Runoff Area=20,267 sf 71.91% Impervious Runoff Depth=1.66"
Tc=6.0 min CN=88 Runoff=0.89 cfs 0.064 af

Subcatchment E-2: PARKING LOT - AREA2 Runoff Area=23,405 sf 44.04% Impervious Runoff Depth=0.85"
Tc=6.0 min CN=75 Runoff=0.49 cfs 0.038 af

Subcatchment E-3: LOWER LOT Runoff Area=36,060 sf 23.24% Impervious Runoff Depth=0.62"
Tc=6.0 min CN=70 Runoff=0.50 cfs 0.043 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=0.89 cfs 0.064 af
Primary=0.89 cfs 0.064 af

Link POI-2: WETLANDS Inflow=0.99 cfs 0.080 af
Primary=0.99 cfs 0.080 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.145 af Average Runoff Depth = 0.95"
58.29% Pervious = 1.067 ac 41.71% Impervious = 0.764 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: PARKING LOT - AREA1 Runoff Area=20,267 sf 71.91% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=88 Runoff=1.50 cfs 0.110 af

Subcatchment E-2: PARKING LOT - AREA2 Runoff Area=23,405 sf 44.04% Impervious Runoff Depth=1.76"
Tc=6.0 min CN=75 Runoff=1.08 cfs 0.079 af

Subcatchment E-3: LOWER LOT Runoff Area=36,060 sf 23.24% Impervious Runoff Depth=1.42"
Tc=6.0 min CN=70 Runoff=1.30 cfs 0.098 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=1.50 cfs 0.110 af
Primary=1.50 cfs 0.110 af

Link POI-2: WETLANDS Inflow=2.37 cfs 0.177 af
Primary=2.37 cfs 0.177 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.287 af Average Runoff Depth = 1.88"
58.29% Pervious = 1.067 ac 41.71% Impervious = 0.764 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: PARKING LOT - AREA1 Runoff Area=20,267 sf 71.91% Impervious Runoff Depth=3.81"
Tc=6.0 min CN=88 Runoff=1.98 cfs 0.148 af

Subcatchment E-2: PARKING LOT - AREA2 Runoff Area=23,405 sf 44.04% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=75 Runoff=1.59 cfs 0.115 af

Subcatchment E-3: LOWER LOT Runoff Area=36,060 sf 23.24% Impervious Runoff Depth=2.15"
Tc=6.0 min CN=70 Runoff=2.02 cfs 0.148 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=1.98 cfs 0.148 af
Primary=1.98 cfs 0.148 af

Link POI-2: WETLANDS Inflow=3.60 cfs 0.263 af
Primary=3.60 cfs 0.263 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.411 af Average Runoff Depth = 2.70"
58.29% Pervious = 1.067 ac 41.71% Impervious = 0.764 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: PARKING LOT - AREA1 Runoff Area=20,267 sf 71.91% Impervious Runoff Depth=4.70"
Tc=6.0 min CN=88 Runoff=2.42 cfs 0.182 af

Subcatchment E-2: PARKING LOT - AREA2 Runoff Area=23,405 sf 44.04% Impervious Runoff Depth=3.35"
Tc=6.0 min CN=75 Runoff=2.07 cfs 0.150 af

Subcatchment E-3: LOWER LOT Runoff Area=36,060 sf 23.24% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=70 Runoff=2.72 cfs 0.198 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=2.42 cfs 0.182 af
Primary=2.42 cfs 0.182 af

Link POI-2: WETLANDS Inflow=4.79 cfs 0.348 af
Primary=4.79 cfs 0.348 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.530 af Average Runoff Depth = 3.48"
58.29% Pervious = 1.067 ac 41.71% Impervious = 0.764 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: PARKING LOT - AREA1 Runoff Area=20,267 sf 71.91% Impervious Runoff Depth=5.78"
Tc=6.0 min CN=88 Runoff=2.94 cfs 0.224 af

Subcatchment E-2: PARKING LOT - AREA2 Runoff Area=23,405 sf 44.04% Impervious Runoff Depth=4.32"
Tc=6.0 min CN=75 Runoff=2.66 cfs 0.193 af

Subcatchment E-3: LOWER LOT Runoff Area=36,060 sf 23.24% Impervious Runoff Depth=3.78"
Tc=6.0 min CN=70 Runoff=3.59 cfs 0.261 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=2.94 cfs 0.224 af
Primary=2.94 cfs 0.224 af

Link POI-2: WETLANDS Inflow=6.25 cfs 0.454 af
Primary=6.25 cfs 0.454 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.678 af Average Runoff Depth = 4.44"
58.29% Pervious = 1.067 ac 41.71% Impervious = 0.764 ac

Summary for Subcatchment E-1: PARKING LOT - AREA1

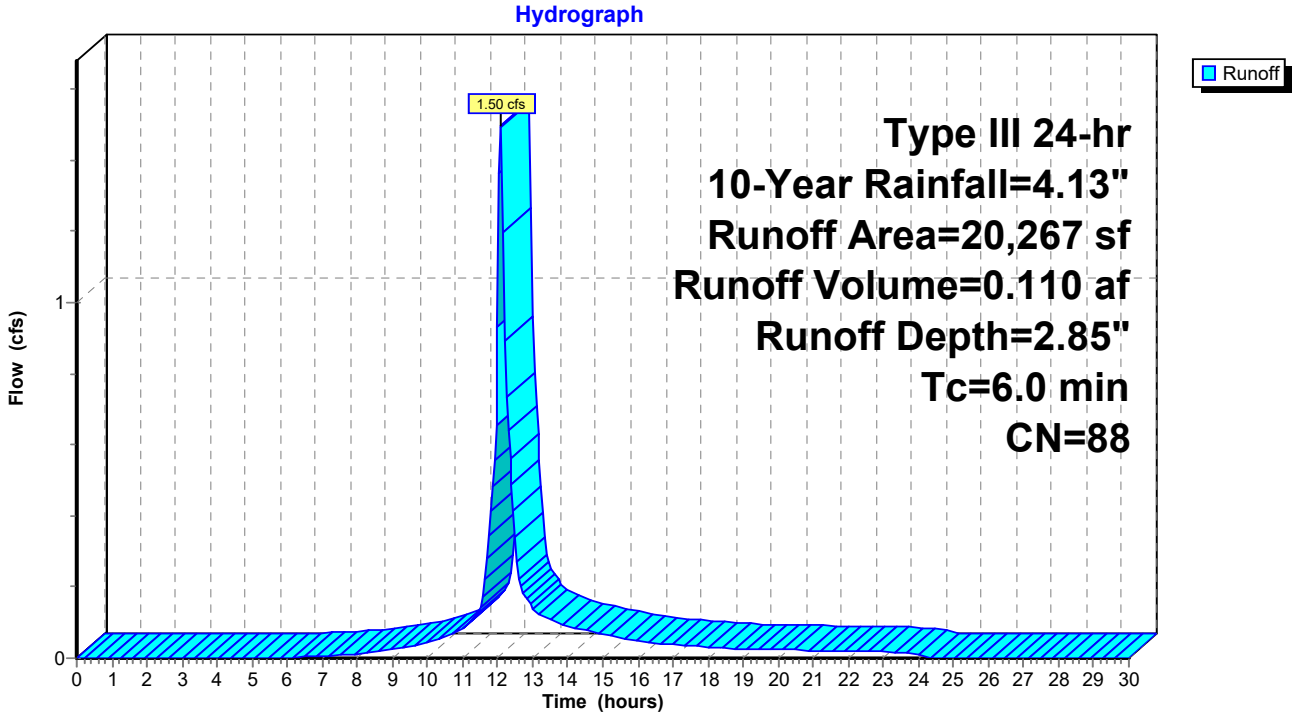
Runoff = 1.50 cfs @ 12.09 hrs, Volume= 0.110 af, Depth= 2.85"
Routed to Link POI-1 : EXISTING SUBSURFACE GALLERY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
14,574	98	Paved parking, HSG B
5,693	61	>75% Grass cover, Good, HSG B
20,267	88	Weighted Average
5,693		28.09% Pervious Area
14,574		71.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO POI 1**

Subcatchment E-1: PARKING LOT - AREA1



Summary for Subcatchment E-2: PARKING LOT - AREA2

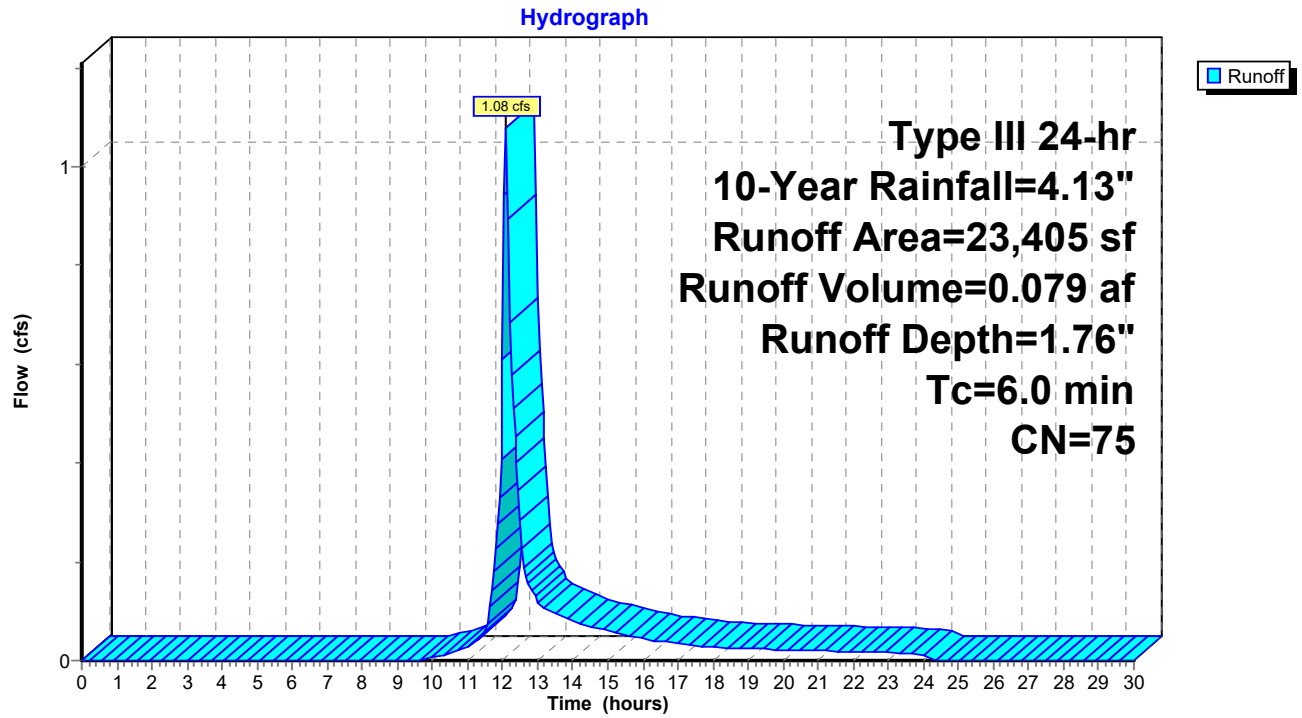
Runoff = 1.08 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 1.76"
Routed to Link POI-2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
10,307	98	Paved parking, HSG B
8,522	55	Woods, Good, HSG B
4,576	61	>75% Grass cover, Good, HSG B
23,405	75	Weighted Average
13,098		55.96% Pervious Area
10,307		44.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO POI 2**

Subcatchment E-2: PARKING LOT - AREA2



Summary for Subcatchment E-3: LOWER LOT

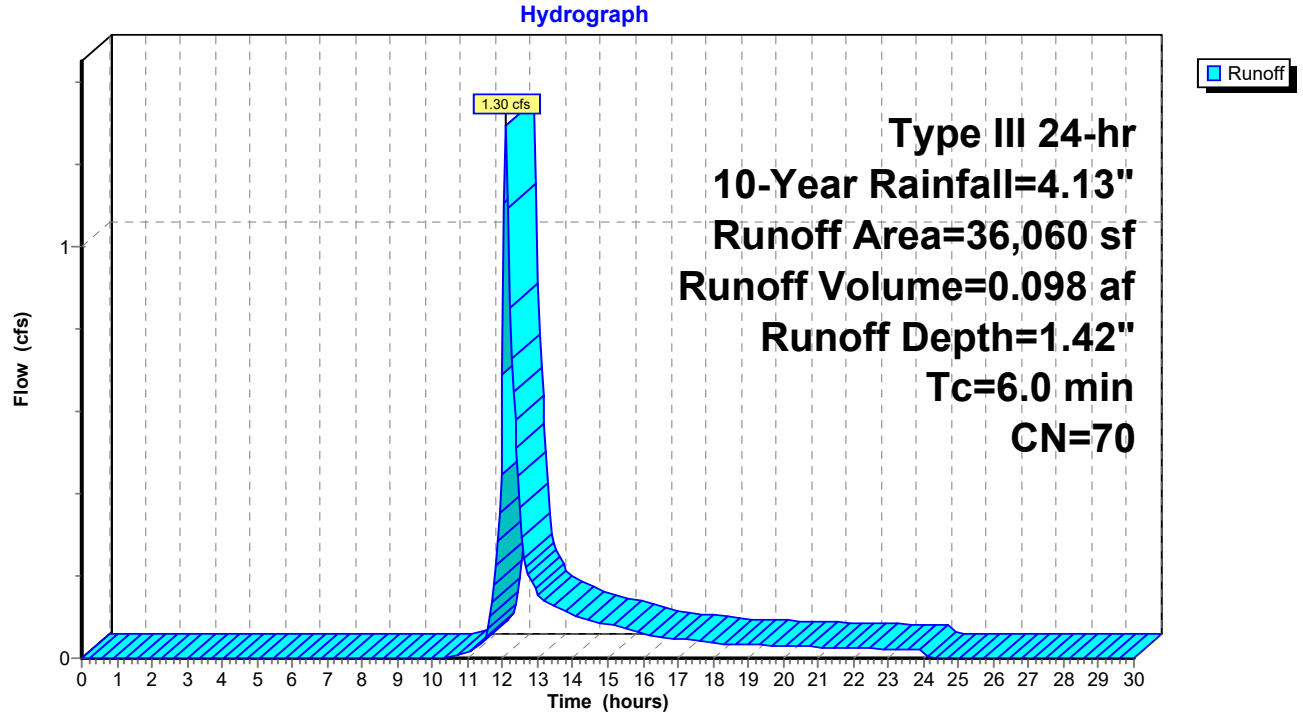
Runoff = 1.30 cfs @ 12.10 hrs, Volume= 0.098 af, Depth= 1.42"
Routed to Link POI-2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
7,177	98	Paved parking, HSG B
1,202	98	Paved parking, HSG D
278	39	>75% Grass cover, Good, HSG A
10,683	61	>75% Grass cover, Good, HSG B
4,469	80	>75% Grass cover, Good, HSG D
1,162	30	Woods, Good, HSG A
9,373	55	Woods, Good, HSG B
1,616	77	Woods, Good, HSG D
100	96	Gravel surface, HSG A
36,060	70	Weighted Average
27,681		76.76% Pervious Area
8,379		23.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO POI 2**

Subcatchment E-3: LOWER LOT

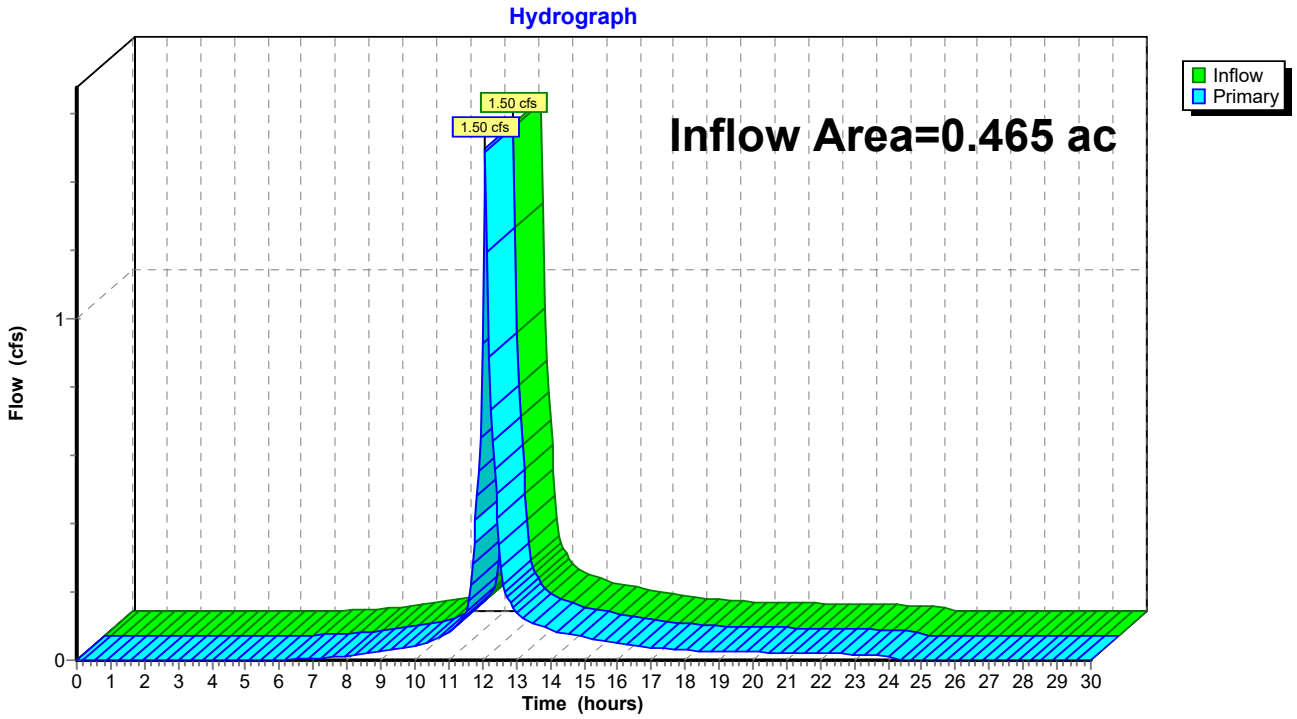


Summary for Link POI-1: EXISTING SUBSURFACE GALLERY

Inflow Area = 0.465 ac, 71.91% Impervious, Inflow Depth = 2.85" for 10-Year event
Inflow = 1.50 cfs @ 12.09 hrs, Volume= 0.110 af
Primary = 1.50 cfs @ 12.09 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POI-1: EXISTING SUBSURFACE GALLERY

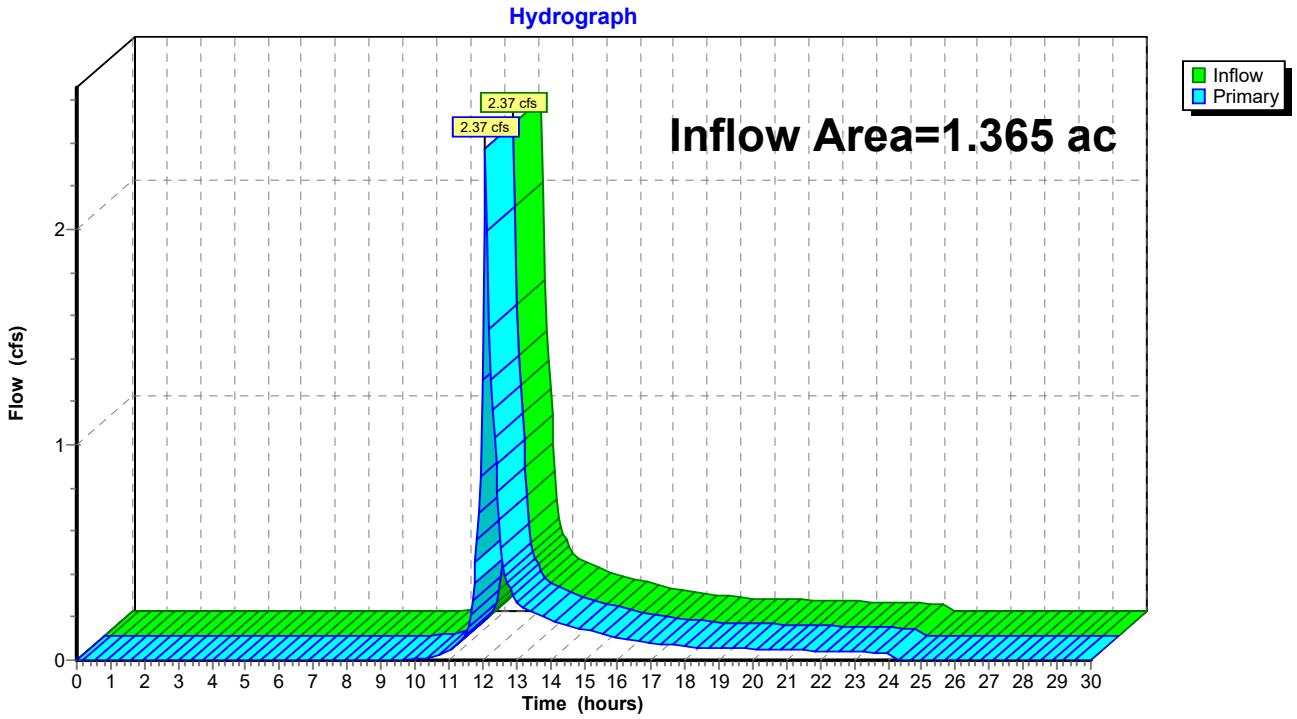


Summary for Link POI-2: WETLANDS

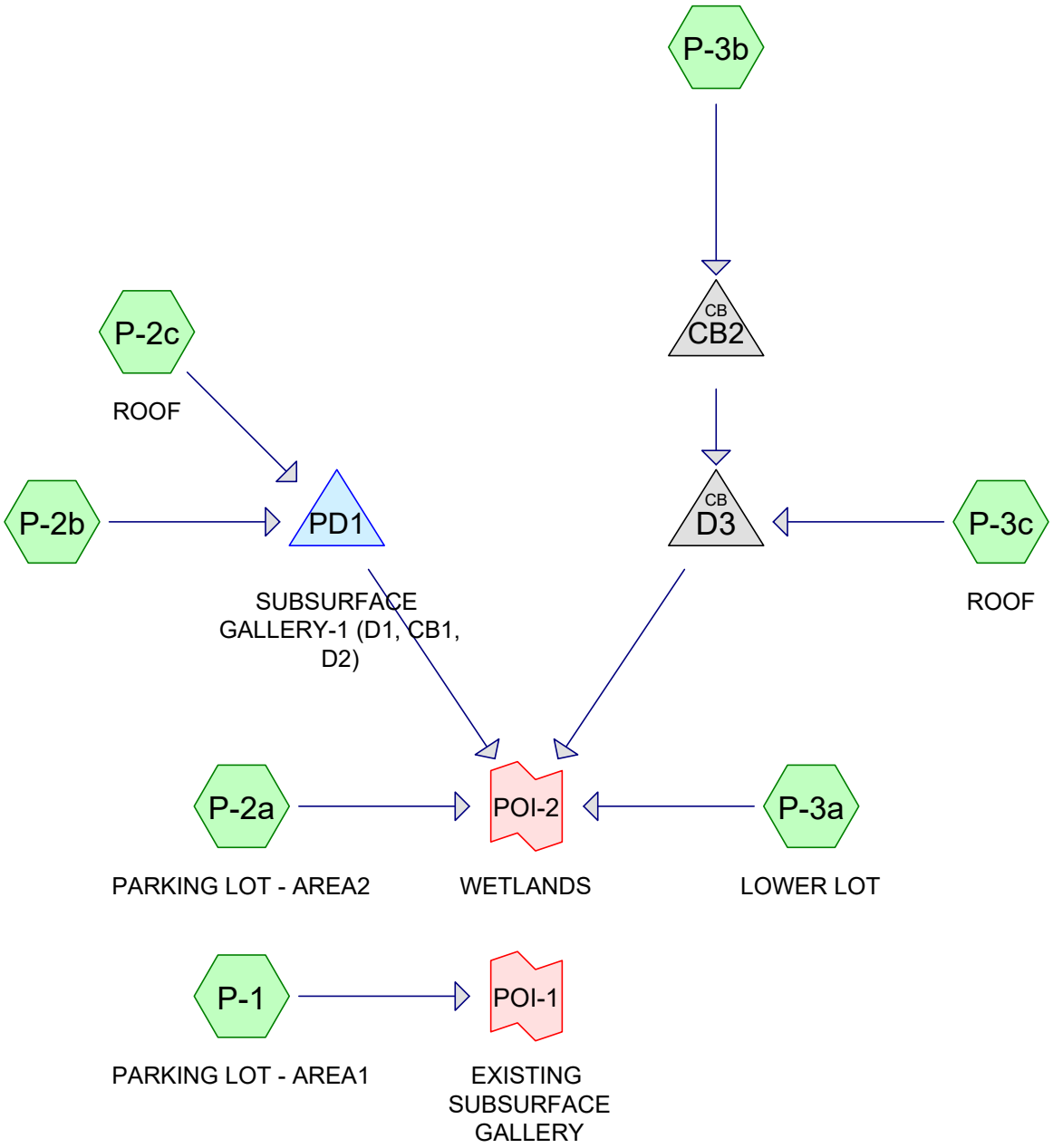
Inflow Area = 1.365 ac, 31.42% Impervious, Inflow Depth = 1.55" for 10-Year event
Inflow = 2.37 cfs @ 12.10 hrs, Volume= 0.177 af
Primary = 2.37 cfs @ 12.10 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POI-2: WETLANDS



Proposed Conditions



Subcat Reach Pond Link

Routing Diagram for 100811.040-SPS SQUASH-PROPOSED
Prepared by Nobis Engineering Inc, Printed 9/16/2025

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.006	39	>75% Grass cover, Good, HSG A (P-3a)
0.399	61	>75% Grass cover, Good, HSG B (P-1, P-2a, P-2b, P-3a, P-3b)
0.032	80	>75% Grass cover, Good, HSG D (P-3a)
0.002	96	Gravel surface, HSG A (P-3a)
0.650	98	Paved parking, HSG B (P-1, P-2a, P-2b, P-3a)
0.007	98	Paved parking, HSG D (P-3a)
0.310	98	Roofs, HSG B (P-2c, P-3c)
0.094	98	Roofs, HSG D (P-2c, P-3c)
0.027	30	Woods, Good, HSG A (P-3a)
0.269	55	Woods, Good, HSG B (P-2a, P-3a)
0.034	77	Woods, Good, HSG D (P-3a)
1.830	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.035	HSG A	P-3a
1.628	HSG B	P-1, P-2a, P-2b, P-2c, P-3a, P-3b, P-3c
0.000	HSG C	
0.167	HSG D	P-2c, P-3a, P-3c
0.000	Other	
1.830		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: PARKING LOT - AREA1 Runoff Area=20,167 sf 69.19% Impervious Runoff Depth=1.58"
Tc=6.0 min CN=87 Runoff=0.84 cfs 0.061 af

Subcatchment P-2a: PARKING LOT - Runoff Area=16,035 sf 34.22% Impervious Runoff Depth=0.66"
Tc=6.0 min CN=71 Runoff=0.24 cfs 0.020 af

Subcatchment P-2b: Runoff Area=3,869 sf 92.58% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=95 Runoff=0.22 cfs 0.017 af

Subcatchment P-2c: ROOF Runoff Area=12,320 sf 100.00% Impervious Runoff Depth=2.59"
Tc=6.0 min CN=98 Runoff=0.75 cfs 0.061 af

Subcatchment P-3a: LOWER LOT Runoff Area=21,254 sf 26.29% Impervious Runoff Depth=0.62"
Tc=6.0 min CN=70 Runoff=0.29 cfs 0.025 af

Subcatchment P-3b: Runoff Area=807 sf 0.00% Impervious Runoff Depth=0.30"
Tc=6.0 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment P-3c: ROOF Runoff Area=5,280 sf 100.00% Impervious Runoff Depth=2.59"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Pond CB2: Peak Elev=295.63' Inflow=0.00 cfs 0.000 af
6.0" Round Culvert n=0.013 L=90.0' S=0.0200 '/' Outflow=0.00 cfs 0.000 af

Pond D3: Peak Elev=293.02' Inflow=0.33 cfs 0.027 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=0.33 cfs 0.027 af

Pond PD1: SUBSURFACE GALLERY-1 (D1, Peak Elev=300.49' Storage=1,152 cf Inflow=0.97 cfs 0.078 af
Discarded=0.10 cfs 0.078 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.078 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=0.84 cfs 0.061 af
Primary=0.84 cfs 0.061 af

Link POI-2: WETLANDS Inflow=0.86 cfs 0.072 af
Primary=0.86 cfs 0.072 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.211 af Average Runoff Depth = 1.38"
42.04% Pervious = 0.770 ac 57.96% Impervious = 1.061 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: PARKING LOT - AREA1 Runoff Area=20,167 sf 69.19% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=87 Runoff=1.45 cfs 0.106 af

Subcatchment P-2a: PARKING LOT - Runoff Area=16,035 sf 34.22% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=71 Runoff=0.61 cfs 0.046 af

Subcatchment P-2b: Runoff Area=3,869 sf 92.58% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=95 Runoff=0.34 cfs 0.026 af

Subcatchment P-2c: ROOF Runoff Area=12,320 sf 100.00% Impervious Runoff Depth=3.89"
Tc=6.0 min CN=98 Runoff=1.11 cfs 0.092 af

Subcatchment P-3a: LOWER LOT Runoff Area=21,254 sf 26.29% Impervious Runoff Depth=1.42"
Tc=6.0 min CN=70 Runoff=0.76 cfs 0.058 af

Subcatchment P-3b: Runoff Area=807 sf 0.00% Impervious Runoff Depth=0.88"
Tc=6.0 min CN=61 Runoff=0.02 cfs 0.001 af

Subcatchment P-3c: ROOF Runoff Area=5,280 sf 100.00% Impervious Runoff Depth=3.89"
Tc=6.0 min CN=98 Runoff=0.48 cfs 0.039 af

Pond CB2: Peak Elev=295.67' Inflow=0.02 cfs 0.001 af
6.0" Round Culvert n=0.013 L=90.0' S=0.0200 '/' Outflow=0.02 cfs 0.001 af

Pond D3: Peak Elev=293.10' Inflow=0.49 cfs 0.041 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=0.49 cfs 0.041 af

Pond PD1: SUBSURFACE GALLERY-1 (D1, Peak Elev=301.34' Storage=2,007 cf Inflow=1.45 cfs 0.118 af
Discarded=0.11 cfs 0.118 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.118 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=1.45 cfs 0.106 af
Primary=1.45 cfs 0.106 af

Link POI-2: WETLANDS Inflow=1.86 cfs 0.144 af
Primary=1.86 cfs 0.144 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.368 af Average Runoff Depth = 2.41"
42.04% Pervious = 0.770 ac 57.96% Impervious = 1.061 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: PARKING LOT - AREA1 Runoff Area=20,167 sf 69.19% Impervious Runoff Depth=3.71"
Tc=6.0 min CN=87 Runoff=1.93 cfs 0.143 af

Subcatchment P-2a: PARKING LOT - Runoff Area=16,035 sf 34.22% Impervious Runoff Depth=2.23"
Tc=6.0 min CN=71 Runoff=0.93 cfs 0.068 af

Subcatchment P-2b: Runoff Area=3,869 sf 92.58% Impervious Runoff Depth=4.57"
Tc=6.0 min CN=95 Runoff=0.43 cfs 0.034 af

Subcatchment P-2c: ROOF Runoff Area=12,320 sf 100.00% Impervious Runoff Depth=4.91"
Tc=6.0 min CN=98 Runoff=1.39 cfs 0.116 af

Subcatchment P-3a: LOWER LOT Runoff Area=21,254 sf 26.29% Impervious Runoff Depth=2.15"
Tc=6.0 min CN=70 Runoff=1.19 cfs 0.087 af

Subcatchment P-3b: Runoff Area=807 sf 0.00% Impervious Runoff Depth=1.46"
Tc=6.0 min CN=61 Runoff=0.03 cfs 0.002 af

Subcatchment P-3c: ROOF Runoff Area=5,280 sf 100.00% Impervious Runoff Depth=4.91"
Tc=6.0 min CN=98 Runoff=0.60 cfs 0.050 af

Pond CB2: Peak Elev=295.70' Inflow=0.03 cfs 0.002 af
6.0" Round Culvert n=0.013 L=90.0' S=0.0200 '/' Outflow=0.03 cfs 0.002 af

Pond D3: Peak Elev=293.15' Inflow=0.62 cfs 0.052 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=0.62 cfs 0.052 af

Pond PD1: SUBSURFACE GALLERY-1 (D1, Peak Elev=302.14' Storage=2,748 cf Inflow=1.82 cfs 0.150 af
Discarded=0.12 cfs 0.150 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.150 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=1.93 cfs 0.143 af
Primary=1.93 cfs 0.143 af

Link POI-2: WETLANDS Inflow=2.75 cfs 0.208 af
Primary=2.75 cfs 0.208 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.500 af Average Runoff Depth = 3.28"
42.04% Pervious = 0.770 ac 57.96% Impervious = 1.061 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP-1: PARKING LOT - AREA1 Runoff Area=20,167 sf 69.19% Impervious Runoff Depth=4.59"
Tc=6.0 min CN=87 Runoff=2.37 cfs 0.177 af

SubcatchmentP-2a: PARKING LOT - Runoff Area=16,035 sf 34.22% Impervious Runoff Depth=2.96"
Tc=6.0 min CN=71 Runoff=1.25 cfs 0.091 af

SubcatchmentP-2b: Runoff Area=3,869 sf 92.58% Impervious Runoff Depth=5.49"
Tc=6.0 min CN=95 Runoff=0.51 cfs 0.041 af

SubcatchmentP-2c: ROOF Runoff Area=12,320 sf 100.00% Impervious Runoff Depth=5.84"
Tc=6.0 min CN=98 Runoff=1.65 cfs 0.138 af

SubcatchmentP-3a: LOWER LOT Runoff Area=21,254 sf 26.29% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=70 Runoff=1.60 cfs 0.117 af

SubcatchmentP-3b: Runoff Area=807 sf 0.00% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=61 Runoff=0.04 cfs 0.003 af

SubcatchmentP-3c: ROOF Runoff Area=5,280 sf 100.00% Impervious Runoff Depth=5.84"
Tc=6.0 min CN=98 Runoff=0.71 cfs 0.059 af

Pond CB2: Peak Elev=295.72' Inflow=0.04 cfs 0.003 af
6.0" Round Culvert n=0.013 L=90.0' S=0.0200 '/' Outflow=0.04 cfs 0.003 af

Pond D3: Peak Elev=293.20' Inflow=0.75 cfs 0.062 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=0.75 cfs 0.062 af

Pond PD1: SUBSURFACE GALLERY-1 (D1, Peak Elev=303.03' Storage=3,459 cf Inflow=2.15 cfs 0.178 af
Discarded=0.13 cfs 0.178 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.178 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=2.37 cfs 0.177 af
Primary=2.37 cfs 0.177 af

Link POI-2: WETLANDS Inflow=3.60 cfs 0.270 af
Primary=3.60 cfs 0.270 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.625 af Average Runoff Depth = 4.10"
42.04% Pervious = 0.770 ac 57.96% Impervious = 1.061 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: PARKING LOT - AREA1 Runoff Area=20,167 sf 69.19% Impervious Runoff Depth=5.66"
Tc=6.0 min CN=87 Runoff=2.89 cfs 0.218 af

Subcatchment P-2a: PARKING LOT - Runoff Area=16,035 sf 34.22% Impervious Runoff Depth=3.88"
Tc=6.0 min CN=71 Runoff=1.64 cfs 0.119 af

Subcatchment P-2b: Runoff Area=3,869 sf 92.58% Impervious Runoff Depth=6.59"
Tc=6.0 min CN=95 Runoff=0.60 cfs 0.049 af

Subcatchment P-2c: ROOF Runoff Area=12,320 sf 100.00% Impervious Runoff Depth=6.95"
Tc=6.0 min CN=98 Runoff=1.95 cfs 0.164 af

Subcatchment P-3a: LOWER LOT Runoff Area=21,254 sf 26.29% Impervious Runoff Depth=3.78"
Tc=6.0 min CN=70 Runoff=2.12 cfs 0.154 af

Subcatchment P-3b: Runoff Area=807 sf 0.00% Impervious Runoff Depth=2.84"
Tc=6.0 min CN=61 Runoff=0.06 cfs 0.004 af

Subcatchment P-3c: ROOF Runoff Area=5,280 sf 100.00% Impervious Runoff Depth=6.95"
Tc=6.0 min CN=98 Runoff=0.84 cfs 0.070 af

Pond CB2: Peak Elev=295.74' Inflow=0.06 cfs 0.004 af
6.0" Round Culvert n=0.013 L=90.0' S=0.0200 '/' Outflow=0.06 cfs 0.004 af

Pond D3: Peak Elev=293.25' Inflow=0.89 cfs 0.075 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0060 '/' Outflow=0.89 cfs 0.075 af

Pond PD1: SUBSURFACE GALLERY-1 (D1, Peak Elev=303.38' Storage=3,664 cf Inflow=2.55 cfs 0.213 af
Discarded=0.14 cfs 0.191 af Primary=0.57 cfs 0.022 af Outflow=0.71 cfs 0.213 af

Link POI-1: EXISTING SUBSURFACE GALLERY Inflow=2.89 cfs 0.218 af
Primary=2.89 cfs 0.218 af

Link POI-2: WETLANDS Inflow=4.65 cfs 0.369 af
Primary=4.65 cfs 0.369 af

Total Runoff Area = 1.830 ac Runoff Volume = 0.778 af Average Runoff Depth = 5.10"
42.04% Pervious = 0.770 ac 57.96% Impervious = 1.061 ac

Summary for Subcatchment P-1: PARKING LOT - AREA1

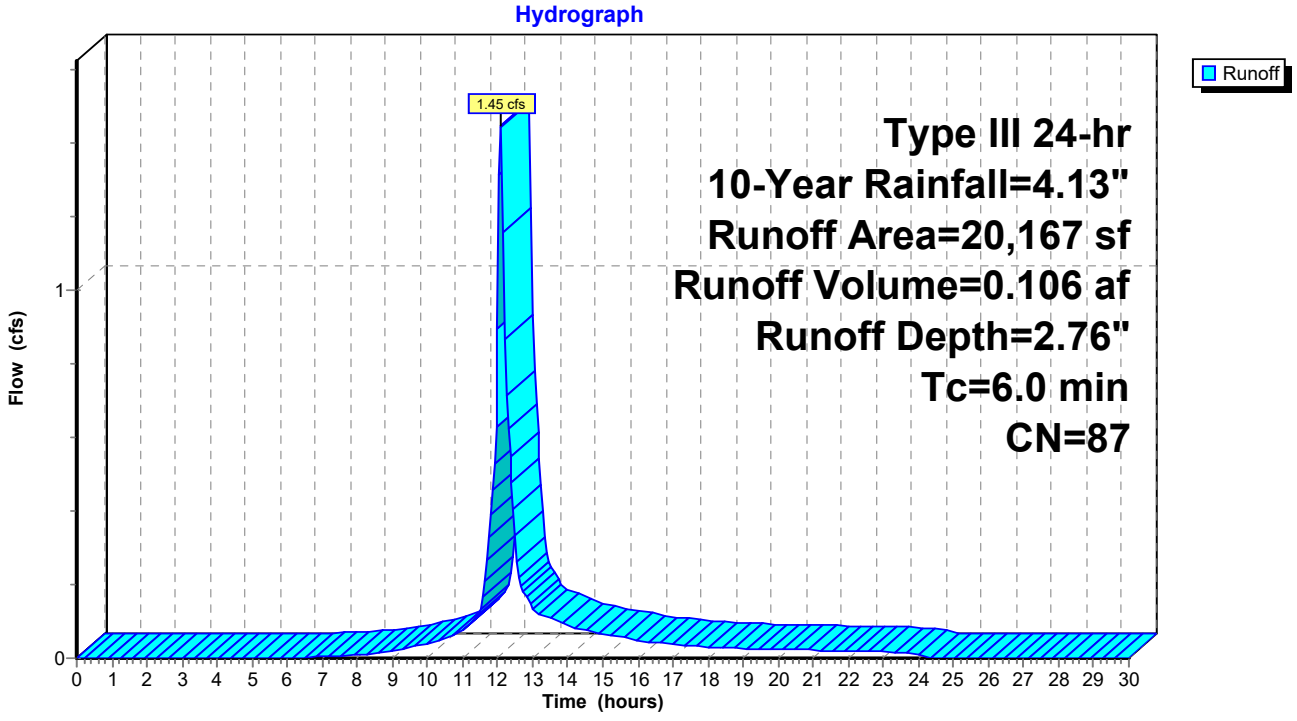
Runoff = 1.45 cfs @ 12.09 hrs, Volume= 0.106 af, Depth= 2.76"
Routed to Link POI-1 : EXISTING SUBSURFACE GALLERY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
13,954	98	Paved parking, HSG B
6,213	61	>75% Grass cover, Good, HSG B
20,167	87	Weighted Average
6,213		30.81% Pervious Area
13,954		69.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO POI 1**

Subcatchment P-1: PARKING LOT - AREA1



Summary for Subcatchment P-2a: PARKING LOT - AREA2

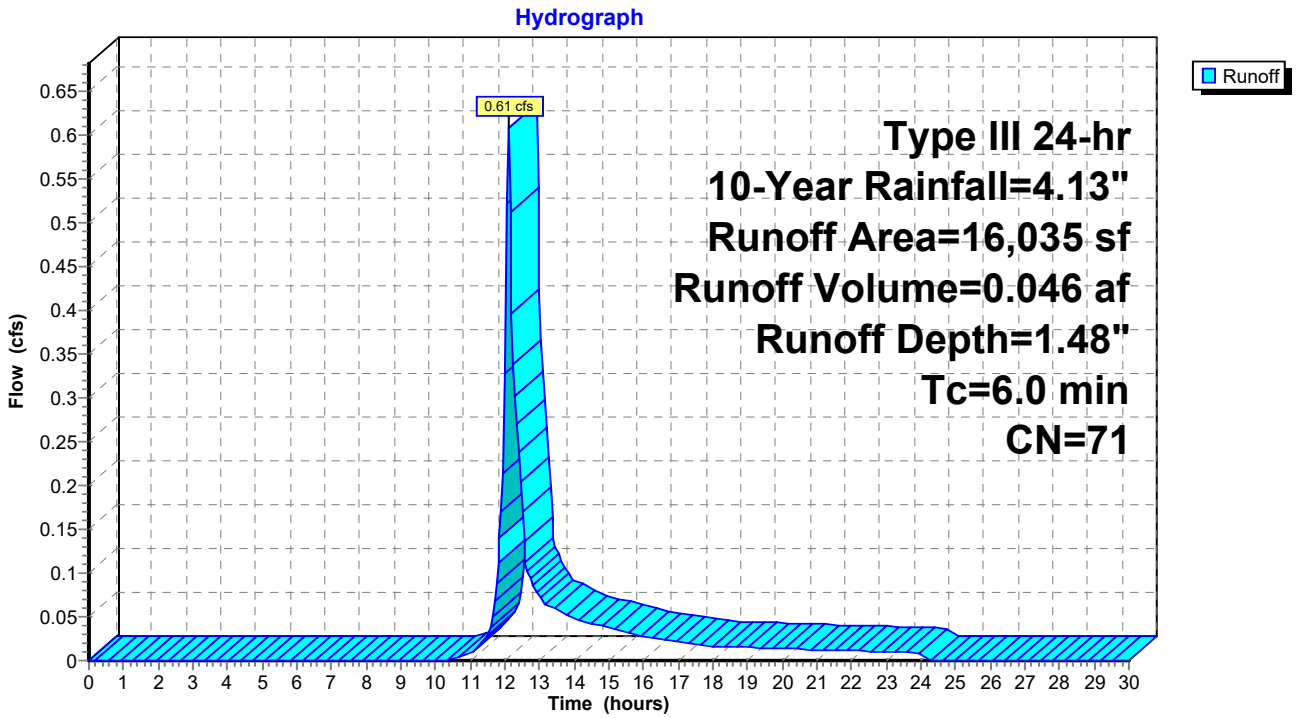
Runoff = 0.61 cfs @ 12.10 hrs, Volume= 0.046 af, Depth= 1.48"
Routed to Link POI-2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
5,487	98	Paved parking, HSG B
5,853	55	Woods, Good, HSG B
4,695	61	>75% Grass cover, Good, HSG B
16,035	71	Weighted Average
10,548		65.78% Pervious Area
5,487		34.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO POI 2**

Subcatchment P-2a: PARKING LOT - AREA2



Summary for Subcatchment P-2b:

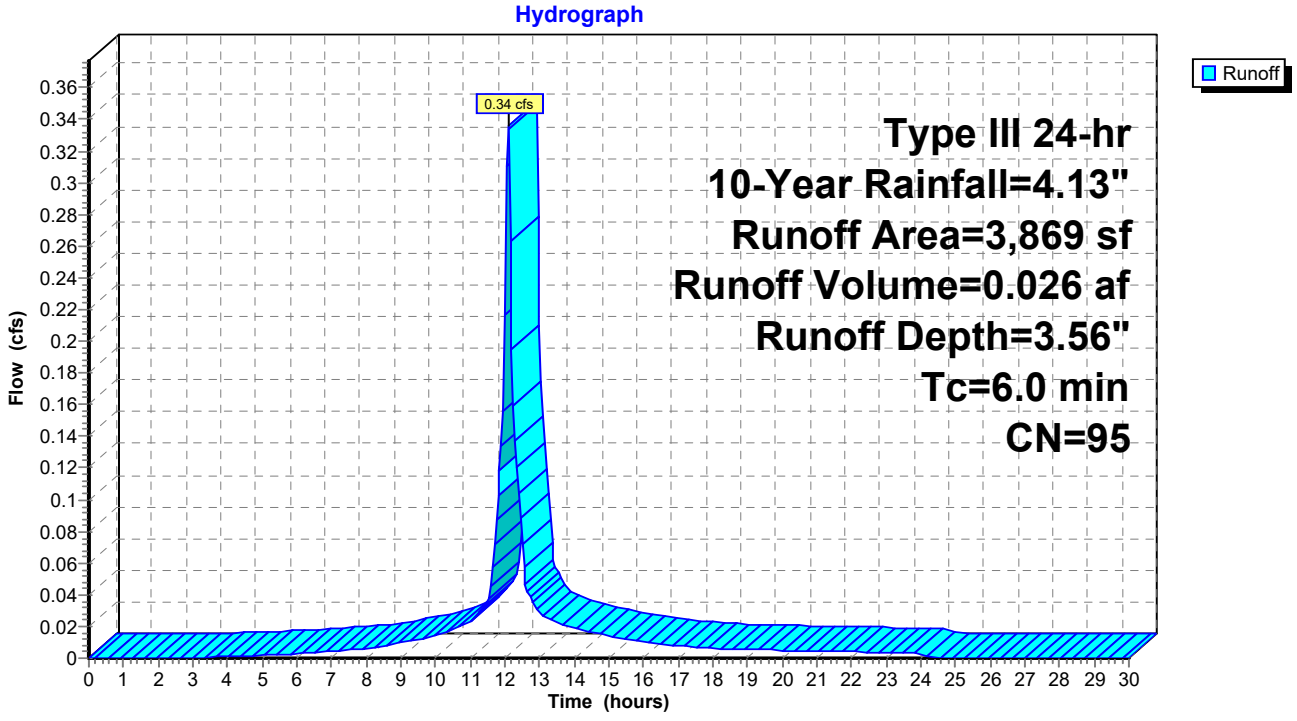
Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 3.56"
Routed to Pond PD1 : SUBSURFACE GALLERY-1 (D1, CB1, D2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
3,582	98	Paved parking, HSG B
287	61	>75% Grass cover, Good, HSG B
3,869	95	Weighted Average
287		7.42% Pervious Area
3,582		92.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO CB1**

Subcatchment P-2b:



Summary for Subcatchment P-2c: ROOF

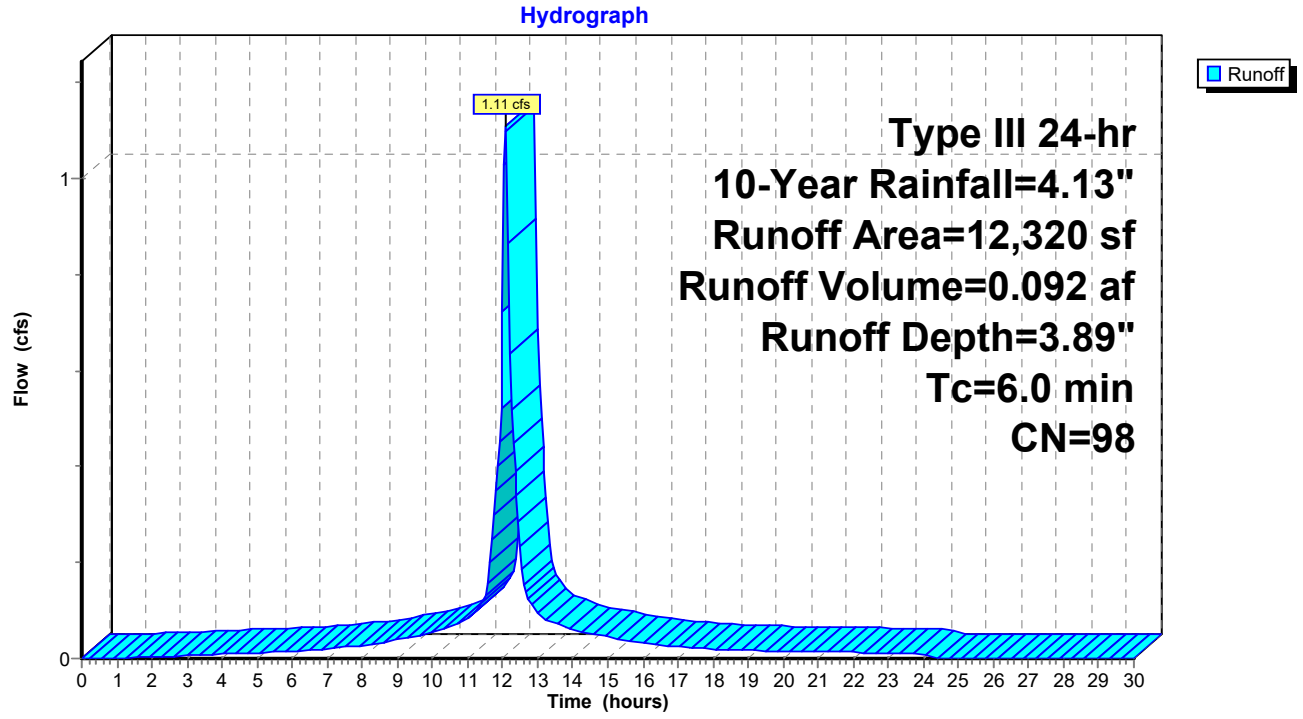
Runoff = 1.11 cfs @ 12.09 hrs, Volume= 0.092 af, Depth= 3.89"
Routed to Pond PD1 : SUBSURFACE GALLERY-1 (D1, CB1, D2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
8,485	98	Roofs, HSG B
3,835	98	Roofs, HSG D
12,320	98	Weighted Average
12,320		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO D1**

Subcatchment P-2c: ROOF



Summary for Subcatchment P-3a: LOWER LOT

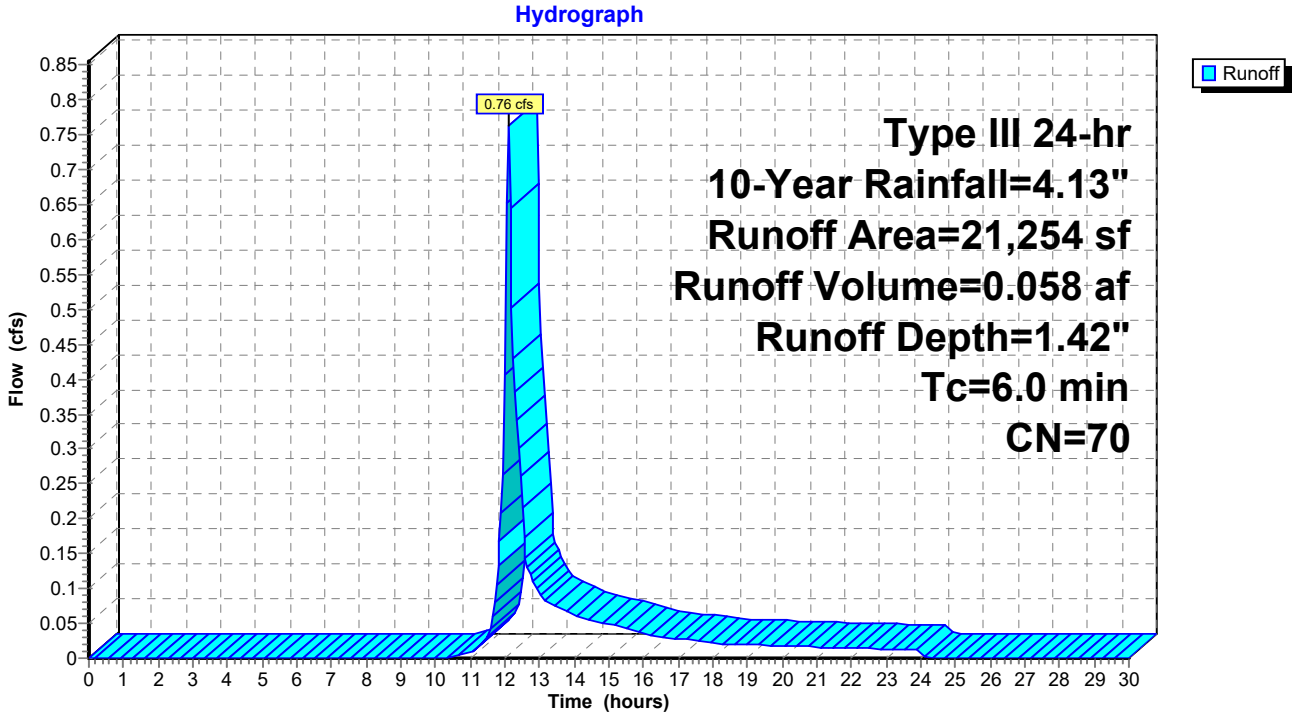
Runoff = 0.76 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 1.42"
Routed to Link POI-2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
5,293	98	Paved parking, HSG B
295	98	Paved parking, HSG D
278	39	>75% Grass cover, Good, HSG A
5,380	61	>75% Grass cover, Good, HSG B
1,384	80	>75% Grass cover, Good, HSG D
1,162	30	Woods, Good, HSG A
5,869	55	Woods, Good, HSG B
1,493	77	Woods, Good, HSG D
100	96	Gravel surface, HSG A
21,254	70	Weighted Average
15,666		73.71% Pervious Area
5,588		26.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO POI 2**

Subcatchment P-3a: LOWER LOT



Summary for Subcatchment P-3b:

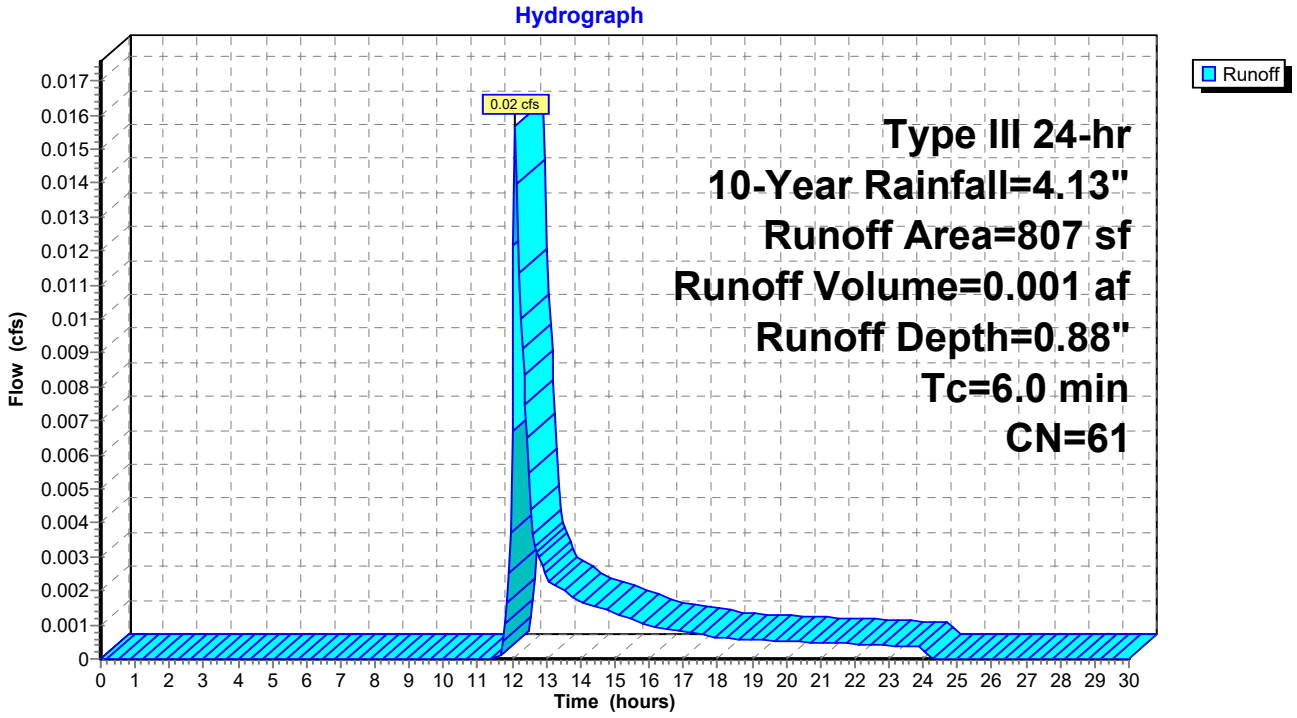
Runoff = 0.02 cfs @ 12.11 hrs, Volume= 0.001 af, Depth= 0.88"
Routed to Pond CB2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
807	61	>75% Grass cover, Good, HSG B
807		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO CB2**

Subcatchment P-3b:



Summary for Subcatchment P-3c: ROOF

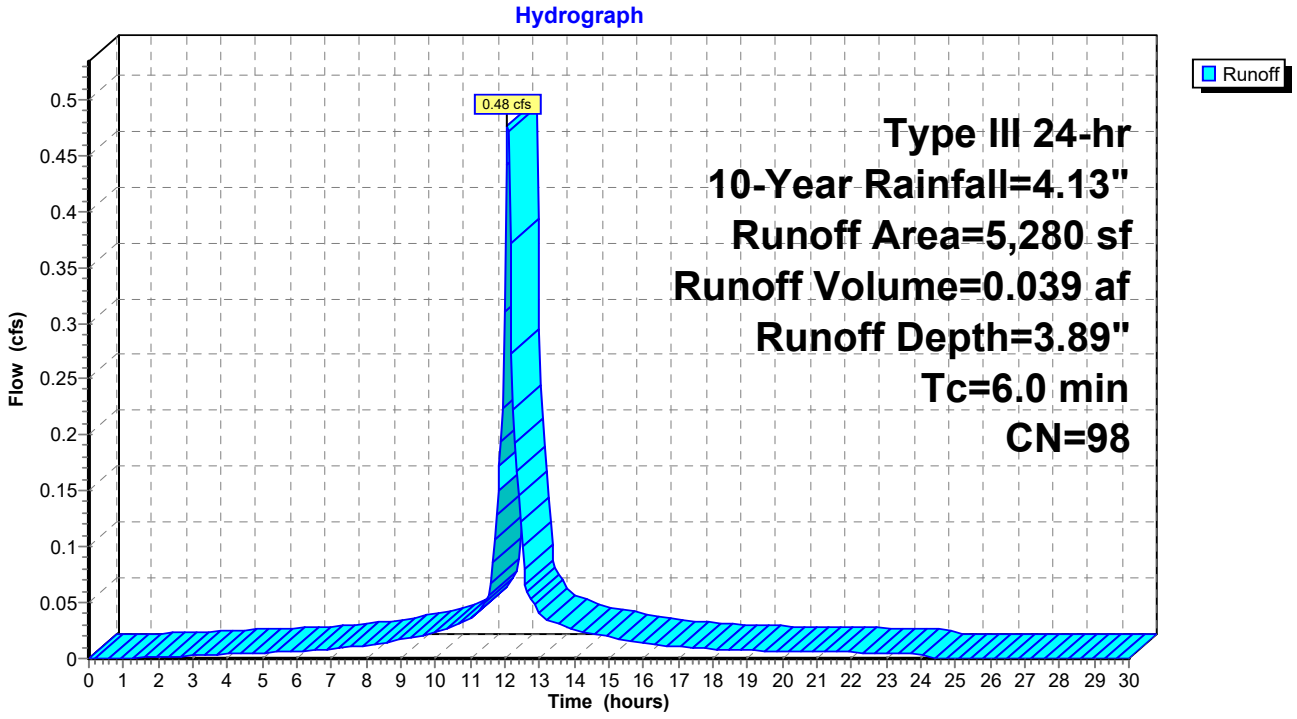
Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 3.89"
Routed to Pond D3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.13"

Area (sf)	CN	Description
5,000	98	Roofs, HSG B
280	98	Roofs, HSG D
5,280	98	Weighted Average
5,280		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT TO DMH3**

Subcatchment P-3c: ROOF



Summary for Pond CB2:

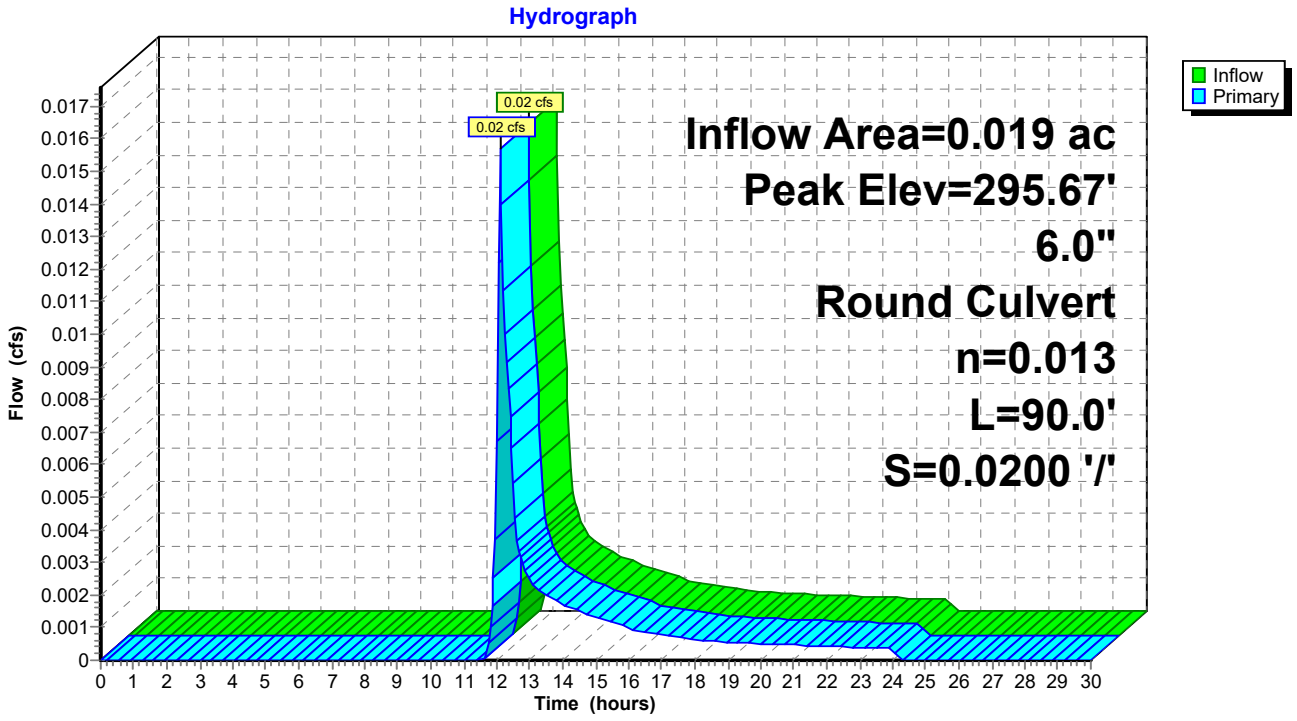
Inflow Area = 0.019 ac, 0.00% Impervious, Inflow Depth = 0.88" for 10-Year event
Inflow = 0.02 cfs @ 12.11 hrs, Volume= 0.001 af
Outflow = 0.02 cfs @ 12.11 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 12.11 hrs, Volume= 0.001 af
Routed to Pond D3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 295.67' @ 12.11 hrs
Flood Elev= 298.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	295.60'	**6.0" Round CB2 TO DMH3** L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 295.60' / 293.80' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

Primary OutFlow Max=0.02 cfs @ 12.11 hrs HW=295.67' TW=293.09' (Dynamic Tailwater)
1=CB2 TO DMH3 (Inlet Controls 0.02 cfs @ 0.90 fps)

Pond CB2:



Summary for Pond D3:

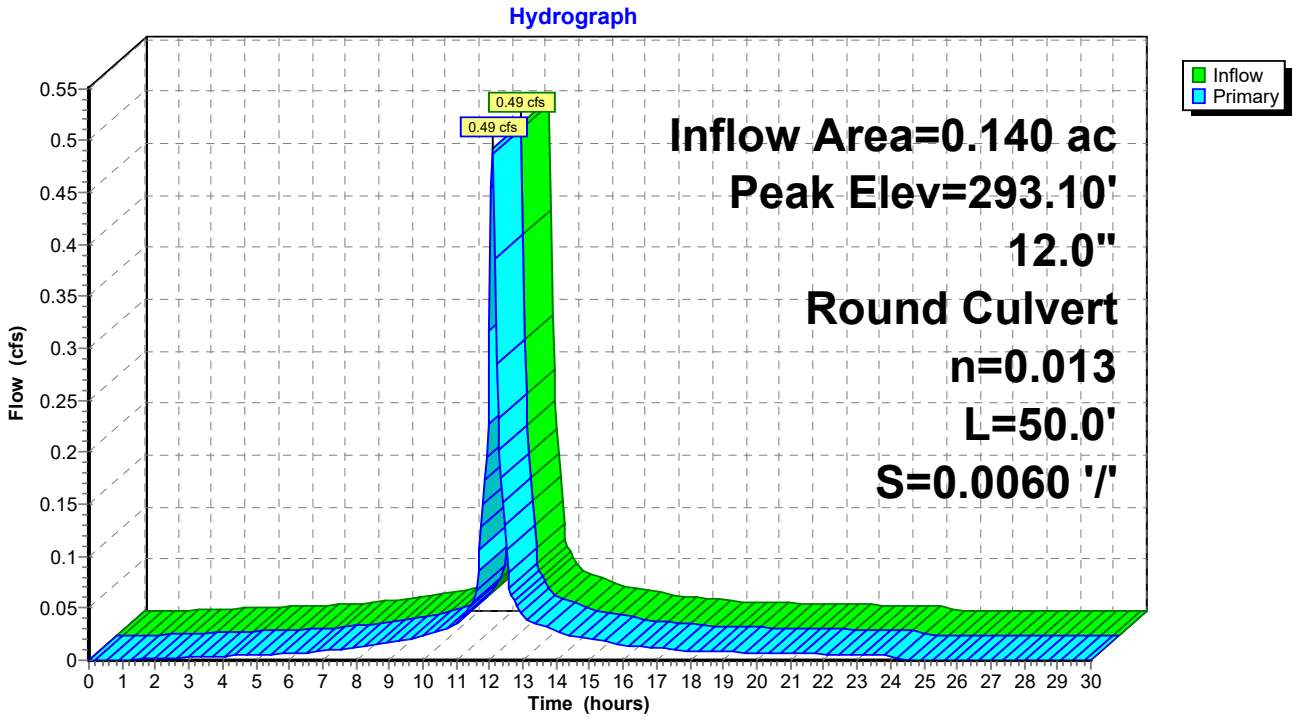
Inflow Area = 0.140 ac, 86.74% Impervious, Inflow Depth = 3.50" for 10-Year event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.49 cfs @ 12.09 hrs, Volume= 0.041 af
Routed to Link POI-2 : WETLANDS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 293.10' @ 12.09 hrs
Flood Elev= 296.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.70'	**12.0" Round DMH3 TO FES2** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 292.70' / 292.40' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.09 hrs HW=293.09' TW=0.00' (Dynamic Tailwater)
↑**1=DMH3 TO FES2** (Barrel Controls 0.48 cfs @ 2.48 fps)

Pond D3:



Summary for Pond PD1: SUBSURFACE GALLERY-1 (D1, CB1, D2)

Inflow Area = 0.372 ac, 98.23% Impervious, Inflow Depth = 3.81" for 10-Year event
Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.118 af
Outflow = 0.11 cfs @ 13.10 hrs, Volume= 0.118 af, Atten= 92%, Lag= 60.8 min
Discarded = 0.11 cfs @ 13.10 hrs, Volume= 0.118 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link POI-2 : WETLANDS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 301.34' @ 13.10 hrs Surf.Area= 1,271 sf Storage= 2,007 cf
Flood Elev= 304.50' Surf.Area= 1,271 sf Storage= 4,236 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 140.5 min (896.8 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	299.00'	1,838 cf	**22.75'W x 55.89'L x 5.50'H Field A** 6,993 cf Overall - 2,398 cf Embedded = 4,595 cf x 40.0% Voids
#2A	299.75'	2,398 cf	**ADS_StormTech MC-3500 d +Cap**x 21 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 21 Chambers in 3 Rows Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf
		4,236 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	303.00'	**12.0" Round DMH-2 TO FES-1** L= 21.0' Ke= 0.500 Inlet / Outlet Invert= 303.00' / 302.00' S= 0.0476 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Discarded	299.00'	**3.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.11 cfs @ 13.10 hrs HW=301.34' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=299.00' TW=0.00' (Dynamic Tailwater)
↑—**1=DMH-2 TO FES-1** (Controls 0.00 cfs)

Pond PD1: SUBSURFACE GALLERY-1 (D1, CB1, D2) - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

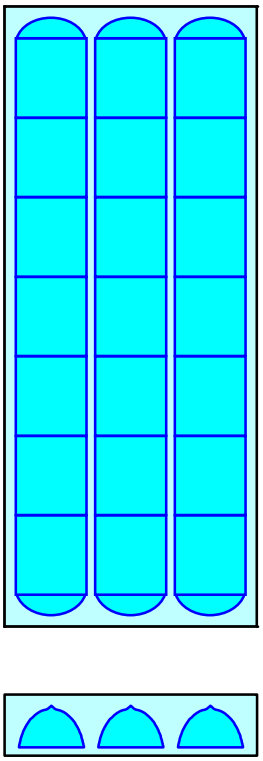
7 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 53.89' Row Length +12.0" End Stone x 2 = 55.89' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

21 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 2,398.4 cf Chamber Storage

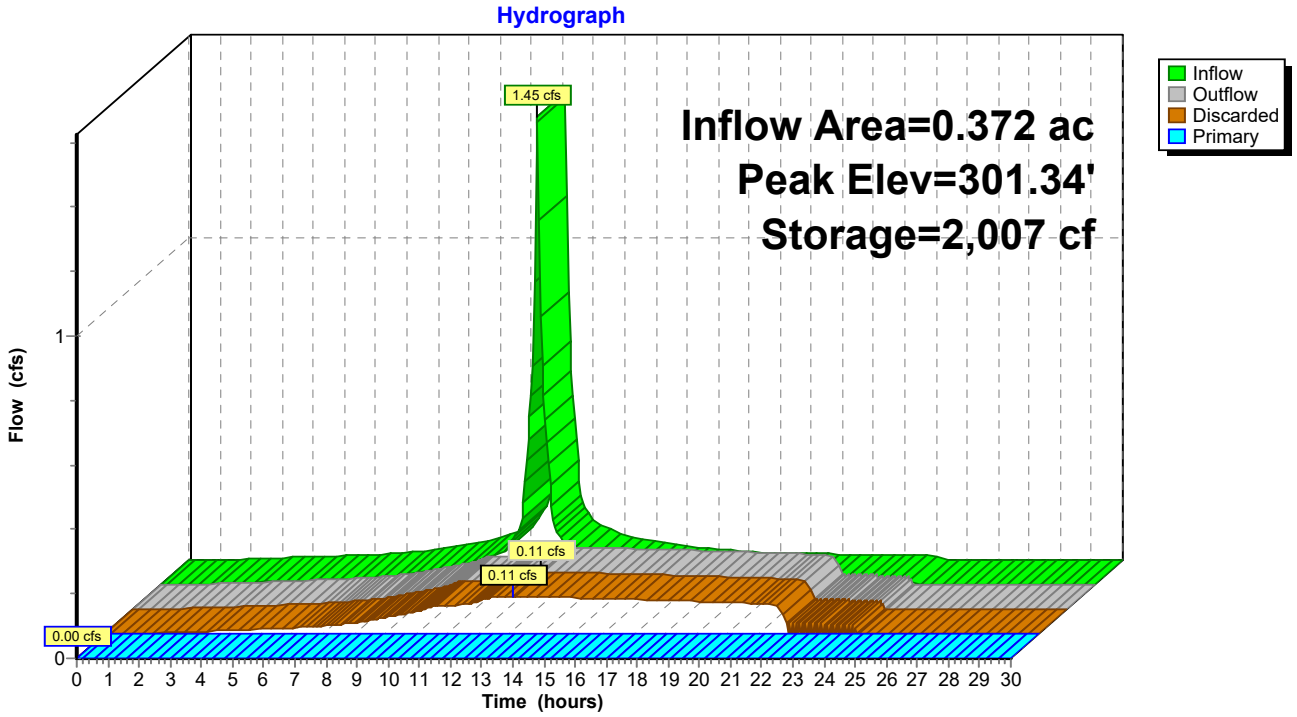
6,993.2 cf Field - 2,398.4 cf Chambers = 4,594.8 cf Stone x 40.0% Voids = 1,837.9 cf Stone Storage

Chamber Storage + Stone Storage = 4,236.3 cf = 0.097 af
Overall Storage Efficiency = 60.6%
Overall System Size = 55.89' x 22.75' x 5.50'

21 Chambers
259.0 cy Field
170.2 cy Stone



Pond PD1: SUBSURFACE GALLERY-1 (D1, CB1, D2)

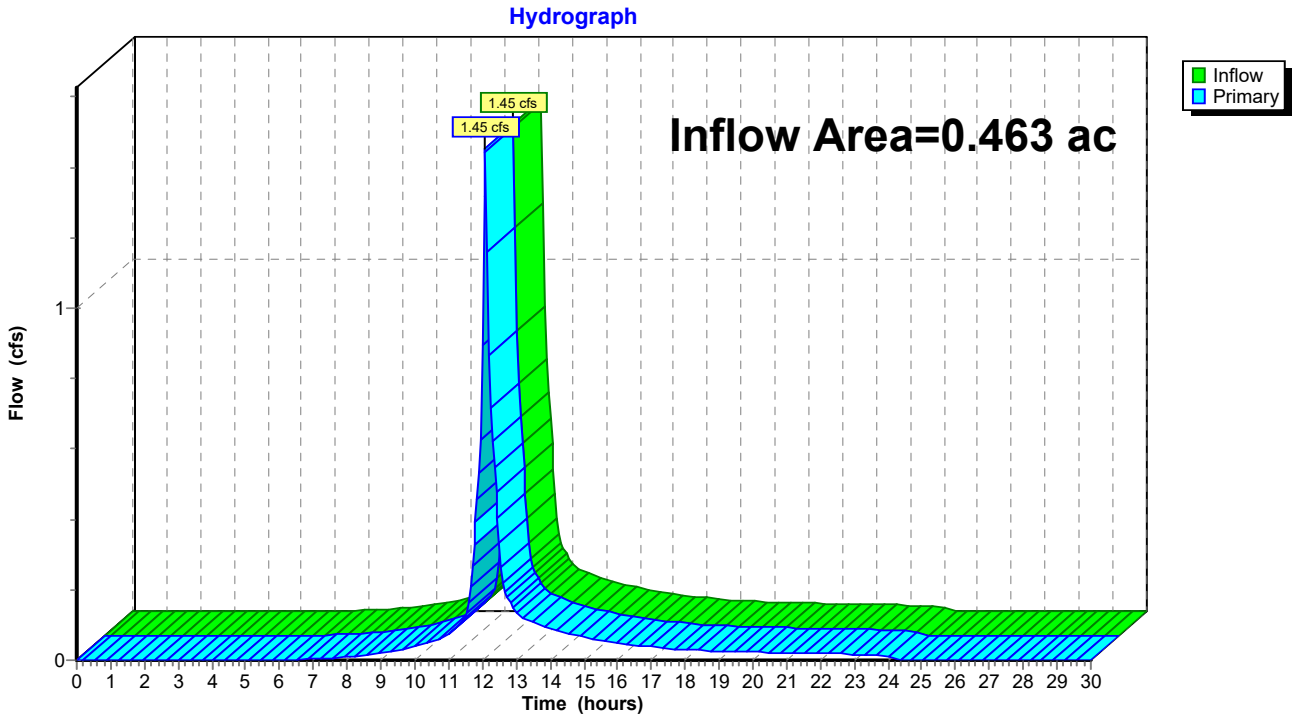


Summary for Link POI-1: EXISTING SUBSURFACE GALLERY

Inflow Area = 0.463 ac, 69.19% Impervious, Inflow Depth = 2.76" for 10-Year event
Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.106 af
Primary = 1.45 cfs @ 12.09 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POI-1: EXISTING SUBSURFACE GALLERY

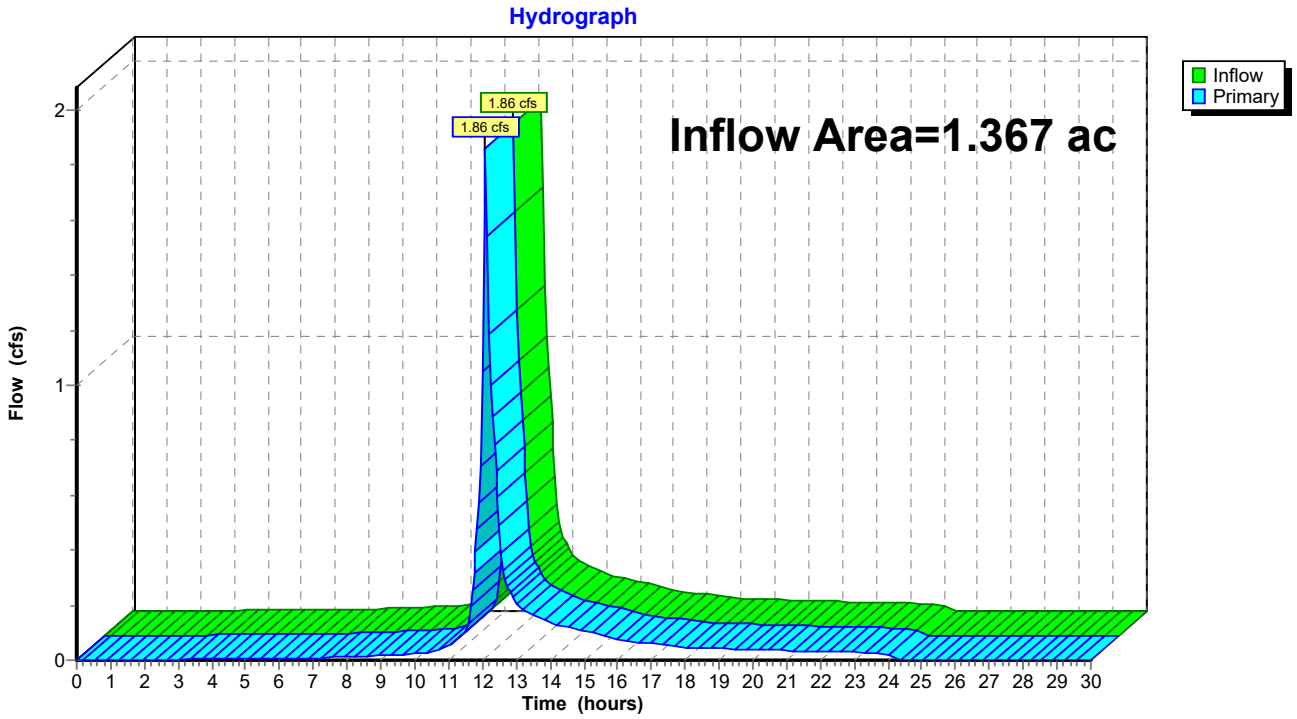


Summary for Link POI-2: WETLANDS

Inflow Area = 1.367 ac, 54.15% Impervious, Inflow Depth = 1.26" for 10-Year event
Inflow = 1.86 cfs @ 12.10 hrs, Volume= 0.144 af
Primary = 1.86 cfs @ 12.10 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link POI-2: WETLANDS



SITE SPECIFIC SOIL SURVEY INFORMATION

TES ENVIRONMENTAL CONSULTANTS, L.L.C.

Environmental Planning and Permitting
Soil and Wetlands Investigation

SITE-SPECIFIC
SOIL SURVEY REPORT

performed at

St. Paul's School New Squash Center Project
85, 87 and 89 Dunbarton Road, Concord, New Hampshire

prepared for

Ecosystems Land Planning
36 Dunklee Street
Concord, NH 03301

TES Project # 25-0003

1494 Route 3A, Unit 1
Bow, NH 03304
(603) 856-8925

tom@tesenviro.comcastbiz.net

August 5, 2025

Mr. John St. John, CWS, CPESC
Ecosystems Land Planning
36 Dunklee Street
Concord, NH 03301

RE: Site Specific Soil Map for St. Paul's School New Squash Center Project
85, 87 and 89 Dunbarton Road, Concord, New Hampshire

Dear Mr. St. John:

On July 11, 2025 I performed field work on a portion of the above-referenced properties in Concord, New Hampshire to perform a Site Specific Soil Survey as you requested. This Site Specific Soil Survey was completed utilizing SSSNNE Special Publication No. 3; Site Specific Soil Mapping Standards for New Hampshire and Vermont, Version 7.0, July 2021. The soil legend used for this soil map conforms to the New Hampshire State-Wide Numerical Soils Legend, Issue #10, January 2011 established and maintained by the Natural Resources Conservation Service.

The Soil Survey encompassed an area of approximately 2.5 acres situated south of the existing athletic facility buildings at these properties, as depicted on an existing conditions plan provided by you. That existing conditions base plan had a scale of 1" = 30' and 1-foot contour intervals. This soil survey was prepared to support a New Hampshire Alteration of Terrain permit application for a planned New Squash Center Project on the properties.

Field work for this survey included the examination of numerous soil profiles via hand dug test pits and hand auger borings taken at intervals sufficient to delineate the boundaries between soil map units. I also observed and logged five (5) soil test pits dug across the site on July 17, 2025 by backhoe for stormwater management design purposes (logs included in this report). Two of these test pits (Test Pits 1 and 2) had loamy fill deeper than 60 inches at the surface, one (Test Pit 3) had thinner, loamy fill (32 inches) over natural, buried soil, and Test Pits 4 and 5 had sandy fill material 48-55 inches deep over bedrock. A geotechnical report describing 5 soil borings in the central part of the soil mapping area was also reviewed, and this report also referenced and described an earlier soil boring that was described by Nobis Engineering. These borings were used mainly for depth to bedrock, as the soils descriptions based on auger borings were not intended for morphological description of soils.

The soil mapping area was previously reviewed for wetlands by you prior to my site visits, and you had delineated the boundaries of one wetland along the southern portion of the site using numbered blue flagging. I observed each of these flags and found them to be accurately placed per wetland delineation standards as well as per the standards for Site Specific Soil mapping of hydric (poorly drained and very poorly drained) soils.

The Soil Survey of Merrimack and Belknap Counties, New Hampshire (USDA – Natural Resource Conservation Service) was reviewed (via Web Soil Survey) prior to site work for reference. This publication indicates that site soils are generally similar to the field observations during this soil survey: soils formed in glacial till deposits with areas of shallow bedrock (250B

– Chatfield-Montauk-Hollis complex) and mixed developed land and soils formed in loose, sandy glacial till (799C – Urban land-Canton complex). The Montauk component of 250B wasn't observed, however, but the natural upland soils that were observed were similar to the Canton component of 799C. The soils in the wetland drainageway along the southern boundary of the soil mapping area aren't depicted on the NRCS mapping likely due to being too small to have been observed at the scale of NRCS mapping.

Ground locational control for this soil survey was abundant, consisting of the existing athletic facility buildings, parking lots, footpaths, driveways, tree lines, individual trees, site lighting, and numbered wetland boundary flagging placed by you. The surface conditions in the soil mapping area consisted of an existing impervious asphalt paved parking lots and driveways, and natural or disturbed soils to the west, south and east of the parking areas and within landscaped or lawn areas within the paved surfaces.

The following report includes a Site Specific Soil Map Key with accompanying Hydrologic Soil Groups and High Intensity Soil Survey codes, as well as soil map unit descriptions. The mixture of developed, altered, and natural land surfaces, presence of shallow bedrock, and different soil textures throughout the mapping area led to an unusually large number of soil map units for a small geographic area.

If you have any questions regarding the soils on this site and the accompanying report, please contact our office.

Very truly yours,

Thomas E. Sokoloski
Certified Soil Scientist #063

SITE SPECIFIC SOIL MAP UNIT KEY

Symbol*	Map Unit	Slope Class	Drainage Class	HISS Symbol	Hydrologic Soil Group
42C	Canton fine sandy loam	8-15%	Well	221CH	B
42D	Canton fine sandy loam	15-25%	Well	221DH	B
42E	Canton fine sandy loam	25% +	Well	221EH	B
85E	Hollis loam, very stony	25% +	Well	224EH	D
87C	Chatfield fine s. loam, v. stony	8-15%	Well	227CH	B
87D	Chatfield fine s. loam, v. stony	15-25%	Well	227DH	B
87E	Chatfield fine s. loam, v. stony	25% +	Well	227EH	B
125A	Scarboro mucky loam, v. stony	0-3%	Very poorly	621AH	D
400B/acaaa	Udorthents, sandy	0-8%	Excessively	161BH	A
400C/acaaa	Udorthents, sandy	8-15%	Excessively	161CH	A
400E/acaaa	Udorthents, sandy	25% +	Excessively	161EH	A
444B	Newfields fine sandy loam	0-8%	Moderately well	321BH	B
444C	Newfields fine sandy loam	8-15%	Moderately well	321CH	B
500B/caabb	Udorthents, loamy	0-8%	Well	261BH	B
500C/caabb	Udorthents, loamy	8-15%	Well	261CH	B
500D/caabb	Udorthents, loamy	15-25%	Well	261DH	B
500E/caabb	Udorthents, loamy	25% +	Well	261EH	B
500B/ccabb	Udorthents, loamy***	0-8%	Well	261BH	B
500C/ccabb	Udorthents, loamy***	8-15%	Well	261CH	B
500D/ccabb	Udorthents, loamy***	15-25%	Well	261DH	B
500E/ccabb	Udorthents, loamy***	25% +	Well	261EH	B
500B/hchbb	Udorthents, loamy***	0-8%	Undeterminable**	761BH	B**
500C/hchbb	Udorthents, loamy***	8-15%	Undeterminable**	761CH	B**
515B	Leicester fine sandy loam	0-8%	Poorly	521BH	C
550B/aceaa	Udorthents, bedrock substrat.	0-8%	Excessively	167BH	B
550C/aceaa	Udorthents, bedrock substrat.	8-15%	Excessively	167CH	B
550B/acdaa	Udorthents, bedrock substrat.	0-8%	Excessively	164BH	D
550C/acdaa	Udorthents, bedrock substrat.	8-15%	Excessively	164CH	D
550B/hcdaa	Udorthents, bedrock substrat.	0-8%	Undeterminable****	764BH	D****
550B/hceaa	Udorthents, bedrock substrat.	0-8%	Undeterminable****	767BH	B****
550C/hceaa	Udorthents, bedrock substrat.	8-15%	Undeterminable****	767CH	B****

* Refer to accompanying report for 5-unit supplemental symbol explanation.

** Assumed to be well drained and HSG B based on adjacent soils.

*** Fill deeper than 60".

**** Assumed to be excessively drained and HSG B or D based on adjacent soils.

This detailed Site-Specific Soil Map, prepared on July 11, 2025 by Thomas E. Sokoloski, Certified Soil Scientist #063 of TES Environmental Consultants, L.L.C. in Bow, New Hampshire, conforms to the standards of SSSNNE Publication No. 3, Version 7.0, "Site-Specific Soil Mapping Standards for New Hampshire and Vermont", July 2021. This map has been prepared to comply with soil mapping requirements of RSA 485 A: 17 and NHDES Env-Wq 1500, Alteration of Terrain. See accompanying report for methodology, map symbol legend, and interpretations. Use of the map symbol denominators for disturbed or altered soils, where given, is at the discretion of the Certified Soil Scientist.

This map product is within the technical standards of the National Cooperative Soil Survey. It is a special purpose product, intended for use in support of a New Hampshire Alteration Terrain permit application. It was produced by a certified Soil Scientist, and is not a product of the USDA Natural Resources Conservation Service. There is a narrative report that accompanies this map.

Supplemental Symbols

The five components of the Disturbed Soil Mapping Unit Supplement are as follows:

Symbol 1: Drainage Class
a-Excessively Well Drained
b-Somewhat Excessively Drained
c-Well Drained
d-Moderately Well Drained
e-Somewhat Poorly Drained
f-Poorly Drained
g-Very Poorly Drained
h-Not Determined

Symbol 2 -: Parent Material (of naturally formed soil only, if present)
a-No natural soil within 60"
b-Glaciofluvial Deposits (outwash/terraces of sand or sand and gravel)
c-Glacial Till Material (active ice)
d-Glaciolacustrine very fine sand and silt deposits (glacial lakes)
e-Loamy/sandy over silt/clay deposits
f-Marine Silt and clay deposits (ocean waters)
g-Alluvial Deposits (floodplains)
h-Organic Materials-Fresh water Bogs, etc
i- Organic Materials-Tidal Marsh

Symbol 3: Restrictive/Impervious Layers
a-None
b-Bouldery surface with more than 15% of the surface covered with boulders
c-Mineral restrictive layer(s) are present in the soil profile less than 40 inches below the soil surface such as hardpan, platy structure or clayey texture with consistence of at least firm, i.e. more than 20 newtons. For other examples of soil characteristics that qualify for restrictive layer, see "Soil Manual for Site evaluations in NH" 2nd Ed., page 3-17, figure 2-14
d-Bedrock in the soil profile 0-20 inches
e-Bedrock in the soil profile 20-60 inches
f-Areas where depth to bedrock is so variable that a single soil type cannot be applied, will be mapped as a complex of soil types
g-Subject to Flooding
h –man-made impervious surface including pavement, concrete, or built-up surfaces (i.e. buildings) with no morphological restrictive layer within control section

Symbol 4 Estimated Ksat* (most restrictive layer excluding symbol 3h above).
a- High
b-Moderate
c-Low
d-Not determined
*See "Guidelines for Ksat Class Placement" in Chapter 3 of the Soil Survey Manual, USDA

Symbol 5: Hydrologic Soil Group*
a-Group A
b-Group B
c-Group C
d-Group D
e-Not determined

*excluding man-made impervious/restrictive layers

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 42

Map Unit Name: Canton fine sandy loam

Landscape Settings: Hilltops and upper slopes of glacial till uplands

Surface Features: None

Drainage Class: Well

Parent Material: Loose, sandy glacial till deposits

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

Areas having moderately well drained Newfields fine sandy loam or bedrock between 20-60 inches may exist where this map unit borders such mapped soils; less than 10% of map unit.

Additional Notes:

Undisturbed upland soils.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-3"	A	10YR 2/1	Sandy loam	Granular	Friable	--	
3-27"	Bw	10YR 5/6	Sandy loam	Blocky	Friable	None	
27-40"	C	10YR 6/4	Loamy sand	Single grain	Loose	None	

87-89 Dunbarton Road. Wooded area in south-central part of soil mapping area.

SHWT deeper than 40".

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 85

Map Unit Name: Hollis loam, very stony

Landscape Settings: Hilltops and upper slopes of glacial till uplands

Surface Features: Stones, boulders, bedrock.

Drainage Class: Well

Parent Material: Shallow glacial till deposits with bedrock within 20 inches of surface

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

Areas having moderately deep bedrock (20-60 inches) and Chatfield fine sandy loam may exist where this map unit borders such mapped soils; less than 10% of map unit.

Additional Notes:

Undisturbed upland soils.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-3"	A	10YR 2/2	Sandy loam	Granular	Friable	--	
3-16"	Bw	10YR 5/6	Sandy loam	Blocky	Friable	None	
Bedrock							

85-87 Dunbarton Road. Wooded area in south-central part of soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 87

Map Unit Name: Chatfield fine sandy loam, very stony

Landscape Settings: Hilltops and upper slopes of glacial till uplands

Surface Features: Stones, boulders, bedrock.

Drainage Class: Well

Parent Material: Moderately deep glacial till deposits with bedrock at 20-60 inches

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

Areas having shallow bedrock (0-20 inches) and Hollis loam may exist where this map unit borders such mapped soils; less than 10% of map unit.

Additional Notes:

Undisturbed upland soils.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-3"	A	10YR 2/2	Sandy loam	Granular	Friable	--	
3-24"	Bw	10YR 5/6	Sandy loam	Blocky	Friable	None	

Bedrock

85-87 Dunbarton Road. Wooded area in south-central part of soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 125

Map Unit Name: Scarboro mucky loam, very stony

Landscape Settings: Depressional areas; wetlands

Surface Features: None

Drainage Class: Very poorly

Parent Material: 8-16 inches of well-decomposed freshwater organic material overlying sandy glacial till deposits

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes:

Wetland in southeastern portion of parcel.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-12"	Oa	10YR 2/1	Muck	--	--	--	
12-26"	Cg	2.5Y 6/2	Loamy sand	Single grain	Loose	10YR 5/8 @12"	

85-87 Dunbarton Road. Wooded wetland drainageway in southeastern part of soil mapping area.

SHWT at or above surface.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 400B-E/acaaa

Map Unit Name: Udorthents, sandy

Landscape Settings: Altered soils with sandy fill or natural sand substratum

Surface Features: Landscaped or lawn areas, or regrown natural vegetation

Drainage Class: Excessively

Parent Material: Loose, sandy glacial till deposits or fill

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes:

Disturbed soils in easternmost portion of soil mapping area.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-3"	Af	10YR 3/2	Sandy loam	Granular	Very friable	--	
3-40"	F	10YR 5/6	Loamy sand	Single grain	Loose		--

85 Dunbarton Road. Disturbed soils in easternmost part of soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 444

Map Unit Name: Newfields fine sandy loam

Landscape Settings: Lower slopes of uplands on glacial till landscapes

Surface Features: None

Drainage Class: Moderately well

Parent Material: Loose, sandy glacial till deposits

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes:

Uplands in western and northern portions of parcel.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-8"	A	10YR 2/2	Fine sandy loam	Granular	Friable	--	
8-14"	Bw1	10YR 5/6	Sandy loam	Blocky	Friable	--	
14-26"	Bw2	10YR 5/4	Loamy sand	Single grain	Loose	--	
26-40"	C	2.5Y 5/3	Gravelly l. sand	Single grain	Loose	10YR 5/8 @30"	

87-89 Dunbarton Road. Natural soils in central and western parts of soil mapping area.

SHWT 18-36".

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 500B/caabb

Map Unit Name: Udorthents, loamy

Landscape Settings: Altered soils with loamy fill substratum

Surface Features: Landscaped or lawn areas, or regrown natural vegetation

Drainage Class: Well

Parent Material: Loamy fill over 60" deep

Complex: Yes ( ) No (**X**)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

May include areas with less than 60" of loamy fill; locations likely near parking lot and along base of fill slopes; estimated as 10% of map unit.

Additional Notes:

Filled areas across soil mapping area.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-4"	F1	10YR 3/2	Sandy loam	Blocky	Friable	--	
4-10"	F2	10YR 4/6	Loamy sand	Single grain	Loose	--	
10-75"	F3	10YR 4/4	Sandy loam	Blocky	Friable	--	

85-89 Dunbarton Road. Disturbed soils (fill) across soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 500B/ccabb

Map Unit Name: Udorthents, loamy

Landscape Settings: Altered soils with loamy fill or natural loamy substratum

Surface Features: Landscaped or lawn areas, or regrown natural vegetation

Drainage Class: Well

Parent Material: Loamy fill less than 60" deep

Complex: Yes ( ) No (**X**)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

May include areas with more than 60" of loamy fill; locations unknown; estimated as less than 10% of map unit.

Additional Notes:

Filled areas in central and western portions of soil mapping area.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-3"	F1	10YR 3/2	Sandy loam	Granular	Very friable	--	
3-32"	F2	2.5Y 4/4	Sandy loam	Blocky	Friable	--	
32-35"	Ab	10YR 2/1	Fine sandy loam	Granular	Friable	--	
35-62"	Bw	10YR 5/6	Sandy loam	Blocky	Friable	--	
62-80"	C	10YR 6/4	Loamy sand	Single grain	Loose	--	

87-89 Dunbarton Road. Disturbed soils (fill) in central and western parts of soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 500B/hchbb

Map Unit Name: Udorthents, loamy

Landscape Settings: Developed land surfaces

Surface Features: Impervious surfaces: buildings, asphalt or concrete pavement, etc.

Drainage Class: Undeterminable

Parent Material: Fill over loose glacial till deposits (assumed based on adjacent soils)

Complex: Yes ( ) No (**X**)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes:

Developed portion of soil mapping area.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes

Not observed due to buildings and pavement.

85-89 Dunbarton Road. Developed areas across soil mapping area.

SHWT > 40 inches.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 515

Map Unit Name: Leicester fine sandy loam, very stony

Landscape Settings: Drainageways and other low-lying areas; wetlands

Surface Features: Surface stones and boulders

Drainage Class: Poorly

Parent Material: 0-8 inches of well-decomposed freshwater organic material overlying sandy glacial till deposits

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes:

Wetland in southern portion of parcel.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-4"	Oa	10YR 2/1	Muck	--	--	--	
4-8"	A	10YR 2/1	Sandy loam	Granular	Friable	--	
8-14"	Bg	2.5Y 5/2	Sandy loam	Blocky	Friable	10YR 5/8	
14-26"	Cg	2.5Y 6/2	Grav. loamy sand	Single grain	Loose	10YR 5/6	

85-87 Dunbarton Road. Wooded wetland drainageway in southern part of soil mapping area.

SHWT at or above surface.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 550B-C/acdaa

Map Unit Name: Udorthents, bedrock substratum

Landscape Settings: Altered soils with sandy fill or natural sand substratum

Surface Features: Landscaped or lawn areas, or regrown natural vegetation, exposed bedrock

Drainage Class: Excessively to somewhat excessively

Parent Material: Loose, sandy glacial till deposits or fill, and bedrock within 0-20 inches

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

May include areas having bedrock deeper than 20 inches; locations adjacent to bordering soil map units; up to 10% of map unit.

Additional Notes:

Disturbed soils in eastern portion of soil mapping area.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-2"	F1	10YR 3/2	Sandy loam	Granular	Very friable	--	
2-18"	F2	10YR 4/3	Loamy sand	Single grain	Loose	--	
Bedrock							

85-87 Dunbarton Road. Disturbed soils in eastern part of soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 550B-C/aceaa

Map Unit Name: Udorthents, bedrock substratum

Landscape Settings: Altered soils with sandy fill or natural sand substratum

Surface Features: Landscaped or lawn areas, or regrown natural vegetation

Drainage Class: Excessively to somewhat excessively

Parent Material: Loose, sandy glacial till deposits or fill, and bedrock within 20-60 inches

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

May include areas having bedrock deeper than 60 inches or within 20 inches of surface; locations adjacent to adjacent soil map units; up to 10% of map unit.

Additional Notes:

Disturbed soils in eastern portion of soil mapping area.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-2"	F1	10YR 3/2	Sandy loam	Granular	Very friable	--	
2-27"	F2	10YR 4/3	Loamy sand	Single grain	Loose	--	
27-48"	C	2.5Y 5/3	Loamy sand	Single grain	Loose	--	
Bedrock							

85-87 Dunbarton Road. Disturbed soils in eastern part of soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 550B/hcdaa

Map Unit Name: Udorthents, bedrock substratum

Landscape Settings: Developed land with impervious surfaces (pavement or buildings)

Surface Features: Landscaped or lawn areas, or regrown natural vegetation

Drainage Class: Excessively to somewhat excessively (assumed based on adjacent soils)

Parent Material: Loose, sandy glacial till deposits or fill, and bedrock within 20 inches

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

May include areas having bedrock deeper than 20 inches; locations adjacent to bordering soil map units; up to 10% of map unit.

Additional Notes:

Developed soils in eastern portion of soil mapping area.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes

Soils not observed due to impervious surfaces.

85-87 Dunbarton Road. Disturbed soils in eastern part of soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 550B-C/hceaa

Map Unit Name: Udorthents, bedrock substratum

Landscape Settings: Developed land with impervious surfaces (pavement or buildings)

Surface Features: Landscaped or lawn areas, or regrown natural vegetation

Drainage Class: Excessively to somewhat excessively (assumed based on adjacent soils)

Parent Material: Loose, sandy glacial till deposits or fill, and bedrock within 20-60 inches

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

May include areas having bedrock within 20 inches of surface or deeper than 60 inches; locations adjacent to bordering soil map units; up to 10% of map unit.

Additional Notes:

Developed soils in eastern portion of soil mapping area.

Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes

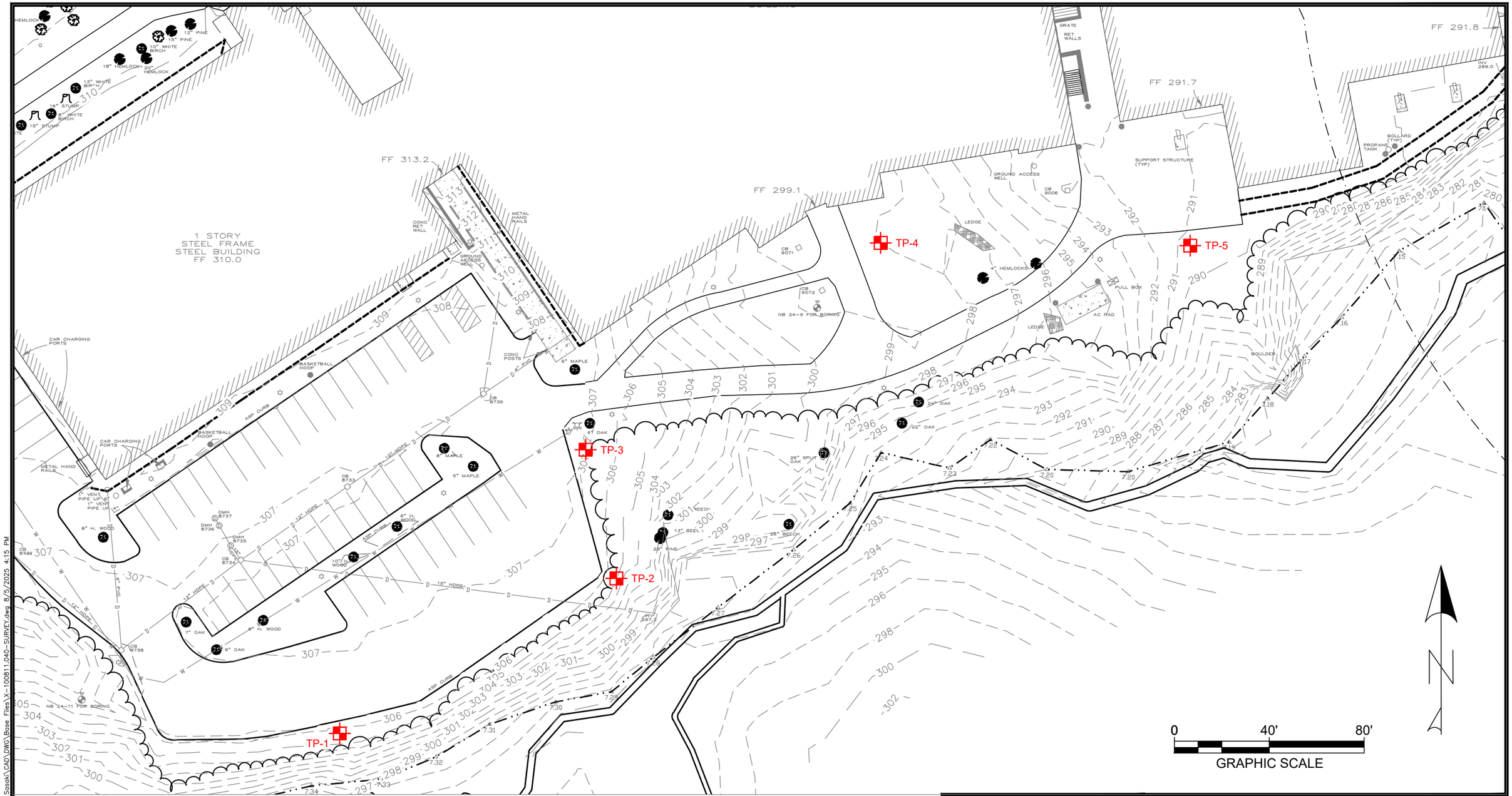
Soils not observed due to impervious surfaces.

85-87 Dunbarton Road. Disturbed soils in eastern part of soil mapping area.

SHWT not observed.

Thomas E. Sokoloski 7/11/2025

TEST PIT LOGS



nobis
engineering & environmental solutions

NOBIS GROUP® | NH OFFICE
18 CHENELL DRIVE
CONCORD, NH 03301
(603) 224-4182
WWW.NOBIS-GROUP.COM

FIGURE 7

TEST PIT LOCATIONS - EXISTING SITE
SPS SQUASH CENTER
87 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

DRAWN BY:	MGD	CHECKED BY:	JCN
PROJECT NO.	100811.040	DATE:	JULY 10, 2025

J:\100811.040 SPS – New Squash Center – Sasaki\CAD\DWG\Base Files\X-100811.040-SURVEY.dwg 8/5/2025 4:15 PM

TES

TES ENVIRONMENTAL CONSULTANTS, L.L.C.

TEST PIT LOG SHEET

Date: 7/17/2025 CSS: Thomas E. Sokoloski	Project No: 25-0003 Project Name: Ecosystems/St. Paul's/Concord	Lot: 85-89 Dunbarton Road Test Pit No: 1

HOR	DEPTH	COLOR	TEXTURE	STRUCTURE	CONSISTENCY	REDOX FEATURES	NOTES
F1	0-45"	10YR 3/2*	Sandy loam	Blocky	Friable	None	Many fine and medium roots.
F2	45-70"	2.5Y 4/4	Sandy loam	Blocky	Friable	None	Few medium roots.

ESHWT: N/O

ROOTS: 50"

OBSERVED WATER: N/O

LEDGE: N/O

RESTRICTIVE LAYER: N/O

NOTES: * Soil colors variegated throughout F1 horizon, 2.5Y 4/4 mixed randomly.

10% stones to 18" diameter throughout.

CSS STAMP

TES

TES ENVIRONMENTAL CONSULTANTS, L.L.C.

TEST PIT LOG SHEET

Date: 7/17/2025 CSS: Thomas E. Sokoloski	Project No: 25-0003 Project Name: Ecosystems/St. Paul's/Concord	Lot: 85-89 Dunbarton Road Test Pit No: 2

HOR	DEPTH	COLOR	TEXTURE	STRUCTURE	CONSISTENCY	REDOX FEATURES	NOTES
F1	0-4"	10YR 3/2	Sandy loam	Granular	Very friable	None	Many fine roots.
F2	4-10"	10YR 4/6	Loamy sand	Single grain	Loose	None	Common fine roots.
F3	10 - 75"	10YR 4/4	Sandy loam	Blocky	Friable	None	No roots.

ESHWT: N/O

ROOTS: 10"

OBSERVED WATER: N/O

LEDGE: N/O

RESTRICTIVE LAYER: N/O

NOTES: 10% stones to 18" diameter throughout.

CSS STAMP

TES

TES ENVIRONMENTAL CONSULTANTS, L.L.C.

TEST PIT LOG SHEET

Date: 7/17/2025	Project No: 25-0003	Lot: 85-89 Dunbarton Road
CSS: Thomas E. Sokoloski	Project Name: Ecosystems/St. Paul's/Concord	Test Pit No: 3

HOR	DEPTH	COLOR	TEXTURE	STRUCTURE	CONSISTENCY	REDOX FEATURES	NOTES
F1	0-3"	10YR 3/2	Sandy loam	Granular	Very friable	None	Many fine roots.
F2	3-32"	2.5Y 4/4	Sandy loam	Blocky	Friable	None	Few fine and medium roots.
Ab	32 - 35"	10YR 2/1	Fine sandy loam	Granular	Friable	None	Many fine and medium roots.
Bw	35 - 62"	10YR 5/6	Sandy loam	Blocky	Friable	None	Many fine, medium and coarse roots.
C	62 - 80"	10YR 6/4	Loamy sand	Single grain	Loose	None	Few fine roots.

ESHWT: N/O

ROOTS: 65"

OBSERVED WATER: N/O

LEDGE: N/O

RESTRICTIVE LAYER: N/O

NOTES: 20% stones to 24" diameter in fill horizons; 5% stones in native soil horizons..

CSS STAMP

TES

TES ENVIRONMENTAL CONSULTANTS, L.L.C.

TEST PIT LOG SHEET

Date: 7/17/2025	Project No: 25-0003	Lot: 85-89 Dunbarton Road
CSS: Thomas E. Sokoloski	Project Name: Ecosystems/St. Paul's/Concord	Test Pit No: 4

HOR	DEPTH	COLOR	TEXTURE	STRUCTURE	CONSISTENCY	REDOX FEATURES	NOTES
F1	0-2"	10YR 3/2	Sandy loam	Granular	Very friable	None	Many fine roots.
F2	2-27"	10YR 4/3 and 2.5Y 5/3	Loamy sand and loamy very fine sand	Single grain and blocky	Loose and friable	None	Fill, mixed materials and colors.
C	27 - 48"	2.5Y 5/3	Loamy sand	Single grain	Loose	None	Broken bedrock with soil in voids.
Bed rock							

ESHWT: N/O

ROOTS: 2"

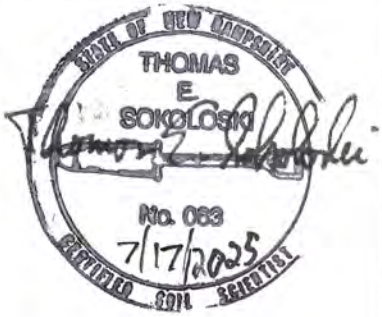
OBSERVED WATER: N/O

LEDGE: 48"

RESTRICTIVE LAYER: N/O

NOTES: C horizon has chunks of broken bedrock and soil in voids between chunks.

10% stones to 18" in fill horizons.



CSS STAMP

TES

TES ENVIRONMENTAL CONSULTANTS, L.L.C.

TEST PIT LOG SHEET

Date: 7/17/2025	Project No: 25-0003	Lot: 85-89 Dunbarton Road
CSS: Thomas E. Sokoloski	Project Name: Ecosystems/St. Paul's/Concord	Test Pit No: 5

HOR	DEPTH	COLOR	TEXTURE	STRUCTURE	CONSISTENCY	REDOX FEATURES	NOTES
F1	0-2"	10YR 3/2	Sandy loam	Granular	Very friable	None	Common fine roots.
F2	2-15"	10YR 5/6	Sand	Single grain	Loose	None	
C1	15 - 37"	2.5Y 5/4	Loamy sand	Single grain	Loose	None	
C2	37 - 55"	10YR 5/4	Loamy sand	Single grain	Loose	None	Broken bedrock with soil in voids.
Bed	rock						

ESHWT: N/O

ROOTS: 2"

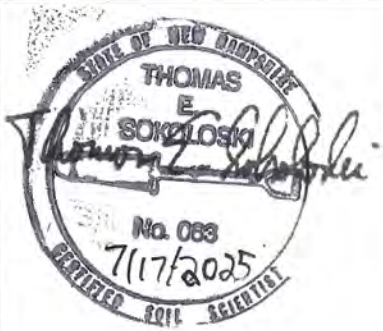
OBSERVED WATER: N/O

LEDGE: 55"

RESTRICTIVE LAYER: N/O

NOTES: C2 horizon has chunks of broken bedrock and soil in voids between chunks.

10% stones to 18" in fill horizons.



CSS STAMP

SITE SPECIFIC SOIL MAP UNIT KEY

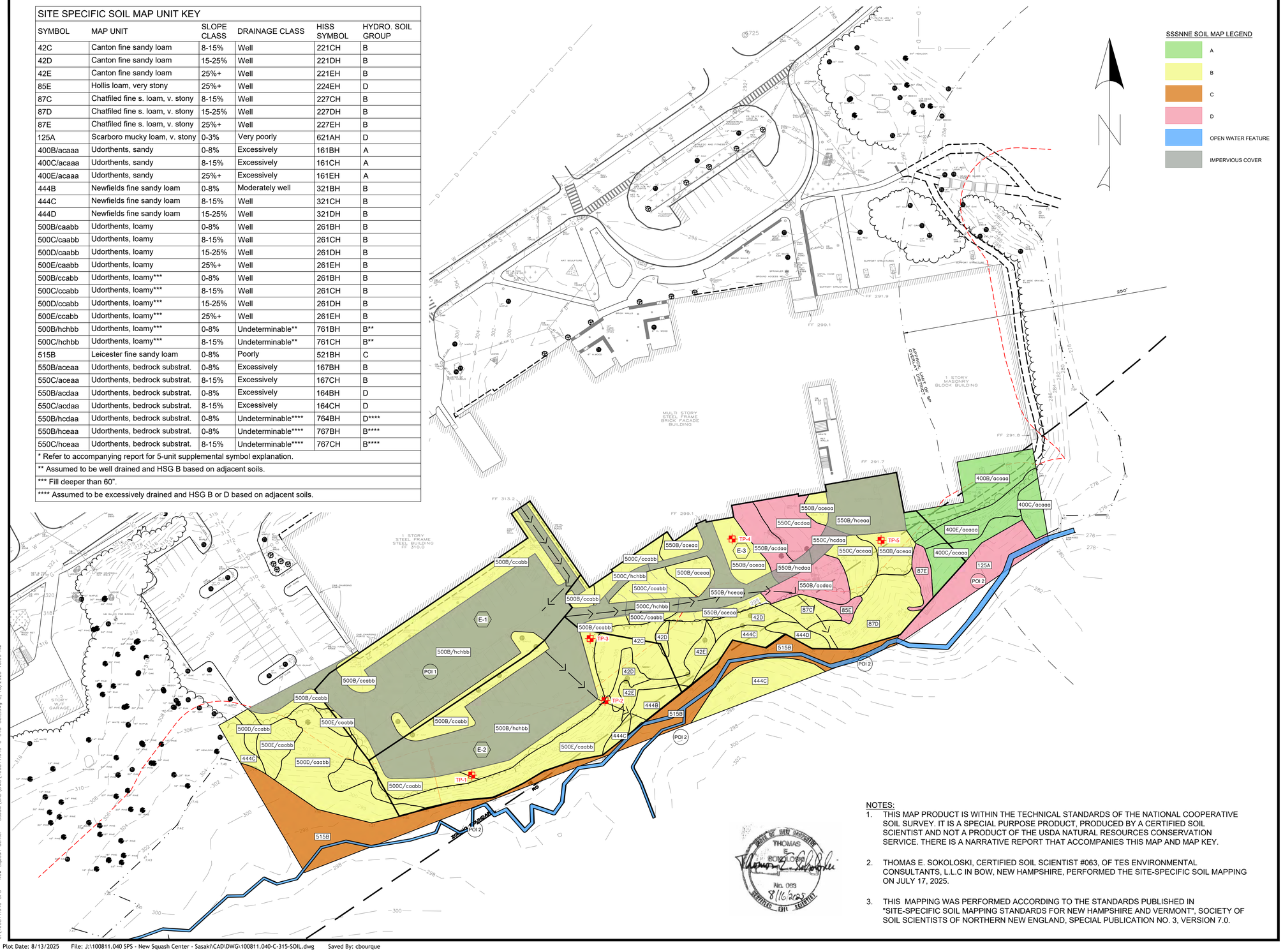
SYMBOL	MAP UNIT	SLOPE CLASS	DRAINAGE CLASS	HISS SYMBOL	HYDRO. SOIL GROUP
42C	Canton fine sandy loam	8-15%	Well	221CH	B
42D	Canton fine sandy loam	15-25%	Well	221DH	B
42E	Canton fine sandy loam	25%+	Well	221EH	B
85E	Hollis loam, very stony	25%+	Well	224EH	D
87C	Chatfiled fine s. loam, v. stony	8-15%	Well	227CH	B
87D	Chatfiled fine s. loam, v. stony	15-25%	Well	227DH	B
87E	Chatfiled fine s. loam, v. stony	25%+	Well	227EH	B
125A	Scarboro mucky loam, v. stony	0-3%	Very poorly	621AH	D
400B/acaaa	Udorthents, sandy	0-8%	Excessively	161BH	A
400C/acaaa	Udorthents, sandy	8-15%	Excessively	161CH	A
400E/acaaa	Udorthents, sandy	25%+	Excessively	161EH	A
444B	Newfields fine sandy loam	0-8%	Moderately well	321BH	B
444C	Newfields fine sandy loam	8-15%	Well	321CH	B
444D	Newfields fine sandy loam	15-25%	Well	321DH	B
500B/caabb	Udorthents, loamy	0-8%	Well	261BH	B
500C/caabb	Udorthents, loamy	8-15%	Well	261CH	B
500D/caabb	Udorthents, loamy	15-25%	Well	261DH	B
500E/caabb	Udorthents, loamy	25%+	Well	261EH	B
500B/ccabb	Udorthents, loamy***	0-8%	Well	261BH	B
500C/ccabb	Udorthents, loamy***	8-15%	Well	261CH	B
500D/ccabb	Udorthents, loamy***	15-25%	Well	261DH	B
500E/ccabb	Udorthents, loamy***	25%+	Well	261EH	B
500B/hchbb	Udorthents, loamy***	0-8%	Undeterminable**	761BH	B**
500C/hchbb	Udorthents, loamy***	8-15%	Undeterminable**	761CH	B**
515B	Leicester fine sandy loam	0-8%	Poorly	521BH	C
550B/aceaa	Udorthents, bedrock substrat.	0-8%	Excessively	167BH	B
550C/aceaa	Udorthents, bedrock substrat.	8-15%	Excessively	167CH	B
550B/acdaa	Udorthents, bedrock substrat.	0-8%	Excessively	164BH	D
550C/acdaa	Udorthents, bedrock substrat.	8-15%	Excessively	164CH	D
550B/hcdaa	Udorthents, bedrock substrat.	0-8%	Undeterminable****	764BH	D****
550B/hceaa	Udorthents, bedrock substrat.	0-8%	Undeterminable****	767BH	B****
550C/hceaa	Udorthents, bedrock substrat.	8-15%	Undeterminable****	767CH	B****

* Refer to accompanying report for 5-unit supplemental symbol explanation.

** Assumed to be well drained and HSG B based on adjacent soils.

*** Fill deeper than 60".

**** Assumed to be excessively drained and HSG B or D based on adjacent soils.



NOTES:

1. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, PRODUCED BY A CERTIFIED SOIL SCIENTIST AND NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP AND MAP KEY.

2. THOMAS E. SOKOLOSKI, CERTIFIED SOIL SCIENTIST #063, OF TES ENVIRONMENTAL CONSULTANTS, L.L.C IN BOW, NEW HAMPSHIRE, PERFORMED THE SITE-SPECIFIC SOIL MAPPING ON JULY 17, 2025.

3. THIS MAPPING WAS PERFORMED ACCORDING TO THE STANDARDS PUBLISHED IN "SITE-SPECIFIC SOIL MAPPING STANDARDS FOR NEW HAMPSHIRE AND VERMONT", SOCIETY OF SOIL SCIENTISTS OF NORTHERN NEW ENGLAND, SPECIAL PUBLICATION NO. 3, VERSION 7.0.

STATE OF NEW HAMPSHIRE THOMAS E. SOKOLOSKI No. 063 8/16/2025 CERTIFIED SOIL SCIENTIST

SASAKI
110 CHAUNCY STREET BOSTON MA 02111 USA
P 617 926 330 F 617 924 2748 W SASAKI.COM

nobis
Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

NOT ISSUED FOR CONSTRUCTION

No.	Description	Date

DRAWING ISSUE & REVISION HISTORY

Seal

ST. PAUL'S SCHOOL
NEW SQUASH CENTER

85, 87, 89 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

TAX MAP:
MAP 724Z/ LOT 1-10A
MAP 811Z LOT 1-A

OWNER/APPLICANT:
ST. PAUL'S SCHOOL
325 PLEASANT STREET
CONCORD, NEW HAMPSHIRE

Nobis Project No: **100811.040**
Sasaki Project No: **250018.00**
Drawn By: **NOBIS - MGD/CMB**
Checked By: **NOBIS - JCN/NCP**
Approved By: **NOBIS - JCN**
Issue Date: **08.20.2025**

0 40' 80'
GRAPHIC SCALE

SHEET TITLE

SSSNE SOIL MAP PRE-DEVELOPMENT

FIGURE
5

J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-315-SOIL.dwg 8/13/2025 10:06 AM

Plot Date: 8/13/2025 File: J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-315-SOIL.dwg Saved By: cbourque

SITE SPECIFIC SOIL MAP UNIT KEY

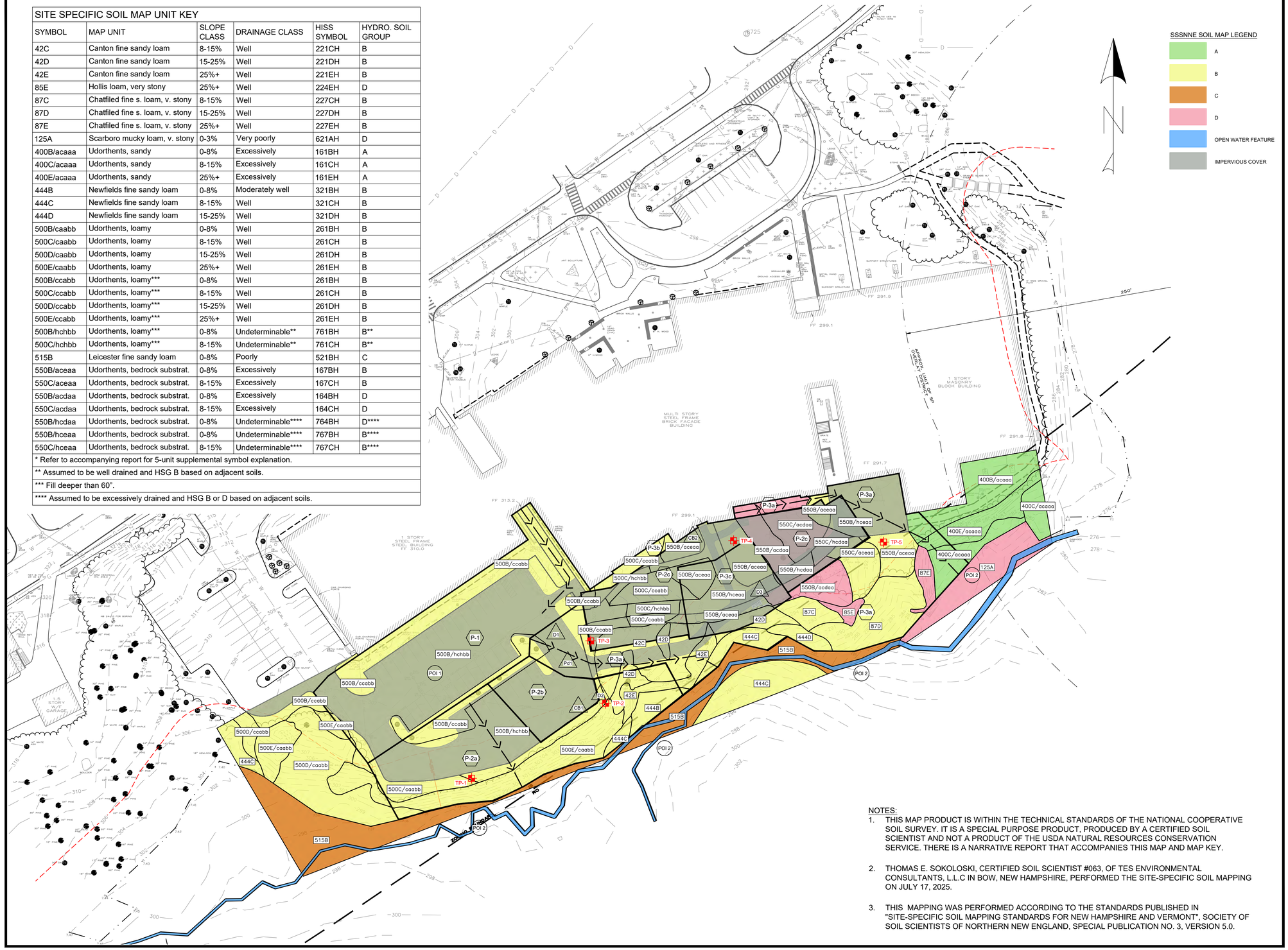
SYMBOL	MAP UNIT	SLOPE CLASS	DRAINAGE CLASS	HISS SYMBOL	HYDRO. SOIL GROUP
42C	Canton fine sandy loam	8-15%	Well	221CH	B
42D	Canton fine sandy loam	15-25%	Well	221DH	B
42E	Canton fine sandy loam	25%+	Well	221EH	B
85E	Hollis loam, very stony	25%+	Well	224EH	D
87C	Chatfiled fine s. loam, v. stony	8-15%	Well	227CH	B
87D	Chatfiled fine s. loam, v. stony	15-25%	Well	227DH	B
87E	Chatfiled fine s. loam, v. stony	25%+	Well	227EH	B
125A	Scarboro mucky loam, v. stony	0-3%	Very poorly	621AH	D
400B/acaaa	Udorthents, sandy	0-8%	Excessively	161BH	A
400C/acaaa	Udorthents, sandy	8-15%	Excessively	161CH	A
400E/acaaa	Udorthents, sandy	25%+	Excessively	161EH	A
444B	Newfields fine sandy loam	0-8%	Moderately well	321BH	B
444C	Newfields fine sandy loam	8-15%	Well	321CH	B
444D	Newfields fine sandy loam	15-25%	Well	321DH	B
500B/caabb	Udorthents, loamy	0-8%	Well	261BH	B
500C/caabb	Udorthents, loamy	8-15%	Well	261CH	B
500D/caabb	Udorthents, loamy	15-25%	Well	261DH	B
500E/caabb	Udorthents, loamy	25%+	Well	261EH	B
500B/ccabb	Udorthents, loamy***	0-8%	Well	261BH	B
500C/ccabb	Udorthents, loamy***	8-15%	Well	261CH	B
500D/ccabb	Udorthents, loamy***	15-25%	Well	261DH	B
500E/ccabb	Udorthents, loamy***	25%+	Well	261EH	B
500B/hchbb	Udorthents, loamy***	0-8%	Undeterminable**	761BH	B**
500C/hchbb	Udorthents, loamy***	8-15%	Undeterminable**	761CH	B**
515B	Leicester fine sandy loam	0-8%	Poorly	521BH	C
550B/aceaa	Udorthents, bedrock substrat.	0-8%	Excessively	167BH	B
550C/aceaa	Udorthents, bedrock substrat.	8-15%	Excessively	167CH	B
550B/acdaa	Udorthents, bedrock substrat.	0-8%	Excessively	164BH	D
550C/acdaa	Udorthents, bedrock substrat.	8-15%	Excessively	164CH	D
550B/hcdaa	Udorthents, bedrock substrat.	0-8%	Undeterminable****	764BH	D****
550B/hceaa	Udorthents, bedrock substrat.	0-8%	Undeterminable****	767BH	B****
550C/hceaa	Udorthents, bedrock substrat.	8-15%	Undeterminable****	767CH	B****

* Refer to accompanying report for 5-unit supplemental symbol explanation.

** Assumed to be well drained and HSG B based on adjacent soils.

*** Fill deeper than 60".

**** Assumed to be excessively drained and HSG B or D based on adjacent soils.



NOTES:

1. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, PRODUCED BY A CERTIFIED SOIL SCIENTIST AND NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP AND MAP KEY.

2. THOMAS E. SOKOLOSKI, CERTIFIED SOIL SCIENTIST #063, OF TES ENVIRONMENTAL CONSULTANTS, L.L.C IN BOW, NEW HAMPSHIRE, PERFORMED THE SITE-SPECIFIC SOIL MAPPING ON JULY 17, 2025.

3. THIS MAPPING WAS PERFORMED ACCORDING TO THE STANDARDS PUBLISHED IN "SITE-SPECIFIC SOIL MAPPING STANDARDS FOR NEW HAMPSHIRE AND VERMONT", SOCIETY OF SOIL SCIENTISTS OF NORTHERN NEW ENGLAND, SPECIAL PUBLICATION NO. 3, VERSION 5.0.

SASAKI
110 CHAUNCY STREET BOSTON MA 02111 USA
P 617 926 330 F 617 924 2748 W SASAKI.COM

nobis
Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

NOT ISSUED FOR CONSTRUCTION

No.	Description	Date

DRAWING ISSUE & REVISION HISTORY

Seal

ST. PAUL'S SCHOOL
NEW SQUASH CENTER

85, 87, 89 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

TAX MAP:
MAP 724Z/ LOT 1-10A
MAP 811Z LOT 1-A

OWNER/APPLICANT:
ST. PAUL'S SCHOOL
325 PLEASANT STREET
CONCORD, NEW HAMPSHIRE

Nobis Project No: **100811.040**
Sasaki Project No: **250018.00**
Drawn By: **NOBIS - MGD/CMB**
Checked By: **NOBIS - JCN/NCP**
Approved By: **NOBIS - JCN**
Issue Date: **08.20.2025**

0 40' 80'
GRAPHIC SCALE

SHEET TITLE

SSSNE SOIL MAP POST-DEVELOPMENT

FIGURE
6

J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-315-SOIL.dwg 8/13/2025 10:06 AM

Plot Date: 8/13/2025 File: J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-315-SOIL.dwg Saved By: cbourque

INFILTRATION FEASIBILITY REPORT

INFILTRATION FEASIBILITY REPORT

St. Paul's School – New Squash Center
87 Dunbarton Rd, Concord, NH
August 2025

LOCATIONS OF THE PRACTICE

The St. Paul's School New Squash Center will be treated by a new infiltration subsurface gallery located within the existing parking lot (area-2). The majority of the roof will discharge "clean" stormwater runoff into DMH-1 which connects to the subsurface gallery-1 (PD-1) for treatment. As well as a portion of the parking lot (area-2) will be re-graded to direct stormwater runoff to CB-1.

TEST PIT LOCATIONS

Test pits 1 through 5 were performed across the site by TES Environmental Consultants, LLC, however only test pits 2 and 3 are relevant to infiltration feasibility.

TP 1: Existing Surface Elevation = 305.6'
ESHWT < not found (299.8' or greater)
Water Table < not found (299.8' or greater)
Bedrock < not found (299.8' or greater)
Deepest Elevation of Test Pit = 299.8'

TP 2: Existing Surface Elevation = 306.1'
ESHWT < not found (299.9' or greater)
Water Table < not found (299.9' or greater)
Bedrock < not found (299.9' or greater)
Deepest Elevation of Test Pit = 299.9'

TP 3: Existing Surface Elevation = 307.1'
ESHWT < not found (300.4' or greater)
Water Table < not found (300.4' or greater))
Bedrock < not found (300.4' or greater)
Deepest Elevation of Test Pit = 300.4'

TP 4: Existing Surface Elevation = 298.1'
ESHWT < not found (294.1' or greater)
Water Table < not found (300.4' or greater)
Bedrock @ 48" (294.1')
Deepest Elevation of Test Pit = 294.1'

TP 5: Existing Surface Elevation = 290.7'
ESHWT < not found (286.1' or greater)

Water Table < not found (286.1' or greater)
Bedrock @ 55" (286.1')
Deepest Elevation of Test Pit = 286.1'

PROFILE DESCRIPTIONS AND SOILS

Refer to the Site Specific Soil Survey Report prepared by TES Environmental Consultants, LLC for soils information.

SUMMARY OF DATA USED TO DETERMINE THE INFILTRATION RATE

As required by NHDES, the default infiltration rate for all infiltration BMPs was determined by obtaining a saturated hydraulic conductivity value (Ksat) from SSSNNE Special Publication No. 5, Ksat Values for New Hampshire Soils, September 2009. The soils within the proposed subsurface gallery-1 (PD-1) consist of Udorthents (500B/hchbb) soils, classified as HSG B, which are moderately well-draining. It is assumed the native soil would have been Canton (42D), classified as HSG B, based on the surrounding soils. The published Ksat number for Canton Soils from SSSNNE Special Publication No. 5, is 6 inches per hour. NHDES requires a factor of safety of 2 be applied to this value, resulting in an infiltration rate of 3 inches per hour for the subsurface gallery based on the assumed native Canton soils.

REGISTRATION FOR INFILTRATION TO GROUNDWATER

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

REGISTRATION AND NOTIFICATION FORM FOR STORMWATER INFILTRATION TO GROUNDWATER (5H1)

Groundwater Discharge Program

RSA/Rule: RSA 485-A:6, VII; 485:3, X; Env-Wq 402

Applicant Information

Name: St. Paul's School	Daytime Phone: 602-229-4600	
Mailing Address: 325 Pleasant Street		
City: Concord	State: NH	ZIP: 03301
Contact Person Name: Derek Russell	Email: drussell@sps.edu	
Contact Person Phone Number:	Fax Number:	

Facility Information

Name: St. Paul's School		
Address: 325 Pleasant Street		
City: Concord	State: NH	ZIP: 03301
Property Tax Map: 724Z	Lot Number: 1-12	
Latitude & Longitude of discharge point(s): 43.1143 71.3423		

Facility Owner Information (complete only if different than applicant)

Owner Name:	Daytime Phone:	
Mailing Address:		
City/Town:	State:	ZIP:
Contact Person Name:	Email:	
Contact Person Phone Number:	Fax Number:	

Property Owner (complete only if different then Applicant)

Name:	Daytime Phone:	
Mailing Address:		
City:	State:	ZIP:
Contact Person Name:	Email:	
Contact Person Phone Number:	Fax Number:	

Facility Operator's Information (complete only if different than applicant)

Facility Operator Name:	Daytime Phone:	
Mailing Address:		
City:	State:	ZIP:

Complete this form if you are using a drywell or other subsurface infiltration structures to recharge stormwater to the ground or groundwater. If a completed Underground Injection Control (UIC) registration form was submitted to the Alteration of Terrain Bureau for this project, then one is not required to be sent directly to the Drinking Water and Groundwater Bureau (DWGB).

REGISTRATION AND NOTIFICATION FORM FOR STORMWATER INFILTRATION TO GROUNDWATER (attach additional sheets, as necessary, for responses to questions below)

Please provide a complete description of the facility including historic uses, any former contamination and/or ongoing remedial action at the site.
The site is located behind the existing Athletic & Fitness Center (AFC) building which currently serves as a secondary form of egress and loading area for the AFC. The proposed development consists of the construction of a 17,800 SF building addition to the AFC building for St. Paul's New Squash Center. The site has no historic or former contamination.

Please provide information concerning the location of the infiltration activity, include Locus map (i.e. USGS map).
The Site will mitigate stormwater through one subsurface infiltration gallery (MC-3500 Stormtech Subsurface gallery) which is located to the west of the proposed building in the parking lot area.

Please describe the pretreatment system, if any, and capacity of the system.
Pretreatment of stormwater is provided at the infiltration gallery within the isolator row, consisting of a series of chambers wrapped in geotextile which is sized to accommodate the water quality flow from the contributing drainage area.

Please describe the materials and products used for the subsurface infiltration structure (i.e., pipe and stone leachfield, plastic chamber units, concrete drywell, etc.).
System consists of Stormtech MC-3500 plastic chamber units surrounded by stone.

Please describe the disposal method and location. Include a site plan showing: the infiltration structure, any other on-site infiltration structures, dimensions, depth to groundwater (if known), adjacent septic system(s), and drinking water source(s).
The soils beneath the stormwater system are assumed to be Canton soils, located below the bottom stone layer, and are expected to infiltrate stormwater at a rate of 3 inches per hour. ESHWT was not observed during the initial test pit exploration, and it is assumed that ESHWT is deeper than the bottom of practice. The system will overflow during large rain events (100-year storm) through structure DMH2 and offsite to the wetland complex which ultimately discharges into the Turkey River.

Please provide information concerning methods and schedule for periodic inspection and/or maintenance.
Refer to inspection and maintenance manual.

Applicant/Owner Certification Statement and Signature

By signing this application, the signer certifies that the information contained in or otherwise submitted with this application is true, complete and not misleading to the best of the signer's knowledge and belief.

By signing this application, the signer understands that submission of false, incomplete or misleading information is grounds for:

- Denying the application;

- Revoking any application that is granted based on the information; and

- If the signer is acting as or on behalf of a listed engineer as defined in Env-C 502.10, debarring the listed engineer from the roster.

By signing the application, the signer and applicant agree to comply with all applicable rules and conditions of this permit and to not discharge to the holding tank(s) until written permission from the department has been received.

Dr. C Brooks Seay, Vice Rector for Finance and Administration	August 14, 2025
Signature of Facility Owner or Contact	**Date**

INSPECTION AND MAINTENANCE MANUAL

INSPECTION AND MAINTENANCE PROCEDURES

RESPONSIBLE PARTIES

St. Paul's School
Derek Russell
325 Pleasant Street
Concord, NH 03301
(603) 229-4600
drussell@sps.edu

INSPECTION SCHEDULE

Catch Basins, Drain Piping, and Outlet Rip Rap.	Each catch basin and drain manhole will be inspected when the system is installed and prior to directing storm water to it. Structure inverts will be measured and documented at this time as a baseline reference for future inspections. Catch basins, drain manholes, and connecting piping will be inspected annually (minimum). Inspection results will be recorded using the Inspection Forms included at the end of this document.
Subsurface Infiltration Gallery	Each chamber gallery will be inspected when the system is installed and prior to directing storm water to it. The isolator rows will be inspected via the inspection ports annually (minimum). If, upon visual inspection, it is found that sediment has accumulated, a stadia rod will be inserted to determine the depth of sediment. Inlet/outlet structures and manifolds will be inspected annually (minimum). Inspection results will be recorded using the Inspection Forms included at the end of this document.

MAINTENANCE PROCEDURES

Catch Basins, Drain Piping, and Outlet Rip Rap	Debris will be removed from catch basin inlet grates, and inlet/outlet pipes inside the structures. Sediment will be removed from the interior of the structures and connecting pipes by vactor truck. Water and sediment from cleanout procedures must be disposed of in accordance with federal, state, and local regulations at an approved off-site disposal facility, and must not be discharged into sanitary sewer systems. Maintenance will be recorded in the Inspection and Maintenance Log included at the end of this document.
Subsurface Infiltration Gallery	Each chamber gallery shall be maintained in accordance with the attached manufacturer recommendations. When the average depth of sediment in the isolator row exceeds 3 inches, clean out will be performed with the JetVac process. Trash and debris will be removed from the inlet/outlet structures when observed during inspections. Maintenance will be recorded in the Inspection and Maintenance Log included at the end of this document.

RECORD KEEPING

Record keeping and inspection/maintenance activity will begin upon completion of all terrain activities that direct storm water to the practices described herein. All records, including records from maintenance subcontractors, will be maintained by St. Paul's School, and will be made available to the New Hampshire Department of Environmental Services (NHDES) upon request. Photo documentation of inspections is required.

Should invasive species begin to grow in the infiltration basin (or other areas on site), refer to the guidance regarding "Methods for Disposing of Non-Native Invasive Plants" prepared by the University of New Hampshire Cooperative Extension included at the end of this document. Herbicides will not be applied.

Winter maintenance activities will include plowing snow and applying sand in operation areas. Salt or other deicing materials may be applied at the driveway entrance to ensure safe access. In the event that deicing materials are used on the site, a Deicing Log is included at the end of this document.

Inspection Checklist

General Information	
Date of Inspection	
Inspector's Name(s)	
Inspector's Title(s)	
Type of Inspection: ❑ Routine (annual) ❑ Post-storm event _____inches	

❑ Inspection of Catch Basins/Drain Piping/Outlet Rip Rap Performed

❑ No Follow Up Action Required ❑ Follow Up Action Required as Detailed Below

Location	Visible Damage?	Maintenance Required? Provide detail below
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No

Corrective Action Needed and Notes

❑ Inspection of Stormwater Subsurface Galleries Performed ❑ No Follow Up Action Required ❑ Follow Up Action Required as Detailed Below		
Location	Visible Damage?	Maintenance Required? Provide detail below
	❑Yes ❑No	❑Yes ❑No
	❑Yes ❑No	❑Yes ❑No
Corrective Action Needed and Notes		

Inspection and Maintenance Log

Date:	
Performed by:	
Catch Basins /Drain Piping/Outlet Rip Rap ❑Inspection ❑Maintenance	Stormwater Galleries ❑Inspection ❑Maintenance

Date:	
Performed by:	
Catch Basins /Drain Piping/Outlet Rip Rap ❑Inspection ❑Maintenance	Stormwater Galleries ❑Inspection ❑Maintenance

Date:	
Performed by:	
Catch Basins /Drain Piping/Outlet Rip Rap ❑Inspection ❑Maintenance	Stormwater Galleries ❑Inspection ❑Maintenance

Date:	
Performed by:	
Catch Basins /Drain Piping/Outlet Rip Rap ❑Inspection ❑Maintenance	Stormwater Galleries ❑Inspection ❑Maintenance

Deicing Log

Date/Location of Application: Amount and Type of Material Applied: Performed by:
Date/Location of Application: Amount and Type of Material Applied: Performed by:
Date/Location of Application: Amount and Type of Material Applied: Performed by:
Date/Location of Application: Amount and Type of Material Applied: Performed by:
Date/Location of Application: Amount and Type of Material Applied: Performed by:

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS), Total Phosphorus (TP), Total Petroluem Hydrocarbons (TPH) and Total Nitrogen (TN) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, DC-780, SC-800, MC-3500, MC-4500 or MC-7200 models, are lined with filter fabric and connected to a closely located manhole for easy access. The fabric lined chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers allow stormwater to flow vertically out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS Isolator Row and Plus fabric are placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting.

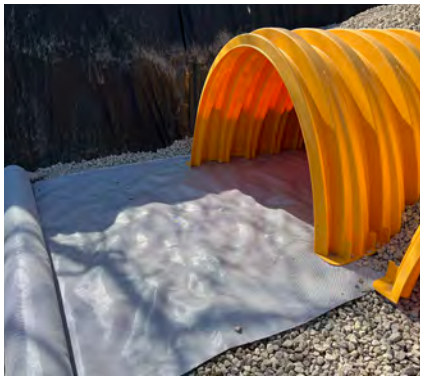
The Isolator Row Plus is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row Plus Flamp™ is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end, or more difficult to remove and require confined space entry into the chamber area. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

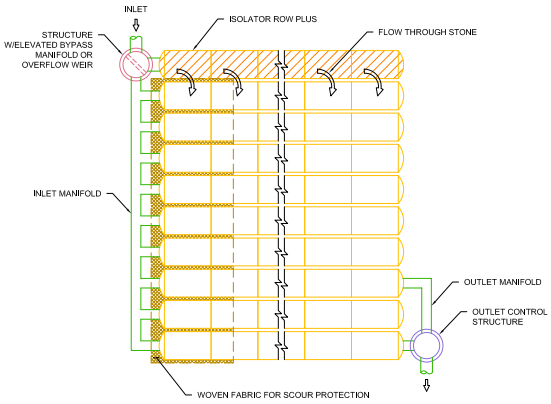
The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row Plus from the manhole opening, ADS Plus Fabric is shown between the chamber and stone base.



StormTech Isolator Row Plus with Overflow Structure (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

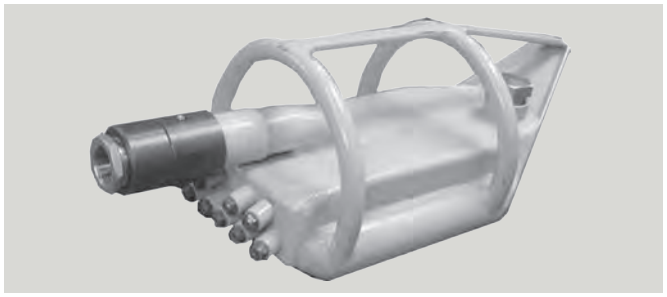
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3" (75 mm) throughout the length of the Isolator Row Plus, clean-out should be performed.

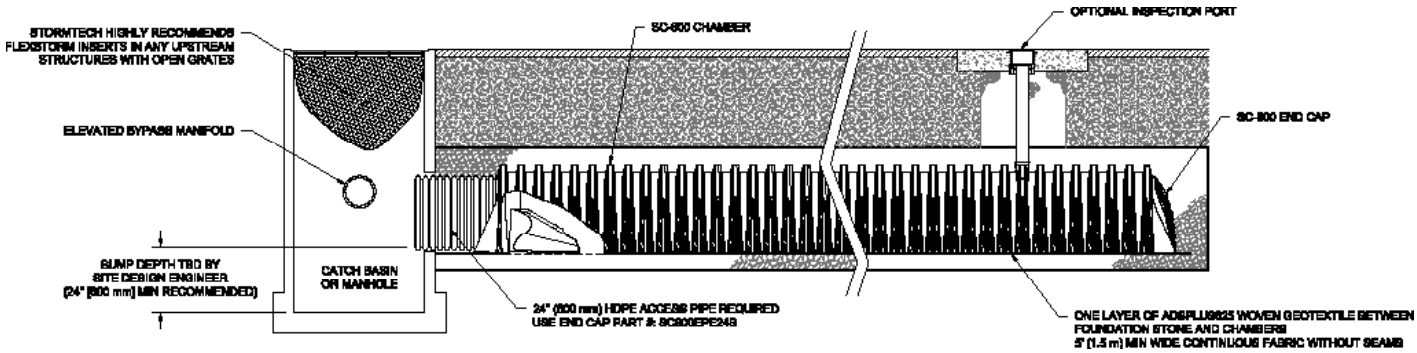
Maintenance

The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entry.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row Plus (*not to scale*)



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
   i. Remove cover from manhole at upstream end of Isolator Row Plus
   ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
   If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

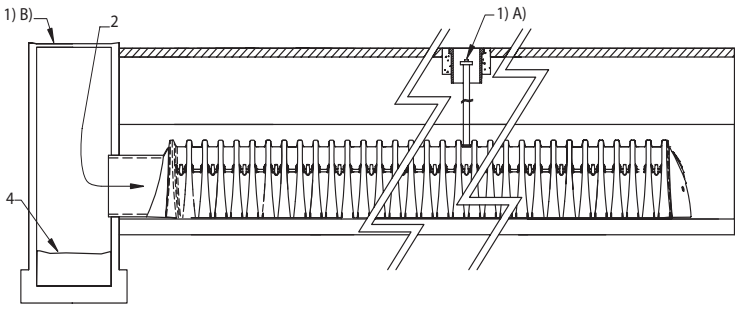
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

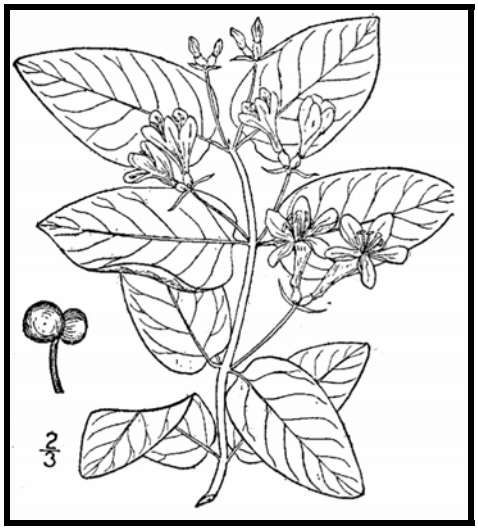
Date	Stadia Rod Readings		Sediment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row Plus, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com
800-821-6710

University of New Hampshire Cooperative Extension

Methods for Disposing Non-Native Invasive Plants

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



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

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

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

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

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

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

New Hampshire Regulations

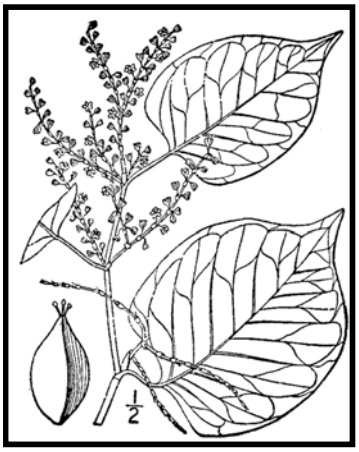
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

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

How and When to Dispose of Invasives?

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

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



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

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

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

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

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

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

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

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

Suggested Disposal Methods for Non-Native Invasive Plants

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

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

<table>
<tr><th>Non-Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">garlic mustard
(Alliaria petiolata)
spotted knapweed
(Centaurea maculosa)
▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.
black swallow-wort
(Cynanchum nigrum)
▪ May cause skin rash. Wear gloves and long sleeves when handling.
pale swallow-wort
(Cynanchum rossicum)
giant hogweed
(Heracleum mantegazzianum)
▪ Can cause major skin rash. Wear gloves and long sleeves when handling.
dame’s rocket
(Hesperis matronalis)
perennial pepperweed
(Lepidium latifolium)
purple loosestrife
(Lythrum salicaria)
Japanese stilt grass
(Microstegium vimineum)
mile-a-minute weed
(Polygonum perfoliatum)</td><td rowspan="2">Fruits and Seeds
  </td><td>Prior to flowering
Depends on scale of infestation
Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

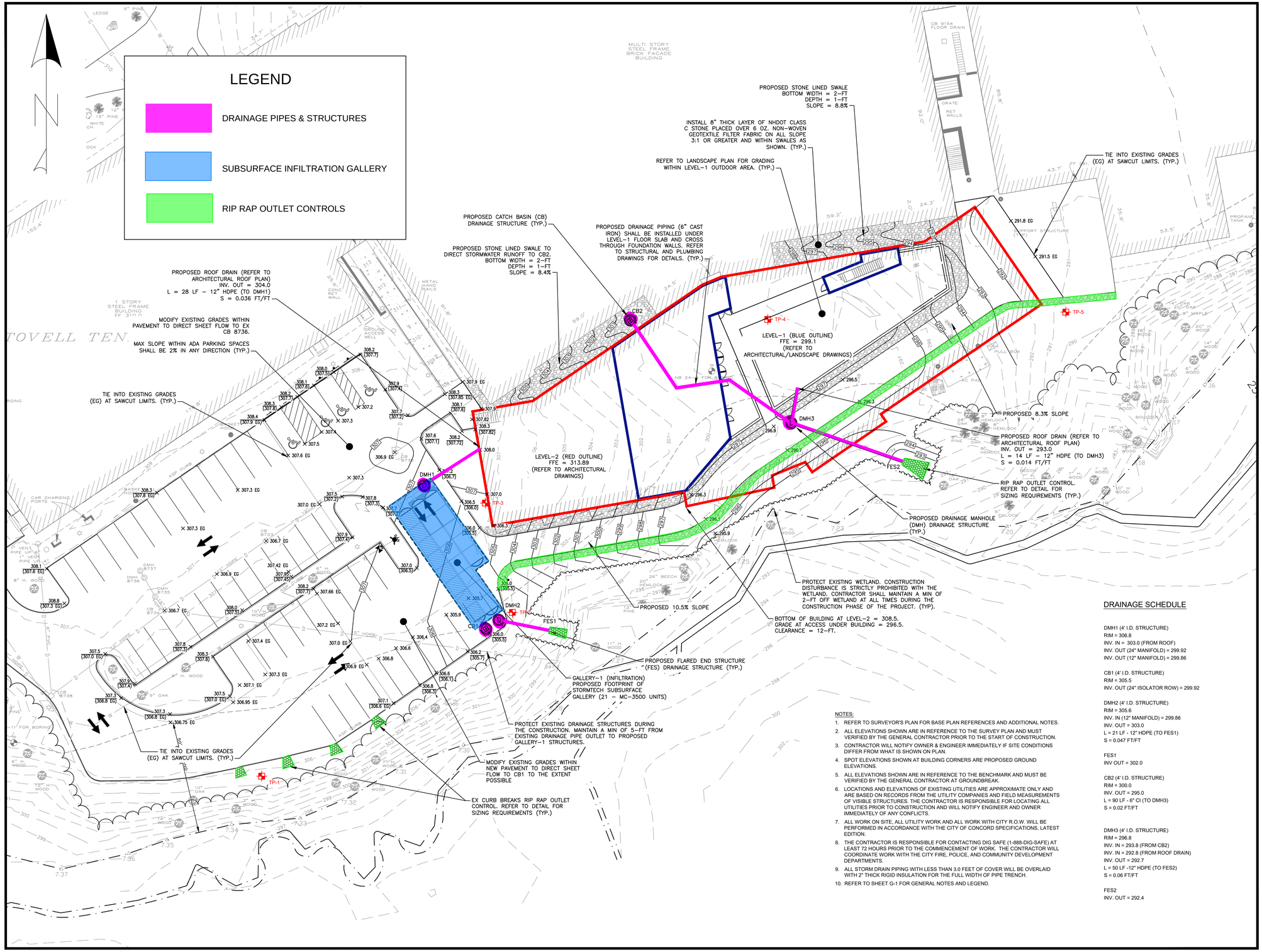
Large infestation
▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>During and following flowering
Do nothing until the following year or remove flowering heads and bag and let rot.

Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>common reed
(Phragmites australis)
Japanese knotweed
(Polygonum cuspidatum)
Bohemian knotweed
(Polygonum x bohemicum)</td><td>Fruits, Seeds, Plant Fragments
Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn’t materially influence disposal activities.</td><td>Small infestation
▪ Bag all plant material and let rot.
▪ Never pile and use resulting material as compost.
▪ Burn.

Large infestation
▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.
▪ Monitor and remove any sprouting material.
▪ Pile, let dry, and burn.</td></tr>
</table>

January 2010



DRAINAGE SCHEDULE

DMH1 (4' I.D. STRUCTURE)
RIM = 306.8
INV. IN = 303.0 (FROM ROOF)
INV. OUT (24" MANIFOLD) = 299.92
INV. OUT (12" MANIFOLD) = 299.86

CB1 (4' I.D. STRUCTURE)
RIM = 305.5
INV. OUT (24" ISOLATOR ROW) = 299.92

DMH2 (4' I.D. STRUCTURE)
RIM = 305.6
INV. IN (12" MANIFOLD) = 299.86
INV. OUT = 303.0
L = 21 LF - 12" HDPE (TO FES1)
S = 0.047 FT/FT

FES1
INV OUT = 302.0

CB2 (4' I.D. STRUCTURE)
RIM = 300.0
INV. OUT = 295.0
L = 90 LF - 6" CI (TO DMH3)
S = 0.02 FT/FT

DMH3 (4' I.D. STRUCTURE)
RIM = 296.8
INV. IN = 293.8 (FROM CB2)
INV. IN = 292.8 (FROM ROOF DRAIN)
INV. OUT = 292.7
L = 50 LF -12" HDPE (TO FES2)
S = 0.06 FT/FT

FES2
INV. OUT = 292.4

NOTES:

1. REFER TO SURVEYOR'S PLAN FOR BASE PLAN REFERENCES AND ADDITIONAL NOTES.
2. ALL ELEVATIONS SHOWN ARE IN REFERENCE TO THE SURVEY PLAN AND MUST VERIFIED BY THE GENERAL CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
3. CONTRACTOR WILL NOTIFY OWNER & ENGINEER IMMEDIATELY IF SITE CONDITIONS DIFFER FROM WHAT IS SHOWN ON PLAN.
4. SPOT ELEVATIONS SHOWN AT BUILDING CORNERS ARE PROPOSED GROUND ELEVATIONS.
5. ALL ELEVATIONS SHOWN ARE IN REFERENCE TO THE BENCHMARK AND MUST BE VERIFIED BY THE GENERAL CONTRACTOR AT GROUNDBREAK.
6. LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES ARE APPROXIMATE ONLY AND ARE BASED ON RECORDS FROM THE UTILITY COMPANIES AND FIELD MEASUREMENTS OF VISIBLE STRUCTURES. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES PRIOR TO CONSTRUCTION AND WILL NOTIFY ENGINEER AND OWNER IMMEDIATELY OF ANY CONFLICTS.
7. ALL WORK ON SITE, ALL UTILITY WORK AND ALL WORK WITH CITY R.O.W. WILL BE PERFORMED IN ACCORDANCE WITH THE CITY OF CONCORD SPECIFICATIONS, LATEST EDITION.
8. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING DIG SAFE (1-888-DIG-SAFE) AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF WORK. THE CONTRACTOR WILL COORDINATE WORK WITH THE CITY FIRE, POLICE, AND COMMUNITY DEVELOPMENT DEPARTMENTS.
9. ALL STORM DRAIN PIPING WITH LESS THAN 3.0 FEET OF COVER WILL BE OVERLAID WITH 2" THICK RIGID INSULATION FOR THE FULL WIDTH OF PIPE TRENCH.
10. REFER TO SHEET G-1 FOR GENERAL NOTES AND LEGEND.

SASAKI
110 CHAUNCY STREET BOSTON MA 02111 USA
P 617 926 330 F 617 924 2748 W SASAKI.COM

nobis
Nobis Group®
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
www.nobis-group.com

NOT ISSUED FOR CONSTRUCTION

No.	Description	Date

DRAWING ISSUE & REVISION HISTORY

Seal

ST. PAUL'S SCHOOL NEW SQUASH CENTER

85, 87, 89 DUNBARTON ROAD
CONCORD, NEW HAMPSHIRE

TAX MAP:
MAP 724Z/ LOT 1-10A
MAP 811Z LOT 1-A

OWNER/APPLICANT:
ST. PAUL'S SCHOOL
325 PLEASANT STREET
CONCORD, NEW HAMPSHIRE

Nobis Project No: **100811.040**
Sasaki Project No: **250018.00**
Drawn By: **NOBIS - MGD/CMB**
Checked By: **NOBIS - JCN/NCP**
Approved By: **NOBIS - JCN**
Issue Date: **09.17.2025**

0 20' 40'
GRAPHIC SCALE
1 INCH = 20 FEET

SHEET TITLE

BMP PLAN

FIGURE
8

J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-300-G&D.dwg 9/17/2025 11:47 AM

Plot Date: 9/17/2025 File: J:\100811.040 SPS - New Squash Center - Sasaki\CAD\DWG\100811.040-C-300-G&D.dwg Saved By: mdunson